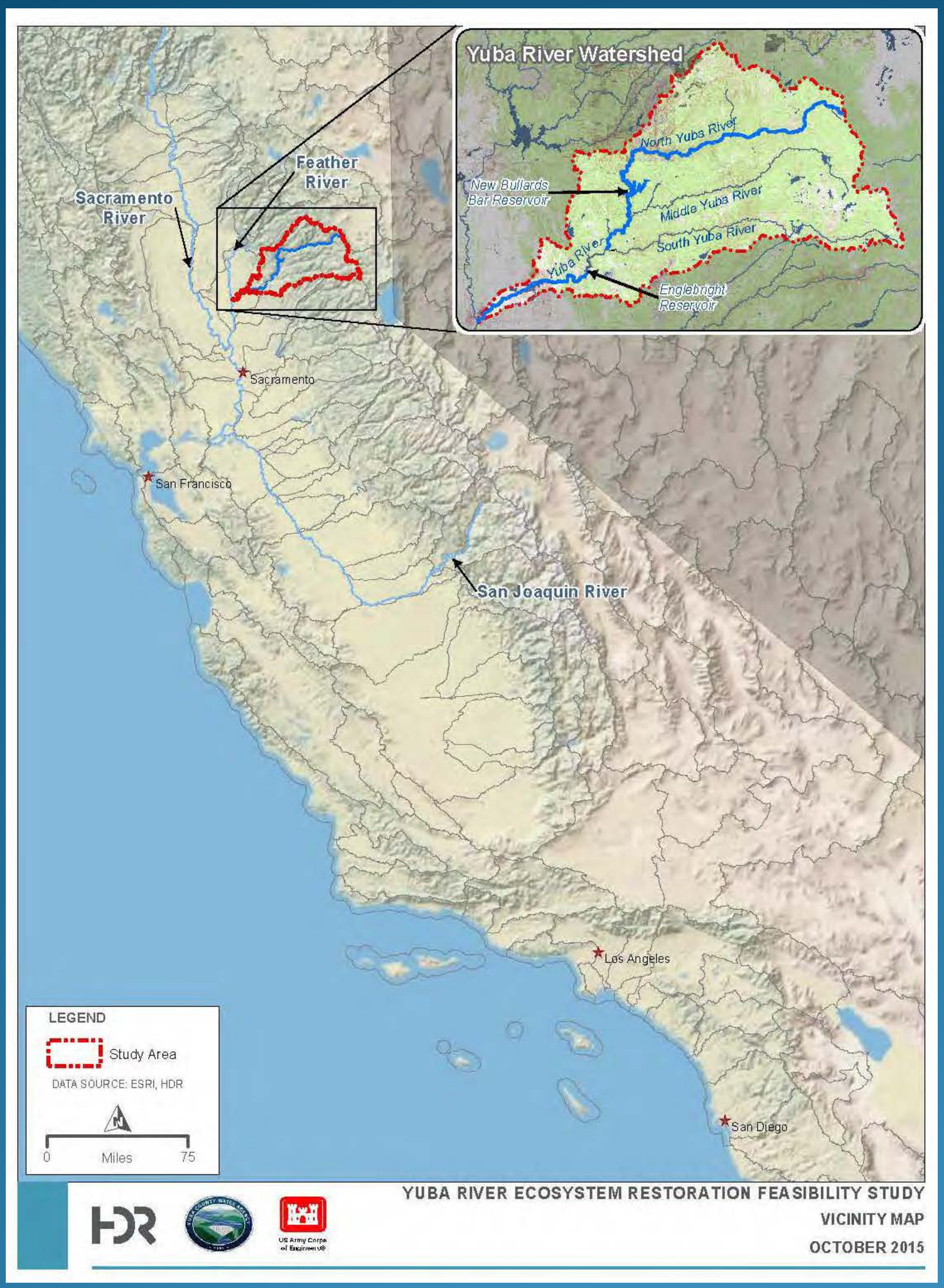
Yuba River Ecosystem Restoration Feasibility Study



Lead Agencies

- US Army Corps of Engineers, Sacramento District (Corps)
- Yuba County Water Agency (YCWA)

Action

Conduct a cost-shared Feasibility Study to identify and respond to problems and opportunities associated with ecosystem restoration in the Yuba River Watershed.

Purpose

- Ecosystem restoration is one of the primary missions of the Corps' Civil Works program.
- The objective is to contribute to national ecosystem restoration, and the stated objective of Civil Works ecosystem restoration is to "*restore degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition*".

Authority

Rivers and Harbors Act of 1962, Public Law 87-874, Section 209.

Environmental Compliance

- The Corps will be the lead agency for compliance with the National Environmental Policy Act (NEPA).
- YCWA will be the lead agency for compliance with the California Environmental Quality Act (CEQA).

Project Area

- Yuba River Watershed
- 1,340 square miles in portions of Sierra, Placer, Yuba, and Nevada counties.
- The Yuba River is a tributary of the Feather River which, in turn, flows into the Sacramento River near the town of Verona, California.

Understanding Ecological Problems in the Watershed

The feasibility study is evaluating opportunities for ecosystem restoration to address the following problems in the Yuba River watershed:

- The quality and quantity of aquatic, riparian, and general floodplain habitat has been diminished. Ecosystem structure, functions, and dynamic processes are degraded.; and

- Aquatic habitat, including riparian forests and wetlands, is fragmented.

