

---

# Source Water Assessment

A Hydrogeologic Susceptibility and  
Vulnerability Assessment for  
AK Division of Parks Whitefish  
Campground Drinking Water System,  
Fairbanks area, Alaska

PWSID # 311671

September 2002

DRINKING WATER PROTECTION PROGRAM REPORT Report 688  
Alaska Department of Environmental Conservation

# Source Water Assessment for AK Division of Parks Whitefish Campground Drinking Water System Fairbanks area, Alaska PWSID# 311671

DRINKING WATER PROTECTION PROGRAM REPORT Report 688

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.

## CONTENTS

	Page		Page
Executive Summary	1	Inventory of Potential and Existing Contaminant Sources	2
AK Division of Parks Whitefish Campground Public Drinking Water System	1	Ranking of Contaminant Risks	2
AK Division of Parks Whitefish Campground Protection Area	1	Vulnerability of AK Division of Parks Whitefish Campground Drinking Water System	3
		References	5

## TABLES

TABLE	1. Definition of Zones	2
	2. Susceptibility	3
	3. Contaminant Risks	4
	3. Overall Vulnerability	4

## APPENDICES

APPENDIX	A. AK Division of Parks Whitefish Campground Drinking Water Protection Area (Map 1)
	B. Contaminant Source Inventory for AK Division of Parks Whitefish Campground (Table 1) Contaminant Source Inventory and Risk Ranking for AK Division of Parks Whitefish Campground – Bacteria and Viruses (Table 2) Contaminant Source Inventory and Risk Ranking for AK Division of Parks Whitefish Campground – Nitrates/Nitrites (Table 3) Contaminant Source Inventory and Risk Ranking for AK Division of Parks Whitefish Campground – Volatile Organic Chemicals (Table 4)
	C. AK Division of Parks Whitefish Campground Drinking Water Protection Area and Potential and Existing Contaminant Sources (Map 2)
	D. Vulnerability Analysis for Contaminant Source Inventory and Risk Ranking for AK Division of Parks Whitefish Campground Public Drinking Water Source (Charts 1 – 8)

# Source Water Assessment for AK Division of Parks Whitefish Campground Source of Public Drinking Water, Fairbanks Area, Alaska

---

## Drinking Water Protection Program Alaska Department of Environmental Conservation

### EXECUTIVE SUMMARY

The public water system for AK Division of Parks Whitefish Campground is a Class B water system (transient/non-community) consisting of one well on the Steese Highway approximately 20 miles north of Fairbanks, Alaska. The wellhead received a susceptibility rating of **Very High** and the aquifer received a susceptibility rating of **High**. Combining these two ratings produces a **High** rating for the natural susceptibility of the well. Identified potential and current sources of contaminants for AK Division of Parks Whitefish Campground public drinking water source include: highways and roads, residential areas, a pit toilet, an underground mine, septic systems, fuel storage tanks, a campground, and a kennel. These identified potential and existing sources of contamination are considered as sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. Combining the natural susceptibility of the well with the contaminant risk, the public water sources for AK Division of Parks Whitefish Campground received a vulnerability rating of **Very High** for bacteria and viruses, a **Medium** for nitrates and/or nitrites, and a **High** for volatile organic chemicals.

### AK DIVISION OF PARKS WHITEFISH CAMPGROUND PUBLIC DRINKING WATER SYSTEM

AK Division of Parks Whitefish Campground public water system is a Class B (transient/non-community) water system. The system consists of one well on the Elliot Highway at its junction with the Chatanika River approximately 20 miles north of Fairbanks, Alaska (T3N, R1W, Section 15) (See Map 1 of Appendix A). Fairbanks and its surrounding communities are located in the Fairbanks North Star Borough which is near the center of Alaska (Please see the inset of Map 1 in Appendix A for location). The Borough's current population is 82,840 making it the second-largest population center in the state (ADCED, 2002). Communities located within the Borough include : College, Eielson Air Force Base, Ester, Fairbanks, Fox, Harding Lake, Moose Creek, North Pole, Pleasant Valley, Salcha, and Two Rivers.

The majority of residents the area surrounding Fairbanks have individual wells and septic systems (ADCED, 2002). Heating oil (stored in both above and below ground 275 to 500-gallon tanks) is used for heating homes and buildings. Refuse is transported to the Fairbanks North Star Borough landfill.

The Fairbanks area includes two distinct topographic areas: the floodplain of the Tanana River and the Chena River, and the uplands north of this floodplain. This water system is located in the uplands at an elevation of approximately 550 feet above sea level.

According to the well log for this water system, the depth of the well is 60 feet below the ground surface, and is screened in gravel beneath a layer of schist. Bedrock in this area is predominantly a metamorphosed marine mud deposit, called a pelitic schist. The schist is locally intruded by granitic rocks – granite and quartz diorite. The well for the Whitefish Campground is located in the floodplain for the Chatanika River and probably draws its water from a historic river channel.

Groundwater in the uplands is recharged by local precipitation. Outflow of ground water in the uplands primarily occurs two ways. In areas under artesian pressure (pressure caused by overlying permafrost), water can flow to the surface through thawed conduits within the permafrost. Otherwise groundwater will flow under the permafrost (if present) and out to the groundwater beneath the adjacent flood plain or creek valley (Nelson, 1978).

The Sanitary Survey (8/27/99) for the water system indicates that although this type of hand pump well does not allow for a sanitary seal, the seal between the well casing and the cement pad is missing. This seal provides protection against contaminants travelling along the well casing and into source waters. The Sanitary Survey also indicates the land surface is appropriately sloped away from the well providing adequate surface water drainage. The well is grouted according to ADEC regulations. Proper grouting also provides added protection against contaminants travelling along the well casing and into source waters.

This system operates seasonally from May to

September and serves approximately 26 non-residents through one service connection.

**AK DIVISION OF PARKS WHITEFISH CAMPGROUND 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 groundwater. These areas are determined by looking at the characteristics of the soil, groundwater, aquifer, and well.

The most probable area for contamination to reach the drinking water well is the area that contributes water to the well, the groundwater recharge area. This area is designated as the drinking water protection area. Because releases of contaminants within the protection area are most likely to impact the drinking water well, this area will serve as the focus for voluntary protection efforts.

An outline of the immediate watershed was used to determine the size and shape of the protection area for AK Division of Parks Whitefish Campground. Available geology was also considered to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful protection area (Please refer to the Guidance Manual for Class B Public Water Systems for additional information).

The protection areas established for wells by the ADEC are usually separated into four zones, limited by the watershed. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well. An analytical calculation was used to determine the size and shape of the protection area. The input parameters describing the attributes of the aquifer in this calculation were adopted from the U.S. Geological Survey (*Patrick, Brabets, and Glass, 1989*), and State of Alaska Department of Water Resources (*Jokela et. al., 1991*).

The time of travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. The following is a summary of the four protection area zones for wells and the calculated time-of-travel for each:

**Table 1. Definition of Zones**

<b>Zone</b>	<b>Definition</b>
A	¼ the distance for the 2-yr. time-of-travel
B	Less than the 2 year time-of-travel
C	Less Than the 5 year time-of-travel
D	Less than the 10 year time-of-travel

The DWPA for AK Division of Parks Whitefish Campground is limited by its immediate watershed and includes only Zone A (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 AK Division of Parks Whitefish Campground DWPA. This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer 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

The sources are displayed on Map 2 of Appendix C and summarized in Table 1 of Appendix B.

**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 time-of-travel 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. Only “Very High” and “High” rankings are inventoried within the outer Zone D due to the probability of contaminant dilution by the time the contaminants get to the well.

Tables 2 through 4 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals.

**VULNERABILITY OF AK DIVISION OF PARKS WHITEFISH CAMPGROUND DRINKING WATER SYSTEM**

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

- Natural susceptibility; and
- Contaminant risks.

Appendix D contains eight 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 Wellhead’ to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the ‘Susceptibility of the Aquifer’ to contamination by looking at the naturally occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 3 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 well. Lastly, Chart 4 contains the ‘Vulnerability Analysis for Bacteria and Viruses’. Charts 5 through 8 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites and volatile organic chemicals, respectively.

A score for the Natural Susceptibility is reached by considering the properties of the well and the aquifer.

$$\begin{array}{r}
 \text{Susceptibility of the Wellhead (0 – 25 Points)} \\
 \text{(Chart 1 of Appendix D)} \\
 + \\
 \text{Susceptibility of the Aquifer (0 – 25 Points)} \\
 \text{(Chart 2 of Appendix D)} \\
 = \\
 \text{Natural Susceptibility (Susceptibility of the Well)} \\
 \text{(0 – 50 Points)}
 \end{array}$$

A ranking is assigned for the Natural Susceptibility according to the point score:

Natural Susceptibility Ratings	
40 to 50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

The well for the AK Division of Parks Whitefish Campground is completed in an unconfined aquifer. Because unconfined aquifers are recharged by surface water and precipitation that migrates downward from the surface, contaminants at the surface have the potential to adversely impact this aquifer. Table 2 shows the Susceptibility scores and ratings for AK Division of Parks Whitefish Campground.

**Table 2. Susceptibility**

	Score	Rating
Susceptibility of the Wellhead	20	Very High
Susceptibility of the Aquifer	15	High
Natural Susceptibility	35	High

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This score has been derived from an examination of existing and historical contamination that has been detected at the drinking water source through routine sampling. It also evaluates potential sources of contamination. Flow charts are used to assign a point score, and ratings are assigned in the same way as for the natural susceptibility:

Contaminant Risk Ratings	
40 to 50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

**Table 3. Contaminant Risks**

Category	Score	Rating
Bacteria and Viruses	50	Very High
Nitrates and/or Nitrites	20	Medium
Volatile Organic Chemicals	30	High

Finally, an overall vulnerability score is assigned for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

$$\begin{array}{r}
 \text{Natural Susceptibility (0 – 50 points)} \\
 + \\
 \text{Contaminant Risks (0 – 50 points)} \\
 = \\
 \text{Vulnerability of the} \\
 \text{Drinking Water Source to Contamination (0 – 100).}
 \end{array}$$

Again, rankings are assigned according to a point score:

Overall Vulnerability Ratings	
80 to 100 pts	Very High
60 to < 80 pts	High
40 to < 60 pts	Medium
< 40 pts	Low

Table 4 contains the overall vulnerability scores (0 – 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	85	Very High
Nitrates and Nitrites	55	Medium
Volatile Organic Chemicals	65	High

**Bacteria and Viruses**

The contaminant risk for bacteria and viruses is very high with the density of the residential septic systems and the kennel representing the most significant risk to the drinking water well (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D).

