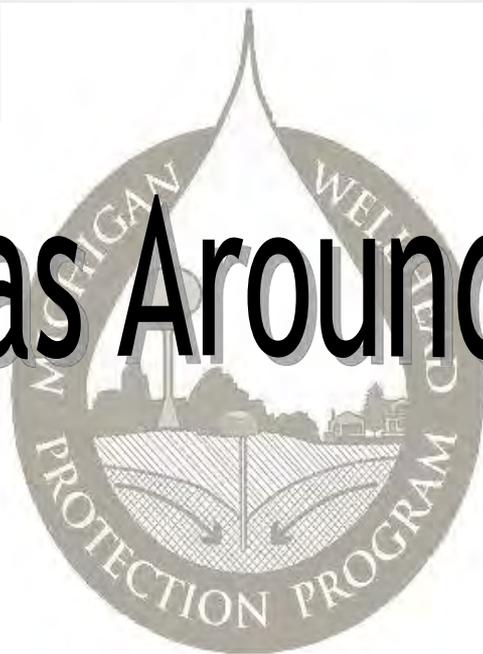


Source Water Protection

Unique Ideas Around The State



Kelly Hon
MRWA Training Specialist
July 2014

Michigan WHPP Goal

**Safeguard public
groundwater supply
systems from potential
sources of contamination
through wise land-use
planning and management**

Seven Elements

1. Roles and Responsibilities
2. Wellhead Protection Area Delineation
3. Potential Sources of Contamination
4. New Wells
5. Contingency Planning
6. *Wellhead Protection Area Management*
7. *Public Education and Participation*

Management Strategies



- ✓ Strategies that will protect and manage land use and planning within the WHPA.
- ✓ Strategies should be identified based on the types of land use in the WHPA.

Examples for Business & Industry

- Zoning Ordinances
- Site Plan Review Standards
- Environmental Permits Checklist
- Pollution Prevention Programs
- Brownfield Redevelopment Initiatives
- Onsite Visits
- Searching and Plugging Abandoned Wells
- Education and Outreach Programs

Examples for Agriculture

- Michigan Clean Sweep Program
- Michigan Emergency Tube/Emergency Planning
- Farm*A*Syst and Crop*A*Syst
- Conservation Reserve Programs (CRP)
- Pollution Prevention
- Searching and Plugging Abandoned Wells
- Education and Outreach Programs

Examples for Homeowners

- Zoning Ordinances
- Household Hazardous Waste Collection Day
- Home*A*Syst
- Education and Outreach Programs
- Searching and Plugging Abandoned Wells

Master Plan Policy Statement

Master Plan Policy Statement

The following policy statement will be included within the **COMMUNITY NAME** Master Plan:

Wellhead Protection

The **COMMUNITY NAME** relies exclusively on groundwater for its drinking water source. In response to the concern over safety of public water supplies, the City has instituted a Wellhead Protection Program (WHPP). WHPPs develop long-term strategies aimed at protecting community drinking water supplies. The purpose of developing a WHPP is to identify the Wellhead Protection Area (WHPA) and develop long-term strategies aimed at safeguarding the area from contamination. A WHPA is defined as the surface and subsurface areas surrounding a ~~water~~ well or well field, which supplies a public water system, and through which contaminants are reasonably likely to move toward and reach the water well or well field within a 10-year time-of-travel. The State of Michigan requires communities to identify seven elements to be included in the WHPP. These elements along with a brief description are below.

- **Roles and Responsibilities** – Identify individuals responsible for the development, implementation, and long-term maintenance of the local WHPP.
- **WHPA Delineation** – Determine that area which contributes groundwater to the public water supply wells.
- **Contaminant Source Inventory** – Identify known and potential sites of contamination within the WHPA and include in a contaminant source inventory list and map.
- **Management Strategies** – Provide mechanisms which will reduce the risk of existing and potential sources of contamination from reaching the public water supply wells or well field.
- **Contingency Planning** – Develop an effective contingency plan in case of a water supply emergency.
- **Siting of New Wells** – Provide information on existing groundwater availability, the ability of the PWSS to meet present and future demands and the vulnerability of the existing wells to contamination.
- **Public Education and Outreach** – Generate community awareness in the WHPP by focusing on public education and the dissemination of WHPP information.

It is the intent of this Master Plan to encourage protection of the City's public water supply wells through the establishment of a Wellhead Protection Zoning Ordinance. Within the ordinance, zoning regulations will limit land uses and practices that may degrade groundwater quality within and outside the WHPA.

The most significant sources of water supply contamination are landfills, surface impoundment areas, subsurface percolation from septic tanks and cesspools, open dumps, uncapped or improperly capped abandoned wells, injection wells and underground storage tanks. These uses represent both *point* and *non-point* contamination sources.

Point source is the term used to describe contaminants, which originate in the immediate area of the well or tap. All of the above, if located in close proximity to the water supply source, are examples of potential point source polluters. Contaminants from these uses may seep directly down through the soil to the water source.

Non-point source contamination is much more difficult to control because the cause of the problem may actually be located a considerable distance from the well. This type of contamination is caused by pollutants that filter into an underground aquifer and then migrate slowly through the groundwater aquifer to off-site wells and water sources. Prevention of this type of contamination must involve a collective effort on the part of property owners and local officials from a large geographic area. It is the recommendation of this Plan that all existing and future wells be protected from both point and non-point source contamination to the greatest degree possible. It is also the intent of this Plan to recognize the importance of groundwater protection within the **COMMUNITY NAME**.

INSERT WHPA MAP HERE

Site Plan Review Standards for Drinking Water Protection

CHAPTER 0123

SITE PLAN REVIEW

- 0123.01 Purposes of Review
- 0123.02 Site Plan Required; Authority of Planning Commission
- 0123.03 Application Procedure
- 0123.04 Site Plan Contents
- 0123.05 Review by Planning Commission
- 0123.06 Amendments to Approved Site Plans
- 0123.07 Issuance of Zoning Permits
- 0123.08 Appeals

CROSS REFERENCES

Zoning and planning in home rule cities - see M.C.L.A. Sec. 0123.4i

Regulation of location of trades, buildings and uses by local authorities - see M.C.L.A. Sec. 012.345

Regulation of buildings; authority to zone - see M.C.L.A. Sec. 012.345

Regulation of congested areas - see M.C.L.A. Sec. 012.345

Uses of land or structures not conforming to ordinances; powers of legislative bodies; acquisition of property - see M.C.L.A. Sec. 012.345a

0123.01 PURPOSES OF REVIEW

The purposes of the site plan review are to determine compliance with the provisions of this Zoning Code, to promote the orderly development of the City, to prevent the depreciation of land value because of uses or structures which do not give proper attention to siting or area protection, and to provide cooperation between applicants and the Planning Commission so that applicants may accomplish their objectives in the utilization of their land in conformity with the provisions of this Zoning Code.

(Ord. 123. Date Passed)

0123.02 SITE PLAN REQUIRED; AUTHORITY OF PLANNING COMMISSION

A site plan, prepared in accordance with the requirements of this chapter, shall be submitted to the Planning Commission. The Planning Commission will require a site plan for all land uses except the following:

- (a) Single and two-family dwelling units on individual lots.
- (b) Residential and agricultural accessory buildings.
- (c) Nonresidential accessory buildings less than 832 square feet in area.

Uses with approved site plans or existing buildings which propose a change constituting ten percent or less of the building floor area or ten percent or less of the required parking spaces may be reviewed, approved and administrated by the Planning Commission.

(Ord. 0123. Date Passed)

0123.03 APPLICATION PROCEDURE

- (1) An application for site plan review shall be made to the Zoning Administrator, along with a fee as required by resolution of Council. The application shall, at a minimum, contain the following information.
 - (a) The applicant's name, address and telephone number.
 - (b) Proof that the applicant is the owner of the property or has a legal or financial interest in the property, such as a purchase agreement.
 - (c) The name, address and telephone number of the owner(s) of record, if different from the applicant.
 - (d) The address and/or parcel number of the property.
 - (e) A project description, including the number of structures, dwelling units, square feet of the building, parking spaces and employees.
 - (f) Gross and net acreage of all parcels in the project.
- (2) The Zoning Administrator shall review the plan with the applicant and attempt to resolve areas of noncompliance and concern.
- (3) A copy of the site plan may be forwarded to the Police and/or Fire Department(s) for review as deemed appropriate by the Zoning Administrator.

City of Gladwin—WHP incorporated into the Site Plan Review

CITY OF GLADWIN 2010 ZONING ORDINANCE

**ARTICLE V
SITE PLAN REVIEW AND APPROVAL PROCEDURES**

SECTION 501: REVIEW AND APPROVAL OF SITE PLANS

8. Standards for groundwater/wellhead protection, as approved by the Michigan Departments of Community Health and Natural Resources on October 7, 2004 and in accordance with the Wellhead Protection Program as follows:
- The project and related improvements shall be designed to protect the natural environment including lakes, ponds, streams, wetlands, floodplains, groundwater and steep slopes.
 - General purpose floor drains shall be allowed only if they are connected to a public sewer system, an on-site holding tank or a system authorized by a State of Michigan groundwater discharge permit.
 - Sites at which hazardous materials and polluting materials are stored, used or generated shall be designed to prevent spills and discharges to

CITY OF GLADWIN 2010 ZONING ORDINANCE

the air, to the surface of the ground, and to groundwater lakes, streams, rivers or wetlands.

- State and Federal agency requirements for storage, spill prevention, record keeping, emergency response. Transport and disposal of hazardous substances and polluting materials shall be met. No discharges to the groundwater, including direct and indirect discharges, shall be allowed without required permit and approval.
- Secondary containment for above ground areas where hazardous substances and polluting materials are stored or used shall be provided. Secondary containment shall be sufficient to move the substance for maximum, anticipated period of time necessary for recovery of any released substance.
- Outdoor storage of hazardous substances and polluting materials shall be prohibited except in product-tight containers, which are protected from weather, leakage, accidental damage and vandalism.
- Secondary containment structures such as out-buildings, storage rooms, sheds and pole barns shall not have floor drains which outlet to soils, groundwater or nearby streams or rivers.
- Areas and facilities for loading or unloading of hazardous substances and polluting materials, as well as areas where such materials are handled and used, shall be designed and constructed to prevent discharge or runoff to floor drains, rivers, lakes, wetlands, groundwater or soils.
- Existing and new underground storage tanks shall be registered with the authorized state agency in accordance with the requirements of the U.S. Environmental Protection Agency and the Michigan State Police Fire Marshal Division.
- Installation, operation, maintenance, closure and removal of underground storage tanks shall be in accordance with requirements of the State Police Fire Marshal Division. Leak detection, corrosion protection, spill prevention and overflow protection requirements shall be met. Records of monthly monitoring/inventory control must be retained and available for review by appropriate governmental officials.
- Out-of-service abandoned underground tanks shall be emptied and removed from the ground in accordance with the requirements of the Michigan State Police Fire Marshal Division and the Michigan Department of Natural Resources.
- Site plans shall consider the location and extent of any contaminated soils and/or groundwater on site and the need to protect public health, and the environment.
- Development shall not be allowed on or near contaminated areas of a site unless information from the Michigan Department of Environmental Quality is available indicating that on-going will proceed in a timely fashion prior to the development.
- No above-ground storage of hazardous substances and related secondary containment facilities shall be located within fifty (50) feet of

CITY OF GLADWIN 2010 ZONING ORDINANCE

any property line or one-hundred (100) feet of any residentially zoned property.

- No underground storage tank shall be within thirty (30) feet of any property line or fifty (50) feet of any residentially zoned property.
9. The City of Gladwin Planning Commission shall notify the Zoning Administrator and the applicant of its decision within thirty (30) days of the Planning Commission meeting at which the plan was reviewed. Failure to do so will cause the project to be approved unless the failure is beyond the ability of the Planning Commission to control. This requirement may be waived by the applicant.
 10. In compliance with the Michigan Zoning Enabling Act 110 of 2006, as amended (M.C.L.A. 012.345a, as amended), the Planning Commission may require, upon staff recommendation, a performance bond, letter of credit, certified check or cash bond, in an amount equal to the estimated cost of the project (as defined by the Michigan Zoning Enabling Legislation). Such performance guarantee shall be deposited with the Finance Director/Treasurer at the time of the issuance of the permit authorizing the activity or project to ensure faithful completion of the improvements indicated on the approved site plan. If not completed, said performance bond shall be forfeited. The City shall receive a proportional share of the cash deposit only when requested by the depositor and verified by the Zoning Administrator.
 11. A site plan approved under this Article shall be valid for one (1) year. If construction has not commenced within this time period, the site plan shall become null and void. Upon a written request from the applicant, the Planning Commission may grant an extension of the site plan for up to two (2) successive six (6) month extensions.
 12. The site plan shall be approved, disapproved or approved subject to conditions that the Planning Commission may deem essential for the protection of the public health, safety and welfare of the City of Gladwin community.

Section 504. Amendments to Approved Site Plans

Amendments to an approved site plan shall be made in accordance with the provisions of this Article V.

Section 505. Issuance of Zoning Permits for Approved or Conditionally Approved Site Plans

The Zoning Administrator shall, upon approval of the final site plan and upon application by the applicant, issue a zoning permit provided that all other applicable ordinances and codes have been complied with.

Section 506. Master Plan Statement regarding Wellhead Protection

The proposed City of Gladwin Master Plan will contain a statement concerning the impact and value of Wellhead Protection. Once an adopted ordinance under the Michigan Zoning Enabling Act of 110 of 2006, as amended the full ordinance is not contained herein. The statement, however, is included in the Appendix to this document to assure the close relationship and cooperation of the Planning Commission members to role in creating and maintaining a Master Plan and preparing and administering the Zoning Ordinance.

