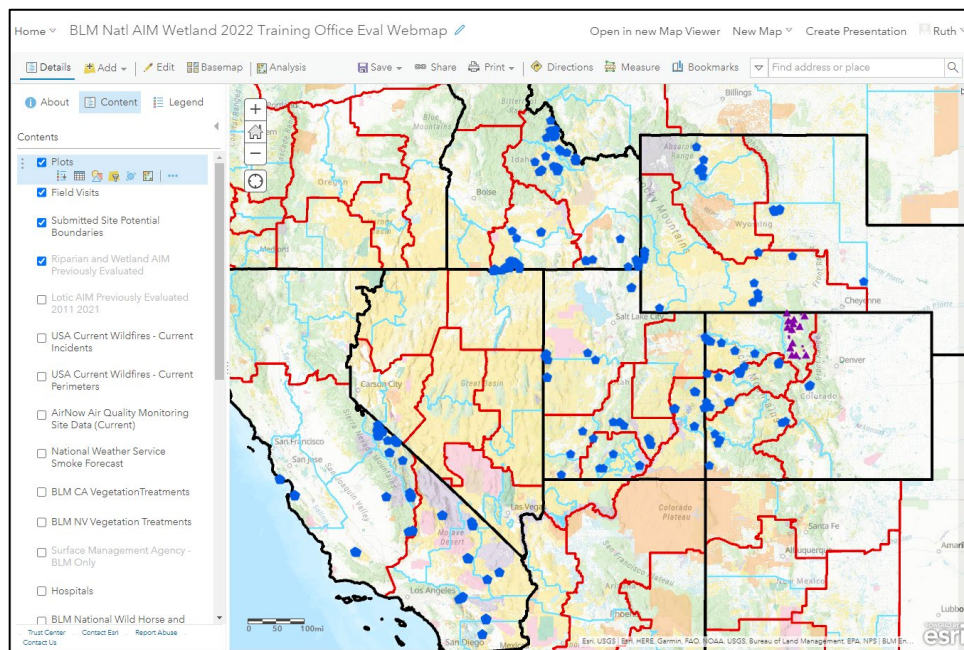# BLM's Riparian and Wetland Assessment, Inventory, and Monitoring (AIM)

Design Management and Plot Evaluation Protocol

2022 Field Season

VERSION 1.0 – March 2022

Produced by BLM National Operations Center (NOC) and Colorado State University (CSU)'s Colorado Natural Heritage Program (CNHP)

Table of Contents

1. Introduction and Design Concepts

A. How to use this protocol

Design management consists of five iterative steps (Fig. 1), which are outlined in the step-by-step instructions below. For each of the five steps, the protocol outlines the responsible parties, required files and tools, and detailed instructions. Supporting information including design concepts, definitions of key terms, and design tool information are provided in the glossary and appendix 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.

B. What is Design Management and Plot Evaluation?

Design management is the process of documenting plot evaluation outcomes, both office and field-based. Proper design management is important to ensure the correct plots are sampled to maintain the statistical validity of your sample design and the subsequent inferences drawn from collected data. Plot evaluation can involve both office and field components. Office evaluation is the process of determining and documenting which plots need to be sampled, how a crew will access point coordinates, whether field crews successfully sampled each plot, and why some plots were not sampled. Plot 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.
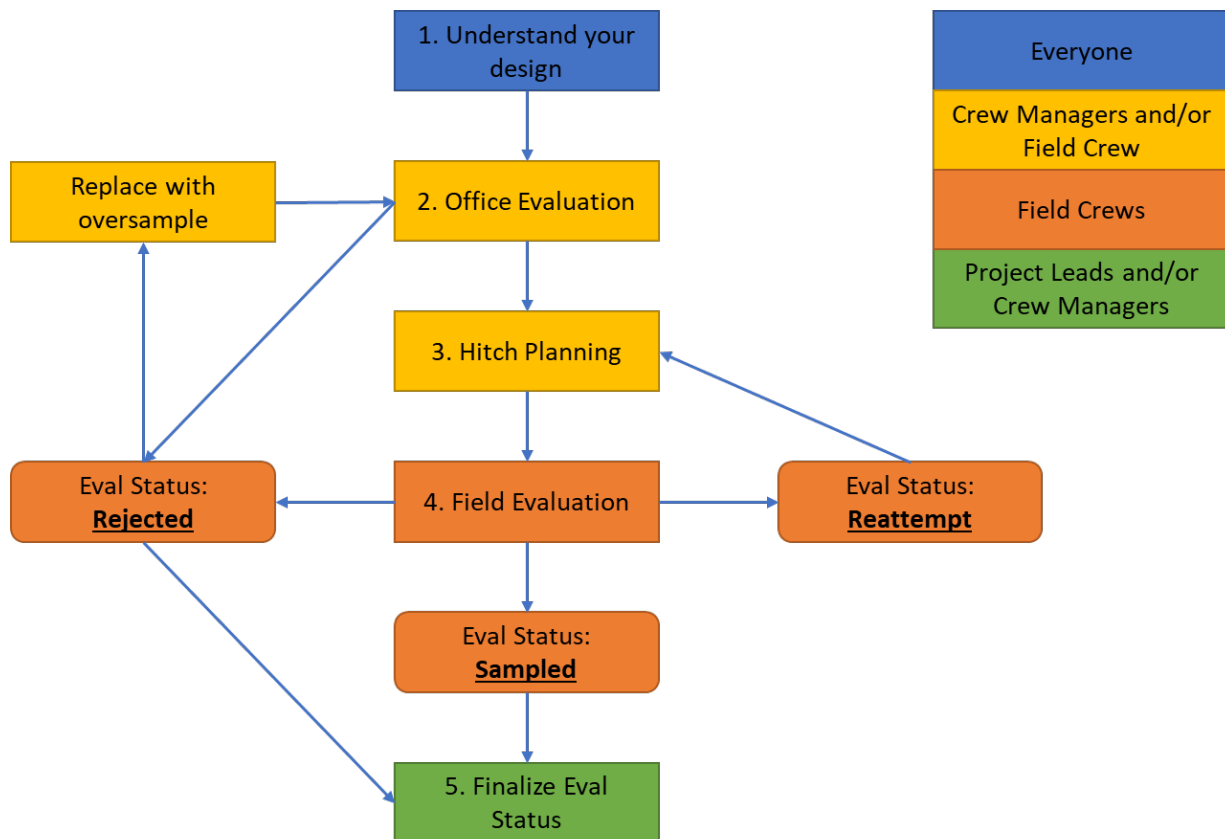
C. Design concepts for design management and office evaluation

Sampling Approach and Designs

Projects in the Riparian and Wetland AIM program may follow a few different strategies for sampling a given *target population*. It is crucial to understand the approach used for a given project to ensure successful implementation. The approach used to select a given Plot will be indicated by the 'Sampling Approach':

- **Random Design**: Sample points are selected randomly across the landscape in a spatially-balanced way. Data from the plots sampled will be used to draw inference across the whole target population. These designs require structured implementation to maintain statistical validity. In most cases, the target population is defined by riparian and wetland areas mapped by the National Wetlands Inventory, though particular projects may use different wetland mapping products. Some random designs may also be divided into smaller *strata* for the purposes of sampling or analysis. During evaluation, strata essentially operate as independent designs, each with their own draw order and replacement points.
- **Targeted Design:** Points are manually-selected by BLM field and district office staff based on specific monitoring goals. Data from these plots cannot be used to make inference to a larger area. Frequently, targeted designs are used where wetland mapping is outdated or inadequately represents the areas project leads are most interested in. As the data from each plot will stand on its own, these plots have less strict plot shifting and replacement rules, but require extra attention to ensure sampling will support the monitoring goals of BLM staff. For a targeted design, BLM staff may provide more sites than they expect to be sampled in a season. Priorities are shown in a 'PriorityOrder' field in the Office Evaluation webmap, but Crews should coordinate with project leads to ensure they meet appropriate sample numbers.
- **Mixed design:** Designs where points come from a random design and are supplemented by additional targeted points. In these designs, crews should make sure they know how many plots they need to sample of each type using the Projects table in the Office Evaluation Webmap.

