

Floodplains Reimagined

Phase I: The Landscape Scale Multi-Benefit Floodplain Feasibility Study Project

Priorities & Objectives Technical Memorandum

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Prepared for
RD108 for Floodplains Reimagined

Prepared by
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Introduction

Floodplains Reimagined aims to improve floodplain connectivity for multiple purposes through voluntary collaborative partnerships with private landowners, sovereign tribal entities, government, and non-government representatives.

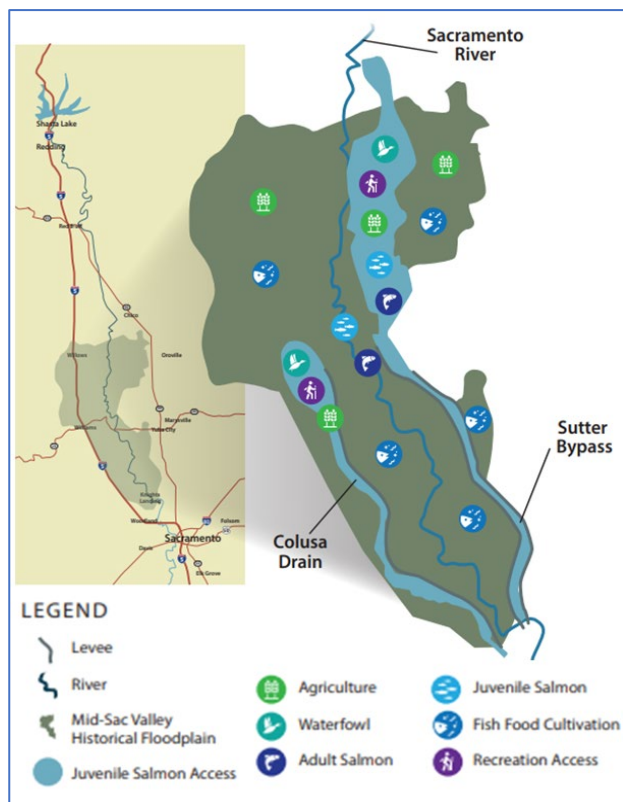
California Natural Resources Agency funded Phase I of the Floodplains Reimagined Program. In Phase I, Floodplains Reimagined began to evaluate the feasibility of improving floodplain functional connectivity by reintroducing low flows during the agricultural off-season, onto lands owned by willing landowners. During Phase I, stakeholders considered the feasibility and benefits of reconnecting the Sacramento River with its floodplains through new or modified river connections, flood conveyance, land-based management, in-river restoration, and fish enhancement activities opportunities.

This Floodplains Reimagined Program is working to coordinate efforts in concert with a constellation of efforts underway in the Colusa, Butte, and Sutter Basins in the Mid-Sacramento River Valley region to improve the floodplain functional connectivity to support salmon, birds, and agriculture.

Vision

To improve floodplain connectivity for multiple purposes through voluntary collaborative partnerships with private landowners, sovereign tribal entities, government, and non-government representatives.

Figure 1: Geographic Scope



As shown in Figure 1, the geographic scope of the Program includes an area along the Sacramento River corridor from Butte Sink at the north end to the top of the Yolo Bypass at the south end. The defining physical watershed and infrastructure features include: Butte Sink, Sutter Bypass and Colusa Drain.

The Program Team includes:

- Program Director – RD 108
- Program Manager & Engineering – KSN
- Facilitation Team – Kearns & West
- Technical Team – cbec, Cramer Fish Sciences, Point Blue, San Francisco Estuary Institute, and Aquatic Resources Consulting
- Larsen & Wurzel Associates – Process Advisors

Purpose of Document

This technical memorandum is one of several produced in support of the Floodplains Reimagined Landscape Scale Multi-Benefit Floodplain Feasibility Study Phase I. This specific technical memorandum provides an overview of the Program’s priorities and objectives¹. These priorities and objectives were created through active stakeholder engagement, outlined below, and led to the development of the associated evaluation criteria and metrics.

