



## CONTACT INFORMATION

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## EDUCATION

M.S. 1994 Geomorphology  
The Johns Hopkins University,  
Maryland  
B.S. 1991 Geology  
Bloomsburg University of  
Pennsylvania

## PROFESSIONAL REGISTRATIONS

California Civil C72614  
Oregon Civil 79492PE

## AREAS OF PRACTICE

- Watershed/Planning Studies
- Geomorphic Assessment
- Stream and Estuarine Restoration
- Aquatic Organism Passage
- 1D & 2D Hydraulic Modeling
- Sediment Transport Analyses
- Bioengineering Design
- Construction Supervision
- Civil 3D/QGIS

## AFFILIATIONS

- American Fisheries Society
- California Salmonid Restoration Federation
- River Restoration Northwest

## EXPERIENCE

Rachel specializes in the application of fluvial geomorphology, hydrology, hydraulic analyses and sediment transport in small to landscape-scale riverine and coastal estuarine environments. She has over 30 years of multidisciplinary experience. Her specialties include geomorphic analysis, hydrologic and hydraulic analyses, 1 and 2-dimensional hydraulic modeling and sediment transport analyses, bridge scour analyses, design development, specifications, and construction supervision. She manages projects, staff, and tracks budgets.

### Windler Off-Channel Habitat Enhancement Project, NF Salmon River, CA

Lead engineer and geomorphologist to re-activate floodplain flow on an ~8-acre river bar highly impacted by gold mining and river sedimentation. Oversaw RTK survey and base-mapping with USGS LiDAR. Designed and oversaw a surface/groundwater well monitoring network to quantify seasonal water levels, temperatures, and dissolved oxygen. Performed 2-D hydraulic modeling to determine flow depths and velocities on the restored floodplain and to support stability calculations for large wood structures. Developed design plans to lower the bar surface, construct a side-channel network to provide winter off-channel rearing, and enhancement of a river-side channel with large to provide summertime cool-water rearing habitat. Constructed slated 2026.

**Client:** Salmon River Restoration Council

**Completed:** 2024

### Hoteling Gulch Fish Access and Habitat Restoration Project (Cecilville, CA)

Prepared design plans, specifications and cost estimates and supervised construction to restore 650-feet of channel to its historical location and geomorphic function. Performed a reference reach geomorphic analysis and designed a steep boulder-step pool channel with large wood structures. Used hydraulic modeling and geomorphic analyses to identify suitable span and elevations for a 27-foot stream-simulation bridge that will pass 100-year flows and a high sediment and debris load. Performed bridge scour analysis using 1D HEC-RAS and FHWA procedures. Evaluated fish passage capabilities of various salmonid sizes & species using fish energetic relationships and hydraulic results.

**Client:** Salmon River Restoration Council

**Constructed:** 2019

### Upper Tryon Creek Enhancement Design Project (Smith River, CA)

Led geomorphic assessment and engineering design for restoration of 4,600 feet of a linear ditch channel to a highly sinuous, low gradient stream with 8 backwater alcoves, a broad re-activated floodplain, and diverse riparian area. Design focused on re-occupying the historical channel planform obtained from aerial photos and historic maps. Reference reach data was used to develop channel cross section and profile complexity. Used HEC-RAS 2-D model to evaluate flow patterns of floodplain flows and to design a 50-foot span bridge and low-water crossing. Performed moment-based stability computations for 60 LWD structures (130 logs).

**Client:** Smith River Alliance

**Constructed:** 2024



### **Williams Creek Alluvial Fan Flooding Alternatives Analysis (Ferndale, CA)**

Lead characterization of geomorphic and hydraulic conditions, alternatives analyses and preliminary design to address landscape-scale flooding of a channel across an alluvial fan onto active ranchlands. Characterized historical and present geomorphic conditions, conducted rapid geomorphic assessment of the upper watershed, calibrated 1-D and 2-D models to streamflow and water level data. Conducted extensive assessment of sediment sampling data and sediment transport analyses to estimate sediment delivery rates, annual loads, and sediment load gradation. Developed a range of alternatives that reduce flooding of residential and agricultural lands and to capture coarse sediment before delivery to the lower gradient Salt River project.

**Client:** Humboldt County RCD

**Completed:** 2023

### **Salt River Ecosystem Restoration Project (Ferndale CA)**

Prepared designs for Francis Creek restoration and associated Sediment Management Area (SMA). Developed a geomorphically stable channel design that maintains sediment transport to the SMA. Instream habitat and grade control in the channel is provided with anchored large wood structures and bioengineered bank stabilization. SMA design evaluated sediment settling and re-mobilization potential and sediment trapping efficiency relative to grain size. Fish passage was integrated into the design as an “alcove” confluence with the Salt River and a chute-and-pool roughened channel into the SMA. Assisted with design and construction of the larger-scale Salt River Restoration project, focusing on large wood habitat structures. Other components included sizing tidal channels using empirical relationships and developing layout of off-channel ponds and tidal marsh plains.

**Client:** HCRCD

**Constructed:** 2018

### **Martin Slough Estuarine Enhancement Project (Eureka, CA)**

Performed unsteady HEC-RAS modeling to determine the Muted Tide Regulator settings on a replacement tide gate to provide limited tidal inflow into the project, creating a zoned tidal marsh system without impacting existing freshwater systems. Performed HEC-RAS quasi-unsteady water quality modeling to predict the extents of salinity into the project area. Prepared hydraulic analyses, tidal channel sizing, off-channel pond development, and large wood placement designs for more than 1.6 miles of restored tidal slough channels and off-channel wetlands in a tributary to Humboldt Bay.

**Client:** Redwood Community Action Agency

**Constructed:** 2021

### **Manly Gulch Fish Access and Habitat Restoration Project (Mendocino, CA)**

Performed geomorphic assessment, developed design plans and specifications, and oversaw construction of a new bridge and restoration of 1,800 feet of channel. Restoration included 18 self-ballasted large wood structures that will passively restore the incised channel by facilitating gravel deposition. Downstream channel restoration included design of a geomorphically stable channel with log-steps provide profile control to the channel. Prepared HEC-RAS analysis to evaluate channel capacity, sediment transport, and compute bridge scour. Currently performing flow depth and velocity monitoring to evaluate fish passage performance.

**Client:** Trout Unlimited

**Constructed:** 2017/18

### **US 101 Tide Gate Replacement Project (Humboldt Bay, CA)**

Evaluated pre-project water level, salinity, and water quality data to size a Muted Tide Regulator (MTR) gate with auxiliary door to allow fish passage. Performed 1-dimensional unsteady flow modeling to calibrate modeling and gate coefficients to observed water levels. Determined MTR gate closure and Auxiliary Door dimension to match pre-replacement muted tide. Performed post-construction monitoring.

**Client:** Caltrans District 1

**Completed:** August 2020