Only a small amount of bacteria and viruses are required to endanger public health. Monitoring samples collected on 5/23/00 were positive for bacteria and viruses (an additional sample collected on 6/5/00

confirmed the positive result). The positive samples increase the overall vulnerability of the drinking water source, indicating that the source is susceptible to bacteria and viruses contamination. The source of the bacteria and viruses is unknown. More recent samples taken in 2001 and 2002 all had negative results for bacteria and viruses. After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability of the well to contamination is very high.

**Nitrates and Nitrites**

The contaminant risk for nitrates and nitrites is medium with the density of residential septic systems and the kennel representing the greatest risk to this source of public drinking water (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

Nitrates are very mobile, moving at approximately the same rate as water. Sampling history for the AK Division of Parks Whitefish Campground well indicates that extremely low concentrations of nitrate have been detected in the drinking water. Concentrations have ranged from not detected to 0.060 mg/L. The Maximum Contaminant Level (MCL) for nitrates is 10 mg/L. The MCL is the maximum level of contaminant that is allowed to exist in drinking water. After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to contamination is medium.

**Volatile Organic Chemicals**

The contaminant risk for volatile organic chemicals is high with the residential fuel storage tanks and the underground mine creating the greatest risk for volatile organic chemicals (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

Both underground and above ground heating oil storage tanks are the standard way of heating homes and businesses in the Fox area. The most common causes of fuel leaks of these heating oil systems are overfilling the tank, ruptured fuel lines, leaking storage tanks, damaged or faulty valves and vandalism. Regular system maintenance can help prevent many of these harmful fuel leaks.

Volatile Organic Chemicals have not been sampled for in recent history. After combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is high.

## REFERENCES

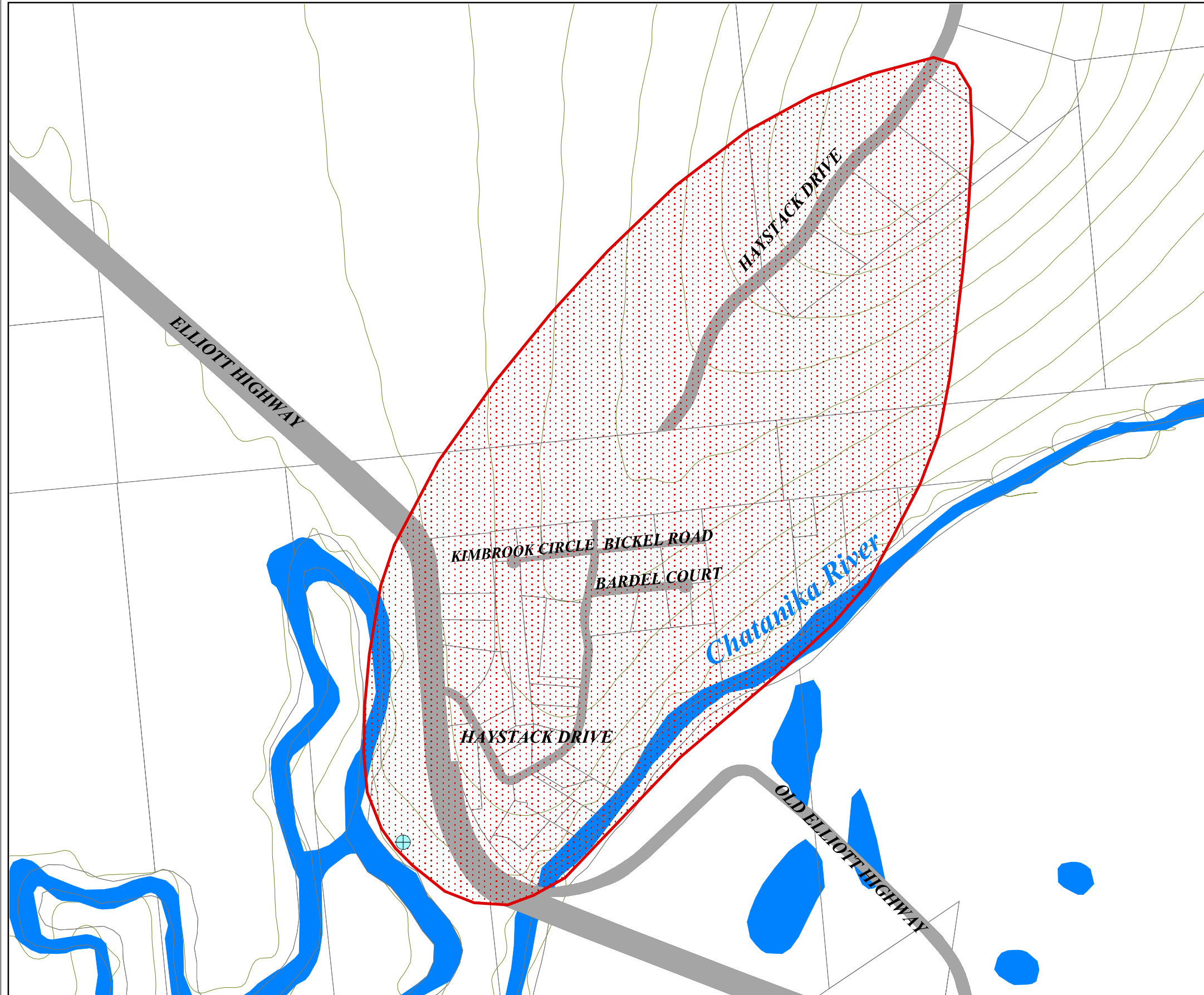
- Alaska Department of Community and Economic Development (ADCED), 2002 [WWW document]. URL [http://www.dced.state.ak.us/mra/CF\\_BLOCK.cfm](http://www.dced.state.ak.us/mra/CF_BLOCK.cfm).
- Forbes, R.B. and Weber, F.R., 1981. Bedrock Geologic Map of the Fairbanks Mining District, Alaska. Funded by the State of Alaska, US Geological Survey, and The National Science Foundation.
- Freeze, R.A. and Cherry, J.A., 1979. Groundwater. Prentice-Hall, Englewood Cliffs, NJ.
- Jokela, J.B., Munter, J.A., and Evans, J.G., 1991, Ground-water resources of the Palmer-Big Lake area, Alaska: a conceptual model. Division of Geological & Geophysical Surveys Reports of Investigations 90-4, State of Alaska Department of Natural Resources, Fairbanks, AK.
- King, P.B., compiler, 1969, Tectonic map of North America: US Geological Survey Map, (scale 1:5,000,000) 2 sheets.
- Nelson, Gordon L., 1978, Hydrologic Information for Land-Use Planning, Fairbanks Vicinity, Alaska. US Department of the Interior Geological Survey Open File Report 78-959, 47p.
- Patrick, L.D., Brabets, T.P., and Glass, R.L., 1989, Simulation of ground-water flow at Anchorage, Alaska: US Geological Survey Water-Resources Investigations Report 88-4139, 41p.
- United States Environmental Protection Agency (EPA), 2002 [WWW document]. URL <http://www.epa.gov/safewater/mcl.html>.



## **APPENDIX A**

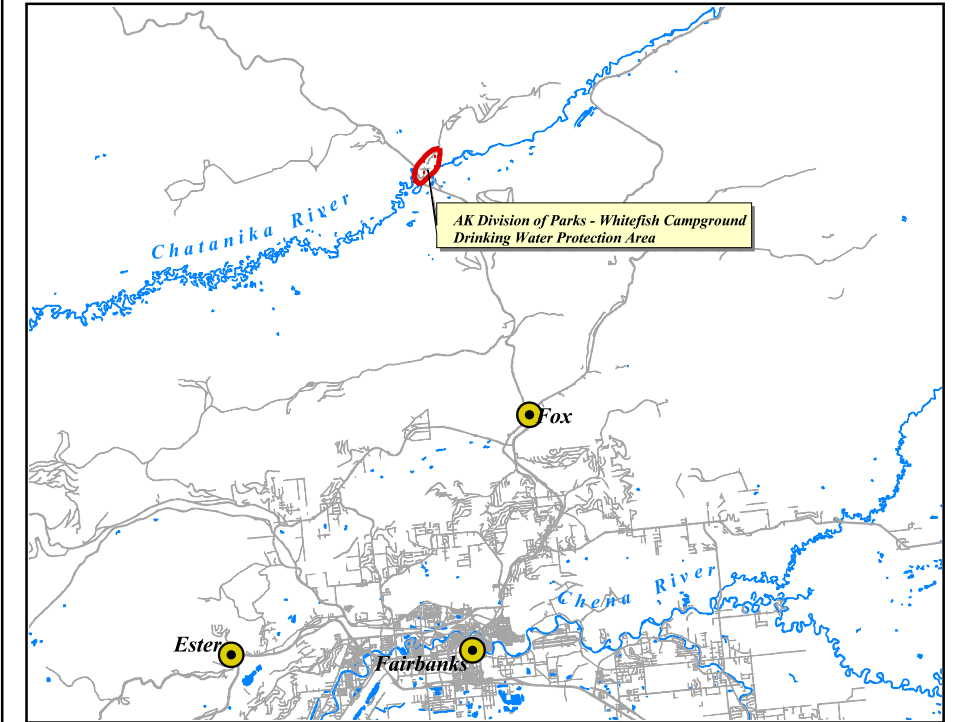
### **AK Division of Parks Whitefish Campground Drinking Water Protection Area Location Map (Map 1)**

# AK Division of Parks - Whitefish Campground Drinking Water Protection Area



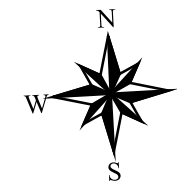
### Legend

- AK Div of Parks - Whitefish Campground Well
- Zone A Protection Area
- Several Months Travel Time
- Roads
- Parcels
- Rivers, Streams, and Lakes
- Elevation Contours (20 meters)



