A Source Water Assessment (SWA) for

Mountain Village Water System (Emergency Source),

PWS ID # 270150.001

What is an SWA?

The Drinking Water Protection group of the Drinking Water Program is producing Source Water Assessments (SWAs) in compliance with the Safe Drinking Water Act (SDWA) Amendments of 1996. Each SWA includes:

- A delineation of the drinking water source area;
- Inventory of potential and existing sources of contamination;
- Risk ranking for the identified contaminants;
- Evaluation of the overall vulnerability to the PWS source.

What is a Protection Area?

The most probable area for contamination to reach the drinking water intake is within the drinking water protection area (DWPA). The DWPA for a surface water source is determined by the drainage area contributing overland water flow to the surface water source intake. Because releases of contaminants within the DWPA are most likely to impact the intake, this area will serve as the focus for voluntary protection efforts.

The DWPAs established for surface water sources by DEC are separated into 3 zones, limited by the watershed. These zones correspond to the overland-flow distance that water travels to get to the source. The following is a summary of the three protection area zones:

Zone	Definition
A	Areas within 1000-ft of lakes or streams
B	Areas within 1-mile of lakes or streams
C	The watershed boundary

Table 1: Public Water System Source Information

PWS Name	**Mountain Village Water System**
PWS ID Number	270150.001
State Asgn ID No.	IN001
Facility Name	Emergency Source
Source Type	Surface Water
Federal Classification	Community
River/Stream Discharge	~ 250,000 cfs*

*"cfs" = cubic feet per second

Executive Summary

The public water system for Mountain Village is a Community Water System (CWS) that has three wells and an intake that is used only as an emergency source. This Source Water Assessment report is exclusively limited to PWS ID# 270150.001 (IN001), the emergency source. This drinking water source obtains water from the north bank of the Yukon River, approximately 20 miles west of St. Mary's, Alaska. The Mountain Village Water System (Emergency Source) protection area is approximately 62 square miles in size and received a susceptibility rating of **Very High**. *A rating of High to Very High is typical for all systems with surface water intakes.* Identified potential and existing sources of contamination for the Mountain Village Water System (Emergency Source) include a motor vehicle repair shop, a wastewater collection system, quarries, residential areas, heating oil tanks, contaminated sites, bulk fuel storage tanks, airports, roads, power plant, firehouse, clinic, cemetery, kennel, and pipelines. These are considered potential sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals (VOCs), heavy metals, cyanide, and other inorganic chemicals, synthetic organic chemicals (SOCs), and other organic chemicals (OOCs).

Combining the natural susceptibility of the surface water source with the six (6) contaminant risk categories, the Mountain Village Water System (Emergency Source) received an overall vulnerability rating of **High** for bacteria and viruses, nitrates, heavy metals, cyanide, and other inorganic chemicals, and SOCs; a **Very High** for VOCs and OOCs.

Introduction

Source Water Assessments (SWAs) are intended to provide public water system operators, owners, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. Mountain Village Water System (Emergency Source)'s SWA is a tool to be used as the foundation or "stepping stone" to comprehensive management and protection of its surface water resource. Protecting the quality of your drinking water is a sensible investment.

Drinking Water Protection Area (DWPA)

The size and shape of a DWPA varies with the specific characteristics of the source and the geography of the surrounding landscape. The DWPA is drawn by determining the area contributing water to the surface water source. This area consists of the watershed or basin that it is located in, plus all watersheds drained by tributaries flowing into the surface water source. (See Mountain Village Water System (Emergency Source)'s DWPA on Map1 of the Appendices.

Natural Susceptibility

The natural susceptibility of a surface water source is a measure of a water supply's potential to become contaminated based on information gathered on the intake structure, conditions contributing to overland flow in the vicinity of the surface water body and the surface water body's capacity to dilute potential and/or existing contaminants.

Natural Susceptibility (Surface Water Source)

The **Natural Susceptibility of a surface water source** to the introduction of contaminants to the drinking water is determined by, but not limited to, the following risk factors: the general adequacy of intake construction, the potential for runoff or flooding, and the capacity of the surface water body to dilute contaminants.

Susceptibility of the Surface Water Source
(Always considered High)
+
Adequate Construction of the Intake
+
Runoff Potential
+
Dilution Capacity of the Surface Water
=
Natural Susceptibility

Based on recent site visits and properties of the surrounding area, the **Natural Susceptibility** of the surface water source for Mountain Village Water System (Emergency Source) received a rating of **Very High**.

Inventory of Potential and Existing Sources Contamination

The Drinking Water Protection (DWP) group has completed an inventory of potential and existing sources of contamination within the DWPA for the Mountain Village Water System (Emergency Source). This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water source include a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

The identified potential sources of contamination are summarized in Table 2 below and are portrayed in Map 2 of the Appendices.