Phase I Technical Memorandums

1. [Priorities & Objectives](#)
2. [Existing Conditions](#)
3. [Communications and Engagement Plan](#)
4. [Hydrodynamic Model Analysis](#)
5. [Opportunities, Constraints & Considerations](#)
6. [Evaluation Criteria - various](#)
7. [Scientific Uncertainties](#)

Outcomes

This section describes the outcomes of the work to define Priorities and Objectives, the Principles, Priorities, Objectives, and Evaluation Criteria. This suite of information is used to evaluate preliminary concepts for their benefits and impacts. These outcomes are also documented in the [Floodplains Reimagined Charter](#), [Program Brief](#), and reflected on the website floodplainsreimagined.org.

For the methods of development, please see the following section on Methodology.

Principles

The Principles of the Floodplains Reimagined Program highlight the Program’s underlying values in how the participants undertake this work .

It is critical to emphasize that the Program is developed to support and inform participants to make voluntary efforts. Regardless of any analysis of benefits that might recommend a concept for implementation, the ultimate governing principle is voluntary willingness of the parties involved.

The Floodplains Reimagined Principles are as follows:

- Voluntary, locally-driven program that serves as a hub for all floodplain related efforts in the region to ensure efficiency and promote coordinated actions.
- Shared understanding of each other’s interests, joint investigation, and collaborative generation of options and evaluation.
- Mutual respect and appreciation cultivated between sovereign tribal entities, private landowners, government and non-government representatives.

¹ In the California Natural Resources Agency grant agreement that funded this effort refers to these deliverables as “Goals and Objectives”. The Floodplains Reimagined Program is using the terminology “Priorities” rather than “Goals” to reflect priorities related to a variety of interests.

- Respect and work within existing land ownership and uses; indigenous land stewardship and cultural resources; and flood management functions, including operations and maintenance.

Priorities

The Advisory Committee recommended and the Steering Committee approved the following Priorities for the Floodplains Reimagined Program. These Priorities are stated as values and represent the interests of the distinct and overlapping interests in relation to floodplains in the region.

- Agriculture
- Carbon as a Greenhouse Gas
- Community Way of Life
- Economic Prosperity
- Ecosystem Health
- Flood Control
- Floodplain Connectivity
- Floodplain Wildlife
- Indigenous Cultural Values
- Recreation
- Water Quality
- Water Supply

Process Priorities

Process priorities include values for “how” to meet the substantive priorities above. These priorities are found in several of the related efforts lists of objectives.

- Collaboration
- Urgency
- Resiliency and Flexibility

Priority Phases

In order to meet the grant requirements for the CNRA grant and limit the scope of the evaluation, the Program Team proposed to limit the development of evaluation criteria, metrics, and analysis. In addition, the Steering and Advisory Committees gave input on evaluating performance against these Priorities that informed three sets of Priorities, outlined as follows.

Priorities - Phase I Evaluation

- Agriculture
- Ecosystem Health
- Flood Control
- Floodplain Connectivity
- Floodplain Wildlife
- Indigenous Cultural Values
- Recreation
- Water Quality
- Water Supply

Priorities - Future Phase Evaluation

- Carbon as a Greenhouse Gas - More specific projects and data is needed to evaluate the effects of change on Carbon as a Greenhouse Gas Priority
- Economic Prosperity - The Priorities of Agriculture and Recreation to a large extent serve as proxies for this Priority.
- Community Way of Life - The Priorities for consideration in Phase I cumulatively serve as a proxy for this overall Priority.

Priorities - Process

- Collaboration
- Urgency
- Resiliency and Flexibility

Program Structure

The work to define the Priorities and Objectives is naturally linked to development of the Program Structure, decision-making, and chartering of the effort.

Based on the voluntary, collaborative, and multi-benefit nature of the vision and Priorities, the structure of the Program needed to reflect bodies that include credible but opposing viewpoints and provide space for scientific discourse as well as learning each other's interests to develop a shared understanding of criteria for success.

