BLM’s Lotic Assessment, Inventory, and Monitoring (AIM) 2020 Field Season: Evaluation & Design Management Protocol

VERSION 3.0
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Contents

INTRODUCTION AND DESIGN CONCEPTS ........................................................................................................... 3
  1.1 How to use this protocol ................................................................................................................................. 3
  1.2 What is reach evaluation and design management? ......................................................................................... 3
  1.3 Design concepts for reach evaluation and design management ................................................................. 4

STEP BY STEP DIRECTIONS .................................................................................................................................. 9
  Step 1 – Understanding Your Design and Design Management Tools ................................................................. 9
  Step 2 – Select Targeted Points, Points for Potential Merging, and Contingent or Supplemental Indicators ........................................................................................................................................... 12
  Step 3 – Office Evaluation ................................................................................................................................... 15
  Step 4 – Trip Planning .......................................................................................................................................... 18
  Step 5 – Field Evaluation .................................................................................................................................... 20
  Step 6 – Finalize Evaluation Status ................................................................................................................... 21

Glossary .................................................................................................................................................................. 25

Appendix 1. QuickStart Guide: AIM Lotic Office Evaluation Webmap .............................................................. 27
Appendix 2. Office Webmap Metadata ................................................................................................................ 29
References ............................................................................................................................................................... 32
INTRODUCTION AND DESIGN CONCEPTS

1.1 How to use this protocol
Design management consists of six iterative steps (Fig. 1), which are outlined in the step-by-step instructions below. For each of the six steps, the protocol outlines the responsible parties, required files and tools, and detailed instructions. Supporting information including design concepts and definitions of key terms are provided in the design concepts and glossary sections. Specifically, terms formatted with bold and italics are defined in the glossary, terms in single quotes are the column names for items in the design tools, and double quotes indicate data in a specific cell of a table.

1.2 What is reach evaluation and design management?
Reach evaluation is the process of determining and documenting which reaches need to be sampled, how a crew will access point coordinates, whether field crews successfully sampled each reach, and why some reaches were not sampled. Reach evaluations can involve both office and field efforts. Design management is the process of documenting reach evaluation outcomes, both office and field-based. Proper design management is important to maintain the statistical validity of your sample design and the subsequent inferences drawn from collected data. Reach evaluation and design management begin prior to the start of the field season and continue until the desired sample size is met for the entire sample design.

Figure 1. Flow chart showing the six design management steps color coded by responsible parties. The branches of the model indicate the iterative process of office and field evaluation, replacing reaches that were not sampled, and rescheduling reaches that should be reattempted until desired sample sizes have been achieved. The tools used for each step are called out in black text in the key and discussed in the Step By Step Directions section.
1.3 Design concepts for reach evaluation and design management

**Base, Oversample, and Targeted Point Types**

Each point in a design is classified as either:

- **Base**: points in a *random design* that correspond to the desired sample size for a given *strata*. Ideally, all base points would be successfully sampled and no oversample points would be needed. However, for a variety of reasons, base points are frequently rejected and subsequently not sampled.

- **Oversample**: points in a *random design* that are used as replacements for points that are rejected or cannot be sampled.

- **Targeted**: points identified by field office staff for sampling that are not part of a *random design*.

**Evaluation Status**

Reaches can be assigned one of five evaluation statuses based on information gained by office and/or field evaluations. The evaluation status can also change throughout the field season as new information is gained (e.g., evaluation status changes from “Not Sampled” to “Reattempt” to “Sampled”), but the evaluation status of all attempted reaches needs to be finalized at the end of the field season.

- **Sampled**: When a reach is sampled, it is considered a member of the *target population*, data is collected, and the data is used for analysis and reporting.

- **Not Sampled**: A reach that was either rejected during the office evaluation process because it met the “Not Sampled” criteria listed below or a reach that the crew attempted to sample but could not because it met the criteria below. This category must be approved by the BLM project lead by the end of the field season.

- **Reattempt**: this is a reach that either:
  - A crew attempted to sample, but for various reasons did not sample and the Project Lead or Crew Manager decided they should return to the reach and reattempt a sample effort.
  - A specialized crew, such as the boating crew, is needed. Be sure to see the ‘Reason Not sampled’ section below to record this situation

- **Oversample**: Reaches that were not office or field evaluated, but are available for evaluation and sampling as replacements for reaches that are rejected or not sampled.

- **Ready to field visit**: Reaches that were office evaluated, but the crew has not yet attempted to sample.

**Reason Not Sampled**

Reaches classified as “Not Sampled” must have an accompanying reason as to why the reach could not be sampled. There are many different reasons that a reach may not be sampled, but they can be broken into 4 main groups:

- **Nontarget**: Reaches not sampled because the selected reach location was ephemeral, lentic, a map error, etc., and therefore not considered a part of the *target population* (Table 1). Nontarget reaches are removed from estimates of stream kilometers in different condition categories but used to estimate errors in the NHD and resulting BLM stream kilometer estimates. Therefore, it is very important to accurately record why a reach was classified as nontarget (Table 1).

- **Permanently Inaccessible**: Reaches that cannot be sampled now or in the foreseeable future (e.g., 10 years) because of terrain barriers, landowner access, or wadeability issues (Table 1).
The decision to classify a reach as permanently inaccessible should not be taken lightly, as omitting reaches can create ‘holes’ or gaps in the design (see ‘Holes in the design’ in the design concepts section below), thus reducing the design’s statistical rigor.

- **Unknown**: Reaches that fall prior to the last evaluated reach within a stratum for a given year (i.e., have a lower ‘Order Code’) that were skipped, categorized as “too close” to another sample reach in the same design, or not evaluated in the sample design are classified as “unknown” and are counted as ‘holes’ in the design. Unknown reaches can have a negative effect on the statistical rigor and inference of the sample design and efforts should be taken to avoid having reaches with such a status. Ideally at the end of the study, no sample reaches would be classified as “unknown”.

- **Reattempt-Boatable crew needed**: Sample reaches that are intended to be sampled but a crew is unable to collect the minimum amount of data with the wadeable protocol. Project leads should determine if they will report on all rivers and streams, or only wadeable rivers and streams for their AIM project. If reporting on all streams and rivers, boatable reaches should be sampled by a boat crew. If reporting on only wadeable streams and rivers, non-wadeable, systems would be considered “Nontarget Boatable”.
Table 1. Reasons for which lotic AIM reaches are rejected or not sampled and respective evaluation status categories for unsampled reaches (i.e. revisit, permanently inaccessible, nontarget).

