



Beltsville Agricultural Research Center: Facility-Wide Ecological Risk Assessment

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The U.S. Department of Agriculture's Agricultural Research Service (ARS) has completed a facility-wide ecological risk assessment for the 60 Areas of Concern (AOCs) at the Beltsville Agricultural Research Center (BARC). These AOCs are known or suspected to have a history of storage, use, disposal, and/or release of hazardous materials.

Ecological risk assessment is a process that evaluates the actual or potential impacts that contaminants from hazardous waste sites may have on plants and animals. The functions are to document whether actual or potential ecological risks exist, identify which contaminants pose an ecological risk; and generate data to be used in evaluating what remedial alternatives (i.e., cleanup options), if any, are necessary.

Background

Based on discussions held between ARS and EPA, it was decided that ecological risks at BARC would be evaluated on a facility-wide (as opposed to site-specific) basis. Ecological risks at BARC are being evaluated according to the location of individual AOCs within distinct "farm areas" and watersheds at the facility. The following five areas have been evaluated separately, based on similarities in soil type, habitats, and location of watersheds:

- South Farm / Paint Branch Creek
- North Farm / Little Paint Branch Creek
- Linkage Farm / Indian Creek
- Central Farm / Beaverdam Creek
- East Farm / Beaverdam Creek

Ecological risks were characterized based on a three-tiered approach. The following three tiers of the BARC facility-wide ecological risk assessment are discussed in greater detail below:

- Screening-level Ecological Risk Assessment (SERA)
- Ecological Risk Assessment (ERA)
- Baseline Ecological Risk Assessment (BERA)

Screening-level Ecological Risk Assessment

The goal of the SERA is to complete an initial screening of ecological risks at BARC using conservative assumptions to determine which contaminants and/or exposure pathways required further ecological evaluation.

Potential risks to organisms living in the environments—ecological receptors--including mammals and birds (such as vole, shrew, fox, mink, woodcock, hawk, and heron), terrestrial and wetland plants, soil invertebrates (such as earthworms), and aquatic receptors such as fish, amphibians, and invertebrates) were evaluated. Exposure of these receptors to maximum concentrations of contaminants detected in the surface soil, surface water,

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sediment, and groundwater at each of the five farm areas was considered. A completed SERA for BARC was submitted to EPA in March 2001.

Based on the results of the SERA, Contaminants of Potential Concern were identified for each of the farm areas and for each of the evaluated ecological receptors. Further ecological evaluation of these Contaminants of Potential Concern and receptors at each of the AOCs within the five farm areas was completed as part of the Ecological Risk Assessment (ERA).

Ecological Risk Assessment

During the refined ERA process, the need to further refine the ecological risk characterization of Contaminants of Potential Concern and ecological receptors was established based on the following criteria:

- Revision of exposure concentrations (from maximum to average concentrations)
- Consideration of the frequency of detected contaminants
- Consideration of contaminant spatial distribution
- Comparison of site-related data to background samples
- Consideration of contaminant bioavailability
- Refinement of exposure parameters for wildlife
- Refinement of screening-level benchmark values
- Consideration of visual observations

In the ERA process, ecological risks were re-evaluated for the same receptor groups and farm areas that were considered in the SERA. However, a number of the conservative assumptions used in the SERA were modified to consider more realistic exposure scenarios.

Following the ERA evaluation, the list of Contaminants of Potential Concern from the SERA was reduced to a smaller list of Contaminants of Concern. In addition, a number of the AOCs at BARC were identified as "No Further Action" sites, based on the ERA conclusions, and no further ecological evaluation was required. For those AOCs requiring further evaluation, more ecological sampling including additional sampling of surface soil, surface water, and sediment; toxicity tests; plant and animal tissue studies; bioaccumulation tests were completed. Additional field investigations aimed at evaluating ecological receptors were completed in 2002.

Baseline Ecological Risk Assessment (BERA)

In the BERA, ecological risks are characterized for those Contaminants of Concern and ecological receptors that required further evaluation as a result of the ERA process. The BERA used site-specific information gathered from the supplemental ecological sampling to characterize possible risks. At this final stage of the ecological risk assessment process, the information collected from the supplemental sampling was used to determine whether AOCs needed no further action or required remedial action, as well as to estimate risks. The BERA report has been reviewed by EPA and was made final in early 2006.

For those AOCs that pose an ecological threat, a final decision-making step is needed to determine site-specific clean-up goals. This ongoing process will continue through 2008.

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For More Information

Contact Kim Kaplan, ARS Information Staff, at 301-504-1637, by e-mail at Kim.Kaplan@ars.usda.gov or visit the ARS Information Repository located in Room 014, Building 003, 10300 Baltimore Avenue, Beltsville, MD. The Information Repository is open to the public Monday through Friday, 8:30am to 4:30pm. The Information Repository is also available at the Prince George's County Memorial Library at 4319 Sellman Road. The library's hours of operation are Monday through Wednesday, 10 am to 9 pm; Thursday and Friday, 10 am to 6 pm; and Saturday, 10 am to 5 pm.