Water Quality Trading Guidance

State of Idaho
Department of Environmental Quality

March 2016

Disclaimer:

Implementing water quality trading will be governed by existing requirements of the Clean Water Act (CWA), US Environmental Protection Agency (EPA) implementing regulations, and Idaho water quality standards. This document is not a substitute for those provisions, regulations, or rules. The recommendations in this guidance are not binding; the Idaho Department of Environmental Quality (DEQ) and EPA may consider other approaches consistent with CWA, EPA regulations, and Idaho water quality standards. Decisions regarding pollutant trades will be made on a case-by-case basis and will be guided by CWA, applicable federal regulations and state standards and, take into account comments and information presented at that time by interested persons about the appropriateness of applying these recommendations to the particular situation. DEQ may change the recommendations in this guidance in the future.

Printed on recycled paper, DEQ, February 2016, PID WPAW, CA code 82932. Costs associated with this publication are available from the State of Idaho Department of Environmental Quality in accordance with Section 60-202, Idaho Code.

Table of Contents

Acronyms and Abbreviations v
1 Introduction 1
1.1 Purpose of Water Quality Trading 1
1.2 Authority in Rule or Regulation for Water Quality Trading in Idaho 1
1.3 Background 2
1.4 Trading Guidance, Framework, and Plan 2
2 Questions and Answers about Water Quality Trading 2
3 Essential Safeguards for Any Water Quality Trading Program 4
4 Scenarios Where Trading Can Be Used 6
4.1 Pollutants Not Considered for Trading 6
4.2 Pollutants DEQ Recommends for Trading 6
4.3 Incorporating Trading into NPDES Permits 6
4.4 Trading Parties and Types of Trades 7
4.4.1 Point-Point Trading 7
4.4.2 Point-Nonpoint Trading 7
4.5 Trading in Pre-TMDL §303(d)-Impaired Waters 8
5 Steps for Developing Water Quality Trading Frameworks or Plans in Idaho 8
6 Trading Components 11
6.1 Project Eligibility for Credits 11
6.2 Baseline 12
6.3 Quantifying Pollutant Reductions for Water Quality Credits 14
6.4 Trading Ratios 15
6.5 Credit Characteristics 16
6.6 Preparing a Credit Project Plan 17
6.7 Project Stewardship 17
7 Approval for Credit-Generating BMPs and Quantification Methods 18
7.1 Approved BMPs in a Trading Framework or Plan 18
7.2 Approved for a New BMP and Quantification Method 18
7.2.1 Step 1: Prepare and Submit Proposed BMP Package 19
7.2.2 Step 2: Initial Screening of BMP Proposal 19
7.2.3 Step 3: Review Process and Criteria for BMP Consideration 19
7.2.4 Step 4: DEQ Concurrence, Public Notice and Comment and Final Decision 19
7.2.5 Step 5: BMP Revision Post Approval 20
8 Process for Generating and Tracking Credits 20
8.1 Initial Project Screening 20

8.2 Initial Verification 21
8.2.1 Inspections of NPDES-Permitted Facilities for Point Source Credits 21
8.2.2 Review of Best Management Practices for Nonpoint Source Credits 21
8.3 Certification and Tracking 22
8.3.1 Certifying and Issuing Credits—Reduction Credit Certificate 22
8.3.2 Registering a Trade—Trade Notification Forms 22
8.3.3 Discharge Monitoring Reports 22
8.3.4 Annual Reports 22
8.4 Ongoing Verification and Credit Tracking 23
8.5 Trade Tracking 23
8.6 Adaptive Management 23
9 Conclusion 23
References 24
Glossary 26
Appendix A. Upper Snake-Rock Trading Framework 30
Appendix B. Lower Boise Trading Framework 36
Appendix C. Reserve 38

Acronyms and Abbreviations

APAP	Idaho Agricultural Pollution Abatement Plan
BMP	Best management practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
DMR	Discharge monitoring report
EPA	United States Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
IPDES	Idaho Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
ISWCC	Idaho Soil and Water Conservation Commission
TBEL	Technology based effluent limit
TMDL	Total maximum daily load
WAG	Watershed advisory group
WQBEL	Water quality based effluent limit

This page intentionally left blank for correct double-sided printing.

1 Introduction

This document provides updated guidance for implementing water quality trading within Idaho. Water quality trading is a highly evaluated and regulated environment designed to realize specific and measureable water quality improvements in areas of a watershed that might not normally see improvements. Trading takes work, money, and commitment to achieve real goals. This guidance is designed to provide an understanding of the details involved in water quality trading.

Water quality trading is also known as pollutant trading under Idaho water quality standards. This updated guidance replaces the 2010 *Water Quality Pollutant Trading Guidance* (DEQ 2010). This guidance update incorporates concepts developed from the *Regional Recommendations for the Pacific Northwest on Water Quality Trading* (i.e., Joint Regional Recommendations) (Willamette Partnership et al. 2014). The Joint Regional Recommendations were developed by state water quality agencies from Idaho, Oregon, and Washington, facilitated by Willamette Partnership and The Freshwater Trust, and with the participation of the US Environmental Protection Agency (EPA), Region 10. Using workshops to generate dialogue, the states identified critical components of water quality trading and recommended several approaches to achieve these components.

1.1 Purpose of Water Quality Trading

Water quality trading occurs when a contractual agreement is made to exchange pollution reductions between two parties in a business-like way. This agreement helps to solve water quality problems by focusing on cost-effective, local solutions to problems caused by pollutant discharges to surface waters. The following are three important aspects of water quality trading:

- Trading is voluntary.
- Trading allows parties to decide how best to reduce their pollutant loads within the limits of the Clean Water Act (CWA) and other federal and state requirements.
- Trading should provide a net environmental benefit.

The appeal of trading emerges when pollutant sources face substantially different pollutant reduction costs. Typically, a party facing relatively high pollutant reduction costs compensates another party to achieve a better than equivalent, though less costly, pollutant reduction.

1.2 Authority in Rule or Regulation for Water Quality Trading in Idaho

CWA provides authority for EPA, states, and tribes to develop a variety of programs and activities to control pollution. Water quality trading, as described in EPA's *Water Quality Trading Policy* (EPA 2003), is one of those tools. Trading is authorized in Idaho water quality standards (IDAPA 58.01.02.055.06) for the purpose of achieving compliance with water quality standards. Currently, the Idaho Department of Environmental Quality's (DEQ's) rules allow water quality trading as a means of helping water quality limited water bodies comply with the standards. This water quality trading guidance outlines the components DEQ considers when reviewing water quality trading frameworks and trading plans.

1.3 Background

In November 2003, DEQ adopted a draft trading guidance, which was used to guide trades in the upper Snake River watershed and helped to inform discussions about expanding trading to other watersheds, such as Bear, North Fork Payette, Spokane, Portneuf, and Lower Boise Rivers. In 2010, DEQ updated and finalized adoption of its guidance to further articulate key concepts of trading and to provide watershed advisory groups (WAGs) more details on the elements and documentation needed to develop a local trading framework. More recently DEQ participated in developing the *Draft Regional Recommendations for the Pacific Northwest on Water Quality Trading* (i.e., Joint Regional Recommendations) (WP et al. 2014). As a result, DEQ has updated the guidance again to stay current and to answer stakeholder's common questions about water quality trading.

1.4 Trading Guidance, Framework, and Plan

A point source permittee must comply with the requirements included and referenced in a National Pollutant Discharge and Elimination System (NPDES) permit or equivalent (e.g., Idaho Pollutant Discharge Elimination System [IPDES]) and other enforceable documents (e.g. Comprehensive Environmental Response, Compensation, and Liability Act consent order). Water quality trading is based on the following types of documents:

- *Trading guidance*—EPA guidance on trading, and this Idaho statewide guidance, outlines how water quality trading should occur within Idaho.
- *Trading framework*—Watershed-level documents approved by DEQ which acts as guidance on the details of trading processes and standards for a specific geographical area (e.g., the Lower Boise River Trading Framework). Trading framework elements are enforceable only when incorporated into an NPDES permit.
- *Trading plan*—Specific incorporation of trading elements into a permit or other binding agreement. A permittee's trading plan may incorporate the terms of a relevant watershed trading framework by reference; otherwise, the permit's trading plan must include all specific details necessary to support trading.

2 Questions and Answers about Water Quality Trading

Q What is water quality trading?

A Water quality trading is one strategy to reduce problem pollutants (e.g., total phosphorus or temperature) in rivers and lakes. Trading allows a point source discharger[1] to meet regulatory

[1] Most discharges relevant to trading will come from *point sources*. Per Idaho water quality standards, *point source* means "[a]ny discernible, confined, and discrete conveyance, including, but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are, or may be, discharged. This term does not include return flows from irrigated agriculture, discharges from dams and hydroelectric generating facilities or any source or activity considered a nonpoint source by definition" (IDAPA 58.01.02.010(79) [2014]).

requirements by entering into an agreement under which the discharger obtains pollutant reductions from another source in the watershed instead of installing tighter controls for that pollutant at the discharge point. The specific conditions of trading must be included in the point source discharger's NPDES permit or similar enforceable document, such as a hydroelectric facility license.

Q Who can participate in water quality trading?

A Trading may occur between two point source dischargers (point-point trading) or a point source discharger and a nonpoint source discharger (point-nonpoint trading). For this guidance, nonpoint sources under an enforceable agreement (e.g., hydroelectric facilities with a Federal Energy Regulatory Commission-issued license) operate similar to a point source. Section 4.4 provides more information on types of trades. Before anyone can participate in trading, DEQ must approve specific analysis that ensure consistency with water quality goals, NPDES permits, total maximum daily load (TMDL) wasteload allocations, CWA provisions, EPA regulations, Idaho water quality standards, and this guidance.

Q Why would dischargers want to trade?

A Trading can save dischargers money. The intent is to achieve expected reductions of a pollutant at a lower cost. Trading also allows dischargers to allocate resources for watershed improvement to enhance recreation opportunities and promote better fish and wildlife habitat that otherwise would be spent on expensive facilities.

Q What are the benefits of water quality trading?

A Trading provides an incentive to reduce pollutants beyond current limits, helps to achieve water quality standards more quickly, and fosters technological innovation while maintaining an emphasis on water quality improvement. The potential exists, in some watersheds, to realize cost savings through water quality trading.

Q What are the keys to successful water quality trading?

