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National Rivers and Streams Assessment 2023/24

Site Evaluation Guidelines

Version 2.0



NOTICE

The intention of the National Rivers and Streams Assessment 2023/24 is to provide a comprehensive “State of Flowing Waters” assessment for rivers and streams across the United States. The complete documentation of overall project management, design, methods, quality assurance, and standards is contained in four companion documents, including:

National Rivers and Streams Assessment 2023/24: Quality Assurance Project Plan EPA-841-B-22-004

National Rivers and Streams Assessment 2023/24: Site Evaluation Guidelines EPA-841-B-22-005

National Rivers and Streams Assessment 2023/24: Wadeable Field Operations Manual EPA-841-B-22-006

National Rivers and Streams Assessment 2023/24: Non-Wadeable Field Operations Manual EPA-841-B-22-007

National Rivers and Streams Assessment 2023/24: Laboratory Operations Manual EPA-841-B-22-008

This document (*Site Evaluation Guidelines [SEG]*) contains an overview of the processes involved in locating a sampling site, evaluating the site, and selecting appropriate alternate sites when necessary, and is based on the guidelines developed and followed in the Western Environmental Monitoring and Assessment Program (Peck et al. 2003) and the National Rivers and Streams Assessment 2008/09, 2013/14 and 2018/19. Methods described in this document are to be used specifically in work relating to the NRSA 2023/24. Mention of trade names or commercial products in this document does not constitute endorsement or recommendation for use. More detail of the project overview and of specific methods for field sampling, sample handling, and sample processing can be found in the appropriate companion document.

The suggested citation for this document is:

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1 INTRODUCTION

This document is provided to clarify all of the steps involved in the process of locating and evaluating a sampling site for the National Rivers and Streams Assessment (NRSA) 2023/24. There are five steps involved in this process (**Figure 1.1**):

- Locate the index site (“X-Site”) on a topographic map
- Verify that the “X-Site” is aligned with an actual channel segment using geospatial data programs
- Obtain permission to access the site
- Verify that the site is sampleable
- Sample the site *OR* replace with an alternate site

