CONCEPT DRAFT

Presented to the Lower Boise River Water Quality Trading Technical Advisory Group for discussion at the March 28, 2016 Meeting.

To TAC Reviewers: These blue boxes will be used throughout the Concept Framework to provide you with additional information, context, ongoing debates on the ideas described in that section. This information may end up in the Framework, may get deleted, or may be housed in a supporting report in order to keep the Framework simple.

Lower Boise River Water Quality Trading Watershed Framework

Idaho Department of Environmental Quality

LOGOS HERE

[INSERT DATE APPROVED HERE]

Table of Contents

1. Introduction

The purpose of this document is to provide the updated Idaho Department of Environmental Quality (DEQ) framework for the implementation of water quality trading within the Lower Boise River. This framework supplants the 2010 Lower Boise Trading Framework (DEQ, 2010a).

A "trade" occurs when water quality credits are acquired and used to satisfy a regulatory requirement, such as the water quality based effluent limit (WQBEL) in an NPDES permit. "Credits" are the measured or estimated pollution REDUCTION generated by a trading project, and may include adjustments for trading baseline (Section 3.3), trade ratios (Section 5), or others.

To TAC Reviewers: Do we want to include a definition for offset, or simply incorporate the term underneath the umbrella term "trade"?

Several reviewers noted that an offset is only the actions of one party and should be dealt with by the permitting agency. A trade is seen as involving two or more parties through which a financial transaction occurs.

This Framework describes the specific conditions under which credits may be generated and how trades may occur in the Lower Boise River Watershed. Trades are enforceable only when incorporated directly into a "trading plan" that is reviewed and approved by DEQ and U.S. EPA as part of an agency approved permit, license, or order.

This framework update is supported by technical information derived from the Lower Boise River Total Phosphorus TMDL addendum and feedback from the Boise Watershed Advisory Group's Technical Advisory Committee (TAC). The Framework has been designed to incorporate concepts from the Regional Recommendations for the Pacific Northwest on Water Quality Trading (also referred to as the Joint Regional Recommendations). This framework also incorporates recent technical work completed by WP (WP, 2015), and TFT (TFT, 2015).

Water quality trading, as outlined in this document is one of multiple strategies identified to achieve load reductions set forth in the Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015). The components of this water quality trading framework will be part of a broader suite of strategies under development in the Boise River (Lower) Subbasin TMDL Implementation Plan.

1.1. Authority for Water Quality Trading in the Lower Boise

Water quality trading (also called pollutant trading) is recognized in Idaho's Water Quality Standards at IDAPA 58.01.02.055.06, and was authorized in the Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015). Trades must be implemented consistent with the federal Clean Water Act (CWA), statewide Water Quality Trading Guidance (DEQ, 2010a, to be updated in 2016), Lower Boise River TMDLs, and this updated Lower Boise River Water Quality Trading Framework (Framework).

1.2. Watershed Context

The Lower Boise River Watershed (ID 17050114) drains approximately 1,290 square miles of rangeland, forests, agricultural lands and urban areas from below Lucky Peak Dam into the Snake River at the confluence between the cities of Adrian and Nyssa, Oregon[1]. The watershed includes impaired waters for seven pollutants with TMDLs for sediment, bacteria, and phosphorus[2]. Pollutants impact cold water aquatic life, salmonid spawning, domestic and agricultural water supply, primary and secondary contact recreation.

Water quality trading is intended to work in concert with existing ongoing efforts to enhance the Lower Boise River and watershed. In addition to TP reductions expected from point source facility upgrades and reductions associated with nonpoint-to-point source trading, DEQ has identified several TP load reduction strategies within the Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015), including:

- TP reductions from stormwater dischargers through project types, increased attention to on-site stormwater inspection, and public education.
- Mitigatation/elimination nonstormwater (dry weather) discharges, and steps to within the implementation timeframe.
- Voluntary BMP implementation on agricultural lands, contingent on available funding, cost sharing, willing partners (e.g., NRCS Farm Bill, 319 grant program).
- Permitting of new septic systems and promoting the use of new technology for existing septic systems.
- Offset credits for reducing nonpoint source loads (i.e., sewering of septic systems).
- Growth and development (i.e., paving new road surfaces).

[1] For additional context information on the Lower Boise River Watershed, please refer to the Lower Boise River Total Phosphorus addendum (DEQ, 2015)

[2] IDEQ (2012) Idaho's Integrated Report pg.20-25. http://www.deq.idaho.gov/media/1117323/integrated-report-2012-final-entire.pdf.

1.3. Framework Objectives

This Framework seeks to:

- Provide cost effective compliance options for wastewater and stormwater permittees;
- Create voluntary incentives for ~~agriculture best management practices~~projects that address non-point source pollution; and
- Help implement the goals described in the Lower Boise River TMDLs.

The water quality objectives of this watershed trading Framework are tied to the following total phosphorus TMDL addendum targets and allocations (DEQ, 2015), ~~s~~ shown in Table 1.3.

Table 1.3. Water quality goals and targets for this Framework

Goal	Target	TP TMDL Allocations	Source
Reduce Total Phosphorus (TP) loads to achieve the 2004 Snake River-Hells Canyon TMDL TP target from May 1 – September 30	TP concentrations (and TP load equivalents) < 0.07 mg/L in the Lower Boise River near Parma.	• Point sources at 0.1 mg/L TP May–September • Point sources at 0.35 mg/L TP October–April (except Idaho Dep't of Fish & Game Eagle and Nampa facilities, which are set at 0.1 mg/L year-round) • Agricultural tributaries and ground water at 0.07 mg/L TP year-round • Stormwater (wet weather) TP loads reduced by 42% • Non stormwater (dry weather) TP loads reduced by 84%	Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015)
Reduce Chlorophyll-*a* within the Middleton-to-Indian Creek and Indian Creek-to-mouth of the Lower Boise River assessment units	Achieve mean monthly benthic (periphyton) chlorophyll-*a* target of < 150 mg/m^2.		Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015)

1.4. Guiding Principles for Water Quality Trading

Some information in this Framework is repetitive of the draft state trading guidance, under development by DEQ. We chose to repeat the information since the state guidance is not yet available and may change through internal review and public comment processes.

Trades under this Framework are designed to be consistent with the following principles:

- Trading should create a net environmental benefit;
- Trades should be based in sound science and more effectively accomplish regulatory and environmental goals than other alternatives;
- Regulators must be able to confirm the promised water quality improvements are actually delivered;
- The benefits of trading must be delivered so it does not result in localized exceedance of water quality standards;[3]
- Trades must be consistent with Idaho water quality standards, the CWA and its implementing regulations, and local laws; and
- Trades cannot circumvent existing U.S. EPA approved technology-based effluent limits (TBELs).

TAC Reviewers: Net environmental benefit can be broadly defined as additional gains in water quality or other ecological functions resulting from trades. Meeting the new environmental gain goal can be done by: A) using positive trading ratios specific to environmental gain, B) applying conservative estimates in credit quantification C) how baseline criteria are set, D) project types that provide other environmental benefits (e.g., habitat), E) or other justifications. As a guiding principle, both the state guidance and this framework have not defined net environmental benefit specifically. However, the principle of net environmental benefit carries throughout the document in the various framework elements, including meeting baseline requirements, trading ratios and quantification from credit generating projects

[3] 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.

1.5. Public involvement

This Framework builds heavily from the concepts included in the 2010 Lower Boise River Water Quality Trading Framework (DEQ, 2010a), which was developed through extensive engagement of local stakeholders (Ross & Associates, 2000).

INSERT RESULT OF WAG TECHNICAL ADVISORY COMMITTEE (E.G., WAG RECOMMENDATION). In addition to the WAG process, DEQ provided a public review period for members of the public to review and comment on the Framework.

The public will also have an opportunity to review trading details for permittees during the public review of NPDES permits (40 CFR §124.10; DEQ, 2010b) or 401 certifications (DEQ, 2010b). In addition, when new or substantially revised project type quality standards are proposed, DEQ will convene a technical review process to vet those standards, as described in Section 10.1 of this Framework.

2. General Provisions for Water Quality Trading

2.1. Trading Parties and Types of Trades

Both point and nonpoint sources are eligible to generate and sell credits. Credits can be purchased to meet compliance obligations or for voluntary reasons (e.g., industry stewardship goals).

Incorporating Trading into Regulatory Documents

Trading must be implemented through an enforceable, DEQ-approved mechanism, typically a permit, order, or license. This Framework explicitly supports potential trades for the following permit types and sectors (other permit types and sectors will be considered on a case-by-case basis):

Table 2.1. Eligible buyers and sellers under this Framework

Buyer/permit type	National Pollutant Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4), Multi-Sector General Permit (MSGP), Rapid Infiltration Basin (RIB), 401 certification, OTHER TYPES?
Seller/sector type	Point sources, nonpoint sources (e.g., agriculture, hydroelectric facilities, unregulated stormwater sources), OTHER TYPES?

Trading can be used to meet all or part of a point source discharger's water quality-based effluent limit (WQBEL), assuming all required treatment technology has been installed. Trading can also be used to offset point source pollutant loads under other scenarios, including:

- *To offset existing point source 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 does not increase or further impair the water body for the specific pollutant; and*
- *To 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 does not increase or further impair the water body for the specific pollutant consistent with the requirements of 40 CFR 122.4(d)(i).*

Reference to this Framework in a regulatory document does not alter the responsibility of an NPDES permittee to comply with the terms of that regulatory document. NPDES permittees participating in trades are responsible for the quantity and quality of the credits even when a third party acts as an aggregator or reviewer of credits.

