

Ecological Risk Assessment–Steps 1 and 2 Ecological Exclusion and Scoping Assessments



In its 2000 session, the Wyoming Legislature created new opportunities, procedures, and standards for voluntary remediation of contaminated sites. These provisions, enacted as Articles 16, 17, and 18 of the Wyoming Environmental Quality Act and implemented by the Wyoming Department of Environmental Quality (DEQ), will govern future environmental cleanups in Wyoming.

This Fact Sheet provides information about the ecological risk assessment screening process within the Wyoming Voluntary Remediation Program (VRP).

1. What is ecological risk assessment, and why is it necessary?

Ecological risk assessment is a process to determine whether plants, invertebrates, fish, or wildlife (ecological receptors) are likely to be affected by chemical, physical, or biological stresses. Most often ecological risk assessment is used to assess potential environmental effects from chemical contamination. §35-11-1605 requires that VRP cleanups protect both human health and the environment; therefore, some level of ecological risk assessment will be necessary at all VRP sites.

2. Is ecological risk assessment required even if my site is in the city?

Yes, some form of ecological risk assessment is required at all VRP sites; however, DEQ believes that complex ecological risk assessments will be uncommon, especially at sites located in urban areas. The ecological risk assessment screening process discussed in this Fact Sheet is designed to efficiently identify sites that require more complex ecological risk assessment and to screen out other sites.

3. What are the steps required in an ecological risk assessment?

DEQ recognizes that not all cleanup sites will present the same types of ecological issues. To accommodate the range of sites that will require consideration in the VRP, DEQ has developed a stepwise approach to ecological risk assessment. Under this approach, sites first undergo a simple Ecological Exclusion Assessment (Step 1) designed to identify cleanup sites where ecological receptors are unlikely to be affected. If, after the Ecological Exclusion Assessment, a site requires further evaluation, it would then undergo an Ecological Scoping Assessment (Step 2), Ecological Screening Assessment (Step 3), or a Baseline Ecological Risk Assessment (Step 4). If it is apparent that ecological evaluation of a site beyond Step 1 will be necessary, the Volunteer must

still complete Step 1 and submit the results to DEQ, but may proceed to Step 2, 3, 4, or remedial action as deemed appropriate by the Volunteer and through consultation with DEQ. Step 1, the Ecological Exclusion Assessment, and Step 2, the Ecological Scoping Assessment, are discussed in this fact sheet. Step 3, the Ecological Screening Assessment, and Step 4, the Baseline Ecological Risk Assessment, are described in Fact Sheet 19 and Supporting Technical Memoranda (Step 3 and Step 4).

4. What documentation is required to be submitted to DEQ to show the results of the ecological risk assessment?

If a site is excluded from any further ecological assessment during Step 1, then the ecological exclusion assessment checklist and supporting documentation must be submitted to DEQ for concurrence and approval. While Step 1 is required, if it is apparent that a more complex risk assessment will be needed for a site, the results of Step 1 need not be submitted independently. In such cases, the Step 1 documentation can instead be appended to any ecological risk assessment reports or remedial action planning documents that are submitted to DEQ during Steps 2, 3, 4, or remedial action.

5. What is an Ecological Exclusion Assessment?

An Ecological Exclusion Assessment is Step 1 of the ecological risk assessment process. The exclusion assessment does not require the expertise of biologists or other professional environmental contractors. Instead, very basic information about a VRP site is used to determine if further ecological risk assessment is necessary. To complete an Ecological Exclusion Assessment, Volunteers fill out a simple checklist and submit it to DEQ. The checklist first requires information on the site location and size, and the possible presence of rare, threatened, and endangered species. Information about the presence of rare, threatened, or endangered species as described in the checklist is easily obtained by contacting the Wyoming Natural Diversity Database..

In most cases, sites that are smaller than one-half acre will be screened out from further assessment. For sites that are larger than one-half acre, the checklist requires information on the type of chemical release and affected area, and on affected or potentially affected habitat and ecological receptors, including rare, threatened, and endangered species.

All Ecological Exclusion Assessment checklists must be supported by documentation including a site map or aerial photo, information about threatened and endangered species on or near the site, or photographs showing the affected area, site, and surroundings.

The Ecological Exclusion Assessment checklist and documentation should be submitted to DEQ for review to determine whether a site requires further ecological risk assessment. The Ecological Exclusion Assessment checklist and documentation requirements are attached to this Fact Sheet.

6. What qualifications are necessary to fill out the Step 1 Ecological Exclusion Assessment checklist?

The Ecological Exclusion Assessment checklist was designed to be as simple as possible. As discussed above, in most cases sites smaller than one-half acre will be screened out from further assessment. If your site is larger than one-half acre and you are having difficulty completing the rest of the Ecological Exclusion Assessment checklist, you can hire a professional environmental contractor, ecologist, or biologist to help you complete the checklist. For information on hiring a professional environmental contractor, ecologist, or biologist you may contact DEQ at the numbers listed below.

7. What if I complete the Step 1 Ecological Exclusion Assessment checklist and it shows that more evaluation is needed?

If an Ecological Exclusion Assessment shows that more evaluation is needed, Volunteers will proceed to the Ecological Risk Assessment Steps 2, 3, 4, or remedial action. The Step 2 Ecological Scoping Assessment is similar to the Ecological Exclusion Assessment except that more site-specific information is required to better understand site conditions, location(s) of contamination, and ecological receptors that may be at risk. In Step 2a, Volunteers complete a checklist that assesses the potential for ecological risks and, in more detail than Step 1, delineates whether contaminated groundwater, soil, surface water, or sediment presents an ecological concern at the site. The checklist also helps to clarify which types of ecological receptors may be at risk. In Step 2b, Volunteers provide documentation of the types of contamination present, the types of habitat and ecological receptors that are present or that may be present based on current and likely future land use, and the potential for ecological receptors to be exposed to, and affected by, the contamination.

Because the Ecological Scoping Assessment requires more evaluation of the site and potential ecological receptors at or near the site than the Ecological Exclusion Assessment, the Ecological Scoping Assessment checklist must be completed by or under the supervision of a biologist, ecologist or other qualified environmental professional who is familiar with the site assessment or ecological risk assessment process. When the Wyoming Natural Diversity Database is contacted to obtain a threatened or endangered species list for the area surrounding your site, unless specific documented locations of those species are provided, a biologist or ecologist may be required to determine whether suitable habitat exists at your site for the listed species.

