Feasibility Study Details, Rankings, and Decision

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December 13, 2024

Objective

This report seeks to identify and evaluate up to three pilot projects that exemplify the application of green infrastructure in achieving compliance with state and federal water quality standards. Grounded in the findings of the feasibility study initiated under Colorado Senate Bill 24-037, this analysis emphasizes the selection of projects that address critical gaps and barriers while demonstrating the operational, financial, and regulatory viability of nature-based solutions. These pilot studies will serve as a foundation for advancing innovative compliance mechanisms, integrating sustainable funding strategies, and establishing scalable models for water quality management that align with Colorado's environmental and community priorities.

Weighted Criteria for Pilot Study Evaluation

The selection of pilot studies was guided by a set of weighted criteria designed to ensure a comprehensive evaluation of their feasibility, regulatory alignment, and potential for achieving meaningful environmental outcomes. Each criterion is assigned a weight, reflecting its importance in the overall scoring process.

- **Viability of Green Programs** assesses the potential for the pilot study to implement and sustain green programs effectively. It evaluates the program's feasibility, scalability, and alignment with innovative approaches to pollution control and environmental sustainability.
- **Alignment with Legislative Intent** evaluates how well a project reflects SB24-037's focus on green infrastructure solutions, such as pollutant credit trading, to meet water quality standards. The bill prioritizes approaches that reduce reliance on gray infrastructure, support cost-effective compliance, and provide additional benefits like climate finance and equity such as assisting disadvantaged or small facilities in meeting compliance goals.
- **Regulatory Pressure** measures the urgency of compliance-driven mechanisms, such as the implementation of TMDLs through discharge permit or state regulations (e.g., Regulation 85 or Regulation 31). Pilot studies in areas under significant regulatory oversight are prioritized due to the higher stakes for immediate action.
- **Utility Interest and Engagement** measures the level of interest, commitment, and capacity of the participating utility. Active involvement from utilities is critical for ensuring the success of the pilot and its integration into long-term operational strategies.

- **Carbon Credits and Revenue Potential** evaluates the potential of the pilot study to generate carbon credits and associated revenue streams. It also considers the energy grid mix's impact on emissions and the opportunities to reduce energy use while maximizing financial benefits.
- **Baseline Data Availability** is the extent to which reliable baseline data is accessible for the proposed site, which enhances the ability to measure the project's impact effectively. The availability and quality of baseline data are crucial for tracking progress and assessing the outcomes of pilot studies.
- **Implementation Funds Availability** considers the financial resources available for pilot implementation, including federal and local funding as well as private-sector investments. Adequate funding ensures the timely and effective execution of best management practices (BMPs).

Feasibility Study: Pilot Project Pipeline

Case Study Overview

Table 1: Case Study Overview

Case Study Name	**Location**	**Permit**	**Pollutant(s)**	**Anticipated Nutrient or Temp Limit (mg/L or Degrees C)**	**Size (MGD)**
Morrison Creek Water & Sanitation District	Routt County, CO	CO0022969	TN, TP	<2 TN, <0.02 TP	0.225
Steamboat Springs POTW	Steamboat Springs, CO	CO0020834	Temperature	5_a	5.0 (July–Feb) and 7.5 (March–June)
Plum Creek WRA	Castle Rock, CO	CO0038547	TN, TP, Temperature	<2 TN, <0.02 TP	9.46
Hayden POTW	Hayden, CO	CO0040959	TN, TP	8 TN, 0.3 TP	0.25
Longmont POTW	Longmont, CO	CO0026671	Temperature	13.8_a	13
Montrose POTW	Montrose, CO	CO0039624	TP	1 TP	2.03

[a] Temperature limit (Degrees C) for the month where utility is the most out of compliance as reported in the provided consulting documentation.

Table 2: Overview of conventional vs green infrastructure alternatives by utility and the relative carbon finance opportunities available.

