



# ECO Update

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Hazardous Site Evaluation Division (OS-230)

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## Briefing the BTAG: Initial Description of Setting, History, and Ecology of a Site

For many Superfund sites, contaminants can cause ecological harm as well as posing risks to human health. Part of the responsibility that a Remedial Project Manager (RPM) must carry out during the site remediation process is to assess whether ecological harm has occurred or may occur. Many Regions have Biological Technical Assistance Groups (BTAGs) to assist RPMs in managing such assessments.<sup>1</sup>

This Bulletin focuses on the first opportunity that an RPM has for conferring with the BTAG about possible ecological effects at a site. This meeting usually occurs early in the planning stages in the Superfund process, the RPM will have the contractor review whatever information is readily available about the site's setting, history, contaminants, and ecological characteristics. The RPM then makes this information available to the BTAG as a site description. This group's input assists the RPM in providing the contractor with clear direction for planning a well-focused investigation: that is, one that has clear-cut objectives and that makes the most efficient use of limited resources.<sup>2</sup> The RPM should find that expert input at this early stage results in long-term savings in both the time and effort needed to evaluate a site's ecological condition.

Although the initial meeting with the BTAG has the same purpose and scope throughout EPA Regions, the details of such a meeting can vary considerably from Region to Region. When preparing the site description for this meeting, the RPM should contact the Region's BTAG coordinator to learn how the Region handles these briefings.

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### The Objective of the Initial Site Description: Assessing Whether More Ecological Information is Needed

The initial site description begins the process of evaluating whether a site's contaminants have caused or could later cause adverse ecological effects. By reviewing readily available information about the site's setting, history, contaminants, and ecological characteristics, the

<sup>1</sup> These groups are sometimes known by different names, depending on the Region, and not all Regions have established BTAGs. Readers should check with the appropriate Superfund manager for the name of the BTAG coordinator or other sources of technical assistance in their Region. A more complete description of BTAG structure and function is available in "The Role of BTAGs in Ecological Assessment" (ECO Update Vol. 1, No. 1).

<sup>2</sup> "Developing a Work Scope for Ecological Assessments" (ECO Update Vol. 1, No. 4) discusses the process of planning and designing ecological assessments.

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BTAG can assess whether the site requires further investigation. Although little site-specific data may exist at this stage of the RI, providing the BTAG with this information will assist in evaluating the site.

What types of recommendations can an RPM expect to hear after presenting the site to the BTAG? For some sites, the BTAG may decide that no significant ecological impact has occurred or is likely to occur and that consequently the site requires no further ecological investigation. In other cases, the BTAG may advise the RPM to pursue further ecological studies. In these instances, the BTAG will be able to suggest:

- What information is lacking,
- Which studies will elicit this information, and
- What level of effort is appropriate to obtaining the information.

## Sources of Information about the Site

The investigator<sup>3</sup> bases the site description for the initial briefing on information about the site and its surrounding. Studies and reports already in the site's record contain useful information. For example, both the Preliminary Assessment (PA) and the Site Inspections (SI) can provide a description of the site's geographical setting, known or suspected contaminants, and general information about the surrounding area.

The investigator may also find that State agencies or local groups have useful information about the site. For example, if the site contains a fishing stream, the State fish and game agency may routinely monitor fish species. University researchers may have conducted biological surveys at or near the site. Environmental impact statements concerning nearby facilities or projects may have additional data on natural resources in the area. Historical societies, fish and game clubs, local or State chapters of such organizations as the Audubon Society or Nature Conservancy, and local experts, such as foresters, soil conservation specialists, and naturalists, also may have information relevant to a site description. In particular, such groups may have lists of habitats and species found in the area.

In some Regions, field reconnaissance trips occur even at this early stage, with the RPM, the contractor, and a BTAG member visiting the site. Observing and studying the site enables the BTAG member to carry back to the group an expert's first-hand observations. Such

observations are especially helpful at this point in the Superfund process when few, if any, ecological studies have occurred. For example, a BTAG member may identify dense growth of a species associated with polluted sites or, alternatively, may note the absence of expected species.

RPMs need to be aware that Regions vary in their policies concerning field reconnaissance visits. Consequently, an RPM who wishes to have a BTAG member present on such a visit needs to consult the BTAG coordinator to find out whether and when this can take place.