2.2. Location: Trading area

The trading area for this Framework is the Lower Boise River watershed (*see* Figure 2.2), as delineated by DEQ in the TMDL (DEQ, 2015). The lower boundary of the trading area is the confluence of the Snake and Boise Rivers. The upper boundary of the trading area is Lucky Peak Dam. Eligible Projects in this trading area can generate credits for eligible permittees in this trading area.

This is consistent with the U.S. EPA Water Quality Trading Policy (EPA, 2003), which states: "All water quality trading should occur within a watershed or a defined area for which a TMDL has been approved…." The Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015) covers the area delineated in Figure 2.2

To TAC Reviewers: There were some comments about adding Sand Hollow into the trading area. Sand Hollow is within the watershed boundary (HUC) of the Lower Boise River, but drains directly to the Snake River. TAC participants noted that Sand Hollow is likely hydrologically connected to the Boise River due to close proximity and possible groundwater interactions.

Question to reviewers: Should credits generated in Sand Hollow be used to meet discharge requirements in the Boise River?

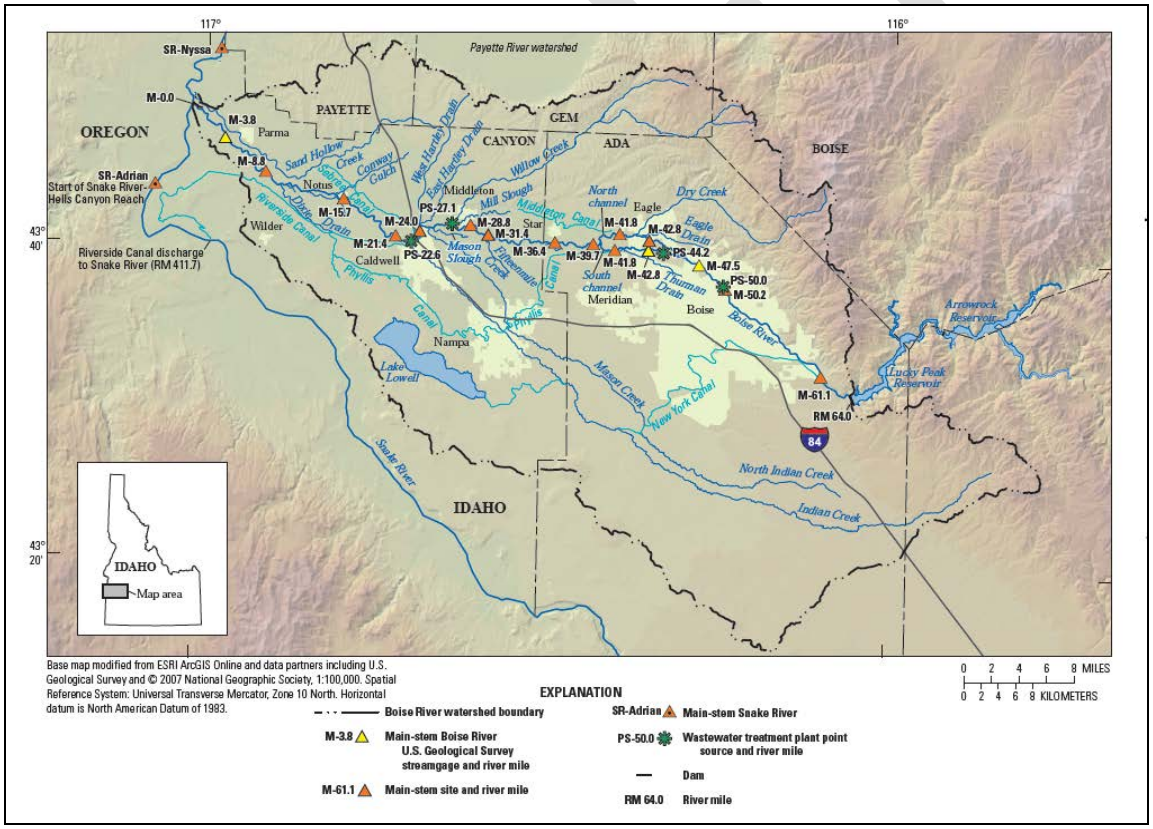
The following is from DEQ response to comments in the 2015 TP Addendum:

Sand Hollow Creek was removed from the TMDL because it is a tributary to the Snake River, and thus should be addressed in a separate TMDL Addendum to the Snake River Hells Canyon TMDL. A Separate plan will be completed to address the tributaries to the

LBR that are impaired for cause unknown—nutrients suspected. Additionally, a separate plan will be completed to address the cause unknown—nutrients suspected impairment in Sand Hollow Creek

Even with this not being a TMDL for Mason Creek, the loading analysis and allocations for Mason Creek did not change for winter or summer months. Because the loading analysis and allocations for Mason Creek were included in this LBR TMDL, trading in that watershed was not jeopardized. Sand Hollow Creek was completely removed from this TMDL and is more appropriately addressed in addendum to the Snake River Hells Canyon TMDL

Figure 2.2. Trading Area



2.3. Eligible Pollutants & Credit Life

This framework currently supports trades for the following credit types[4]:

To TAC Reviewers: TAC Participants expressed interest in adding sediment as a tradable pollutant in this version of the Framework. In June 2015, A TMDL addendum for sediment and E. Coli was completed for the Lower Boise River. The TMDL notes that multiple projects have already been implemented by point sources and according to the calculation and assignment of waste load allocations, all wastewater treatment plant point sources currently meet their allocations and therefore no reductions are necessary (at this time). It also notes that Stormwater point sources require more data to know whether they meet their wasteload allocations and that data will become available in future permit cycles (5-10 years).

The structure of the framework would allow for the addition of sediment now or in the future, however to include it at this time would require a moderate amount of effort including:

Trading area: Review of sediment TMDL to determine eligible trading area

Baseline: Review of sediment TMDL and collaboration with stakeholders and EPA to derive requirements for individual participants.

Determine credit life: Identify watershed dynamics that drive sediment transport from point and nonpoint sources and the time period on which they operate. Identify residence time of sediment loads from various sources.

Completing the necessary technical review to set a reasonable credit life and working with EPA and stakeholders to derive baseline are the most significant tasks and may delay the completion of a final Framework. Setting the trading area should be straightforward. Other trading program components, like development of a quantification method or BMP list, are not listed because the information can be easily adapted from the Framework for total phosphorus (e.g., SISL can calculate sediment loss).

Given that there is no current demand for sediment credits, benefit of including at this time may not equal the efforts required to include as a tradable pollutant at this time.

[4] Other credit types can be added to the Framework in future updates.

Table 3.2 Total phosphorus credits eligible under this Framework

Credit Type	Unit	Time	Credit Life
Total phosphorus (TP)[5]	lbs	per year	1 year

Credit Life: Total phosphorus

A credit's "life" is the period from the date it becomes usable by a permittee for compliance purposes through to the date when it expires and is no longer valid for compliance purposes. Credit life needs to be based in science and tied to the critical period(s) for a watershed.

For this Framework, a nonpoint source credit produced in any one month can be used to offset discharges throughout a permittee's 12 month compliance period. This reflects complex groundwater interactions and numerous diversions of surface water with associated return flow in the Lower Boise River watershed[6].

Applying credits to monthly permit limits

If permit limits and exceedances are calculated on a monthly—instead of annual—basis, the permittee should aggregate its monthly permit limit exceedances into an annual total to compare against annual credit totals from nonpoint sources. Annual credits can be used to offset the 12-month total of monthly permit exceedances.

[5] Total phosphorus (TP) includes all chemical forms of phosphorus. The Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015) is written for TP. There is not sufficient understanding or data to account for dissolved and particulate phosphorus differently (WP, 2015). Permit limits are typically written for TP.

[6] Specifically, water that is diverted from the mainstem (and the associated phosphorus load) accumulates in shallow groundwater during the irrigation season and then permeates to the Boise River year round in "base flow" (WP, 2015). The result is that point source phosphorus loading and nonpoint source phosphorus reductions are released relatively evenly throughout the year (WP, 2015; Etheridge, MacCoy & Weakland, 2014; Etheridge, 2013). As a result, there is no need for seasonal credits.

3. Trading Eligibility

3.1. Eligibility for Credit Buyers

Proposed trades are described in a trading plan, which is reviewed by EPA and DEQ as part of the procedures for NPDES permits. A permittee's trading plan may incorporate the terms of this watershed trading framework by reference, or it may include all specific details within the permit itself. Trading plans must include the following elements, many of which are addressed in this Framework:

- *Trading area*: Justify and describe how designated uses will be protected.
- *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).
- *Description of credit quantification methodology*: Describe how pre- and anticipated post-project conditions are modeled; how credit values are derived; how baseline is accounted for.
- *Trading ratio*. Articulate assumptions, calculations, and components.
- *Allowable project types*: Identify quality and performance standards.
- *Credit life*: Identify 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*: Identify which entity will perform, the frequency, and the standards by which performance is judged.
- *Credit tracking*: Identify where information on trades will be made available.