1000 0 1000 2000 3000 4000 Feet

PWSID 311671.001



# Map 1

## **APPENDIX B**

### **Contaminant Source Inventory and Risk Ranking for AK Division of Parks Whitefish Campground (Tables 1-4)**

**Table 1**

**Contaminant Source Inventory for  
AK Div Parks - Whitefish CG**

**PWSID 311671.001**

<b>Contaminant Source Type</b>	<b>Contaminant Source ID</b>	<b>CS ID tag</b>	<b>Zone</b>	<b>Map Number</b>	<b>Comments</b>
Highways and roads, paved (cement or asphalt)	X20		A	2	Six roads located within Zone A
Residential Areas	R01		A	2	Approximately 35 acres of residential area located within Zone A
Pit toilets (vaulted) nonresidential (one or more)	D17	D17-1	A	2	Whitefish Campground
Metals mining, underground (inactive)	E05	E05-1	A	2	Irish Association Prospect
Septic systems (serves one single-family home)	R02	R02-1 - 19	A	2	Number approximated based on number of parcels designated as residential
Tanks, heating oil, residential (above ground)	R08	R08-1 - 19	A	2	Number approximated based on number of parcels designated as residential
Campgrounds and RV Parks	X35	X35	A	2	Whitefish Campground
Kennels	X49	X49-1	A	2	Bardel Court

**Table 2**

*Contaminant Source Inventory and Risk Ranking for  
AK Div Parks - Whitefish CG  
Sources of Bacteria and Viruses*

**PWSID 311671.001**

<b>Contaminant Source Type</b>	<b>Contaminant Source ID</b>	<b>CS ID tag</b>	<b>Zone</b>	<b>Risk Ranking for Analysis</b>	<b>Map Number</b>	<b>Comments</b>
Highways and roads, paved (cement or asphalt)	X20		A	Low	2	Six roads located within Zone A
Residential Areas	R01		A	Low	2	Approximately 35 acres of residential area located within Zone A
Pit toilets (vaulted) nonresidential (one or more)	D17	D17-1	A	Low	2	Whitefish Campground
Septic systems (serves one single-family home)	R02	R02-1 - 19	A	Low	2	Number approximated based on number of parcels designated as residential
Campgrounds and RV Parks	X35	X35	A	Low	2	Whitefish Campground
Kennels	X49	X49-1	A	Medium	2	Bardel Court

**Table 3**

*Contaminant Source Inventory and Risk Ranking for  
AK Div Parks - Whitefish CG  
Sources of Nitrates/Nitrites*

**PWSID 311671.001**

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Residential Areas	R01		A	Low	2	Approximately 35 acres of residential area located within Zone A
Highways and roads, paved (cement or asphalt)	X20		A	Low	2	Six roads located within Zone A
Pit toilets (vaulted) nonresidential (one or more)	D17	D17-1	A	Low	2	Whitefish Campground
Septic systems (serves one single-family home)	R02	R02-1 - 19	A	Low	2	Number approximated based on number of parcels designated as residential
Campgrounds and RV Parks	X35	X35	A	Low	2	Whitefish Campground
Kennels	X49	X49-1	A	Medium	2	Bardel Court

Table 4

*Contaminant Source Inventory and Risk Ranking for  
AK Div Parks - Whitefish CG  
Sources of Volatile Organic Chemicals*

PWSID 311671.001

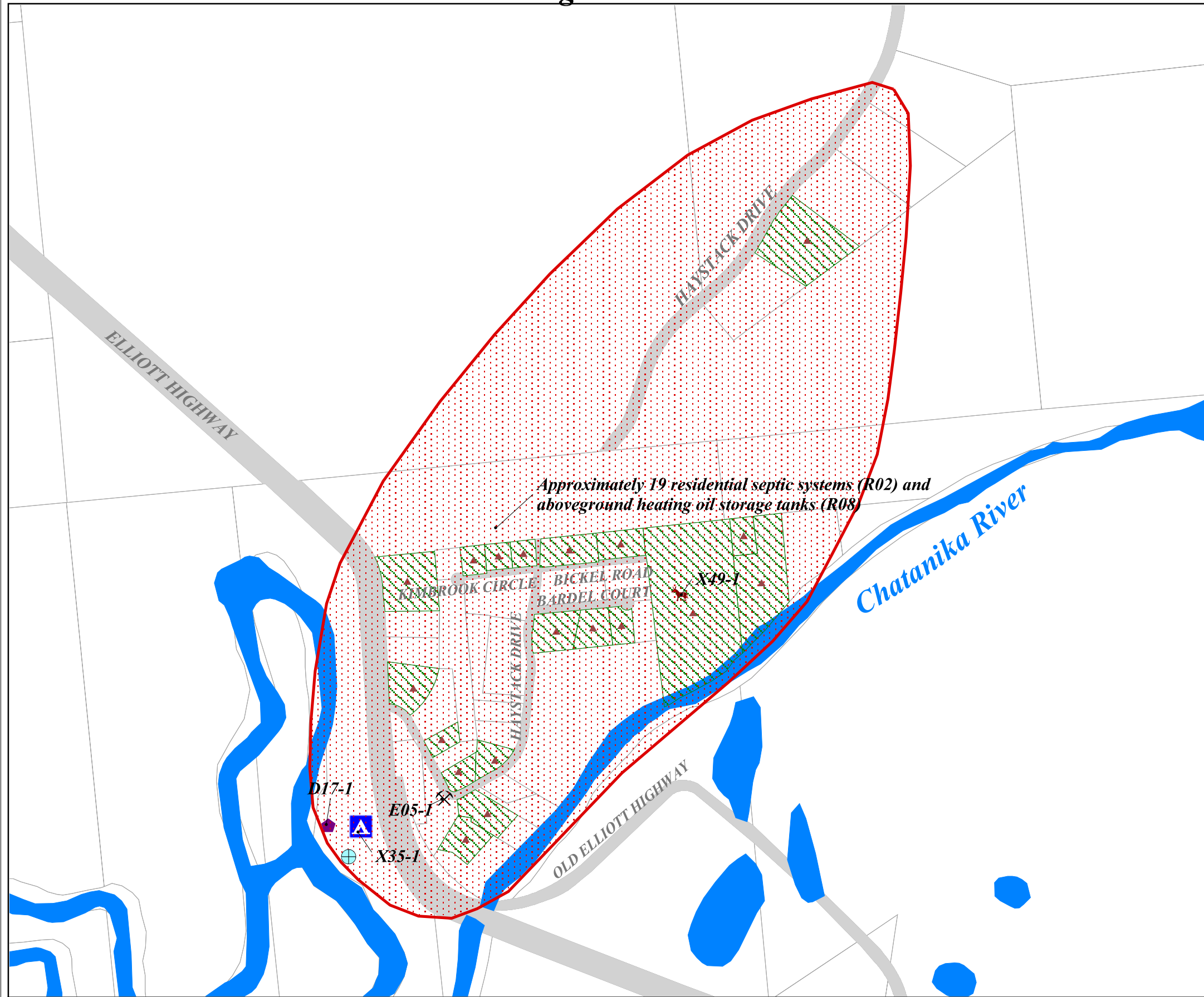
<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Highways and roads, paved (cement or asphalt)	X20		A	Low	2	Six roads located within Zone A
Residential Areas	R01		A	Low	2	Approximately 35 acres of residential area located within Zone A
Metals mining, underground (inactive)	E05	E05-1	A	Medium	2	Irish Association Prospect
Septic systems (serves one single-family home)	R02	R02-1 - 19	A	Low	2	Number approximated based on number of parcels designated as residential
Tanks, heating oil, residential (above ground)	R08	R08-1 - 19	A	Medium	2	Number approximated based on number of parcels designated as residential
Campgrounds and RV Parks	X35	X35	A	Low	2	Whitefish Campground

## **APPENDIX C**

### **AK Division of Parks Whitefish Campground Drinking Water Protection Area and Potential and Existing Contaminant Sources (Map 2)**



# AK Division of Parks - Whitefish Campground Drinking Water Protection Area with Potential & Existing Contaminant Sources

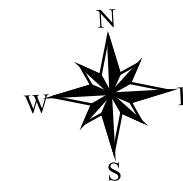


## Legend

- AK Div of Parks - Whitefish Campground Well
- Zone A Protection Area**
- Several Months Travel Time
- Contaminant Sources**
- Pit toilet (vaulted) (D17)
- Campground (X35)
- Kennel (X49)
- Underground Mine (E05)
- Residential septic systems (R02) and aboveground heating oil storage tanks (R08)
- Residential Area (R01)
- Rivers, Streams, and Lakes
- Roads (X20)
- Parcels