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Yuba River Watershed Project Area

The Yuba River Watershed begins at the confluence of the Yuba and Feather rivers near the city of Marysville and extends upstream approximately 90 miles to the east past Sierra City. The watershed encompasses 1,340 square miles in portions of Sierra, Placer, Yuba, and Nevada counties.

The Yuba River flows through forest, foothill chaparral, and agricultural lands. Levees are absent from most of its course except for near the river's confluence with the Feather River. At that point, the Yuba River is bounded by setback levees for approximately six miles.

The Yuba River Watershed encompasses a wide variety of stakeholders, activities, interests, and resources. Some of the major considerations in the watershed are identified below:

Features

- Rivers and Creeks
  - North Yuba River
  - Middle Yuba River
  - South Yuba River (CA Wild & Scenic)
- Dams
  - Daguerre Point
  - Englebright
  - New Bullards Bar
  - Our House
  - Log Cabin
  - Lake Spaulding
- Gold Fields
- Sate Parks
  - South Yuba River SP
  - Malakoff Diggins SHP
- National Forests
  - Tahoe National Forest
  - Plumas National Forest
- Pacific Flyway

Activities & Interests

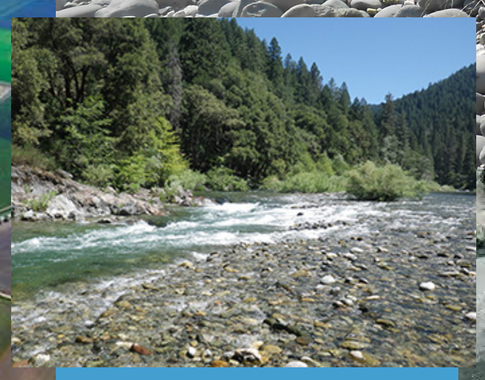
- Aggregate/ Gold Mining
- Recreation
- Agriculture
- Water Supply
- Flood Control
- Hydroelectric Generation
- Cities and Towns

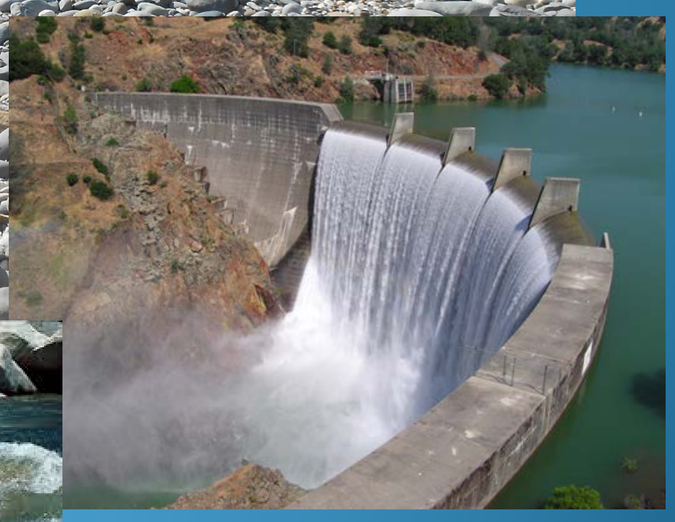
Biological Resources

- Chinook Salmon
- Central Valley Steelhead
- Green Sturgeon
- Migratory and Resident Birds
- Forest, Chaparral, Grasslands, Oak Woodland

Ongoing Restoration Activities

- Spawning Gravel Augmentation below Englebright (USACE)
- Large Woody Material Management Plan (USACE)
- Hammon Bar Riparian Habitat Restoration Project (SYRCL)





Yuba River Ecosystem Restoration Feasibility Study

Possible Measures – Comments or Suggestions?

Habitat Restoration Measures - A number of possible measures have been proposed to improve the connectivity to off channel and floodplain habitats. These actions increase the overall complexity and availability of microhabitats.

- Structural Modifications to floodplain
  - Lower adjacent bank areas to reconnect floodplain to groundwater
  - Construct swales to restore hydraulic connectivity between side channels and backwaters
  - Create or enhance additional side channel habitat
  - Create or enhance additional backwater habitat
  - Modify or remove training berms
  - Restore riparian vegetation.
- Add Structural Complexity
  - Construct engineered log jams, install Large woody material, and/or install large boulders.
  - Scallop or sculpt shoreline
- Rice Field Rearing

Fish Passage measures – A number of possible measures have been proposed to improve fish passage in the watershed. These actions focus on making existing habitat available rather than restoring or creating new habitat.

- Fish Passage at Englebright Dam
  - Collect and transport above Englebright
  - Remove Englebright Dam
  - Construct a second dam as step to Englebright Dam
  - Install a full height fish ladder at Englebright Dam
  - Notch Englebright Dam and install a partial fish ladder
  - Construct a fish bypass channel around Englebright Dam
- Fish Passage at Daguerre Point Dam
  - Remove Daguerre Point Dam
  - Construct step pools up to Daguerre Point Dam
  - Modify Daguerre Point Dam diversion structure and construct fish bypass channel
  - Modify the fish ladders at Daguerre Point Dam

Reproductive Enhancement Measures – A number of possible measures have been proposed to improve reproductive habitats in the river. These actions focus on the restoration of spawning gravels and improving opportunities for reproductive isolation.

