



Wright Water Engineers, Inc.

## NATALIE M. COLLAR, CFM, HIT WATER RESOURCES SCIENTIST

### CURRENT

Water resources scientist with experience in stormwater management, post-fire hydrology, watershed mechanics, fluvial geomorphology, wetland science, hydrologic and hydraulic modeling, statistical hydrology, water quality monitoring and statistical analysis, and floodplain management. Modeling applications include SWMM, HEC-RAS, HEC-HMS, and others. Proficient in ArcGIS.

### EDUCATION

Ph.D. (current student), Civil and Environmental Engineering, projected 2022  
Colorado School of Mines

Advisor: Dr. Terri Hogue, Civil and Environmental Engineering (Department Chair)

Dissertation: Post-fire hydrologic response using remotely-sensed data on the conterminous United States scale; post-fire best management practices for reducing erosion and runoff

M.S., Water Resources Science, 2015

University of California Santa Barbara (UCSB)

Thesis: *Addressing Sedimentation of Ecuador's Rio Chone Estuary: A Watershed Perspective*

B.S., Biological Science, 2009

University of California Santa Barbara

Dual focus: Ecology, Evolution, and Marine Biology; Molecular, Cellular, and Developmental Biology

### REGISTRATION

Certified Floodplain Manager, 2016 (#US-16-09257)

Hydrologist-in-Training, American Hydrology Institute, 2017 (#17-HIT-104)

Certificate in Permanent Stormwater Quality Best Management Practice Inspection and Maintenance, Colorado State University Stormwater Center, 2017 (#247)

38-Hour Army Corps of Engineers Wetland Delineation Training Program, 2016 (#7991). Denver, CO. Richard Chinn Environmental Training, Inc.

## GENERAL REPRESENTATIVE PROJECTS

**Confidential Missouri River Flooding Assessment.** Evaluated flooding along the Missouri River mainstem for the United States Department of Justice (USDOJ) to evaluate impacts of reservoir operational changes and in-channel modifications carried out by the United States Army Corps of Engineers (USACE) following directives by Congress and the United States Fish and Wildlife Service (USFWS) to revitalize Missouri River riparian ecology. Conducted statistical hydrologic assessment of flow records pre- and post-modification and analysis of flood recurrence intervals.

**Pitkin County Post-Wildfire Debris Flow Assessment.** Coordinated with Colorado's Pitkin County to select seven drainage basins with meaningful Values-at-Risk (infrastructure, potential risk to human safety and/or welfare, etc.) to evaluate for a pre-event post-fire hydrologic hazard risk assessment. Modeled clearwater and bulked flow volumes and peak rates to represent the hydrologic change anticipated after a wildfire event. Assembled report and graphics for Pitkin County and presented results at local water-oriented conference.

**No-Rise Certification Hydraulic Modeling on Big Dry Creek, Thornton, Colorado.** Set up duplicate effective, corrected effective, existing conditions, and proposed conditions hydraulic models for the Big Dry Creek Pilot Project implementation for the City of Thornton. Work included all aspects of hydraulic modeling analysis using HEC-RAS, iterative work with design engineering firm Matrix, and submitting materials to the City of Thornton's floodplain administrator for a no-rise certification.

**Mile High Flood District Colorado Stream Quantification Tool Assessment.** Part of a project team assembled by Denver's Mile High Flood District (MHFD) to assess the USACE/United States Environmental Protection Agency (USEPA) Colorado Stream Quantification Tool (CoSQT), a regulatory tool rolled out in 2020 in Colorado to assess functional stream lift or loss on USACE Clean Water Act Section 404 permitted projects. Project team evaluated overall tool effectiveness, functionality, and repeatability, and provided detailed comments to USACE/USEPA during multiple in-person meetings.

**Base Flood Elevation Determination for CLOMR-F/LOMR-F on Blue River, Silverthorne, Colorado.** Project engineer for a CLOMR-F/LOMR-F certification along the Blue River for a private developer. Determined 100-year floodplain Base Flood Elevations (BFEs) from Federal Emergency Management Agency (FEMA) current effective hydraulic model and Flood Insurance Study (FIS) flood profiles. Stewarded client through floodplain development permitting process.

