

# DRINKING WATER SOURCE PROTECTION

Trent Conservation Coalition Source Protection Region



## Drinking Water Threats 7 Northern Groundwater Sites

Trent Conservation Coalition (TCC)

Source Protection Region (SPR)

Source Protection Committee Meeting – January 19, 2010

Peterborough, Ontario



**Expert People. Better Decisions.**



# Threats Background



- Identification of potential threats to the drinking water systems has always been a part of the source water protection work.
- Original identification of threats was by land activity, land use, chemical of concern, etc. and hazard scores were calculated for every threat in the WHPA.
- Methodology was not totally defined in the early stages of the threats work (i.e. Guidance Modules not complete) – tiered approach was used.
- Significant undertakings in much larger areas.

# What is a threat?



Issues and Threats can be considered to be complementary parts of the source protection continuum. Issues are problems that currently exist in the source water, or that can be reasonably predicted to be a problem in the near term if rising trends continue. Threats are activities on the landscape that, if managed improperly, may cause an issue to occur in the future.

*From: Draft Issues Evaluation and Threats Inventory Module 5 – October 2006*

# What is a threat?



A “drinking water threat” means an activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water, and includes an activity or condition that is prescribed by the regulations as a drinking water threat.

*From: Draft Issues Evaluation and Threats Inventory Module 5 – October 2006*

# Prescribed Drinking Water Threats



1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3	The application of agricultural source material to land.
4	The storage of agricultural source material.
5	The management of agricultural source material.
6	The application of non-agricultural source material to land.
7	The handling and storage of non-agricultural source material.
8	The application of commercial fertilizer to land.
9	The handling and storage of commercial fertilizer.
10	The application of pesticide to land.
11	The handling and storage of pesticide.
12	The application of road salt.
13	The handling and storage of road salt.
14	The storage of snow.
15	The handling and storage of fuel.
16	The handling and storage of a dense non-aqueous phase liquid.
17	The handling and storage of an organic solvent.
18	The management of runoff that contains chemicals used in the de-icing of aircraft.
19*	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20*	An activity that reduces the recharge of an aquifer.
21	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.

Note: \* indicates that threat is not water quality threat.

# Tables of Threats



DRINKING WATER THREATS:	Reference Number	Under the following CIRCUMSTANCES:	Areas Within Vulnerable Area	Threat is Significant in Areas with a Vulnerability Score of:	Threat is Moderate in Areas with a Vulnerability Score of:	Threat is Low in Areas with a Vulnerability Score of:		
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 6		
The handling and storage of fuel.	1358	1. The storage of liquid fuel in a tank at or above grade at a facility as defined in section 1 of O. Reg. 213/01 (Fuel Oil) made under the <i>Technical Standards and Safety Act, 2000</i> or a facility as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the <i>Technical Standards and Safety Act, 2000</i> , but not including a bulk plant. 2. The fuel is stored in a quantity that is more than 250, but not more than 2,500 litres. 3. A spill of the fuel may result in the presence of Petroleum Hydrocarbons F3 (>nC16-nC34) in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, WHPA-E		9 - 10	6 - 8.1		
			WHPA-A, WHPA-B, WHPA-C, WHPA-C1, WHPA-D		10	6 - 8		
			HVA			6		
			SGRA			6		
			1359	1. The storage of liquid fuel in a tank below grade and at a facility as defined in section 1 of O. Reg. 213/01 (Fuel Oil) made under the <i>Technical Standards and Safety Act, 2000</i> or a facility as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the <i>Technical Standards and Safety Act, 2000</i> , but not including a bulk plant. 2. The fuel is stored in a quantity that is more than 250, but not more than 2,500 litres. 3. A spill of the fuel may result in the presence of BTEX in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, WHPA-E		10	7 - 9
					WHPA-A, WHPA-B, WHPA-C, WHPA-C1, WHPA-D	10	8	6
	1360	1. The storage of liquid fuel in a tank below grade and at a facility as defined in section 1 of O. Reg. 213/01 (Fuel Oil) made under the <i>Technical Standards and Safety Act, 2000</i> or a facility as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the <i>Technical Standards and Safety Act, 2000</i> , but not including a bulk plant. 2. The fuel is stored in a quantity that is more than 250, but not more than 2,500 litres. 3. A spill of the fuel may result in the presence of Petroleum Hydrocarbons F1 (nC6-nC10) in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, WHPA-E			7.2 - 10		
			WHPA-A, WHPA-B, WHPA-C, WHPA-C1, WHPA-D	10	8	6		
	1361	1. The storage of liquid fuel in a tank below grade and at a facility as defined in section 1 of O. Reg. 213/01 (Fuel Oil) made under the <i>Technical Standards and Safety Act, 2000</i> or a facility as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the <i>Technical Standards and Safety Act, 2000</i> , but not including a bulk plant. 2. The fuel is stored in a quantity that is more than 250, but not more than 2,500 litres. 3. A spill of the fuel may result in the presence of Petroleum Hydrocarbons F4 (>nC34) in groundwater or surface water.	IPZ-1, IPZ-2, IPZ-3, WHPA-E			8 - 10		
			WHPA-A, WHPA-B, WHPA-C, WHPA-C1, WHPA-D		8 - 10	6		
			HVA			6		
			SGRA			6		

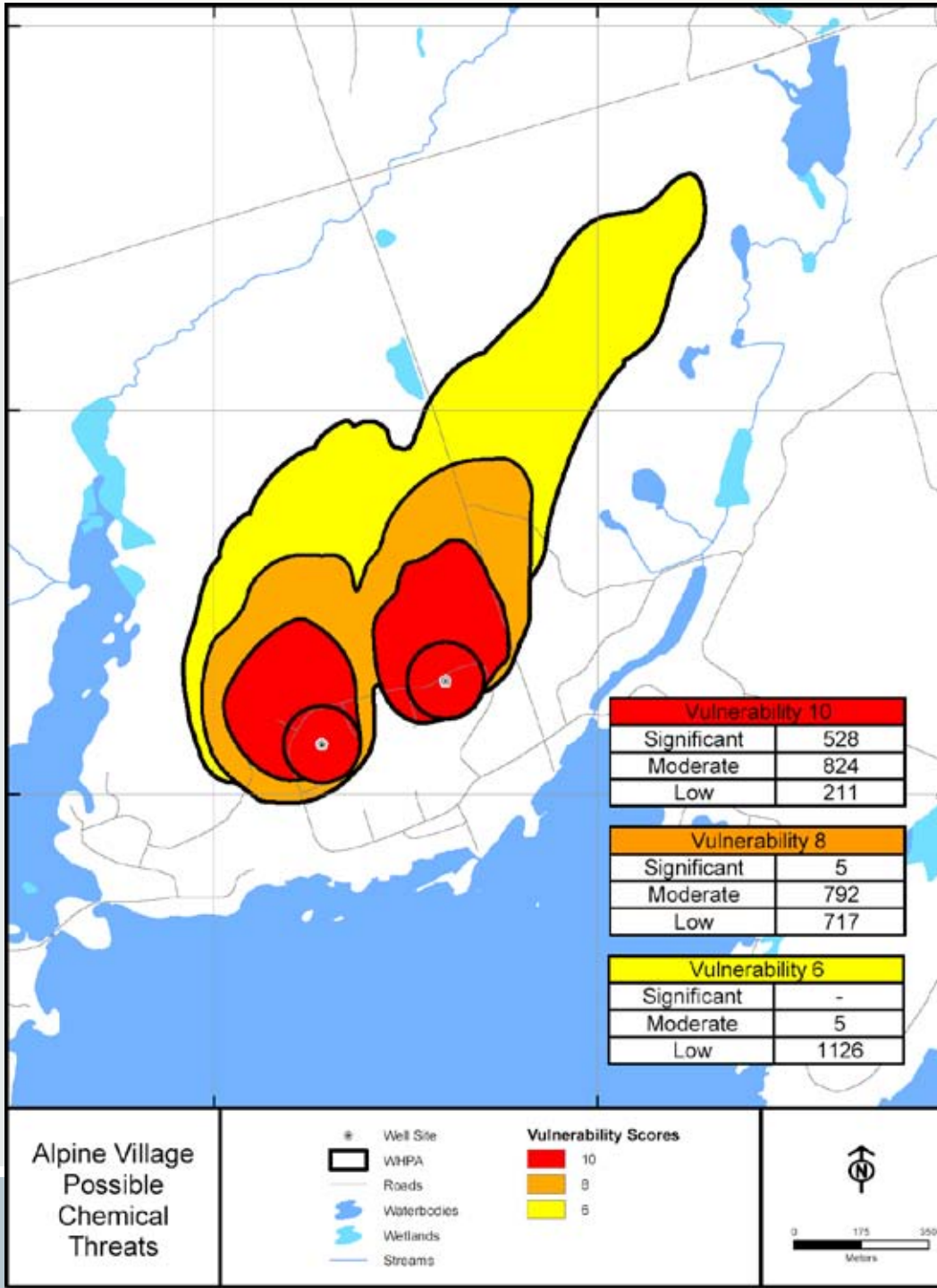
# Threats Methodology – 9 Steps



- Step 1: Review Vulnerable Area Delineation
  - Including mapping of areas for specific types of threats:
    - Chemicals
    - Pathogens
    - DNAPLs

