

CONTACT

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EXPERTISE

River and Riparian Restoration

- Habitat and natural form & function design
- Bed and bank stabilization
- Bioengineered treatments
- Design-build approach
- Construction costing, bid support, and oversight

Geomorphic Assessments and Sediment Transport

- Characterization, process modeling, and hazard mapping
- Channel evolution assessments
- Sediment transport analyses and modeling
- Bed stability and scour analyses
- Sediment budgets
- Terrain modeling (LiDAR, Softcopy photogrammetry)

Watershed Master Planning

- Restoration opportunity and prioritization
- Erosion hazard/channel migration zone (CMZ) assessment and mapping
- Flood recovery and flood hazard mitigation
- Floodplain mapping and risk assessment
- Technical support for grant acquisition
- Stakeholder engagement and capacity/consensus building

Federal, State, and Local Regulatory Support

- Full service permitting
- Sections 404 and 401 of the Clean Water Act
- Floodplain permitting (FEMA and local regulations)
- NEPA baseline, alternative, and mitigation measure development
- CDPS and other state and local permits
- UDFCD maintenance eligibility
- Monitoring inspections and reporting for compliance
- Water quality monitoring and analyses

Hydraulic and Hydrologic Modeling and Analysis

- 1D hydraulic modeling (HEC-RAS, HEC-GeoRAS)
- 2D hydrodynamic modeling (River 2D, FESWMS, iRIC)
- GIS and spatial data modeling (ArcHydro)
- Flood frequency analysis
- Hydrologic modeling (HEC-HMS, HEC-GeoHMS, VIC, PRMS)
- Bridge and culvert hydraulic design and assessment

Since 1981, **Otak** has built a reputation based on creativity, integrity, and skill—strengthening our communities, performing exciting work, and serving our clients. This philosophy, coupled with the energy and passion of our professional staff, has produced an award-winning planning, design, and engineering firm committed to collaborative success. By drawing upon the diversity of our in-house talents, we develop insightful and resourceful approaches to problem solving for our clients. Otak serves public and private clients from offices in Colorado, Arizona, Oregon, Washington, and abroad. With more than 240 professionals, we have in-house experts in water resources, civil and structural engineering, environmental sciences, landscape architecture, planning, urban design, surveying and mapping, construction management, GIS, and architecture.

Colorado Water and Natural Resources Team

We are excited to announce the formation of Otak's Colorado Water and Natural Resources Team, based in the Boulder/Denver area. The team is composed of scientists and engineers who are well-known locally and bring multidisciplinary skills and backgrounds to watershed, stream, and drainage resource problems. Led by **Julie Ash**, the team is composed of **Blair Vajda**, **Luke Swan**, **Tracy Emmanuel**, and **Rachel Williams** and offers over 50 years of collective experience working on Colorado river systems. We are known for innovative solutions that maximize natural form and function for complex restoration and engineering projects, which always entail diverse and sometimes directly competing technical issues and project goals.

Our team is dedicated to meeting our clients' varied and unique goals and solving project challenges through constant innovation and breadth and depth of technical expertise. Our experts have spent much of the last 16 months fully immersed in Front Range flood recovery efforts, providing a broad range of support that includes emergency flood protection, education on river processes, outreach and capacity building for local watershed advocacy, and long-term restoration planning efforts.

The team is motivated by a shared vision of ecologically- and process-based river restoration that works with the river to promote natural form and function within site constraints, rather than attempting to tame it with hard engineering. Our approach is founded on a comprehensive understanding of river and hillslope processes and strives to utilize the natural materials that are key components of the processes and contexts of the river systems. Individual sites or reaches are assessed holistically to successfully accommodate processes that operate at the site-, reach-, and watershed-scale, allowing the team to efficiently produce defensible designs that incorporate prevailing process regimes (e.g., sediment transport, flood) and onsite natural materials to re-establish river and biologic function.

This approach has been consistently proven by projects that maximize stream health and function and simultaneously increase safety and reduce future infrastructure damage. We share the belief that it is only through this combination of improved flood protection and stream health that we can create resiliency in our communities, economies, and river systems.

The group utilizes a proven design-build approach to implement our natural, process-based river restoration and habitat enhancement projects. This approach involves the designer through all phases of construction, providing better guidance to the contractor and reducing overall costs especially on smaller projects, and shifts the effort required for bid-level documents to actual onsite guidance.