**Confidential Debris Flow Assessment.** Evaluating debris flow initiating rainfall, assessing post-fire hydrology including modeling sediment production from sheetflow processes, evaluating debris flow hydraulic controlling factors, including the effects of bridges and other channel constrictions/obstructions, performing a multi-day site visit to evaluate upper and lower watershed including entire length of the thalweg, and general testimony support role for fatal debris flow in Montecito, California following 2017/18 southern California Thomas Fire. Similar evaluation for post-fire pre-debris flow Woolsey Fire area in Malibu, California.

**Confidential Hurricane Flooding Evaluation.** Co-managed a team of WWE staff and adjunct peer reviewers to evaluate impacts of USACE reservoir operations in the Houston, Texas metropolitan area for the USDOJ during August 2017's Hurricane Harvey. Site visit and meetings with USACE officials, assessment of hydrologic methods for estimating design storm runoff, assessment of floodplain hydraulics, and general testimony support role.

**Confidential Fluvial Geomorphologic Assessment of the Bad River, Wisconsin.** Part of a project team overseeing a pipeline owner's engineering consultant who is actively assessing the potential of a meandering alluvial channel to avulse during high flows and/or gradually migrate during typical baseflow conditions to expose a buried pipeline at the neck of an oxbow.

**Confidential Industrial Stormwater Permitting Assignment.** Managing preparation of expert witness testimony materials for work with the USDOJ, including attendance of defendant's deposition, site visit with the USDOJ and USEPA, stormwater BMPs cost assessment, and preparation of expert witness report, appendices, and exhibits. Case related to alleged Clean Water Act Section 402 violations pertaining to the discharge of stormwater under the National Pollutant Discharge Elimination's (NPDES) Multi-Sector General Permit.

**Confidential Pipeline Environmental Impact Statement Assessment.** Assessing adequacy of a United States Department of State's Environmental Impact Statement for a controversial proposed pipeline in terms of impacts to water resources. Site visit to meet with stakeholders and assess proposed pipeline corridor, review of Environmental Impact Statement and associated materials, and preparation of letter report for client representing a Native American tribe.

**Confidential Colorado Wetland Delineations.** Performing comprehensive wetland delineations for United States Army Corps of Engineers Clean Water Act Section 404 jurisdictional determination purposes, including assessment of hydrology, vegetation, and soils. Running pre-application meetings with project stakeholders, performance of field work, GIS mapping, and report preparation. Performance of desktop evaluations when necessary for potential waters of the U.S.

**Confidential Stormwater Expert Witness Assignment.** Review of literature related to stormwater management using low impact development and green infrastructure principles, agricultural best management practices, and stream restoration. Managing preparation of expert witness report on stormwater management and impact of urbanization and farming on receiving waters in terms of hydrology, water quality, stream biota response, and channel geometry. Review of various aquatic biota integrity metrics.

**Keep It Clean Partnership Annual Water Quality Report.** Preparation of annual water quality report for City of Boulder, Boulder County, City of Longmont, City of Lafayette, City of Louisville, and Town of Superior, Colorado. Included compilation and analysis of water quality data and data interpretation to aid participating entities in attaining numeric water quality standards and Total Maximum Daily Load regulatory thresholds.

**Confidential Wetland Expert Witness Assignment.** Project engineer managing the preparation of expert witness report and exhibits for the USDOJ, including data management and statistical water quality analysis, performance of a site visit, research on area drainage history, research on planned development, SWMM modeling input development and evapotranspiration calculations, analyzing ditch drawdown calculations, assessing relevance of 303d listings, and file organization. Preparing client for deposition of opposing expert witness team; attending depositions to aid attorneys in deposition of technical topics.

**Risk Assessment Review.** Review of a surface water toxicity risk assessment performed for a confidential site in California, including assessment's thoroughness, completeness, methodology, and accuracy.

**Tiger River Run Floodplain Analysis.** Performed hydraulic calculations to determine how fill placed in a floodway would change stage elevations.

**Myers and Summit Farms Water Rights.** Field work and data compilation related to wells for water rights analysis for a potato farm.