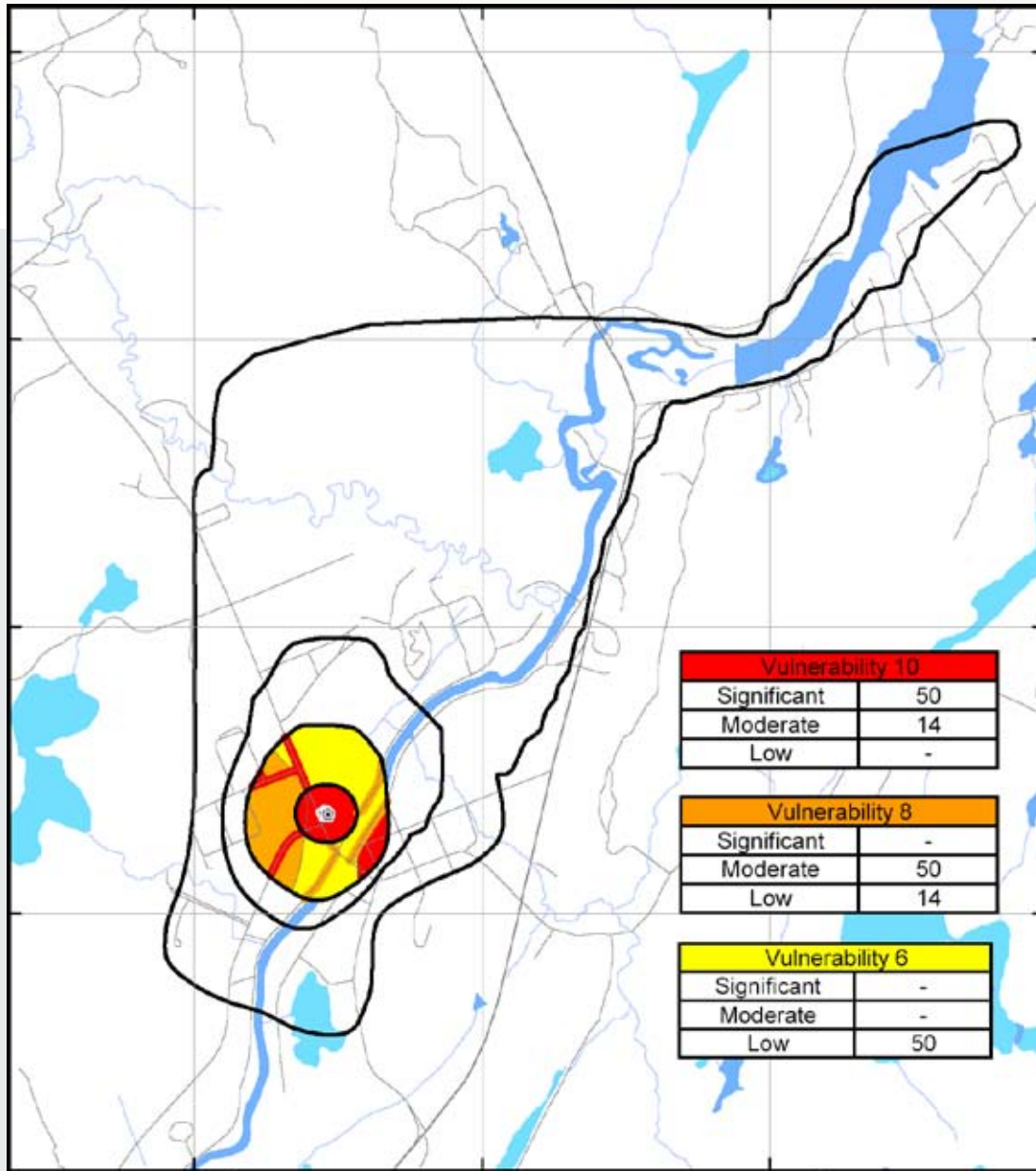


# Step 1: Review Potential Threat Zones for Different Parameters – Chemicals (based on vulnerability)





# Step 1: Review Potential Threat Zones for Different Parameters – Pathogens (based on vulnerability in WHPA-A & B only)



Vulnerability 10	
Significant	50
Moderate	14
Low	-

Vulnerability 8	
Significant	-
Moderate	50
Low	14

Vulnerability 6	
Significant	-
Moderate	-
Low	50

**Minden Possible Pathogenic Threats**

- WHPA
- Well Site
- Roads
- Waterbodies
- Wetlands
- Streams

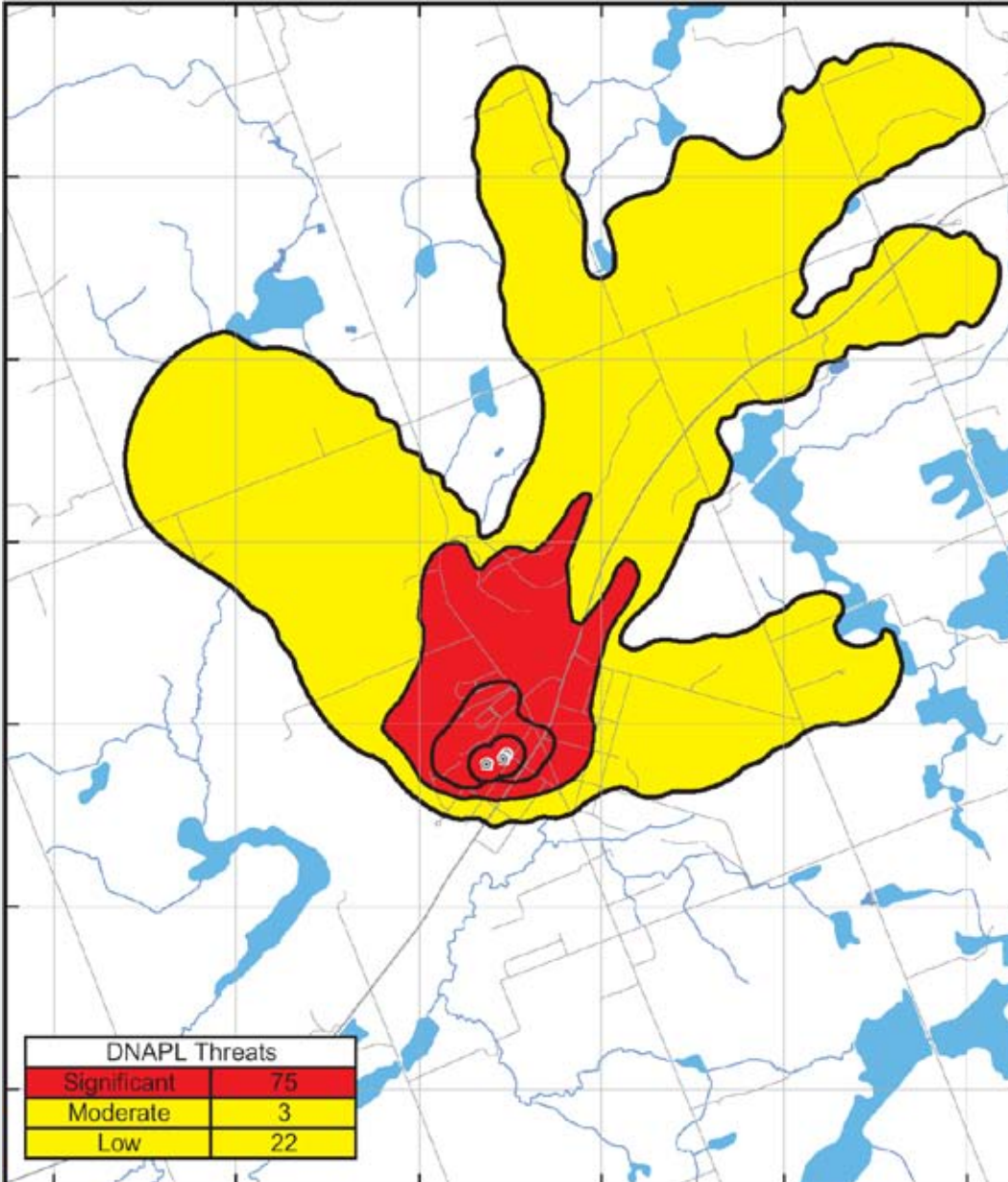
**Vulnerability Scores**

- 10
- 8
- 6

0 237.5 475 Meters



# Step 1: Review Potential Threat Zones for Different Parameters – DNAPLs (based on zone and vulnerability (D only))



Norwood Possible DNAPL Threats

- WHPA
- Well Site
- Roads
- Waterbodies
- Wetlands
- Streams

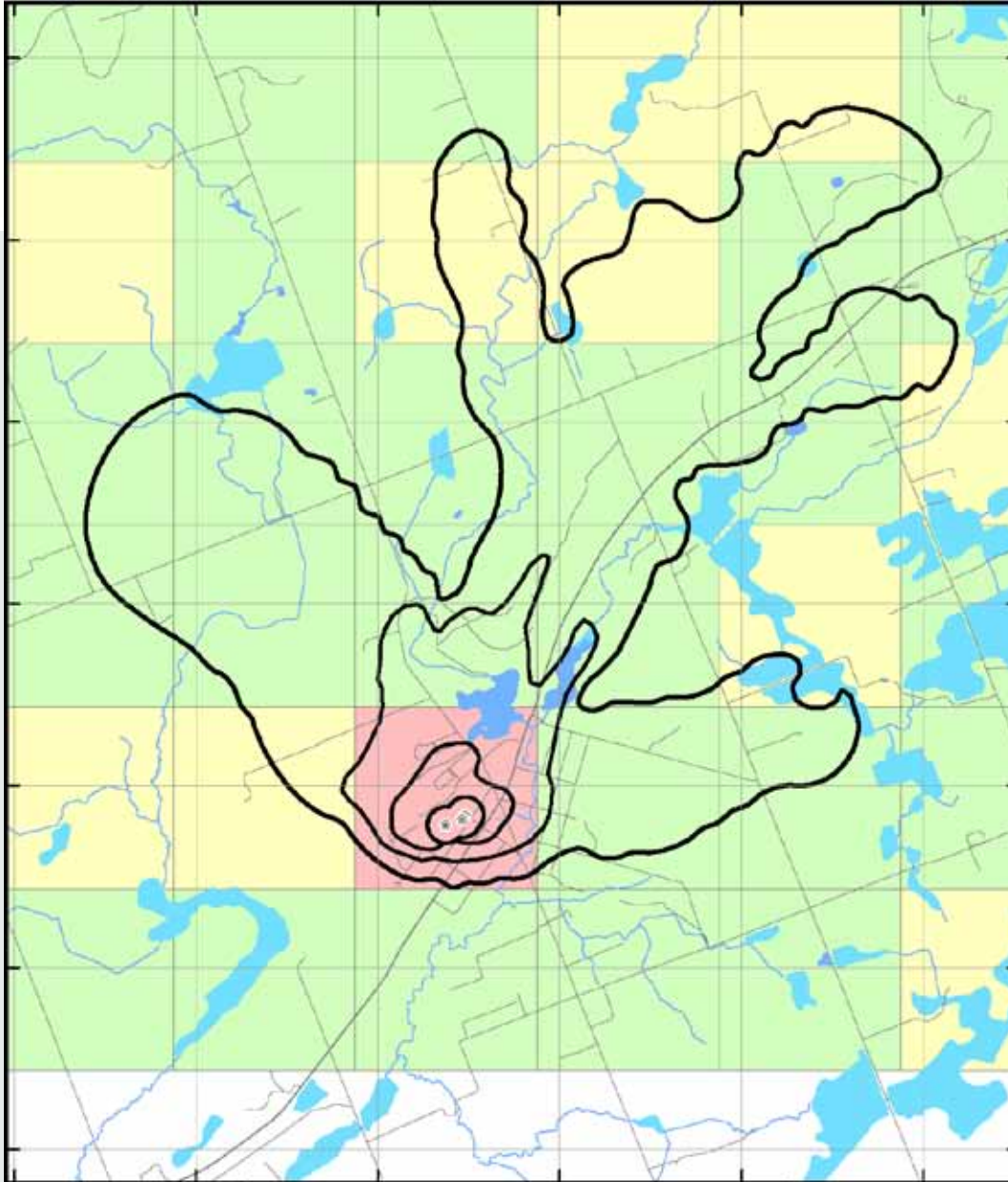
# Threats Methodology – 9 Steps



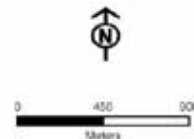
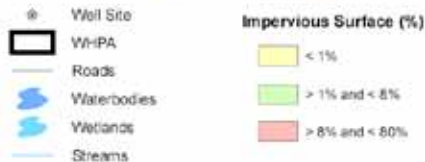
- Step 2: Review background information:
  - Morrison Reports (interviews, EcoLog ERIS 2002)
  - XCG updated EcoLog ERIS (2006/2007)
  - MOE Datahound files
  - Mapping from Watershed Characterization
    - Managed Lands
    - Agricultural Density
    - Imperviousness