1000 0 1000 2000 3000 4000 5000 6000 Feet

PWSID 311671.001

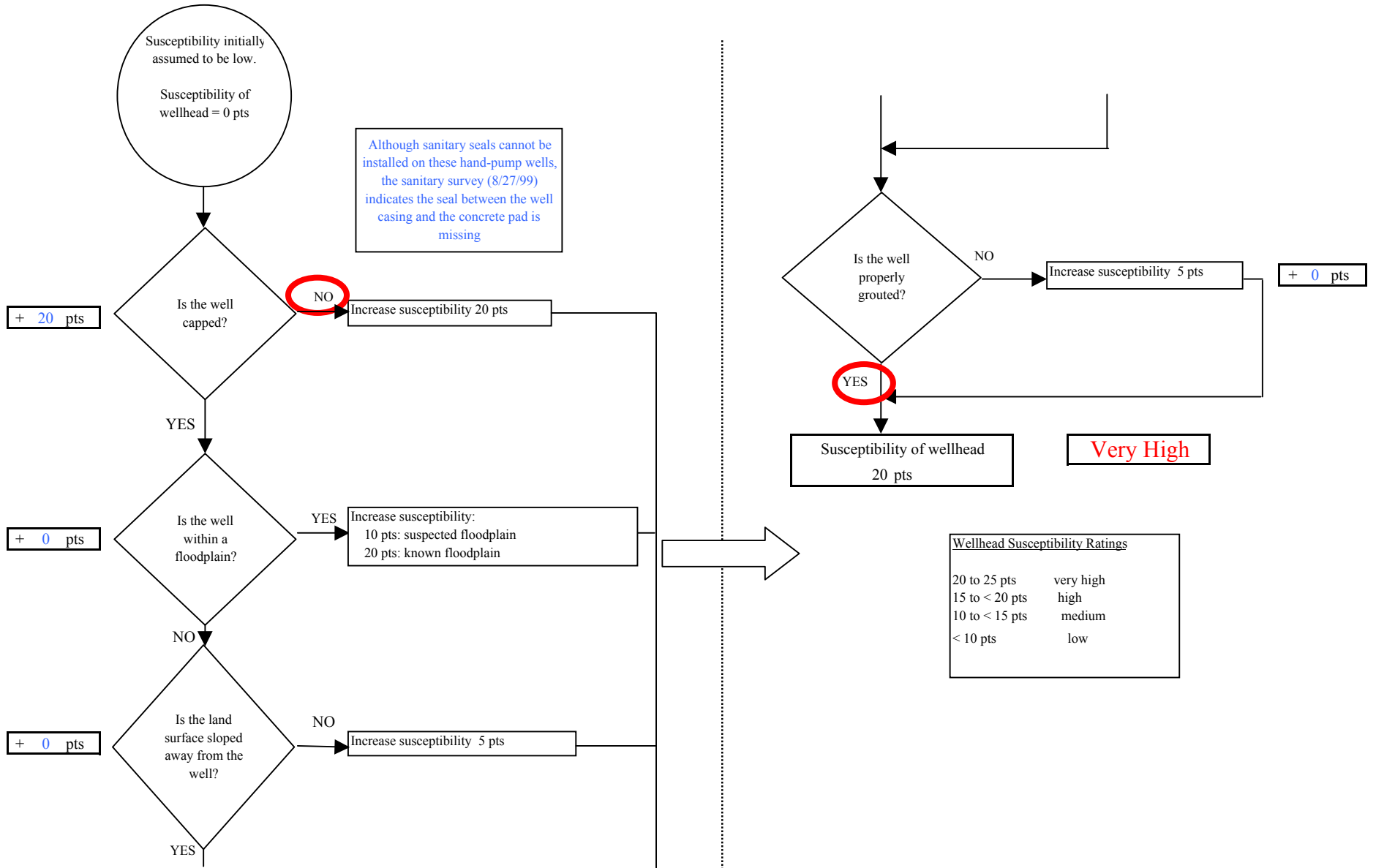


# Map 2

## **APPENDIX D**

### **Vulnerability Analysis for AK Division of Parks Whitefish Campground Public Drinking Water Source (Charts 1-8)**

**Chart 1. Susceptibility of the wellhead - AK Division of Parks Whitefish Campground**



**Chart 2. Susceptibility of the aquifer - AK Division of Parks Whitefish Campground**

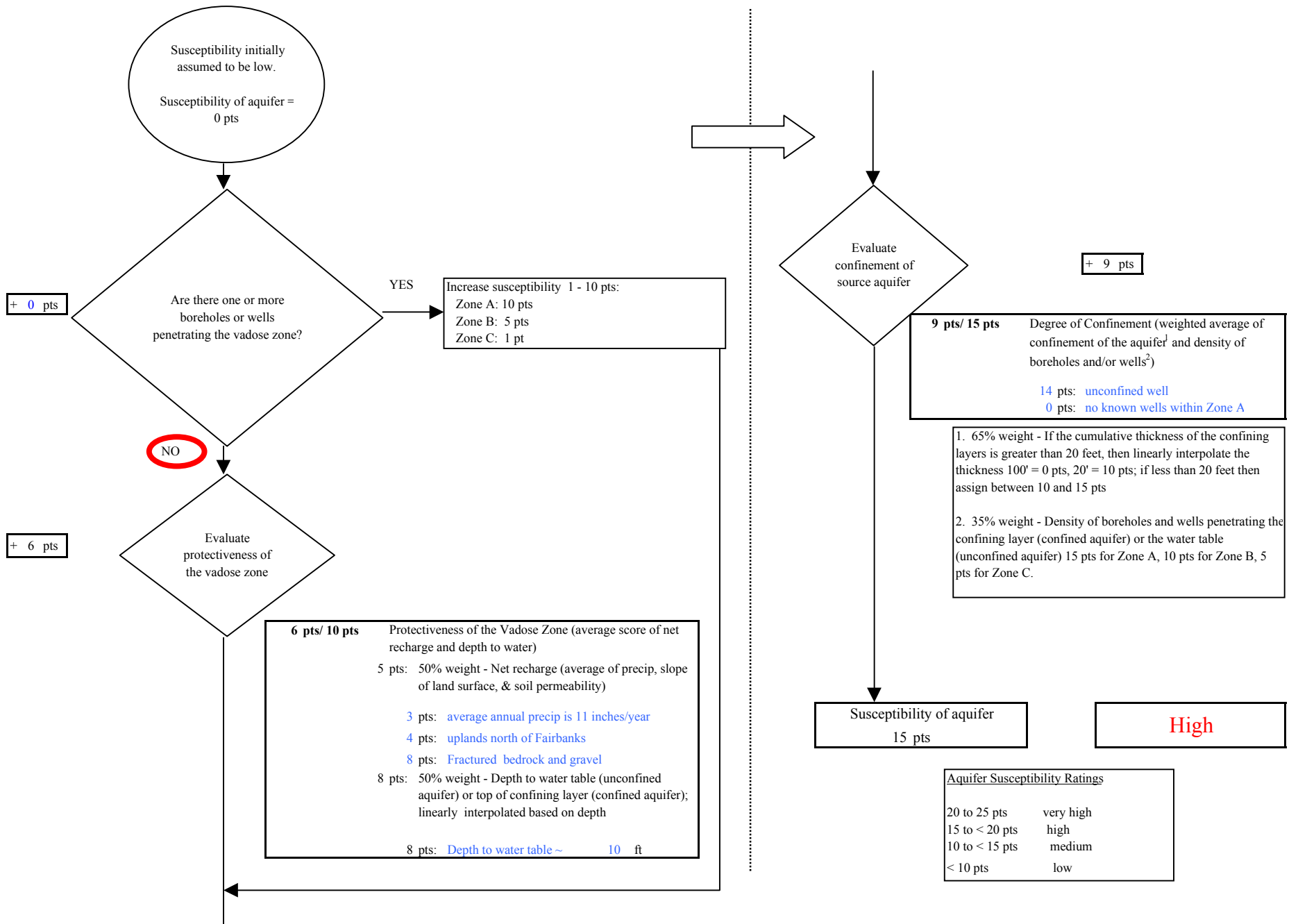
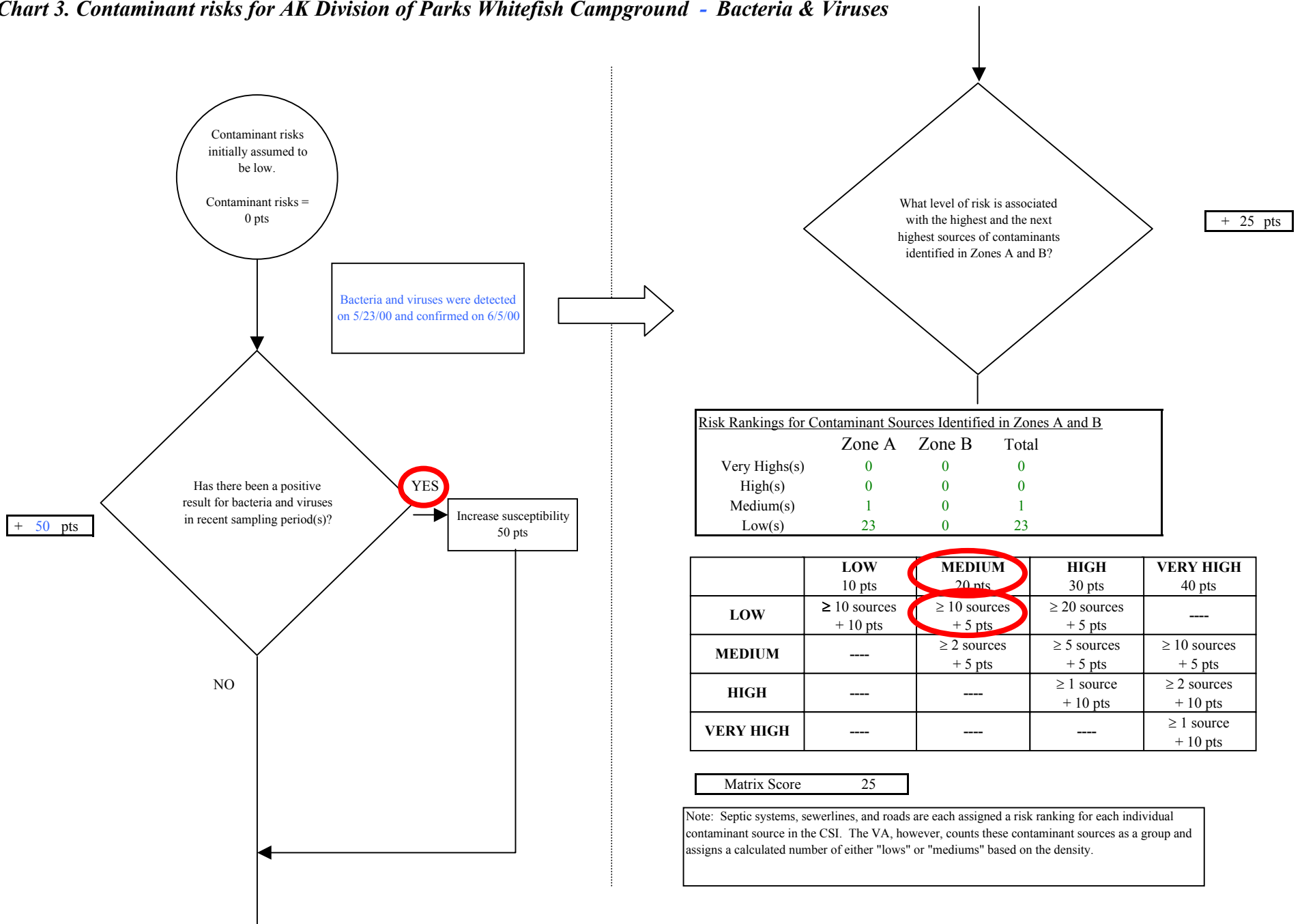
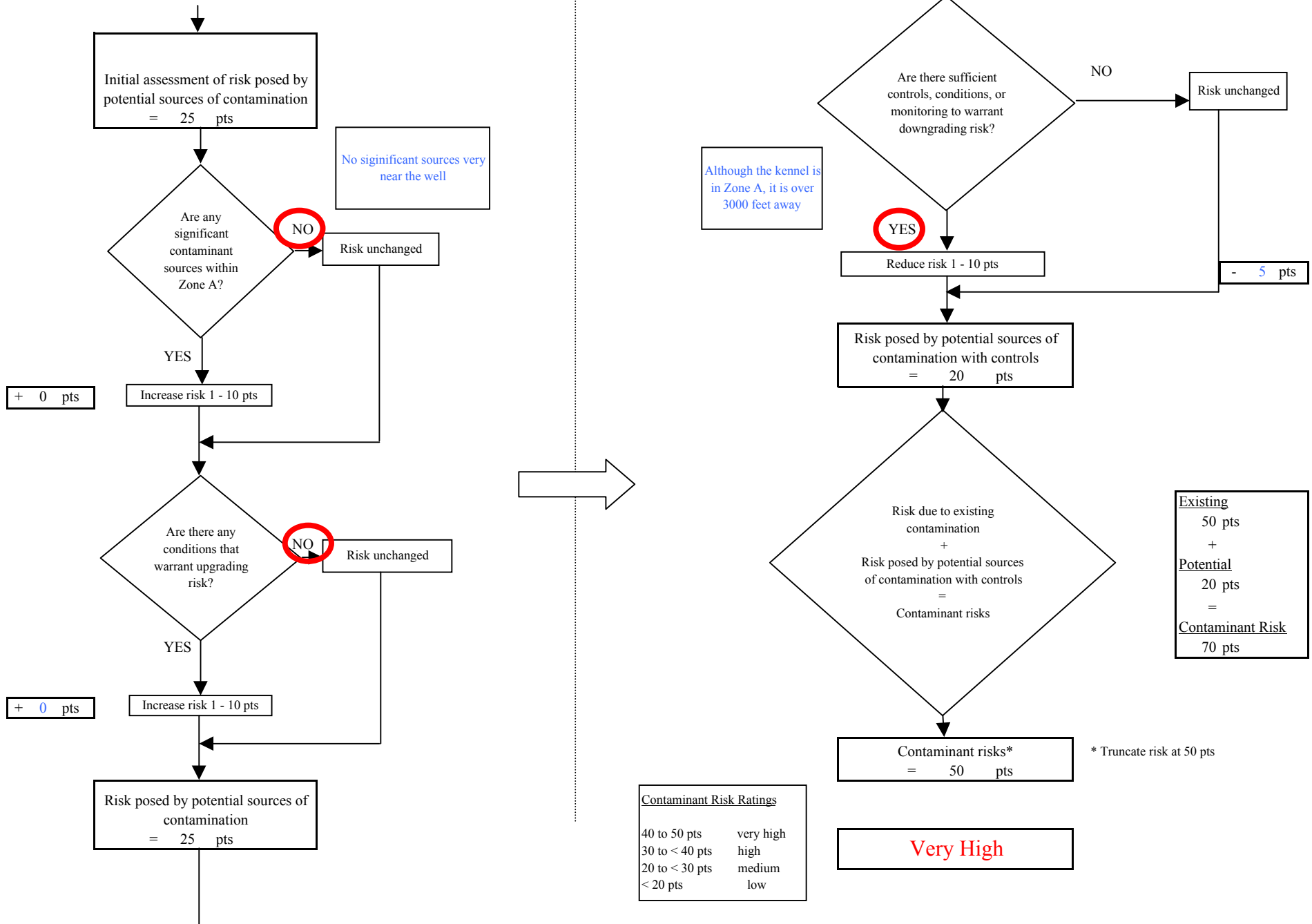


