

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

In response to concerns regarding potential human health risks associated with the algae found in the Saginaw Bay coastal area the Department of Environmental Quality, with the assistance from local health departments; other state and federal agencies; and researchers, has prepared the following list of frequently asked questions with responses based upon the best available scientific information. It should be noted that the current science in this field is incomplete and does not provide the answers to every question.

The questions are arranged under the following topics: Background Questions, Sources of *E. coli*, Impacts of *E. coli*, *E. coli* Monitoring, Agency Responsibility, Landowner Self Help, and Miscellaneous Issues.

Background Questions

- 1) QUESTION: We have heard that the algae or “muck” has *E. coli* bacteria in it. Is this true?**

Yes, in a few samples. Analysis of the “muck” detected the presence of fecal indicator organisms (e.g. E. coli, enterococci and Clostridium perfringens). The samples were processed as general sediment samples as a method for “muck” analysis is not currently available.

- 2) QUESTION: Is the growth rate of *E. coli* accelerated by warmer summer temperatures?**

*There is evidence that some of the *E. coli* as well as other fecal bacterial indicators like Enterococci can regrow in the environment. This is related to temperature; normally the bacteria like to grow at body temperature but can grow more slowly at natural Michigan summer temperatures.*

- 3) QUESTION: Can 35 degree winter water temperatures kill it?**

No, a few bacteria will die during freezing and thawing but low temperatures help to preserve the bacteria.

- 4) QUESTION: Does it go dormant? Is there a spore form?**

*The bacteria *E. coli* do not have a spore form. Spore formers become truly dormant and can survive a very long time. Non-spore forming bacteria go into a “physiologically” lower state in the environment, depending on the nutrients and temperature that allows them to persist for longer periods.*

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

5) QUESTION: Is shoreline vegetation contributing to the *E. coli* problem?

*The presence of vegetation itself is not a human health issue and there is no evidence that its presence on the beach in any way exacerbates the public health threat of exposure to *E. coli*.*

6) QUESTION: Will removal of shoreline vegetation and/or grooming of beaches help reduce *E. coli* levels?

*There is conflicting research on the benefits of beach grooming practices to reduce *E. coli* levels. In some cases it looks like grooming stirs up bacteria in the sand, bringing *E. coli* from lower depths where it persists more readily due to the protection from sunlight up to the surface where it will increase measurable levels on the beach. However, in other cases aeration and exposing the wet sand to the sunlight decreases the bacterial concentrations.*

*Removal of existing vegetation along the shoreline is not recommended, as these wetland areas counteract many of the factors contributing to high *E. coli* populations. Vegetated Great Lakes coastal wetlands filter contaminants and take up nutrients from Saginaw Bay's water, eliminating potential sources of harmful bacteria. In addition, shoreline vegetation makes it difficult for webfooted birds, known contributors to *E. coli* problems throughout the nation's beaches, from landing and leaving fecal material behind on the shoreline. Removal of vegetation may also open up new areas containing *E. coli* to human exposure. Generally, *E. coli* populations present in vegetated areas should not be a concern because these areas are not used for recreating.*

7) QUESTION: What destroys *E. coli*?

**E. coli* can die off at a faster rate at temperatures above 37°C (97°F, body temperature), with exposure to UV and sunlight, bleach, alcohol, through dehydration, and repeated freeze-thawing. Chlorine is used as a disinfectant most often in wastewater and drinking water treatment facilities.*

Sources of *E. coli*

1) QUESTION: Are CSOs the source of the algae and *E. coli* problem?

*The source(s) of *E. coli* that was found in the muck along Saginaw Bay is unknown. However, CSOs can contribute *E. coli* as well as nutrients, which can stimulate algae and macrophyte growth, to surface waters of the state. The municipalities with CSOs in the Saginaw Bay watershed have opted to construct retention basins to provide primary treatment (i.e. settling and disinfection) before discharging to surface waters. Therefore, CSOs should not be as great a concern as other potential sources.*

2) QUESTION: Are on-site septic systems the source of the algae and *E. coli* problem?

