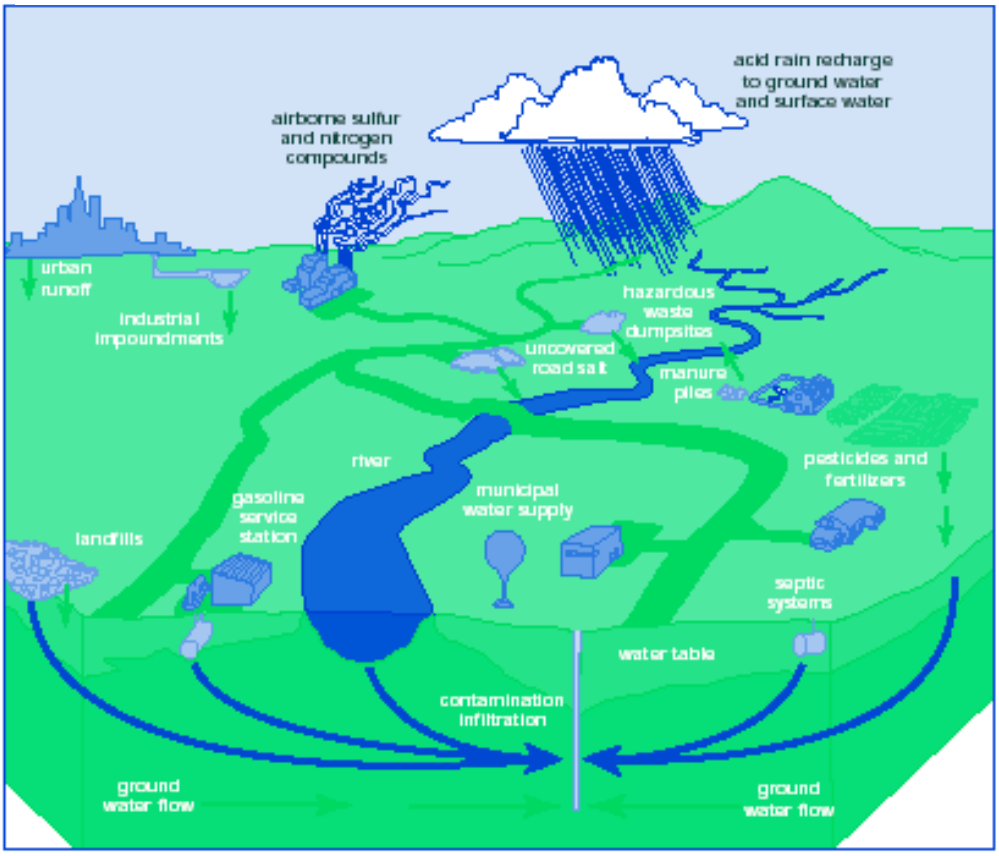
Source Water Assessment & Protection Program Report of New Mexico Water Utility

Public Water System # 12345

for Ground Water systems

Potential Threats to Drinking Water Sources



New Mexico Environment Department -
Drinking Water Bureau
July, 2004
Funded under *the Federal Safe Drinking Water Act Amendments of 1996*

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ACRONYMS

ARCGIS	ArcView Geographic Information System
BMP	Best Management Practices
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
DWB	Drinking Water Bureau
EPA	Environmental Protection Agency
GGAP	Ground-Water Protection Policy and Action Plan
GPAB	Ground Water Protection Advisory Board
GPD/FT^2	Gallons Per Day Per Foot Squared
GPS	Global Positioning System
LU	Land Use
MCL	Maximum Contaminant Level
NMED	New Mexico Environment Department
NMED-DWB	New Mexico Environment Department Drinking Water Bureau
PIC	Policy Implementation Committee
PSOC	Potential Sources of Contamination
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SWA	Source Water Assessment
SWAPP	Source Water Assessment and Protection Program
WSS	Water Supply System

SOURCE WATER ASSESSMENT AND PROTECTION PLAN PROCESS FOR THE NEW MEXICO WATER SYSTEM

INTRODUCTION

The New Mexico Environment Department Drinking Water Bureau's (NMED-DWB) *Source Water Assessment and Protection Program* (SWAPP)[1] is a federally funded national program. The program is part of a national effort to prevent adverse effects to human health and the environment and to manage and protect the environmental integrity of states' ground water resources.

The SWAPP is intended to be an information-gathering tool that identifies, evaluates, and prevents contaminants[2] from polluting public drinking water systems. As the lead agency under SWAPP responsible for source water protection of public drinking water supplies, NMED-DWB is attaching this *Request for Participation in the New Mexico Source Water Protection Plan Process* to your completed Source Water Assessment Report, and hopes that your water utility will join the Source Water Protection Plan (SWAPP) portion of this program.

Your choice to continue with SWAPP is voluntary, however, your participation will be a valuable contribution to both your community and the state. Source water protection benefits all of New Mexico and may be measured in many ways.[3] In recognition of the importance of this program toward the protection of the state's water resources, the executive branch agency will give special recognition and commendation to water utilities with approved source water protection plans that are also in compliance with the Safe Drinking Water Act. **Plan approval is conducted by NMED-DWB and is based on the satisfactory completion of all steps outlined in the Source Water Protection Plan Template** (see Appendix J).

SOURCE WATER PROTECTION PLAN PROCESS

A SWAPP incorporates six steps. Steps 2-4 have been completed for your water utility by NMED-DWB, and are incorporated in this addendum. NMED-DWB will continue to work with you toward the development, adoption, and management of an approved SWAPP, should you choose to proceed. The remainder of this report describes the six steps for developing a SWAPP, incorporates the findings of the assessments conducted by NMED-DWB, and gives examples of SWAPP tools and documents. The six steps of the SWAPP are as follows:

1. Formation of a Community Planning team
2. Delineation of Source Water Protection Areas (*completed by NMED-DWB under SWA*)
3. Inventory of Actual and Potential Sources of Contamination (*completed by NMED-DWB under SWA*)
4. Completion of a Susceptibility Analysis (*completed by NMED-DWB under SWA*)
5. Management of Source Water Protection Areas
6. Planning for Existing and Future Events / Contingency Protocol

[1] SWAPP incorporates the goals and mandates of the *Safe Drinking Water Act* such as the *Source Water Assessment Program* and the *Wellhead Protection Program* described in Sections 1453 and 1428 of the *Federal Safe Drinking Water Act Amendments of 1996*, respectively. The general goals of SWAPP are the identification and management of existing and potential sources of pollution as they may impact public drinking water sources.

[2] The Contaminants of Concern (COC) (refer to your utility's Source Water Assessment) are defined as broad land-use categories, facilities, or activities that store, use, or produce as a product or by-product any contaminants regulated under the federal *Safe Drinking Water* Act, including microbiological contaminants giardia lamblia, cryptosporidium, and total coliform bacteria, and synthetic organic contaminants included in the New Mexico *Pesticide Management Plan*.

COC identified in this report have been determined by NMED-DWB as posing a *significant* likelihood of having the potential to impact drinking water sources. For example, COC that were not considered as having the potential to impact drinking water sources are small quantities of highly volatile organic chemicals that would most likely volatilize upon release into the environment.

[3] Source water protection is a relatively new and pro-active approach for ensuring safe and reliable sources of drinking water. Benefits range from protecting human health and the quality of life to maintaining tourism and property values. Benefits may also be measured by considering what the costs might be if the water source was to become polluted. Costs incurred from polluted water may include the costs of treatment, land purchase and well drilling (for locating a new water supply) or, in the worst case, the costs of the complete loss of a water supply utility.

Compliance with other programs may also result in savings. For instance, the federal *Safe Drinking Water Act Amendments of 1996* requires treatment under the Disinfection Byproducts Rule, however, systems with cleaner water sources will naturally require less disinfection to begin with. Further, sampling waivers issued because of the SWAP Plan may reduce the frequency of sampling requirements, which would result in the reduction of sampling costs.

STEP 1 FORM A COMMUNITY PLANNING TEAM

Forming a community planning team (team) may be as simple as calling someone who may be interested in participating on the team such as a resident near a public water source(s). The team should include everyone that is interested in and/or may be affected by the SWAPP. Other potential team members may include a utility or public works employee, a geologist, hydrologist, or engineer, a citizen with computer and/or public relations skills, an attorney, and Realtor. In addition, local governments that are not directly involved in your water utility may in fact be the legal authority for authorizing and enforcing protection measures and, thereby, may help with the adoption of a protection plan. Examples of local governmental entities include commissioners, council members, and mayors.

The team determines the goals of the program and the roles and responsibilities of the participants. The team must make every effort to involve the public in plan development and implementation, and to secure the public's support.[4] Other tasks include the development of protection plan management strategies (refer to Step 5, Manage the Source Water Protection Area), the establishment and continued evaluation of both short- and long-term goals (see Step 6, Planning for Existing and Future Events / Contingency Protocol), record keeping, and ensuring that the public receives proper notification during all of the relevant stages of the process. The team submits the SWAPP[5] to NMED-DWB for approval (documentation of source water management control tools such as agreements, ordinances, regulations, and public notice(s), etc., should be attached).

STEP 2 DELINEATE SOURCE WATER PROTECTION AREAS (*COMPLETED BY NMED-DWB*)

The State of New Mexico's *Designated Fixed Radius* method was used to delineate each of the system's water sources. The method utilizes a 1,000-foot radius (72.12 acres) as the delineated source area or *capture zone,* which is further subdivided into three zones. Zone A represents a radius that is from 0 to 200 feet from the wellhead, Zone B 200 to 500 feet from the wellhead, and Zone C is the area between 500 to 1,000 feet of the wellhead. Geographical Information Systems ArcView 8.0 was used to generate the maps (Appendix A). You may decide to customize or use another delineation method to produce the maps or use these to satisfy the requirements for this Step.

The identified contaminants were assembled through database[6] tables and shapefiles, sanitary surveys, water system and DWB staff review within the context of the limitations of resources, and available information. As shown in Appendix A, PSOC identified from the databases, such as UST facilities are shown as points, while the three-letter text code (ISM in the example) indicates the PSOC was identified during an onsite survey. The map legend remains consistent throughout the SWAPP.

STEP 3 INVENTORY ACTUAL AND POTENTIAL SOURCES OF CONTAMINATION (*COMPLETED BY NMED-DWB*)

PSOC regulated by the *Safe Drinking Water Act* (SDWA) were inventoried as required under the SWA process. Only facilities and/or land use where potential use of SDWA regulated contaminants may pose a **significant** likelihood of impacting ground water were identified as PSOC. PSOC, along with their associated codes, and Contaminants of Concern generally associated with the PSOC are listed in Appendices C and D, respectively.

The identified contaminants were assembled through database[7] tables and shape files, sanitary surveys, water system and DWB staff review within the context of the limitations of resources and available information. Table 1 shows PSOC identified from the map example (Appendix A). PSOCs identified from the databases, such as UST facilities are shown as points, while the three-letter text code (RSF) indicates the PSOC was identified during an onsite survey. Water systems, which choose to develop a Source Water Protection Plan, may to be provided with additional information.

STEP 4 CONDUCT A SUSCEPTIBILITY ANALYSIS (*COMPLETED BY NMED-DWB*)

Susceptibility analyses provide a method to identify and prioritize potential risks to human health and the environment by identifying the water sources most likely to be impacted by a contaminant. Once completed, consideration should be given to

[4] Keeping records of public participation (i.e., sign-in sheets) is important and may help you to recall public involvement, in addition to serving as a list of possible future team members.

[5] A cover sheet should be attached and signed by an official of the governing entity when returning the SWAPP. For water utilities helping to develop SWAP Plans on a watershed scale, there may be several governing entities.

[6] Drinking water supply systems, Federal Toxic Release Inventory, Underground Injection Control (including Monitoring Wells and Impoundments, Federal Permit Facility, Federal Industrial Permit Facilities, Oil Conservation District Wells, Petroleum Storage, Roads (by county), Railroads, State Impaired Waters (303 d List), Land Use/Land Cover (by county), and Hazardous and solid waste facilities. Base maps were produced using *All Topo Maps*. All data was projected to North American Datum 83 /Universal Transverse Mercator Zone 13.

[7] Drinking water supply systems, Federal Toxic Release Inventory, Underground Injection Control (including Monitoring Wells and Impoundments, Federal Permit Facility, Federal Industrial Permit Facilities, Oil Conservation District Wells, Petroleum Storage, Roads (by county), Railroads, State Impaired Waters (303 d List), Land Use/Land Cover (by county), Hazardous and solid waste facilities. Base maps were produced using *All Topo Maps*. All data was projected to North American Datum 83 /Universal Transverse Mercator Zone 13.

the effects on human health the contaminants may pose, such as *acute* (appearing within hours or days) verses *chronic* (exposure over many years) health effects. Management plans should reflect the findings of the assessments, by directing the development and implementation of the management plan to the sources with the highest susceptible ranking and with the potential for causing acute adverse human health effects.

Table 1

INVENTORY OF ACTUAL AND POTENTIAL SOURCES OF CONTAMINATION

Description of Contaminant	Actual Contamination	Potential Contamination	Distance from Wellhead and/or Zone of Influence	Number of Sources of Contamination (may be expressed by a range i.e., 2-4).
Monitoring Well	No	Yes	Zone A	1+
Hazardous/Solid Waste Generator	No	Yes	Zone B	2-4
Petroleum Storage	No	Yes	Zone B	2-4
Primary Highway	No	Yes	Zone B	2-4
Railroad	No	Yes	Zone B	2-4
Single family Residences – Unsewered	No	Yes	Zone B	2-4
Abandoned Well	No	Yes	Zone C	3-4
Arroyo	No	Yes	Zone C	3-4
Federal Toxic Release Inventory Site	No	Yes	Zone C	3-4
Railroad	No	Yes	Zone C	3-4
Secondary Highway	No	Yes	Zone C	3-4

NMED-DWB susceptibility analysis was performed using decision matrices. Susceptibility was defined as a combination of the **vulnerability** of a water source to contamination due to characteristics of the contaminant, and the **sensitivity** of a water source to contamination due to characteristics of the source water area (Appendix B).

