Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Sportsman Cove Lodge, Prince of Wales Island, Alaska PWSID #121093

DRINKING WATER PROTECTION PROGRAM REPORT NO. 736

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 Sportsman Cove Lodge, Prince of Wales Island, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for Sportsman Cove Lodge is a Class B (transient/non-community) water system consisting of one surface water intake from an unnamed stream flowing into Saltery Cove on the east side of Prince of Wales Island, 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. There are no identified potential and current sources of contaminants for Sportsman Cove Lodge public drinking water. However, potential sources of contamination may 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 Sportsman Cove Lodge received a vulnerability rating of **Medium** for bacteria and viruses; nitrates and nitrites, and volatile organic chemicals.

SPORTSMAN COVE LODGE PUBLIC DRINKING WATER SYSTEM

Sportsman Cove Lodge public water system is a Class B (transient/non-community) water system. The system consists of one surface water intake from an unnamed stream flowing into Saltery Cove (See Map 1 of Appendix A). Sportsman Cove Lodge is on the east side of Prince of Wales Island, Alaska. The population of the Prince of Wales Island is approximately 5,200.

Prince of Wales Island averages about 100 inches of precipitation per year and approximately 40 inches of snow. 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. Prince of Wales Island topography varies from near sea level to 4,000 feet.

The most recent Sanitary Survey (June 8, 1994) indicates the intake was initially put into operation in June 1987. Supplemental information regarding the system, dated May 5, 1994, indicates the intake is 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 chlorination. It is assumed there is a potential for runoff within the area surrounding the surface water.

This system operates seasonally, from May 15 through September 30, servicing 10 residents and 18 non-residents through one connection.

SPORTSMAN COVE 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 that water is being drawn from. 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 Sportsman Cove Lodge extends over the entire watershed. There is no development in the vicinity of the surface water intake (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 Sportsman Cove 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 SPORTSMAN COVE 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 Sportsman Cove Lodge is in an unnamed 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 Sportsman Cove 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	0	Low
Nitrates and/or Nitrites	0	Low
Volatile Organic Chemicals	0	Low

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	45	Medium
Nitrates and Nitrites	45	Medium
Volatile Organic Chemicals	45	Medium

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Low** with no unnatural contaminant sources identified (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 sampling of the system. 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 **Medium**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Low** with no unnatural contaminant sources identified (See Chart 4 – Contaminant Risk for Nitrates and/or Nitrites in Appendix D).

Sampling history for Sportsman Cove Lodge indicates that nitrates have not been detected in the water. 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 **Medium**.

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Low** with no contaminant sources identified (See Chart 6 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

No sample results for volatile organic chemicals were found. 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 **Medium**.

REFERENCES

Alaska Department of Community and Economic Development (ADCED), 2002 [WWW document]. URL http://www.dced.state.ak.us/mra/CF_BLOCK.cfm.

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Gehrels, G.E., Berg, H.C., Geologic Map of Southeastern Alaska: U.S. Geological Survey Map (scale 1:600,000), Map I-1867, 1sheet.

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United States Environmental Protection Agency (EPA), 2002 [WWW document]. URL: http://www.epa.gov/safewater/mcl.html.

APPENDIX A

Sportsman Cove Lodge
Drinking Water Protection Area Location Map
(Map 1)

Map 1: Sportsman Cove Lodge Drinking Water Protection Area

PWSID: 121093.001

Alaska Department of Environmental Conservation

Alaska Drinking Water Protection Program

0 500 1,000 2,000 3,000 4,000 Feet

1:11,585

Data Sources:

Background image - USGS 1:63,000 mapping
Lakes & streams - U.S. Forest Service, Tongass
Aerial Photographs - Prince of Wales Raster Tiff Images

Protection zones were delineated based upon streams noted on U.S. Forest Service Streams, Aerial Photographs and USGS 1:63,000 mapping.

For this PWS, Zone C (the entire watershed) covers the same area as Zone B (areas within 1-mile of the stream) and Zone A (areas within 1000 feet of the stream).

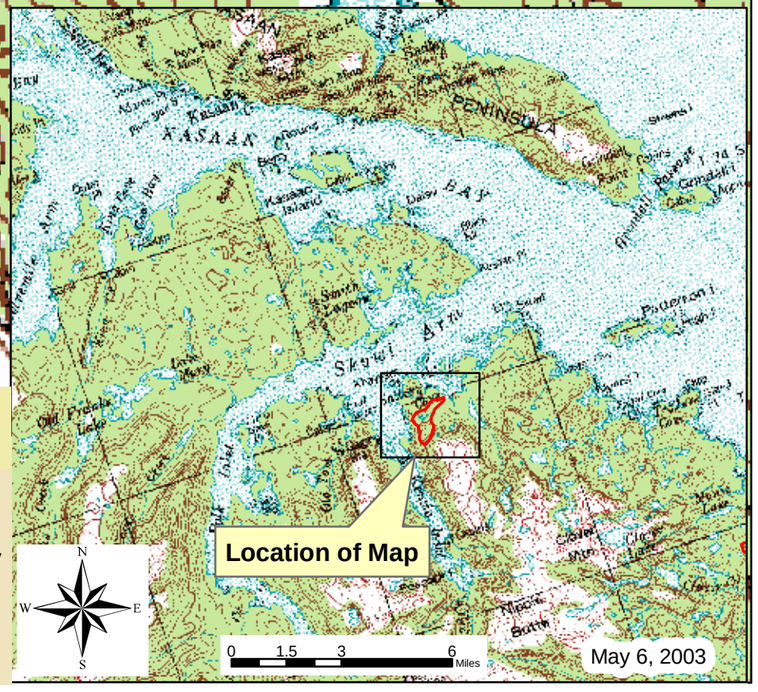
Legend

Public Drinking Water Systems

Zone A Protection Area
1000 Feet from Surface Water Body

Zone B Protection Area
1 Mile from Surface Water Body

Zone C Protection Area
Entire Watershed



APPENDIX B

Vulnerability Analysis for Sportsman Cove Lodge Public Drinking Water Source

(Charts 1-7)

