Omaha District

United States Army Corps of Engineers
Omaha District
Wyoming Regulatory Office

WYOMING STREAM MITIGATION PROCEDURE
Version 2 (WSMP v2)

– July 2018 –

Acknowledgements

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Updates and Revisions

- WSMP v2, July 2018 – Updated regulatory direction for stream mitigation and restoration; debit and credit calculator applying ecological and administrative adjustment factors to functional lift and loss units measured using the Wyoming Stream Quantitative Tool (WSQT), a condition calculator tool developed for use in Wyoming.

- WSMP, February 2013 – Regulatory direction for stream mitigation; debit and credit calculator based on functional loss and improvement assessed using existing qualitative methods.

- This procedure was originally adapted from similar methodologies used in other Corps Districts that have been in effect for several years. The foundation document is based on the Montana Stream Mitigation Procedure as provided by Todd Tillinger and Christina Schroeder, USACE Montana Regulatory Office.

The WSQT can be updated and revised as necessary in the future.

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I. OVERVIEW

A. Background

The practice of using compensatory mitigation to minimize unavoidable losses of the aquatic resources is an important component of the U.S. Army Corps of Engineers (Corps) Clean Water Act Section 404 Regulatory (404) Program. The fundamental objective of mitigation is to compensate for the losses in aquatic resource function from unavoidable impacts resulting from permitted activities (33 CFR 332.3(a)). As outlined in the 2008 Compensatory Mitigation Rule (33 CFR Parts 325 and 332), compensatory mitigation means the restoration, enhancement, establishment and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. The Corps considers the need for compensatory mitigation when evaluating potential individual and cumulative adverse impacts to the aquatic environment that may be authorized by Department of Army (DA) Permits, including nationwide permits and standard individual permits.

The Wyoming Stream Mitigation Procedure, version 1 (WSMP v1) was developed in 2013 to provide a method for quantifying stream losses (debits) and the acceptable compensatory mitigation (credits) for DA-permitted projects in Wyoming. Through implementation of the procedure, evaluation of the 404 mitigation program, and acknowledgement of an abundance of stream restoration projects in the State, the Corps (Wyoming Regulatory Office, WRO) and the Interagency Review Team (IRT) for third party mitigation, found that the procedures would benefit from a more consistently applied quantitative approach to stream assessment. Stream assessment tools are needed to ensure that authorized stream impacts are adequately mitigated. Although the WSMP v1 provided suitable regulatory direction, the debit and credit calculations relied on a narrative approach to characterizing changes in stream function. The WRO and IRT have developed the Wyoming Stream Quantification Tool (WSQT), a calculator that consolidates well-defined procedures for objective and quantitative measures of defined stream variables, to produce an improved approach for debiting and crediting. This WSMP v2 integrates the results from the WSQT into the final calculation of regulatory-based stream credits and debits, and provides updated direction for implementation of the Corps regulatory program concerning activities that affect stream resources.

B. Purpose and Limitations

This document provides direction for Corps regulatory actions (DA-permitted projects) requiring compensatory mitigation for stream functional losses in Wyoming. Specifically, this version of the Wyoming Stream Mitigation Procedure (WSMP v2):

- Identifies the regulatory framework, considerations and circumstances under which the Corps in the Wyoming Regulatory Office (WRO) may require stream mitigation.

- Identifies when and how the Wyoming Stream Quantification Tool (WSQT) may be used or required to assess and quantify stream functional loss and lift.

- Describes the methods for calculating and adjusting stream losses and impacts (debits) and the acceptable compensatory mitigation (credits) for DA-permitted projects in Wyoming.

The WSMP does not affect sequencing (e.g., avoidance, minimization, reduction) or any requirements of the Clean Water Act Section 404(b)(1) Guidelines or other applicable documentation. Such requirements shall be evaluated during permit analysis.

The intent of this WSMP is to establish a procedure for determining when stream mitigation may be needed, and calculating compensatory mitigation debits and credits that will provide predictability and consistency. This WSMP is not intended for use as project design criteria but includes elements for consideration to ensure minimal impacts to the aquatic environment under the 404 Regulatory Program.

Nothing in this WSMP should be interpreted as a guarantee that a project that follows the procedure described herein will be approved. Since a particular project may warrant alternative mitigation requirements, each resource and proposed project is evaluated on a case-by-case basis. The Corps will rely on 33 CFR 332.3 when approving mitigation.

C. Corps Regulatory Policy on Stream Mitigation

This WSMP was adapted from similar methodologies used in other Corps Districts that have been in effect for several years. The intent for this WSMP is to comply with the requirements for mitigation found in 33 CFR Parts 320, 332 and 325.

If there appears to be a conflict between this WSMP and a Corps regulation or policy, users should immediately notify the Corps. The Corps will review and modify this WSMP as necessary.

D. Applicability and Use

The WRO of the Corps will consider the need for compensatory mitigation when evaluating the potential for unavoidable losses of waters of the United States associated with an application or pre-construction notification for a DA permit to ensure that the adverse effects to the aquatic environment are minimal. Projects, determined by the Corps, which result in more than minimal stream loss will usually require compensatory mitigation. Large stream enhancement and restoration projects that require a 404 permit must result in a net increase in aquatic resource functions and services.

<u>Application of the WSMP and WSQT *will* be required for the following:</u>

1. Stream mitigation banks and stream in-lieu fee (ILF) projects.
2. Projects resulting in the loss or conversion of 500 feet or more of stream length that involve relocation and reconstruction of a channel, and are not part of a stream enhancement or restoration project. Ditches or canals excavated in uplands and ephemeral steams are excluded.

<u>Application of the WSMP and WSQT *may* be required for the following:</u>

1. Projects resulting in the loss of 500 feet or more of ephemeral stream length.
2. Projects resulting in the loss of less than 500 feet of stream length that involve relocation and reconstruction of a channel. Ditches or canals excavated in uplands and ephemeral streams are excluded.
3. Stream losses due to the installation of new culverts or cumulative sections of culverted/piped streams greater than 300 feet in length.
4. Cumulative project impacts to a single stream; for example, greater than 500 feet of riprapped

stream bank (armored with concrete rubble or placed to near the top of bank) with no bioengineering.
5. Nationwide permits that require a waiver.
6. Stream restoration, rehabilitation, or enhancement projects that require individual 401 certification and where net increases in aquatic resource functions and services need to be demonstrated due to substantial changes in channel geomorphology.

The use of the WSQT for planning, documenting and monitoring stream restoration and enhancement projects in Wyoming will become a standard procedure for the Corps and partnering agencies. Project proponents are encouraged to apply the WSQT for NWP 27 stream projects that exceed 500 feet, as similar levels of data are already requested for individual 401 Certification by Wyoming Department of Environmental Quality (WDEQ). Use of the WSQT will help document expected net increases in aquatic resource function and could expedite review.

Prospective permittees and applicants should contact the WRO in early project planning stages to verify if WSMP and WSQT documentation are necessary and to what degree they are applied.

Other considerations:

- This WSMP v2 will fully replace version 1 for all new permit actions and mitigation bank and in lieu fee (ILF) program approvals and modifications. Version 1 will be grandfathered for all existing and finalized actions.