A Compliance monitoring, performance tracking, and enforceability are the keys to successful water quality trading. Although point sources are regulated through NPDES permits, nonpoint sources are not always regulated and are not typically monitored. Because monitoring is essential, point source permits should require third parties to monitor and report on any nonpoint source projects used for permit compliance. Transparency, which includes clearly articulated permit conditions, trading plan details and public participation, is a critical component for successful water quality trading.

Q What are the potential problems with water quality trading?

A Trading may not be available to all dischargers. For example, trading cannot be used if the point source's discharge would create localized areas of impact (pollution hotspots). Trading

---

Trading may also be authorized for hydroelectric facilities or other permitted nonpoint source discharges operating under a §401 certification or other enforceable agreement.

may not always provide the greatest opportunity for water quality improvement in some watersheds, so it should be considered in tandem with other approaches. Trading may not always be the cheapest alternative for a source, but its flexibility and scalability might still be appealing.

3 Essential Safeguards for Any Water Quality Trading Program

Individual trades and different watersheds will face unique situations and issues. In general, trading frameworks and plans should follow these guiding principles:

- Trades should be based in sound science and more effectively accomplish regulatory and environmental goals than other alternatives.
- Accountability is required that allows regulators to confirm the promised water quality improvements are actually delivered and to verify compliance with CWA requirements.
- The benefits of trading must be delivered so it does not result in localized exceedance of water quality standards[2].Trades must be consistent with Idaho water quality standards, NPDES permits, TMDL wasteload allocations, and the CWA and its implementing regulations.

Compliance with water quality standards and a water quality trading program requires safeguards to ensure that successful trading helps to solve existing water quality problems without creating new ones. Such safeguards include the following:

- *Consistency with existing regulations*—Water quality trades and trading programs must be consistent with the CWA, Code of Federal Regulations (CFR), Idaho statutes and administrative rules, and all other applicable laws and regulations.
- *TMDLs are typically a prerequisite*—A TMDL provides the basis for a watershed by setting the overall cap on a specific pollutant and dividing the reductions among various sources. TMDLs also may provide the science and analysis to support variations in pollution reductions based on geography. Situations where a TMDL may not be a prerequisite are discussed in Section 4.5"Trading in Pre-TMDL Impaired Waters."
- *Good compliance records*—Dischargers should have a good track record of compliance with their NPDES permits, including an EPA-compliant quality assurance program plan, monitoring, and reporting, to sell credits in a trade.
- *Pollution discharge limits in permits*—Trading can be used to meet part or all of a discharger's water quality-based effluent limits (WQBELs), provided that applicable technology-based effluent limits (TBELs) are met. In some cases, DEQ may determine that an advanced technology option for the permittee is not as reasonable as trading to meet all of a WQBEL. Trading to achieve TBELs is not allowed by Idaho.
- *Implementation through enforceable mechanisms*—Trading is typically implemented through a NPDES permit, order, or license. Trading transactions are memorialized in a

[2] For the purposes of trading, a *localized impact* occurs if the continued discharge from the purchasing source would impact existing and designated uses in the area immediately surrounding the discharge.

contract, or similar formal agreement between the trading parties, and trading is authorized in the NPDES permit.

- *Adequate accounting for uncertainty*—The trading framework or plan must be designed to account for uncertainty through adequate adjustments such as trading ratios. The trading framework/plan must take into account all the variables and uncertainty of the best management practices (BMPs) installed to generate credits, locations in the watershed to trade, and under what conditions the trades are valued.
- *Clear trading areas*—Trading frameworks and plans need to define a geographic boundary, based in the science of a watershed, where trades are appropriate and permissible. A trading area helps to ensure no localized impacts occur and trades contribute to meeting water quality standards. The easiest way to avoid localized impacts is to set a trading area so that the seller of credits is upstream from the buyer. However, in some watersheds, depending on the pollutant and number of sources and points of compliance, downstream sellers may be able to sell to upstream buyers. Generally, trading between basins is inappropriate but may be appropriate in specific situations where a rational nexus exists with the science to support it.
- *Clear baseline policy*—Nonpoint credit sellers must meet baseline requirements before selling credits to ensure progress towards meeting water quality improvement goals in the watershed (section 6.2).
- *Policies that avoid localized impacts/hotspots*—Any trading framework or plan must analyze the potential for localized impacts and be specific about measures and/or monitoring that will be completed to ensure no localized impacts occur. If some or all of the analysis has occurred in a TMDL, it should be used.
- *Implementation of projects according to quality standards*—Credit-generating trading projects must be designed and managed in a consistent manner to ensure that such projects result in water quality benefits throughout the project's lifetime or permit cycle.
- *Time frame for trading (credit life)*—Credits can only be used within the same time period generated to align the timing of the pollutant reduction with a time when the permittee's discharge is not being reduced. The time period, or credit life, must be based in science and tied to the critical period for a watershed. Credit life may be per month, seasonal, or on an annual basis. Credits cannot be banked (e.g., a pollutant reduction in 2012 cannot be used to offset a discharge in 2014).
- *Sufficient monitoring and transparency*—A consistent and verifiable monitoring program is essential for a successful trading program. Point sources are already required to monitor, but ambient monitoring within the watershed is also important to ensure water quality improvements are occurring and localized impacts are not. Nonpoint source site conditions should also be regularly and consistently verified by third parties to ensure the water quality improvements are continually achieved by the project generating credits. Important information needed to determine compliance should be readily available to the public. Trading frameworks or plans should describe how information on trades and trading projects will be made available to the public.
- *EPA's role*—EPA is currently the NPDES permitting authority for Idaho and is directly responsible for incorporating any trading provisions into an NPDES permit. DEQ is working to obtain authority for the IPDES permit program. Once the IPDES Program is delegated to Idaho by EPA Region 10, DEQ will administer the program, including those permits with trading provisions. EPA Region 10 retains oversight of the IPDES

permitting process after delegation including authorization of trades addressed in IPDES permits.

- *Public involvement*—DEQ, in concert with EPA Region 10, oversees development of water quality trading frameworks on a watershed basis with local WAGs and public participation (section 5). Public involvement is crucial to the success of a trading program. Public participation is also a requirement of the NPDES permit program.

4 Scenarios Where Trading Can Be Used

Trading can be used to offset pollutant loads under the following scenarios consistent with a watershed-specific trading framework (IDAPA 58.01.02.055.06.):

- *Offset existing discharges to a CWA §303(d)-impaired water body with an EPA-approved TMDL or similar watershed analysis needed to support trades*—Section 4.5 provides more criteria on pre-TMDL trades with existing discharges. Point sources must ensure the discharge and trade is consistent with the TMDL and water quality standards.
- *Offset new or expanding point source discharges to a §303(d)-impaired water body with or without an EPA-approved TMDL*—Point sources must ensure their discharge and trade does not cause or contribute to a violation of water quality standards and is consistent with the requirements of 40 CFR 122.4(i) and IDAPA 58.01.25.103.07.

Trades that would allow discharges in excess of applicable TBELs are prohibited.

4.1 Pollutants Not Considered for Trading

DEQ does not anticipate trades involving bacteria. Bacteria, such as fecal coliform and *Escherichia coli*, have the potential to threaten public health and will not be considered for trading. DEQ and EPA also do not currently support trading of persistent bioaccumulative toxics.

4.2 Pollutants DEQ Recommends for Trading

DEQ considers nutrients and temperature appropriate pollutants for trading—specifically, phosphorus, nitrogen, and thermal loading. The unit of credit should be tied to the unit of pollutant in a permit. Sediment or suspended solids trading to address sedimentation may be considered, particularly where dissolved oxygen impacts occur. DEQ supports trades involving other pollutants on a case-by-case basis where adequate information exists to establish and correlate water quality improvements from implementing BMPs or technological measures.

4.3 Incorporating Trading into NPDES Permits

The authority to trade comes from a discharger's NPDES permit, which is currently issued in Idaho by EPA. DEQ would expect a permit to include a trading plan providing detail (or incorporating the detail from an approved watershed trading framework) on how trades will be conducted.

As part of DEQ's §401 certification of NPDES permits, DEQ would confirm that a permit and trading plan adequately detail or clearly reference the necessary material, as described in Section 5 of this guidance. DEQ would also review the permit for clarity on any connection between trading and compliance schedules, mixing zones, antidegradation provisions, and related federal provisions. The *Water Quality Toolkit for Permit Writers* (EPA 2007) and *Water Quality Trading Assessment Handbook* (EPA 2004) provide additional information and recommendations on trading.

NPDES permittees participating in trades are responsible for the quantity and quality of the credits even when a third party or DEQ supports implementation of some required components of a permit.

4.4 Trading Parties and Types of Trades

Both point and nonpoint sources are eligible to trade. Although this guidance focuses on regulated point sources as buyers, DEQ supports voluntary purchases of water quality credits outside of compliance obligations. Generally, two different types of trades are recognized for water quality trading: point-point trading and point-nonpoint trading.

4.4.1 Point-Point Trading

A point source may voluntarily reduce its pollutant discharge below its water quality-based effluent limit by a particular amount for a particular period of time. This voluntary reduction creates a credit that may be sold to another point source.

Each point source is still required to meet its individual effluent limit, which is not officially changed in the permit. However, the discharger demonstrates compliance with the permit limit by purchasing credits that make up a portion of the required load limit. The credits along with effluent quality are reported in the discharge monitoring report (DMR) (section 8.3.3). EPA under the NPDES program (or DEQ under IPDES) retains full enforcement authority in the event that the point source's effluent limit, despite its use of credits, is exceeded.

DEQ supports intraplant trading (trading between different outfalls within a facility or plant) that involves generating and using credits between multiple outfalls that discharge to the same receiving water. DEQ will treat intraplant trading like a point-point trade.

4.4.2 Point-Nonpoint Trading

A nonpoint source may voluntarily reduce its amount of pollutant run-off. Saleable credits can be created when an approved BMP is installed and the pollutant reduction is measured or calculated, the project is documented according to BMP requirements, credits are adjusted for any relevant baseline requirements and trading ratios, and the BMP is verified by a third party. BMP approval is discussed further in Section 7. The process for generating and tracking credits, and the role of third parties, is discussed in Section 8. The point source retains full responsibility for third-party verification for the quantity and delivery of the credits it purchases from a nonpoint source and uses to meet its effluent limits.