- Installation of segregation weir below Englebright Dam
- Spawning gravel placement
- Shot-rock stabilization

- **Other Possible Measures**
  - Conduct habitat restoration in the Yuba Goldfields
  - Construct waterfowl habitat in the Yuba Goldfields and possibly at Waterway 13 and Timbuctoo Bend.
  - Build a hatchery.
  - Conduct gold mining to remove mercury.

Yuba River Ecosystem Restoration Feasibility Study

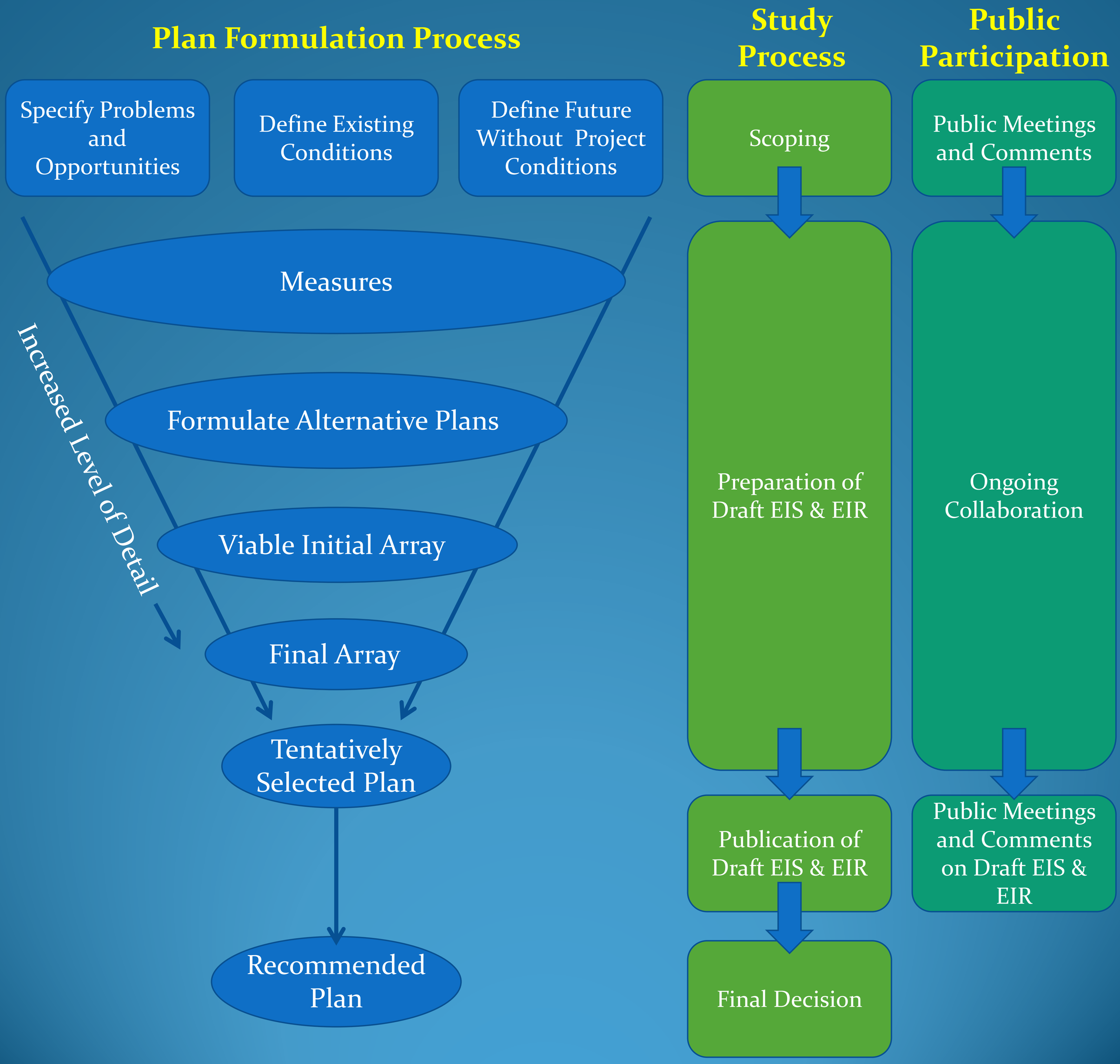
What is Public Scoping? Public scoping invites agencies, stakeholders, and the interested public to participate in the environmental review process. US Army Corps of Engineers, Sacramento District (NEPA lead agency) and the Yuba County Water Agency (CEQA lead agency) invite agencies, stakeholders, and public input on the Draft Environmental Impact Statement and Draft Environmental Impact Report (EIS & EIR).

Scoping helps to identify and refine potential:

- Measures and alternatives
- Environmental impacts

We need the public's help in determining the scope of issues to be addressed in the EIS/EIR. Your input is appreciated and valued. Please provide input on:

- Potential measures
- Potential significant environmental impacts of the Project
- Local information and geographic-specific knowledge
- Any other issues you'd like to raise about the Project



Yuba River Ecosystem Restoration Feasibility Study

How to Submit Comments:

Tonight:

- Fill out a written comment form and return it to the comment box ; or
- Provide oral comment(s) to the court reporter (oral comments will be limited to 3 minutes per person)

Please provide comments within 30 days.