## The Information in the Site Briefing

The information contained in a site briefing varies with the nature of the site and its contaminants, the sources of information available about the site, and the evaluations already performed there. However, an RPM should keep in mind that the more the BTAG learns about a site, the more specific direction it can offer. The Appendix at the end of this Bulletin provides a check sheet that RPMs may wish to use to make certain that the site description is as detailed as possible, given the information that is readily available to the contractor at this early stage. In most cases, the site description will lack some of the information listed in the Appendix. Such gaps can prove helpful in pointing to issues that may require further investigation.

## The Setting

A site's setting includes its geographical location (including coordinates) and its surroundings. The setting should include the site's town, county, and State and should describe the land use of the area around it. Land use upstream and downstream of the site also constitutes important information about the setting. Land uses may include industrial, business, residential, military, agricultural, recreational, and undeveloped. The setting should note especially such natural areas as parks, refuges, wetlands, and coastal zones.

The BTAG will also find helpful a description of the general topography of the area associated with the site. Consequently, the site description should include such information as whether the site is wooded or open, flat or hilly, marshy or dry. The setting should describe surface water associated with the site, along with such related information as the water body's location, size, depth, and flow rate, where applicable. A description of the aquifer, the overlying strata, and the ground water discharge area is also important to the site's description. The site's elevation, its size, and its accessibility may prove useful to know. Investigators can find some of this information in the topographical maps published by the U.S. Geological Survey and in the National Wetlands Inventory maps. Geographical Information Systems available in the

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<sup>3</sup> The term "investigator" refers to the individual charged with responsibility for designing and/or carrying out any part of an ecological assessment. Investigators can include government scientists, contractors, or university scientists. However, the RPM retains ultimate responsibility for the quality of the ecological assessment.

Regions may also provide additional information on natural resources in the vicinity of the site. While the setting generally contains several pieces of information, this description need not be lengthy.

To appreciate the relevance of this information, consider the following hypothetical examples:

*An abandoned mine.* One Superfund site consisted of land containing a former nickel mine and the area that it had contaminated. The RPM's description of the site indicated that the site occupied a steep mountain slope, which received heavy snow cover in winter. Contaminants from the mine had leached into streams that drained the area. These streams in turn emptied into a larger stream, which local anglers fished for brook trout before it flowed into a National Park. This description of the setting alerted the BTAG to several important facts about the site:

- Because of the slope's steepness, at least part of the site was not easily accessible, making it difficult and possibly costly to assess the ecological condition of these parts of the site.
- Both heavy rains and the annual spring melt resulted in continuing migration of contaminants into streams draining the site.
- The presence of a National Park downstream from the site indicated that site contamination had the potential to adversely affect a sensitive environment.

*An industrial site.* This consisted of a small wooded area bordered by several factories. The soil in the woodland had become contaminated with refuse from the factories. No ponds or streams occurred on this flat site. In addition, the site's geology indicated that ground water lay below an impervious layer. Because industrial plants surrounded the site, the site lacked surface water, and its contaminants had no access to ground water, the BTAG concluded that off-site migration of contaminants would occur only through movement of biota.

*A former landfill.* The site consisted of a former landfill operation located in a wetland that overlay a shallow aquifer. Streams from the wetland fed a river protected by the State. Residences and industrial facilities occupied the properties adjacent to the landfill. From this description, the BTAG concluded that:

- As a wetland, this site merited special concern;
- The streams provided a means of off-site contaminant migration to the surrounding area;
- Migration of contaminants into the aquifer could occur, with any discharge of ground water into surface water further spreading the contaminants; and

- The river constituted a sensitive environment because it was a body of water designated by the State for protection of aquatic life.

## The Site's History

The site's history includes information about the events that have resulted in its being designated a Superfund site. In general, the PA and the SI recount the site's contaminant history, indicating both the activities that caused the contamination and the length of time over which these activities occurred. As with the setting, this information helps the BTAG to develop a picture of the site. In addition, such information can indicate contaminants potentially associated with the site. Consider again the three hypothetical Superfund sites described above.

*The abandoned mine.* The old mining site had been worked for 30 years before its closing. For more than 30 years, then, tailings had been exposed on the mountainside. From this information, the BTAG discerned that contaminants from the mine had had many years to leach into the soil, the streams that drain the mountainside, and the sediments in these streams and that contamination was on-going.

*The industrial site.* The contaminated woodland surrounded by factories had had a shorter but more diverse history of contamination than the nickel mine. Industrial activities, including electroplating and plastics manufacture, had been occurring in the buildings surrounding the site for 15 years. In general, the plants had accurate records of the chemicals and the amounts they had used. From this information, the BTAG concluded that it had a clear and complete account of the site's history and required no further information on the

*The former landfill.* The landfill site presented a different picture. Few records existed to show which chemicals the facility received and in what amounts. The RPM learned that the operation did not dispose of contaminants properly, frequently pouring liquid wastes directly onto the ground. This sketchy history alerted the BTAG that they could only guess at the precise nature and extent of contamination.