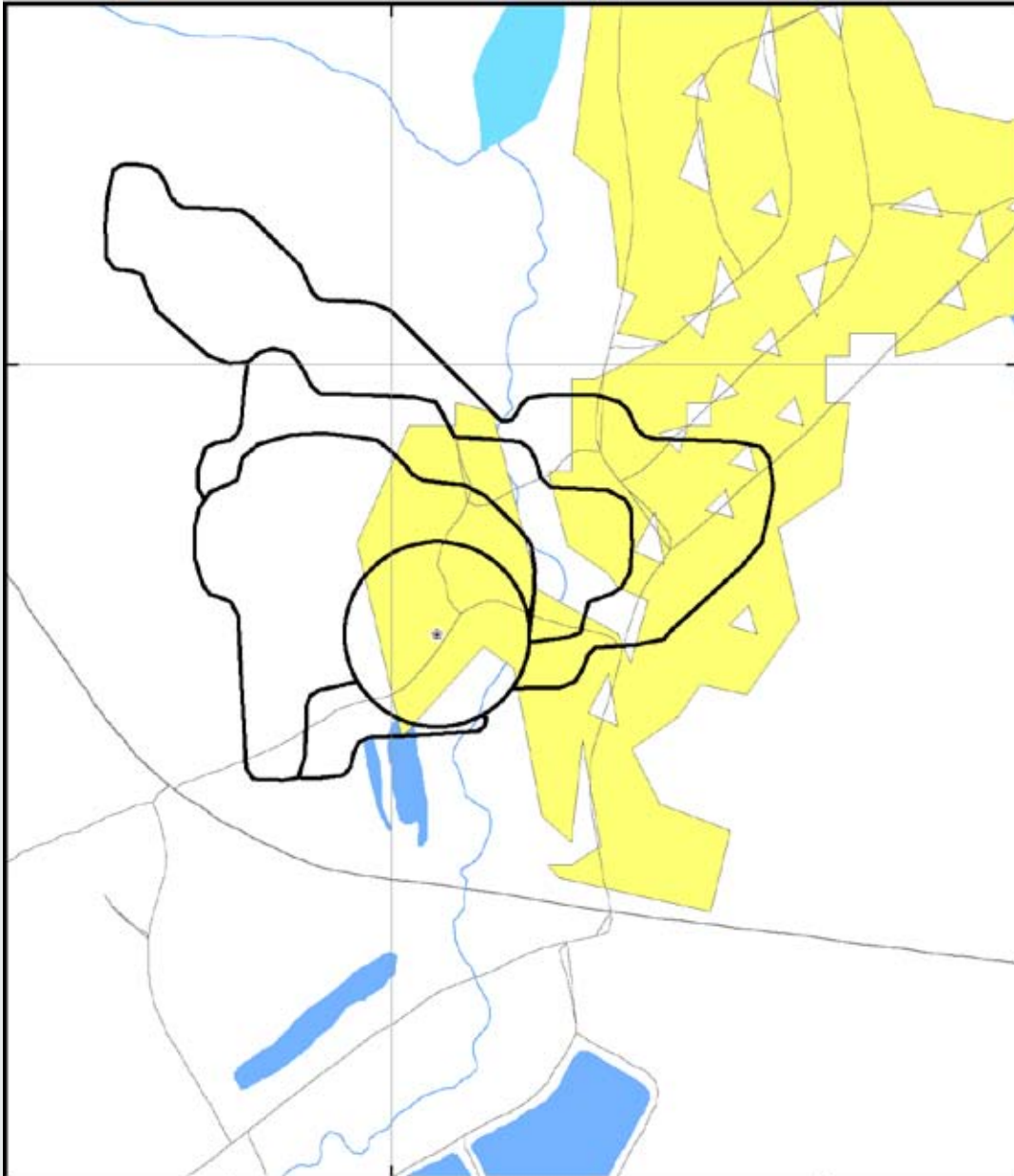


## Step 2: Review Additional Background Mapping: % Impervious Surface



Norwood  
Impervious  
Surfaces

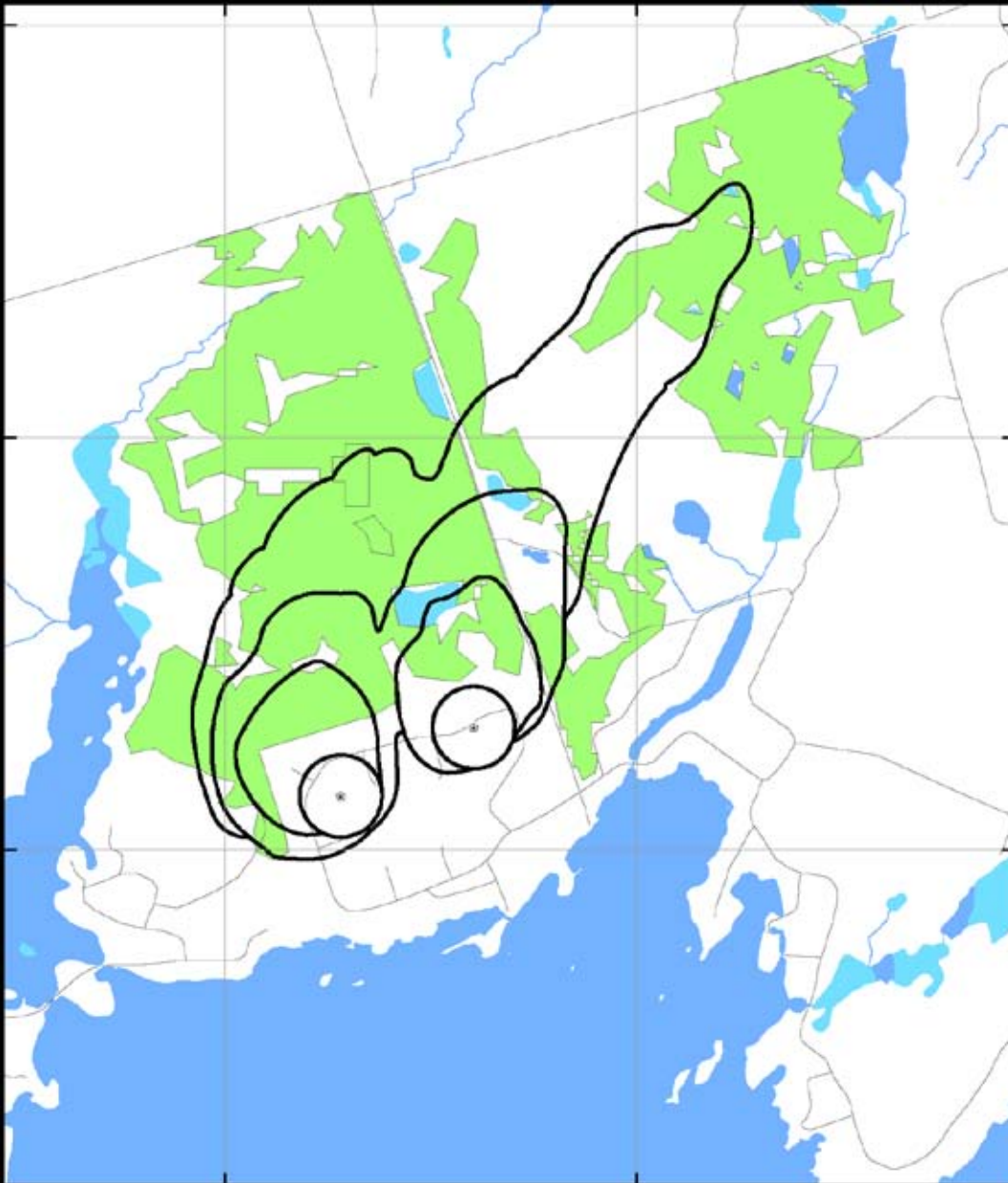




## Step 2: Review Additional Background Mapping: % Managed Lands

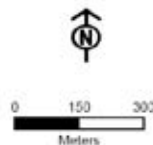


## Step 2: Review Additional Background Mapping: Agricultural Density



Alpine Village  
Agricultural  
Density

- \* Well Site
- WHPA
- Roads
- Waterbodies
- Wetlands
- Streams
- Livestock Density (<0.5 Nutrient Units)



# Threats Methodology – 9 Steps



- Step 3: Conduct field reconnaissance survey
- Step 4: Overlay parcel fabric
- Step 5: Evaluate POTENTIALLY Significant Threats
- Step 6: Enumerate Potentially Significant Threats
- Step 7: Send out letters to land owners of potentially significant parcels
- Step 8: Conduct interviews/site visits to determine circumstances on site
- Step 9: Enumerate Significant Threats

**Provincial Threat Categories with Circumstances That Could Pose a Significant Threat in a Wellhead Protection Area**

		Wellhead Protection Area Vulnerability Scoring									
		Contaminant released:									
		Chemical					Pathogen				
<b>Prescribed Drinking Water Threats (Ontario Regulation 287/07)</b>		10	8	6	4	2	10	8	6	4	2
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	✓	✓				✓				
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	✓	✓				✓				
3	The application of agricultural source material to land.	✓					✓				
4	The storage of agricultural source material.	✓					✓				
5	The management of agricultural source material.										
6	The application of non-agricultural source material to land.	✓					✓				
7	The handling and storage of non-agricultural source material.	✓					✓				
8	The application of commercial fertilizer to land.	✓									
9	The handling and storage of commercial fertilizer.	✓									
10	The application of pesticide to land.	✓									
11	The handling and storage of pesticide.	✓									
12	The application of road salt.	✓									
13	The handling and storage of road salt.	✓									
14	The storage of snow.	✓									
15	The handling and storage of fuel.	✓									
16	The handling and storage of a dense non-aqueous phase liquid (DNAPLs)*.	Anywhere in 5 year time of travel									
17	The handling and storage of an organic solvent.	✓									
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	✓									
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.**										
20	An activity that reduces the recharge of an aquifer.**										
21	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.	✓					✓				

\*DNAPLs are chemicals that are heavy and sink in water (e.g. trichloroethylene)

\*\*Water quantity threats will be evaluated as a part of the Water Budget studies

# What is a Condition?



- Technical Rules 138-140
  - Condition is contamination as a result of past activities
  - Must be documented – based on O.Reg. 153/04
  - Hazard Rating given to condition based on proximity to well/intake, off-site impacts (10 or 6)
  - Risk Score = Hazard Score X Vulnerability Score
  - If Risk Score is > 80 – Condition is significant

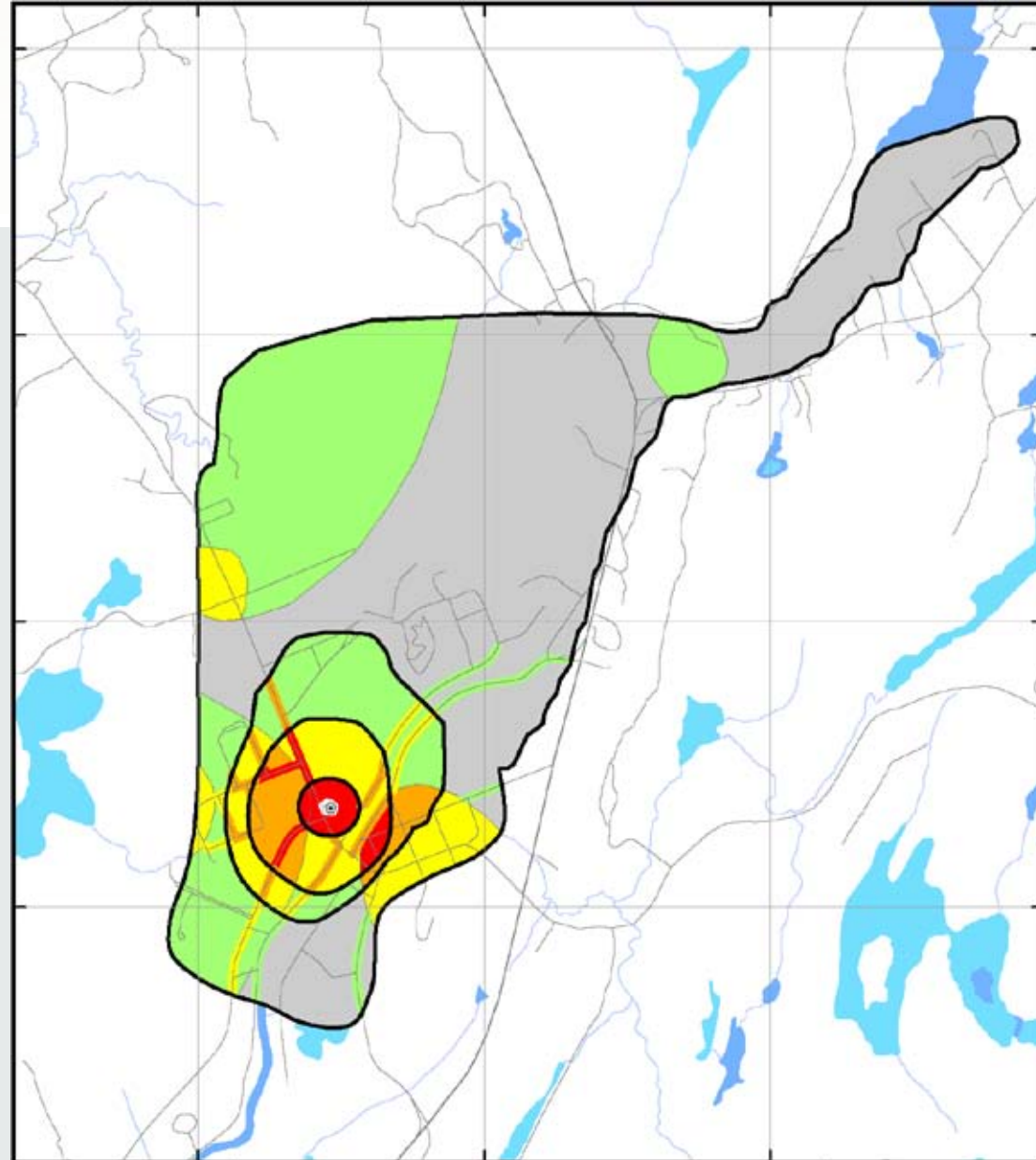
# Condition Methodology



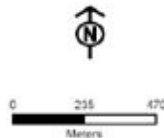
- Step 1: Review available background data
- Step 2: Calculate risk score
- Step 3: Enumerate significant threats



# Step 1: Review Mindens Vulnerability Scores



Minden  
Modified  
Vulnerability  
Scores



## Step 2: Review Background Information



- Morrison Report: Nov 2003
- Included EcoLog ERIS report: Dec 2002
- XCG Updated EcoLog ERIS report: Aug 2007
- Review Additional Mapping: Managed Lands, Agricultural Density, Imperviousness
- MOE Datahound Information

