MONROE COUNTY

Newsletter from the Monroe County Department of Health

Reviewed by the Brockport Consultation Group

Second Issue

Brockport Environmental News

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Monroe County Health Department
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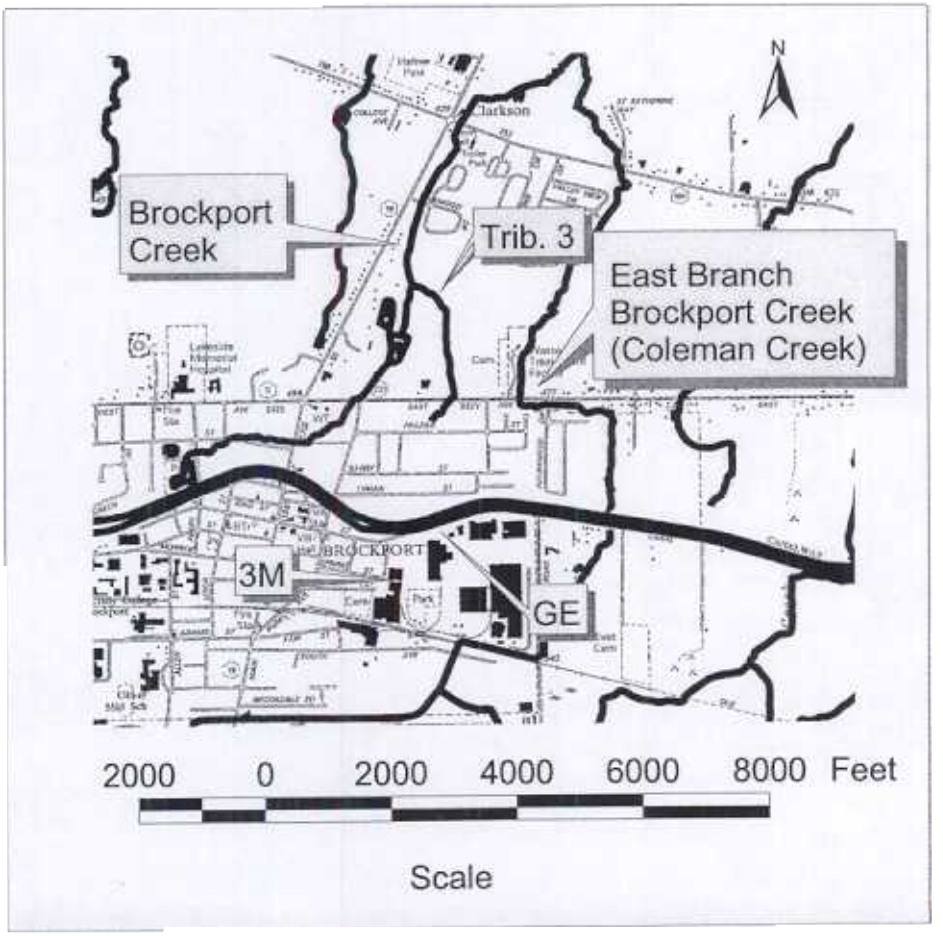
March 2001

Tributary #3 and Brockport Creek: An Investigation Update

Where are the tributary and the creek located?

Tributary #3 flows north through the Village of Brockport and meets with the western branch of Brockport Creek just south of the Lynnwood Drive subdivision (Town of Clarkson) located east of Route 19 (see map). Some segments of the tributary in the Village of Brockport flow underground through large pipes. Stream sediment and stream bank surface soil samples have been collected from Tributary #3.