Chart 1. Susceptibility of the surface water source - Sportsman's Cove Lodge

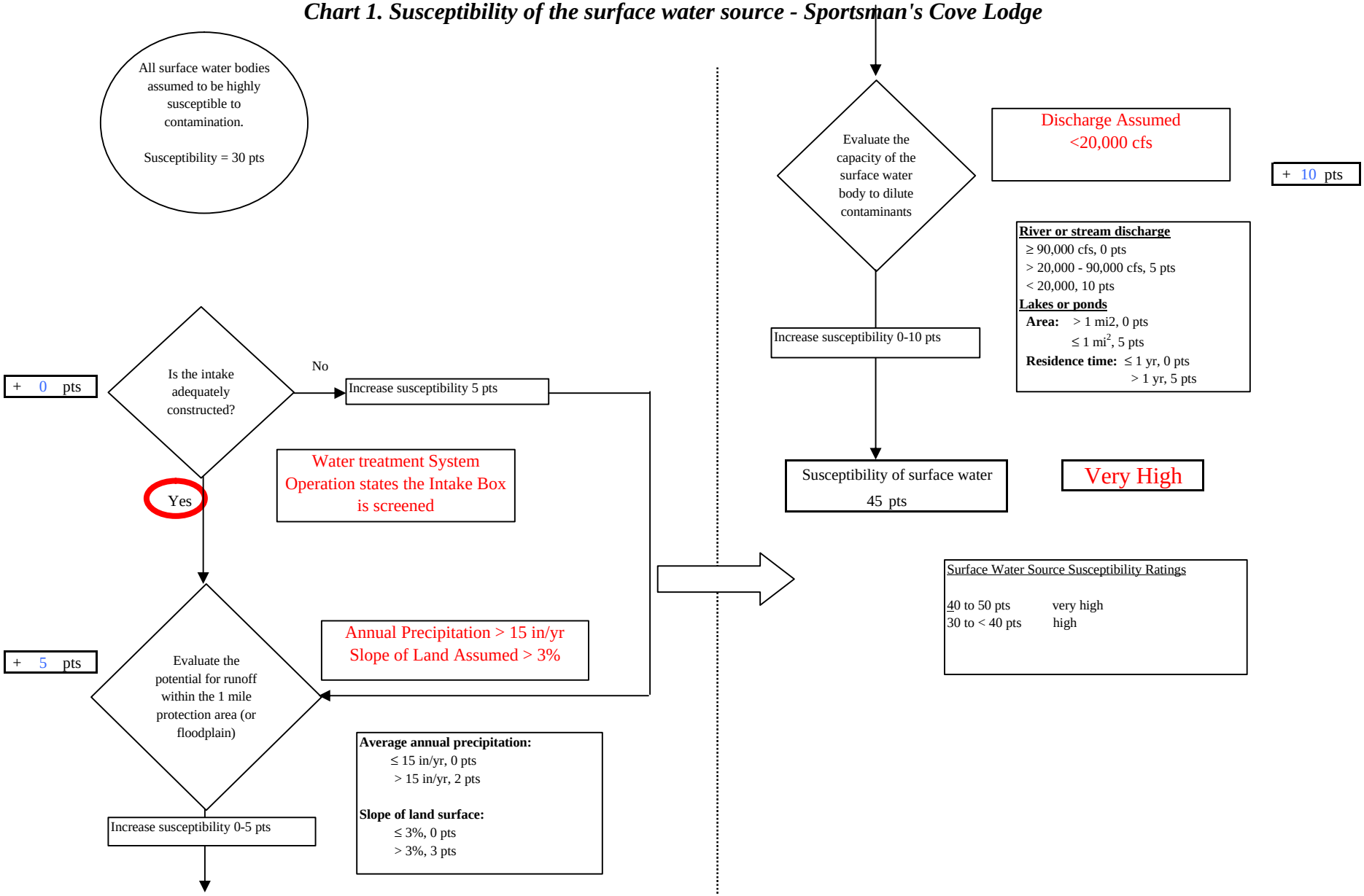