Evaluation (Eval) Status

At the beginning of the season, all plots will start with an evaluation ("eval") status that matches their sampling approach. As the season progresses, plots can be reassigned to other eval statuses based on information gained during office and field evaluation. Crew Leads are initially responsible for changing these statuses until a particular plot is either Sampled or Rejected. At this point, Crew Managers and/or Project Leads are responsible for reviewing these Plots and approving the data collected by the crew. Eval statuses should be finalized at the end of the field season by Crew Managers or Project Leads.

- **Ready for field visit:** A plot that has been office evaluated, but a crew has not yet attempted to sample. "Ready to field visit – Backup" can be used for sites that have been office evaluated, but may be lower priority than the points specifically planned for sampling.
- **Sampled:** When a plot is sampled, it is considered a member of the *target population*, data are collected, and the data are later used for analysis and reporting. Data from all sampled plots should be reviewed by the Project Lead or Crew Manager by the end of the season. At this point the status can be changed from "Sampled – Waiting for data review" to "Sampled – Data reviewed."

- **Rejected:** A plot that was not sampled because it was found to either be permanently inaccessible or did not fall in the target population. A plot may be rejected during either office evaluation or during a field visit. All permanent rejections must be reviewed and approved by project leads and/or crew managers by the end of the season. At this point the status can be changed from "Rejected – Waiting for project manager approval" to "Rejected – Project manager approved"
- **Reattempt:** A plot that was not sampled or partially sampled due to a temporary access or safety concern or was visited for reconnaissance purposes.

Reason Not Sampled

Plots classified as either Reattempt or Rejected must have an accompanying reason as to why the plot could not be sampled. There are many different reasons a plot may not be sampled, but they fall into three main groups. Each reason is described in more detail in Table 1, and in Section 3.3 of the Riparian and Wetland AIM Field Protocol. The reasons shown below are shown in a hierarchical order, meaning a site that was both non-target and inaccessible should be shown as non-target.

- **Non-target:** The sample location was not within the target population, either due to prevalence of upland vegetation, low perennial cover, size, permanent deep water, or administrative boundaries.
- **Permanently inaccessible:** The sample location did fall in the target population but is not sampleable due to permanent access issues or safety concerns.
- **Reattempt needed:** The sample location was within the target population, but data was not collected because the visit was reconnaissance or the location is temporarily inaccessible. The sample location should be reattempted in the future.

Table 1. General sample status and specific reasons for unsuccessful outcomes of a sample location. Descriptions apply to the sample location and all area within 50 m. (From Table 3 of the Riparian and Wetland AIM field protocol).

Sample status	Reason not sampled	Description
Non-target	Uplands	Sample location is upland. The vegetation is not dominated by hydrophytic species and is not influenced by surface or groundwater.
	No perennial vegetation	Sample location contains <10% perennial vegetation during a typical growing season (e.g., not following heavy livestock use, wildfire, or flooding).
	Permanent deep water	Standing water at the sample location is deeper than 50 cm across more than 10% of the sample plot and is unlikely to recede.
	Size	Wetland area cannot accommodate three 25-m transects or is less than 2 m wide.
	Administrative boundary	The sample location does not fall on lands administered by the appropriate agency.
Permanently Inaccessible	Access denied, private	The sample location can only be accessed by crossing private land and landowner permission was explicitly denied.
	Access denied, terrain	All possible routes were attempted, but natural barriers such as cliffs, slopes greater than 50 percent, waterfalls, or permanently deep water prevented access.

	Distance prohibitive	The sample location falls more than 5 km (3.12 miles) from a road or UTV path and transit time by foot is excessive. The specific distance threshold can be adjusted depending on programmatic goals.
Reattempt Needed	**Different route or permission needed**	The crew was unable to gain access to the sample location but could gain access at a later date with landowner permission or by taking a different route.
	Temporary deep water	Water at the sample location was deeper than 50 cm at the time of visit but will likely recede later in the season.
	Recon visit	The site was visited as a reconnaissance trip, sampling criteria have been met, and information helpful for the future sampling crew has been noted.
	Seasonality	Sample location meets all criteria, but the vegetation was unidentifiable because the visit was too early or too late in the season
	Recent disturbance	Recent flood, fire, or other disturbance that has caused significant impact on the vegetation, but is likely to recover within the season or in the next season
	Other	The crew started to access or sample but ran out of time; the crew was turned back by inclement weather; the sample location will require a backpacking crew, more capable truck, or all-terrain vehicle because it is remotely located or access road is too rugged; or various reasons not listed above, including safety issues such as illegal activities or active wildfire in the vicinity of the sample location.

D. Additional Considerations for Evaluating Random Designs

Base and Oversample

All random designs are made up of two types of points: an initial set of design points, called the base, that must either be Rejected or Sampled by the end of the season, and a second set of "oversample" or backup plots used to replace rejected plots from the base sample. This information shows up as the 'Panel' of a particular plot.

- **Base:** Plots drawn in a random design that correspond to the desired sample size for a given stratum. Ideally, all base plots would be successfully sampled and no oversample plots would be needed. However, for a variety of reasons, base plots are frequently rejected and subsequently not sampled. The number of points in a particular stratum assigned as 'Base' in the panel field of the Plots layer indicates the target number of random plots to be sampled during the current field season.
- **Oversample:** Plots in a random design that are used as replacements for points that are rejected or cannot be sampled.

Evaluation of random designs and sampling order

All sampling locations in a random design should be sampled in the order in which they appear within each *stratum*. As a rule of thumb, start by evaluating and sampling base plots (i.e., the lowest 'PriorityOrder') for each stratum. If a plot (base or oversample) is rejected and classified as "Not Sampled", replace it with the first oversample plot within a given stratum (lowest 'PriorityOrder') to

achieve the desired sample size. 'PriorityOrder' is a sequential number assigned to each plot within each *stratum* and used to ensure plots are in the correct order.

However, 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:

- If you are confident all base points within a *stratum* will be evaluated or sampled by the end of the field season, then base points may be evaluated (office and/or field) in any order. 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 points. 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 were drawn in the design to achieve desired sample sizes, contact the National AIM Team.
- 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 hitches, 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,' below).

Holes in the design
Sampling reaches out of order in random designs or having lots of inaccessible plots can cause 'holes' in the design. Holes result from "inaccessible" or "unknown" plot designations that fall between evaluated plots, which includes sampled plots. *As a rule of thumb, ensure that holes do not make up >30% of evaluated plots (excluding non-target).*

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 plots are classified as "inaccessible" or "unknown" (>30% of plots), a systematic bias may be created that can impact condition estimates. For example, if all inaccessible plots are located in remote wilderness areas with minimal anthropogenic impacts, excluding these plots from your analysis could result in worse overall condition estimates than if those plots were sampled.

When managing a design, it can be difficult to determine how much effort should be expended sampling difficult plots 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.