The decision-making process also needed to reflect the reservation of authority by all parties as well as their effort to seek consensus and identify diverging viewpoints. The structure also needed to reflect the principle of local control and respect the Program Manager's fiduciary responsibility to deliver on granted funds.

Perhaps most importantly, contribution to, recommendation of, and approval of the Charter which included the Priorities and the Program Structure was one of the first efforts this Program undertook together to build the Program that would serve their multiple and sometimes disparate needs.

The following description of the Program Structure is paraphrased from the Floodplains Reimagined Charter.



Steering Committee

- **Membership:** Eleven (11) appointed members from the Advisory Committee.
- **Role:** Steer the program, adopt key deliverables, and work with the Program Team to design and provide feedback on the process, approach, and materials.



Advisory Committee

- **Membership:** Broad representation of interests including agricultural landowners; hunting clubs and wetland preserves; local, state, and federal agencies; tribes; flood managers and maintainers; water suppliers; research institutions; river, wildlife, and agriculture NGOs.
- **Role:** Make recommendations to the Steering Committee.



Ad-Hoc Groups

- **Membership:** Technical representatives who contribute to the quantification of benefits, constraints, modeling, and evaluation of potential structural and biological options.
- **Role:** Provide science and technical input, make proposals to the Advisory Committee

Objectives

With stakeholder input from the interviews and Advisory and approval from the Steering Committee meetings, the Program Team developed the following Objectives related to each Priority. In the following table, each Priority is listed with its corresponding Objective(s). As with the above section, the Priorities are categorized in Tables below by Phase I, Future Phases, and Process.

Table 1: Priorities and Objectives - Phase I

Priorities – Phase I	Objectives
Agriculture	<ul style="list-style-type: none"> • Do no harm to existing property and water rights. • Limit actions to voluntary measures. • Maintain planting, growing, and harvest seasons • Maintain or improve agricultural water supply and quality
Ecosystem Health	<ul style="list-style-type: none"> • Increase the frequency, duration, and spatial extent of inundation within the FR geographic areas to stimulate production of invertebrates to provide habitats for rearing when juvenile salmon are migrating through the area. • Improve sediment dynamics. • Improve the ecosystem health of the floodplains including riparian habitat throughout the FR geographic area during varying flow conditions, where and when appropriate. • Decrease invasive vegetation including in channel maintenance areas to prevent fish kills and localized backflow flooding.
Flood Control	<ul style="list-style-type: none"> • Respect flood management functions, including operations and maintenance so that scenarios are flood management neutral or flood positive.
Floodplain Connectivity	<ul style="list-style-type: none"> • Increase hydrologic connectivity between the FR geographic area and the Sacramento and Feather rivers to provide access onto and off-of the floodplain for juvenile salmon. • Improve long-term, independently sustainable holistic floodplain connectivity.
Floodplain Wildlife	<ul style="list-style-type: none"> • Increase the frequency, duration, and spatial extent of inundation within the FR geographic areas to stimulate production of invertebrates to provide habitats for rearing when juvenile salmon are migrating through the area. • Improve juvenile access to functional habitat. • Reduce fish passage impediments to adult fish passage. • Improve Pacific Flyway bird populations (including waterbirds, shorebirds, and migratory birds) using the floodplain.

Priorities – Phase I	Objectives
Indigenous Cultural Values	<ul style="list-style-type: none"> • Improve accessibility for indigenous peoples to grounds for ceremony, as well as the gathering of traditional vegetation and wildlife during desired seasons. • Do no harm to existing property and water rights. • Limit actions to voluntary measures.
Recreation	<ul style="list-style-type: none"> • Do no harm to existing property and water rights. • Limit actions to voluntary measures. • Maintain or improve public and private access. • Maintain or improve recreational hunting opportunities for duck and goose clubs and conditions.
Water Quality	<ul style="list-style-type: none"> • Improve water quality.
Water Supply	<ul style="list-style-type: none"> • Improve groundwater supply reliability and maintain groundwater supply by diversifying and coordinating regional water supply management.