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

The source(s) of E. coli that was found in the muck along Saginaw Bay is unknown. However, on-site septic systems, particularly those that are not functioning properly, can be a source of E. coli and nutrients to surface waters. The wastewater (called effluent) that seeps into the ground from a septic tank contains E. coli and nutrients; however, the soil can “filter” out some of the bacteria and adsorb some of the nutrients. Risks to water bodies are influenced by the numbers of septic tanks in the area, type of soil (very sandy soils will remove less bacteria and nutrients), whether the system is functioning properly and the proximity to a river or lake. Set back distances of 50 to 100 feet are common and these have been shown to be inadequate in some cases.

3) QUESTION: Are waterfowl the source of the algae and E. coli problem?

Waterfowl can contribute fecal indicator bacteria to the water (as well as nitrogen, particularly ammonia, and phosphorus).

4) QUESTION: Are farm-related animals causing the algae and E. coli problem?

The source(s) of E. coli that was found in the muck along Saginaw Bay is unknown. However, animal operations can be a source of E. coli and nutrients to surface waters. Farm animals do excrete E. coli at very high concentrations. Storage can reduce bacterial concentrations, but most often animal wastes have high E. coli levels. Animal waste, just like human waste, also contains nitrogen and phosphorus that can contribute to algae and macrophyte growth. If the animal waste is not properly handled, bacteria and nutrients can run off into surface waters.

5) QUESTION: Does the use of fertilizers have anything to do with the amount of algae in the bay?

Phosphorus fertilizers are likely sources of phosphorus to Saginaw Bay and may be a contributing factor to excess algae and macrophyte growth. The over application of fertilizers (used in excess of labeled rates), use of phosphorus when the soils are phosphorus saturated, and the misapplication of fertilizers (i.e. on frozen ground, directly into water or onto paved surfaces) are of particular concern.

6) QUESTION: If the algae is caused by animal waste from farms and CAFO's, are the current controls on CAFOs adequate to ensure no contamination from those sources?

It is important to first point out that this question begins with a conclusion that cannot be verified. Some CAFOs in Michigan are responsible for releasing excessive quantities of nutrients that end up in our Great Lakes and the DEQ is working to address these problems. However, it is impossible (from a practical standpoint) to differentiate between the phosphorus from agriculture and the phosphorus from poorly operating septic systems, wildlife, natural vegetation decomposition, urban runoff, etc. It is likely that if CAFOs are a part of the problem, they represent a relatively small part compared to all of the other sources. The state is currently working on new permitting processes

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

that will more tightly regulate how animal waste is controlled at large animal farming operations; however, it must be pointed out that a significant nutrient load will persist, even if 100% of the nutrients and bacteria that enter our rivers and streams from CAFO related operations are eliminated.

7) QUESTION: What can be done to get rid of the algae?

Algae and higher aquatic plants proliferate, as a general rule, when water is mixed with sunlight and nutrients from sources such as fertilizers, wastes, naturally decomposing vegetation, and naturally occurring sources such as soil. Therefore, eliminating sunlight, nutrients or both will reduce algae and macrophyte growth. There are relatively few ways to eliminate sunlight in a body of water without being injurious to water quality. Limiting the availability of nutrients can and has been undertaken with some success. Controllable sources include agriculture, municipal and industrial discharges of waste water, failing septic systems and fertilizers. However, eliminating (or limiting) many of these sources can be expensive and will involve significant changes in treatment processes, management practices, and lifestyles. Individuals may undertake relatively simple, low cost actions to reduce the amount of nutrients entering the water; such as, limiting or eliminating fertilizer use, picking up pet waste, ensuring septic systems are in good working order, protecting wetlands on their property and maintaining a natural buffer strip next to surface waters. Communities can also take actions to reduce phosphorus loads such as re-establishing wetlands that naturally suppress high water events and store nutrients and using low impact development techniques. Maintaining existing wetlands in healthy condition and creating new wetlands wherever possible also results in removal of nutrients and filtration of waters.

Impacts of *E. coli*

1) QUESTION: How dangerous is *E. coli* from animal and/or human sources to humans?

*All wastes contain generic *E. coli*, the fecal indicator which we use to measure the "potential" for pathogens to be present. Direct contact with both animal and human waste is considered a risk to human health. Animal wastes do carry pathogens, cattle in particular have been a source of *E. coli* 0157H7 a special strain of *E. coli* that causes severe disease. Animal waste can also have *Cryptosporidium* and other types of pathogens. Human waste can carry over 100 different kinds of pathogens, including viruses.*

2) QUESTION: Is it safe for adults/kids to walk through the algae to get to clear water? Should people walk barefoot on the beaches?

