Adaptive Management at Scale

Project Charter

1. Introduction

Project Goal

The purpose of this project is to develop and implement a shared adaptive management framework for assessing watershed health in the St. Vrain Basin, including Left Hand Creek and Boulder Creek. We will develop the shared framework collaboratively, with input from diverse entities that currently manage and monitor watershed health throughout the basin. Our goal is to create a framework that will help us make more informed management decisions as a basin and better track broad progress towards basin-wide watershed health goals. We envision that this framework will be used as part of an ongoing (e.g. annual) on-the-ground basin-scale adaptive management process.

Project Background

Left Hand Watershed Center (the Center) brought partners (see "Roles and Responsibilities" section for definition) together in 2019 to collaborate on developing and implementing a basin-scale adaptive management framework. Having used an adaptive management framework to track watershed health in Left Hand Creek Watershed, the Center saw opportunity to scale our approach up to the basin by leveraging existing partner efforts. Partners agreed about the need and value of a shared framework that integrates and complements existing management and monitoring efforts. Acknowledging that numerous entities manage and monitor watershed health in the St. Vrain Basin, all agreed about the importance of incorporating diverse stakeholders ("Roles and Responsibilities" section for definition) in the framework development process. Today, the Center is leading the effort to create a shared adaptive management framework with project partners to accommodate the needs of project partners and the basin through a collaborative learning process.

2. Framework Context

Key Language

The language below describes key elements are foundational to the framework and the framework development process. An example framework is provides in Table 1 to help interpret each definition.

- **Adaptive Management Framework:** A monitoring approach that helps maintain a watershed's trajectory towards pre-defined watershed health goals by tying together watershed health indicators to performance thresholds and suggested actions.
- **Basin Zone:** A landscape unit with similar eco-geomorphology, land-use, goals, and concerns that allows basin-scale assessment of watershed health. Examples include Plains – Urban, Plains – Agricultural, or Canyons. Reporting of watershed health will focus on indicators and thresholds at the basin zone scale. This definition will be re-visited and updated through focused discussions with individual entities.
- **Attribute:** A characteristic or inherent part of a watershed such as water quality, riparian condition, or forest health that, if altered, will influence watershed health. Attributes are specific to basin zones and have associated indicators. For example, relative percent native species composition is an indicator of riparian condition.

- **Watershed Health Indicator:** A specific quantitative measure of watershed health such as relative percent native species composition, percent pool habitat, or MMI score. Different watershed indicators may be appropriate/informative for different basin zones or sites/locations. For example, *E. Coli* may be an informative indicator in a Plains – Urban Basin Zone but not in the Alpine/Sub-Alpine Zone.
- **Performance Threshold:** A specific range or tolerance of performance for each watershed health indicator that falls within what is acceptable for a healthy watershed. Different thresholds may be appropriate/informative for different basin zones or sites/locations. For example, 30% or greater pool habitat may be appropriate in an Alpine/Sub-Alpine Basin Zone while 15% or greater may be appropriate in a Plains – Urban Basin Zone.
- **Suggested Action:** Management or monitoring actions that could help explain or correct the problem when a performance indicator is not being met. For example, weed control or additional data collection through a focused experiment may be suggested actions.
- **Representative Area:** Specific sites or reaches within each basin zone that offer a good representation of basin zone conditions and will be used to build a better understanding of how to define watershed health (via indicators and thresholds) and how to build the framework to accommodate a diversity of site/locations. Representative areas may include a range of high and low functioning site examples.
- **Site/Location:** Specific site or reach within the basin zone where data is or will be collected.

Defining Watershed Health

Defining watershed health is inherent to tracking our progress towards watershed health goals using this framework. For the purpose of this project we are defining watershed health as a function of information contained in the framework, notably performance indicators and thresholds. As such, a basin zone will meet watershed health goals when indicators are within their respective performance thresholds. As described in the definitions above, indicators and performance thresholds will vary by basin zone. Consequently, this approach offers flexibility to define watershed health based on criteria and considerations specific to each basin zone. Additionally, when needed, we plan to consider indicators and thresholds that may be unique to a specific site/location and incorporate them as needed. For example, this scenario is likely to occur in transport vs. depositional reaches within basin zones. Finally, as part of our approach for defining watershed health (selecting indicators and thresholds), we plan to identify and visit Representative Areas within each basin zone to facilitate deeper thinking and discussion about watershed health goals for each basin zone.

Table 1: Example framework with hypothetical data to support definitions above.

