

Source Water Assessment

A Hydrogeologic Susceptibility and
Vulnerability Assessment for
McCarthy Lodge,
McCarthy, Alaska
PWSID #291108

DRINKING WATER PROTECTION PROGRAM REPORT NO. 866

Alaska Department of Environmental Conservation

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The Drinking Water Protection Program (DWPP) is producing Source Water Assessments in compliance with the Safe Drinking Water Act Amendments of 1996. Each assessment includes a delineation of the source water area, an inventory of potential and existing contaminant sources that may impact the water, a risk ranking for each of these contaminants, and an evaluation of the potential vulnerability of these drinking water sources.

These assessments are intended to provide public water systems owners/operators, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. The assessments combine information obtained from various sources, including the U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (ADEC), public water system owners/operators, and other public information sources. The results of this assessment are subject to change if additional data becomes available. It is anticipated this assessment will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of public drinking water source. If you have any additional information that may affect the results of this assessment, please contact the Program Coordinator of DWPP, (907) 269-7521.

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Source Water Assessment for McCarthy Lodge, McCarthy, Alaska

Drinking Water Protection Program Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for McCarthy Lodge is a Class B (transient/non-community) water system consisting of one surface water intake from a culvert next to Clear Creek, northwest of McCarthy, Alaska. The surface water intake received a susceptibility rating of **Very High**. A rating of High to Very High is typical for all surface water systems. Identified potential and current sources of contaminants for McCarthy Lodge's public drinking water source include large-capacity septic systems; placer metals mining; underground metals mining; single-family septic systems; aboveground heating oil tanks; and a DEC-recognized contaminated site. These identified potential and existing sources of contamination include sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. Contaminant sources could potentially contribute bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals into the source waters. Overall, the public water sources for McCarthy Lodge received a vulnerability rating of **High** for bacteria and viruses; and **Very High** for nitrates and nitrites and volatile organic chemicals.

MCCARTHY LODGE PUBLIC DRINKING WATER SYSTEM

McCarthy Lodge public water system is a Class B (transient/non-community) water system. The system consists of one surface water intake from a culvert next to Clear Creek, northwest of McCarthy, Alaska. McCarthy lies 61 miles east of Chitina off the Edgerton Highway. It is on the Kennicott River at the mouth of McCarthy Creek, 12 miles northeast of the junction of the Nizina and Chitina Rivers, in the heart of the Wrangell-St. Elias National Park and Preserve. The population of McCarthy is approximately 20.

McCarthy's snowfall averages 52 inches, with total precipitation of 12 inches per year. The groundwater sources underlying the area are recharged through the infiltration of precipitation and surface water. Groundwater sources in the region generally occur in the fractured bedrock and unconsolidated sediments deposited by glaciers and/or rivers. The elevation for McCarthy is about 1,500 feet above sea level.

According to a Sanitary Survey dated June 16, 1992, the surface water intake was adequately constructed. An adequately constructed intake may provide protection against debris and contaminants from entering the system. The raw water is treated by filtration and disinfection. There is a potential for runoff within the area surrounding the surface water.

This system operates seasonally from May through September and serves approximately 12 residents and 180 non-residents through three service connections.

MCCARTHY LODGE DRINKING WATER PROTECTION AREA

In order to evaluate whether a drinking water source is at risk, we must first evaluate what are the most likely pathways for surface contamination to reach the creek. These areas are determined by looking at the characteristics of the creek, surrounding contaminant sources, and the intake.

The most probable area for contamination to reach the drinking water system is the area that contributes water to the surface water body from which that water is being drawn. This area is designated as the Drinking Water Protection Area (DWPA). Because releases of contaminants within the DWPA are most likely to impact the drinking water system, this area will serve as the focus for voluntary protection efforts.

The size and shape of the DWPAs were established based on aerial distances from the surface water body, and the watershed that recharges the surface water body. Please refer to the Guidance Manual for Class B Public Water Systems for additional information.

The DWPAs established for surface water systems by the ADEC are separated into three zones. These zones correspond to different distances from the surface water body, and the entire watershed that recharges the surface water body. The following is a summary of the three DWPA zones and their definitions.

Table 1. Definition of Zones

Zone	Definition
A	1,000 feet from the Surface Water Body
B	1 mile from the Surface Water Body
C	Entire Watershed

The DWPA for McCarthy Lodge extends throughout the entire watershed area. Development in the vicinity of the surface water intake is limited to Zones A and B (See Map 1 of Appendix A).

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within the McCarthy Lodge DWPA. 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.

For the basis of all Class B public water system assessments, three categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses;
- Nitrates and/or nitrites;
- Volatile organic chemicals

RANKING OF CONTAMINANT RISKS

Once the potential and existing sources of contamination have been identified, they are assigned a ranking according to what type and level of risk they represent. Ranking of contaminant risks for a “potential” or “existing” source of contamination is a function of toxicity and volumes of specific contaminants associated with that source. Rankings include:

- Low;
- Medium;
- High; and
- Very High.

The TOT for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. Bacteria and Viruses are only inventoried in Zones A and B because of their short life span.

VULNERABILITY OF MCCARTHY LODGE DRINKING WATER SYSTEM

Vulnerability of a drinking water source to contamination is a combination of two factors:

- Natural susceptibility; and
- Contaminant risks.

Each of the three categories of drinking water contaminants has been analyzed and an overall vulnerability score of 30 to 100 is ultimately assigned:

Natural Susceptibility (30 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

Vulnerability of the
Drinking Water Source to Contamination (30 – 100).

A score for the Natural Susceptibility is achieved by analyzing the properties of the surface water source.

Natural Susceptibility
(Susceptibility of the Surface Water Source)
(30 – 50 Points)

The surface water intake for McCarthy Lodge is Clear Creek. Because the creek is recharged by surface water runoff and precipitation, contaminants at or near the creek have the potential to adversely impact this drinking water source. Table 2 shows the Overall Susceptibility score and rating for McCarthy Lodge.

Table 2. Natural Susceptibility

	Score	Rating
Natural Susceptibility	45	Very High

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This data has been derived from an examination of existing or historical contamination that has been detected at the drinking water source through routine sampling. It also evaluates potential sources of contamination. Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	30	High
Nitrates and/or Nitrites	42	Very High
Volatile Organic Chemicals	35	High

Appendix D contains seven charts, which together form the ‘Vulnerability Analysis’ for a source water assessment for a public drinking water source. Chart 1 analyzes the ‘Susceptibility of the Surface Water Source’ to contamination by looking at the construction of the intake and its surrounding area and naturally-occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 2 analyzes ‘Contaminant Risks’ for the drinking water source with respect to bacteria and viruses. The ‘Contaminant Risks’ portion of the analysis considers potential sources of contaminants as well as a review of contamination that has or may have occurred, but has not arrived or been detected at the surface water source. Chart 3 contains the ‘Vulnerability Analysis for Bacteria and Viruses.’ Charts 4 through 7 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites and volatile organic chemicals, respectively.

Table 4 contains the overall vulnerability scores (30 – 100) and ratings for each of the three categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	75	High
Nitrates and Nitrites	85	Very High
Volatile Organic Chemicals	75	High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **High** with the large-capacity septic systems and single-family septic systems representing the risk to this source of public drinking water (See Chart 2 – Contaminant Risks for Bacteria and Viruses in Appendix D).

Only a small amount of bacteria and viruses are required to endanger public health. Bacteria and viruses have not been detected during recent water sampling of the system at the McCarthy Lodge. Combining the contaminant risks with the overall natural susceptibility of the surface water source, the vulnerability of the surface water source to contamination by bacteria and viruses is **High**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Very High** with the large-capacity septic systems and single-family septic systems representing the risk to this source of public drinking water (See Chart 4 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

Sampling history for McCarthy Lodge indicates that nitrates have been detected in the water, but only in very low concentrations (at 1.60 mg/L on 05/14/02) or 16% of the Maximum Contaminant Level (MCL). The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects. Due to the high solubility and weak retention by soil, nitrates are very mobile, moving at approximately the same rate as water.

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the surface water source, the overall vulnerability of the surface water source to contamination by nitrates and nitrites is **Very High**.

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **High** with large-capacity septic systems; underground metals mining; single-family septic systems; and aboveground heating oil tanks creating the only known risks for volatile organic chemicals (See Chart 6 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