It is not clear how low or how high the risk might be. The local health departments advise, until the exact nature of the debris (muck) that is causing concern is identified, limited contact with the debris and to take extra precaution by washing with soap and water if you do come in contact with the debris. People with open sores and wounds and

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

anyone that may ingest the material should avoid the “muck” areas altogether. See also response to question 2 under Agency Responsibility.

3) QUESTION: What are physical indicators that it may be unsafe to use a beach area or swim in the water?

One can not see the bacteria. The best physical indicator is to look for signs that indicate whether a beach is closed or a swimming advisory has been issued. The DEQ’s beach monitoring website also includes beach monitoring data and advisories. Another physical indicator may be cloudy water because wind or other factors could stir up the bacteria along with the sediments. Wind and wave action may also deposit other debris (e.g. dead fish, algae mats, trash) on the shore. Rainfall may wash debris from the beach back into the water. A relationship between rain fall and beach water quality has been established for some beaches, allowing beach managers to determine the relative risk of swimming there.

4) QUESTION: As children are more likely to ingest sand and water, is it unsafe to let them play in the beach area adjacent to the shoreline and shallow water areas?

It is relatively safe for children to play adjacent to the shoreline and in shallow water; however, there is a risk in playing in the natural environment, similar to playing in a sandbox or garden. The health risk for children playing in shallow water at the beach is less if the water is clear and there is minimal debris present (e.g. algae mats, dead fish, trash). Children may be at higher risk of illness because they may ingest sand and water and they have a developing immune system. To further minimize the health risk after coming in contact with the water, sand, algae or debris, children should wash their hands prior to eating food. Studies of exposure to recreational water that included children tended to report higher risks of illness compared to those that did not study children.

5) QUESTION: Does exposure over long periods of time tend to sensitize people and make them more vulnerable to get sick from *E. coli*?

*No, previous infection with a pathogen can produce what is called “an immune” reaction that can lead to protection the next time a person is exposed to that same pathogen. However, generic *E. coli* is an indicator and can indicate that multiple pathogens might be present. Thus one can not be assured with *E. coli* contaminated waters, algae or sand that the same pathogen will be present the next time.*

6) QUESTION: At the shoreline there is a strong smell that is becoming more frequent and pungent. Is this a potential health hazard? Should air sampling be done for dangerous airborne chemicals.

We do not know. We do not have knowledge of confirmed illness associated with shoreline smells to form an opinion about the potential health hazard.

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

- 7) **QUESTION: Is irrigation water for crops being drawn from the Pinnebog River? Is this a potential health problem for consumers of truck crops as has been the case in California?**

We do not know whether water from the Pinnebog River is being used for irrigation. The Michigan Departments of Agriculture and Community Health would be in a better position to address the issue of whether there would be a potential health risk if it were being used for irrigation.

- 8) **QUESTION: To minimize the high levels of *E. coli* should clean fresh sand be brought in to cover and mix with the sand to reduce exposure?**

*The placement of sand on Great Lakes bottomlands requires a permit from DEQ and the U.S. Army Corp of Engineers. The DEQ rarely issued permits for the placement of sand on Great Lakes bottomlands for several reasons. While bringing in fresh sand to cover contaminated sand may reduce exposure to *E. coli*, we believe that until the source is eliminated, the effectiveness of bringing in fresh sand would be short lived. First, it is not clear that importing new sand from offsite is an effective method of *E. coli* control, since the new sand will either already be colonized or will quickly become colonized by *E. coli*. Second, the placement of sand in vegetated areas or areas with cobble, gravel, or other fish and wildlife habitat could cause long term harm to these resources. Finally, sand is very mobile when placed along shorelines that are exposed to the wind and wave action of the Great Lakes. Any short term benefits provided by sand placement are likely to be lost with the first storm surge or with an increase in water levels.*

- 9) **QUESTION: How does *E. coli* affect pets? Can it affect wildlife?**

*As generic *E. coli* is an indicator of animal and human pathogens, animals can be at risk of disease as well, particularly from drinking contaminated water or eating contaminated food. The level of risk to pets and wildlife would be dependent on their exposure and other factors such as the health of their immune system.*

