

Upper Mississippi River Restoration (UMRR) Program Habitat Restoration and Enhancement Project (HREP) Boundary Mapping Guidelines

U.S. Army Corps of Engineers
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Problem Statement

The Upper Mississippi River Restoration (UMRR) Habitat Restoration and Enhancement Project (HREP) boundaries, developed over the 27 years of the program, contain inconsistencies that only become apparent when combined into a single GIS feature class and used for program-wide analysis and report generation. These inconsistencies have arisen due to a wide range of issues:

- No USACE mapping standards exist for project boundaries in feasibility reports.
- USACE planning policy has not been consistent over the past 27 years of the UMRR program.
- As a result of this longstanding lack of mapping standards, decisions about project boundaries were delegated to District-based project delivery teams (PDT). Continuity in mapping approach was provided by common team members, but not necessarily maintained due to staff turn-over.
- Lack of consistent communication between PDTs located in different districts (i.e., MVS, MVR, MVP).
- The quality of geospatial data (i.e., aerial photography, terrestrial and hydrographic digital elevations models, and topographic survey) has improved over time revealing deficiencies in earlier attempts at project area mapping.
- Formal terminology and definitions have not been adopted or applied consistently. Terms are loosely applied such as “Project Area”, “Study Area”, “Area of Influence”, “Area of Potential Effects”, “Action Area”, “Project Footprint”, and “Evaluation Area”. This confusion is further aggravated when they cross-over to other jurisdictions. “Action Area”, for example, has a specific definition for the USFWS when applied to ESA. Likewise, “Area of Influence” has a specific definition for cultural resources.

Need

Project areas need to be periodically updated for a range of reasons:

- Correct historic inconsistencies – Lack of mapping consistency in the past creates reporting inconsistencies today.
- Changing program reporting needs – As the ability to fuse a growing number of different data types (i.e., geospatial, financial, project planning, biological response) into new reports increases, the need for correcting undetected inconsistencies becomes increasingly apparent.
- Adapt to current planning policy – As USACE guidance continually changes, this creates the need to reclassify data on previously completed projects to ensure consistency on aggregated program reports.
- Utilize higher resolution geospatial data – The increasing resolution of geospatial data reveals inaccuracies in the original project mapping products and summary statistics.
- Evolving best practice – As newer more refined geospatial mapping techniques are used on current projects, this creates the need to revisit completed projects and adjust their geospatial data to prevent program summary inconsistencies.

Feature Class Definition

The HREP Boundary feature class definition is taken from the [Ecosystem Restoration Business Line Database \(ERBL\)](#).

Project (polygon) – A cartographic representation of the project study area considered during the feasibility phase and used to communicate where project features are located and where habitats benefits primarily accrue.

Mapping Guidelines

The purpose of these mapping guidelines is to establish consistent methods for mapping project areas.

1. The project area boundary should represent the area analyzed during the feasibility phase of the project.
 - a. The project feasibility study area is the area over which benefits were determined to be most effective for the selected plan. It is the area where the benefits per acre have been determined to be highest relative to the surrounding area.
 - b. There are four stages when the project boundary determination could be made or updated:
 - i. Planning
 - ii. Plans and Specifications
 - iii. During Construction
 - iv. Post-Construction Evaluation
 - c. However, many feasibility reports are inconsistent in their definition of the project study area. A single report may use different project study area sizes in different parts of the report (i.e., overview maps, project descriptions, habitat unit calculations, benefit analysis).
 - d. For many older projects, no project area overview map displaying a boundary line or GIS polygon was ever created. The feasibility report may only list a study area (or areas) without defining where the boundary used for that calculation was located.
 - e. Often the area sizes cited in the report do not correspond with the area sizes mapped using current, higher resolution geospatial data (i.e., LiDAR derived digital elevation models, high resolution aerial photography).
 - f. Therefore, current analysts must use best professional judgment to reconstruct the project study area boundary.
 - g. Given these inconsistencies, the goal of this effort is to establish a single project study area polygon that “averages-out” the different areas used in the feasibility study.
 - h. This agreed upon project study area polygon will be used for program-level reporting purposes.
2. The project area must contain all of the project restoration features.
 - a. But, the project area does not need to closely follow the edge of the constructed restoration features (since it should represent the entire feasibility phase study area).
 - b. However, the project area does not necessarily need to contain restoration features that do not directly provide restoration benefits such as borrow areas (DredgingEvent UMRRSubType=Borrow) or dredging for equipment access (DredgingEvent UMRRSubType=Channel Dredging).
3. The project area does not need to be limited to USACE real estate fee title land.
 - a. The project area may include USACE easement tracts or sponsor acquired land (fee or easement).
 - b. Many project areas include channel areas which are sovereign state waters. Therefore, no real estate interest was ever acquired by USACE or sponsor (because the real estate interest was already possessed by a sponsor, the state).
 - c. However, the project area should not include private land (real estate interests possessed by non-sponsors).
 - d. Typically, restoration features are constructed on USACE or sponsor fee title or permanent easement land.
4. The project study area does not represent the total benefitted area claimed by the project for the purpose of calculating habitat benefits (e.g., fish benefitted area, waterfowl benefitted area, etc.).
 - a. Habitat benefitted areas (i.e., fish, waterfowl, etc.) are not rigorously mapped during feasibility. GIS boundaries describing habitat benefitted areas are seldom created.
 - b. Although area sizes are cited in the feasibility report habitat benefit analysis, maps depicting the boundaries of these areas are not consistently created.

- c. Some of the reasons for benefitted areas not being rigorously mapped include: continuous ecological gradients are not easily mapped using discrete lines, ever changing USACE planning guidance/policy, lack of professional consensus, and evolving scientific understanding and practice.
- d. A common misconception of the project study area is that it is either the summation or intersection of the fish and wildlife benefitted areas. Although this may seem ideal, the barriers to rigorously defining those areas described above means that this is currently impossible.

Review Methodology

District-based PDTs were created (i.e., MVS, MVR, MVP) to identify and document problems with each district's set of UMRR HREP boundaries. The mapping guidelines described in this document were used by the PDTs to decide on the corrective actions necessary to adjust the geometry of problematic HREP boundaries. The PDTs reviewed all relevant project documents and consulted with HREP PDT members in determining corrective actions. The identified problems and corrective actions were recorded in fields of the UMRR-DB. The proposed boundary update is currently being circulated among sponsor agencies for review. To assist this review, a series of webinars will be held to allow partner agencies to interactively review the GIS data and help clarify the location of project boundaries. The resulting adjusted project boundaries will be used for future program reporting.