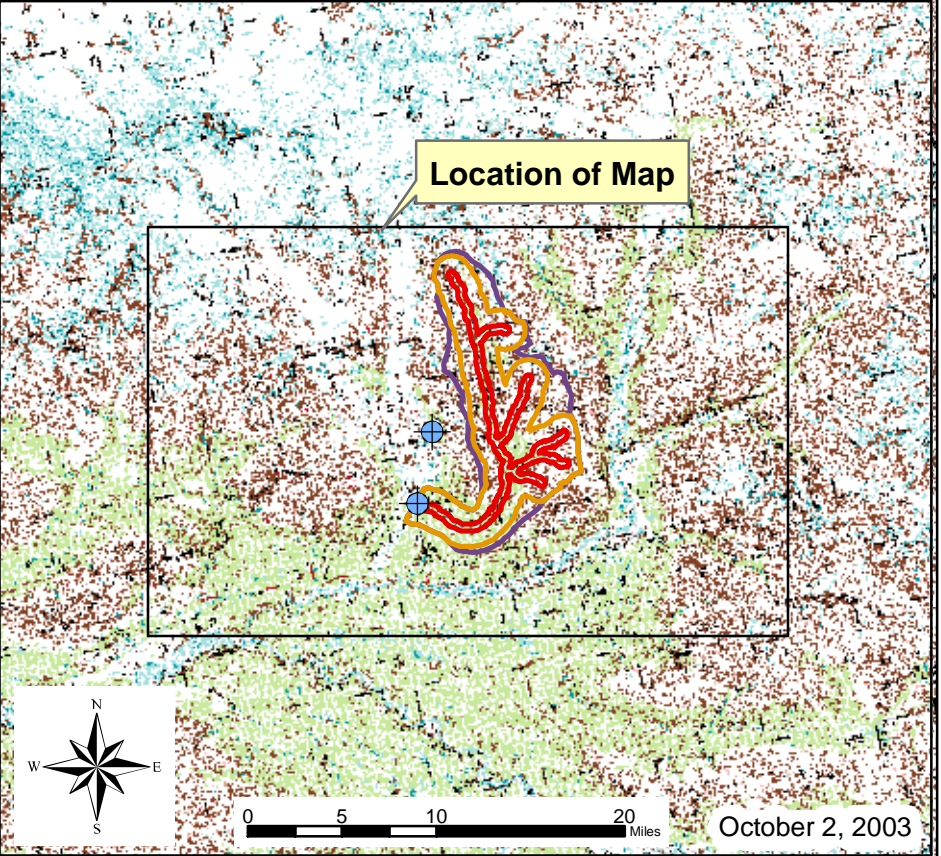
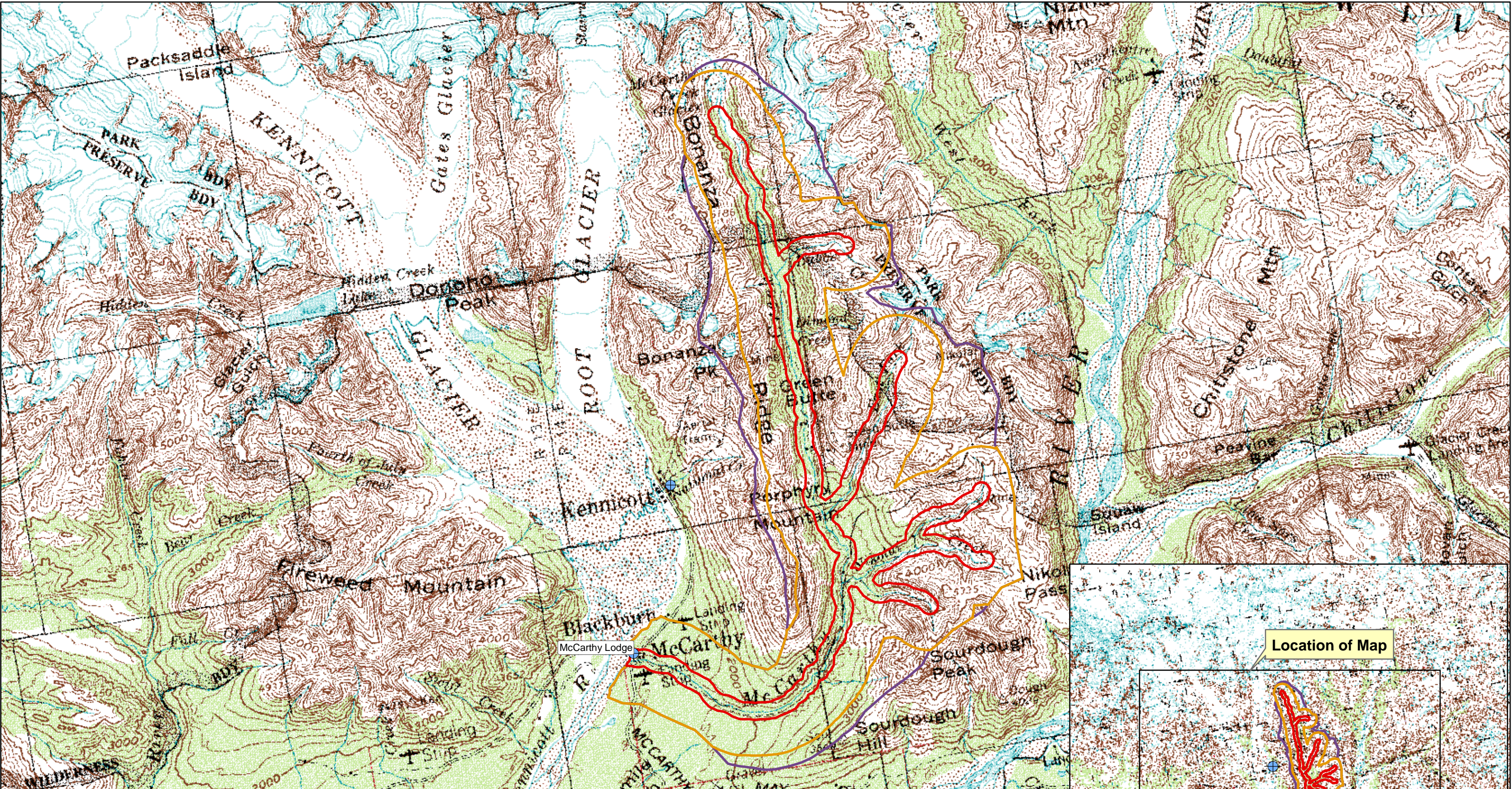
No sampling for volatile organic chemicals were available. Combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the surface water source, the overall vulnerability of the surface water source to contamination by volatile organic chemicals is **High**.

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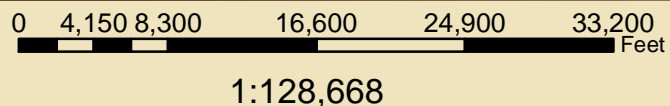
APPENDIX A

McCarthy Lodge Drinking Water Protection Area Location Map (Map 1)



Map 1: McCarthy Lodge Drinking Water Protection Areas

PWSID: 291108.001



Data Sources:
Background image - USGS 1:250,000 mapping

- Legend**
- Public Drinking Water Systems
 - Surface Water Zone A**
1000 Feet from Surface Water Body
 - Surface Water Zone B**
1 Mile from Surface Water Body
 - Surface Water Zone C**
Entier Water Shed

APPENDIX B

Contaminant Source Inventory and Risk Ranking for McCarthy Lodge (Tables 1-4)

Table 1

Contaminant Source Inventory for McCarthy Lodge

PWSID 291108.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	2	McCarthy Lodge Septic System
Metals mining, placer (active or inactive?)	E04	E04-1	A	3	McCarthy Creek Placer
Metals mining, underground (active or inactive?)	E05	E05-1	A	3	Nikolai Mine
Metals mining, underground (active or inactive?)	E05	E05-2	A	3	Tjosevig Prospect
Metals mining, underground (active or inactive?)	E05	E05-3	A	3	Moraine Placer No. 4
Metals mining, underground (active or inactive?)	E05	E05-4	A	3	Lube 1-5
Septic systems (serves one single-family home)	R02	R02-1	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-10	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-11	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-12	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-13	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-14	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-15	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-16	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-17	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-18	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-2	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-3	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-4	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-5	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-6	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-7	A	2	Residence
Septic systems (serves one single-family home)	R02	R02-9	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-1	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-10	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-11	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-12	A	2	Residence

Table 1 (continued)**Contaminant Source Inventory for
McCarthy Lodge****PWSID 291108.001**

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Map Number	Comments
Tanks, heating oil, residential (above ground)	R08	R08-13	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-14	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-15	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-16	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-17	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-18	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-2	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-3	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-4	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-5	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-6	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-7	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-8	A	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-9	A	2	Residence
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	2	McCarthy Lodge Heating Oil Tank
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-1	A	2	DEC Recognized Contaminated Site
Metals mining, underground (active or inactive?)	E05	E05-5	B	3	Nikolai 1-22, 24-116
Metals mining, underground (active or inactive?)	E05	E05-6	B	3	Green Butte
Septic systems (serves one single-family home)	R02	R02-19	B	2	Residence
Septic systems (serves one single-family home)	R02	R02-20	B	2	Residence
Septic systems (serves one single-family home)	R02	R02-21	B	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-19	B	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-20	B	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-21	B	2	Residence
Metals mining, underground (active or inactive?)	E05	E05-7	C	3	Mother Lode
Metals mining, underground (active or inactive?)	E05	E05-8	C	3	Houghton Alaska

Table 2

**Contaminant Source Inventory and Risk Ranking for
McCarthy Lodge
Sources of Bacteria and Viruses**

PWSID 291108.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	2	McCarthy Lodge Septic System
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-10	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-11	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-12	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-13	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-14	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-15	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-16	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-17	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-18	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-2	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-3	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-4	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-5	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-6	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-7	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-9	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-19	B	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-20	B	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-21	B	Low	2	Residence

Table 3

**Contaminant Source Inventory and Risk Ranking for
McCarthy Lodge
Sources of Nitrates/Nitrites**

PWSID 291108.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	2	McCarthy Lodge Septic System
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-10	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-11	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-12	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-13	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-14	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-15	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-16	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-17	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-18	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-2	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-3	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-4	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-5	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-6	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-7	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-9	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-19	B	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-20	B	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-21	B	Low	2	Residence

Table 4

**Contaminant Source Inventory and Risk Ranking for
McCarthy Lodge
Sources of Volatile Organic Chemicals**

PWSID 291108.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	McCarthy Lodge Septic System
Metals mining, underground (active or inactive?)	E05	E05-1	A	Medium	3	Nikolai Mine
Metals mining, underground (active or inactive?)	E05	E05-2	A	Medium	3	Tjosevig Prospect
Metals mining, underground (active or inactive?)	E05	E05-3	A	Medium	3	Moraine Placer No. 4
Metals mining, underground (active or inactive?)	E05	E05-4	A	Medium	3	Lube 1-5
Septic systems (serves one single-family home)	R02	R02-1	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-10	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-11	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-12	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-13	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-14	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-15	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-16	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-17	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-18	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-2	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-3	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-4	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-5	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-6	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-7	A	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-9	A	Low	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-1	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-10	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-11	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-12	A	Medium	2	Residence

Table 4 (continued)