Section 507. Wellhead Protection Area Map

Environmental Permits Checklist



PERMIT INFORMATION

The Department of Environmental Quality (DEQ) has prepared a list of key questions to help identify what departmental permits, licenses, or approvals of a permissive nature may be needed for a project. By contacting the appropriate offices listed below, you will help reduce the possibility that your project or activity will be delayed due to the untimely discovery of additional permitting requirements later in the process. While this list covers the existence of permits and approvals required from the DEQ, it is not a comprehensive list of all legal responsibilities (i.e. planning requirements and chemical storage regulations may apply). A useful way to learn whether any other requirements will apply is to go through the Self-Environmental Assessment in the Michigan Manufacturers Guide, online at: <http://www.michigan-manufacturers.com/011607-1-15-2014-4168-1840-18118>.

KEY QUESTIONS: (DEQ Permit and Licensing Guidebook Chapter)	Yes <input type="checkbox"/>	No <input type="checkbox"/>	If "Yes," refer to the DEQ Permit and Licensing Guidebook section(s), the Web Page, or Call the Program:
CONSTRUCTION PERMITS			
Permit to Install: Does the project involve installation, construction, reconstruction, relocation, or alteration of any process equipment (including air pollution control equipment) which has the potential to emit air contaminants? (Permit Guidebook Chapter 5.1.3)	<input type="checkbox"/>	<input type="checkbox"/>	Web , AQD, Permit Section, 517-373-7023
Asbestos Notification: Does the project involve renovating or demolishing all or portions of a building? (Notification is required for all renovations and demolitions, even if the structure never contained asbestos.)	<input type="checkbox"/>	<input type="checkbox"/>	Web , AQD Asbestos NESHAP Program 517-373-7064
Soil Erosion and Sedimentation Control (SESC): Does the project involve an earth change activity within 500 feet of a lake or stream, or will the project disturb an area greater than one acre in size? (Permit Guidebook Chapter 5.3.5)	<input type="checkbox"/>	<input type="checkbox"/>	Contact Your Local SESC Agency: http://www.deq.state.mi.us/seca/ Web , WB, SESC Program, 517-335-3178
Does the project involve construction which will disturb one or more acres that comes into contact with storm water that enters a storm sewer, drain, lake, stream, or other surface water? (Permit Guidebook Chapter 5.5.1)	<input type="checkbox"/>	<input type="checkbox"/>	Web , WB, Permits Section, 517-241-8993 or appropriate DEQ District Office
Does the project involve construction or alteration of any sewage collection or treatment facility? (Permit Guidebook Chapter 5.3.1)	<input type="checkbox"/>	<input type="checkbox"/>	Web , Appropriate District Office, WB, Part 41 Construction Permit Program
Does the project involve construction of a community water supply well or the extension of a water supply from an existing water system? (Permit Guidebook Chapter 5.3.2)	<input type="checkbox"/>	<input type="checkbox"/>	Web , Appropriate DEQ District Office, WB, Community Water Supply Program
Does the project involve construction of a water supply well (a private, irrigation, process, or public water well)?	<input type="checkbox"/>	<input type="checkbox"/>	Contact a Registered Well Driller (Web , Local Health Department Contacts , Non Community Water Supply, Web)
Does the project involve construction of a facility that landfills, transfers, or processes any type of solid non-hazardous waste on-site, or places industrial residuals/sludge into or onto the ground? (Permit Guidebook Chapter 5.4.1)	<input type="checkbox"/>	<input type="checkbox"/>	Web , Appropriate DEQ District Office, WHMD 517-335-4035
Does the project involve the construction of an on-site treatment, storage, or disposal facility for hazardous waste? (Permit Guidebook Chapter 5.4.2)	<input type="checkbox"/>	<input type="checkbox"/>	Web 5.4.2, WHMD, Hazardous Waste Section, 517-373-9875
CONSTRUCTION PERMITS (LANDWATER FEATURE)			
Does the project involve filling, dredging, placement of structures, draining, or use of a wetland? (Permit Guidebook Chapter 5.5.5)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application, Web), Web Land & Water Management Division (LWMD), Permit Consolidation Unit, 517-373-9244
Storm Water Discharge to Wetlands: Will storm water be collected, stored, or treated in a wetland area from a public road, industrial, commercial, or multi-unit residential development? (Permit Guidebook Chapter 5.5.5)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application, Web), Web LWMD, Permit Consolidation Unit, 517-373-9244

Great Lakes: Does the project involve construction, filling, or dredging below the Ordinary High Water Mark of one of the Great Lakes? (Permit Guidebook Chapter 5.5.1)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web , LWMD, Permit Consolidation Unit, 517-373-9244
Inland Lakes and Streams: Does the project involve any dredging, filling, placement of structures, or the operation of a marina within an inland waterbody (e.g. lake, river, stream, drain, creek, ditch, or canal), enlargement of a waterbody, or excavation of a pond within 500 feet of a waterbody? (Permit Guidebook Chapter 5.5.7)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web , LWMD, Permit Consolidation Unit, 517-373-9244
Storm Water Ponds and Discharges to Inland Lakes/Streams, or Great Lakes: Will storm water from any road or any other part of the development be discharged either directly or ultimately to an inland waterbody, or one of the Great Lakes, or will a storm water pond be constructed within 500 feet of an inland waterbody? (Permit Guidebook Chapters 5.5.7 & 5.5.1)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web 5.5.7, Web 5.5.1 LWMD, Permit Consolidation Unit, 517-373-9244
Does the project involve placement of fill, earth moving, or placement of structures within the 100-year floodplain of a watercourse? (Permit Guidebook Chapter 5.5.2)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web , LWMD, Permit Consolidation Unit, 517-373-9244
Does the project involve construction of a building or septic system in a designated Great Lakes high risk erosion area? (Permit Guidebook Chapter 5.5.4)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web , LWMD, Permit Consolidation Unit, 517-373-9244
Does the project involve dredging, filling, grading, or other alteration of the soil, vegetation, or natural drainage, or placement of permanent structures in a designated environmental area? (Permit Guidebook Chapter 5.5.4)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web 5.5.1, Web 5.5.4 Web 5.5.6, LWMD, Permit Consolidation Unit, 517-373-9244
Does the project propose any development, construction, structural activities or contour alterations within a designated artificial dune area? (Permit Guidebook Chapter 5.5.5)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web , LWMD, Permit Consolidation Unit, 517-373-9244
Does the project involve construction of a dam, weir or other structure to impound flow? (Permit Guidebook Chapters 5.5.7 & 5.5.8)	<input type="checkbox"/>	<input type="checkbox"/>	(Permit Application Web), Web 5.5.7, Web 5.5.8 LWMD, Dam Safety Program, 517-241-9862
CONSTRUCTION PERMITS (SECTOR SPECIFIC)			
Does the project involve a subdivision or site condominium project utilizing individual on-site subsurface disposal systems or individual wells? (Permit Guidebook Chapter 5.3.4)	<input type="checkbox"/>	<input type="checkbox"/>	Web , WB, DWEHS, 517-241-1345
Does the project involve the construction or modification of a campground? (Permit Guidebook Chapter 5.3.5)	<input type="checkbox"/>	<input type="checkbox"/>	Web , WB, DWEHS, 517-241-1340
Does the project involve the construction or modification of a public swimming pool? (Permit Guidebook Chapter 5.3.3)	<input type="checkbox"/>	<input type="checkbox"/>	Web , DEQ, WB, Drinking Water & Environmental Health Section (DWEHS), 517-241-1340
OPERATIONAL PERMITS			
Renewable Operating Permit: Does your facility have the potential to emit any of the following: 100 tons per year or more of any criteria pollutant; 10 tons per year or more of any hazardous air pollutant; or 25 tons per year or more of any combination of hazardous air pollutants? (Permit Guidebook Chapter 5.1.2)	<input type="checkbox"/>	<input type="checkbox"/>	Web , AQD, Permit Section, 517-373-7023
NPDES: Does the project involve the discharge of any type of wastewater to a storm sewer, drain, lake, stream, or other surface water? (Permit Guidebook Chapter 5.2.1)	<input type="checkbox"/>	<input type="checkbox"/>	Web , WB, Appropriate District Office, or National Pollutant Discharge Elimination (NPDES) Permit Program 517-241-1346
Does the facility have industrial activity that comes into contact with storm water that enters a storm sewer, drain, lake, stream, or other surface water? (Permit Guidebook Chapter 5.2.1)	<input type="checkbox"/>	<input type="checkbox"/>	Web , WB, Permits Section, 517-241-8993 or appropriate DEQ District Office

WHP Zoning Ordinance

**CITY OF XXXX
XXXX COUNTY, MICHIGAN
ORDINANCE NO. XXXX**

AN ORDINANCE TO PROVIDE FOR AND REGULATE THE PROTECTION OF GROUNDWATER RESOURCES IN THE CITY OF XXXX.

THE CITY OF XXXX ORDAINS:

SECTION 1. That Chapter XXXX, TITLE OF CHAPTER, of the XXXX City Code be, and hereby is, amended by adding thereto at the end thereof the following article:

ARTICLE XXXX. GROUNDWATER PROTECTION

Sec. CHAPTER NO. -XXX. SHORT TITLE.

This article shall be known as the "XXXX Groundwater Protection Ordinance".

Sec. CHAPTER NO. -XXX. PURPOSE

The City of XXXX has determined that:

1. The groundwater underlying the City is the sole source of the City's drinking water.
2. Groundwater aquifers are integrally connected with, and flow into, the surface water, lakes, and streams which constitute significant public health, recreational and economic resources of the City.
3. Spills and discharges of petroleum products, sewage and other hazardous substances threaten the quality of the groundwater supplies and other water related resources, posing potential public health and safety hazards and threatening economic losses.

Therefore, the City of XXXX has enacted an ordinance to:

4. Preserve and maintain existing and potential groundwater supplies, aquifers, and groundwater recharge areas of the City, and protect them from adverse development or land use practices.

5. Preserve and protect present and potential sources of drinking water supply for public health and safety.
6. Conserve the natural resources of the City.
7. Protect the financial investment of the City in its drinking water supply and to meet state requirements for wellhead protection.
8. Assure that state regulations which help protect groundwater are implemented consistently when new or expanded development proposals are reviewed.

Sec. CHAPTER NO. -XXX. DEFINITIONS.

1. AQUIFER: A geologic formation, group of formations or part of a formation capable of storing and yielding a significant amount of groundwater to wells or springs.
2. BEST MANAGEMENT PRACTICES: Measures, either managerial or structural to prevent or reduce pollution inputs to soil, surface water or groundwater.
3. DEVELOPMENT: The carrying out of any construction, reconstruction, alteration of surface of structure or change of land use or intensity of use.
4. ENVIRONMENTAL CONTAMINATION: The release of a hazardous substance, or the potential release of a discarded hazardous substance, in a quantity, which is or may become injurious to the environment, or to the public health, safety, or welfare.
5. FACILITY: Any building, structure, or installation from which there may be a discharge of pollutants.
6. HAZARDOUS SUBSTANCE: A chemical or other material which is or may become injurious to the public health, safety, or welfare, or to the environment. The term "hazardous substance" includes, but is not limited to, hazardous substances as defined in the comprehensive environmental response, compensation, and liability act of 1980, Public Law 96-510, 94 Stat. 2767; "hazardous waste" as defined in the Hazardous Waste Management Act, Act No. 64 of the Public Acts of 1979, being sections 299.501 to 199.551 of the Michigan Compiled Laws; "petroleum" as defined in the Leaking Underground Storage Tank Act, Act No. 478 of the Public Acts of 1988, being sections 299.831 to 299.850 of the Michigan Compiled Laws.
7. PRIMARY CONTAINMENT FACILITY: A tank, pit, container, pipe, or vessel of first containment of a hazardous substance.

Abandoned Well Ordinance

ABANDONED WELL ORDINANCE

ORDINANCE XXXX

Section 18-26. OPERATION OF PUBLIC WATER SUPPLY SYSTEM.

The operation, maintenance, and management of the public water supply system (PWSS) of the **COMMUNITY NAME** shall be under the immediate supervision and control of the utilities department. (Order Number XXXX, DATE)

Section 18-27. DEFINITION

“Private Well” defined: exceptions. A private well is defined as an opening in the surface of the earth for the purpose of removing water through mechanical or non-mechanical means for any purpose except: treatment of the groundwater, under a plan approved by the Michigan Department of Environmental Quality. This exception applies only when all necessary permits for the well have been obtained.

Prohibitions; permits. No person shall install a private well, without first obtaining a permit from **COMMUNITY NAME** and the XXXX County Local Health Department. The intent of this Section is to promote public health and the general welfare and to facilitate the adequate provision of public water.

Section 18-28. MANDATORY CONNECTION TO THE **COMMUNITY NAME** WATER SYSTEM

- (1) To insure the payment of the **COMMUNITY TYPE (TOWNSHIP, VILLAGE, CITY)** obligations incurred relating to the creation, maintenance, and extension of the PWSS, and to insure the public health, safety and welfare, any new structure, not to include remodeling or additions, including residences, retail, office and industrial buildings for which a building permit is obtained after the effective date of this ordinance, that is to be used for human occupancy, employment, recreation, or other purposes shall be physically connected to said system and obtain its entire water supply for human consumption and sanitary purposes from said system if such structure is used for industrial purposes or is located within 200 feet of the **COMMUNITY NAME** water system.
- (2) Existing structures for human occupancy, employment, recreation or other purposes that are served by a private well, are used for industrial purposes or are located within 200 feet of the **COMMUNITY NAME** water system, and that experience well failure shall be prohibited from drilling a new well. Such structures shall be required to connect to the **COMMUNITY NAME** water system.
- (3) Any cost of extending the **COMMUNITY NAME** water system to comply with the connection requirements shall be the responsibility of the property owner unless otherwise determined and agreed to by the **COMMUNITY NAME** Board.

(Order Number XXXX, DATE)

Section 18-29. CONNECTION TO THE WATER SYSTEM.

For the purposes of this ordinance, all connections to the **COMMUNITY NAME** water system shall be physically connected to the interior plumbing system of the structure within 30 days of the extension of the service line into the building, and, if applicable, the disconnection of a private well to the interior plumbing system. This requirement may be waived only at the discretion of the utilities director.

(Order Number XXXX, DATE)

Section 18-30. MANDATORY WELL PLUGGING.