- The Corps will use this document and the WSQT as the primary means of calculating stream mitigation debits and credits for losses of waters of the U.S.in Wyoming, and as the primary reference when applied to stream mitigation bank or ILF program establishment. When this WSMP is used in the establishment of a mitigation bank, the Corps, in concert with the Interagency Review Team (IRT), will evaluate the appropriate application and integration of the WSQT with other aspects of the mitigation banking instrument, such as functional assessment methods, monitoring and performance standards. A similar process applies when evaluating a permittee-responsible mitigation plan.

- Validation of debiting and crediting will be required as special conditions to a permit and in context of a mitigation banking instrument.

- In addition to the requirements set forth in this document, other Federal, State, Tribal, or local agencies within Wyoming may require additional or separate mitigation under their own authorities. Note: the WSQT has been tailored to meet the function-based approaches set forth in the 2008 Compensatory Mitigation Rule, as well as the needs of the Wyoming Game and Fish Department (WGFD) and WDEQ for their stream monitoring and restoration programs.

- Separate and/or additional performance metrics and assessment procedures may be applied to special resources, standard individual permits, or approved mitigation banks. For example, large, complex projects could deviate from this procedure.

- Ephemeral, intermittent, and perennial streams can be evaluated under this WSMP.

II. MITIGATION INFORMATION

A. Mitigation Types

In general, there are four types of compensatory mitigation that may be available to an applicant (permittee), upon approval by the Corps:

Mitigation Bank Credits: A mitigation bank is a site where aquatic resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved in advance of impacts to provide compensatory mitigation for impacts authorized by DA permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument (33 CFR Part 332.2). A permittee may elect to purchase credits from an established stream mitigation bank when impacts are within the bank's service area and the bank has appropriate credits available. Service area of banks are defined during assessment of the banking proposal and are recorded in the banking instrument.

To locate a bank in Wyoming, visit the Regional Internet Bank Information Tracking System (RIBITS) website https://ribits.usace.army.mil or contact the Wyoming Regulatory Office.

In-Lieu Fee Credits: An ILF program involves the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to eventually satisfy compensatory mitigation requirements for DA permits. Similar to a mitigation bank, an ILF program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the ILF program sponsor. The rules governing the operation and use of ILF programs are somewhat different from the rules governing operation and use of mitigation banks. The operation and use of an ILF program are governed by an ILF program instrument (33 CFR Part 332.2). A permittee may elect to pay a fee to an ILF sponsor who will construct the mitigation site within a designated service area concurrent or after impacts have occurred. Service areas of in-lieu fee programs are defined during establishment of program objectives and protocols. For current information in Wyoming, visit the Regulatory ILF and Bank Information Tracking System (RIBITS) website https://ribits.usace.army.mil

Permittee-Responsible Mitigation: A permittee may elect to prepare their own mitigation proposal or hire a consultant to prepare a mitigation plan which must be approved by the Corps. There are three sub-categories of permittee-responsible mitigation (33 CFR Section 332.2 (b)(4-6)). Regardless of sub-category, the permittee retains all responsibility for the mitigation obligations.

- Permittee-responsible mitigation under a watershed approach.
- Permittee-responsible mitigation through on-site and in-kind mitigation
- Permittee-responsible mitigation through off-site and/or out of kind mitigation

Combination of Above: With Corps approval, the permittee may combine mitigation bank credits, ILF credits, and/or permittee-responsible mitigation to satisfy compensatory mitigation.

B. Location and Site Selection

A watershed is an area that drains water to the end of a relevant primary stream reach. The size/scale of watersheds can vary and is dependent upon the relevant primary stream targeted and the scale of the issue to be addressed. The appropriate size watershed, when evaluating mitigation location, depends on the stream order and documented watershed needs and goals (33 CFR 332.2 definition and 332.3(b)).
To provide continuity in identifying location preferences for compensatory mitigation in Wyoming, a

watershed is an area within the boundary of an 8-digit Hydrologic Unit Code (HUC), and a watershed basin is an area within the boundary of a 6-digit Hydrologic Unit Code (HUC). Both HUC-8 and HUC-6 watershed scales are important levels of evaluation and thresholds depending on the project stream order under a watershed approach to stream mitigation. The WSQT can assist in site selection and can help determine if a proposed site has the potential to be considered for a stream restoration or mitigation project.

C. Timing

In most cases, mitigation should be completed prior to or concurrent with the permitted project impacts. Complete mitigation prior to the impacts is preferred, though, it is recognized that issues such as equipment availability for permittee-responsible mitigation may necessitate mitigation concurrent with the overall project. This is usually acceptable provided the time lag between the impacts and mitigation is minimized and the mitigation is completed within one growing season following commencement of the project impacts. ILF progams are the exception where construction delays of up to 3 years may be approved and accounted for within a program's structure. Rationale will need to be provided for schedules showing less than 100% completion of the approved mitigation concurrent with completion of the permitted project. In such cases, the Corps may require additional mitigation to account for temporal losses.

D. Site Protection

Appropriate site protection is a requirement of the Compensatory Mitigation Rule (33 CFR 332.7). This WSMP recognizes five different site protection mechanisms that offer long-term protection, generally in-perpetuity, or such that the mitigation lasts as long the impacts. These are mechanisms are described in Section IV(A) of this document. Each offers a different level of protection to ensure land and aquatic resources, including riparian width and buffers, offered for mitigation.

E. Monitoring

Monitoring a stream compensatory mitigation project site is necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. It includes the selection of appropriate measures that will ensure that the aquatic resource functions are provided and involves analysis of monitoring results to identify potential problems of a compensatory mitigation project and the identification and implementation of measures to rectify those problems (33 CFR 332.6). The WSQT can be used to set project-specific function-based goals and objectives, inform performance standards, and develop a monitoring plan. These are all required elements of a stream mitigation plan. Monitoring may also be required for some stream restoration and enhancement projects authorized under NWP 27. The WSQT includes a spreadsheet for documenting monitoring events and facilitates production of monitoring reports.

F. Maintenance

Mitigation areas will be designed to be hydrologically and ecologically self-sustaining with little to no maintenance (33 CFR 332.7) after performance standards have been attained. Diligence should be taken to show hydrology is adequately considered since plans requiring extensive maintenance or other substantial ongoing human inputs (water control structures, pumping, etc.) will normally not be accepted.

G. Mitigation Bank and ILF Development

Proposals for mitigation banks and ILF programs must comply with 33 CFR 332.8. Proposals that include use of credits from either third-party source must normally comply with the requirements of this WSMP as well as any conditions or restrictions applicable to the bank or ILF program.

H. Stream Mitigation Costs

All costs are the responsibility of the permittee (whether conducting the work or purchasing credits from a Corps approved bank). For mitigation banks, the actual cost per credit is determined by the sponsor in consultation with the permittee. For ILF, a cost per credit will be established in the ILF agreement, with final approval provided by the Corps. Financial assurances in the form of a bond or other similar binding document may be applied to assure funds will be available to complete mitigation (33 CFR 332.3n).

I. Guidance

Copies of this document will be made available on the Wyoming Regulatory Office website http://www.nwo.usace.army.mil/Missions/Regulatory-Program/Wyoming/Mitigation or upon request.