Written comments and comment cards can be addressed to:

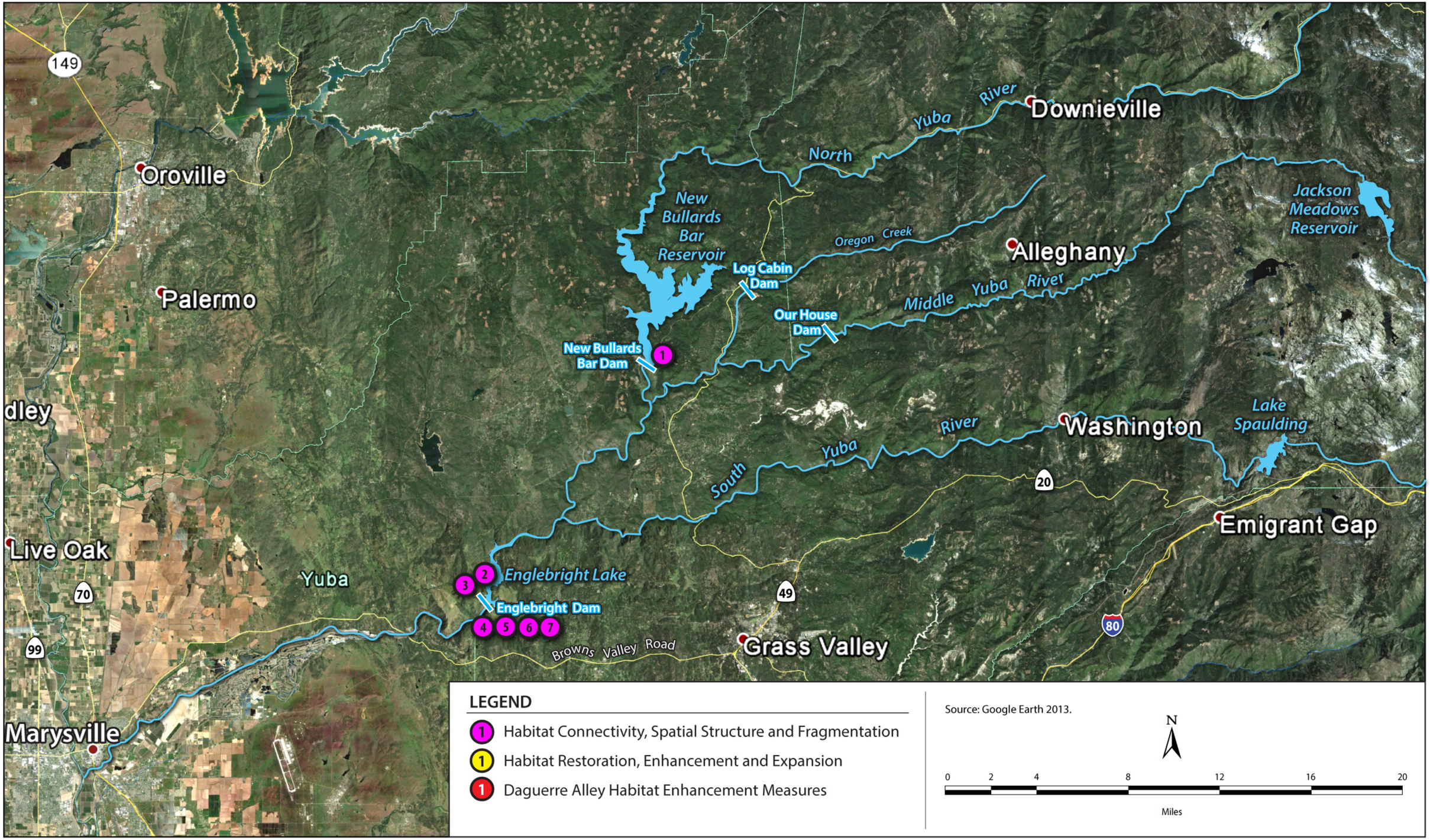
U.S. Army Corps of Engineers, Sacramento District
Attn: Michael Fong, CESPK-PD-RP
1325 J Street
Sacramento, CA, 95814-2922

E-mailed comments can be addressed to *Michael.R.Fong@usace.army.mil*.
Requests to be placed on the mailing list should also be sent to this address.

We will be developing an informative web page and providing updates throughout the study.
bit.ly/YubaEcoRestoration.

US Army Corps of Engineers
Sacramento District

Yuba River Ecosystem Restoration Feasibility Study
Preliminarily Identified Potential Measures



LEGEND

- 1 Habitat Connectivity, Spatial Structure and Fragmentation
- 1 Habitat Restoration, Enhancement and Expansion
- 1 Daguerre Alley Habitat Enhancement Measures

Source: Google Earth 2013.

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Miles

Yuba River Ecosystem Restoration Feasibility Study
Preliminarily Identified Potential Measures

US Army Corps of Engineers
Sacramento District

Yuba County Water Agency 1959

LEGEND

- 1 Habitat Connectivity, Spatial Structure and Fragmentation
- 1 Habitat Restoration, Enhancement and Expansion
- 1 Daguerre Alley Habitat Enhancement Measures

Parks Bar Reach
Timbuctoo Bend Reach
Narrows Reach
Englebright Dam Reach

Hammon Bar
Silica Bar
First Island
Hidden Island
Lower Gilt Edge Bar
Parks Bar
Timbuctoo Bend
Englebright Dam
Narrows 2 Powerhouse
Sinoro Bar
Narrows Gateway
S-Turn
Narrows 1 Powerhouse
Narrows Pool
Upper Gilt Edge Bar
Hammonton Road
New Bangham Ranch Road
Old Bangham Ranch Road
Englebright Dam Road
Rocklin Trail
Dagenon Road

28 27 26 25 24 23 22 21 20 19 18 16 12D 13 14 15 12B 12A 12C

Source: Google Earth 2013.