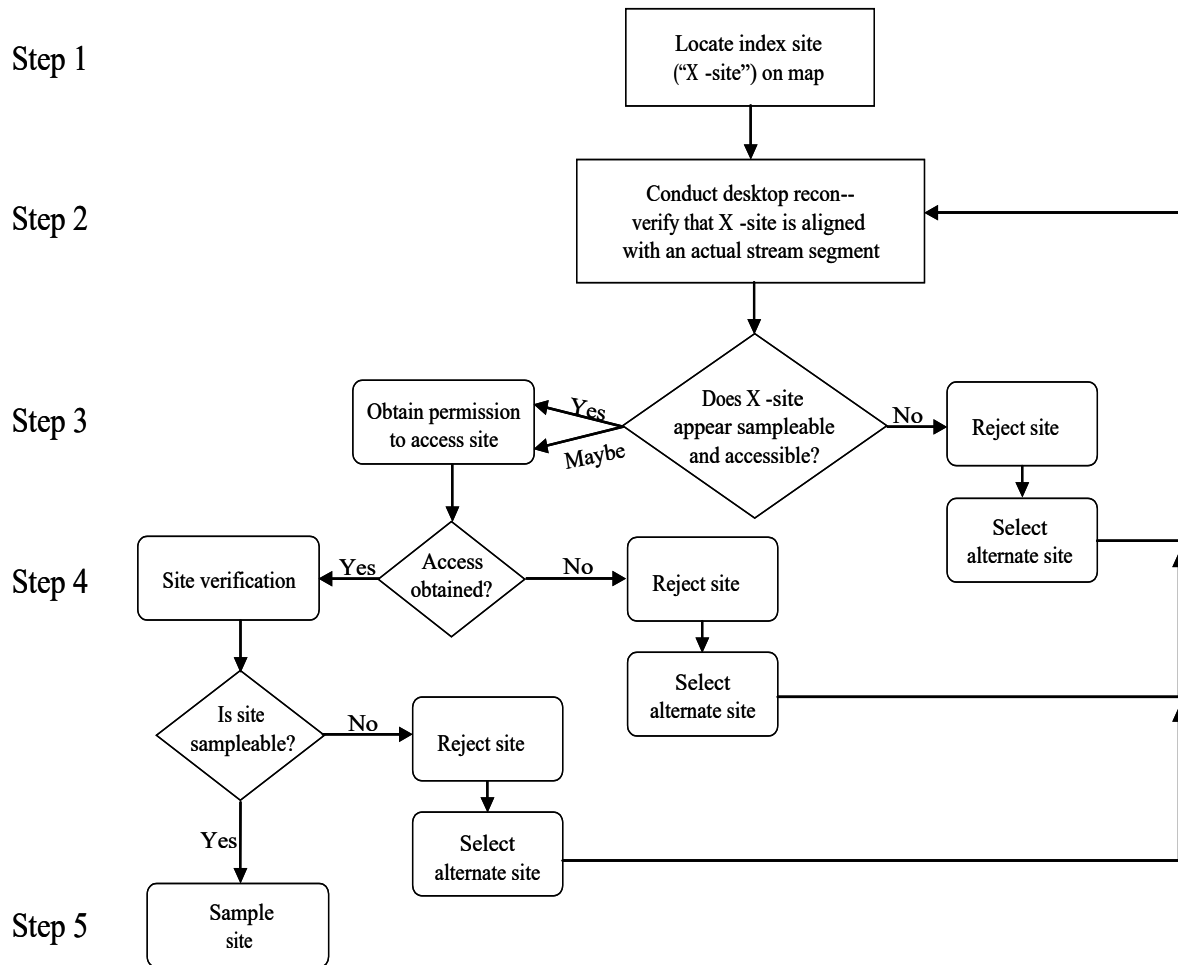


Figure 1.1. Site Evaluation Process

Field crews must assemble a dossier containing important locational and access information for each site they are scheduled to visit. The dossier must contain the appropriate maps, contact information, copies of permission letters (if applicable), and access instructions. Before a site visit, each field crew should confirm access to the waterbody if possible. The landowner(s) listed in the dossier should be

contacted to confirm permission to sample and to identify any revisions to the information in the dossier.

2 SURVEY DESIGN

2.1 Target Population

The target populations consist of all streams and rivers within the 48 contiguous states that have flowing water during the study index period excluding portions of tidal rivers up to head of salt (defined as < 0.5 ppt for this study). The study index period extends from the beginning of June to the end of September and is generally characterized by base flow conditions. Run-of-the-river ponds and pools are included while reservoirs with greater than seven-day residence time are excluded. A complete definition of the target population is given in the Field Operations Manuals.

2.2 Sample Frame

The sampling frame was derived from and is a subset of the National Hydrography Dataset (NHD) product NHDPlus HR. The NHDPlus HR (<https://doi.org/10.3133/fs20203033>) is a geospatial dataset depicting the flow of water across the Nation's landscapes and through the stream network. The NHDPlus HR is built using the NHD High Resolution data at 1:24,000 scale or more detailed, the 10-meter 3D Elevation Program data, and the nationally complete Watershed Boundary Dataset (Moore et.al. 2019). Since this is a better representation of streams and rivers in the contiguous United States, NRSA 2023/24 will use it as the source for its sampling frame with the intent to use it for at least the next 10-15 years. Note that NHDPlus HR is not restricted to a single map scale, e.g., 1:24K. While NHDPlus HR also includes attributes for Strahler order and Strahler calculator, they are based on the available map scale, which means their definition depends on the map scale. NHDPlus HR also includes an attribute for mean annual flow for each reach. Mean annual flow estimates are based on a model described in the NHDPlus HR User Guide. Attributes from NHD-Plus HR and additional attributes added to the sample frame that are used in the survey design are:

- **Strahler order**
- **Ecological Reporting Region:** Nine aggregated Omernik ecoregions that are used for reporting.
- **Omernik and North American ecoregions** Levels I, II, III, and IV.

2.3 Survey Design

The NRSA 2023/24 survey design consists of two separate designs to address the dual objectives of (1) estimating current status and (2) estimating change in status for all flowing waters:

- Resample design applied to NRSA 2018/19 sites
- New site design for NRSA 2023/24

There are 11 panels which are separated into three tabs of the Site Evaluation Spreadsheet. These tabs represent the panel uses within the three reach categories in the NRSA 2023/24 design: Rivers (RV), Large Streams (LS), and Small Streams (SS). Each of the following panels are defined as “Base” sites and “Oversample” replacement sites.

Note, the FT suffix in some of the base River sites refers to whole fish for “Fish Tissue” samples. EPA does not currently plan on collecting this data though the suffix has been left in should EPA obtain funding for the collection of whole fish for fish tissue analysis purposes. The evaluation process is the same regardless of the FT suffix. Examples of the replacement process can be found in **Section 6**.

Panel use codes are assigned to each site to describe the type of site and contain the components listed below and a detailed description of each panel is also provided.

1. A prefix indicating the survey design
 - a. NRS23_18 – Resample sites from NRSA 2018/19
 - b. NRS23_23 – New sites for NRSA 2023/24
2. Panel type
 - a. RVT2 – A revisit site designated to be sampled twice during the same index period
 - b. Base – Sites designated to be sampled once during the NRSA 2023/24 survey
 - c. Over – Sites to be used as replacements for dropped sites
3. Size category
 - a. RV - River
 - b. LS – Large stream
 - c. SS – Small stream
 - i. Note, unlike NRSA 2018/19, crews will not have to determine replacement of sites based on Strahler Order or Ecoregion for NRSA 2023/24. Replacement sites will only be based on panel type, year and reach categories (RV, SS or LS).
4. Fish tissue designator
 - a. _FT is appended to the panels code for those sites that have been designated for potential whole fish tissue sampling in the event this sample is added to NRSA 2023/24. **Currently, this sample not be part of NRSA 2023/24 sampling process. Please disregard unless receive instruction from NRSA Lead regarding sampling for whole fish tissue samples at a later date.**

Small Streams

- **NRS23_18RVT2SS** – only one of these for each state and it is the first resample site in this reach category in Site ID order. Note that it is very possible that this site may have not been sampled in 2018/19. It will be evaluated again in 2023/24 to determine if it can be sampled, and if not, it is then replaced by the first NRS23_18BaseSS site. This is referred to as a “revisit site” as it will be evaluated and sampled twice, with at least two weeks in between each visit.
- **NRS23_18BaseSS** – all the remaining sites required for each state in this reach category from 2018/19. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_18OverSS site. If no NRS23_18OverSS sites are available, then the site is replaced by the next available NRS23_23OverSS site.
- NRS23_18OverSS – remaining SS sample sites evaluated in 2018/19 listed in their siteID order.
- **NRS23_23BaseSS** – SS new sites selected for 2023/24 listed in their siteID order. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_23OverSS site
- NRS23_23OverSS – SS new over sample sites selected for 2023/24 listed in their siteID order.