Facility	**Conventional Treatment Avoided**	**BMPs or Green Infrastructure Utilized**	**Carbon Finance Available**
Town of Hayden[d]	Biological Phosphorus Removal and Biological Nitrogen Removal	Livestock Execution, Nutrient Management, Riparian Revegetation	Very Low
City of Montrose[c]	Biological Phosphorus Removal	Livestock Execution, Nutrient Management, Riparian Revegetation	Low
City of Longmont[a]	Cooling Tower	Cooling Pond	Medium
City of Steamboat Springs	Cooling Tower	Riparian Shading	Low
Plum Creek Water Reclamation Authority [a]	Reverse Osmosis and Cooling Tower	Livestock Execution, Nutrient Management, Riparian Revegetation Constructed wetlands would also be used to lower the load before the point of discharge.	High
Morrison Creek Water and Sanitation District	Tertiary Nitrogen Removal, Tertiary Filtration, and Reverse Osmosis	Livestock Execution, Nutrient Management, Riparian Revegetation	Low

BMP: Best Management Practice
[a] No credits are needed because it is assumed that the wetlands discharge would become the facility's new permitted point of discharge.
[b] The facility would require grey infrastructure upgrades and trading would occur for the remaining upgrades presented here.
[c] Some credits may be generated below the point of discharge but above the point of highest environmental impact.
[d] Not all land available for BMP implementation was assessed because there is more than enough available.

Detailed Overview of Pilot Project Options

Detailed analysis of the top three case studies with rationale.

1. Longmont POTW

Discharging into the impaired St. Vrain Creek in Longmont, Colorado, this facility operates under temperature compliance requirements, with new winter effluent limits anticipated during its 2027 permit renewal. Treating approximately 8.0 MGD, the facility is proactively exploring innovative wetland solutions as a sustainable alternative to energy-intensive cooling towers, making it a compelling candidate for green infrastructure implementation.

- **Viability of Green Program:** The proposed wetland establishment offers an energy-efficient solution for temperature compliance, with clear near-field sites but minimal agricultural activity. The facility owns land designated for wetlands and has consultant-developed green infrastructure designs. While exploring wetland viability, uncertainty remains about whether it will be a sufficient solution for temperature compliance or if WQT is a more fitting alternative.
- **Regulatory Pressure:** Temperature compliance under Regulation 61.8(5)(h) provides moderate regulatory urgency. Depending on the size of the wetland, water quality trading credits may not be needed. While this represents a green-over-gray solution. This approach might not technically qualify as water quality trading, as it involves a regulated point source becoming a permanent point source discharge.
- **Carbon Credits and Revenue Potential:** The facility demonstrates a medium potential for carbon credits and revenue. The use of a cooling pond as its BMP effectively reduces thermal pollution but does not reach the diversified or large-scale impact of facilities.
- **Utility Interest and Engagement:** Strong interest and collaboration with stakeholders. Longmont has demonstrated significant engagement through the development of a project charter, showcasing a comprehensive and organized approach to advancing its compliance and green infrastructure goals. We already have consistent communication.
- **Baseline Data Availability:** Robust datasets enhance feasibility and compliance tracking. The facility has professionally developed green compliance plans and possesses some of the best data availability among comparable utilities, with access to all the necessary data to support project planning and implementation.
- **Implementation Funds Availability:** Initial funding has been approved, with additional grants anticipated, including a Bureau of Reclamation grant specifically for wetland implementation.
- **Alignment with Legislative Intent:** The project aligns less strongly with SB24-037 due to its focus on direct reductions through green infrastructure rather than leveraging pollutant trading mechanisms. While Longmont's efforts to implement wetlands and other green infrastructure align with the bill's environmental objectives, the absence of a trading component diminishes its scalability and broader political value. Additionally, as Longmont is not located in a disadvantaged or politically strategic area, its selection may not provide the same level of legislative visibility or impact compared to other projects.

2. Yampa Valley Regional Pilot (one pilot, two utilities)

2a. Morrison Creek Water & Sanitation District (MCWSD)

Located in Routt County, Colorado, MCWSD discharges into the nutrient-impaired Stagecoach Reservoir, addressing TP and TN pollution contributing to algal blooms. Its small size (0.225 MGD) and rural setting provide a manageable scale for pilot projects while enabling collaboration with agricultural stakeholders for watershed-wide nutrient management.

