Hanson Russian River Ponds Floodplain Restoration: Feasibility Study & Conceptual Design Summary

June 2016

The Project: The Endangered Habitats Conservancy (EHC), National Marine Fisheries Service (NMFS), Sonoma County Permit and Resource Management Department, California Coastal Conservancy, and US Geological Survey (USGS) completed a feasibility study focused on Sonoma County's Russian River Middle Reach that evaluated restoration alternatives for the 358 acre Hanson Aggregates Mid-Pacific, Inc. property adjacent to the Russian River, near Windsor (Figure 1). The four ponds on the property are remnants from gravel mining on river terraces that were once annually inundated floodplain. Historically, winter flows seasonally flooded the Middle Reach floodplain creating abundant shallow water habitats rich in food resources for fish and wildlife. Off-channel floodplain features of tributary sloughs and blind channels likely provided year-round rearing habitat for salmonids.

The project goal is to re-establish a stable, seasonal river - floodplain connection to restore essential ecological processes and functions to sustain off-channel aquatic, wetland, riparian, and upland habitats crucial for recovery of fish and wildlife, particularly ESA-listed coho and Chinook salmon, and steelhead populations. Additional goals are to establish science-based standards for similar river restorations and promote use of the Surface Mining and Reclamation Act (SMARA) to achieve ecosystem restoration. The project is also designed to accommodate public access for recreation and environmental education compatible with the ecological restoration goals.

Russian River Context and Existing Conditions: The Russian River Middle Reach Valley extends approximately 8.5 miles from the Highway 101 Bridge in Healdsburg downriver to the Wohler Road Bridge near Mirabel. Analysis of current versus historic conditions indicates existing geomorphic and ecological conditions and values within this reach have never been lower.

River channel dredging, straightening, and levee construction have disconnected the river from its historic floodplain. These modifications eliminated off-channel rearing and nursery habitat for salmonids and other native species by narrowing, deepening and simplifying the channel. Although it is one of California's largest gravel bed rivers, there is no suitable salmonid spawning gravel habitat remaining within the reach.

The incised channel and over-steepened banks and levees separating the river from numerous terrace gravel mining ponds are geotechnically unstable throughout the Middle

The Russian River flows from right (north) to left (south). The Hanson Ponds are adjacent to the Middle Reach.

Reach, requiring frequent and expensive repairs. Current reach conditions provide poor habitat for salmonids and other native fish due to hydromodification. Compounding the negative impacts, the existing ponds and river morphology offer extensive productive rearing habitat for warm water introduced fish known to prey on juvenile salmonids.

Summer/fall river water quality in the Middle Reach is also degraded by nutrient-rich warmed water flowing subsurface from the ponds to the adjacent river channel. Further water quality degradation occurs as the deep ponds promote biogeochemical processes that convert naturally occurring inorganic mercury into highly toxic and bioavailable methylmercury. The summer thermal stratification of the deep ponds results in accumulation and cycling of phosphorous and other nutrients driving these biogeochemical processes, and potentially contributing to blue green algae blooms. The gravel ponds sit atop the relatively small and shallow alluvial aquifer that is the drinking water source for 600,000 residents in Sonoma and Marin Counties.

Restoration Opportunity: EHC and Hanson have an option agreement allowing Hanson to transfer the property to EHC at no cost if and when EHC and its partners can secure approval for a restoration plan to replace the existing and outdated reclamation plan. State mining law, SMARA, requires the approval of a reclamation plan at the time mining permits are issued, but reclamation plans rarely, if ever, equate to ecological restoration. Hanson has implemented many of the existing reclamation plan obligations but is at an impasse over a requirement to maintain a revetment separating the ponds from the river. This requirement is at odds with growing scientific evidence that emphasizes the ecological

importance of floodplain restoration for recovery of endangered species populations. Recent research and this feasibility study indicate that with a restored connection to the river, the project area can become an ecologically valuable, seasonally inundated alluvial floodplain with native riparian forest, wetlands, and wet meadows for the benefit of native aquatic and terrestrial species.