# Step 3: Windshield Survey

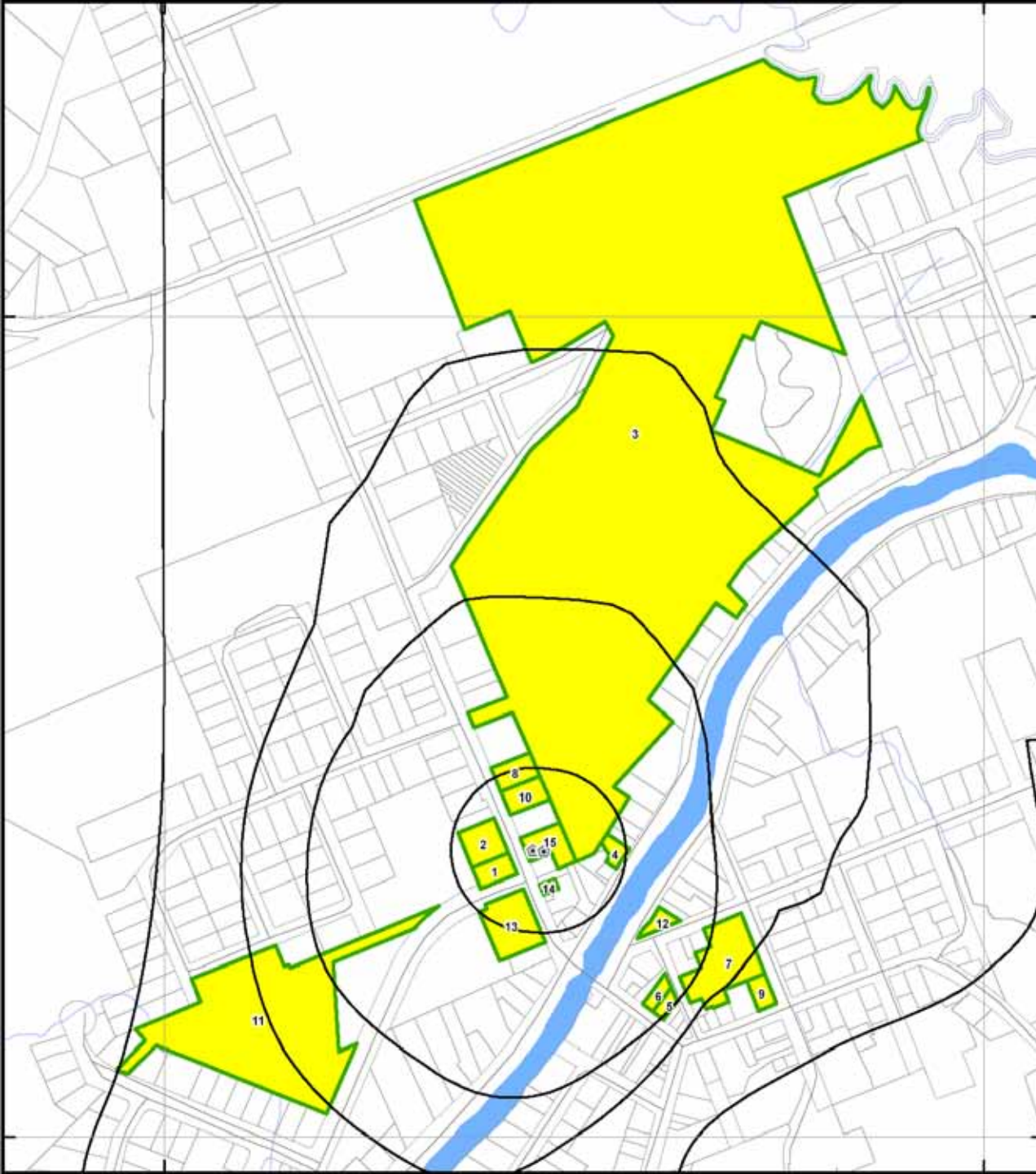


- Field Reconnaissance:
  - August 2007
  - November 2007
  - December 2009



**Steps 4 & 5:**

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**





# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat			
	Vulnerability Score = 10		Vulnerability Score = 8	
	Affected Parcels**	No. of PDWT	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	10	10	1	1
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1	1	-	-
9. The handling and storage of commercial fertilizer.	1	1	-	-
11. The handling and storage of pesticide.	1	1	-	-
14. The storage of snow.	1	1	-	-
15. The handling and storage of fuel.	34	34	-	-
17. The handling and storage of an organic solvent.	11	11	-	-
<b>Total Number of Affected Parcels</b>	<b>34</b>	<b>59</b>	<b>1</b>	<b>1</b>

Note:

\* Prescribed Drinking Water Threats, Clean Water Act (2006) – O. Reg. 287/07, 1.1(1)

\*\* “Affected parcels” represents the number of parcels on which a specific activity may be taking place. Some parcels may have more than one activity on-site.

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 15 parcels originally identified
- Letters sent out to original 15 parcels (Oct 16 2009)
- 4 refusals to participate
- XCG added 20 more parcels for home heating oil tanks
- XCG revisited Minden in December 2009 with Jessica Mueller (KC) to survey for below grade heating oil tanks & interview 1 land owner (2 planned interviews did not take place)



# Example Aerial Photograph for Minden

# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat			
	Vulnerability Score = 10		Vulnerability Score = 8	
	Affected Parcels**	No. of PDWT	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	4 (4)	4 (4)	-	-
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1	1	-	-
15. The handling and storage of fuel.	7 (3)	7 (3)	-	-
17. The handling and storage of an organic solvent.	2 (2)	2 (2)	-	-
<b>Total Number of Affected Parcels</b>	<b>10</b>	<b>14</b>	-	-



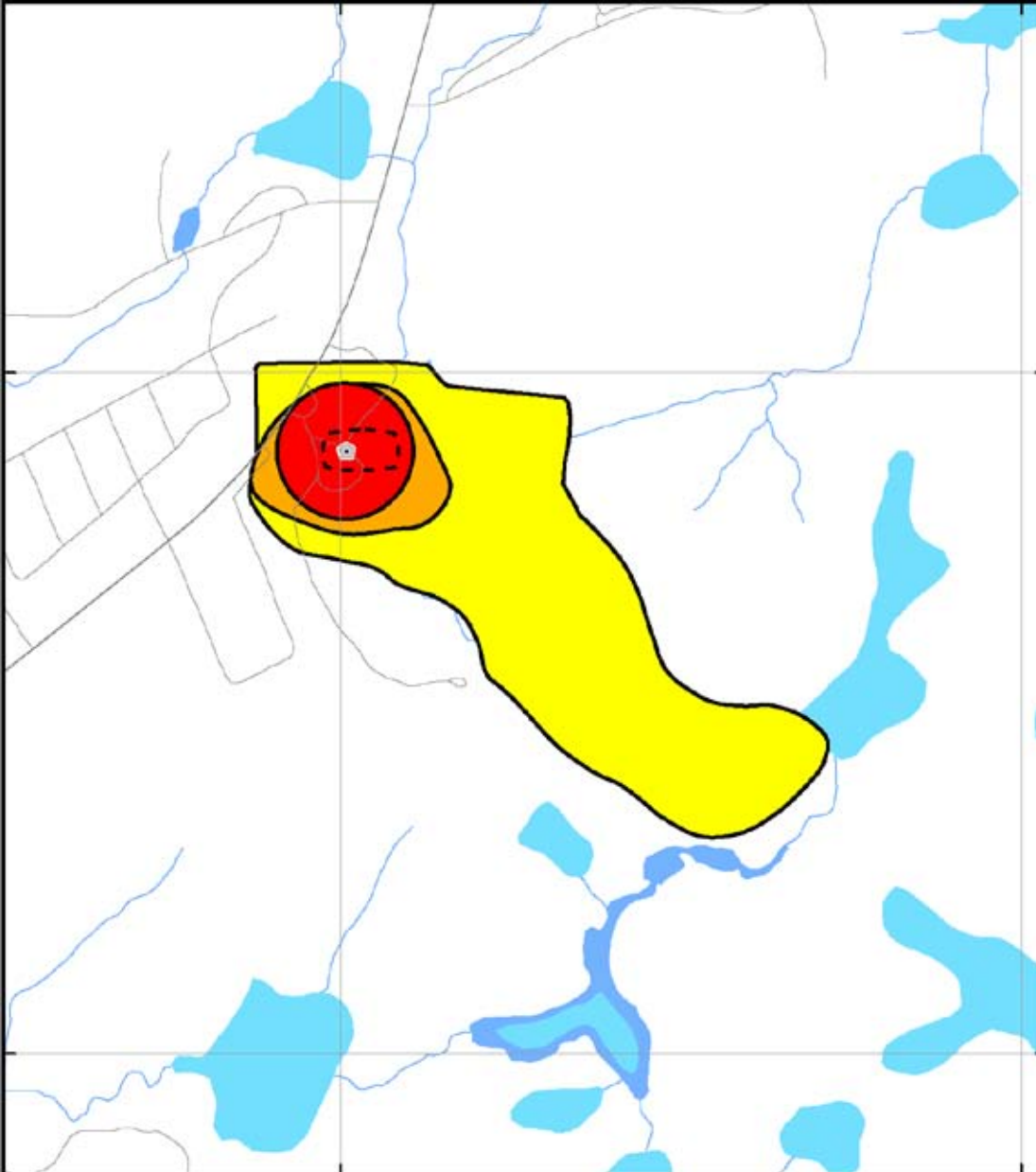
# Summary of Significant Threats

## - Minden

- 2 parcels with storage of hazardous waste and storage of organic solvents
- 2 parcels with storage of hazardous waste and storage of fuel
- 5 parcels with home heating oil storage below grade
- 1 combined parcel (roadways) with sanitary sewer lines for pathogenic threats
- No Conditions



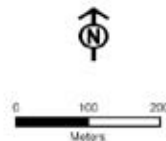
# Step 1: Review Lutterworth Pines Vulnerability Scores



Lutterworth  
Pines  
Vulnerability  
Scores

- WHPA
- Well Site
- Roads
- Waterbodies
- Wetlands
- Streams

- Vulnerability Scores
- 10
  - 8
  - 6



# Step 2 & 3: Review Background Information & Windshield Survey

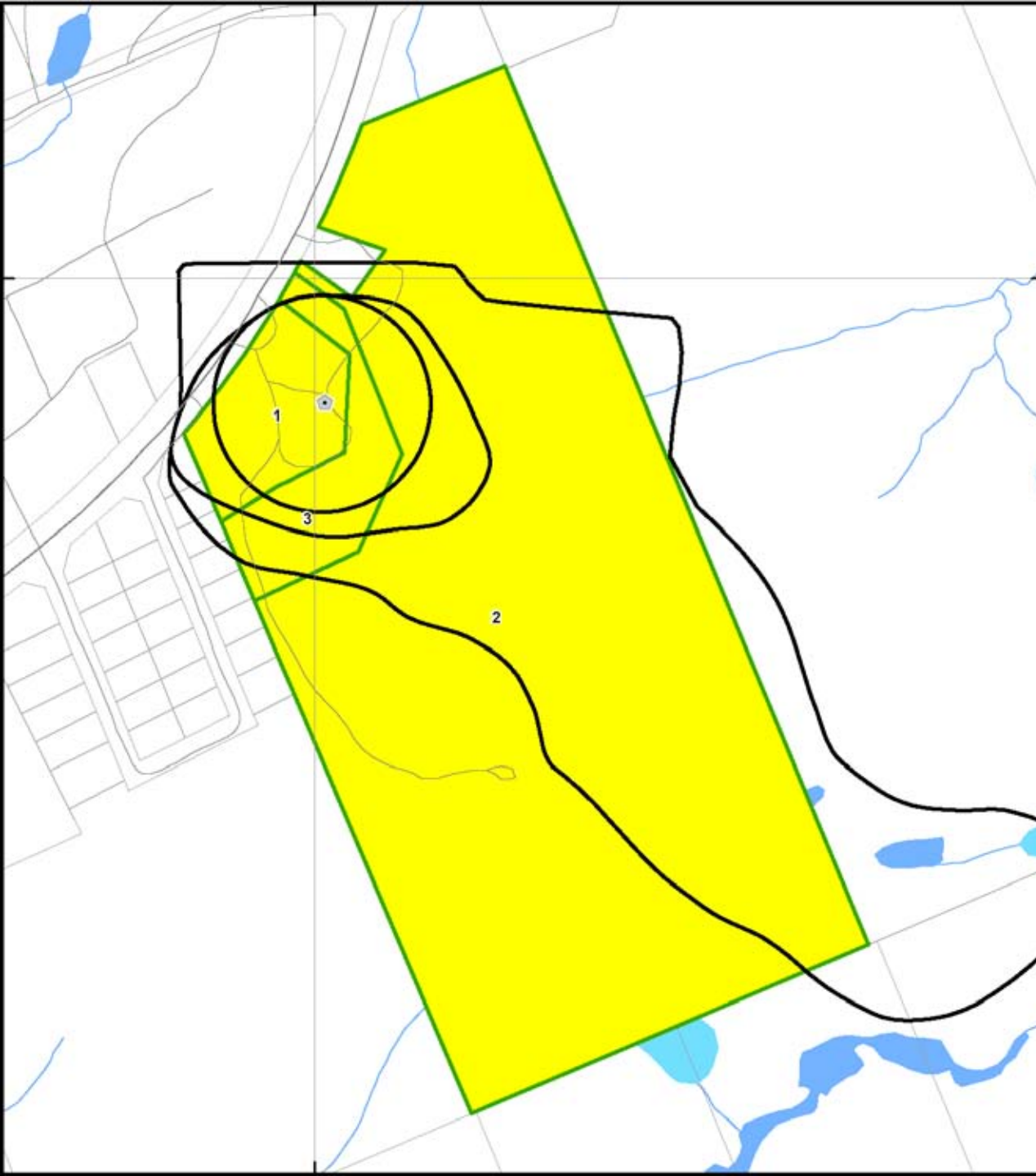


- Previous MEL work (threats database)
- XCG EcoLog ERIS report: Aug 2007
- MOE Datahound files
- Field Reconnaissance:
  - August 2007
  - November 2007