Large Streams

- **NRS23_18RVT2LS** – only one of these for each state and it is the first resample site in this reach category in siteID order. Note that it is very possible that this site may have not been sampled in 2018/19. It will be evaluated again in 2023/24 to determine if it can be sampled, and if not, it is then replaced by the first NRS23_18BaseLS site. This is referred to as a “revisit site” as it will be evaluated and sampled twice, with at least two weeks in between each visit.
- **NRS23_18BaseLS**– all the remaining sites required for each state in this reach category from 2018/19. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_18OverLS site. If no NRS23_18OverLS sites are available, then the site is replaced by the next available NRS23_23OverLS site.
- **NRS23_18OverLS** – remaining LS sample sites evaluated in 2018/19 listed in their siteID order.
- **NRS23_23BaseLS** – LS new sites selected for 2023/24 listed in their siteID order. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_23OverLS site
- **NRS23_23OverLS** – LS new over sample sites selected for 2023/24 listed in their siteID order.

Rivers – Note, please ignore the _FT designation as we do not plan on collecting whole fish samples for fish tissue analysis at this time.

- **NRS23_18RVT2RV_FT** – two of these for each state and it is the first two resample sites in this reach category in siteID order. Note that it is very possible that these sites may have not been sampled in 2018/19. It will be evaluated again in 2023/24 to determine if it can be sampled and if not then replaced by the first NRS23_18BaseRV site. This is referred to as a “revisit site” as it will be evaluated and sampled twice, with at least two weeks in between each visit. Note regarding the _FT distinction, currently we will not be collecting whole fish for fish tissue contaminant analysis. Please treat these sites as a regular revisit site (NRS23_18RVT2RV) unless instructed differently by the NRSA Lead.
- **NRS23_18BaseRV_FT**– Sampled once in 2023/24. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_18BaseRV or NRS23_18OverRV site if no NRS23_18BaseRV site is available. Note regarding the _FT distinction, currently we will not be collecting whole fish for fish tissue contaminant analysis. Please treat these sites as a regular NRS23_18BaseRV site unless instructed by the NRSA Lead.
- **NRS23_18BaseRV**– all the remaining sites required for each state in this reach category from 2018/19. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_18OverRV site. If no NRS23_18OverRV sites are available, then the site is replaced by the next available NRS23_23OverRV site.
- **NRS23_18OverRV** – remaining RV sample sites evaluated in 2018/19 listed in their siteID order.
- **NRS23_23BaseRV_FT**– RV new sites selected for 2023/24 listed in their siteID order. If it cannot be sampled, then it will be replaced by the next available NRS23_18OverRV site. Note regarding the _FT distinction, currently, we will not be collecting whole fish for fish tissue contaminant analysis. Please treat these sites as a regular NRS23_23BaseRV site unless instructed by the NRSA Lead.
- **NRS23_23BaseRV**– RV new sites selected for 2023/24 listed in their siteID order. If it cannot be sampled in 2023/24, then it will be replaced by the next available NRS23_23OverRV site.
- **NRS23_23OverRV** – RV new over sample sites selected for 2023/24 listed in their siteID order.

The survey design is explicitly stratified by state. The unequal probability categories are specific to survey design used for NRSA 2018/19 and NRSA 2023/24. Note, all Base sites/revisit sites must be evaluated regardless of whether they are sampled. Base/revisit sites that are found to be target and sampleable must be sampled, those found to be non-target or unsampleable are replaced.

2.4 Resample Sites

The Resample survey design is a subsample of the NRSA 2023/24 sites that were target and evaluated in NRSA 18/19. These sites all begin with the NRS23_18 prefix. The major objective for this design is change estimation. This results in 790 resample base sites which are part of the 2023/24 design. Allocation of sites to NARS aggregated ecoregions is proportional to the number sampled in the prior surveys.

2.5 New Sample Sites

The NRSA 2023/24 survey design includes 1028 new sites which have not been included in previous NRSA surveys. Allocation of number of sites to states is proportional to stream length and is stratified by state. Unequal probability categories are 27 combinations of NARS nine aggregated ecoregions and three waterbody reach categories (SS – small streams, LS – large streams, and RV – Rivers). A minimum of 20 sites was guaranteed in each state and the maximum number of sites was set at 75 for an individual state.

3 LOCATING THE INDEX SITE ON MAPS

Stream sampling points were chosen from the "blue line" stream network represented on 1:100,000 scale USGS maps, following a systematic random site selection process developed for NRSA 2023/24. Each point is referred to as the "index site" or "X-Site". The "X-Site" is the mid-point of the segment to be sampled. The latitude/longitude of the "X-Site" was listed on a regional sampling site spreadsheet that was distributed electronically to the field crews and EPA Regional Coordinators.