2. Understanding Design Management Tools

Overview:
Once a design has been finalized, the National Riparian and Wetland AIM Team will make the design points widely accessible for office and field evaluation during the field season. At this point, implementation may begin. All parties involved in design implementation should take some time to understand the tools available for tracking sample design implementation.

Responsible Parties: Everyone

Tools:
- **Office Evaluation Webmap**: Webmap used for tracking all design points and associated information resulting from point evaluation. This should be used on a computer, not a tablet. Information entered into this webmap will be automatically syncyed to the field webmap when the crew is online.
- **Field Evaluation Webmap:** Webmap used for field crews to use in the Field Maps application on their iPad. All information entered into this map should be synced to the field visits layer of the Office Evaluation webmap when a crew returns from the field.

Detailed tool orientation: Use the above tools to explore available features before beginning to evaluate your design.
1. Access the Office Evaluation Webmap
   a. All users must be added to the Riparian and Wetland AIM Group on AGOL to access design management materials. Contact Ruth Whittington (Ruth.Whittington@colostate.edu) if you need to be added to the group.
   b. Contractors may first need to create a geoplatform account before they can be added. Find the instructions for this here and here.
   c. To navigate to the webmap, first go to Groups in ArcGIS Online. There you should find the Riparian and Wetland AIM group. Field and Office Evaluation Webmaps will be linked in the main group description as soon as they are ready for the upcoming field season.
2. Orient yourself to the Office Evaluation Webmap
   a. Review quick start guide in Appendix 1 to navigate the features found in the Office Evaluation Webmap
   b. Review all layers
      i. The plots layer is where all steps during office evaluation will be documented. See Appendix 2 for metadata on all fields in the Plots layer and read carefully before beginning to edit.
      ii. See the list below for a description of other layers found in the Office Evaluation Webmap.
   c. Add layers from ArcGIS Online
      i. The webmap as managed by the National Riparian and Wetland AIM Team will have universally useful layers. There may be additional layers available for an area or region. Use the Add button to search for helpful layers to use during office evaluation.

d. Filter the Webmap for your use
   i. Office Evaluation: AdminState and Project can limit the plots to a state, district, or field office to make office evaluation more manageable. Strata, SamplingApproach, or PriorityOrder may also be used to sort or filter the webmap during various times of the eval process
   ii. Trip Planning: It may help to filter plots to only those with an Eval Status of "Ready to Field Visit" or with a particular hitch indicated.
   iii. Finalizing Eval Status: Project and Eval Status can help filter Plots to those with statuses indicating data review is still required before finalizing the Eval Status for the season.
e. Edit Plots layer to change EvalStatus, add Office Evaluation information and access instructions.
   i. Edits can be made by clicking on a point and then clicking "Edit" or in the table by double clicking on a cell. Be careful to only edit plots which are under your purview.
   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.
   iii. If you cannot edit the table, you may need your permissions upgraded on your AGOL account. BLM users can accomplish this by submitting a helpdesk ticket. Geoplatform users will need to have a BLM sponsor work to upgrade their permissions.

3. Saving your map
a. To save the filters, extent, symbology, or other changes you made to webmaps, you can click the Save As button in the webmap. This will save aesthetic features of the map to a user's contents folder in AGOL, while maintaining the maps connection to the data underlying the layers contained in it. This means all other map users *will not* see changes to the map layout itself, but they *will* continue to see any attribute edits made to the Plots layer.
b. While saving a map can allow users to curate a map to their specific purpose, it will also remove the map from central management by the National AIM Team. In some cases, edits the National AIM Team makes to the webmap may interfere with data collection. For this reason, it is recommended that users remake and save their map starting from the original webmap every 1-2 weeks.

4. Understand how the Office Webmap interacts with the Field Webmap and Field Visits layer.
a. The Plots layer should only be edited on a computer by those responsible for Office Evaluation and Design Management tasks.
   i. Edits to the Plots layer will automatically transfer to the Field Evaluation Webmap, providing crews with information to use during their site visit. Tablets need to be synced with the online webmap before the edits will show up.
b. The Field Visits layer should only be edited by crews from the Field Evaluation Webmap on their iPad through the Field Maps application.
   i. Visits added to the Field Visits layer on crew iPads will show up on the Webmap when the Field Maps application is synced to ArcGIS Online.

Layers in the Office Evaluation Webmap

For all layers in the webmap, additional information may be available in the item description. Find this by clicking the three dots below a particular layer in the content pane of the webmap. This should open a dropdown with "Show Item Details" at the bottom.

- **Plots:** Used to view all plots in a design for a given year and track progress towards completing planned sampling. This layer tracks:
  - Comments and general information (Office evaluator, directions, plot layout comments, etc.)
  - Evaluation Status across the season (EvalStatus column)
  - Reasons a particular site was not sampled and lines of evidence used to reject a Sample Location from the office (NotSampledReason, RejectionReason1 and 2)
  - Contingent and supplemental data to be collected at each plot
- **Field Visits:** Layer used to track individual field visits to a particular plot.
  - Every time a crew visits a Sample Location, whether they rejected or sampled it, a new field visit should be submitted with a unique EvaluationID. Each Plot may have multiple field visits before it is successfully sampled.
  - Each visit should have an appropriate VisitStatus indicating what kind of data were collected. For Rejected and Reattempt visits, a Location Verification form should also be filled out to track additional information on why the site was not sampled.
- **Submitted Site Potential Boundaries**: Some project leads may submit targeted sites where management action is expected to change the extent of riparian and wetland area. This will be indicated in the BLM Comments field of the plots layer, where it will either indicate "Plot can be established in the existing wetland or riparian area" or "Plot should represent site potential". In cases where the plot should represent site potential, they may help guide sampling by submitting potential plot boundaries. Additional polygons may be added by using the Targeted Site Potential Boundaries form. This may be one way for Crew Leads to get clarification on monitoring goals from project leads, by requesting they submit plot boundaries through this webform. Polygons will automatically sync with the Office Evaluation Webmap as soon as forms are submitted.
- **Riparian and Wetland AIM Previously Evaluated:** This layer contains a record of every Plot that has been previously evaluated as part of the Riparian and Wetland 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. Access information can be particularly useful, but plots that have previously been rejected should not be written off as rejections this year. Rather, evaluators should consider if plot conditions may have changed across years and the validity of previous evaluations. This layer will appear as you zoom in closer to an area on the map.
- **Lotic AIM Previously Evaluated:** This layer contains a record of every reach that was previously evaluated as part of the *Lotic* AIM Program. This layer can be helpful to gather information on access and the availability of water during previous field visits from previous years.
- **Project Information:** This table will show up at the bottom of the Contents tab of the Office Evaluation Webmap. This will contain information about expectations for a given project as

directed by the Task Order, including Contingent and Supplemental methods that need to be collected, the number of sampled plots required, and the anticipated balance between targeted and random plots.