Prospective permittees and their agents are strongly encouraged to seek the advice of this office and other regulatory and resource agencies such as WDEQ and WGFD during the planning and design of stream mitigation plans. For complex mitigation projects, such consultation may improve the likelihood of mitigation success and reduce permit processing time. Questions regarding use of this policy for specific projects must be addressed to the Project Manager handling the specific permit action. Other general inquiries or comments regarding this document may be addressed to:

Wyoming Regulatory Office
U. S. Army Corps of Engineers, Omaha District
2232 Dell Range Boulevard, Suite 210
Cheyenne, Wyoming 82009
Phone (307) 772-2300
Subject: WSMP

J. Document Updates.

This document is subject to periodic review and modification. This document will be reviewed within 2 years after implementation and thereafter, as warranted. Necessary modifications or updates will be released to the public as a new version of the WSMP. The version of the WSMP utilized for an approved permit, mitigation bank or other 404 mitigation program is the document used for reference and compliance for the life of the required mitigation.

The referenced web links in this document may change over time. Please contact the Wyoming Regulatory Office if a web link is no longer valid.

III. WSQT APPLICATION

A. Stream Assessment Methodology

To determine how much compensatory mitigation is required, the Compensatory Mitigation Rule recommends that condition or functional assessments be completed: one at the impact site to quantify

ecological losses and one at the mitigation site to quantify projected ecological gains (33 CFR 332.3(f)(1)). The approved approach for Wyoming is the Wyoming Stream Quantification Tool (WSQT), which is a spreadsheet calculator that consolidates a suite of well-established metrics into a single condition score to calculate a change (delta) between existing condition and proposed condition (loss or gain). The tool integrates structural metrics to characterize hydrologic, hydraulic, geomorphic, physicochemical and biological functions. The WSQT will be used as a basis for the approach to crediting and debiting, and should be used to assess the project impact site and anticipated stream loss, as well as the mitigation site and anticipated stream improvement. If a permittee seeks credits from a mitigation bank with a different approved methodology, they should use the assessment method dictated by the bank's mitigation banking instrument.

The Wyoming Stream Quantification Tool user manual and spreadsheet can be found on the Regional Internet Bank Information Tracking System (RIBITS) link https://ribits.usace.army.mil under Wyoming then Assessment Tools or contact the Wyoming Regulatory Office.

The WSQT may be periodically updated as new metrics or reference data become available. Necessary modifications or updates will be released to the public as a new version of the WSQT. The version of the WSQT utilized for an approved permit, mitigation bank or other 404 mitigation program is the version that should be applied for the life of the required mitigation, unless a newer version is specifically requested by a permittee or sponsor and approved by the Corps.

B. WSQT Parameter and Metric Selection

The level of analysis and documentation for evaluating projects under 404 should be commensurate with the scale and scope of the project (USACE 2008). Although, it has been determined in Section I(D) that the WSQT will be utilized for projects that result in more than minimal stream loss or extensive stream restoration, the size and complexity of the projects and affected resources can vary. For 404 projects, the Corps has discretion over which field methods, metrics, and parameters are used for a particular project; therefore, permittees and applicants need to consult with the Corps prior to data collection on a particular project.

The remainder of this section is reproduced from Section 2.1 of the WSQT Version 1.0 User Manual. Subsequent versions of the WSQT may provide additional or different guidance on parameter selection. The user should consult the most recent version of the WSQT User Manual for the most up-to-date guidance on parameter selection.

The WSQT v1.0 includes 13 function-based parameters and 28 metrics (See Table 1). Their descriptions and data collection methods are outlined in the WSQT User Manual.

If the Corps determines that the WSMP and/or WSQT are required for a project, the minimum subset of data for the following parameters (i.e., basic assessment), are to be collected at both the project impact site and proposed mitigation site:

1. Reach Runoff
2. Floodplain Connectivity
3. Lateral Migration
4. Riparian Vegetation
5. Bed Form Diversity

These parameters are important indicators of the stability and resiliency of stream systems. For example, riparian planting may not be a successful restoration approach if the channel is incised and actively eroding the bed and/or banks.

Table 1. Parameter Selection Checklist function-based parameters and metrics in the WSQT v1.0.

Parameter Selection Checklist

	Function-Based Parameter		Metric(s)	Field (F) and/or
•	Reach Runoff	•	Land Use Coefficient	D
		•	Concentrated Flow Points	F
	Flow Alteration		Q_Low, Measured / Q_Low, Expected	F/D
•	Floodplain Connectivity	•	Bank Height Ratio (BHR) *AND* Entrenchment Ratio (ER)	F
	Large Woody Debris (LWD)		LWD Index (LWDI)	F
			No. of LWD Pieces/ 100 meters	F
•	Lateral Migration		Dominant BEHi/NBS *AND* Percent Streambank Erosion	F
			Greenline Stability Rating	F
			Percent Armoring	F
	Bed Material Characterization		Size Class Pebble Count Analyzer	F
•	Bed Form Diversity	•	Pool Spacing Ratio *AND* Pool Depth Ratio *AND* Percent Riffle	F
			Aggradation Ratio	F
	Plan Form		Sinuosity	F/D
•	Riparian Vegetation	•	Riparian Width* *AND* Woody Vegetation Cover *AND* Herbaceous Vegetation Cover *AND* Percent Native Cover	*F/D F
	Temperature		MWAT	F
	Nutrients		Chlorophyll	F
	Macroinvertebrates		WSII	F
			RIVPACS	F
	Fish		Native Fish Species Richness	F
			SGCN Absent	F
			Game Species Biomass	F

• Basic Assessment – required elements.

The WSQT can be tailored to a specific project through the selection of additional parameters and metrics that tie to the project's landscape setting, function-based goals, objectives and restoration potential. For projects proposed under 404, a proposed parameter selection checklist should be submitted during early

consultation with the Corps to identify any additional parameters or metrics that may be needed for a specific project.

General recommendations for additional parameters are provided below:

- Flow Alteration (Hydrology) – this parameter should be evaluated where the user is proposing to modify baseflows within the project reach.
- Bed Material Characterization (Geomorphology) – this parameter is recommended for stream reaches with potentially altered sediment transport processes. Examples include streams with a gravel bed and sandy banks, or transport or sediment-limited reaches where there is potential to coarsen the bed.
- Large Woody Debris (Geomorphology) – this parameter is recommended in historically forested areas, where LWD could be a significant component in stream systems.
- Plan Form - Sinuosity (Geomorphology) – this parameter is recommended for all projects located in alluvial valleys with Rosgen C and E stream types, and also for B stream types to ensure that practitioners do not propose sinuosity values that are too high.
- Temperature and Nutrients (Physicochemical) – these parameters are recommended for projects with goals and objectives related to water quality improvements or projects where improvements to these parameters is anticipated based on restoration potential.
- Macroinvertebrates (Biology) – this parameter is recommended for projects with goals and objectives related to biological improvements or projects where improvements in biological condition is anticipated based on restoration potential.
- Fish (Biology) – this parameter is recommended for projects with goals and objectives related to fisheries improvements. Selection of this parameter requires coordination with a WGFD Regional Fish Biologist.