The line work for US EPA's NHDPlus (NHDPlus HR) is based on 1:100,000-scale Digital Line Graphs and, therefore, will not match exactly with the 1: 24,000-scale maps. Use the NHDPlus HR line to locate important features such as confluences or bends in the channel to assist in placing the "X-Site" accordingly on the 1:24,000-scale (or 7.5") map. All NHDPlus HR lines are shown even though many are not channel traces. Line segments for lakes, inundated areas, wetlands, and occasionally, even map boundaries are shown as NHDPlus HR line work. State, 2023/24 site ID, panel use, waterbody reach category, Strahler order, ecoregion, coordinates, and 2018/19 Site ID and evaluation status are also included in the Site Evaluation Spreadsheet. All information, including the longitude/latitude, refers to the location of the "X-Site". Note, the 2018/19 Site ID and evaluation status are given for reference material only. Crews should evaluate all sites as if they have not been evaluated before as things can change in the five years between surveys.

If you have any questions about the site maps or how to use them, please contact Richard Mitchell (202-566-0644, mitchell.richard@epa.gov). If you have questions regarding the Site Evaluation Spreadsheets, please contact Danielle Grunzke (202-566-2876, grunzke.danielle@epa.gov).

4 OBTAINING PERMISSION TO ACCESS CANDIDATE SITE

Each field crew is responsible for obtaining permission for their sampling crew to access their sampling sites. Obtaining permission prior to the sampling day is often important to minimize loss of time on the part of the field crew. An in-person visit is an effective way to establish contact with landowner(s). Past surveys have found that landowners are more likely to grant permission if they meet with a study representative than if their only contact is through a phone call or letter. If a personal visit cannot be made, a phone call is considered the best alternative. A local representative may be more effective in

securing permission, so it is important to request assistance at this level if you are not local to the area. If attempts to reach the landowner(s) through an in-person visit or telephone call are unsuccessful, a letter should be mailed (see **Figure 4.1** for an example) with a fact sheet on the survey (**Appendix A**) and a permission slip for the landowner(s) to return (**Appendix B**). Included in this package should be a return-addressed and postage-paid envelope with a specific date by which the permission slip should be returned. A signed permission slip is important to use as documentation on the day of sampling. Some crews will choose to deal with access issues on the day of the sampling event. This method is usually adequate if a desk-top reconnaissance shows that the area around the site includes enough public land to gain access to the waterway. If the site is in an area that is largely privately owned land, waiting until the day of sampling could pose unnecessary delays and access issues that should have been resolved prior to the scheduled sampling day.

Landowner information can often be obtained from the county tax assessor office. Tax assessor maps will display landowner boundaries, addresses and, oftentimes, phone numbers. This information enables the crew to contact landowners before the sampling day, and identifies which landowner owns which portions of the stream or riverbanks. The provision of county maps for the field crews will help clarify access to the targeted sampling reach.

<p>(Date)</p> <p>Dear Landowner:</p> <p>The US Environmental Protection Agency, in cooperation with state agencies, is conducting an environmental assessment of rivers and streams across the United States. A computer was used to randomly select these streams. A total of approximately 1,800 sampling sites in rivers and streams were selected for sampling in 2023 and 2024. Water quality chemistry, aquatic life, and habitat will be evaluated at each site. The findings of the study will not be used for enforcement or regulatory purposes.</p> <p>We are contacting you prior to the site visit to obtain permission (form enclosed) to access the sampling site. We have enclosed a copy of a topographic map(s) with the site(s) identified by an "X" at the specific point on the stream to be sampled. We realize that working on your property is a privilege and we will respect your rights and wishes at all times.</p> <p>Please return the completed Access Permission Form in the enclosed envelope by <u>(date)</u>. If you have any questions concerning this request, please contact me <u>(phone number)</u>. We are looking forward to hearing from you.</p> <p>Sincerely,</p> <p><u>(Name)</u></p> <p>NRSA 2023/24 Crew Leader</p>

Figure 4.1. Example Permission Cover Letter

5 SITE VERIFICATION

While traveling from a base location to a site, record a detailed description of the route taken on the **Verification Form in the NRSA field app**. This information will allow others to find the site again if it is selected for a repeat visit in the future. Upon reaching the “X-Site” for a stream or river channel, confirm its location and that the crew is at the correct location. Record the information on the **Verification Form in the NRSA field app**. Complete a **Verification Form** for each site visited with the intent to sample (regardless of whether it is sampled), following the procedures described below.

5.1 Site Verification Procedures

1. Find the site location in the field corresponding to the “X-Site” coordinates and the "X" marked on the map (“X-Site”) prepared for each site. Record the routes taken and other directions on the **Verification Form** so that others can visit the same location in the future.
2. Use a GPS receiver to confirm the latitude and longitude of the “X-Site” with the coordinates for the site. Make sure the GPS unit is set to reference the NAD 83 geospatial data set. Record these coordinates in decimal degrees on the **Verification Form**. Be sure to use the negative (-) sign for all longitudes.
3. Use all available means to ensure that you are at the correct location as marked on the map including: 1:24,000 USGS map, topographic landmarks, county road maps, local contacts, etc.
4. Scan the channel upstream and downstream from the “X-Site”, determine whether the site is sampleable using the guidelines provided below, and mark the appropriate box in the **Verification Form**.
5. Do not sample non-target or "Non-sampleable Permanent", "Non-sampleable Temporary", or "No Access" sites. If the site is not sampleable for the above reasons, select the "NO" bubble next to the “Did you sample this site?” section of the **Verification Form**, otherwise select “YES”.

