

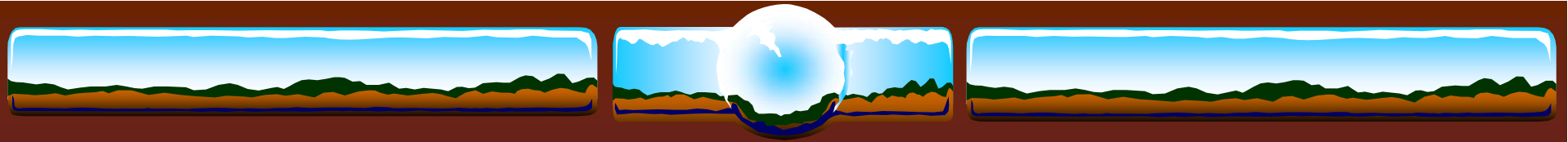


# Development and Implementation of Drinking Water Source Protection Strategies

## The Maumee River Basin Approach

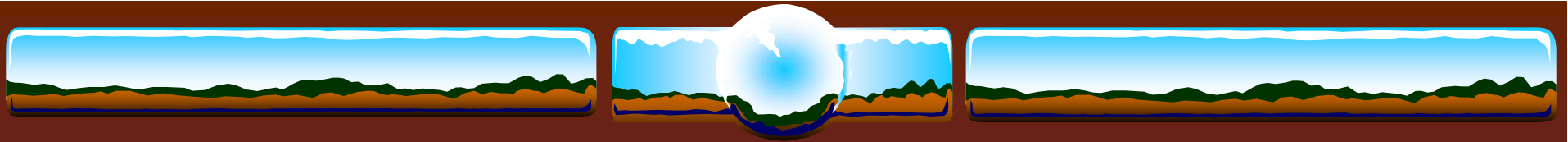
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Central Office, Columbus

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Division of Drinking and Ground Waters  
Central Office, Columbus



# Presentation Outline

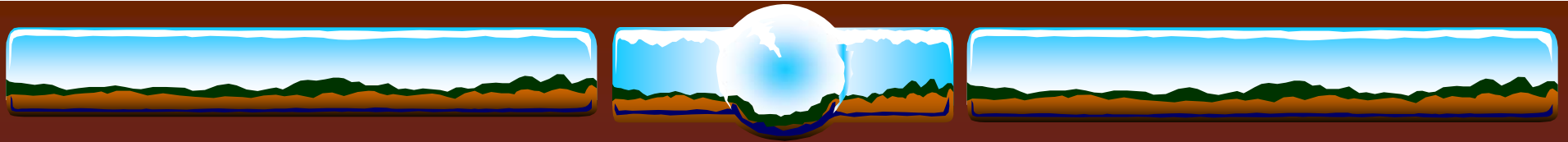
- ❖ Introduction - Why Protect Source Water?
- ❖ Source Water Assessment Summary
- ❖ Source Water Protection Planning Initiative
- ❖ Maumee Basin Approach
- ❖ Benefits of MRBPLG Involvement



# Why Protect Source Water?

## Surface Water Disaster Example 1:

- ❖ Ethylene dibromide spill on the Ohio River
  - ❖ June 3, 1994 - Spill of EDB impacted Ironton and Portsmouth. Shut off intakes and almost ran out of reserve water. Barges with water called in at last minute. Emergency was over after 1 month.

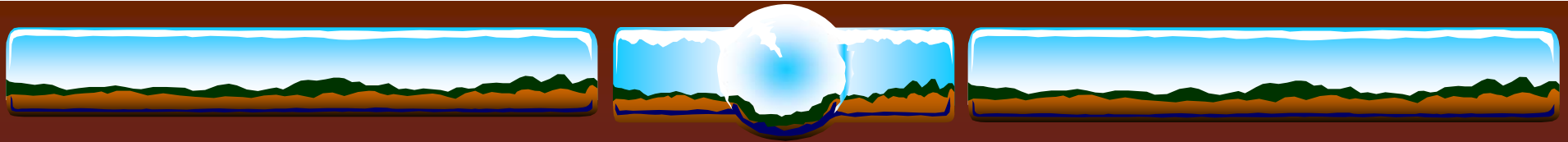


# Why Protect Source Water?

## Surface Water Disaster Example 2:

- ❖ Seasonal Water Quality Problems at Village of Monroeville
  - ❖ Persistent exceedances of nitrate and atrazine MCLs from the Huron River during heavy rains in the spring.
  - ❖ Constructed upground reservoir in 2000 - \$2.6 million dollars