## The Contaminants of Concern

The BTAG will want to know what contaminants are associated with the site and in which media and in what concentrations they occur. The RPM should also provide the BTAG with the results of chemical analyses that have already been performed at the site. The BTAG will want to know where samples were collected and, where applicable, at what depth(s). The contractor should research whether the contaminant levels exceed Federal Ambient Water Quality Criteria, State Water Quality

Standards, or other widely accepted screening values. The BTAG, in turn, may compare a site's contaminant concentrations with concentrations known to cause adverse ecological effects to biota.

If a site has a large number of contaminants, tracking all of them may prove unwieldy. The BTAG may be able to advise the RPM as to which contaminants to choose as contaminants of concern. Alternatively, the BTAG may advise that additional analyses be performed to document the presence of certain contaminants at specific areas of the site or in various media.

*The abandoned mine.* At the old mining site, the BTAG recognized that soil, surface water, and sediment were all potentially contaminated with metals. Since the chemical analyses performed during the SI concentrated mainly on surface water, the BTAG advised chemical testing of soil and sediment. In addition, the analyses of surface water lacked a reference site, so the BTAG suggested that future analyses include an upstream water sample.

*The industrial site.* Because of the variety of industrial facilities adjacent to the site, the initial site chemistry included both inorganics and organics. Since some of the organics were volatile, the SI had analyzed air as well as soil. The variety of contaminants present at this site made it advisable for any future ecological assessment to focus on a subset of the contaminants. To this end, the BTAG advised the RPM as to which chemicals to consider the contaminants of concern.

*The former landfill.* Because of the sparse history of the landfill, the BTAG regarded both organics and inorganics as potential contaminants and soils, sediments, surface water, and air potential contaminated media. Consequently, the BTAG advised chemical analyses more extensive than those conducted as part of the SI. The BTAG also suggested that the RI examine contamination of the river. As at the woodland site, this site had a large number of contaminants, and the BTAG offered the RPM advice on selecting contaminants of concern.

## Ecological Description

This part of the site description helps the BTAG decide whether the contaminants and their history at the site represent a potential for ecological harm to the area associated with the site. In preparing this description, the RPM should make full use of all readily available information.

Central to an ecological description is a list of the habitats, which are types of environments, associated with a site. These include wetlands, woodlands, grasslands, open fields, ponds, streams, estuaries, coastal zones, and other natural areas.

The ecological description also includes geological information, such as hydrology, sediment types, and soil types. Consequently, the RPM needs to describe all

surface waters—lakes, ponds, rivers, streams (including intermittent streams), and flood plains—in greater detail than was required for the site's setting. The topographical maps published by the U.S. Geological Survey can provide much of this information. Maps providing information about floodplains include the Flood Insurance Rate Maps and the Flood Hazard Boundary Maps published by the Federal Emergency Management Agency. For areas largely owned by the State or Federal government, the controlling agency generally has information about floodplains. The SI may contain measurements of soil and sediment parameters. Such information enables the BTAG to decide whether the contaminants of concern are likely to adsorb to the site's soil and sediment.

Whatever information the RPM has about plants and animals in the site-associated area also belongs in the ecological description. In addition to species spending all or most of their time in the site-associated area, this information should include migratory species using the area during only part of their life cycle. Some sites may have species of special interest, such as game species, Federal- or State-listed endangered or threatened species, or species protected under other statutes.

*The abandoned mine.* An ecological description of the old mining site showed that it had no ponds or lakes but did contain a number of fastflowing streams with hard, gravelly sediments. The fishing stream into which these emptied had finer sediments. This information led the BTAG to conclude that the streams with the gravelly beds probably had little or no adsorbed contaminants but the fishing stream's finer sediments may have adsorbed contaminants from the water column. As to the area's biota, State surveys indicated that brook trout, minnows, dace, shiners, and suckers all inhabited the streams. The local Audubon chapter provided a list of bird species sighted in the area. Hunters routinely took deer and occasionally bear. The team that made the site visit reported spotting several squirrels and chipmunks and noted that vegetation consisted largely of pine and birch trees with limited undergrowth. The flora and fauna described for the site held no surprises for the BTAG.