The Ecological Scoping Assessment checklists (Steps 2a and 2b) and instructions for completing the checklists are attached to this Fact Sheet. The procedures for Steps 3 and 4 are provided in Fact Sheet 19 (available on the VRP website) and supporting technical memoranda, which must be obtained by contacting DEQ (see Section 9 for contact details).

8. What if the Ecological Scoping Assessment shows that more evaluation is needed?

If the Ecological Scoping Assessment (Steps 2a and 2b) shows that more evaluation is needed, Volunteers will work with DEQ to design an approach to conducting Step 3, Step 4, or remedial action, as appropriate. DEQ has developed guidance for Steps 3 and 4, which are more detailed ecological risk assessments, in Fact Sheet 19 and supporting technical memoranda.

If Total Petroleum Hydrocarbons (TPH) is a contaminant of interest at the site and the Ecological Scoping Assessment indicates that more evaluation is needed, the Volunteer should discuss this further with DEQ. The TPH cleanup levels provided in the VRP documents may not be protective of ecological receptors.

9. How can I get more information about the VRP?

To learn about VRP sites that may exist in your community, obtain copies of other VRP Fact Sheets/guidance documents, get answers to your questions, or volunteer for the program, contact DEQ at (307) 777-7752 or through the VRP website at: <http://deq.state.wy.us/volremedi/index.asp>.

The VRP website includes all of the Fact Sheets and other guidance documents for the VRP. This website is updated frequently and includes the latest information about DEQ's progress in developing guidance, policy, and other supporting documents for the VRP.

Step 1: Ecological Exclusion Assessment

Instructions

The following questions comprise the Ecological Exclusion Assessment—Step 1 of the VRP ecological risk assessment process. The purpose of this step is to determine whether a contaminated site can be excluded from any further ecological risk assessment. This step must be completed for every contaminated site and submitted to DEQ separately or as part of the report for additional, more complex ecological assessment.

Provide the information required in Parts 1 and 2. If the answer to any of the following questions is “Unknown”, it may be interpreted to represent a “Yes” or “No” response, whichever leads to a more conservative estimate of the potential for ecological receptors to be exposed to, and/or affected by, site-related chemicals.

The answers to the questions within this Ecological Exclusion Assessment should be supported by documentation of pertinent ecological conditions at the site, as requested in Part 3. Additional documentation of site conditions may also be attached if you feel it is necessary to understand the potential for ecological risks to be posed by the chemicals of interest.

Sign the certification in Part 4.

Step 1: Ecological Exclusion Assessment – Part 1

Part 1: Basic Site Information	
Site Name/Project Name:	
Site Location: (address, county, and/or region)	
Latitude/Longitude or other location documentation for site:	
Size of Site (acres):	
Size of the affected area (acres):	
Type of Facility: (gas station, dry cleaner, jet hangar, etc.)	
Date and Time Checklist Completed:	
Checklist Completed By: (name and title/expertise)	
Type of Chemical Spill/Release: For Example: Tanker Spill - Gasoline Storage Tank Release - Diesel Service Bay Spills and Leaks - Petroleum Products Process Wastes - Chlorinated Solvents	

Step 1: Ecological Exclusion Assessment – Part 2

Part 2: Ecological Exclusion Assessment Checklist	
1	<p>Is the areal extent of the chemical release (i.e., the affected area) less than one-half (½) of an acre or completely covered by maintained landscape (such as lawns and flowerbeds), gravel, asphalt, concrete (such as roadways and parking lots), buildings, or other structures</p> <p>and</p> <p>are all ditches, streams, rivers, ponds, lakes, reservoirs, or other water bodies more than one-quarter (1/4) of a mile from the affected area? (Yes, No, Unknown)</p> <p>and</p> <p>Does a search of the Wyoming Natural Diversity Database ((307)-766-3023 or http://uwadmnweb.uwyo.edu/wyndd/) indicate that no rare, threatened, or endangered species have been documented at the site or within one-quarter (1/4) mile of the site?</p> <p>"Rare" defined for this purpose includes those species being actively tracked by the WYNDD (i.e. those species designated by a "Y" in the Trackstat column on the search results spreadsheet).</p> <p>(Yes, No, Unknown)</p>
<p>If the answer to Question 1 was "Yes", then with the concurrence of the Department of Environmental Quality, no further ecological assessment is required at the site. Go to parts 3 (see p. 9) and 4 (see p. 10) of the Ecological Exclusion Assessment to provide evidence supporting your answer and to complete the Certification section.</p> <p>If the answer to Question 1 was "No" or "Unknown", then proceed with questions 2 through 6 to complete Part 2 of the Ecological Exclusion Assessment.</p>	
2	<p>Which is/are potentially affected? (Circle all that apply)</p> <p>Surface Soil (0-5' deep) Subsurface Soil (deeper than 5') Surface Water</p> <p>Groundwater Surface Sediment (0-4" deep)</p> <p>Subsurface Sediment (deeper than 4") Air</p>
3	<p>Are important or sensitive habitats present within the affected area? (Yes, No, Unknown)</p> <p>Note:</p> <p><u>Important habitats</u> include fish-bearing water bodies (possibly including ditches, streams, rivers, ponds, lakes, or reservoirs) and habitats that are uncommon (such as pools/wetlands in arid basins) or that many fish or wildlife are known to use.</p> <p><u>Sensitive habitats</u> include local, state, or federal natural areas, refuges, reserves, or preserves, wetlands, areas where habitat, fish, or wildlife restoration will be conducted, other lands designated for wildlife habitat and/or use, or unique or rare habitats such as thermal hot springs, or those habitats that contain unique or rare plants, fish or wildlife.</p>

<p>4</p>	<p>Is the potentially affected area likely to attract or be a feeding area or resting site for rare, threatened, or endangered species or for a large number of non-protected fish or wildlife? (Yes, No, Unknown)</p> <p>Note: Use the rare, threatened, or endangered species information from question 1 to aid in answering this question.</p>	
<p>5</p>	<p>Is it likely that site-related chemicals will migrate to other areas where important or sensitive habitats, or rare, threatened or endangered species will be present? (Yes, No, Unknown)</p>	
<p>6</p>	<p>Could site-related chemicals or their remediation result in physical harm (such as coating with oil, excavating habitat, or destroying many nests) to individuals of a protected (i.e., threatened, or endangered) species or a large number of non-protected fish or wildlife. (Yes, No, Unknown)</p>	
<p>If the answers to Questions 3 through 6 are all “No”, then, with the concurrence of the Department of Environmental Quality, no further ecological assessment is required at the site. Go to parts 3 and 4 of the Ecological Exclusion Assessment (pp 9 and 10) to provide evidence supporting your answer and to complete the Certification section.</p> <p>If any of the answers to Questions 3 through 6 are “Yes” or “Unknown”, Proceed to Step 2, 3, 4 or remedial actions, as deemed appropriate through the Ecological Scoping Assessment.</p>		