Basin Zone: Plains Agricultural			
Attribute: Vegetative Condition			
Indicator	**Methods**	**Performance Threshold**	**Suggested Actions**
% Native veg cover	Transect	Greater than 45%	- Continue monitoring and assess for increase over time - Apply stewardship activities: overseeding, weed removal
Crop Yield	Annual Production Survey	Meets or exceeds County Average	- Continue monitoring to assess for increase over time - Investigate drivers eg. Water supply, soil, etc.
Attribute: Water Quality			
Indicator	**Methods**	**Performance Threshold**	**Suggested Actions**
MMI Score	Kick sample	Greater than CO State Biotype 2 Attainment Threshold, 50.	- Continue monitoring and assess for increase over time. - Study water chemistry
N Concentration	Monthly Grab Sample	Less than toxicity threshold for Aquatic Life.	- Continue monitoring and assess for decrease over time - Increase monitoring locally to investigate possible sources
Basin Zone: Canyons			
Attribute: Vegetative Condition			
Indicator	**Methods**	**Performance Threshold**	**Suggested Actions**
% Native veg cover	Transect	Greater than 50%	- Continue monitoring and assess for increase over time. - Apply stewardship activities: overseeding, weed removal.
Diversity of woody age classes	Plot Samples	Greater than 2.0	- Continue monitoring to assess for increase over time - Investigate drivers
Attribute: Water Quality			
Indicator	**Methods**	**Performance Threshold**	**Suggested Actions**
MMI Score	Kick sample	Greater than CO State Biotype 1 Attainment Threshold, 52.	- Continue monitoring and assess for increase over time - Study water chemistry
Copper Concentration	Monthly Grab Samples	Less than acute toxicity threshold for aquatic life.	- Continue monitoring and assess for decrease over time - Increase monitoring locally to investigate possible sources

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3. Approach, Deliverables, and Timeline

Approach

The following four steps explain the general approach we will use to meet our project goal. Additional details are outlines in the "Project Process" section.

1. Center staff will work with partners and stakeholders to assess watershed health data collection efforts throughout the basin in order to understand what is collected, where there is overlap, and where there are gaps;
2. Center staff will work with partners and stakeholders to document, research, and refine location-specific watershed health indicators and thresholds;
3. Center staff will work with partners and stakeholders to develop a shared framework for adaptive management that compliments existing data collection efforts and integrates existing watershed management plans and tools; and
4. Center staff will work with partners and stakeholders to implement the framework, report results in a "State of the Watershed" report, and iterate the adaptive management process by updating the framework based on what is learned.

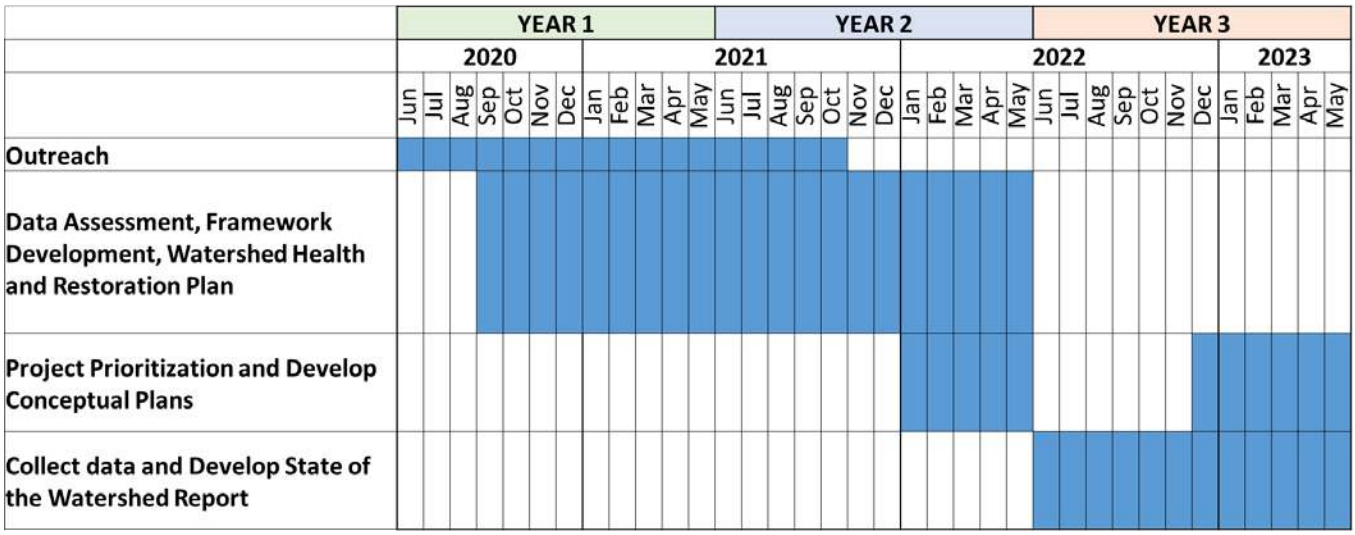
Deliverables

The project includes the following deliverables. Additional details are outlined in the "Project Process" section.

