



Final Report
**Wetland Inventory for the
McKay Community Forest**



prepared for
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Introduction

The McKay Community Forest in Eureka, California is owned and managed by the County of Humboldt. The land was acquired from Green Diamond Resource Company in 2013 with assistance from the California State Coastal Conservancy and funding from a U.S. Fish and Wildlife National Coastal Wetlands Conservation grant. The eastern boundary of the property runs along the centerline of Ryan Creek, a tributary of Humboldt Bay (Figure 1). In addition to the 168 acres acquired west of the creek, plans were made to secure a conservation easement over about 5,000 acres owned by Green Diamond east of the creek.

A primary objective of the land acquisition and conservation easement was to protect valuable coastal wetlands and associated upland habitats adjacent to Humboldt Bay (California State Coastal Conservancy 2012). Based on U.S. Fish and Wildlife Service National Wetland Inventory (NWI) maps, it was estimated that 73 acres of wetlands occurred in the McKay Community Forest and 24 acres of wetlands occurred in the land subject to the proposed conservation easement. There have been delays in the securing of the conservation easement, which means that the protection of those targeted 24 acres of wetlands cannot yet be assured.

In response to a request for assistance by the California State Coastal Conservancy, Pacific Coast Fish, Wildlife and Wetlands Restoration Association (Pacific Coast Restoration) conducted a field investigation in May-June 2018 to look for any additional wetlands in the McKay Community Forest that were not previously mapped by NWI. The wetlands mapped by NWI were mostly associated with the Ryan Slough estuary and lower Ryan Creek. We defined a study area upstream of where most NWI wetlands were mapped (Figure 1). We did not attempt to check or revise NWI mapping outside of our study area.

We found an additional 43 acres of wetlands in the McKay Community Forest that were not mapped by NWI. Combined with the 73 acres of wetlands already mapped by NWI, we estimate a total of 116 acres of wetlands in the McKay Community Forest are now under the protection of stewardship by the County of Humboldt as a result of the land acquisition.

Our findings are useful for planning and resource management; however, they are not suitable for jurisdictional or permitting purposes. Our mapping is not intended to represent an exhaustive accounting of all wetlands in the study area. This report provides documentation of our field investigation, including a description of methods, a map, and a brief characterization of the wetlands found. Geospatial data were submitted to the State Coastal Conservancy with this report.