At the time of a connection to the **COMMUNITY NAME** water system, the existing well(s) on the premises must be abandoned and plugged. In those instances where the well is inaccessible, such as under a building/structure or covered by concrete/asphalt, the **COMMUNITY NAME** engineer shall determine if the mandatory well plugging can be waived. A licensed well driller retained and under the supervision of the **COMMUNITY NAME** Engineering Department, shall perform the plugging of the well.

(Order Number XXXX, DATE)

Section 18-31. EXTENSIONS TO THE WATER SYSTEM.

Any extension to the **COMMUNITY NAME** water system shall be designed and constructed in accordance with the **COMMUNITY TYPE (TOWNSHIP, VILLAGE, CITY)** water installation standards, as amended, and applicable under state law.

Section 18-32. FEES.

All users of the water system shall be responsible for the payment of user fees based on a fee schedule adopted by the **COMMUNITY TYPE (TOWNSHIP, VILLAGE, CITY)**. The fees shall be binding upon all users of the water system, as well as their successors in interest, assigns, estates and heirs.

City of Vassar—Abandoned Well Ordinance

DIVISION 3. WATER WELL ABANDONMENT

Sec. 78-90. Abandonment required.

Any user with an existing water well shall, upon making a water connection, abandon and plug the water well in accordance with the requirements of Part 127 of the Michigan Public Health Code, Act 368 of 1978, as amended, and the Michigan Administrative Code R325.1601 et seq., as amended. Such a water well shall be abandoned and plugged no later than 30 days after the water connection is made. The user shall provide advance written notice of the well abandonment and plugging to the department and ensure that the department inspects the abandonment and plugging work.

(Ord. of 10-7-02)

City of Jackson—Abandoned Well Program

How to Locate an Abandoned Well

Helpful Information and Materials needed to find an Abandoned Well

Here are some things to think about when looking for a well.

- Identify roads or neighborhoods that were developed before a water main was in that area.
- Send out a mass mailing letting your community know what you are doing and ask them if they have an old well. With this letter attach a consent to enter private property form. This will help you in two ways, it will one give you the permission to enter the property to do a search. Two it will give validity to residents when you show up to whom you are, it is nice that you have a document that they have signed. This came in hand when dealing with elderly residents. (You will be surprised that a lot do know and they will even draw you a map of where it is at.)

Doing the Property searches

Material needed

- Flashlight
- Fish tape
- Tape or devise to mark fish tape
- Polypropylene pipe cutter
- Plastic plugs (various sizes from ½" to 1 ½")
- Hose clamps (various sizes)
- Metal detector
- Marking device (flags, paint, PVC pole)

Here are some Examples of What a well can Look Like



Example of how to mark a well. Well was buried within 1 ft of stake 4 ft deep.



Well found in the basement floor in a corner



Other tips to keep in mind are:

- Look for city water lines in Basement, a lot of times the old well pipes will be near them.
- Look for depressions in the yard (Low Spots)
- Metal detector should get a strong reading if the reading is weak or small its probably not a well, I used a Metal detector from Schonstedt Instruments Model # GA-52 CX it worked great some of my markings were over a foot off.
- Most Neighborhoods will have a pattern if several are above ground most will be or if they are all buried the generally will follow same pattern.

Our community found and abandoned 377 wells in one year, It can be done.

If any communities have any question please call Steve Rumsey @ 517-768-6116

The City located and abandoned **377** wells with funding through the Michigan Abandoned Well Management Program

Abandoned Well Templates

CONSENT TO ENTER PRIVATE PROPERTY

Property Address: _____
Address City County

I, _____, the person in charge of the above described property, (or his/her authorized representative), having been informed of the Abandoned Well Management Program by representatives of the Village of XXXXX hereby grant access to Village personnel and their authorized consultant (NAME OF CONSULTANT) to conduct a search and inspection of the above described property for the purpose of identifying abandoned water wells. I understand that I am entitled to accompany the Village and their authorized consultant during these search activities.

I also understand that if an abandoned well is located on the above referenced property, this well will be plugged according to statutes within the Groundwater Quality Control Act, Part 127. This plugging will be performed by a third party well drilling contractor who is registered in the State of Michigan. I further understand that the plugging of a well identified on the above-referenced property will be plugged AT NO COST TO ME, and that I may be eligible for an incentive reimbursement for cooperation with the well abandonment program.

I agree that the duration of this entry authorization shall be of such reasonable length to enable the Village, its employees, its contractors, and its authorized representatives to satisfactorily complete the search for abandoned water wells and properly plug any identified such wells.

I also agree that as long as this entry authorization remains in force, I will not interfere with, interrupt, change or otherwise disturb any systems or equipment installed or utilized by the Village, its employees, contractors, or authorized representatives.

I understand that I may refuse entry to my property. However, I am advised that plugging of abandoned water wells is required by Michigan law, and that failure to properly plug an abandoned well may result in fines and/or other legal actions.

Person in Charge or Representative's Signature—Required _____ Date _____

Print Person in Charge or Representative's Name _____ Title/Position _____

Mailing Address _____ City _____ State _____ Zip Code _____

Area Code and Telephone Number _____

Date Property Searched: _____

Searched By (Name and Affiliation): _____

Abandoned Well Located: Yes No

Well Plugged On: _____ By: _____

Incentive Paid: _____

Village of XXXXX

Street Address _____

Street Address _____

Phone: XXXXX

Fax: XXXXX

NOTICE

Our records show that you own a property that is hooked to municipal water in the Village of XXXXX, and at one time you may have been served by a private well. State law requires that if the private well is not currently being used, it needs to be plugged by a registered well driller. Unplugged abandoned wells can threaten the quality of your drinking water. Plugging these abandoned wells protects Michigan's private and public water supply.

GOOD NEWS

The Village of XXXXX has received a grant that will pay for plugging these wells at **NO COST TO THE HOMEOWNER**. Please fill out the access agreement sheet and mail or return the form to XXXXX. If you wish to keep your well for irrigation, car washing, or other uses, it must be in an operational condition, meeting the XXXXX Health Department specifications. If your well has already been plugged, the records should be on file with the State of Michigan Department of Natural Resources and Environment.

Under Michigan's Groundwater Quality Control Rules (Part 127, Act 368 PA 1978), property owners are responsible for assuring that all abandoned wells on his or her property are properly plugged. Please take this opportunity to have your wells properly plugged.

If you are unsure if you have a well, please contact the Village of XXXXX for more information at XXXXX. If your property does not have an abandoned well, please disregard this notice. If you do have an abandoned well, please provide a sketch of where the well is located on your property. If the well is located inside the home, simply indicate "inside home". Please use the back of the consent form.

Thank you,

Village of XXXXX

Village of Breckenridge—Annual Well Inspection Form

Village of Breckenridge Annual Well Inspection Form

Owner Name: _____

Occupant Name (if applicable): _____

Address: _____

Are you having operation problems with the well? Yes No

Well appears to be in use? Yes No

Would you be interested in plugging the existing well? Yes No NA
*Your signature is required to notify us that you wish to keep the existing well in service at this time.

Well Details: (type, size, use) _____

Well Location: (example front yard, basement, etc.) _____

Comments: (example best time to reach you at home, well depth, well size, etc) _____

Signature: _____ Date: _____
Owner/representative

Signature: _____ Date: _____
Village Employee

City of Mason--Resolution

Introduced: Waltz
Second: Droscha

CITY OF MASON CITY COUNCIL RESOLUTION NO. 2011- 11

A Resolution Establishing Policies and Administrative Procedures to be Used by the City of Mason to Protect the Municipal Water Supply

June 6, 2011

WHEREAS, the City of Mason recognizes the importance of its groundwater supply as a natural resource used for drinking; and

WHEREAS, it is within the responsibility of the City of Mason, as a public water supplier, to consider the health, safety and welfare of its customers; and

WHEREAS, groundwater contamination can and does occur as a consequence of a variety of land use activities; and

WHEREAS, it is desirable to preserve and protect the quality and quantity of our groundwater resources to assure a continued safe, adequate, and useable supply both now and in the future; and

WHEREAS, the protection of current and potential future sources of groundwater used for drinking water is worthwhile from the standpoint of resource protection; and

WHEREAS, state, county and municipal laws and regulations require certain land uses to obtain permits and approvals for construction and operation; and

WHEREAS, state agencies are not always aware of new development proposals and the owners or developers of proposed new land uses are not always aware of state, county and municipal permit and approval requirements; and

WHEREAS, local government officials, through adopted zoning ordinances, have the legal authority to review and/or approve land uses for the purposes of meeting the needs of the state's residents for natural resource protection and public services, including public water supplies; and

NOW THEREFORE BE IT RESOLVED that the City of Mason does hereby agree to take action to: (1) protect the immediate Wellhead Protection Area, (2) take steps to update the zone of contribution to the wells or well field(s) in compliance with the State of Michigan Wellhead Protection Program, and (3) to alert persons applying for land use, building, or subdivision approvals about state requirements for environmental protection. Any land uses or activities which may pose a threat to the public water supply and groundwater shall be properly managed to minimize the possibility of contamination; and

BE IT FURTHER RESOLVED that the City of Mason requests the establishment of a "Budget Line Item" for wellhead protection in order to determine the zone of contribution to our wells or well fields, and to implement the Wellhead Protection Program Plan, at such time as funds become available; and

BE IT ALSO RESOLVED that the City of Mason issue no land use permit, zoning permit, building or occupancy permit until such time that all required federal, state, county and/or local environmental permits or approvals have been obtained, and/or there is evidence that proper application to the responsible municipal, county, state or federal agencies has been made and significant issues affecting the Wellhead Protection Area have been addressed. An Environmental Permits Checklist will hereby be adopted for administrative use when new, changed or expanded land use activities are proposed.

Yes (7) Clark, Droscha, Ferris, Johnson, Naeyaert, Tornholm, Waltz

No (0)

CLERK'S CERTIFICATION: I hereby certify that the foregoing is a true and accurate copy of a resolution adopted by the City Council at its regular meeting held Monday, June 6, 2011 the original of which is part of the City Council minutes.


Deborah J. Cwierzewicz, City Clerk
City of Mason
Ingham County, Michigan

Eagle Harbor Township (U.P)– Purchase of Property

- Utilized their delineation and obtained a DNR Trust Fund grant to:
 - purchase sensitive property
 - establish a public access park with restrictive use to protect their aquifer

Village of Paw Paw and Village of Holly— Awareness of WHPA's in Planning Process

- The Village of Holly developed maps that included their zoning map and an overlain map of the WHPA.
- The Village of Paw Paw had large scale delineation maps printed and placed in areas where planning decisions are made.



Because all concerns are not adequately covered by state and county **regulations.....**

Communities need to develop management strategies designed to fit **their community's needs.**

Public Education: Importance

- Increases local support and awareness
- Ensures WHPP success and longevity
- Lessens the likelihood of drinking water contamination through better managed PWSS
- Better prepares and equips communities to deal with contamination in the event of an emergency

MRWA Public Education Checklist

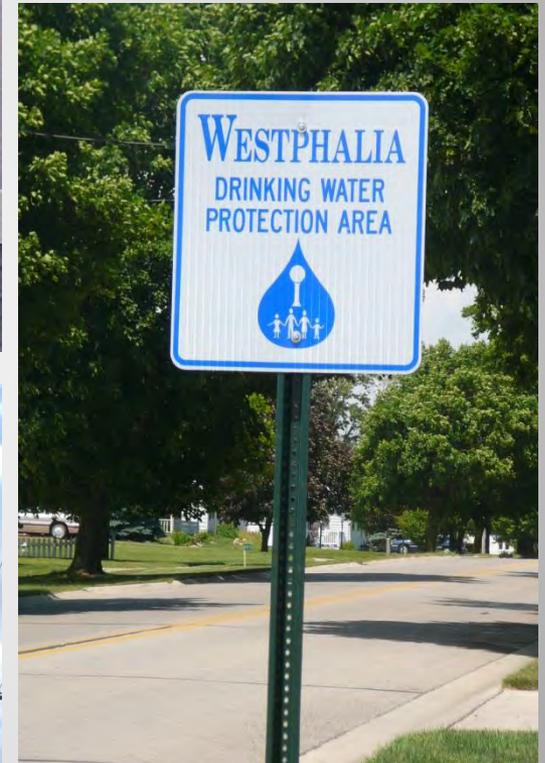
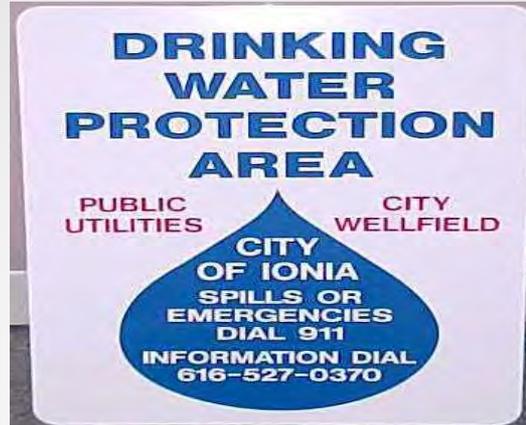
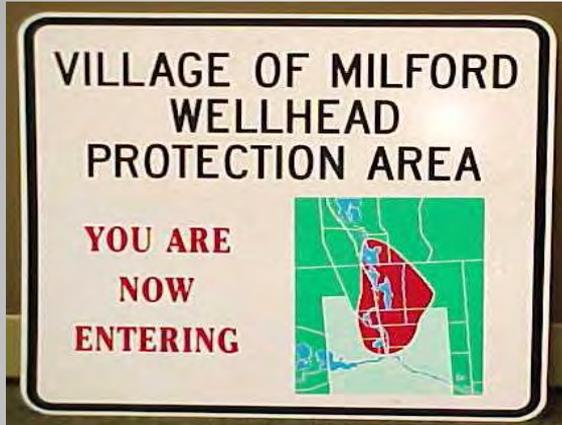
Michigan Rural Water Association
 P.O. Box 960
 780 W. Spaulding Street, East Lansing, MI
 48825-0960
 Phone: 989-539-4111
 Fax: 989-539-4055
 Website: www.mrwa.net