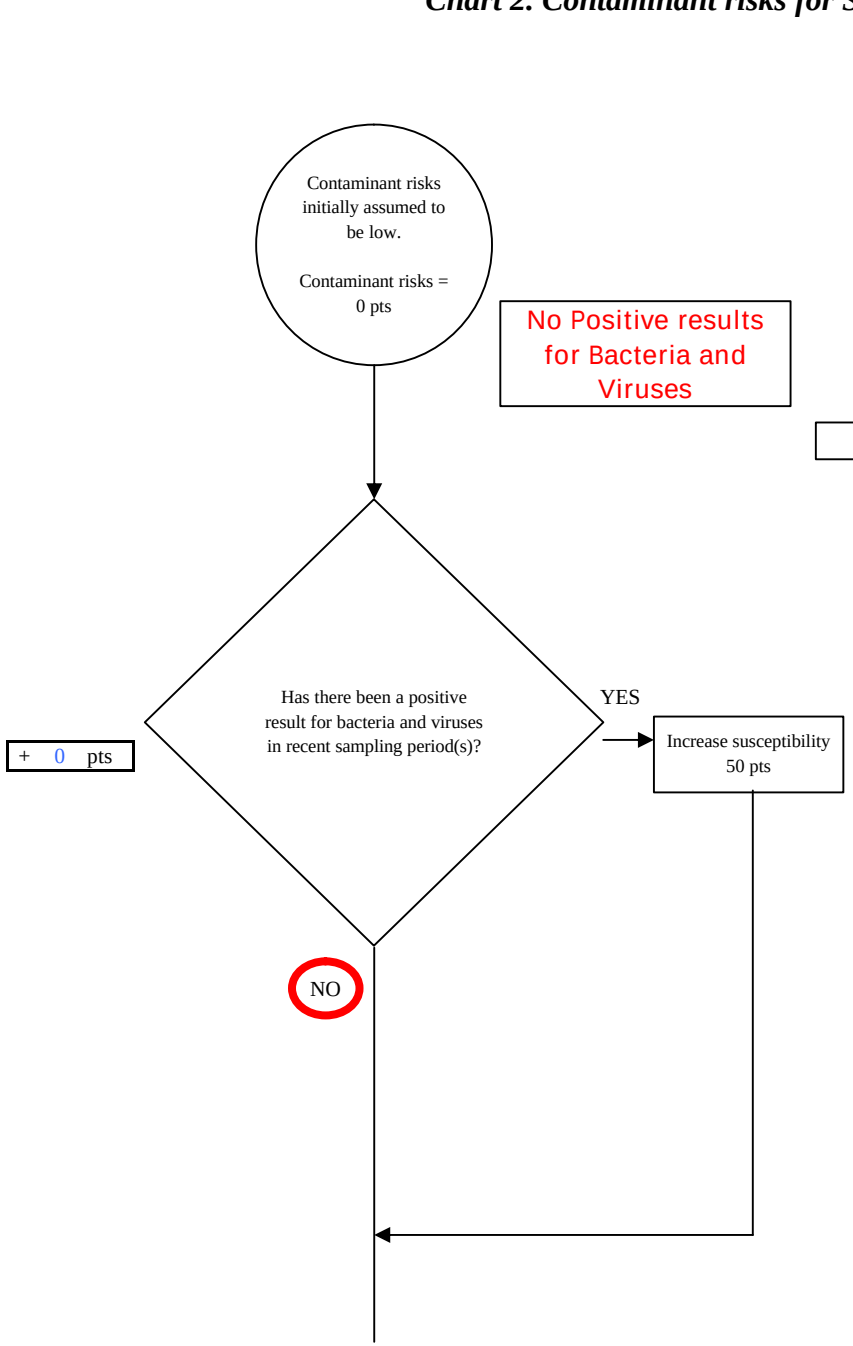
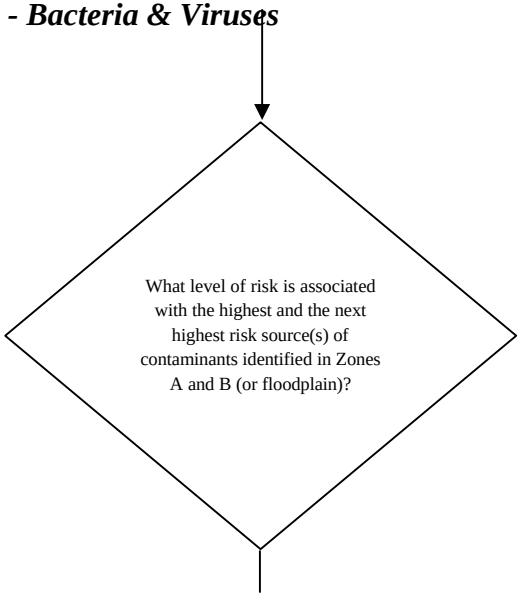