*The industrial site.* While researching the site, the investigator learned that a State-listed endangered species inhabited woodlands in this general area, raising the possibility that the site could be home to members of this species. With respect to vegetation, pine trees dominated the site, which also contained grasses and shrubs. In places the dry sandy soil was bare of vegetation. The BTAG suggested that the RPM have additional chemical analyses performed on soil samples from this part of the site. No readily available information existed as to the site's resident animals.

*The former landfill.* Because this area was a wetland, the BTAG had concerns about potential cross-media contamination between soil and surface water. With respect to vegetation, the SI noted that shrubs and grasses dominated the area's vegetation and that the pollution-

tolerant marsh plant *Phragmites* grew abundantly at the site.

## Known Ecological Effects

In addition to the ecological description, the investigator may have information about known or suspected ecological harm at a site. For example, the site may have an abundance of a “nuisance” or pollution-tolerant species. Alternatively, an expected species may be absent, or present only in small numbers. Local sport and nature groups or State agencies may have information about changes in the condition or abundance of certain species.

*The abandoned mine.* In the course of routine surveys of the fishing stream, the State noted that a decline in the population of several species, including brook trout, had occurred over the past ten years.

*The industrial site.* The bare areas of the woodland site gave evidence of ecological impact.

*The former landfill.* The abundant growth of *Phragmites*, known for its association with polluted wetlands, suggested a disturbed ecological condition.

At this stage of the investigation, the available information can only suggest possibilities for future study. Demonstrating a causal link between site contaminants and ecological effects requires considerably more evidence.

## The BTAG's Preview

In many cases, this briefing represents the first time that the BTAG has encountered the site. Having materials ahead of time enables the group's members to familiarize themselves with the site. By providing these materials, the RPM enables the BTAG to give more thoughtful and informed advice about handling the site. BTAG coordinators have indicated that members sometimes take this opportunity to consult additional outside experts.

Precisely which materials the BTAG members ask to preview varies considerably among the Regions. These documents could include the documents relating to the site, such as the PA and the SI; all materials that will be used at the meeting; or a “distilled” version of these materials. The RPM will need to check with the BTAG coordinator to find out which materials to supply.

At the very least, however, the RPM should provide the BTAG with a brief description and history of the site. Many BTAG coordinators indicate that members find a copy of the SI helpful at this time. In addition, a map of the site helps in following the details of a site description. The RPM should include among the pre-meeting materials the reasons for the site's listing and any additional information that has expanded the reasons for the listing.

## The Meeting

EPA Regions have developed two ways of dealing with the BTAG's first meeting concerning a site. In some Regions the RPM introduces the site in a presentation that generally lasts no longer than 30 minutes. The presentation covers the information that the RPM has assembled: the site's setting, history, contaminants, ecological description, and any evidence of ecological impact. BTAG coordinators indicate that members find maps and photographs particularly useful visual aids at these briefings. Maps should show the source of contamination, the direction in which it is moving, and the nearest potentially exposed habitats (Figure 1).

In other EPA Regions, the BTAG gathers specifically to discuss the SI or the document on which the RPM is currently working. Here the RPM does not make a formal presentation. Instead, he or she attends the meeting to answer questions and to hear the BTAG's input first hand. Even in these Regions, however, the BTAG may expect the RPM to present a brief description of the site's setting and a short account of its contaminant history.

## The BTAG's Recommendations

An important part of this initial meeting is the open discussion, during which BTAG members ask questions and develop suggestions for the site. At this time, the BTAG will offer its advice.

- The group may decide that a site does not pose a significant present or future ecological risk. In such a case, the BTAG will advise the RPM that the site does not require any further ecological assessment.
- Before deciding what to recommend with regard to future ecological studies, the BTAG may decide that the group needs more information. In this case the BTAG's recommendation will include suggestions as to the studies that could provide the additional information.
- The BTAG's evaluation of the available data may lead it to conclude that the site has a significant potential for ecological impact and should undergo an ecological assessment. The BTAG will then offer advice on the types of studies that will elicit pertinent information and the level of effort commensurate with the adverse effect suspected.