- **Layers for assessing whether a site falls within the target population**
    - **USA Wetlands –** National Wetlands Inventory polygons mapped across the entire US. This layer is often what random plots are drawn from. Opening pop-ups from this layer can tell you more about how a particular site was classified in this nationally implemented wetland mapping program.
    - Additional Imagery layers – Allows for viewing imagery from multiple time points.
        - **Sentinel-2 Views –** Imagery layer updated regularly, depending on cloud cover. May be used to see a recent image of a particular area.
        - **USA NAIP Imagery** – This contains several layers highlighting particular aspects of imagery, including Infrared (darker tones indicate moist soils, red colors indicate actively growing plants) and NDVI (Normalized Difference Vegetation Index; shows relative biomass of an area)
- **Layers for gathering additional information about a site**
    - Vegetation Management Treatments – Available for only some states.
    - Horse Management Areas – Layer from the BLM showing areas where Horse and Burros are managed to specific population levels based on the Appropriate Management Level (AML).
    - BLM Natl Fire Perimeter by Decades – open the dropdown to turn on particular decades and check to see whether a particular site has burned.
- **Layers for trip planning and predicting field conditions**
    - Surface Management Agency – A couple layers showing management agency, with BLM lands shown in yellow.
    - USA Roads – Major roads and highways. May not include smaller unpaved roads and 2-tracks.
    - Wildfires
    - Air Quality and Smoke Forecast
    - Hospitals

3. Office Evaluation

Overview

The purpose of office evaluation is to: (1) determine whether the sample location or surrounding area is likely to meet the definition of the target population; (2) verify if the sample location is accessible and, if so, plan a travel route; and (3) develop a preliminary plan for laying out the monitoring plot. The process can include, but is not limited to: reviewing aerial imagery, topographic maps, riparian and wetland mapping, and other ancillary spatial information; compiling previously collected monitoring or assessment data; consulting with field office resource specialists for local knowledge; and contacting private landowners to obtain access permissions and instructions.

Through the process of Office Evaluation, evaluators prioritize points that need to be field visited and manage successful implementation of a particular project's design. In random designs, rejected points need to be replaced by oversample points until the desired sample size is met – see 'Evaluation of random designs and sampling order' design concept. For targeted points, crews must communicate with project leads to ensure sampling fits monitoring goals for a particular site. This process requires iteratively updating the 'EvalStatus' throughout the season and finalizing this field at the end. All points are assigned "Base", "Oversample", or "Targeted" as their 'EvalStatus' at the beginning of the field season to properly symbolize the points on the Webmap. 'Panel' is a noneditable field that permanently stores "Base" or "Oversample" designations.

Responsible Parties: Crew Lead, Crew Manager, and Project Lead (support)

Tools: Office Evaluation Webmap

Process Overview: Document decision-making process in the Plots layer of the Office Evaluation Webmap. See below for a list of items to consider when deciding a site's qualification, access, and sample plan.
1. Review sampling requirements for plots to qualify for the Riparian and Wetland AIM program
   a. All monitoring plots may be shifted a maximum of 50 m from the sample design location, thus the entire area within 50 m of the sample location should be evaluated.
   b. Different potential plot layouts are described in Section 4 of the Riparian and Wetland AIM field protocol. Careful consideration should be given to the potential plot layout during the office evaluation process. If a site has previously been sampled, the plot will need to be laid out as close to the original layout as possible. See 'Revisit Sampling' below for more information.
   c. While random sampling must adhere to strict definitions of the Riparian and Wetland target population and shifting limitations, targeted sites have more flexibility based on the interests of the project lead who chose them. Evaluators and crew leads should do their best to ensure their sampling plan for targeted sites matches the goals of the project lead who chose the plot.
2. Understand project sampling requirements.
   a. Use the Project Information table at the bottom of the contents panel to determine the number of targeted and random points that are required for sampling during the field season.

      b. Information on contingent and supplemental methods can be found in this table. Project Leads and Contractors should communicate about which sites require supplemental sampling and how data from those methods should be collected. Supplemental methods will not be covered during Core methods AIM trainings or in AIM documentation.

3. For each plot in a design, determine whether the sample location meets the definition of the target population. See 'Does the sample location fall within the target population?' below for more information.

      a. Make notes about site evaluation in the 'OfficeEvaluationNotes' field in the Plots layer.

      b. If a site does not meet the definition of the target population change the Eval Status to "Rejected – Waiting for project manager approval"

            i. Fill in the NotSampledReason to be Non-Target, with the correct rejection reason found in Table 1.

            ii. Office rejections require that Office Evaluators offer two lines of evidence filled out in RejectedReason1 and RejectedReason2. What were the tools you used to determine the designation (e.g. local knowledge [give name if not yourself], imagery, SMA, etc.)?

            iii. All rejections, office or otherwise, need to be reviewed and approved by either Project Leads or Crew Managers. After review, the Eval Status may be updated to "Rejected – Project manager approved"

4. If a site does meet the definition of the target population, determine if the location is accessible. See 'Is the sample location accessible?' below for more information.

      a. If a sample location is not accessible, change the EvalStatus to "Rejected – Waiting for project manager approval"

            i. Fill in the NotSampledReason to be Permanently Inaccessible with an appropriate rejection reason found in Table 1.

            ii. Fill in RejectedReason1 and RejectedReason2 with two lines of evidence used for the determination.

5. If a site is determined to be within the target population and accessible, create an access plan for the plot. See 'Planning a route and writing access directions' below for more information.

      a. Write full turn-by-turn access directions in the 'AccessNotes' field of the Plots layer. See below for suggestions on mapping a route to the plot.

      b. Once at the site, these same directions can be updated based on information gathered during the trip, then copied and pasted directly into field forms, so it benefits the crew to write detailed directions from the office.

      c. If a site has previously been sampled, the plot will need to be laid out as close to the original layout as possible. See 'Revisit Sampling' below for more information.

6. Consider how the plot will be laid out, and use the 'PlotLayoutComments' field to document. See 'Creating a sampling plan' below for more information.

7. Once a plan has been developed for sampling, change the Eval Status to "Ready to field visit". Sites that are fully reviewed but of a lower priority can be changed to "Ready to field visit – Backup"

8. Evaluators gaining experience in office evaluation may need to review plots several times as they gain confidence in the evaluation process.

a. A field, 'AdditionalGuidanceNeeded', provides a space to flag plots for follow-up with project leads. Note this field is for use by evaluators and crew leads and will not directly communicate questions to Project Leads.

b. As plots are reviewed, evaluators should compile a list of questions or example borderline sites they need extra guidance on. Consult with Crew Managers, Project Leads, or members of the National Riparian and Wetland AIM Team to clarify recurring issues.

<u>Site qualification, access, and ownership considerations</u>

Does the sample location fall within the target population?
The target population refers to the resources to be described by the sample design, and generally includes the riparian and wetland ecosystems defined in Section 1.2 of the field protocol. Review Section 1.2 before beginning the office evaluation process. Use various layers and basemaps in the Office Evaluation Webmap to help verify that the sample location or an area within 50 m of the sample location will pass each of the six criteria.

Criteria for applicable ecosystems (Field protocol Section 1.2):
- **Perennial vegetation**: At least 10% cover of perennial vegetation under typical growing season conditions without disturbance (e.g., heavy livestock use, wildfire, or flooding).
- **Hydrophytic vegetatio**n: Within existing cover, a dominance of hydrophytic vegetation (OBL, FACW, or FAC species).
- **Hydrology**: Evidence of hydrology influenced by surface or groundwater at some point in the growing season.
- **Shallow water**: No more than 10% cover of permanent standing water deeper than 50 cm (20 in) during the growing season.
- **Area for transects**: Sufficient area to accommodate three 25-m transects with individual transects spaced at least 5 m apart.
- **Minimum width**: For narrow sites, a minimum average width of 2 m.

Potential considerations:
- For targeted plots, did the BLM contact provide additional context about sampling in the BLM Comments field?
  - Some targeted points may not qualify for the six criteria of applicable ecosystems. If a targeted site does not seem to qualify, this may be due to two possible reasons:
    - The BLM Project Lead expects the site to improve in the future due to a change in management, so it is expected to meet the six criteria in the future.
    - The BLM Project Lead may be unaware of the criteria for applicable ecosystems.
  - Evaluators should communicate with the BLM Contact provided to ensure they will get the data they expect from the point they submitted.
  - For communicating potential plot boundaries, a Survey123 webform can be used by BLM staff to demonstrate the area around the sample location in which they would like the plot to be established. Once submitted, the polygon drawn using this form will automatically sync with the Office Evaluation Webmap.