3.1.1. Meeting Technology-Based Effluent Limitations (TBELs)

The CWA requires point sources to meet the more stringent of TBELs or WQBELs. A point source that has attained applicable TBEL requirements, if any, can obtain credits to achieve its WQBELs.

3.1.2. Avoiding localized impacts

A permit's trading plan needs to analyze the potential for localized impacts and be specific about measures and/or monitoring that will be completed to ensure there are no localized impacts. A localized impacts assessment should address the following:

- Near-field analysis of potential impacts on local aquatic biota from a facility's effluent.
- Comparison of effluent data to relevant regional numeric nutrient criteria.
- Consideration of all parameters that may a negative impact on biota: chlorophyll-*a*, turbidity, dissolved oxygen, pH, biological oxygen demand (BOD), indices of biotic integrity for macroinvertebrates or fish.

3.1.3. Compliance with Antidegradation and Anti-backsliding

No trades can lower existing water quality (anti-degradation) consistent with 40 CFR §131.12 (anti-degradation), CWA §402(o) and 40 CFR §122.44(l) (anti-backsliding), and related state requirements. These criteria will be assessed and documented in individual permits, licenses or orders where trading is being considered. The Lower Boise River Total Phosphorus TMDL addendum analysis should be used to support this analysis.

3.2. Project Eligibility for Credits

Both point sources and nonpoint sources are eligible to generate credits. However, not all projects can create credits. There are several checks that make sure projects create pollution reductions that lead to the water quality improvements consistent with permit requirements and TMDL goals:

- *Project site is "hydrologically connected" to the Lower Boise River system*: A hydrologic connection simplifies ratios and credit quantifications. Hydrologic connection between a site and the Lower Boise River system can be demonstrated through connection to a tributary, drain, canal, and/or lateral as identified in the National Hydrography Dataset flowlines, and those identified by Idaho DEQ (available upon request), or where it can be otherwise demonstrated by the project developer that a conveyance (e.g., ditch, drain, pipe) or other direct connection is in effect (The Freshwater Trust, 2015).

Alternately, we can use more restrictive language above to disqualify sites that do not have a direct hydrological connection.

To TAC Reviewers: Hydrologic connectivity in this context means conveyance of pollutants from a land area to the Lower Boise River. The analysis completed by the Freshwater Trust used available data to make a determination of hydrologic connectivity via surface water, but recognizes this does not capture subsurface connections nor addresses reuse of irrigation water. Therefore, the language "where it can be otherwise demonstrated" captures the opportunity/responsibility of a project

developer to demonstrate connectivity by a process other than use of the National Hydrography Dataset flowlines.

- *Project uses an approved project type~~BMP~~ and updated Quality Standards*: Project types that generate credits need to be supported by enough information about efficacy and implementation to ensure that they deliver the promised water quality benefits. Credits can be generated from project types and associated quantification methods pre-approved by DEQ (Appendix A) or from innovative project types approved through the process outlined in Section 10.1 of this Framework.

  While updating this Framework, we will review and update, if needed, the BMP information developed by Dr. Carter in 2000 and include it as Appendix C.

- *Credits come from project types installed after a base year*: Projects implemented after December 31, 2012, the data year used to build~~approval date of~~ the Lower Boise River Total Phosphorus TMDL addendum (DEQ, 2015) may be eligible to generate credits.

To TAC Reviewers: We had thought of setting this to 2015 (TMDL approval date). If we use 2012, we might want to limit to high priority project types, limit the % of credits a buyer can use from this period, or not worry about it. A limitation to the "look-back" approach may be that the information and records necessary to calculate pre-project conditions may be missing or incomplete.

- *Projects are consistent with other laws*: To generate a credit, a project should comply with applicable federal, state, and local requirements necessary to implement the project.

3.3. Point and nonpoint source credit baseline

Both point and nonpoint sources need to meet some minimum requirements prior to selling credits. These minimum requirements are known as "baseline." For point sources, the baseline requirement is that all applicable TBELs must be met prior to generating credits. Point sources under a compliance schedule cannot generate credits until they have reduced pollutant loading beyond the final effluent limits in their permit. For hydroelectric facilities, the baseline requirement is that all 401 license conditions must be met prior to generating credits.

To TAC Reviewers: Strong TAC comments were received **for and against** allowing point sources to trade unused wasteload allocations. This section may need additional information to clarify trades resulting from reduced wasteloads versus un-used wasteloads if one exists.

This would be the place to restrict sales of unused point source Wasteload Allocation. For example, "Point sources that have closed operations or ceased discharge altogether cannot sell credits for their unused wasteload allocation. There are times where point sources have additional wasteload allocation to accommodate growth or severe environmental conditions. Point sources may sell credits for this unused wasteload allocation if they can demonstrate net environmental benefit."

For nonpoint sources, this Framework establishes staged baseline obligations for different trading-related implementation windows consistent with the Lower Boise River Total Phosphorus TMDL addendum. This addendum acknowledges that it "may take decades" to achieve the targets established in the TMDL and therefore relies on a "staged implementation strategy" (section 5.5.1). In particular, the TMDL notes that "[i]f trading has been authorized in the area covered by this TMDL, any phased implementation plan targets for meeting load allocations may be used to derive trading baseline requirements for individual landowners wishing to sell water quality trading credits" (section 5.5.2). This phased approach to baseline for nonpoint sources is consistent with national EPA policy (EPA, 2006).

To account for the time it takes to plan, receive local government approval, integrate trading into permits, and develop the systems necessary to implement trading, each phase runs for ten years.

Stages of the nonpoint source baseline are described below for on-farm BMPs ~~and~~, in-drain treatment projects, stormwater, and septic system upgrades. All baseline requirements are summarized in Table 3.5.

To TAC Reviewers: "In drain" treatment projects may not be the right term. We are also considering "in-stream" or other terms that will better convey this class of actions. In order to add stormwater bmps and septic system upgrades, will need to have corresponding quality standards, quantification methods, design guidelines and associated documentation similar to those prepared by Dr. Carter (2002) and the Freshwater Trust for agricultural BMPs. Do these exist? Or are they worth incorporating at this time?

- Stage 1 (2015–2025)
    - *On farm BMPs*: Participating landowners have completed a~~develop a~~ conservation plan[7] consistent with NRCS guidelines covering the entire agricultural operation.[8]

TAC Reviewers: Based on discussions, many want to add components to Stage 1 baselines beyond conservation plan, such as soil and moisture testing.

TAC Reviewers: We do not include reference to "nutrient management" as part of the conservation plan, because the term so strongly implies the NRCS practice standard (590). In this definition, we chose to refer instead to the general idea of having some form of documented plan for or record of nutrient application. That is the general idea of 590 as well, but excluding the mention of 590 from the description of a conservation plan would allow for more flexibility in the development of the conservation plan framework.

The conservation plan is the foundation for achieving progress toward the load allocations because it: 1) provides landowners with information on how to improve yields, reduce water use, and improve conservation overall; 2) cultivates additional landowner awareness about the effect of current practices on local waterways and potential operational efficiencies; and 3) fosters relationships between landowners and local NRCS and conservation district staff, who can provide technical assistance and access to other programs that support pollutant load reductions (e.g., Farm Bill and other cost share programs).

TAC Reviewers: This first stage also provides an opportunity for DEQ and EPA to capture consistent, quantifiable information about current practices.

[7] A "conservation plan" is the formal documentation of the condition of soil, water, and other natural resources on a given farm or ranch, along with the land manager's plans for maintaining or improving the condition of these resources moving forward. A conservation plan may include the following: resource inventory checklist, soil test results, nutrient management planning, livestock grazing schedule, irrigation schedule, conservation program participation, and/or an evaluation of potential resource concerns. The goal of a conservation plan is to increase the long-term productivity of the farm or ranch by planning for and documenting progress toward the sustainable use of its natural resources. Farm managers should consult with local organizations (e.g. NRCS, SWCDs, FSA) in the development of a conservation plan for their operation. Conservation plans may be developed by NRCS staff or by an NRCS-certified technical service provider.

[8] The purpose of this operation-wide requirement is to ensure that that the credited activities have not displaced water quality impacts elsewhere within the operation.

- *In-drain treatment*: Participating project developers may use the estimated efficiency rates for watershed- and field-scale sediment basins (found in Appendix A of this Framework). Project developers have completed an operation and maintenance plan, including a direct measurement plan to determine the actual TP reductions associated with the project type. This provides concrete data regarding the effectiveness of the practice in the Lower Boise system.

- Stage 2 (2026-2035):
  - *On-farm BMPs*: Participating landowners have a conservation plan consistent with NRCS guidelines for their entire agricultural operation and implement at least one approved BMP (Appendix A) affecting the site where credits will be generated. The reductions from this baseline BMP make progress toward the TMDL load allocations. The pollutant load reductions generated from the non-baseline BMP are creditable.[9]
  - *In-drain treatment*: It is not possible for these project types to add another project type. Instead, XX% of credits, based on one half of the load reductions expected in load allocations will be set aside, or retired, to meet baseline requirements.

TAC Reviewers: It came to our attention recently that the on-farm BMP-based approach to baseline does not apply to in-drain or in-stream treatment projects, for which considerable interest has been expressed by stakeholders. At this time, we have not settled on a particular approach. Here are the ones currently being considered:

There is a zero baseline for in-drain projects and these projects do not contribute progress toward the Load Allocation.