Step 1: Ecological Exclusion Assessment – Part 4

Part 4: Ecological Exclusion Assessment Certification	
<p>I have prepared or reviewed this Ecological Exclusion Assessment and swear that the information contained in it is accurate and represents actual site conditions. I certify that the Ecological Exclusion Assessment and all attachments were prepared by me or under my direction or supervision by qualified personnel capable of properly gathering and evaluating the information submitted. I am aware that there are significant penalties for submitting false information.</p>	
Name:	_____
Title:	_____
Date:	_____

Step 2A: Ecological Scoping Assessment

Instructions

This checklist should be completed by, or under the supervision of, a biologist, ecologist, or other qualified environmental professional who is familiar with the site assessment or ecological risk assessment processes.

The following questions comprise the Ecological Scoping Assessment, Step 2 of a VRP Ecological Risk Assessment. The purpose of Steps 2a and 2b is to determine and document whether a more complex Ecological Risk Assessment is necessary for a contaminated site.

If the answer to any of the following questions is “Unknown” it may be interpreted to represent a “Yes” or “No” response, whichever leads to a more conservative estimate of the potential for ecological receptors to be exposed to, and/or affected by, site-related chemicals. The answers to the questions within Step 2a should be supported by documentation of pertinent ecological conditions at the site as part of Step 2b. Such documentation constitutes Step 2b of the VRP Ecological Risk Assessment approach and includes completion of the VRP Ecological Scoping Assessment Documentation checklist, written documentation that provides the information requested in the checklist, or other pertinent written or pictorial information that supports the conclusions reached in Step 2a. The Step 2b documentation can be submitted to DEQ separately or as part of the report for additional, more complex ecological assessment.

For the purposes of Steps 2a and 2b, the term “significant” is used to assess the types of receptors that may be present and the potential ecological exposure to and effects of site-related chemicals of interest. The use of the term “significant” does not imply that statistical or other numerical measures of significance need to be determined. Rather, it is intended to imply a subjective threshold above which there is likely to be a need for further ecological assessment. “Significant species” may be those that are of concern for societal or regulatory reasons. “Significant effects” are those that may result in harm to a population of ecological receptors or to individual threatened or endangered species. If the answers provided in Step 2a indicate that significant receptors or significant ecological effects are not expected at a given site, then justification for these answers must be provided within Step 2b.

Site-specific wetland delineation, critical habitat/species surveys, or other detailed field efforts are not required for Steps 2a or 2b. However, a rare, threatened, or endangered species search via the Wyoming Natural Diversity Database or local biologists is required. If the U.S. Fish and Wildlife Service is contacted to obtain a threatened or endangered species list, a biologist will be required to determine whether the contaminated site has habitat for the listed species. Only those sections of Steps 2a and 2b that apply to your site need to be considered.

Step 2A: Ecological Scoping Assessment – Part 1

Part 1: Basic Site Information	
Site Name/Project Name:	
Site Location: (address, county, and/or region)	
Latitude/Longitude or other location documentation for site:	
Size of Site (acres):	
Size of the affected area (acres):	
Type of Facility: (gas station, dry cleaner, jet hangar, etc.)	
Date and Time Checklist Completed:	
Checklist Completed By: (name and title/expertise)	
Type of Chemical Spill/Release: For Example: Tanker Spill - Gasoline Storage Tank Release - Diesel Service Bay Spills and Leaks - Petroleum Products Process Wastes - Chlorinated Solvents	

Step 2A: Ecological Scoping Assessment – Part 2

Part 2: Surface Water/Sediment/Groundwater Contamination	
1	<p>Is site-related or spill-related contamination known or likely to exist in on- or off-site surface water or is it likely that such contaminants will reach a surface water body or wetland habitat within one-half mile of the affected area via surface water runoff or related erosion? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 5 and 6.5 through 6.9. (See pp 24-27)</p>
2	<p>Is site-related or spill-related contamination known or likely to exist in on- or off-site sediment (include consideration of chemical transport through groundwater to sediment)? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 5 and 6.5 through 6.9. (See pp 24-27)</p>
3	<p>Is it likely that any site-related or spill-related contaminants will reach surface water or sediment in a surface water body or wetland habitat within one-half mile of the affected area via transport in groundwater? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 5 and 6.5 through 6.9. (See pp 24-27)</p>
4	<p>Did you answer “Yes” or “Unknown” to either questions 1,2, or 3? (Yes, No)</p>
5	<p>Do ecological receptor populations (e.g., aquatic or benthic plants, aquatic or benthic invertebrates, fish, reptiles, amphibians, aquatic birds, aquatic mammals, semi-aquatic birds, or semi-aquatic mammals), or large portions of such populations, use the potentially affected water body? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 6.5 through 6.9, 7, and 8. (See pp 25-30)</p>
6	<p>Are important, unique, or critical habitats (e.g. migratory waterfowl staging areas, spawning areas, thermal hot springs, etc.) within or immediately downstream of the potentially affected water body? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 6.5 through 6.9, 7, and 8. (See pp 25-30)</p>
7	<p>Are there any documented sensitive, rare, threatened, or endangered species, in the vicinity of the contamination, that are known or likely to use the affected water body? (Yes, No, Unknown)</p> <p>Note: Volunteers should contact the Wyoming Natural Diversity Database at ((307)-766-3023 & http://uwadmnweb.uwyo.edu/wyndd/) to receive information regarding rare, threatened or endangered species in the vicinity of the affected area.</p> <p>Provide documentation in Step 2b, Parts 7 and 8. (See pp 28-30)</p>
8	<p>Did you answer “Yes” or “Unknown” to either questions 5, 6, or 7? (Yes, No)</p>
9	<p>Is further ecological assessment required for current or future site-related or spill- related contamination in surface water or sediment?</p> <p>If the answer to question 4 was “No”, then the answer to question 9 is “No”. If the answer to question 4 is “Yes” <u>and</u> the answer to question 8 is “No”, then the answer to question 9 is “No”. If the answers to both questions 4 <u>and</u> 8 were “Yes” then the answer to question 9 is “Yes”.</p>

If the answer to Question 9 was “No” then no further ecological assessment is required at the site for surface water or sediment. The site conditions that support this decision should be described in Step 2b. Proceed to question 10.