5.2 Sampleable Categories

The Site Evaluation Spreadsheet prompts evaluators to assess and record each site’s target status and sampleability in columns P-R. The available drop-down selections in columns Q and R are dependent upon the selections made in the previous column(s). If a subsequent change is made to the selections in columns Q or R, be sure to review and/or change the selections made in the previous column(s) to avoid incongruent answers. The columns are:

1. Column P: Q1. Is the site sampleable? (Yes or No). Select the proper answer to indicate whether the site is sampleable or not. **Table 5.1** showcases the dropdown options which will appear in Column Q if the evaluation selects “Yes” in Column P. Selecting “No” in column P changes the available drop-down options in the next column to correspond to non-sampleable categories.
2. Column Q: Q2. For sampleable sites, select the method by which the site will be or was sampled. For non-sampleable sites, choose the best category for why the site is not sampleable and enter a sub-category explanation in Q3. **Tables 5.2, 5.3, and 5.4** showcase the dropdown options which will appear in Column R should the evaluator answer “No” in Column P. The headings of the Tables are the dropdowns which appear in Column Q.
3. Column R: Q3. Non-Sampleable Sub-Category. If the site is not sampleable, select the appropriate sub-category which is based on the previous column’s selection. An entry in this

column is only required if “No” was selected for Q1. Leave this column blank if the site is sampleable.

Table 5.1 Sampleable Categories

Category	Description
Wadeable	There is continuous water flow and >50% of the sample reach is wadeable.
Boatable	Boat is required for sampling > 50% of sample reach.
Partial Sampled by Wading	Sampled by wading (>50% of reach sampled).
Partial Sampled by Boat	Sampled by boat (>50% of reach sampled).
Wadeable or Boatable Interrupted	The flow of water is not continual, but there is water in the sample reach (e.g., isolated pools); >50% of the reach has water present.
Altered Channel	There is a stream at the location marked with the “X-Site” on the map, but the stream channel does not appear the way it is drawn on the map. An example of this is a channel rerouting following a flood event that cut off a loop of the stream. Establish a new “X-Site” at the same relative position in the altered channel. (Make careful notes and sketches of the changes on the Verification Form.)

5.3 Non-Sampleable Categories

If the site is non-target and/or not sampleable, assign one of the sub-categories in **Table 5.2**, **Table 5.3**, or **Table 5.4** to the stream. Record all pertinent details in the site evaluation spreadsheet and replace the site with the appropriate site (see **Section 6**).

5.3.1 Non-Sampleable (permanent condition; stream/river becomes non-target)

Table 5.2 Non-Sampleable Categories (permanent condition)

Category	Description
Dry Channel	A discernible stream channel is present but there is no water anywhere within a 150-m reach centered on the “X-Site”. If determined at the time of the sampling visit, record as "Dry-Visited"; if site was determined to be dry (or otherwise non-perennial) from another source and/or field verified before the actual sampling visit, record as "Dry-Not Visited."
Wetland	(No definable stream channel) there is standing water present, but no definable stream channel. In cases of wetlands surrounding a recognizable stream channel, define the site as sampleable but restrict sampling to the stream channel.
Map Error	No evidence that a water body or stream channel was ever present at the coordinates provided for the “X-Site”.
Impounded	The stream is submerged under a lake or pond due to man-made or natural (e.g.,

Stream	beaver dam) impoundments. If the impounded stream, however, is still wadeable, record the stream as "Altered" and sample.
Tidal	The site in question occurs near a coast and is below the head of salt. If the site has a salinity of greater than 0.5 parts per thousand.
Other	<p>The site is non-target for reasons other than those above. Examples include underground pipelines or a non-target canal. A sampling site must meet both of the following criteria to be classified as a non-target canal:</p> <ul style="list-style-type: none"> • The channel is constructed where no natural channel has ever existed. • The sole purpose/usage of the reach is to transfer water. There are no other uses of the waterbody by humans (e.g., fishing, swimming, boating). <p>Be sure to record additional information in column S of the site evaluation spreadsheet if "Other" is chosen as the reason for dropping a site.</p>

5.3.2 Non-Sampleable (temporary condition; stream/river can be revisited)

Table 5.3 Non-Sampleable Categories (temporary condition)

Category	Description
Not Boatable	Unable to reach a site with a boat. Site should be rescheduled for another visit during the same 2-year survey cycle.
Not Wadeable	Unable to reach a site without a boat. Site should be rescheduled for another visit during the same 2-year survey cycle.
Other	The site could not be sampled on that particular day but is a target site. Examples include a recent precipitation event that has caused unrepresentative conditions or the crew assessing the site does not perform both protocols and cannot complete the methods necessary for said site. Site should be rescheduled for another visit during the same 2-year survey cycle.

5.4 No Access to Site Categories

Table 5.4 No Access to Site Categories

Category	Description
Access Permission Denied	You are denied access to the site by the landowners.
Permanently Inaccessible	Site is unlikely to be sampled by anyone due to physical barriers that prevent access to the site (e.g., cliffs).
Temporarily Inaccessible	Site cannot be reached at the present time due to barriers that may not be present at some future date (e.g., forest fire, high water, road temporarily closed, unsafe weather conditions). Site may be sampled at a later date, however if deemed necessary, can be replaced.
Other	Site may not be sampled for other unforeseen reasons. This could include excessive

effort required by crews to sample site defined below. Please explain in the comments section of the Site Evaluation Spreadsheet.