**RESERVOIRS ARE EXPENSIVE!**

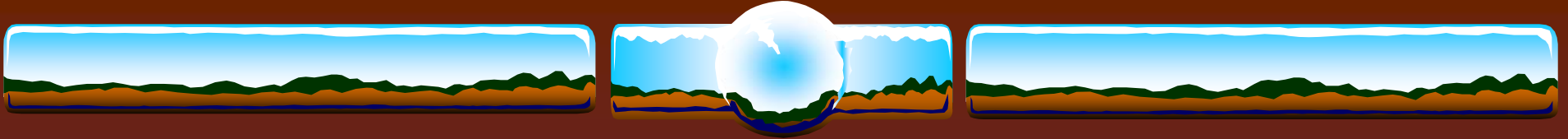


# Why Protect Source Water?

## Surface Water Disaster Examples 3&4:

- ❖ Taste and odor problems in Akron's finished water in December, 2005.
  - ❖ MIB and Geosmin problems in December. Suspected heavy rainfall and runoff in November.
  - ❖ City used 100 tons of carbon in December (\$50,000) when it normally uses 20 tons/year.
- ❖ Taste and odor problems in Wichita, Kansas Cheney Reservoir in 2002-2003.
  - ❖ Taste and odor problems all winter.
  - ❖ Suspected heavy rains that washed phosphorus from farms into reservoir.
  - ❖ Wichita added a \$7.5 million ozone-injection system to the water plant.

**RESERVOIRS HAVE THEIR OWN PROBLEMS**



# Drinking Water Source Assessment & Protection Program

## What Is It?

- ❖ A program designed to determine what the potential contaminant sources are to drinking water in the watershed, and then design strategies to protect the drinking water from those potential sources.
- ❖ Not a regulatory requirement, however highly recommended to promote improved raw water quality at the intake and to minimize cost of treatment.



# The SWAP Process

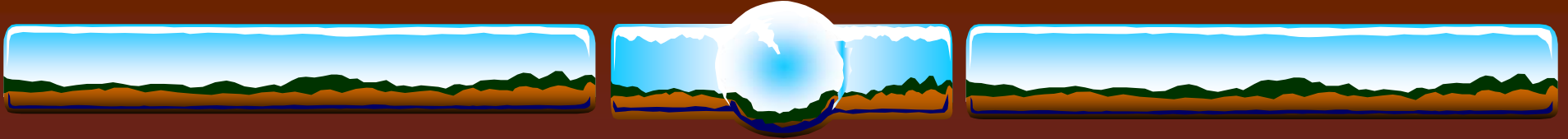
## **The Assessment - Completed by Ohio EPA**

- ❖ Define Protection Areas for Wells/Intakes
- ❖ Inventory Potential Contaminant Sources
- ❖ Determine Susceptibility- (All intakes are highly susceptible)



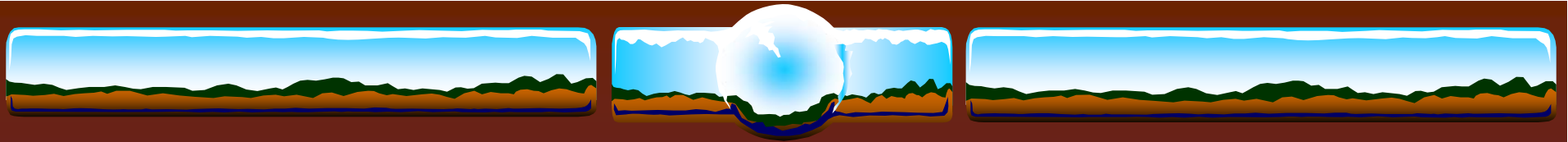
## **The Protection Plan - Completed by Water System**

Develop and Implement Drinking Water Source Protection Strategies



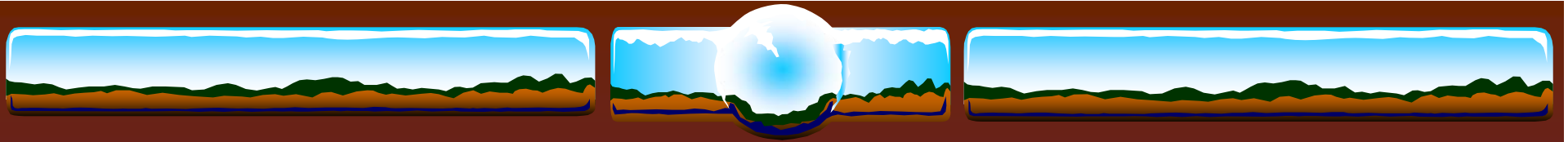
# Source Water Assessment Background

- ❖ Required by 1996 Amendments to the Safe Drinking Water Act
- ❖ Requires that Public Water Systems take Steps to Protect their Source of Drinking Water
- ❖ Addresses All Public Water Systems
  - ❖ ~5400 Ground Water Systems & ~150 Surface Water Systems