There is an eastern branch of Brockport Creek, which is also referred to as Coleman Creek. This branch flows somewhat parallel to the western branch and the two branches eventually merge in the Town of Clarkson approximately 2000 feet north of Ridge Road. To date, *no samples have been collected along Coleman Creek because there is currently no documented link between the 3M and G.E. sites and Coleman Creek.*



History of contamination in Tributary #3

The 3M facility and the G.E. and Black & Decker facility discharged industrial wastewater to the tributary. This was done prior to the establishment and enforcement of protective wastewater discharge permits. In addition, wastewater containing ferro cyanide, which was used at the 3M site, was discharged into the tributary and resulted in several fish kills between 1956 and 1967.

Industrial discharges were not regulated until 1975 when the State Pollution Discharge Elimination System (SPDES) was enacted. This legislation prohibits the discharge of industrial wastewater to local waterways unless a permit is obtained from the New York State Department of Environmental Conservation (NYSDEC).

Monitoring

In 1999 as part of an ongoing environmental investigation, sediment samples were collected along aboveground portions of the tributary between the Erie Barge Canal and Lyman Street and north and south of East Avenue. Surface soil samples were also collected in this area where the tributary sometimes floods and deposits sediment along the stream bank.

This initial sampling revealed that polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs) primarily polycyclic aromatic hydrocarbons (PAHs), cyanide, silver, nickel and zinc were present at elevated levels in the sediment samples and surface soil samples. These levels, which were reported in the first issue of this newsletter, indicated that further investigation was needed to determine where the contamination originated and if it had affected Brockport Creek.

In the summer and fall of 2000, the NYSDEC continued its effort to determine the extent and the source of the contamination. The NYSDEC collected sixteen sediment samples from aboveground portions of the tributary between the Erie Barge Canal and north of East Avenue, where the tributary meets Brockport Creek. In addition, surface and shallow subsurface soil samples were collected from areas prone to flooding along the tributary within this same stretch of the stream. Several sediment samples were collected from the storm sewer system along State Street, and one sample was collected from the storm sewer system at Barry Street, as well as one from Keable Court.

The results revealed that PCBs, SVOCs primarily PAHs, cyanide, silver, nickel and zinc were present at elevated levels in the sediment samples collected from Tributary #3 and the storm sewer, and the surface and subsurface soil samples.

The PCB concentrations ranged from non-detectable to 190 parts per million (ppm). The highest levels of PCBs were detected in shallow subsurface soils along the segment of the tributary between Frazier Street and East Avenue. The PCB levels generally decreased north of East Avenue to where the tributary meets Brockport Creek. In the past, the New York State Department of Health has used 1 ppm as a clean up goal for PCBs in residential surface soil.

In some of the samples taken in this area, SVOCs primarily PAHs, cyanide, silver, zinc and nickel were also detected at elevated levels.

The NYSDEC collected additional sediment samples from Brockport Creek in January 2001 to determine if the sediment in Brockport Creek has been significantly impacted by PCBs. One sample was collected near Lynnwood Drive and the other sample was collected farther downstream (north) behind the Clarkson Town Hall. The results revealed that SVOCs, silver, nickel and zinc are present at elevated levels. However, *PCBs and cyanide were not detected in these samples.*

Clean up

Before the clean up of the tributary and the storm sewer can begin, it is important to identify and eliminate the source(s) of the PCBs. This will ensure that the storm sewer and Tributary #3 will not be recontaminated after clean up activities begin.

Precautions

Until the contaminated sediment and soil have been remediated, you may minimize any potential exposure to the contaminants in the sediment in Tributary #3 and the stream bank surface soil along the tributary in the areas previously described in this article. The New York State Department of Health (NYSDOH) suggests the following:

> Maintain a good grass cover over lawn areas along the tributary. Grass provides a barrier between people and potentially contaminated soil.
>
> Do not grow garden vegetables in contaminated soil. You should not use sediment from the tributary in your garden soil and do not locate gardens in areas where the tributary has flooded. (see **page 8** for further discussion)
>
> If you must work in or near the tributary, wear rubber boots and gloves while in the tributary. Do not track sediment or surface soils from this area to other areas. Rinse off gloves and boots before leaving the tributary area.