- 10) **QUESTION: Will spraying the algae with chlorine bleach, or swimming pool chemicals kill the *E. coli*, and would be advisable or permissible to do that periodically for health reasons?**

*Chlorine bleach and swimming pool chemicals are not recommended for killing algae and *E. coli* in the Saginaw Bay because non-target aquatic life would also be adversely impacted resulting in significant environmental damage.*

- 11) **QUESTION: What level of *E. coli* can our bodies can actually fight off and stay healthy when exposed?**

*We all have *E. coli* in our bodies. However, the strains that cause disease can initiate infection at low bacterial concentrations resulting from a small number of cells swallowed.*

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

E. coli Monitoring

1) QUESTION: Why is current testing protocol not looking at nearshore areas (testing of water at public swimming beaches for *E. coli* is done too far out)?

In the context of this question, nearshore areas are interpreted as ankle deep water near the water's edge along the beach. Current testing protocols in Michigan do not include samples from ankle deep areas for 4 reasons:

- a) Criteria have been adopted that are based on epidemiological studies. Scientists examined water quality while people were swimming and compared water quality data with reports of people getting sick after they visited the beach. Scientists found the best way to judge whether people were likely to get sick was by measuring the water quality from areas where people were swimming which was 3 to 6 feet in depth.*
- b) Other water depths were tested in the study and a relationship of decreasing *E. coli* levels was determined with deeper water. Another relationship that was determined was that *E. coli* levels varied considerably in ankle deep areas. It should be noted that while the study used water quality data from the 3 to 6 foot water depth, that the illness reports were collected from beach visitors that played in all areas of the beach, including children playing in ankle deep areas. Water samples from the 3 to 6 foot water depth correlated to illness reports from all areas of the beach whereas the results from areas of ankle depth did not correlate with illness reports.*
- c) There is a concern for using water samples from ankle deep areas because there is a greater chance of reporting inaccurate results (false positive and false negative results). The greater variability of *E. coli* levels in ankle deep areas makes it difficult to get reliable *E. coli* results. Water samples from areas that are 3 to 6 feet deep may not be perfect but they have been shown to be less variable than samples from ankle deep areas. This is one reason why samples from the 3 to 6 foot water depth have been correlated to health risks.*
- d) There are many factors that affect *E. coli* levels, especially in ankle deep areas. Naturally occurring *E. coli* present in the sand and sediments in ankle deep areas may be resuspended in the water column by wave action and contribute to the variability of *E. coli* levels in ankle deep areas. Vegetation and other debris that washes on shore are also likely to contribute to the variability of *E. coli* levels in ankle deep areas. These factors and others are being investigated by scientists.*

2) QUESTION: What do monitored levels of *E. coli* mean, does the current standard have any relationship to the health risks for nearshore areas?

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

Results of E. coli tests in beach water are compared to the Michigan Water Quality Standard which is based on the 1986 criteria published by the U.S. Environmental Protection Agency (USEPA). In Michigan, the daily geometric mean criteria of 300 E. coli/100 ml are protective of an excess risk of 9 illnesses /1000 swimmers (0.9% risk) above background levels while the monthly geometric mean criteria of 130 E. coli/100 ml is protective of an excess risk of 8 illnesses /1000 swimmers (0.8% risk) above background. The current standard incorporates the relationship of health risks in ankle deep areas. The criteria are based on epidemiological data that included children playing in shallow water. The studies evaluated E. coli results from different water depths and E. coli results from 3 to 6 feet of water correlated to illness rates reported from beach visitors (including children in shallow water). E. coli results from ankle deep samples tend to be more variable than results from offshore samples (i.e., 3 to 6 foot depths). Because of this variability, it is not possible for the E. coli results from ankle deep areas to reliably correlate or to demonstrate a relationship with health risks.

3) QUESTION: Does the current testing protocol adequately/accurately account for exposure by children? If not, why not and what can we do about it?

Yes. As mentioned above, the epidemiological study showed that water samples collected from the 3 to 6 foot depth of water best correlated to the illness reports of swimmers. Swimmers in the study included children that played in the shallow water (one foot depth). This means that a test result of a water sample collected from a beach in an area that is 3 to 6 feet deep can be used to determine if shallower areas as well as the entire beach area is safe for swimming. E. coli tests from water depths of 3 to 6 feet deep correlated to illness rates reported from beach goers (including children in the shallow water). Other water depths were tested but did not correlate to illness reports. The standards adopted by the State are based on criteria recommended by the USEPA.