Feasibility Study Key Findings: The feasibility study explored restoration alternatives with assistance from the USGS Geomorphology and Sediment Transport Laboratory. Using state-of-the-art multidimensional surface-water and sediment transport/landscape evolution modeling of the 8.5 mile Middle Reach, the performance of restoration alternatives was evaluated with regard to reach-wide channel stability, water quality, sedimentation, flooding, fish habitat and other biological metrics. Model results were reviewed and restoration concepts refined by 20 scientists comprising the Scientific Working Group and the Peer Review Panel. Figure 2 illustrates the ultimate refined restoration alternative that best achieves the geomorphic and ecological restoration goals of the project. Findings from the feasibility report include the following:

1. The Middle Reach riverbed is continuing to incise. The proposed project will halt the ongoing river bed degradation by significantly reducing flood elevations and velocities, and river bed and bank scour energies exerted during flood events. The project will also coarsen the bed downstream, possibly allowing pools to recover former depths.
2. Water from the ponds flow subsurface into the river degrading water quality with elevated temperatures, mercury methylation, and nutrient accumulation and cycling. The proposed project will improve onsite and downstream water quality by eliminating the open water ponds and restoring fine sediment deposition on the floodplain.
3. Currently the ponds provide non-native predatory fish habitat and are a sink to native fish populations when flooded. The proposed project will eliminate the ponds, significantly increase salmonid spawning habitat, and increase by ten-fold the availability of productive off-channel salmonid winter and spring rearing and refuge habitat.
4. Due to historical hydromodification, little functional floodplain remains in the Russian River catchment. The proposed project will restore connectivity between river, riparian, and floodplain shallow water habitats, stimulating ecosystem productivity by reactivating the seasonal pulse inundation of a sizeable floodplain for biologically significant periods.
5. Current gravel mine reclamation is out of step with ecosystem conservation and fisheries recovery. The proposed project presents an ecologically superior and exemplary alternative to typical SMARA reclamation plans, and strong rationale and impetus to utilize SMARA for ecological restoration purposes.
6. The Hanson property is closed to the public. The proposed project will provide recreational and environmental education opportunities compatible with ecosystem restoration.

Next Steps. The draft feasibility study report is under revision following favorable review by the Peer Review Panel and key supporting agencies. Preliminary results will be presented for comment to the Partners Planning Group, an advisory group for the project, and other stakeholders. Once the report is finalized, scoping for the CEQA process will begin, more detailed analysis will be conducted to estimate construction costs, and funding for final planning, permitting and implementation will be secured. EHC will own and manage the property during restoration, then transfer ownership to Sonoma County Regional Parks or other qualified entity that will provide public access.

Feasibility study funding: State Coastal Conservancy, Sonoma County, NOAA National Marine Fisheries Service West Coast Region, and California Wildlife Foundation.

