Placer Mining Baseline Environmental Information Guidance

Background

Due to the complexities associated with placer mining adjacent to and within streams and the subsequent reclamation of those areas, the BLM has established a suite of detailed baseline environmental information requirements that represent the minimum information necessary for the BLM to adequately analyze potential environmental impacts and to determine if the mining activity will prevent UUD.

This operator-provided baseline environmental information will expedite the technical review process of the submitted Plan, ensure proper NEPA analysis, aid the BLM in determining whether the mining operations will cause UUD, and facilitate the BLM's decision regarding whether to approve the proposed Plan of Operations.

Policy

As described in the Instructional Memorandum, all new Plans of Operations and proposed modifications affecting perennial streams1 in Alaska include specific baseline environmental information as provided for in 43 CFR 3809.401(c).

The BLM may require additional baseline environmental information, depending on the complexity of the site and potential resources affected. The following sections provide details about the required data components for the operator-provided baseline environmental information.

Authorized officers may request an Interdisciplinary Team site visit and/or require operators to obtain baseline data from stable reference stream segments if activities are proposed within previously disturbed stream segments that have not reached their recovery potential. In these situations, data from stable stream segments or adjacent areas that have recovered from previous mining are critical for developing site specific reclamation plans. These areas provide insight into the stream habitat's recovery potential and serve as a model for appropriate stream channel design specifications and site specific reclamation objectives.

Authorized officers should develop internal processes for plan completeness reviews, including the review of baseline environmental information. Authorized officers should not approve submitted Plans until adequate baseline environmental information is provided and the

[1]"Affecting perennial streams" is defined as mining or exploration activity in or within 100 feet of a perennial stream channel, or the construction of stream bypasses or diversions. Surface disturbing activities within 100 feet of streams have an increased potential for adversely impacting stream habitats and water quality based on a literature review on the efficacy of various riparian buffers widths.

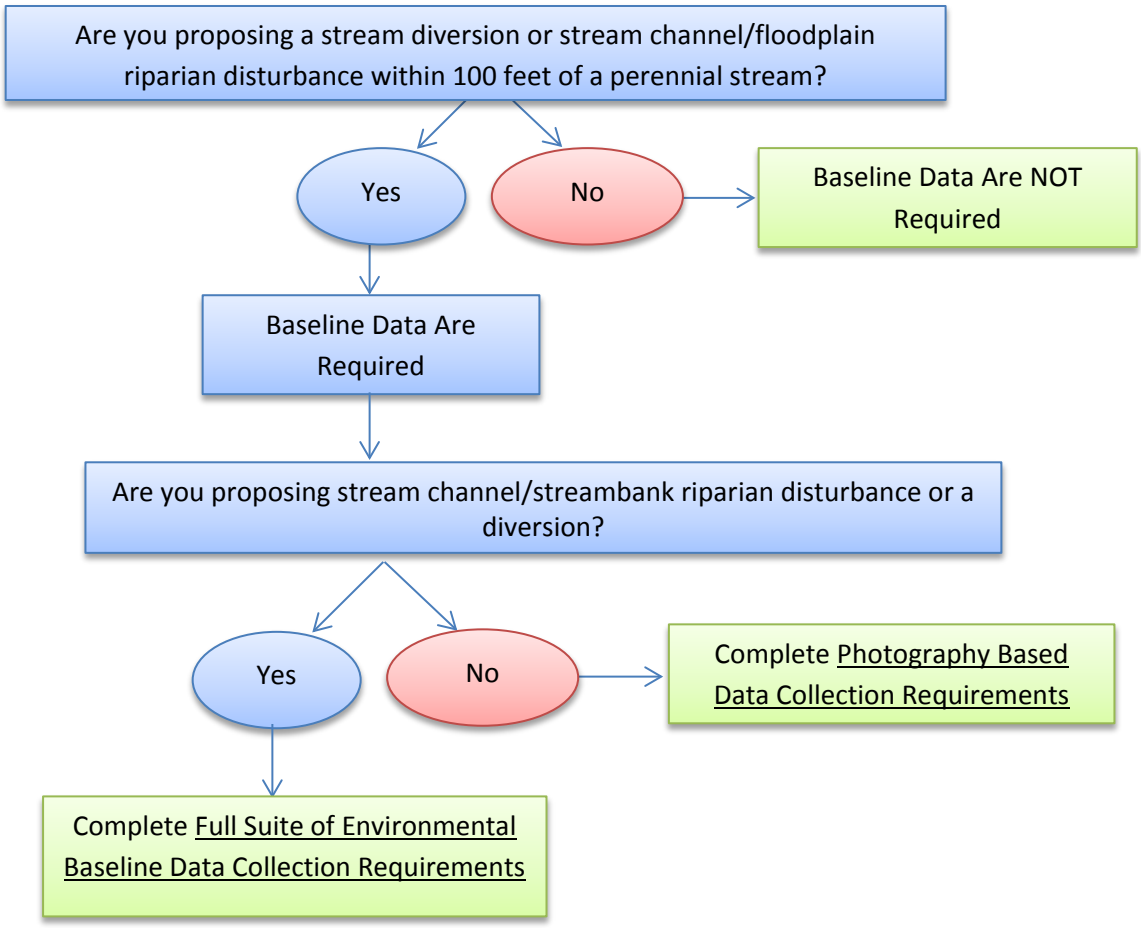
associated environmental review (NEPA) is completed (43 CFR 3809.411 (3)). BLM reviewers should ensure that baseline environmental information follows standardized sampling protocols to ensure consistent and defensible analysis. (See Attachment 1)