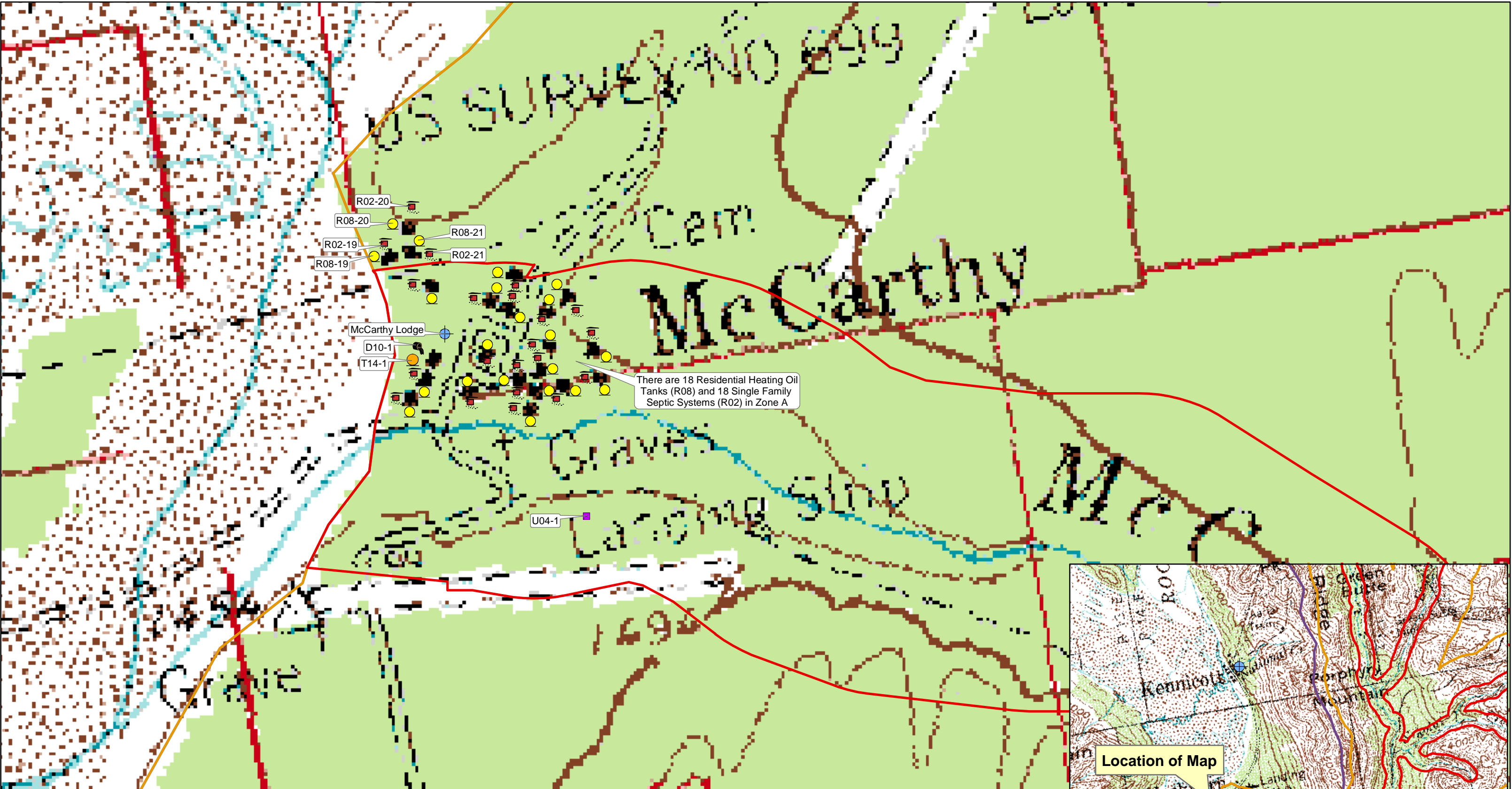
**Contaminant Source Inventory and Risk Ranking for
McCarthy Lodge
Sources of Volatile Organic Chemicals**

PWSID 291108.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Tanks, heating oil, residential (above ground)	R08	R08-13	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-14	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-15	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-16	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-17	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-18	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-2	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-3	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-4	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-5	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-6	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-7	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-8	A	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-9	A	Medium	2	Residence
Tanks, heating oil, nonresidential (aboveground)	T14	T14-1	A	Low	2	McCarthy Lodge Heating Oil Tank
Metals mining, underground (active or inactive?)	E05	E05-5	B	Medium	3	Nikolai 1-22, 24-116
Metals mining, underground (active or inactive?)	E05	E05-6	B	Medium	3	Green Butte
Septic systems (serves one single-family home)	R02	R02-19	B	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-20	B	Low	2	Residence
Septic systems (serves one single-family home)	R02	R02-21	B	Low	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-19	B	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-20	B	Medium	2	Residence
Tanks, heating oil, residential (above ground)	R08	R08-21	B	Medium	2	Residence

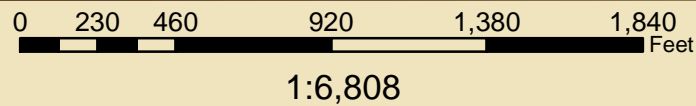
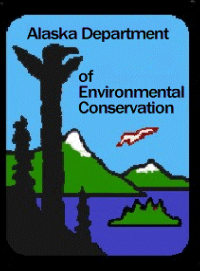
APPENDIX C

McCarthy Lodge Drinking Water Protection Area and Potential and Existing Contaminant Sources (Maps 2 and 3)



Map 2: Drinking Water Protection Areas for McCarthy Lodge and Potential and Existing Sources of Contamination

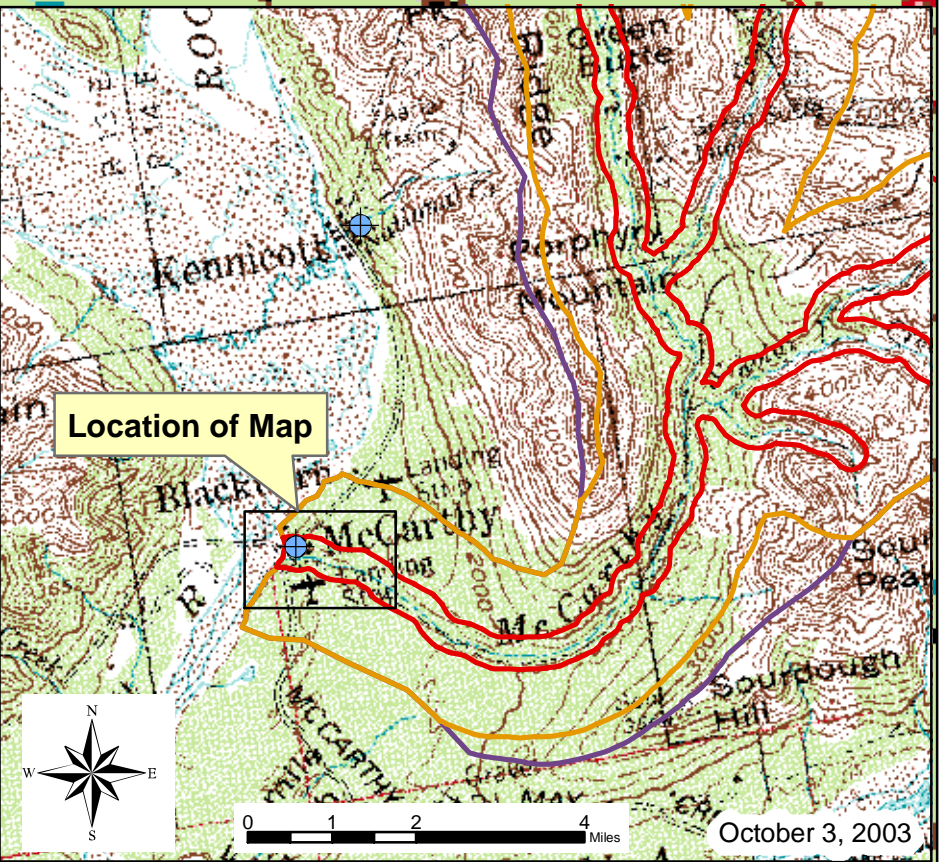
PWSID: 291108.001



Data Sources:
Background image - USGS 1:250,000 mapping

- Legend**
- Public Drinking Water Systems
 - Large Capacity Septic System (D10)
 - Single Family Septic System (R02)
 - Residenital Heating Oil Tank (R08)
 - Nonresidenital Heating Oil Tank (T14)
 - DEC Recognized Contaminated Site (U04)



- Surface Water Zone A**
1000 Feet from Surface Water Body
- Surface Water Zone B**
1 Mile from Surface Water Body
- Surface Water Zone C**
Entier Watershed





Map 3: Drinking Water Protection Areas for McCarthy Lodge and Additional Potential and Existing Sources of Contamination

PWSID: 291108.001



0 2,350 4,700 9,400 14,100 18,800 Feet

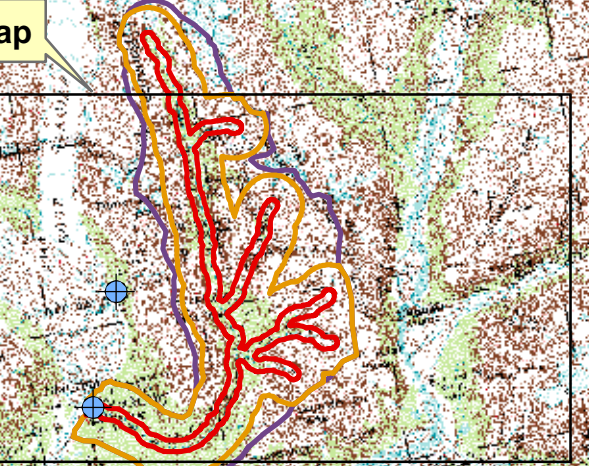
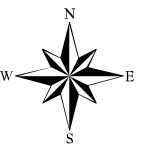
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Data Sources:

Background image - USGS 1:250,000 mapping

Legend

- Public Drinking Water Systems
- Placer Mining Claim**
 - Placer Mining Claim (E04)
- Other Mining Claim**
 - Underground Mining Claim (E05)
- Surface Water Zone A**
 - 1000 Feet from Surface Water Body
- Surface Water Zone B**
 - 1 Mile from Surface Water Body
- Surface Water Zone C**
 - Entier Watershed



0 3.5 7 14 Miles

October 3, 2003

APPENDIX D

Vulnerability Analysis for McCarthy Lodge Public Drinking Water Source (Charts 1-7)