Wash hands before eating, especially after visiting areas along Tributary #3 where contaminants have been detected.

Clean floors with a damp mop to remove soil and sediment tracked into homes.

The NYSDEC recently distributed a fact sheet entitled **Stream Investigation Results** (March 1, 2001).
For a copy of this fact sheet and/or to be included on the mailing list for future fact sheets, please contact:
Linda Vera - Citizen Participation Specialist
Phone (716) 226-5324
Email ljvera@gw.dec.state.ny.us

Community Corner

If you have a health related question regarding the 3M/Dynacolor or G.E. and Black & Decker sites that you would like the Monroe County Health Department to address in a future newsletter, please send it or e-mail it to:

Monroe County Health Department
111 Westfall Road, Room 976, PO Box 92832
Rochester, NY 14692-8932
Attn: Karen Paris Tuori
(kptuori@mcls.rochester.lib.ny.us)

The Monroe County Health Department Staff will make every effort to respond in the next newsletter.

Who to Contact for Site Information

New York State Dept. of Environmental Conservation (NYSDEC)

- Linda Vera, Citizen Participation Specialist
  (716) 226-5324

New York State Department of Health (NYSDOH)

- Mark Van Deusen, Outreach Coordinator
  1-800-458-1158 ext. 27530

Monroe County Health Department (MCHD)

- Joe Albert, Senior Sanitarian
  (716) 274-6904

Neighborhood Contacts

Kathy Snyder	(716) 637-7391
John Lessord	(716) 637-5580
Lynne Gardner	(716) 637-4803
Shawn Lessord	(716) 637-4068
Louise Cardillo	(716) 624-8392
Ken Pike	(716) 395-9080

A Close Up Look At POLYCHLORINATED BIPHENYLS (PCBs)

Physical Properties

Polychlorinated biphenyls (PCBs) are a family of 209 chemical compounds with varying harmful effects. Each of these 209 related compounds is called a **congener** and consists of two benzene rings and one to ten chlorine atoms. PCBs are either oily liquids or solids and are colorless to light yellow in color. They have no known smell or taste. There are no known natural sources of PCBs.

PCBs consist of mixtures of congeners that do not easily **biodegrade** (break down). However, PCBs released into the environment may slowly degrade or transform varying their composition and toxicity. These changed forms of PCBs are called environmental PCBs. Original mixtures of PCBs are called commercial PCBs.

Information on specific congener toxicity is very limited. The laboratory studies that have been conducted on PCBs generally focus on specific commercial mixtures and not on the potentially altered PCBs found in the environment. Therefore, it is uncertain if the toxicity tests that are performed on commercial PCBs are relevant to the toxicity of the environmental PCBs. This is an important factor in evaluating risk from exposure to PCBs in the environment.

History of PCBs

1929 to 1977 - PCBs were manufactured in the United States by Monsanto Chemical Company, the sole U.S. producer. It is estimated that Monsanto produced approximately 1.1 billion pounds of PCBs, which were marketed under the trade name 'Aroclor'.

PCBs were widely used in electrical equipment such as transformers, capacitors and fluorescent light ballasts because of their insulating capacity and flame retardant nature. Other uses include heat transfer fluid, hydraulic fluid, dye carriers in carbonless paper, pesticides, and as plasticizers in paints, caulking compounds and adhesives.

1960's - researchers in Sweden discovered that PCBs were present in soil and water samples. Additional studies confirmed that some PCB congeners naturally biodegrade (breakdown) very slowly.

1968 - more than 1,000 people became ill in Western Japan after consuming rice bran oil that had been contaminated by PCBs during processing.

1971 - Monsanto Chemical Company voluntarily limited the types of PCB mixtures it produced to those containing less chlorine.

1974 - U.S. Government restricted the use of PCBs to closed system applications such as transformers and capacitors.

1976 - U.S. Government banned commercial production of all PCBs under the **Toxic Substances Control Act (TSCA)**.