Chart 2. Contaminant risks for Sportsman's Cove Lodge - Bacteria & Viruses





+ 0 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0		0
Low(s)	0		0

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	[3] 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 0

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.

Chart 2. Contaminant risks for Sportsman's Cove Lodge - Bacteria & Viruses

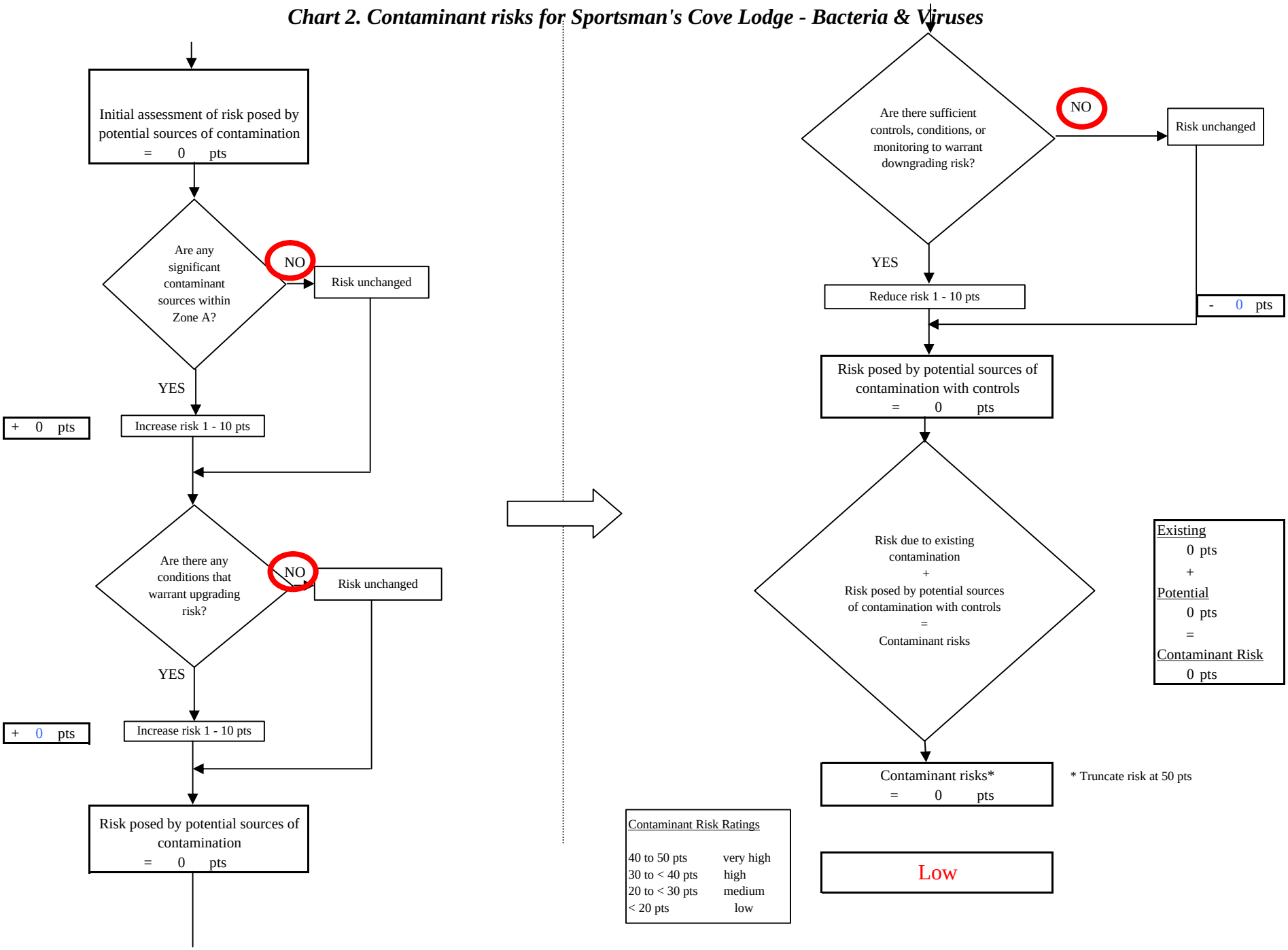


Chart 3. Vulnerability analysis for Sportsman's Cove Lodge - Bacteria & Viruses

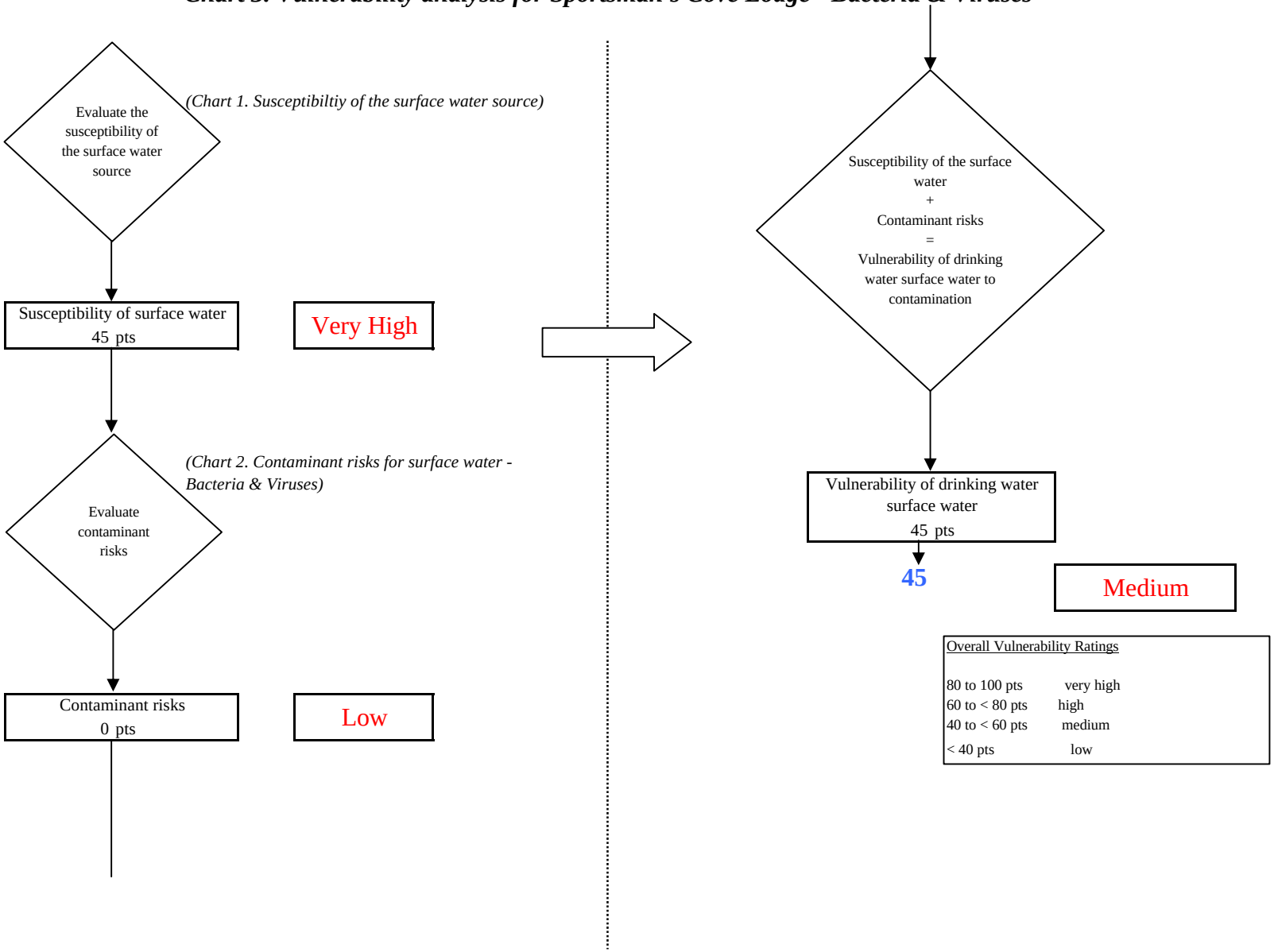


Chart 4. Contaminant risks for Sportsman's Cove Lodge - Nitrates and Nitrites

