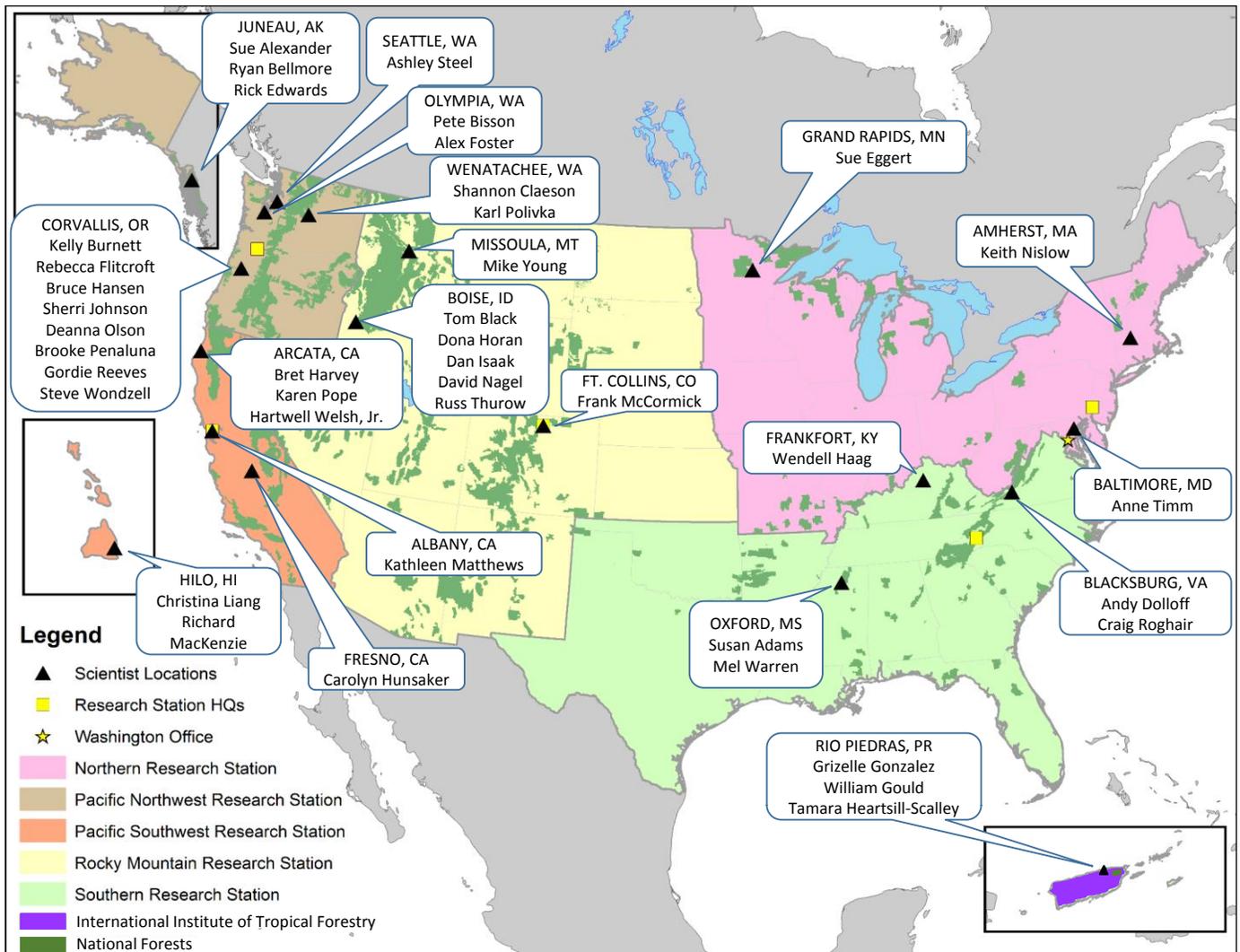




USDA Forest Service

Fish and Aquatic Ecology Research Staff

Contacts, Interests, and Current Projects



Fish biologists and aquatic ecologists in the US Forest Service’s Research and Development organization provide the knowledge and tools to sustain the health, diversity, and productivity of aquatic animals and habitats in the Nation’s forests and grasslands. We conduct basic and applied research on aquatic species and ecosystems to both inform land management and address existing and emerging threats, such as climate change and invasive species. Our research addresses restoration actions and strategies across large landscapes and watersheds; management of aquatic species and habitats under future climate scenarios; development of innovative protocols for inventory and monitoring of fish populations and habitats; and strategies to meet growing demands for water, energy, and other forest-based commodities while ensuring the sustainability and diversity of aquatic species. We emphasize science delivery and work with a diverse group of partners, including Federal, State, and Tribal resource agencies, universities, nongovernmental organizations, and international cooperators.

For more information contact our scientists or John Rothlisberger, National Program Leader for Fish and Aquatic Ecology Research, at jrothlisberger@fs.fed.us.



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Southern Research Station

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Keywords: Ecology of stream and river fishes; crayfish distribution, ecology, taxonomy, and conservation; aquatic community responses to disturbance

Current projects:

- Effects of disturbances on Alabama shad and other fishes in the Pascagoula River, MS
- Taxonomy and distribution of Mississippi crayfishes, with a goal of creating an identification guide
- Effects of stream warming on sculpin and dace distributions in Montana streams
- Landscape-scale assessment of warmwater stream temperatures in relation to fish and crayfish populations and to impoundments
- Building a better understanding of crayfish ecology and how human activities affect crayfish populations

