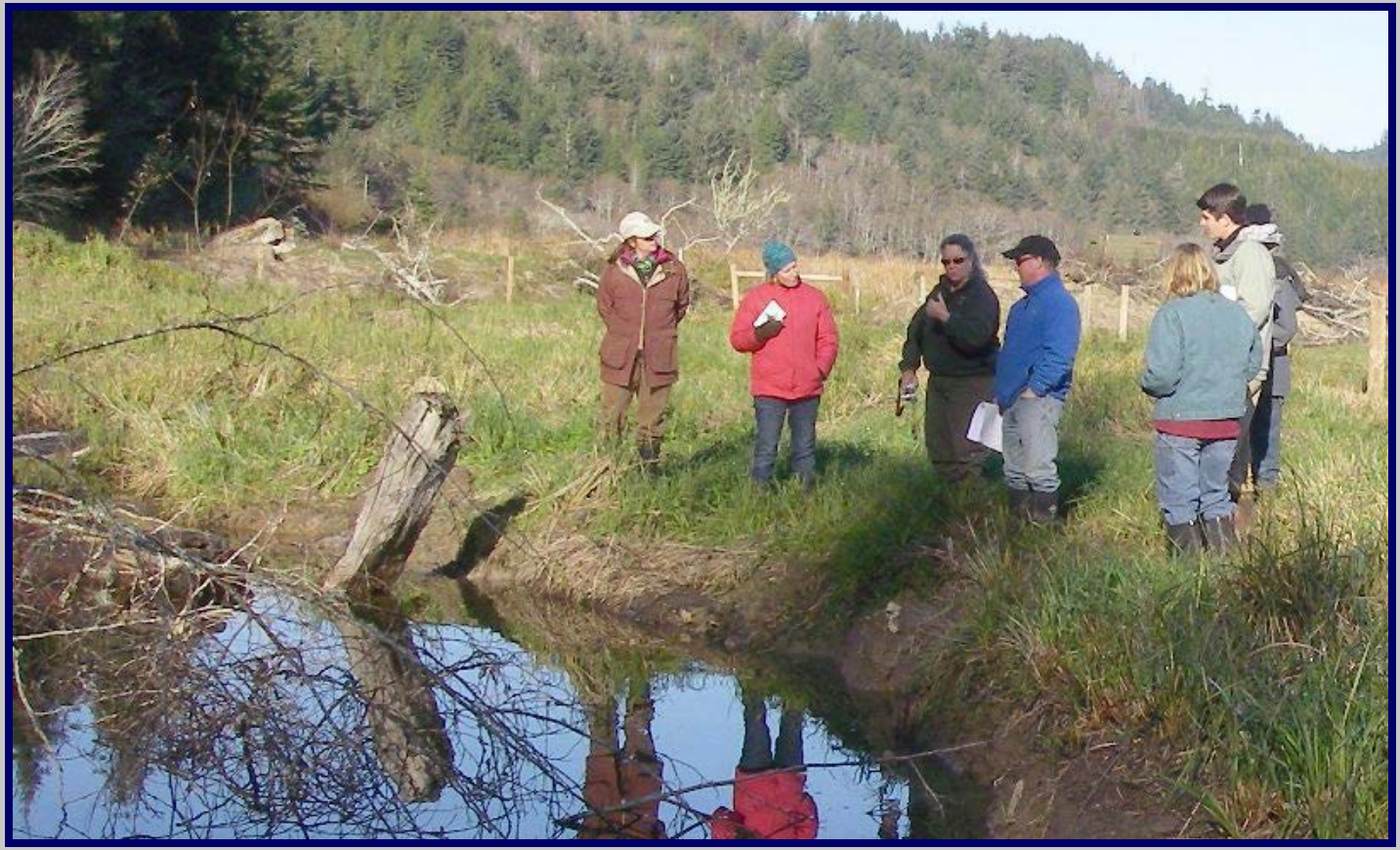
OFF-CHANNEL & SIDE CHANNEL HABITAT
DESIGN PLAN CRITERIA