4.5 Trading in Pre-TMDL §303(d)-Impaired Waters

Trading in §303(d)-impaired waters for a pollutant that still needs a TMDL may be challenging; it is difficult to determine the allowable load for a pollutant to a receiving water body without the TMDL analysis process. With respect to pre-TMDL trading for a §303(d)-listed parameter, DEQ will consider the following:

- If trading is under consideration to allow for a discharge from an existing permittee, the sources involved should conduct an analysis of pollutant load similar to DEQ's TMDL development process. The analysis would be subject to a public notice and review process as well as DEQ review and approval (e.g., as part of the §401 certification or NPDES permit process).
- Similar requirements apply to a new or expanded discharge, although this trading scenario will be very limited. Trading must be implemented through an NPDES permit. Generally, a permit limit for the new source to an impaired water body would be developed to meet the applicable water quality standard at the end of pipe. If trading is allowed to meet that limit, the discharger must demonstrate the trade is consistent with the pollutant load analysis described above (i.e., show sufficient remaining load to allocate in the system so that the discharge does not cause or contribute to a violation of water quality standards).
- The proposed trading framework or plan achieves direct environmental benefit relevant to the conditions for which the water body is impaired.

When EPA approves a TMDL, any trading agreements made before the TMDL that are inconsistent with TMDL requirements, including generated credits, will have to be modified. DEQ encourages parties involved in pre-TMDL trading to contact DEQ early in the TMDL development process to ensure that future revisions to trading agreements do not create disincentives for early action.

5 Steps for Developing Water Quality Trading Frameworks or Plans in Idaho

DEQ must ensure that trades do not violate Idaho water quality standards or impair existing or designated uses and are consistent with the CWA. DEQ needs adequate information and a trading framework to ensure compliance with state and federal laws. A trading framework can be developed by permittees and/or watershed stakeholders and must be approved by DEQ after public involvement and comment. DEQ can modify the proposed trading framework based on public comment it receives during the public comment period. Trading frameworks not meeting DEQ and EPA expectations will not be incorporated into discharge permits. Current DEQ-approved trading frameworks are listed in Appendix A and Appendix B. A trading framework should be consistent with this guidance, applicable TMDLs, and other state and federal requirements. A trading framework is an optional method for developing trades. In the absence of a trading framework, a permittee can work directly with EPA and DEQ to build a trading plan into its permit or state §401 certification. DEQ believes that the following information should be developed for each framework, and the following steps should be taken to ensure trades are consistent with state and federal requirements (Figure 1):

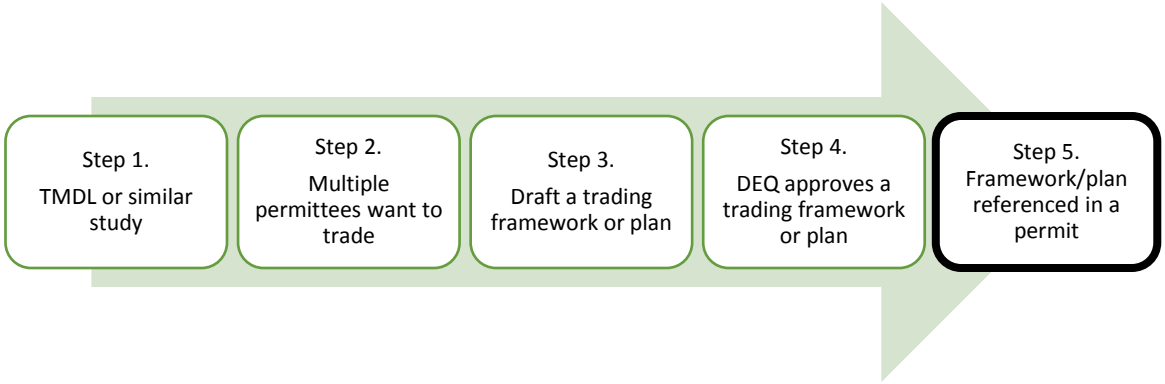

Figure 1. Steps to developing pollutant trading framework or plan.

Step 1.-Normally, a TMDL should be in place or under development. As discussed in section 4.5, specific issues should be addressed to conduct trades in the absence of a TMDL. Interest in trading should be identified, which involves meeting with likely trading partners, determining if the pollutant of choice is viable for trading, and determining if opportunities exist to reduce pollutant load above current requirements and contribute to meeting water quality standards.

Step 2.-Where multiple credit buyers exist in a watershed, a trading framework should be developed, approved by DEQ, with an opportunity for public comment, and included as an appendix to this guidance. This statewide guidance then becomes the repository for approved trading frameworks.

Step 3.-A TMDL or TMDL implementation document will provide guidance for trading in a watershed or may contain requirements that should be incorporated into a trading framework. In the absence of a trading framework, DEQ will be responsible for approving eligible BMPs in a permit's trading plan and/or through a §401 water quality certification.

A trading framework or plan must identify:

- *Eligible trading participants:* Sectors that would be eligible to trade and the specific conditions for their eligibility;
- *Trading area:* Where trades may occur and description of how designated uses will be protected (e.g., applicable trading framework and TMDL), and processes to identify and assess localized impacts. If a TMDL covers any of the trading area, the trading framework must be consistent with the TMDL, including specific wasteload allocations and load allocations (e.g., actual allocations, timing, and baseline assumptions).
- *Baseline:* Sources of applicable regulation or law in trading area and how baseline is expressed (e.g., federal, state, and local regulations applicable to the land uses at play in the trading area, TMDLs and/or TMDL implementation plans, and trading guidance/framework) Additional discussion of baseline can be found in Section 6.2.
- *Credit Quantification:* Methods for quantifying credits, how pre- and anticipated post-project conditions are modeled; how credit values are derived; how baseline is accounted for.

- *Trading ratio:* The assumptions, calculations, and components of applicable trading ratios (e.g., uncertainty, delivery, equivalency, retirement, etc.).
- *Risk mitigation mechanisms:* Describe how uncertainty and risk will be managed (e.g., reserve pool, insurance, and performance bonding requirements).
- *Project pre-screening:* Note whether project pre-screening is required or suggested.
- *Allowable BMPs:* List approved credit-generating actions, identify quality and performance standards (e.g., NRCS practice guides, state forestry, or agricultural program BMPs. Section 7 provides more on approving BMPs).
- *Credit life:* When credits become valid, how long credits remain valid, and renewability of credits.
- *Project site design, maintenance, implementation, and performance confirmation:* Determine whether these components are required and their frequency.
- *Verify project site implementation and performance:* Whether it is required, which entity will perform, the frequency, and the standards by which performance is judged.
- *Credit registration and trade tracking:* Whether required, characteristics of credit file storage system/database and information disclosure minimums.
- *Permit conditions:* Direction about how to incorporate these watershed-specific details into permittees' trading plan documents and NPDES permits. Where only a single buyer exists and there is no framework, this information will be incorporated into the trading plan contained within an NPDES permit.
- *Adaptive management:* how to improve the operations, science, and effectiveness of trading over time. The adaptive management component would clarify which framework changes warrant public review and comment (e.g., changes that could affect how effluent limits are met).

Step 4.-DEQ believes that public comment and input is critical for successful trading. Therefore, each trading framework document and/or trading plan should go to public comment for no less than 30 days. Changes to the document, as appropriate, would be made based on the public comments received. After DEQ approves the final trading framework or plan for the specific watershed or discharge, the framework/plan would be incorporated into Idaho's water quality trading guidance as an appendix.

Step 5.-The permit and/or §401 certification is the mechanism that translates general trading authorization into a set of enforceable conditions based on the DEQ-approved trading framework for the watershed or individual trading plan, and any additional conditions the permit writer determines are necessary to protect water quality. The elements of a trading framework should provide as much information as needed for a permittee's trading plan (section 4.3). The timing for this step depends on when the last permit was issued; permits that are closer to their expiration date are likely to be higher on the priority list for reissuance. DEQ supports modifying

existing NPDES permits to include trading so that water quality improvements may be achieved as soon as practical.

Once incorporated into the NPDES permit, trading can then commence between the discharger and a nonpoint source or another point source, under the conditions of the permit and consistent with the trading framework for the specific watershed. These conditions include the timely filing of all required trade execution and confirmation documents with DEQ (and/or its designated trade administrator, should DEQ establish one), and any documents required by EPA when a trade occurs (e.g. reporting the trade in the permittee's DMR, as described in Section 8.3.3). DEQ anticipates that an independent third party will maintain a single trade tracking database for each framework to ensure that documentation for all trades can be found in one central place.

6 Trading Components

This section describes the components of a water quality trading framework or plan. The majority of trades will occur after a TMDL is developed, and so this section assumes a TMDL is in place (see section 4.5 for pre-TMDL trades).

The major components of water quality trading are *trading parties* (buyers and sellers) and *credits* (the commodity being bought and sold). Additionally, *ratios* are used to address uncertainty and ensure net water quality benefit. All trading activity must be documented and the documents provided to DEQ (and/or its designated trade administrator). Both point and nonpoint sources may create marketable credits, which are a reduction of a pollutant beyond baseline:

- Point sources create credits by reducing pollutant discharges below NPDES water quality-based effluent limits, which must be consistent with that source's wasteload allocation, and then selling that extra reduction to other sources.
- Nonpoint sources create credits by implementing approved BMPs that reduce the amount of pollutant run-off above established baselines. Nonpoint sources must follow specific design, maintenance, monitoring, and reporting requirements for each BMP as outlined in the trading framework/plan.

6.1 Project Eligibility for Credits

Both point sources and nonpoint sources may create pollutant reductions. However, not all reductions can necessarily be counted as credits. A pollutant reduction may need to be discounted to reflect uncertainty, attenuation, and/or policy choices, or a reduction may come from an unproven BMP, or be quantified according to an unknown methodology. Pollutant reductions may also need to be adjusted to meet baseline requirements. Before that reduction can become a credit, the reduction must go through several checks:

- *Project uses an approved BMP*—For a BMP type to be eligible, it must be approved by DEQ via a watershed trading framework or plan. The process for incorporating BMPs into frameworks and plans is described in Section 7.
- *Projects need to be consistent with other laws and in good standing*—To generate a credit, in addition to meeting baseline, a project should comply with applicable federal and state permit requirements necessary to implement the project.