- Random plots *must* fall within the target population. In some cases, plots can be rejected from the office when enough evidence is available to suggest it will not be sampleable. In other cases, borderline sites may still require a field visit to verify that a site does not qualify for sampling.
- Using various imagery sources and years, is the area consistently a bright green color suggesting wet conditions?
- Do NDVI or Color Infrared imagery sources suggest the plot will be covered with vegetation and wet?
- Is the potential area wide enough to fit one of the plot layouts? Use the measuring tool to explore dimensions of sampleable area.
- Is the plot classified in the National Wetlands Inventory (USA Wetlands layer in Webmap). If so, how is it classified?
- Are there previously sampled Riparian and Wetland AIM Plots in the area? Has this Plot been previously sampled or rejected?
    - If the site appears in the previously sampled layer as Reattempt or Permanently Rejected, why was it not sampled?
    - If the site was visited in the past, Crews will need additional information and photos to ensure the plot is placed exactly how it was placed previously. Communicate with the National Riparian and Wetland AIM Team for that information.
- Are there previously sampled reaches from Lotic in the area? Can you get any more information about conditions on the ground from other data sources?
- Is the sample location and/or sampleable area located on land managed by the BLM?

Is the sample location accessible?
Once a site is determined to be within the target population, check that the site is accessible, both in terms of available roads to the area as well as terrain. Plots further than 5 km from roads or UTV path may also be rejected. Potential factors to consider when evaluating access might be:
- A link to Google Maps directions is available in the pop-up in the Office Eval Webmap. While these directions can provide a general idea of how to get to a particular site, they should not be viewed as definitive. Use imagery in Google Maps and knowledge of private land ownership to evaluate the route suggested.
- Are there special access instructions available in the BLM comments? Do you need follow-up with BLM staff to check a particular route?
- What is the land ownership of the route you are planning?
    - Typically, BLM, State, and USFS managed land does not pose access issues. (There are some exceptions in the case of wildlife refuges, certain logging areas, or seasonal road closures that may pose access issues.)
    - BIA (Bureau of Indian Affairs) and DOD (Dept of Defense) land usually have some access restrictions.
    - Private land should be avoided whenever possible. (This does not apply to municipal areas or areas with regular through traffic.)
    - If a private landowner needs to be contacted, resource specialists in the BLM field office may be able to help.
    - If there are issues you can't resolve, make a note to check in with the BLM contact to see if they have any suggestions.

- What is the slope of the area around the sample location? Be aware of any significant changes in topography (e.g. cliffs) and plan accordingly. Google Earth can help assess the maximum slope of a given walking route and whether particular routes should be avoided.
- Are there any major stream crossings planned? Should the season be taken into account to ensure safe passage across a channel? The USGS Water Dashboard can be used to check stream flows in advance.

Planning a route and writing access directions

Make sure to provide detailed, step-by-step directions in the Access Comments section of the Plots layer.

- Don't forget to check whether BLM staff have provided access instructions already. In some cases, information from the BLMComments field can be directly copied and pasted into the AccessNotes field.
- Start with a concrete location or landmark (such as a small town or mile marker on a highway) that can be easily accessed using a navigation application. Then, using a measuring tool in AGOL or Google Earth, select path and use miles as the measuring unit. Use the measuring tool to measure approximate mileage between each turn and helpful landmark (corral, water tank, power lines, etc.). In the field, it is important to keep track of the odometer to avoid taking wrong turns.
- Satellite imagery can be helpful in determining which roads allow you to access the site most efficiently.
- Consider the following when deciding the reliability of 4x4 and gravel roads:
  - Is the road clearly visible throughout its length?
  - Are there significant sections where the road runs in a straight line? Or is the road mostly winding? Generally speaking, dirt and gravel roads that have fewer curves and run in a straight line for long distance are more regularly maintained than winding roads with lots of curves and turns.
  - How much elevation change happens along the road? Is there a better route to circumvent any unnecessary elevation changes?
  - Try to prioritize time spent on solid straight roads over time spent on windier roads or 2-tracks. It may appear that the winding road directly to a site is a shorter distance, but the time spent navigating over rough terrain almost always outnumbers the time spent traveling on a graded gravel road.

Revisit sampling

If a site has been visited during a previous field season, additional information about the previous visit may be required, including transect locations and photos. Transect locations for revisits will be added to the field evaluation webmap in a point layer prior to the field season, but field crews should double check that they have the information they need before leaving to sample these points. Photos will be provided for revisits in the corresponding state folder of the AIM Riparian & Wetland Field Work Teams. If additional information would be helpful for sampling, reach out to the National Riparian and Wetland AIM Team for the information you need.

Annual Use visits are a special kind of revisit, where BLM staff or contractors plan to revisit a site during the same field season to collect annual use information at an appropriate time. This will be indicated in the 'CollectAnnualUse' field in the Plots layer by "YesBLMStaff" or "YesSecondVisitContractCrew". The timing of the second visit will need to be communicated with the National AIM Team so they can prepare a revisit package and provide GPS locations for transect beginning and end points once the first field visit has occurred. See Appendix 3 for guidance specific to Annual Use revisits.

Creating a sample plan
If a site will be visited during the field season, crew leads should prepare for their visit while they have online access to additional information. Using imagery and other available data, crew leads should spend some time planning plot layout and gathering any additional information that may provide additional context for sampling while additional information is readily available online. Potential considerations include:

- Can a spoke layout fit at the sample location? Considering transects radiating 30 m out from plot center at 0, 120, and 240 degrees, will any transects hit upland or administrative boundaries?
- If not, is there an obvious place within 50 meters to shift the plot? What are the rough dimensions of that area? Which plot layout makes the most sense?
    - See Section 4 of the protocol for additional information on possible plot layouts.
- Are there any particular requirements on the plot layout based on BLM Staff monitoring goals and comments?
- Are there potential seasonal limitations to sampling?
    - High elevation sites may require a later sampling date because they take longer to thaw in the spring than low elevation sites.
    - Sites with major stream crossings may require later sampling to allow water levels to subside.
    - Certain ecotypes may dry faster than others and need to be sampled earlier, i.e., some mesic wet meadows dry faster than Riparian Shrublands which frequently have water later in the season.
- Is there any other information you should be aware of during sampling using other layers available in the Office Evaluation Webmap?

4. Hitch Planning

<u>Overview</u>
Once a Plot is determined to likely be within the target population and accessible, they can start to be grouped together into hitches for sampling. Hitch planning is an iterative process that should be re-assessed after each hitch, at which point all plots that were field visited should be updated to reflect their new Eval Status, either Rejected, Reattempt, or Sampled. Based on the sampling goals for the season, changes may need to be made to avoid design holes and ensure high priority sites are sampled.