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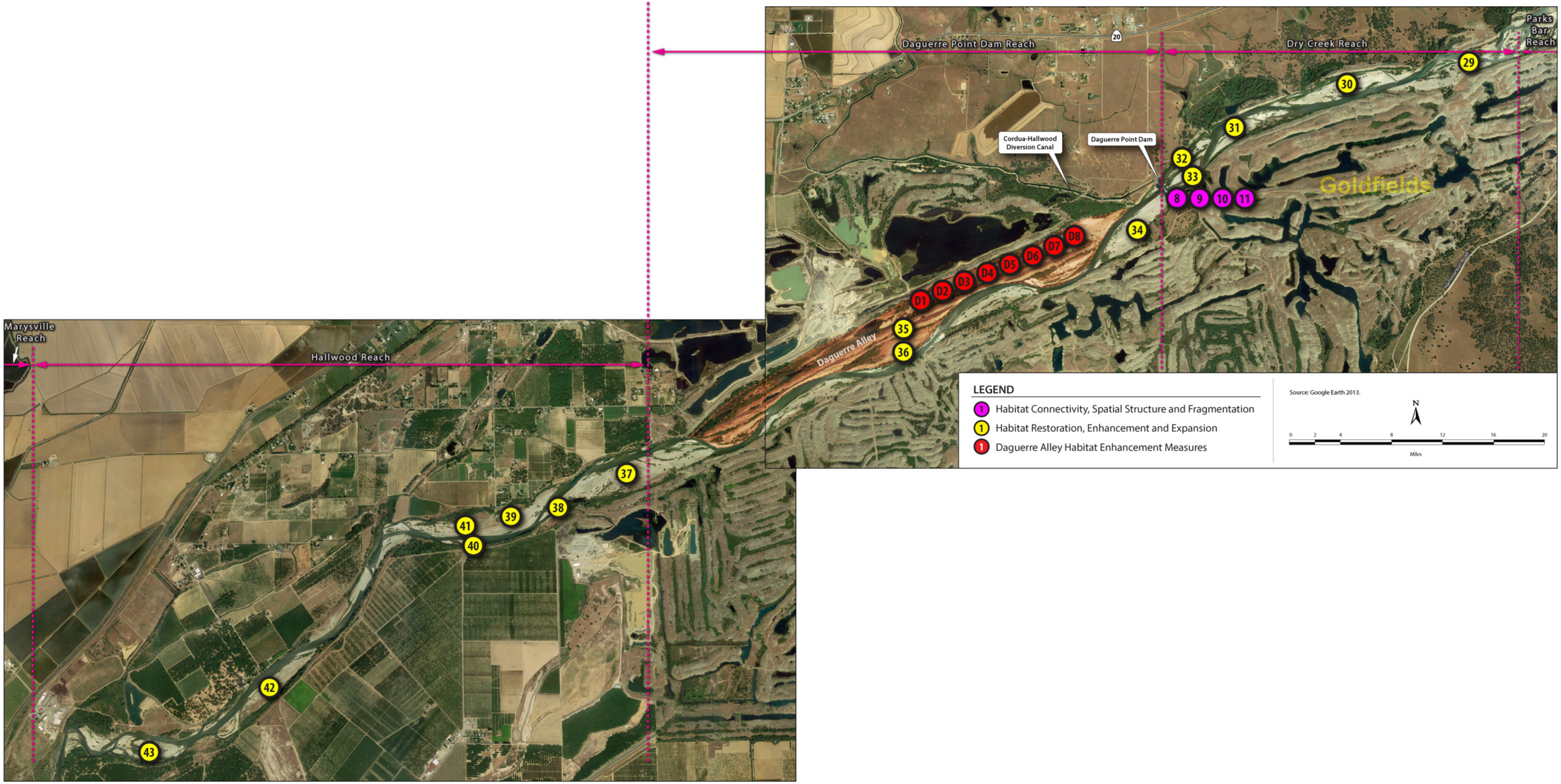
Yuba River Ecosystem Restoration Feasibility Study
Preliminarily Identified Potential Measures

US Army Corps of Engineers
Sacramento District

Yuba County Water Agency · 1959



Yuba River Ecosystem Restoration Feasibility Study
Preliminarily Identified Potential Measures