**MHFD Water Rights Modeling.** Reviewed documentation for SWMM modeling for the Mile High Flood I District (MHFD). Ran model scenarios and interpreted model output.

**MHFD Clear Creek CLOMR.** Graphed discharges at Clear Creek stream gages for Conditional Letter of Map Revision for MHFD.

## OTHER EXPERIENCE

**Intern, The Nature Conservancy, Boulder, Colorado. (August 2015–December 2015).** Performed a fluvial geomorphologic GIS/remote sensing assessment of a disturbed Yampa River stream corridor, assessing change over time including occurrence/extent of sand bars, sinuosity, and total riparian area using NAIP imagery.

**Research Intern, National Snow and Ice Data Center, Boulder, Colorado. (August 2015–December 2015).** Data integration for CyberNABO's data partners into user-friendly data portal, and general cyber-infrastructure conceptualizing for usability of archaeological dataset portal. Provided Web-Atlas support using a Nunaliit platform for ELOKA.

**Intern, Goleta Water District, Santa Barbara, California. (January 2015–July 2015).** Authored portions of the 2015/16 annual Sustainability Plan Progress Report, RFPs, and internal technical documents. Determined water usage statistics for each of the District's customer classes. Participated in drought contingency planning and produced customer outreach materials.

**Graduate Researcher, UCSB Earth Research Institute (ERI), Santa Barbara, California. (January 2014–August 2015).** Assessed the efficiency of remote sensing products using surface reflectance data from MODIS and Landsat satellite imagery by comparing snow-cloud discrimination algorithms for improved snow-water equivalent (SWE) mapping.

**Graduate Researcher, UCSB Master's Thesis Group Project, Santa Barbara, California. (June 2014–June 2015).** Identified the major sources of sediment production in Ecuador's Rio Chone Watershed and the effect changing land use could have on reducing erosion rates, which was incorporated into a comprehensive watershed management plan. Also served as primary editor for all written materials and lead modeler for the employment of Stanford's Natural Capital Project InVEST Sediment Retention model, including pre- and post-data processing in *R* and ArcGIS.

**Graduate Intern, Global Student Embassy, Bahia de Caraquez, Ecuador. (July 2014–August 2014).** Performed reforestation work, identified sources of funding for non-profit, restructured business logistics, and volunteered with local schools to teach children about environmental awareness.

**Habitat Restoration Intern, UC Natural Reserve System, Santa Barbara, California. (January 2014–July 2014).** Collected data on phenology of specific reserve species and spatial species compositions on burned vs. non-burned transects, installed drip irrigation systems, maintained general greenhouse, and propagated native seed bank. Performed restoration planting.

**Graduate Teaching Assistant, UCSB (August 2013–December 2013).** Physiology. Taught five sections each week, attended lectures, and ran review sessions for a class of 300 students.

**Research Associate, Global Energy Network Institute, San Diego, California. (July 2011–July 2013).** Authored a comprehensive report on the implications of climate change on California's water supply, published online at [www.geni.org](http://www.geni.org), and served as a climate change specialist during month-long annual energy-water nexus conference.

**Laboratory Technician, UCSB Page-Dugan Lab, Marine Science Research Institute, Santa Barbara, California. (January 2008–January 2009).** Collected field data on intertidal marine macroinvertebrate kelp holdfast species compositions and beach ecological community compositions as affected by diminished beach detritus from seawalls.

**Community College Teaching Assistant, Santa Barbara City College, Santa Barbara, California. (August 2007–July 2010).** Under professors Larry Friesen and Robert Cummings, Department of Biological Sciences, graded all coursework material and held office hours for Cellular Biology, Plant Biology, and Introduction to Evolution.