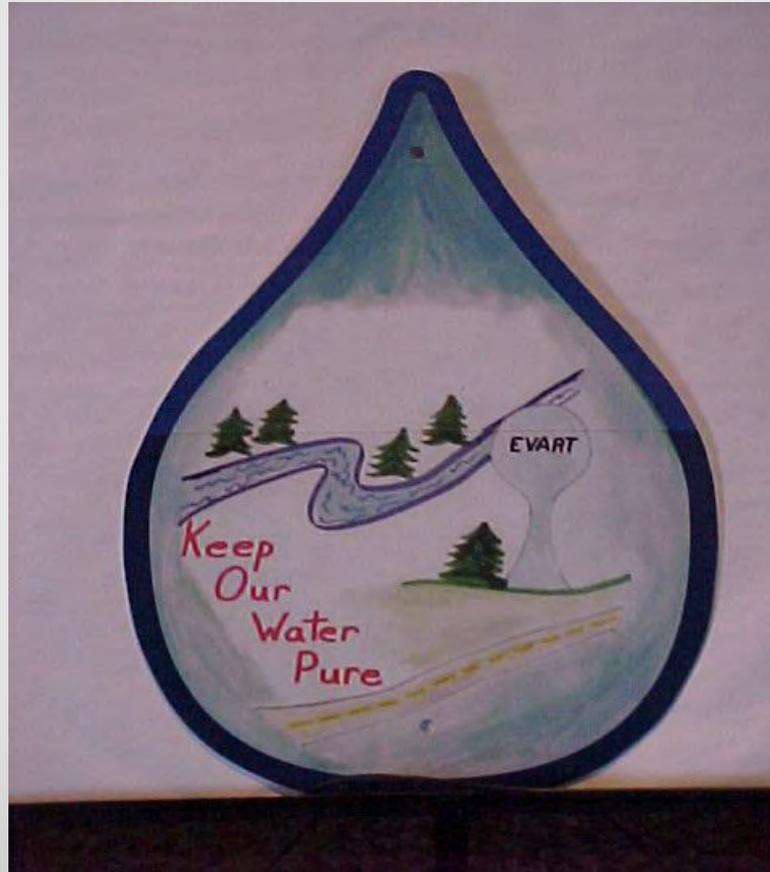
Michigan Rural Water Association Source Water Protection (SWP) Education Checklist

<input checked="" type="checkbox"/>	EDUCATIONAL ACTIVITIES
<input type="checkbox"/>	SWP Presentations (Schools, Town Hall Meetings, Boards/Commissions, Rotary, Library, United Way, Realtors Association)
<input type="checkbox"/>	Conduct SWP Trainings (Local Officials, Fire/Police Department, Planning Commission, DPW, Teachers, Businesses, Farmers, Residents)
<input type="checkbox"/>	Radio and Television Shows (partner with High School Media Center (if available), presentations on local cable channel (ask MRWA))
<input type="checkbox"/>	Display Booth at Local Fair
<input type="checkbox"/>	Poster Contest for SWP
<input type="checkbox"/>	Local Children's Water Festival, Water Quality Day or School Presentations
<input type="checkbox"/>	Tours of the Water Treatment Plant/Wastewater Treatment Plant
<input type="checkbox"/>	Teacher Training Camp
<input type="checkbox"/>	SWP Website
<input type="checkbox"/>	SWP Ads in Local Cinema
<input type="checkbox"/>	SWP Articles in Local Newsletters/Other Mailings
<input type="checkbox"/>	Water Taste Testing Contest
<input type="checkbox"/>	Essay Contest for SWP (Scholarships/Cash Prizes)
<input type="checkbox"/>	Art Contest for SWP (Scholarships/Cash Prizes)
<input type="checkbox"/>	Road Signs for SWP
<input type="checkbox"/>	SWP Placemats to Local Restaurants (MRWA/local classroom project)
<input type="checkbox"/>	SWP Paraphernalia (Mugs, hats, clothing, magnets, rulers, coloring books, stickers, pencils/pens, erasers, water bottles)
<input type="checkbox"/>	Brochures on SWP and Abandoned Well Management
<input type="checkbox"/>	T-Shirt Design Contest
<input type="checkbox"/>	Purchase Groundwater Models, Enoiroscape Models or Other Models for SWP (keep/donate to schools)
<input type="checkbox"/>	Work with Local Cinemas to Host "Free" Public Showing of Water Documentaries (i.e. Flow)
<input type="checkbox"/>	Develop Software for Groundwater Education (Interactive CD, for homeowners)
<input type="checkbox"/>	Custom Design SWP Coloring Books
<input type="checkbox"/>	Custom Design Calendars with SWP Art from Local Students

WHPA Road Signs



City of Evart—Sign Design Contest



City of Ionia—Interactive WHP CD



PURPOSE:
To Help Educate The General Public And Particularly The People And Children Of The Ionia Area About Wellhead Protection & Groundwater Issues!

This collection of software is used to provide Environmental Ambassadors with the tools necessary to transfer technical information about the environment and pollution prevention.

The viewer program describing the City of Ionia's Wellhead Protection Program (WHP) was developed in response to the City's proactive efforts to protect its water supply resources. The WHP is part of a state funded program to protect public water supplies initiated by the 1986 amendments to the Safe Drinking Water Act and the Michigan Department of Environmental Quality (MDEQ). The City of Ionia completed the initial WHP activities in 2001. Since 1988, the U.S. Environmental Protection Agency (USEPA) Region 5 and Purdue University have worked together to develop environmental software programs that make complex subjects clear and understandable and learning enjoyable. Contact the City of Ionia's Public Utilities Dept. at 616-527-4570 or visit www.epa.gov/glnp/ica/home/index.html for more information.



SOFTWARE DESCRIPTIONS:

- 1) Ground Water Primer**
 This HTML ground water program educates users about the nature of ground water and the principles of ground water protection. It contains a detailed introduction to hydrogeology, information on numerous drinking water contaminants, and a section on what you can do to protect your ground water. You can learn about groundwater protection programs in EPA and other government agencies, and find EPA contacts and hotline numbers. Aimed at the general public, this program is also a useful reference for high school earth science. (1998, 2.9Mb, www.epa.gov/sea/home/groundwater.html)
- 2) Household Waste Management**
 This HTML program teaches the user how to safely and efficiently manage waste and particularly hazardous waste, in the home. Users can visit a virtual house, and choose extended discussions of the many products they might encounter there. Safe homemade alternatives are presented and evaluated. An enormous state-by-state database of mail, telephone, and internet contacts puts users in touch with a wealth of free downloadable publications. Includes over 30 quizzes and activities for K-12 students, sorted by grade level. (1997, 3.8Mb, www.epa.gov/sea/home/hwaste.html)
- 3) Wellhead Protection**
 DDS based program that describes public water supply protection. Planning team, wellhead protection area delineation, contaminant source inventory, management. Aimed at concerned citizens and small communities interested in wellhead protection. (1994, 3Mb, www.epa.gov/sea/home/wellhead.html)
- 4) Residential Water Conservation Techniques**
 Save water inside and outside the house using water efficient devices. Save amazing amounts of money while protecting the environment. Calculates retrofitting savings. (1991, 3.2Mb, www.epa.gov/sea/home/wellcon.html)
- 5) Electronic Wetlands Herbarium - 1993 Midwest Edition**
 A detailed look at the plants typical of 11 different wetland types from bog to wet prairie. Users can explore a list of species found in each type of ecosystem. Entries give detailed botanical information as well as an identification quality photograph of the plant. (1993, Windows 3.1 or later, 47Mb, www.epa.gov/sea/home/wetlib.html)
- 6) City of Ionia's Wellhead Protection Program**
 A portable document format (PDF) file of information regarding the City of Ionia's Wellhead Protection Program (WHP). The file lists the user view and print maps, figures, pictures, and text descriptions of the geology, hydrogeology, land uses, potential contaminants, and other information within and near the City's Wellhead Protection Area (WHPA). Local agency contact names & phone numbers are given for the user to obtain additional information. (2001, 206b, Adobe Acrobat Reader® needed to view file - see below).

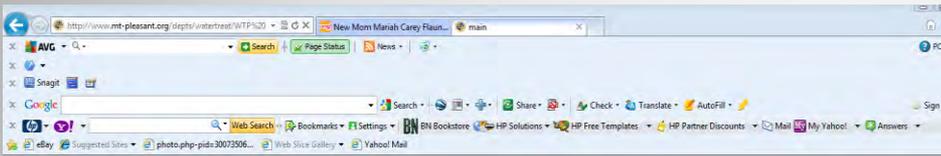
NOTES:

- Programs No. 1-4 are freeware and may be copied and given (not sold) to other interested users.
- Copyright © Purdue University except liability for any errors resulting from the use or reuse of these programs.
- Purdue University retains copyright on all software products. Neither mail or programs from any of the above programs may be modified nor incorporated into other software programs without the express permission of the author and Purdue University.

CITY OF IONIA
 PERLESS KOSWATZ, INC.
 To obtain a free copy of Adobe Acrobat Reader® visit <http://www.adobe.com/products/acrobat/readstep2.html>

- ✓ Groundwater Basics
- ✓ Household Waste Management (Virtual House Tour)
- ✓ Ionia's Wellhead Protection Program and Program Plan
- ✓ Residential Water Conservation Techniques

City of Mt. Pleasant—Website



Wellhead Protection Program

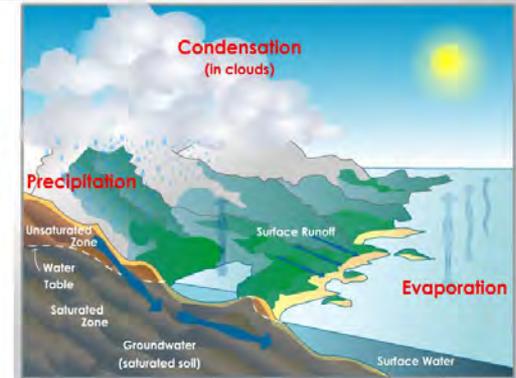
Simply put, a Wellhead Protection Program is a preventative program to insure the purity of groundwater by determining the area that City wells draw water from, conducting a risk assessment of that area and taking preventative measures to guard against pollution of the underlying groundwater.

In order to have a full understanding of the principles involved in well head protection, one must be familiar with much broader concepts, such as the [hydrologic \(water\) cycle](#), what [groundwater](#) is, and how we [tap into](#) this resource.



[What Is The Hydrologic Cycle?](#) [What Is Groundwater?](#) [Water Well Design](#)
[Sources of Contamination](#) [Why Is Wellhead Protection Important?](#) [Links](#) [Contractor](#)

City of Mt. Pleasant Water Treatment Plant, Division of Public Works

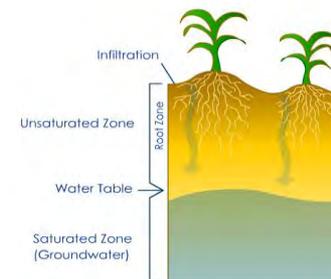


Description:

From the time the earth was formed, water has been endlessly circulating. This circulation is known as the hydrologic (water) cycle...



What Is Groundwater?



There are two types of water below the surface: Soil moisture, in the unsaturated zone, and Groundwater.



www.mt-pleasant.org/depts/watertreat/WTP%20Web%20Flash/wellheadprotection/main.html

City of Davison—Essay Contest for WHP

City of Davison Wellhead Protection Program \$500 Scholarship

Purpose: In an effort to protect a community's drinking water, the 1986 amendments to the Federal Safe Drinking Water Act provided for the establishment of Wellhead Protection Programs (WHPPs) designed to be locally initiated and implemented. The City of Davison designed such a program in an effort to safeguard its drinking water and encourage public involvement.

Amount of Scholarship: One first place scholarship (\$500) awarded annually.

Application Procedure:s

1. Qualifications of the applicant:
 - A. Must be a college-bound high school junior or senior.
2. Procedure for filing:
 - A. Submit an essay that addresses the question "What could each person do to save or protect the public water supply system?" The essay is to be a minimum of 300 words and a maximum of 500, typed, double-spaced, and one-inch margins.
 - B. Include in your essay why you think your idea would be effective, how you would get others to participate, and how you would go about promoting your suggestion.
 - C. Complete and attach the scholarship application form.
3. Method of Selection:
 1. Judges from the City of Davison WHPP Committee will judge the essay's content on originality, depth of knowledge, practicality, and ease of implementation.
4. Deadline for filing:
 - A. The application and essay must be postmarked by April 1, 2009.
5. Award of Scholarship:
 - A. The scholarship is contingent upon your acceptance to a chosen college.
 - B. The award will be drafted in your name and the name of the college or university to which you have been admitted.

TIPS

*Observe the application deadline of April 1, 2009.

Proofread everything. Check for spelling, grammar and punctuation.