Chart 3. Contaminant risks for AK Division of Parks Whitefish Campground - Bacteria & Viruses



**Chart 3. Contaminant risks for AK Division of Parks Whitefish Campground - Bacteria & Viruses**



**Chart 4. Vulnerability analysis for AK Division of Parks Whitefish Campground - Bacteria & Viruses**

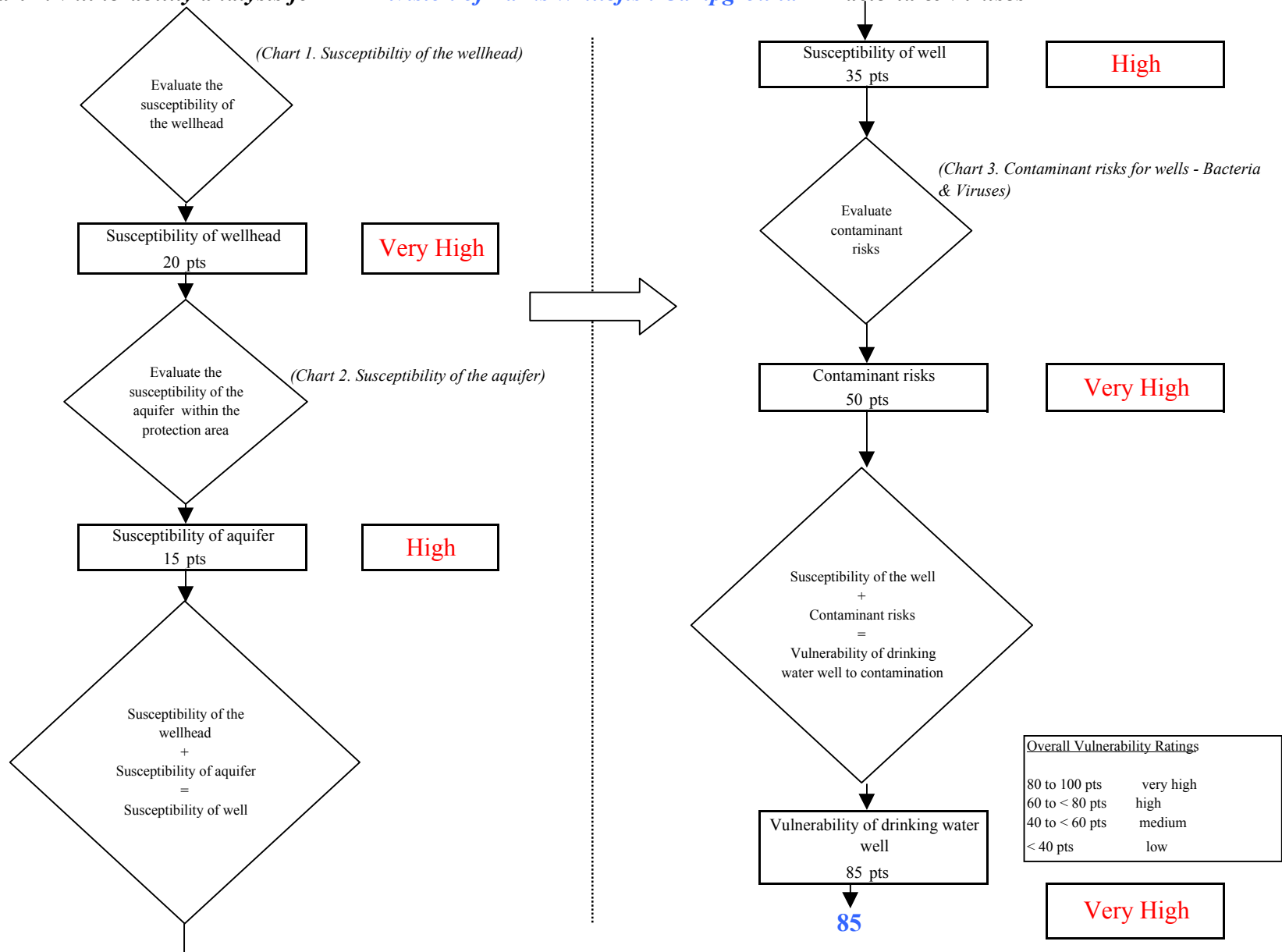
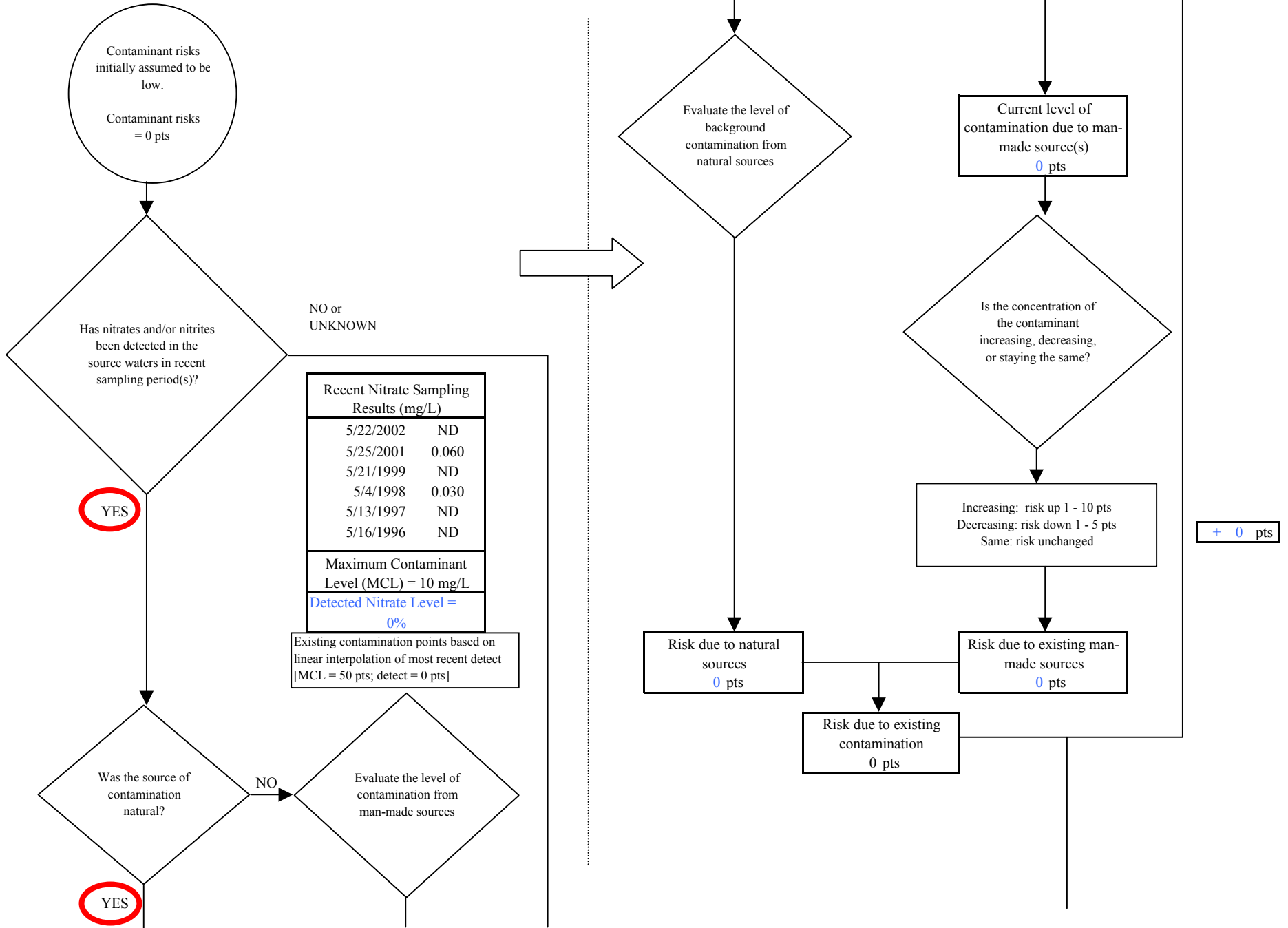
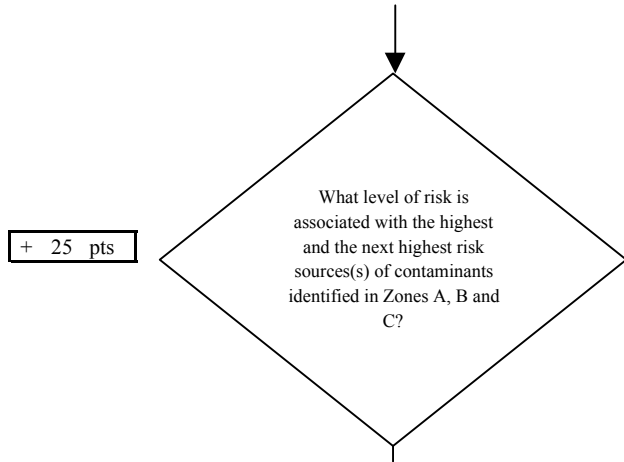