**Steps 4 & 5:**

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**





# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	3	3
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	3	3
15. The handling and storage of fuel.	3	3
17. The handling and storage of an organic solvent.	3	3
<b>Total Number of Affected Parcels</b>	<b>3</b>	<b>12</b>

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 3 parcels originally identified – same land owner
- Letter sent out to land owner (Oct 16 2009)

# Example Aerial Photograph for Lutterworth Pines



# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	1	1
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1	1
15. The handling and storage of fuel.	1	1
<b>Total Number of Affected Parcels</b>	<b>1</b>	<b>3</b>

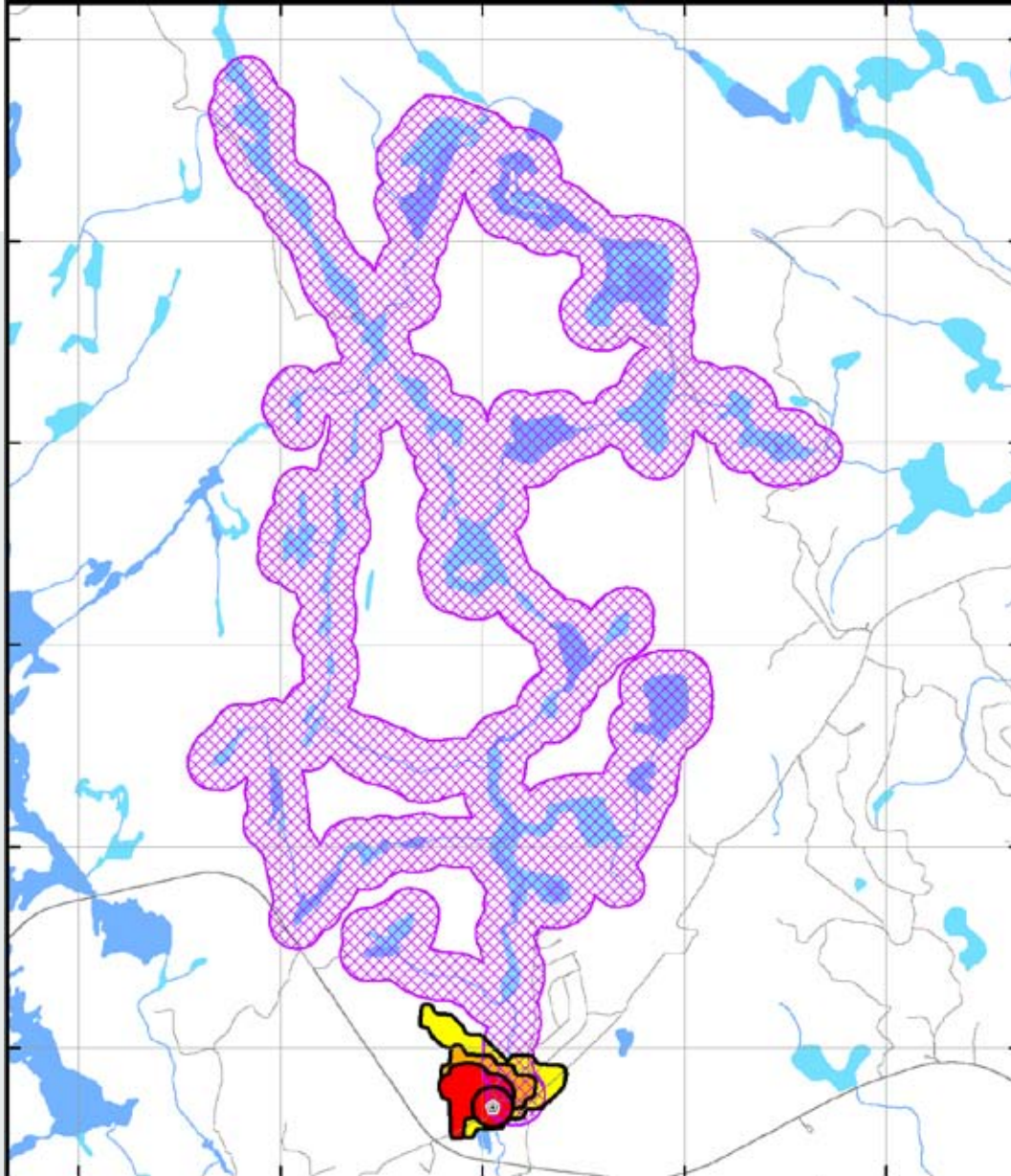
# Summary of Significant Threats – Lutterworth Pines



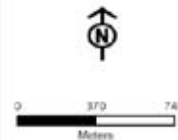
- 1 parcel with storage of hazardous waste, storage of fuel and a septic system
- No Conditions



# Step 1: Review Cardiff Vulnerability Scores



Cardiff  
Vulnerability  
Scoring



# Step 2 & 3: Review Background Information & Windshield Survey

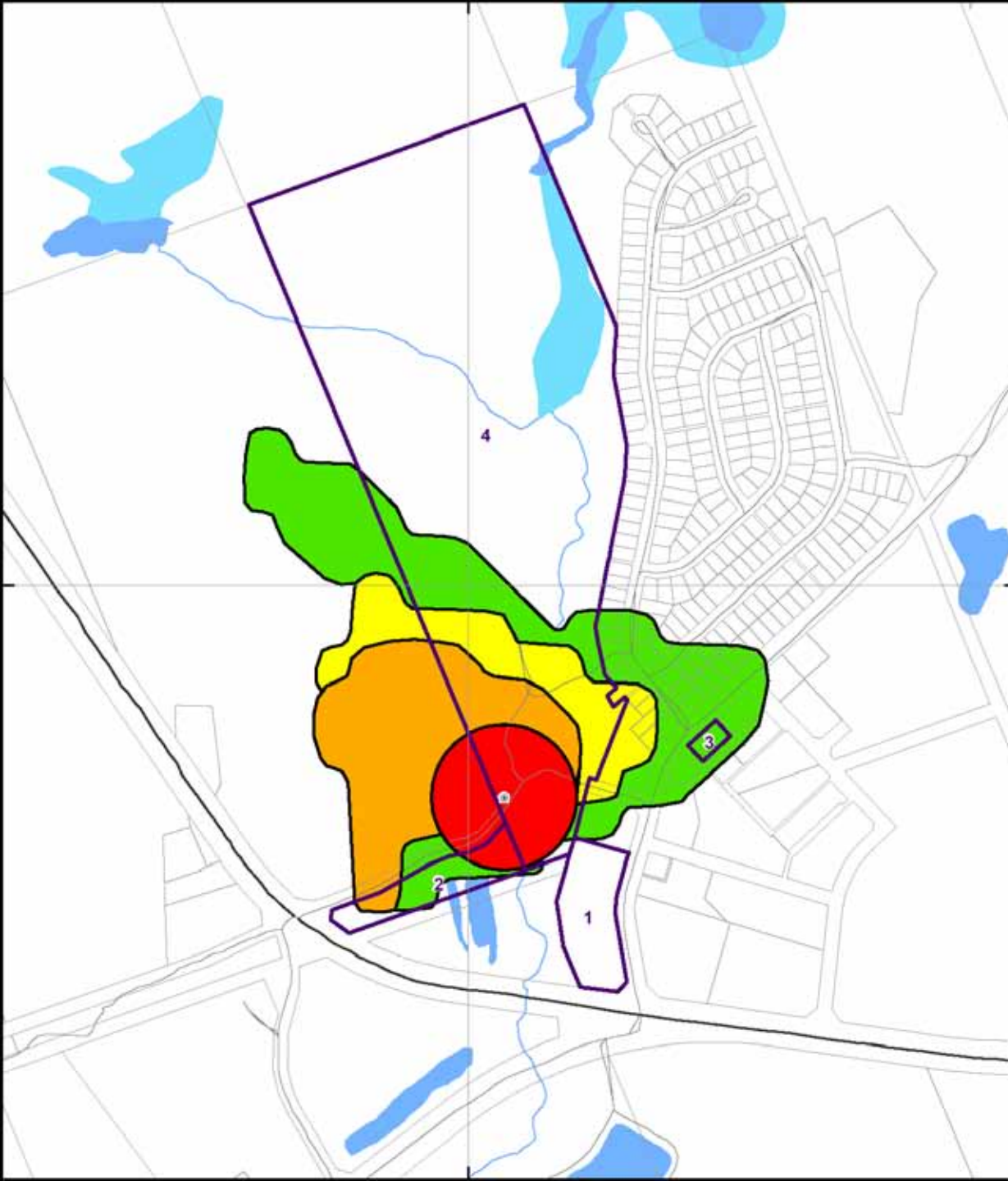


- Morrison Report: Nov 2003
- Included EcoLog ERIS report: Dec 2002
- XCG EcoLog ERIS report: Aug 2007
- MOE Datahound files
- Field Reconnaissance:
  - August 2007
  - November 2007
- WHPA-E did not score high enough to investigate for significant threats



**Steps 4 & 5:**

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**





# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	3	3
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1	1
15. The handling and storage of fuel.	3	3
17. The handling and storage of an organic solvent.	1	1
<b>Total Number of Affected Parcels</b>	<b>4</b>	<b>8</b>

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 4 parcels originally identified
- Letters sent out to land owners (Oct 19 2009)
- All land owners were contacted
- No aerial photography available
- No site visits required

# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	2	2
15. The handling and storage of fuel.	1	1
<b>Total Number of Affected Parcels</b>	<b>2</b>	<b>3</b>