CALIFORNIA DEPARTMENT OF FISH & GAME

OUTLINE

Target occupants

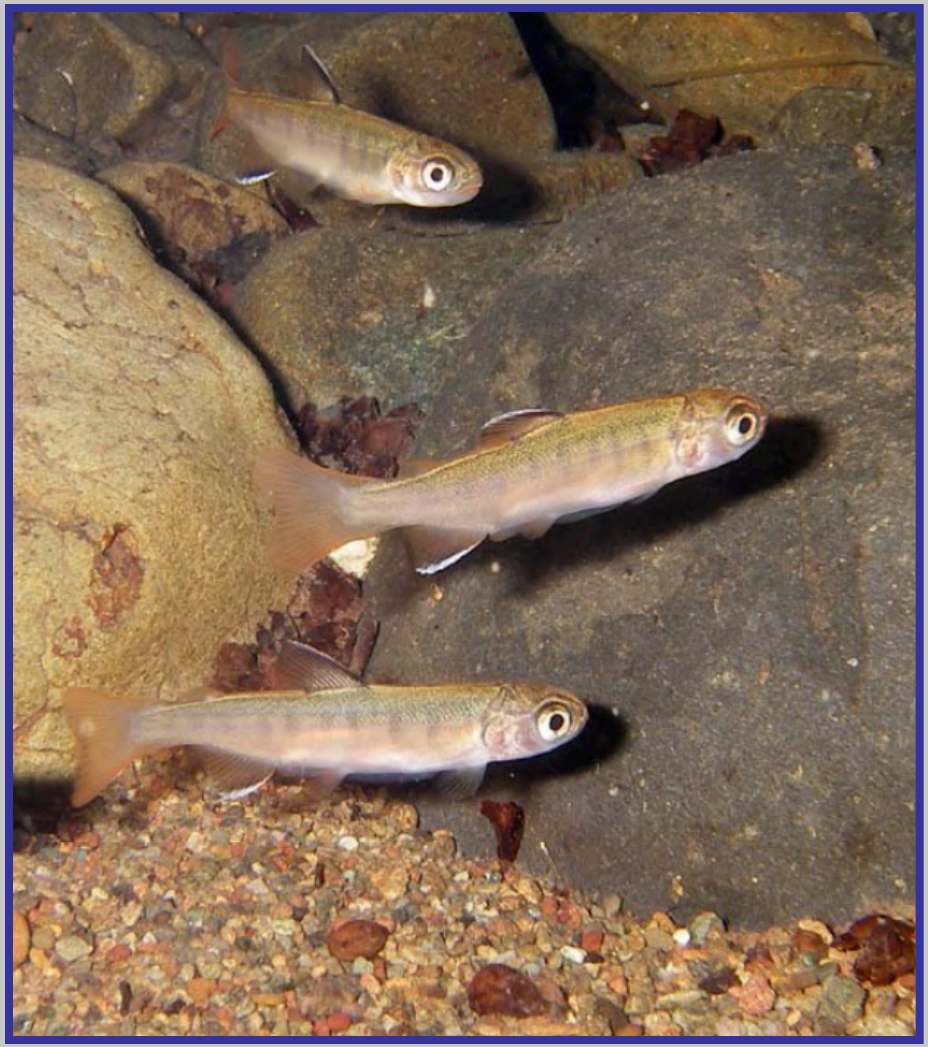
Off-channel habitat

DFG responsibilities

Project complexities

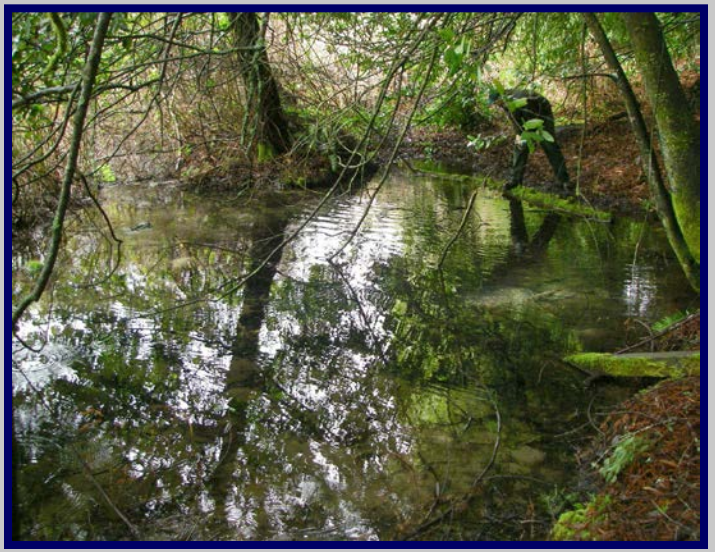
Project hazards

Design criteria



Young-of-year Coho Salmon
Felta Creek

OFF-CHANNEL HABITAT



Slow-moving cool water with much edge length, cover, and food; flood-plain wetlands