OTAK COLORADO WATER AND NATURAL RESOURCE TEAM



Julie Ash, PE—Group Manager and Senior Water Resource Engineer

Julie is a senior project manager and a registered professional engineer in Colorado. She has 20 years of experience in restoration and engineering to support ecological, development, and redevelopment projects. Currently, she

serves as the group manager, leading a multidisciplinary Boulder-based water and natural resources team with a concentrated expertise on river corridor restoration. Julie focuses on restoring health and resiliency to natural systems challenged by today's reality of myriad and unavoidable constraints. She believes that intact natural systems, with their inherent resiliency, are the key to successfully meeting the diverse and often competing goals that we place on these areas and that protecting them is the best way to protect ourselves.



Blair Vajda, PE—Senior Water Resource Engineer

Blair is a senior project manager and registered professional engineer in Colorado specializing in rehabilitation of the natural function of stream ecosystems. She has close to ten years of diverse experience using an integrated approach

of science and engineering to optimize aquatic habitat and riparian corridor quality. Blair has successfully completed all aspects of stream channel rehabilitation projects on stream systems located in urban, natural, and mine site settings. She has extensive experience in regulatory compliance and permitting under Sections 404 and 401 of the Clean Water Act, including jurisdictional delineations of wetlands and waters of the US, as well as permitting expertise with NPDES and local agency regulations, including floodplain development permit applications. Blair has extensive experience in the full range of project components, including site evaluations; impact assessments; grading and planting plans; hydrologic and hydraulic analyses; geomorphic analyses; floodplain evaluation, permitting, and mapping; volume estimation; construction support; construction cost estimation; and monitoring and maintenance plans.



Luke Swan—Senior Geomorphologist

Luke is a project manager and fluvial geomorphologist with nine years of experience in sediment transport, flood and watershed planning, river restoration, hydrologic and hydraulic modeling, GIS, and remote sensing. He has spent much of the last year providing technical

support for both emergency and long-term flood recovery efforts,

including master planning, geomorphic assessments, and channel design. Luke's training is based in the morphologic approach to fluvial geomorphology, where process is inferred from the precise measurement of landform change through time. Watershed and river processes are fundamentally spatial in nature and Luke has found that GIScience can greatly facilitate an understanding of physical processes. With a thorough understanding of land form evolution, spatial relationships between physical phenomena become explicit. Process-based strategies to restore sections of channel can then be linked to watershed-scale phenomena. In this manner, holistic, sustainable solutions to water resource problems are developed. To determine these relationships, he has developed technical proficiencies in GIS and spatial data modeling; field survey, data collection, and interpretation; hydrologic and hydraulic modeling; processing remotely sensed (satellite and aerial) data; GPS, DGPS, and total station survey; softcopy photogrammetry; and terrain modeling.



Tracy Emmanuel—Senior Geomorphologist

Tracy is a fluvial geomorphologist with ten years of broad experience in geomorphic stream corridor assessments, sediment transport and scour analyses, hydrologic analyses, hydraulic (1 and 2D) modeling, large-scale stream inventories, groundwater

and surface water quality monitoring and analyses, and NEPA analyses. She has experience managing projects and being an active participant on multidisciplinary teams. Tracy is knowledgeable in channel and bank stabilization design, fish habitat design, and riparian revegetation. She also has experience managing large document organization, assembly, and technical editing, including various state and federal permitting applications and NEPA-related documentation for projects in Colorado and other western states.



Rachel Williams, EIT—Water Resource Engineering Designer

Rachel is an engineering designer with two years of experience working in the Rocky Mountain region. Her experience includes hydraulic modeling on stream and rivers, with analyses for bank stabilization, habitat improvement, compound channel

design, and flood flow analysis. Rachel also has experience with 2D and hydrologic modeling and has helped with the development of instream flow needs. Her field experience includes construction oversight, surveying, bed characterization, and velocity and water quality sampling. Rachel is dedicated to providing creative solutions for environmental management of water resources and aquatic systems through sound research, design, and professional standards.

The primary challenge with restoring rivers is understanding natural river function, which is the combination of complex hydrologic, hydraulic, geomorphic, biologic, and anthropogenic processes that control the evolution of a channel and its floodplain. Otak understands these challenges and relies upon decades of collective experience to efficiently assess processes, produce defensible designs, and construct sustainable river systems.