Vulnerability Rank

Once identified according to zone of influence, a vulnerability[8] rank was determined based on the number of PSOC located in a particular zone. The vulnerability rank may have been increased due to one or more of the following:

1. State of New Mexico Environment Department *Drinking Water Regulations* (regulations) for compliance samples were exceeded: 3 or more violations within 12 months, with a set period of review.

2. Three or more categories of PSOC occurred within the same zone of influence.

[8] This report uses the term *vulnerability* to express the characteristics of contaminants in terms of the likelihood of 1) discharge, 2) spill or accidental release, and 2) the number of potential contaminant sources according to their location to ground water. Although determining vulnerability based on the number and location of the PSOC in relation to the wellhead neglects the basic chemical characteristics of the contaminants such as density and volatility, and the likelihood of accidental spills or releases, the number and location of contaminant sources capable of impairing a supply well are easily counted and provide information relevant to initial protection planning efforts. ***Please note that vulnerability is not used to describe hydrogeologic related factors. Hydrogeologic factors are incorporated in the sensitivity analysis using DRASTIC (see footnote 9).***

3. Records maintained for facilities operating under a New Mexico Environment Department (NMED) Ground Water Discharge Plan, Abatement Plan, Solid Waste Facility Permit, or Underground Storage Tank registration, or operating under an United States Environmental Protection Agency National Pollutant Discharge Elimination System permit or any other federal or state permitting system indicate the effectiveness of treatment processes used and the compliance status of the facility with the terms and conditions of its permit.

Tables 2 and 3 show the vulnerability-ranking scheme and an example of a PSOC inventory determined from the map shown in Appendix A. As shown in Table 3, the vulnerability rank that corresponds to the example inventory is "low" as Zone B and C are the zones where the highest Vulnerability Rank (refer to Appendix A).

Table 2

PSOC RANKING DETERMINATION				
	Zone			Ranking
	Zone A	Zone B	Zone C	
Number of PSOC in Zone	1+	10+	15+	high
	0	8-9	12-14	moderately high
	0	5-7	8-11	moderate
	0	3-4	5-7	moderately low
	0	0-2	0-4	low

Sensitivity Rank

The sensitivity of a water source to contamination was determined from ranks calculated for the following four matrices: 1) depth to groundwater (the upper most screened interval), 2) well construction/integrity information, 3) construction and integrity of the well, and 4) calculated DRASTIC [9] Index (refer to Appendix B for matrices).

Table 3

PSOC VULNERABILITY INVENTORY AND RANKING

Map Reference	Description	Zone of Influence	Number of Type	Vulnerability Rank
Base Map	Primary Highway	B	0-2	Low
Base Map	Secondary Highway	B	0-2	Low
Appendix K	ISM	C	0-4	Low
Map Legend	Petroleum Storage	C	0-4	Low

Table 4 provides definitions, explanatory notes, references, and additional information related to the sensitivity evaluation criteria.

[9] *DRASTIC* is a method developed in 1987 by the National Ground Water Association to evaluate the potential for ground water contamination in any hydrogeologic setting in the United States, and is an acronym for: depth to water (D); net recharge (R); aquifer media (A); soil media (S); topography (T); impact of vadose zone media (I); and aquifer hydraulic conductivity (C). The method assigns a relative rank and weight to each of these factors to determine the relative sensitivity (high, moderately high, moderate, moderately low, or low) of a given supply well to surface-derived contamination. The higher the DRASTIC Index, the more sensitive the well is to contamination.

Table 4	
SENSITIVITY ANALYSIS DEFINITIONS, EXPLANATORY NOTE, and INFORMATION SOURCE (S)	
General Information	
Water Supply Source Name	The name of the well assessed.
Source Type	Where the drinking water comes from, i.e. ground water, surface water, or ground water under the direct influence of surface water.
Susceptibility Analysis ate	The date the susceptibility was completed.
Date of PSOC Inventory	The date the onsite inventory was completed.
Hydraulic Conductivity	A description of the rate at which water can move through a permeable medium (vertical movement).
Depth of Screened Interval	The top of the well screen where water is allowed to enter the well casing.
Information Assessment – Administrator and operator knowledge of the water supply system	
Well Casing	Generally determined from well logs.
Location of Screened Interval (s)	Generally determined from well logs.
Total Completion Depth	The depth to water measured from ground surface. Generally determined from well logs.
Pump, Type, Size, and Setting	Generally determined from well logs.
Drilling Log or Equivalent	A log produced by the driller of the well – usually filed at the Office of State Engineer.
DRASTIC Index Parameters (also see footnote 8)	
Depth to Water	The depth to water from ground surface. Generally determined from well logs.
Net Recharge	The amount of annual rainfall.
Aquifer Media	The aquifer's primary media.
Soil Media	Values generally determined estimated from the Soil Conservation Service's Soil Surveys.
General Topography	The slope of the ground surface (estimated from U.S. Topographic maps).
Hydraulic Conductivity	A description of the rate at which water can move through a permeable medium (vertical movement).
Impact of Vadose Zone Media	Primary vadose zone material type.
Source Area Delineation Data	
Map Legend	Map legend criteria reflect PSOC such as petroleum storage sites, hazardous and solid waste generator sites, and toxic inventory release facilities. In addition, topography and general land use are shown. The map legend remains constant throughout the assessment (see footnote 6).
Source Area Delineations	The State of New Mexico's *Designated Fixed Radius* method for the State Sanitary Survey is a 1,000 feet, and is based on an arbitrarily chosen radius.

Rankings were then entered as shown in Table 5, and a final *point sum* determined. Table 6 shows the final ranking criteria for sensitivity.

Table 5	
COMPOSITE SENSITIVITY RANKING	
Rank for Depth of Screened Interval	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	
Low (5 point)	
Rank for Well Construction Records	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	
Low (5 point)	
Rank for Integrity of Construction	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	
Low (5 point)	
Rank for DRASTIC Index	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	
Low (5 point)	
Point Sum	
Rank Assigned (see Ranking Guide, below)	

Table 6		
COMPOSITE SENSITIVITY RANK ASSIGNED		
Sum of Sensitivity Points	**Composite Sensitivity Range**	**Composite Rank Assigned**
90-100	high	
70-85	moderately high	
50-65	moderate	
30-45	moderately low	
20-25	low	

Susceptibility Rank

Together, the rankings determined from the vulnerability and sensitivity analysis were merged as shown in table 7. Susceptibility ranks were increased where professional judgment or extenuating circumstances and/or facts warranted an increased rank such as if a nearby contaminant plume was know to exist but falls outside the delineated areas. Further, ranks were increased where systems were reported on quarterly chemical monitoring and/or NMED-DWB Escalation reports and where land use and/or land cover in the source area of delineation that fell under one or more of the following categories: 1) agricultural, 2) rangeland, 3) commercial, industrial, transportation, and utility, 4) open water and/or irrigation, and 5) urban/recreational grass area.

Table 7						
SUSCEPTIBILITY RANKING						
Sensitivity Ranking						
Vulnerability Ranking		**High**	**Moderately High**	**Moderate**	**Moderately Low**	**Low**
	High	High	high	moderately high	moderately high	moderate
	Moderately High	High	moderately high	moderately high	moderate	moderate
	Moderate	moderately high	moderately high	moderate	moderate	moderately low
	Moderately Low	moderately high	moderate	moderate	moderately low	moderately low
	Low	Moderate	moderate	moderately low	moderately low	low

Increases in rank are noted in the *Final Rating & Comments* column of Table 8. Ranking of the entire water was determined by using the median of the source ranks (only applicable where water utilities have multiple water sources). The final rank is noted in *Assessment Findings and Summary* (refer to page 11).

Table 8	**SOURCE SUSCEPTIBILITY RANKING**				
SOURCE NAME	**Sensitivity Rank**	**Vulnerability Rank**	**Susceptibility Rank**	**Operational Exceptions**	**Final Rank**
WELL # 1	Moderate	High	Moderately High	Land Use >3PSOCs	High

STEP 5 MANAGE THE SOURCE WATER PROTECTION AREA

The goals of managing a source water protection area are pollution prevention and management of threats to source water. Management "measures or tools" range from promoting pubic education through public service radio campaigns where there are little to no associated costs, to developing complex protection plans involving new land acquisitions, where financing may be a considerable factor of the management plan. In addition, management of source water protection areas may involve a variety of strategies each targeted to address a specific goal. It may be most effective to adopt a simple plan and continue to update it; however, efforts should focus on water sources with the highest susceptibility to contamination. Primary categories of protection measures/tools include the following (also refer to Appendix G, Examples of Source Water Protection Planning Categories, Measures and Tools):

- Public education such as giving presentations at schools, business meetings, and government forums, and participation in water-related events sponsored by other groups and organizations;
- Best management practices (BMPs) such as preventing leaks or spills by installation of "secondary containment" equipment;
- *Regulatory controls such as* zoning ordinances and subdivision controls, construction and operating standards, health regulations (such as setting setback requirements for septic tanks and/or sewer lines from drinking water wells), and permitting or inspections;
- Point source pollution restrictions, requirements, and/or controls for fixed PSOC such as waste processing plants and inorganic sources such as salts, nutrients, and heavy metals; and
- Land acquisitions, land leasing, economic incentives such as cost-share programs, and conservation easements.

Implementing protection measures, along with water quality monitoring, capacity[10] building, and treatment can significantly protect a water source.

STEP 6 PLAN FOR EXISTING AND FUTURE EVENTS / CONTINGENCY PROTOCOL

Where the management of source water protection areas may help reduce the likelihood of water pollution and help focus efforts on the successful treatment of contaminated water, planning for future events that are both expected and unexpected is also a necessary part of the SWAPP. Contingency planning provides the information that is helpful during these events. This includes emergency contact information, protocols and strategies, and revenues from budgeting.

Determine if there are local emergency response teams that your water utility could contact for assistance. On the state level, the State of New Mexico Environment Department Office of Emergency Preparedness organizes assistance for damage caused by events such as wildfires, and will provide water utilities with information regarding damage assessments related to drinking water systems. Further, the New Mexico National Guard is the entity responsible for providing public water utilities with a source of water under emergency conditions.[11] When water outages may not be classified as "emergency conditions," water utilities should know and develop their options of supplying their customers with safe drinking water. Categories of contingency planning that should be addressed in your SWAPP include the following:

- Water outages due to contamination, mechanical or physical breakdown of a system, and natural disasters such as floods and drought;
- Water conservation;
- Accidental leaks or spills;
- Land acquisition for future water supplies; consider and/or identify where a new well could be drilled should a new water source be required; and
- Land acquisition as a source water protection measure.

ASSESSMENT FINDINGS AND SUMMARY

The Susceptibility Analysis of the New Mexico water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on well construction, hydrogeologic settings, and system operations and management. The susceptibility rank of the entire water system is **High.**

NMED-DWB staff is available to help your water utility continue with the development of the SWAP Plan, which may include providing additional mapping, (refer to Step 2), evaluation of BMP (refer to Step 5), or providing emergency planning options (refer to Step 6). This SWAPP Report is intended primarily to provide water utilities with information about the susceptibility of their water supplies to contamination, and to help water utilities initiate Source Water Assessment and Protection Plans for the protection of theses water resources.

The remainder of this report 1) offers a template and information for developing a source water protection plan for your water utility, 2) provides examples of management categories commonly utilized in protection planning, and 3) includes an exercise (Appendix I) to help illustrate some of the SWAPP steps.

REPORTING:

The report was provided to the New Mexico Water Supply System for initial review, and is now available at the State of New Mexico Environment Department Drinking Water Bureau, 525 Camino de Los Marquez, Suite 4, Santa Fe, NM 87505.

Copies may also be requested by emailing the Drinking Water Bureau at SWAPP@nmenv.state.nm.us or by calling (505) 827-7536 (toll free 1-877-654-8720). Please include your name, address, telephone number, and email address, and the name of the water utility. *NMED-DWB may charge a nominal fee for paper copies*.

[10] Capacity Development program support services are available on a priority basis to assist eligible public water systems enhance *technical, managerial*, and *financial* capacities.

[11] The State of New Mexico recognizes emergency conditions according to categories Type A and Type B. Type A conditions are major state or county disasters, including nuclear, earthquakes, volcano eruptions, floods, hurricanes, and tornadoes. Type B disasters are water outages due to drought, major contamination of a system's basic water source, and major destruction or impairment of a system's physical facilities.