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Keywords: aquatic organism passage; climate change - effects on ecosystem services and species distribution; habitat inventory and monitoring

Current projects:

- Climate change: characterization and prediction of water temperature in headwater streams
- Effect of climate change on transition of aquatic communities from cold-, cool-, and warmwater habitats
- Influence of disturbances on aquatic organisms
- American eel freshwater distribution, age & growth, and habitat use

- Influence of frequent prescribed fire on large wood in Atlantic coastal plain streams and aquatic communities

Wendell Haag

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Keywords: freshwater mussel ecology and conservation; warmwater fish; influence of life histories on community assembly and vulnerability to extinction; general aquatic ecology and environmental history; applying life history knowledge to management practices

Current projects:

- Reconstructing environmental history from long-term growth records in mussel shell rings
- Experimental studies of mussel recruitment and community assembly in hatchery ponds
- Long-term population dynamics of wild mussels

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<http://www.srs.fs.usda.gov/catt>

Keywords: science delivery, science-management partnerships, technology transfer, brook trout, headwater mountain streams

Current projects:

- Center Manager, Center for Aquatic Technology Transfer (CATT)



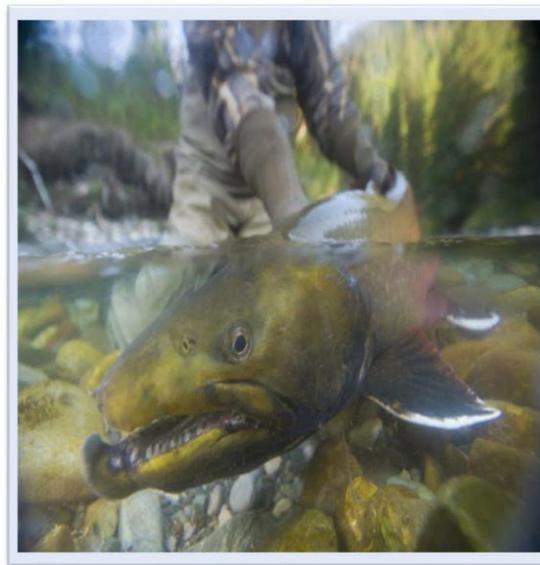
Mel Warren

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Keywords: stream fish and mussel ecology; fish and flooded forest interactions; aquatic organism conservation

Current projects:

- North American Freshwater Fishes: Natural History, Ecology, and Conservation (co-editor)
- Landscape-scale stream temperature modeling and population structure, demographics, and genetic conservation of an imperiled darter
- Natural resource climate change assessments for west African countries (Liberia, Ghana)
- Diversity-stability links in freshwater fishes
- Fish-floodplain interactions in a disturbed bottomland hardwood ecosystems