Here are six "PLEAs" that promote Healthy Swimming:

Three "PLEAs" for All Swimmers

Practice these three "PLEAs" to stop germs from causing illness at the pool:

Please don't swim when you have diarrhea. This is especially important for kids in diapers. You can spread germs in the water and make other people sick.

Please don't swallow the pool (or beach) water. In fact, avoid getting water in your mouth.

Please practice good hygiene. Take a shower before swimming and wash your hands after using the toilet or changing diapers. Germs on your body end up in the water.

Three "PLEAs" for Parents of Young Kids

Follow these three "PLEAs" to keep germs out of the pool and your community:

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

Please take your kids on bathroom breaks or check diapers often. Waiting to hear "I have to go" may mean that it's too late.

Please change diapers in a bathroom and not at poolside. Germs can spread to surfaces and objects in and around the pool and spread illness.

Please wash your child thoroughly (especially the rear end) with soap and water before swimming. Everyone has invisible amounts of fecal matter on their bottoms that ends up in the pool (or beach water).

- 4) **QUESTION: Why hasn't the DEQ analyzed the algae so we can all speak more knowledgeably about its composition and determine the different sources of the *E. coli*?**

Viable samples of the material that washed onto the shores of Saginaw Bay during 2006 were not available for visual analysis by DEQ biologists. However, arrangements will be made during 2007 to evaluate the material to determine its composition. E. coli analysis has not been conducted by the DEQ because there are no standard methods for collecting the sample and no standards against which to compare the results. Samples collected by Dr. Joan Rose contained too few organisms to initiate source identification, and it is unclear from the low number of organisms present whether source identification is needed.

Agency Responsibility

- 1) **QUESTION: Why don't local health department take an active role in identifying the risks associated with the algae? Response provided by: Bay and Huron County Health Departments.**

*First, it is important to note that the local health departments have historically monitored the presence of algae in the bay. Bay County's Health Department has been involved with Beach cleanup efforts for at least twenty years. However, the simple fact of the matter is that health departments bordering the Saginaw Bay are limited by their capacity to test and perform scientific analysis. For the most part, these health departments are limited to testing water quality, specifically *E. coli* levels, and those efforts have only been consistently funded since 2003. As a result of these limitations, there have been no comprehensive studies of the algae on the Saginaw Bay. Without comprehensive studies to ascertain the composition of the "muck", the health effects remain unknown. That is why it is imperative that the local health departments from Bay, Huron and Tuscola participate on the Saginaw Bay Science Committee which is looking at the Saginaw Bay "muck" issue. If a reasonable, scientific solution to identify and monitor algae/muck presence is found, it will be the responsibility of the local health departments to provide that assurance and if necessary, issue advisories or closures. In absence of concrete information regarding the composition of the "muck", the Huron County Health Department, on August 21, 2006, issued a 'Muck' advisory. The muck advisory stated that until the exact nature of the debris (muck) that is causing concern is*

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

identified, the department is advising limited contact with the debris and washing with soap and water if you do come in contact with the debris. People with open sores and wounds and anyone that may ingest the material should avoid the “muck” areas.

2) Why don't local health departments provide health warnings? Response provided by: Bay and Huron County Health Departments.

Quite simply, until it is determined what the algae/muck consists of and what, if any levels of potential harmful substances are present, local health departments cannot provide specific health warnings. It is important to remember that any beach or naturally occurring body of water, such as Lake Huron is not an enclosed swimming pool and the water cannot be chemically treated to limit or destroy naturally occurring bacteria. Whether playing in the sand or swimming at the beach a good common hygienic practice is to immediately wash afterwards with soap and water. That being said, until the exact nature of the debris (muck) that is causing concern is identified, these health departments advise limited contact with the debris and to take extra precaution by washing with soap and water if you do come in contact with the debris. People with open sores and wounds and anyone that may ingest the material should avoid the “muck” areas altogether.

3) QUESTION: Why are the lakefront property owners bearing the cost of testing the algae for *E. coli*?