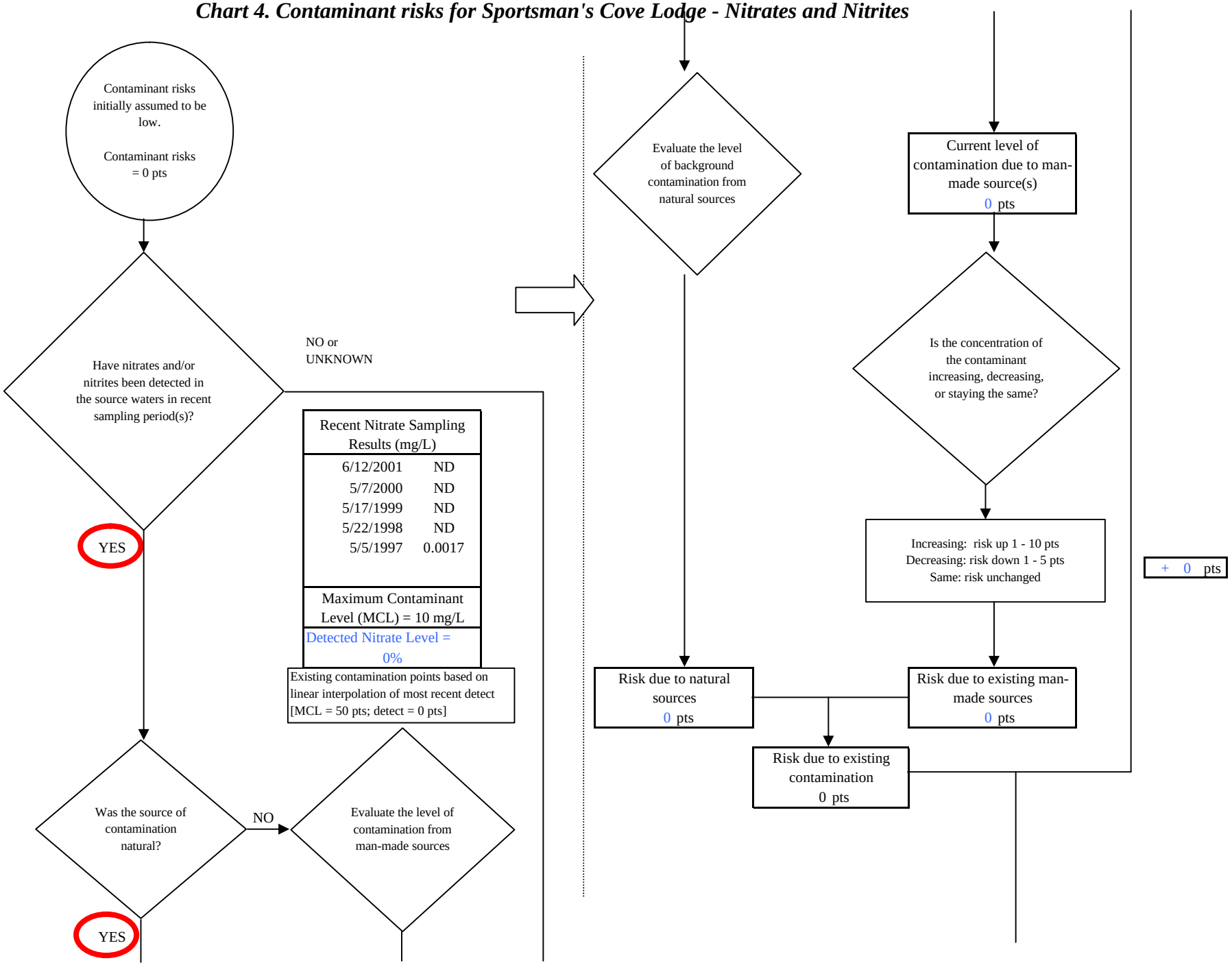


Chart 4. Contaminant risks for Sportsman's Cove Lodge - Nitrates and Nitrites

+ 0 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A and B? (see Risk Matrix below)

Initial assessment of risk posed by potential sources of contamination = 0 pts

Are any significant sources in Zone A?

NO → Risk unchanged

YES → Increase risk 1 - 10 pts

+ 0 pts

Risk Levels for Contaminant Sources identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0		0
Low(s)	0		0

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	[3] 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 0

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.