FLOODPLAIN WETLANDS

During the 200 years between 1780 and 1980, 91% of California's wetlands were eliminated (NRC, 1992)

DRAINED & PARTITIONED FLOODPLAIN

FISH & GAME NEXUS

CEQA

Recovery Strategy
For
California Coho Salmon

RECEIVED
JUL 13 2012
DFG
1600 OFFICE - REDDING

FOR DEPARTMENT USE ONLY

Fee Received	Amount Due	Date Complete	Notification No
$ 840.50	$		1600-2012-0188-R1

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

NOTIFICATION OF LAKE OR STREAMBED ALTERATION

Complete EACH field, unless otherwise indicated, following the enclosed instructions and submit ALL required enclosures. Attach additional pages, if necessary.

1. APPLICANT PROPOSING PROJECT

Department of Fish and Game
ife and Fisheries Division
Fisheries Branch

FRGP

In partnership with

National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery Fund

$$

INCIDENTAL
CESA
TAKE PERMIT

EASY PROJECTS? – JUST HOLES IN THE GROUND?

Junior Pond

Martin Slough

Hamilton Ponds

VARIABLES

Water supply (tidal, rain, snow melt, springs)

Water quality (temperature & dissolved oxygen)

Mainstem flow hydraulics (eddies & sweeping flows)

Flood frequency and inundation patterns

Groundwater – surface water connection

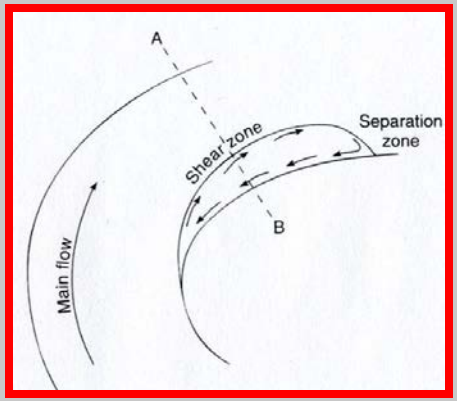
Groundwater table flux

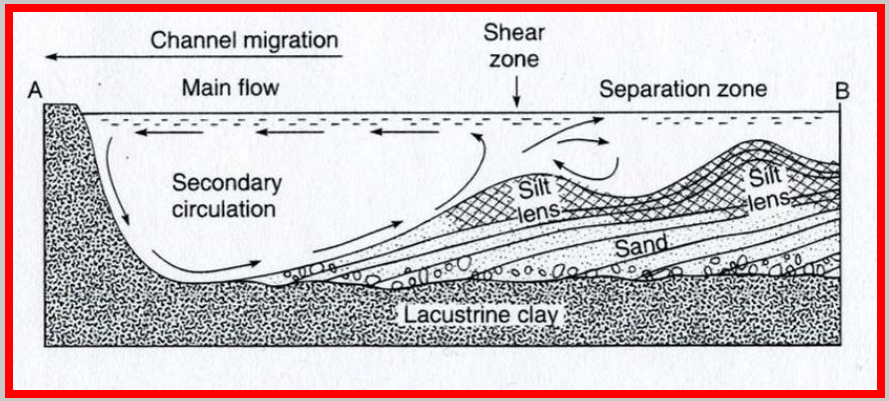
Subsurface stratigraphy

Floodplain landscape

Sediment transport

Off-channel hydraulics





DESIGN CONSIDERATIONS

Water supply (groundwater, surface water, or a combination?

Impacts to infrastructure and/or adjacent landowners?

Water & turbidity control during construction?

Flow regime in sync with life history patterns?

One inlet, or one inlet and one outlet?

In-line or off to the side?

Perennial or ephemeral?

New diversion channel?

Tributary influences?

Revegetation plan?

Equipment access?