<table>
<thead>
<tr>
<th>Not sampled status</th>
<th>Reason not sampled</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reattempt</td>
<td>Above bankfull or flow too high</td>
<td>The water is temporarily too deep or swift to wade but could be sampled when flows recede.</td>
</tr>
<tr>
<td></td>
<td>Boatable crew needed</td>
<td>The project lead wants boatable reaches to be sampled and the reach must be sampled by boat because the water will <em>always</em> be too high for wading. See below for other boatable options.</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>Field data collectors attempted to gain access or sample the reach but were unable to for some other reason and the reach should be reattempted later. Examples include: taking a different route; gaining landowner permission; starting to access or sample but running out of time; inclement weather or fire danger; an overnight backpacking trip, more capable truck, or ATV are required.</td>
</tr>
<tr>
<td>Permanently Inaccessible</td>
<td>Private access denied</td>
<td>This reach can only be accessed by crossing posted private land and landowner permission was explicitly denied.</td>
</tr>
<tr>
<td></td>
<td>Terrain access denied</td>
<td>All possible routes were attempted, but natural barriers such as cliffs, slopes over 50%, waterfalls, extremely dense vegetation, or beaver complexes prevented access.</td>
</tr>
<tr>
<td></td>
<td>Not wadeable nor boatable</td>
<td>Reaches that will <em>always</em> be unsafe to wade or boat (e.g., reaches with long segments of class V whitewater; steep creeks in constrained gorges).</td>
</tr>
<tr>
<td>Nontarget</td>
<td>Dry</td>
<td>The reach was determined to be dry (&lt;5 main transects with water) either by field visit, or two lines of evidence during office evaluation. For field visits, specify if the point was <em>intermittent</em> or ephemeral (TR 1735-2 Appendix B). Office personnel should also specify if the reach is <em>always dry during the sample season or ephemeral</em> or if it <em>possibly has flow during some sample seasons</em> based on either office or field evaluations.</td>
</tr>
<tr>
<td></td>
<td>Lentic</td>
<td>The reach is a wetland, pond, or is otherwise impounded and no defined channel is present with identifiable bankfull indicators. Do not use this classification for lotic reaches that have definable channels and bankfull indicators but are not wadeable due to beaver ponds or have adjacent beaver complexes.</td>
</tr>
<tr>
<td></td>
<td>Map error</td>
<td>There is no evidence that a waterbody or stream channel exists, the stream is an artificial channel such as a diversion ditch, or 5 or more transects cannot be located on BLM land.</td>
</tr>
<tr>
<td></td>
<td>Reach too short</td>
<td>The point coordinates fall on a stream reach that contains less than 100 m of contiguous BLM land (office rejection criterion only).</td>
</tr>
<tr>
<td></td>
<td>Boatable (not sampling boatable reaches for this design)</td>
<td>The project lead does not want to sample boatable reaches as part of the design and the reach is boatable, so it should not be sampled. These sites are not part of the target population (nontarget).</td>
</tr>
<tr>
<td>Unknown</td>
<td>Too close to other monitoring location</td>
<td>The BLM project lead chose to not sample the reach because it was very close to another reach <em>within the same design</em> and met all strict criteria detailed below (office rejection criterion only).</td>
</tr>
<tr>
<td></td>
<td>Skipped</td>
<td>Reach was skipped for various reasons: crew ran out of time, project lead chose to not sample the reach, the project lead is unsure why the crew did not sample, but the sample season is over, etc.</td>
</tr>
</tbody>
</table>
Evaluation and sampling order
All points in a design are intended to be sampled in the order in which they appear within each stratum. As a rule of thumb, start by evaluating and sampling base points (i.e., the lowest ‘Order Code’) for each stratum. If a point (base or oversample) is rejected and classified as “Not Sampled”, replace it with the first oversample point within a given stratum (lowest ‘Order Code’) to achieve the desired sample size. ‘Order Code’ is a sequential number assigned to each point within each stratum and used to ensure points are in the correct order.

It is not always logistically practical to visit points in their exact order. Below are some best practices for evaluating and sampling base and oversample points:

- Base points may be evaluated (office and/or field) in any order if you are confident all base points within a stratum will be evaluated or sampled by the end of the field season. Whenever possible, base points should be prioritized before oversample points.
- Evaluate all base points in each stratum first. Then assess the base point failure rate for each stratum by counting the number of inaccessible or nontarget reaches. Use this failure rate to estimate how many oversample points may be needed per stratum. For example, if there are ten base points and five fail, ten more oversample points are likely needed to ensure five more sampleable points on average. If during the field season it seems as though an insufficient number of oversample points have drawn in the design to achieve desired sample sizes, contact the person responsible for office evaluation or the National AIM Team, respectively.
- Use the above failure rates and anticipated oversample points to plan field trips so that both base and oversample points are visited. This can be advantageous if potentially needed oversample points are located near base points that you plan to sample during current or future trips, and it would be difficult or resource intensive to visit these oversample points at a later date. However, determining how many oversample points are needed can be a guessing game. Therefore, the first trips should just consist of base points until you have a better idea of how many points are actually rejected.
- If points are sampled out of order it is important that no holes are left in the design by the end of the field season (see ‘Holes in the design’ in the design concepts section).

Holes in the design
Sampling reaches out of order or having lots of inaccessible reaches can cause ‘holes’ in the design. Holes result from ‘inaccessible’ or ‘unknown’ reach designations that fall between evaluated reaches, which includes sampled reaches. As a rule of thumb, ensure that holes do not make up >30% of evaluated reaches (excluding nontarget).

Some holes are inevitable due to denied access through private property or unsafe access or sampling conditions. Depending on the desired sample size, one or two holes in a sample design are generally acceptable. However, if too many reaches are classified as “inaccessible” or “unknown” (>30% of reaches), a systematic bias may be created that can impact condition estimates. For example, if all inaccessible reaches are located in remote wilderness areas with minimal anthropogenic impacts, excluding these reaches from your analysis could result in worse overall condition estimates than if those reaches were sampled.

When managing a design, it can be difficult to determine how much effort should be expended sampling difficult reaches because the number of holes in the design is unknown. As design implementation progresses, the importance of putting extra effort into accessing very remote points, or those with otherwise difficult access issues, will become more obvious.
**Design Management Example**

In the example design stratum below (Table 2), the desired sample size is seven (i.e., 7 base points). The first three reaches were sampled, but reach XX-SS-1046 was rejected as nontarget and needed to be replaced. The first possible replacement within the oversample was reach XX-SS-1057, which also turned out to be nontarget and thus the next oversample in the list, XX-SS-1063, was evaluated and sampled. The next evaluated reaches were XX-SS-1048, 1052, and 1055, two of which were sampled and one of which was rejected as inaccessible and needed to be replaced. The next available oversample reach was XX-SS-1066, which was also inaccessible. The next reach that should have been evaluated was XX-SS-1071, which was skipped for some unknown reason, thereby creating another hole. While the sample size (n=7) was finally met when XX-SS-1079 was sampled, the person managing the sample design inadvertently created another hole in their design by skipping reach XX-SS-1071. This mistake could affect the statistical rigor of the design, especially since 30% of the points (not considering nontarget reaches) are classified as holes (i.e., unknown or inaccessible). It would be advantageous to try to access and sample the unknown reach if there is time during the current year’s sampling season. If you cannot do this, sample one or more extra oversample reaches to increase the number of sampled reaches compared to the number of holes.

**Table 2. Example columns from a completed design at the end of a field season illustrating the outcome of replacing failed reaches with oversamples and the concept of ‘holes’. In this example, the desired sample size for stratum XX-SS is seven. There are two nontarget reaches (not holes), two inaccessible reaches, and one unknown reach which combined creates a total of three holes.**

<table>
<thead>
<tr>
<th>Order Code</th>
<th>PointID</th>
<th>PointType</th>
<th>EvalStatus</th>
<th>ReasonNotSampled</th>
<th>Design consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>XX-SS-1000</td>
<td>Base</td>
<td>Sampled</td>
<td></td>
<td>Used in analysis</td>
</tr>
<tr>
<td>2</td>
<td>XX-SS-1020</td>
<td>Base</td>
<td>Sampled</td>
<td></td>
<td>Used in analysis</td>
</tr>
<tr>
<td>3</td>
<td>XX-SS-1035</td>
<td>Base</td>
<td>Sampled</td>
<td></td>
<td>Used in analysis</td>
</tr>
<tr>
<td>4</td>
<td>XX-SS-1046</td>
<td>Base</td>
<td>Not Sampled</td>
<td>Nontarget - Lentic</td>
<td>Not a hole, replace with oversample XX-SS-1057</td>
</tr>
<tr>
<td>5</td>
<td>XX-SS-1048</td>
<td>Base</td>
<td>Sampled</td>
<td></td>
<td>Used in analysis</td>
</tr>
<tr>
<td>6</td>
<td>XX-SS-1052</td>
<td>Base</td>
<td>Not Sampled</td>
<td>Permanently Inaccessible - Private Denied Access</td>
<td>HOLE, replace with oversample XX-SS-1063</td>
</tr>
<tr>
<td>7</td>
<td>XX-SS-1055</td>
<td>Base</td>
<td>Sampled</td>
<td></td>
<td>Used in analysis</td>
</tr>
<tr>
<td>8</td>
<td>XX-SS-1057</td>
<td>OvrSmp</td>
<td>Not Sampled</td>
<td>Nontarget - Reach Too Short</td>
<td>Not a hole; use next oversample to find replacement for XX-SS-1046</td>
</tr>
<tr>
<td>9</td>
<td>XX-SS-1063</td>
<td>OvrSmp</td>
<td>Sampled</td>
<td></td>
<td>Used to replace XX-SS-1052; used in analysis</td>
</tr>
<tr>
<td>10</td>
<td>XX-SS-1066</td>
<td>OvrSmp</td>
<td>Not Sampled</td>
<td>Permanently Inaccessible - Terrain Denied Access</td>
<td>HOLE; use next oversample to find replacement for XX-SS-1046</td>
</tr>
<tr>
<td>11</td>
<td>XX-SS-1071</td>
<td>OvrSmp</td>
<td>Not Sampled</td>
<td>Unknown - Skipped</td>
<td>HOLE</td>
</tr>
<tr>
<td>12</td>
<td>XX-SS-1079</td>
<td>OvrSmp</td>
<td>Sampled</td>
<td></td>
<td>Used to replace XX-SS-1046</td>
</tr>
<tr>
<td>13</td>
<td>XX-SS-1084</td>
<td>OvrSmp</td>
<td>Oversample</td>
<td></td>
<td>Sample size met; point not needed</td>
</tr>
</tbody>
</table>
**STEP BY STEP DIRECTIONS**