Chart 1. Susceptibility of the surface water source - McCarthy Lodge

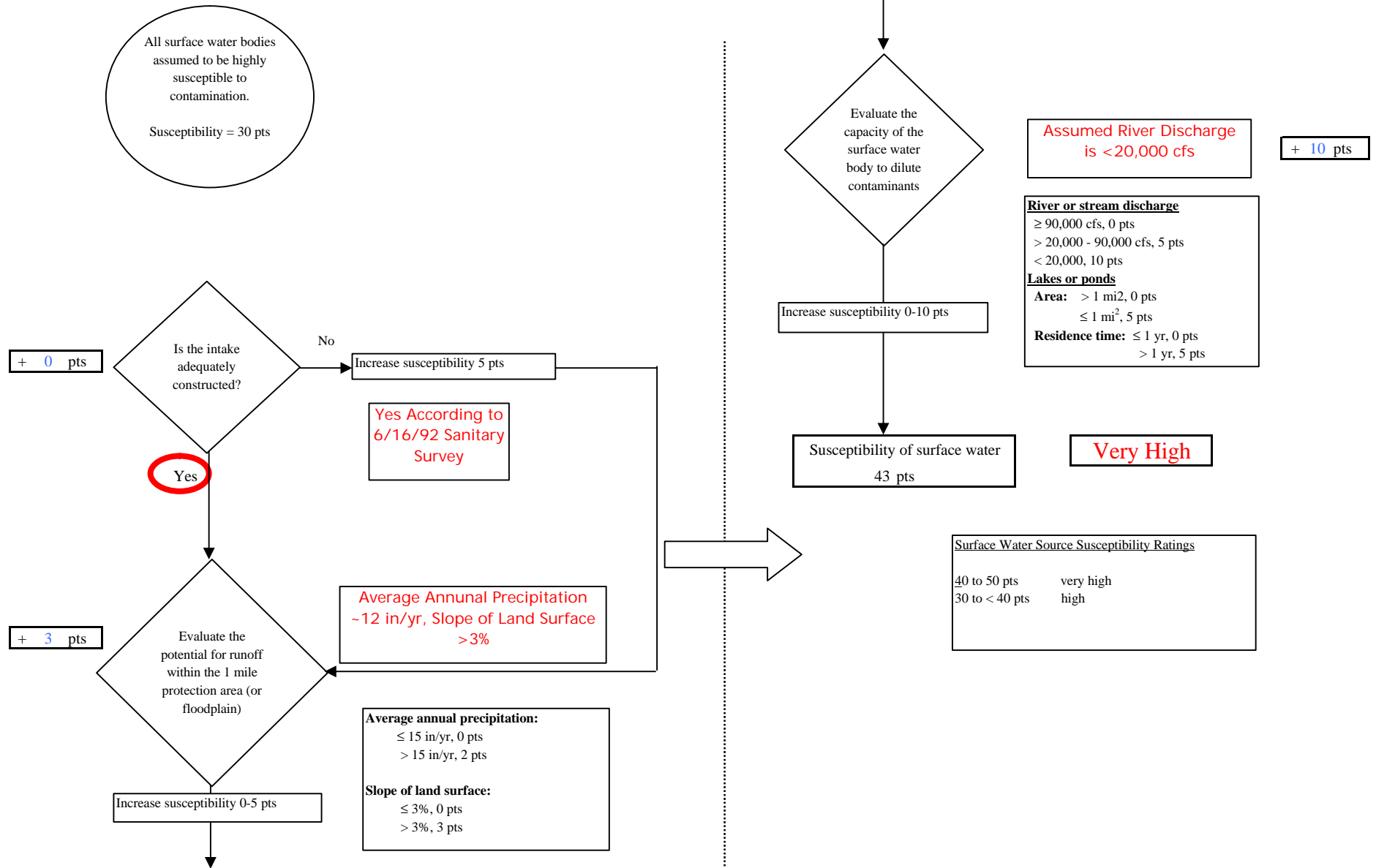


Chart 2. Contaminant risks for McCarthy Lodge - Bacteria & Viruses

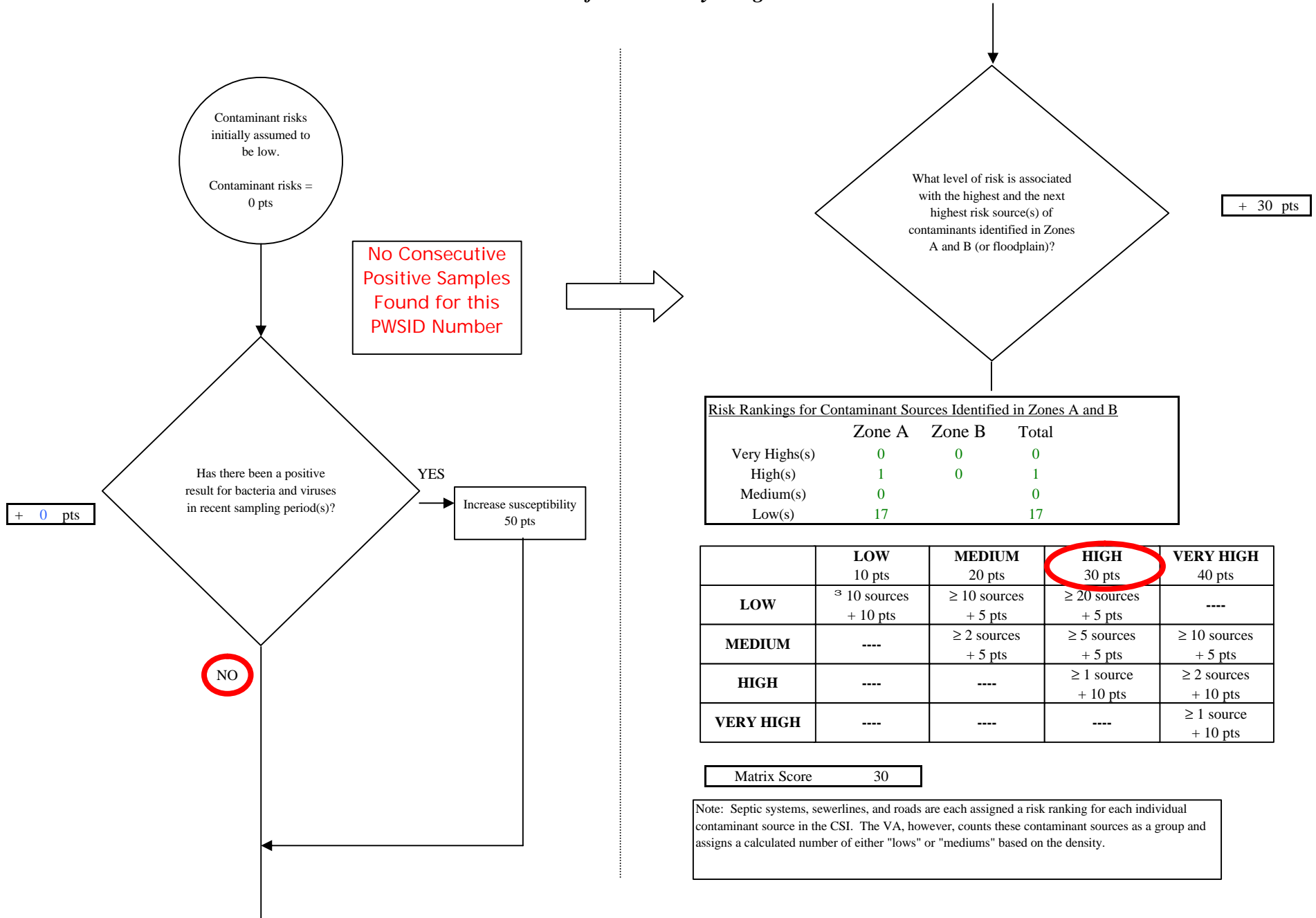


Chart 2. Contaminant risks for McCarthy Lodge - Bacteria & Viruses

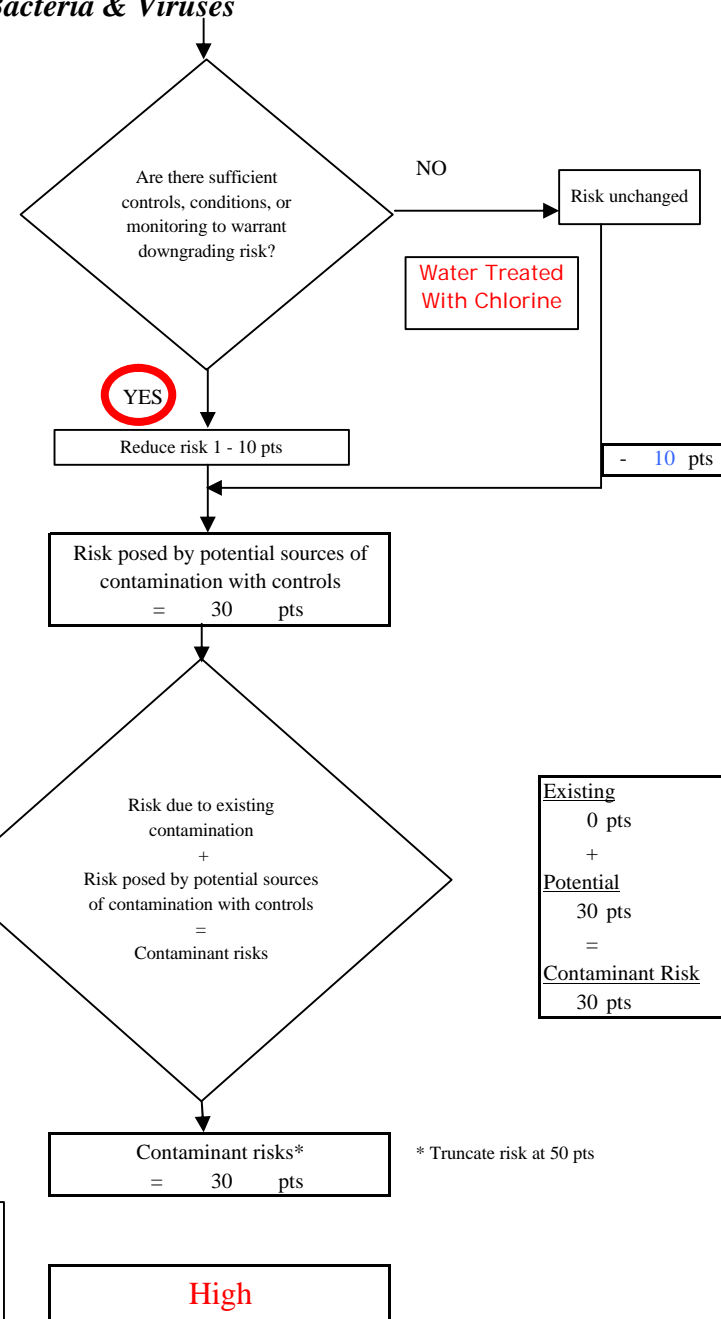
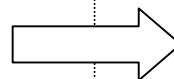
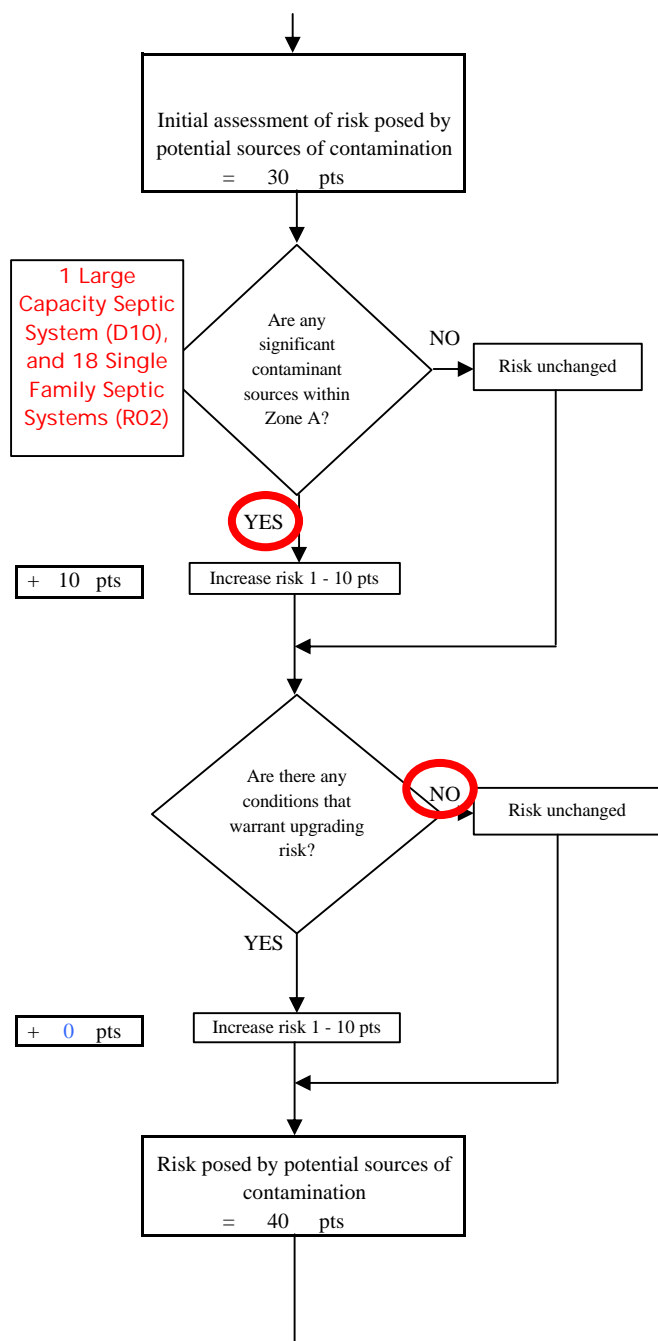