1. **Adaptive management framework, as part of Watershed Health and Restoration Plan:**
    - This key deliverable which will be developed as part of a Plan the described supporting information pertaining to the framework, potentially including some project prioritization.
2. **Extensive outreach resulting in map:**
    - Outreach will target stakeholders who manage and monitor watershed health in basin.
    - Map will show who is collecting what watershed health data and where, and will help place data in the context of other data.
3. **One year of framework implementation (data collection):**
    - Data collection will include any new data that is not already being collected by partners or stakeholders.
4. **Results reported in a "State of the Watershed" report:**
    - Report will include all data that contribute to the shared framework.
    - Data will be presented in a holistic context focused on basin-scale watershed health and suggested action in response to issues.
    - Report development will involve two to three drafts for partner review and approval.
5. **Conceptual designs for two to four priority restoration or management projects:**
    - Secondary deliverable which may be considered as an option at any time during that project.

Timeline

The approximate timeline is below with additional details provided in the "Project Process" section.



4. Guiding Considerations

This section includes a list of considerations that will help guide the project and will be updated periodically as the project progresses and we learn through trial and error.

- We will use the Project Process (see below) to maintain collaboration so that project entities can learn from each other to achieve a greater level of broad consensus regarding watershed health and resilience, as well as the role of adaptive management in helping achieve these goals.
- We will complement and integrate existing efforts and plans without duplicating, recreating, or replacing other efforts.
- We will select performance thresholds and indicators that are relevant and informative for assessing watershed health at the "basin zone" scale, but will maintain enough flexibility in the framework for site/location-specific indicators and thresholds when needed.
- Center staff will provide partners/stakeholders with sufficient time for review and feedback. Generally, we plan to target four weeks for substantial documents (e.g. draft report), two weeks for smaller review requests, and one week for minor questions. We appreciate the effort of each Partner to help maintain project momentum by providing timely responses.
- For the purpose of this project, data sharing means sharing only data that has been previously discussed and agreed upon through a collaborative process with each Partner or Stakeholder. While the purpose of the map is to show which data is collected in the basin (not make the data available), we will work with Partners and Stakeholders to select specific data sets that are appropriate and allowable for integrating into the framework and reporting in the State of the Watershed Report.

5. Roles and Responsibilities

The core project team is made up of the Center and the Project Partners. A key project task involves outreach to Stakeholders. Each category is described below.

Left Hand Watershed Center

- Lead entity responsible for project scope and deliverables.
- Comprised of project managers and scientists with experience developing and implementing adaptive management frameworks.
- Responsible for administering funding from grantors.
- Manage funding and grant administration, ensuring that funding criteria are met and project is complete within scope and budget.
- Main point of contact for all partners and stakeholders.
- Keep partners in the loop on project progress and timeline.
- Strive for open and transparent communication between all partners and stakeholders.
- Facilitate discussions among partners and stakeholders as appropriate or needed.

Partners

- Current participating entities that manage and monitor watershed health in the St Vrain Basin, and contributed project funding:
    - Mile High Flood District,
    - City of Boulder,
    - City of Longmont,
    - St. Vrain and Left Hand Water Conservancy District,
    - Keep It Clean Partnership, and
    - Boulder County.
- Support the Center's efforts to develop and implement a shared adaptive management framework development by:
    - Providing technical expertise in relevant disciplines;
    - Helping Center staff understand and integrate their goals and data;
    - Participating in meetings/calls/surveys, responding to questions, and reviewing/commenting on draft documents in accordance with each step in the "Project Process" section;
- Assist in keeping the project on schedule by being responsive.
- Communicate information and obtain feedback from respective entities as appropriate.
- Communicate questions and concerns to Center's project manager.

Stakeholders

- Potential future partners;
- Represent additional entities that collect data related to watershed health in the St. Vrain Basin which could potentially be incorporated into the framework;
- Will be identified and contacted throughout the project process based on recommendations from project partners (see initial list); This is a draft, we need partner feedback on this list.
- Following outreach, may support the Center's efforts to develop and implement a shared adaptive management framework similarly to partners;
- Further role refinement will occur following outreach.