**Step 1 – Understanding Your Design and Design Management Tools**

**Overview:** The National AIM Team and project leads work together to decide what kind of design is most appropriate: *randomly selected points, targeted* (e.g., designated monitoring areas), or a mixture of both. All design-based decisions are documented in monitoring design worksheets and all members of the lotic AIM implementation team should understand the difference between *random and targeted points*, what *strata* were used, how to utilize base versus oversample points, why the sample order matters, and the desired design sample sizes. Such concepts are defined in the design concepts or glossary sections and should be reviewed before proceeding. Once design concepts are understood, then review your design management tools to understand how the Office Webmap, Field Webmap, and the Sample Size Dashboard are used; all can be accessed by both BLM and our partners.

**Responsible Parties:** All parties involved in implementing a *sample design*

**Tools:**
- **Monitoring Design Worksheet** – BLM document outlining monitoring objectives and the Monitoring Design.
- **Office Webmap** – Webmap used for tracking all design points and associated information. This should only be used on a computer, not on a tablet. Information entered into this map will be automatically synced to the Field Webmap (explained below) when the crew is online.
- **Sample Size Dashboard** – Displays the desired sample size per strata, the number of sampled and nontarget reaches, and the number of holes that are recorded in the Office Webmap.
- **Field Webmap** – A webmap for the field crews to use in the Collector application on their iPad. All information entered into this map will be automatically synced to the Field Visits layer of the Office Webmap when the crew takes their iPad back online.

**Detailed instructions about how to use your design management tools:**
1. Understand all design concepts described above.
2. Project Leads should review their Monitoring Design Worksheet.
3. Access the Office Webmap: **Follow these instructions** to ensure you have access to the appropriate tools. Once you have access, copy and paste the below links into the Google Chrome web browser:
   - **BLM users** (The first time you use this link, locate the bell icon in the upper right-hand corner of the screen and click “view your invitations” to accept access to the Webmap):
     - **Office Webmap:** https://blm-egis.maps.arcgis.com/home/item.html?id=499d6ec1fe834443acb051f48b43be95
     - **Sample Size Dashboard:** https://blm-egis.maps.arcgis.com/home/item.html?id=f048f86919cd4d7c9e608d4887d7dac
   - **GeoPlatform users** (automatically added to group):
     - **Office Webmap:**
       https://geoplatform.maps.arcgis.com/home/item.html?id=499d6ec1fe834443acb051f48b43be95
     - **Sample Size Dashboard:**
       https://geoplatform.maps.arcgis.com/home/item.html?id=f048f86919cd4d7c9e
4. Understand the Office Webmap:
   a. Review the QuickStart guide (Appendix 1)- This guide will orient you to webmaps in general, but also provide more detailed information about layers, symbology, and functions you will commonly use, including some of those listed below.
   b. Review all layers
      i. See the ‘Layers in the Office Webmap’ section below for a description of each layer.
      ii. Review Appendix 2- This will explain all the columns in the two key layers (Points and Field Visits) and can serve as a quick reference to better understand which columns must be filled out and the responsible party.
   c. Filter the webmap for your use. Common filters for each task are listed below:
      i. **Office Evaluation**: ‘Project’; Also might initially want to filter by ‘StrataName’ to display one strata at a time and ‘PointType’ so that only Base points are visible. However oversample will need to be included once all base are office evaluated.
      ii. **Trip Planning**: ‘Project’ and ‘EvalStatus’- Only points that are “Ready to Field Visit” and “Reattempt” (Consider labeling with Order Code or Trip)
      iii. **Finalizing Eval Status**: ‘Project’ and ‘EvalStatus’; Only points that are “NotSampled- not yet BLM approved” or “Ready to Field Visit”
   d. Edit Points layer to change the evaluation status, add indicators, or give directions.
      i. Edits can be made by clicking on a point and then clicking “Edit” (remember to re-click “Edit” when you’re finished editing) or in the table by double clicking on a cell (do not need to click edit).
      ii. Column names with padlock icons are locked and cannot be edited. If the attribute name does not have a padlock icon, you can double click the cell for editing.

5. Understand how the Office Webmap interacts with the Field Webmap and Field Visits layer
   i. The Points layer should only be edited on a computer by those responsible for Office Evaluation and Design Management tasks.
   ii. The Field Visits layer should only be edited by the crews on their iPad through the Collector application.
   iii. When points are set to “Ready to Field Visit” in the Points layer the crew will field visit those points and add them to the Field Visits layer in the Field Webmap.
   iv. The Field Visits layer of the Field Webmap syncs directly with the Field Visits layer in the Office Webmap once the crew gets back online and syncs the Collector application.
      1. The field visited point will now appear on the Office Webmap.
      2. Within the Points layer, there will also now be a related record for the visited points. You can view these visits two ways:
         a. In the popup for a point, you can select “Show Related Records” and a table of all the Field Visits for that specific point will appear.
         b. In the table, click the “Show” link in the ‘FieldVisits’ column to show related records. The number listed in this column is the
number of times the crew field evaluated the reach.

6. Understand how the Sample Size Dashboard works:
   a. All instructions are listed on the left side panel in the dashboard.
   b. Generally, you will apply filters to select your points to calculate sample sizes, holes, etc.
      i. The formulas in this tool are based on information in the ‘EvalStatus’ and ‘ReasonNotSampled’ columns in the Points layer of the Office Webmap.
   c. The Sample Size Dashboard updates immediately when the ‘EvalStatus’ or ‘ReasonNotSampled’ fields are edited in the Points layer.
   d. If the numbers in the Sample Size Dashboard appear off, ensure that your Points layer is up to date and refresh the Sample Size Dashboard webpage. If issues persist, contact the National AIM team.

Layers in the Office Webmap:

- **Points layer:** used to view all points in a design for a given year and to track progress toward meeting desired sample sizes. This layer tracks:
  - Office evaluation comments and general information (Office evaluator, date evaluated, merging of points, contact information, and directions)
  - Reach evaluation statuses (‘EvalStatus’ column)
  - Reasons a reach is not sampled (‘ReasonNotSampled’ column)
  - Indicators to collect at each reach (e.g., ‘TNTP’, ‘Turbidity’ columns)
  - When initial data QC is completed by the Project Lead or Crew Manager so that the National AIM Team can run additional QC checks (‘EvalStatus’ of “Sampled- Data Summary Reviewed”)
  - Point labels will appear when you zoom in

- **Field Visits layer:** Used to track individual field visits.
  - Every time a crew attempts to visit a point, they should create a new record. Each point can have multiple recorded field visits before successful sampling occurs.
  - Each visit should have an appropriate ‘FieldEvalStatus’ and the ‘Comments’ column filled out describing the visit and its outcome.
  - If a reach is not sampled or needs to be reattempted at a future date, crews should ensure that ‘ReasonNotSampled’ is properly filled out.
  - This layer also serves as a chain of custody for macroinvertebrate and water quality samples (i.e., ‘NumberofBugJars’, ‘NumberofWQSamples’).