If the answer to Question 9 was “Yes”, then further ecological assessment may be warranted for the site. The site conditions supporting this answer and the need, or lack of need, for further assessment of surface water or sediment may be described in Step 2b, or Step 3, Step 4, or remedial action may be completed if further ecological assessment or remediation of surface water or sediment contamination is warranted. Proceed to question 10.

Step 2A: Ecological Scoping Assessment – Part 3

Part 3: Soil/Groundwater Contamination	
10	<p>Is site-related or spill-related contamination known or likely to exist in on- or off-site soil at any depth? (Yes, No, Unknown)</p> <p>If “No”, proceed to question 18. (See p.15) If “Yes” or “Unknown” proceed to question 11. Provide documentation in Step 2b, Part 5. (See p. 24)</p>
11	<p>Is site-related or spill-related soil contamination known or likely to be present in subsurface soil (i.e., at a depth greater than 5 feet below ground surface [bgs])? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Part 5. (See p. 24)</p>
12	<p>Is site-related or spill-related soil contamination known or likely to be present in surface soil (i.e., at a depth of 0 to 5 feet bgs)? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Part 5. (See p. 24)</p>
13	<p>Is the area of surface soil contamination capped, covered, or otherwise developed such that current and foreseeable future exposure of ecological receptors is precluded? (Not Applicable for soil contamination deeper than 5 feet bgs) (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 5 (See p. 24) and 6.9. (See p. 26)</p>
14	<p>Is there a use control area designated to prevent contaminated subsurface soil (i.e., greater than 5 feet below the ground surface [bgs]) from being excavated, and/or to prevent surface soil (0 to 5 feet bgs) from being “uncovered” and left at the surface where ecological exposure could occur? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 5 (See p. 24) and 6.2 through 6.5. (p. 25)</p>
15	<p>Is it likely that any site-related or spill-related soil contamination at any depth bgs is in contact with, or could infiltrate to, groundwater and be transported to a surface water body or wetland within one-half mile of the site boundary? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 5 (See p. 24) and 6.2 through 6.5. (p. 25)</p>
16	<p>Are ecological receptors potentially exposed to site-related or spill-related contaminants in subsurface soil (i.e., greater than 5 feet below the ground surface) due to potential future excavation/uncovering of the subsurface soil or due to contaminant transport in groundwater?</p> <p>If the answer to question 10 is “No”, then the answer to question 16 is “No”. If the answer to question 11 is “No”, then the answer to question 16 is “No”. If the answers to questions 11 and 14 are “Yes”, and the answer to 15 is “No”, then the answer to 16 is “No”</p> <p>Otherwise, if significant ecological exposure pathways could exist, the answer to question 16 is “Yes”.</p>

17	<p>Are ecological receptors potentially exposed to site-related or spill-related contaminants in surface soil (i.e., between 0 and 5 feet below the ground surface) due to direct exposure, future excavation/uncovering of the subsurface soil, or due to contaminant transport in groundwater?</p> <p>If the answer to question 10 is “No”, then the answer to question 17 is “No” If the answer to question 12 is “No”, then the answer to question 17 is “No” If the answers to questions 12 and 13 are yes and 11 is “No” or 14 is “Yes” <u>and</u> the answer to 15 is “No”, then the answer to question 17 is “No”</p> <p>Otherwise, if significant ecological exposure pathways could exist the answer to question 17 is “Yes”.</p>	
18	<p>Is further ecological assessment required for current or potential future site-related or spill-related contamination in soil?</p> <p>If the answers to questions 16 and 17 are “No”, then the answer to question 18 is “No”. If the answer to either question 16 or 17 is “Yes”, then the answer to question 18 is “Yes”.</p>	
<p>If the answer to question 18 is “No”, then no further ecological assessment is required at the site for soil. The site conditions that support this decision should be described in Step 2b. Then proceed to question 25. (See p.17)</p> <p>If the answer to question 18 is “Yes”, then further ecological assessment may be warranted for the site. The site conditions supporting this answer and the need, or lack of need, for further assessment of surface water or sediment may be described in Step 2b, or Step 3, Step 4, or remedial action may be completed if further ecological assessment or remediation of surface water or sediment contamination is warranted. Proceed to questions 19 through 24.</p>		

Step 2A: Ecological Scoping Assessment – Part 4

Part 4: Surface Soil Contamination	
19	<p>Do ecological receptor populations (e.g., terrestrial plants, invertebrates, reptiles, birds, or mammals) or large portions of such populations, use the potentially affected area of surface soil contamination and are population numbers likely to be reduced due to such use? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 6.2 through 6.5, (p. 25) 7, and 8. (pp 28-30)</p>
20	<p>Are important, unique, or critical habitats (e.g. rookeries) within the area likely to be impacted by current or potential future site-related surface soil contamination or is the area a particular attractant or potential attractant to any plants, invertebrates, or wildlife (e.g. wildlife habitat restoration areas, nature preserves, or a primary nesting/display area)? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Parts 6.2 through 6.5, (p. 25) 7, and 8. (pp 28-30)</p>
21	<p>Are any documented sensitive, rare, threatened, or endangered species in the vicinity of the contamination known or likely to use the affected area of surface soil contamination? (Yes, No, Unknown)</p> <p>Note: Volunteers should contact the Wyoming Natural Diversity Database at ((307)-766-3023 & http://uwadmnweb.uwo.edu/wyndd/) to receive information regarding rare, threatened or endangered species in the vicinity of the affected area.</p> <p>Provide documentation in Step 2b, Parts 7 and 8. (pp 28-30)</p>
22	<p>Is the combined area of all current or potential future surface soil contamination greater than one-half (½) of an acre? (Yes, No, Unknown)</p>
23	<p>Are there more than 2 contiguous acres of non-maintained wildlife habitat on or within the area of current or potential future surface soil contamination, or is the area of current or potential future surface soil contamination on, or within 500 feet of, a particularly important, unique, critical, or sensitive habitat? (Yes, No, Unknown)</p>
24	<p>Is further ecological risk assessment warranted for current or potential future site- related surface soil contamination?</p> <p>If the answers to questions 19 through 23 are all “No” then the answer to question 24 is “No”.</p> <p>If the answer to any one of questions 19 through 23 is “Yes” or “Unknown”, then the answer to question 24 is “Yes”.</p>
<p>If the answer to question 24 is “No”, no further ecological assessment is required at the site for surface soil. The site conditions that support this decision should be described in Step 2b. Proceed to question 25.</p> <p>If the answer to question 24 is “Yes” then further ecological assessment may be warranted for soil contamination at the site. The site conditions supporting this answer and the need, or lack of need, for further assessment may be discussed in Step 2b, or Step 3, Step 4, or remedial action may be completed if further ecological assessment or remediation of surface soil contamination is to be conducted. If the “Yes” response to question 24 is the result of site- related contamination in subsurface soil that may be brought to the surface in the future, use control area considerations to prevent this occurrence (making further ecological assessment unnecessary) may be provided as part of Step 2b to document why further ecological assessment may be unnecessary. Proceed to question 25.</p>	