## AWARDS

**2020-2021 American Water Works Association Rocky Mountain Section's James B. Warner Scholarship (\$4,000)** recipient. For a young professional seeking higher education in the water-related field; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2020-2021 Water Environment Federation's Rocky Mountain Water Environment Association Tony Campman Educational Grant (\$2,500)** recipient. For a student of a 4-year Colorado, Wyoming, or New Mexico university or college or a resident of the above-mentioned states pursuing study at a 4-year university or college in the water environment profession; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2020-2021 Colorado School of Mines Sister-to-Sister Scholarship (\$5,000)** recipient. For a female at CSM exhibiting exemplary leadership and community service with particular emphasis on girls and women-related issues, personal and professional accomplishments, financial need, past academic performance, special circumstances, and quality of essay submission; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2019-2020 Pitkin County Healthy Rivers Grant (\$14,500)** recipient, dually submitted by Natalie Collar on behalf of Wright Water Engineers, Inc. and the Colorado School of Mines for work on post-fire best management practice research as part of doctoral dissertation research. Proposal presented to grant board of directors and defended to Colorado's Pitkin County Board of County Commissioners after grant board voted to recommend funding. County Commissioners vote in favor of funding was unanimous

**2019-2020 Ben Urbonas CASFM (Colorado Association of Stormwater and Floodplain Managers) Graduate Scholarship (\$2,500)** recipient. For a student enrolled in a hydrology, hydraulics, watershed management, floodplain management, stormwater management, stormwater quality, meteorology, or climatology graduate program closely related to CASFM's goal of reducing the loss of human life and property from flood and storm damage; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2019-2020 WateReuse Martha Hahn Memorial Scholarship (\$1,500)** recipient. For a student with sincere interest in pursuing/currently employed in a professional career related to water reclamation, water reuse, and/or desalination; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2019-2020 Rocky Mountain Water Quality Analysts Association Graduate Scholarship (\$1,000)** recipient. For a student pursuing an education and career in the water quality field; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2019-2020 John Fetcher Upper Yampa Water Conservancy District Scholarship through Colorado Water Center, Colorado State University (\$2,000)** recipient. For a student in a water-related degree program; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

**2019-2020 Colorado School of Mines Hydrological Science and Engineering Fellow.**

## TEACHING AND PRESENTATION ACTIVITIES

*Proactive Planning for Post-fire Hazards in Pitkin County, Colorado* (Co-author on material presented at November 2019 annual International Erosion Control Association [IECA] conference). Presentation, given by WWE's Dr. Andrew Earles and Haley Rogers and Pitkin County's Catherine Berg Christoff, provided a summary of WWE's work on pre-event post-fire hydrological modeling of seven study basins in Pitkin County using CUHP and HEC-HMS with a focus on bulked flows and volumes. Work performed for Pitkin County's Planning and Development department.

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*Natural Rivers, Urban Streams, and Working Waterways—Using Context to Inform Restoration* (Technical presentation, November 2017 at annual IECA conference). Co-presented with WWE's Dr. Andrew Earles about the need to consider stream context when designing and planning stream corridor restoration efforts and stream management objectives.

*Considerations for Evaluations of Relatively Permanent Waters* (Poster session at annual USEPA Region 8 Wetlands conference, October 2017). Co-hosted a poster with WWE's Noah Greenberg during the annual USEPA Region 8 wetlands conference in Boulder, Colorado, on WWE's experience evaluating connectivity between a wetland or other water feature and the nearest downstream traditional navigable water (Scalia waters) and how this evaluation interplays with the Trump administration's February 2017 E.O. 13778.

Floodplain 101, Annual Colorado Association of State Floodplain Managers Conference (CASFM) (Class instructor, September 2017). Taught a class on engineering components (Units 3 and 4) of the National Flood Insurance Program's Certified Floodplain Manager program at the CASFM 2017 annual conference in Breckenridge, Colorado.

*20 Year Engineering Assessment of LID Facility in Boulder, Colorado* (Technical presentation, September 2017 at annual CASFM conference). Co-presented with WWE's Jonathan Jones and Wenk Associates' William Wenk on engineering components and lessons learned from a 20-year old stormwater management low-impact development retrofit at a commercial site in Boulder, Colorado. Presentation at the CASFM 2017 annual conference in Breckenridge, Colorado.

Clean Water Act Section 404, WWE Attorney Water Field Seminar (Class instructor, June 2017). Taught a class on CWA 404 wetland delineation and permitting considerations during WWE's 2017 attorney water field seminar in Golden, Colorado.