- **NHD:** The NHD layer the National AIM team uses to draw points for most designs
  - The national NHD is visible at a large scale, but if you need to click this layer for additional attributes and information, zoom into a local area. The resolution of the layer adjusts based on your zoom.
  - Oregon will have two layers because we used two different NHDs: one for the local designs and one for the Western Rivers and Streams Assessment design.
  - The NHD will appear and be a “clickable” feature as you zoom in.

- **Lotic Previously Evaluated Points:** This layer contains a record of every reach that has been previously evaluated as part of the BLM’s Lotic AIM program. This layer should be used as a reference layer while office evaluating points to prevent duplicated office evaluation efforts across years and to learn from previous evaluations. Any points that have a record in the Lotic Previously Evaluated Points layer should have ‘Yes’ autopopulated in the Points layer.
‘PreviouslyEvaluated’ column. Access information from the previously evaluated points layer may be particularly useful, but previously evaluated reaches classified as “Not Sampled” should not automatically be written off as “Not Sampled”. Consider if reach conditions may have changed across years and also consider how valid previous evaluations were. This layer will appear as you zoom into a local area.

- **Other useful layers:**
  - BLM administrative unit boundaries
  - BLM Ownership
  - USGS Stream Gauges
  - Imagery (Add basemap imagery for zoomed detail)

- **Add basemaps, your own layers, or already published layers to this map as well**
  - Basemaps are added from the basemap menu above your map content
  - Click the Add option above the map content and add layers from various sources. If you are adding a shapefile it must be in a zipped folder.

**Step 2 – Select Targeted Points, Points for Potential Merging, and Contingent or Supplemental Indicators**

**Overview:** Project leads identify targeted points for sampling, if applicable, and specify which points need contingent or supplemental indicators collected. In addition, project leads determine if any random points can be merged with existing monitoring locations to maximize opportunities for trend assessments and data applicability to management decisions. Lastly, points from the same design that are in very close in proximity to one another are evaluated for potential skipping.

**Responsible Parties:** Project leads

**Files and Tools:**
- **Office Webmap**
- **Shapefiles or CSV** of other existing monitoring locations (MIM, PFC, AREMP, PIBO, other). Shapefiles must be in a zipped folder to add to the map.
- **Targeted Point Request Form** – [Office 365 form](#) used when requesting that a new targeted ‘PointID’ be generated.
- **Existing Targeted Point Request Form** – [Office 365 form](#) used when requesting that an existing targeted ‘PointID’ be added into the Office Webmap.
- **Current year’s task order**

**Detailed Instructions – Targeted Points:**

1. Determine if your point has been previously evaluated as a part of lotic AIM. If you are not sure, consult the Lotic Previously Evaluated layer to determine if there is a point in this layer in your desired location.

2. Determine if you can use a random point from your design as a targeted sample location. To do this turn on the Points layer and if the point falls in a desired targeted location mark the point as “Ready to field visit” and make notes in the ‘OfficeEvalNotes’ that it should be sampled as a targeted location and provide the information listed in number 3 below. If the point does not fall in the exact desired location, we recommend requesting a targeted point exactly where you want it to be located.
3. Gather the following information about your targeted point.
   a. Previous 'PointID' if the point has been previously evaluated
   b. The latitude and longitude (in decimal degrees; WGS84; six decimal places):
      (49.452684, -119.562379)
   c. Stream or drainage name (not required)
   d. Field office the point falls in
   e. Reason for choosing this targeted point location
   f. If and how far the point can be moved. This usually depends on the reason for choosing
      a site. A restoration reach usually can’t be moved. If you just want a sampled reach
      somewhere on a specific stream, it can usually be moved to make sure the crew can
      sample the whole reach.
   g. Is there a temporal constraint on when the point needs to be sampled?

4. Submit a targeted point request to the National AIM Team using the appropriate form. This
   form will be available from the National AIM team in March 2020.

5. Once the National AIM Team receives the request, they will work on appending a new point
to your project in the Points layer. Note that it may take up to 24 hours for the point to be added.
Once a targeted point has been appended to the Points layer, the crew will have to take their
device back online to sync the newly added 'PointID'.

Detailed Instructions – merging or skipping reaches:

1. Examine the location of point coordinates in the AIM design in relationship to pre-existing
   sample reaches or new AIM reaches to be sampled on the same stream. Point coordinates that
   fall in very close proximity to an existing sample reach can be considered for merging or
   skipping. If points are not from the same design, consider merging. In contrast, points within
   the same design cannot be merged, but they can be considered for skipping. To merge or skip a
   reach, the random sample point coordinates must meet ALL of the following criteria:
   a. Be within the following distance of the other point:
      i. Small streams (1st and 2nd order): 500 m
      ii. Large streams (3rd and 4th order): 1000 m
      iii. Rivers (5th+ order): 2000 m
   b. No geomorphic differences exist between the two sample reaches. Specifically,
      determine if valley confinement and the subsequent extent of the floodplain area and
      vegetation type appear similar between the two sample reaches.
   c. No perennial or intermittent tributaries enter between the two sample reaches.
   d. No management changes exist between the two sample reaches. Specifically, determine
      if fence lines, changes in land ownership, or other land-use activities differ between
      reaches.

2. Document merged points, if all of the above criteria are met
   a. Record the point identifier of the point you want to merge with in the ‘MergedSiteCode’
      column. This is called 'PointID' for all AIM points.
   b. Record the monitoring program you are merging the point to in the
      ‘MergedMonProgram’ column (PIBO, MIM, AREMP, PFC, AIM, other).
   c. The location of the new sample point needs to be moved to the location of the existing
      monitoring location to ensure spatial compatibility of monitoring data and so the crew
      knows the correct location to sampled. To do this:
i. Type coordinates into the “Find Address” search bar at the top right of the webmap, hit enter/return, and click “Add to Map Notes” in the popup. This will drop a pin on the webmap.

ii. Coordinates should be typed in decimal degrees format
   EX: 45.17938374, -116.28202490

iii. Click the AIM point you are moving and select “edit” on the lower section of the popup window. Then click and drag the point to the desired sample location.

iv. Review the ‘CurrentLat’ and ‘CurrentLong’ attribute fields and ensure that they were updated to the new coordinates you moved the point to. Also ensure that the field ‘Has the Point been Moved’ says Yes.

d. The crew will field visit the ‘CurrentLat’ / ‘CurrentLong’ coordinates and record a visit in the Field Visits layer under those coordinates and the original points ‘PointID’, not the merged ‘PointID’.

e. Points within the same design cannot be merged! Consider skipping one of the points, but please consult with the National AIM Team first since this will create holes.

3. Document any skipped points if all of the above criteria are met
   a. Record the ‘EvalStatus’ as either “Not sampled- BLM approved” if you are a BLMer, or “Not-sampled- Not yet BLM approved” if you are not a BLMer and set the ‘ReasonNotSampled’ to “Unknown - Too Close to other monitoring location”.
   b. You must make a comment in the ‘OfficeEvalNotes’ about which point it was too close to, why it was skipped, and explain how it met all criteria.
   c. You do not have to skip points that meet the too close criteria and skipping points may negatively impact the statistical rigor of your design by creating holes.

Detailed Instructions – selecting contingent or supplemental indicators to be collected at each reach:

1. Core indicators should be collected at all random points.
2. Project leads should identify additional contingent or supplemental indicators to be collected at each reach. Not all reaches require the same contingent and supplemental indicators to be collected. A list for each point ensures the crew knows the correct indicators to collect.
   a. Reference the monitoring design worksheets and contract/agreement (if applicable) for more information about which indicators are to be collected at each reach.
   b. In each of the Contingent Indicator columns within the Points layer, select yes or no
to indicate if it will be collected.

c. In the Supplemental Indicators column within the Points layer, type which supplementals you want collected.

d. If you have a default set of indicators to be collected, please work with the National AIM Team and they can prepopulate the corresponding columns so there is not as much manual selection.

3. In some cases, a subset of core indicators may be collected and specified in the ‘CoreSubset’ columns. Please contact the National AIM Team for guidance on when this may be appropriate.