The following options assume that in-drain projects are subject to the Load Allocation.

TMDL addendum calls for between 69-73% reduction from nonpoint sources. For simplicity, that might be 35% and 70% of the total load for stages 1 and 2.

Apply these same baseline reductions (35% and 70%) as a % of the reduction instead of a % of the total load passing through the treatment facility.

Focus on equity between on-farm and in-drain projects and use %s similar to the baseline proposed for on-farm BMPs. For example, 50% in Stage 1, 75% in stage 2.

- Stage 3 (2036-onward):

[9] Appendix B4 provides more information on calculating the load reduction from two overlapping or non-overlapping BMPs.

- *On-farm BMPs*: Credits can be generated from BMPs the improve water quality in shallow groundwater. Dissolved phosphorus delivered to the river system via shallow groundwater is understood to be a significant factor in nonpoint source loading (DEQ, 2015; WP, 2015). By this third stage, there should be a better understanding of the interaction between BMPs and shallow groundwater. To meet baseline, BMPs will need to be in place to achieve the load reductions from surface water runoff assumed in the TMDL load allocations.
- *In-drain treatment*: These project types cannot add another project type. Instead, XX% of credits, based on achieving the full load reductions expected in load allocations will be set aside, or retired, to meet baseline requirements.

Table 3.3 Baseline requirements

This table largely repeats the text above and will be considered for removal.

Seller Type	Baseline for Seller	Eligible credit-generating actions	Timing	Source of baseline
Point source	Effluent limits in their NPDES permit	Pollution reductions beyond permitted effluent limits	Prior to generating credits	NPDES permits
Hydroelectric facility	401 license conditions	Pollution reductions beyond license conditions	Prior to generating credits	401 certification
Nonpoint source (on farm)	**Stage 1:** Completed conservation plan[10]	All pre-approved BMPs	2015–2025	TMDL load allocation goals, state and local regulations.
	Stage 2: 1. Completed conservation plan	All pre-approved BMPs	2026–2035	

[10] A "conservation plan" is the formal documentation of the condition of soil, water, and other natural resources on a given farm or ranch, along with the land manager's plans for maintaining or improving the condition of these resources moving forward. A conservation plan may include the following: resource inventory checklist, soil test results, nutrient management planning, livestock grazing schedule, irrigation schedule, conservation program participation, and/or an evaluation of potential resource concerns. The goal of a conservation plan is to increase the long-term productivity of the farm or ranch by planning for and documenting progress toward the sustainable use of its natural resources. Farm managers should consult with local organizations (e.g. NRCS, SWCDs, FSA) in the development of a conservation plan for their operation. Conservation plans may be developed by NRCS staff or by an NRCS-certified technical service provider.

	2. One BMP in the area or field where credits will be generated			
	Stage 3: 1. Completed conservation plan 2. BMPs to control surface runoff in the area or field where credits will be generated	BMPs that address groundwater loading	2036–onward	
Nonpoint Source (In-drain)	**Stage 1:** Develop and implement direct measurement plan to determine TP reductions.	All pollutant reductions	2015–2025	TMDL load allocation goals, state and local regulations.
	Stage 2: XX% of credits set aside based on ½ of load allocations	All pollutant reductions after baseline has been met	2026–2035	
	Stage 3: YY% of credits set aside based on meeting load allocations	All pollutant reductions after baseline has been met	2035–onward	

3.4. Use of public conservation funds and credit stacking

Credits need to come from projects creating new (or "additional") water quality benefits." Projects created to mitigate wetland impacts (credit stacking) or funded fully with public conservation funds like EPA 319 dollars were not designed to generate water quality *credits*, even if they create water quality *benefits*.

The portion of projects used for compliance/generating credits cannot be funded with cost share or other public conservation funds.[11] Public conservation funds CAN be used to help nonpoint sources meet baseline requirements (*see* Section 3.5).

There is a lot of value in leveraging multiple funding sources to create bigger, more beneficial projects. The credit buyer will just need to demonstrate that they meet the requirements above. Proportional accounting is one way to show how credits generated from a project site are subdivided proportionately according to financial contribution (see WP et al., 2014). For example, if NRCS' Environmental Quality Incentives Program (EQIP) cost shares 50% of a sediment basin, and a farmer pays for 50%, then the farmer

[11] Public conservation funds are defined here to include those targeted to support voluntary natural resource protection and/or restoration. Public loans intended to be used for capital improvements of public water systems (e.g., state Clean Water Revolving Funds and USDA Rural Development funds) and utility sewer, stormwater, and surface water management fees are not considered public funds dedicated to conservation.

could sell 50% of the total credits from the project. This means that if the project generated 10 remaining pollutant reductions, only 5 could be sold as credits (assuming other adjustments have been applied or were not needed).

TAC Reviewers: This is consistent with the Joint Regional Recommendations and the approach that Oregon took in their recently approved rule.

We know this may be a talking point where the TAC wants to take a different direction. We will definitely discuss this at the March 28 TAC meeting.

4. Total Phosphorus Credit Quantification

If a project type is eligible, the pollutant reductions generated by the BMP must be estimated or measured (quantified) in order to generate credits. Quantification is the process of developing an estimate or measurement of the pollutant reduced at the end of a pipe (point source), or at the edge of a project (nonpoint source). Pollutant reductions can be quantified in several ways to generate water quality credits. The methods currently approved for credit quantification in the Lower Boise River include:

- Surface Irrigation Soil Loss (SISL) model in combination with approved individual on-farm BMP efficiency rates (Appendix A).
- Direct monitoring/measurement of total phosphorus reduction.
- Other quantification methods can be approved using the process described in the Section 10.1 of this Framework.

Quantifying credits using SISL follows the process below:

1. Using SISL, identify the total soil loss associated with irrigation and management practices at the field prior to implementing BMP(s).
2. Apply the appropriate efficiency rate(s) associated with the approved BMP(s) implemented at the field to determine the net reduction in total soil loss between pre-BMP and post-BMP conditions.

   *Net reduction in TP = Pre-BMP soil loss (tons) * BMP efficiency rate(s)*
3. Converted into total pounds phosphorus. The total phosphorus credits is represented by the following formula:

   TP Credits (lbs) = Net reduction in sediment (tons) x 2lbs TP/ton sediment

Appendix B provides a detailed description of SISL and its application to quantify TP credits from eligible on-farm BMPs.

TAC Reviewers: See Water Quality Trading Note VI for a discussion on approaches to quantifying water quantity benefits. Direct measurement/monitoring can reduce the uncertainty of measuring water quality benefits. However, like other approaches to quantification, direct measurement/monitoring should include documentation of processes including monitoring protocols, quality assurance plan and maintenance and equipment calibration.

4.5. Trading Ratios

Ratios can adjust credit quantities by either discounting the value of credits produced at the end of a pipe or edge of a field, or by multiplying the number of credits needed by a buyer. Ratios may account for: 1) Delivery from a field to a water body and through a water body; 2) Equivalency between different pollutants (e.g., between phosphorus and nitrogen for dissolved oxygen); 3) Uncertainty (e.g., measurement error); 4) Reserve (e.g., for credit generating project failure or temporary diminishment); and 5) Retirement/Water quality contribution (see EPA, 2007). This Framework will apply two types of trading ratio multipliers to all trades in the Lower Boise River trading area (*see* Table 5).

Table 5. Summary of trading ratios applicable in this Framework

Ratio Type	Ratio Multiplier	Notes
Delivery	N/A	All projects must have a direct hydrologic connection to perennial water bodies, which is a significant portion of land in the Lower Boise River trading area. There is minimal attenuation of phosphorus as loads move through the watershed.[12] Because of the hydrologic connection eligibility criterion and minimal attenuation, delivery ratios are not applied.
Equivalency	N/A	Equivalency ratios adjust between different forms of the same pollutant. This Framework addresses all forms of phosphorus—e.g., dissolved and particulate phosphorus—as total phosphorus because tools are not currently available to distinguish the effect of separate chemical forms of phosphorus. Likewise, this Framework does not currently provide for equivalency between sediment, nitrogen, phosphorus, temperature, or other pollutants affecting algal blooms and dissolved oxygen levels. As a result, equivalency ratios are not included in this Framework at this time.
Uncertainty	2	After a permittee identifies its total annual phosphorus exceedance, that total is multiplied by two (2) to account for uncertainty. This multiplier accounts for the following factors

[12] Willamette Partnership. (2015) Lower Boise Framework Update: Findings and Recommendations. p5-6. Prepared for Idaho DEQ. Available upon request from Idaho DEQ. This Framework eliminates the location ratios by field type and municipal location that were included in the original Lower Boise Trading Framework (2010a).

		(*see* EPA, 2014): • Meteorological conditions; • Variability in project type efficiency rates,[13] operations, and risk that the project type will fail; • Any time lag for restoration projects that take time to mature; • Credit estimation error; • Unknown differences in how dissolved and particulate phosphorus act in the watershed; and • Effects of agricultural water reuse on delivery of pollution reductions to the Lower Boise River.
Reserve	N/A	Point sources are responsible for maintaining their own reserves of credits to ensure compliance. As a result, reserve ratios are not used.
Retirement	0.2	A 0.2 factor is used to ensure that all trades generate a net water quality benefit.[14]

The uncertainty ratio multiplier can be adjusted downward by as much as 0.5, with approval from DEQ and US EPA, if:

- The permittee can demonstrate, through direct measurement, in-stream water quality improvements in a manner that reduces the influence of uncertainty; or
- The permittee agrees to fund and undertake research initiatives investigating the effectiveness of project types at reducing dissolved phosphorus loads within subsurface and baseflow.[15]

TAC Reviewers: Consider whether just one or both of the conditions above should be met prior to providing discounted ratios. Also considered for inclusion was investing in watershed-level effectiveness monitoring to show overall progress toward TMDL goals across all programs.