Enviroscape Models

EnviroScape® consists of six environment education models (curriculum included) and assorted kits:



Watershed, Nonpoint Source, Stormwater Pollution and Prevention



Drinking Water Sources, Uses and Wastewater Treatment



Coastal Environment Use and Protection



Wetland Functions, Values, Protection & Conservation

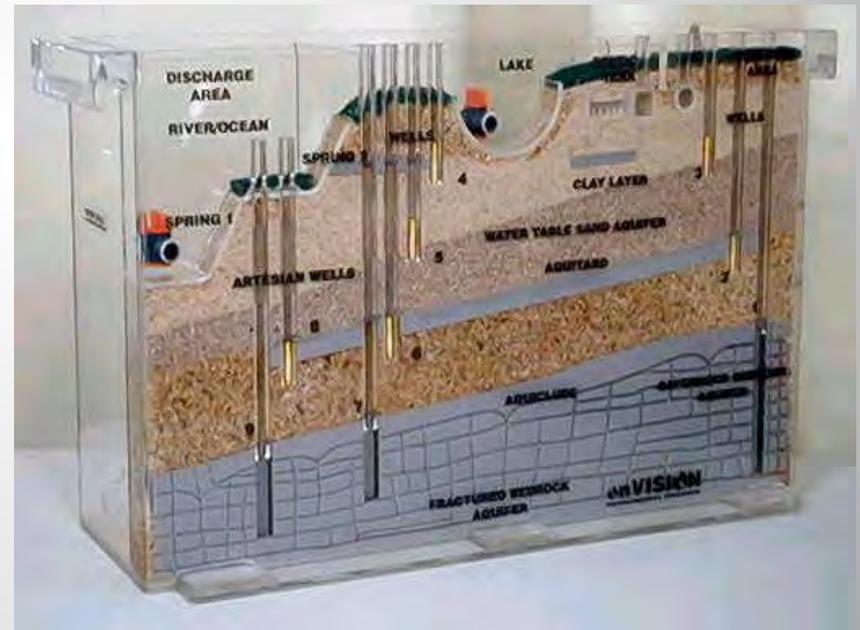


Hazardous Materials and HHW Management & Clean-up



Waste Management, Landfills and Recycling

Groundwater Models



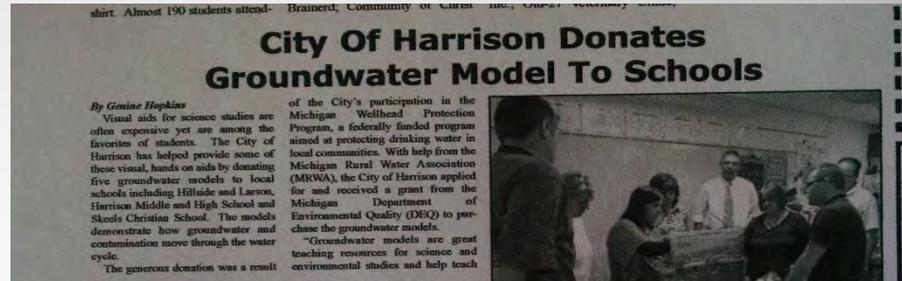
Groundwater Models Demonstrations



Village of Paw Paw—School Presentations



City of Harrison—Teacher Training



MRWA Quality On Tap

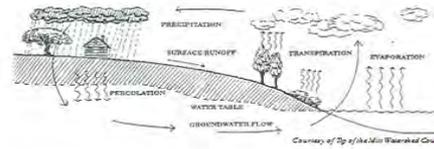
GROUNDWATER MODEL CURRICULUM

Developed By: Kelly Hon, MRWA Source Water Specialist

BRIEF INTRODUCTION

DISCUSSION OF THE WATER CYCLE

- Discuss the definition of water and have the students describe its many uses. **Water (H₂O)** is an odorless, tasteless, colorless liquid made up of a combination of hydrogen and oxygen. **Water** forms streams, lakes and seas and is a major constituent of all living matter.
- Explain the different types of water (see types below) and point each out on the model.
 - Groundwater** – Water that is found underground in cracks and spaces in the soil, sand and rocks.
 - Surface Water** – Water above the surface of the land, including lakes, rivers, streams, ponds, floodwater and runoff.
- Discuss the **Water Cycle**. The **Water Cycle** is the paths that water takes through its various states—vapor, liquid, solid—as it moves throughout the ocean, atmosphere, groundwater, and streams.
- Water Cycle** terms:
 - Condensation** – The process in the hydrologic cycle by which a vapor becomes a liquid, the opposite of evaporation.
 - Precipitation** – The process in the hydrologic cycle when water falls, in a liquid or solid state, from the atmosphere to Earth (rain, snow, sleet).
 - Recharge** – Groundwater supplies are replenished or recharged when water enters the saturation zone by actions like rain or snow melt.
 - Runoff** – Precipitation that flows over land to surface streams, rivers and lakes.
 - Evaporation** – The conversion of a liquid (water) into a vapor (a gaseous state) usually through the application of heat energy during the hydrologic cycle; the opposite of condensation.
 - Transpiration** – The process by which water absorbed by plants (usually through the roots) is evaporated into the atmosphere from the plant surface (principally from the leaves).
- Draw a diagram similar to the one below (some groundwater models have the water cycle diagram attached to the top of the model).



DISCUSSION ON GROUNDWATER SPECIFICS

- Begin to discuss what is found below the surface.
- Discuss (and point out) the **soil**. Soil is the top layer of the Earth's surface, containing unconsolidated rock and mineral particles mixed with organic material.
- Discuss (and point out) the **unsaturated zone** (also known as the **aeration zone**). The **unsaturated zone** is the dry area above the water table.
- Discuss (and point out) the **water table**. The **water table** is the top of an unconfined aquifer, indicates the level below which soil and rock are saturated with water.
- Discuss (and point out) the **saturation zone**. The **saturation zone** is the portion below the earth's surface that is saturated with water. The upper surface of this zone, open to atmospheric pressure, is known as the water table.
- Discuss (and point out) the definition of an **aquifer**. An **aquifer** is an underground geological formation that stores and yields water.
 - Confined Aquifer** – Also known as artesian or pressure aquifer, confined aquifers exist where the groundwater is bounded between layers of impervious substances like clay or dense rock. When tapped by a well, water in confined aquifers is forced up, sometimes above the soil surface. This is how a flowing artesian well is formed.
 - Unconfined Aquifer** – An aquifer in which the upper boundary is the water table.

Area teachers are provided training on how to best use donated models.

students to be more aware of the responsibilities of both citizens and their governments to protect and maintain the quality of our natural environment," stated Tom House, Harrison Community Schools' Superintendent.

In fact, the models provide a clear path that groundwater and contaminants work within an ecosystem, providing a tactile method of introducing the concept of protection of ground water.

Teachers from each school attended a groundwater model demonstration to show them how the models can be best used. In attendance was MRWA Source Water Protection Specialist Kelly Hon and Harrison City Clerk

Tracey Beadle, both of whom gave the presentation. Members of the IACS Board of Education were also in attendance.

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 Residential • Commercial • Industrial
For All Your Concrete & Excavating Needs
 • Land Clearing • Septic Systems
 • Crawl Spaces, Footings • Driveways
 • Brick Textured & Insulated

City of Battle Creek—Teacher Training Camp



City of Battle Creek—Children's Water Fest



Billy B., Groundwater Simulator Demonstrations, Edible Aqi-Flurry Sessions, Goey Garbage and more!

Groundwater Management Board— MSU Children's Water Fest



- **18th Annual Children's Water Festival was held in May 2014**
- **Event is sponsored by the GMB and local businesses**
- **Educate 4th, 5th, and 6th grade students on the importance of water conservation and protection.**

Village of Quincy—Water Quality Day



City of Charlotte—Collaborating River Cleanup Day with WHP



City of South Lyon—Collaboration with Local Groups



Water and Wastewater Plant Tours



City of Mason—T-Shirt Design Contest

Attention Mason 5th Graders!! Drinking Water Protection T-Shirt Contest!

PURPOSE:

Water is a very important resource that needs to be protected! In the U.S. groundwater is the source of drinking water for half of the total population and 95% of the rural population. Within the City of Mason and surrounding communities, all residents rely on groundwater to supply their drinking water needs. Without water, where would we be?

THEMES...draw a picture that demonstrates any of the following:

- Protect Our Drinking Water
- Protect Our Groundwater
- Importance of Water

PRIZES:

\$50.00 (First Place Winner)

All students that participate will receive a t-shirt!!

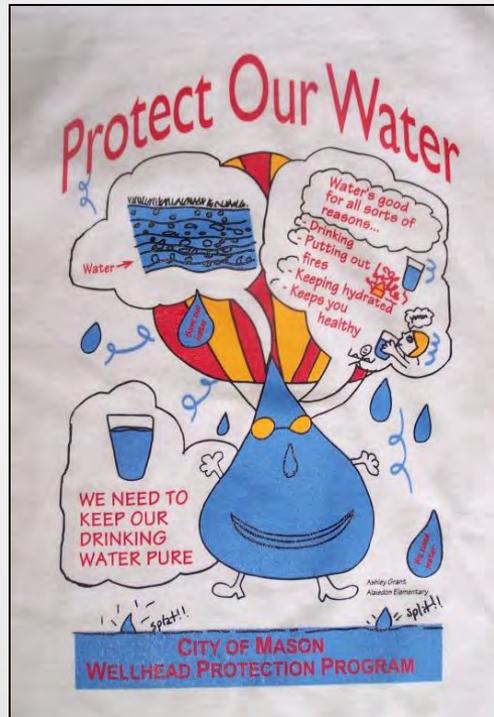
IMPORTANT NOTES:

- All designs must be original artwork (no clipart, photographs to which you do not own the copyright).
- A parent or guardian may assist, but you must do the majority of the work yourself.
- Please submit your design on the attached 8 1/2 X 11 paper. Include your name on the back.
- Funding for this project is made possible by a grant that the City of Mason received from the Michigan Department of Environmental Quality.

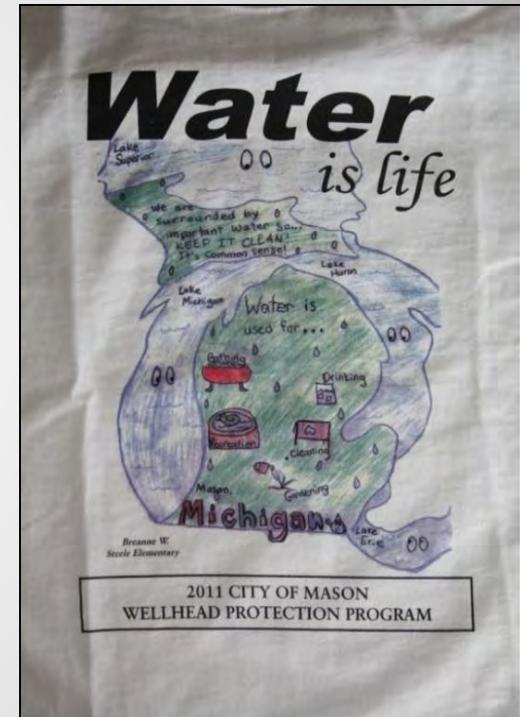
DEADLINE: May 6, 2011

Student Name: _____ Teacher: _____

Youth T-Shirt Size (circle one): Small (6-8) Medium (10-12); Large (14-16) XL

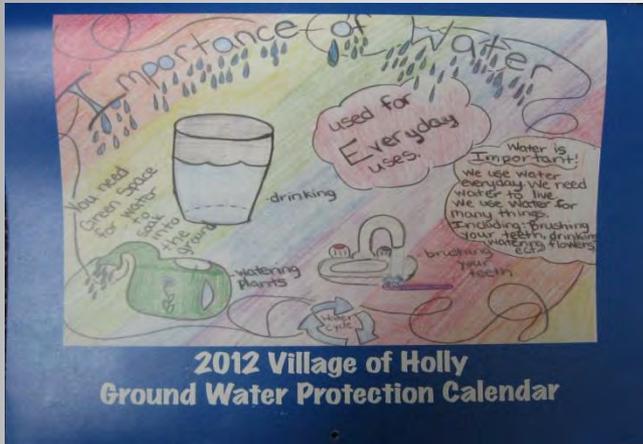


2010 Winner



2011 Winner

Village of Holly—Calendar Contest



WHAT IS THE WELLHEAD PROTECTION PROGRAM?

First, it is important to determine the area which contributes groundwater to the public water wells. Communities will hire a consulting firm to do a thorough review of the groundwater that is supplying the drinking water wells. This study will determine how fast the groundwater is flowing and in what direction the groundwater is flowing. This area is called the Wellhead Protection Area (WHPA). An example of a WHPA is included. At the edge of this area, it would take ten years for contamination to reach the community wells. This is the area that communities will manage and protect. Steps to manage and protect this area include:

1. **ESTABLISH A TEAM** - Identify people that play an important role in groundwater protection. Examples: managers, water superintendents, zoning administrators, teachers, fire department officials, business leaders, farmers and residents.
2. **CONTAMINANT SOURCE INVENTORY** - Identify known and potential sites of contamination within the WHPA and include in a contaminant source inventory list and map.
3. **MANAGEMENT STRATEGIES** - Provide mechanisms that will reduce the risk of contamination. Examples: plugging abandoned wells and implementing zoning ordinances.
4. **CONTINGENCY PLANNING** - Develop a contingency plan in case of a water emergency.
5. **PLAN FOR NEW WELLS** - Provide information on existing groundwater availability, the need for new wells and the vulnerability of the existing wells to contamination.
6. **PUBLIC EDUCATION** - Educate the public about drinking water protection through brochures, placemats, presentations, newsletters and other educational activities.

Honorable Mentions

Abby Ryan, Allison Harris, Alyssa Helfferich, Kayden Shell, Alle Hover, Lily Raymer, Tyler Peters, Mareah Ray, Taitlyn Pauson

Cover Design by Amanda Anstanding

This calendar made possible through a Grant to the Village of Holly from the Michigan DEQ. A special thank you to the teachers and wonderful artists!

JULY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	A gallon of gas can contaminate 750,000 gallons of water.			

JUNE AUGUST

Michigan Great Lakes Fun Facts

VOLUME of the Michigan Great Lakes
The Great Lakes boast 6 quadrillion gallons of fresh water which is one-fifth of the world's fresh surface water (only the polar ice caps and Lake Baikal in Siberia contain more). The Great Lakes are 95 percent of the U.S. supply.

Lake Erie, Lake Superior, Lake Huron, Lake Michigan and Lake Ontario
Lake Erie is the smallest of the Michigan Great Lakes in volume (119 cubic miles) and is exposed to the greatest effects from urbanization and agriculture. Measuring 241 miles across and 57 miles from north to south, the lake's surface is just under 10,000 square miles, with 871 miles of shoreline.

TOTAL AREA of the Michigan Great Lakes
More than 94,000 square miles/244,000 square kilometers of water (larger than the states of New York, New Jersey, Connecticut, Rhode Island, Massachusetts, Vermont, and New Hampshire combined, or about 23 percent of the province of Ontario). About 250,000 square miles/707,000 square kilometers in the watershed (the area where all the rivers and streams drain into the lakes). * Boat Accessories at Barr's • Water Skis at Overton's • Consumer Marine - Marine Electronics

TOTAL COASTLINE of the Michigan Great Lakes
United States and Canada - 16,900 mi/17,549 km (including connecting channels, marinas and islands). The Great Lakes shoreline is equal to 36 times the circumference of the earth, and Michigan's Great Lakes coast totals 3,268 mi/5,294 km, more coastline than any state but Alaska.