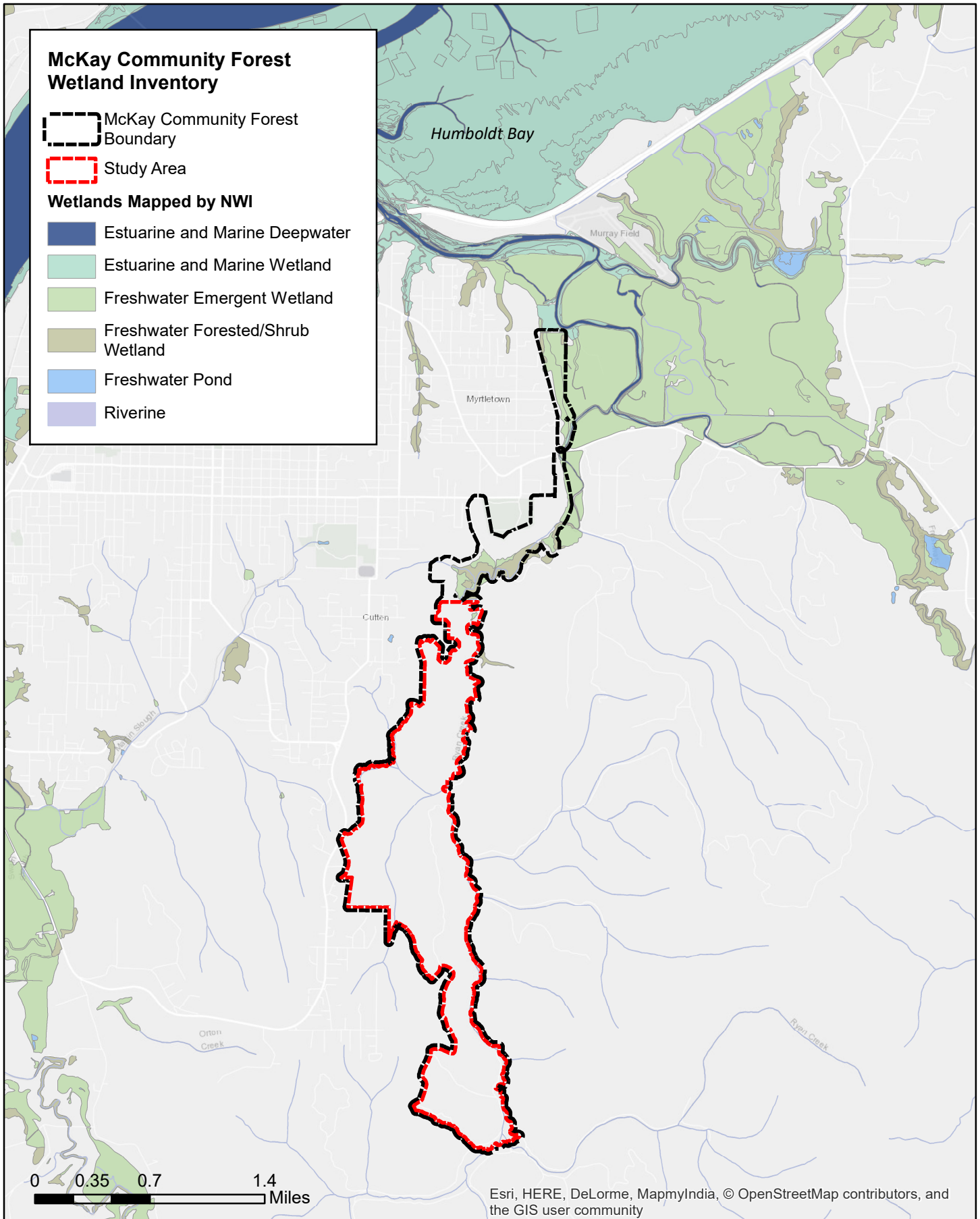


Figure 1. McKay Community Forest Wetland Inventory Study Area, Showing Wetlands Previously Mapped by the National Wetland Inventory

Methods

All work was performed by Pacific Coast Restoration’s staff Annie Eicher (plant ecologist/project manager) and Kelsey McDonald (GIS specialist), with oversight by Mitch Farro (project director).

To classify wetlands, we followed NWI and used the Wetland Classification Standard (WCS). WCS is based on the hierarchical classification system for wetlands and deepwater habitats developed by Cowardin et al. (1979) and updated by the Federal Geographic Data Committee (2013). For our wetland maps, we used NWI Map Classification Codes (U.S. Fish and Wildlife Service Ecological Services 2016). For regional wetland ratings of plant species, we consulted the *National Wetland Plant List (NWPL): Western Mountains, Valleys and Coast 2016 Regional Wetland Plant List* (Lichvar et al. 2016). NWPL ratings are based on the indicator status categories shown in Table 1. Hydrophytes are plants adapted to wet environments, and hydrophytic vegetation is dominated by hydrophytes. Scientific nomenclature for plants in this report follows Jepson Flora Project (2018). Where appropriate, synonyms used by the NWPL are shown in parentheses.

Table 1. Qualitative Description of the National Wetland Plant List Indicator Status Ratings

Indicator Status	Code	Designation	Qualitative Description
Obligate	OBL	Hydrophyte	almost always occur in wetlands
Facultative Wetland	FACW	Hydrophyte	usually occur in wetlands, but may occur in non-wetlands
Facultative	FAC	Hydrophyte	occur in wetlands and non-wetlands
Facultative Upland	FACU	Nonhydrophyte	usually occur in non-wetlands, but may occur in wetlands
Upland*	UPL	Nonhydrophyte	almost never occur in wetlands

* A few upland plants are included on the regional NWPL list because they are rated FACU or wetter in other regions. Plant species not listed are considered UPL in all regions.

For background information on the McKay Community Forest study area, we reviewed aerial imagery (Google Earth 06/23/2016), NWI maps (U.S. Fish and Wildlife Service National Wetland Inventory 2018), and National Cooperative Soil Survey soils maps (U.S. Department of Agriculture Natural Resource Conservation Service [NRCS] 2018). We referred to Light Detection and Ranging (LIDAR) elevation data and information on the location of drainages in the Ryan Creek watershed depicted by Herbst (2015) in a report describing habitat improvement and sediment reduction measures performed by Pacific Coast Restoration and Pacific Watershed Associates in 2013.