Step 2A: Ecological Scoping Assessment – Part 5

Part 5: Visible Impacts/Physical and Biological Hazards	
25	<p>Is there apparent visual evidence of significant chemical-related impacts to plants, invertebrates, fish, or wildlife? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Part 9. (See p.31)</p>
26	<p>Are any chemical-related physical hazards (e.g. oil pits, nets, towers, etc.) or biological hazards (e.g. landfill wastes or sewage ponds) present that may significantly affect plant, invertebrates, fish, or wildlife populations? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Part 9. (See p.31)</p>
27	<p>Are Best Management Practices (BMPs), Best Available Technologies (BATs), or other appropriate ecological impact mitigation procedures being implemented to eliminate or reduce the biological or chemical-related physical hazards (e.g., oiling, entanglement, bird impacts, etc.) present at the site? (Yes, No, Unknown)</p> <p>Provide documentation in Step 2b, Part 9. (See p.31)</p>
28	<p>Is further action required at the site to reduce the biological or physical hazards?</p> <p>If the answers to questions 25 and 26 were “No” then the answer to question 28 is “No”. If the answer to question 25 or 26 was “Yes” or “Unknown” <u>and</u> the answer to question 27 was “Yes”, the answer to question 28 is “No”. If the answer to question 25 or 26 was “Yes” or “Unknown” <u>and</u> the answer to question 27 was “No” or “Unknown”, then the answer to question 28 is “Yes”</p>
<p>If the answer to question 28 was “No”, no further ecological assessment is needed for physical or biological hazards. The site conditions that support this decision should be described in Step 2b.</p> <p>If the answer to question 28 was “Yes”, then further ecological assessment may be warranted for the site. The site conditions supporting this answer and the need, or lack of need, for further assessment may be discussed in Step 2b, or Step 3, Step 4, or remedial action may be completed if further ecological assessment of physical or biological hazards or remediation is to be conducted. Proceed to Steps 2b, Step 3, Step 4, or remedial action as indicated by the answers to questions provided in Step 2a.</p>	

Step 2B: Ecological Scoping Assessment Documentation

Instructions

The Ecological Scoping Assessment Documentation should be completed by, or under the supervision of, a biologist, ecologist, or other qualified environmental professional who is familiar with the site assessment or ecological risk assessment processes.

The following questions comprise the Ecological Scoping Assessment Documentation, Step 2b of a VRP Ecological Risk Assessment. The purpose of Step 2b is to document whether a more complex Ecological Risk Assessment is necessary for a contaminated site. The Step 2b documentation can be submitted to DEQ separately or as part of the report for additional, more complex ecological assessment.

To address the need for decision documentation as all or part of Step 2b of the Wyoming VRP ecological risk assessment approach, fill in all the blank spaces with the appropriate information or “NA” if the question is not applicable at the site. If the appropriate answer is unknown, insert “U” in the response column. These “U” responses may be interpreted to represent a “Yes” or “No” response, whichever would lead to a more conservative estimation of the potential for ecological receptors to be exposed to site-related chemicals. Written documentation other than the Step 2b checklists may also be provided as all or part of the decision documentation required in Step 2b.

The Ecological Scoping Assessment Documentation must clearly, logically, and adequately justify or refute the answers and decisions that were made during responses to the questions posed in the Ecological Scoping Assessment (Ecological Risk Assessment Step 2a). This is provided by completing Steps 1 through 4 and all, or portions, of the remaining Ecological Scoping Assessment Documentation Checklist (as required, based on your answers in Step 2a). Additional justification (e.g., memorandum or letter) may also be provided such that pertinent site-specific ecological conditions are adequately documented.

Site-specific wetland delineation, critical habitat/species surveys, or other detailed field efforts may be conducted but are not required for this effort. However, a rare, threatened, or endangered species search via available natural heritage databases or local biologists is required (contact the Wyoming Natural Diversity Database: (307)-766-3023 and <http://uwadmnweb.uwyo.edu/wyndd/>). If possible, a site visit should be conducted at a time (e.g., early morning) when invertebrate, fish, or wildlife are most active; preferably not during inclement weather.

Surface soil, surface water, or surface sediment may be excluded from further assessment if that medium does not contain site-related hazardous substances or if it can be shown in Step 2a and/or 2b that it is unlikely for plants, invertebrates, fish, and wildlife to be significantly exposed to site-related hazardous substances in that particular medium, now and in the future. Within Step 2b consideration may be provided to the nature of the contamination, soil type, precipitation levels, and

quantity of the hazardous substance. A site may be excluded from further ecological assessment (i.e., Step 3 or Step 4 of an ecological risk assessment) if it can be shown in Steps 2a and/or 2b that it is unlikely for plants, invertebrates, fish, and wildlife to be significantly exposed to site-related contaminants in all media, now and in the future.

Step 2B: Ecological Scoping Assessment Documentation – Part 1

To address the need for Ecological Scoping Assessment Documentation as all or part of Step 2b of the Wyoming VRP ecological risk assessment process, fill in all the blank spaces with the appropriate information or “NA” if the question is not applicable at the site. If the appropriate answer is unknown, insert “U” in the response column. These “U” responses may be interpreted to represent a “Yes” or “No” response, whichever leads to a more conservative estimation of the potential for ecological receptors to be exposed to site-related chemicals.