*The lakefront property owners voluntarily undertook sampling for *E. coli*. See also response to question number 4 under *E. coli* monitoring.*

4) QUESTION: Why has there not been action taken by state/local agencies after locals paid for *E. coli* analysis and provided the results to local and state agencies?

*The local health departments have issued advice to avoid the detritus washing up on the shore. Further action has not been taken as there are no public health standards against which to compare the *E. coli* results, and no action that is clearly required at this point in time. In order to make any further analysis, a comprehensive study must be done.*

5) QUESTION: If the problem of algae is as widespread as we are led to believe, this should be an international and multi-state issue and effort to find a solution to the problem.

This issue is, indeed, widespread and is being focused on at many levels. Nuisance algal blooms and toxic algal blooms are a focal point for multiple state, federal, and interjurisdictional agencies in the Great Lakes basin. Great Lakes states including Michigan, Wisconsin, and Ohio have recognized the problems and continue to work at informing the public, attempting to understand the problems/causes, and working toward solutions.

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

- 6) **QUESTION: Are agencies raising the acceptable safe levels of *E. coli* in the algae just to keep the beaches open and not lose tourism and the property tax base?**

*The agencies are not raising the acceptable safe levels of *E. coli* to keep beaches open. The Michigan Water Quality Standards for total body contact recreation are based on “acceptable” risks of excess gastrointestinal illness of 8 excess cases for every 1000 swimmers in fresh water. Since the original EPA studies in 1986, numerous studies with similar design have been conducted and support the results of the EPA study.*

- 7) **QUESTION: Why are the authorities trying to figure out acceptable levels of *E. coli* instead of working on cleaning the water up?**

*Authorities are doing both. The DEQ is involved with researchers and the U.S. Environmental Protection Agency to determine appropriate standards for *E. coli* in water and to identify and study other areas where standards may be needed, such as *E. coli* levels in beach sand. Because *E. coli* occurs naturally and there will always be a background level of these organisms, standards are important to determine what levels are harmful to human health. Standards also help regulatory agencies, the public and the regulated community prioritize their pollution control activities and to allocate resources for those activities that are most needed to protect the public health and the environment. The DEQ, local governments, landowners and the regulated community are also very much involved in addressing water quality problems through activities such as permitting programs, watershed management planning, land use planning, nonpoint source pollution control, compliance and enforcement, and remedial actions to address legacy pollution problems.*

- 8) **QUESTION: We haven't had the *E. coli* problem in the past. Hasn't the DEQ and the USACE made the problem worse by not allowing property owners to clean up their beaches by removing vegetation and grooming the shoreline?**

**E. coli* is naturally occurring and has always been present; it is the awareness of its presence that has changed due to increased monitoring and our ability detect to it in matrices such as beach sand and organic material as well as in water. The public health agencies have advised against contact with the detritus, which is sound advice in the absence of known or measured health risks. The presence of vegetation itself is not a human health issue and there is no evidence that its presence on the beach in any way exacerbates the public health threat of exposure to *E. coli*. In addition, there is conflicting evidence about the benefits and/or risks of beach grooming related to *E. coli* exposure.*

- 9) **QUESTION: Will the DEQ set up areas where *E. coli* laden materials can be safely disposed of? Will the DEQ identify safe means for handling the algae?**

*The DEQ would regulate the disposal of *E. coli* laden algae consistent with other solid wastes pursuant to the administrative rules promulgated pursuant to Part 115, Solid Waste Management of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The options for disposal are to dispose of the material in a*

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

municipal solid waste landfill or to compost it. The DEQ will assign staff to provide guidance on the safe disposal of E. coli laden materials. However, the DEQ does not have the necessary resources to set up areas where E. coli laden material can be safely disposed.

10) **QUESTION: Will the DEQ assist in the efforts to remove the algae?**

The DEQ can provide guidance on the safe removal of algae, but does not have the resources to provide assistance with removal.