- *Project BMP's pollutant reduction quantified in a verifiable way*—While pollutant reductions from point sources must be directly measured, credits produced by nonpoint source practices can be quantified using BMP efficiency rates as identified in a trading framework/plan, DEQ-approved modeling, and/or direct measurement. This quantification requires clear documentation of preproject conditions and a consistent methodology for measuring or estimating postproject conditions.
- *Projects must adequately account for risk and uncertainty*—Pollutant reductions may be directly measured, or based on BMP efficiency rates or DEQ-approved modeling. When estimating site-level reductions with efficiency rates or modeling, it may be necessary to account for uncertainty in model inputs or assumptions, or for unknowns related to the attenuation of the pollutant through the water system (section 6.4). It may also be important to adjust the reduction amount to account for risk of delayed implementation results, decreased effectiveness, or nonperformance.
- *Projects need to demonstrate consistency with baseline requirements*—See section 6.2.
- *Credit portions of project cannot be funded with cost share funds, but cost share funds can be used to meet baseline*—Cost share funds, or more specifically public dollars dedicated to conservation purposes, can make bigger and more robust projects. DEQ supports using cost share funds to help nonpoint sources meet baseline requirements, including using those funds to install baseline BMPs (e.g., a nutrient management plan or irrigation management plan). However, the proportion of a credit-eligible project funded by public dollars dedicated to conservation cannot be used to generate credits. For example, if NRCS' Environmental Quality Incentives Program cost shares 50% of a sediment basin, and a farmer pays for 50%, then the farmer could sell 50% of the total credits from the project.
- *Credits must be from BMPs installed after a base year*—Trading frameworks and plans need to define a base year after which credits can be created. The base year should be as current as possible and tied to the watershed analysis (e.g., a TMDL) used to support trading. Trading frameworks and plans can update the base year from time to time. Trading frameworks and plans may provide a limited *look-back* period to bring in otherwise eligible early action projects, typically no more than 2 years before a TMDL is approved by EPA.

6.2 Baseline

Trading baseline is the threshold that must be met before selling credits, specified in existing rules or regulations, NPDES permits or documents such as a trading framework, or a TMDL. Credits are established by sources delivering additional pollutant reductions beyond a baseline level of reduction.

For point source sellers, baseline is represented as the most stringent WQBEL in their NPDES permit, which typically means that a point source can only sell credits if it reduces its discharge concentration below its WQBEL.

For nonpoint sources, the 2003 EPA *Water Trading Policy* states that "pollutant reductions [should be] greater than those required by a regulatory requirement or established under a TMDL" (EPA 2003). These baseline obligations can be derived from a variety of sources:

- Area-based or other derivative portions of TMDL load allocations
- Idaho agriculture or forest management rules
- Requirements of a federal land management plan or an agreement between a federal agency and the state
- Requirements established in a CWA §401 water quality certification
- Other applicable federal and state rules establishing nonpoint source requirements
- Projects completed as part of compensatory mitigation, or projects required under a permit or approval issued pursuant to CWA§404, or a supplemental environmental project used to settle a civil penalty imposed under CWA
- Regulatory requirements a designated management agency establishes to comply with a DEQ-issued TMDL, water quality management plan, or another water pollution control plan adopted by rule or issued by order under Idaho law.

EPA's Trading Toolkit states that in the absence of a TMDL, baseline is equal to the pollutant control requirements that apply to a buyer and seller in the absence of trading (EPA 2007). When one of the applicable sources of baseline is a TMDL, the EPA's Trading Toolkit notes that a nonpoint source's baseline "would be derived from the nonpoint source's [load allocation]" (EPA 2007). Determining what is baseline before trading for nonpoint sources may be difficult if particular watershed goals, TMDL load allocations, laws, or regulations overlap or need to be translated for control requirements specific to an individual nonpoint source. As a result, it is necessary for DEQ to derive a baseline obligation from these sources. On-the-ground, baseline is a pollutant load reduction, BMP requirement, or site condition that must be met under regulatory requirements in place at the time of trading project initiation.

Figure 2 provides a decision tree to help watershed entities, with DEQ approval, identify nonpoint source baselines that would apply to individual landowners who generate credits. Landowner operations must be consistent with current applicable federal, state, local, requirements. In addition to consistency with these existing requirements, if TMDL load allocations exist, further baseline requirements may be expressed as (a) an extra amount of load that must be reduced by a nonpoint source at a site (e.g., as a percentage of the total overall load, or as a numeric amount); (b) a minimum set of BMPs or actions that must be installed at a site; or (c) a site condition that must be met. Depending on the watershed, baseline requirements may be phased in over time as part of a TMDL staged implementation. Consistent with EPA's policy on staged implementation (EPA 2006), the plan to stage implementation of baseline requirements would need to be spelled out in the TMDL itself, its implementation plan, or the trading framework.

Depending on the nature of the baseline requirements, they may apply to the whole farm or to individual fields/areas where credits will be generated. Landowners can establish BMPs to meet the baseline at the same time they are implementing actions to generate credits.

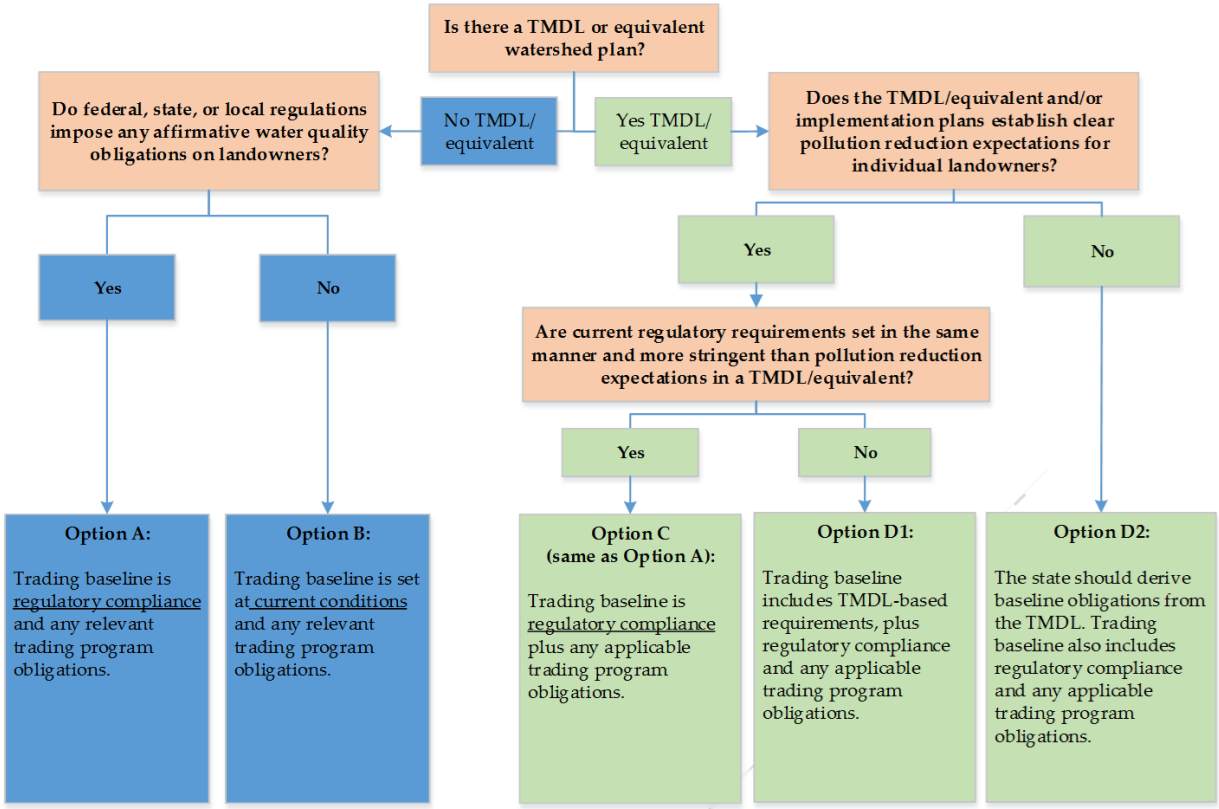

Figure 2. Options for deriving nonpoint source baselines.

The level of information on baseline will differ in each of DEQ's regulatory documents related to trading. This statewide guidance document describes the general parameters and decision points that must be considered when structuring baseline obligations for trading programs. More geographically specific detail on baseline requirements should be articulated in basin-level trading frameworks and/or individual permit, or license documents. In the documentation for individual trades made under permits, or licenses, consistency with applicable baseline requirements should be confirmed and reported upon as part of demonstrating eligibility. Trading frameworks and associated baselines not meeting DEQ and EPA expectations will not be incorporated into discharge permits. Older trading frameworks will need updating to ensure expectations are met.

6.3 Quantifying Pollutant Reductions for Water Quality Credits

Pollutant reductions can be quantified in several ways to generate water quality credits. Quantification includes measurement of the pollutant reduced at the end of a pipe (point source), or a measurement or an estimate of the pollutant reduced at the edge of a field or end of a drain (nonpoint source), and may include adjustments for pollutant delivery and attenuation through the watershed as well as application of any trade ratios.

Reductions can be measured directly, or they can be estimated using models and BMP efficiency rates. Different quantification methods will work better for different BMPs in different watersheds. A trading framework or plan's credit quantification approach must be approved by

DEQ, rely on a sound scientific basis, and be accurate, repeatable, sensitive, and transparent. DEQ review and approval of a new quantification method will occur as part of approving new types of BMPs for a trading framework or plan (Section 7).

For point source pollutant reductions and for nonpoint BMPs where appropriate, DEQ prefers direct measurement. For BMPs and projects that use direct measurement, an approved quality assurance project plan (QAPP) is needed. The trading plan should require a QAPP and documentation for verifying credits. Direct measurement may not be the most feasible quantification method for some nonpoint source BMPs. For all quantification methods, a trading framework or plan should articulate potential sources of uncertainty and how those uncertainties will be managed and mitigated.

For all projects, quantification should be based on preproject and postproject conditions. The BMP guidelines mentioned in a trading framework or plan should articulate what documentation and information is needed to accurately quantify pollutant reductions in a way that can be reviewed during the verification process.

6.4 Trading Ratios

A trading ratio is a numeric value used to adjust the number of credits generated from a trading project, or to adjust the number of credits that a credit user needs to obtain. Trading ratios depend on the specific circumstances in the watershed. Factors that drive the use of trading ratios might relate to environmental conditions, pollutants, or programmatic goals (EPA 2007). Trading ratios can be applied either to the buyer or seller. If applied to the seller, a ratio would affect the number of credits available for sale. If applied to a buyer, a ratio would increase the number of credits the buyer would need to purchase. Credits from pollutant reductions produced at the end of a pipe or edge of a field should be adjusted to protect overall water quality. Ratios can adjust credit quantities of pollution reduction to account for the following factors:

1. Delivery from a field or project to a water body
2. Attenuation through a water body before reaching a point of environmental concern (as described in the TMDL and/or trading framework)
3. Equivalent environmental impact between different pollutants (e.g., between dissolved phosphorous and particulate phosphorous)
4. Uncertainty (e.g., measurement error or margin of error in the estimate or measurement method)
5. Reserve[3] (e.g., for BMP failure or temporary diminishment)
6. Retirement/water quality contribution[4]

[3] A type of uncertainty ratio in which credits are held in reserve and then used to account for uncertainty and offset failures in project performance. A reserve ratio is not necessary if other program elements address *force majeure* and other unforeseen events causing catastrophic BMP failure. This risk can be addressed by aggregators, private insurance, or contract provisions between parties.