Chart 4. Contaminant risks for Sportsman's Cove Lodge - Nitrates and Nitrites

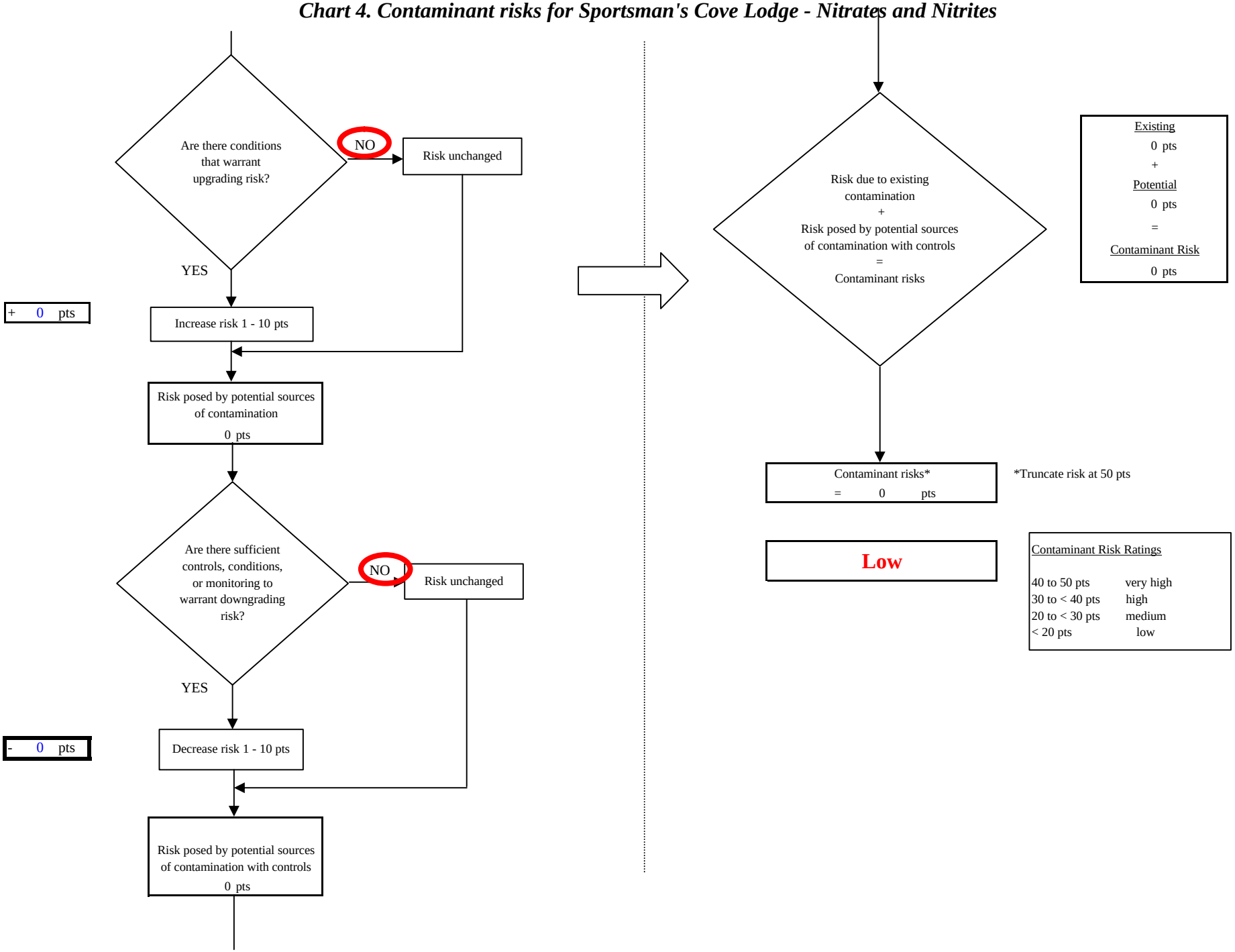


Chart 5. Vulnerability analysis for Sportsman's Cove Lodge - Nitrates and Nitrites