[13] The BMP-specific uncertainty ratios included in the original Lower Boise Trading Framework (DEQ, 2010a) and discussed by The Freshwater Trust (TFT, 2015) are incorporated into and covered by this 2:1 uncertainty multiplier. As such, BMP-specific uncertainty factors are not applied when calculating credits generated from individual fields.

[14] This value is consistent with the nonpoint source water quality contribution required under the original Lower Boise Trading Framework (DEQ, 2010, Sec 2.2.7)

[15] The Lower Boise River Total Phosphorus TMDL addendum identifies groundwater as a significant source of phosphorus loading (DEQ, 2015). However, credits cannot currently be generated by reducing phosphorus loading to groundwater because quantification methods approved for use under this Framework do not provide estimates of how it groundwater affected by BMPs.

Ratios will be reviewed in conjunction with the issuance and renewal of NPDES permits for point sources, and through license or order procedures.

~~5.~~6. Credit Characteristics

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

- *Credit life*: The life of a credit is described in Section 2.3 of this Framework, unless otherwise described for a certain project type in Appendix C.
- *Credits can be released when verified*: Most project types will start generating water quality improvements immediately. All credits can be released and used for compliance purposes as soon as these projects have been implemented and verified as consistent with a project design and management plan (Section 7.1 of this Framework) and the associated project type quality standards (Appendix C).
- *No double counting credits*: The environmental benefits generated from a project type on one land area cannot be sold to two different credit buyers to offset two different impacts.
- *Credits are not property rights in the same way land and water rights are.* 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.

TAC Reviewers: Consider if/how we need to be more sensitive in the statement above to the concerns of landowners regarding property rights issues.

- *Credit Banking:* Credits cannot be banked for use outside of the approved credit life (e.g., a pollutant reduction in 2012 cannot be used to offset a discharge in 2016).
- *Credit Renewal:* Projects can be renewed to generate credits in subsequent compliance cycles so long as they continue to function and are properly maintained (though the reductions may need to be adjusted to reflect the ratios and baseline requirements that apply at that future point in time).

~~6.~~7. Project Implementation and Assurance

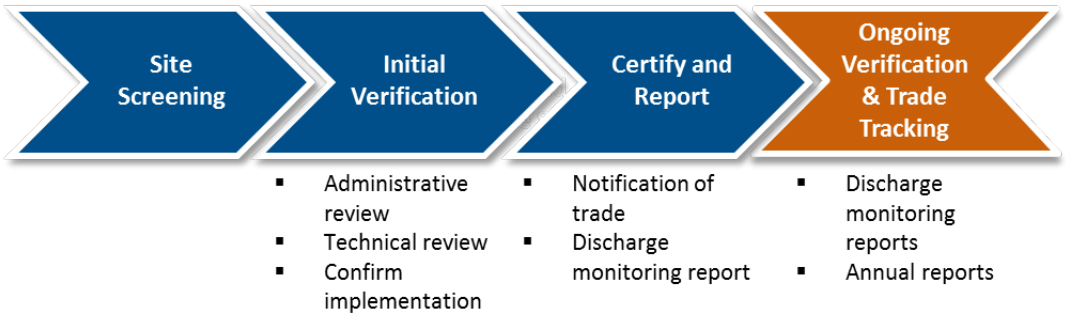
All credit-generating projects must be accompanied by a Project Design and Management Plan (Plan), prepared by a qualified individual (e.g., an NRCS certified planner or an NRCS employee or a certified crop advisor) (*see* Appendix C for qualifications). Some project types, such as constructed wetlands, may require consultation with other experts regarding the project's design, installation, and maintenance requirements.

Once installed, projects are expected to be be maintained in accordance with the Project Design and Management Plan. Project developers must demonstrate that adequate funding and resources will be available to steward project sites for the duration of the project life.

Adequate land stewardship safeguards must be in place to protect the project from conversion for the duration of the project life. The protection period for each project is described in Appendix A, Table A1 (e.g., annual (1), five (5) or twenty (20) years). These minimum time periods recognize the balance between maintaining operational flexibility for sellers and the need to provide some certainty for buyers.

~~7.~~8. Process for Generating and Tracking Credits

This section describes the standard process to generate, review, and track credits over time.



a. Initial Project Screening

All projects can optionally undergo an initial project screening to determine eligibility. Project screening does not guarantee a project will be verified, but may help developers avoid unnecessary costs. Basic eligibility criteria for non-point sources are listed in Section 3.4 of the Framework. Project developers should also reference Appendix A for project types approved for credit generation. If initial project screening is requested, the project developer should submit the following documentation with a request for project screening:

- Draft Project Design and Management Plan;
- Draft project protection (e.g., lease, easement, etc.); and
- Summary of project eligibility relative to requirements in this Framework.

Complete information is required for accurate evaluation of project eligibility. A positive screen result represents only a preliminary determination of the project's eligibility to generate credits. The type, quantity, and final approval of credits are confirmed in later phases of the credit cycle. Where a project does not receive a positive screen result, a justification and suggestion for remedy will be provided.

b. Initial Verification

TAC Reviewers: The presumption in the following sections is that DEQ will issue an RFP and select a designated entity to conduct verification and track trades.

In the first year for all credit generating projects, a DEQ-designated verification entity will conduct a project review (initial verification). That initial verification will include:

- *Administrative Review*: Confirms project eligibility. [This step may be expedited if the initial project screen has occurred].
- *Technical Review*: Confirmation that credits were quantified accurately.
- *Confirmation of Successful Project Implementation*: Confirmation that the project was installed (via a site visit or other means) consistent with approved eligibility, design and construction criteria for that project type (see Appendix C), and that baseline requirements have been satisfied. For point sources, confirm from DMRs the pollutant load reductions.

c. Ongoing Verification

Ongoing verification will occur on a cycle described for each project type in Appendix C. To confirm that projects are being maintained and functioning as promised, a DEQ-designated verification entity will conduct reviews of some or all nonpoint source credit projects on the schedule described for each project type in Appendix C. In addition, EPA, DEQ, or DEQ's designee, may visit the project sites to verify the documentation of the project design, maintenance, and monitoring performance.

TAC Reviewers: Landowners probably won't be excited about the possibility that EPA or DEQ might visit a project. But, we've found in other programs that agencies likely need to reserve that ability, even if they never intend to use it, to make sure they can meet their program authorities. This last piece is likely to be of interest for the WAG

d. Forms and Reporting

After Initial Verification, and when credits are ready to be issued, the verification entity will certify that all aspects of the projects are in place and provide a certification of the pollution reduction credit to DEQ to register the credits into its trade registry.

Trading parties must generate and maintain records which may include the project's verification report, certification, and other relevant information needed to register credits. Records shall be maintained in accordance with applicable record retention policies.

To DEQ: Are there other records retention requirements that would be applicable to cite to here?

In addition, the permittee will need to provide a Discharge Monitoring Report and Annual Report associated with any trading activity.

A. Discharge Monitoring Reports

If trading occurs, a point source discharger will report its actual average monthly effluent discharge, the amount of credits sold or bought for that period, and its adjusted discharge (the actual discharge plus or minus any credits traded). Trading activity must be summarized for DEQ in the following month's DMR report.

TAC Reviewers: This submittal date gives a point source discharger time to complete sample analysis for any nonpoint source monitoring conducted near the end of the month and find replacement credits if its credit need has not been met.

A permit violation occurs when the amount of the point source's actual discharge exceeds the amount of its base limit plus the amount of purchased credits minus any credits sold.

B. Annual Report

The discharger must also submit an annual report to DEQ detailing all trade activity for the reporting period as well as performance of the associated credit generating projects. The credit adjustments shown on the DMRs must match the credit totals shown in the Annual Report.

e. Trade Tracking Database

DEQ is responsible for tracking trades and the day-to-day oversight of trading. DEQ may authorize a third party to assist with those tasks. All trade transactions must be entered into a single trade tracking database. Use of a single trade tracking database for the Lower Boise River trading area ensures:

- Credits are not used more than once;
- All credits meet the same verification standards prior to being registered and sold;
- Trading activity (e.g., account balances, transaction records) can be readily tracked; and
- DEQ and public can easily review of trading programs.

~~8.~~9. Compliance and Enforcement

Compliance will be ascertained through the permittee's DMR and annual reports, which shall demonstrate that it has secured and continues to hold an adequate credit balance to meet its established effluent limits. Enforcement of the trading program as detailed in this Framework shall be consistent with EPA and DEQ enforcement policies and guidance.

To DEQ: Please add additional information from state guidance or permit enforcement that may be appropriate and relevant.