Chart 3. Vulnerability analysis for McCarthy Lodge - Bacteria & Viruses

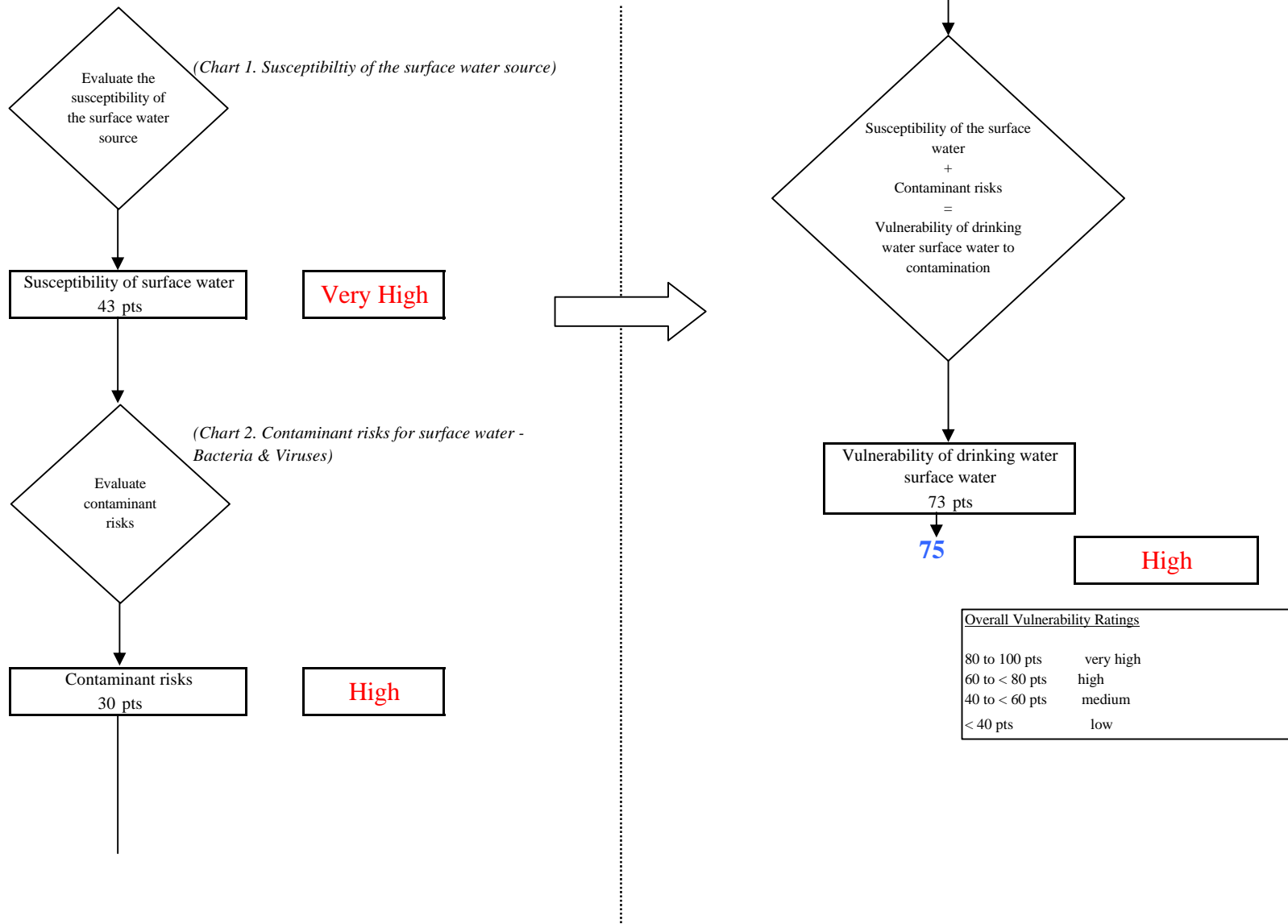


Chart 4. Contaminant risks for McCarthy Lodge - Nitrates and Nitrites

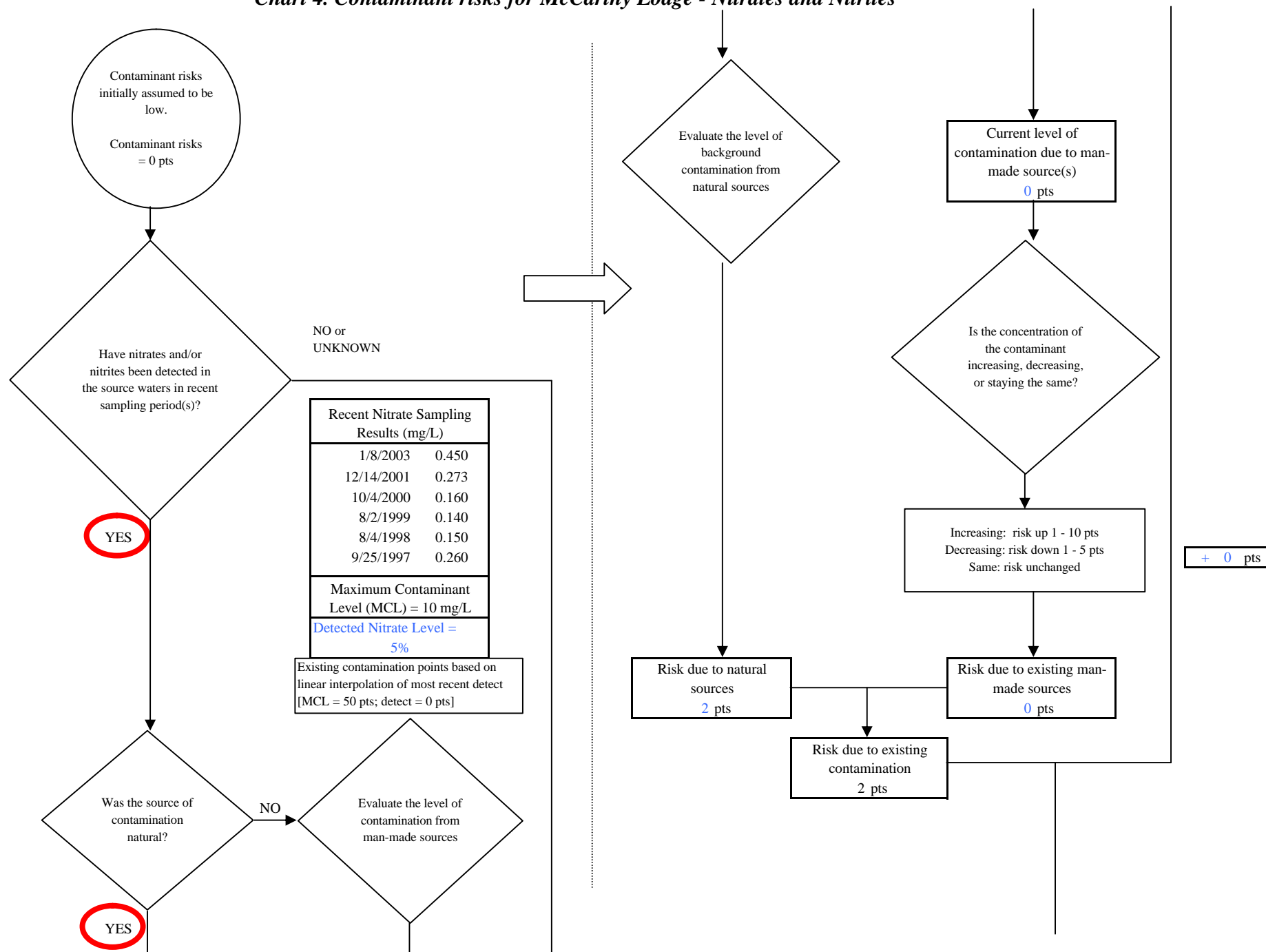