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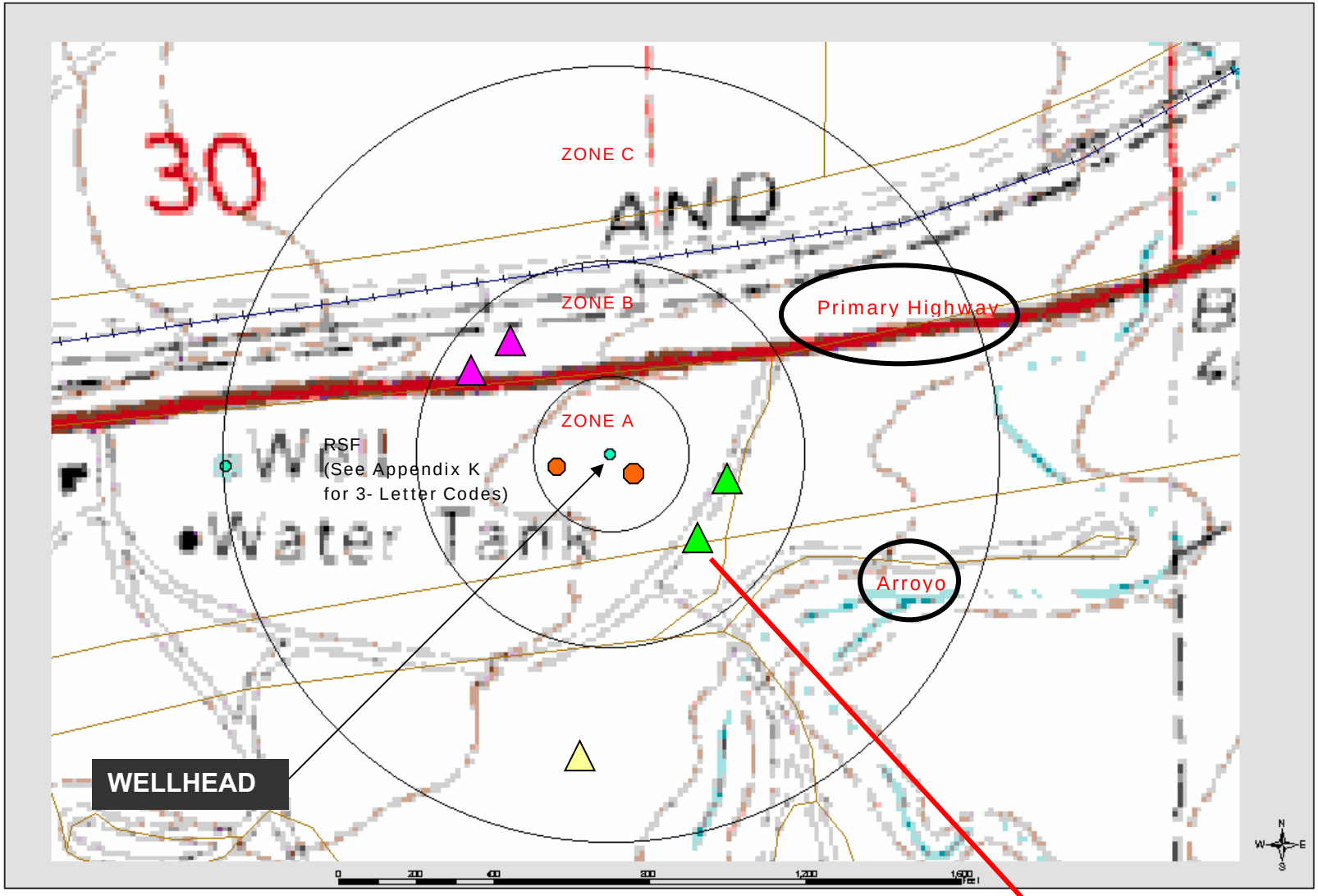


EXAMPLE ONLY

Information depicted characterizes data available from multiple sources, including current Sanitary Surveys and state and federal databases. No assertion of the accuracy of the databases is made by NMED-DWB.

Map Legend ***Refer to Appendix C for 3-Letter Source Codes***

- Well Head
- Federal Industrial Permit Facility
- Federal Permit Facility
- Federal Toxic Release Inventory
- Hazardous/Solid Waste Facility
- Impoundment
- Monitoring Well
- NM Impaired Water
- Oil Conservation Well
- Petroleum Storage
- Underground Injection Well
- Railroad
- Roadway

WELL 1	WSS # 12345
Source Type	Ground Water
Susceptibility Analysis Date	July, 2004
Susceptibility Analysis Completed by	NMED-DWB
Date of PSOC Inventory	July, 2004

SENSITIVITY ANALYSIS

1. Depth of Screened Interval

Screened Interval Depth	Sensitivity Range	Rank Assigned
less than 100 feet	high	X
100 - 200 feet	moderately high	
201 - 500 feet	moderate	
501 - 700 feet	moderately low	
greater than 700 feet	low	

2. Well Construction Information and Integrity

A) Information Ranking

Construction Information Available	Points Possible	Points Assigned
Casing diameter, casing length and casing materials	2	2
Location of screened interval(s)	3	3
Total completion depth	3	3
Static water level at completion	2	2
Pump type, size and setting	2	2
Drilling log or equivalent	3	2
Total Points	15	14

Information Points	Sensitivity Range	Rank Assigned
0-3	high	
4-6	moderately high	
7-9	moderate	
10-12	moderately low	
13-15	low	X

B) Integrity Ranking

Physical Integrity of Supply Well	Points Possible	Points Assigned
Is the well located outside of an area susceptible to flooding?	2	2
Does well casing terminate at least 18 inches above floor or ground level?	2	1
Is annular space pressure-grouted to depth of at least 20 feet?	3	1
Is the wellhead properly sealed?	3	2
Is there a concrete pad around the wellhead that slopes away from the casing?	1	1
Does the well vent terminate at least 18 inches above floor or ground level, and is the vent screened and oriented to open downward?	1	1
Are check valves, blow-off valves and flow meters properly maintained and operated?	1	1
Is the wellhead fenced, housed or properly protected?	2	2
Total Points	15	11

Integrity Points	Sensitivity Range	Rank Assigned
0-3	high	
4-6	moderately high	
7-9	moderate	
10-12	moderately low	X
13-15	low	

3. DRASTIC Index = 138 for Well 1

Depth to Water (ft)	5
Net Recharge (inch/yr (approximated))	3.5
Aquifer Media	SAND & GRAVEL
Soil Media	SANDY LOAM
Topography (ground slope) (%)	3
Impacts of Vadose Zone Media	SILT CLAY / SAND & GRAVEL
Hydraulic Conductivity (Aquifer) (gpd/ft^2)	25

DRASTIC Index	Sensitivity Range	Sensitivity Rank
201 or greater	high	
171-200	moderately high	
131-170	moderate	X
101-130	moderately low	
0-100	low	

Composite Sensitivity Ranking for Ground Water Source (Converted, Uniform Scale) for Well
Sensitivity Rank = Well Depth Rank (Screen) + Well Construction/Integrity Rank + DRASTIC Index Rank

Rank for Depth of Screened Interval	
High (25 points)	25
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	
Low (5 point)	
Rank for Well Construction Records	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	
Low (5 point)	5
Rank for Integrity of Construction	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	
Moderately Low (10 points)	10
Low (5 point)	
Rank for DRASTIC Index	
High (25 points)	
Moderately High (20 points)	
Moderate (15 points)	15
Moderately Low (10 points)	
Low (5 point)	
Point Sum	55
Rank Assigned (see Ranking Guide, below)	Moderate

Sum of Sensitivity Points	Composite Sensitivity Range	Well Composite Rank Assigned
90-100	high	
70-85	moderately high	
50-65	moderate	X
30-45	moderately low	
20-25	low	

Sensitivity Rank = Moderate for Well 1

VULNERABILITY ANALYSIS for Well 1

PSOC Ranking Determination				
	Zone			Ranking
	Zone A	Zone B	Zone C	
Number of PSOC in Zone	1+	10+	15+	high
	0	8-9	12-14	moderately high
	0	5-7	8-11	moderate
	0	3-4	5-7	moderately low
	0	0-2	0-4	low

PSOC Vulnerability Inventory and Ranking				
Map Reference	Description	Zone of Influence	Number of Type	Vulnerability Rank
Appendix K	ARL – Animal Rangeland	A	1+	High
Appendix K	CST – Commercial Septic Tank	A	1+	High
Appendix K	ADC – Ditch	B	0-2	Low
Appendix K	ARL – Animal Rangeland	B	0-2	Low
Appendix K	CST – Commercial Septic Tank	B	0-2	Low
Map Legend	Roadway	B	0-2	Low
Appendix K	ARL – Animal Rangeland	C	0-4	Low
Appendix K	AFI – Irrigated Cropland	C	0-4	Low
Appendix K	RSF – Single Family Residence-Unsewered	C	0-4	Low
Map Legend	Roadway	C	0-4	Low
Map Legend	River	C	0-4	Low

Vulnerability Rank = HIGH FOR WELL 1

Susceptibility Ranking						
	Sensitivity Ranking					
Vulnerability Ranking		High	Moderately High	Moderate	Moderately Low	Low
	High	High	High	**Moderately High**	Moderately High	Moderate
	Moderately High	High	Moderately High	Moderately High	Moderate	Moderate
	Moderate	Moderately High	Moderately High	Moderate	Moderate	Moderately Low
	Moderately Low	Moderately High	Moderate	Moderate	Moderately Low	Moderately Low
	Low	Moderate	Moderate	Moderately Low	Moderately Low	Low

The Inventory of Actual and Potential Sources of Contamination was completed by NMED-DWB and is incorporated in Appendix J at Step 3, Number 9.

INVENTORY OF ACTUAL AND POTENTIAL SOURCES OF CONTAMINATION				
Description of Contaminant	Actual Contamination	Potential Contamination	Distance from Wellhead and/or Zone of Influence	Number of Sources of Contamination (may be expressed by a range i.e., 2-4).
Monitoring Well	No	Yes	Zone A	1+
Hazardous/Solid Waste Generator	No	Yes	Zone B	2-4
Petroleum Storage	No	Yes	Zone B	2-4
Primary Highway	No	Yes	Zone B	2-4
Railroad	No	Yes	Zone B	2-4
Single family Residences – Unsewered	No	Yes	Zone B	2-4
Abandoned Well	No	Yes	Zone C	3-4
Arroyo	No	Yes	Zone C	3-4
Federal Toxic Release Inventory Site	No	Yes	Zone C	3-4
Railroad	No	Yes	Zone C	3-4
Secondary Highway	No	Yes	Zone C	3-4

Adoption of management strategies for specific contaminate sources should be based on a thorough review of the exiting management types. For instance, when considering management of storm water runoff, [12] management methods range from non-structural methods (sewer stenciling, good housekeeping, education,) to engineered devices (buffer and filter strips, infiltration, BMPs) and for municipal systems compliance with U.S. EPA's *National Pollutant Discharge Elimination System (NPDES) Permitting Program* is a regulatory requirement.

MANAGEMENT STRATEGY AND SCHEDULE (EXAMPLE)

Management Measure/Tool	Management Strategy	Assigned to /Implemented by	Time Line	Update Schedule and Planned Date
Wellhead Protection Ordinance	Identify the wellhead protection area, draft a source water protection ordinance (see example, Appendix G), identify the entity responsible for hearing ordinances, gain citizen support, and petition for adoption of ordinance.	Mr. XYZ and Ms. ABC	July 2003	Not Applicable
Wellhead Protection Sign Posting	Identify the source water delineation area; identify how many signs will be needed and where they may be purchased, the costs and budget considerations, and guidelines and/or laws for posting the signs. Post the signs.	Mr. XYZ and Ms. ABC	August 2003	Every 10 years (August 2013)
Adopt a Zoning Ordinance	Research zoning ordinances. Identify any existing zoning ordinances, and procedures necessary for adoption. Talk with city planners and landowners, gain public support, and petition to adopt the zoning ordinance.	Mr. XYZ Attorney, and Ms. ABC City Planning	September 2003	Not Applicable
Well Abandonment Procedures	Determine if an additional water source is necessary. Check local and state guidelines and regulations for proper well abandonment procedures, properly abandon the well, and report well abandonment to NMED-Drinking Water Bureau.	Ms. Hydrologist	July 2003	Not Applicable
Strom Water Drain Protection	Contact the city-planning department and inquire about storm water drains. Check local and state guidelines and regulations for requirements, and research storm water protection measures/tools.	Mr. Hydrologist	July 2003	Bi-Yearly (July 2005)

[12] *Storm water runoff* is rain or snowmelt flowing from rooftops and other structures, pavement on roads, sidewalks, and parking lots, and degraded land covers such as dirt parking lots, walking paths, baseball fields and suburban lawns, and areas of insufficient land cover such as vegetation.

Your Water Utilities *Contingency Protocol and Schedule* should include the first three categories in Column 1 of the table below, in addition to categories you may wish to include.

CONTINGENCY PROTOCOL **AND SCHEDULE (EXAMPLE)**						
Contingency Planning Categories	**Protocol Elements**	**Current Issue**	**Future Issue**	**Assigned to - Implemented by**	**Time Line**	**Update Schedule and Planned Update**
Emergency Water Outage	Develop a protocol: list all potential types of water outages, identify responsible agencies/parties, and provide contact information. Estimate how much water per day will be needed by your customers, and budget for this potential expense.	No	Yes	Ms. ABC	July 2003	Quarterly September 2003, November 2003, etc.
Accidental Leak or Spill Near or Into Water Source	Develop a protocol: list all potential types of leaks and spills, identify responsible agencies/parties, and provide contact information.	Yes	Yes	Mr. XYZ and Ms. ABC	August 2003	Yearly August 2004
Water Conservation	Develop a Water Conservation Plan: research the status of your aquifer, identify existing conservation methods, and promote the plan.	Yes	Yes	Ms. DEF	August 2003	Bi-Yearly August 2005
Land Acquisition for New Water Source	Develop a Land Acquisition Strategy: Identify when the source will be needed, where potential new water sources exist, and research land acquisition methods such as ownership, lease, and/or easements. Identify and discuss future zoning issues surrounding the new source site, and prepare a budget for the costs of acquiring the new source.	No	Possibly	Mr. XYZ Attorney, and Ms. ABC Public Works Director	September 2003	Yearly September 2004

Shown below are two examples of Media Aids developed by the International City/County Management Association to promote source water protection, and which may be used as part of your Source Water Protection Plan. Other forms of media aids include posters, fact sheets, informational flyers, brochures, and resources lists.

For Immediate Release: Contact: [*Name*]
[*Date*] [*Phone #*]

Protect Your Drinking Water… Protect the Source!

[*City*],[*State*]—Have you ever thought about where your drinking water comes from, beyond the faucet? Did you know that what you do in and around your home can affect not only the quality of your water but also the quality of your neighbor's water? Find out where your drinking water really comes from and learn about how you can help protect it during a [*Duration of campaign*]-month-long drinking water source awareness campaign, starting [*Start date*], sponsored by [*Name of sponsor*]. The campaign will provide information on

- The source of your local drinking water
- The value of safe drinking water
- Potential threats to your local drinking water
- Steps you can take to protect your drinking water
- Contact information for additional resources on drinking water protection.

Safe drinking water is essential to a community's quality of life and continued economic growth. Yet citizens may not always be aware of safe drinking water issues in their community and may not realize what needs to be done to protect drinking water and keep it safe for their families and businesses. Drinking water wells across the country are being contaminated daily by common activities, such as pouring motor oil and household chemicals down drains, using too much pesticides and fertilizers, and littering streets with refuse that will eventually run off into rivers and streams. When water supplies are not safe, the health of the community — especially of the young, the old, and the sick — is jeopardized. In addition, communities may experience a loss of tax revenues from real estate and new jobs as businesses refuse to locate to or remain in communities with known or suspected water contamination problems. Protecting drinking water sources is the first line of defense in ensuring safe drinking water. If communities are aware of their drinking water sources and of potential threats to these sources, they can take steps to keep the sources safe and improve their local environment. There is something everyone — from retirees to school kids to individuals in their homes — can do to help. To find out what you can do, contact [*Contact name and phone number*].
[*Acknowledgment*]

EXAMPLE PRESS RELEASE

Hi, my name is (Name) with a few words on protecting your drinking water.