Table 2: Contaminant Source Inventory

Contaminant Source Type	*Contaminant Source ID*	*Zone*	*Map Number*	*Comments*
Motor /motor vehicle repair shops	C31	A	2	City Maintenance Building - Service/Maintenance Shop
Domestic wastewater collection systems (sewer lines or lift stations)	D01	A	2	Sewerline/Lift Station
Domestic wastewater collection systems (sewer lines or lift stations)	D01	A	2	Lift Station #1
Quarries (sand, gravel, rock, other?)	E10	A	2	Azachorak Corp Gravel Pit
Residential Areas	R01	A	2	Identified approximately 9 acres of residential area in Zone A.
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	AVEC Power Plant - Power Generation Facility
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Azachorok Corp Store
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Yupik Store and Warehouse
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	LYSD Housing 2 -Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	LYSD Teacher Housing 3 - Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	United Utilities Telephone - Telephone
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Mountain Village Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Covenant Church/Mt Village Covenant Church
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Russian Orthodox Church
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Search and rescue - Emergency Operations Center
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Community Hall
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Fire House - Fire Station
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Armory - National Guard

Table 2: Contaminant Source Inventory (Continued)

Contaminant Source Type	Contaminant Source ID	Zone	Map Number	Comments
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	City and Traditional Council - Offices
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	City Office/Public Safety - Offices
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	City Office/Public Safety - Police Station
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Head Start School
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	LYSD Elementary School
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	LYSD Middle School
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	LYSD Teacher Housing 4
Tanks, heating oil, nonresidential (aboveground)	T14	A	2	Armory - National Guard
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	A	2	Mountain Village Elementary School; heating oil spill from above ground storage tanks (ASTs). Contaminants of Concern: Benzene and DRO. ETM Groundwater Ingestion: High Potential Exposure; Surface Water Ingestion: Pathway Incomplete (12/30/2010)
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	A	2	AKARNG Mountain Village FSA; petroleum product spill from above ground storange tanks (ASTs). Contaminants of Concern: DRO and GRO. ETM Groundwater and Surface Water Ingestion: Pathway Incomplete as of 04/01/2008.
Contaminated sites, Superfund (CERCLA) (inactive or abandoned hazardous wastes)	U06	A	2	Old Village Store, Mountain Village. Confirmed Brownfields as of 08/2005. From the EPA Brownfields website: Phase II Assessment has been completed and found Petroleum products, Asbestos, VOCs in soil.
Water supply wells	W09	A	2	Mountain Village Water System - Lower Loop (PWS ID# 270150.002)
Petroleum product bulk station/terminals	X11	A	2	AVEC Fuel Storage -Fuel Storage Tanks > 500 gallons
Petroleum product bulk station/terminals	X11	A	2	Azachorak Fuel, Shepards Way - Fuel Storage Tanks > 500 gallons
Petroleum product bulk station/terminals	X11	A	2	City Fuel Storage - Fuel Storage Tanks > 500 gallons
Petroleum product bulk station/terminals	X11	A	2	LYSD Fuel Storage 2 - Fuel Storage Tanks > 500 gallons
Petroleum product bulk station/terminals	X11	A	2	LYSD Fuel Storage 3 - Fuel Storage Tanks > 500 gallons
Petroleum product bulk station/terminals	X11	A	2	Army National Guard
Petroleum product bulk station/terminals	X11	A	2	Army National Guard
Airports	X14	A	2	Mountain Village Airport
Airports	X14	A	2	Mountain Village Old Airstrip
Highways and roads, paved (cement or asphalt)	X20	A	2	Identified 21 paved roads in Zone A.
Highways and roads (winter)	X26	A	2	Winter Trail
Electric power generation (fossil fuels)	X36	A	2	AVEC Power Plant - Power Generation Facility
Firehouses	X38	A	2	Fire House - Fire Station
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	A	2	Helath Clinic - Hospital/Clinic/ER
Domestic wastewater collection systems (sewer lines or lift stations)	D01	B	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	B	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	B	2	Lift Station #2
Domestic wastewater treatment plants	D05	B	2	Sewage Treatment Plant - Waste Water Treatment Facility
Quarries (sand, gravel, rock, other?)	E10	B	2	New Gravel Pit - NW of New Airstrip
Residential Areas	R01	B	2	Identified approximately 18 acres of residential area in Zone B
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	LYSD Housing 1 -Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	LYSD Teacher Housing 1
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	LYSD Teacher Housing 2
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	LYSD Central Office
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	LYSD High School
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	
Tanks, heating oil, nonresidential (aboveground)	T14	B	2	
Water supply wells	W09	B	2	Mountain Village Water System - High School Well (PWS ID# 270150.003)
Water supply wells	W09	B	2	Mountain Village Water System - Upper Loop 85 (PWS ID# 270150.004)

Table 2: Contaminant Source Inventory (Continued)

Contaminant Source Type	*Contaminant Source ID*	*Zone*	*Map Number*	*Comments*
Cemeteries	X01	B	2	Cemetery
Petroleum product bulk station/terminals	X11	B	2	LYSD Fuel Storage 1
Petroleum product bulk station/terminals	X11	B	2	LYSD Fuel Storage 4
Highways and roads, paved (cement or asphalt)	X20	B	2	Airport Access Rd, Homiere Rd, Peterson St, Sheppard St, Spring Water Rd.
Pipelines (oil and gas)	X28	B	2	Valley St.
Electric power generation (fossil fuels)	X36	B	2	Valley St.
Kennels	X49	B	2	Dog Staking Area

Contaminant Risks

Inventoried contaminant sources are sorted by the Drinking Water Protection (DWP) group according to the six (6) major categories of contaminants regulated for drinking water: 1) bacteria and viruses; 2) nitrates and/or nitrites; 3) volatile organic chemicals (VOCs); 4) heavy metals, cyanide, and other inorganic chemicals; 5) synthetic organic chemicals (SOCs); and 6) other organic chemicals (OOCs). The potential contaminant sources are then given a ranking (within each category) according to the degree of risk posed to human health based on the volume, toxicity, persistence, and the mobility of the contaminants involved.