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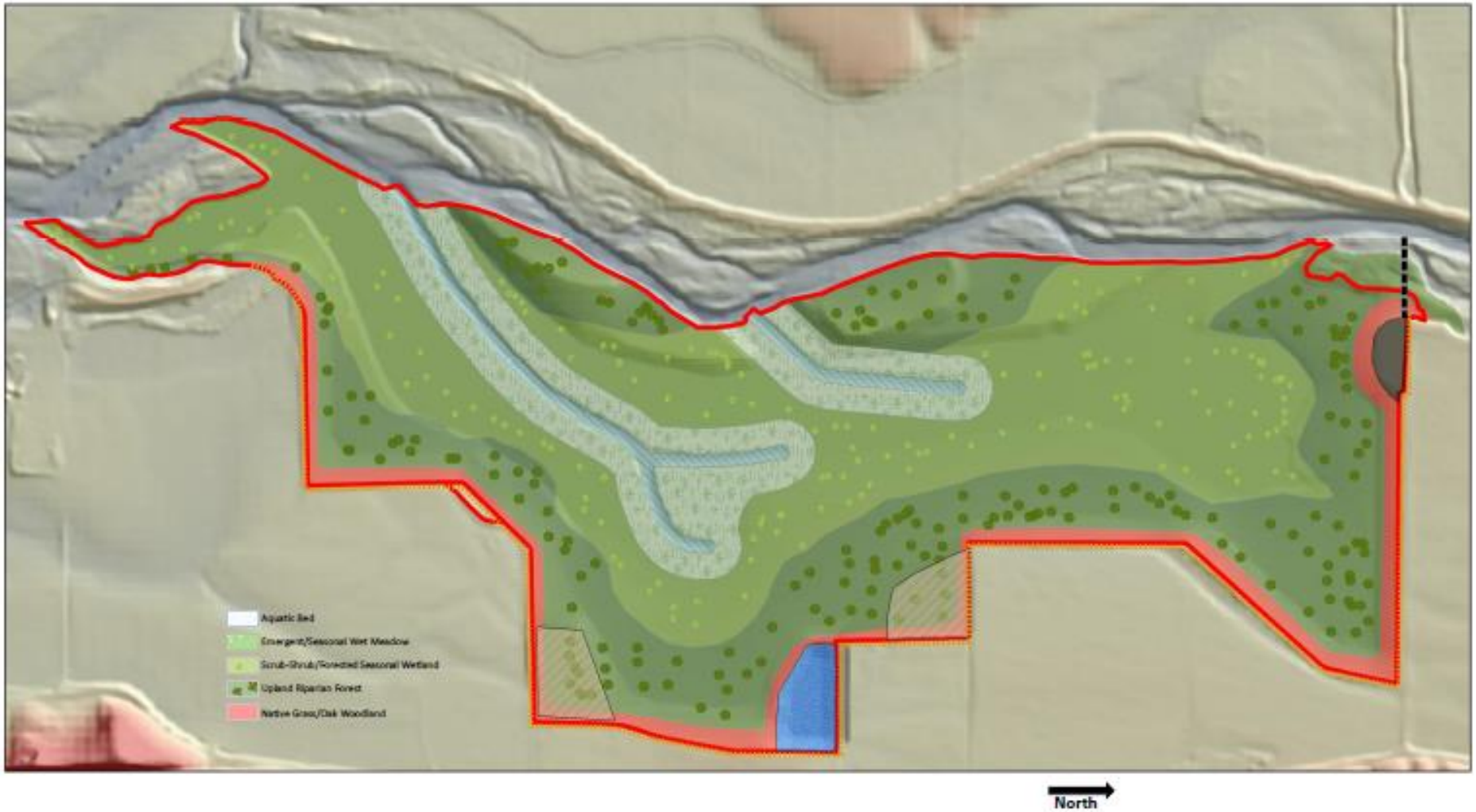
Figure 1. The Hanson property, Windsor, Sonoma County.

SYMBOLS

- Potential Trail
- Potential Campground
- Potential Parking Lot
- Potential Water Storage

Project: Hanson Russian River Gravel Pits Feasibility Study Report	Title: Existing Land Cover and Hanson Property Lines	Date Drawn: January 25, 2016
	Scale: 1 centimeter = 30 meters	Drawn by: C. Gavette
Location: Near Windsor, Sonoma County	Prepared for: California Coastal Conservancy & Sonoma County Permit and Resource Management Department	Checked by: B. Cluer

Figure 2. Hanson Russian River Ponds Floodplain Restoration Conceptual Design.



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Project: Hanson Russian River Gravel Pits Feasibility Study Report	Title: Proposed Vegetation Zones and Land Features	Date Drawn: January 25, 2016
	Scale: 1 centimeter = 30 meters	Drawn by: C. Gavette
Location: Near Windsor, Sonoma County	Prepared for: California Coastal Conservancy & Sonoma County Permit and Resource Management Department	Checked by: B. Cluer

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