The primary distinction between "Sampleable" and "Non-Sampleable" rivers or streams is based on the presence of a defined channel and water content. If the site is determined to be non-sampleable or inaccessible, no further sampling activities are conducted. The site must then be replaced by an alternate site.

5.5 Target, Excessive Effort Required

Some remote rivers and streams may be physically accessible, but the effort required to reach them is prohibitive because an extreme effort (in terms of time and/or cost) would be required to sample them. This would represent very few, if any sites, and should not be used for sites which are merely inconvenient to sample. Please assign these sites a response of *No Access- Other* and describe the excessive effort constraint (i.e., the time or cost that would be needed) in the *COMMENTS* column of the Site Evaluation Spreadsheet. You will then need to select and evaluate a replacement site. Crews may be contacted for further detail if they use this response.

5.6 Tidal Sites

The NRSA design contains sites that are **above the head of salt, including tidal sites**. Consult the NOAA head of salt maps for reconnaissance information about these sites in relation to the head of salt. Mark if sites are tidally influenced on the **Site Verification Form in the app** and on Column T of the Site Evaluation Spreadsheet.

However, sites are considered non-target if they are below the head of salt. In addition to looking at the NOAA maps, crews must evaluate tidal sites salinity levels in the field. Sites that are tidal and exceed the salinity threshold of > 0.5 ppt are considered non-target and should not be sampled. They should be replaced following the site replacement procedures.

5.7 Blackwater Sites

For the NRSA 2023/24, we are looking to evaluate how many target sites are considered "blackwater" sites by the field sampling crews and local experts. If the site you are sampling is a blackwater site, please mark that on the field **Verification Form in the app** and sample the site. This is for data analysis purposes only and is not a factor for whether a site should be dropped or not, though you should also mark it in Column U on the Site Evaluation Spreadsheet.

5.8 Run-of-the-River Reservoirs

Large streams and rivers with run-of-the-river reservoirs on them are considered target for the NRSA 2023/24. The determination if a site with a dam is a run of the river or a reservoir is based on the residency time of the water. **Sites with less than seven-day residence time are considered TARGET for the NRSA. Sites with greater than seven-day residence time are considered NON-TARGET for the NRSA.**

6 SELECTING ALTERNATE SITES

The sampling site lists for the NRSA 2023/24 are organized by state and replacement is done within the state. Each Site Evaluation Spreadsheet contains a list of all primary sites (panel=base) which also includes revisit (RVT2) sites, and alternate (panel=oversample) sites in the state. The sites are listed on the Site Evaluation Spreadsheet in the order in which they were randomly selected. **All primary (base and revisit) sites must be evaluated for potential sampling and must be sampled unless they are determined to be non-target, non-sampleable, or not accessible.** If a primary site is rejected, then it will be replaced by an alternate site within the same state, panel year (if possible), and reach (size) category. **Table 6.1 describes the order in which sites are replaced.**

6.1 Site Sampling Categories

There are 11 sampling panels within three waterbody reach categories for the NRSA 2023/24 (**Section 2.3**). Sites are designated as “base sites” which must be evaluated and “oversample sites” which will be evaluated in a given order based on the base site within the panel they are replacing. If a base site is deemed non-target or non-sampleable during the reconnaissance process or in the field, a site from the replacement site list must be selected. The replacement site must be done within the same state and waterbody reach category.

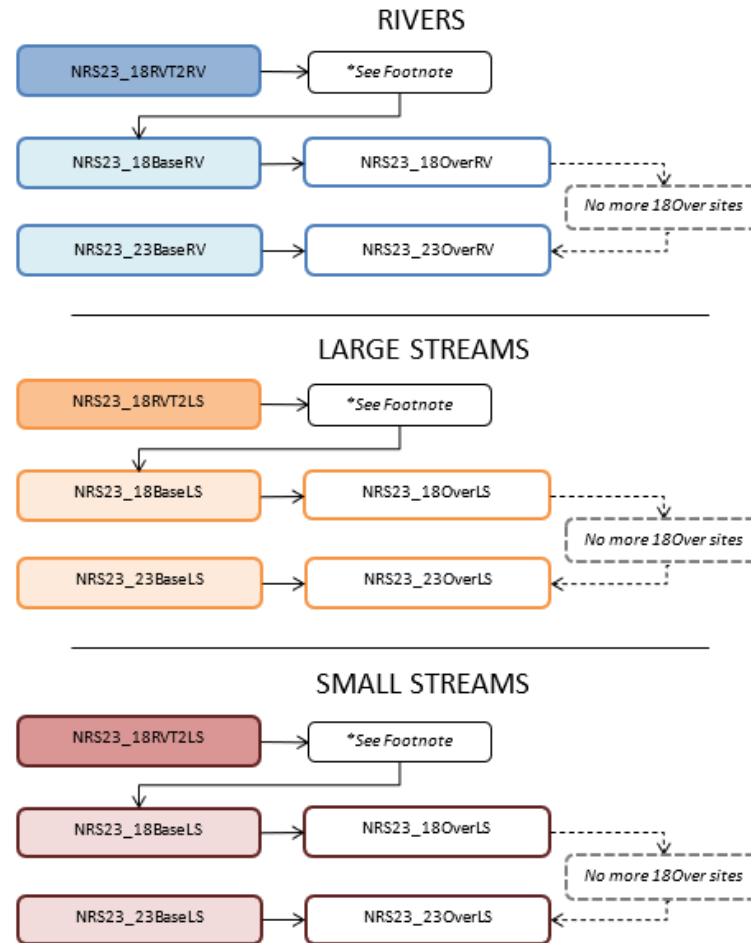
The replacement site must be the next available site in site ID order. **Table 6.1** discusses the logical order in which sites are replaced and **Figure 6.1** shows the order in a flowchart for each reach category. Note, within the Site Evaluation Spreadsheet, each panel use and their replacement sites have been separated by a black line. Should you run out of replacement sites for those panels, please proceed to utilizing the first available NRS23_23 Oversample site at the bottom portion of each reach category tab.