The contaminant risk rankings for the inventoried contaminant sources are summarized in Table 3 below.

Table 3: Contaminant Risk Rankings

Contaminant Source Type	*Contaminant Source ID*	*Zone*	*Risk Ranking*					
			Bacteria & Viruses	*Nitrates / Nitrites*	*VOCs*	*Inorganic Chemicals**	*SOCs*	*OOCs*
Motor /motor vehicle repair shops	C31	A	None	None	Medium	Medium	None	Medium
Domestic wastewater collection systems (sewer lines or lift stations)	D01	A	Medium	Medium	Low	Low	Low	Low
Domestic wastewater collection systems (sewer lines or lift stations)	D01	A	Medium	Medium	Low	Low	Low	Low
Quarries (sand, gravel, rock, other?)	E10	A	None	Low	Low	None	None	Low
Residential Areas	R01	A	Low	Low	Low	Low	Low	Low
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	A	None	None	Low	Low	None	None

Table 3: Contaminant Risk Rankings

Contaminant Source Type	*Contaminant Source ID*	*Zone*	*Risk Ranking*					
			Bacteria & Viruses	*Nitrates / Nitrites*	*VOCs*	*Inorganic Chemicals**	*SOCs*	*OOCs*
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	A	None	None	Low	None	None	None
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	A	None	None	Low	None	None	None
Contaminated sites, Superfund (CERCLA) (inactive or abandoned hazardous wastes)	U06	A	None	None	Low	Low	None	None
Water supply wells	W09	A	None	None	None	None	None	None
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	A	None	None	Very High	Low	Low	High
Airports	X14	A	None	Low	Medium	Low	Medium	Medium
Airports	X14	A	None	Low	Medium	Low	Medium	Medium
Highways and roads, paved (cement or asphalt)	X20	A	Low	Low	Low	Low	None	Low
Highways and roads (winter)	X26	A	Low	Low	Low	Low	None	Low
Electric power generation (fossil fuels)	X36	A	None	None	Low	Medium	None	High
Firehouses	X38	A	None	None	Low	Low	None	None
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	A	Low	Low	Low	Low	Low	None
Domestic wastewater collection systems (sewer lines or lift stations)	D01	B	Medium	Medium	Low	Low	Low	Low
Domestic wastewater collection systems (sewer lines or lift stations)	D01	B	Medium	Medium	Low	Low	Low	Low
Domestic wastewater collection systems (sewer lines or lift stations)	D01	B	Medium	Medium	Low	Low	Low	Low
Domestic wastewater treatment plants	D05	B	Medium	Medium	Low	Low	Low	Low
Quarries (sand, gravel, rock, other?)	E10	B	None	Low	Low		None	Low
Residential Areas	R01	B	Low	Low	Low	Low	Low	Low
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Tanks, heating oil, nonresidential (aboveground)	T14	B	None	None	Low	Low	None	None
Water supply wells	W09	B	None	None	None	None	None	None
Water supply wells	W09	B	None	None	None	None	None	None
Cemeteries	X01	B	None	Medium	None	Low	Medium	None
Petroleum product bulk station/terminals	X11	B	None	None	Very High	Low	Low	High
Petroleum product bulk station/terminals	X11	B	None	None	Very High	Low	Low	High
Highways and roads, paved (cement or asphalt)	X20	B	Low	Low	Low	Low	None	Low
Pipelines (oil and gas)	X28	B	None	None	Medium	Low	None	High
Electric power generation (fossil fuels)	X36	B	None	None	Low	Medium	None	High
Kennels	X49	B	Medium	Medium	None	None	None	None
Overall Risk Ranking			**Medium**	**Medium**	**Very High**	**Medium**	**Medium**	**Very High**

** Includes Heavy Metals, Cyanide and Other Inorganic Chemicals*

The contaminant risk ranking for Bacteria and Viruses is **Medium**. The risk ranking is primarily attributed to the sewerlines, lift stations, wastewater treatment plant, and the dog staking area.

The contaminant risk ranking for nitrates and nitrites is **Medium.** The risk ranking is primarily attributed to the sewerlines, lift stations, wastewater treatment plant, cemetery and the dog staking area.

The contaminant risk ranking for volatile organic chemicals is **Very High**. The risk ranking is primarily attributed to the bulk fuel storage tanks.

The contaminant risk ranking for heavy metals, cyanide and other inorganic chemicals is **Medium.** The risk ranking is primarily attributed to the motor vehicle repair shop and the power plant.

The contaminant risk ranking for synthetic organic chemicals is **Medium**. The risk ranking is primarily attributed to the airports and the cemetery.