[4] The ratio indicates the proportion of credits that must be purchased in addition to credits needed to meet regulatory obligations. These excess credits are taken out of circulation (retired) to accelerate water quality improvements. A

Ratios may also be used to increase credit quantities to provide incentives for priority area restoration and early action. Each trading framework and/or trading plan should consider these six ratio factors to determine the applicable trading ratio. Specific choices related to ratios should be documented in the trading framework or plan to be approved by DEQ. If needed, ratios that make sense for the watershed can be established individually and in combination to ensure that a net environmental benefit is being achieved through trading. In combination, an overall trade ratio should be greater than 1:1.5.

In some watersheds, available models can quantify pollutant delivery and attenuation if their capability is deemed sufficient to accurately reflect the fate and transport of the pollutant throughout the watershed. In some watersheds, a model may be used to account for pollutant delivery and attenuation if it is deemed capable of accurately reflecting the fate and transport of the pollutant through the watershed. In this case, the model must be approved by DEQ and may be reviewed through the process described in section 7. Finally, any investment in more sophisticated modeling should be done as part of the TMDL development or modification process, not just for developing ratios for trading purposes.

6.5 Credit Characteristics

Once a pollutant reduction has been converted into a credit, several aspects of that credit are important to define:

- *Credit life*—Period from the date a credit becomes usable by a permittee for compliance purposes through the date the credit expires and is no longer valid. Credit life depends upon the type of BMP and pollution reduction generated.
- *Credit projects can be renewed*—If projects are continuing to function and are properly maintained, the pollutant reductions from projects can be renewed to generate credits in subsequent compliance cycles (although the reduction calculations may need to be adjusted to reflect the ratios and baseline requirements that apply at that future point in time).
- *Credits can be released in phases*—Most BMPs, once implemented, will start generating water quality improvements immediately. All credits can be released as soon as these BMPs are installed. For BMPs that take time to mature (e.g., restored wetlands or riparian planting), credits may be released in phases, or a ratio can be used to account for time lag.
- *Credits are not property rights*—Similar to a point source's effluent limit, credits are tied to a specific permittee's authorization to discharge. Just as EPA and DEQ may need to adjust a point source's effluent limit, credits may also need to be adjusted. DEQ does recognize that credits created consistent with an approved trading framework or plan are tradable with an ascertainable value, and encourages predictable and transparent management of trading and other water quality programs.
- *No double counting*—A credit generated from a BMP on an acre of land or project cannot be sold to offset the impacts from two different credit buyers. For example, a restored

trading framework could choose to apply a retirement ratio only to certain BMPs, such as those that provide little or no ancillary benefits.

wetland cannot sell the same credit to offset a phosphorous impact from a point source and the wetland impact from a road project. However, projects with multiple environmental benefits are important. DEQ supports using proportional accounting that lets landowners sell, for example, 25% of their phosphorous credits from that wetland as long as the seller proportionally reduces the amount of wetland credits available to sell by an equivalent 25%. If a single permittee needs to offset multiple types of pollutant discharge (e.g., phosphorous and temperature), the permittee can purchase BMP credits that produce that same array of pollutant reduction types. DEQ does not consider this double counting.

6.6 Preparing a Credit Project Plan

All credit-generating projects need to prepare a credit project design and management plan (project plan), and submit the plan to the entity (usually an independent third party designated by DEQ) administering a given trading framework or plan. The project plan should be prepared by a qualified professional[5] who can select and properly design appropriate DEQ-approved BMPs (section 7) to improve water quality at a specific location.

Landowners developing BMP projects for water quality trading are encouraged to use the conservation planning process in coordination with NRCS and the Idaho Soil and Water Conservation Commission (ISWCC), but they also may choose to develop a private project plan. A project plan should meet the following requirements:

- Designed with the goal of improving water quality.
- Meet all applicable laws and regulations (e.g., wetlands and stream channel alteration), credit characteristics, trading ratios, and baseline requirements.
- Outline specific restoration goals.
- Describe the proposed BMPs, their relevant efficiencies and quality standards (e.g., from NRCS) for each BMP, and the BMP implementation plan.
- Describe the BMP monitoring and maintenance plan and how it will ensure the BMPs stay viable, consistent, and support quality standards during the project's life.

Whether the project plan addresses resource issues other than water quality is up to the landowner and/or project planners.

6.7 Project Stewardship

Adequate legal and financial safeguards must be in place to protect the project for a minimum time period (e.g., 5 years for nonstructural BMPs and 20 years for structural BMPs). These minimum stewardship times recognize the balance between maintaining operational flexibility

[5] A qualified professional could be any of the following: an NRCS-certified planner or an NRCS employee, a certified crop advisor, or a professional services provider. Some BMPs, such as constructed wetlands, will require consulting with other experts as well. Some BMPs on the list may specify the type of expert that must be consulted in the project's design, installation, and maintenance requirements.

for landowners and the need to provide some certainty for point source buyers over the life of their permit and facility plan.

Legal protections might include leases, deed restrictions, and easements that protect the BMPs as they operate for the life of the project. Credit sellers should also demonstrate that they have adequate funding to operate and maintain BMPs for the duration of the credit life. These types of financial protections may include maintenance funds, performance bonds, restricted accounts, insurance, and financial certification. Different BMPs may require different lengths and amounts of funding.

7 Approval for Credit-Generating BMPs and Quantification Methods

7.1 Approved BMPs in a Trading Framework or Plan

Trading frameworks or plans must include a list of approvable BMP packages including procedures quantifying credits and monitoring and maintenance requirements.

Each BMP proposed for inclusion in a trading framework or plan must be supported by a BMP package that includes the following information:

- a description of the BMP and how it works; where the BMP should be applied (e.g., appropriate site conditions);
- potential side effects and ancillary benefits;
- monitoring requirements;
- design, installation, operation, and maintenance requirements;
- a method for quantifying credits, including any appropriate BMP efficiency or uncertainty ratio; and
- substantiating information for proposed credit quantification methods (e.g., background and technical documentation, protocol for applying the method, estimation of method accuracy, sensitivity, and uncertainty).

DEQ must approve proposed BMP packages during review of proposed trading frameworks or plans and DEQ may choose to modify or deny inclusion of proposed BMPs.

7.2 Approved for a New BMP and Quantification Method

New practices and the associated methods to quantify credits can be developed and added to a framework or plan’s list of approved BMPs by following the steps outlined below. Practices and associated quantification methods approved by DEQ may be added to a BMP list at any time after their approval.

7.2.1 Step 1: Prepare and Submit Proposed BMP Package

New practices, existing practices already on the *Idaho Agriculture Pollution Abatement Plan*[6] (APAP) list (ISWCC 2015), or improved design, measurement, or quantification methods may be nominated by anyone for inclusion on a trading framework or plan's BMP list. A BMP package (described in Section 7.1) must be submitted to DEQ or its designee for each BMP or quantification method proposed.

7.2.2 Step 2: Initial Screening of BMP Proposal

For new or modified practices, DEQ or its designee will perform an initial screening of the package for completeness. DEQ forwards complete packages that are consistent with the APAP mission to be reviewed by a BMP technical committee, which may be comprised of NRCS, DEQ, ISWCC, and other agencies and administered by ISWCC. Additional technical experts may be engaged to review any proposed quantification methods. The BMP committee only reviews agricultural nonpoint source BMPs consistent with the APAP's mission. BMPs that may involve structures and entities outside of the APAP arena (e.g. stormwater, septic systems, urban development) will be addressed by DEQ separately.

7.2.3 Step 3: Review Process and Criteria for BMP Consideration

This section describes the recommended process of reviewing new or modified BMPs consistent with the APAP. The BMP technical committee reviews the package. If the proposed BMP is already included in the APAP, the committee reviews only the modifications portion of the BMP package and related supporting documentation for consideration on the BMP list. If the BMP is not included in APAP, the BMP technical committee can reject, or proceed to add it to the APAP BMP list if it is found acceptable. If the new or modified BMP is found acceptable by the committee, it is then eligible for inclusion in a trading framework or plan. If the proposed BMP involves new technology or methods for which data and experience are insufficient to support credit quantification, the BMP is initially approved only if the BMP can be directly measured and if the monitoring is scientifically credible and not cost prohibitive. If the practice's measurements are too variable based on the type of crop planted or field size, it may only be allowed using modeling or BMP efficiency rates.

7.2.4 Step 4: DEQ Concurrence, Public Notice and Comment and Final Decision

All BMPs, whether they are new, modified, on the existing APAP list, or for entities outside of the APAP arena, will be reviewed by DEQ consistent with Section 7.1 as part of the review and approval of the trading framework or plan. DEQ will conduct a public notice and comment period associated with that approval process, and will accept comments on the acceptability of included BMP packages. DEQ may revise or remove a BMP package based on public comments, in consultation with the BMP technical committee, and potentially other technical experts. If the

[6] The *Idaho Agriculture Pollution Abatement Plan* is Idaho's response to CWA §208 (PL 92-500), detailing how agricultural nonpoint source pollution must be managed. This plan includes a list of nonpoint source BMPs that can be used in Idaho to achieve water quality benefits.

BMP package is acceptable, the BMP and associated quantification method remain on the appropriate BMP lists for a trading framework or plan. Approval of BMP packages will occur simultaneously with framework or plan approval.

7.2.5 Step 5: BMP Revision Post Approval

Revisions to BMPs, revisions to a quantification method, or a new quantification method for a BMP that has already been approved following the above process can be requested by DEQ after a framework or plan is approved. BMP revisions may be triggered by the monitoring results or any other monitoring of the BMP's overall effectiveness and impact on environmental parameters, as well as research of the BMP's performance on the trade or other sites.