## PUBLICATIONS

Collar, Natalie M., Ashley J. Rust, and Terri S. Hogue. 2020. *Post-fire Erosion and Runoff Reduction Treatment Effectiveness and Inter-study Variability: A Review of the Literature and Meta-analysis of Case Study Data*. **International Journal of Wildland Fire**. (IN REVIEW)

Stillinger, T., D.A. Roberts, N.M. Collar, and J. Dozier. 2019. *Cloud Masking for Landsat 8 and MODIS Terra over Snow-Covered Terrain: Error Analysis and Spectral Similarity between Snow and Cloud*. **Water Resources Research**, 55. <https://doi.org/10.1029/2019WR024932>.

Wenk, William, Jonathan Jones and Natalie (Collar) Phares. 2018. *Opening the LID: 20 Years of Integrating Function and Aesthetics at a National Stormwater Demonstration Site in Colorado*. **Landscape Architecture Magazine**.

Jones, Jonathan, Natalie (Collar) Phares, William Wenk, Jorge Figueroa, Melissa Figurski, and Emily Barnes. 2018. *20 Year Engineering Assessment of LID Facility in Boulder, Colorado*. **Stormwater Magazine**. January/February.

(Collar) Phares, Natalie, Francesca de Leon, Steven Johnson, and Jacob Marcon. 2015. *Addressing Sedimentation of Ecuador's Rio Chone Estuary: A Watershed Perspective*. University of California, Santa Barbara. **Master's Thesis**.

(Collar) Phares, Natalie and Peter Meisen. 2011. *Impacts of Climate Change on California's Water Supply*. Global Energy Network Institute. **GENI.org**.

## ADDITIONAL QUALIFICATIONS

Mile High Flood District's *Stream Academy* graduate, 2017/2018. 72-hour class taught by David Rosgen, PhD, Ben Urbonas, PhD, Holly Piza, P.E.(MHFD), Barbara Chongtoua, P.E. (MHFD), Shea

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Thomas, P.E. (MHFD), Will Harman, P.G. (Stream Mechanics), Julia McCarthy (USEPA), Aaron Eilers (USACE), Andrew Earles, P.E., PhD (WWE), Jim Wulliman, P.E. (Muller Engineering), and others.

Haley & Aldrich, Inc. 8-hour Certified Professional in Erosion and Sediment Control™/Certified Erosion, Sediment, & Stormwater Inspectors (CPESC/CESSWI) Course.

Avalanche Hazard Management Training (January 2018) 32-hour. American Institute for Avalanche Research and Education.

PADI Open Water Diver

AIARE Avalanche Level 1

American Association of Snowboard Instructors (AASI) Level 1

### **RELEVANT COURSEWORK**

Statistics

Advanced Statistics

Analytical Hydrology

Fluid Mechanics

Groundwater Engineering

Environmental Modeling

Snow Hydrology

Fate and Transport of Pollutants

River Restoration

Watershed Analysis

Biological Waste Treatment

Large River Systems

Earth Systems Science

Statics

Calculus

Remote Sensing

Aqueous Chemistry

Organic Chemistry

General Chemistry

Biogeochemistry

Physics

Vertebrate Evolutionary Morphology

Invertebrate Zoology

Neural Biology

Evolutionary Biology

Plant Biology

Cellular Biology

Cellular Physiology

Aquatic Ecosystems

Eukaryotic Genetics

Prokaryotic Genetics

Population Genetics

Macroevolution

**PROFESSIONAL & HONORARY SOCIETIES**

Liaison, American Council of Engineering Companies of Colorado (ACEC)  
Member, Association of State Floodplain Managers  
Member, American Institute of Hydrology  
Member, American Geophysical Union (AGU)  
Member, American Water Resources Association (AWRA)  
Member, American Water Works Association (AWWA)  
Member, Association of Environmental Professionals (AEP)  
Member, Groundwater Resources Association (GRA)  
Member, Rocky Mountain Water Quality Analysts Association  
Member, Water Environment Federation (WEF)  
Member, Women in Science and Engineering (WiSE)

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