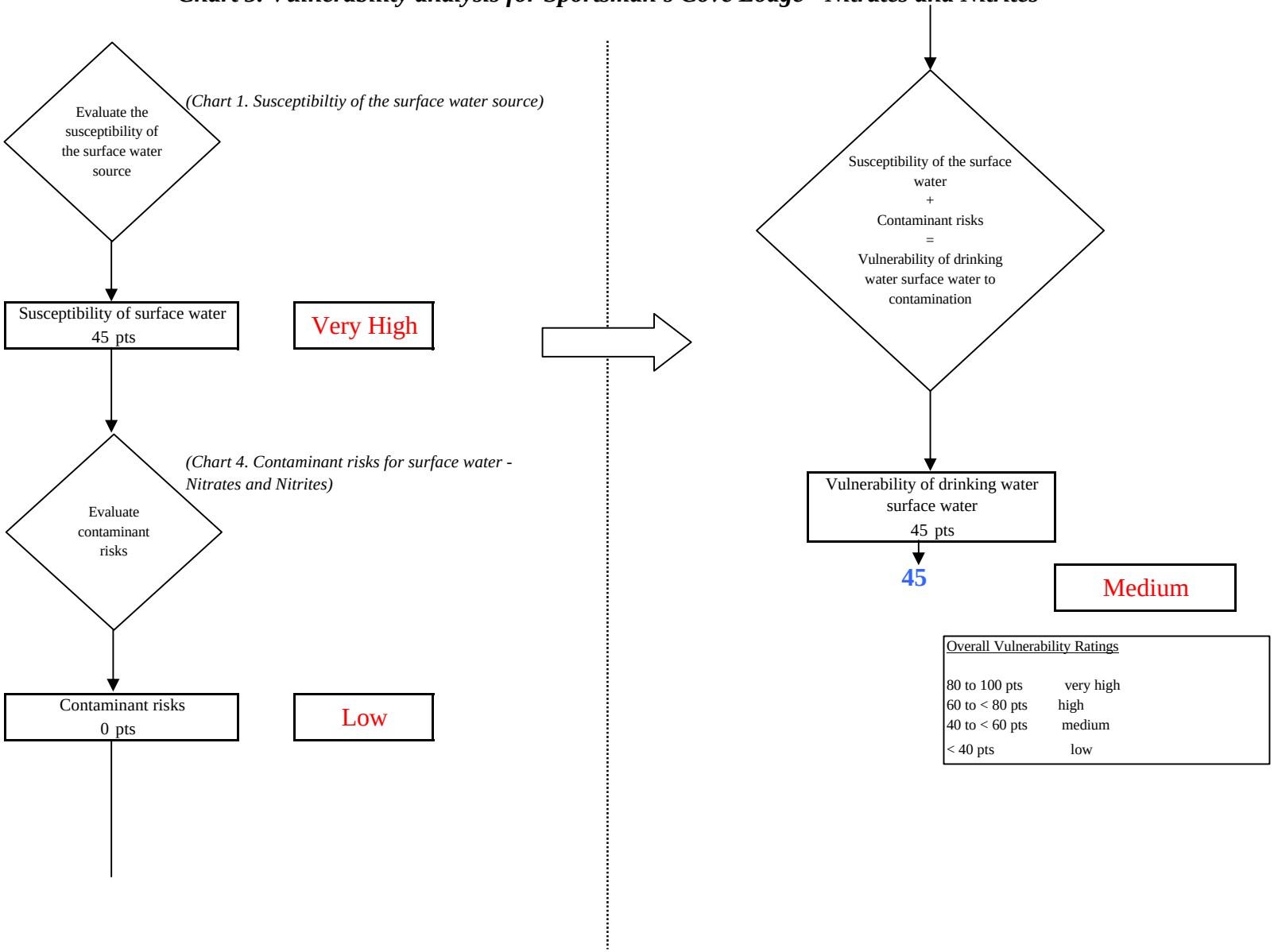


Chart 6. Contaminant risks for Sportsman's Cove Lodge - Volatile Organic Chemicals