8 Process for Generating and Tracking Credits

In general, a similar process to generate, review, and track credits over time is used for projects. A standard process is customized within trading frameworks and plans once a permittee has determined that trading is desirable (Figure 3). The steps described below occur after a watershed framework is developed and approved by DEQ. The customized version is submitted as a trading plan to be incorporated into an NPDES permit and approved by EPA. The process applies to individual credit-generating projects.

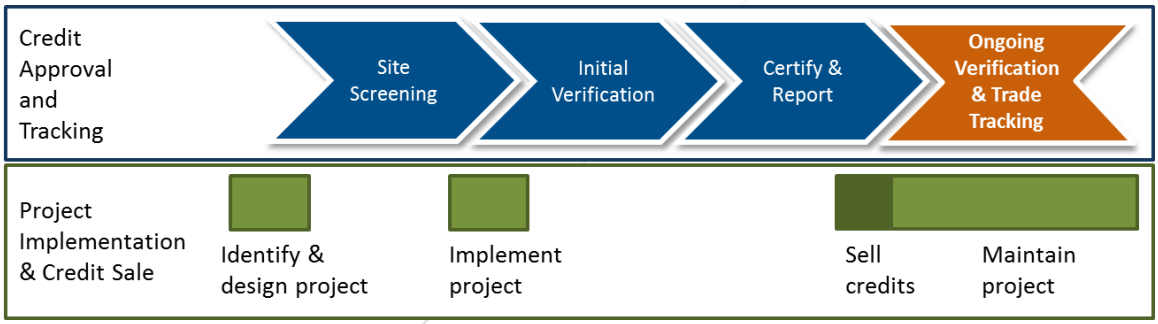

Figure 3. Credit generation process.

DEQ anticipates delegating the management of program administration, verification, and registration/trade tracking. Administrative, verification, and tracking roles may be filled by one or more independent third parties.

8.1 Initial Project Screening

Project screening is used to confirm a project's desirability. Project screening occurs after a specific site has been identified and an initial project design has been developed but before the project is implemented. The available project information is reviewed relative to the requirements in the trading framework or plan. Project screening is conducted by the permittee or the third party designated to conduct verification (verification entity). This step is a good practice to minimize investing time and money on projects that are not eligible to generate credits, and screening can provide information used to refine project design before implementation; however, project screening is typically optional.

8.2 Initial Verification

Credit generating activities (e.g., nonpoint source project, point source reduction in discharge below WQBELs) must be verified within one year of installation. Verification review may be conducted by the permittee, designated independent third party (verification entity), and/or DEQ and include the following components:

- *Administrative review*—Confirm project eligibility (section 6.1).
- *Technical review*—Confirm that credits were quantified accurately.
- *Project implementation*—Confirm that the nonpoint source project was installed (via a site visit or other means) consistent with approved design and construction criteria, and any BMPs expected as part of baseline are in place. From DMRs, confirm the pollutant load reductions for point sources.

8.2.1 Inspections of NPDES-Permitted Facilities for Point Source Credits

Proposed point source credit project plans are reviewed by EPA and DEQ as part of the procedures for NPDES permits. The credit transaction is also required to be reported in the DMRs for both the point source buyer and seller in the same time period the point source buyer is using the credits (section 8.4). The DMR is reviewed and compared with trading information contained in the applicable framework/plan and associated reports generated by DEQ or a designated independent third party managing trade tracking (tracking entity). Any material anomalies will be investigated by EPA and DEQ.

8.2.2 Review of Best Management Practices for Nonpoint Source Credits

DEQ anticipates designating a verification entity to conduct reviews of some or all nonpoint source credit projects. Verification occurs on a schedule and at a frequency determined by DEQ for a particular trading framework.

The verification entity describes in a report(s) findings from the administrative and technical reviews and confirms project implementation. These verification reports either confirm that all relevant protocols and standards (as described in Section 6) have been met, or describe material deficiencies/inconsistencies that must be addressed. Copies of the verification reports will be posted to the files/database of the entity designated for trade tracking (tracking entity).

In addition, EPA and DEQ or DEQ's designee, may visit the BMP sites to verify the reduction mechanism, documentation of the BMP design, maintenance, and monitoring performance. Prior to requesting verification, project developers should obtain signed authorization from landowners that the BMP site may be inspected by the regulatory authorities (advance notice may be provided to the sellers, but is not required) or their designee, to verify a permit holder's compliance. NPDES permit holders who purchased nonpoint source-generated credits remain responsible for ensuring BMPs are properly implemented and the credit amounts that are traded are in fact produced. Only DEQ and/or EPA will resolve compliance matters or enforcement actions with the NPDES permit holder.

8.3 Certification and Tracking

8.3.1 Certifying and Issuing Credits—Reduction Credit Certificate

Certification signifies that credits are ready to be issued. The certification process includes final confirmation that the necessary documentation is available, verification review is complete, and all aspects of the project are in place. Credits must be certified through a signed attestation by EPA or DEQ (for point source credits) or by the verification entity (for nonpoint source credits). Upon submission of this form, DEQ or a designated tracking entity can register credits into the framework or plan's administrative files/database. Attachments to credit registration documentation will likely include the project's verification report, certification, and other relevant information needed to register credits.

Trading parties must generate and maintain records substantiating pollutant reductions by credits and trades. These records must be made available to EPA and DEQ upon request. Buyers should retain copies of trading records on site for a minimum of 5 years after completing a trade contract.

8.3.2 Registering a Trade—Trade Notification Forms

After registration, credits can be transferred from the project developer/seller to the buyer. Trades must be formally registered with DEQ or a designated tracking entity in a trade-tracking file system/database. The NPDES permittee must report the trade on its DMR where it shows the credit purchase or sale as an adjustment to the pollutant limit (by adjusting the actual discharge amount on the DMR, as explained in section 8.3.3), subject to ongoing credit verification for nonpoint source credits.

The registered trade documentation must be signed by both contractual parties and submitted to DEQ, or tracking entity. The DEQ tracking entity enters the information into a trade-tracking file/database.

8.3.3 Discharge Monitoring Reports

Point source dischargers involved in a trade use DMRs to summarize monitoring results and report actual effluent discharges. On the DMR, the permittee reports the actual effluent discharge, the amount of credits sold or bought for that period, and its adjusted discharge (i.e., the actual discharge plus any credits sold or minus any credits purchased). The DMR should also note the location of a registry where additional credit information may be found.

DMRs are generally submitted monthly to both EPA and DEQ. Detailed instructions on how to complete DMRs to reflect a permittee's credit purchases and sales transactions applicable for that reporting month are provided to the permittee by the permitting authority.

8.3.4 Annual Reports

DEQ requires dischargers participating in water quality trades to summarize all trade activity for the year as well as the performance of the associated credit-generating projects in an annual report. The trade amounts shown on the DMRs must match the trade amounts shown on the annual trade summary reports. If an independent tracking entity exists, that entity will prepare

and send a trade summary report to the point source discharger, DEQ, and EPA at intervals defined in a trading framework or plan.

8.4 Ongoing Verification and Credit Tracking

Ongoing verification and credit tracking must occur on a cycle described in the trading framework and plan to confirm that projects are maintained and function as promised.

8.5 Trade Tracking

DEQ is ultimately responsible for tracking trades and the day-to-day oversight of trading. DEQ may establish, in a trading framework or plan, the designation of an independent third party tracking entity to assist with those tasks. Major functions of trade tracking include the following:

- Setting a submittal time for credit registration document
- Verifying trades meet program requirements
- Tracking all trades in a central database and showing account balances of buyers and sellers
- Reconciling all trades in the trading area to ensure credits are not used more than once
- Making trading information and effluent limits available to regulatory agencies and the public
- Producing trade summary reports as described in section 8.3.4

By maintaining a trade-tracking database, DEQ, or its designee, ensures that an accounting of all trades and credits is available to the public and environmental agencies. The database must be subject to sound data system and accounting principles with the ability to support outside review.

8.6 Adaptive Management

Adaptive management is a systematic approach for improving natural resource management, with an emphasis on learning about management outcomes and incorporating what is learned into ongoing management (feedback loop). Adaptive management in water quality trading programs may focus on improving program operations, trade administration, quantification methods, and overall effectiveness. Water quality trading frameworks and plans are expected to include adaptive management to improve the elements within them with new information over time.

9 Conclusion

DEQ encourages trading in watersheds where water quality problems exist and where point and nonpoint sources can combine strengths for greater improvement. DEQ believes that water quality trading is a viable option in many regions of the state. However, DEQ strongly advises that this and other guidance on water quality trading be studied carefully. Trading is not a panacea for sources' obligations to undertake the necessary pollutant reductions where they are needed to improve water quality, as established in the TMDL.

Water quality trading is a highly evaluated and regulated environment designed to realize specific and measureable water quality improvements in areas of the watershed that might not normally see improvements. Trading takes work, money, and commitment to achieve real goals. This guidance is designed to provide readers with an understanding of the details involved in water quality trading. In this arena, experience matters and experts in the field of water quality trading, permitting, and BMP construction and operation are essential.

References

DEQ (Idaho Department of Environmental Quality). 2010. *Water Quality Pollutant Trading Guidance*. Boise, ID: DEQ.

EPA (US Environmental Protection Agency). 2003. *Water Quality Trading Policy*. Federal Register. 68 FR 1608 and 1610.

EPA (US Environmental Protection Agency). 2004. *Water Quality Trading Assessment Handbook.https://owpubauthor.epa.gov/type/watersheds/trading/upload/2004_11_08_watershed_trading_handbook_national-wqt-handbook-2004.pdf*

EPA (US Environmental Protection Agency). 2006. "Benita Best-Wong memorandum to Water Division Directors re: Clarification regarding "Phased" Total Maximum Daily Loads." *http://www.epa.gov/sites/production/files/2015-10/documents/2006_08_08_tmdl_tmdl_clarification_letter.pdf*

EPA (US Environmental Protection Agency). 2007. *Water Quality Trading Toolkit for Permit Writers.* Glossary-2. *http://www3.epa.gov/npdes/pubs/wqtradingtoolkit.pdf* .

Grafe, C.S., C.A. Mebane, M.J. McIntyre, D.A. Essig, D.H. Brandt, and D.T. Mosier. 2002. *Water Body Assessment Guidance*. 2nd ed. Boise, ID: Idaho Department of Environmental Quality. *deq.idaho.gov/media/457010-wbag_02_entire.pdf.*

ISWCC (Idaho Soil and Water Conservation Commission) 2015. *Idaho Agricultural Pollution Abatement Plan*. Boise, ID: Resource Planning Unlimited, Inc.