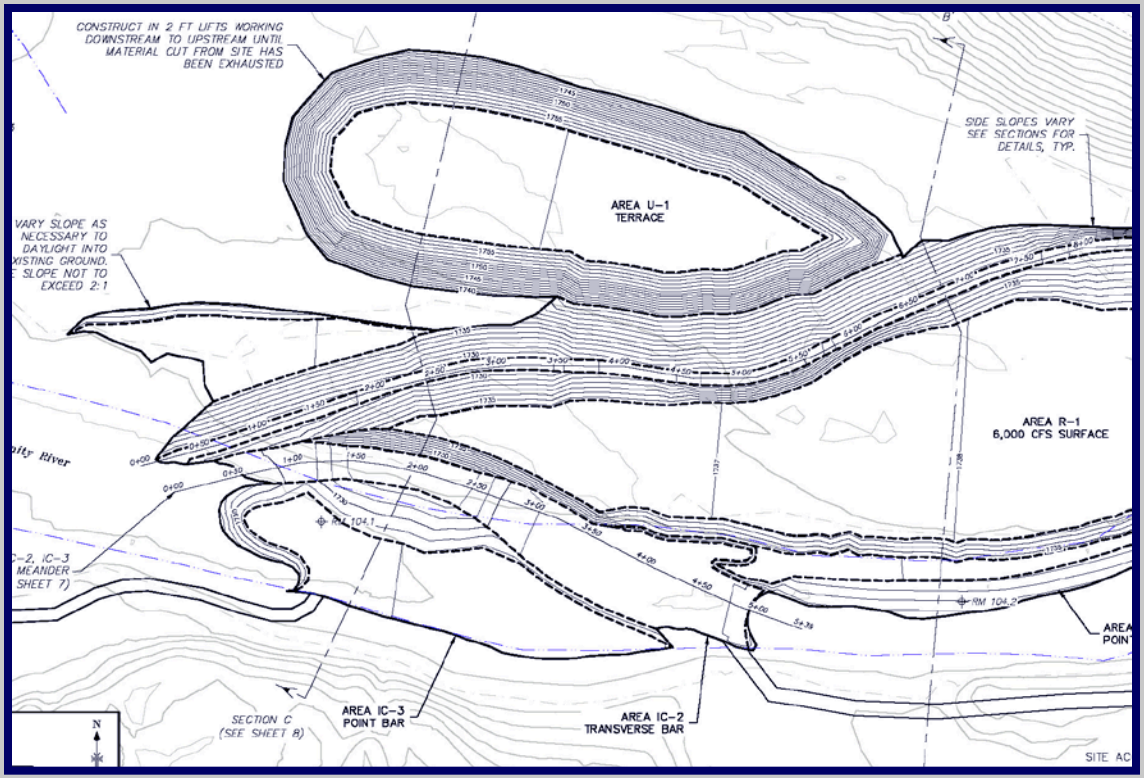
Tidegate control?

Spoils disposal?

Earth materials?

Flood proofing?

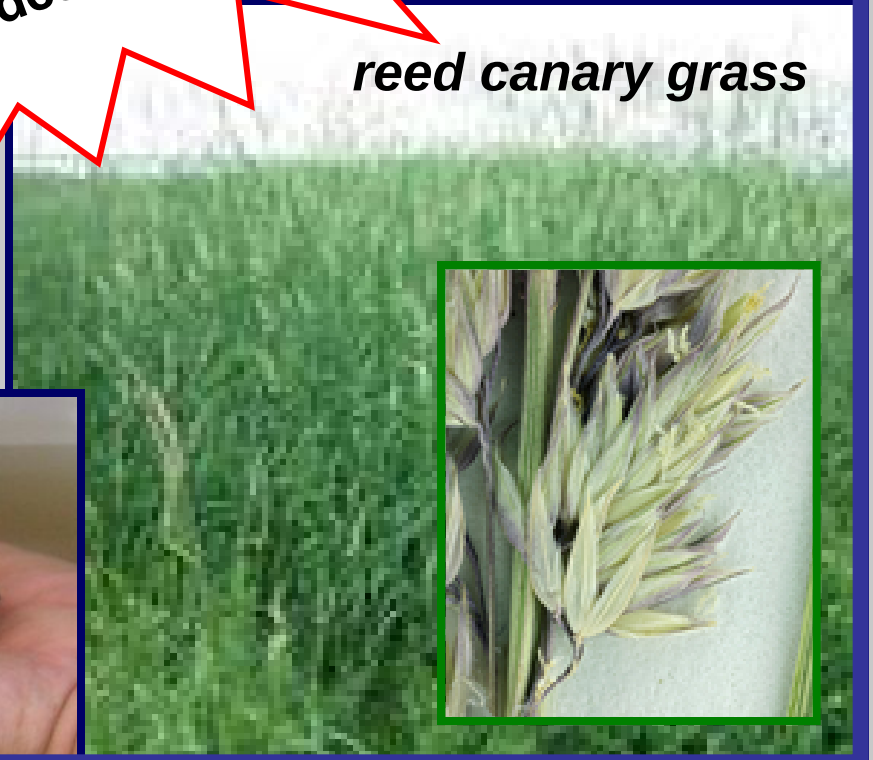
Design life?



