

Years of Experience

5 Years

Areas of Expertise

- ArcGIS - analyzing GPS, LiDAR, and bathymetry datasets, utilizing spatial analysis tools.
- MATLAB - plotting and analyzing GPS and raster data, time-series analysis, numerical modelling, automated data downloads.
- Beach stabilization design, beach nourishment
- Agisoft – UAV imagery collection, photogrammetric processing to create DEMs and orthomosaics.
- GPS - RTK, differential, and hand-held.
- Illustrator - editing to create clean and detailed maps and figures.

Education

MS, Geology, Western Washington University, 2020

BS, Geology, University of Oregon, 2014

Registrations

Licensed Geologist #21013999, Washington State, 2021

Certifications

Approved Biologist, Forage Fish Survey, WDFW, 2021
Part 107 Unmanned Aircraft License, FAA, 2021

Avery Maverick, MS, LG

Project Scientist



Key Qualifications

Avery is a coastal geologist (LG) who specializes in sea level rise assessments, shoreline change analysis, coastal processes, and applied coastal geomorphology. Avery has proven experience with field data collection, GIS mapping and analysis, remote sensing, photogrammetry, and has expertise in sourcing and managing Pacific Northwest geospatial data. Avery applies her skills by providing beach and bluff property management advice and by assisting with coastal restoration design in the Puget Sound region. Her current focus is assessing vulnerability to sea level rise and contributing to the development of adaptation strategies for specific sites. Avery graduated with a MS in Coastal Geology from Western Washington University and a BS in Geology from University of Oregon. She is a licensed UAV operator and an approved biologist in Washington State. Avery is passionate about protecting and managing shorelines, especially in the Salish Sea.

Project Experience

Prioritizing Sea Level Rise Exposure and Habitat Sensitivity Across Puget Sound — Western Department of Fish and Wildlife ESRP

Coastal Geologist and Lead Geospatial Analyst. Puget Sound wide project to assess sea level rise vulnerability at the parcel scale. Developed approaches to quantify coastal hazard exposure to flooding and erosion and the vulnerability of habitat and infrastructure. Compiled existing spatial data into a GIS database from many sources and managed GIS analysis. Created new SLR inundation and depth layers based on the most recent SLR projections for several scenarios for the entire Puget Sound region. Additionally, lead the incorporation of a complimentary social vulnerability metric developed for the Puget Sound region by NCCOS partners. Authored in a paper published in the Journal of Sustainability.

Coupeville Sea Level Rise Vulnerability Assessment for the Town of Coupeville and WA — Department of Ecology

Coastal Geologist and Lead Geospatial Analyst. Avery led the development and implementation of the vulnerability framework, the geospatial analysis, and the preparation of the project geodatabase. She participated in all project planning meetings and gave several technical presentations to the client and stakeholder/community groups. The assessment resulted in an evaluation of key infrastructure such as roads, buildings, storm/sewer/water utilities, critical infrastructure, and parks and community assets to help prioritize future efforts and apply for additional funding. This project involved a large community engagement effort which Avery supported.

Whatcom County Compound Flood Vulnerability Assessment – Whatcom County

Coastal Geologist and Geospatial Analyst. Avery led the development of the methodology to estimate historic coastal bluff erosion throughout Whatcom County. This was part of a larger study that identified coastal and lower Nooksack River areas of the county that may be most vulnerable to climate change driven sea level rise impacts and changing rainfall patterns and identified strategies that may be applicable for addressing these risks. The historic bluff erosion rates along with a coastal erosion potential index (created in another study lead by Avery (CGS, 2022)) informed our project partners to identify the stretches of Whatcom County with the highest erosion potential and erosion zones for 2040, 2080, and 2100.

Shore Friendly Site Assessments — Northwest Straits Foundation & Kitsap County Shore Friendly

Coastal Geologist and Project Manager. Conducted dozens of site assessments for residential shoreline property owners in seven Puget Sound counties. Characterized nearshore conditions and provided recommendations tailored to owner's concerns, particularly related to erosion control, stormwater, vegetation management, ongoing sea level rise, and shore armor reduction.