6.2 Sampling Sites from Previous Surveys

If a primary site is rejected because it is non-target, non-sampleable, or not accessible, then it will be replaced by an alternate site within the same state, reach category (small stream, large stream, or river), and, whenever possible, the same year category. Should there be a need to select an alternative site from the revisit sites, specific instructions can be found in flowcharts described in **Figure 6.1**.

Table 6.1 Alternative Site Replacement Instructions

Type of Sites	Original Site	Primary Oversample Replacement Site	Replacement Site If No Oversample Site is Available
Revisit Sites from 2018/19 (Revisit sites were evaluated in 2018/19 and will be evaluated again 2023/24. Sites with RVT2 will be sampled twice)	NRS23_18RVT2SS	NRS23_18BaseSS	NRS23_18RVT2SS -> NRS23_18BaseSS -> NRS23_18OverSS -> NRS23_23OverSS
	NRS23_18RVT2LS	NRS23_18BaseLS	NRS23_18RVT2LS -> NRS23_18BaseLS -> NRS23_18OverLS -> NRS23_23OverLS
	NRS23_18RVT2RV	NRS23_18BaseRV	NRS23_18RVT2RV -> NRS23_18BaseRV -> NRS23_18OverRV -> NRS23_23OverRV
<p>*If a site supposed to be sampled in 2023/24 after being sampled in 2018/19 but cannot be sampled, please replace with first BASE site on list within the respective Rivers/ Streams tabs. This replacement must be sampled TWICE. The base site that was used must be replaced with an available oversample site to compensate for the shift in sites. Strahler Category and Ecoregion do not matter in the selection of oversample sites.</p>			
Resample Sites from 2018/19 (Sites that are evaluated in both 2018/19 and 2023/24, but sampled once)	NRS23_18BaseSS	NRS23_18OverSS	NRS23_18BaseSS -> NRS23_18OverSS -> NRS23_23OverSS
	NRS23_18BaseLS	NRS23_18OverLS	NRS23_18BaseLS -> NRS23_18OverLS -> NRS23_23OverLS
	NRS23_18BaseRV	NRS23_18OverRV	NRS23_18BaseRV -> NRS23_18OverRV -> NRS23_23OverRV
<p>*If a base site supposed to be sampled in 2023/24 after being sampled in 2018/19 but cannot be sampled, please replace with first available oversample site</p>			
New sites only sampled in 2023/24	NRS23_23BaseSS	NRS23_23OverSS	NRS23_23BaseSS -> NRS23_23OverSS
	NRS23_23BaseLS	NRS23_23OverLS	NRS23_23BaseLS -> NRS23_23OverLS
	NRS23_23BaseRV	NRS23_23OverRV	NRS23_23BaseRV -> NRS23_23OverRV
<p>*If a base site new in 2023/24 cannot be sampled, please replace with first available oversample site</p>			



*When replacing a Revisit (RVT2) site with a Base Site, Redesignate the appropriate Base site as a Revisit site AND replace the dropped Base site with an appropriate oversample site

Figure 6.1 NRSA 2023/24 Site Replacement Plan. Darker shaded colors are the revisit sites (sites to be sampled twice), lighter shaded sites are regular base sites and cells without shading are oversample sites. Each of these colors refers to reach category tabs within the Site Evaluation Spreadsheet.

6.3 Example of Site Replacement Process

Figure 6.2 describes the replacement process of a revisit site within the river’s reach category evaluated in NRSA 2023/24. If the revisit base site (NRS23_18RVT2RV_FT) in question, NRS23_NJ_10005, is non-target or otherwise unsampleable, it needs to be replaced by the first available NRS23_18BaseRV site **regardless of FT suffix** (NRS23_NJ_10007) and will be evaluated and sampled twice. All base sites must be conserved. Therefore, if a site is dropped and replaced with another base site, which is the case for all revisit sites, the replacement base site must also be replaced.

In this case, the base site which will replace the revisit site (NRS23_NJ_10007) is used as Revisit site replacement and is also replaced with first available NRS23_18Over oversample site (NRS23_NJ_10032). If all oversample sites are used and more are needed, crews should select the first available NRS23_23Over site from that reach category (on the same tab in the Site Evaluation Spreadsheet as the original dropped site). Sites may not be used as a replacement for multiple sites. Evaluators will mark if a site was used as a replacement for another base site in Column V of the Site Evaluation Spreadsheet (Yes or No). If the site was used as a replacement and was sampled, please include the Site ID of the dropped site in Column W.