Consider where your drinking water comes from.

Get to know the source of your drinking water, and get involved in activities to protect it. Drinking water source protection is a low-cost means to preserving the safety of a vital resource. Here are a few simple things you can do to help keep pollution out of the river, lake, stream, or aquifer that is your drinking water source:

- Take used motor oil to a recycling center. If you let it drain into a storm sewer or bury it in the trash, it can leak into lakes, rivers, and wells. Just one pint of used motor oil can expand over great distances, and potentially harm human health and the environment.
- Properly dispose of toxic household trash. For example, batteries contain lead and mercury. Some household cleaners also contain substances that contaminate water. Many communities have special collection sites for these items.
- Do not dispose of chemicals such as paints, cleaning products, and pesticides into septic systems, dry wells, stormwater drainage wells, or other shallow disposal systems that discharge to groundwater.
- Properly install and maintain septic systems. Be sure to inspect them regularly and pump them out when necessary.
- Find out what your community is doing to protect your water source and get involved. Work with schools, civic groups, and others to start a protection program. Safe drinking water is everyone's responsibility.

EXAMPLE PUBLIC SERVICE ANNOUNCEMENT

For more information, contact (Name) and (Contact information) Together, we can make a difference. This is a public service announcement brought to you by (Name of sponsoring organization).

Examples of Categories of Management Measures & Tools Used for Source Water Protection Planning

PUBLIC EDUCATION
- **Newspaper Articles**
- **Radio**
- **Pamphlets**
- **Brochures**
- **Community Meetings**
- **Seminars –Slide Shows and Video**
- **Storm Drain Stencil Program**

BEST MANAGEMENT PRACTICES
- Agricultural

Tillage Practices / Erosion Control Measures
Range & Pasture Management

- Forestry

Forest Revegetation
Logging & Road Construction Management
Streamside Area Management

- Urban

Buffer Zones / Setbacks
Primary & Secondary Containment
Storm Drain Maintenance

- Waterbody

River/Reservoir Management Program(s)
Shoreline Restoration

ZONING (Regulatory)
- **Overlay/Protection District**
- **Prohibition of Various Land Use**
- **Special Permitting**
- **Large-Lot Zoning**
- **Transfer of Development Rights**
- **Growth Control**
- **Performance Standards**

HEALTH REQUIREMENTS (Regulatory)
- **Privately Owned Wastewater Treatment Plant**
- **Septic Cleaner Ban**
- **Septic System Upgrade**
- **Toxic & Hazardous Materials Handling Requirements**
- **Private Well Protection**

LAND TRANSFER (Non-Regulatory/ Voluntary)
- **Sale/Donation**
- **Conservation Easement**
- **Limited Development**

LEGISLATIVE (Regulatory)
- **Regional Source Water Protection Districts**
- **Land Banking**

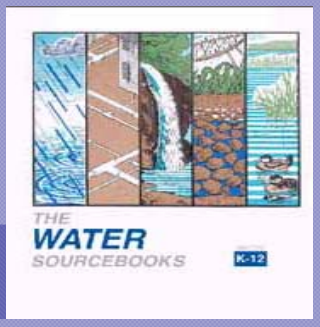
POINT SOURCE POLLUTION RESTRICTIONS
- **Waste Processing Plants**

LAND ACQUISITION (Non-Regulatory & Regulatory)

OTHER (Non-Regulatory)
- **Increased Monitoring**
- **Hazardous Waste Collection**

A Variety of Resources are Available

Wellhead Protection Signs



Water Sourcebooks Contain 324 Activities for Grades K-12

U.S. EPA STORM DRAIN STENCILING PROGRAMS

Planning tools such as ordinances, zoning decisions, regulations, and descriptions of BMP used to support your Source Water Protection Plan should be attached *(the Ordinance shown below is an example based on a Wellhead Protection Ordinance adopted by the City of Wilber, Saline County, Nebraska).*

ORDINANCE NO. __

AN ORDINANCE FOR THE CITY OF (NAME), (NAME) COUNTY, (NAME OF STATE) TO CREATE SECTION XXX OF THE MUNICIPAL CODE OF THE CITY OF (NAME), BY ADDING A NEW SECTION TO DESIGNATE A WELLHEAD PROTECTION AREA.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF (NAME), STATE OF (NAME), as follows:

Section 1. Definition. Source Water Protection Area means the surface and subsurface area surrounding a water well or well field supplying a public water system through which contaminants are reasonably likely to move toward and reach such water or well field.

Section 2. The City of (Name) designates a Wellhead Protection Area for the purpose of protection of the public water supply system. The boundaries of the source Water Protection Area are delineated based upon a map prepared by the (Name) presented to the City of (Name) on (Date), which is on file at the office of the (Name) City/County Clerk, and is available for public inspection.

Section 3. Any other Ordinance or section passed and approved prior to the passage, approval, and publication of this Ordinance and in conflict herewith, is hereby repealed.

Section 4. This Ordinance shall take effect and be in full force from and after its passage, approval, and publication as required by law.

PASSED AND APPROVED THIS (Date)

_____
Mayor

ATTEST:

_____
City Clerk

(SEAL)

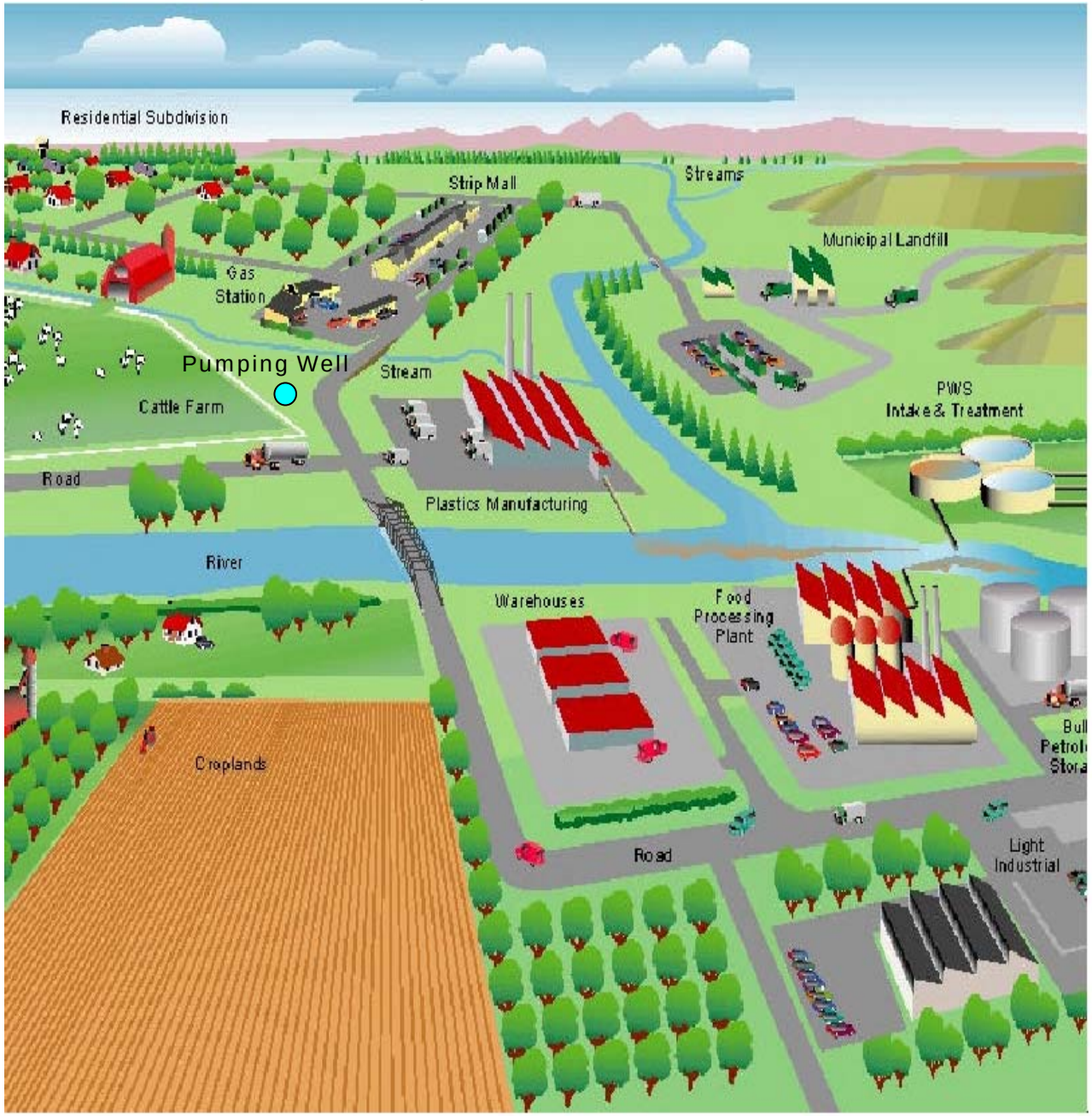
By completing the following exercise many of the tasks and goals of the source water protection planning team (team) should become more apparent.

For the exercise imagine that, as the "Pumping Well (center/ left in the graphic) pumps, contaminants are pulled toward the wellhead and eventually may enter the drinking water system. The team should complete the following: 1) Delineate the source water area as it may extend outward from the wellhead, 2) Identify actual (these are not pictured in the illustration) and potential sources of contamination and their potential impacts to your source water, 3) Identify management measures/tools that may be implemented to protect the water source, 4) Identify potential barriers (physical /economic /political) to implementing the measures, and 5) Identify solutions to the potential barriers.

[As an example, imagine the following: The Plastic Manufacturing Plant (plant) is within 1,00 feet of the pumping well. Although no actual contaminants have been detected in your utilities drinking water samples, potential contaminants from the plant include solvents, oils, organic/inorganic chemicals, acids, and bases, which are considered significant sources of contamination. The plant may or may not be adequately designed to prevent releases of theses chemicals into the environment/groundwater.

The team might begin by 1) notifying officials at the plant that the plant is located within a planned source water protection area, 2) Make arrangements with the officials to gather information, discuss concerns, 3) Seek information regarding potential protection measures, and 4) Develop management measures (i.e., BMPs) that may help prevent potential releases. The team should work with the plant officials to document any management measures implemented, select a time for updating the measure(s), properly inform the public of the **proactive** protective measure taken by the plant (any responses from the public should be reviewed and considered), enter the management measure in the Source Water Protection Plan].

Source Water Protection Planning Exercise



This Protection Plan Template lists the necessary elements of a Source Water Protection plan. You may complete this template and return it to NMED-DWB or create a template of your own design.

Source Water Protection Plan of the
New Mexico Water Utility
Public Water System # 12345
Date:

Your Water Utility Logo, Picture, or Graphic Here!

Prepared by
New Mexico Water Utility &
The New Mexico Environment Department Drinking Water Bureau
Funded under the Federal Safe Drinking Water Amendments of 1996

The New Mexico Water Utility
Address
Utility Administrator and Operator Contact Information
Number of Water Supply Sources (#)
Current Date
Scheduled Update by (Date)

On (Date) a *Source Water Assessment and Protection Plan* (SWAPP) was adopted by the New Mexico water utility. The SWAPP complies with the requirements for source water protection defined under the *Safe Drinking Water Act Amendments of 1996*. In recognition for its contribution toward preventing adverse effects to human health and the environment, and for protection of the environmental integrity of the State of New Mexico's ground water resources, the executive branch agency presents the (NAME) Utility with the attached (Certificate/Letter of Commendation).

SOURCE WATER PROTECTION PLAN OF THE NEW MEXICO WATER UTILITY

(The following information is required for NMED-DWB to approve your protection plan. Once a draft protection plan is prepared, and before public review, your utility must submit the plan to NMED-DWB for review and approval)[13]

STEP 1

1) List the names of the Community Planning team.

2) List the name(s) and provide signature(s) of the governing entity.

3) Describe the public's involvement/participation in the development and implementation of the Source Water Protection Plan. Attach copies of all relevant public notice(s).

4) Describe how the public will continue to participate in and/or be informed of Source Water Protection Plan issues (one example is to petition to have your Source Water Protection Plan on a weekly or monthly agenda, such as your town or city council meeting).