<u>Responsible Parties:</u> Crew Leads and Crew Managers

<u>Tools:</u> Office Evaluation Webmap

<u>Step-by-step instructions:</u>
1. Select groups of points that are spatially close together while considering the following:
    a. Crews can typically sample one plot per day with some exceptions
        i. At the start of the field season when the crew is less-experienced, it may take more than one day to sample a plot, particularly those with challenging layouts and high species diversity.
        ii. Woody sites may sometimes take more than one day to sample due to the difficulty of moving through the plot.
    b. Depending on travel time, crew experience, plot complexity, and the likelihood that sites will be rejected, crews should plan to sample 5-6 plots during an 8-day hitch.
        i. Efficiency will depend on the travel time to and from the sampling area.
        ii. After the first hitch, crews may need to budget some time on the first day of a hitch to resolve errors that were flagged during QC before heading out.
        iii. Additionally, time should be budgeted for unknown plant ID and data review and submission, often as the final day of the hitch. As crews become more experienced, this may not be as necessary.
    c. When selecting points geographically close together, always consider the 'PriorityOrder'.
        i. Random sites: While sites do not need to be sampled in exact order, by the end of the season, all sampled plots should follow the priority order with no holes left (see 'Evaluation of random designs and sampling order' section of design concepts). Oversample sites should only be sampled when field crews are confident that all sites with lower 'PriorityOrders' will be rejected or sampled.
        ii. Targeted sites: More sites may have been submitted than a field office expects a crew to sample. 'PriorityOrder' may be used to guide which sites are most important for crews to sample.
    d. In addition to the points intended for field sampling, it is highly encouraged to add several additional sites in the event that sites are rejected or temporarily inaccessible.
        i. These backups may apply to specific sites, i.e. if your hitch is going to take place in two areas, make sure you have backups in both of those areas.
2. Review evaluation fields in the Plots layer to determine if additional information or contacts are needed.

     a. Review Office Evaluation fields to determine the amount of time that should be budgeted for each plot, considering the hiking distance, likely site complexity, and access difficulty.

     b. Review information about private landowners or field personnel that should be contacted and allow for enough time to do so before the hitch begins.

     c. Review 'AccessNotes' to determine if supplemental maps or information is needed. When reviewing maps, pay particular attention to areas that could prohibit access, like cliffs or private land.

3. Create a list of points to visit on the hitch.

     a. Based on the above, create a list of sites to attempt to visit on a given hitch. The hitch plan template provided in Appendix 4 can be used as a guide. Alternatively, contractors may have their own hitch plan template they prefer to use.

          i. The list should include the order that the sample points should be visited.

          ii. A list of backup points should be included with notes such as "sample this site if site x fails" or "sample if extra time".

          iii. In the Plots layer, use the 'Hitch' column to record which points should be sampled during each hitch. Be sure to update this field at the end of each hitch.

          iv. The HitchNotes field can be used to make notes about this year's sampling that will not be preserved for future use. Gate codes, contacts, hitch sampling order, and anticipated challenges are examples of things that could go into this field.

     b. Hitch plans should be sent at least a week in advance to the BLM Project Leads whose office is being sampled so they know when to expect crews.

<u>Tips for hitch planning:</u>

- Filter the Plots layer by your specific 'Project', and filter plots that have an 'EvalStatus' of "Ready to field visit" to help narrow the list of points to work with.
- Schedule sites with long difficult hikes or high site complexity for the start of the hitch when the crew has more time and energy.
- Plan easy points at the end of the hitch in case the crew is running short on time and energy.
- Plan easy points for the entire first hitch of the season, then harder points for the middle of the season.
- Consider local phenology, snowpack, monsoon season, and irrigation withdrawals when planning the best timing for each hitch. Avoid areas with late season snowpack early in the field season and avoid areas prone to monsoonal rains during the mid to late field season. In general areas at lower elevations experience earlier peak plant flowering than those at higher elevations. Areas at higher elevations also experience a shorter growing season, so the window to sample those sites is much more limited.

5. Field Evaluation

Overview: Field crews can sample, not sample, or delay sampling of a plot to another hitch. 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. Detailed information on Field evaluation is covered in Section 3.2 of the Field Protocol and detailed information on data management during field evaluation can be found in the Data Management Protocol.

6. Finalizing Eval 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. However, the project lead, crew lead, or crew manager (depending on Roles and Responsibilities of your specific project) should iteratively update this information throughout the season not just at the end of the season.

Responsible parties: Crew managers (final review), crew leads (ongoing review), Project Leads (final approval)

Tools: Office Evaluation Webmap

Detailed instructions:

1. Finalize 'EvalStatus' for all sampled plots.
    a. All data from sampled plots should be reviewed by Project Leads or Crew Managers, following the QAQC checklist found in the Riparian and Wetland AIM Data Management Protocol.
    b. Once data has been reviewed, 'EvalStatus' may be updated from "Sampled – Waiting for data review" to "Sampled – Data reviewed". These plots do not require further review except to consider ongoing data edits.
2. Finalize 'EvalStatus' for all plots Not Sampled.
    a. All rejected plots marked "Rejected – Waiting for project manager review" must be reviewed by Project Leads or Crew managers.
        i. For sites rejected from the office, review 'RejectedReason1' and 'RejectedReason2'. Review all evaluation notes alongside imagery to determine whether the plot could ever be sampled in the future.
        ii. For sites rejected in the field, review photos in the Photo Review dashboard alongside data from location verification.
    b. If it seems the crew made the wrong determination on the Eval Status or the Not Sampled Reason, decide whether the plot should be reattempted, or whether another Not Sampled Reason is more appropriate.
        i. If the plot should be reattempted:
            1. Change the 'EvalStatus' to "Reattempt" and change the 'NotSampledReason' to a reattempt option. Communicate with the crew how they should sample if there is time left in the season.

                2. Ex. If a crew marked a site as permanently inaccessible but the project lead identified another potential route.
        ii. If the Not Sampled Reason should be changed:
                1. Identify the correct Not Sampled Reason.
                2. There may be multiple overlapping reasons to reject a site, but Non-Target reasons are prioritized over Inaccessible reasons. Within Non-target reasons, the order shown in Table 1 demonstrates the hierarchy.
                3. Ex. A site was marked as "Permanently Inaccessible" by the crew, but imagery shows no perennial vegetation. This site should be updated in the Plots Layer to "Non-Target – No perennial vegetation". Non-target points do not count as holes in the design, so this reason is preferred.
                4. Ex. A site was marked as "Non-target – Size" but the small wetland area is exclusively covered by annual species. Change the status to "Non-target – No perennial vegetation".
        iii. Make notes in the OfficeEvalComments field to explain why the EvalStatus and/or NotSampledReason was changed.
    c. If there is agreement on the Eval Status and Not Sampled Reason, update the EvalStatus to "Rejected – Project manager approved".
    d. This process should be used to assess progress made towards sample size goals and ensure the number of holes stays to a minimum.
        i. Manage the design such that each stratum will have fewer than 30% holes at the end of the season (see 'Holes in the design' in the design concepts section). If you find that you will likely have more than 30% holes at the end of the season, carefully review all 'inaccessible' points to determine which points might be feasible to reattempt. If possible, reattempt and sample some of these points. If this is not possible, consider increasing your sample size in this stratum to reduce the ratio of 'holes' to sampled points. If you need additional guidance, contact the National AIM Team.

Additional steps to finalize EvalStatus at project closeout:
1. Ensure all Plots have an EvalStatus appropriate to their level of review. By the time all data has been finalized:
    a. There should not be any plots marked "Sampled – Waiting for data review".
    b. There should not be any plots marked "Rejected – Waiting for project manager approval".
    c. Plots that have been office evaluated but not rejected or field visited should be marked as "Ready to Field Visit".
    d. Plots that have been field visited but not rejected or sampled should be marked "Reattempt". Make sure an appropriate NotSampledReason is selected.
    e. Unevaluated plots may remain as their original EvalStatus. This should only apply to oversample and low priority targeted plots.
    f. All Plots marked as "Base" in the panel field should have been evaluated and if not sampled, marked with an appropriate NotSampledReason. This also applies to all oversample points that fall prior to the last sampled plot in the strata.

        i. All plots prior to the final sampled plot in a strata marked as "Reattempt" or "Permanently inaccessible" will be considered holes in the design.

        ii. Discuss these plots with the National Riparian and Wetland AIM Team during project close-out.