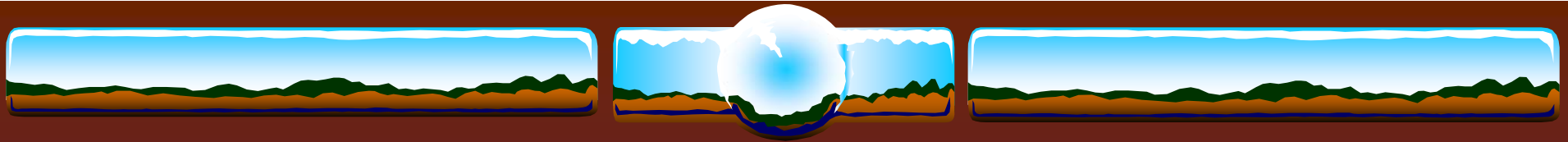
# From Wellhead Protection to Source Water Assessments

- ❖ SWAP program is an extension of the Wellhead Protection Program (WHP)
- ❖ Under WHP, each PWS had to conduct their own assessment.
- ❖ Under SWAP, Ohio EPA prepared most of the Assessments



**Source Water Assessment**  
**Step 1: Determining the Source**  
**Water Protection Area**

The SWAP protection area is the watershed area that supplies water to the intake.



# Inland Surface Water Intake Protection Areas:

## ❖ **Source Water Protection Area (SWAP) -**

Entire Watershed upstream of the intake.

## ❖ **Corridor Management Zone (CMZ) -**

Extends 10 miles upstream of intake and 1,000 feet laterally from each bank of the main stream and 500 feet laterally from each bank of tributaries to main stream.

## ❖ **Emergency Management Zone (EMZ) -**

Area in the immediate vicinity of the intake where there is little time to respond to a spill.



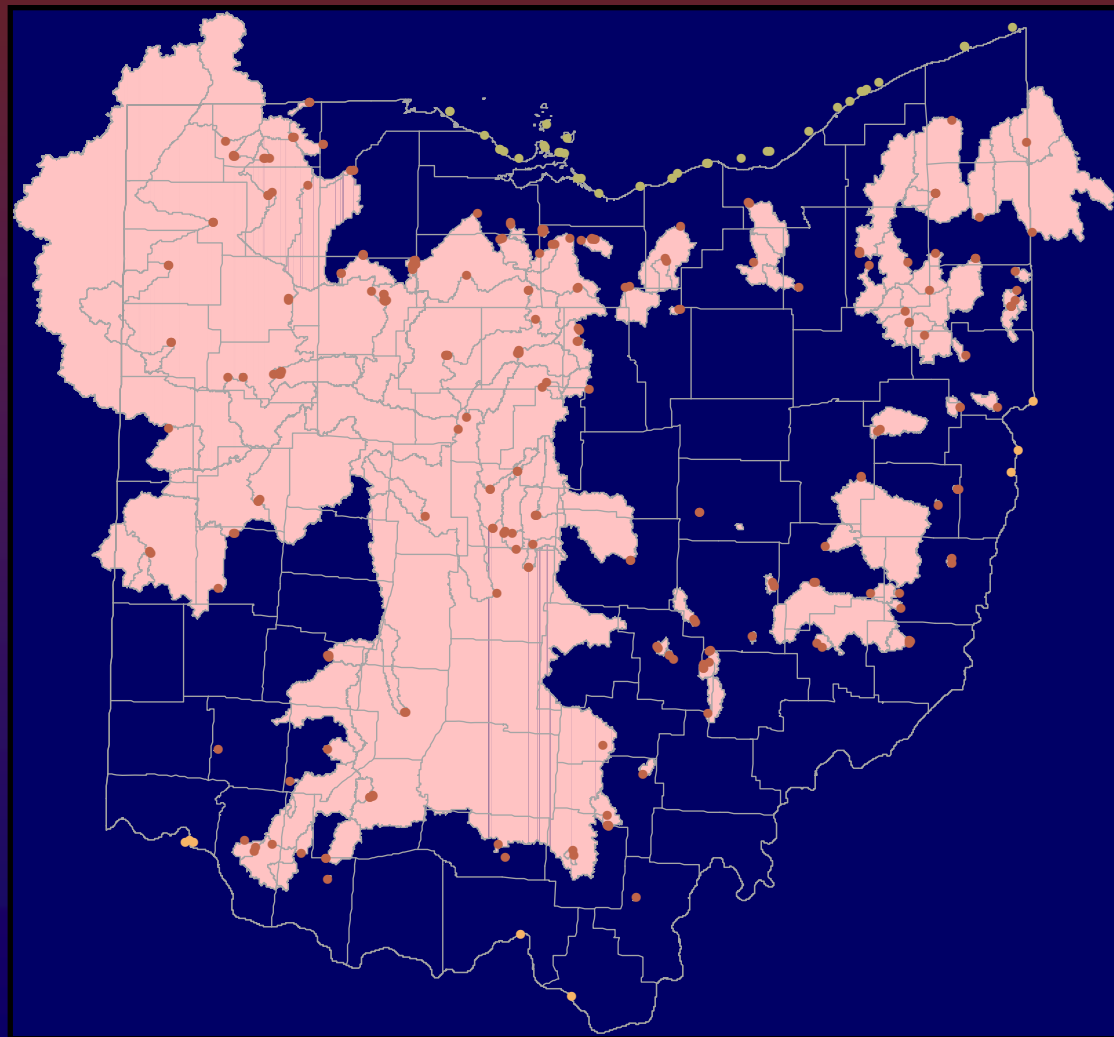
## Source Water Assessment and Protection Areas for Surface Water Supplied Public Water Systems