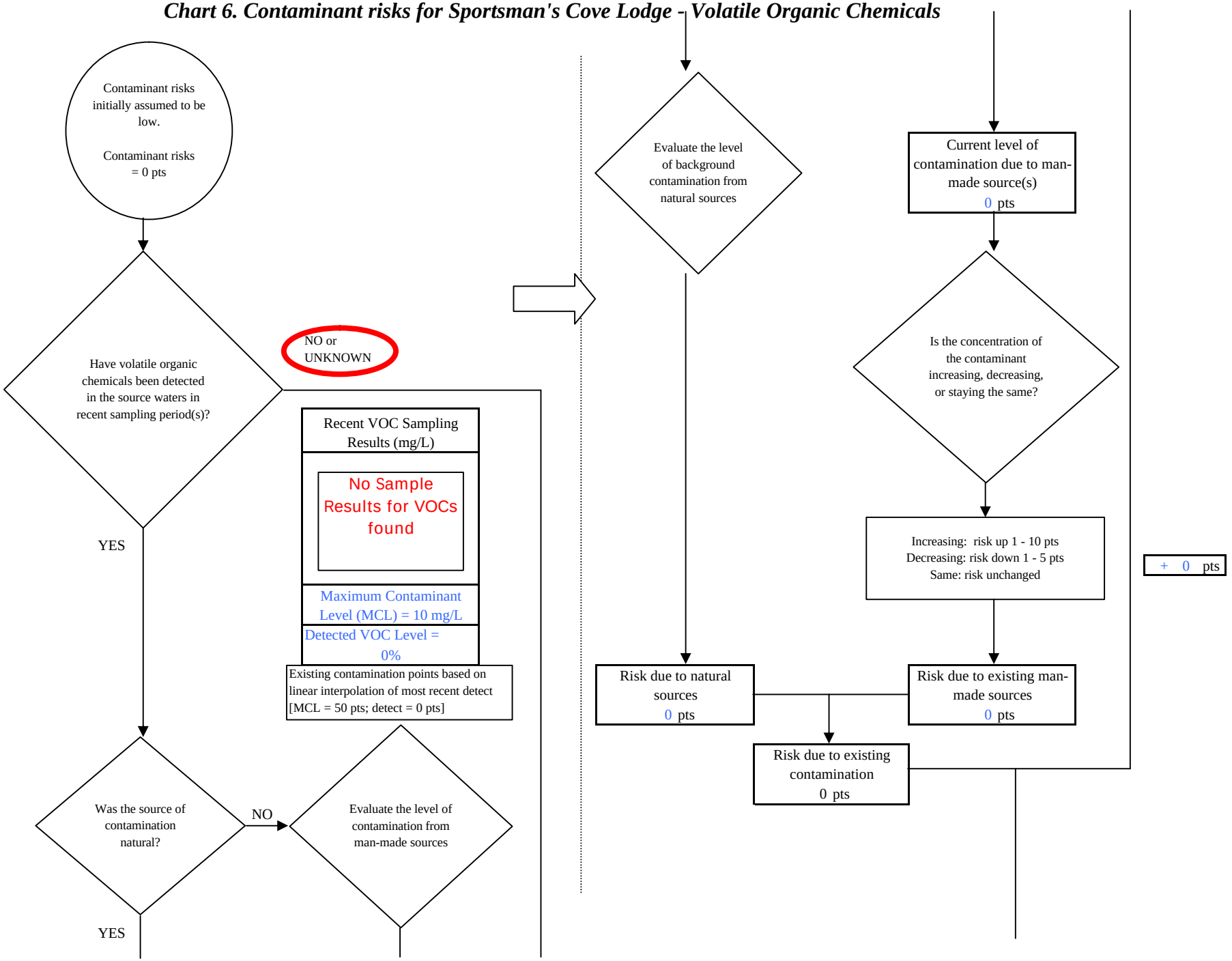


Chart 6. Contaminant risks for Sportsman's Cove Lodge - Volatile Organic Chemicals

+ 0 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A and B? (see Risk Matrix below)

Initial assessment of risk posed by potential sources of contamination = 0 pts

Are any significant sources in Zone A?

NO → Risk unchanged → + 0 pts

YES → Increase risk 1 - 10 pts → + 0 pts

Risk Levels for Contaminant Sources identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0		0
Low(s)	0		0

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	[3] 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 0

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.

Chart 6. Contaminant risks for Sportsman's Cove Lodge - Volatile Organic Chemicals

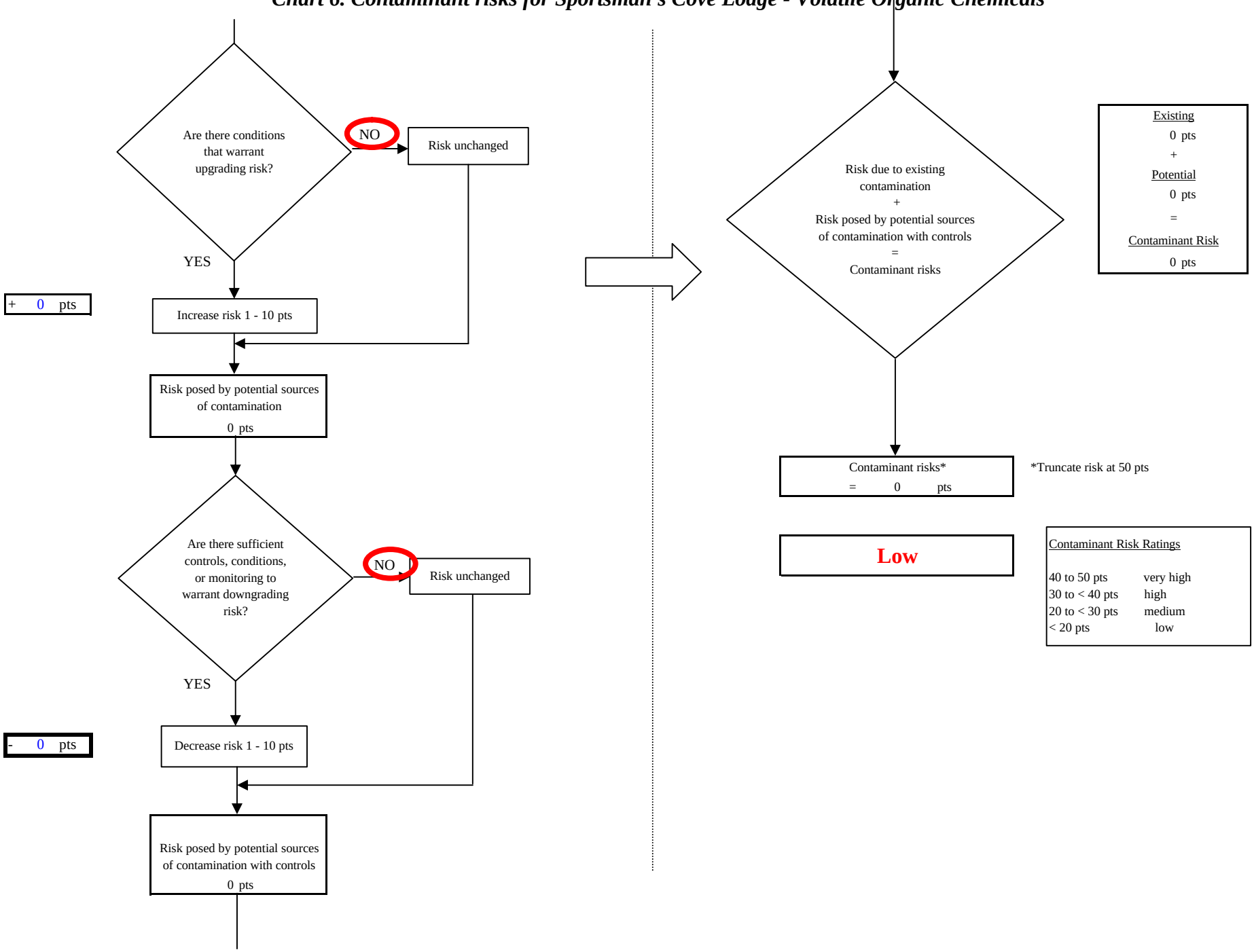


Chart 7. Vulnerability analysis for Sportsman's Cove Lodge - Volatile Organic Chemicals