2. For all Rejected and Reattempt plots, make sure the correct NotSampledReason is selected and that notes on rejections are thorough and accurate.
3. Review and clean up all comments so they are clear and make sense to people that were not involved in this year's process.
4. Review 'Check-In and Project Close Out' section of the data management protocol to ensure all data requirements have been met.

7. Glossary of Design Concepts

'PriorityOrder': For random plots, a sequential number in the Plots layer starting at one and ending with the total number of points within that stratum of the design. For targeted plots, numbers 1, 2, or 3 are used to indicate the priority of the plot according to the project lead, with 1 being used for high priority and 3 for low priority. The number is used to assist with assessing the order in which points should be evaluated and sampled.

Project: A unit of monitoring implementation for which specific monitoring goals are outlined and sample designs are created in alignment with those goals. Projects may be initiated at the district or field office scale. For each project, one or more project leads define the target population, sampling approach, stratification, sample sizes, and the monitoring methods to be used using a Monitoring Design Worksheet.

Sample design: A framework, or road map, that serves as the basis for the selection of sample plots and affects many other important aspects of a project as well. 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,' 'monitoring design,' and 'study design.'

Strata: In the context of monitoring, stratification refers to dividing a population or study area into sub-groups 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 strata for Riparian and Wetland systems are: field offices, management or planning units, or sage-grouse habitat. Strata are defined at the design stage and have important implications on the order in which plots are sampled.

Target Population: The target population for a survey is the entire set of sample units (e.g., Wetland and Riparian plots) for which the sample design is 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. Sample points in the design are selected from within the population. The definition of the target population should contain specific information on the resource of interest, its spatial extent, its ownership status, its size. The definition should be specific enough that an individual could determine whether a sample point is part of the target population. Examples of the target population include: all riparian and wetland ecosystems within a reporting unit or all wetlands in sage grouse habitat on managed lands. (Monitoring Resources, 2017)

Appendix 1. Office Evaluation Webmap Quick Start Guide

Riparian and Wetland AIM Office Evaluation Webmap

Filter Webmap

Apply a filter by clicking the filter button beneath the layer of interest.
The first box is the field you are filtering on. The second is the "operator", and the third is the value. Click the "Unique" button to get a potential list of values. Map settings, including filters, can be saved to your content by clicking the save button.

Open table options to center on selection, clear selections, and show/hide columns.

Editing a Feature

Editing may be done either in the pop-up or in the attribute table.
Editing is used to change the EvalStatus and track the decisions made during the Office Evaluation Process.

To edit in the pop-up, click the edit button at the bottom. You should now be able to type in values to editable fields. Close the edit session by either scrolling down in the pop-up or clicking the edit button at the top left corner of the map.

To edit in the table, double click the field you wish to edit. Field with padlock icons are read-only.

Appendix 2. Office Evaluation Webmap Metadata

Table 2. Plots layer field metadata. Blue indicates the field is prepopulated. Red indicates a field that may be prepopulated but may be edited by BLM field office staff. Green indicates fields that may be edited by crew managers or crew leads.

Plots Layer Field	Who's responsible	Description
PlotID	NOC	Alpha-numeric code assigned by the NOC. Code represents a field office or district office code, followed by a code for sampling approach, followed by a 5-digit number starting with a 2-digit code for draw year and is used to relate all data associated with that monitoring location.
SiteName	Project lead	First pass on naming sites is from BLM project leads, but empty site names may be filled in by Crew managers or leads based on helpful geographical landmarks or place names.
EstablishmentDate	Project lead Crew manager Crew lead	Date of first visit. Filled in by NOC if point has been sampled before. Otherwise filled in by Crew Lead during field season.
Project	NOC	Name representing project. For 2021 sampling, project is by state. Crew leads should use this information to filter the Office eval map for the points in their state.
PriorityOrder	NOC	Numeric representation of priority. For random sites, this represents the draw order within a particular strata. This order number will indicate the order in which points should be evaluated. If a base sample is rejected, then the oversample with the lowest order number should be evaluated next. For targeted sites, priority is indicated by project leads, with 1 = Needs to be sampled this field season. 2 = Would be great to be sampled where possible. 3 = Good as backup options, but could be sampled in future years.
SamplingApproach	NOC	Random or Targeted.
Panel	NOC	Base or Oversample for random points, none for Targeted points.
Stratum	NOC	Stratum used during draw for random points ("None" or NA for targeted sites). For 2022, Stratum was defined in some random designs by ecoregion.
MultidensityCategory	NOC	Used for some random sites during sample draw ("None" for random sites, "Equal" for random draws with no mdcaty defined). These categories were used to draw plots, but should not be used to select replacement sites from list of Oversample.
FieldOffice	NOC	Administrative field office of the BLM.
DistrictOffice	NOC	Administrative district office of the BLM.
AdminState	NOC	Administrative state office of the BLM.
SpeciesState	NOC	State species list to be used during sampling, corresponding to the political state.
StateCode	NOC	Political state.
County	NOC	US county name.

WetlandIndicatorRegion	NOC	Region used for defining wetland indicator status of plant species (i.e. Arid West, Mountains Valley and Coast, etc.).
LRR	NOC	Land Resource Region the plot is located in, used to select potential hydric soil indicators.
Elevation	NOC	Elevation (feet). This field should be used for trip planning purposes, while elevation in forms will be calculated in Survey123 in situ.
CowardinAttribute	NOC	Cowardin attribute code of site assigned by the National Wetlands Inventory for reference purposes. Most random sites will correspond to NWI polygons, but some targeted points may not be mapped in NWI as shown by "None". May not be included for non Palustrine systems.
Allotment	Project lead	May or may not be pushed into design from the NOC. Project leads particularly interested in allotment may enter this into their Targeted site list to push into points layer.
DesignLatWGS	NOC	Original latitude of the design sample location in WGS84 coordinate system.
DesignLongWGS	NOC	Original longitude of the design sample location in WGS84 coordinate system.
OfficeEvaluator	Crew manager Crew lead	First and last name of person doing office evaluation.
EvalStatus	Crew manager Crew lead	Used to track a point's status throughout the season from unevaluated to sampled and data reviewed. At the end of the season all plots that have been sampled should have a status of "Sampled - Data reviewed" and all plots that have been rejected should have a status of "Rejected - project manager approved".
OfficeEvalDate	Crew manager Crew lead	The date plot was office evaluated.
NotSampledReason	Crew manager Crew lead	Specifies the primary reason that a reach was not sampled (e.g., Nontarget, Permanently inaccessible, or Reattempt Needed (for temporary rejections in the field)).
RejectedReason1	Crew manager Crew lead	The first line of evidence used to reject the point and classify in the appropriate 'RejectedReason' category (e.g., field visit, local knowledge, imagery, administrative boundaries)
RejectedReason2	Crew manager Crew lead	The second line of evidence used to reject the point and classify in the appropriate 'RejectedReason' category (e.g., field visit, local knowledge, imagery, administrative boundaries)
OfficeEvalComments	Crew manager Crew lead	General notes about the plot that may help with site evaluation. May include notes on likely plant community, fire history of the area, suggestions on sampling time or restrictions to access.
AccessNotes	Crew manager Crew lead	Detailed directions on how to get to point from a major town or landmark and include both driving and walking parts of the journey. Be complete and concise, and note landmarks, permanent features, road names, land ownership issues, and segment distances. By the time a point is classified as "Ready to sample", these access notes should provide you with all the information you need to access the point in the field, and can be copied into a directions field in the Plot Characterization form during sampling.