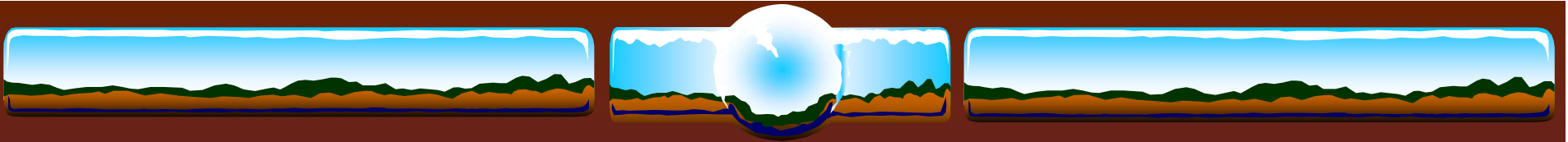
### Intakes

- Inland Waters
- Lake Erie
- Ohio River

### Number of Systems

Inland Waters	113
Lake Erie	28
Ohio River	6



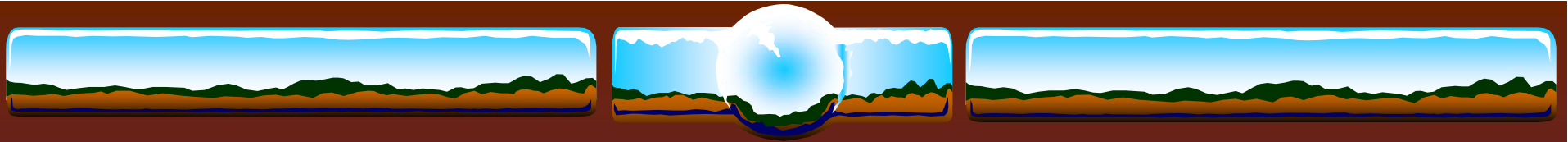


# Source Water Assessment

## Step 2: Potential Contaminant

### Source Inventory

The inventory identifies potential contaminant sources that could affect the aquifer or the surface water entering an intake.



# Ohio EPA Review of Historical Potential Sources

- ❖ Ohio EPA databases
- ❖ USGS databases
- ❖ ODNR databases
- ❖ Databases included cemeteries, oil and gas wells, hazardous waste sites, landfills, underground storage tanks, air emissions, airports, etc.