References: Great Lakes Basin brochure, 1990, Michigan Sea Grant

Lake Huron is the third largest of the Michigan Great Lakes by volume, with 350 cubic miles of water. Lake Huron is hydrologically inseparable from Lake Michigan, joined by the wide Straits of Mackinac.

Not only is Lake Superior the largest of the Michigan Great Lakes, it also has the largest surface area of any freshwater lake in the world. It contains almost 3,000 cubic miles of water, an amount that could fill the other Great Lakes plus three additional Lake Eries.

The Great Lakes Circle Tour is a designated, scenic road system connecting all of the Great Lakes and the St. Lawrence River.

The Circle Tour established by the Great Lakes Commission is recognizable with its eight member states and the province of Ontario, promotes travel and tourism along the shores of North America's Fresh Coast.

NEWSPAPER ARTICLES

NEWSPAPER ARTICLES

Press Release

June 21, 2011

Mason Fifth Graders Participate in T-Shirt Design Contest and Learn about Water!

Since 2004, the City of Mason has been working through the Michigan Wellhead Protection Program, a federal program aimed at protecting drinking water within local communities. Although this program is voluntary, communities that participate, take the necessary steps to safeguard their drinking water source from contaminants. Among the many facets of the program, the City had to implement public education activities. The City worked with the Michigan Rural Water Association (MRWA) to apply for grant funding through the Michigan Department of Environmental Quality (MDEQ). A portion of the grant was dedicated to educating students in Mason.



In the spring of 2011, the MRWA and the City worked with the local elementary schools to participate in a drinking water protection t-shirt design contest. Fifth graders from Alafolke Elementary and Steele Elementary were given the challenge of designing a t-shirt that demonstrated the importance and protection of water. First, the MRWA Source Water Specialist demonstrated a groundwater model to the fifth grade classes. Through the groundwater model, students had the opportunity to see what life looks like underground and witnessed what happens when a drinking water well becomes contaminated. The model shows students how contamination would move through the groundwater cycle and discussed what could potentially be impacted. They also brainstormed on ways to prevent contamination from occurring. Next, students were given the task of designing a t-shirt based on what they had learned.

The City of Mason Wellhead Protection Committee reviewed the submissions. According to Kelly Hon, MRWA Source Water Protection Specialist, "there was a number of excellent drawings which made it a difficult task for the Wellhead Protection Committee." The Committee chose Breanna Winkler, fifth grade student from Steele Elementary as the 2011 winner. Ms. Winkler received a cash prize and all students that participated received a t-shirt with the winning design.

The City would like to thank the teachers at Steele Elementary and Alafolke Elementary, Mrs. Cecil, Mrs. Sanders, Mrs. Castle and Ms. Fitzgerald for making this project a success! For more information about the City of Mason Wellhead Protection Program or to get involved, please contact Ken Baker, City of Mason at 513-676-1319 or Ken@qmsm.com.



View Hon, MRWA Source Water Specialist, presenting the award to Breanna Winkler, 2011 contest winner.

Groundwater Hits the Big Screen

Contributed by: Groundwater Remediation Activities Program

By John P. Pappas, Water Resources Manager, City of Eastland, Michigan

Since 1992, the City of Eastland's Wellhead Protection Program (WHP) Committee has worked hard to protect the city's water supply. The WHP Committee has been successful in securing state and federal funding for the WHP program. The WHP Committee has also been successful in securing state and federal funding for the WHP program. The WHP Committee has also been successful in securing state and federal funding for the WHP program.

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tctimes
TRI-COUNTY TIMES
Fenton Michigan's
News and Information Source

Education

Schools receive wellhead models from village Teachers will use as educational tool

By Anna Tropens
Published Tuesday, June 15, 2010 6:14 AM EDT

Holly — Village Manager Marsha Powers recently presented wellhead protection materials to Holly Area Schools, for use in classrooms. The four models cost \$4,739, from Holly's \$20,000 in wellhead protection grant funding.

Training Specialist Kelly Hon, of the Michigan Rural Water Association, demonstrated how pollution spreads — or doesn't spread — underground. Depending on different factors, pollution can contaminate underground drinking water supplies, or it might not spread to the well or home next to it.

Layers of clay soil, for example, act as a protective barrier against pollution, for drinking water.

Septic tank failure, fertilizers and pesticides used in improper amounts, can threaten groundwater.

The wellhead protection models are good for all ages, and there is a list Holly teachers can do with them, Hon said. These models show wells, and underground aquifers, which are large amounts of water. Water tables also are demonstrated.

Sixth grade science teacher Dan Hughes, from Holly Area Schools, said he can't wait to use the wellhead protection models in his classroom. "This is going to be outstanding."

Before, he used cups with clay and gravel, and comparators to "Detroit Liens defense" to explain how things can pass through, Hughes said.



Print Page

www.papawaterleader.com



Paw Paw Village Water Treatment Superintendent Bob Hervey (left) and Kelly Hon (right) from the Michigan Rural Water Association, joined forces last week to teach Paw Paw second graders about groundwater and groundwater contamination. Students learned about the different geological layers of the ground and how pollutants can contaminate and make groundwater unfit to drink. To help illustrate the lesson, the students got to help make wellhead equal filters using clear soils to represent water. One cookies to represent dirt, sand and gravel, marshmallows to represent boulders, ice cream to represent a clay barrier, granules to represent top soil, food coloring to represent contamination and a straw stuck in the top to represent a well. Students got to breathe (food coloring stayed above and did not sink into the clay layer) ice cream. Enjoying their wellhead equal filters, above, are students, from left, Emma Wainwright, Canada Kinsinger and Lindsay Westbroth. Their classroom Brandy Flinders looks on.

Press Release April 5, 2011 Mason Second Graders Experience Groundwater!

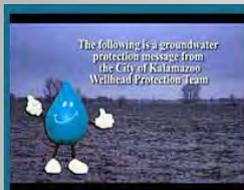


Since 2004, the City of Mason has been working through the Michigan Wellhead Protection Program, a federal program aimed at protecting drinking water within local communities. Although this program is voluntary, communities that participate, take the necessary steps to safeguard their drinking water source from contaminants. Among the many facets of the program, the City had to implement public education activities. The City worked with the Michigan Rural Water Association (MRWA) to apply for grant funding through the Michigan Department of Environmental Quality (MDEQ). A portion of the grant was dedicated to educating students in Mason.

On Thursday, March 31st, Kelly Hon, MRWA Source Water Protection Specialist, Ken Baker, City of Mason and Tom Babby, City of Mason did just that! Second grade students from Steele Elementary and North Ausubell Elementary were able to use a groundwater model demonstrated and see how water behaves. Through the groundwater model, students had the opportunity to see what life looks like underground and witnessed what happens when a drinking water well becomes contaminated. The model shows students how contamination would move through the groundwater cycle and discussed what could potentially be impacted. They also brainstormed on ways to prevent contamination from occurring. Afterwards, students had the chance to build edible aquifers using a variety of yummy goodies. Cream was used to represent aquifers and gyoza, ice cream was used as clay; clear soda as water; granules for the top soil, food coloring for contamination and a straw for the well. Students eagerly sized questions and were especially excited when the ice cream arrived!

And the fun has just started! The City will also be educating second grade students in Alafolke Elementary in May 2011. In addition, they are organizing a drinking water protection t-shirt design contest with Mason fifth grade students. Cash prizes will be awarded to all students that participate who receive a t-shirt. For more information about the City of Mason Wellhead Protection Program or to get involved, please contact Ken Baker, City of Mason at 513-676-1319 or Ken@qmsm.com.

City of Kalamazoo—Movie Ads



[1. Groundwater Source](#)



[2. Water Faucet](#)



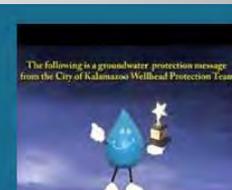
[5. Stormwater](#)



[6. Residential Property](#)



[9. Conserve Your Water](#)



[10. Companies with Voluntary Spill Response Plans](#)



[3. Groundwater Pollution](#)



[4. Hazardous Chemicals](#)



[7. Abandoned Wells](#)



[8. Household Chemical Use](#)



[11. Cross Connections](#)

Still Ads



[Chemical Disposal \(.pdf\)](#)



[Stormwater \(.pdf\)](#)



[Groundwater \(.pdf\)](#)

Since 2006, the City rotated Cinema Ads at the Kalamazoo 10 Theater and "still" ads at the Kalamazoo Rave 14 Theater.

City of South Lyon—Videos



City of Jackson—Movie Night

save-the-Date
Friday, May 8th
7 pm

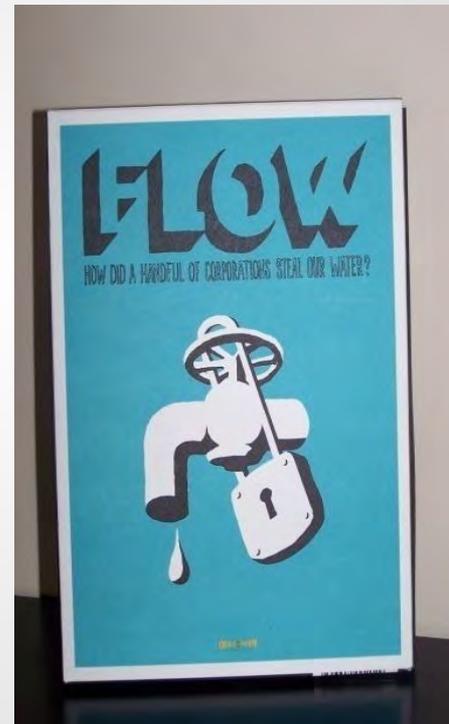
FREE public showing of the
water documentary "Flow"
at
The Michigan Theatre
124 N. Mechanic St. in Jackson



Irena Salina's award-winning 2008 documentary about what experts label the most important political and environmental issue of the 21st Century - the World Water Crisis.

- ◆ Informational materials on the Upper Grand River Watershed and local water issues will be on display
- ◆ Watch the City of Jackson's new water Public Service Announcements

Sponsored by the Upper Grand River Watershed Alliance, City of Jackson Wellhead Protection Program, Jackson County Conservation District, and Potawatomi Resource Conservation & Development Council



Village of Mattawan – WHP Coloring Book

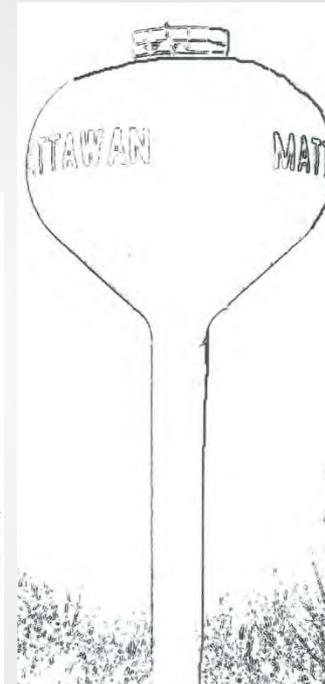
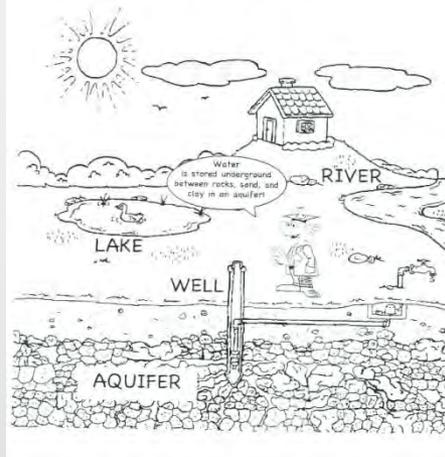
PROFESSOR
FAUCET'S



WACKY
WATER
ADVENTURE

*Brought to you by the Village of
Mattawan Well Head Protection
Committee*

Drinking water comes from lakes,
rivers, streams or under the
ground (ground water).



FOR MORE INFORMATION AND
ACTIVITIES VISIT THESE WEB
SITES AT:

WWW.MATTAWANWELLHEAD.COM

WWW.EPA.GOV/SAFEWATER



Also, meet Professor Faucet in person at
the following Mattawan events:

1. Lions Health Fair (February)
2. Mattawan Days Festival (August)
3. Local Parades (Christmas and Homecoming)

You may also contact the Village at 668-2300 to
arrange for Professor Faucet to make an
appearance at your school, business or event.

Village of Milford—WHP Paraphernalia



Protect Your Drinking Water
 Village of Milford
 Watershed Protection Program
 (248) 684-1915

Handy Tips To Conserve Water

- Take shorter showers
- Chilly (vs. full) loads of wash
- Flush commodes without fully flushed
- Water lawn & garden on weekdays, early A.M.

Water costs money... don't waste it!
 A single toilet flush wastes 3 gallons x 3.785 liters = 11.367 gallons x 3.785 liters = 43.015 liters

Pipe Size	Waste per quarter at 60 psi water pressure	
	1/2" Diameter	3/4" Diameter
1/2" (1.315 in. ID)	1,181,560	168,000
3/4" (1.315 in. ID)	566,000	89,031
1" (1.315 in. ID)	290,000	38,480
1 1/2" (1.315 in. ID)	74,000	9,460
2" (1.315 in. ID)	18,500	240

A single toilet flush wastes 3 gallons of water in 15 seconds. A single shower wastes 20 gallons of water in 10 minutes. A single car wash wastes 100 gallons of water in 10 minutes. A single car wash wastes 100 gallons of water in 10 minutes.

automotive care

How do you represent a significant financial investment? The answer is in the car. You've invested your hard-earned money in your car. You want to make sure it lasts as long as possible. That's why you need to take care of your car by practicing quality automotive maintenance.

Tip: It also prevents water quality.

The most likely to cause water quality at your place is the recent parking lot. Signs of Road Runners can be found in the concrete. The concrete is placed across the pavement. These signs are composed of highly toxic materials, such as antifreeze, motor oil, brake fluid and transmission fluid. When these toxic materials enter the storm drain system or wash into the soil, surface and ground water supplies are contaminated.