Chart 4. Contaminant risks for McCarthy Lodge - Nitrates and Nitrites

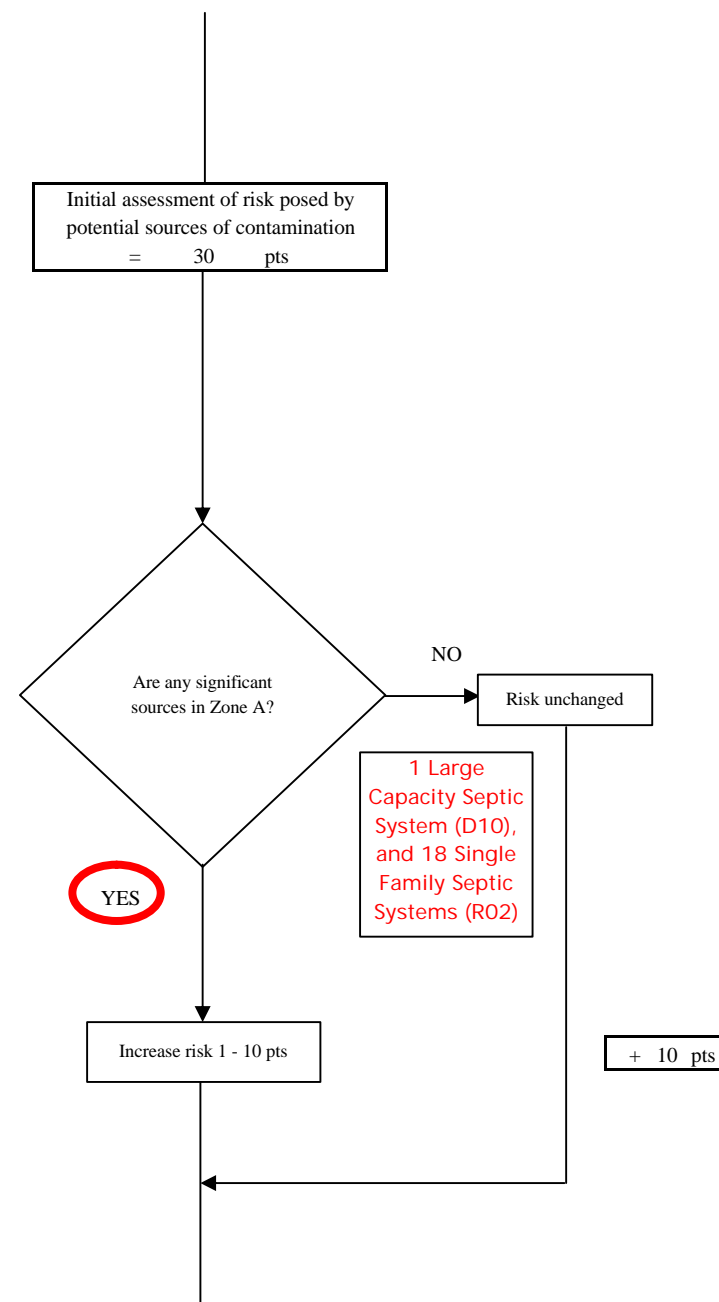
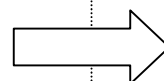
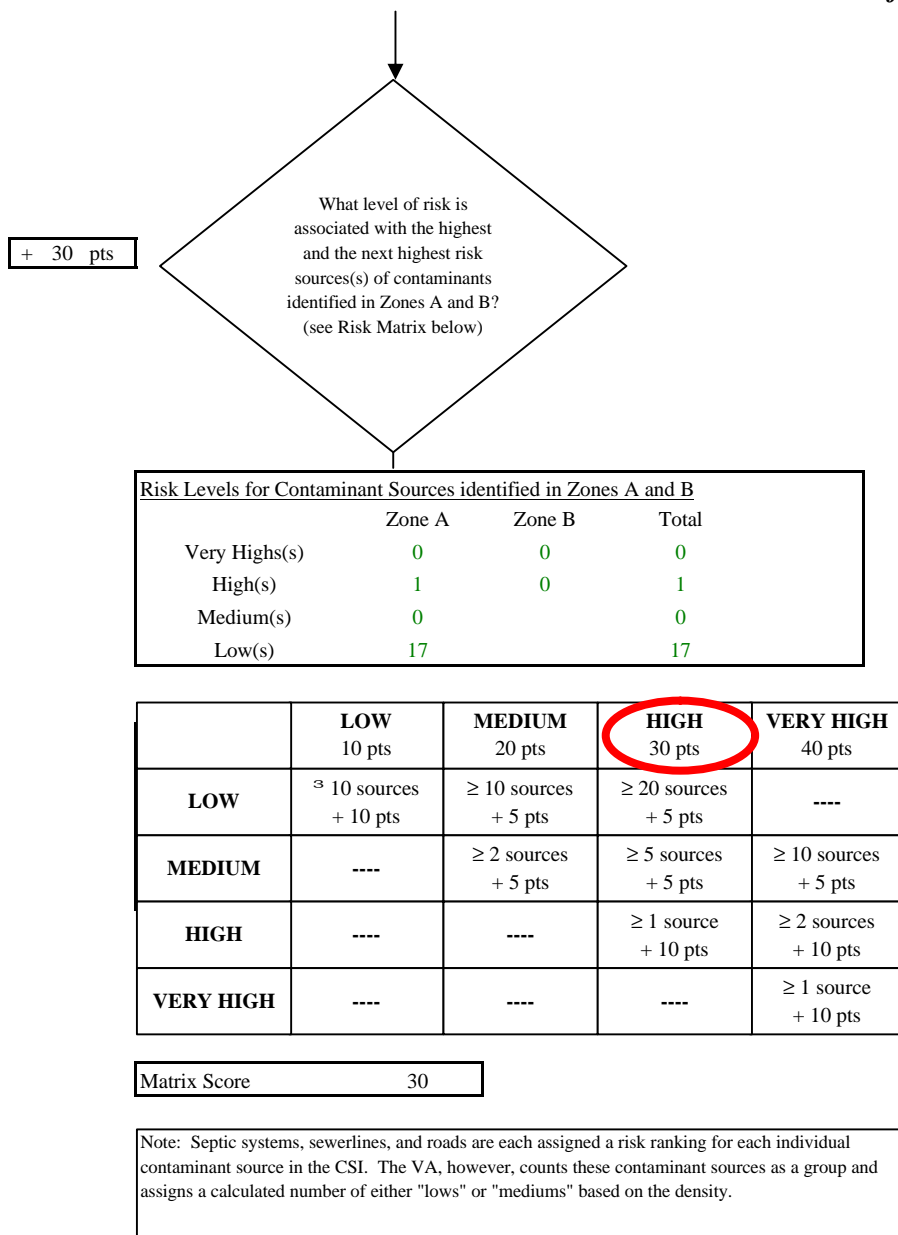