# Detailed Inventory

- ❖ Field Visit
  - ❖ Verify and correct database information
  - ❖ Locate additional potential contaminant sources
- ❖ Enter information into GIS database

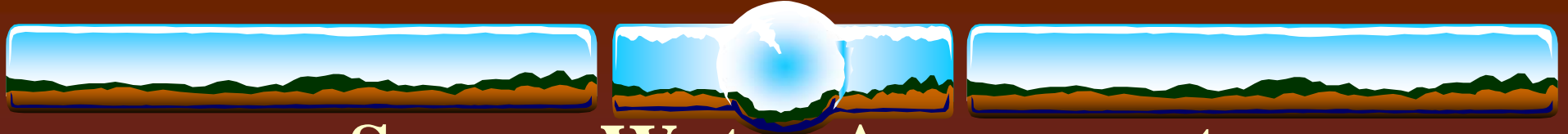


# General Contaminant Source Categories



- Agriculture
  - Commercial
  - Industrial
- Municipal
  - Waste Disposal
  - Site-Specific





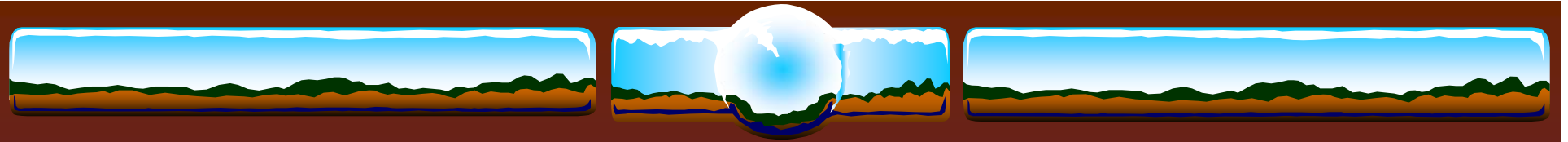
# Source Water Assessment

## Step 3: Susceptibility Analysis

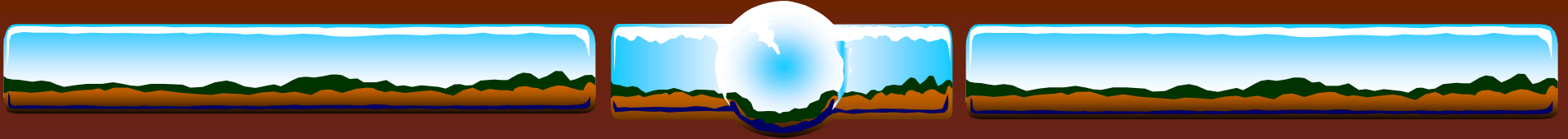
WELLS: Susceptibility rating is based upon:

- ❖ Hydrogeologic Setting
- ❖ Potential Contaminant Sources
- ❖ Water Quality Data

INTAKES: All surface water intakes are considered susceptible to contamination and therefore not rated by the above criteria.



What happens after the assessments  
have been completed?



# Protection Plan

- ❖ The Protection Plan describes how the community is going to protect the surface waters from potential contaminants in and near the drinking water source protection area.

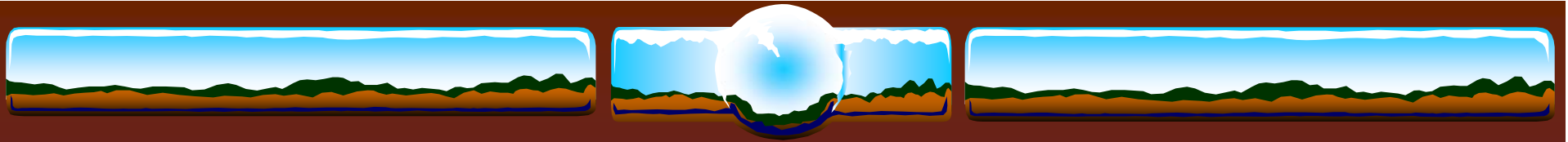
TEMPLATE

DRINKING WATER SOURCE  
PROTECTION PLAN

FOR

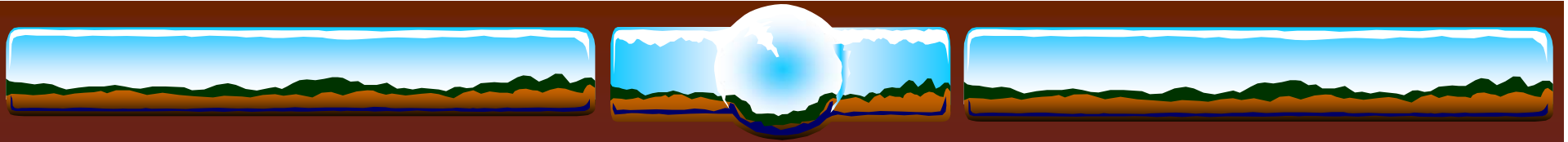
the [SYSTEM NAME]

