

Suggested Monitoring Plan Components for Inclusion in Final Compensation Plan

Note: Permit conditions may require specific monitoring or success criteria. This document is only intended to provide example monitoring and success criteria possible for a stream restoration project. Each plan must be tailored to suit the proposed project's restoration goals.

- Sketch depicting location of photostations, vegetation sampling points, survey points, bank pins, scour chains, and reference streams (if available)
- Monitoring goals and proposed methodologies
 - Description of monitoring methodologies to evaluate the success of the proposed restoration measures allowing comparison to the design plan, to the as-built and from year to year
 - Summary of stream geomorphologic measurements, including channel dimension, pattern, profile, materials
 - Physical stream measurements and surveys to determine stability of the stream channel / bank
 - Location and profile of instream structures and evaluation of stability
 - Vegetation
 - Benthic macroinvertebrate sampling and indices allowing year to year comparison
 - Habitat assessment allowing year to year comparison
 - Documentation of wildlife or signs of wildlife observed at the site during each monitoring event
- Monitoring and reporting schedule (based on permit requirements)
 - Photos required prior to site activities, during activities, and within one week of site completion, following each major storm event, and at least one day of each monitoring year to depict existing [**channel, bank, riparian conditions**].
 - Annual monitoring required for five consecutive years
 - Monitoring reports due by November 30th of monitoring year
- Success criteria, which **may** include any of the following,
 - Survey and classifying stream
 - Survey and evaluate instream structures
 - Vegetation
 - Habitat assessment
 - Benthic monitoring
 - Any other restoration measure for the specific site

Examples of success criteria. Success criteria should be proposed based on the specific goals of the restoration project.

1. Stability

The analysis of each cross section survey indicates that the designed **[width to depth ratio, entrenchment ratio, bankfull width]** falls within the specified **[specify design criteria, can use the range for designed stream type, or regional curve]** every monitoring year.

The slope calculation at each cross section shall not exceed the shear stress required to move the D84 particle every monitoring year.

The analysis of each longitudinal profile survey indicates that the designed slope falls within the specified **[% slope - % slope]** over the restored segment every monitoring year.

The analysis of the cross section and longitudinal profile surveys indicates that the bed elevation has not aggraded or degraded to the point that the restored reach is not within the **[ratios for design spec/ stream type]** every monitoring year.

The sinuosity of the restoration site will fall within the **[specify design criteria, can use the range for designed stream type]** every monitoring year.

The **[name of instream structure]** are within **[specify range]** of the designed slope and **[specify range]** angle relative to the streambank.

Using the USDA Stream Reach Inventory and Channel Stability Evaluation process (modified Pfankuch), the stream stability ratings must be good or excellent every monitoring year.

2. Riparian Buffer

The percent survival of the planted woody (tree and shrub) species (excluding live stakes or planted material installed for bank stabilization from the top of the bank to the channel; e.g., willow, alders, dogwood, viburnum) within the riparian buffer shall be at least 80% of the originally planted number every monitoring year.

The number of woody (tree and shrub) species (excluding live stakes or planted material installed for bank stabilization from the top of the bank to the channel; e.g., willow, alders, dogwood, viburnum) within the riparian buffer shall be a minimum of 436 stems/acre of planted and volunteer woody species every monitoring year, beginning the second monitoring year.

The riparian buffer area will have at least 70% ground cover by the first monitoring year and 80% ground cover by the second monitoring year and through the last monitoring year.

The percent cover of the live stakes, planted material, or volunteer woody (tree and shrub) species providing bank stabilization from the top of the bank to the

channel (e.g., willow, alders, dogwood, viburnum) shall be at least 30% for monitoring years 1 and 2 and at least 80% for the remaining monitoring years.

Note: The following are typical permit conditions concerning corrective actions required if success criteria are not met.

If the compensation area fails to meet the specified success criteria based on reporting and/or additional visual observations in a monitoring year (with the exception of the final monitoring year, see below), the reasons for this failure shall be determined and a corrective action plan (which includes proposed actions, a schedule and monitoring plan) shall be submitted to DEQ for approval with that year's monitoring report. All problems shall be addressed by the permittee. Shall significant changes be necessary to ensure success, the required monitoring cycle shall begin again, with monitoring year one being the year the changes are complete, as confirmed by DEQ.

If the permittee believes that corrective action to a problem area is not warranted at this time, the permittee shall state the reasons and submit them to DEQ for approval with that year's monitoring report. Continued monitoring of the problem area may be required.

If all success criteria have not been met in the final monitoring year and/or visual observations determine that the site has not met the overall restoration goals, then monitoring shall be required for each consecutive year until two annual sequential reports indicate that all criteria have been successfully satisfied and/or the site has met the overall restoration goals (i.e., that corrective actions were successful). All problems shall be corrected by the permittee.