PCB Regulations

The United States Government's decision to regulate PCBs came under the Toxic Substances Control Act (TSCA) in 1976. TSCA banned the manufacture, processing, distribution, and use of PCBs in all products with the exception of closed electrical and hydraulic systems. This legislation regulated the management of PCBs from "cradle to grave" or from manufacture to disposal.

PCBs are also regulated by the United States Environmental Protection Agency (USEPA) under the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation and Liability Act.

PCBs and the Environment

Past industrial practices have led to the release of PCBs into the environment. Practices such as discharging wastewater containing PCBs into rivers and streams, and disposing of products containing PCBs in open landfills were considered acceptable, legal and hazard -free. In addition, waste oils containing PCBs were sprayed on dirt roads to reduce dust. PCBs were also used in agriculture as extenders in some agricultural pesticide formulations. PCBs were released into the environment accidentally through leaking equipment and electrical fires in equipment that contained PCBs.

When PCBs are released into the environment, they do not easily biodegrade. Instead, they **persist** for many years and can build up in the food chain. This build up is called **bioaccumulation**. Once PCBs are released into the environment they may enter the food chain. As PCBs move up through the food chain, they increase in concentration.
For example, PCBs discharged to waterways may accumulate in microscopic plants called phytoplankton. The phytoplankton are then eaten by tiny animals called zooplankton, which are then eaten by small fish that are eaten by larger fish. The PCBs accumulate in the fatty tissue of fish. If a human eats the larger fish the PCBs will be passed onto and build up or bioaccumulate in the human. According to the United States Environmental Protection Agency (USEPA), measurable amounts of PCBs have been found in soils, water, fish, milk, and human tissue.

Health Effects

How Can You Be Exposed?
People may be exposed to PCBs at their workplace. This is called **occupational exposure**. For example, exposure to PCBs may occur when a person's job responsibilities include repairing or maintaining PCB transformers.

For the general public, exposure to PCBs occurs mostly through the fish and dairy products that they eat.

The following are other less likely ways that the general public may be exposed to PCBs:

Using old fluorescent lighting fixtures and old appliances such as television sets and refrigerators; these may leak small amounts of PCBs into the air when they get hot during operation

- Ingestion of soil contaminated with PCBs
- Skin contact with PCB-contaminated soil or sediment
- Drinking PCB-contaminated well water
- Breathing indoor or outdoor air that contain PCBs in vapor or fugitive dust

"The contaminants associated with the tributary will not evaporate to any significant extent. The tributary and its surroundings are usually wet. Contaminants are, therefore, not expected to become airborne in dust. Therefore, exposure from breathing contaminants is minimal."

- New York State Department of Environmental Conservation

Results of Exposure Studies in Laboratory Animals – Laboratory animals that breathed very high levels of PCBs had liver and kidney damage, while laboratory animals that ate food with large amounts of PCBs had mild liver damage. Laboratory animals that ate food with smaller amounts of PCBs had liver, stomach, and thyroid gland injuries, and anemia, acne, and problems with their reproductive systems.

Skin exposure to PCBs in laboratory animals resulted in liver, kidney, and skin damage.

Acute Effects – Laboratory animal studies have reported effects on the liver, kidneys, and the central nervous system from *oral exposure* to PCBs. Laboratory animal tests have also indicated that PCBs may produce a moderate toxic effect from short-term *oral* exposure. No information is available on the acute (short-term) effects of PCBs in humans.

Chronic Effects - Chronic (long-term) exposure to PCBs by *inhalation* in humans has been reported to result in the following:

- respiratory tract symptoms such as cough and tightness of the chest;
- gastrointestinal effects including anorexia, weight loss, nausea, vomiting, and abdominal pain;
- mild liver effects; and
- effects on the skin and eyes such as chloracne (a skin eruption resembling acne and resulting from exposure to chlorine or its compounds), skin rashes, and eye irritation.