PWS ID#



## A Protection Plan:

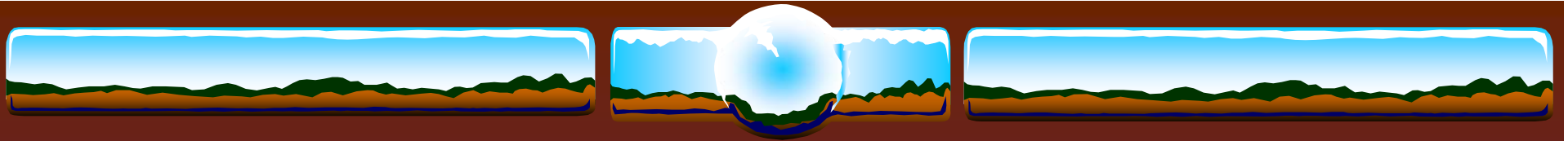
- ❖ Presents and explains the protective strategies each community chooses to implement
- ❖ Is developed by a protection team formed by the public water supply in cooperation with each community



# What Will The Plan Contain?

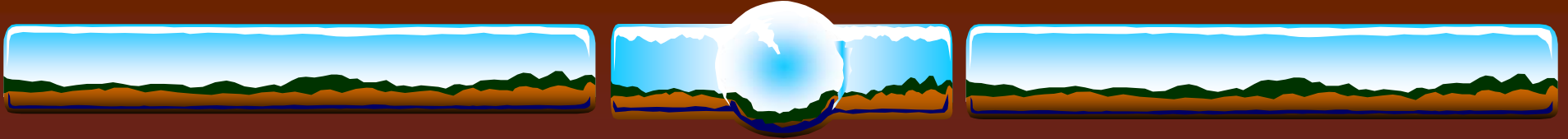
## *That Depends On:*

- ❖ What's important to the communities
- ❖ Potential Contaminant Sources
- ❖ Available Resources
- ❖ The community's vision for the future



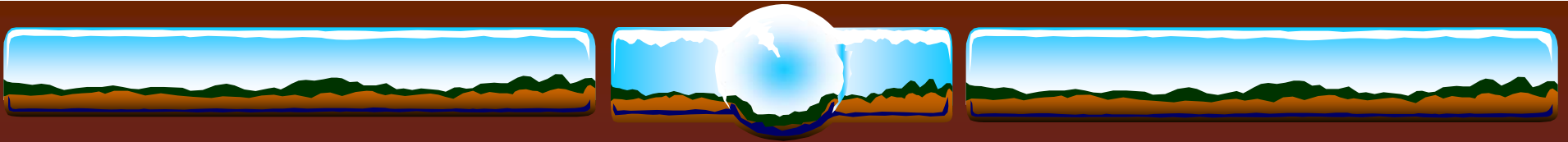
# Elements of a Source Water Protection Plan

- ❖ Forming a Protection Team
- ❖ Evaluating the Threat
- ❖ Education and Outreach
- ❖ Contingency Planning
- ❖ Source Management
- ❖ Source Water Monitoring
- ❖ Writing and Submitting the Protection Plan)



# Obtaining Support from Local Officials

- ❖ Before starting the protection planning process:
  - ❖ Support of the PWS governing body (i.e. city council, homeowners association, board of directors, county commissioners, etc.)
  - ❖ Resolution of Intent to develop a drinking water source protection program (or some documented approval for the process)
  - ❖ Use Information in the following Appendices of Surface Water Guidance:
    - ❖ C - Benefits and Cost of Source Water Protection
    - ❖ D - Potential Contaminant Sources
    - ❖ E - Case Studies
    - ❖ F - Summary of Drinking Water Source Protection Tools



# Identifying Current Protection Efforts

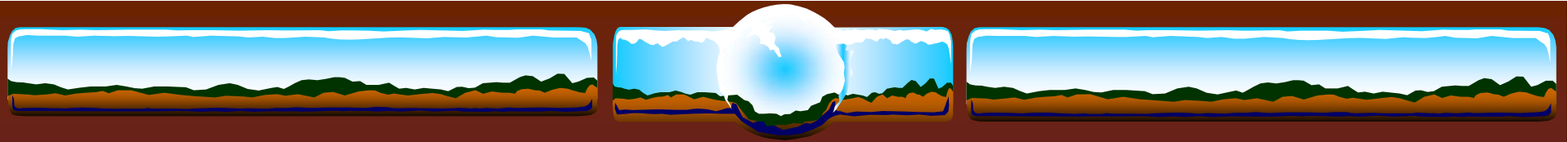
- ❖ Identify watershed activists
  - ❖ <http://ohiowatersheds.osu.edu/groups-huc>
    - ❖ Examples:
      - ❖ **Conservation Action Project Maumee River Basin**
      - ❖ **Maumee River Basin Partnership of Local Governments (MRBPLG)**
      - ❖ **Western Lake Erie Partnership**
  