- **Viability of Green Program:** The district's green program viability is bolstered by its strategic location in a nutrient-impaired watershed. Morrison Creek can achieve compliance and generate substantial nutrient credits through full BMP adoption. The available land supports green infrastructure as a viable and effective alternative to conventional treatment methods. These estimates indicate that BMPs could fully address the nitrogen requirements and potentially meet or exceed the phosphorus reduction needs, depending on implementation success. Proposed green solutions, such as riparian buffer restoration and stream bank stabilization, aim to reduce nutrient runoff.
- **Regulatory Pressure:** While MCWSD operates under the Colorado Pollutant Discharge Elimination System (CPDES), targeting nutrient reductions for the Stagecoach Reservoir TMDL, the small scale and unclear compliance deadlines reduce regulatory urgency up to 20 years. It remains questionable how much regulatory pressure Morrison is truly under or how soon action will be required, as the facility's small size, lack of specific nutrient standards in the location, and uncertainty around future permit timelines further diminish immediate compliance demands.
- **Carbon Credits and Revenue Potential:** The facility demonstrates a low potential for carbon credits and revenue generation. Despite implementing tertiary nitrogen removal, tertiary filtration, and reverse osmosis, alongside BMPs like livestock execution, nutrient management, and riparian revegetation. Its smaller scale results in limited financial impacts from carbon credits compared to larger facilities.
- **Utility Interest and Engagement:** The utility has demonstrated moderate interest, they are very willing to operate in the feasibility study, and their smaller program size makes it easier to launch initiatives. We already have consistent communication channels set up. These efforts align with their goal of achieving the same reductions in nutrient loading through a small-scale pilot, despite the significant expense associated with upgrades at Morrison Creek.
- **Baseline Data Availability:** Extensive baseline data, including nutrient load estimates and water quality trends, support robust project implementation and monitoring. However, there is missing data regarding how water quality trading or green infrastructure would work in this context. The utility does, however, possess in-house data and has resources for scoping and implementation through direct monitoring, supported by a NASA earmark for the Yampa River watershed, including modeling above Stagecoach Reservoir.
- **Implementation Funds Availability:** While financial constraints exist, partnerships with upstream stakeholders and carbon markets offer partial mitigation. Additionally, there is potential to leverage support from programs like the Regional Resilience Innovation Incubator (R2I2) through NSF, as well as the Regional Conservation Partnership Program (RCPP) in the coming year, to directly support implementation efforts.
- **Alignment with Legislative Intent:** Morrison aligns moderately with the legislative intent of SB24-037 as a small discharger, which reflects the bill's focus on supporting innovative solutions for smaller facilities. However, its status as a non-disadvantaged community reduces its alignment with the equity-focused goals of the legislation, making it less impactful politically compared to other pilot options.

2b. Steamboat Springs POTW

Discharging treated wastewater into the Yampa River facility provides treatment for residential and commercial users in Routt County. The facility operates with a permitted flow rate of 5 MGD from July through February and 7.5 MGD from March through June. This river segment has not consistently met the state's water quality temperature standards under Regulation 61.8(5)(h) for over two decades. Despite a temporary modification for chronic temperature standards, set to expire in 2024, the facility has a strong history of riparian restoration and partnerships with landowners, enhancing its capacity for green infrastructure projects like wetland and stream restoration to address ongoing compliance challenges.

Steamboat Springs POTW has been separated into two categories—General WQT and Site-Specific. The feasibility of its inclusion in this pilot study depends heavily on the regulatory alignment pathway chosen. General WQT emphasizes market-based solutions through pollutant credit trading, while Site-Specific Criteria provide tailored regulatory adjustments to local environmental conditions. This distinction reflects the practical and regulatory nuances highlighted in the discussion and legislative framework.