We mapped wetlands using a combination of aerial photointerpretation and ground-truthing. Preliminary mapping was performed in ArcGIS 10.5.1, using geospatial data gathered during site reconnaissance to aid in recognition of specific wetland vegetation types seen in the aerial imagery. Fieldwork was conducted on May 24 and 29 and June 7, 2018 to check wetland boundaries and to describe the wetlands observed. A mobile Global Positioning System (GPS) unit was used for field data collection, with 2-5 m accuracy in the forested terrain of the study area. In the field, we considered vegetation patterns, hydrology, topography, and signs of habitat alteration to make our mapping determinations. Mapping was then refined, incorporating information gathered during the field investigation. Acreage of wetlands mapped was calculated from the geospatial data.

Results

We mapped a total of 43.14 acres of wetlands in the McKay Community Forest study area (Figure 2). The majority of the wetlands found were freshwater forested wetlands (43.0 acres) associated with the Ryan Creek and its tributaries. We mapped a small freshwater emergent wetland (0.14 acre) in the southeast region of the study area. Additionally, the study area contained one small freshwater emergent wetland mapped by NWI in the northeast region. The NWI wetland is shown in Figure 2, but we did not include this acreage in our total because it was already accounted for in the previous estimate of wetland acreage based on NWI mapping.

Riverine Channels

Using the WCS hierarchical system, the Ryan Creek channel is a deepwater habitat classified as Riverine, Upper Perennial, Unconsolidated Bottom, Semipermanently Flooded channel (R3UBf). The channel is narrow with relatively steep banks and contains at least some flowing water year-round. The largest tributaries are Bob Hill Gulch and Henderson Gulch, and there are numerous other unnamed drainages in the Ryan Creek watershed. Like Ryan Creek, Henderson Gulch and the main stem of Bob Hill Gulch are also classified as R3UBf. The smaller tributary channels, including the north and south forks of Bob Hill Gulch, are classified as Riverine, Intermittent, Streambed, Seasonally Flooded channels (R4SBc). These smaller channels contain flowing water only part of the year and may have steep or shallow banks.

Freshwater Forested Wetlands

The freshwater forested wetlands found bordering Ryan Cr and its tributaries are classified as Palustrine Forested, Broad-leaved Deciduous, Seasonally Flooded wetlands (PFO1c). They were characterized by the presence of wetland plants that are adapted to the wet soil conditions created by