Table 2: Priorities and Objectives - Future Phases and Covered by Proxy

Priorities – Future Phases and Proxy	Objectives
Carbon as a Greenhouse Gas	<ul style="list-style-type: none"> • Decrease or be neutral to carbon greenhouse gases.
Community Way of Life	<ul style="list-style-type: none"> • Preserve and build local water management.
Economic Prosperity	<ul style="list-style-type: none"> • Minimize costs of projects. • Reduce cost of future operations and maintenance by reducing human intervention through the utilization of natural infrastructure where possible. • Increase multi-benefit floodplain workforce and scale the flood control and water management workforces appropriately.

Table 3: Priorities and Objectives for Process

Priorities - Process	Objectives
Collaboration	<ul style="list-style-type: none"> • Maximize landscape coverage from willing partners. • Maximize willing collaborating sectors especially willing landowners, permitting agencies, and land managers.
Resiliency and Flexibility	<ul style="list-style-type: none"> • Increase resiliency and flexibility under uncertain future climate and economic scenarios. • Improve the ability of the flood system to adapt to climate change while sustaining flood management functions.
Urgency	<ul style="list-style-type: none"> • Minimize the amount of time to accrue benefits.

Evaluation Criteria

The Program developed a suite of Evaluation Criteria by which to evaluate performance of proposed concepts and ultimately scenarios. The Technical Teams built off of related efforts to propose Evaluation Criteria. The Ad-Hoc Groups discussed the supporting science, refined metrics, thresholds, and weighting. They also identified potential future evaluation criteria and data gaps and uncertainties.

Principles

It is critical to emphasize that the Program's Principles govern the selection and advancement of any concept for implementation. Despite the evaluation criteria and its resulting benefits or impacts, the governing Principle of this Program is ultimately the willingness of the entity to participate – landowner, water manager, agency, or tribe.

- Voluntary Willingness

In order for participants to consider whether they are willing to develop or implement any concept, they need the tools to evaluate the benefits and impacts. The Program developed the Evaluation Criteria in order to inform participants decision-making and ultimately, their willingness to participate.

Below is the list of Evaluation Criteria that was approved as well as those recommended for future Floodplains Reimagined Program Phases.

Evaluation Criteria Approved

- Agricultural Compatibility Evaluation Criteria
- Juvenile Salmon Habitat Suitability Criteria
- Birds Habitat Suitability Criteria
- Zooplankton Production and Export Evaluation Criteria
- Managed Wetland and Waterfowl Hunting Evaluation Criteria

Evaluation Criteria To Be Developed or Updated

- [Update] to Juvenile Salmon Habitat Suitability Criteria
 - New science and understanding of influence of different cover types, and depth of water on juvenile salmon habitat
- [NEW] Food Web Production and Export Evaluation Criteria
- [NEW] Fate of Food Web and Benefits for Salmon

Below is a table of the Principle of Willingness and Evaluation Criteria approved in Phase I and their related Priorities and Objectives. At this time, the Program has not developed Evaluation Criteria for every Priority and Objective. For detailed information on the Evaluation Criteria, please see Technical Memorandum on each topic in the Appendices of this Report.

Guide to the Table

- **Green** indicates the objectives to be evaluated by the Principle of Willingness.
- **Blue** indicates the objectives to be evaluated by the Evaluation Criteria.