Landowner Self Help

1) **QUESTION: What can individuals do to reduce their exposure to E. coli short of not using shoreline areas and swimming?**

There are three things that local landowners can do to reduce their exposure. The first is to educate themselves on the seasonal monitoring of water quality conducted by Huron County Health Department and Bay County Health Department in the summer months. If the E. coli levels exceed a daily geometric mean average of 300 E. coli per 100 milliliters of water, the health departments close the beach and monitor water quality for E. coli until it returns to a safe level. Once a safe level is reached, the beach is reopened. All beach sample results are placed on the Michigan Department of Environmental Quality Beach Monitoring website (www.deq.state.mi.us/beach). All beach closings and subsequent re-openings are provided to area newspapers and radio stations for dispersment to the community. Good hygienic practices such as limiting contact with the debris and washing with soap and water if you do come in contact with the debris should also be followed. People with open sores and wounds and anyone that may ingest the material should avoid the "muck" areas. Secondly, landowners may protect themselves from E. coli by educating themselves and their neighbors as to the many sources of E. coli contamination and reducing personal sources of contamination if they can. Thirdly, landowners can help solve these problems by working with their local health departments and the Department of Environmental Quality to help develop long-term solutions to make our beaches as clean and safe and accessible as possible. The Michigan Department of Community Health recommends that individuals read the beach advisories.

2) **QUESTION: What can a shoreline property owner do to reduce E. coli along their shoreline?**

Following are some bullet points from the DEQ's publication "Practical Tips for Home and Yard". These tips will also help prevent excess nutrients from entering surface waters.

- Maintain or create vegetated low areas, or swales, near the roads and other areas where rainwater collects to allow it to soak into the ground.*
- Animal wastes contain nutrients as well as bacteria. Pick up after your pets and dispose of the wastes in the toilet, or bury it in your yard.*

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

- *Inspect your septic system annually.*
- *Pump out your septic system every three to five years for a three-bedroom house with a 1,000 gallon tank. Smaller tanks should be pumped more often.*
- *Use household chemicals sparingly. Some may kill the bacteria which break down the waste in your septic system.*
- *Know the location of your septic drain field. Keep vehicles off it. Don't plant trees and shrubs close by. Don't cover the drain field with a hard surface such as concrete, asphalt, or decks.*
- *Use less water to avoid overloading your septic system.*
- *Use your kitchen garbage disposal sparingly. Heavy use adds large amounts of solids, which shorten the time between septic tank pumpings.*

3) QUESTION: What financial assistance is available for property owners to remove debris from the shoreline?

Department staff are not aware of any resources available to provide financial assistance to property owners for the removal of debris from the shoreline.

4) QUESTION: Is incorporating shoreline debris into a garden or crop land a safe method of disposal?

Incorporating shoreline debris into a garden is a reasonably safe method, if proper precautions are taken while handling the waste. This method of disposal is not recommended if pets or children may potentially be exposed. From a resource use perspective, it is preferred that the aquatic plants be safely used rather than disposed in a landfill. The DEQ recommends that the aquatic plants from Saginaw Bay be appropriately composted using common pathogen reduction standards or land applied according to Generally Accepted Agricultural Management Practices. For more information on composting the aquatic plants please contact Matt Flechter at 517-373-8422. For more information on GAAMPs contact the MDA Environmental Stewardship Division at 517-241-0236.

5) QUESTION: What permits do I need to remove the algae? If I have a permit for beach grooming can I use that permit to remove the algae? Can I remove the algae with a tractor and trailer?

Manual removal of algae, without the assistance of mechanical equipment, does not require a permit from the DEQ. Algae removal activities below the water's edge (i.e., in the water) or in areas that contain vegetation require that an individual, public noticed permit be obtained from the DEQ. Until November 1, 2007, mechanical removal of algae from areas above the water's edge that are naturally free of vegetation or where vegetation has been legally removed does not require a permit from the DEQ. After November 1, 2007, all mechanical activities between the ordinary high watermark of the Great Lakes and the water's edge will require a permit. A permit is required by the U.S. Army Corp of Engineers for all mechanical removal of algae.

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

If you have a permit for beach grooming you must modify your beach grooming permit to include the algae removal activities. If you do not have a permit and plan for conducting beach grooming activities, you should include debris/algae removal plan in your permit application.

Use of a tractor and trailer is considered mechanical removal, and in most cases, a permit will be required for algae/muck removal activities conducted in this manner.