While this baseline environmental information is not required for Notice-level operations, these operators are required to demonstrate how their proposed exploration will be reclaimed sufficient to meet the performance standards described in 43 CFR 3809.420. Therefore, to adequately review Notice-level operations proposed within 100 feet of a perennial stream, the BLM reviewer would need site-specific information sufficient to demonstrate how the proposed reclamation would result in the rehabilitation of fisheries and wildlife habitat and what criteria would be used to measure success (see H-3809-1, pages 3-6 and 3-7.)

Miners should be actively encouraged to contact their local BLM office well in advance of their planned mining operations to discuss future proposed plans or modifications and baseline environmental information needs.

Required Components

BLM reviewers should use the following diagram to determine what minimum baseline environmental information requirements are required based on the reasonably foreseeable development (proposed Plan of Operation) at the site.



Photography Based Data Collection Requirements

1. Site photographs:
    - are sufficient to understand the landforms (e.g. stream overview photographs)
    - illustrate the vegetation community types in the riparian and floodplain areas
    - illustrate streambank conditions
    - illustrate general instream habitat conditions (e.g. photographs taken upstream and downstream from various locations in the area proposed for mining)
2. Location (Latitude/Longitude) of photograph sites and any other relevant aspects of the site.

Full Suite of Environmental Baseline Data Collection Requirements

1. Site photographs that:
    - are sufficient to understand the landforms (e.g. stream overview photographs)
    - illustrate the vegetation community types in the riparian and floodplain areas
    - illustrate streambank conditions
    - illustrate general instream habitat conditions (e.g. photographs taken upstream and downstream from various locations in the area proposed for mining)
    - include proposed or existing bypass locations
    - include the stream cross section and longitudinal survey end points
    - capture any unique features (e.g. headcuts)
2. Location (Latitude/Longitude) of cross section/longitudinal survey end points, photograph sites, and any other relevant aspects of the site
3. Plan-view Morphology (Sinuosity of the stream segment within the mining claim(s))
4. Meander Width Ratio (of the stream segment within the mining claim(s))
5. Longitudinal Profile (at least 5 mean wetted channels widths upstream and downstream of the potentially affected stream segment or a minimum of 20 mean wetted channels widths in length, whichever is greater)
6. Cross Sectional survey (at least 2 stable riffle cross sections within the surveyed stream segment)
7. Site Survey Map/Field Notes
8. Bed Material Characterization

Detailed Description of Baseline Environmental Data Parameters

1. ***Site Photographs***

Requirement: High resolution photographs must also be collected throughout the stream segment that:

- are sufficient to understand the landforms (e.g. stream overview photographs)
    - Example:

- illustrate the vegetation community types in the riparian and floodplain areas
    - Example:

- illustrate streambank conditions
    - Example:

- illustrate general instream habitat conditions (e.g. photographs taken upstream and downstream from various locations in the area proposed for mining)
    - Examples:

- include proposed or existing bypass locations
    - Example:

- include the stream cross section and longitudinal survey end points
    - Examples:

- capture any unique features (e.g. headcuts, off channel habitats, etc.)
    - Examples:

All photographs must include GPS locations (Datum WGS 84). Video (.mpeg format) of the site is also encouraged, but not required.

2. ***Location (Lat/Long – WGS 84 Datum)***

Requirement: This information must be collected at the furthest downstream and upstream points proposed for or directly adjacent to proposed mining. In addition, the locations of cross section/longitudinal survey end points, photograph sites, and any other relevant aspects of the site, such as the locations of any proposed or existing bypass or stream diversions must be included. All submitted photographs need to include location information in decimal degrees to 4 decimal places.