Table 4: Priorities - Phase I, Objectives, Evaluation Criteria, and Principles

Priorities – Phase I	Objectives	Evaluation Criteria
Agriculture	<ul style="list-style-type: none"> • Do no harm to existing property and water rights. • Limit actions to voluntary measures. 	Landowner Willingness
	<ul style="list-style-type: none"> • Maintain planting, growing, and harvest seasons • Maintain or improve agricultural water supply and quality 	Agricultural Compatibility Evaluation Criteria
Ecosystem Health	<ul style="list-style-type: none"> • Increase the frequency, duration, and spatial extent of inundation within the FR geographic areas to stimulate production of invertebrates to provide habitats for rearing when juvenile salmon are migrating through the area. 	Zooplankton Production and Export Evaluation Criteria Juvenile Salmon Habitat Suitability Criteria
	<ul style="list-style-type: none"> • Improve sediment dynamics. 	
	<ul style="list-style-type: none"> • Improve the ecosystem health of the floodplains including riparian habitat throughout the FR geographic area during varying flow conditions, where and when appropriate. 	Zooplankton Production and Export Evaluation Criteria
	<ul style="list-style-type: none"> • Decrease invasive vegetation including in channel maintenance areas to prevent fish kills and localized backflow flooding. 	
Flood Control	<ul style="list-style-type: none"> • Respect flood management functions, including operations and maintenance so that scenarios are flood management neutral or flood positive. 	Landowner and Manager Willingness
Floodplain Connectivity	<ul style="list-style-type: none"> • Increase hydrologic connectivity between the FR geographic area and the Sacramento and Feather rivers to provide access onto and off-of the floodplain for juvenile salmon. 	Juvenile Salmon Habitat Suitability Criteria
	<ul style="list-style-type: none"> • Improve long-term, independently sustainable holistic floodplain connectivity. 	Various Contributing Evaluation Criteria

Priorities – Phase I	Objectives	Evaluation Criteria
Floodplain Wildlife	<ul style="list-style-type: none"> Increase the frequency, duration, and spatial extent of inundation within the FR geographic areas to stimulate production of invertebrates to provide habitats for rearing when juvenile salmon are migrating through the area. 	Zooplankton Production and Export Evaluation Criteria
	<ul style="list-style-type: none"> Improve juvenile access to functional habitat to support survival and growth. 	Juvenile Salmon Habitat Suitability Criteria
	<ul style="list-style-type: none"> Reduce fish passage impediments to adult fish passage. 	
	<ul style="list-style-type: none"> Improve Pacific Flyway bird populations (including waterbirds, shorebirds, and migratory birds) using the floodplain. 	Birds Habitat Suitability Criteria Managed Wetland and Waterfowl Hunting Evaluation Criteria
Recreation	<ul style="list-style-type: none"> Do no harm to existing property and water rights. Limit actions to voluntary measures. 	Landowner Willingness
	<ul style="list-style-type: none"> Maintain or improve recreational hunting opportunities for duck and goose clubs and conditions. 	Managed Wetland and Waterfowl Hunting Evaluation Criteria
	<ul style="list-style-type: none"> Maintain or improve public and private access. 	
Indigenous Cultural Values	<ul style="list-style-type: none"> Improve accessibility for indigenous peoples to grounds for ceremony, as well as the gathering of traditional vegetation and wildlife during desired seasons. 	
	<ul style="list-style-type: none"> Do no harm to existing property and water rights. Limit actions to voluntary measures. 	Indigenous Tribes Willingness
Water Quality	<ul style="list-style-type: none"> Improve water quality. 	
Water Supply	<ul style="list-style-type: none"> Maintain or improve water supply for agriculture Improve groundwater supply reliability and maintain groundwater supply by diversifying and coordinating regional water supply management. 	Landowner and Manager Willingness

Diverging Viewpoints

It is important to also note that as the Program approved evaluation criteria for each Priority, some Steering Committee members became concerned that the lens of opportunity to meet multiple benefits was narrowing significantly. In response, some Steering Committee members recommended that the Priority for Floodplain Wildlife, which includes salmon, and Floodplain Connectivity should be considered the primary Priority for evaluation of benefit. They continued to uphold the Program Principles of voluntary and collaborative efforts. Other Steering Committee members maintained the need for equal weighting between these Priorities.

Technical Memoranda on Evaluation Criteria

Please refer to the following Technical Memos for further reading on the application of Evaluation Criteria to understand benefits and impacts of concepts and scenarios:

- Agricultural Compatibility Evaluation Criteria Technical Memo
- Juvenile Salmon Habitat Suitability Criteria Technical Memo
- Birds Habitat Suitability Criteria Technical Memo
- Zooplankton Production and Export Evaluation Criteria Technical Memo
- Managed Wetland and Waterfowl Hunting Evaluation Criteria Technical Memo

Methodology

Terminology

The following definitions are useful when interpreting the outcomes of the feedback.