Chart 4. Contaminant risks for McCarthy Lodge - Nitrates and Nitrites

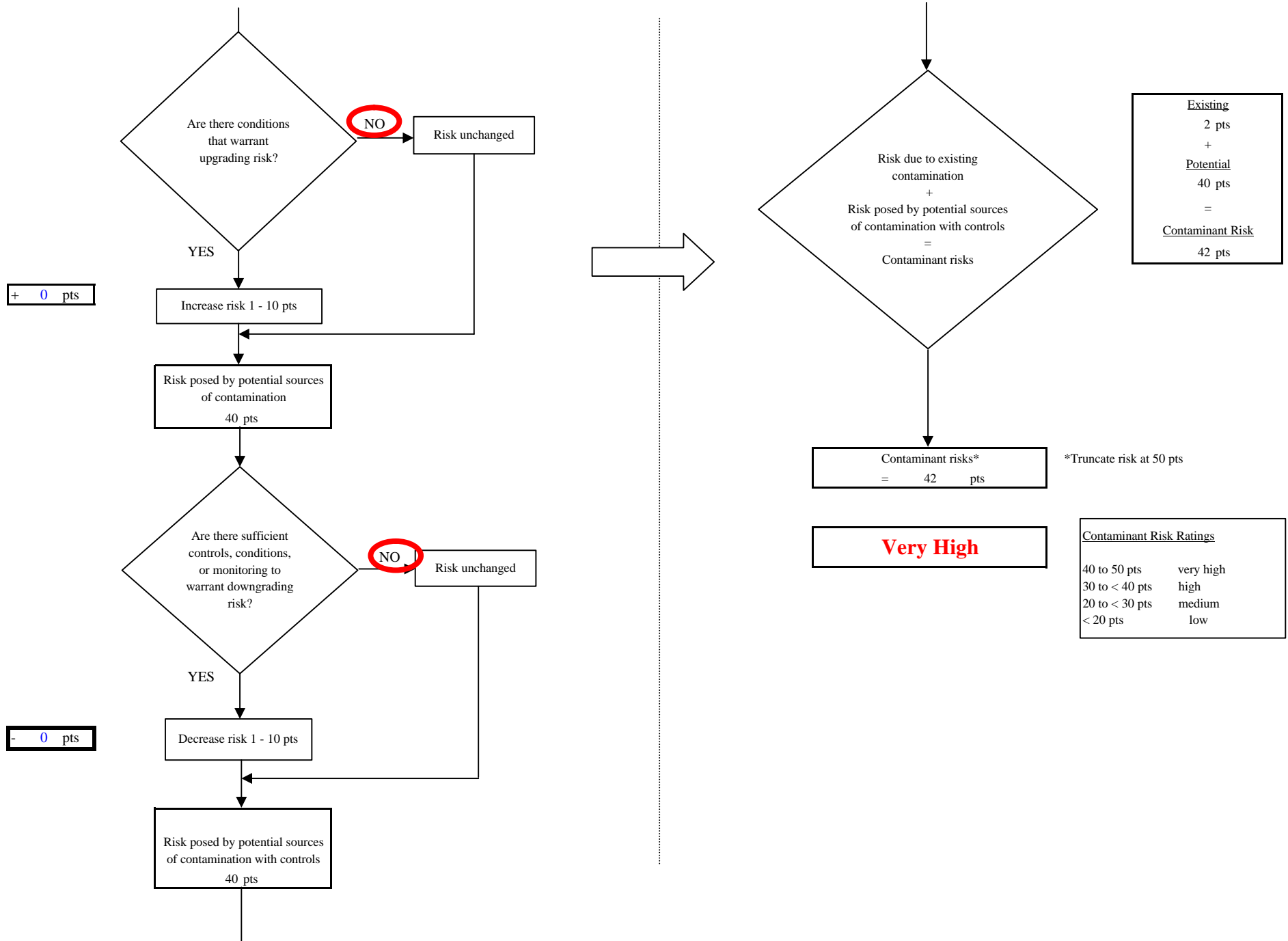


Chart 5. Vulnerability analysis for McCarthy Lodge - Nitrates and Nitrites

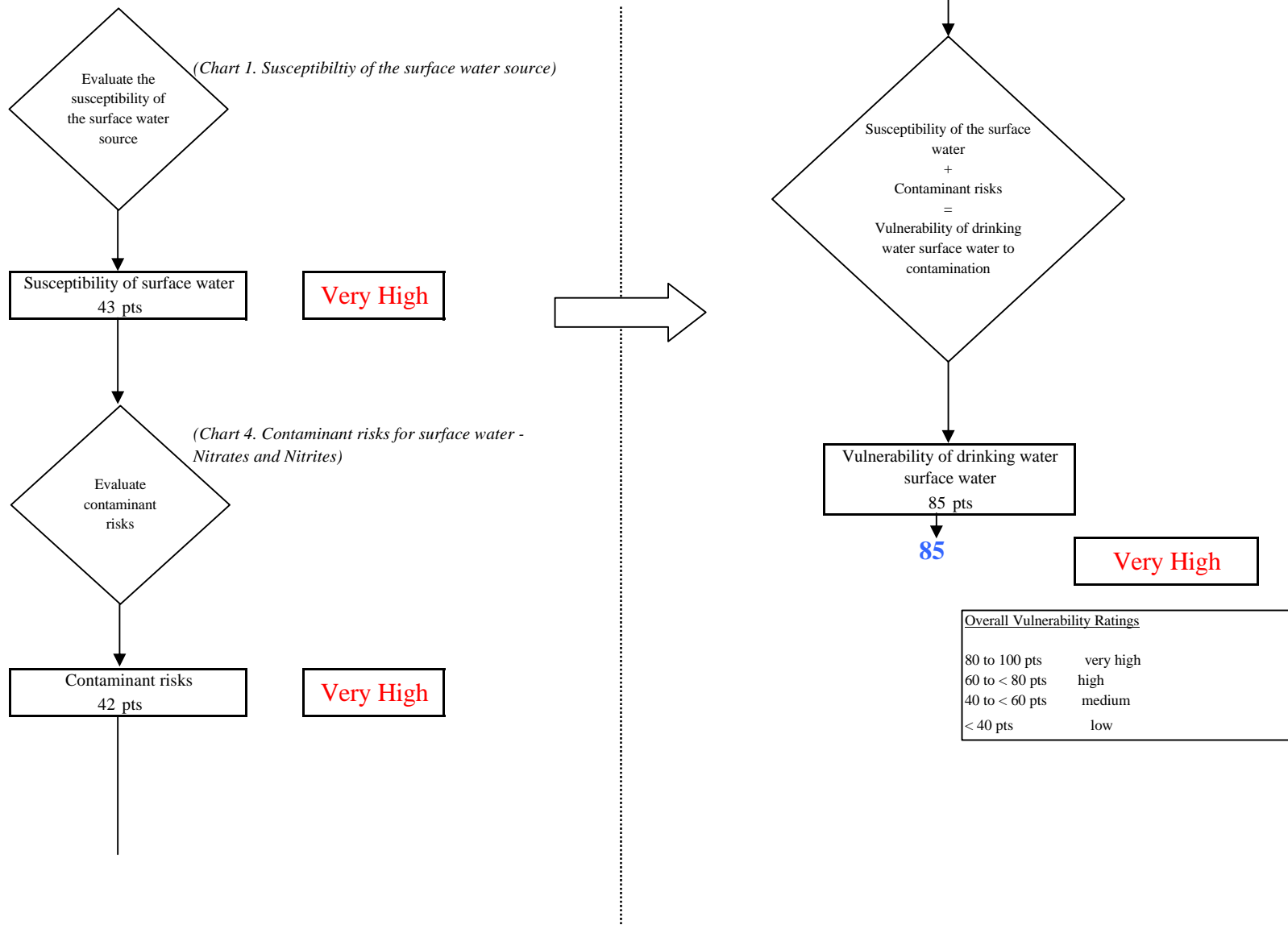


Chart 6. Contaminant risks for McCarthy Lodge - Volatile Organic Chemicals

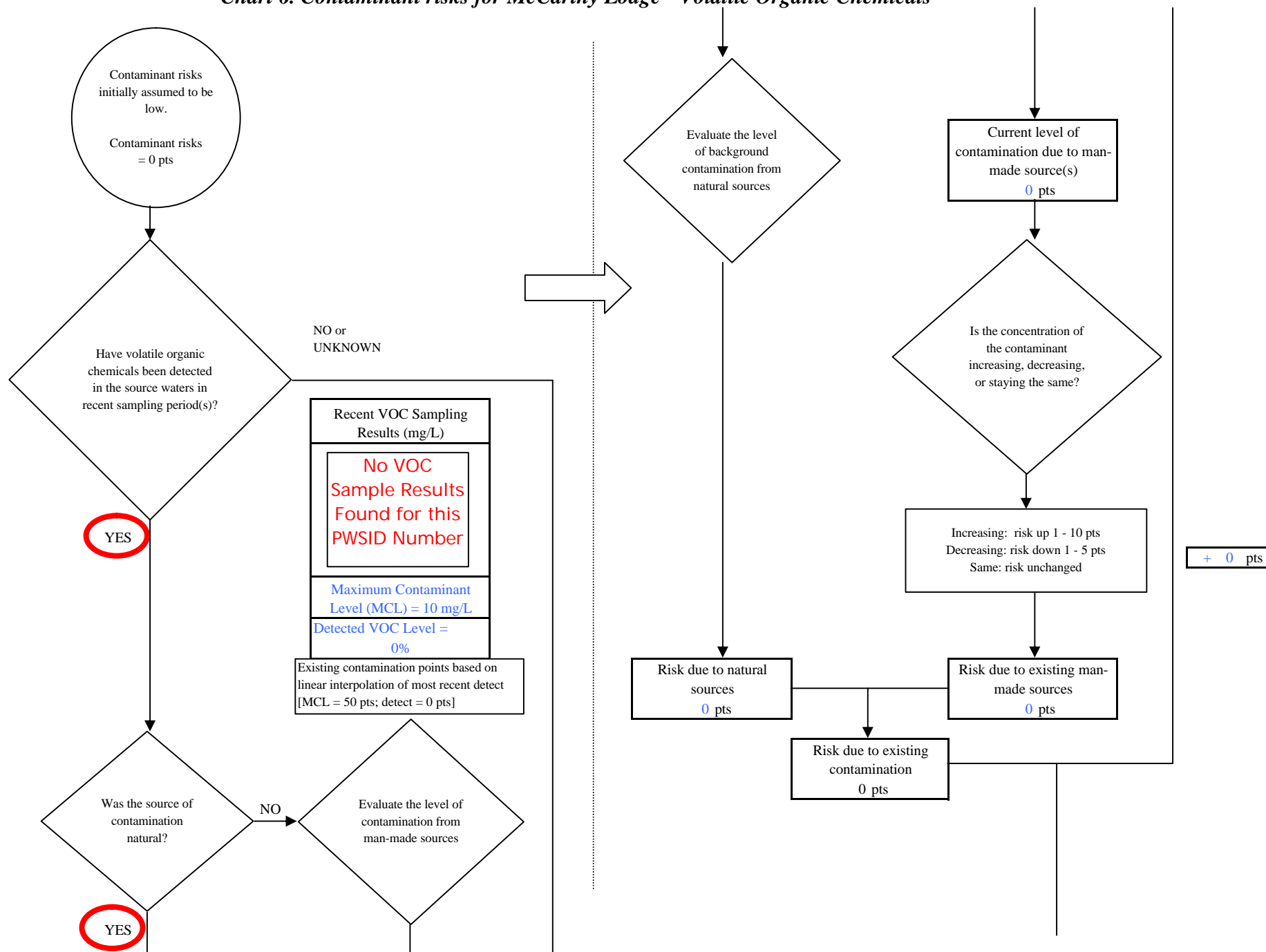