Reproductive/Developmental Effects - It is not known whether PCBs may cause birth defects or reproductive problems in people. Some studies have shown that babies born to women who consumed PCB-contaminated fish had problems with their nervous systems at birth. However, it is not known whether these problems were definitely due to PCBs or other chemicals.

An epidemiological study reported that babies born to women *occupationally* (on the job) exposed to high levels of PCBs had lower birth weights and shortened gestational age, as compared with babies born to women exposed to low concentrations of PCBs.

PCBs can reach a developing fetus (across the placenta) or be transferred to a newborn (through the mother's milk).

Laboratory animal studies have reported developmental effects in the offspring of animals exposed orally to PCBs, such as learning deficits, impaired immune functions, focal liver necrosis, and cellular alterations of the thyroid. Reproductive effects, such as decreased fertility, decreased conception, and prolonged menstruation have also been noted in oral laboratory animal studies. Two human studies, which investigated exposure to PCBs through the consumption of contaminated fish suggested that exposure to PCBs may cause developmental effects in humans. Both studies reported neurodevelopmental effects, such as motor deficits in infants of mothers who ate PCB-contaminated fish.

Human studies are not conclusive on the reproductive effects of PCBs. One study of men who were *occupationally* exposed to PCBs showed no fertility abnormalities. Another study of men with low sperm counts found elevated levels of PCBs in the blood and an association between certain PCB compounds in semen and decreased sperm motility.

Cancer Risk - It is not known whether PCBs cause cancer in people. In a long-term (365 days or longer) study, PCBs caused cancer in the liver of rats that ate certain PCB mixtures. The Department of Health and Human Services has determined that PCBs may reasonably be anticipated to be carcinogens (substances that cause cancer).

The USEPA has stated that PCBs are a probable human carcinogen based on sufficient evidence in animal studies. Several other agencies share the belief that PCBs are a probable carcinogen for humans including the International Agency for Research on Cancer, the National Toxicology Program (part of the National Institutes of Environmental Health Science), and the National Institute for Occupational Safety and Health.

Determining If You Have Been Exposed - There are tests to find out if PCBs are in your blood, body fat, and breast milk. Blood tests are probably the easiest, safest, and best method for detecting recent exposures to large amount of PCBs. However, since all people in the industrial countries have some PCBs in their bodies, these tests can only show if you have been exposed to higher-than-normal levels of PCBs. ***These measurements cannot determine the exact amount or type of PCBs you have been exposed to or how you have been exposed. In addition, they cannot predict whether you will experience any harmful health effects.***

(Health information courtesy of the Agency for Toxic Substances and Disease Registry and the USEPA)

What Should You Do If You Think You Had An Exposure to PCBs?

Tell your doctor. If you are generally healthy and experiencing no symptoms, the doctor will probably note your potential exposure in your medical record. If you are experiencing symptoms or health problems, your doctor may recommend some laboratory tests.

- Monroe County Health Department

Information Sources

More on PCBs

USEPA - Toxic Substance Control Hotline
(Information about PCBs & PCB regulations)

(202) 554 – 1404 (M – F) 8:30 am to 5:00 pm
E-mail - tsca-hotline@epamail.epa.gov

Environmental Protection Agency

1. **PCB Homepage**
   http://www.epa.gov/opptintr/pcb/

2. **Health Effects of PCBs**
   http://www.epa.gov/opptintr/pcb/effects.htm

   http://www.epa.gov/ttn/uatw/hlthef/polychlo.html

3. **PCB Info – Hudson River**
   http://www.epa.gov/hudson/
   Click on *PCBs and Human Health* at this site

Agency for Toxic Substances & Disease Registry (ATSDR)
http://www.atsdr.cdc.gov/tfacts17.html

What can happen if you are exposed to a chemical?

A chemical exposure can produce a health effect directly at the site of contact (**local**) or elsewhere in the body (**systemic**), and that effect can be either immediate or delayed.