~~9.~~10. Program Improvement and Tracking

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 includes processes to improve the elements of trading guidance, frameworks, or plans with new information over time and may focus on improving program operations, trade administration, quantification methods, and overall effectiveness.~~.~~

a. Adding new ~~BMP~~ Project Type and/or quantification method

Quality standards development is essential for consistently and legitimately translating ecological benefit into a credit that can offset a regulated impact. These quality standards can be used in site screening, site design & implementation, verification, certification, and registration to predictably and fairly operate across watersheds as applied to different permittees. A list of approved on-farm BMPs for this Framework can be found in Appendix A. This list sets out which BMPs are currently recommended for trading in this trading area. Appendix C describes each BMP's quality standards.

New creditable project types may be developed and added to the Lower Boise Trading Framework by following the steps outlined in Table 10. Project type revisions may be triggered by monitoring results or any other monitoring of the project type's overall effectiveness and impact on other environmental parameters, as well as through research of the project type's performance on other sites.

TAC Reviewers: This is a skeleton process that follows the current State Guidance on approving new types of BMP and Quantification Methods (Chapter 7). Additional information needs to be added.

Table 10 Adding new, creditable on- and off-farm project typs

Process Step	On-Farm Projects	Off-Farm Projects
Step 1: Prepare and Submit Proposed Project Type Package	New practices, existing practices already on the Idaho Agriculture Pollution Abatement Plan[16] (APAP) list (ISWCC-DEQ 2015), or improved design, measurement, or calculation methods to BMPs already on a DEQ-approved BMP list may be nominated by anyone for inclusion on a trading framework's BMP list. Each proposed BMP package must contain 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 (e.g., background and technical documentation, protocol for applying the method, estimation of method accuracy, sensitivity, and uncertainty). The proposed BMP package must be submitted to DEQ or its designee.	New project types, existing projects already approved under this trading framework, or improved design, measurement, or calculation methods to project types may be nominated by anyone for inclusion on a trading framework's list. Each proposed project package must contain a description of the project and how it works; where it 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 project efficiency or uncertainty ratio; and substantiating information (e.g., background and technical documentation, protocol for applying the method, estimation of method accuracy, sensitivity, and uncertainty). The proposed project package must be submitted to DEQ or its designee.

[16] 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.

Step 2: Initial Screening of Project Type Proposal	DEQ or its designee will perform an initial screening of the package for completeness. DEQ then forwards complete packages for review by Idaho's BMP technical committee, which is 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 nonpoint source BMPs.	DEQ or its designee will perform an initial screening of the package for completeness. Additional technical experts may be engaged to review any proposed quantification methods.
Step 3: Review Process and Criteria for Project Type Consideration	This section describes the recommended process for reviewing BMPs. The BMP technical committee will review the package. If the proposed BMP is already included in the APAP, the committee will only review the water quality trading portion of the BMP package and related supporting documentation for its 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 water quality trading BMP list if it is found acceptable. If the proposed BMP involves new technology or methods for which data and experience are insufficient to support credit quantification, the BMP will initially be 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 type of crop planted or field size, it may only be allowed using modeling or BMP efficiency	DEQ or its designee will review the content of the proposed project package. If the proposed project involves new technology or methods for which data and experience are insufficient to support credit quantification, the project will initially be approved only if the pre and post project conditions can be directly measured and if the monitoring is scientifically credible and not cost prohibitive.

	rates.	
Step 4: DEQ Concurrence, Public Notice and Comment	If the BMP technical committee recommends the BMP, it is forwarded to DEQ to conduct a public notice and comment period. Comments will be limited to the new BMP and not to the program or the list of BMPs that have already been approved for that trading framework or plan.	If DEQ or its designee initially approves the project type, a public notice and comment period will be conducted. Comments will be limited to the new project type and not to the program or the list of project types that have already been approved for that trading framework or plan.
Step 5: Final Decision/Addition to creditable Project Type List	DEQ will revise the project type based on public comments, in consultation with the technical experts, and issue its final decision. If it is approved, the project type and associated quantification method will then be placed on the appropriate project type lists for a trading framework or plan. Revisions to project types, revisions to a quantification method, or a new quantification method for a project type that has already been approved will follow the same process as for adding a new project type. Project type revisions may be triggered by the monitoring results or any other monitoring of the project type's overall effectiveness and impact on environmental parameters, as well as research of the project type's performance on other sites.	

References

Bjorneberg, D. L., Prestwich, C. J., & Evans, R. G (2007). Evaluating the surface irrigation soil loss (SISL) model. Applied Engineering in Agriculture, 23(4), 485–491.

Etheridge, A.B. (2013). *Evaluation of Total Phosphorus Mass Balance in the Lower Boise River, Southwestern Idaho*: U.S. Geological Survey Scientific Investigations Report 2013-5220.

Etheridge, A.B., MacCoy, D.E., and Weakland, R.J. (2014). *Water-quality and biological conditions in selected tributaries of the Lower Boise River, southwestern Idaho, water years 2009–12*: U.S. Geological Survey Scientific Investigations Report 2014-5132.

Idaho Dep't of Environmental Quality (2000). Lower Boise River TMDL (Sediment, Bacteria). Available at https://www.deq.idaho.gov/water-quality/surface-water/tmdls/table-of-sbas-tmdls/boise-river-lower-subbasin/.

Idaho Dep't of Environmental Quality (2010a). Water Quality Pollutant Trading Guidance, with attached Lower Boise Trading Framework. Available at https://www.deq.idaho.gov/media/488798-water_quality_pollutant_trading_guidance_0710.pdf.

Idaho Dep't of Environmental Quality (2010b). Idaho Section 401 Certification Guidance. Available at https://www.deq.idaho.gov/media/516305-401-certification-guidance-0912.pdf.

Idaho Dep't of Environmental Quality (2012). Idaho's Integrated Report. Available at http://www.deq.idaho.gov/media/1117323/integrated-report-2012-final-entire.pdf

Idaho Dep't of Environmental Quality (2015). Lower Boise River TMDL: 2015 Total Phosphorus Addendum. Available at https://www.deq.idaho.gov/media/60177413/lower-boise-river-tmdl-total-phosphorus-addendum-0815.pdf.

Ross & Associates Environmental Consulting (2000). Lower Boise River Effluent Trading Demonstration Project: Summary of Participant Recommendations For a Trading Framework. Final Report, (September 2000). Retrieved from http://1.usa.gov/191LSip

The Freshwater Trust (2015). Lower Boise River Technical Analysis: Evaluation of agricultural best management practices, on-field conditions, and hydrologic connection to support water quality trading (available upon request from DEQ).

U.S. Dep't of Agriculture, National Resource Conservation Service (2003). Predicting irrigation induced soil loss on surface irrigation cropland using Surface Irrigation Soil Loss model (SISL). Idaho NRCS Agronomy Technical Note NO. 32 (Rev. 3)

U.S. Dep't of Agriculture, National Agricultural Statistics Service Cropland Data Layer (2005 and 2007-2014). Published crop-specific data layer [Online]. Available at http://nassgeodata.gmu.edu/CropScape/ (verified December 1, 2015). USDA-NASS, Washington, DC.

U.S. Dep't of Agriculture, National Resource Conservation Service, Soil Survey Staff. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed July, 2015.

U.S. Environmental Protection Agency (2003). Water Quality Trading Policy. 68 Fed. Reg. 1608. Available at http://www.gpo.gov/fdsys/granule/FR-2003-01-13/03-620.

U.S. Environmental Protection Agency (2006). Benita Best-Wong memorandum to Water Division Directors re: Clarification regarding "Phased" Total Maximum Daily Loads, August 2, 2006.

U.S. Environmental Protection Agency (2007, updated 2009). Water Quality Trading Toolkit for Permit Writers. Available at http://www3.epa.gov/npdes/pubs/wqtradingtoolkit_fundamentals.pdf.

U.S. Environmental Protection Agency, Region 3 (2014). Accounting for Uncertainty in Offsets and Trading Programs. EPA Technical Memorandum. Accessed 8/19/2015 at http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/TradingTMs/Final_Uncertainty_TM_2-12-14.pdf

Willamette Partnership (2015). Lower Boise Framework Update: Findings & Recommendations (available upon request from DEQ).

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

~~10.~~11. Appendix A: Eligible On-farm BMPs

The following BMPs are eligible to generate credits, pending the development of updated BMP quality standards for each BMP.

Table A1. Eligible BMPs

BMP Type	Approved Quantification Method	BMP Efficiency Rates[17]	Design Criteria	Lifespan
Sediment basin (field scale)	SISL	75%	NRCS 350	20 years
Sediment basins (watershed scale)	SISL	65%	NRCS 350	20 years
Filter strips	SISL	50%	NRCS 393	1 season
Underground outlet (years 1-2)[18]	SISL	85%	NRCS 620	2 years
Underground outlet (after year 2)	SISL	65%	NRCS 620	18 years
Straw in furrows	SISL	85%	NRCS 484	1 season
Sprinkler irrigation	SISL	100%	NRCS 442	15 years
Microirrigation	SISL	100%	NRCS 441	10 years
Tailwater recovery	SISL	100%	NRCS 447	15 years
Surge irrigation	SISL	50%	NRCS 449[19]	1 season
Constructed wetland (farm scale)	SISL	85%	NRCS 656	15 years

[17] These BMP efficiency rates are based on the analysis completed by The Freshwater Trust (TFT, 2015) to update the BMP efficiency rates included in the original Lower Boise Trading Framework (IDEQ, 2010). Unlike the original Lower Boise Trading Framework, the BMP efficiency rates in Table 4.1 do not incorporate BMP-specific uncertainty factors. These have been excluded from the field-level credit calculation process, and are instead incorporated into and covered by the 2:1 uncertainty multiplier (see Section 4.3 of this Framework).