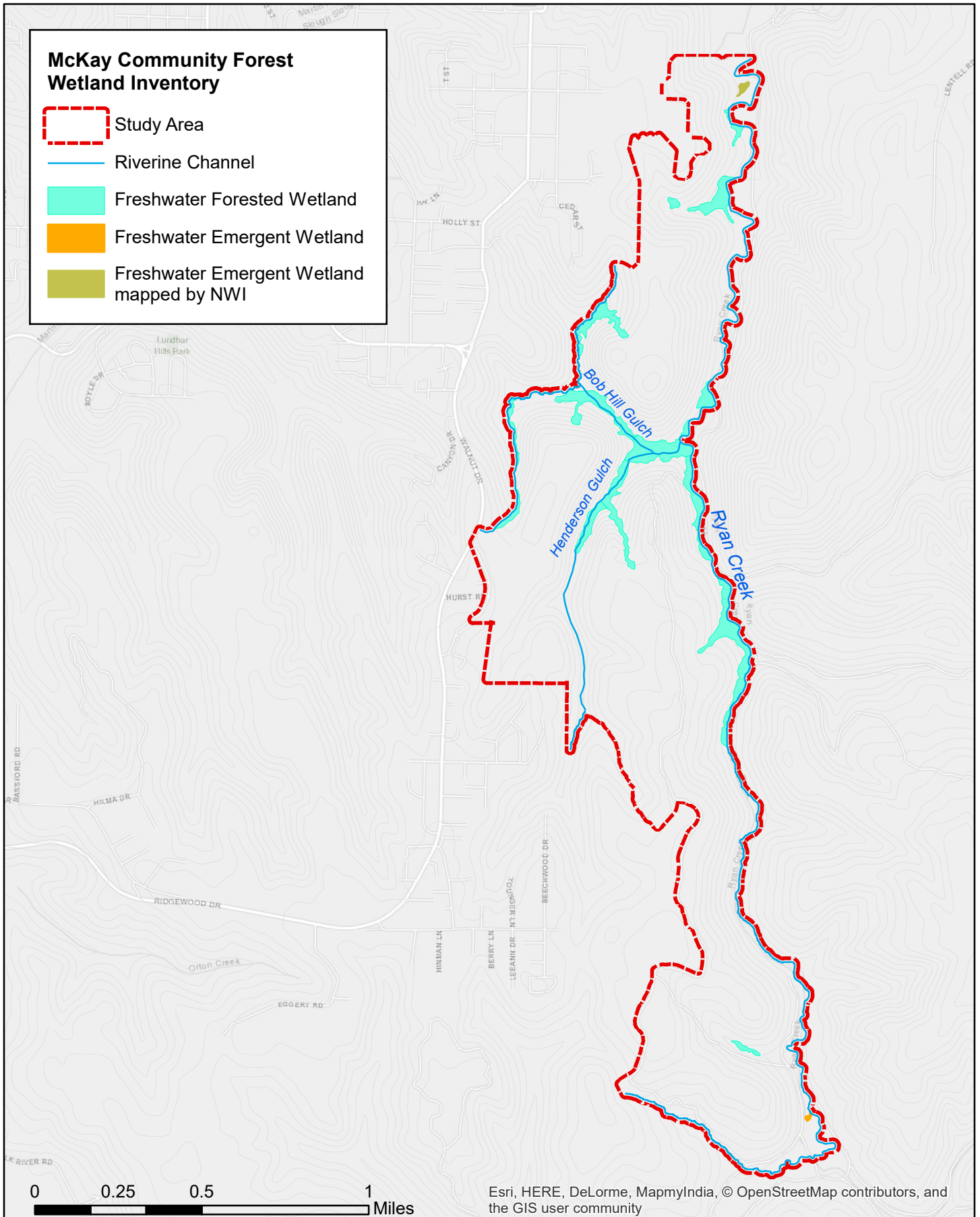


Figure 2. Wetlands in the McKay Community Forest Study Area

periodic flooding during the rainy season. In the landscape, these forested wetlands were transitional between aquatic channel habitats and upland forest habitats. A few facultative upland and upland plant species found in adjacent uplands also occurred in the forested wetlands. We mapped our wetland/boundaries where there was a shift in dominance from hydrophytic to nonhydrophytic plant species. The boundary was often associated with a change in topography as well. The wetlands were lower and less steep than adjacent uplands.

In general, the freshwater forested wetlands had open canopies dominated by mature red alder (*Alnus rubra*, FAC), with occasional big-leaf maple (*Acer macrophyllum*, FACU), and a sparse shrub layer dominated by red elderberry (*Sambucus racemosa*, FACU), with occasional salmonberry (*Rubus spectabilis*, FAC). The herb layer was variable, but usually contained a dense mixture of hydrophytic plants including yellow skunk cabbage (*Lysichiton americanus*, OBL), slough sedge (*Carex obnupta*, OBL), small-headed bulrush (*Scirpus microcarpus*, OBL), water parsley (*Oenanthe sarmentosa*, OBL), coastal monkeyflower (*Mimulus dentatus*, OBL), western sweet coltsfoot (*Petasites frigidus* var. *palmatum*, FACW), lady fern (*Athyrium filix-femina* var. *cyclosorum* [synonym: *A. cyclosorum*], FAC), Pacific waterleaf (*Hydrophyllum tenuipes*, FAC), and American stinging nettle (*Urtica dioica* subsp. *gracilis*, FAC). (Photos A and B).



Photos A and B. Freshwater Forested Wetlands on the West Bank of Ryan Creek (left) and Bordering the North Fork of Bob Hill Gulch (right)

Freshwater Emergent Wetlands



Photo C. Restored drainage

The small freshwater emergent wetland that we mapped in the southeast region of the study area (Figure 2) was associated with restoration work performed by Pacific Coast Restoration and Pacific Watershed Associates in 2013. As part of a sediment reduction project, a small area of fill was removed from a small drainage and the natural pattern of water flow into Ryan Creek was restored. The freshwater emergent wetland was shallow and had been colonized primarily by slough sedge, with water parsley and a few cattails (*Typha latifolia*, OBL). Young red alder were also evident (Photo C).