The contaminant risk ranking for other organic chemicals is **Very High.** The risk ranking is primarily attributed to the bulk fuel storage tanks, the power plants and the pipeline.

There is no required monitoring for any of the above contaminants as of the writing of this report.

Overall Vulnerability of the Drinking Water Source to Contamination

An overall vulnerability is determined for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

Overall Vulnerability of the Drinking Water Source to Contamination = Natural Susceptibility + Contaminant Risks

Table 4 summarizes the overall vulnerability ratings for each of the six (6) categories of drinking water contaminants.

Table 4: Overall Vulnerability

Category	*Rating*
Bacteria and Viruses	**High**
Nitrates and/or Nitrites	**High**
Volatile Organic Chemicals	**Very High**
Heavy Metals, Cyanide, and Other Inorganic Chemicals	**High**
Synthetic Organic Chemicals	**High**
Other Organic Chemicals	**Very High**

Using the Source Water Assessment

This assessment of contaminant risks and source vulnerability can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Mountain Village Water System (Emergency Source) to protect public health. Communities can use the Source Water Assessment (SWA) to create a *drinking water protection plan* to manage the identified potential and existing sources of regulated drinking water contaminants and to prevent or minimize new contaminant threats in the drinking water protection area.

Mountain Village Water System (Emergency Source) can use a number of different drinking water protection methods to limit or prevent contamination of its drinking water source.

- Non-Regulatory Options include:
    - Public education about where drinking water comes from and the effects of contaminants is probably the most effective and least costly method of protection;
    - Household hazardous waste collection - household hazardous wastes are usually generated in small amounts but can have a big impact on the environment;

  - The source water assessment report is a tool that can be used to prioritize protection strategies identified in a drinking water protection plan;
  - Taking proactive measures towards proper waste storage and disposal can help eliminate the need to find an alternative drinking water source by preventing source water contamination;
  - Conservation easements - easements can assist in protecting the area by limiting development;
  - Make a written plan on what you will do if an accidental spill happens that could contaminate your source of drinking water; and
  - Local drinking water protection plan (an example or template is available from DEC).

- Regulatory Options include:
  - Source protection regulations prohibiting the presence or use of all or specific chemicals within the drinking water protection area;
  - Zoning ordinances to control development within the protection areas around the source;
  - Subdivision ordinance; and
  - Operating standards for industrial and other activities within the protection areas around the source.

Source Water Assessments can be updated to reflect any changes in the vulnerability and/or susceptibility of the Mountain Village Water System (Emergency Source) drinking water source. The data that is used to generate the Source Water Assessment is updated on an on-going basis as identified in the field or if changes are identified and brought to the attention of the Drinking Water Program.

Where to go from here?

The Source Water Assessment (SWA) is a comprehensive evaluation of the potential risk of contamination to the public water system and the source(s) of drinking water used by the system. Identifying potential sources of contamination and the vulnerability of the public water system is an important first step in protecting the drinking water source from contamination. However, in order to prevent contamination from occurring, action must be taken by the water system owner and/or operator. The SWA can be used by the public water system to educate the local community and to prioritize community-driven protection strategies. Inviting community members, council members, and local government officials to help develop a Drinking Water Protection Plan is one essential component towards successful drinking water protection efforts. For questions regarding, or assistance to begin, the process of developing a Drinking Water Protection Plan, please contact the Drinking Water Protection group at #1-866-956-7656.