[18] This BMP's effectiveness drops after two years, and so the remaining years of the BMP must be decreased.

[19] NRCS Practice Standard 449 – Irrigation Water Management, includes guidance on a variety of irrigation techniques, including "surge irrigation". Additional information can be found at https://efotg.sc.egov.usda.gov/references/public/ID/449_0312.pdf.

Cover Cropping	SISL	TBD[20]	NRCS 340	1 year
Residue Mgmt (No Till)	SISL	90%	NRCS 329	1 year

TAC Reviewers: The table presented in this draft varies from what was presented in Water Quality Trading Note VI. As the footnote above elaborates, uncertainty ratios were not included in the efficiency rate here and thus the difference.

Other agriculture related project types discussed, but will need additional research to determine if the appropriate level of scientific information, guidelines and quality standards are available.

-Land conservation/restoration

-stream bank restoration, revegetation

-forest buffers

For Resideue Management (No Till) the efficiency rate is based on Dr. Carter's 2002 report. Additional literature review and analysis may be necessary to update.

Table A1 does not include Nutrient Management (NRCS 590) because the efficiency of nutrient management is difficult to estimate due to numerous complexities such as the highly site-specific nature of the practice, and the dynamic and responsive nature of the practice (TFT, 2015). Nutrient management is most effective when used in conjunction with other on-field BMPs. Nutrient management is not assigned an efficiency rate, but is instead considered to be a complementary practice that enhances the outcomes of other BMPs when considered as part of a conservation plan.

For instruction son the application of SISL, see Appendix B.

[20] This BMP was not included in the original 2010 Lower Boise Trading Framework. Based on a literature review, The Freshwater Trust suggested a 60% efficiency rate (TFT, 2015). This efficiency rate should be calibrated and tested through pilots prior to incorporation into Table 4.1.

TAC Reviewers: Other project types were discussed as potential credit generating activities. Similar to on-farm BMP project types these potential credit generating activities will need supporting documentation, design guidelines and quality standard. If direct monitoring/measurement are not feasible, efficiency rates and associated appropriate modeling for determining pollution reduction/credit quantification will be necessary.

In-drain: constructed basins / constructed wetlands (CBCW) and constructed basins/existing wetlands (CBEW)

Stormwater: Detention/Retention, infiltration practices, gsi implementation

Septic - Pumpouts, Connections to Public Sewer, Enhanced Systems (with nutrient removal)

~~11.~~12. Appendix B. SISL Method for Quantifying Total P Reductions

3.5. B1. SISL

The SISL model is an empirical model that was developed and calibrated by the NRCS using over 200 field-years of data from Southern Idaho. The form of the SISL model is similar to that of the Universal Soil Loss Equation (USLE). The model estimates the overall soil loss at the end of a furrow by multiplying a base soil loss value by other adjustment factors to reflect the on-field conditions. The accuracy of the SISL model was confirmed against instream water quality data collected by USGS for Mason Creek (TFT, 2015). The model takes the following form:

$$SISL = BSL \times KA \times PC \times CP \times IP$$

where:

- **Base soil loss (BSL)**: the base soil loss is a function of field slope, field length, crop type, and end of field slope shape (convex end). Embedded within the BSL is the typical irrigation practices (number of irrigations, inflow rate, furrow spacing, irrigation duration, etc.) used for the different crop categories in southern Idaho (Bjorneberg et al., 2007). Base soil loss values for a given field can be determined by locating the value from the below tables corresponding to the correct combination of the following variables: 1) surface irrigation method (gated pipe, siphon tube, or feeder ditch); 2) crop type (permanent cover, close growing, row crop, or intensive row crop); 3) field length (660 feet or 1320 feet); 4) field slope (<1%, 1 – 1.9%, 2 – 2.9%, or > 3%); and 5) end condition (no, moderate or severe convex ends). Examples of specific crops included in each of the four crop type categories are described below.

Crop Type	Field Length (ft)	Base Soil Loss (tons/acre) – Gated Pipe											
		Field Slope											
		<1%			1 to 1.9%			2 to 2.9%			>3%		
		N*	M	S	N	M	S	N	M	S	N	M	S
Permanent cover	660	0.0	0.0	0.0	0.7	0.9	1.3	2.4	3.0	4.3	5.9	7.4	10.3
	1320	0.0	0.0	0.0	0.6	0.7	1.0	1.9	2.4	3.4	4.7	5.9	8.2
Close growing	660	1.2	1.4	1.9	3.4	4.2	4.9	6.7	8.4	11.8	10.9	13.7	19.1
	1320	1.0	1.1	1.5	2.7	3.4	4.7	5.4	6.7	9.4	8.7	11.0	15.3
Row crop	660	2.6	3.3	4.6	9.1	11.4	16.1	19.3	24.2	32.2	29.4	36.8	51.5
	1320	2.1	2.6	3.7	7.3	9.1	12.9	15.4	19.4	25.8	23.5	29.4	41.2
Intensive row crop	660	3.4	4.2	5.9	12.7	16.0	22.3	27.7	34.7	48.5	46.2	57.8	80.9
	1320	2.7	3.4	4.7	10.2	12.8	17.8	22.2	27.8	38.8	37.0	46.2	64.7
* N, M and S refer to none, moderate and severe convex ends.													

Crop Type	Field Length (ft)	Base Soil Loss (tons/acre) – Siphon Tube											
		Field Slope											
		<1%			1 to 1.9%			2 to 2.9%			>3%		
		N*	M	S	N	M	S	N	M	S	N	M	S
Permanent	660	0.0	0.0	0.0	0.7	0.9	1.2	2.3	2.9	4.1	5.6	7.0	9.8

cover	1320	0.0	0.0	0.0	0.6	0.7	1.0	1.8	2.3	3.3	4.5	5.6	7.8
Close growing	660	1.1	1.3	1.8	3.2	4.0	5.6	6.4	8.0	11.2	10.4	13.0	18.2
	1320	0.9	1.0	1.4	2.6	3.2	4.5	5.1	6.4	9.0	8.3	10.4	14.6
Row crop	660	2.5	3.1	4.4	8.7	10.9	15.3	18.4	23.0	32.2	28.0	35.0	49.0
	1320	2.0	2.5	3.5	7.0	8.7	12.2	14.7	18.4	25.8	22.4	28.0	39.2
Intensive row crop	660	3.2	4.0	5.6	12.1	15.2	21.2	26.4	33.0	46.2	44.0	55.0	77.0
	1320	2.6	3.2	4.5	9.7	12.2	17.0	21.1	26.4	37.0	35.2	44.0	61.0
* N, M and S refer to none, moderate and severe convex ends													

Crop Type	Field Length (ft)	Base Soil Loss (tons/acre) – Feeder Ditch											
		Field Slope											
		<1%			1 to 1.9%			2 to 2.9%			>3%		
		N*	M	S	N	M	S	N	M	S	N	M	S
Permanent cover	660	0.0	0.0	0.0	0.8	1.0	1.4	2.6	3.3	4.7	6.4	8.1	11.3
	1320	0.0	0.0	0.0	0.6	0.8	1.1	2.1	2.6	3.4	5.1	6.5	9.0
Close growing	660	1.3	1.5	2.1	3.7	4.6	6.4	7.4	9.2	12.9	12.0	15.0	20.9
	1320	1.0	1.2	1.7	3.0	3.7	5.1	5.9	7.4	10.3	9.6	12.0	16.7
Row crop	660	2.9	3.6	5.1	10.0	12.5	17.6	21.2	26.5	32.2	32.2	40.3	56.4
	1320	2.3	2.9	4.1	8.0	10.0	14.1	17.0	21.2	25.8	25.8	32.2	45.1
Intensive row crop	660	3.7	4.6	6.4	13.9	17.5	24.4	30.4	38.0	53.1	50.6	63.3	88.6
	1320	3.0	3.7	5.1	11.1	14.0	19.5	24.3	30.4	42.5	40.5	50.6	70.9
* N, M and S refer to none, moderate and severe convex ends													