Option A: General WQT

- **Viability of Green Program:** Riparian restoration programs and partnerships with landowners strengthen the potential for green solutions. The facility already has green infrastructure designs from consultants, including shading as a proposed solution on the upper Yampa River. However, there is skepticism about the efficacy of shading, with local stakeholders, the Division, and the EPA expressing concerns about its certainty as a compliance measure. Steamboat has explored trading for nearly a decade, which demonstrates long-term commitment, but uncertainties about trading's actual feasibility remain a challenge. Compliance objectives can potentially be met through BMP adoption, indicating that BMPs could generate sufficient nitrogen credits, depending on the level of adoption and the effectiveness of the practices implemented.
- **Regulatory Pressure:** Temperature compliance remains the primary regulatory driver, with moderate urgency compared to nutrient-impaired regions. Steamboat's compliance options, including water releases or riparian shading, highlight its immediate need for solutions.
- **Carbon Credits and Revenue Potential:** The facility exhibits a low potential for carbon credits and revenue, relying on riparian shading as its primary BMP. Limited opportunities exist for monetizing carbon credits, as the facility focuses on temperature compliance rather than broader environmental benefits.
- **Utility Interest and Engagement:** Interest in green infrastructure and proactive engagement though tempered by local preferences for alternative approaches. Already have consistent communication channels in place.
- **Baseline Data Availability:** Decades of monitoring and analysis provide a solid foundation for planning and implementation. The facility has professionally developed green compliance plans and boasts the best data availability among comparable utilities. Over the past 10 years, it has actively worked on alternative temperature compliance measures, conducting extensive analysis and ongoing monitoring to explore solutions beyond a cooling tower.
- **Implementation Funds Availability:** Multiple grant opportunities, including from Colorado Parks and Wildlife and the Yampa River Fund, enhance funding viability.
- **Alignment with Legislative Intent:** General WQT aligns with Colorado's pollutant trading law and the regulatory intent of SB24-037, particularly as stated in Section 25-8-311(3)(a)(I) ("green

infrastructure, rather than traditional gray infrastructure, may be used in an alternative compliance program using mechanisms described in the Colorado Pollutant Trading Policy").

Option B: Site-Specific Standard Change

- **Viability of Green Program:** The site-specific standard adjustment scenario has a higher viability due to its focused compliance pathway, which avoids the challenges associated with WQT. This scenario is considered viable as long as scientific validation supports the efficacy of proposed temperature control methods, such as riparian shading. The Division has expressed regulatory preference for site-specific solutions for Steamboat's temperature compliance issues.
- **Regulatory Pressure:** Steamboat faces moderate to high regulatory pressure due to temperature compliance requirements under Colorado Regulation 31. Permit staff have indicated that WQT is not the preferred approach and have instead recommended that the facility focus on increased monitoring and modeling efforts to pursue a change in the temperature standard and obtain site-specific criteria. However, the focus on site-specific criteria suggests a less immediate need for alternative mechanisms like trading.
- **Carbon Credits and Revenue Potential:** Please see the above reasoning.
- **Utility Interest and Engagement:** Please see the above reasoning.
- **Baseline Data Availability:** Please see the above reasoning.
- **Implementation Funds Availability:** Please see the above reasoning.
- **Alignment with Legislative Intent:** The site-specific pathway has a weaker alignment with legislative intent compared to WQT. There is some concern about whether such a narrowly focused approach, like a site-specific criterion, will fully meet the broader goals of the pilot program legislation, which aims to explore scalable and transferable solutions like trading. The site-specific criteria rely on localized, tailored changes to compliance standards (e.g., higher temperature thresholds for discharges based on local ecosystem tolerance), rather than leveraging the innovative, market-based, or green infrastructure solutions the bill promotes.

3. Plum Creek Water Reclamation Authority (PCWRA)

Located in Castle Rock, Colorado, PCWRA operates within the South Platte River Basin, addressing TP TN pollution under the Chatfield Reservoir TMAL. Its mid-sized capacity (9.46 MGD) and robust stakeholder engagement make it a leading candidate for pilot projects.