Some metrics can be calculated in the office, but the majority rely on field data collection. Some parameters have metrics that are redundant, while other metrics complement each other or simply provide additional information. For example, the large woody debris index (LWDI) and large wood piece count metrics are redundant and vary in their level of field effort. Alternatively, the bank height ratio and entrenchment ratio metrics are complimentary, as each of these metrics contributes differently to an overall understanding of floodplain connectivity; both should be used to inform the floodplain connectivity parameter. Aggradation ratio and greenline stability rating metrics provide additional information that may be more appropriate for capturing certain channel conditions.

General recommendations for additional metrics are provided below:

- Aggradation ratio (Bed Form Diversity) – this metric is recommended for projects where symptoms of aggradation are present, such as mid-channel or transverse bars, or where sediment transport or hydrologic processes are anticipated to change due to changes in land use, recent wildfires or other factors within the contributing catchment.
- Greenline Stability Rating (Lateral Migration) – this metric is recommended for relatively stable reaches or where lateral channel migration is not a concern and provides an indication of bank stability based on the type of vegetation growing at the intersection of bed and bank.
- Armoring (Lateral Migration) – this metric should only be used if bank armoring is present or proposed in the project reach. Examples of armoring include rip rap, gabion baskets, concrete, and other engineered materials that prevent streams from meandering.

A basic assessment includes the minimum suite of metrics and parameters to be evaluated at all impacted and mitigation sites. An abbreviated parameter selection checklist is provided below with minimum

parameter and metrics marked. Additional data elements should be discussed with the Corps prior to data collection. Some metrics can be informed by multiple field methods that vary in their level of intensity; and these methods can be used interchangeably within the WSQT. Rapid methods for collecting data are available for certain metrics under bed form diversity, floodplain connectivity and riparian vegetation can be conducted at stream impact sites, as well as the site selection stage for permittee-responsible mitigation, and the prospectus stage for mitigation bank development. More detailed data collection techniques, as well as additional metrics and parameters to align with specific project goals and objectives and performance standards should be conducted for the development of mitigation banking instruments, and may be required by the Corps at an impact site or for permittee-responsible mitigation on a case-by-case basis.

The WSQT architecture is flexible and can accommodate additional parameters and metrics that are accompanied by specific and defensible reference curves and index values. Any additional parameters or metrics for incorporation into the tool should be provided in a written proposal to the Corps for consideration. *Other data elements that support separate performance standards outside of the WSQT may be requested by the Corps and evaluated under "credit adjustments" on a case-by-case basis.*

<u>Important Notes on parameter and metric selection</u>:

- The same metrics must be used in the existing condition and all subsequent condition assessments (e.g. proposed, as-built, and monitoring), otherwise the relative weighting between metrics and parameters changes and the overall condition scores are not comparable.
- For metrics that are not assessed (i.e., a field value is not entered), the metric is not included in the scoring. It is NOT counted as a zero.
- When the suite of parameters and metrics varies between project sites, the overall condition scores should not be compared or contrasted between sites. To evaluate multiple sites, the same suite of parameters and metrics would need to be collected at all sites.

The WSQT has been primarily designed for application within perennial, wadeable, single-thread stream systems. Other stream situations, such as braided systems, large rivers, or streams with side channels should always be noted and considered in selecting applicable parameters and metrics. Data collection methods may vary in these reaches; discuss proposed sampling plan with the Corps prior to performing the field work. Additional discussion on the limitations of applying the WSQT in these systems is provided in the WSQT Scientific Support Document.

<u>General recommendations for other stream situations include:</u>

- Intermittent and Ephemeral Streams: relevant parameters include riparian vegetation, reach runoff, flow alteration, floodplain connectivity, lateral stability, bed material characterization, large woody debris and bedform diversity. NOTE: Reference curves have been developed from reference sites within perennial systems, and thus these systems may not attain high index scores even if they are considered reference standard for this stream type.
- Perennial and intermittent braided or anastomosing systems: relevant parameters include riparian vegetation, reach runoff, flow alteration, floodplain connectivity (bank height ratio only), bed material characterization, large woody debris, temperature, nutrients, macroinvertebrate and fish. Note: Reference curves have not been developed specifically for these streams. Additionally, modifications to sampling methods would need to be made to accommodate these types of streams.

- Non-wadeable streams: Some metrics may be difficult to sample in these systems, or may require alternate field methodologies. Sampling plans in these systems should be discussed with the Corps prior to data collection efforts

C. Stream Losses

This procedure uses the existing condition of the stream and the anticipated functional loss within a given length (reach) of stream caused by the permitted activity, including direct, and predicted secondary and cumulative effects to determine debits, also referred to as credit obligations. The evaluation of existing condition and functional loss are calculated using the WSQT, which considers both instream and stream corridor condition.

The WSQT generates a condition score that is unitless, which is then multiplied by stream length to generate a "Functional Feet" score. This score is used to determine the initial credit obligation (described below). The WSQT spreadsheet calculates the change in condition at an impact site by comparing the difference between existing and proposed condition. Functional loss at an impact site is calculated using the following equation:

$$\begin{aligned}\Delta\, Functional\ Feet \\ &= (Proposed\ Condition\ Score \times proposed\ stream\ length) \\ &- (Existing\ Condition\ Score \times existing\ stream\ length)\end{aligned}$$

The existing condition score is generated in the WSQT spreadsheet using data collected via methods outlined in the WSQT User Manual; and existing stream length is the current measure of stream length. Typically, a basic assessment using rapid survey methods can be conducted at an impact site, however, the Corps retains the discretion to recommend that additional parameters be assessed or alternate methods applied. If a field assessment of existing condition is not conducted at an impact site, debits will be calculated using an existing condition score of 1.0. The proposed condition score is derived either by estimating changes to specific metrics based on project design, or by using the WSQT Debit Tool to estimate impact severity, as outlined in the WSQT User Manual. The proposed stream length is the final length of stream anticipated following the project. Additional information on these options to calculate debits is provided in Chapter 4 of the WSQT User Manual.

To account for the appropriate magnitude of potential functional loss, losses that occur in different locations (or within different stream reaches) of the same project should be counted as separate losses in the WSQT and a separate spreadsheet should be submitted to the Corps for each stream reach. Guidance on defining stream reaches is provided in the WSQT User Manual.

The initial steps in the regulatory process for determining stream debits is outlined in Figure A.

D. Stream Mitigation and Functional Lift

Permittees are responsible for proposing appropriate compensatory mitigation commensurate with the amount and type of loss associated with a particular DA permit. Compensatory mitigation for stream losses may include a combination of stream corridor restoration (re-establishment or rehabilitation), enhancement, creation or preservation. Preservation will generally only be considered in combination with enhancement and restoration, e.g., preserving healthy ephemeral, intermittent, and perennial streams that are tributaries to a larger stream corridor that is being restored. Because streams are difficult to replace through creation, restoration and enhancement activities will provide greater certainty that

permitted impacts will be successfully offset (33 CFR 332.3(e)(3)).