The small freshwater emergent wetland previously mapped by NWI in the northeast region occurred near but not adjacent to Ryan Creek and was surrounded by conifers. Slough sedge was dominant, with Pacific silverweed (*Potentilla anserina* subsp. *pacifica*, OBL), common horsetail (*Equisetum arvense*, FAC), California blackberry (*Rubus ursinus*, FACU) and patches of reed canary grass (*Phalaris arundinacea*, FACW), which is a noxious weed.

Wetland Soils

Much of the wetlands we found were in areas mapped by NRCS (2018) as having Weott soils, 0-2% slopes (Figure 3). Weott soils are classified by NRCS as hydric (wetland) soils. Weott soils typically occur in floodplains, backswamps, and depressions. The parent material is alluvium derived from mixed sources. They are non-saline or slightly saline, very poorly drained silt loams associated with occasional flooding and/or frequent ponding.

The other wetlands we found were in areas mapped by NRCS (2018) as various map-unit complexes comprised of three main soil types: Salmoncreek, Rootcreek, and Tepona. Of these, Salmoncreek is a hydric soil and the other two are upland soils. We expect that some of the wetlands we mapped are associated with Salmoncreek soils; however, we could not determine the precise distribution of Salmoncreek soils since they were mapped as part of multiple map-unit complexes (and therefore Salmoncreek soils are not shown in Figure 3). Salmoncreek soils typically occur on mountain slopes. The parent material is colluvium derived from siltstone and/or residuum weathered from siltstone. They are non-saline to very slightly saline, poorly drained silty clay loams.