Part 1: Basic Site Information	
Site Name/Project Name:	
Site Location: (address, county, and/or region)	
Latitude/Longitude or other location documentation for site:	
Size of Site (acres):	
Size of the affected area (acres):	
Type of Facility: (gas station, dry cleaner, jet hangar, etc.)	
Date and Time Checklist Completed:	
Checklist Completed By: (name and title/expertise)	
Type of Chemical Spill/Release: For Example: Tanker Spill - Gasoline Storage Tank Release - Diesel Service Bay Spills and Leaks - Petroleum Products Process Wastes - Chlorinated Solvents	

Step 2B: Ecological Scoping Assessment Documentation – Part 2

Part 2: Site Description (provide pictures, aerial photos, or video of site and surroundings)	
Approximate size of site: (dimensions, acres, hectares)	
Are there buildings on-site? (Yes, No) If so, describe.	
What percentage of the site is paved or graveled?	
Is the site fenced? (Yes, No)	
If "Yes" above, what type(s) and height(s) of fence? (concertina, chain link, barbed wire, wood rail, etc)	
Is access to the site controlled? (Yes, No)	
If so, how?	
Are there multiple uses of the site? (Yes, No)	
Has there been significant recent soil disturbance at the site (e.g. excavation, dozing, etc.)? (Yes, No)	
If "Yes" above, describe soil disturbance:	
What is the known / suspected depth to groundwater (feet)?	
Discussion:	
Draw a sketch of the site on the next page	

Sketch of site boundaries, buildings, parking lots, fences, and other features
(If an accurate site map is available it may be attached as a substitute for the sketch)

Step 2B: Ecological Scoping Assessment Documentation – Part 3

Part 3: Land Use (provide pictures, aerial photos, or video of site and surroundings)	
Past land use at site?	
% Urban Residential	
% Rural Residential	
% Industrial / Commercial	
% Recreational	
% Agricultural	
% Grassland or Scrub / Shrub	
% Forested / Wooded	
% Wetland / River / Lake (circle as appropriate)	
% Other (describe briefly)	
What is the site's current county or city zoning?	
Current land use at site?	
% Urban Residential	
% Rural Residential	
% Industrial / Commercial	
% Recreational	
% Agricultural	
% Grassland or Scrub / Shrub	
% Forested / Wooded	
% Wetland / River / Lake (circle as appropriate)	
% Other (describe briefly)	
Current/Future Land Use Within ½ mile of the Site?	
% Urban Residential	
% Rural Residential	
% Industrial / Commercial	
% Recreational	
% Agricultural	
% Grassland or Scrub / Shrub	
% Forested / Wooded	
% Wetland / River / Lake (circle as appropriate)	
% Other (describe briefly)	
What is the likely, proposed, or documented future zoning/land use for the site? (required only if different than current land use)	

<p>Are there land use restrictions currently in place? If "Yes", describe briefly</p>	
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Step 2B: Ecological Scoping Assessment Documentation – Part 4

Part 4: Chemicals of Interest (based on past and current land use practices and/or previous investigations)		
<p>List the known or suspected site-related potentially hazardous substances that may have been released to the environment and are currently being investigated. (Provide chemical class and/or specific name)</p> <p>Chemical classes may include, but are not limited to:</p> <p>Inorganics Volatiles Semi-volatiles PAHs Petroleum Pesticides/PCBs Herbicides Organophosphorus pesticides (OPs)</p>	Chemical Class	Chemical Name
<p>List the known or suspected site-related potentially hazardous substances that may have been released to the environment and are currently being investigated. (Provide chemical class and/or specific name)</p> <p>Chemical classes may include, but are not limited to:</p> <p>Inorganics Volatiles Semi-volatiles PAHs Petroleum Pesticides/PCBs Herbicides Organophosphorus pesticides (OPs)</p>	Chemical Class	Chemical Name
What is the area of soil contamination?		
What is the area of surface water/sediment contamination?		
Estimated volume of contamination?		
Discussion:		

Step 2B: Ecological Scoping Assessment Documentation – Part 5

Part 5: Chemical Sources, Release Mechanisms, and Likely Transport Pathways, and Affected Media										
Primary source(s) of chemicals? (Where did chemicals come from?) ("U" if unknown)										
May include , but not limited to:										
<table border="0"> <tr> <td>Manufactured on-site</td> <td>Site process(es)</td> </tr> <tr> <td>On-site barrel storage</td> <td>Electrical transformers</td> </tr> <tr> <td>Tanker truck</td> <td>Oil Drilling</td> </tr> </table>	Manufactured on-site	Site process(es)	On-site barrel storage	Electrical transformers	Tanker truck	Oil Drilling				
Manufactured on-site	Site process(es)									
On-site barrel storage	Electrical transformers									
Tanker truck	Oil Drilling									
Release mechanisms from primary source										
May include, but not limited to:										
<table border="0"> <tr> <td>Burning</td> <td>Volatilization</td> <td>Dumping</td> </tr> <tr> <td>Spills/Leaks</td> <td>Spraying</td> <td>Overflow/Outfall</td> </tr> <tr> <td colspan="3">Industrial/Commercial Processes</td> </tr> </table>	Burning	Volatilization	Dumping	Spills/Leaks	Spraying	Overflow/Outfall	Industrial/Commercial Processes			
Burning	Volatilization	Dumping								
Spills/Leaks	Spraying	Overflow/Outfall								
Industrial/Commercial Processes										
Potential transport mechanisms from point of release										
May include, but not limited to:										
Suspension/Transport via Wind Deposition to Surface Soil Surface Runoff/Erosion via Water Leaching/Infiltration to Subsurface Soil										
Leaching/Infiltration to Groundwater Groundwater Flow Surface Water Flow Deposition to Sediment Resuspension from Sediment										
Media known or likely to be impacted by release (surface soil [0-5 feet bgs], subsurface soil [>5 feet bgs], groundwater, surface water, or sediment)										
Discussion:										