The existing condition at a mitigation site will be assessed and proposed condition estimated to quantify ecological gains expected and realized from the mitigation project. Information about the existing condition of a mitigation site is useful for determining what restoration or enhancement activities would provide the greatest functional lift and whether the site is suitable for a mitigation project. Activities that may constitute restoration or enhancement of stream functions include, but are not limited to: establishment of natural riparian areas; impoundment removal; livestock exclusion; road crossing improvements; removal of invasive vegetation and restoration of appropriate vegetation communities; improvements to in-stream channel complexity; sediment supply reduction by stabilizing streambanks; improving baseflow duration; and reconnection of a stream with its floodplain.

The improvement in stream functions, or functional lift, at a compensatory mitigation site will be quantified using the WSQT. The WSQT generates a condition score that is unitless, which is then multiplied by stream length to generate a "Functional Feet" score. This score is used to determine a project's initial credit availability (described below). The WSQT spreadsheet calculates the change in condition at a mitigation site by comparing the difference between existing and proposed condition. Functional lift at a mitigation site is calculated using the following equation:

$$\begin{aligned}\Delta\, Functional\ Feet \\ &= (Proposed\ condition\ score \times proposed\ stream\ length) \\ &- (Existing\ condition\ score \times existing\ stream\ length)\end{aligned}$$

The existing condition score is generated in the WSQT spreadsheet using data collected via methods outlined in the WSQT User Manual, and existing stream length is the current measure of stream length at the mitigation site. During initial mitigation site selection, or the prospectus stages of mitigation bank development, existing condition can be measured using the basic assessment and rapid survey methods. Upon final selection of the mitigation site, or during the development of a mitigation banking instrument, the Corps will likely require baseline data collection using detailed assessment methods outlined in the WSQT User Manual. The Corps retains the discretion to recommend that additional parameters be included beyond the basic assessment. The proposed condition score is estimated using design specifications or as-built measurements that are input into the WSQT and later verified (and adjusted if necessary) through monitoring. The proposed stream length is the measured length of stream following mitigation activities. For final credit determination, the existing and predicted condition scores should be based upon the most detailed level of assessment and complete suite of metrics conducted at the site.

The initial steps in the regulatory process for determining stream credits for permittee responsible mitigation is outlined in Figure B. The initial steps in the regulatory process for determining stream credits for third party mitigation credits is outlined in Figure C.

E. Documentation

For permit review, the investigator shall provide a detailed report of the stream assessment, a copy of the WSQT parameter selection checklist and spreadsheets for each site. A copy of the WSQT riparian vegetation field forms should also be provided. In addition to the stream assessment information, applicants and permittees must submit all other required information for 404 permit applications or pre-construction notifications. For the WRO, an aquatic resource inventory (ARI) shall be provided where stream and open water resources are delineated in accordance with Regulatory Guidance Letter 05-05 (Ordinary High Water Mark Identification) and any appropriate regional supplement; and wetlands

present in the stream and/or riparian buffer are delineated in accordance with 1987 Corps of Engineers Wetland Delineation Manual and any appropriate regional supplement. Submitted surveys and maps shall be in accordance with an outlined or cited standard operating procedure for recording delineations using Global Position Systems.

IV. DEBIT AND CREDIT ADJUSTMENTS

A. Definition

Compensatory mitigation is the offset of unavoidable losses of aquatic resources, functions and services. The WSQT characterizes the loss or gain of stream functions at an impact or mitigation site and provides the technical foundation on which to establish debits and credits. In addition, 33 CFR 332.3 directs us to consider other aspects of compensatory mitigation that would affect appropriate offset of types and services of regional resources, and likelihood of ecological success and sustainability.

The majority of permittee-responsible stream impact and mitigation sites are likely to occur in perennial streams with similar ecological conditions and administrative requirements defined herein as "normal standards". Special circumstances may require adjustment of debits or credits (i.e. penalties and incentives) due to deviations from those normal standards. Penalties are usually applied to debits for loss of designated uses and special resources. Incentives are usually applied to credits, encouraging selection of mitigation sites with higher designated uses, special resources, stronger protection, closer proximity, and adhering to a watershed approach. However, penalties can also be applied as reduced credits when mitigation sites have lower standards.

Table 2 summarizes factors that must be considered in calculation of debits and credits, following determination of initial credit obligation or availability using the WSQT. Adjustments can be applied as a percentage increase or decrease depending on the circumstance. Special resources and site protection factors are evaluated individually.

Adjustment factors include ecological services factors and administrative factors (Table 2). Ecological services factors should be considered at both impact and mitigation sites. Administrative factors should only be considered in the context of mitigation, and thus are only applicable for credit adjustments for mitigation banks, ILFs and permittee-responsible mitigation.

Table 2. Debit and credit adjustment factors that may be applied to the WSQT functional feet score.

Debit and Credit Adjustment Factors					
#	Factor	Lower Standards	Normal Standards	Higher Standards	Adjustments
1	Designated Uses 1	Aquatic Life Only (Class 3)	Aquatic Life and Fisheries (Class 2)	Outstanding Waters (Class 1)	5%
2	Special Resources 1		No	Wild & Scenic, T&E Species, Blue Ribbon, Red Ribbon, Conservation	2%
3	Secondary Effects 1	Negative	None	Positive	3%
4	Type of Protection 2		Deed Restriction, Permittee Easement, Agency Owned	Fee Title, Conservation Easement	5%
5	Buffer 2		None	Yes	2%
6	Watershed Approach 2		No	Yes	15%
7	Timing 2*	Schedule 3	Schedule 2	Schedule 1	3%
8	Site Location 2*	Off-Site	On-Site		15%
	Factor Notes: 1 Ecological Services Factor applies to impact and mitigation sites; 2 Administrative Factor applies to mitigation sites; *affected by relationship to impact site.				

Designated Uses are important ecological services underlying the WDEQ Wyoming Surface Water Classification List which incorporates flow regime; uses such as aquatic life and fisheries; and a special category for outstanding waters (Class 1). The classification list can be obtained from Chapter 1 of the *Wyoming Water Quality Rules and Regulations* on the WDEQ website: http://deq.wyoming.gov/wqd/surface-water-quality-standards-2/resources/guidance-doc/

Designated uses can be used to adjust debits at an impact site and to adjust credits for all mitigation types, including banks, ILF and permittee-responsible mitigation.

Special Resources are stream and riverine systems that provide functions and services of recognized importance.

> Red Ribbon and Blue Ribbon – Statewide and nationally important trout production streams, as designated by the Wyoming Game and Fish Department (WGFD). A list and map of these resources can be found on the WGFD website: https://wgfd.wyo.gov/WGFD/media/content/PDF/Fishing/Stream%20Class/WYSTREAM_BLUEREDRIBBON_LIST.pdf
>
> Conservation - All waters within HUC 10 local watersheds designated by the WGFD as Aquatic Conservation Areas under the State Wildlife Action Plan. A list and map of these resources can be found on the WGFD website: https://wgfd.wyo.gov/WGFD/media/content/PDF/Fishing/Stream%20Class/WYSTREAM_SWAP_HUCS.pdf
>
> Wild and Scenic –Wyoming waters receiving designation under the Wild and Scenic Rivers Act can be found on the following website: http://www.rivers.gov/wyoming.php
>
> T&E Species – Streams that provide habitat for threatened and endangered (T&E) species in Wyoming as designated under the Endangered Species Act. Current information regarding T&E

species in Wyoming can be found on the U.S. Fish and Wildlife Service website: https://www.fws.gov/wyominges/species_endangered.php

Special resources can be used to adjust debits at an impact site and to adjust credits for all mitigation types, including banks, ILF and permittee-responsible mitigation.