US Army Corps of Engineers
Sacramento District

Yuba County Water Agency · 1959 ·

Habitat Connectivity, Spatial Structure and Fragmentation

1. **Collect and transport anadromous salmonids around New Bullards Bar Dam.**
   - Collect adults downstream of Englebright Dam, release adults into the North Yuba River upstream of New Bullards Bar Dam, collect juveniles upstream of New Bullards Bar Dam and release juveniles downstream of Englebright Dam.
2. **Collect and transport anadromous salmonids around Englebright Dam.**
   - Collect adults downstream of Englebright Dam, release adults into the Middle and/or South Yuba rivers upstream of Englebright Dam, collect juveniles upstream of Englebright Dam and release juveniles downstream of Englebright Dam.
3. **Remove Englebright Dam.**
   - Remove or sequester sediment in Englebright Reservoir, or gradually release sediment downstream of Englebright Dam, remove Englebright Dam, rehabilitate the river beneath Englebright Reservoir, and re-operate upstream water release and power generation facilities to provide suitable flows to the lower Yuba River.
4. **Construct a second dam as step to Englebright Dam.**
   - Construct a second dam and reservoir downstream of Englebright Dam, and construct two fish ladders, one from the river to the top of the first dam, the second from the first reservoir to the top of Englebright Dam.
5. **Install a full height fish ladder at Englebright Dam.**
   - Construct a full height fish ladder at Englebright Dam – an equivalent facility (e.g., a fish tramway) might be an option. As necessary, re-operate upstream water release and power generation facilities to provide suitable flows.
6. **Notch Englebright Dam and install a partial fish ladder.**
   - Partially remove or sequester sediment in Englebright Reservoir, or gradually release sediment downstream of Englebright Dam, notch the dam to a lower elevation, construct a fish ladder or other fish transport facility, rehabilitate exposed river bed beneath Englebright Reservoir, and re-operate upstream water release and power generation facilities to provide suitable flows.
7. **Construct a fish bypass channel around Englebright Dam.**
   - Construct a low-gradient channel around Englebright Dam. Depending on the gradient of the constructed channel, the new channel could extend several miles downstream and upstream of the current location of Englebright Dam.
8. **Remove Daguerre Point Dam.**
   - Provide unobstructed volitional passage of adult anadromous salmonids and green sturgeon upstream of the dam, and minimize predation of downstream migrants.
9. **Construct step pools up to Daguerre Point Dam.**
   - Provide unobstructed volitional passage of adult anadromous salmonids and green sturgeon upstream of the dam, and minimize predation of downstream migrating juvenile salmonids.
10. **Modify Daguerre Point Dam diversion structure and construct fish bypass channel.**
    - Construct a low-gradient channel around Daguerre Point Dam. Could include construction of a "Coanda" screen to continue to provide diversion capability at the dam, and could include filling of the scour pool located immediately downstream of Daguerre Point Dam to minimize predation of downstream juvenile migrants.
11. **Modify the fish ladders at Daguerre Point Dam.**
    - Reconstruct the fish ladders at Daguerre Point Dam using state-of-the-art design and technology for anadromous salmonids. Also could address green sturgeon passage.
12. **Segregation Weir downstream of Englebright Dam.**
    - Reconstruct the fish ladders at Daguerre Point Dam using state-of-the-art design and technology for anadromous salmonids. Also could address green sturgeon passage:

12A. Upstream end of Narrows Gateway.

12B. At gravel outcrop near western edge of Narrows Gateway.

12C. Just downstream of Blue Point Mine.

12D. At outcrops just upstream of Highway 20 Bridge.

Habitat Restoration, Enhancement and Expansion

13. **Englebright Dam Reach shot-rock stabilization.**
    - Stabilize loose fractured rock or sources of angular rock ("shot rock") in the Englebright Dam Reach. Could include modification of the Narrows 2 Powerhouse access road.
14. **Sinoro Bar spawning habitat expansion.**
    - Three primary components: (1) remove shot rock deposited on the surface of Sinoro Bar; (2) reshape the streambed, including redistributing the slope and expanding the wetted width; and (3) placement and contouring of gravel in the streambed.
15. **Narrows Gateway spawning habitat expansion.**
    - Three primary components: (1) remove excess cobbles and boulders from Narrows Gateway; (2) reshape the streambed; and (3) placement and contouring of gravel in the streambed.
16. **Upper Gilt Edge Bar structural complexity.**
    - Line the left bank of the main channel with boulder/wood structures, and enhance an ephemeral backwater with boulder/wood structures.
17. **Bank scalloping at Upper Gilt Edge Bar.**
    - Scallop banks and place large wood within and protruding from the scallops.
18. **Backwater at Upper Gilt Edge Bar.**
    - Excavate sediment to allow for backwater inundation at fall baseflows. Riparian woody species may be planted. Additional fine material could be introduced to upper 3 ft of the soil column. Large wood would be placed within the backwater.
19. **Channel and floodplain restoration below Highway 20 Bridge.**
    - Mine out the entire mining sediment terrace along the south side of the river (Upper Gilt Edge Bar). Could include removal of the mining sediment terrace just downstream to the north (Parks Bar). Construct either a terraced valley floor with different elevations, or a low-lying, intermixed multiple-channel, forested floor. Could incorporate engineered riffles or boulder fields, as well as riparian vegetation planting.
20. **Lower Gilt Edge Bar enhancement.**
    - Lower floodplain elevations and plant riparian vegetation. Lower a swale feature (at upstream end of Lower Gilt Edge Bar) and connect to channel to become inundated at about 3,000 cfs. Could also include construction of a patchwork floodplain network surrounding the enhanced groundwater-fed swale.
21. **Percolation-fed backwater at Lower Gilt Edge Bar.**
    - Create a percolation gallery-fed backwater with floodplain lowering and riparian planting adjacent to the backwater. Excavate a side channel and create a riparian bench planted with native riparian hardwoods, or allowed to re-vegetate naturally. Large wood would be placed along the margins of the backwater channel.
22. **Bank bio-engineering downstream of Lower Gilt Edge Bar.**
    - Stop the erosion of the 15-20 ft tall steep bank, threatening Hammonton Road. Design and install a large revetment structure composed of large wood (bole sections with root wads attached), cables and probably riprap. Plant narrowleaf willows, if practicable.
23. **Side channel at Hidden Island.**
    - Lower the side channel elevation to allow connectivity at fall baseflow levels. A riparian bench would be created through surface lowering, fine sediment or soil would be added, the riparian bench would be planted with native hardwoods, and large wood would be placed along the banks and within the side channel.
24. **First Island side channel and floodplain patchwork.**
    - Create a side channel in an existing swale within a stand of relatively dense riparian vegetation. Place large wood on the left bank of the main river channel, and construct a floodplain patchwork network by placement or Engineered Log Jams (ELJs) along the apex of First Island just above bankfull elevation, or along the side channel.