Step 2B: Ecological Scoping Assessment Documentation – Part 6

Part 6: Ecosystem Components (photographic documentation is highly recommended)	
6.1 Pavement/Gravel – No Habitat	
Percentage of site covered with buildings, pavement, or non-native gravel	
Evidence/observation of wildlife in the paved/gravel environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.2 Terrestrial – Wooded Habitat	
Percentage of site that is wooded	
Dominant vegetation type (Evergreen, Deciduous, Mixed)	
Prominent tree diameter at four feet above the ground (<6", 6" to 12", >12")	
Evidence/observation of wildlife in the wooded environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.3 Terrestrial – Scrub/Shrub/Grassy Habitat	
Percentage of site that is scrub/shrub	
Dominant vegetation type (Scrub, Shrub, Grasses, Other)	
Prominent height of vegetation (<2', 2' to 5', >5')	
Density of vegetation (Dense, Patchy, Sparse)	
Evidence / observation of wildlife in the scrub/shrub/grass environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.4 Terrestrial – Ruderal/Landscaped Habitat	
Percentage of site that is ruderal/landscaped	
Dominant vegetation type (Landscaped, Agriculture, Fallow, Bare, Other)	
Prominent height of vegetation (0', >0' to <2', 2' to 5', >5')	
Density of vegetation (Dense, Patchy, Sparse)	
Evidence / observation of wildlife in the ruderal/landscaped environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.5 Riparian Habitat	
Percentage of site that is riparian	
Dominant vegetation type? (Meadow/Grassland, Scrub/Shrub, Forested, etc.)	
Density of vegetation? (Dense, Patchy, Sparse)	
Evidence / observation of wildlife in the riparian environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.6 Aquatic - Non-flowing (Lentic) Habitat	
Percentage of site that is covered by lakes or ponds	
Type of water bodies (Lakes, Ponds, Vernal pools, Impoundments, Lagoon, Reservoir)	
Size (acres) of water bodies	
Average depth (feet) of water bodies	

Part 6: Ecosystem Components (photographic documentation is highly recommended)	
Trophic status of water bodies (Highly Eutrophic, Moderately Eutrophic, Oxygenated/clear)	
Source water (River, Stream, Groundwater, Industrial discharge, Surface water runoff)	
Water discharge point (None, River, Stream, Groundwater, Wetlands, Impoundment)	
Nature of bottom (Mud/Muck, Rock, Sand, Concrete, Other)	
Vegetation present (Submerged, Emergent, Floating)	
Obvious wetlands associated with water body (Yes, No)	
Evidence / observation of wildlife in the lake or pond environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.7 Aquatic – Flowing (Lotic) Habitat	
Percentage of site that is covered by rivers, streams, brooks, creeks, intermittent streams, dry wash, arroyo, ditches, or channels.	
Type of water bodies (Rivers, Streams, Intermittent Streams, Dry Wash, Arroyo, Ditches, Channels, Impoundments)	
Width and approximate flow (e.g., cubic feet per second) of water bodies	
Average depth (feet) of water bodies	
Trophic status of water bodies (Highly Eutrophic, Moderately Eutrophic, Oxygenated/clear)	
Bank Height in Feet	
Bank Environment (Heavily vegetated, Sparsely vegetated, Bare)	
Bank Environment (Vertical/undercut, Steep, Gradual)	
Source Water (River, Stream, Groundwater, Industrial, Surface water runoff)	
Primary off-site receiving water body (None, River, Stream, Groundwater, Wetlands, Impoundment)	
Nature of bottom (Mud, Rock, Gravel, Sand, Concrete, Other)	
Vegetation present (Submerged, Emergent, Floating)	
Obvious wetlands in association with water body (Yes , No)	
Evidence / observation of wildlife in the flowing water environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.8 Aquatic – Wetland Habitat	
Obvious or designated wetlands present (Yes , No)	
Wetlands suspected at site is/has (Adjacent to Water Body, in Flood Plain, Standing Water, Dark Wet Soils, Mud cracks, Debris line, Water marks)	
Vegetation present (Submerged, Emergent, Scrub/shrub, Wooded)	
Size (acres) and depth (feet) of suspected wetlands	
Source water (River, Stream, Groundwater, Industrial discharge, Surface water runoff)	
Water discharge point (None, River, Stream, Groundwater, Impoundment)	
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other) Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
6.9 Aquatic – Offsite Habitat	
Are there wetlands, ponds, lakes, streams or rivers within ½ mile of the site? (Yes , No)	

Part 6: Ecosystem Components (photographic documentation is highly recommended)	
If yes, is groundwater likely to be hydraulically connected with this surface water? (Yes / No / Unknown)	
Type of water bodies (Wetland, Pond, Lake, Rivers, Streams, Intermittent Streams, Dry Wash, Arroyo, Ditches, Channels, Impoundments)	
Size (acres) or width and approximate flow (e.g., cubic feet per second) of water bodies	
Average depth (feet) of water bodies	
Trophic status of water bodies (Highly Eutrophic, Moderately Eutrophic, Oxygenated/clear)	
Bank Height in Feet	
Bank Environment (Heavily vegetated, Sparsely vegetated, Bare)	
Bank Environment (Vertical/undercut, Steep, Gradual)	
Source Water (River, Stream, Groundwater, Industrial, Surface water runoff)	
Primary off-site receiving water body (None, River, Stream, Groundwater, Wetlands, Impoundment)	
Nature of bottom (Mud, Rock, Sand, Concrete, Other)	
Vegetation present (Submerged, Emergent, Floating)	
Obvious wetlands present (Yes , No)	
Evidence / observation of wildlife in the offsite aquatic environment (None, Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	
Abundance of observed/expected species (Numerous, Common, Occasional, Rare)	
Discussion:	

Step 2B: Ecological Scoping Assessment Documentation – Part 7

Part 7: Ecologically Important Habitats / Species	
Are there any of the following documented at the site:	
State or federal wildlife areas/reserve/preserve/refuge/etc. (Yes, No)	
Other public or private set asides for plants, invertebrates, fish or wildlife (Yes, No)	
Critical habitat for candidate, proposed, rare, threatened, or endangered species (Yes, No)	
Riparian habitat (Yes, No)	
Wetlands (Yes, No)	
Old-growth/original native habitat (Yes, No)	
Are there any of the following documented within one-half mile of the site?	
State or federal wildlife areas/reserve/preserve/refuge/etc. (Yes, No)	
Other public or private set asides for plants, invertebrates, fish or wildlife (Yes, No)	
Critical habitat for candidate, proposed, rare, threatened, or endangered species (Yes, No)	
Riparian habitat (Yes, No)	
Wetlands (Yes, No)	
Old-growth/original native habitat (Yes, No)	
Is the site an attractant for particular species from the surrounding area (e.g., a heavily used wetland environment in an otherwise arid environment) (Yes, No)	
Are there candidate, proposed, rare, threatened, or endangered species, and/or species of concern documented to use the site? (Yes, No)	
If present, list the candidate, proposed, rare, threatened, and/or endangered species and/or species of concern known or expected to use the site	
Are there candidate, proposed, rare, threatened, or endangered species and/or species of concern documented within one-half mile of the site? (Yes, No)	
If present, list the candidate, proposed, rare, threatened, or endangered species, and/or species of concern known or expected within one-half mile of the site	
Discussion:	