- **Viability of Green Program:** Plum Creek requires significant nutrient reductions to achieve compliance and the largest pilot program to implement. Through 100% adoption of BMPs, the facility has the potential to generate substantial nutrient credits, demonstrating the feasibility of meeting regulatory goals while supporting environmental improvements. This approach would utilize some watershed areas upstream of Chatfield Reservoir to deliver compliance and instream water quality benefits. The facility's advanced green infrastructure program includes nutrient trading, riparian buffer restoration, and stream bank stabilization, effectively targeting nutrient runoff and sediment reduction. PCWRA's program further incorporates strategies such as fencing, off-channel watering, grazing management planning, and leveraging 100 acres of undeveloped farmland they own for wetland development in the Upper South Platte Basin.

- **Regulatory Pressure:** PCWRA is subject to stringent requirements under Regulations 85 and 31, as well as Chatfield Reservoir TMAL limits, ensuring high regulatory alignment and urgency. The facility discharges into Chatfield Reservoir, which is governed by a TMAL, making WQT a potentially more supported and feasible compliance option. Regulatory frameworks include a stringent phosphorus limit of 0.07 mg/L in receiving waters, which heightens the need for effective nutrient management. However, the facility faces uncertainty regarding its next permit timeline, which could range from 1 to 5 years. Additionally, the Chatfield Reservoir TMAL was last updated in 2009 and is 15 years out of date, adding further regulatory pressure to update this allocation.
- **Carbon Credits and Revenue Potential:** The facility has significant potential to achieve CO2e reductions over 20 years.
- **Utility Interest and Engagement:** PCWRA has actively participated in green infrastructure projects, and has consistent meeting engagements while partnering with local stakeholders to explore and implement nutrient trading opportunities.
- **Baseline Data Availability:** PCWRA's baseline data includes decades of water quality monitoring from the Chatfield Reservoir and Plum Creek Watershed, dating back to the 1980s. This dataset captures phosphorus and nitrogen loads, streamflow, temperature, and biological assessments, providing insights into nutrient contributions and ecological health. Active modeling efforts, including in-reservoir modeling, support decision-making for nutrient management. While comprehensive, there are data gaps regarding how water quality trading or green infrastructure would function.
- **Implementation Funds Availability:** Existing funding available.
- **Alignment with Legislative Intent:** Plum Creek aligns well with SB24-037 due to its location within the Chatfield TMAL, which provides strong regulatory support for pollutant trading. This alignment positions Plum Creek as a key facility to demonstrate the effectiveness of trading mechanisms under the Colorado Pollutant Trading Policy. However, certain factors, such as flagged MS4 concerns, may slightly limit its alignment compared to other projects.

Remaining Questions & Key Takeaways:

1. **Steamboat Springs:** Which compliance pathway is Steamboat more likely to choose to meet temp standards? Can this legislation and choosing SB Springs as a pilot option influence their decision towards WQT vs site-specific?
2. **Longmont:** Determine whether Longmont's wetland restoration contributes to direct reductions at the facility or if these green infrastructure upgrades, and be leveraged through trading mechanisms. How does this decision impact overall feasibility and alignment with legislative intent?
3. **Plum Creek:** Implementation will be challenging due to limited available land for BMPs but has the largest potential environmental benefits.
4. **Regulatory Focus:** In the current top options, there is a balance between temperature compliance and nutrient reduction requirements. We expected a greater emphasis on nutrient issues.
5. **Regional Representation:** Within the current top 3 options, the targeted geographic diversity across the Front Range and Western Slope is met, providing broader applicability and representation for the pilot projects. However, smaller underserved utilities on the Western Slope were not included due to a lack of regulatory pressure from Regulation 85, which primarily focuses on nutrient reductions. Additionally, many of these utilities face challenges related to toxins, such as arsenic and salinity, rather than nutrients, making them less aligned with the

objectives of SB24-037 and the pilot project goals focused on green infrastructure and pollutant trading.

6. **Scaling Green Infrastructure for Broader Impact:** Larger utilities are ideal pilot programs for testing and refining green infrastructure approaches under SB24-037. Their capacity and resources can address operational and financial barriers, setting the stage for standardized protocols with CDPHE. These protocols will simplify adoption for smaller utilities, enabling cost-effective compliance and broader environmental benefits, creating scalable solutions for statewide sustainability.