**Step 3 – Office Evaluation**

**Overview:** The purpose of office evaluation is threefold: 1) to determine whether a reach meets the definition of the target population (e.g., perennial wadeable streams on land managed by the BLM within the Bruneau Field Office) and should be sampled or is not part of the target population and should not be sampled (Table 1); 2) to assess the accessibility of a reach; and 3) to plan travel routes to the point coordinates. Field crew efficiency and productivity is often directly related to how well reaches are evaluated and thus the value of this process cannot be underestimated. Office evaluation involves using available geospatial information and local knowledge to determine if a field visit is needed and to record access information. Rejected points need to be replaced by oversample points until the desired sample size is met – see ‘evaluation and sampling order’ design concept.

**Responsible Parties:** Project leads, crew managers, and/or field crews

**Files and Tools:**
- Office Webmap

**Detailed instructions – completing office evaluations in Office Webmap:** Document all information obtained and decisions made during the office evaluation process in the ‘Points’ layer

1. For each point, consider the area you are assessing for perennial flow, wadeability, access, and land ownership.
   a. A minimum of 75 m up and downstream of the point coordinates needs to be evaluated, but this length should increase for larger systems (reach length = 20x bankfull width)
   b. Note that crews have the ability to move point coordinates during the field visit to meet the sampling criteria (See TR 1735-2 Section 3.2 for more information).

2. Determine whether a reach meets the definition of the target population and is accessible (See below for a list of example stream flow, access and ownership questions):
   a. If the sample reach is believed to be a member of the target population (e.g., perennial stream on BLM land within your reporting unit),
      i. Determine if the reach is accessible and provide access information
         1. If it’s not accessible, complete the ‘EvalStatus’ and ‘ReasonNotSampled’ columns.
            a. The ‘EvalStatus’ of “Not Sampled – BLM approved” should be used by BLM project leads
            b. The ‘EvalStatus’ of “Not Sampled – Not yet BLM approved” should be used by anyone other than the BLM project lead conducting the evaluation.
                i. All points with an ‘EvalStatus’ of “Not Sampled – Not yet
BLM approved” will need to be verified by a BLM project lead and changed to “Not Sampled – BLM Approved” by the end of the field season if in agreement. See Step 6 – Final Evaluation Status below.

ii. Clearly state the reasons why a reach was determined to be permanently inaccessible in the ‘OfficeEvalNotes’ column.

2. If you think the reach could be accessible
   a. Use the ‘EvalStatus’ column in the Points layer to select the “Ready to Field Visit” option.
   b. Provide all relevant notes for the field crew regarding point access, the timing of sampling, etc. in the ‘OfficeEvalNotes’ column.
   c. Provide any landowner contact information and names in the ‘ContactInfoForAccess’ column. Names, phone numbers, and emails must be kept out of the ‘OfficeEvalNotes’.

b. If the sample reach DOES NOT meet the definition of the target population, set the ‘EvalStatus’ field to “Not Sampled” and fill out the appropriate ‘ReasonNotSampled’ (Table 1). For more details about “Not Sampled- BLM approved” vs “Not Sampled- Not yet BLM Approved” see above steps.
   i. All points with a ‘ReasonNotSampled’ of “Nontarget” must have ‘NotSampledEvidence1’ and ‘NotSampledEvidence2’ filled out. What were the tools you used to determine this (e.g., local knowledge [give name if not yourself], imagery, gauges, SMA, etc)?
   ii. Also clearly state the reasons why a reach was determined to not be part of the target population in the ‘OfficeEvalNotes’ column (e.g., the point falls in the Salmon Field Office, but this is the Upper Snake Field Office design and should only include points in Upper Snake FO)
Stream flow, access, and ownership considerations:

1. **Stream Flow Considerations**: Examine the location of the reach in the Office Webmap to determine:
   a. Does the reach fall on or near an actual stream? If not, record the ‘ReasonNotSampled’ as “Nontarget- Lentic” or “Nontarget- Map Error” (Table 1)
   b. Is the system likely to be perennial? Streams should be sampled if they contain water at five or more of the eleven main transects during the time of sampling, even if that water is no longer flowing. If the office evaluator is not sure, the point coordinates should be visited by a field crew.
      i. For non-perennial reaches that the office evaluator is sure will never contain water during the sample period (usually June 1-Sept 31), use the “Nontarget- always dry during the sample season or ephemeral” designation (Table 1)
      ii. If you are office evaluating in a drought year or at the end of the season you may find a reach that is dry at the moment, but will likely have water in future years, or earlier in the sample season. To avoid permanently writing off these sites as dry use the “Nontarget- possibly has flow during some sample seasons” designation.
      iii. If you are unsure if a reach will always be dry, use the “Nontarget- possibly has flow during some sample seasons” designation so the site is re-evaluated at another time.
      iv. Furthermore, two sources of ‘NotSampledEvidence’ is mandatory for Nontarget rejections.
   c. Is there a specific time of year the reach should be sampled based on when the stream might be influenced by runoff, weather, dam operations or irrigation withdrawals and returns?
   d. Can the reach be boated but not waded? Consult with the project lead and determine if boatable reaches should be sampled as part of the design, or if the project lead is only intending to report on wadeable streams and rivers.
      i. Boatable reaches that should be sampled need to be sampled by a specialized crew with a different protocol. If you cannot return to the point later in the season and wade at least 50% of the reach then use the ‘Not Sampled Reason’ of “Reattempt- Boatable crew needed”
ii. If the project lead wants to report on only wadeable streams and rivers and not sample any boatable systems, then use “Nontarget- Boatable (not sampling boatable reaches for this design)”

iii. If the project lead is unsure, please contact the NOC to determine the appropriate next steps.

e. Is the reach both unsafe to wade and unsafe to boat? If so, record the ‘ReasonNotSampled’ as “Not wadeable nor boatable” (Table 1).

2. **Access Considerations:** Examine the location of the reach in the Office Webmap to gain an understanding of potential access routes and terrain. In doing so, document answers to the following questions in the ‘OfficeEvalNotes’ column in the Points layer:

   a. Is the point safe to access? If not, record the ‘ReasonNotSampled’ as “Permanently Inaccessible-Access denied terrain” (Table 1). Permanently Inaccessible should only be used if the point is truly inaccessible and multiple attempts have been made to visit the point coordinates and access will be impossible/impractical by all crews for at least 10 years into the future. It should be noted that using this status creates holes in the design.

   b. What are the driving directions to access the point coordinates and what will road conditions be like? Provide multiple suggestions when possible.

   c. How long (in miles) is the hike from the parking area to the sample point? Lotic AIM does not have a maximum hike distance used to reject points like terrestrial AIM. Crew and Project leads should assess the situation and determine if the crew is capable and it is safe to attempt. Three- to five-mile hikes are not rare.

   d. How difficult is the hike (easy/moderate/hard/very difficult)?

   e. Are there unique challenges that might affect access (e.g., cliffs or private land)?

   f. Are there any specific access directions (e.g., access directly from the North and pick your way between the cliff bands) that need provided to crews?

3. **Landownership Considerations:** In the Office Webmap, examine the location of the point in relation to public and private land and determine if you need permission to cross private land to access the point. If so, research and document answers to the following questions in the ‘OfficeEvalNotes’ or ‘ContactInfoForAccess’ columns:

   a. Is at least 100 m of stream on BLM land? If not, record the ‘ReasonNotSampled’ as “Nontarget – Reach too short” (Table 1). If there is >100 m of stream but the point falls on the edge of BLM land, remember that field crews can move the point in the field to sample the reach.

   b. Where is private land in relation to the point (e.g., upstream, East, etc.)?

   c. Have you arranged to access the point? If not, what are the next steps toward arranging access?

   d. Who is the point of contact to gain access and how should the person be contacted? Only record contact information in the ‘ContactInfoForAccess’ column.

   e. What are the access stipulations/directions from the landowner?

   f. Have all private landowners denied access and no other routes are possible? If so, record the ‘ReasonNotSampled’ as “Permanently Inaccessible-Private access denied” (Table 1).