- ❖ Review any Watershed Action Plans for ideas
  - ❖ <http://www.epa.state.oh.us/dsw/nps/NPSMP/WAP/WAPendorse.html>



# Organizing The Protection Team

- ❖ Include those who play a role in implementing protective strategies and those affected by any decisions made:
  - ❖ PWS staff knowledgeable about emergency response and environmental compliance
  - ❖ Public relations specialist
  - ❖ Members from local watershed planning organizations (SWCD, NRCS, Farm Bureau, etc.)
  - ❖ Local decision makers
  - ❖ County Commissioners
  - ❖ Emergency Response Personnel





# Evaluating The Threat

- ❖ Evaluate existing water quality data
- ❖ Identify critical areas for drinking water source protection
- ❖ Evaluate potential contaminant sources in critical areas.



# Education and Outreach

- ❖ Make people aware:  
how their activities **IMPACT**  
ground water,  
what they can do to help
- ❖ Examples:
  - Inserts in water bill
  - brochures & web pages
  - newspaper articles
  - posters & presentations
  - booths at events
  - employee training
  - field trips to water plant





# Drinking Water Shortage

## Water Supply Planning

- ❖ What happens if the source water becomes unusable?
  - ❖ Identify short and long-term sources
  - ❖ Identify financial mechanisms
- ❖ What are future water supply needs?





# Emergency Response

## ❖ Spill Response

- ❖ What happens if there is a catastrophic spill?
- ❖ Develop emergency response plan





# Source Control Strategies

- ❖ Actions taken to protect the aquifer or intake from a *specific* potential contaminant source





# Source Control Strategy Examples

- ❖ Best Management Practices
- ❖ Prohibitions and Restrictions
- ❖ Design and Operating Standards
- ❖ Reporting Requirements
- ❖ Land Purchases
- ❖ Zoning
- ❖ Documentation





# Water Quality Monitoring

Provides:

- ❖ Early Warning
- ❖ Water Quality Trends
- ❖ Evaluation of effectiveness of selected protective strategies





*IN SUMMARY*

## Assessment

(Technical Information)

Delineation  
of  
Protection  
Areas

Pollutant  
Source  
Inventory

## Protection Plan

(Developed by Local Team)

Education/  
Public Participation

Contingency Plan  
Update

Source Control  
Strategies

Water Quality  
Monitoring

Protected  
Source  
of  
Drinking  
Water

# Timeline for Creating a Protection Plan



- ❖ Resolution of Council
- ❖ Form a protection team – ~1 month
- ❖ Protection team meetings – ~1-2 years
- ❖ Plan review by Ohio EPA – ~30 to 60 days
- ❖ Endorsement – when the plan is complete

# Protection Plan Incentives

Helps Ensure Continuity

Endorsement by Ohio EPA

Points toward low interest loans from Ohio EPA for public drinking water system infrastructure improvements.

PWS operators for surface water systems will receive up to 5 Contact Hours by attending all workshops and completing a detailed draft outline of their Protection Plan.

PWS operators for ground water systems must submit an endorseable Protection Plan to receive up to 5 Contact Hours.





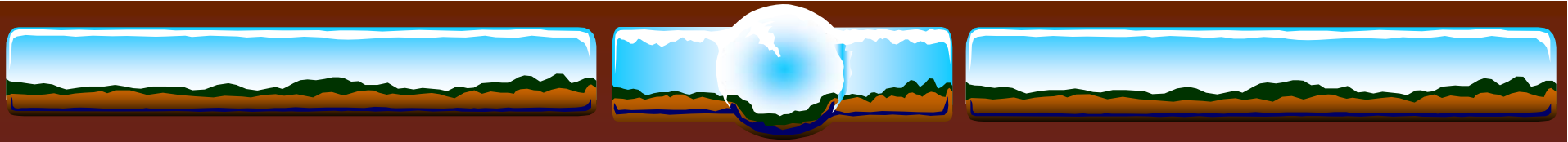
# Protection Planning Workshops

## Maumee Basin

- ❖ 5 Interactive Protection Planning Workshops (**first one on October 18, next one on January 10**)