Secondary Effects are either adverse or beneficial impacts on stream functions that occur beyond the physical limits of a stream reach analyzed in the WSQT. There must be a tangible connection to activities within the reach with effects elsewhere that would not occur but for implementation of those activities. Secondary effects cannot be purely speculative or in dispute. For example, removal of a structure to eliminate a barrier to fish migration has tangible effects on movement of fish in a stream far beyond the physical location of the structure. Likewise, installation of a barrier has similar tangible effects on fish migration. Barriers can have adverse or beneficial effects depending on the project purpose so the adjustment factor can be applied positively or negatively. Flow augmentation and water withdrawals also have tangible secondary effects. An example of effects that are speculative would be perceived water quality benefits such as reduced turbidity downstream of a reach where stabilization occurred. Monitoring may be used and/or required by the Corps to document secondary benefits associated with a mitigation project. Secondary effects can be used to adjust debits at an impact site and to adjust credits for all mitigation types, including banks, ILF and permittee-responsible.

Type of Protection refers to legally binding real estate instruments that ensure land and aquatic resources, including riparian width as defined in the WSQT, offered for mitigation have long-term protection, generally in-perpetuity. Appropriate site protection is a requirement of 33 CFR 332.7. Credit adjustments for site protection are applicable for all mitigation types, including banks, ILF and permittee-responsible mitigation. This WSMP recognizes five different site protection mechanisms, each offering a different level of protection:

Deed Restriction - A private individual or property owner's association attaches a recorded restrictive covenant to the property deed.

Permittee Easement - A permittee obtains a specific easement from a land owner to establish, maintain and protect a compensatory mitigation site.

Agency Owned - A mitigation site is located on government property. The land is preferably owned or managed by a state or federal natural resource agency where mitigation responsibilities are established through special permit or an interagency agreement. Long-term protection may be provided through an appropriate federal facility management plan or integrated natural resources management plan (33 CFR 332.7).

Conservation Easement - A qualified, experienced, non-profit conservation organization or a government agency holds a conservation easement for the mitigation site. The easement is enforced by the easement holder.

Fee Title - Transfer of complete ownership to a qualified, experienced, non-profit conservation organization or government agency that will protect and manage the area as intended.

Buffer is defined as an additional land area in the floodplain beyond the riparian width as defined in the WSQT. The additional area must be part of the "site" defined in a protection instrument. The buffer must also have desirable attributes that contribute to floodplain function and habitat. Areas that are

completely disconnected from the floodplain are not eligible. There is no penalty for excluding buffers so the adjustment factor is only applied positively when buffers are included. The 2% adjustment is a factor that may be applied to the first 25 – 100 feet of average buffer width at the Corps' discretion, based on factors such as the bankfull width, valley width, habitat connectivity, and external sources of water quality impairment. Credit adjustments for buffer protection should be applied for all mitigation types, including banks, ILF and permittee-responsible mitigation.

Watershed Approach means that the permittee or sponsor has effectively demonstrated to the Corps that the mitigation location, resources and improvements were strategically selected based on watershed needs and goals (33 CFR 332.2 definition and 332.3(b)). For example, a watershed approach may specifically address an identified priority, resource and location from a watershed plan, regional wildlife action plan, or species recovery plan; or improve a TMDL or known source of water quality impairment. Credit adjustments for watershed approach should be applied for all mitigation types, including banks, ILF and permittee-responsible mitigation. Note that using a watershed approach in mitigation site selection offsets the site location adjustment factor for all projects.

Timing means the relative time when the mitigation will be performed in relation to when resource losses will occur. Credit adjustments for timing should be applied for all mitigation types, including banks, ILF and permittee-responsible mitigation. All credit withdrawals associated with mitigation banks must be able to meet interim success criteria commensurate with the level of credit withdrawal. Related terms include:

> Schedule 1 –All mitigation is completed prior to project impacts and the mitigation site has achieved or demonstrates consistent progress toward meeting performance standards.
>
> Schedule 2 – Mitigation is concurrent with the project impacts.
>
> Schedule 3 – Mitigation is constructed after project impacts occur.

Site Location is the relative proximity of the mitigation site to the impact site. Compensatory stream mitigation on-site is frequently a permittee preference. It may also be a necessity when the project involves relocation of a channel at the impact site. Therefore, on-site is considered the normal standard for permittee-responsible mitigation. An off-site mitigation adjustment would be applied for a permittee-responsible mitigation site located on a different stream or the same stream sufficiently far beyond the property boundary. To apply a consistent standard across mitigation sites, this credit adjustment factor is also applicable for mitigation banks and ILFs. Note that using a watershed approach to select the mitigation site would offset this adjustment factor for all project types. Mitigation sites outside the HUC 6 in which an impact occurs will generally be unacceptable.

B. Application of Adjustments

The following paragraphs describe debit and credit adjustments for impact and permittee-responsible mitigation scenarios. The initial debit calculation (credit obligation) is derived from the WSQT as functional feet (FF) of loss at the impact site. Likewise, initial credit availability is calculated as FF of lift at the mitigation site.

Determining whether a debit adjustment is appropriate begins with identification of all ecological factors at the impact site that deviate from normal standards. No debit adjustment is necessary if there are no deviations. The next step is to identify the mitigation option. Those options include use of credits from an established bank, payment of an in-lieu fee, permittee-responsible, or any combination of those options. No credit adjustment is necessary if mitigation site selection has no deviations from normal ecological and administrative standards.

The following paragraphs summarize how debit and credit adjustments are applied for each mitigation option. The term "credit obligation" is used to define a permittee's mitigation requirement and the term "credit availability" is used to define the amount of credit available from a mitigation site to offset that obligation after credit adjustments are applied.

Debit Adjustments (Credit Obligations):

The permittee must apply debit adjustments based on comparison of ecological standards at the impact site with normal standards. Higher ecological standards at the impact site require a debit increase using an aggregate of appropriate percentages derived from Table 2. In rare circumstances, a lower designated use at the impact site (Class 3) could result in reduction of debits using the same methodology. Following debit adjustments, the credit obligation reflects the amount of credits the permittee would need to purchase from a mitigation bank or ILF, or the amount of credits a permittee-responsible mitigation project would need to provide to offset the impact. For permittee-responsible mitigation, credit availability must equal or exceed the credit obligation.

For credit purchases, an additional credit obligation adjustment will be made if the impact is located outside of the designated service area. Selection of a mitigation site outside the service area must be approved in advance by the Corps and will incur a penalty of no less than 100% (a ratio of 2:1) depending on service area structure and other physical and ecological offset considerations. Mitigation sites outside of the service area and outside HUC 6 will generally be unacceptable.

Example 1: A permittee impacts a Class 1 water. The WSQT yields an initial debit of 100 FF for stream losses.