Area of the Body Affected – chemicals can affect any of the following systems in the body:

- Respiratory (nose, air passages and lungs)
- Digestive (mouth, throat, stomach, etc.)
- Circulatory (heart, blood)
- Nervous (brain, nerve cells)
  Reproductive (sperm, egg, etc.)

Some chemicals, like acids, are nonspecific and cause damage on direct contact. Other chemicals, like gasoline, can be absorbed into the blood, and carried throughout the body. Some chemicals affect only certain target systems or target organs.

Every organ system has different functions and physical characteristics. So the effect of chemicals on each system has to be evaluated slightly differently. As an example, consider three ways that chemicals can affect one system: the reproductive system.

1) Chemical exposure can affect a man's or woman's reproductive system by making the production of normal sperm or eggs more difficult.

2) The chemical may act directly on an unborn baby (fetus). Since chemicals can be transferred from the mother's blood to the unborn baby's blood, the fetus can be affected when the mother is exposed to certain chemicals. A pregnant woman who drinks alcohol can have a baby with fetal alcohol syndrome. The health effects can include birth defects and learning disabilities.

3) Some chemicals can have indirect effects on the development of the fetus. For example, smoking during pregnancy can reduce the amount of oxygen to the fetus. The lack of oxygen can affect the baby's growth.

Not all chemical exposures affect reproduction, but it is best to minimize exposure to all toxic substances during pregnancy.

When Will Health Effects Occur – Health effects may occur immediately or may be delayed.

Immediate health effects happen right away. They can occur directly at the site of contact or elsewhere in the body. For example, inhaled ammonia can irritate the linings of the nose, throat and lungs. Alcohol can cause dizziness. Immediate health effects are sometimes reversible and may disappear soon after the exposure stops. However, some immediate health effects do not go away; acute exposure to a corrosive substance, such as battery acid, may cause permanent damage to skin or eyes.

Delayed health affects may take months or years to appear and can result from either acute (short-term) or chronic (long-term) exposure to a toxic substance. The delay between the exposure and the appearance of health effects is called the **latency period**. Delayed health effects can be reversible or permanent. Permanent effects don't go away when the exposure stops. For example, breathing asbestos over a period of time may cause lung disease. Once the lung disease begins, it will continue even if the exposure stops or decreases.

Cancer is an example of a delayed health effect. Cancer is the uncontrolled growth and spread of abnormal cells in the body. There are many kinds of cancer. Cancer can be caused by a number of things, including exposure to toxic substances, ultraviolet sunlight and ionizing radiation. Exposure to some chemicals, such as benzene (found in gasoline) and asbestos, can produce cancer in

humans. Some chemicals produce cancer in animals, but whether they will in humans is unknown. Because cancer may not appear until 5 to 40 years after exposure, determining the cause of cancer is often difficult.

(Information courtesy of the New York State Department of Health)

Glossary of Terms

Absorption – The process of taking in, i.e. when a sponge takes up water. Chemicals can be absorbed through the skin into the bloodstream and then transported to other organs. Chemicals can be absorbed into the bloodstream after breathing or swallowing.

Persistence – The quality of remaining for a long period of time (such as in the environment or the body). Persistent chemicals, such as DDT & PCBs, are not easily broken down.

Remediation – Correction or improvement of a problem, such as work that is done to clean up or stop the release of chemicals from a hazardous waste site. After investigation of a site, remedial work may include removing soil and/or drums, capping the site or collecting and treating the contaminated fluids.

Sediment – Solid material (mineral and organic) that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Storm Sewer – An underground system of pipes intended to collect storm water (i.e. rain) from paved surfaces in catch basins, transport and discharge it to the nearest waterway. Storm sewers do not connect to the sanitary sewer. The storm water is not treated before it is released to a waterway such as a stream or creek.