# Summary of Significant Threats

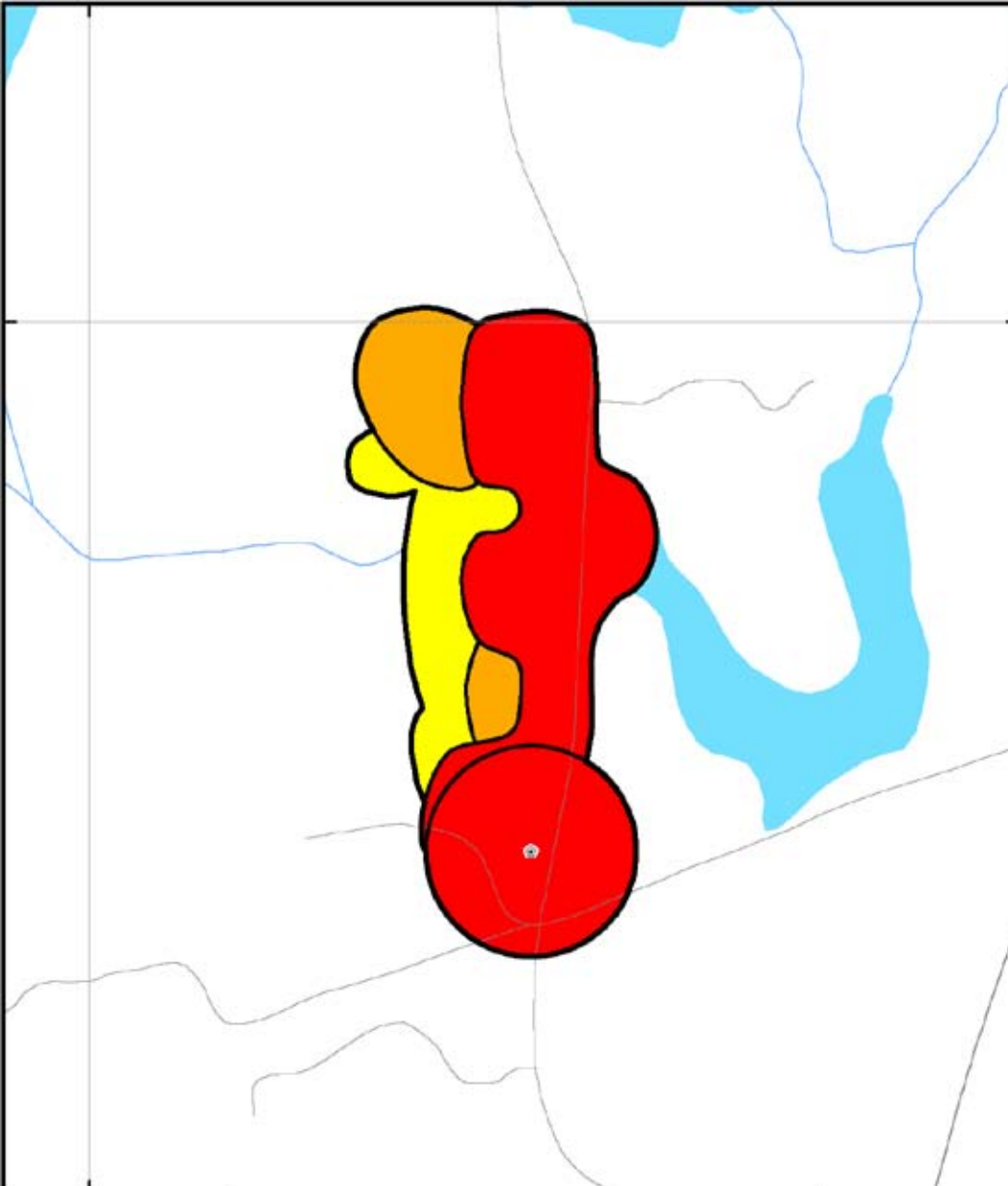
## – Cardiff



- 1 parcel with storage of storage of fuel and a septic system
- 1 parcel with a septic holding tank
- No Conditions



# Step 1: Review Dyno Estates Vulnerability Scores



Dyno Estates  
Vulnerability  
Scores

WHIPA	<b>Vulnerability Scores</b>
Well Site	10
Roads	8
Waterbodies	5
Wetlands	
Streams	

0 70 140  
Meters

# Step 2 & 3: Review Background Information & Windshield Survey

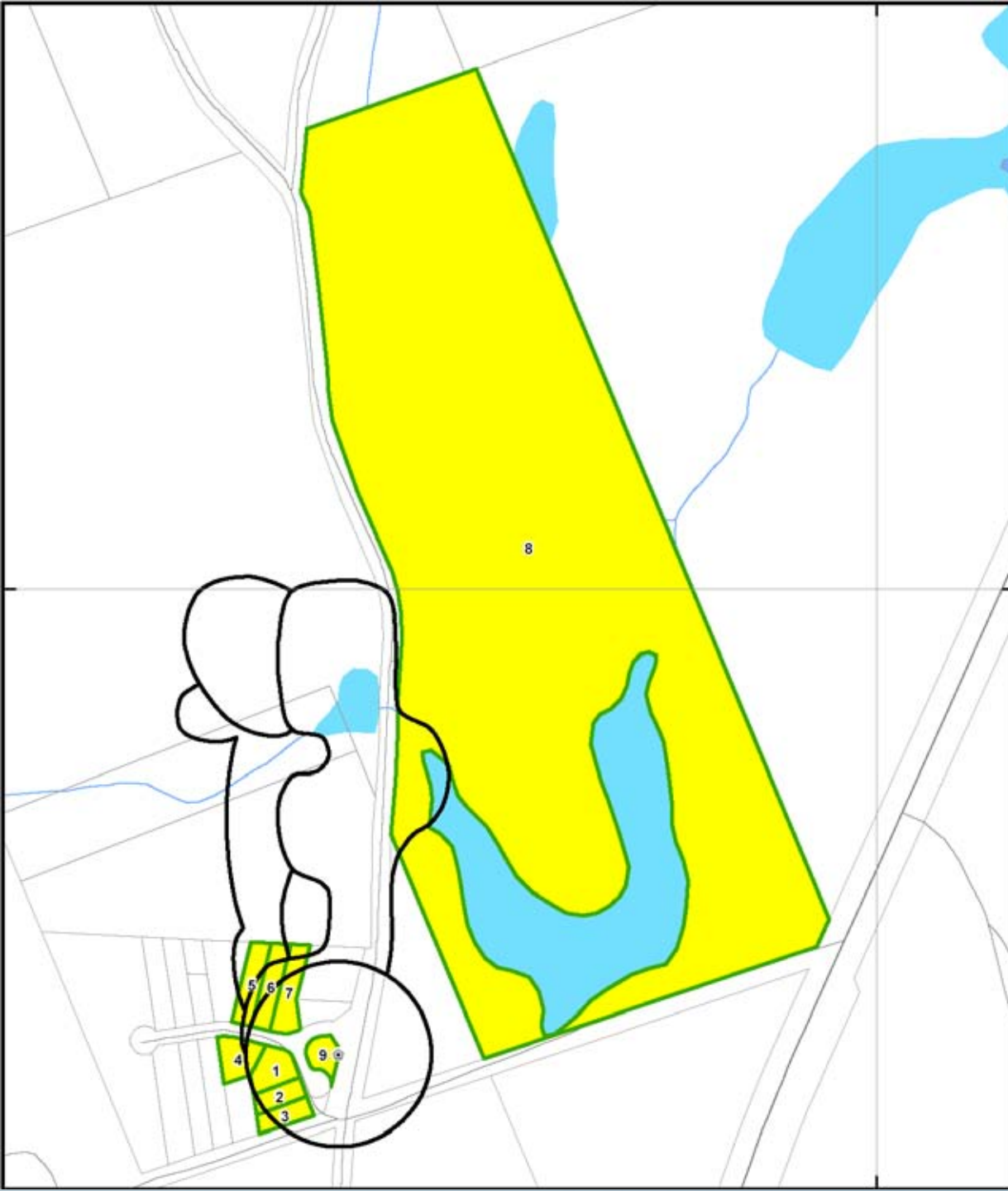


- Morrison Report: Nov 2003
- Included EcoLog ERIS report: Dec 2002
- XCG EcoLog ERIS report: Aug 2007
- MOE Datahound files
- Field Reconnaissance:
  - August 2007
  - November 2007



**Steps 4 & 5:**

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**





# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1	1
8. The application of commercial fertilizer.	8	8
14. The storage of snow.	1	1
15. The handling and storage of fuel.	8	8
17. The handling and storage of an organic solvent.	1	1
<b>Total Number of Affected Parcels</b>	<b>9</b>	<b>26</b>

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 9 parcels originally identified
- Letters sent out to all land owners (Oct 19 2009)
- Limited contact information available (only 4 land owners)
- No aerial photography available
- Assumptions were made on septic / home heating oil for residential properties
- No site visits required

# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	7 (7)	7 (7)
15. The handling and storage of fuel.	7 (7)	7 (7)
<b>Total Number of Affected Parcels</b>	<b>7</b>	<b>14</b>

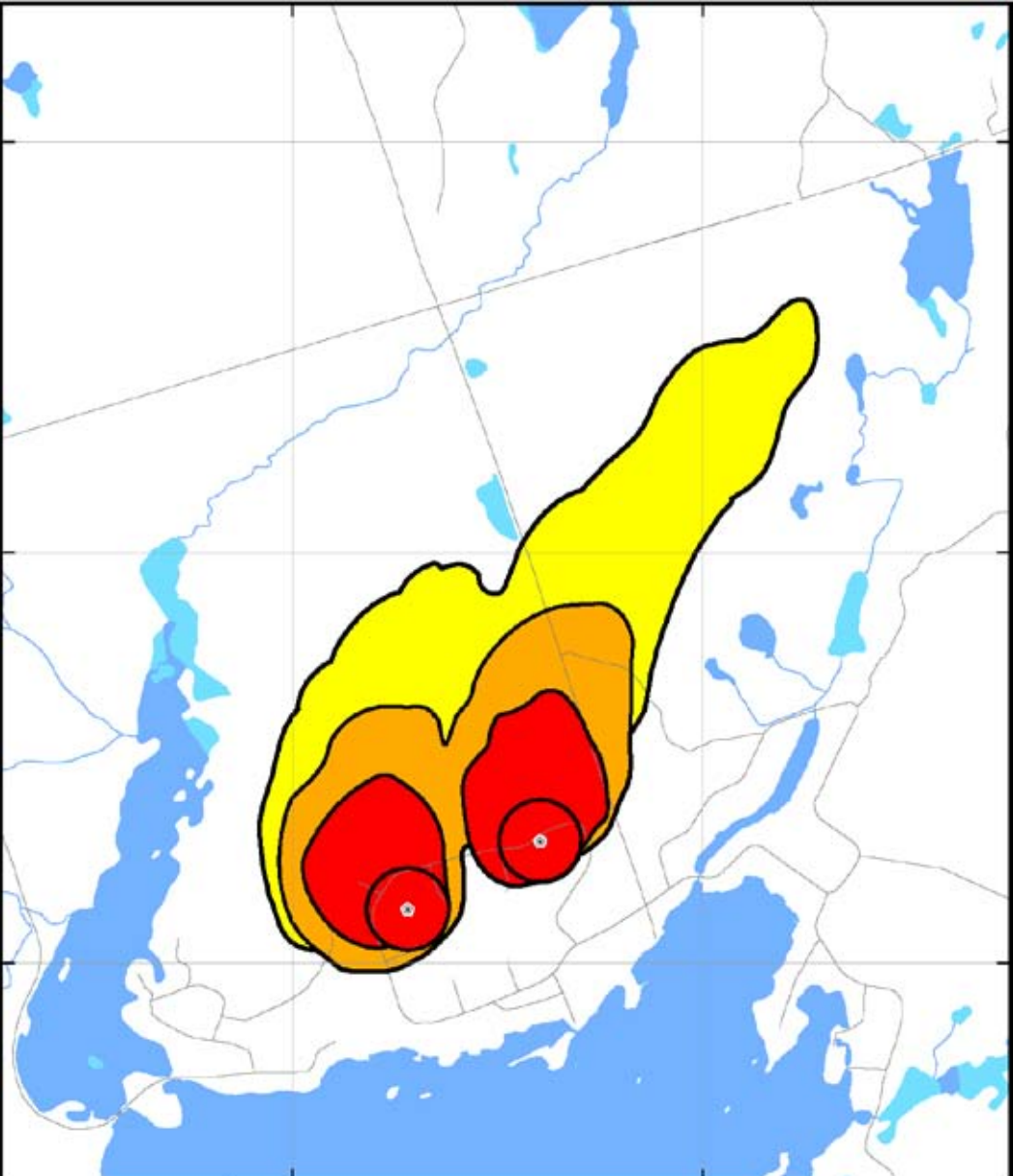
# Summary of Significant Threats – Dyno Estates