Chart 5. Contaminant risks for AK Division of Parks Whitefish Campground - Nitrates and Nitrites





**Chart 5. Contaminant risks for AK Division of Parks Whitefish Campground - Nitrates and Nitrites**



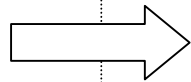
+ 25 pts

Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	1	0	1
Low(s)	23	0	23

	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
MEDIUM	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH	----	----	----	≥ 1 source + 10 pts

Matrix Score 25

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.



No significant sources very near the well

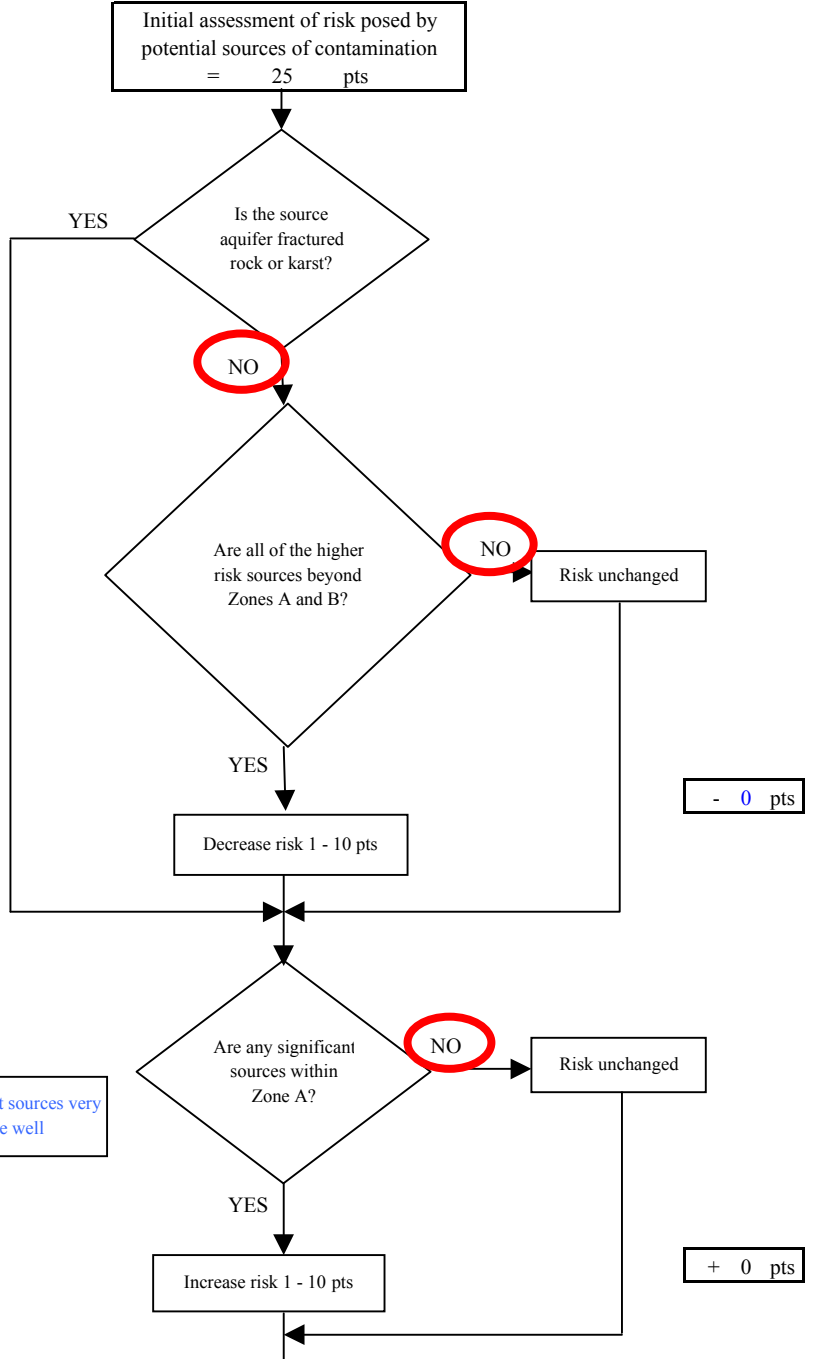
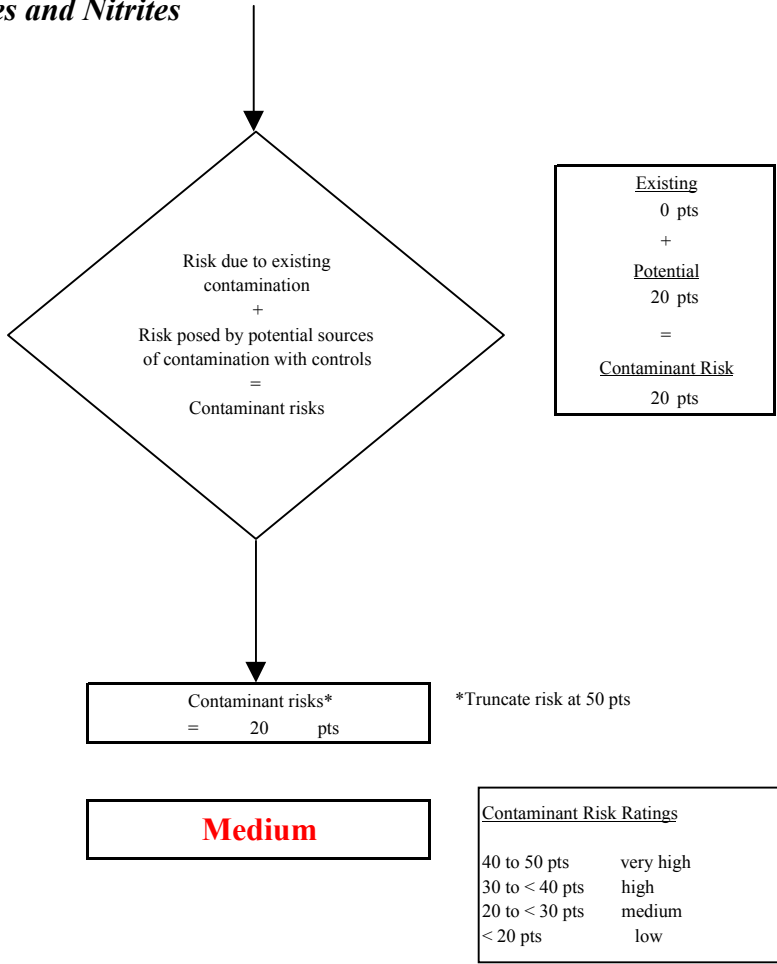
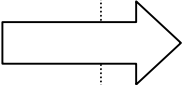
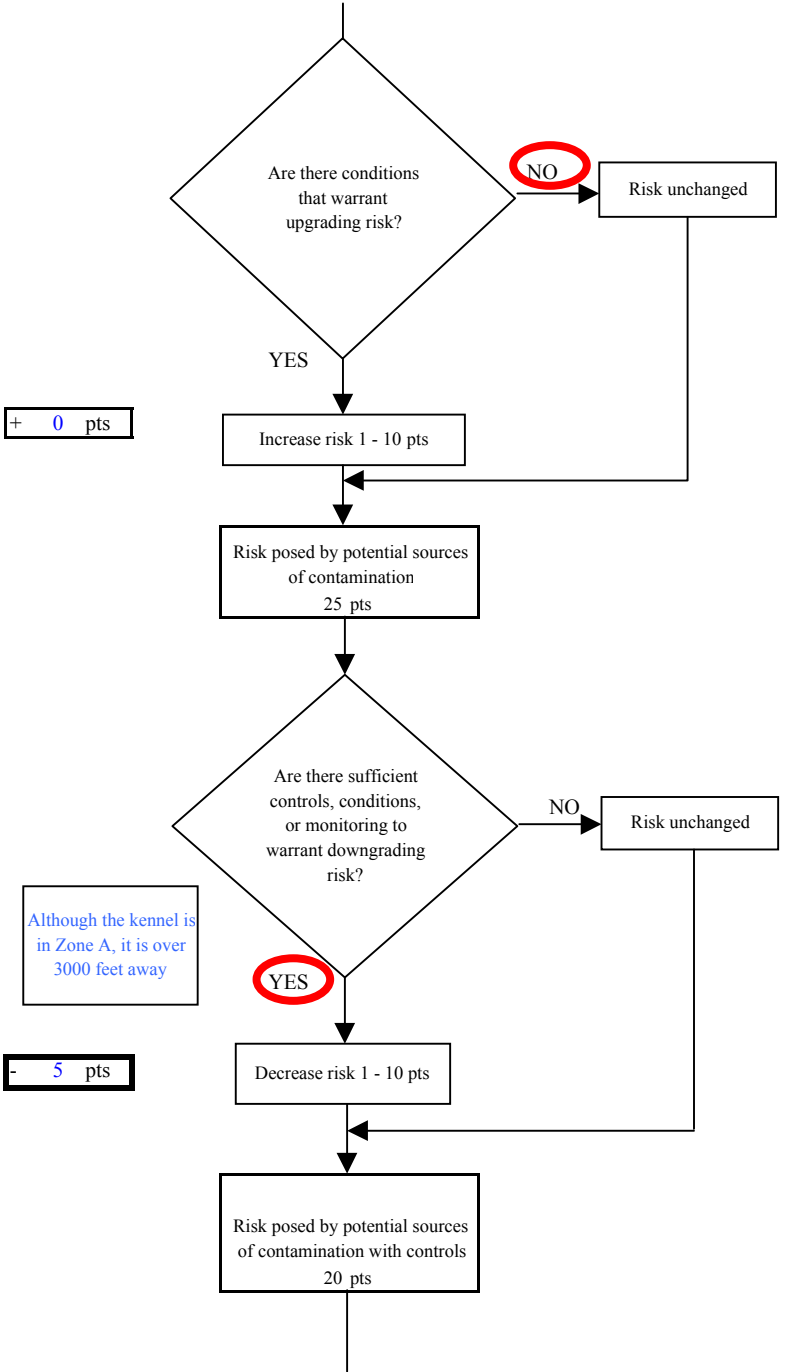