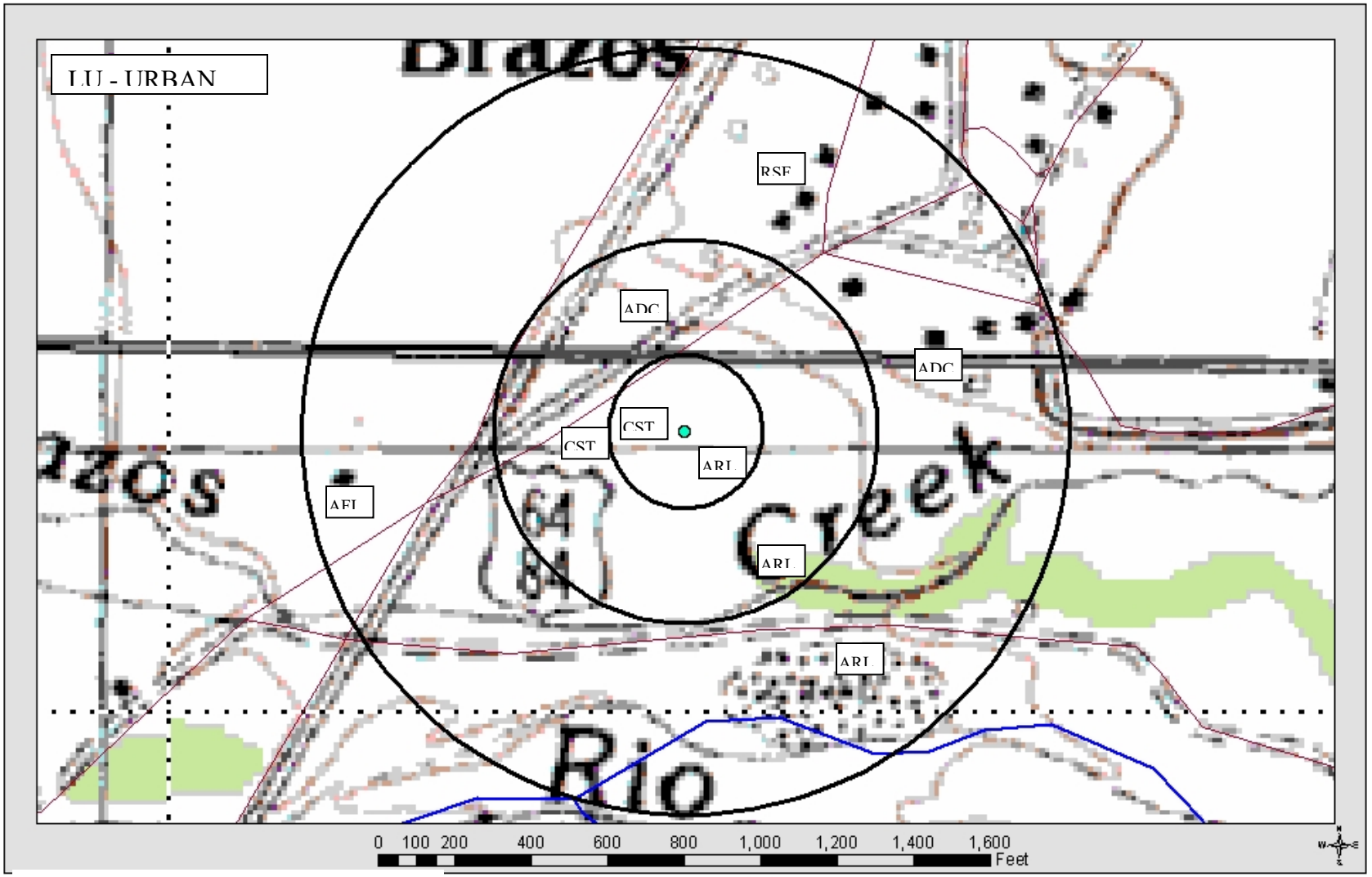
STEP 2

5) Describe the water supply system.

6) Describe the hydrogeology of the area.

7) Describe how the source water protection area(s) were determined (your answer may include topographic maps, ArcView Geographical Information Systems, Wellhead Analytical Element Model, Modflow, *etc*). Attach a copy of all source water maps (see example, Appendix A). ***NMED-DWB has inserted the Source Area Delineation Maps for your water utility. You may use these maps to satisfy this required element, or develop your own approach.***

[13] Please allow 45 days for the NMED-DWB approval process, once you have completed and submitted a SWAPP for review.


LU - URBAN
Brazos
RSF
ADC
ADC
CST
CST
ARI
AFI
64
84
Creek
ARI
ARI
Rio
0 100 200 400 600 800 1,000 1,200 1,400 1,600
Feet
New Mexico Water Utility
Well #1, Water System 12345
Information depicted on these data layers is derived from multiple sources, including current Sanitary Surveys and state and federal databases. No assertion of the accuracy of the databases is made by NMED-DWB.
Wellhead
Monitoring Well
Underground Injection Well
Oil Conservation Well
Petroleum Storage
Federal Permit Facility
Federal Industrial Permit Facility
Hazardous/Solid Waste Facility
Federal Toxic Release Inventory
Impoundment
NM Impaired Water
Roadway
Railroad
Refer to Appendix K for 3-Letter Source Codes

8) Show and/or describe any potential changes to the source water protection area that might be considered. For instance, one might extend a boundary determined in the initial delineation in order to incorporate a particular parcel of land or existing or planned zoning area.

STEP 3

9) List the actual and potential sources of contamination identified during the inventory, identify the distances and/or zones of influence where they are located, and provide the date(s) the inventory was conducted (see example, Appendix B). ***NMED-DWB has inserted the Inventory of Actual and Potential Sources of Contamination for your water utility. You may use this inventory to satisfy this required element, or you may wish to customize the inventory.***

PSOC Vulnerability Inventory and Ranking for Well 1				
Map Reference	Description	Zone of Influence	Number of Type	Vulnerability Rank
Appendix K	ARL – Animal Rangeland	A	1+	High
Appendix K	CST – Commercial Septic Tank	A	1+	High
Appendix K	ADC – Ditch	B	0-2	Low
Appendix K	ARL – Animal Rangeland	B	0-2	Low
Appendix K	CST – Commercial Septic Tank	B	0-2	Low
Map Legend	Roadway	B	0-2	Low
Appendix K	ARL – Animal Rangeland	C	0-4	Low
Appendix K	AFI – Irrigated Cropland	C	0-4	Low
Appendix K	RSF – Single Family Residence-Unsewered	C	0-4	Low
Map Legend	Roadway	C	0-4	Low
Map Legend	River	C	0-4	Low

STEP 4

10) NMED-DWB has inserted a susceptibility analysis of your water utility, according to the U.S. EPA approved susceptibility guidelines under SWAPP, 2000.

Table 8	**SOURCE SUSCEPTIBILITY RANKING**				
SOURCE NAME	**Sensitivity Rank**	**Vulnerability Rank**	**Susceptibility Rank**	**Operational Exceptions**	**Final Rank**
WELL # 1	Moderate	High	Moderately High	Land Use >3PSOCs	High

STEP 5

11) List the existing and proposed land use of the delineated source area(s) such as recreation, agriculture, forestry, commercial, and residential. If applicable, this should include current and proposed zoning.

12) Provide a management strategy (measures/tools) and schedule for ***each*** actual and/or potential contaminate (noted in the *Inventory of Actual and Potential Sources of Contamination). Although there may be a time-delay in the implementing specific management strategies, priority should be given to water sources identified as having the greatest* susceptibility to contamination. **Your water utility is not required to develop a susceptibility analysis, and, NMED-DWB has completed and inserted an analysis for purposes of prioritizing protection planning, refer to Step 4, # 10).**
In addition, state if, when, and how the management strategies will be updated (see example, Appendix D).

STEP 6

13) Develop a *contingency protocol and schedule* that addresses potential future events that may adversely impact your water supply system such as water outages, accidental leaks and/or spills, water conservation, and land acquisition for new sources of water supply. You should include when and how the plan will be updated (see example, Appendix E).

Map Code	Land Use	Description	Contaminants of Concern*
AGRICULTURAL LAND USE			
AAP	Animal Processing or Rendering Plants	Commercial Operations/Waste Storage/Disposal Facility	Nitrates, Pathogens, Organic/Inorganic Chemicals
ACS	Farm/Ranch Agrochemical Storage Facilities or Sites	Farm/Ranch Storage Site	Pesticides, Herbicides, Fertilizers
ADC	Drainage Canals, Ditches or Acequias-Unlined, Wells (Private, Stock wells, and Irrigation)	Runoff and Infiltration	Pesticides, Herbicides, Fertilizers, Nitrate, Pathogens
ADF	Livestock Production-Dairies	Livestock Wastes, Runoff and Infiltration	Nitrate, Phosphate, Chloride, Pathogens, Pharmaceuticals
AFI	Farming-Irrigated Croplands	Runoff and Infiltration	Nitrate, Ammonia, Chloride, Fertilizers, Pesticides, Herbicides
AFL	Confined Animal Feeding Operations	Runoff and Infiltration of Livestock Wastes	Nitrate, Phosphate, Chloride, Pathogens, Pharmaceuticals
AFM	Farm Machinery Storage or Maintenance Areas	Farm Machinery Maintenance Areas	Automotive Wastes, Welding Wastes, Fuels, Oils, Lubricants
AFN	Farming-Non-irrigated Croplands	Runoff and Infiltration Operations	Nitrate, Ammonia, Chloride, Fertilizers, Pesticides, Herbicides
AHC	Horticultural/Gardens/Nurseries/Greenhouses	Operations/Storage	Pesticides, Herbicides, Fertilizers
AHF	Hay/Feed and Veterinary Product Storage Sites	Farm/Ranch Storage Site	Fungicides, Pesticides, Nitrates, Pharmaceuticals
AMA	Manure or Livestock Waste-Land Application Areas	Land Application of Manure	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
AMS	Manure or Livestock Waste-Storage Facilities or Sites	Lined and Unlined Manure Storage Facilities	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
AOA	Livestock Production-Other Animal	Livestock Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
APF	Livestock Production -Poultry	Poultry Sewage Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
APP	Processing Plants or Mills- Hay, Grain, or Produce	Operations, Waste Storage and Disposal	Organic/Inorganic Chemicals, Lubricants, Machinery Wastes
ARL	Animal Rangeland	Rangeland and Pasturage	Nitrate, Ammonia, Phosphate, Chloride, Pesticides, Pathogens
ASC	Bulk Agrochemical Storage-Petroleum/Chemicals	Storage-500 gallons or more	Petroleum Products, Inorganic/Organic Chemicals
ASF	Bulk Agrochemical Storage-Fertilizers	Feed Mill, Agricultural Co-op	Fertilizers
ASG	Bulk Agricultural Product Storage-Grain or Produce	Grain Elevator, Warehouse or Storage Site	Fungicides, Oils, Lubricants, Machinery Wastes

Map Code	Land Use	Description	Contaminants of Concern*
ASH	Livestock Production -Sheep	Livestock Sewage Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
ASP	Bulk Agrochemical Storage-Pesticides	Feed Mill, Agricultural Co-op	Pesticides
ASW	Livestock Production -Swine	Livestock Sewage Wastes	Nitrate, Ammonia, Phosphate, Chloride, Pathogens, Pharmaceuticals
COMMERCIAL LAND USE			
CAI	Airports (Active/Inactive)	Operations/Maintenance/Construction	Aircraft Fuels, Deicers, Batteries, Diesel Fuel, Chlorinated Solvents, Automobile Wastes, Heating Oil, Building Wastes, Sewage, Septage, Pathogens, Pesticides, Fertilizers
CAR	Automotive Repair Shops	Operations/Maintenance/Storage	Solvents, Metals, Automotive Waste, Oils, Gasoline
CAW	Abandoned/Improperly Closed Wells	Storage/Disposal	Organic/Inorganic Chemicals, Brines, Waste Oil, Treated Sewage Effluent, Storm Water Runoff, Process Waste Water, Metals, Pathogens, Nitrate
CBS	Automotive Body Shops	Operations/Maintenance	Paints, Solvents
CBY	Boat Yards/Marinas	Operations/Maintenance	Gasoline, Diesel Fuels, Septage, Wood Treatment Chemicals, Paints, Varnishes, Automotive Wastes, Solvents, Building Wastes
CCG	Camp Grounds - Unsewered	Untreated Domestic Wastewater	Septage, Gasoline, Pesticides, Organic/Inorganic Chemicals
CCE	Cemeteries	Operations/Maintenance	Leachate, Arsenic, Pesticides, Fertilizers
CCW	Car Washes	Unsewered, Without Total Recycling System	Soaps, Detergents, Waxes, Organic/Inorganic Chemicals
CCY	Construction/Demolition Yard/Staging Areas	Storage/Maintenance	Gasoline, Diesel Fuels, Wood Treatment Chemicals, Paints, Varnishes, Automotive Wastes, Solvents, Building Wastes, Explosives, Oil
CDC	Dry Cleaning Shops	Operations/Maintenance	Chlorinated Solvents, Organic/Inorganic Chemicals
CFA	Fuel Storage Tanks-Above Ground	Non-Service Station Tanks	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals
CFB	Fuel Storage Tanks-Below Ground	Non-Service Station Tanks	Gasoline, Diesel Fuel, Organic/Inorganic Chemicals
CFC	Funeral Homes/Crematories	Operations	Biohazard Waste, Organic/Inorganic Chemicals, Septage
CFR	Furniture Repair/Refinishing	Operations	Paints, Solvents, Organic Chemicals
CGC	Golf Courses	Operations/Maintenance	Fertilizers, Pesticides, Gasoline, Automotive Wastes, Batteries, Septage
CHG	Historic Gasoline Service Stations	Above/Below Ground Storage Tanks/Operations	Gasoline, Oils, Solvents, Automotive Wastes, Septage

Map Code	Land Use	Description	Contaminants of Concern*
CHM	Home Manufacturing	Operations/Maintenance/Storage	Paints, Solvents, Organic/Inorganic Chemicals
CHN	Hospitals/Nursing Homes - Unsewered	Wastewater Discharge to Septic Tank/Leach Field	Biohazard Waste, Organic/Inorganic Chemicals, Septage, Radiological Waste
CHW	Hardware/Lumber/Parts Stores	Operations/Storage	Pesticides, Fertilizers, Organic/Inorganic Chemicals
CLD	Laundromats - Unsewered	Wastewater Discharge	Detergents, Soaps, Septage
CPP	Photo Processing Laboratories	Operations/Storage	Organic/Inorganic Chemicals
CPR	Printing Shops	Operations/Storage	Solvents, Inks, Dyes, Organic/Inorganic Chemicals
CPS	Paint Stores	Storage	Paint, Solvents
CRL	Research Laboratories	Operations/Maintenance/Storage	Biohazard Waste, Radiological Materials and Waste, Metals, Organic/Inorganic Chemicals
CRY	Railroad Yards and Tracks	Operations/Maintenance/Storage	Diesel Fuel, Pesticides, Organic/Inorganic Chemicals
CSS	Gasoline Service Stations	Above/Below Ground Storage Tanks/Operations	Gasoline, Oils, Solvents, Automotive Wastes, Septage
CST	Commercial Septic Tanks/Leachfields/Leachpits/Cesspools	Storage/Disposal	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride
CVS	Veterinary Facilities	Operations/Maintenance	Biohazard Waste, Organic/Inorganic Chemicals, Septage, Radiological Waste
INDUSTRIAL LAND USE			
IAS	Asphalt Plants	Production/Storage	Petroleum Derivatives
ICC	Cement/Concrete Plants	Operations/Maintenance/Storage	Organic/Inorganic Chemicals, Oils, Natural Gas, Propane,
ICE	Communications Equipment Manufacturers	Production/Maintenance/Storage	Solvents, Organic/Inorganic Chemicals, Oils, Waste Oils, Metals
ICL	Chemical Landfills	Storage/Disposal	Leachate of Organic/Inorganic Chemicals, Acids, Bases, Metals, Solvents, Gasoline, Diesel Fuel, Pesticides, PCB's
ICP	Chemical Production Plants	Production/Maintenance/Storage	Organic/Inorganic Chemicals, Solvents, Oils, Metals
IEE	Electronic/Electrical Equipment Manufacturers	Production/Maintenance/Storage	Solvents, Organic/Inorganic Chemicals, Oils, Waste Oils, Metals, Acids, Bases
IFM	Furniture and Fixture Manufacturers	Production/Maintenance/Storage	Paints, Solvents, Organic/Inorganic Chemicals