- 7 parcels with storage of storage of fuel and a septic system
- No Conditions



# Step 1: Review Alpine Village Vulnerability Scores

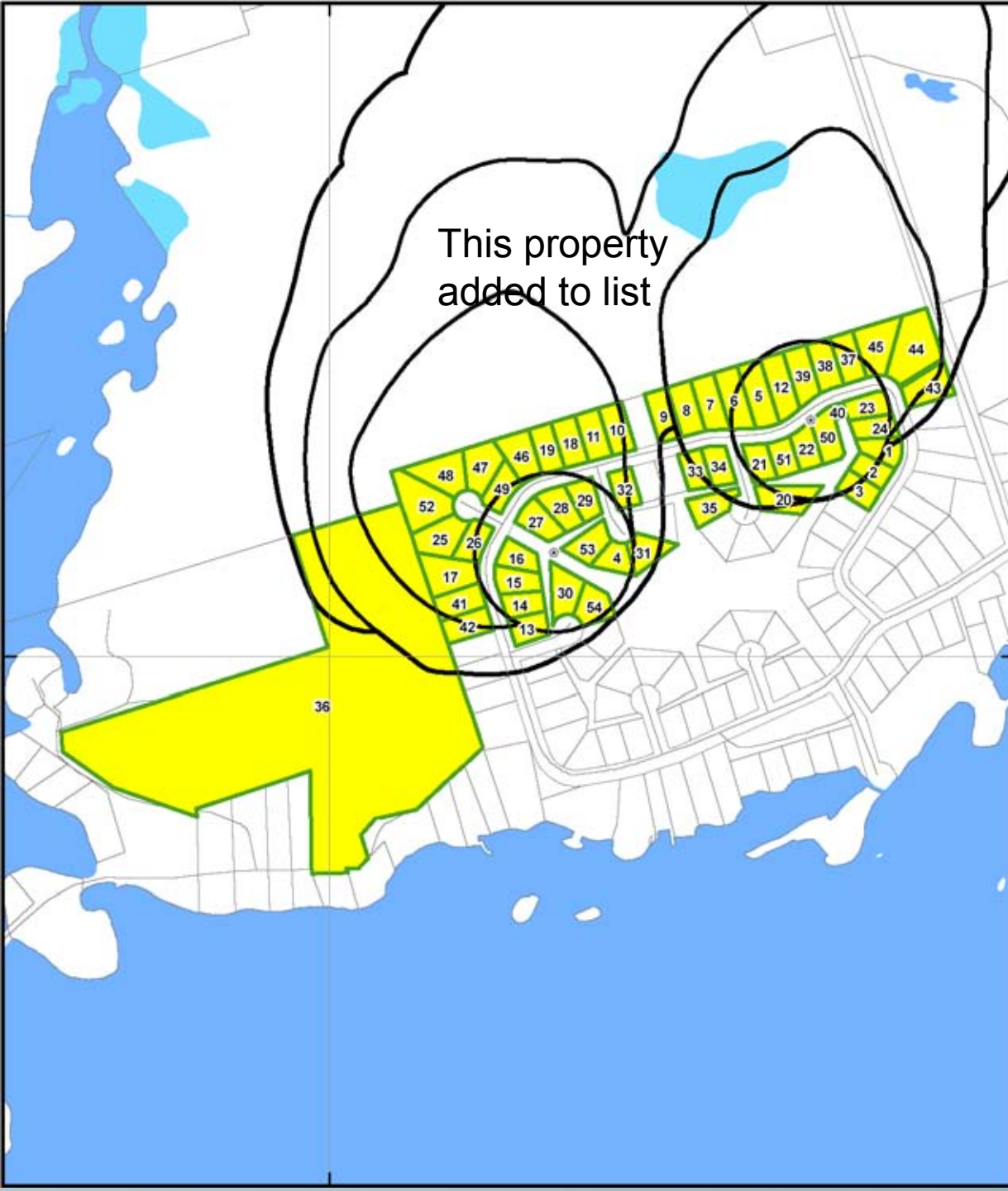


<b>Alpine Village Vulnerability Scores</b>	WhPA	<b>Vulnerability Scores</b> 10 8 6	 0 175 350 Meters
	Well Site		
	Roads		
	Waterbodies		
	Wetlands		
	Streams		

# Step 2 & 3: Review Background Information & Windshield Survey



- Morrison Report: Nov 2003
- Included EcoLog ERIS report: Feb 2003
- XCG EcoLog ERIS report: Aug 2007
- MOE Datahound files
- Field Reconnaissance:
  - August 2007
  - November 2007



## Steps 4 & 5:

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**



# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	53	53
3. The application of agricultural source material to land.	2	2
6. The application of non-agricultural source material.	2	2
10. The application of pesticide to land.	2	2
15. The handling and storage of fuel.	53	53
17. The handling and storage of an organic solvent.	2	2
<b>Total Number of Affected Parcels</b>	<b>55</b>	<b>116</b>

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 54 parcels originally identified (one addition)
- Letters sent out to all land owners (Oct 19 2009)
- 12 parcels with no telephone contact
- 1 refusal to participate
- Limited response from residential land owners
- Aerial photography available through Peterborough County GIS
- Assumptions were made on septic / home heating oil for residential properties
- No site visits required

# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	52 (38)	52 (38)
3. The application of agricultural source material to land.	3 (2)	3 (2)
10. The application of pesticide to land.	2 (2)	2 (2)
15. The handling and storage of fuel.	39 (38)	39 (38)
21. Livestock grazing	2 (2)	2 (2)
<b>Total Number of Affected Parcels</b>	<b>54</b>	<b>98</b>

# Summary of Significant Threats

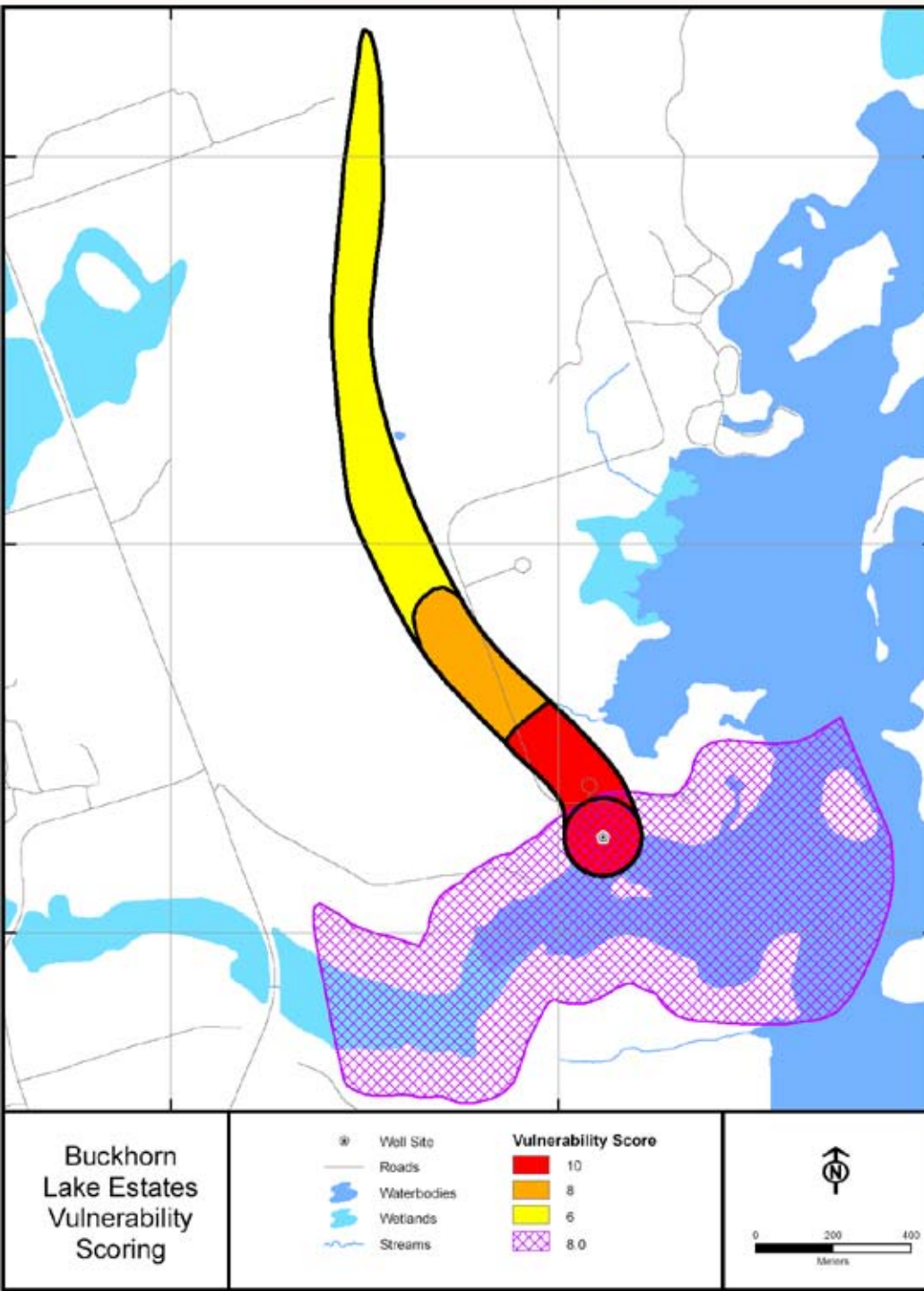
## – Alpine Village



- 1 parcel with a septic system and application of agricultural source material
- 39 parcels with storage of fuel and a septic system
- 12 parcels with septic system
- 2 parcels with application of agricultural source material, application of pesticide and animal pasturing
- No Conditions



# Step 1: Review Buckhorn Lake Estates Vulnerability Scores



# Step 2 & 3: Review Background Information & Windshield Survey

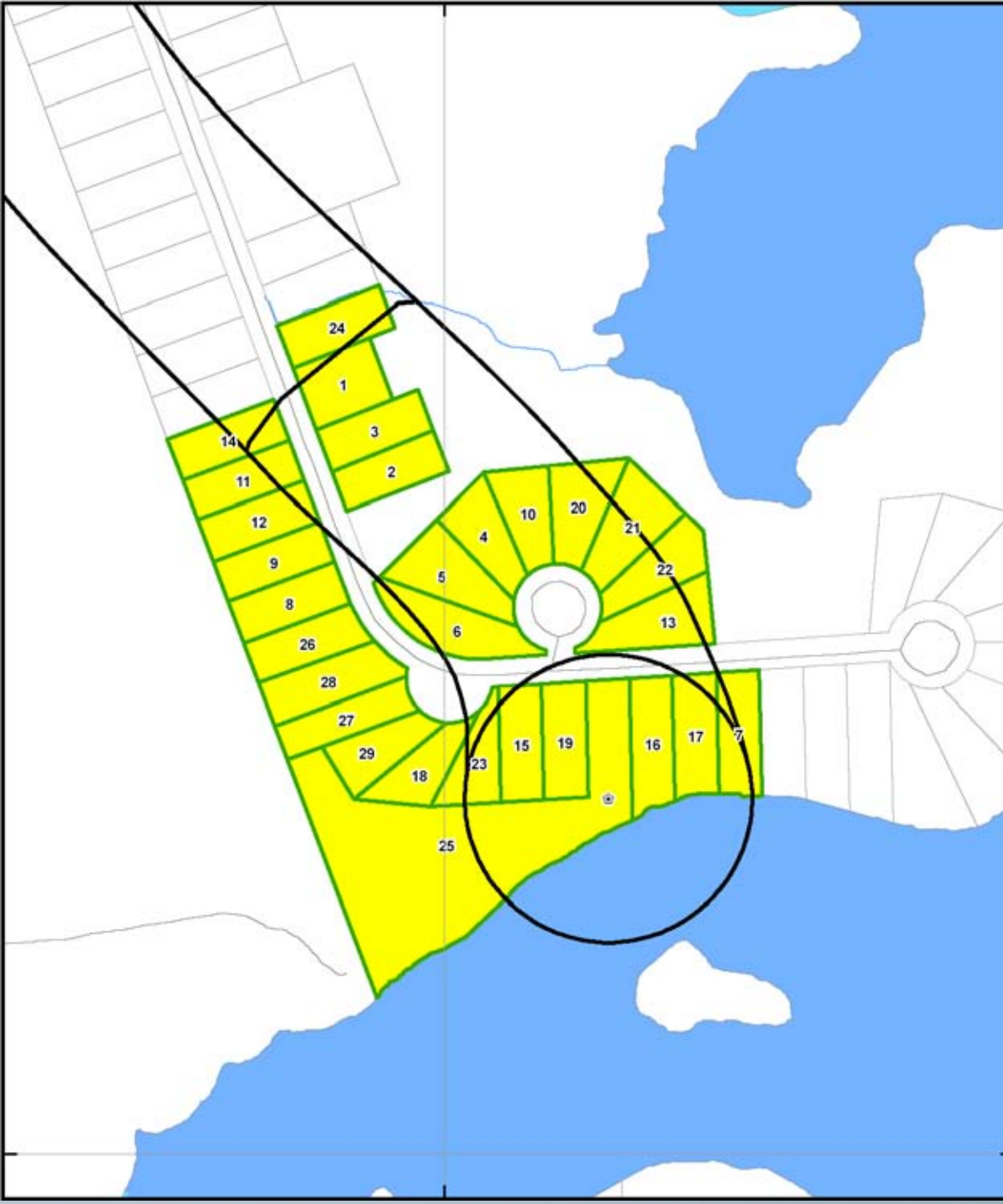


- Morrison Report: Nov 2003
- Included EcoLog ERIS report: Feb 2003
- XCG EcoLog ERIS report: Sep 2006
- MOE Datahound files
- Field Reconnaissance:
  - September 2006
  - August 2007
  - December 2009