Chart 5. Contaminant risks for AK Division of Parks Whitefish Campground - Nitrates and Nitrites



**Chart 6. Vulnerability analysis for AK Division of Parks Whitefish Campground - Nitrates and Nitrites**

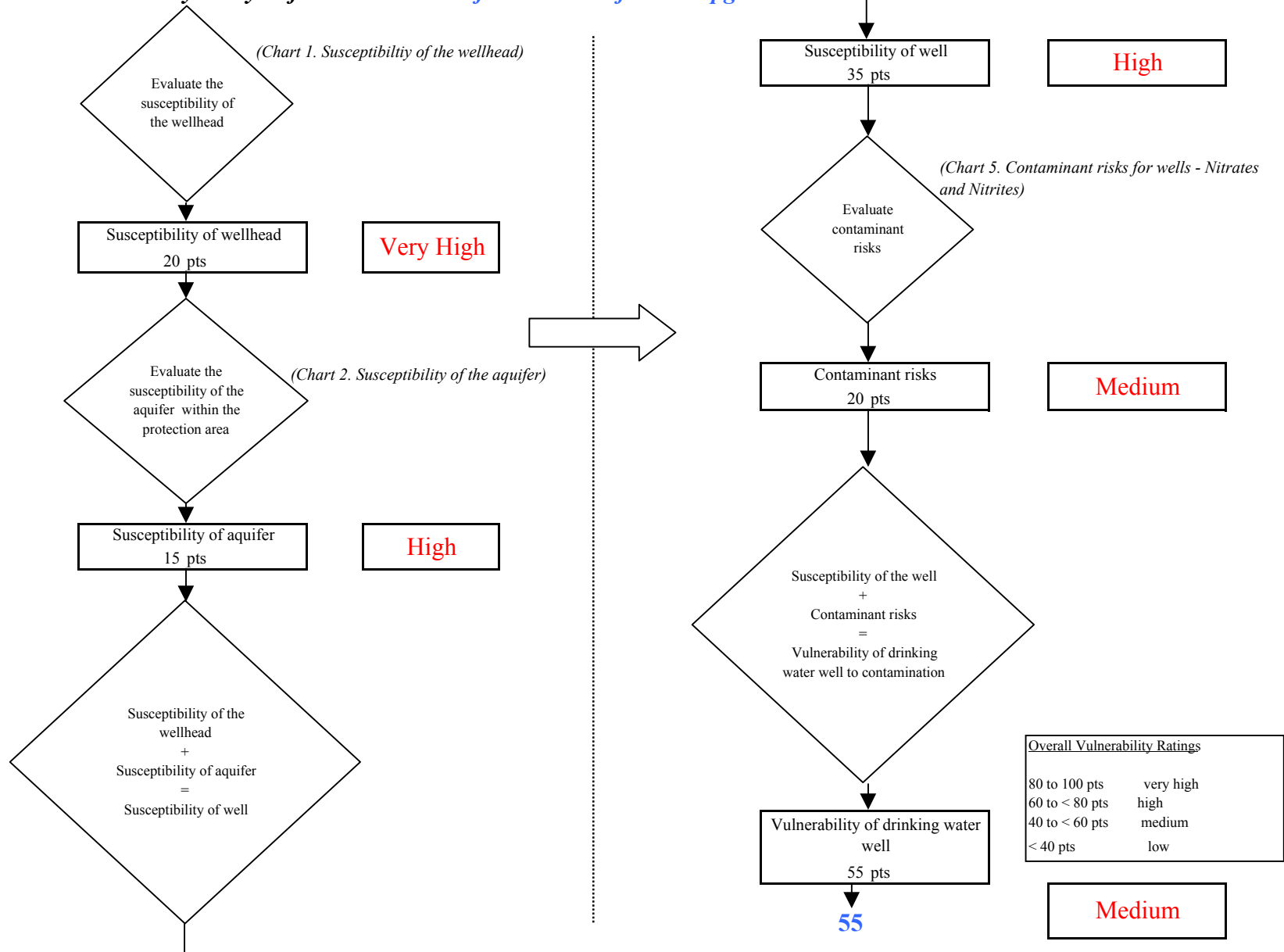
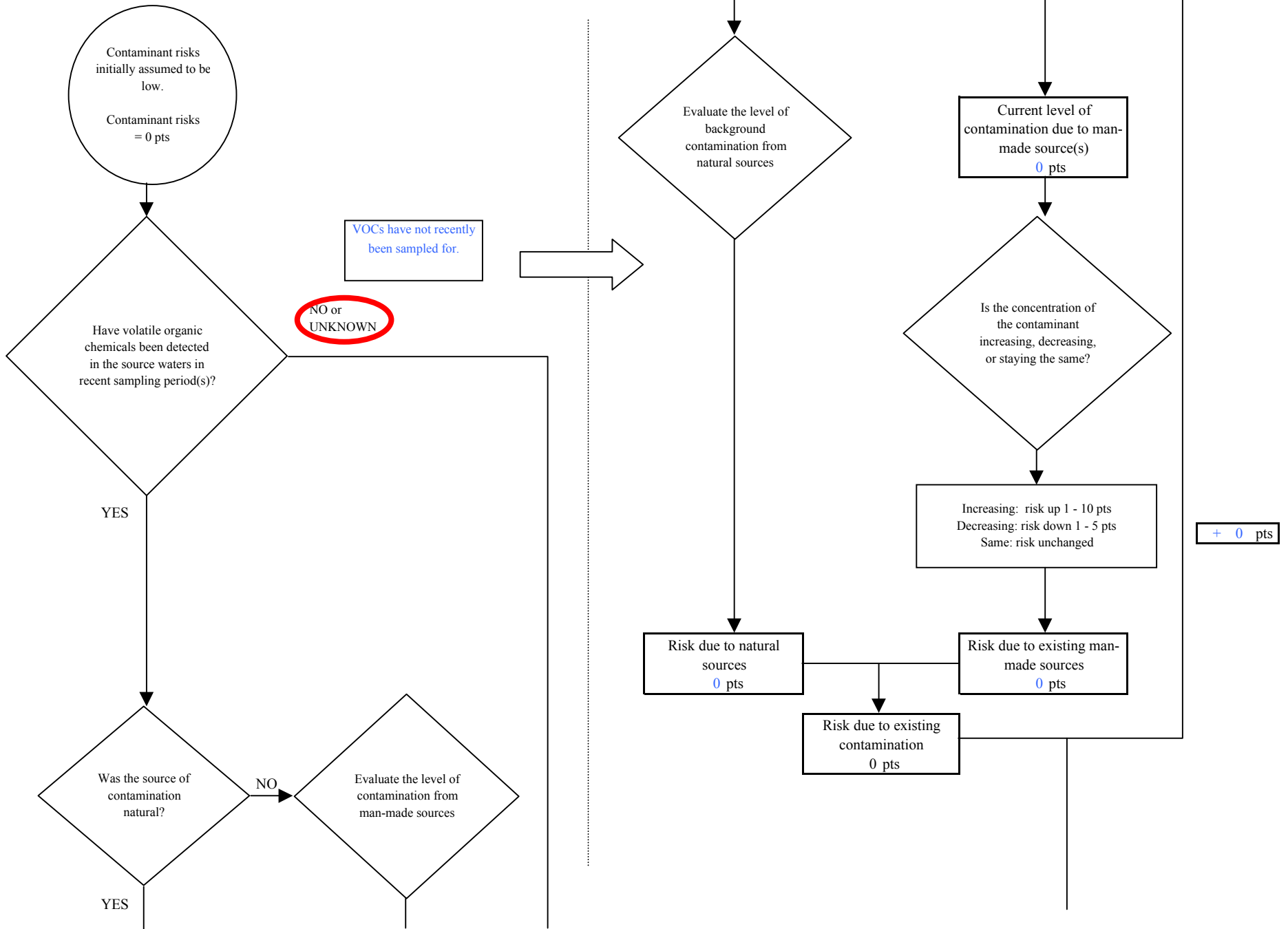
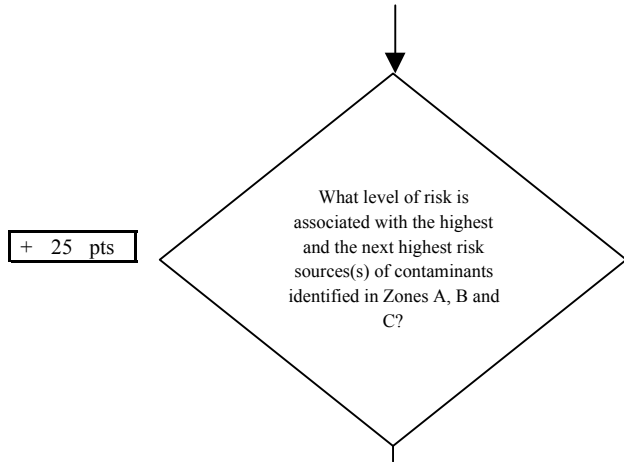