Improve water quality right now. Take care of your car.

Disposal help

Call your local county home water utility for disposal information.

Call Milford at (248) 684-1915 for more information.

lawn & garden

A beautiful well-maintained yard enhances property value and provides a place for recreation and relaxation. But you may be making more work of your yard than is necessary.

What's the most common mistake in yard care? The "over" use of lawn and garden. Over application of fertilizers, pesticides and herbicides wastes money, runs down and pollutes waterways. Learn that an overuse of lawn devices break root systems and require frequent watering and maintenance. Removing grass clippings drains your soil of beneficial nutrients and the organic matter necessary to prevent soil compaction.

For your lawn to grow, let your grass follow the simple tips on the back of this card for a healthier lawn that's cheaper and easier to maintain.

Improve water quality right now. Be smart about garden care.

Want to learn more?

Call Milford at (248) 684-1915 for more information.

Call Milford at (248) 684-1915 for more information.

decks & lumber

Pressure-treated lumber is popular for good reasons. It resists rot and insect damage. For many homeowners, treated lumber is the choice for decks, play equipment, benches, picnic tables, and a variety of other outdoor applications.

What is pressure-treated lumber? Simply put, it is wood that has been treated with a solution that includes copper, chromium and arsenic (CCA) under high pressure. Copper is toxic to long-lead insects and arsenic is an effective preservative. Chemicals like these build up over the wood's life. They don't wash off. Instead, they leach out of the treated lumber, contaminating both soil and waterways. Copper is harmful to plants and human life. Arsenic is hazardous to humans and other animals.

Although treated lumber is a common building material, few people know how to handle and maintain it properly. **Use simple tips on the back of this card to help you get the most out of your treated lumber.**

Improve water quality right now. Use and maintain treated lumber properly.

home toxics

Getting rid of old items right now is a common mistake. Many people throw away old items without knowing they contain hazardous materials. These materials can pollute the ground and waterways. They can also harm you and your family.

What are home toxics? Home toxics are household items that contain hazardous materials. They include old paint, oil, antifreeze, and other chemicals. They can be found in old paint cans, oil cans, antifreeze cans, and other household items.

Disposal help

Call your local county home water utility for disposal information.

Call Milford at (248) 684-1915 for more information.

MRWA Materials: Placemats

Rural Water Words

AGRIAN, TERNAL, COASTAL, COUNTRY, BAMS, SECURITY, WELLS, BULLDOGS, DATED, PROTECTION

BYSTAND, METERS, OPERATED, RINGS, FLUORIDE, BLEN, BACTICIDE, CONTAMINATION, GROUNDWATER, RECICLE

Water Wisdom

How much do you know?

- In the Village of Davison, the Davi, Davison, and Davison are named after the person who...
 - A. Davison
 - B. Davison
 - C. Davison
 - D. Davison
- Groundwater is a natural resource that is...
 - A. unlimited
 - B. finite
 - C. infinite
 - D. inexhaustible
- Groundwater is...
 - A. found only in one location
 - B. found in many locations
 - C. found only in one location
 - D. found in many locations
- Groundwater is...
 - A. found only in one location
 - B. found in many locations
 - C. found only in one location
 - D. found in many locations

Paw Paw Drinking Water Protection Program

Because residents in the Village of Paw Paw rely on groundwater as their drinking water source, a voluntary Wellhead Protection Program (WHP) was developed. The goal of a WHP is to protect the Village's drinking water from contamination. The Village established a team of people to oversee the program. Find a Wellhead Protection Area (WHPA) at the edge of this area. Groundwater is found in the area below the ground surface. Groundwater is found in the area below the ground surface. Groundwater is found in the area below the ground surface.

For more information, contact the Village Office at:
111 East Michigan Avenue, P.O. Box 179, Paw Paw, MI 49079
269-637-3160

PROTECT YOUR DRINKING WATER

- Protect your drinking water from contamination.
- Be aware of dangerous chemicals, hazardous materials and other substances that are found in your area.
- Consider alternatives to hazardous products that contain hazardous chemicals.
- Participate in a voluntary Wellhead Protection Program (WHP) in your area.
- Be aware of dangerous chemicals, hazardous materials and other substances that are found in your area.
- Consider alternatives to hazardous products that contain hazardous chemicals.
- Participate in a voluntary Wellhead Protection Program (WHP) in your area.

Davison Drinking Water Protection Program

2018 MICHIGAN RURAL WATER ASSOCIATION WATER QUALITY OF THE YEAR
2018 MICHIGAN RURAL WATER ASSOCIATION WATER QUALITY OF THE YEAR
2018 MICHIGAN RURAL WATER ASSOCIATION WATER QUALITY OF THE YEAR

Awarded "2011 Best Tasting Water" by the Michigan Rural Water Association

WASTE NO WORDS

Color Mel

A peek inside the Davison Water Treatment Plant...

Mason Bulldogs

What's wrong in this picture?

The people here are saving water, and they are saving water by using a well that is leaking. The well is leaking water, and the people are saving water by using a well that is leaking.

Water...Water...A Continuous Cycle!

clouds, rain/snow, sun, vapor, well, groundwater, bedrock

How can you help?

- Check for leaks in your home.
- Check for leaks in your car.
- Check for leaks in your business.
- Check for leaks in your community.

Mason Drinking Water Protection Program

The City of Mason owns and operates its own drinking water system and provides groundwater to area residents and businesses with their own pumping wells located throughout the City. The City has a Water Protection Program that includes the entire portion of the City and extends into both adjacent and areas. This program is overseen by the Michigan Department of Environmental Quality (MDEQ) and allows the City to take action to safeguard the drinking water supply by preventing contamination of the water supply. For more information, please call the City at 513-555-1131.

Protect Your Drinking Water. Plug Abandoned Wells

What is an abandoned well?

- A well that has not been in use for several years.
- A well that is in such disrepair that it cannot be used.
- A well that has been left uncompleted.
- A well that is a threat to groundwater resources or may be a health or safety hazard.

This abandoned well is in a basement!!!!

There is a proper way to plug an abandoned well! For more information, call the Oakland County Health Department at 248-288-5150.

Why are these wells dangerous?

Safety Hazard—Each year the Michigan Department of Environmental Quality (MDEQ) receives reports of people, mostly children, falling into old wells. Injury or death may result.

Health Hazard—Abandoned wells allow contaminants to move from the surface into deeper aquifers. Drinking water wells have been contaminated by abandoned wells.

Environmental Hazard—Deteriorating well casings or open, unsealed boreholes allow movement of water between previously separated aquifers. This can degrade water quality. Abandoned wells have also been used for illegal dumping of waste.

Word Scramble

All living things need... WATER

When water evaporates, it goes up into the air and becomes part of a... CLOUD

Less than 1% of all the water on earth is... FRESH

Michigan has over ONE million... WELLS

Michigan leads the nation in the number of new wells... DAILY

According to Michigan law... HOMEOWNERS are responsible for plugging abandoned wells.

Placemat Designs...Other Unique Ideas

City of Charlotte Wellhead Protection

This placemat was developed as part of the City's Wellhead Protection Program. The City is working with the Michigan Department of Environmental Quality to conduct the Michigan Drinking Water Wells Near Urban Contamination. The Program includes the following elements:

- Determining the Protection Area (WHPA)** - This step shows the best area that requires the greatest protection, the best areas contributing water to the City wells.
- Land Use Inventory** - An inventory of potential sources of contamination. Land use that has the greatest potential for contamination is identified, such as gas stations, dry cleaning, auto repair, etc. and included facilities are given a risk assessment.
- Pollution Prevention Strategies** - An Advisory Committee made up of local citizens, planning officials, and City and Township staff is working to develop strategies to prevent contamination of the City's water supply.

Can you find the hidden words in the puzzle?

ABANDONED	COAL	GROUNDWATER	POLLUTION
ALGIC	CONSERVATION	SEW	SPRINKLER
ALKALINE	CRIB	KAYAK	WELL
ALUMINUM	DOWNSTREAM	MANGANESE	WATER
ANNE	EKOLOGY	MONITORING	WATERBIRD
BIOMASS	FISHING	MONTGOMERY	WILDLIFE

Test Your Knowledge of Groundwater

- Of Michigan's 9 million residents, approximately which percent depend on groundwater for their drinking water source?
 - 10%
 - 50%
 - 100%
 - none of the above
- Groundwater is stored in underground formations known as aquifers. A groundwater aquifer is most like:
 - an underground lake
 - an underground river
 - an underground sponge
 - none of the above
- Groundwater is especially susceptible to contamination because:
 - it moves slowly, once contaminants enter they may be there a long time
 - it is very cold, acting as a contaminant preserver
 - it is low in oxygen, causing slow biological and chemical activity and breakdown
 - all of the above
- Sources of groundwater contamination can include:
 - improperly installed or malfunctioning septic tanks
 - unlined industrial and municipal waste pits, ponds and lagoons
 - agricultural land treated with fertilizers and pesticides
 - salt from road deicing operations
 - all of the above
- Which of these amounts comes closest to the amount of garbage created annually by the average American?
 - 10 lbs
 - 100 lbs
 - 1000 lbs
 - 10,000 lbs

GROUNDWATER ANSWERS

- B. About 50% of Michigan's residents depend solely on groundwater for their drinking water supply, making roughly 50% of the state's drinking population.
- C. An aquifer is a well-saturated layer of absorbing and storing water. It behaves functionally like a sponge.
- D. For all of the reasons listed, groundwater is vulnerable to contamination and recovery difficult and expensive to clean once polluted. For these reasons, contamination prevention is the most appropriate method of protecting groundwater supplies.
- E. All of these sources are potential routes of entry for contaminants into groundwater systems. The types of contaminants that enter depend on the source, however. Offense farms and dairies may leak fertilizers and pesticides. Industrial facilities may leak heavy metals, petroleum products, and other industrial pollutants.
- E. About 100 million tons of garbage are generated annually from the U.S. population of 240 million, about 100 pounds per person per year.

TESSERACT'S MAZES

WH

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City of Charlotte—8th Grade Project

Before It's too Late
make your wells great!

Millington Drinking Water Protection Program

Because residents in the Village of Millington rely on groundwater as their drinking water source, a voluntary Wellhead Protection Program (WHP) was developed. The goal of a WHP is to protect the Village's drinking water from contamination. The Village established a team of people to oversee the program. First, a Wellhead Protection Area (WHPA) was developed. At the edge of this area, it would take ten years for contamination to reach the Village's municipal wells. Because activities within this area could have an impact on the safety of your drinking water, this is the area that is being protected. Potential and existing sources of contamination were identified and mapped within the WHPA. Public education and management activities are also implemented to educate the public about the importance of groundwater protection.

For more information, contact the Village Office at:
2659 State Street, Millington, MI 48166
984-47-2701

Village of Millington Wellhead Protection Area

Village of Millington—5th Grade Contest

Placemat Designs...Other Unique Ideas



City of Vassar– 6th Grade Project

MRWA Materials: Brochures

How to Locate Abandoned Wells on Your Property

- Search for water well drilling logs or old billing statements that show well depth and well location.
- Information can be found by contacting any of the following sources: (a) the contractor who drilled or serviced the well, (b) the local health department, (c) the MDEQ, Geological Survey Division in Lansing.
- If there are no records available for your well, look for the following:
 - Pipes sticking out of the ground
 - Pipes sticking through wall or floor in the basement
 - Electrical switch boxes out in the yard
 - Cement pits in or under sheds
 - Weldments
 - Old crank, brick, or stone structures
 - Old hand pumps
- For locating **SAFED** wells:
 - Metal detectors may be used to find buried steel well casings.
 - First, locate where the old wire line exited the house or building.
 - From this point, survey the ground with the metal detector moving away from the structure.
 - Use a marker to designate the location of any readings you get.
 - Well casings will typically be 4 to 5 feet below grade and will be located between 7 to 25 feet from your house.

Plugging



Abandoned Water Wells

Protecting Your Safety, Health and the Environment

Unplugged Abandoned Wells Pose Safety, Health and Environmental Threats

Safety Hazards—Each year the Michigan Department of Environmental Quality (MDEQ) receives reports of people, mostly children, falling into old wells. Injury or death may result.

Health Hazards—Abandoned wells act as conduits for contaminants to move from the surface into deeper aquifers. Drinking water contamination has been caused by abandoned wells.

Environmental Hazards—Deactivated well casings or open, unlined boreholes allow movement of water between previously separated aquifers. This can degrade water quality. Abandoned wells have also been used for illegal dumping of waste.

What is an Abandoned Water Well?
An abandoned water well is defined as a well which:

- has its use permanently discontinued,
- is in such a deep state its continued use for obtaining groundwater is impractical,
- has been left unsecured,
- is a threat to groundwater resources,
- is or may be a health or safety hazard.

Who is Responsible for Plugging Abandoned Water Wells?
The property owner is responsible for plugging an abandoned water well.

A registered well drilling contractor or his/her employee may plug a well at any residence, farm, industry, business or other water supply facility.

Examples of Abandoned Wells That Must Be Plugged

- Wells that are not operational.
- Wells that are disconnected and have out of service pipe time connection is made to the municipal water system.
- Any, regardless of abandonment well which is not properly sealed that can be a safety or environmental hazard.

For Further Information, contact:
City of Gladwin
Phone: 989-426-9231

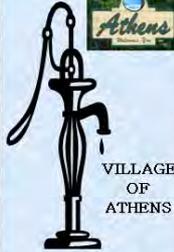
What Can You Do To Protect Your Drinking Water?

- Inform the Village of Athens of any potential sources of contamination.
- Properly plug abandoned wells on your property.
- Be aware of dangerous household hazardous chemicals and never dump them directly onto the ground.
- Consider alternatives to household products that contain hazardous chemicals.
- Participate in a Household Hazardous Waste Collection Day.
- Recycle used motor oil and brake and transmission fluid. Many service stations will accept used oil.
- Pick up and dispose of animal waste.
- Follow instructions and soil test recommendations for use of pesticides and fertilizers. Over-application is harmful.
- If you have a private well, test your water annually.
- If you have a septic system, have it checked every three years to ensure that it is functioning properly.
- Get involved in the Athens Wellhead Protection Program.