POTENTIAL HAZARDS

- Avulsion
- Flooding
- Predators
- Sedimentation
- Fish stranding
- Rising sea level
- Invasive plants & animal
- FEMA flood map changes

Presence of hazards requires that risk assessments be included as part of the design plan



DESIGN CRITERIA ELEMENTS

Foundational Goals:

No adverse impact to the existing ecosystem

Desire a naturally sustainable habitat feature

Seeking a professional level of rationale and explanation

Criteria Elements:

Project Site Selection

Constraints Analysis

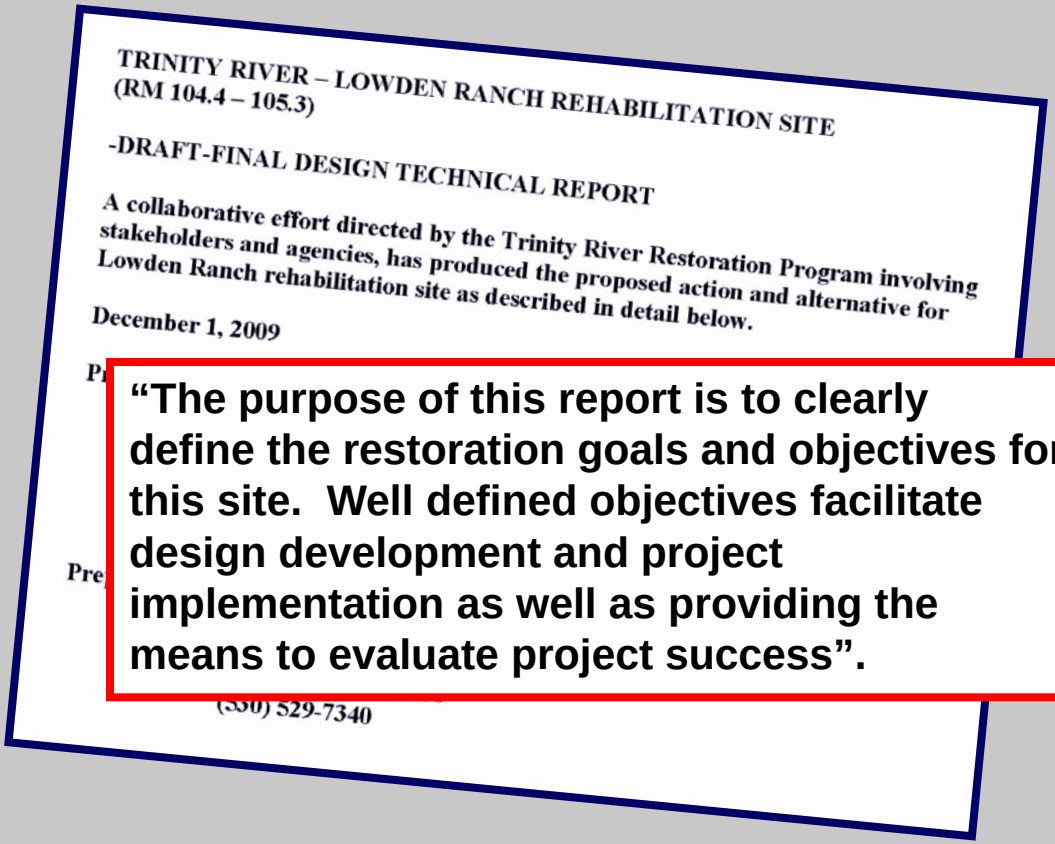
Biological Assessment

Physical Characterization

Hydrology & Hydraulics

Operations & Maintenance

Monitoring



TRINITY RIVER – LOWDEN RANCH REHABILITATION SITE
(RM 104.4 – 105.3)

-DRAFT-FINAL DESIGN TECHNICAL REPORT

A collaborative effort directed by the Trinity River Restoration Program involving stakeholders and agencies, has produced the proposed action and alternative for Lowden Ranch rehabilitation site as described in detail below.

December 1, 2009

(530) 529-7340

"The purpose of this report is to clearly define the restoration goals and objectives for this site. Well defined objectives facilitate design development and project implementation as well as providing the means to evaluate project success".