Step 2B: Ecological Scoping Assessment Documentation – Part 8

Part 8: Evaluation of Receptor-Pathway Interactions			
8.1 Surface Water (answer “Y” = yes; “N” = No, “U” = Unknown)	Y	N	U
Are site-related hazardous substances known or likely to be present in surface waters? AND Are ecologically important species or habitats present? AND Is it likely that these species or habitats will be significantly affected by site-related hazardous substances in surface water?			
When answering the above questions, consider the following: Known or suspected presence of hazardous substances in surface waters. Ability of hazardous substances to migrate to surface waters. Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters. Semi-aquatic (e.g. waterfowl, shorebirds, and mink) and aquatic receptors may be exposed through osmotic exchange, respiration or ventilation, dermal exposure as a result of wading or swimming, and by ingestion of surface waters and aquatic organisms. Contaminants may be taken-up by plants whose roots are in contact with surface waters. Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.			
Are site-related hazardous substances known or likely to be present in groundwater? AND Are ecologically important species or habitats present? AND Is it likely that these species or habitats will be significantly affected by site-related hazardous substances in groundwater?			
When answering the above questions, consider the following: Known or suspected presence of hazardous substances in groundwater. Ability of hazardous substances to migrate to groundwater. Potential for hazardous substances to migrate via groundwater and discharge into wetland habitats and/or surface waters. Contaminants may be taken-up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1m depth). Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.			
8.2 Surface Sediment (answer “Y” = yes; “N” = No, “U” = Unknown)	Y	N	U
Are site-related hazardous substances known or likely to be present in sediments? AND Are ecologically important species or habitats present? AND Is it likely that these species or habitats will be significantly affected by site-related hazardous substances in sediments?			

<p>When answering the above questions, consider the following: Known or suspected presence of hazardous substances in sediment. Ability of hazardous substances to leach or erode from surface soils and be carried into sediment via surface runoff. Potential for contaminated groundwater to upwell through, and deposit contaminants in, sediments. If sediments are present in an area that is shallow or only periodically inundated with water, terrestrial species may be directly exposed (i.e. incidental ingestion or dermal) to sediment. Semi-aquatic (e.g. waterfowl, shorebirds, and mink) and aquatic receptors may be directly exposed to sediments or may be exposed through osmotic exchange, respiration or ventilation of sediment pore waters. Terrestrial and rooted aquatic plants may be exposed to sediment in shallow or periodically inundated areas.</p>			
<p>Are site-related hazardous substances known or likely to be present in prey or food items of ecologically important receptors? AND Are ecologically important species or habitats present? AND Is it likely that these species or habitats will be significantly affected by site-related hazardous substances via consumption of food items?</p>			
<p>When answering the above questions, consider the following: Higher trophic level terrestrial and aquatic consumers and predators may be exposed through consumption of contaminated food sources. In general, organic contaminants with log K_{ow} > 3.5 may accumulate in terrestrial mammals and those with a log K_{ow} > 5 may accumulate in aquatic vertebrates.</p>			
<p>8.3 Surface Soil (answer “Y” = yes; “N” = No, “U” = Unknown)</p>	Y	N	U
<p>Are site-related hazardous substances known or likely to be present in surficial soils? AND Are ecologically important species or habitats present? AND Is it likely that these species or habitats will be significantly affected by site-related hazardous substances via incidental ingestion of or dermal contact with surficial soils?</p>			
<p>When answering the above questions, consider the following: Known or suspected presence of hazardous substances in surficial (<5 ft deep) soils. Ability of hazardous substances to migrate to surficial soils. Significant exposure via dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers. Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash). Contaminants in bulk soil may partition into soil solution, making them available to roots. Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil.</p>			
<p>Are site-related hazardous substances known or likely to be present in subsurface (>5 ft deep) soils? AND Are ecologically important species or habitats present? AND Is it likely that these species or habitats will be significantly affected by site-related hazardous substances via vapors or fugitive dust carried in surface air or confined in burrows?</p>			

<p>When answering the above questions, consider the following:</p> <p>Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant $> 10^{-5}$ atm m³/mol and molecular weight < 200 g/mol).</p> <p>Exposure via inhalation is most important to organisms that burrow in contaminated soils, given the limited amounts of air present to dilute vapors and an absence of air movement to disperse gases.</p> <p>Exposure via inhalation of fugitive dust is particularly applicable to ground-dwelling species that could be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.</p> <p>Foliar uptake of organic vapors would be limited to those contaminants with relatively high vapor pressures.</p> <p>Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces.</p>	
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Step 2B: Ecological Scoping Assessment Documentation – Part 9

Part 9: Observed Ecological Impacts Associated With Site-Related Hazardous Substances	
Are there apparent site-related physical impacts to on-site vegetation (e.g., grading, dredging, road building, etc.)? (None, Limited, Extensive)	
Are there any apparent chemical-related impacts to on-site vegetation (e.g., lack of vegetation within an area of oil-stained soil)? (None, Limited, Extensive)	
Are there apparent site-related physical impacts to vegetation within ½ mile of the site? (None, Limited, Extensive)	
Are there apparent site-related chemical impacts to vegetation within ½ mile of the site? (None, Limited, Extensive)	
Is there, or have there been any apparent site-related physical impacts (including hazards such as netting or oil pits) to on-site macroinvertebrates, reptiles, amphibians, birds, mammals, or fish? (None, Limited, Extensive)	
Is there, or have there been any apparent site-related chemical impacts to on-site macroinvertebrates, reptiles, amphibians, birds, mammals, or fish? (None, Limited, Extensive)	
Is there, or have there been any apparent site-related physical impacts to macroinvertebrates, reptiles, amphibians, birds, mammals, or fish within ½ mile of the site? (None, Limited, Extensive)	
Is there, or have there been any apparent site-related chemical impacts to on-site macroinvertebrates, reptiles, amphibians, birds, mammals, or fish within ½ mile of the site? (None, Limited, Extensive)	
Other readily observable impacts (None, Discuss below)	
Discussion:	