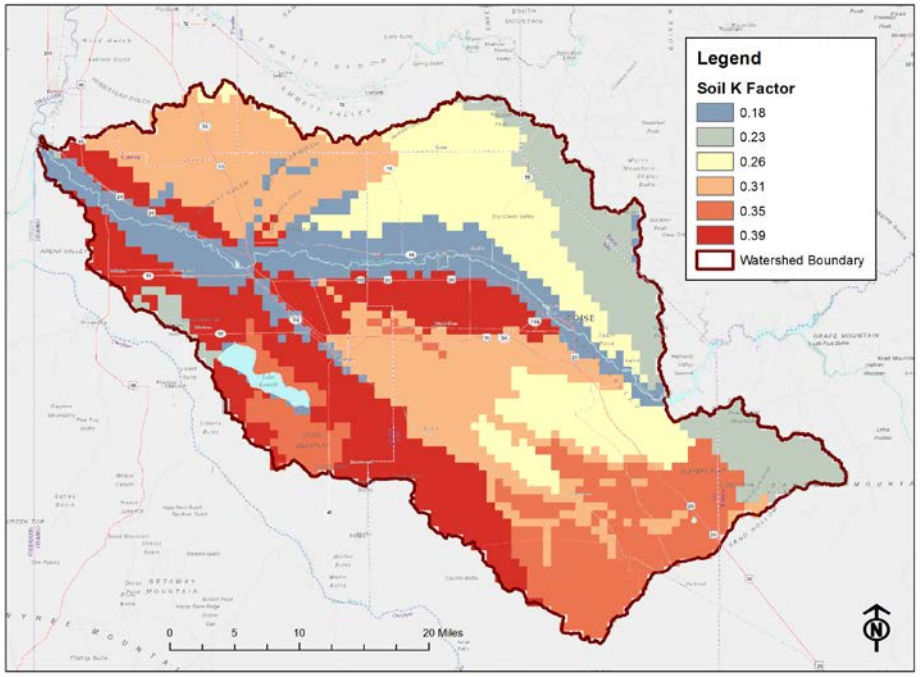
CROP TYPE	Examples
Permanent Cover	Alfalfa, clover/wildflowers, fallow/idle cropland, grapes, herbs, pasture/grass, pasture/hay
Close Growing	Barley, camelina, canola, flaxseed, hops, oats, rye, safflower, sorghum, sunflower, triticale, wheat
Row Crop	Carrots, corn, dry beans, greens, lettuce, mint, mustard, peas, pumpkins, soybeans, watermelons, peppers
Intensive Row Crop	Onions, potatoes, radishes, sugarbeets, turnips

- **Soil erodibility adjustment factor (KA)**: The soil erodibility adjustment factor is based on the NRCS soil erosion "K" factor from USDA soil surveys. The dominant K factors in the Lower Boise River watershed can be found in Figure X below. Once the K factor is estimated based on the map below, this value is then multiplied by 2.04 to get the adjustment factor, KA, for use in the SISL equation.[21]

K Factor	KA (after applying 2.04 multiplier)
0.18	0.37
0.23	0.47
0.26	0.53
0.31	0.63
0.35	0.71
0.39	0.80

[21] The soil erodibility adjustment factor (KA) is based on the soil erosion factor (K factor) from NRCS soil surveys. The KA factor used in the SISL model is the NRCS K factor for the modeled soils, multiplied by 2.04 (NRCS, 2003).

Regarding the K-Factor Guides. This table represents the easiest way for someone to estimate the dominant K factor for their field. There are higher resolution maps of K factors with much smaller pixels, but these would be unwieldy for estimating the dominant K factor for a given field. Instead, TFT looked at the distribution of K factors in the watershed and split it into 6 clumps. The K factors in the map are essentially the average K factor for those clumps. This approach loses some resolution but gains a lot of usability.



- **Prior crop adjustment factor (PC)**: The SISL model includes a prior crop adjustment factor (PC) to account for crop residue from the previous year's crop. High residue crops provide additional resistance to soil erosion.[22]

CROP	PC ADJUSTMENT FACTOR
Pasture	0.65
Alfalfa	0.70
Mint	0.70
Alfalfa Seed	0.75
Small Grain (high residue)	0.75
Corn (high residue)	0.75
Corn silage	0.85
Sugar Beets	1.00
Potatoes	1.00

[22] USDA crop data (USDA, 2005 and 2007-2014) were used to determine the crop type in the previous year, which informed the selection of the PC adjustment factor for that year.

*PC adjustment factors derived from NRCS 2003 data[23]

- **Conservation practice adjustment factor (CP)**: Any variation of conservation practices can be altered through the CP adjustment factor.[24]

CONSERVATION PRACTICE	CP ADJUSTMENT FACTOR*
No conservation practices installed	1.00
Conventional/moldboard tillage	1.00
Residue management (seasonal)	0.20
Residue management (mulch till)	0.15
Residue management (no till)	0.10
Deep tillage	0.50
Alfalfa seed	0.35
Alfalfa hay (more than one year in rotation)	0.20

*CP adjustment factors derived from NRCS 2003 data[25]

- **Irrigation management adjustment factor (IP)**: Typical surface irrigation practices are reflected in the irrigation management adjustment factor (NRCS, 2003). The factor applicable to a particular field will vary depending on the type of irrigation practices being used.

IRRIGATION MANAGEMENT TYPE[26, 27]	IP ADJUSTMENT FACTOR
No irrigation management occurring	1.00
High level irrigation water management w/o cutback	0.90
High level irrigation water management with cutback	0.70
Surge irrigation	0.50

3.6. B2. Sediment Loss to Total Phosphorus Conversion Factor

The SISL model calculates the total soil loss currently associated with surface irrigation practices at the relevant field. For every ton of sediment loss modeled at a field, DEQ assumes that two (2) pounds of total phosphorus are attached (IDEQ, 2010; TFT, 2015).

[23] Need reference from TFT

[24] Because no information is available to suggest if additional conservation practices are being implemented at any particular field, this Framework should assume that only conventional tillage is being implemented. However, if conservation practice(s) are being implemented, then the appropriate conservation practice adjustment factor should be used.

[25] Need reference from TFT

[26] "High level irrigation water management" is a combination of a variety of irrigation methods and technologies used to improve water application efficiency. Additional information can be found at http://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=nrcseprd323426&ext=pdf.

[27] "Cutback" is the reduction of furrow inflow after the flow has reached the end of the furrow. Surge flow and cablegation are examples of cutback systems.

Therefore, in calculating total phosphorus credits, multiply the number of tons of soil loss from a field (e.g., 1.5 tons, not 3000 pounds) by two to translate from sediment loss to attached total phosphorus.

3.7. B3. BMP Efficiency Rates

Assuming an approved BMP is designed, implemented, monitored, maintained, and tracked according to the quality standards outlined in Appendix C, then the total phosphorus reduction potential associated with the field—SISL output in tons soil loss, multiplied by two—is then adjusted by the appropriate "BMP efficiency rate" (see Table 4.1, from TFT, 2015). BMP efficiency rates are not discounted for each field. Instead of discounting BMP efficiency rates to address uncertainty and multiplying the overall obligation for a credit buyer by a 2:1 to account for uncertainty (see Section 4.3 of this Framework), uncertainty is only applied to the credit buyer obligation.

3.8. B4. BMP Efficiency Rates Where Multiple BMPs are Installed

Table A1 above lists the approved BMP efficiency rates for individual BMPs. If multiple BMPs are installed at a field, then the individual BMP efficiency rates must be discounted to account for redundancy associated with simultaneous application of the two practices. Discount rates were developed acknowledging that phosphorus runoff is likely reduced by implementing multiple BMPs, while reflecting the diminishing returns that are likely to be seen with the employment of each additional BMP.

There are two types of "multiple BMP discount factors." Where the BMPs do not overlap spatially and may interact relatively independently (e.g., cover crop installed on upland and sediment basin installed on edge of field), the BMP efficiency rate of the less efficient BMP is discounted by 11% (TFT, 2015). Where the BMPs are spatially overlapping and therefore are more likely to interact (e.g., conservation tillage and cover crops both help to reduce sediment loss on a field by maintaining vegetative cover on the soil surface), the BMP efficiency rate of the less efficient BMP is discounted by 20% (TFT, 2015).

The equations below describe how these discount rates are applied in the calculation of the overall efficiency rate associated with multiple BMPs:

- Equation 1a: Non-overlapping BMPs[28]

  $$E_{1+2} = E_1 + 0.89E_2(1 - E_1)$$

  Where,

[28] Non-overlapping BMPs are pairs of BMPs that are function in discrete physical locations, and/or employ different mechanisms to reduce soil erosion, such as irrigation upgrades (on-field, decreases disruptive force of water application) and filter strips (edge-of-field, creates physical barrier for moving water and sediment).

E_{1+2} = Combined Efficiency of BMPs #1 and #2
E_1 = Efficiency rate of BMP #1 (the more efficient of the two BMPs)
E_2 = Efficiency rate of BMP #2

- Equation 1b: Overlapping BMPs[29]

$$E_{1+2} = E_1 + 0.8E_2(1 - E_1)$$

Where,

E_{1+2} = Combined efficiency of BMPs #1 and #2
E_1 = Efficiency rate of BMP #1 (the more efficient of the two BMPs)
E_2 = Efficiency E_{1+2} rate of BMP #2

The effectiveness of additional BMPs can be calculated using the same equation structure. For example, if a third BMP is added, the results from Equations 1a or 1b would be used as follows:

Equation 2a or 2b:

$$E_{1+2+3} = E_{1+2} + (\text{discount})E_3(1 - E_1)$$

Where,

E_{1+2+3} = Combined Efficiency of BMPs #1, #2 and #3
E_{1+2} = answer from equation 1a or 1b
Discount = either 0.11 or 0.2, depends whether E_3 is overlapping or not
E_3 = Efficiency rate of BMP #3

[29] Physically overlapping BMP pairs are those that include any combination of the following: cover crop, strip or no-till, sprinkler upgrade, microirrigation upgrade, surge irrigation, or straw in furrows.

~~12.~~13. Appendix C. BMP Quality Standards

The 2010 Lower Boise Trading Framework includes a set of abbreviated BMP quality standards for each of the BMPs included in the original framework. Based on lessons learned through the Joint Regional Recommendations process, these quality standards will be updated, approved by DEQ, and added to this appendix.