25a. **Silica Bar side channel and floodplain enhancement.**
    - Create a side channel in an existing swale within an existing stand of diverse, mature, native riparian vegetation. Place large wood along the margins of the side channel, and plant with native riparian woody vegetation.

25b. **Training berm setback at Silica Bar.**
    - As an additional component, setback a ~5,000 ft segment of the southern training berm in this area to expand the river's corridor from ~700 ft to ~1,150 ft.

26. **Bar A enhancement.**
    - Lower floodplain surfaces for riparian vegetation planting and more frequent inundation between 3,000 and 5,000 cfs. Include large wood placement, and bank scalloping along the steeper bank downstream.
27. **North Silica Bar side channel (bar opposite of Silica Bar side channel).**
    - Create a side channel in an existing swale within a stand of relatively dense riparian vegetation which presently includes willows and cottonwoods.
28. **Hammon Bar enhancement.**
    - Create a side-channel within a stand of riparian vegetation, extending into the current backwater area. Possibly place boulder structures at the inflow section. At the outflow section, wood/boulder structures may be placed, and riparian vegetation planted. Plant riparian vegetation adjacent to the backwater and place large wood throughout its length, and in the existing backwater. Could include floodplain lowering, construction of a swale-like feature, additional riparian planting and placement of ELJs.
29. **Bar B floodplain grading and riparian vegetation planting.**
    - Create a swale across a lowered and planted floodplain surface. ELJ placement in a floodplain patchwork configuration along the upstream portion of the bar. Could include floodplain grading at the downstream portion of the bar, scalloped with key individual logs placed and bolstered.
30. **Island A riparian vegetation planting.**
    - Plant riparian vegetation in the large expanses of shallow groundwater.

31. and 32. **Riparian vegetation planting upstream of Daguerre Point Dam.**
    - Plant riparian vegetation in areas with shallow (< 7 ft) groundwater depths. Enhance with ELJ placement in a patchwork configuration.

33. **South Bar upstream of Daguerre Point Dam side channel.**
    - Create a side channel, within a stand of riparian vegetation, along the toe of the training wall, extending from the upper portion of the site to the existing downstream backwater area. Boulders for hydraulic maintenance may be placed at the inflow.
34. **Immediately below Daguerre Point Dam floodplain enhancement.**
    - Enhance existing slackwater/swale by grading to facilitate more frequent inundation, and to reduce depth to groundwater. Potentially place ELJ in patchwork configuration.

(continued on next board)

Yuba River Ecosystem Restoration Feasibility Study
Preliminarily Identified Potential Measures

35. Daguerre high flow channel floodplain enhancement.
- This area is a large expanse of potential floodplain habitat with relatively extensive riparian resources and shallow depth to groundwater. This location is the focus of separate investigation for side channel enhancement, floodplain reconnection and vegetation planting alternatives with the RMT and landowner (Teichert Aggregates).

36. Below Daguerre Point Dam main channel, off-channel enhancement.
- Some floodplain areas could be lowered, then combined with riparian vegetation planting. ELJs could be placed along river left (south bank), especially along the apex of the three meander bends. Possible ELJ placement in a floodplain patchwork configuration along the floodplain surfaces.

37. Bar C floodplain and backwater enhancement.
- Grade the floodplain to enhance two historic channel alignments to inundate at 3,000 cfs to function as a swale habitat.

38. Waterway 13 side channel.
- Create a side-channel, within a stand of riparian vegetation, extending from the main-channel into the current backwater area. Boulder structures for hydraulic maintenance may be placed at the inflow section.

39. Narrow Bar side channel.
- Create a side-channel north of the main channel following a historic channel path, within existing riparian vegetation. Boulders for hydraulic maintenance may be placed at the inflow.

40. Yuba Goldfields Terminus side channel.
- Create a side-channel, within a stand of riparian vegetation, extending into a current backwater habitat. Boulder structures for hydraulic maintenance may be placed at the inflow section.

41. Bar D floodplain riparian vegetation planting.
- An existing swale connects across the downstream end of the bar with relatively extensive riparian vegetation, and could be extended to connect further downstream. Floodplain grading along main channel could increase inundation duration and frequency at 3,000 cfs. Place ELJs to facilitate riparian recruitment.

42. Bar E riparian vegetation planting.
- Plant riparian vegetation in the downstream portion of this bar surrounding a historical channel alignment. Possibly large woody material in the swale/backwater downstream from the diversion point across the upstream portion of this bar.

43. Island B riparian vegetation planting.
- Plant riparian vegetation along the upstream portion of this island. This island also may benefit from ELJ placement in a patchwork configuration.