**Step 4 – Trip Planning**

**Overview:** Once reaches are office evaluated, trip planning begins by logically grouping and planning to sample reaches labeled “Ready to Field Visit”. Crews can typically sample one reach per day if drive times are not too long. Trip planning is an iterative process that should be re-assessed after each trip.
considering rejected, nontarget, and temporarily or permanently inaccessible reaches and the need for oversample points. To retain statistical validity of the design while also being efficient with your sampling efforts, it is important to balance the sampling order, sample size, and spatial extent of each sample trip. Use the Sample Size Dashboard to review the number of sampled reaches, progress towards achieving desired sample sizes, and number of holes. As a reminder the Points layer ‘EvalStatus’ must be up to date for correct values to appear in the Sample Size Dashboard.

**Responsible Parties:** Project leads, field crew leads, or crew managers may complete this step.

**Files and Tools:**
- Office Webmap
- Sample Size Dashboard

**Detailed Instructions – Trip Planning:**

**Step 1. Select groups of reaches that are spatially close together, while considering the following:**
1. The number of selected reaches for each sampling trip will depend on the length of trip, the distance between point coordinates, stream size, the difficulty of point access, and the likelihood of point failure. If the points are within 1-2 hour drive of each other, and the hike to each point is relatively short (less than ~2 miles each way), crews can typically sample one point per day. If drive time and hike distances are longer, more time will need budgeted per point.
2. When selecting points geographically close together, you should always consider the sample order and potential for creating holes in the design (see ‘Holes in the design’ in the design concepts section).
3. The National AIM Team strongly recommends adding several extra points to every trip, so that the crew has backup options in the event that points are rejected or temporarily inaccessible. Base the number of backups on the likelihood of rejection for each point scheduled on the trip.

**Step 2. Review evaluation information in the Points layer to determine if additional information or contacts are needed and allow enough time to follow up for more information if needed.**
1. Review if the point has been merged or moved and if this was intentional
   - Follow up with the office evaluator and project lead if the point was moved, but there is no indication in the notes or merged info that would support this.
2. Review information about private landowners or field personnel that should be contacted and determine if there is enough time to do so before the trip begins.
3. Review the driving and access routes in your Office Webmap or other available resources to determine if supplemental maps or information is needed. When reviewing maps, pay particular attention to areas that could prohibit access (e.g., cliffs). If terrain impediments are identified, consider other routes, even if alternative routes will require longer hiking.

**Step 3. Create a list of points to visit on the field trip**
1. Based on the above, create a list of points the crew should attempt to visit on their field trip. The list should include the order that the crew should sample points and a list of backup points. Backup points should include notes such as ‘sample this point if point XYZ fails’ or ‘sample if extra time’. Make sure the crew clearly understands any special point access instructions before departing.
2. In the Points layer, use the ‘Trip’ column to record which points should be sampled during each
trip. This is simply included as a tool to assist trip planning and does not need to be used.

a. We suggest using a trip number or the date that the crew will leave for their trip to group points.

b. If a point is not visited during the trip, simply update the trip column when the crew returns to the office and before they leave for their next trip.

Tips for trip planning:

- Filtering the Points layer by your ‘Project’, which sites have a ‘EvalStatus’ of “Ready to field visits” and “Reattempt” will help remove clutter on the map during trip planning.
- Schedule difficult points for the start of the field trip when the crew has more time and energy.
- Plan easy points at the end of the trip in case the crew is running short on time and energy.
- Plan easy points for the entire first trip of the season, hardest points in the middle of the field season, and easy points at the end of the season when the crews are running out of time and energy.
- Consider snow pack, flow regimes, and irrigation withdrawals, but generally plan Small Steam strata at the beginning of the season before some of them dry up, Large Streams in the middle of the season so that flows are safe to wade, and Rivers at the end to be wadable at all.

Step 5 – Field Evaluation

Overview: Field crews can sample, not sample, or reschedule points for another visit. Field crews are responsible for recording the outcome of all attempted field visits in the Field Visit layer (See Table 1 for possible point statuses). Any rejected points need to be replaced by oversample points until the desired sample size is met – see ‘evaluation and sampling order’ design concept.

Responsible Parties: Field crews

Files and Tools:

- Collector Field Webmap – Field Visits layer

Detailed Instructions: Content can be viewed and updated with or without internet access. All crews should be able to take a webmap offline in Collector by specifying an area on the webmap to cache. After editing or creating field visits using Collector offline, open the Collector application while online to sync all changes.

Step 1. Ensure you have all the needed information

- Crew reviews their trip schedule. Look at each point on the list and review the directions and access information. If there are questions the crew should follow up with the office evaluator before departing on the trip.
- Review merged or moved points. Ensure any moved or merged points were intentional by looking at the ‘MergedSiteCode’, ‘CurrentLat’, ‘CurrentLong’, ‘Has the Point been Moved’, and the ‘OfficeEvalNotes’ columns. Follow up with the office evaluator and project lead if there is no indication in the notes or merged info to support the merge or move.
- Review indicators to be collected. Review which indicators are to be collected at which reaches. Not all reaches will have the same indicators to collect so be careful not to miss anything, check that you have the gear to sample those indicators, and that you understand the field protocol to sample them.
Step 2. Create your offline Field Evaluation Map
- Not all parts of this step are necessary but are highly recommended.
- The crew lead, or the person signing in on the iPad while sampling, should log into their GeoPlatform account in the ArcGIS Companion application on the iPad or on a computer. When it requests for a portal URL, enter: https://geoplatform.maps.arcgis.com. Navigate to the Field Eval Map and then filter the Points layer by the 'Trip' column for the specific trip.
- Save a copy of the map to your GeoPlatform account and label it appropriately (e.g., Trip5_June14th).
- Sign into your GeoPlatform account in the Collector application on the iPad, open the map you saved and “Add offline area”. This saved map will still sync to the main Office and Field Eval Webmaps once you return to service and can sync the map through Collector. More information will be provided in the pre-training material.
- If you are using a BLM iPad follow the same instructions but use your BLM-Mobile account.

Step 3. Field visit points and know what to record in SARAH / Collector applications
- Crews should follow field methods protocol TR-1735-2 Section 3 when evaluating reaches in the field.
- All attempted field visits MUST be recorded in the SARAH application as well as in Collector using the Field Visits layer with the appropriate ‘FieldEvalStatus’ (Collector) or ‘Site Status’ and ‘Designation’ (SARAH). This includes reaches the crew attempted, but did not visit and should be reattempted during a future trip. If a reach is not sampled, ensure that proper comments have been recorded and that ‘ReasonNotSampled’ is filled out. This ensures that the appropriate information for revisiting points is documented and that any rejected reaches are also properly documented for analysis.
- If you did not attempt to access the point on the trip, you do not need to record an eval status.

Step 4. Record a Field Visit for all attempted visits
Crews need to record this information in both the Field Webmap using Collector and also in the SARAH application.
- **Collector:** Creating a Field Visit in the Field Visits layer must be done in the field while you are still located at the physical point.
  - While at the Point Coordinates (or F transect if the point was moved at all), the crew should provide the:
    - ‘FieldEvalStatus’ of the reach
    - Relevant comments or notes about the reach (e.g., “water was too high due to snowmelt runoff, revisit later in the season”)
    - Number of Bug and WQ jars collected if the reach was sampled
    - If the reach was not sampled the ‘ReasonNotSampled’.
  - When data is reviewed and submitted as final, the crew must go back into Field Visits layer and fill out the date for ‘DataSubmittedAsFinal’.
- **SARAH:** In the verification page of SARAH, provide the ‘Site Status’ and ‘Designation’ of the reach and any relevant comments or notes (e.g., ‘water was too high due to snowmelt runoff, revisit later in the season’).

Step 6 – Finalize Evaluation Status
**Overview:** Project leads are responsible for ensuring the accuracy and completeness of all point statuses at the end of the season and contacting the National AIM Team when complete, but throughout the
season the project lead, crew lead, or crew manager (depending on Roles and Responsibilities of your specific project) can iteratively update this information.

**Responsible Parties:** Project leads (final and ongoing review), crew managers, and crew leads (ongoing review only)

**Files and Tools:**
- Office Webmap
- Sample Size Dashboard

**Detailed Instructions:** This process is much easier if iteratively completed by the project lead (or crew manager) throughout the season (after each trip or every 2 weeks).