Credit Obligation = 100 + (100* (0.05)) = 105 FF

Example 2: A permittee impacts a wild and scenic stream that is also a blue ribbon fishery. The WSQT yields an initial debit of 100 FF for stream losses.

Credit Obligation = 100 + (100*(0.02 + 0.02)) = 104 FF

Example 3: A permittee proposes to install an instream diversion structure in a Class 2 water with no special resources. The structure will negatively affect fish migration. The WSQT yields an initial debit of 100 FF for stream losses.

Credit Obligation = 100 + (100*(0.03)) = 103 FF

Permittee-Responsible Credit Adjustments (Credit Availability):

The permittee must apply debit adjustments first based on comparison of ecological standards at the impact site with normal standards (see section above). The adjusted debit amount becomes the credit obligation, which must be equal to or less than the credits available from the proposed mitigation.

The permittee is encouraged to select a mitigation site that has equal or higher ecological and administrative standards as the impact site. The aggregate of appropriate percentages derived from Table 2 will result in a reduction to the credit obligation. Using the same methodology, selecting a mitigation site with lower than normal standards would inherently increase the amount of mitigation required to satisfy the credit obligation.

The WSQT is then applied to the mitigation site(s) in a manner that calculates whether there is sufficient FF of lift to satisfy the credit obligation.

> Example PR1: A permittee impacts a Class 2 water in a conservation watershed (2% adjustment). The WSQT yields an initial debit of 100 FF for stream losses.
>
> Credit Obligation = 100 + (100*(0.02)) = 102 FF
>
> Example PR1a: The proposed mitigation site is on the same property, same stream, and the permittee will donate a conservation easement (5% adjustment). The WSQT yields an initial estimate of 100 FF of lift.
>
> Credit Availability = 100 + (100*(0.02+0.05)) = 107 FF
>
> Example PR1b: The proposed mitigation site is on another property in the same watershed (15% adjustment). The mitigation site has no special resources but was selected because it adheres with a watershed approach (15% adjustment) in an area previously protected by an adequate conservation easement (5% adjustment). The WSQT yields an initial estimate of 100 FF of lift at the mitigation site.
>
> Credit Availability = 100 + (100*(0.15- 0.15+0.05)) = 105 FF
>
> Example PR1c: The proposed mitigation site is on another property in the same watershed (15% adjustment) without a watershed approach. The mitigation site is a blue ribbon stream (2% adjustment) that is agency owned. The WSQT yields an initial estimate of 100 FF of lift at the mitigation site.
>
> Credit Availability = 100 + (100*(0.02 - 0.15)) = 87 FF

Example PR1a and PR1b would exceed the permittee's credit obligation, whereas Example PR1c would require additional compensatory mitigation (equivalent to 15 FF) to offset the credit obligation.

Mitigation Bank and ILF Credit Adjustments (Credit Availability):

Sponsors are encouraged to select mitigation sites with normal or higher ecological and administrative standards. Lower than normal standards at a mitigation site would reduce the number of available credits. Credit adjustment factors will be based on the information outlined in the instrument. For example, timing adjustment factors will be based on the credit release schedules identified in the instrument.

The WSQT is applied to mitigation bank and ILF sites to calculate the FF of lift, which serves as the initial credit availability.

> Example: The proposed bank site is in a Class 2 water in a conservation watershed (2% adjustment). A conservation easement will be applied to the site (5% adjustment), including an additional buffer area (2% adjustment). A watershed plan was used to select the bank site, and it

is thus consistent with a watershed approach (thus offsetting the site location adjustment). Twenty percent of credits will be available as advance credits upon signing the instrument. The WSQT yields an initial estimate of 1,000 FF of lift.

Initial Credit Availability = 1,000 + (1,000*(0.02 +0.02+ 0.05 +0.15 -0.15)) = 1,090 FF

Timing adjustment:

20% at Schedule 3 = 218 + (218*(-0.03)) = 211 FF

80% at Schedule 1 = 872 + (872*(0.03)) = 898 FF

Final Credit Availability = 211 + 898 = 1,109 FF

Combinations:

There are situations that require more than one mitigation option to fulfill a credit obligation. A permittee may have the desire and ability to accomplish some stream restoration activities but the mitigation site has limitations that prevent full compensation.

The permittee must apply debit adjustments first based on comparison of ecological standards at the impact site with normal standards (see section above). The adjusted debit amount becomes a credit obligation.

A potential permittee-responsible mitigation site must be identified to define applicable ecological and administrative standards. The WSQT is used to calculate potential lift that could be derived from the mitigation site, which serves as the initial credit availability estimate. Credits are then adjusted by comparing mitigation site standards to normal standards. Initial credit availability would be multiplied by all appropriate percentages derived from Table 2 to adjust credits for each site individually. The final credit availability is subtracted from the credit obligation leaving a balance that must be satisfied using another mitigation option.

Example C1: A permittee impacts a Class 1 water, wild and scenic, blue ribbon stream, in Grand Teton National Park. The WSQT yields a debit of 100 FF for stream losses.

Credit Obligation = 100 + (100*(0.05 + 0.02 + 0.02)) = 109 FF

Example C1a: Two proposed mitigation sites are available on the same property (agency owned), but on different Class 2 streams (off-site) Class 2. One mitigation site has 200 feet of stream channel available with an estimated increase in WSQT score of 0.30 and will be constructed after impacts occur (Schedule 3). Site 2 has 500 feet of stream channel available with an estimated increase in WSQT score of 0.20 and will also be constructed after impacts occur (Schedule 3).

Site 1 Initial Credit Estimate = 200*0.30 = 60 FF
Final Credit Availability = 60 + (60* (-0.15-0.03)) = 49.2 FF

Mitigation Balance (Deficit) = 109 – 49.2 = 59.8 FF

Site 2 Initial Credit Estimate = 500*0.20 = 100 FF

Final Credit Availability = 100 + (100* (-0.15-0.03)) = 82 FF

Mitigation Balance (Deficit) = 59.8 – 82 = -22.2 FF

The combination of the two sites generates a total of 131.2 FF, which exceeds the 109 FF credit obligation by 22.2 FF.

The regulatory process for determining stream debits is outlined in Figure A. The regulatory process for determining stream credits for permittee responsible mitigation is outlined in Figure B. The initial steps in the regulatory process for determining stream credits for third party mitigation credits is outlined in Figure C.

REFERENCES CITED

Compensatory Mitigation for Losses of Aquatic Resources, 33 C.F.R. § 325 and 332 (2008)

United States Army Corps of Engineers (USACE). 2005. Regulatory Guidance Letter No. 05-05. Ordinary High Water Mark Identification.

USACE. 2008. Regulatory Guidance Letter No. 08-03. Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources. http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl08_03.pdf

USACE. 2018. Wyoming Stream Quantification Tool (WSQT) User Manual and Spreadsheet. Version 1.0, Omaha District, Wyoming Regulatory Office, Cheyenne Wyoming.