44. Rice field rearing (not shown on map).
- This measure would generally include diverting river flows and juvenile fish to specifically designated rice fields to provide high quality juvenile rearing in a controlled fashion. Size of rice field area, location and flow/fish diversion techniques that meet specific criteria such as proximity to the river and minimal handling stress are to be determined.

Daguerre Alley Habitat Enhancement Measures

Daguerre Alley is the name given to an approximately 2 mi. long section along the north side of the lower Yuba River extending downstream from Daguerre Point Dam. The Daguerre Point Dam Reach is the widest part of the river corridor, and is functionally different from the rest of the river by disbursing flow and avoiding the concentration of high velocities characteristic of other reaches. As a result, this reach contains the greatest abundance of riparian vegetation.

D1. Floodplain grading.
- Grade the floodplain so that most floodplain areas would inundate between 3,000 and 7,000 cfs. Resulting gradient of elevations, inundation frequencies, ground water depths and flood energy would generate a diverse mosaic of habitat types for juvenile salmonid rearing.

D2. Side channel or split channel.
- Grade the high flow channel to increase inundation frequency, and create a split channel of similar size to the main channel or a smaller side channel. Split or side channel inlet configuration could include a perennial surface connection and a perennial sub-surface connection, coupled with a seasonal surface connection (e.g., invert activating when main channel discharge reaches 3,000 cfs).

D3. Middle wall grading.
- As part of an overall floodplain grading effort, some portion of the middle wall could be removed to increase habitat and reduce flood levels along the Daguerre Point Dam Reach.

D4. Topographic modification of existing downstream aquatic features.
- Create a new, lower elevation side channel could tie into the existing network of beaver ponds, channels and backwater areas at their upstream end. Alternatively, the existing pond and backwater features could be modified by adding sediment to create floodplains and a narrower faster-flowing side channel.

D5. North wall enhancement.
- Enhance the north wall to protect it from being eroded, and construct a connection to the dredged ponds to the north. This is important for all measures that increase the amount of flow in the northern channel, but it is particularly important if a perennial split channel is constructed. Scour protection measures include rock and log revetments along the wall as well as augmentation of the wall with aggregate derived from the middle wall, or finer grain material from a nearby source.

D6. Engineered large wood structures.
- ELJs (engineered log-jams) may be placed at key locations (e.g., upstream connection with main channel) to both resist scour of important elements (e.g., northern wall or power line transmission tower island) as well as to promote scour and maintain side channel inlets. Large woody material placements or ELJs can also be designed to create localized areas of scour, geomorphic complexity and habitat diversity.

D7. Engineered diversions to side channel.
- A diversion from the Cordua-Hallwood Diversion Structure fish screen to the upstream end of a rearing side channel could provide a source of flow and juvenile salmonids to the side channel. The diversion structure could be augmented with an open channel or large pipe that would be controlled with a simple gate at the diversion structure.

D8. Swales.
- Additional features that could be created include swales and slackwater areas. Swales are defined as "a weakly-defined geometric channel or adjacent bench on the floodplain that only conveys flow at stages above low-flow", and slackwater areas are defined as "shallow, low-velocity regions of the stream that are typically located in adjacent embayments, side channels, or along channel margins".

Management Plans and Policies, Regulations and Studies

- Curtail further development in active Yuba River floodplains through zoning restrictions, master plans, and other federal, state and county planning and other processes.
- Permanently protect Yuba River riparian and floodplain habitat through easements and/or land acquisition.
- Implement programs and measures designed to minimize predation, including harvest management techniques and programs for non-native predators. Such measures and programs would focus on the area proximate to Daguerre Point Dam, as well as the lower Yuba River in general.
- Monitor and evaluate sport fishing regulations to ensure they are consistent with recovery of listed salmonids.
- Evaluate whether adult anadromous salmonid straying between the Feather and Yuba rivers can be minimized through coordinated management between lower Yuba River operations (Narrows 1 and 2 powerhouse operations and releases) with Feather River operations (Thermolito Afterbay outflows). Impacts on water delivery obligations, as well as potential flood control operations and hydropower generation for the Feather and Yuba River systems, would need to be assessed.
- Implement flow fluctuation and ramping rates found to be protective of anadromous salmonid embryos and juveniles.

Infrastructure Modifications Not Directly Associated with Habitat Enhancement

- Modify the Hallwood-Cordua diversion facility to decrease mortality of out-migrating juvenile anadromous salmonids. This measure would generally include modifications to the intake of the Hallwood-Cordua canal, modifications to the existing Hallwood-Cordua fish screen, and/or modifications to the bypass pipe and outlet.
- Modify the South Yuba/Brophy diversion facility to decrease mortality of out-migrating juvenile anadromous salmonids. This measure would generally include modification and/or replacement of the intake canal, outlet canal, and the rock gabion fish barrier.
- Install new security features or reconstruct existing barriers, etc. to limit public access (where access is currently prohibited) at Daguerre Point Dam to reduce poaching of indicator fish species.
- Removal or realignment of Hammonton Road between Lower Gilt Edge Bar and First Island
- Relocate the riverside motocross recreation area, located in the Marysville Reach, outside of the active floodplain.

Additional Suggestions

- Conduct habitat restoration in the Yuba Goldfields.
- Construct waterfowl habitat in the Yuba Goldfields and possibly at Waterway 13 and Timbuctoo Bend.
- Build a hatchery.
- Conduct gold mining to remove mercury.
- Deer Creek gravel augmentation.