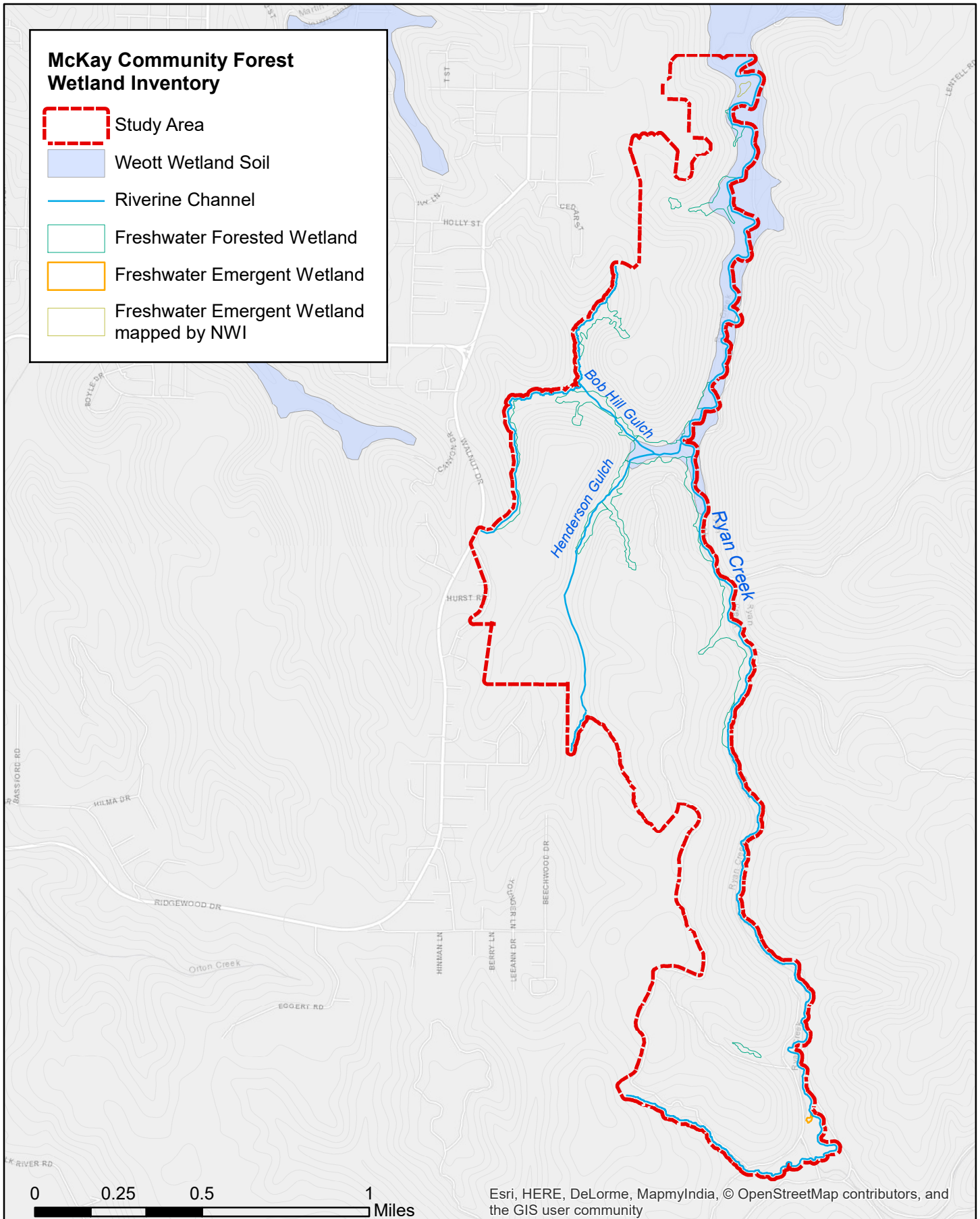


Figure 3. Distribution of Weott Wetland Soil Type (NRCS 2018) in Relation to Wetlands in the McKay Community Forest Study Area

Adjacent Uplands

Adjacent to the freshwater forested wetlands are slopes vegetated by upland coniferous forest. In general, the upland forest had a dense canopy dominated by redwood (*Sequoia sempervirens*, UPL), Douglas-fir (*Pseudotsuga menziesii*, FACU), and Sitka spruce (*Picea sitchensis*, FAC), with occasional western red cedar (*Thuja plicata*, FAC). The sparse shrub layer contained cascara (*Frangula purshiana*, FAC), evergreen huckleberry (*Vaccinium ovatum*, FACU), and salal (*Gaultheria shallon*, FACU). The herb layer had moderate cover and was dominated by sword fern (*Polystichum munitum*, FACU), with occasional redwood sorrel (*Oxalis oregana*, FACU) and cow parsnip (*Heracleum maximum*, FAC) (Photo D).



Photo D. Upland coniferous forest

Sensitive Plants

Two sensitive wetland plants were observed during our surveys. Pacific golden saxifrage (*Chryso-splenium glebomifolium*, OBL) was fairly common in wet, shaded areas. It is listed by the California Plant Society with a California Rare Plant Rank (CRPR) of 4.3: limited distribution and not very endangered in California (CNPS 2018). Nodding semaphore grass (*Pleuropogon refractus*, OBL) was found in two locations in wet forest openings. It has a CRPR of 4.2: limited distribution and fairly endangered in California (CNPS 2018). These incidental findings do not represent a complete survey or mapping of either sensitive plant noted. Additional sensitive plants may also occur in McKay Community Forest that were not encountered during our wetland surveys.

Discussion

The freshwater forested wetlands found in this investigation are naturally occurring habitats associated with Ryan Creek and its tributaries. The hydrology supporting these wetlands is seasonal flooding, with sustained saturated soils and seasonal ponding in some locations. The wetlands are generally correlated with mapped hydric soils. They are vegetated primarily by hydrophytes. They can be distinguished from the adjacent upland forests which lack wetland hydrology and which are vegetated primarily by nonhydrophytes.

With close inspection, the red alder dominated wetland forests were discernible in the aerial imagery we reviewed; however, they occur in narrow corridors that don't stand out clearly from the adjacent upland coniferous forests. Fieldwork was needed to confirm and refine the boundaries. Likely, this is why they were not included on NWI maps, which were prepared from analysis of high altitude imagery and limited fieldwork.

In addition to the naturally occurring wetlands we mapped, we also observed areas of wetland vegetation that have developed artificially as a result of altered drainage patterns resulting from past logging operations. If the watershed were fully restored, many of these artificially wet areas would be re-contoured to support natural drainage patterns, and they would lose their wetland characteristics. Restoration of natural hydrology would in turn enhance and increase the extent of wetlands in their natural place in the landscape. We did not map areas of artificially created wetlands, but rather restricted our mapping to natural wetlands that are expected to persist and be protected by future management of the McKay Community Forest.

Another thing to note is that young red alders and a mix of other hydrophytes (e.g., coltsfoot and common horsetail) have colonized slopes where former logging roads have recently been decommissioned. This vegetation type represents an early successional stage, a precursor to the mature coniferous forest that will eventually develop and merge into the surrounding upland forests; therefore, we did not include this vegetation type in our wetland mapping.

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