Map Code	Land Use	Description	Contaminants of Concern*
IFW	Foundry/Smelting Plants	Production/Maintenance/Storage	Organic/Inorganic Chemicals, Metals, Solvents, Acids, Bases, Oils
IGO	Gas/Oil Wells-Active/Abandoned/Test, Wells Geothermal and Industrial	Production	Oil, Natural Gas, Organic/Inorganic Chemicals, Acids, Bases, Drilling Wastes
IHD	Historic Dumps/Landfills	Storage/Disposal	Leachate of Organic/Inorganic Chemicals, Acids, Bases, Metals, Solvents, Gasoline, Diesel Fuel, Pesticides, PCB's, Automotive Wastes
IHM	Historic Mining Operations	Production Waste/Storage	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials
IMI	Primary Metal Industries	Steel/Metal Works, Rolling/Wire Mills	Metals, Inorganic Chemicals, Acids, Bases
IMO	Mining Operations (Surface And Subsurface)	Production Waste/Storage	Metals, Inorganic Chemicals, Acids, Bases, Radiological Materials
IMP	Metal Plating/Processing Facilities	Operations/Maintenance/Storage	Organic/Inorganic Chemicals, Acids, Bases, Metals
IMW	Machine/Metal Working Shops	Operations/Maintenance/Storage	Cutting Oils, Metals, Solvents, Organic/Inorganic Chemicals, Detergents
IOG	Oil/Gas Pipelines	Transport	Oils, Gasoline, Volatile Organic Chemicals, Natural Gas, Propane
IPL	Plastics Manufacturing/Molder	Operations/Maintenance/Storage	Solvents, Oils, Organic/Inorganic Chemicals, Acids, Bases
IPM	Paper Mills	Operations/Maintenance/Storage	Acids, Metals, Organic/Inorganic Chemicals
IPP	Petroleum Production/Refining/ Bulk Plants	Operations/Maintenance/Storage	Oils, Gasoline, Diesel Fuels, Organic Chemicals, Oil Drilling/Refining Wastes
IPU	Public Utilities	Power Generating Stations	PCB's, Solvents, Diesel Fuel, Propane, Natural Gas, Oil, Acids, Bases, Organic/Inorganic Chemicals, Metals
IRG	RCRA Waste Generators - Other	Storage/Disposal	Organic/Inorganic Chemicals, Solvents, Metals, PCB's, Acids, Bases, Radiological Materials
IRW	Radioactive Waste Disposal Sites	Storage/Disposal	High and Low Level Radiological Wastes
ISD	Sumps/Dry Wells	Storage/Disposal	Storm Water Runoff, Organic/Inorganic Chemicals, Solvents, Process Wastewater, Pesticides, Oils
ISF	Superfund Sites	Storage/Disposal	Organic/Inorganic Chemicals, Solvents, Metals, PCB's, Acids, Bases, Radiological Materials
ISM	Primary Wood Industries	Saw Mills, Planers, Wood Treatment	Organic/Inorganic Chemicals, Metals, Solvents
IST	Stone, Tile, Glass Manufacturing	Operations/Maintenance/Storage	Solvents, Oils, Metals, Organic/Inorganic Chemicals
ITS	Treatment/Storage/Disposal Ponds/Lagoons	Treatment/Storage	Organic/Inorganic Chemicals, Metals, Acids, Bases, Sewage

Map Code	Land Use	Description	Contaminants of Concern*
ITT	Transport/Distribution, Warehouses, Truck Terminals	Operations/Maintenance/Storage	Gasoline, Diesel Fuels, Automotive Wastes, Metals, Organic/Inorganic Chemicals, Acids, Bases
IUD	Unregulated Dumps/Excavated Sites, Snow Dumps	Storage/Collection/Disposal	Organic/Inorganic Chemicals, Automotive Wastes, Oil, Gasoline, Runoff from Adjacent Sites
IUI	Underground Injection (UIC) Wells	Storage/Disposal	Organic/Inorganic Chemicals, Brines, Waste Oil, Treated Sewage Effluent, Storm Water Runoff, Process Wastewater, Metals, Pathogens, Nitrate
IUR	Utility/Transportation Right of Ways, major transportation corridor	Power Lines, Gas/Oil Pipelines	Pesticides, Gasoline, Diesel Fuels, Automotive Wastes, Organic/Inorganic Chemicals, PCB's, Sewage, Metals, Storm water Runoff, Pathogens
MUNICIPAL/RESIDENTIAL LAND USE			
MHM	Highway/Road Maintenance Yards	Operations/Maintenance/Storage	Gasoline, Diesel Fuels, Solvents, Road Salt, Asphalt, Pesticides, Automotive Wastes,
MHR	Highway Rest Areas	Operations/Maintenance/Storage/Disposal	Automotive Wastes, Septage, Gasoline, Diesel Fuels, Pesticides
MIN	Incinerators - Commercial or Municipal	Operations/Disposal	Metals, Organic/Inorganic Chemicals
MLF	Municipal Waste Landfills	Storage/Disposal	Leachate, Organic/Inorganic Chemicals, Pesticides, Metals, Oils
MMF	Military Facilities	Operations/Maintenance/Storage/Disposal	Gasoline, Aircraft Fuels, Diesel Fuels, Automotive Wastes, Metals, Organic/Inorganic Chemicals, Explosives, Radiological Materials, Pesticides, Sewage/Septage, Oils, Solvents, Fertilizers, Batteries, Deicers
MMP	Motor Pools	Operations/Maintenance/Storage/Disposal	Gasoline, Diesel Fuel, Oils, Waste Oils, Automotive Waste, Batteries, Metals
MPS	Sewage Pump Stations	Operations/Storage	Sewage, Pathogens, Nitrate, Metals, Organic/Inorganic Chemicals
MPW	Polluted Surface Water Sources	Naturally Occurring/Anthropogenic	Sewage, Pathogens, Nitrate, Metals, Acids, Bases, Organic/Inorganic Chemicals
MRF	Recycling Facilities	Operations/Storage/Disposal	Metals, Organic/Inorganic Chemicals, Pesticides, Automotive Wastes, Oils
MSC	Schools – Unsewered	Wastewater Discharge to Septic Tank/Leach Field	Septage, Septic Effluent, Pathogens, Nitrate, Ammonia, Chloride
MSD	Storm Drainage Collection Areas or Outlets-Unlined	Storage/Disposal	Runoff, Pesticides, Fertilizer, Pathogens, Nitrate, Phosphate, Oil
MSL	Sewer Lines	Transport	Sewage, Pathogens, Nitrate, Metals, Organic/Inorganic Chemicals
MSP	Wastewater Seepage/Retention Ponds (Unlined/Lined)	Storage/Disposal	Sewage Effluent, Nitrate, Ammonia, Pathogens, Organic/Inorganic Chemicals, Pesticides
MSS	Sewage Effluent/Sludge Land Application Areas	Storage/Disposal	Sewage/Sewage Sludge, Nitrate, Pathogens, Organic/Inorganic Chemicals, Metals
MST	Sewage Treatment Plants	Operations/Maintenance/Storage/Disposal	Sewage, Sewage Sludge, Metals, Pathogens, Organic/Inorganic Chemicals

Map Code	Land Use	Description	Contaminants of Concern*
MSW	Solid Waste Transfer Stations	Storage/Disposal	Metals, Organic/Inorganic Chemicals, Pesticides, Automotive Wastes, Oils
MWP	Water Treatment Plants and Water Supply Wells	Operations/Maintenance/Storage/Disposal	Organic/Inorganic Chemicals, Chlorine
RSF	Single Family Residences - Unsewered	Wastewater Discharge to Septic Tank/Leach Field or Cesspool	Septage, Pathogens, Nitrate, Ammonia, Chloride, Heavy Metals, Household Pesticides, Herbicides, Cleaning Agents and Solvents, Fuels
* Contaminants of Concern include substances that are commonly, but not always, associated with the Contaminant Source listed in column 2			

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
VOLATILE ORGANIC CHEMICALS			
Benzene	0.005	AAP, APP, CAI, CAR, CBS, CBY, CCY, CDC, CHW, CHM, CHN, CSY, CPP, CPR, CPS, CRL, CRY, CUS, CVS, ICC, ICE, ICL, ICP, IEE, IFW, IFM, IHD, ILS, IMI, IMW, IMP, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, IST, ITS, ITT, IUD, IUI, IUR, MMF, MMP, MSW	Anemia; decrease in blood platelets; nervous system disorders; immune system depression; increased risk of cancer
Carbon Tetrachloride	0.005	AAP, APP, CAI, CDC, CHM, CHN, CHW, CPP, CPR, CRL, CUS, CVS, ICE, ICL, ICP, IEE, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, IST, ITS, ITT+, IUD, MLF, MMF, MMP, MSC, MSW	Liver problems; kidney, lung damage; increased risk of cancer
Ortho-Dichlorobenzene	0.6	CAR, CBS, CBY, CCY, CDC, CFR, CHM, CHW, CPP, CPR, CPS, CRL, CRY, CUS, ICE, ICP, ICL, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, IST, ITS, ITT, IUD, MHM, MMF, MMP, MSC	Liver, kidney, nervous system or circulatory problems
Para-Dichlorobenzene	0.075	ACS, AFI, AFN, AHC, AHF, ASC, ASP, CAR, CDC, CPP, CHW, CPP, CPR, CPS, CRL, CRY, CUS, ICL, ICP, ILS, IMP, IMW, IPL, IPP, IPU, IRG, ISF, ITS, ITT, MMF, MMP, MSC	Eye, respiratory, gastrointestinal tract irritation; anemia; skin lesions; liver, kidney, spleen damage; blood changes
1, 2-Dichloroethane	0.005	ACS, AFI, AFN, AHC, AHF, ASC, ASG, ASP, CFR, CHN, CPP, CPR, CRL, CUS, CVS, ICL, ICP, IEE, IFM, ILS, ITT, IMW, IPL, IPP, IRG, ISD, ISF, IUD, MMF, MSC	Nervous system disorders; lung, kidney, liver, circulatory, gastrointestinal effects; increased risk of cancer
1,1-Dichloroethene	0.007	CPP, CPR, CRL, CUS, ICP, ICL, IHD, ILS, IMW, IPL, IPM, IPU, IRG, ISD, ISF, ISM, ITS, ITT, IUD, MSC	Liver, kidney damage; increased risk of cancer; fetal toxicity
Cis-1, 2-Dichloroethene	0.07	AAP, CAI, CAR, CBS, CCY, CFR, CHG, CHM, CPP, CPR, CPS, CRL, CRY, CSS, CSY, ICP, ICL, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, ITS, ITT, IUD, IUI, MMF, MMP, MSP, MST	Nervous system disorders; liver, circulatory system damage
Trans-1, 2-Dichloroethene	0.1	AAP, CAI, CAR, CBS, CCY, CFR, CHG, CHM, CPP, CPR, CPS, CRL, CRY, CSS, CSY, IEE, IFM, ICP, ICL, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, ITS, ITT, IUD, IUI, MMF, MMP, MSP, MST	Nervous system disorders; liver, circulatory system damage
Dichloromethane	0.005	AAP, APP, ACS, AFI, AFN, AHC, AHF, ASC, ASG, ASP, CAI, CAR, CBS, CBY, CCE, CCY, CFC, CFR, CHN, CHW, CHM, CPP, CPR, CPS, CRY, CRL, CSS, CUS, CVS, ICC, ICE, ICP, ICL, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, IST, ITS, ITT, IUD, MHM, MMF, MMP, MSC, MSP, MSW	Nervous system, liver, blood damage; increased risk of cancer

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
1,2-Dichloropropane	0.1	ACS, AFI, AFN, AHC, AHF, ASC, ASG, ASP, CAW, CPP, CPR, CRL, CUS, ICL, ICP, IHD, ILS, IPM, IPP, IRG, ISD, ISF, ISM, ITT, IUD, IUI, MLF, MSP	Liver, kidney, adrenal glands, bladder, gastrointestinal tract, respiratory tract damage; increased risk of cancer
Ethylbenzene	0.1	CAI, CFR, CHM, CRL, CUS, ICC, ICP, ICL, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IRG, ISD, ISF, ISM, ITS, ITT, IUD, IUI, MSC, MSP	Eye, liver, kidney, central nervous system damage; respiratory irritation
Chlorobenzene	0.005	CAR, CBS, CDC, CHW, CHM, CPP, CPR, CRL, CUS, ICP, ICL, IEE, IHD, ILS, IMI, IMP, IMW, IPL, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, MMF, MSC, MSP	Liver, kidney, central nervous system damage
Styrene	1	CHM, CPP, CPR, CRL, CUS, ICC, ICP, ICL, IEE, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IRG, ISD, ISF, ISM, ITS, ITT, IUD, IUI, MSP	Liver, kidney, circulatory problems; nerve damage; increased risk of cancer
Tetrachloroethene	0.005	AAP, APP, CAI, CAR, CBS, CCY, CDC, CHM, CHN, CHW, CPP, CPR, CRL, CRY, CSS, CSY, CUS, CVS, ICC, ICL, ICP, IEE, IHD, ILS, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, ITS, ITT, IUD, IUI, MMF, MMP, MSC, MSP, MWP	Liver, kidney, circulatory problems; nerve damage; increased risk of cancer
Toluene	1	AAP, APP, CFR, CHW, CHM, CHN, CPP, CPR, CRL, CUS, CVS, ICC, ICP, ICL, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, ITS, ITT, IUD, MMF, MSC, MSP, MWP	Nervous system, liver, kidney damage
1,2,4-Trichlorobenzene	0.07	CRL, CUS, ICL, ICP, IHD, ILS, IPM, IPP, IRG, ISD, ISF, ISM, ITS, IUD	Liver, kidney, adrenal gland changes
1,1,1-Trichloroethane	0.2	AAP, APP, CAR, CAI, CBS, CBY, CCY, CDC, CFR, CHM, CHN, CHW, CPP, CPR, CRL, CUS, CVS, ICP, ICL, IEE, IFM, IHD, IHM, ILS, IMI, IMO, IMP, IMW, IPM, IPP, IRG, ISD, ISF, ISM, ITS, ITT, IUD, MHM, MMF, MMP, MSC, MSP, MWP	Liver, nervous system, circulatory problems
1,1,2-Trichloroethane	0.005	AAP, CDC, CPP, CPR, CRL, CUS, ICP, ICL, IEE, IFW, IHD, ILS, IMI, IMP, IMW, IPL, IPP, IRG, ISD, ISF, ITS, IUD, MSP	Liver, kidney, gastrointestinal tract, immune system problems; lung damage; increased risk of cancer
Trichloroethene	0.005	AAP, AFM, APP, CAI, CAR, CBS, CBY, CFR, CHG, CHM, CHW, CPP, CPR, CRL, CRY, CSY, CUS, ICE, ICL, ICP, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, ITS, ITT, IUD, IUI, MHM, MMF, MMP, MSC, MSP	Liver damage; increased risk of cancer