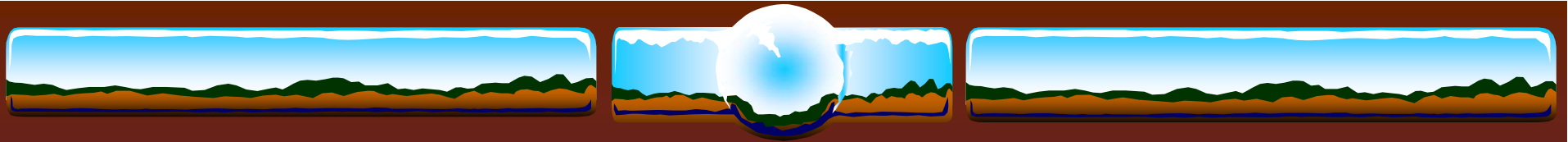
Designed to help the Public Water Supply initiate the Protection Planning Process and help them make connections with other partners in the process.

- ❖ Maumee Basin set of workshops focuses on the Source Water areas for the following public water supplies:
  - ❖ Bowling Green ( Wood County)
  - ❖ McClure (Henry County)
  - ❖ Campbell Soup (Henry County)
  - ❖ Napoleon (Henry County)
  - ❖ Defiance ( Defiance County)
  - ❖ Paulding (Paulding County)
  - ❖ Village of Antwerp (GW) ( Paulding County)
  - ❖ Sherwood Village Water (GW) (Defiance County)
  - ❖ Hicksville Water Treatment Plant (GW) (Defiance County)



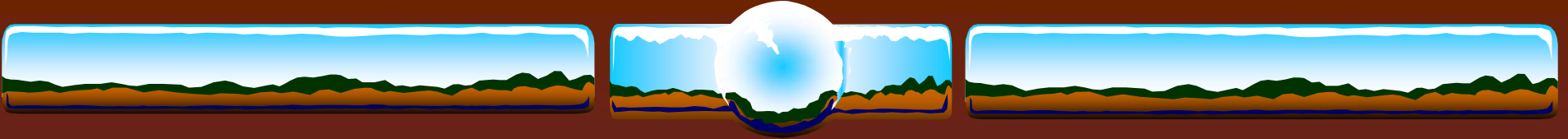
# Maumee Basin Approach

- ❖ Maumee Approach for Source Water Protection Planning:
  - ❖ Develop template for the Maumee Basin Surface Water PWS.
    - ❖ Big picture issues common to all in Maumee Basin.
  - ❖ Public Water Supplies and their Team will develop tailored protection strategies
    - ❖ Fit into the template those strategies that can be addressed locally.



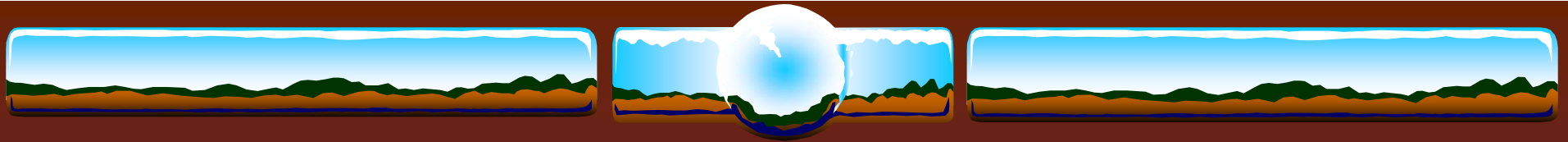
## Why A Regional Plan?

- ❖ Similar water quality problems from similar sources in Maumee Basin.
- ❖ Very large watershed that extends beyond Ohio's borders with many potential pollutant sources.
- ❖ Connections need to be made with the appropriate organizations who can partner with the PWSs.



## What is MRBPLG's Potential Role in a Regional Source Water Protection Plan?

- ❖ MRBPLG can:
  - ❖ Act as an umbrella for SWAP efforts within the Maumee basin.  
For example:
    - ❖ Coordinate an early spill warning system
    - ❖ Include SWAP concerns on quarterly agenda
    - ❖ Include SWAP concerns in educational efforts
    - ❖ Help with coordinating big picture (CSO, SSO, WWTP) issues over jurisdictional boundaries. Help with making appropriate connections with agencies and other contacts for coordinating and funding options.



## Benefits to MRBPLG

- ❖ MRBPLG can use the public water supply needs as a way to promote improved best management practices basin-wide.
- ❖ Potential cost reduction to water treatment plants,
- ❖ Potential priority for low interest loans for drinking water infrastructure improvements.