U.S. ARMY CORPS OF ENGINEERS

Stream Assessment:

A Quantitative versus

Qualitative Approach

US Army Corps of Engineers

BUILDING STRONG®

2008 Mitigation Rule
33 CFR 332.3(e)(3)

For **difficult-to-replace** resources (e.g., bogs, fens, springs, **streams**, Atlantic white cedar swamps) if further avoidance and minimization is not practicable, the required compensation should be provided, if practicable, through **in-kind rehabilitation, enhancement, or preservation** since there is greater certainty that these methods of compensation will successfully offset permitted impacts.

Tiered Assessment

- Level 1- A qualitative assessment for all Ephemeral & Intermittent Streams, Intermittent Streams with Perennial Pools, and Perennial Stream where the impact is less than 500 LF
- Level 2 – A quantitative Assessment for all Intermittent Streams With Perennial Pools, Perennial Streams and Wadeable Rivers where the impact is greater than 500 LF
- Level 3 – All Impacts that have a significant effect on the human environment (EIS)

Why a Tiered System?

- The level of detail and documentation is flexible depending on the project, but should reflect the significance and complexity of the discharge activity.
- The level of scrutiny should be commensurate with the severity of the environmental impact as well as the scope and cost of the project.

Assessing a Stream

Riparian Buffer

Channel Alteration

Channel Condition (channel stability)

In-Stream Habitat/Biological Usage

Riparian Buffer

- A Riparian buffer is defined as the zone of vegetation adjacent to streams, rivers, creeks or bayous.
- This parameter is not intended to be a detailed vegetative cover survey, but instead, is a qualitative evaluation of the cover types that make up the riparian buffer.
- The ideal riparian buffer would be 100% coverage of the assessment area by the native woody vegetation community with no additional land use.

Channel Alteration

- This parameter considers direct impacts to the stream channel from anthropogenic sources
  - Straightening of channel or other channelization
  - Stream crossings (bridges and bottomless culverts)
  - Riprap, articulated matting, concrete aprons, gabions, or concrete blocks along streambank or in streambed
  - Manmade embankments on stream banks, including spoil piles
  - Constrictions to stream channel or immediate flood prone area such as any culverts, levees, weirs, and impoundments
  - Livestock impacted channels (i.e., hoof tread, livestock in stream,)

Visual Channel Condition (L1)

A visual assessment of the cross-section of the stream, along the stream reach. This assessment looks at:

1. channel incision
2. access to original or recently created floodplains
3. channel widening
4. channel depositional features
5. rooting depth compared to streambed elevation;
6. streambank vegetative protection
7. streambank erosion.

Bank Erosion Hazard Index (L2)

- The BEHI procedure consists of five metrics:

  1) bank height ratio; 2) root depth ratio 3) root density, in percent; 4) bank angle, in degrees; and 5) surface protection, in percent.

- Each of these five metrics are used to compute an erosion risk index, and then the individual erosion risk indices are summed to provide a total erosion risk index for use in identifying the Channel Condition Variable.

Aquatic Life Use (L1)

- The Stream is assessed based on the aquatic life use category score assigned to the stream segment by the TCEQ.
- Each classified segment in the TSWQS is assigned an aquatic life use, based on physical, chemical, and biological characteristics of the water body.
- The five aquatic life use categories are: *exceptional; high; intermediate; limited; and minimal* (no significant) *aquatic life use*.
- For streams not classified in the TSWQS, the aquatic life use is presumed based on the stream flow type.

Biological Usage (L2)

Macroinvertebrates

The recognized benefits of utilizing macroinvertebrate populations to assess function of perennial streams include:

- they are an important part of the food chain,
- they are indicator species of water pollution,
- and they are relatively easy to collect.

Fishes

The recognized benefits of utilizing fish populations to assess function of perennials streams and perennial pools on intermittent streams include:

- some fish families possessing long life spans;
- there is a large amount of published information regarding the occurrence, habits, and habitats of fishes;
- fishes exhibit a wide range of feeding habits, reproductive traits, and tolerances to environmental perturbations;
- fishes are among the easier groups to identify to the species level;
- many fish species are familiar to the general public and provide recreational opportunities;

Assessing Impact

Different types of impacts should be assessed based on the extent to which they are expected to impair the stream.

Severe-IF Score 5

The proposed project will eliminate a stream*, or result in a loss function equivalent to a 4-point change in Reach Condition Index.

Major-IF Score 4

The proposed project will result in a loss of function equivalent to a 3-point change in Reach Condition Index.

Moderate-IF Score 3

The proposed project will result in a loss of function equivalent to a 2-point change in Reach Condition Index.

Minor –IF Score 2

The proposed project will result in a loss of function equivalent to or less than a 1-point change in Reach Condition Index.

Temporary- If Score 1

Impacts are temporary and the site will be returned to pre-construction contours and elevations with no permanent loss of aquatic function.

Assessing Mitigation Plans

- **Re-establishment**
  - Re-establishment means the manipulation of the physical, chemical, and biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. Re-establishment shall result in a net gain in aquatic resource.
    - *Not all stream reaches qualify for this type of compensatory mitigation*
    - *Mandatory 200-foot belt width riparian buffer.*
- **Rehabilitation or Enhancement**
  - Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Similarly enhancement means the manipulation of the physical, chemical, or biological characteristics of a site to heighten, intensify, or improve a specific aquatic resource function(s). Neither rehabilitation nor enhancement will result in a gain in aquatic resource area.

Additional Factors for Mitigation Plan

- **Riparian Buffer**
  - Stream mitigation projects require protected riparian buffers. This compensation category includes establishment or enhancement of riparian buffer zones and requires appropriate monitoring and site protection in perpetuity.
- **Credit Adjustments**
  - Used to account for exceptional or site specific circumstances associated with the compensation site. These circumstances may provide ecological benefits or detriments that must be accounted for when determining credits. The Adjustment Factors are applied only when ecological and/or water quality function is affected by the action.

Where are we now?

1.usa.gov/1hrSOUd

Finalized*

- Level 1 Stream Assessment**
- Impact Assessment
- Determination of Compensation

* All procedures are revisited for efficacy.

** Complex and/or controversial stream impacts may require additional information to complete an appropriate evaluation of the proposed impacts. The District reserves the right to request additional assessment of stream on a case-by-case basis.

Interim

- Interim Level 2
  - ► Special Public Notice
    - *Posted: 3/26/2014*
    - *Expiration date: 4/1/2015*
- Evaluating Avoidance, Minimization, Stream Restoration Projects and Compensatory Mitigation Plans

Questions