DistanceFromRoad	Crew manager Crew lead	Distance in miles to the nearest road or accessible two track as estimated by crew leads.
PlotLayoutComments	Crew manager Crew lead	General notes about likely plot layout to be used or plot dimensions to help with plot layout in the field
AdditionalGuidanceNeeded	Crew manager Crew lead	Used by crew leads to flag sites with needed follow-up. This field should be used as a way to track their notes for themselves before following up with project leads via email. BLM Project Leads will not know to check this field.
BLMComments	Project lead	Comments submitted during targeted site submission or notes added later by BLM DO/FO staff. May include recommended sampling time, recommended plot placement, management history information, access notes, or special considerations about sampling.
BLMContact	Project lead	Contact information of BLM personnel who submitted targeted points.
Hitch	Crew manager Crew lead	Hitch number
Hitch Notes	Crew manager Crew lead	Notes specific to the hitch for tracking by crew lead. May be used prior to sampling for hitch-specific reminders, then edited after sampling to include information on how sampling went.
CollectWQ	Project lead	Based on project task order, this Yes No field indicates whether Water Quality methods should be implemented, including in-situ measurements and grab samples.
CollectAnnualUse	Project lead	Based on project task order (random plots) or based on requests from BLM staff during site submission (targeted), this field indicates whether Annual Use methods should be applied. "YesContractCrew" indicates the crew is expected to complete annual use forms during normal sampling. "YesContractCrewSecondVisit" indicates the contract crew should return at another time to take Annual Use measurements. "YesBLMStaff" indicates BLM staff will return to take the annual use measurements themselves at a later date.
CollectHummocks	Project lead	Based on project task order, this Yes No field indicates whether Hummocks methods should be applied.
Supplementals	Project lead	This lists additional methods the contract crew is expected to complete. Crew managers and Project Leads should discuss method implementation prior to field visit.

Appendix 3. Special Instructions for Annual Use Revisits

Because Annual Use revisits may be completed by BLM staff, the following guidance is created to highlight aspects of data collection which differ slightly from usual sampling methods. Ensure the following is clear prior to completing an annual use visit.

1. Technology – Complete and check before leaving service
   a. In Field Maps app, you should download an offline area in field maps using the map called "BLM Natl AIM Wetland 2022 Field Map Revisit"
   b. This map will have GPS information for all forms launched during the original site visit as well as a couple layers showing the GPS of the end points of each transect, and lines connecting the beginning and the end. Use whichever layer is most helpful in placing transects.
        i. GPS locations for transects will not be totally accurate. iPads have an accuracy of around 5 m. So, when placing transects, you'll have to use a combination of photos and GPS and what you're seeing on the ground to get as accurate a placement as possible.
        ii. Look at the original field visit and comments to determine if monuments such as rebar have been placed to make the transect locations
        iii. The layer showing transect lines is no more accurate than using the points for beginning and end, so when comparing your transects on the ground to the map, you should be comparing the placement of start and end, not whether the line is going in the correct direction. For direction, you can see the Azimuth recorded if you click the transect points. This is another good way to check transect placement.
   c. All the layers will be turned off except for Plots and Field Visits. To view transect and plot characterization information on the map, click the layer button in the top righthand corner. Then click the toggle buttons for the layers you would like to see.
   d. While connected to WiFi, download necessary offline areas. Then double check the layers will show off WiFi prior to leaving service.
   e. In Survey123, make sure all the necessary forms are downloaded.
        i. Necessary forms include:
             1. BLM Natl AIM Lentic 2022 Woody Structure and Annual Use
             2. BLM Natl AIM Lentic 2022 Photos
             3. BLM Natl AIM Lentic 2022 Unknown Plants
        ii. If these forms do not show up in your forms, click the person icon in the upper righthand corner, then click "Download Surveys". Next search for "BLM Natl AIM Wetland" and all forms should show up. Select the download button to ensure they are all downloaded to your device.
2. Photos
   a. Photos will be provided for revisits in the corresponding state folder of the AIM Riparian & Wetlands Field Work Team in Microsoft Teams. Contact Michelle Stropky (mstropky@blm.gov) if you do not have access to this Team.
   b. Download these photos for offline use to help place transects in the field.

c. Plot drawings will also be provided when applicable. These also can provide information on where they dug the soil pit and took water samples.

d. It may also be helpful to download the georeferenced maps for the sites you are likely to visit. Each site has three georeferenced maps at different scales to help with navigation. These maps can be used in apps like Avenza or Paper Maps to aid in navigation.

3. Changes to data collection

a. For annual use visits, you will only need to launch a field visit from the original Plot point, and a Woody Structure and Annual Use form for each transect launched directly from that field visit. If you take photos, you may also launch a photos form to associate these directly with the field visit.

b. To start data collection, at each plot you should:

   i. Open Field maps, select the plot you are visiting, then scroll down in the information popup until you see a link to launch a field visit.

   ii. Select this link, and add a new feature, filling in necessary information.

       1. Plot information such as AdminState and Project will be listed in the original plot data. If you don't know what field should be in the FieldVisits layer, first refer back to information in the Plots layer.

       2. For 'FieldVisitType' **select "Annual Use Visit"**. You should also **select the project for the state you are working in**. Check and double check that the field eval date is correct. This will be pushed into each form.

   iii. Once you submit this point, links to survey123 forms should show in the popup. Launch all Survey123 forms from this link rather than directly from the Survey123 app. Forms will show an error message in red if you forget this, but they will allow you to submit.

   iv. Be extra careful when launching field visits and field forms, as the data contained in the field visit form will be used to distinguish this visit from previous ones. Make sure when you launch forms, the correct date is showing in the EvaluationID of each launched form.

   v. In the Woody Structure and Annual Use form, there are options to select based on the type of data you plan on collecting on the first page. Make sure these questions are checked like so:

Recorder *

Date

Friday, October 1, 2021

Will annual use be collected? *
● Yes   ○ No

Will woody structure (age and height class) be collected? *
Select no if this visit is for collecting annual use only.
○ Yes   ● No

Interval (cm)

150

Otherwise, you'll see questions regarding woody structure that you don't need to fill out.

c. Turn on LPI points on your field map and review photos from the crews to begin to set up the plot exactly as they did.
    i. Resources for plot setup:
        1. Rebar for monumented sites
        2. Azimuths contained in LPI data of field maps.
        3. GPS points from the Transect Starts shown in the LPI layer.
        4. GPS points from transect ends and lines connecting the transect starts and ends labeled "RevisitTransectEnds" and "RevisitTransectLines".
        5. Photos of transect ends, beginnings, and plot overview
        6. Plot Drawing

Appendix 4. Hitch Plan Template

Crew Identification Information		
Name	*Position*	*Cell Phone Number*

Trip Dates			
Departure		*Return*	
Date	Time	Date	Time

Vehicle Information			
Make	*Model*	*License Plate*	*Description*

General Driving Route Planned

Emergency Contact Information		
Crew Member	*EC Name & Relationship*	*EC Phone Number*

Daily Hitch Plan				
Date	*Plot ID*	*Site Name*	*Field Office*	*Site Notes*

Backup/Oversample Plots				
Date	Plot ID	Site Name	Field Office	Site Notes

Overnight Camping Plan		
Date	Location	Notes