Chart 7. Contaminant risks for *AK Division of Parks Whitefish Campground - Volatile Organic Chemicals*



**Chart 7. Contaminant risks for AK Division of Parks Whitefish Campground - Volatile Organic Chemicals**

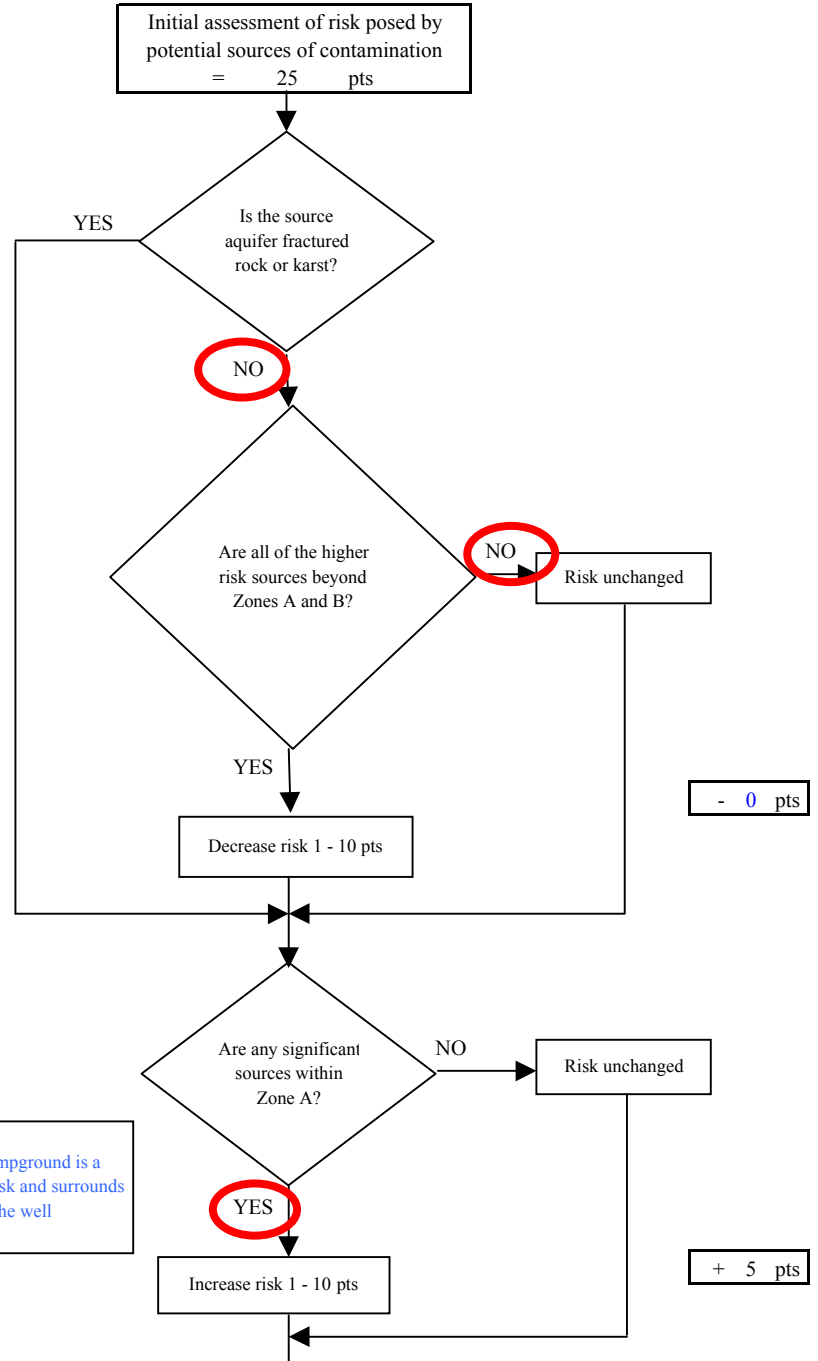


Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	21	0	21
Low(s)	4	0	4

	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
<b>LOW</b>	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
<b>MEDIUM</b>	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
<b>HIGH</b>	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
<b>VERY HIGH</b>	----	----	----	≥ 1 source + 10 pts

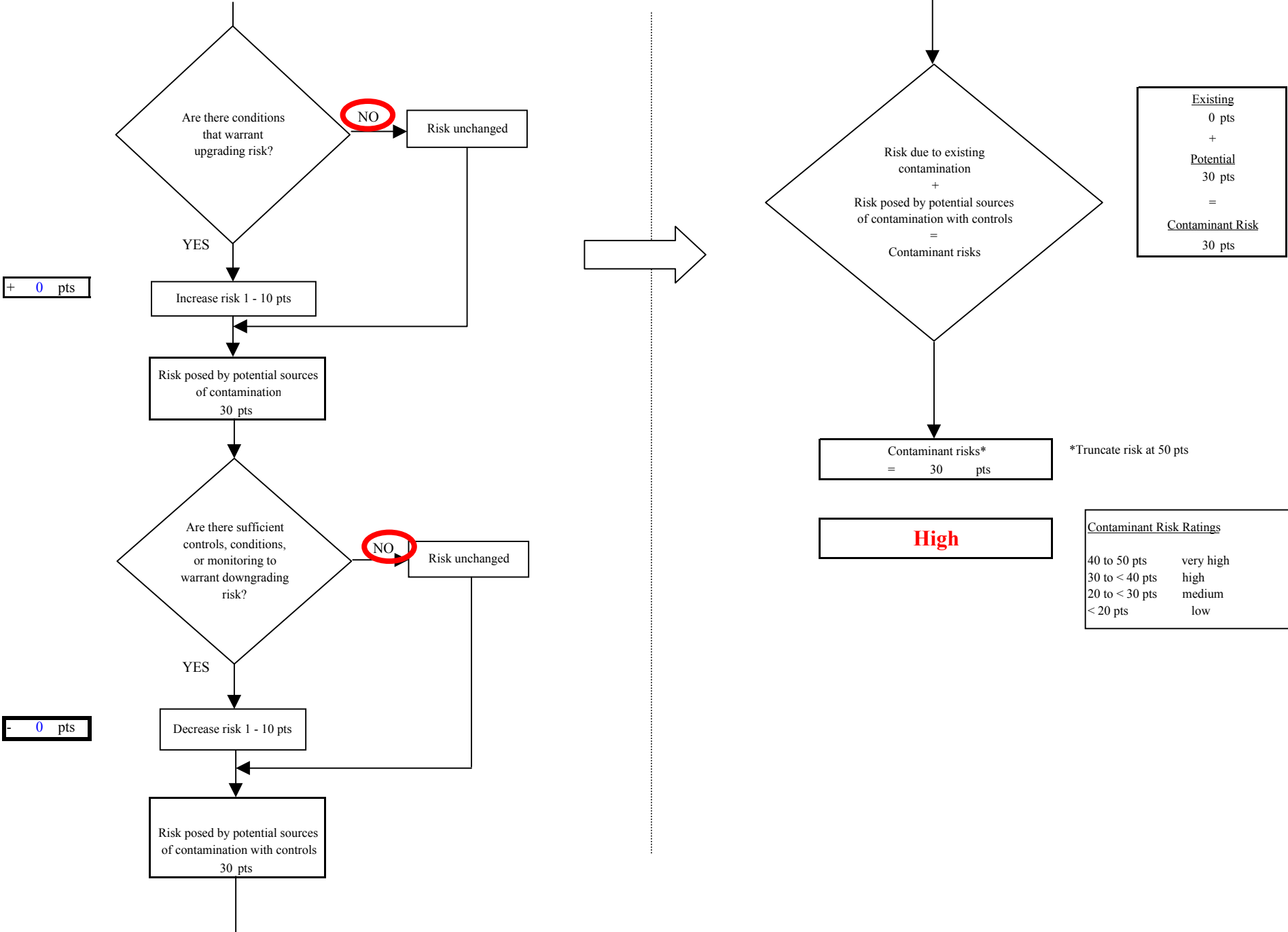
Matrix Score 25

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.



The campground is a medium risk and surrounds the well

**Chart 7. Contaminant risks for AK Division of Parks Whitefish Campground - Volatile Organic Chemicals**



**Chart 8. Vulnerability analysis for AK Division of Parks Whitefish Campground - Volatile Organic Chemicals**