1. Finalize ‘EvalStatus’ for all sampled reaches. (These steps can be done by the BLM project lead or others.)
   a. Review the Data Summary, ensure all QAQC is completed, and the crew has submitted final data.
   b. Change the ‘EvalStatus’ column to say “Sampled- Data summary reviewed”.

2. Finalize ‘EvalStatus’ for all reaches classified as “Not sampled”
   a. The BLM project lead must approve any point classified as “Not Sampled- Not yet BLM approved” by the end of the field season. Review all comments and ‘NotSampledEvidence1’ and ‘NotSampledEvidence2’ to ensure you agree with the ‘EvalStatus’ and ‘ReasonNotSampled’.
   b. If the reach was classified as “Not sampled” during field evaluation:
      i. Review field and office information:
         1. Comments, directions, notes provided to the crew, previous evaluation information.
         2. Crew’s comments, pictures, notes from the field visit.
      ii. Determine if the crew made the correct classification and edit the Points layer.
         1. If there is agreement by the BLM project lead or the crew manager
            a. BLM project lead should update the ‘EvalStatus’ attribute in the Points layer to “Not Sampled – BLM Approved” and make sure the ‘ReasonNotSampled’ matches the reason the crew selected.
            b. Crew managers should update the ‘EvalStatus’ column in the Points layer to “Not Sampled – Not Yet BLM Approved” and make sure the ‘ReasonNotSampled’ matches the reason the crew selected.
         2. If there is not agreement with the crew, decide whether the point should be reattempted, or if there is a different reason the point was not sampled
            a. Different ‘ReasonNotSampled’
               i. For instance, the crew classified a point as “Nontarget-Map Error”, but the project lead looks at the photos and it looks to be a lentic system. They talk to the crew and decide it was in fact a lentic system. This should be recorded in the Points layer as “Nontarget- Lentic”.
               ii. The ‘FieldEvalStatus’ and ‘ReasonNotSampled’ in the
Field Visits layer should not be changed, but a comment should always be made in the ‘OfficeEvalNotes’ column in the Points layer to clearly explain why the Project Lead disagreed with the Field Visit ‘ReasonNotSampled’.

b. Reattempt:
   i. For instance, the crew identified a point as being “Permanently inaccessible”, but the project lead identified another possible access route, then the ‘EvalStatus’ in the Points layer should be set to “Reattempt”.
   ii. If this is done during the field season, this status lets the crew and crew manager know that they should reattempt sampling this point. If they do not reattempt, the point will become a hole.
   iii. If this is done at the end of the season, it should still be recorded as reattempt so we know the point can be sampled in the future, but for this effort the point will become a hole.

3. Part of this process is to assess progress made towards sample size goals and ensure the number of holes stays to a minimum.
   a. For this process, use the Sample Size Dashboard.
   b. Manage the design such that each stratum has fewer than 30% holes (see ‘Holes in the design’ in the design concepts section). If you find that you have more than 30% holes, carefully review all ‘inaccessible’ points to determine which points might be feasible to sample. If possible, reattempt and sample some of these points. If this is not possible, determine if the National AIM Team can offer sampling assistance or consider increasing your sample size in this stratum to reduce the ratio of ‘holes’ to sampled points.

Finalizing Design for the Season
At the end of each field season, the Points layer needs to be finalized. Once finalized, send the National AIM Team an email and they will archive the Points and Field Visits layers for database ingestion.

Detailed instructions
1. Ensure you have updated the ‘EvalStatus’ for all reaches.
2. Ensure all “Not sampled” reaches have associated comments and evidence.
3. Review and clean up all comments so that they are clear and make sense to people that were not involved in this year’s process.
4. Make sure any merged points have the ‘MergedSiteCode’ and ‘MergedMonProgram’ columns in the Points layer filled out and that the crew sampled the correct location.
5. Make sure that the National AIM Team has received final data for all reaches and that all evaluated reaches are properly recorded in the Points layer.
6. Review the sample size tables in the Sample Size Dashboard and verify that the values are correct. Also consider how results from this year could inform your planning for next field season. If numbers in the Sample Size Dashboard appear off, ensure that ‘EvalStatus’ and ‘ReasonNotSampled’ in your Points layer is the properly filled out. If questions persist, contact the National AIM Team.
7. Email the National AIM team to inform them that you are complete with your Design Management for the current field season.
Glossary

Sample design: A framework, or road map, that serves as the basis for the selection of sample points and affects many other important aspects of a survey as well (Sage Research 2017). Provides information on the target population, sample sizes, strata definitions, time period over which data will be collected and the sample selection methodology. This term can be used interchangeably with ‘sample plan,’ ‘survey design,’ ‘sampling plan,’ ‘sampling design,’ and ‘study design.’

Order Code: sequential number in the points layer starting at one and ending with the total number of points within that stratum of the design. The number is used to assist with assessing the order in which points/reaches should be evaluated and sampled.

PointID: Each point in a design is given a unique identifier called a ‘PointID’. The ‘PointID’ is used to track the fate of each point (i.e., was it sampled or rejected) and all data and samples that are associated with that monitoring location. Therefore, it is extremely important that the ‘PointID’ is accurately recorded when evaluating points in a design or collecting data at the associated location. Always double (or triple) check the ‘PointID’.

Generally, the ‘PointID’ for random points consist of a two or three letter prefix that represents the stratum in which the point falls, followed by a two letter code that represents the stream size category associated with the order of the stream, followed by a five digit number that is derived from the master sample point selection tool (e.g. PF-SS-12345). Commonly the stratum will be associated with the field office in which the point falls (e.g. PF = Price Field Office). Stream order categories are as follows unless stated otherwise: small streams (SS - 1st and 2nd order streams), large streams (LS - 3rd and 4th order streams), and rivers (RV - 5th order and above).

The ‘PointID’ for targeted points has a similar structure where the first two letters of the ‘PointID’ are associated with the Field Office the point falls in. The second two letters are ‘TR’ identifying the point as targeted. The ‘PointID’ will conclude with a randomly generated 4-digit number. E.g., RA-TR-1023.

Strata: In the context of monitoring, stratification refers to dividing a population or study area into subgroups or subunits called strata for the purposes of sampling or data analysis. Example reasons to stratify include: 1) ensuring a sufficient sample size in reporting units; 2) ensuring uncommon portions of a study area are sampled; and 3) placing sample points in homogeneous groups to account for natural environmental gradients (BLM AIM 2017). Examples of possible stratum for lotic systems are field offices, Strahler stream order, or stream slope.

Random sample points OR Random design: Method of point selection in which every unit in the target population has some non-zero probability of being selected. The selected sample units are representative of the target population and can be used to derive population estimates. For random sample designs, the target population, strata, and design weights or selection probabilities are explicitly known. AIM selects random points from the National Hydrography Dataset streams layer in a spatially

1 Stream size categories in Alaska may be calculated differently.
balanced manner that results in a subsample of the population that is representative of the entire population of interest (e.g. Ator et al. 2003; Olsen; Olsen et al. 2012). The fate of all random points must be determined and documented for use during analysis and reporting.

**Targeted sample points:** Method of point selection using a non-random method. Sample units are selected deliberately, using the judgement of the sampler or project lead. Elements of the sample design (e.g., target population, selection probabilities) are unknown.

**Target population:** The target population for a survey is the entire set of sample units (e.g., plots, stream reaches) for which the survey data are to be used to make inferences. Thus, the target population explicitly defines those units for which the findings of the survey are meant to generalize (Sage Research 2017).
Appendix 1. QuickStart Guide: AIM Lotic Office Evaluation Webmap
**Reach Evaluation and Design Management Version 3.0 January 2020**

### AIM Lotic Office Evaluation Webmap Quick Start Guide

#### Filter: Points

- **Create**
  - Add another expression
  - Add a set

**Display features in the layer that match the following expression**

**Project**: ID_UpperSnakeFO

**Ask for values**: Y

- **Value**
- **Field**
- **Unique**

**APPLY FILTER**

**APPLY FILTER AND ZOOM TO**

**CLOSE**

---

#### Applying a Filter in the Content window

Click the filter icon under the layer you want to filter. The first box is the field name you want to filter on, the second box is the “operator”, and the third box is the value. The “Unique” button will give you a list of potential values. Example, “Project is ID_UpperSnakeFO” would only show points for ID_UpperSnakeFO.