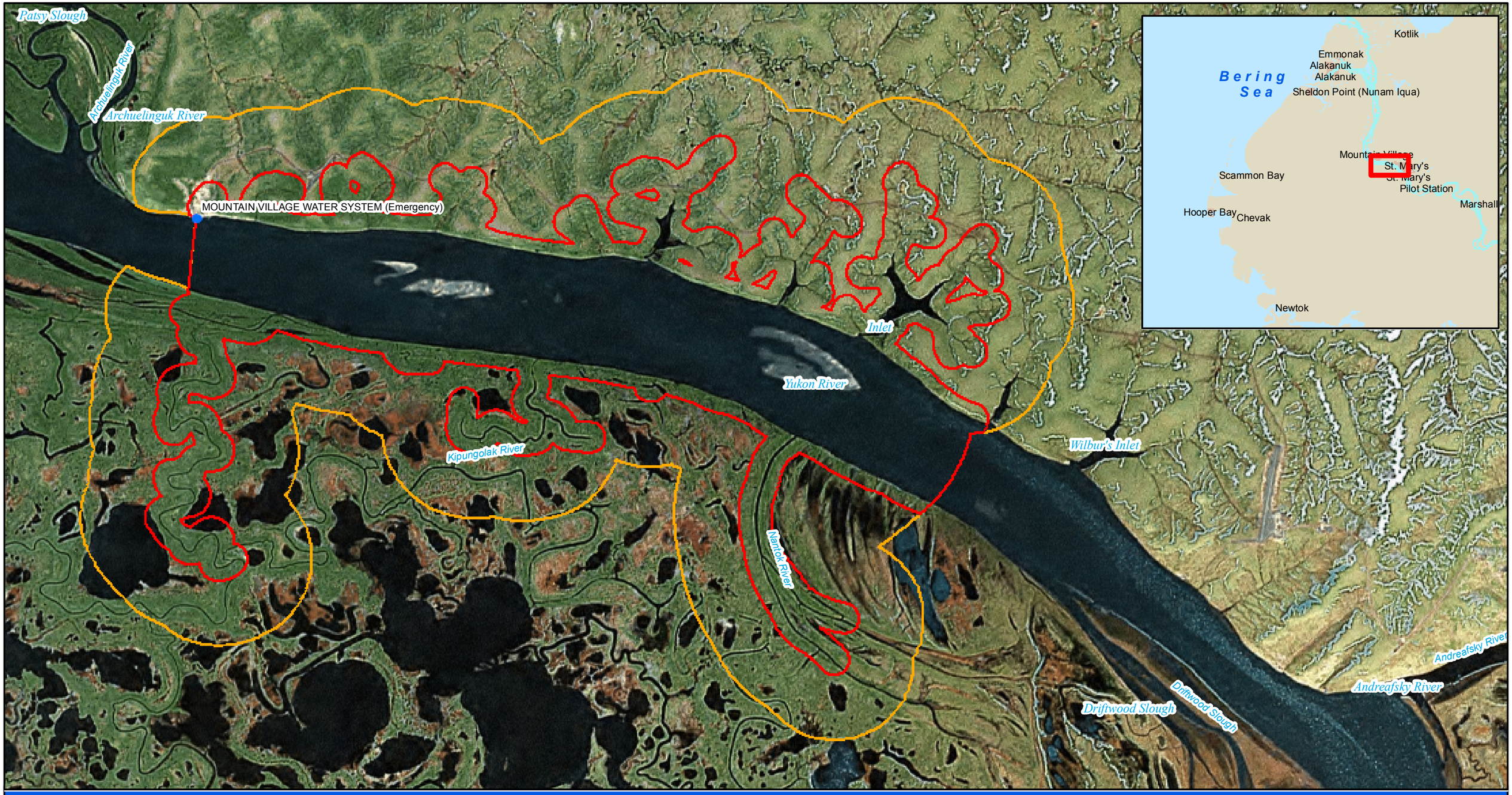
Other Resources

The Drinking Water Protection group, the EPA, and local organizations are available to help you build on this Source Water Assessment report as you continue to improve drinking water protection in your community.

DEC, Drinking Water Protection - http://dec.alaska.gov/eh/dw/DWP/source_water.html
EPA, Drinking Water Protection - http://cfpub.epa.gov/safewater/sourcewater/index.cfm
ARWA (Alaska Rural Water Association) - http://www.arwa.org

Appendices

- Mountain Village Water System (Emergency Source) Drinking Water Protection Area Location Map (Map 1)
- Mountain Village Water System (Emergency Source) Drinking Water Protection Area with Potential and Existing Contaminant Sources (Map 2)
- Best Management Strategies for Potential Contaminants Identified within a Drinking Water Source Protection Area



Map 1 - Mountain Village Water System (Emergency)

PWS ID# 270150.001

Alaska Department of Environmental Conservation

1 0.5 0 1 Miles

1:72,000

Inset Scale: 1:2,880,000

N W E S

Public Water Systems

Community Water System (CWS) source (formerly: Class A)

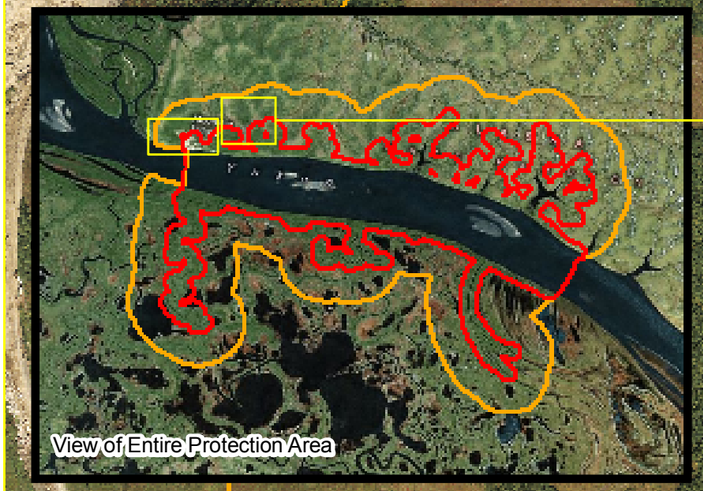
Drinking Water Protections Areas

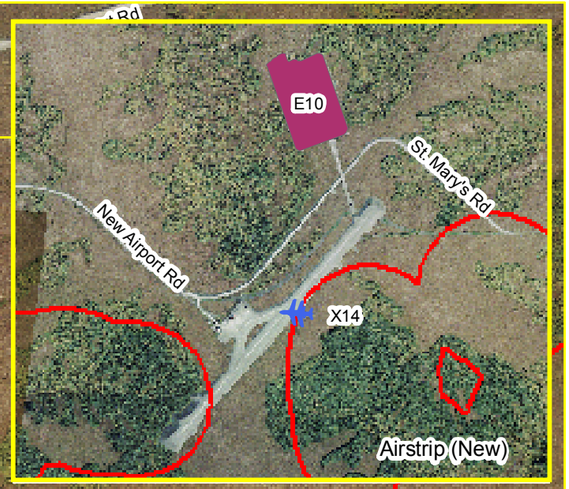
Zone A: 1,000-foot buffer from shoreline of source and its tributaries for surface sources.