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
Vinyl Chloride	0.002	CRL, ICP, ICL, IEE, IHD, IMI, IMP, IMW, IPL, IPP, IRG, ISF, IST, ITT, IUD,	Liver, nervous system damage; increased risk of cancer
Xylenes (Total)	10	AAP, APP, ASC, CAI, CAR, CBS, CBY, CCY, CFR, CHM, CHN, CHW, CPP, CPR, CPS, CRL, CUS, CVS, IAS, ICC, ICL, ICP, IEE, IFM, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, IST, ITT, IUD, MHM, MMF, MSC, MSP	Central nervous system, liver, kidney damage
SYNTHETIC ORGANIC CHEMICALS: PESTICIDES			
Alachlor	0.002	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CCE, CCG, CGC, CHW, CRL, CRY, CUS, ICL, ICP, IHD, ILS, IPP, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHM, MHR, MMF, MPR, MSC, MSD, MSP	Eye, skin irritation; liver, kidney, spleen, nose, eye damage; increased risk of cancer
Aldicarb	0.003	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAW, CGC, CHW, CRL, CUS, ICL, ICP, IHD, ILS, IPP, IRG, ISD, ISF, ITS, ITT, IUD, MPR, MPW, MSC, MSP	Gastrointestinal, central nervous system, eye problems
Aldicarb Sulfone	0.003	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAW, CGC, CHW, CRL, CUS, ICL, ICP, IHD, ILS, IPP, IRG, ISD, ISF, ITS, ITT, IUD, MPR, MPW, MSC, MSP	Gastrointestinal, central nervous system, eye problems
Aldicarb Sulfoxide	0.003	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAW, CGC, CHW, CRL, CUS, ICL, ICP, IHD, ILS, IPP, IRG, ISD, ISF, ITS, ITT, IUD, MPR, MPW, MSC, MSP	Gastrointestinal, central nervous system, eye problems
Atrazine	0.003	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CAI, CAW, CCG, CCE, CFC, CGC, CHW, CRL, CRY, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHD, MHM, MLF, MMF, MPR, MPW, MSC, MSD, MSP, RMS	Cardiovascular system, kidney, adrenal gland damage; increased risk of cancer
Carbofuran	0.04	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAI, CAW, CCE, CCG, CGC, CHW, CPL, CRL, CST, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHR, MLF, MMF, MPR, MSC, MSD, MSP, RMS	Central nervous system, reproductive system damage
Chlordane	0.002	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAI, CAW, CBY, CCY, CRL, CST, CUS, ICP, ICL, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUR, MHM, MLF, MMF, MPR, MRF, MSC, MSD, MSP, RMS	Central nervous system, blood disorders; liver, kidney, heart, lung, spleen, adrenal gland damage; increased risk of cancer

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
2, 4-Dichlorophenoxyacetic acid (2,4-D)	0.07	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CAI, CAW, CCE, CCG, CCY, CGC, CHW, CRL, CRY, CST, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUR, MHM, MHR, MLF, MMF, MPR, MPW, MSC, MSD, MSP	Nervous system, kidney, liver damage
Dalapon	0.2	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CAI, CAW, CCE, CCG, CCY, CGC, CHW, CRL, CRY, CSY, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHD, MHM, MHR, MLF, MMF, MPR, MPW, MSC, MSD, MSP, RMS	Kidney changes
Dibromochloropropane	0.0002	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAI, CAW, CCE, CGC, CHW, CRL, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUR, MHM, MMF, MSC, MSD, MSP	Kidney, liver, reproductive system damage; increased risk of cancer
Dinoseb	0.007	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CHW, CRL, ICL, ICP, IHD, IRG, ISD, ISF, ITT, IUD	Reproductive system problems
Diquat	0.02	ACS, ADC, AFI, AFN, AHC, AHF, ARL, ASC, ASG, ASP, CAW, CGC, CRL, CUS, ICL, ICP, IHD, ILS, IPP, IPU, ISD, ISF, ITS, ITT, IUD, IUR, MHM, MMF, MPW, MSD, MSP	Cataracts
Endothall	0.1	ACS, ADC, AFI, AFN, AHC, AHF, ARL, ASC, ASG, ASP, CAI, CAW, CBY, CCE, CCG, CCY, CGC, CHW, CPL, CRL, CRY, CST, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUR, MHM, MHR, MLF, MMF, MPR, MPW, MSC, MSD, MSP	Stomach, intestinal problems
Endrin	0.002	ACS, ADC, AFI, AFN, AHC, AHF, ARL, ASC, ASG, ASP, CAW, CRL, CRV, CRY, CST, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUR, MHM, MMF	Central nervous system problems; liver damage
Ethylene Dibromide (EDB)	0.00005	ACS, ADC, AHC, APP, ASC, ASG, ASP, CAI, CAW, CFR, CHW, CPP, CPR, CPS, CRL, CUS, ICL, ICP, IFM, IHD, ILS, IPL, IPP, IRG, ISD, ISF, ITS, ITT, IUD, MMF, MSP	Liver, stomach, adrenal gland, reproductive system, respiratory, nervous system, heart, kidney damage; increased risk of cancer
Glyphosate	0.7	ACS, ADC, AFI, AFN, AHC, AHF, AHF, ARL, ASC, ASP, CAI, CAW, CCE, CCG, CCY, CGC, CHW, CPL, CRL, CRY, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, IUD, IUI, IUR, MHM, MHR, MLF, MMF, MPR, MPW, MSC, MSD, MSP, RMS	Respiratory problems; kidney, reproductive system damage
Heptachlor	0.0004	CAI, CCY, CGC, CPL, CRL, CRV, CRY, ICE, ICL, ICP, IHD, IPP, IPU, ISF, ITT, IUD, IUR, MHM, MMF, MSC	Central nervous system, liver damage; increased risk of cancer

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
Heptachlor Epoxide	0.0002	CAI, CCY, CGC, CPL, CRL, CRV, CRY, ICE, ICL, ICP, IHD, IPP, IPU, ISF, ITT, IUD, IUR, MHM, MMF, MSC	Central nervous system, liver damage; increased risk of cancer
Hexachlorobenzene	0.001	ACS, ADC, ASC, ASG, ASP, CPP, CPR, CRL, CUS, ICL, ICP, IHD, ILS, IMW, IPL, IPP, IRG, ISF, ITS, ITT, IUD, MMF	Skin lesions; nerve, liver, kidney damage; reproductive system problems; endocrine gland tumors; increased risk of cancer
Hexachlorocylopentadiene	0.05	CRL, CUS, ICL, ICP, IHD, ILS, IPL, IPP, IRG, ISF, ITS, ITT, IUD	Gastrointestinal problems; liver, kidney, heart damage
Lindane	0.0002	ACS, ADC, ADF, AFI, AFL, AFN, AHC, ARL, ASC, ASP, CCY, CHW, CPP, CPR, CRL, CVS, ICL, ICP, IHD, IPM, IPP, IRG, ISF, ISM, ITS, ITT, IUD, MHM, MMF, MSC, MSP	Liver, kidney damage; pulmonary problems
Methoxychlor	0.04	ACS, ADC, ADF, AFI, AFL, AFN, AHC, AHF, ASC, ASG, ASH, ASP, ASW, CBY, CCG, CGC, CHW, CRL, CUS, ICL, ICP, IHD, ILS, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUR, MHD, MHR, MMF, MPR, MSC, MSD	Central nervous system, gastrointestinal tract problems; liver, kidney, heart damage
Oxamyl (Vydate)	0.2	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CAW, CCE, CGC, CHW, CRL, ICL, ICP, IHD, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHM, MLF, MMF, MSC, MSP	Central nervous system problems
Pentachlorophenol	0.001	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CBY, CCY, CFR, CHW, CRL, CRY, ICL, ICP, IFM, IHD, IPM, IPP, IPU, IRG, ISF, ISM, ITT, IUD, MHM, MLF, MMF	Central nervous system damage, liver, kidney, reproductive system damage; increased risk of cancer
Picloram	0.5	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CAI, CAW, CCE, CCG, CCY, CGC, CHW, CPL, CRL, CRY, ICL, ICP, IHD, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHD, MHM, MHR, MLF, MMF, MPR, MSC, MSD, MSP, RMS	Central nervous system, liver damage
Simazine	0.004	ACS, ADC, AFI, AFN, AHC, ARL, ASC, ASP, CAI, CAW, CBY, CCG, CCE, CCY, CGC, CHW, CPL, CRL, CRY, CSY, ICL, ICP, IHD, IPP, IPU, IRG, ISD, ISF, ITS, ITT, IUD, IUI, IUR, MHD, MHM, MHR, MLF, MMF, MPR, MPW, MSC, MSD, MSP	Reproductive system, blood, kidney, liver, thyroid damage; gene mutation; increased risk of cancer
2,3,7,8-TCDD (Dioxin)	3x10-8	CAI, CRL, ICL, ICP, IEE, IHD, IPP, IPU, ISF, IUD, IUR, MIN, MMF, MSW	Reproductive system problems; birth defects; increased risk of cancer

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
Toxaphene	0.003	ACS, ADC, AFI, AFL, AFN, APF, ARL, ASC, ASP, CRL, ICL, ICP, IHD, IPP, ISF, IUD	Central nervous system, thyroid problems; liver, kidney degeneration; increased risk of cancer
2,4,5-TP (Silvex)	0.05	ACS, ADC, ARL, ASC, ASP, CBY, CCE, CGC, CRL, CRY, ICL, ICP, IHD, IPP, IPU, ISF, ITT, IUD, IUR, MHM, MLF, MMF	Liver, kidney damage; central nervous system problems
Benzo (a) pyrene	0.0002	AFM, CAI, CAR, CBS, CCY, CFC, CRL, CRY, IAS, ICC, ICL, ICP, IFW, IHD, IMI, IMP, IPL, IPP, IPU, IRG, ISF, IST, ITT, MFS, MHM, MIN, MLF, MMF, MMP, MSC	Anemia; immune system depression; reproductive, developmental problems; increased risk of cancer
Di (2-ethylhexyl) adipate	0.4	AAP, CAI, CAR, CBY, CCY, CHW, CPS, CRL, CST, ICL, ICP, IHD, IMI, IMP, IMW, IPL, IPP, IPU, IRG, ISF, ITS, ITT, IUD, MIN, MLF, MMF, MMP, MSL, MSP, MSS, MST	Liver, reproductive system damage; increased risk of cancer
Di (2-ethylhexyl) phthalate	0.006	AAP, APP, CHM, CHW, CPP, CPR, CRL, CSY, ICE, ICL, ICP, IEE, IHD, IMP, IMW, IPL, IPP, IRG, ISF, IST, ITT, IUD, MHM, MIN, MLF, MMF, MRF, MSW	Liver, reproductive system damage; increased risk of cancer
Polychlorinated Biphenyls (PCB's)	0.0005	ACS, ASC, CAI, CCY, CHM, CRL, CRY, CST, CSY, ICL, ICP, IEE, IHD, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, ISM, ITS, IUD, IUR, MHM, MIN, MLF, MMF, MSS, MST, MSW	Skin problems, thymus gland, reproductive system, immune system problems; liver function changes; increased risk of cancer
INORGANIC CHEMICALS			
Antimony	0.006	CRL, CSY, ICL, ICP, IEE, IFW, IHD, IMI, IMP, IPL, IPP, IRG, ISF, IST, IUD, MIN, MLF, MSW	Blood changes; increased risk of cancer
Arsenic	0.05	AAP, ACS, ADC, AFI, AFN, AHC, APP, ASC, ASP, CAI, CAR, CBS, CCE, CCY, CFC, CGC, CHM, CHN, CPP, CPR, CRL, CRV, CSY, CVS, ICL, ICP, IEE, IHD, IMI, IMP, IMW, IPM, IPP, IRG, ISF, ISM, IUD, IPU, MLF, MMF, MSC, MSW	Skin damage; circulatory problems; increased risk of cancer
Asbestos	7 MLF (million fibers/Liter)	CAI, CAR, CBS, CBY, CCY, CHM, CHN, CHW, CRL, CRV, CRY, CSY, ICC, ICL, ICP, IHD, IHM, IMI, IMO, IMW, IPU, IRG, ISF, IST, ITT, IUD, MHD, MHM, MIN, MLF, MMF, MMP, MSC, MSW, MWP	Lung disease, increased risk of cancer