For Further Information
Village of Athens
129 E. Burr Oak Street
Athens, MI 49011
269-729-5515

Michigan Quality of Life
This material was created by the Michigan Rural Water Association.

ATHENS



VILLAGE OF ATHENS

WELLHEAD PROTECTION PROGRAM

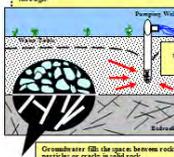
COMMITTED TO PROTECTING YOUR DRINKING WATER

What is Groundwater?

Groundwater is the water that fills the small spaces between rock particles (sand, gravel, etc.) or cracks in solid rock. Rain, melting snow, or surface water becomes groundwater by seeping into the ground and filling these spaces. The top of the water-saturated zone is called the water table.

Water movement is cyclical and moves from the ground to the surface (springs, rivers, lakes, wells), to the air (evaporation) and back to the surface (precipitation) where it seeps into the ground and into an aquifer. An aquifer is any type of geologic material, rock or sand or sandstone, which can supply water to wells or springs.

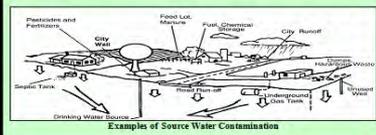
Groundwater, which supplies wells, often comes from within a short distance (a few miles) of the well. Flow that the groundwater moves depends both on how much the well is plugged and what type of rock particles or bedrock it is moving through.



Groundwater can fill the space between rock particles or cracks in solid rock.

How Do Wells Become Contaminated?

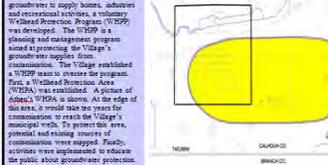
Wells become contaminated when substances that are harmful to human health get into the groundwater. Water from these wells can be dangerous to drink when the level of pollution rises above health standards. Many of our everyday activities can cause contamination. The diagram includes potential sources of contamination.



Examples of Source Water Contamination

What is Wellhead Protection?

Because residents in the Village of Athens depend on clean, safe groundwater to supply homes, industries and recreational activities, a voluntary Wellhead Protection Program (WHP) was developed. The WHP is a planning and management program aimed at protecting the Village's groundwater supplies from contamination. The Village established a WHP team to oversee the program. The Village Wellhead Protection Act (WHPA) was established. A picture of Athens, WHPA is shown. At the edge of the area, it would state the year the commitment to reach the Village's managed wells. To protect the area, potential and existing sources of contamination were mapped. Facility activities were implemented to reduce the public about groundwater protection.



VILLAGE OF ATHENS

MRWA Materials: Cable Access Channel

Westphalia's Drinking Water Protection Program

1

Westphalia has **TWO GROUNDWATER** wells that supply drinking water to residents.

2

What does a well look like?

3

What is **GROUNDWATER**?

4

Groundwater is water that is found in pores and spaces under the ground.

5

How does water travel from the ground to your faucet?

6

Pumping allows groundwater to move toward a well.

7

8

How does the water get from the well into your home?

9

Water moves through pipes located underground called **water mains!**

10

Why is the water tower important?

- > It provides water storage in case of a fire or water emergency.
- > It creates pressure in the system.

11

How is the Village working to protect Your drinking water?

12

The Village implemented a local **Wellhead Protection Program.**

13

What is **Wellhead Protection**?

14

Wellhead Protection Program (WHPP)

- 1995 amendments to the recent Safe Drinking Water Act (SDWA)
- Voluntary program implemented at the local level through the coordination of activities by local, county, regional, and state agencies.
- Requires local program developed by the Michigan Department of Environment and Natural Resources

15

The Goal of a Wellhead Protection Program

Protect your public groundwater supply system from potential sources of contamination.

16

Why do we need a **Wellhead Protection Program**?

17

Because the activities on the surface and subsurface impact groundwater quality

18

How many communities in Michigan have a **Wellhead Protection Program**?

19

Wellhead Protection in Michigan

- > 100 Approved Programs
- > 200 Approved WHPPs (in Low Tonnage)
- > 70% of the population that rely on a municipal groundwater system have done something with wellhead protection

20

What does the **Wellhead Protection Program** involve?

21

PROGRAM ELEMENTS

- Form a team of people that can assist with the program
- Determine the "Wellhead Protection Area" by studying local geology
- Implement management strategies
- Plan for New Wells
- Monitor Current Contamination
- Regulate Future Contamination
- Control existing and existing sources of contamination

22

Protection is provided by...

- > Identifying the area that contributes groundwater to public water supply system (PWSS) wells.
- > Identifying sources of contamination within the area.
- > Developing methods to manage the area and minimize the threat to the PWSS.

23

1st FORM A WELLHEAD PROTECTION TEAM

24

Possible WHP Team Members

- > Village Manager
- > Water Superintendent
- > Fire Chief
- > Police Chief
- > Zoning Administrator
- > Teachers
- > Environmental Group
- > Business Owners
- > Farmers
- > Local Health Department

A good team will have any of the following members.

25

Westphalia's WHP Team

- > Jim Beardsall, Department of Public Works Supervisor
- > Steve Miles, Department of Public Works
- > Sandy Smith, Village Clerk
- > Phil Smith, St. Mary's Elementary, Teacher
- > Sarah Rollins, Mt. Michigan District Health Department-Clinic, County Branch
- > Michael Spitzer, Plovero Department of Public Works Director
- > Kelly Fox, Michigan Rural Water Association

26

2nd IDENTIFY THE WELLHEAD PROTECTION AREA

27

What is the **Wellhead Protection Area (WHPA)**?

The surface area that overlies the aquifer that is directly contributing to your well.

28

How is the Area Determined?

Because the Village's water is provided from a very protected groundwater source, the State allowed the Village to draw a one (1) mile radius around the wells.

29

Westphalia's **Wellhead Protection Area (WHPA)**

One mile radius around the Village's water wells.

30

Westphalia's WHPA

- > **ONE** mile radius provides a reasonable length of time for responding to environmental problems within the WHPA.
- > Provides an area which can be reasonably managed.

31

3rd IDENTIFY POTENTIAL & EXISTING SOURCES OF CONTAMINATION

32

Federal and State Potential Sources of Contamination

- > Past 201 Sites of Environmental Contamination
- > Underground Storage Tank Sites
- > Leaking Underground Storage Tank Sites
- > Hazardous Waste Generator Sites

33

Create a Contaminant Source Inventory

- > List existing and potential sources of contamination within the one-mile radius.

34

4th IDENTIFY MANAGEMENT STRATEGIES THAT WILL

35

Choosing Management Strategies

Communities should choose management strategies based on the types of potential or existing sources

36

If a community has business and industry they could implement the following...

- > Zoning Ordinances
- > Site Plan Review Standards
- > Government Permit Checklist
- > Pollution Prevention Programs
- > Brownfield Redevelopment Initiatives

37

If a community has agriculture land, they could implement the following....

- > Michigan Clean Sweep Program
- > Michigan Emergency Tube/Emergency Trenching
- > Farm*A*Syst and Org*A*Syst
- > Pollution Prevention

38

If a community is largely residential, they could implement the following.....

- > Zoning Ordinances
- > Household Hazardous Waste Collection Day
- > Home*A*Syst
- > Education and Outreach Programs

39

Westphalia's Management Strategies

- > Searched and plugged approximately 17 abandoned wells
- > Adopted an abandoned well ordinance

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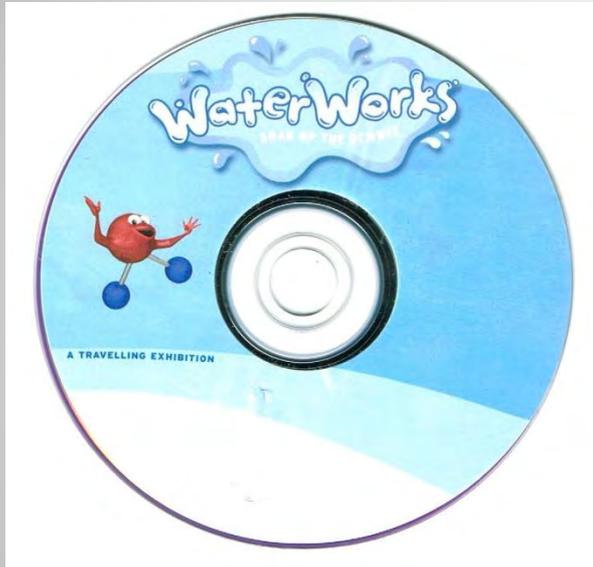
Other Items for Cable Access Channel

- After the Storm

- Available at: <http://www.clu-in.org/search/t.focus/id/602/>

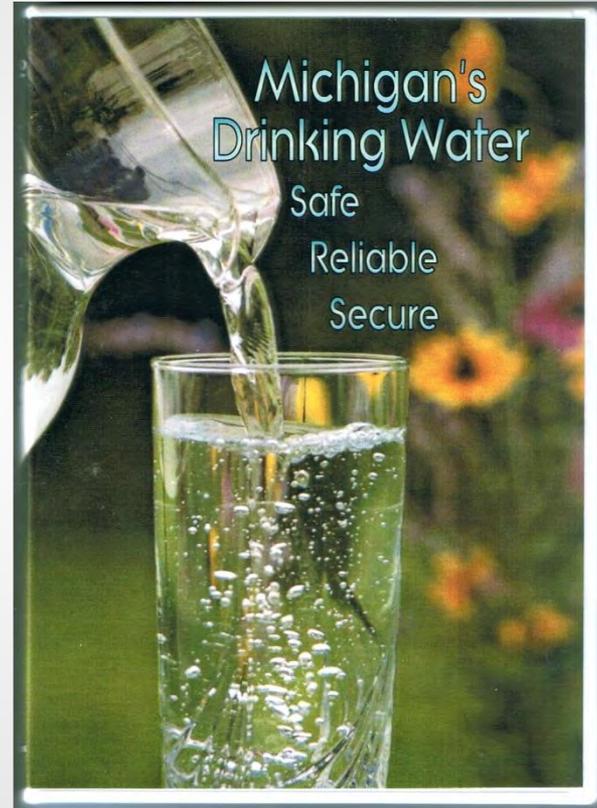
The screenshot shows the EPA website's 'Water: After the Storm - Weather' page. The header includes the EPA logo and navigation links for 'LEARN THE ISSUES', 'SCIENCE & TECHNOLOGY', 'LAWS & REGULATIONS', and 'ABOUT EPA'. A search bar and 'A-Z Index' are also visible. The main content area features a breadcrumb trail: 'You are here: Water » What You Can Do » "After the Storm"'. The title is 'After the Storm' in a large, stylized font. Below the title, it states 'Television Special Called "After the Storm" Co-Produced by EPA and The Weather Channel'. A sub-headline reads 'Complete Copy of "After the Storm" Video Posted on Internet'. The main text describes the program as a 1/2 hour television special about watersheds, co-produced by EPA and The Weather Channel (TWC), available at no charge. It premiered on TWC on Feb. 24, 2004. To the right, there is a section titled 'What can you do to help prevent water pollution?' with an image of a person mowing a lawn. Below this, there is a link to 'After the Storm Brochure' which provides tips on preventing runoff. A list of links is provided at the bottom of the page, including 'Announcement', 'Fact Sheet', 'DVD and VHS copies', and 'Beta SP copies (for cable and other TV stations)'. There are also links for 'Reader-friendly print version (PDF) (5 pp, 511K, About PDF)' and 'Original print version (PDF) (2 pp, 435K, About PDF)'. A sidebar on the left contains a list of navigation links under 'Water Home', 'Drinking Water', 'Education & Training', 'Grants & Funding', 'Laws & Regulations', 'Our Waters', 'Pollution Prevention and Control', 'Science & Technology', 'Water Infrastructure', and 'What You Can Do'.

Other Items for Cable Access Channel



Science North Productions

<http://sciencenorth.ca/exhibitions/video-water.aspx>



Michigan Section AWWA Productions

Materials Available

- **MDEQ**
 - Booklets
 - “The Power to Protect: Planning and Managing Land Uses in the Wellhead Protection Area”
 - “Teaming Up for Quality Drinking Water”
 - Brochures
 - Packets
 - Agricultural Management Packets
 - Education and Outreach Packets
 - Guidance Documents
 - Fact Sheets
 - “Zoning For Wellhead Protection”
 - “On-site Wastewater Systems With Sand Filters: Maintenance Needs For Groundwater Protection”
 - “State & County Environmental Permits Checklist: An Administrative Tool For Intergovernmental Communication”
 - “Storm Water Infiltration: Considerations for Michigan Communities”
 - “Pollution Prevention at Small Commercial & Industrial Facilities”
 - “How To Locate Abandoned Wells”

Materials Available cont.

- **EPA**
 - Posters
 - Brochures
 - Fact Sheets
- **MRWA**
 - Education and Outreach Examples and Ideas Packet
 - Placemats (Surface Water & Groundwater)
 - Brochures (WHPP & Abandoned Well Hazards)
 - Article Series for Drinking Water Protection (9 Articles for Newsletters/Newspapers/Website/etc.)
 - Planning and Zoning Templates (Ordinances, Site Plan Reviews, Environmental Permits Checklist)

Materials Available cont.

- Other Organizations
 - Groundwater Foundation
 - American Water Works Association (AWWA) & Member Organizations
 - Water Environment Federation & Member Organizations
 - MSU Extension Offices
 - Local Conservation Districts
 - Others

Why Participate?

INCREASE drinking water protection and management through education and awareness efforts

AND

DECREASE the likelihood of your drinking water supply becoming contaminated

Funding

- Michigan Wellhead Protection Grant Program
 - October 1–September 30 of each year
 - 50/50 grant match
 - Previous Expenditures Available
- MI Surface Water Intake Protection Grant Program
 - Available in Fiscal Year 2014
 - Communities can receive \$10,000 to \$20,000 with a 50% match
 - Funding amount will be based on susceptibility rating from the 2003 assessments

Contact Information

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QUESTIONS?