What's New

Former G.E. and Black & Decker Site

Because PCBs were found by the NYSDEC in the storm sewers exiting the former G.E. and Black & Decker site, G.E. was required under their hazardous waste management permit to further investigate the contamination. On February 26, 2001, G.E. collected sediment samples from on-site storm sewers and soil samples were collected near two existing electrical substations on the site. The results revealed elevated levels of PCBs in sediment samples, ranging from less than 1 part per million (ppm) to 780 ppm. The highest levels were found in two on-site storm water catch basins. The results from the soil samples revealed concentrations of PCBs up to 80 ppm at the western electrical substation and soil samples from the other substation showed levels less than 1 ppm. The NYSDEC has instructed G.E. and Black & Decker to submit work plans by May 4, 2001 for immediately conducting an investigation to determine the extent of PCB contamination at the site and to clean up this recently identified contamination.

Former 3M/Dynacolor Site

The results from the indoor air testing conducted by Barr Engineering (3M's environmental consultant) in residences along Oxford Street indicated that the site related compounds were within the range of published data for typical indoor air. The 3M Corporation and five residents on Oxford Street reached an agreement for 3M to purchase their houses, which are adjacent to the former 3M/Dynacolor site. The residents have six months to move. The 3M Corp. has not yet publicized their plan for these five properties.

Cancer Incidence Survey

Due to community concerns, the New York State Department of Health is conducting a cancer incidence survey to determine if levels of some cancers are higher than expected among Brockport residents living in the vicinity of the 3M and G.E. and Black & Decker sites. A report will be issued after the study is completed.

Gardening along Tributary #3

The gardening season is approaching and it is important for people in areas where contaminated soil and sediment have been detected to be aware of where they plant gardens and to understand how to minimize exposure to the contaminants.

The following information/suggestions will hopefully help you to plan and enjoy your garden this year.

The contamination is limited to the sediment in Tributary #3 and surface/subsurface soil in areas immediately adjacent to the tributary that are prone to flooding. The contaminants detected in the sediment and surface/subsurface soils are *not* expected to move through the subsurface.

Precautionary measures

Plant gardens in areas away from Tributary #3 and any areas that have been flooded by the tributary.

Do not mix any sediment or soil from along the stream with your garden soil.

Do not water your garden with water from the tributary.

Remember to thoroughly wash all fruits and vegetables from the garden to remove any contaminated soil particles.

If you are concerned about gardening along the tributary, here are some other suggestions:

Build raised beds with a plastic liner base for a vegetable garden. There are pre-fabricated raised beds and also plastic corner stakes available that hold the wooden sides of the raised bed.

Container garden – use several large containers to grow plants.

Wear gloves while working in the garden to protect your skin.

Plant Absorption of Contaminants

Information on the ability of plants to absorb specific contaminants found in soils is limited. Research is currently being conducted to determine if there are certain plants that would be suitable to absorb contaminants to remediate sites, as well as to determine how contaminants absorbed by plants may potentially affect human health.

There has been research conducted on lead and vegetable plants, which indicates that the uptake of lead by vegetable plants such as tomatoes and the accumulation of lead in the fruit of the plant is not a concern. However, the research does indicate that the very fine soil particles containing lead may be consumed with leafy and root vegetables. Soil particles containing lead may be deposited on the leaves of low-growing, leafy vegetable plants by wind or splashed on plants during watering. In addition, lead levels can be elevated along busy roadsides from the accumulated deposition of exhaust gases from years past when gasoline contained lead.

Where to find information about raised beds, container gardens, etc...

If you have **general** questions about gardening, the Cornell Cooperative Extension has a gardening hotline answered by Master Gardeners. The hotline number is (716) 473-5335. Please note that Master Gardeners are not trained to answer specific questions related to contamination in soils.

The following local gardening website provides information on many garden topics such as raised beds and container gardens. It also provides several links to other sources of gardening information. **www.rochestergardening.com**