Miscellaneous Issues

- 1) **QUESTION: Why is it that the Drain Commission has told us that it's against the law for a team of people that was set up to study the Pinnebog River to actually inspect the drains and the runoff from farms and that no one is allowed to go onto their farms and inspect the area to find sources of our algae? Is this true?**

The Drain Commissioner, upon advice from legal council, said that he could not grant access to a third party unless it was within an assessed drain project, such as the Sebewaing River, where the Inter-county Drainage Board allowed Huron and Tuscola Conservation District staff access to their drain right-of-ways to conduct a watershed assessment. Section 280.196 of the Drain Code, "Inspection of county and inter-county drains," appears to allow some flexibility for third party access, as has been our experience in other watersheds. However, the DEQ does not administer the Drain Code and the decision as to whether to allow this access is the Drain Commissioner's.

- 2) **QUESTION: Can a government agency raise the lake level to disperse the algae?**

Water levels on Lake Huron are always changing. They can change within a few hours (short-term changes) in response to a storm event, undergo seasonal changes in response to higher evaporation rates in the late fall, winter and spring, and higher precipitation and melting snow-pack in spring. Long-term fluctuations for Lake Huron are within a range of about 5-6 feet between highs and lows. Long-term changes in the lake level are the difference between the amount of water coming into the lake and the amount going out. There are no water control structures on Lake Huron that can provide significant increases or decreases to the quantity of water in the lake.

The International Joint Commission is initiating the "International Upper Great Lakes Study" which will investigate potential changes to the regulation plans for Lake Superior outflows and the impacts of these changes on various interest groups and the environment along the shorelines of the Upper Great Lakes (Superior, Michigan, Huron, Erie) as well as the connecting channels and Lake St. Clair. (Study web site is www.ijc.org/conseil_board/upper_greatlakes/en/upper_mandate_mandat.htm)

Saginaw Bay Algae

Frequently Asked Questions from Local Landowners

- 3) **QUESTION: Can the DEQ help by having exposed rock piles that are blocking wave action pushed out into deeper water instead of creating a catch basin for the algae?**

No, the DEQ cannot move the exposed rocks. It should be noted that any movement of rocks or other structures on exposed bottomlands will require a permit from the DEQ and U.S. Army Corp of Engineers. Rocks and other structures that are submerged during "normal" water levels serve as critical shallow water habitat for many fish and wildlife species. Removal of these can cause long term adverse impacts to fish and wildlife populations and, in most cases, will not be permitted.

- 4) **QUESTION: For the past several years there are days when the Bay is covered with a white foamy substance. What is causing this foam? Is it associated with the algae? Is it dangerous to fish and humans?**

Foams often form naturally when organic materials are released into the water, for example during the natural die-off of aquatic plants. These materials are mixed turbulently in the water by winds, creating the harmless foam which is often blown up against lakeshores. Foam: A Naturally Occurring Phenomenon, undated, Environmental Sciences and Services Division and Water Bureau is available on-line at: <http://www.deq.state.mi.us/documents/deq-ead-tas-foam.pdf>

- 5) **QUESTION: This is the first year that I have had to remove algae in mid-November (usually we do not have to remove algae after October). Why are we seeing algae in mid-November?**

The question doesn't provide a description if the algae seen in November is dead algae from the summer or new algae. However, Michigan did experience a late winter this year with unusually warm temperatures in September, October, and November. The Bay may have experienced a late algal bloom due to the warm temperatures and may not have experienced the "Fall Turnover" until late November or even December. There is also a presentation by NOAA on the MDEQ webpage under "Beaches and Wetlands" titled "NOAA Algae Causes Presentation". The presentation discusses nutrients and the sources of nutrients in the Saginaw Bay Watershed. The following is a link to that presentation: <http://www.deq.state.mi.us/documents/deq-ogl-sbci-noaa-algae-11-30-06.pdf>

- 6) **QUESTION: Why did we have this problem in the 60's when there was low water?**

Light penetration into the water column is a key factor needed for higher plant and algae growth. Low water levels, such as occurred in the 1960s, may result in a larger area where light penetration is sufficient to stimulate plant and algae growth. Excess nutrient loading would also have been an important factor in the 1960s, which was before the Clean Water Act and concerted efforts to address point and nonpoint sources of nutrients.

Saginaw Bay Algae Frequently Asked Questions from Local Landowners

ACKNOWLEDGEMENTS:

The Department of Environmental Quality wishes to thank and acknowledge the significant contribution of the members of the *E. coli* Science Committee and the Bay and Huron County Health Departments in responding to these questions.