Willamette Partnership et al. (Willamette Partnership, The Freshwater Trust, Idaho Department of Environmental Quality, Oregon Department of Environmental Quality, and Washington Department of Ecology). 2014. *Draft Regional Recommendations for the Pacific Northwest on Water Quality Trading*. *http://willamettepartnership.org/wp-content/uploads/2014/09/PNW-Joint-Regional-Recommendations-on-WQT_ThirdDraft_2014-08-05_full1.pdf.*

This page intentionally left blank for correct double-sided printing.

Glossary

§303(d)	Refers to Section 303, subsection "d" of the Clean Water Act. Section 303(d) requires states to develop a list of water bodies that do not meet water quality standards. This section also requires that total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to US Environmental Protection Agency approval.
Baseline	Pollutant load reductions, BMP requirements, or site conditions that must be met under federal and state regulatory requirements in place at the time of trading project initiation.
Best management practice (BMP)	Structural, nonstructural, and managerial techniques that are effective and practical means to control nonpoint source pollutants. BMPs can be applied before, during, and after pollution-producing management activities to reduce or eliminate the introduction of pollutants into receiving waters (EPA 2007). BMPs can consist of land management practices and in-stream improvements (e.g., in-stream restoration actions and in-stream flow augmentation).
Best professional judgment	Conclusion and/or interpretation derived by a trained and/or technically competent individual by applying interpretation and synthesizing information.
Certification	Formal application and approval process of the credits generated from a BMP. Certification occurs after project verification and is the last step before credits can be used toward a compliance obligation.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (i.e., Clean Water Act) establishes a process for states to use to develop information on, and control the quality of, the nation's water resources (33 USC §§1251–1387).
Designated use	As defined in 40 CFR 131.3(f) and 40 CFR 131.10, designated uses are specified in water quality standards for each water body or segment whether or not they are being attained. As defined in 40 CFR 131.10(a), examples of designated uses include public water supply, protection and propagation of fish, shellfish, and wildlife, recreation, agriculture, industrial, and navigation.
Fully supporting	In compliance with water quality standards and within the range of biological reference conditions for all designated and exiting beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Hydrologic unit	One of a nested series of numbered and named watersheds arising from a national standardization of watershed delineation. The initial 1974 effort described four levels (region, subregion, accounting unit, and cataloging unit) of watersheds throughout the United States. The fourth level is uniquely identified by an eight-digit code built of two-digit fields for each level in the classification. Originally termed a cataloging unit, fourth-field hydrologic units have been more commonly called subbasins. Fifth- and sixth-field hydrologic units have since been delineated for much of the country and are known as watershed and subwatersheds, respectively.
Hydrologic unit code (HUC)	Number assigned to a hydrologic unit. Often used to refer to fourth-field hydrologic units.
Load allocation	Portion of receiving water's load capacity that is allocated to one or more nonpoint sources of pollution or to natural background pollution (40 CFR 130.2(g)). Load allocations specify how much pollutant each nonpoint source or group of nonpoint sources may release to a water body. Load allocations are best estimates of the load, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the load.
Metric	Periodic or continuous measurement of the properties or conditions of some medium of interest, such as monitoring a water body.
Monitoring	Periodic or continuous measurement of the properties or conditions of some medium of interest, such as monitoring a water body.
National Pollutant Discharge	National program established by CWA for permitting point sources of pollution (33 USC §1342). Discharge of pollution from point sources is not allowed without a permit.

Elimination System (NPDES)	
Nonpoint source	Dispersed source of pollutants, generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state (40 CFR 35.1605-4). Nonpoint sources are without a discernable point or origin. They include, but are not limited to irrigated and nonirrigated lands used for grazing; crop production and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Parameter	Variable, measurable property whose value is a determinant of the characteristics of a system (e.g., temperature, dissolved oxygen, and fish populations are parameters of a stream or lake).
Point source	Source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable *point* of discharge into a receiving water (33 USC §1362(14)). Common point sources of pollution are industrial and municipal wastewater.
Pollutant	Generally, any anthropogenic substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems. This includes fertilizer runoff, pesticides, heavy metals, heat load caused by vegetation removal or bacteria introduced from human and animal wastes, among others.
Pollution	Broad concept encompassing human-caused changes in the environment that alter the functioning of natural processes and produce undesirable environmental and health effects. This includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Project plan	Document detailing (a) how the proposed credit-generating action will be designed and installed to meet BMP guidelines, including a description of the proposed actions, installation practices, anticipated timelines, restoration goals, and anticipated threats to project performance; and (b) how the project developer plans to maintain/steward the practice or action for the duration of the project life, keep the practice or action consistent with BMP guidelines, and report on that progress.
Site screening	Initial site-screening process through which a project developer receives confirmation that their proposed project is likely eligible to produce credits, based on the information available at that time.
Surface runoff	Precipitation, snow melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of nonpoint source pollutants in rivers, streams, and lakes. Surface runoff is also called overland flow.
Surface water	All water naturally open to the atmosphere (e.g., rivers, lakes, reservoirs, streams, impoundments, seas, and estuaries) and all springs, wells, or other collectors that are directly influenced by surface water.
Suspended sediments	Fine material (usually sand size or smaller) that remains suspended by turbulence in the water column until deposited in areas of weaker current. These sediments cause turbidity and, when deposited, reduce living space within streambed gravels and can cover fish eggs or alevins.
Total maximum daily load (TMDL)	A TMDL is a water body's pollutant load capacity that will still allow the water body to meet its applicable water quality standards (33 USC §1313(d)(1)(C); 40 CFR 130.2(1)). A TMDL can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual basis. A TMDL is equal to the load capacity, such that load capacity = margin of safety + natural background + load allocation + wasteload allocation = TMDL. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.
Total dissolved solids	Dry weight of all material in solution in a water sample as determined by evaporating and drying filtrate.

Toxic pollutants	Materials that cause death, disease, or birth defects in organisms that ingest or absorb them (EPA 2003). The quantities and exposures necessary to cause these effects can vary widely.
Trading Area	A watershed or other hydrologically-connected geographic area, as defined within a water quality management plan adopted for a TMDL, trading framework or trading plan. A trading area must encompass the location of the discharge to be offset, or its downstream point of impact, if applicable, and the trading project to be implemented.
Trading framework	DEQ-approved and vetted watershed-level documents, which provide specificity on how trading should be implemented in a particular watershed. These documents may be developed by watershed stakeholder groups and are included as appendices to the trading guidance once approved by DEQ.
Trading plan	Permittee-level plans, either included in or attached to permits that detail how a particular trading solution will be designed, implemented, verified, and tracked to meet effluent limits. Trading plans can also reference DEQ-approved trading frameworks where they exist.
Trading ratio	A trading ratio is a numeric value used to adjust the number of credits generated from a trading project, or to adjust the number of credits that a credit user needs to obtain.
Verification (project)	Process of confirming that a credit-generating project has completed certain elements that should help ensure the project provides the water quality benefits it promises. Specifically, confirmation that project site BMPs or credit-generating activities and credits conform to the applicable quality standards required by a program administrator or regulator. This process includes (1) an administrative review for the completeness and correctness of documentation; (2) technical review for the completeness and accuracy of quantification; and (3) confirmation of project implementation and/or performance.
Wasteload allocation	Portion of receiving water's load capacity that is allocated to one of its existing or future point sources of pollution (40 CFR 130.2(h)). Wasteload allocations specify how much pollutant each point source may release to a water body.
Water body	Stream, river, lake, estuary, coastline, or other water feature, or portion thereof.
Water pollution	Any alteration of the physical, thermal, chemical, biological, or radioactive properties of any waters of the state, or the discharge of any pollutant into the waters of the state, which will or is likely to create a nuisance or to render such waters harmful, detrimental, or injurious to: public health, safety, or welfare; to fish and wildlife; or to domestic, commercial, industrial, recreational, aesthetic, or other designated uses.
Water quality	Term used to describe the biological, chemical, and physical characteristics of water with respect to its suitability for a designated use.
Water quality criteria	Defined in 40 CFR 131.3, water quality criteria are elements of state water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use. The US Environmental Protection Agency develops criteria guidance; states establish criteria.
Water quality standards	State-adopted and US Environmental Protection Agency-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses (40 CFR 131.3(i)).

This page intentionally left blank for correct double-sided printing.

Appendix A. Upper Snake-Rock Trading Framework

Upper Snake-Rock Subbasin—Middle Snake River Water Quality Trading Ratios

This document provides information on the ratios used to trade phosphorus specific to the middle Snake River in the Upper Snake-Rock subbasin (HUC 17040212).

Application Limits of Ratios

The ratios should not be adapted to other trading markets or scenarios without reevaluation of the relationships, flow characteristics, and overall qualifications defined for the middle Snake River. The ratios described in this document are only applicable to the middle Snake River for total phosphorus (TP).

Hydrologic Model Basis for Establishing Ratios

The ratios are based upon a mass balance model that tracks the flow of water and phosphorus from Milner Dam to King Hill, Idaho. The phosphorus total maximum daily load (TMDL) target of 0.075 milligrams per liter (mg/L) TP is the central basis of the model. The TMDL assumes that the water quality pollutant targets by the various water user industries are implemented until beneficial use support is achieved. The target is applicable only to the middle Snake River.

This model does not make any assumptions related to the uptake of phosphorus in the middle Snake River. Recent analysis by TetraTech in September 2014 (*deq.idaho.gov/media/1118007/mid-snake-river-wag-tmdl-reevaluation-report.pdf*) indicates that flow and attenuation is not occurring and that phosphorus is not being transported out of the system. As such, the Idaho Department of Environmental Quality (DEQ) has determined that the prior trading ratio of a pound in equaling a pound out at any place on the river is not appropriate as a trading ratio for use by aquaculture facilities who wish to engage in water quality trading.

Through this Upper Snake-Rock/middle Snake River trading framework, DEQ seeks to adopt a revised trading ratio of 2:1. By requiring a facility to purchase 2 pounds of TP for each pound they need to meet their discharge requirement, a margin of safety is created to account for variability in uptake of TP, and provides a net environmental benefit to achieve overall water quality goals.