**Steps 4 & 5:**

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**





# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	1	1
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	29	29
15. The handling and storage of fuel.	29	29
17. The handling and storage of an organic solvent.	1	1
<b>Total Number of Affected Parcels</b>	<b>29</b>	<b>60</b>

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 29 parcels originally identified
- Letters sent out to all land owners (Oct 19 2009)
- 3 parcels with no telephone contact
- Limited response from residential land owners
- Aerial photography available through Peterborough County GIS
- Vacant properties confirmed in Dec 09 visit
- Assumptions were made on septic / home heating oil for residential properties
- No site visits required

# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat	
	Vulnerability Score = 10	
	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	21 (14)	21 (14)
<b>Total Number of Affected Parcels</b>	<b>21</b>	<b>21</b>

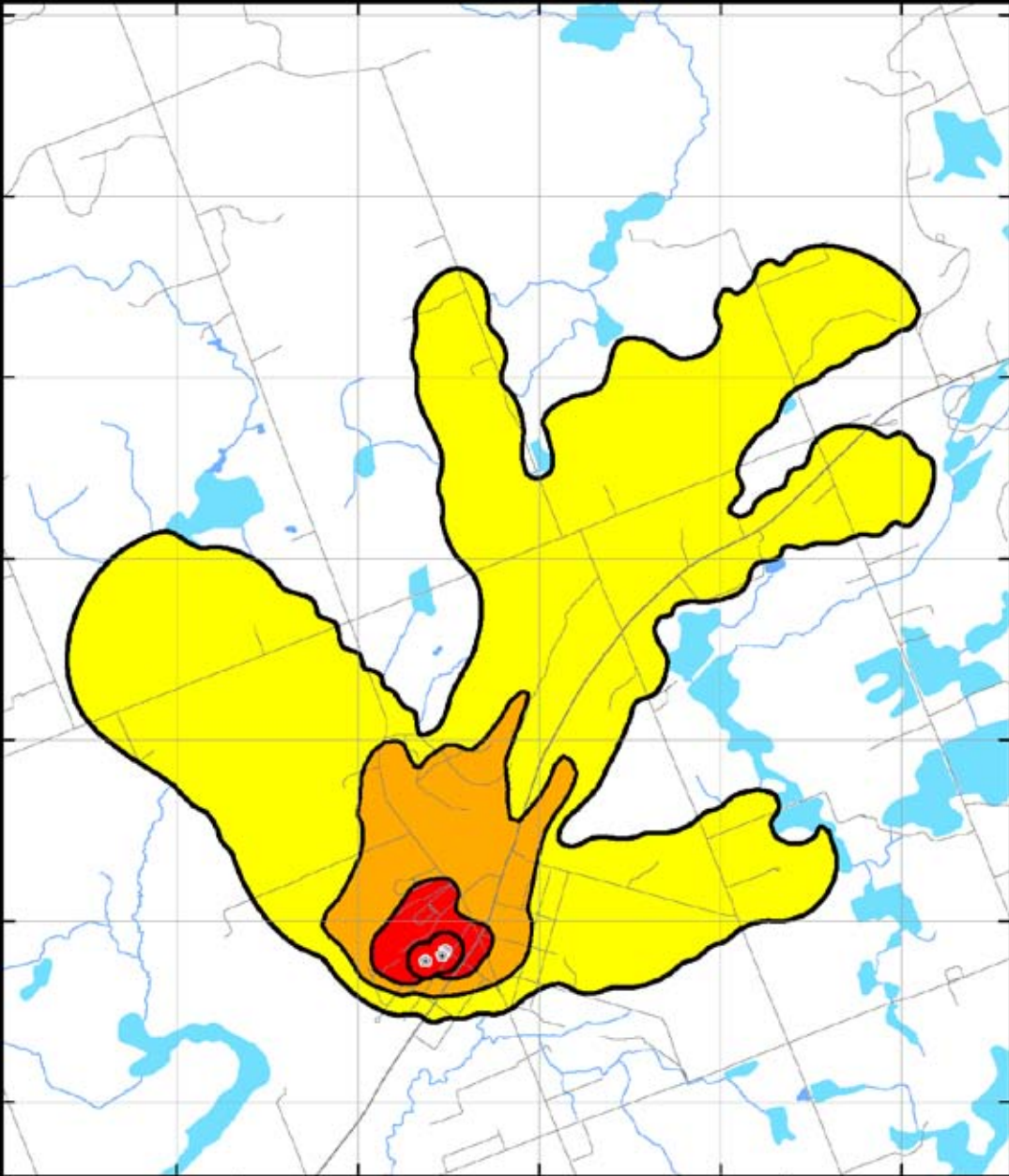
# Summary of Significant Threats – Buckhorn Lake Estates



- 21 parcels with septic systems
- No Conditions



# Step 1: Review Norwood Vulnerability Scores



Norwood  
Vulnerability  
Scores

WIPA	<b>Vulnerability Scores</b>
Well Site	10
Roads	8
Waterbodies	6
Wetlands	
Streams	

N

0 450 900  
Meters

# Step 2 & 3: Review Background Information & Windshield Survey

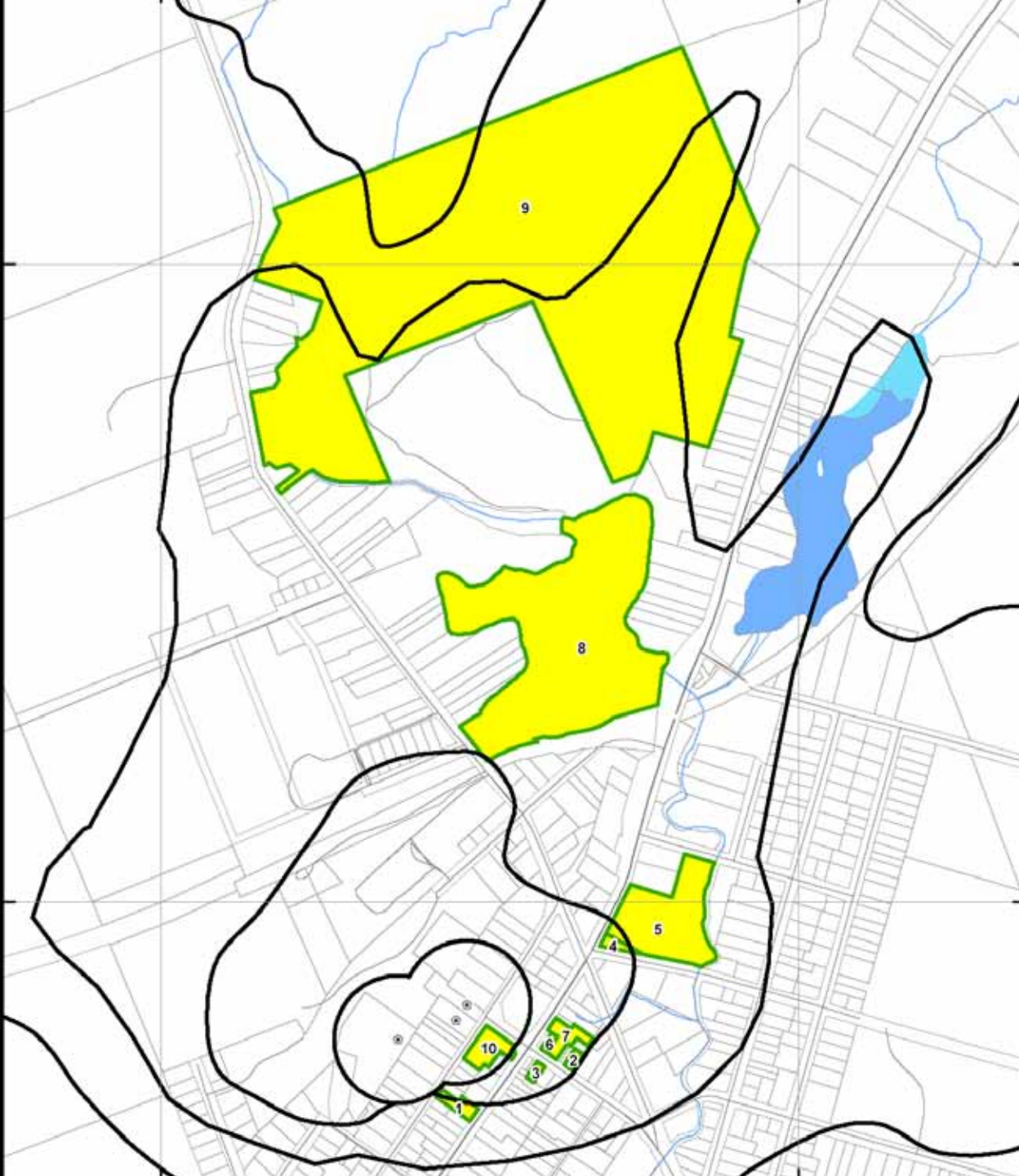


- Morrison Report: April 2004
- Included EcoLog ERIS report: Feb 2003
- XCG EcoLog ERIS report: Sep 2006
- MOE Datahound files
- Field Reconnaissance:
  - September 2006
  - August 2007
  - November 2009



**Steps 4 & 5:**

**Overlay Parcel  
Fabric &  
Evaluate  
Potentially  
Significant  
Threats**





# Step 6: Enumerate Potentially Significant Threats

Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat			
	Vulnerability Score = 10		Vulnerability Score = 8	
	Affected Parcels**	No. of PDWT	Affected Parcels**	No. of PDWT
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .	2	2	1	1
9. The handling and storage of commercial fertilizer.	1	1	-	-
10. The application of pesticide to land.	-	-	1	1
11. The handling and storage of pesticide.	1	1	-	-
15. The handling and storage of fuel.	78	78	-	-
16. The handling and storage of a dense non-aqueous phase liquid (DNAPLs).	1	1	-	-
17. The handling and storage of an organic solvent.	4	4	-	-
<b>Total Number of Affected Parcels</b>	<b>78</b>	<b>87</b>	<b>2</b>	<b>2</b>

# Steps 7 & 8: Send out letters & Additional Information Gathering



- 10 parcels originally identified
- Letters sent out to all land owners (Oct 19 2009)
- 70 parcels added for potential heating oil tanks
- Aerial photography available through Peterborough County GIS
- Walking survey for below grade heating oil tanks
- Some assumed b/g h.o.t. (chimney – no other fuel)
- No site visits required

# Step 9: Enumerate Significant Threats



Prescribed Drinking Water Threat (PDWT)*	Score to Trigger a Significant Threat			
	Vulnerability Score = 10		Vulnerability Score = 8	
	Affected Parcels**	No. of PDWT	Affected Parcels**	No. of PDWT
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1	1	-	-
15. The handling and storage of fuel.	12 (4)	12 (4)	-	-
<b>Total Number of Affected Parcels</b>	<b>13</b>	<b>13</b>	-	-

# Summary of Significant Threats – Norwood



- 12 parcels with home heating oil storage below grade
- 1 combined parcel (roadways) with sanitary sewer lines for pathogenic threats
- No Conditions

# Summary of Significant Threats



<b>Prescribed Drinking Water Threat (Reference Number)</b>	<b>Minden</b>	<b>Lutterworth Pines</b>	<b>Cardiff</b>	<b>Dyno Estates</b>	<b>Alpine Village</b>	<b>Buckhorn Lake Estates</b>	<b>Norwood</b>
Below grade home heating oil tanks (1369, 1370)	5	1	1	7	39		12
Other fuel storage (1359, 1360, 1369, 1370)	2						
Storage of organic solvents < 250 L (1241, 1245)	1						
Storage of organic solvents <2500 L (1241, 1245, 1249, 1253-1255, 1257-1259)	1						
Storage of hazardous/liquid industrial waste <2500 L (1914, 1917, 1924-1943)	4	1					
Sanitary sewer lines (1958) (P)	1						1
On-site septic systems (1956) (P)		1	1	7	52	21	
On-site holding tank (1957) (P)			1				
Application of ASM (1944) (P)					3		
Application of pesticides (71, 73, 77-80, 82-86)					2		
Pasture (1945) (P)					2		
<b>Total Number of Affected Parcels</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>7</b>	<b>54</b>	<b>21</b>	<b>13</b>