Chart 6. Contaminant risks for McCarthy Lodge - Volatile Organic Chemicals

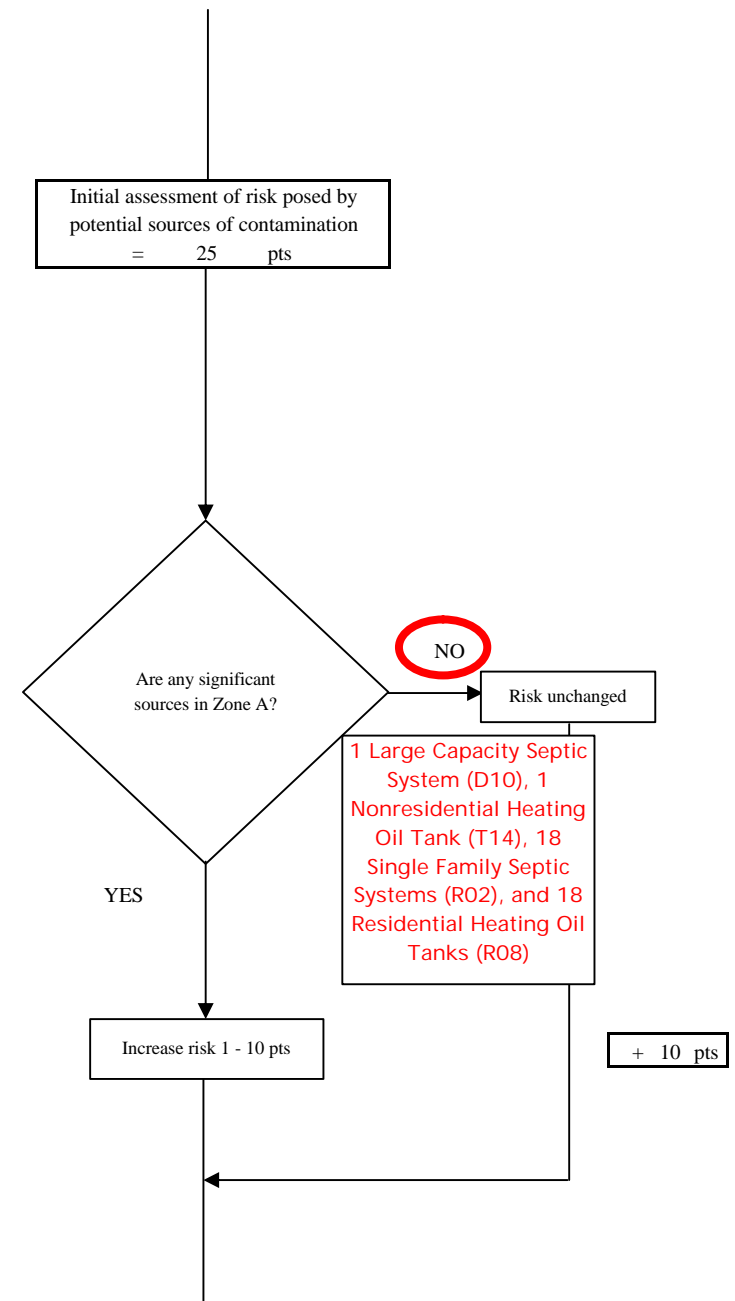
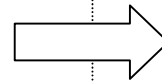
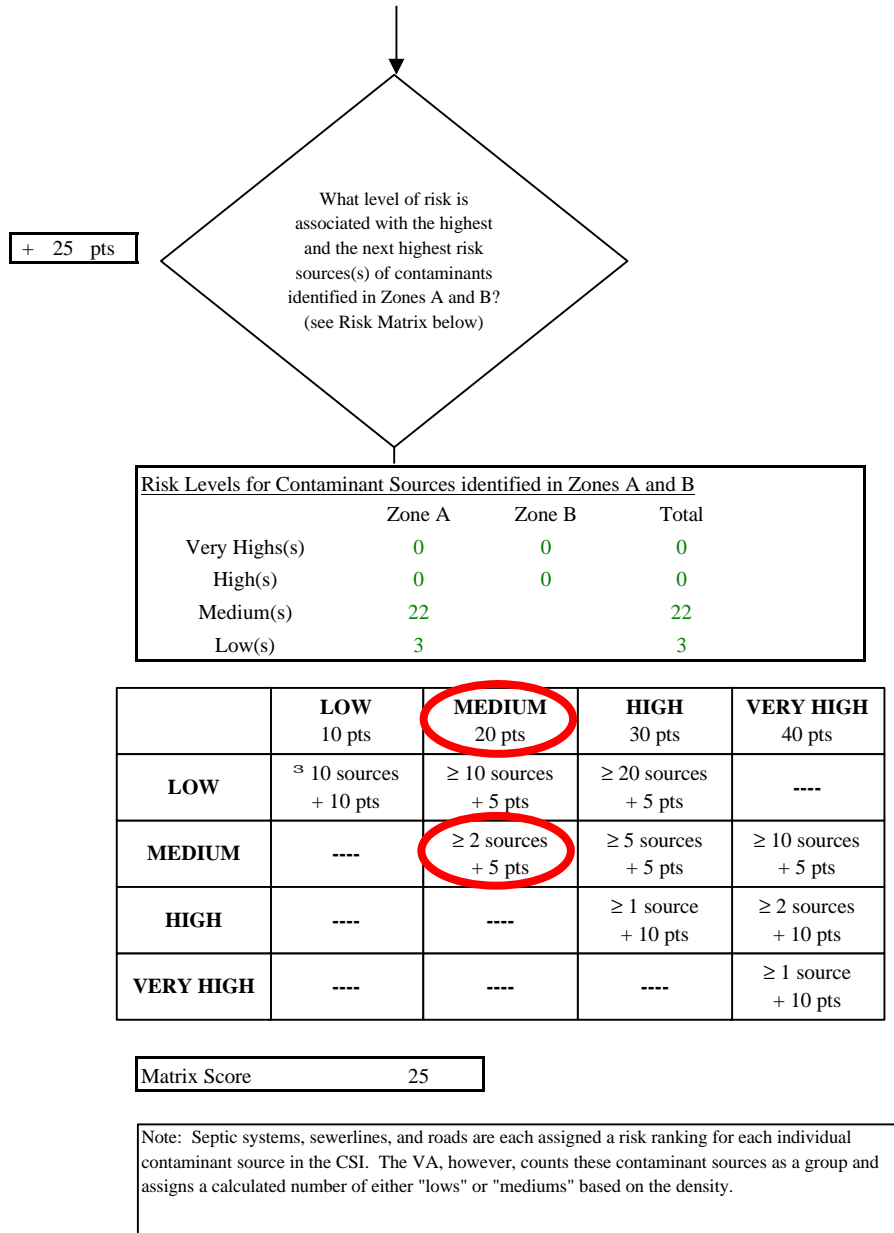


Chart 6. Contaminant risks for McCarthy Lodge - Volatile Organic Chemicals

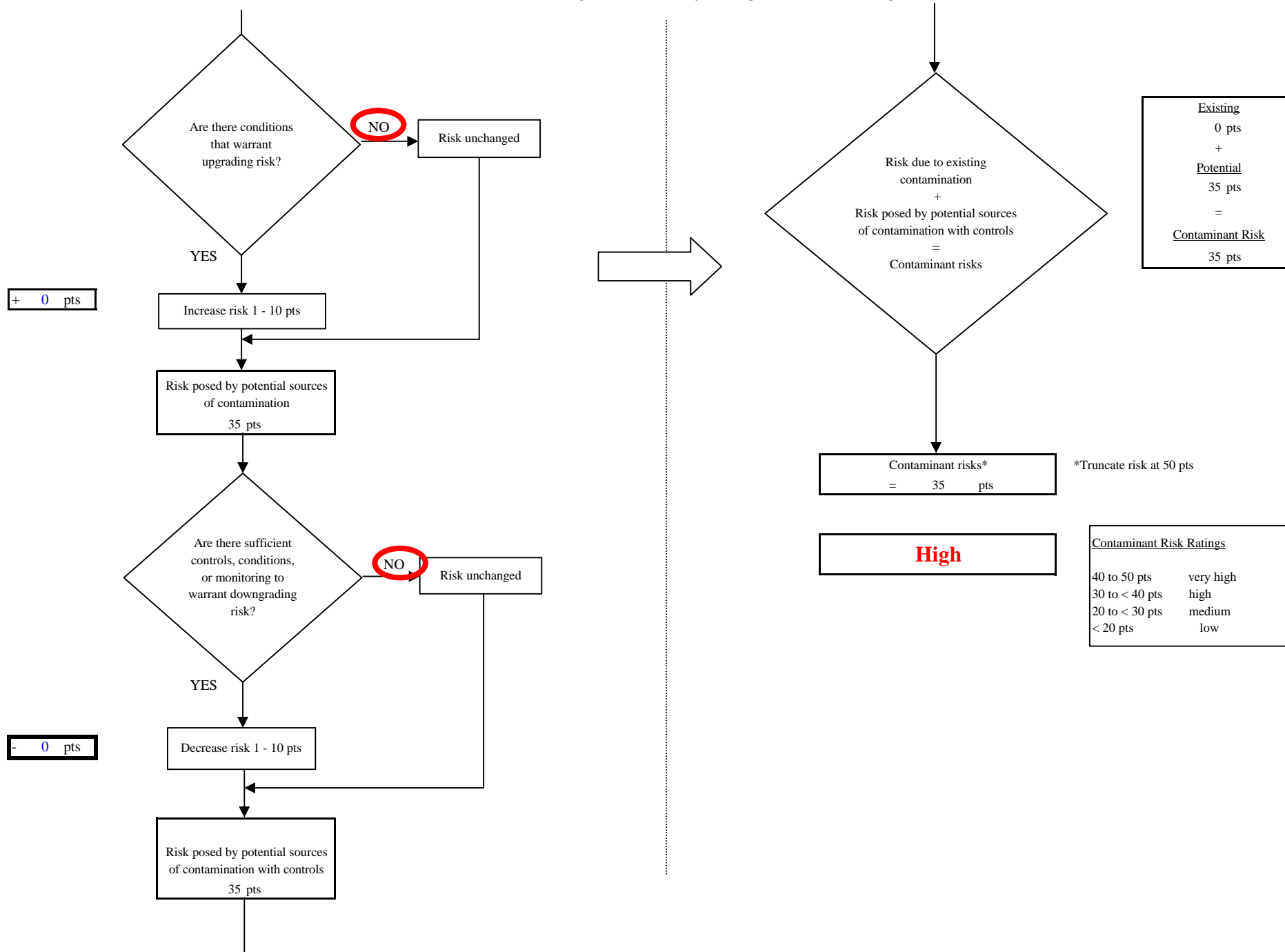


Chart 7. Vulnerability analysis for McCarthy Lodge - Volatile Organic Chemicals