---

#### Open table options to Show Selected Records, Clear Selections, Show/Hide Columns, etc.

---

#### Editing a Feature

The editing function is used to change the EvalStatus, add indicators, or give directions.

Click on the point you want to edit. In the bottom of the pop-up window click on “Edit”. You can now type in values or use the drop down menus to add information to the feature.

You can also edit features by double clicking on a cell in the table to bring up the drop down menu or type in values.

---

#### Show Related Records opens the Field/lotics/Points table related to the point.
Appendix 2. Office Webmap Metadata

Table 1. Points layer column metadata. Blue indicates the column is prepopulated. Orange indicates that the project lead, crew manager, or crew is responsible for filling out. Red indicates that it is only the project lead’s responsibility for filling the column out.

<table>
<thead>
<tr>
<th>Column name</th>
<th>Who’s responsible</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OrderCode</td>
<td>NOC</td>
<td>A sequential number in the points layer for each stratum of the design. The number is used to assist with assessing the order in which reaches should be evaluated and sampled.</td>
</tr>
<tr>
<td>PointID</td>
<td>NOC</td>
<td>Each point in a design is given a unique identifier called a ‘PointID’. ‘PointID’ is used to relate all data associated with that monitoring location.</td>
</tr>
<tr>
<td>StreamName</td>
<td>NOC</td>
<td>NHD designated stream or river name</td>
</tr>
<tr>
<td>StratumName</td>
<td>NOC</td>
<td>Stratum in which the point falls such as a field office or ecoregion. See glossary for more information.</td>
</tr>
<tr>
<td>PointType</td>
<td>NOC</td>
<td>Specifies if the point is base, oversample, targeted, or boat</td>
</tr>
<tr>
<td>DesignLatWGS</td>
<td>NOC</td>
<td>Original latitude of the point in WGS84 coordinate system</td>
</tr>
<tr>
<td>DesignLongWGS</td>
<td>NOC</td>
<td>Original longitude of the point in WGS84 coordinate system</td>
</tr>
<tr>
<td>OfficeEvaluator</td>
<td>Project Lead, Crew manager, Crew Lead</td>
<td>The first and last name of the person doing office evaluation.</td>
</tr>
<tr>
<td>OfficeEvalDate</td>
<td>Project Lead, Crew manager, Crew Lead</td>
<td>The date the reach was office evaluated</td>
</tr>
<tr>
<td>PreviouslyEvaluated</td>
<td>NOC</td>
<td>Whether the reach was or was not previously evaluated in past years</td>
</tr>
<tr>
<td>MergedSiteCode</td>
<td>Project Lead</td>
<td>The unique identifier for the point that is being merged with this one (if applicable). For example a PIBO site identifier might be “015-09-IKS”</td>
</tr>
<tr>
<td>MergedMonProgram</td>
<td>Project Lead</td>
<td>The monitoring program of the merged point (e.g., AIM, PIBO), if applicable</td>
</tr>
<tr>
<td>EvalStatus</td>
<td>Project Lead (must approve all non-sampled sites), Crew manager, Crew Lead</td>
<td>Used to track a points/reach status throughout the season from design to office evaluated, and from ready to field visit to field evaluated and data reviewed. At the end of the season all reaches that have been sampled should have a status of “Sampled- Data Summary Reviewed” and all reaches that have been rejected should have a status of “Not Sampled- BLM approved”.</td>
</tr>
<tr>
<td>ReasonNotSampled</td>
<td>Project Lead, Crew manager, Crew Lead</td>
<td>Specifies the reason that a reach was not sampled (e.g., Nontarget, or Permanently inaccessible)</td>
</tr>
<tr>
<td>NotSampledEvidence1</td>
<td>Project Lead, Crew manager, Crew Lead</td>
<td>The first line of evidence used to reject the reach and classify in the appropriate ‘ReasonNotSampled’ category (e.g., field visit, local knowledge, imagery, gauges, SMA)</td>
</tr>
<tr>
<td>NotSampledEvidence2</td>
<td>Project Lead</td>
<td>A second separate line of evidence used to reject the reach</td>
</tr>
<tr>
<td>Column</td>
<td>Responsible</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>OfficeEvalNotes</td>
<td>Crew Lead</td>
<td>and classify in the appropriate ‘ReasonNotSampled’ category (e.g., field visit, local knowledge, imagery, gauges, SMA)</td>
</tr>
<tr>
<td></td>
<td>Crew Lead</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project Lead</td>
<td>Directions on how and when to access the point (e.g., use Deer Creek road and sample early in the season because it may go dry later in season). Other pertinent information such as any specific sampling directions if it is a targeted point. <strong>Note landowner contact information should be put in the ‘ContactInfoForAccess’ column and not here.</strong></td>
</tr>
<tr>
<td>ContactInfoForAccess</td>
<td>Crew Lead</td>
<td>Phone number or other landowner contact information needed to access the point.</td>
</tr>
<tr>
<td></td>
<td>Crew Lead</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project Lead</td>
<td></td>
</tr>
<tr>
<td>TNTP</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>ThalwegDepthProfile</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>BankAngle</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>ExtraBankPlots</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>PoolTailFines</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>GreenlineVegComp</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>VegComplexity</td>
<td>Project Lead</td>
<td>Whether or not this indicator should be collected at the reach; Prepopulated based on project information but may be edited for individual reaches.</td>
</tr>
<tr>
<td>CoreSubset1</td>
<td>Project Lead</td>
<td>Specifies a group of core indicators that should be collected if all core indicators are not to be collected at the reach</td>
</tr>
<tr>
<td>CoreSubset2</td>
<td>Project Lead</td>
<td>Specifies a group of core indicators that should be collected if all core indicators are not to be collected at the reach</td>
</tr>
<tr>
<td>CoreSubset3</td>
<td>Project Lead</td>
<td>Specifies a group of core indicators that should be collected if all core indicators are not to be collected at the reach</td>
</tr>
<tr>
<td>Supplementals</td>
<td>Project Lead</td>
<td>Text field to specify any supplemental indicators that should be collected at the reach</td>
</tr>
<tr>
<td>AdminState</td>
<td>NOC</td>
<td>The BLM administrative state associated with the point</td>
</tr>
<tr>
<td>District</td>
<td>NOC</td>
<td>The BLM district office associated with the point</td>
</tr>
<tr>
<td>Field Office</td>
<td>NOC</td>
<td>The BLM field office associated with the point</td>
</tr>
<tr>
<td>Column name</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>PointID</td>
<td>Each point in a design is given a unique identifier called a ‘PointID’. ‘PointID’ is used to relate all data associated with that monitoring location.</td>
<td></td>
</tr>
<tr>
<td>VisitDate</td>
<td>Date the point was visited</td>
<td></td>
</tr>
<tr>
<td>FieldEvalStatus</td>
<td>Whether or not the reach was sampled or could be sampled at a later date. If it was sampled, the type of sample should be selected (e.g. interrupted flow vs. full reach).</td>
<td></td>
</tr>
<tr>
<td>ReasonNotSampled</td>
<td>If the reach was not sampled, the specific reason it was not sampled should be selected (e.g. nontarget)</td>
<td></td>
</tr>
<tr>
<td>CrewLead</td>
<td>The first and last name of the crew lead that field evaluated the reach</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>General sampling comments and any comments to justify the FieldEvalStatus or ‘ReasonNotSampled’ category.</td>
<td></td>
</tr>
<tr>
<td>NumberOfBugJars</td>
<td>The number of bug jars collected at the reach.</td>
<td></td>
</tr>
<tr>
<td>NumberOfWQSamples</td>
<td>The number of water quality samples collected at the reach (1 or 3 depending on whether duplicates and blanks were collected)</td>
<td></td>
</tr>
<tr>
<td>DataSubmittedAsFinal</td>
<td>Date the data for the reach was submitted as final using the SARAH application.</td>
<td></td>
</tr>
</tbody>
</table>
References