Zone B: 1-mile buffer from shoreline of source and its tributaries for surface sources.

Data Sources:
Imagery: Alaska Mapped (SDMI and GINA)
Public Water Systems and Drinking Water Protection Areas: ADEC

Anne Gleason 03/11/2011





Other Potential Sources of Contamination in Zone B:
- R01, Residential Areas (approximately 18 acres)
- X20, Highways and roads, paved (identified 5 roads)

Other Potential Sources of Contamination in Zone A:
- R01, Residential Areas (approximately 9 acres)
- X20, Highways and roads, paved (identified 21 roads)
- X26, Highways and roads, winter (identified 1 winter trail)

Mountain Village Water System (Emergency)
PWS ID# 270150.001

N W E S

Mountain Village

Map 2 - Mountain Village Water System (Emergency)

PWS ID# 270150.001

Alaska Department of Environmental Conservation

Data Sources:
Imagery: Alaska Mapped (SDMI and GINA) and DCRA Photos (http://maps.commerce.alaska.gov/arcgis/services)
Public Water Systems, Drinking Water Protection Areas and Potential Sources of Contamination: ADEC

Mountain Village: 1:5,580

Airstrip Inset: 1:24,000

Entire Protection Area: 1:239,400

Public Water Systems
- Community Water System (CWS) source (formerly: Class A)

Drinking Water Protections Areas
- Zone A: 1,000-foot buffer from shoreline of source and its tributaries for surface sources.
- Zone B: 1-mile buffer from shoreline of source and its tributaries for surface sources.

2.5 1.25 0 2.5 Miles

Potential Sources of Contamination
- C31, Motor /motor vehicle repair shops
- D01, Domestic wastewater collection systems (sewer lines or lift stations)
- D05, Domestic wastewater treatment plants
- T14, Tanks, heating oil, nonresidential (aboveground)
- X01, Cemeteries
- X11, Petroleum product bulk station/terminals
- X14, Airports
- X28, Pipelines (oil and gas)
- X36, Electric power generation (fossil fuels)
- X38, Firehouses
- X40, Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)
- U04/U06, Contaminated Sites
- E10, Quarries (sand, gravel, rock, other?)
- X14, Airports/Airstrips
- X49, Kennels

Anne Gleason 03/22/2011

Best Management Strategies for Potential Contaminants Identified within a Drinking Water Source Protection Area

Best Management Strategies (BMP's)	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's
General BMP's for all Activities				
Avoid the activity or reduce its occurrence.	All	All	All	All
Move the activity indoors.	All	All	All	All
Use less material.	All	All	All	All
Use least toxic material available.	All	All	All	All
Create and maintain vegetative areas near activities.	All	All	All	All
Locate activities as far as possible from surface drainage paths.	All	All	All	All
Keep storm drain systems clean.	All	All	All	All
Reduce, reuse and recycle as much as possible.	All	All	All	All
Be an advocate for stormwater pollution prevention.	All	All	All	All
Report Violators.	All	All	All	All
Cleaning, Washing and Industrial Activities				
Cleaning and washing of tools, engines and manufacturing equipment .	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Illicit connections to stormwater drains should be eliminated.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Employees should be educated.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
All wastewater should be dishcharged to a holding tank, process treatment system, or sanitary sewer. Never discharge to septic system or stormwater drains.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If soaps and detergents are used, use least toxic chemical capable of doing the job. Use non-phosphate detergents, if possible.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Limit the amount of water used for washing activities to limit the potential runoff of carrying pollutants beyond the designated wash pad or capture system.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Recycle wash water for subsequent washings.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Implement one of following stormwater treatment BMP's:	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Oil water separator.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Wet vault for settling.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Infiltration Basin.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Filtration for media designed for pollutant present.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Catch basin with a filter insert for pressure washing.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Paved wash area should be swept daily.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Greasy buildup on cooking equipment must be removed and properly disposed of prior to washing to reduce the amount of material that can contaminate runoff.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Use a tub or similar device to contain washwater.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If activity can not be moved indoors or contained by a tub, the washing area must drain to a sanitary sewer, holding tank or process treatment system and provisions should be made to prevent stormwater run-off onto the washing area.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If a holding tank is used, the contents must be pumped and disposed of appropriately.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
A cover should be placed over wash area to prevent rain from falling on dirty equipment and producing contaminated runoff.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Take vehicles to commercial car wash.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Designated wash areas must be marked well, with signs indicated where and how washing should occur. Any inlets to sanitary sewer or storm drain should be marked "No Dumping".	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Clean catch basins regularly.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Consider washing vehicles less frequently.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If pressure washing waste water doesn't collect in a centralized area, such as an area that is very flat, or you are on a grassed area, a tarp should be placed under the washing area to collect paint chips and other debris that may be loosened by the spray.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Pressure washing of boats should occur where runoff control can be achieved.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous

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Best Management Strategies (BMP's)	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's
Spread filter fabric under object being washed.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Spill cleanup material should be stocked near liquid transfer area and employees should be trained in emergency spill response procedures and correct use of spill clean up materials.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If a sump or holding tank is used for spill containment, its contents should be pumped out and disposed of appropriately.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Drip pans should be provided underneath hose and pipe connections and other leak prone areas during liquid transfer operations. Drip pans should be cleaned regularly and stored nearby transfer area.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
A trained employee should be present during loading and unloading of materials.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Use a temporary storm drain cover during transfer of materials.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Pumps and hoses used for liquid transfer should be in good condition.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Cover transfer area with roof to avoid rain contact.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
A designated area for liquid transfer could be paved and sloped to a sump or holding tank to facilitate capture.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If a liquid transfer area can not be paved, then a containment/run-on structure such as a curb, dike or berm should be provided.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Implement an inventory control system to track purchase and consumption of liquids.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If paving the fuel transfer area, use Portland Cement because asphalt deteriorates.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Do not hose down maintenance repair areas. Instead sweep weekly to collect dirt and use absorbent pads to collect spills.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
If transfer occurs at temporary site, a tarp, cloth or drip pan should be used.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Drain all fluids from wrecked vehicles and remove coolants.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Sweep all driveways and gutters that show an accumulation of materials.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
A catch basin insert filter should be used during rainy weather.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Painting, finishing and coating materials should be stored in areas protected from the rain .	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Never clean brushes, equipment into storm drain, gutters, ditch, stream or other water body.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Properly dispose of hazardous wastes.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Wood treatment should not occur during rain or when rain is expected.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Keep treated wood away from surface drainage areas.	Waste Water Disposal (D01-D62)	Industrial (I01-I36)	Commercial Activities (C01-C44)	Miscellaneous
Agricultural Activities				
Maintain ground cover.	Agricultural Sources (A01-A10)			
Practice conservation tillage.	Agricultural Sources (A01-A10)			
Practice conservation coverage.	Agricultural Sources (A01-A10)			
Utilize contour farming.	Agricultural Sources (A01-A10)			
Plant critical areas.	Agricultural Sources (A01-A10)			
Plant and maintain vegetative buffers and filter strips.	Agricultural Sources (A01-A10)			
Practice conservation irrigation.	Agricultural Sources (A01-A10)			
Use integrated pest management activities.	Agricultural Sources (A01-A10)			
If possible crops should be planted away from surface drainages.	Agricultural Sources (A01-A10)			
Contact NRCS for developing fertilization schedules.	Agricultural Sources (A01-A10)			
Proper pesticide application should be followed.	Agricultural Sources (A01-A10)			
Never apply pesticides, herbicides, fungicides when rain is expected.	Agricultural Sources (A01-A10)			
Do not apply chemicals when it is windy.	Agricultural Sources (A01-A10)			
Use manual pest control procedures.	Agricultural Sources (A01-A10)			
Pesticide application should not occur within 200 of surface water.	Agricultural Sources (A01-A10)			
Store pesticide, herbicides and fungicides in protected areas.	Agricultural Sources (A01-A10)			
Compost material should be kept away from surface drainage.	Agricultural Sources (A01-A10)			

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Best Management Strategies (BMP's)	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's
Fuel Storage				
Replace leaking and deteriorating tanks with good tanks.	Petroleum Storage Tanks (T01-T24)	Miscellaneous		
Tanks should have overflow detection.	Petroleum Storage Tanks (T01-T24)	Miscellaneous		
Spilled liquids should be collected and disposed appropriately.	Petroleum Storage Tanks (T01-T24)	Miscellaneous		
Use double walled tanks.	Petroleum Storage Tanks (T01-T24)	Miscellaneous		
Do not store containers in direct contact with the ground.	Petroleum Storage Tanks (T01-T24)	Miscellaneous		
Use funnels to pour fuel.	Petroleum Storage Tanks (T01-T24)	Miscellaneous		
Demolitions				
Schedule demolitions to take part in dry part of year.				
Light spraying of water can control some of the dust.				
Logging				
Preserve vegetation along streams.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Logging road should have crushed rock or spall apron construction.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Avoid logging on steep slopes.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Drainage ditches and culverts should direct runoff into vegetated areas or stormwater treatment systems.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Mining/Natural Resource Extraction:				
If the material is appropriate, use excavated spoil material to form compacted beams along the down slope sides to contain runoff.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Semi-permanent stockpiles should be seeded to promote vegetation growth to limit erosion from stockpiles.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Use detention ponds to promote settling of suspended solids or infiltration basins to filter suspended solids, to clean up runoff before it leaves the site.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
Use anchorage tarps to cover stockpiles at small-scale mining operations.	Natural Resource Extraction Activities (E01-E12)	Miscellaneous		
		Miscellaneous		
Residential BMP's				
Wash your car directly over your lawn or make sure wash water drains to a vegetative area. This allows the water and soap to soak into the ground instead of running off into a local water body.	Residential Sources (R01-R09)	Miscellaneous		
Select soap without phosphates.	Residential Sources (R01-R09)	Miscellaneous		
Sweep driveways and street gutters before washing vehicle to clean up dirt, leaves, trash and other materials that may flow to the storm drain along with your wash water.	Residential Sources (R01-R09)	Miscellaneous		
Commercial products are available that allow you to clean a vehicle without water.	Residential Sources (R01-R09)	Miscellaneous		
Use a nozzle on your hose to save water.	Residential Sources (R01-R09)	Miscellaneous		
Do not wash your car is rain is expected.	Residential Sources (R01-R09)	Miscellaneous		
Consider not washing your car at home.	Residential Sources (R01-R09)	Miscellaneous		
Recycle all oils, antifreeze, solvents and batteries.	Residential Sources (R01-R09)	Miscellaneous		
Never dump new or used automotive fluids or solvents on the ground, in a storm drain or street gutter, or in a water body. Eventually, it will make its way to local surface waters or groundwater.	Residential Sources (R01-R09)	Miscellaneous		
Do not mix wastes. The chlorinated solvents in some carburetor cleaners can contaminate a huge tank of used oil, rendering it unsuitable for recycling. Keep wastes in separate containers and properly labeled.	Residential Sources (R01-R09)	Miscellaneous		
To dispose of oil filters, punch a hole in the top and let drain for 24 hours. This is where a large funnel in the tip of your oil storage container will come in handy. After draining, wrap in 2 layers of plastic and dispose of in your regular garbage or recycle by taking it to the household hazardous waste line.	Residential Sources (R01-R09)	Miscellaneous		
Use care in draining and collecting antifreeze.	Residential Sources (R01-R09)	Miscellaneous		
Perform your service activities on concrete or asphalt.	Residential Sources (R01-R09)	Miscellaneous		
If doing body work outside, be sure to use a tarp to catch material resulting from grinding, sanding and painting. Double bag wastes.	Residential Sources (R01-R09)	Miscellaneous		
Follow manufacturer's directions when applying fertilizers.	Residential Sources (R01-R09)	Miscellaneous		
Consider planting a vegetative buffer zone.	Residential Sources (R01-R09)	Miscellaneous		