Seven compliance points on the middle Snake River relate to meeting beneficial uses and/or water quality standards as defined in the Upper Snake-Rock subbasin TMDL. The compliance points include Milner Dam, Pillar Falls, Crystal Springs, Below Box Canyon, Gridley Bridge, Shoestring Bridge, and King Hill, Idaho. Because of these seven compliance points, six segments are defined on the middle Snake River. The six segments are Segment 1 (Milner Dam to Pillar Falls), Segment 2 (Pillar Falls to Crystal Springs), Segment 3 (Crystal Springs to Box Canyon), Segment 4 (Box Canyon to Gridley Bridge), Segment 5 (Gridley Bridge to Shoestring Bridge), and

Segment 6 (Shoestring Bridge to King Hill, Idaho). Figure 1 illustrates all of the compliance points, segments, and major tributaries that discharge to the middle Snake River; however, pollutant trading is only provided for on the first three segments at this time.

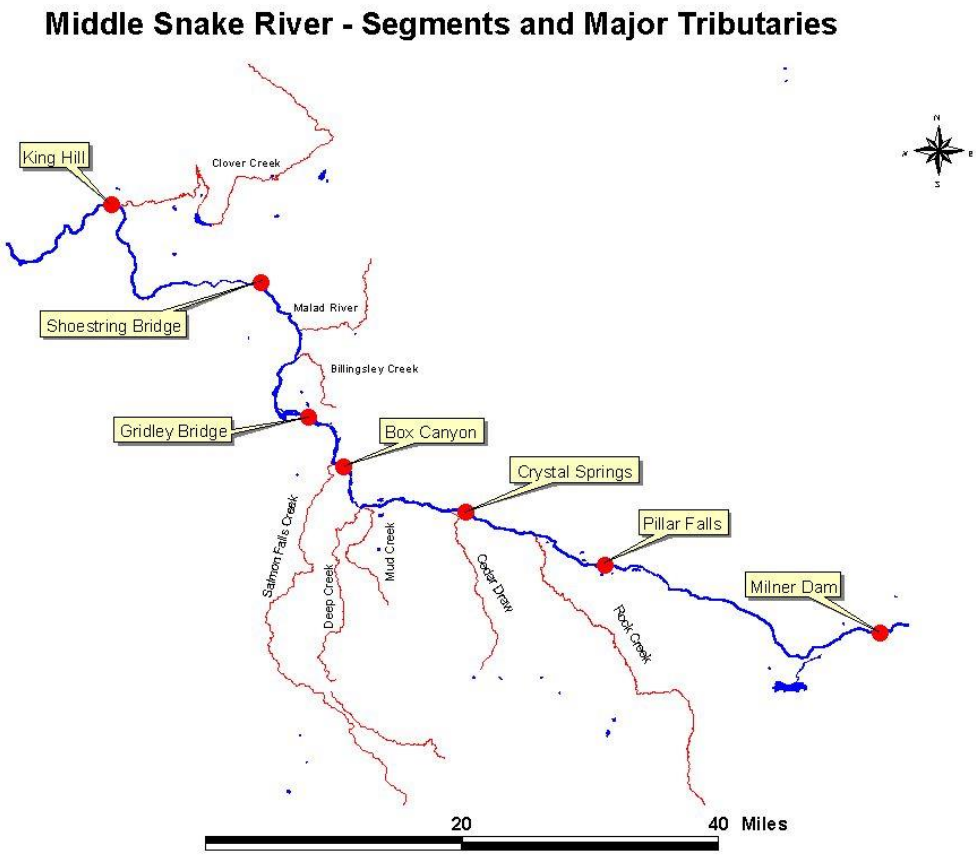

Figure 1. Middle Snake River—segments and major tributaries.

The mass balance model stipulates the following assumption:

Total Flow = Groundwater Flow + Point Source Flow + Nonpoint Source Flow

To the extent practical, each component of the mass balance model was subdivided into flows that could be accounted versus flows that could not be accounted. United States Geological Survey quadrangle maps (1:24,000) were consulted to define more accurately which sources were unaccounted. This ended up being unnamed springs or tributaries that discharged directly into the middle Snake River. Most unnamed tributaries are ephemeral streams.

Conceptualization of Mass Balance Model

The mass balance model for the Upper Snake-Rock subbasin TMDL operates under the premise that the middle Snake River will obtain the instream target of 0.075 mg/L TP as an overall average for the river system. Seven compliance points along a 94-mile stretch of river have been selected for monitoring purposes to ascertain if the concentration target is reached.

Several assumptions are included in the middle Snake model:

1. The middle Snake model incorporates all known inputs and diversions. In the case of the middle Snake River, the mass balance centers primarily on inputs since the majority of effects come from inputs and very minimally from outputs (or diversions). No diversions occur in Segments 1, 2, and 3.
2. The upstream portion of the middle Snake model begins at Milner Dam (River Mile 638.5). Although the model runs all the way to King Hill, Idaho (River Mile 545.0), pollutant trading is allowed in only the first three segments of the middle Snake River. Therefore, the furthest downstream site is below Box Canyon (River Mile 587.0).
3. The flow information was derived for 1983 through 1998. These years were chosen because they aptly describe the more recent flow conditions on the middle Snake River. The baseline years are defined as 1990–1991. High flow years are defined for 8 years: 1983–1987 and 1996-1998. Low flow years are defined for 8 years: 1988–1995. The median flow is based on flows from 1995 and 1987, whereas the mean flow is from 1983 to 1998.
4. The TP methodology is United States Environmental Protection Agency (EPA) 365.2 at an method detection limit of 0.005 mg/L or SM4500-P as unfiltered TP. TP = Suspended TP + Dissolved TP.

River Location Ratios

The main phosphorus sources within the watershed, aquaculture fish hatcheries, municipalities, food processors, industrials, confined animal feeding operations, irrigated agriculture, and grazing, eventually discharge to the middle Snake River directly or indirectly. There are no diversions from Milner Dam to Gridley Bridge. Along this stretch of the middle Snake River, numerous discharges to the river occur. These discharges are from point and nonpoint sources. Segment 1 of the middle Snake River runs from Milner to Pillar Falls (Table 1).

Table 1. Segment 1—Milner Dam to Pillar Falls.

River Mile	Discharge Source	Diversion Point	Total Phosphorus Ratio
638.5		**Milner Dam**	
630.6	Dry Creek		2:1
627.6	Northside A Drain		2:1
619.5	Southside A10 Drain		2:1
619.0	Northside C55 Drain		2:1
618.0	Southside Twin Falls Coulee		2:1
617.9	Vinyard Creek		2:1
613.1		**Pillar Falls**	

Notes: Springs are not identified in this table. However, 57 springs are identified as discharging directly to the middle Snake River. It is uncertain how many additional unnamed springs exist. Unnamed surface waters are not included.

Segment 2 of the middle Snake River runs from Pillar Falls to Crystal Springs (Table 2).

Table 2. Segment 2—Pillar Falls to Crystal Springs.

River Mile	Discharge Source	Diversion Point	Total Phosphorus Ratio
613.1		**Pillar Falls**	
612.7	East Perrine Coulee		2:1
610.9	Main Perrine Coulee		2:1
610.1	Canyon Springs Fish Hatchery		2:1
610.0	Alpheus Creek		2:1
609.9	Blue Lakes Fish Hatchery		2:1
609.1	Southside West Perrine Coulee		2:1
608.9	Pristine Springs Fish Hatchery		2:1
608.5	City of Twin Falls Municipality		2:1
608.3	Southside 43 Drainage		2:1
608.0	Warm Springs Creek		2:1
607.5	Jerome Golf Course Drain		2:1
607.2	Auger Falls		2:1
606.4	Rock Creek		2:1
605.3	Southside 30 Drain		2:1
603.4	Southside LS/LQ Drain		2:1
602.2	Southside LS2/39A Drain		2:1
600.9	Northside N42 Drain		2:1
600.9	Southside 39 Drain		2:1
600.5	Crystal Springs Fish Hatchery		2:1
600.4		**Crystal Springs**	

Notes: Springs are not identified in this table. However, 74 springs are identified as discharging directly to the middle Snake River. It is uncertain how many additional unnamed springs exist. Unnamed surface waters are not included.

Segment 3 of the middle Snake River runs from Crystal Springs to Below Box Canyon Area (Table 3).

Table 3. Segment 3—Crystal Springs to Lower Box Canyon.

River Mile	Discharge Source	Diversion Point	Total Phosphorus Ratio
600.4		**Crystal Springs**	
600.0	Magic Valley Fish Hatchery		2:1
599.1	Cedar Draw		2:1
599.0	Niagara Springs Fish Hatchery		2:1
598.7	Rim View Fish Hatchery		2:1
598.1	Southside I Drain		2:1
595.0	Northside J8 Drain		2:1
598.0	Clear Springs and Lake: Snake River Fish Hatchery Clear Springs Processing Middle Fish Hatchery Clear Lakes Fish Hatchery		2:1
592.5	Gary Wright Fish Hatchery		2:1
591.8	Kanaka Rapids		2:1
591.5	Southside N Drain		2:1
591.5	Catfish Fish Hatchery		2:1
591.5	Mud Creek		2:1
591.4	Deep Creek		2:1
590.3	Briggs Creek Fish Hatchery		2:1
589.5	Northside S29 Drain		2:1
589.8	Kaster Trout Fish Hatchery		2:1
588.4	Northside S19/S Drains		2:1
588.4	Box Canyon Fish Hatchery		2:1
588.1	Blind Canyon Creek		2:1
588.1	Blind Canyon Fish Hatchery		2:1
587.8	Box Canyon “Creek”		2:1
587.0		**Below Box Canyon Area**	

Notes: Springs are not identified in this table. However, 66 springs are identified as discharging directly to the middle Snake River. It is uncertain how many additional unnamed springs exist. Under the middle Snake TMDL (1997) and the Upper Snake Rock TMDL (1999), the Clear Springs and Lake is considered a part of the middle Snake River. It is another ground water source that discharges directly to the river. Unnamed surface waters are not included.

Equations Used in the Mass Balance Model

The standard equation used in the mass balance model is the same one used for calculating loads:

$$\text{Load, lb/day} = \text{Concentration, mg/L} \times \text{Flow, cfs} \times 5.4$$

This page intentionally left blank for correct double-sided printing.

Appendix B. Lower Boise Trading Framework

Lower Boise River Effluent Trading Demonstration Project: Summary of Participant Recommendations for a Trading Framework

Prepared for the Idaho Division of Environmental Quality by Ross & Associates Environmental Consulting, Ltd. September 2000.

Available at: *http://www.deq.idaho.gov/media/489512-boise_river_lower_effluent_report.pdf*

To be updated in 2016.

This page intentionally left blank for correct double-sided printing.

Appendix C. Reserve