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
Barium	2	CAI, CAR, CAW, CBS, CCY, CFR, CHM, CHN, CHW, CPP, CPR, CRL, CRV, CRY, CSY, CVS, ICC, ICL, ICP, IEE, IFW, IFM, IGO, IHD, IHM, IMI, IPL, IPM, IPP, IPU, IRG, ISF, ISM, IST, ITT, IUD, IUI, IUR, MHM, MIN, MLF, MMF, MMP, MSC, MSW	Gastrointestinal problems; high blood pressure
Beryllium	0.004	CRL, CSY, ICL, ICP, IEE, IFW, IHD, IHM, IMI, IMO, IMP, IMW, IPP, IPU, IRG, IRW, ISF, IST, IUD, MIN, MLF, MMF, MSW	Lung, bone damage; increased risk of cancer
Cadmium	0.005	AAP, APP, CAI, CAR, CBS, CBY, CCY, CHG, CHM, CHW, CPP, CPR, CPS, CRL, CRY, CSS, CSY, ICC, ICE, ICL, ICP, IEE, IFW, IHD, IHM, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, ISM, IST, ITT, IUD, IUR, MHM, MIN, MLF, MMF, MMP, MSC, MSP, MSS, MST, MSW, MWP	Gastrointestinal problems; kidney, liver, bone, blood damage
Chromium	0.1	CPP, CPR, CRL, CSY, ICC, ICL, ICP, IEE, IFW, IHD, IHM, IMI, IMO, IMP, IMW, IPP, IPU, IRG, ISF, IST, ITS, ITT, IUD, MIN, MLF, MMF, MPW, MSC, MSP, MSS, MST	Skin problems; liver, kidney, circulatory, nerve damage.
Copper	1.3 TT** Action Level	AAP, ACS, ADC, AHC, APF, APP, ASC, ASP, CAR, CBS, CCY, CHM, CHN, CHW, CPP, CPR, CRL, CRY, CST, CSY, CVS, ICL, ICP, IEE, IFM, IFW, IHD, IHM, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, ISM, IST, ITS, ITT, IUD, MIN, MLF, MMF, MSP, MSS, MST, MSW	Gastrointestinal problems; liver, kidney damage; anemia
Cyanide	0.2	ACS, ADC, AFI, AFN, AHC, ASC, ASP, CCY, CHN, CHW, CPP, CPR, CPS, CRL, CST, CUS, CVS, ICL, ICP, IEE, IFW, IHD, ILS, IMI, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISD, ISF, ISM, IST, ITS, ITT, IUD, MHM, MLF, MMF, MPW, MSC, MSS, MST	Thyroid problems; nerve damage
Fluoride	4	ACS, ADC, ASC, ASF, CCY, ICC, ICL, ICP, IFW, IHM, IMI, IMO, IMP, IST, IUD, MWP	Tooth mottling; bone disease
Lead	0.015 TT**	CAI, CAR, CBS, CBY, CCY, CFR, CHG, CHM, CHN, CHW, CPP, CPR, CPS, CRL, CRY, CSY, ICC, ICL, ICP, IEE, IFM, IFW, IHD, IHM, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, ISM, IST, ITS, ITT, IUD, IUR, MHD, MHM, MIN, MLF, MMF, MMP, MRF, MSC, MSP, MSS, MST, MSW, MWP, RMS	Blood, neurological development problems; kidney disease; stroke; increased risk of cancer
Mercury	0.002	AAP, ACS, ADC, AFI, AFN, AHC, APP, ASC, ASP, CAI, CAR, CBS, CBY, CCY, CFR, CHM, CHN, CHW, CPP, CPR, CRL, CRV, CRY, CST, CSY, CUS, CVS, ICE, ICL, ICP, IEE, IFM, IFW, IHD, IHM, ILS, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, ISM, IST, ITS, ITT, IUD, IUR, MHM, MIN, MLF, MMF, MPW, MRF, MSC, MSP, MSS, MST, MSW	Kidney damage
Nickel	0.1	CAI, CAR, CBS, CBY, CCY, CPP, CPR, CRL, CST, CSY, CUS, ICE, ICL, ICP, IEE, IFW, IHD, IHM, ILS, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, IST, ITS, ITT, IUD, MHM, MIN, MLF, MMF, MMP, MPW, MRF, MSC, MSP, MSS, MST, MSW	Gastrointestinal irritation; nerve, liver, kidney, reproductive system damage

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
Nitrate	10	AAP, ACS, ADC, ADF, AFI, AFL, AFN, AHC, AMA, AMS, AOA, APF, APP, ARL, ASC, ASF, ASH, ASW, CAI, CAW, CBB, CBY, CCE, CCG, CCW, CCY, CFC, CGC, CHG, CHN, CPL, CPP, CPR, CRL, CST, CVS, ICL, ICP, IHD, IHM, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, ISD, ISF, ISM, ITS, ITT, IUD, IUR, MHD, MHM, MLF, MMF, MPR, MPS, MPW, MSC, MSD, MSL, MSP, MSS, MST, MSW, MWP, RMS	Methemoglobinemia; spleen damage
Nitrite	1	AAP, ACS, ADC, ADF, AFI, AFL, AFN, AHC, AMA, AMS, AOA, APF, APP, ARL, ASC, ASF, ASH, ASW, CAI, CAW, CBB, CBY, CCG, CCE, CCW, CCY, CFC, CGC, CHG, CHN, CPL, CPP, CPR, CRL, CST, CVS, ICL, ICP, IHD, IHM, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, ISD, ISF, ISM, ITS, ITT, IUD, IUR, MHD, MHM, MLF, MMF, MPR, MPS, MPW, MSC, MSD, MSL, MSP, MSS, MST, MSW, MWP, RMS	Methemoglobinemia; spleen damage
Selenium	0.05	ADC, AFI, AFN, ARL, CPP, CPR, CRL, ICC, ICL, ICP, IEE, IFW, IHD, IHM, IMI, IMO, IMP, IMW, IPL, IPM, IPP, IPU, IRG, ISF, IST, IUD, MHM, MIN, MLF, MMF, MPW, MSC, MSS, MST, MSW	Peripheral nervous system, kidney, liver, circulatory system damage
Thallium	0.002	CHN, CPP, CRL, ICC, ICE, ICL, ICP, IEE, IFW, IHD, IHM, IMI, IMO, IMP, IPL, IPP, IPU, IRG, ISF, IUD, IUR, MIN, MLF, MMF, MSS, MST, MSW	Blood chemistry changes; nerve, liver, kidney, intestinal, reproductive system damage
RADIONUCLIDES			
Beta Particles and Photon Emitters	4 Millirems per year	CAW, CHN, CRL, IGO, IHM, IMO, IRG, IRW, ISF, MMF, MWP	Increased risk of cancer
Gross Alpha Particle Activity	15 Picocuries per Liter	CAW, CHN, CRL, IGO, IHM, IMO, IRG, IRW, ISF, MMF, MWP	Increased risk of cancer
Radium 226 and Radium 228 (Combined)	5 Picocuries per year	CAW, CHN, CRL, IGO, IHM, IMO, IRG, IRW, ISF, MMF, MWP	Increased risk of cancer
MICROBIOLOGICAL (Pathogenic organisms)			
Crytosporidium parvum		AAP, ADC, ADF, AFL, AMA, AMS, AOA, APF, APP, ARL, ASH, ASW, CAW, CBY, CCG, CFC, CHN, CPL, CRV, CSS, CST, CVS, ISD, ITS, IUI, IUR, MHD, MHR, MMF, MPR, MPS, MPW, MSC, MSD, MSL, MSP, MSS, MST, MWP, RMS	Cryptosporidiosis (a gastroenteric disease)
Giardia lambia	TT**	AAP, ADC, ADF, AFL, AMA, AMS, AOA, APF, APP, ARL, ASH, ASW, CAW, CBY, CCG, CFC, CHN, CPL, CRV, CSS, CST, CVS, ISD, ITS, IUI, IUR, MHD, MHR, MMF, MPR, MPS, MPW, MSC, MSD, MSL, MSP, MSS, MST, MWP, RMS	Giardiasis (a gastroenteric disease)

Name of Contaminant	MCL *	Potential Contaminant Source (by Contaminant Code)***	Health Effects
Legionella sp.	TT**	ADC, CBY, ITS, MPW, MSD, MSP, MWP	Legionnaire's Disease; pneumonia
Total Coliforms (Including	5 Percent (See NOTE 1)	AAP, ADC, ADF, AFL, AMA, AMS, AOA, APF, APP, ARL, ASH, ASW, CAW, CBY, CCG, CFC, CHN, CPL, CRV, CSS, CST, CVS, ISD, ITS, IUI, IUR, MHD, MHR, MMF, MPR, MPS, MPW, MSC, MSD, MSL, MSP, MSS, MST, MWP, RMS	Used as an indicator that other potentially harmful bacteria may be present (see NOTE 2)
Fecal Coliform & E. coli)			
Turbidity	TT**	ADC, CBY, CCG, CCW, CCY, CGC, CPL, CRV, CRY, ICC, IHD, IHM, IMO, IPM, IUD, IUR, MHD, MHM, MHR, MIN, MLF, MMF, MPR, MPW, MRF, MSC, MSD, MSL, MSP, MSS, MST, MSW, RMS	Turbidity has no health effects but can interfere with disinfection and provide a medium for bacterial growth. It may indicate the presence of microbes
Viruses (Enteric)	TT**	AAP, ADC, ADF, AFL, AMA, AMS, AOA, APF, APP, ARL, ASH, ASW, CAW, CBY, CCG, CFC, CHN, CPL, CRV, CSS, CST, CVS, ISD, ITS, IUI, IUR, MHD, MHR, MMF, MPR, MPS, MPW, MSC, MSD, MSL, MSP, MSS, MST, MWP, RMS	Gastroenteric disease

Conservative Values were used to complete the DRASTIC Index under the Sensitivity Analysis when adequate and/or complete information was not available (one or more of the conservative values may have been used):

1. Where DRASTIC Index = D_R x D_W + R_R x R_W + A_R x A_W + S_R x S_W + T_R x T_W + I_R x I_W + C_R x C_W

- D (depth to ground water) – Use 10 (10 x 5[weight] = 50)
- R (recharge) - If the well is near a stream bed or is receiving mountain front recharge, use 9 (9 x 4[weight] = 36 as the "Most conservative". Otherwise use 6(6 x 4[weight] = 24
- A (aquifer media) – Use 10 (10 x 3[weight] = 30)
- S (soil media) – Use 10 (10 x 2[weight] = 20)
- T (Topography/slope) – Use 10 (10 x 1[weight] = 10)
- I (Impacts of the Vadose Zone) – If the well is in a limestone area, use 10 (10 x 5[weight] = 50). If the well is not in a limestone area, use 8 (8 x 5[weight] = 40.
- C (Hydraulic Conductivity) – Use 10 (10 x 4[weight] = 40

The equation:
DRASTIC (conservative) = (10 x 5) + (9 x 4) + (10 x 3) + (10 x 2) + (10 x 1) + (10 x 5) + (10 x 4) = 236
(If the lower values for R and I are used the result will be 214. Both of these results fall in the "High" range).

The Pesticide Index equation was used when calculating a DRASTIC Index for a well located in an area where crops and/or orchards were the predominant land use or when pesticide use was known.

2. Where DRASTIC Pesticide Index = D_R x D_W + R_R x R_W + A_R x A_W + S_R x S_W + T_R x T_W + I_R x I_W + C_R x C_W

- D (depth to ground water) – Use 10 (10 x 5[weight] = 50)
- R (recharge) - If the well is near a stream bed or is receiving mountain front recharge, use 9 (9 x 4[weight] = 36 as the "Most conservative". Otherwise use 6(6 x 4[weight] = 24
- A (aquifer media) – Use 10 (10 x 3[weight] = 30)
- S (soil media) – Use 10 (10 x 5[weight] = 50)
- T (Topography/slope) – Use 10 (10 x 3[weight] = 30)
- I (Impacts of the Vadose Zone) – If the well is in a limestone area, use 10 (10 x 4[weight] = 40). If the well is not in a limestone area, use 8 (8 x 4[weight] = 32
- C (Hydraulic Conductivity) – Use 10 (10 x 4[weight] = 40

The equation:
(10 x 5) + (9 x 4) + (10 x 3) + (10 x 5) + (10 x 3) + (10 x 4) + (10 x 4) = 276
(If the lower values for R and I are used the result will be 260. Both of these results fall in the "High" range).

If a screened interval is needed the conservative value used was <100 feet.

ROADS AND RELATED FEATURES

Roads on Provisional edition maps are not classified as primary, secondary, or light duty. They are all symbolized as light duty roads.

- Primary highway
- Secondary highway
- Light duty road
- Unimproved road
- Trail
- Dual highway
- Dual highway with median strip
- Road under construction
- Underpass; overpass
- Bridge
- Drawbridge
- Tunnel

VEGETATION

- Woods
- Scrub
- Orchard
- Vineyard
- Mangrove

CONTOURS

Topographic

- Intermediate
- Index
- Supplementary
- Depression
- Cut; fill

Bathymetric

- Intermediate
- Index
- Primary
- Index Primary
- Supplementary

BUILDINGS AND RELATED FEATURES

- Building
- School; church
- Built-up Area
- Racetrack
- Airport
- Landing strip
- Well (other than water); windmill
- Tanks
- Covered reservoir
- Gaging station
- Landmark object (feature as labeled)
- Campground; picnic area
- Cemetery: small; large

RAILROADS AND RELATED FEATURES

- Standard gauge single track; station
- Standard gauge multiple track
- Abandoned
- Under construction
- Narrow gauge single track
- Narrow gauge multiple track
- Railroad in street
- Juxtaposition
- Roundhouse and turntable

LAND SURVEY SYSTEMS

U.S. Public Land Survey System

- Township or range line
- Location doubtful
- Section line
- Location doubtful
- Found section corner; found closing corner
- Witness corner; meander corner

Other land surveys

- Township or range line
- Section line
- Land grant or mining claim; monument
- Fence line

RIVERS, LAKES, AND CANALS

- Intermittent stream
- Intermittent river
- Disappearing stream
- Perennial stream
- Perennial river
- Small falls; small rapids
- Large falls; large rapids
- Masonry dam
- Dam with lock
- Dam carrying road
- Perennial lake; Intermittent lake or pond
- Dry lake
- Narrow wash
- Wide wash
- Canal, flume, or aqueduct with lock
- Elevated aqueduct, flume, or conduit
- Aqueduct tunnel
- Well or spring; spring or seep

MINES AND CAVES

- Quarry or open pit mine
- Gravel, sand, clay, or borrow pit
- Mine tunnel or cave entrance
- Prospect; mine shaft
- Mine dump
- Tailings

DARIES

- ional
- e or territorial
- nty or equivalent
- l township or equivalent
- rporated city or equivalent
- k, reservation, or monument
- Small park