PROJECT SITE SELECTION

1. Re-connection of existing and naturally formed but abandoned side channel or alcove habitats (remove flow blockages such as levees or sediment plugs);
2. Improve hydrologic connection between floodplains and main channel; and
3. Creation of new, self-maintaining side channel or off-channel habitat that mimic or replicates naturally formed and maintained fluvial features.

NOTE: proposals to alter existing floodplain wetland ecosystems, regardless of their utility to anadromous fishes, will be required to demonstrate the ecological imperative for doing so.

CONSTRAINTS

Water quality (temperature and dissolved oxygen)

Water supply (surface and groundwater)

Floodplain partitioning (property boundaries, levees, roads, etc.)

Existing infrastructure (structures, pipelines, over-head utilities)

Existing wetlands/floodplain habitat areas

Flood frequency and inundation

Subsurface earth materials

BIOLOGICAL ASSESSMENT

Demonstrate that off-channel habitat is limited;

Document the biological imperative to correct anthropogenic changes to channel form and function;

Target species and life stages intended to benefit from the project and their current utilization of the project reach;

Habitat objective relative to the target species and life stages (e.g., spawning habitat vs. winter refugia vs. summer rearing);

Potential impacts to existing habitat areas;

The predatory species that may benefit from the project; and

Assessment and recommendations to prevent stranding.

PHYSICAL SITE CHARACTERIZATION

Description of geomorphology, and shallow subsurface earth materials;

Qualitative assessment of streambank/floodplain stability (i.e., how erodible are these features and what is the avulsion potential?);

Qualitative description of sediment supply, composition, and transport (likelihood and relative significance of aggradation or degradation);

Assessment of existing in-stream habitat elements (e.g., water temperature, dissolved oxygen, salinity; habitat type, etc.); and

Description of existing floodplain wetland habitat areas that may be impacted by the reestablishment of surface flow across the floodplain.

HYDROLOGY & HYDRAULICS

Water supply, quality, and sources through the seasons;

Flood frequencies and inundation depths & patterns;

Characterization of shallow groundwater-surface water relationship and annual fluctuation in groundwater table;

Calibrated surface water level rating curves developed through modeling, direct measurements, and/or gage records of the main channel near upstream and downstream ends of project channel across the range of design flows; and

Calculation of the tidal prism for the purpose of determining an appropriate channel geometry for projects in tidally influenced areas.

OPERATIONS & MAINTENANCE

Off-channel habitat practitioners report that surface-fed channels or ponds "will often require an active operation and maintenance program" (Lister and Finnigan, p. 7-1, 1997).

Maintenance will be necessary to address normal channel and floodplain sedimentation at the inlet, outlet, and in the pool.

Maintenance will also likely be necessary to remove large flood debris & related sediment deposits.

How long will the maintenance go on?

Who will perform the maintenance?

Maintenance is key element of a project's "design-life" and success.

A maintenance plan should be included as part of the design.

VITZUM NOTCHES
Trinity River

Eleven notches constructed in 2007

8/5/2008 370 cfs

8/25/2010 483 cfs

7/30/2012 476 cfs

MONITORING

Need to move these types of projects from “experimental” to “reliable”.

Need to establish reasonable “design life” goals for such projects.

Project designs must include physical and biological monitoring plans appropriate to the feature, the targeted species, and the targeted time period of feature use.

DFG is recommending two years of such monitoring following construction.

Basic monitoring effort:

- **As-built map of constructed feature;**
- **Photo monitoring;**
- **Surveys of constructed hydraulic elements;**
- **Assessment of off-channel habitat engagement with the main channel.**
- **Surveys of the functional use of the feature by the target species; and**
- **Water quality (e.g., dissolved oxygen, temperature, salinity, turbidity, etc).**

SUMMARY

The serious situation of coho salmon and the substantial loss of off-channel habitat areas requires well-planned project designs;

Off-channel habitat restoration can also be defined as floodplain wetlands restoration;

Off-channel habitat projects are complex because they involve multiple variables working together at different time scales;

There are many hazards associated with these projects, which means the risks associated with those hazards need to be evaluated as part of the design process;

DFG's design criteria provides recommendations related to project site selection, biological assessment, and physical characterizations;

Maintenance is a necessary element of these projects and therefore a maintenance plan needs to be included as part of the design; and

Monitoring is the only way we can move these projects from "experimental" to "reliable" and establish realistic design life and cost/benefit statistics. Therefore, DFG recommends that off-channel habitat designs include a monitoring component.


THE END