3. ***Plan-view Morphology (Sinuosity)***

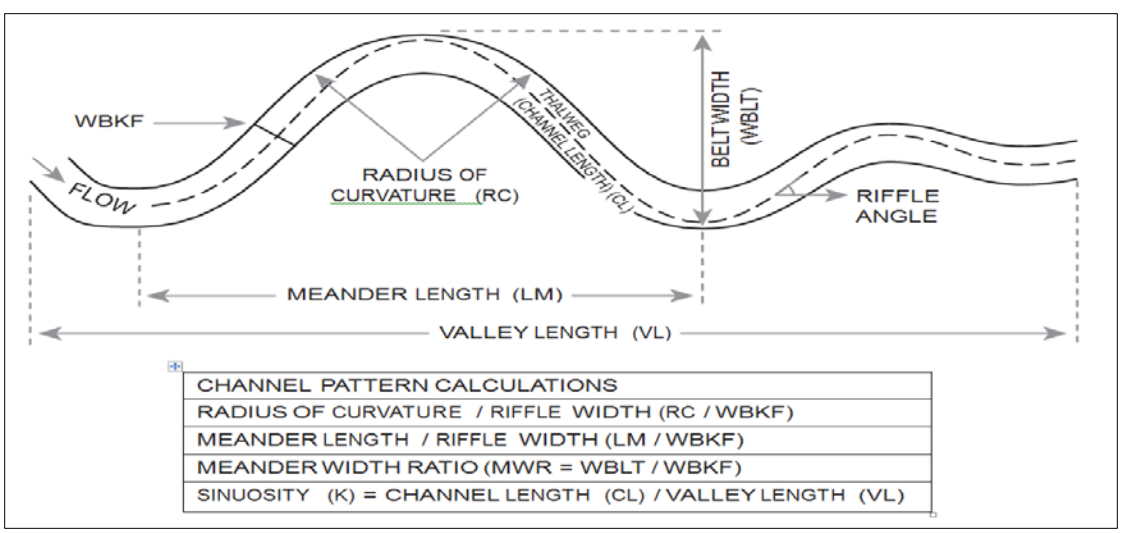
Requirement: Sinuosity is a descriptor of the general meander pattern of a stream and is a core attribute for understanding many of the parameters necessary to evaluate stream geomorphic stability**.**

It is calculated by **DIVIDING** the stream length (down the thalweg) by the valley length between the same two points in a direction that is parallel with the fall line of the valley.

4. ***Meander Width Ratio***

Requirement: Meander width ratio (MWR) is the ratio of stream belt width divided by stream bankfull width (Figure 1). The belt width is the distance from the apex of one meander bend to the next meander bend, measured perpendicular to the fall line of the valley. Meander width measurements can rapidly be taken from existing engineering plans and recent aerial photographs and the data can be used to indirectly assess bank migration and lateral stability of a stream segment.

Figure 1. PATTERN MEASUREMENTS AND RATIOS, INCLUDING THE MEANDER WIDTH*



**used with permission from Harman et al. 2012*

5. ***Longitudinal Profile***

Requirement: Like the cross sectional survey, this survey should be conducted consistent with the guidance found in Harrelson et al (1994, http://www.stream.fs.fed.us/publications/PDFs/RM245E.PDF). The extent of the survey must encompass the area proposed for mining. Specifically, the survey must extend at least 5 mean wetted channel widths upstream and downstream of the potentially affected stream segment or a minimum of 20 mean wetted channel widths in length, whichever is greater. Key features that must be included in the survey are individual elevations of the water surface, thalweg, bankfull indicators, floodplains, and terraces

6. ***Cross Sectional Surveys***

Requirement: This survey should be conducted consistent with the guidance found in Harrelson et al (1994, http://www.stream.fs.fed.us/publications/PDFs/RM245E.PDF). Surveys should extend beyond the streambank area and on to the floodplain, capturing as much of the floodprone area (twice max bankfull depth) as reasonably possible. The survey must also identify the thalweg (deepest point within the channel) depth and bankfull elevations. At least 2 cross sectional surveys must be completed and should be reasonably spaced apart within the area that will be surveyed longitudinally.

7. ***Site Survey Map/Field Notes***

Requirement: A description of these required components is detailed in Harrelson et al (1994, http://www.stream.fs.fed.us/publications/PDFs/RM245E.PDF) in Chapter 4 and specifically listed on page 12.

8. ***Bed Material Characterization***

Requirement: Using the Wolman Pebble Count (1954) technique, which is also describe in Chapter 11 of Harrelson et al (1994, http://www.stream.fs.fed.us/publications/PDFs/RM245E.PDF), data on the bed material size classes must be collected using the step-toe procedure. Pools and riffles should be sampled based on their composition in the sample reach, which is defined as the area between the lowest and uppermost cross sections.

Additional Sources of Information

Rosgen, D. L. 2008. *River Stability Field Guide*. Fort Collins, CO. Wildland Hydrology

Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs, C. Miller. 2012. *A Function-Based Framework for Stream Assessment and Restoration Projects*. US Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, DC EPA 843-K-12-006.
http://water.epa.gov/lawsregs/guidance/wetlands/upload/A_Function-Based_Framework-2.pdf

Harrelson, Cheryl C; Rawlins, C. L.; Potyondy, John P. 1994. Stream channel reference sites: an illustrated guide to field technique. Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p. http://www.stream.fs.fed.us/publications/PDFs/RM245E.PDF),

Rosgen, D. L. 2007. Chapter 11 In J. Bernard, J.F. Fripp & K.R. Robinson (Eds.), Part 654 Stream Restoration Design National Engineering Handbook (210-VI-NEH). Washington, D.C.: USDA Natural Resources Conservation Service.
http://www.wildlandhydrology.com/assets/Rosgen_Geomorphic_Channel_Design.pdf