- **Priority:** An underlying interest represented by stakeholders in relation to the Floodplains Reimagined Program. Expressed as a value without directionality.
- **Objective:** Multiple specific objectives with directionality that support each Priority.
- **Evaluation Criteria:** The criteria by which the performance of concepts or scenarios will be measured. Includes a set of metrics.
- **Metric:** A quantitative or qualitative unit with which Objectives are measured to be used in the predictive modeling and other analyses to analyze feasibility and benefits of various potential scenarios.

Development of Priorities and Objectives

The Floodplains Reimagined Program Team took the following approach to developing priorities and objectives by interviewing and collecting priorities from a broad group of stakeholders, compiling objectives from related efforts in the region, and consulting with the Program Team, and reflecting the resulting draft priorities and objectives in subsequent stakeholder meetings to solicit input.

First, the Kearns & West Facilitation Team (Facilitation Team) conducted a first round of interviews with a subset of stakeholders and the Program Team to compile an initial list of priorities and objectives.

Second, the Facilitation Team compiled a draft set of priorities articulated by the Program Team and stated in other related efforts in the state and the region including:

- Central Valley Flood System Conservation Strategy
- Central Valley Flood Protection Plan
- Central Valley Joint Venture
- Central Valley Salmon Habitat Partnership
- Voluntary Agreement Framework
- California Water Resiliency Portfolio
- Sutter & Tisdale Bypasses Multi-Benefit Management Plan
- Lower Sutter Bypass Conceptual Anadromous Fish Habitat Restoration Planning

Third, the Kearns & West Facilitation Team (Facilitation Team) conducted a stakeholder assessment with a full round of interviews and information sessions. With input from the Program Team and referrals from interviewees themselves, the Facilitation Team identified a group of stakeholders representative of the geography and interests in the region.

Interviewees represented water management, flood management agencies, federal and state agencies, tribes, non-governmental organizations for conservation of wildlife and rivers, recreational waterfowl hunting, private and public landowners, local government, and Groundwater Sustainability Agencies, and Resource Conservation Districts. The interviewees represented the subregions characterized by the Butte Sink, Sutter Bypass, and Colusa Drain.

In these interviews, the Facilitation Team used a draft Program Brief describing draft Priorities and Objectives, Program Team, geographic scope, Phase I Feasibility Study, and the proposed governance structure. The Facilitation Team solicited and documented input on priorities and objectives and updated the Program Brief as the living document in which all input was incorporated.

Fourth, the Program Team solicited comments and revisions to the priorities and objectives in the first meetings of the Floodplains Reimagined Steering and Advisory Committees.

Finally, after many revisions and updates to incorporate stakeholder input, the Steering Committee approved the Floodplains Reimagined Charter, which included Priorities & Objectives.

As the Program continued to develop evaluation metrics and engage stakeholders, stakeholders did suggest some updates to some objectives. In particular, representatives of the Priorities of Agriculture and Recreation suggested inclusion of more detailed objectives that would help them to evaluate concepts against their primary Priorities.

Development of Tools, Metrics, and Evaluation Criteria

For methodology on development of the Tools, Metrics, and Evaluation Criteria, see the various Technical Memos on Evaluation Criteria.

Information Session Participants

Tribes

1. Konkow Valley Band of Maidu
2. Yocha Dehe Wintun Nation

Session 1

1. Butte County
2. CA Rice Commission
3. Central Valley Flood Protection Board
4. Ducks Unlimited
5. Goose Club and Roosevelt Ranch
6. The Nature Conservancy
7. Trout Unlimited
8. US Bureau of Reclamation
9. Western Canal Water District

Session 2

1. CalTrout
2. CA Department of Water Resources, Division of Flood Maintenance
3. Colusa County Groundwater Sustainability Agency
4. Wild Goose Club