Stream Debit Determination Flow Chart

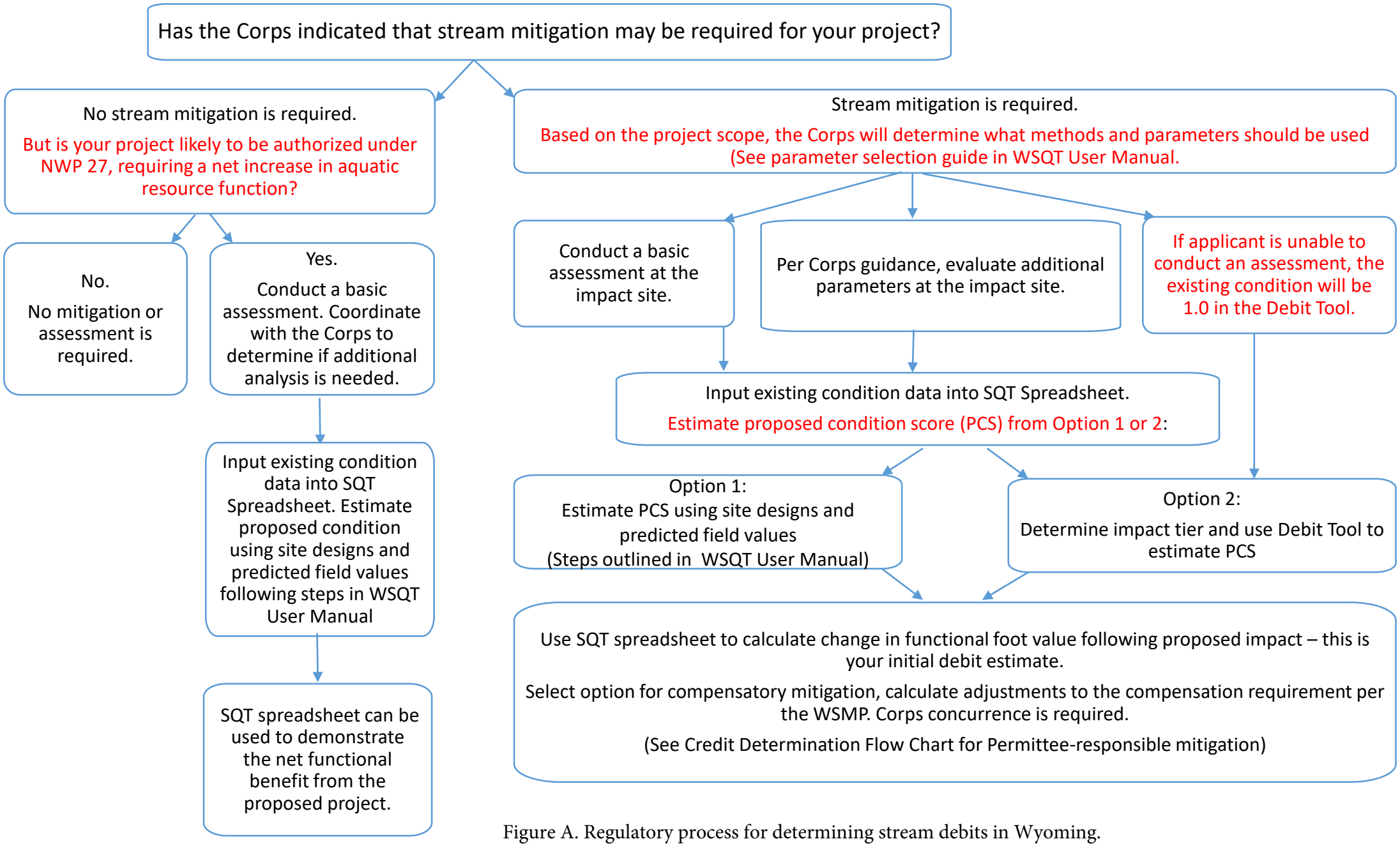

Figure A. Regulatory process for determining stream debits in Wyoming.

Stream Credit Determination Flow Chart for Permittee-Responsible Mitigation

Site Selection Stage

- **Select Potential Mitigation Project Site**
- **Preliminary site review by Corps, approval is contingent on multiple factors in their review including the site potential**
- **Corps will direct applicant to conduct assessments to develop mitigation plan**

Mitigation Plan Development Stage

- **Perform Reach-Scale Assessment:** Characterize the existing stream condition following steps in SQT User Manual
- **Quantify Existing Condition Score:** Quantify the function of the existing stream using the SQT spreadsheet.
- **Predict Proposed Condition Score:** Following steps in SQT User Manual, use site design to predict field values/measurements in SQT
- **Quantify Proposed Functional Lift & Estimate Credits:** Calculate Functional Feet Score and estimate stream credits based on additional credit factors (see Stream Mitigation Procedures). Corps concurrence is required.
- **Mitigation Plan review by Corps*: Corps ensures the mitigation plan is sufficient to offset debits/meet compensatory requirement**

Implementing Stage

- **Construct mitigation project**
- **Project Monitoring and Performance Standards:** Complete annual monitoring activities as required by Corps, ensure project achieves performance standards

*If any one of the following parameters (reach runoff, floodplain connectivity, lateral migration, bedform diversity and riparian vegetation) are not predicted to function under plan, revise plan.

Figure B. Regulatory process for determining permittee responsible mitigation credits in Wyoming.

Stream Credit Determination Flow Chart for Third Party Mitigation

Draft Prospectus Stage

- **Select Potential Mitigation Project Site:** based on bank or ILF site criteria
- **Perform Basic Assessment:** Complete catchment assessment and minimum subset of parameters (i.e., basic assessment)
- **Draft Prospectus reviewed by IRT; Approved or Denied by Corps**

Final Prospectus Stage

- **Perform Basic Assessment:** Characterize the existing stream condition following steps in SQT User Manual
- **Quantify Existing Condition Score:** Quantify the function of the existing stream using the SQT spreadsheet.
- **Predict Proposed Condition Score:** Following steps in SQT User Manual, use site design to predict field values/measurements in SQT
- **Estimate Proposed Functional Lift & Estimate Credits:** Calculate Functional Feet Score and estimate stream credits based on additional credit factors (see Stream Mitigation Procedures).
- **Final Prospectus reviewed by IRT; Approved or Denied by Corps***

Bank Instrument Development Stage

- **Perform Complete Reach-Scale Assessment:** Characterize the existing stream condition following steps in SQT User Manual, including additional parameters not included in basic assessment
- **Revise Existing Condition Score:** Enter detailed results into the SQT spreadsheet.
- **Revise Proposed Condition Score:** Use refined site design to predict field values/measurements in SQT
- **Revise Proposed Functional Lift & Estimate Credits:** Calculate Functional Feet Score and estimate stream credits based on additional data and additional credit factors (see Stream Mitigation Procedures). Corps concurrence is required.
- **Mitigation Banking Instrument or ILF project plan is reviewed by IRT, Approved or Denied by Corps***

Implementing Stage

- **Project Monitoring and Verification of Credits:** Complete annual monitoring activities, re-calculate credits based upon monitoring results; adjust number of credits based on any differences between predicted project condition and monitored condition
- **Mitigation Bank Credit Release:** Request credit release based on achievement of performance standards

*If any one of the following parameters (reach runoff, floodplain connectivity, lateral migration, bedform diversity and riparian vegetation) are not predicted to function under plan, revise plan.

Figure C. Regulatory process for determining third party mitigation credits in Wyoming.