	State	2023-24 Site ID	Panel Use	Waterbody Category	Strahler Order	Ecoregion	NRSA provided Coordinates Latitude / Longitude	2018-19 Site ID	2018-19 Evaluation Status	Waterbody Name
3										
4	NJ	NRS23_NJ_10005	NRS23_18RVT2RV_FT	RV	7	Southern Appalach	40.7223671 -74.120847	NRS18_NJ_10	NonTarget_Tidal	Passaic River
5	NJ	NRS23_NJ_10006	NRS23_18RVT2RV_FT	RV	7	Northern Appalach	41.1123126 -74.975634	NRS18_NJ_10	Target_Sampled	Delaware River
6	NJ	NRS23_NJ_10007	NRS23_18BaseRV_FT	RV	7	Southern Appalach	40.8128161 -75.095684	NRS18_NJ_10	Target_Sampled	Delaware River
7	NJ	NRS23_NJ_10008	NRS23_18BaseRV_FT	RV	6	Northern Appalach	40.8333482 -74.982711	NRS18_NJ_10	Target_Sampled	Pequest River
8	NJ	NRS23_NJ_10009	NRS23_18BaseRV	RV	7	Southern Appalach	40.85885 -74.119	NRS18_NJ_11	Target_Sampled	Passaic River
9	NJ	NRS23_NJ_10032	NRS23_18OverRV	RV	8	Coastal Plains	40.0154233 -75.033912	NRS18_NJ_11	Target_Sampled	Delaware River
10										
11	NJ	NRS23_NJ_10016	NRS23_23BaseRV_FT	RV	8	Coastal Plains	39.6572591 -75.54324			Delaware River
12	NJ	NRS23_NJ_10017	NRS23_23BaseRV_FT	RV	6	Coastal Plains	39.6184954 -74.603724			Mullica River
13	NJ	NRS23_NJ_10018	NRS23_23BaseRV_FT	RV	8	Southern Appalach	40.489117 -74.433518			Raritan River
14	NJ	NRS23_NJ_10019	NRS23_23BaseRV	RV	5	Northern Appalach	40.7332083 -74.830764			South Branch Raritan River
15	NJ	NRS23_NJ_10020	NRS23_23BaseRV	RV	6	Coastal Plains	39.2456273 -75.006188			Maurice River
16	NJ	NRS23_NJ_10063	NRS23_23OverRV	RV	5	Southern Appalach	41.0775123 -74.19519			Ramapo River
17	NJ	NRS23_NJ_10064	NRS23_23OverRV	RV	8	Northern Appalach	40.9763861 -73.89809			Hudson River
18	NJ	NRS23_NJ_10065	NRS23_23OverRV	RV	7	Coastal Plains	40.199931 -74.761264			Delaware River
19	NJ	NRS23_NJ_10066	NRS23_23OverRV	RV	8	Coastal Plains	38.9386609 -75.096007			Delaware River
20	NJ	NRS23_NJ_10067	NRS23_23OverRV	RV	7	Southern Appalach	40.8538461 -74.325523			Passaic River
21	NJ	NRS23_NJ_10068	NRS23_23OverRV	RV	8	Southern Appalach	40.7878362 -73.991956			Hudson River
22	NJ	NRS23_NJ_10069	NRS23_23OverRV	RV	7	Northern Appalach	40.6178677 -75.20121			Delaware River
23	NJ	NRS23_NJ_10070	NRS23_23OverRV	RV	8	Coastal Plains	39.2923818 -75.36974			Delaware River

Figure 6.2 Example of Replacement of Revisit Site in Rivers Reach Category

New base sites which start with a Panel Use of “NRS23_23Base” are replaced with the “NRS23_23Over” sites within that reach category. Oversample sites must be evaluated in order and sites may not be skipped. Using the lower half of the image in Figure 6.2, if NRS23_NJ_10016 must be dropped, the evaluator would first evaluate site NRS23_NJ_10063 as a potential replacement for that base site and sample that site if target and permission has been granted. If NRS23_NJ_10063 is also dropped, evaluators must assess the next Oversample site on the list and continue doing so until all dropped sites have been replaced. All sites must be evaluated in order. If all oversample sites are used from the new NRS23_23 Panel Use within that reach category, evaluators must contact EPA for additional oversample sites.

Note, crews can disregard the FT suffix in the panels. The design includes sites which are meant for Fish Tissue collection. Currently, EPA does not plan on collecting Fish Tissue samples, but have kept the FT in the design in case the opportunity presents itself later.

6.4 State Designs

Eight states have state-specific survey designs: Arizona, Indiana, Kansas, New Hampshire, Oklahoma, Texas, Virginia, and Wisconsin. These designs are described in the design document. In addition, a state may implement a state-level survey using the national design for their state. The above survey design describes the national survey design and sets the required number of sites that must be sampled within each state. If a state implements a state-level design, the NRSA 2023/24 design sites must be sampled as part of the state-wide design. It is critical that the site replacement process be followed and that the state communicate to the NRSA 2023/24 coordinator whether only the required NRSA 2023/24 sites will collect all the NRSA indicators or if all state-level sites will collect all the NRSA indicators. This information is required by the NRSA staff to know what sites evaluated should be included in the weight adjustment after field implementation.

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7 LITERATURE CITED

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