Penn Cove Road Repair, Bluff, and Coastal Processes Assessment — Island County Public Works

Coastal Geologist and Lead Geospatial Analyst. Assessed site conditions, performed shore change analysis, determined bluff erosion rates, and evaluated the proposed road relocation design feasibility. Past and anticipated future bluff recession rates with sea level rise were calculated based on shore change analysis of historical aerial photos and GPS survey data. Time frames for the

bluff to receded to the proposed road edge were estimated to give the County a better understanding of management options for this roadway considering ongoing sea level rise.

City of Oak Harbor Residential Bluff Conservancy Analysis — City of Oak Harbor

Coastal Geologist. Assembled publicly available geologic and shoreline mapping, aerial photography, LiDAR, and hydrologic and watershed data to assess site conditions and the potential effects of developments within the Residential Bluff Conservancy. Performed GIS analysis of sea level rise effects on bluff stability and shoreline armoring, historical bluff recession rates, and future prediction based on possible mitigation scenarios, wave fetch, and wave height assessment. Completed field assessments of upland geology and drainage, bluff condition analysis, and ecological conditions analysis. Assisted in developing a narrative to incorporate findings including maps of current and predicted future site conditions.

Freeland Park Soft Shore Protection — Island County Public Works

Coastal Geologist. Assessed site conditions and assisted in developing and analyzing design alternatives to address erosion issues at the upper beach and low bank area near the restroom at Freeland Park in Freeland, WA. The assessment included background research on geology, beach and coastal processes, recent storm damage, water levels, and sea level rise, as well as analysis of coastal erosion/accretion rates, and determination of an appropriate coastal management approach for the area surrounding the restroom building.

Birch Bay Berm Five-Year Monitoring — Whatcom County Public Works

Coastal Geologist and Project Manager. Leading the annual performance and effectiveness monitoring analysis for an approximately 8,000-FT-long berm installed along Birch Bay Drive. The pre-project area included some segments of shore armor, a groin field, stormwater outfall pipes, and an overwater structure. Beach nourishment was placed on top of these structures along most of the sites, with the highest portions of the shore armor removed. Monitoring surveys include RTK-GPS mapping of features such as berm toe and crest, vegetation, and erosion hotspots, drone imagery collection, and collection of repeat ground photos. The general outcomes from the last few winters indicate that the berm performed as desired and is providing effective protection for the community.

Jackson Beach Nearshore Restoration — San Juan County Dept. of Environmental Stewardship

Coastal Geologist and Project Manager. Provided a coastal geomorphic assessment and mapping for a project to implement nearshore restoration along Jackson Beach in Griffin Bay in San Juan County at the site of an old sand and gravel mining operation. The assessment involved analyzing coastal conditions, existing armor, shore erosion/accretion trends, sea level rise projections, and associated effects. Assisted in the design of extensive armor removal and regrading of the shore. The design considered nearshore and aquatic ecological conditions, restoring values, cultural and historic resources, existing infrastructure, and heavy recreation use.

Residential Shoreline Loan Program Feasibility Study — Puget Sound Institute

Coastal Geologist. Gathered costs of soft shore protection, bulkhead removal, and structure elevation and relocation projects within Puget Sound into a database to assist in creating a revolving loan program to incentivize the implementation of projects that preserve or enhance nearshore habitats. Created a cost escalation adjustment factor to account for modern project costs and inflation, wrote report sections, and prepared all figures.

Coastal Enhancement and Shore Armor Repair/Replacement at MJB Properties, Anacortes, WA — MJB Properties

Coastal Geologist. Assisted in evaluating site conditions including coastal processes, littoral drift, projected sea level rise implications, bathymetric data compilation, and wave climate. Provided technical assistance in submitting a FEMA LOMR application to revise the flood zone delineation for the project site.

Geotechnical Assessments — property owners in seven Puget Sound counties

Coastal Geologist and Project Manager. Evaluated site conditions for several private coastal properties to assess geologic hazards and determine compliance with Island and San Juan County Codes. Conditions assessed included geology and marine banks, coastal processes, sea level rise impacts, bluff recession rates, and shoreline change.

Port Gamble Nearshore Restoration and Enhancement — Port Gamble S'Klallam Tribe

Coastal Geologist. Assisted in site reconnaissance and data collection of site conditions and nearby reference sites including beach profile surveys and sediment analysis. Conducted wave modeling using Xbeach to estimate cross-shore sediment mobility during storm conditions and wave runup.