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Best Management Strategies (BMP's)	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's	Contaminant Source ID's
Store all fertilizers and pesticides in covered location.	Residential Sources (R01-R09)	Miscellaneous		
Compost yard clippings.	Residential Sources (R01-R09)	Miscellaneous		
Pull weeds instead of spraying.	Residential Sources (R01-R09)	Miscellaneous		
Work fertilizers into the soil.	Residential Sources (R01-R09)	Miscellaneous		
Dispose of hazardous material and their containers properly.	Residential Sources (R01-R09)	Miscellaneous		
Store hazardous material off of the ground and away from children.		Miscellaneous		
Use ground cloths and drip pans when working outdoors with hazardous materials.	Residential Sources (R01-R09)	Miscellaneous		
Let latex paints dry before placing in garbage.	Residential Sources (R01-R09)	Miscellaneous		
Use less toxic products whenever possible.	Residential Sources (R01-R09)	Miscellaneous		
Follow manufacturer's directions in the use of all materials.	Residential Sources (R01-R09)	Miscellaneous		
When hazardous material are used, place inside a tub or bucket to minimize spills.	Residential Sources (R01-R09)	Miscellaneous		
Properly maintain septic systems.	Residential Sources (R01-R09)	Miscellaneous		
Monitor septic systems for signs of failure: odors, surface sewage or green areas.	Residential Sources (R01-R09)	Miscellaneous		
Pump septic systems out every two to five years depending on hydraulic loading.	Residential Sources (R01-R09)	Miscellaneous		
Garbage disposal increase the need for increase pumping of solids.	Residential Sources (R01-R09)	Miscellaneous		
Household chemicals such as solvents, drain cleaners, oils, pants, pharmaceuticals, and pesticides can interfere with the proper operation of septic systems.	Residential Sources (R01-R09)	Miscellaneous		
Vehicles and heavy equipment should be kept off the drainfield.	Residential Sources (R01-R09)	Miscellaneous		
Trees should not be planted in drainfield.	Residential Sources (R01-R09)	Miscellaneous		
Clean up your dog poop and horse manure.				
Wells and Boreholes				
Identify abandoned wells and boreholes and properly decommission.	Wells and Boreholes (W01-W09)	Miscellaneous		
Assure that all wells and boreholes are properly grouted and are securely sealed.	Wells and Boreholes (W01-W09)	Miscellaneous		
Assure that all wells and boreholes are properly constructed.	Wells and Boreholes (W01-W09)	Miscellaneous		
Educate community about the implications of abandoned wells.	Wells and Boreholes (W01-W09)	Miscellaneous		
Natural Products Processing/Storage				
Storage of soil, wood chips, saw dust, gravel, sand, salt should be covered.	Natural Products Processing/Storage (N01-N10)	Miscellaneous		
Store solid and food wasted in containers and check for leaks.	Natural Products Processing/Storage (N01-N10)	Miscellaneous		
Restrict animal access to stream or lakes by fences.	Natural Products Processing/Storage (N01-N10)	Miscellaneous		
Military Activities				
Assure all Military activities follow State and Federal guidelines.	Military Activities			
Uncontrolled Sites				
Assure all Military activities follow State and Federal guidelines.	Uncontrolled Sites			
Educate community about the implications of the uncontrolled sites.	Uncontrolled Sites			