## Follow-Up of the Meeting

After the meeting has ended, the RPM will most likely want a written record of the meeting's results. How such a record comes into existence varies with the Region. In some Regions, the RPM receives a copy of the minutes or memorandum prepared by one or more members of the

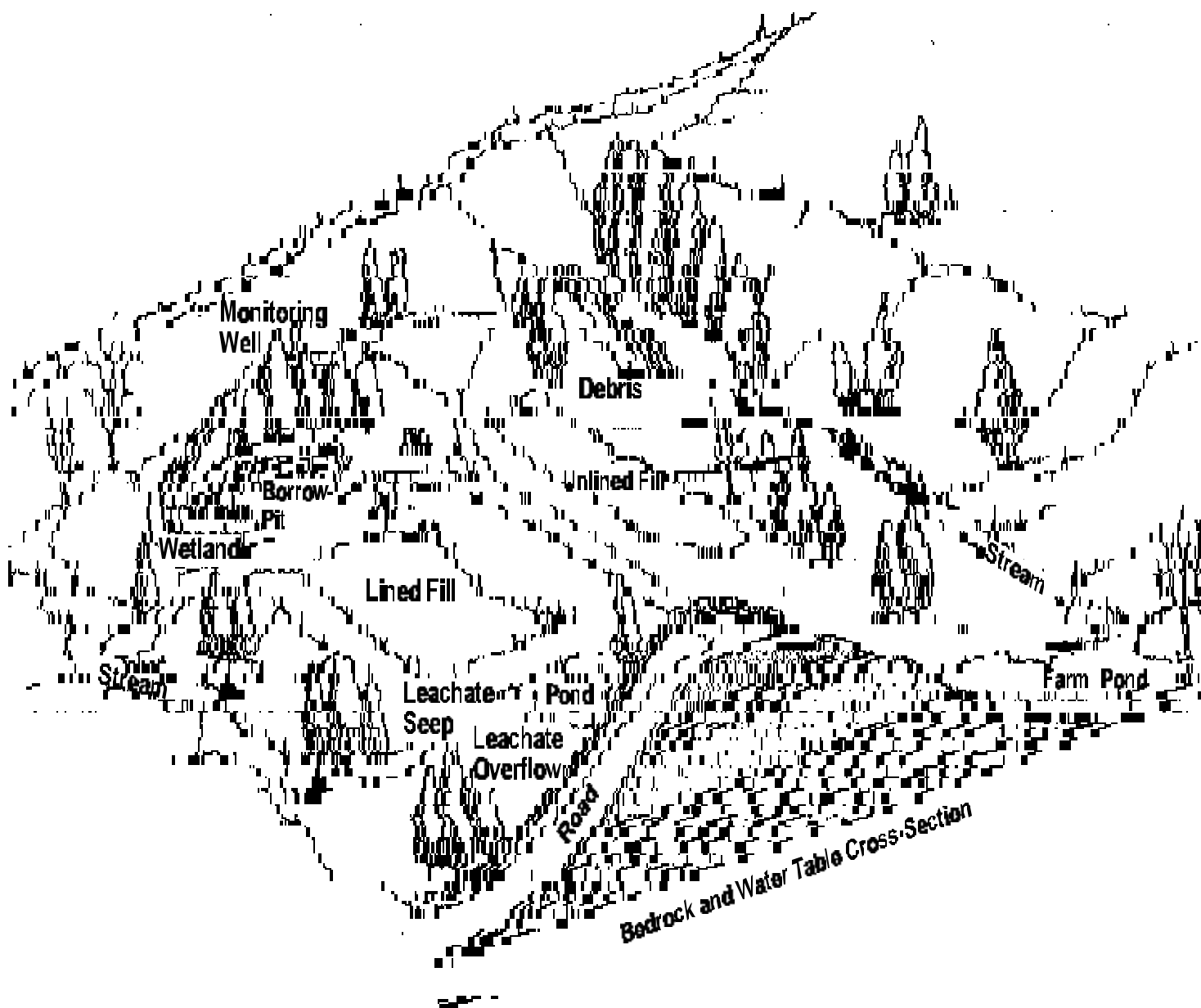
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BTAG. This document provides the RPM with a copy of the BTAG's recommendations in the BTAG's own words. Other Regions have the RPM prepare minutes, summarizing both the presentation (if one occurred) and the BTAG's advice. BTAG coordinators in these Regions say that this approach enables them to confirm that the RPM has understood the group's suggestions. Regardless of who prepares the record, it is generally available no later than two weeks following the meeting.

The record of this first meeting constitutes a succinct description of the site, its contaminant history, and the BTAG's initial recommendations. RPMs may wish to copy this record, along with a map, to BTAG members to refresh their memories about a site the next time it comes up for review. Alternatively, RPMs can accomplish the same end by copying the check sheet (see Appendix) to BTAG members.

## A Map Style Useful for the Initial Site Briefing

Figure 1



many other maps. Here is one style of map helpful in visualizing a Superfund site with which they are unfamiliar. Arrows indicate the direction in which runoff flows.

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## Appendix A: Check Sheet for Ecological Description of Site

### Setting

1. What are the land uses/facilities in the vicinity of the site?

North\_\_\_\_\_

South\_\_\_\_\_

East\_\_\_\_\_

West\_\_\_\_\_

What directions do contaminant gradients follow?

Surface water, sediment\_\_\_\_\_

Soil\_\_\_\_\_

Ground water\_\_\_\_\_

2. What is the site's highest elevation? \_\_\_\_\_

What is the site's lowest elevation? \_\_\_\_\_

3. Is the site readily accessible? \_\_\_\_Yes \_\_\_\_No

If No, explain:\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. For each pair of descriptors, circle the one that best describes the site.

Wooded/open

hilly/flat

marshy/dry

Other\_\_\_\_\_

5. Does the site contain or drain into surface water? \_\_\_\_Yes \_\_\_\_No

If Yes what type(s)?

Pond or lake:

Location\_\_\_\_\_

Area\_\_\_\_\_

Average Depth (or depth range)\_\_\_\_\_

Stream or River (including intermittent streams):

Location\_\_\_\_\_

Length\_\_\_\_\_

Average Width (or width range)\_\_\_\_\_

Average Depth (or depth range)\_\_\_\_\_

Type(s) of bottom\_\_\_\_\_



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Flow rate\_\_\_\_\_

Estuary/embayment:

Location\_\_\_\_\_

Area\_\_\_\_\_

Average Depth (or depth range)\_\_\_\_\_

Type(s) of bottom\_\_\_\_\_

List any known parameters of site-associated surface water:

PH\_\_\_\_\_ Temperature\_\_\_\_\_ Dissolved Oxygen\_\_\_\_\_

Total Suspended Solids\_\_\_\_\_

Total Organic Carbon\_\_\_\_\_

Hardness\_\_\_\_\_

Salinity\_\_\_\_\_

Other (specify)\_\_\_\_\_

List any known sediment parameters of site-associated bodies of surface water:

Sediment type(s)\_\_\_\_\_

Grain Size\_\_\_\_\_ pH\_\_\_\_\_ Eh\_\_\_\_\_ pE\_\_\_\_\_

Total Organic Carbon\_\_\_\_\_

Acid-Volatile Sulfides\_\_\_\_\_

Other (specify)\_\_\_\_\_

(If more than one surface water body of each type, repeat information as needed.)

6. Does the site contain or drain into wetlands? \_\_\_\_Yes \_\_\_\_No

If Yes, what type(s) and size(s)?

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List any known surface water and sediment parameters of site wetlands, as in #5, above.

7. Describe sub-surface hydrology.

Overlying strata\_\_\_\_\_

Aquifer\_\_\_\_\_

Depth of aquifer\_\_\_\_\_

Location of groundwater discharge\_\_\_\_\_

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## Ecological Description

8. List and describe habitats that occur at the site.

Woodlands \_\_\_\_\_  
Grasslands/open fields \_\_\_\_\_  
Wetlands \_\_\_\_\_  
Ponds \_\_\_\_\_  
Streams \_\_\_\_\_  
Estuaries \_\_\_\_\_  
Coastal zones \_\_\_\_\_  
Flood plains \_\_\_\_\_  
Other natural areas \_\_\_\_\_

List any known soil and sediment parameters for each terrestrial habitat.

Soil type(s) \_\_\_\_\_  
Grain Size \_\_\_\_\_ pH \_\_\_\_\_ Eh \_\_\_\_\_ pE \_\_\_\_\_  
Total Organic Carbon \_\_\_\_\_  
Total Phosphorus \_\_\_\_\_  
Nitrogen forms \_\_\_\_\_  
Other \_\_\_\_\_

9. Are any Federally or State listed endangered or threatened species known or suspected to occur on or near the site?

\_\_\_\_\_ Yes    \_\_\_\_\_ No

If yes, list:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. Does the site have any game species or species of interest for another reason?    \_\_\_\_\_ Yes    \_\_\_\_\_ No

If yes, list:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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## Known Ecological Effects

11. Does the site show any evidence of adverse ecological effects?    ☐ Yes    ☐ No

If yes, list:

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12. Documentation attached:

☐ Site map(s)

☐ PA

☐ SI

☐ Contaminant concentration data

☐ Species list(s)

☐ Preliminary Natural Resources Survey (PNRS)

☐ Other (specify) \_\_\_\_\_