Bull Trout, J. Sartore, USFWS

Northern Research Station

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Keywords: aquatic-terrestrial linkages; food web ecology of aquatic ecosystems; functional responses of streams and wetlands to disturbance; stream restoration; invertebrate ecology

Current projects:

- Effectiveness of stream simulation design of road- stream crossings on stream food webs and ecosystem function (Wisconsin)
- Effects of whole-system manipulations of terrestrial organic matter inputs on stream function (North Carolina)
- Effects of fine sediment and mining on food webs in a coaster brook trout stream (Michigan)
- Mercury accumulation in peatland and seasonal pond food webs affected by biomass harvesting and climate change (Minnesota)

Keith Nislow

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Keywords: floodplain forest ecology; demographic, population genetic, and ecosystem consequences of barriers to movement in stream networks; effects of climate change and hydrologic alteration on secondary production, population resilience, and biodiversity; forest succession, forest management, and aquatic habitats in the North Atlantic basin; impacts of atmospheric deposition of acid and mercury on aquatic invertebrates and fishes; land use; urban aquatic ecosystems

Current projects:

- Bioenergetics approaches to habitat suitability modeling for juvenile salmonids
- Effects of forest change on aquatic habitats, invertebrates, and fishes
- Using genetic and stable isotope markers to understand Atlantic salmon movement and dispersal between habitats



- Role of biotic interactions at local spatial scales in determining growth and survival of juvenile salmonids
- Role of anadromous fish in the transport of nutrients and materials to and from freshwater ecosystems
- Effects of hydrologic alteration on river and floodplain ecosystems
- Effects of acidification on Atlantic salmon
- Develop and apply new techniques and technologies to determine the effects of fragmentation associated with dams and roads on brook trout and other native species
- Develop an adaptive management framework to implement and assess ecologically sustainable flow regimes for northeastern river systems
- Determine the relationship between long-term changes in forest structure and atmospheric emissions and aquatic ecosystems and communities
- Understand the role of habitat-dependent interactions between invasive and native species in structuring aquatic communities

Anne Timm

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Keywords: applications of aquatic species population genetics; effects of hydrological modification on aquatic communities; aquatic organism passage improvement project effectiveness; effects of aquatic invasive species invasion on aquatic community dynamics

Current projects:

- Regulated water level fluctuation effects on Northern pike breeding habitat in Rainy Lake and Namakan Reservoir
- Quantifying biological structure and function associated with stream simulation design projects in the Great Lakes Region
- Effects of pharmaceuticals and personal care chemical (PPCPs) on aquatic species in the Patapsco River Watershed (Maryland)
- Hydrological and temperature effects of riparian communities on trout stream community productivity in the Driftless Area of SE Minnesota

Rocky Mountain Research Station

Tom Black

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Keywords: effects of disturbance on natural systems; interactions between road systems and stream networks

Current projects:

- Geomorphic Road Assessment and Inventory Package

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Keywords: fish distribution and persistence; effect of climate change on fish movement and habitat quality; stream temperature monitoring

Current projects:

- Helping to develop basin-scale stream temperature models using ArcGIS and spatial statistical models



- Developing documentation to assist resource managers to create stream temperature statistical models in their management areas
- Creating a regional network of ongoing, annual temperature monitoring sites
- Developing simple, cost-effective methods for deploying long-term stream temperature loggers

Dan Isaak

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Keywords: predicting and understanding how climate change, disturbance, and biophysical interactions across spatial and temporal scales affect population dynamics and habitat for native fishes in wildland streams

Current projects:

- Regional and river basin scale stream temperature monitoring and modeling
- Biological responses to climate change

Frank McCormick

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Keywords: ecology and evolution of freshwater species; ecosystem responses to disturbance; responses of aquatic ecosystems to climate change

Current projects:

- Monitoring and assessment of stream restoration
- Ecosystem services derived from headwater catchments

David Nagel

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Keywords: development of landscape scale spatial models that impact aquatic biology, stream temperature modelling

Current projects:

- River Bathymetry Toolkit
- The Rangewide Bull Trout eDNA project
- Stream temperature modelling website

Russ Thurow

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Keywords: patterns of species and life stages; structure of populations; sampling protocols; climate effects

Current projects:

- Spatial and temporal variation in Chinook salmon populations
- Bias and precision of aerial and ground-based Chinook salmon redd counts
- Demographic and genetic structuring of Chinook salmon populations
- Exploring the application of otolith microchemistry to describe life history variation, measure dispersal, and assess climate effects on Chinook salmon
- Response of Chinook salmon to post-fire debris flows and gravel deposition
- Geomorphic controls on salmonid habitat at watershed scales
- Fluvial bull trout movements, spawning, and habitat use
- Fine-scale characteristics of fluvial bull trout spawning sites and redds
- Development of protocols for sampling stream dwelling salmonids
- Effects of environmental and habitat characteristics on sightability of juvenile bull trout
- Assessing climate effects on the timing and distribution of Chinook salmon spawning



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Keywords: broad-scale monitoring and assessment of stream fishes; use of genetic methods for fish and amphibian detection, identification, and monitoring; natural and anthropogenic disturbances: effects and recovery

Current projects:

- Genetic and compositional assessment of the interior Columbia River fauna
- Rangewide assessment of westslope cutthroat trout: evolutionary history, ESU discovery, and current status
- Detecting at-risk or invasive species using environmental DNA
- Influence of climate change, fire, and biotic interactions on fish species persistence
- National Genomics Center for Wildlife & Fish Conservation

Pacific Northwest Research Station

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Ryan Bellmore

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Keywords: salmon and trout food webs; watershed-scale stream energy processes

Current projects:

- Effects of climate change and forest management on fisheries

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Keywords: restoration of aquatic habitats; disturbance and recovery cycles in aquatic and riparian ecosystems; emerging threats: invasive species and climate change

Current projects:

- Salmon recovery in the Columbia River Basin
- Risk assessment for invasive riparian plants and non-native fishes

- Long-term recovery of the Mount St. Helens ecosystem
- Experimental riparian zone management on Washington's Olympic Peninsula

Kelly Burnett (Emeritus)

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Keywords: landscape modeling and decision support tools for streams; understanding the relevance of spatial patterns in stream networks; characterizing and communicating best available science; climate change effects on coastal Pacific salmon populations

Current projects:

- Behavior of debris flows and their effects on mountain streams
- Communication and collaboration networks regarding fire and aquatic resources
- Describe summer and winter habitat conditions and relationships to salmon distribution in the Nome River, Alaska
- Modeling relationships of juvenile coho salmon to spatial heterogeneity in stream habitats and landscape features in the Oregon Coast Range



Shannon Claeson

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Keywords: Riparian and aquatic systems interactions; role of aquatic invertebrates in stream and lake systems; community ecology; disturbance ecology; food webs; invasive organisms

Current projects:

- effects of man-made large-wood structures on fish
- response of stream biota and channel morphology to dam removal and debris flows
- development of benthic macroinvertebrate communities in streams and ponds created from the eruption of Mount St. Helens in 1980

Richard Edwards

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Keywords: Stream ecology, nutrient cycling, carbon cycling, riparian-stream interactions, hydrology and ecology of surface-groundwater interaction zones, global warming and its effects on streams and stream habitat, terrestrial-near shore coastal zone interactions, fate of carbon in streams and estuaries, and the functional role of wetlands in watersheds

Current projects:

- Héén Latinee Experimental Forest

Rebecca Flitcroft

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Keywords: stream network analysis; salmon; riverscape- scale; aquatic ecology; estuaries; climate change and rivers

Current projects:

- Developing management models and scenarios the consider the effects of fire on fish habitat
- The effect of eustatic sea-level rise on estuarine rearing habitats for native salmonids

- The relationship between hydrologic flow and spawning for coho salmon

Alex Foster

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Keywords: effects of forest management; forest wetlands; riparian ecosystems

Current projects:

- How plant and animal species recolonize a recent debris flow
- Physical and biological attributes of small forested wetlands
- Ecology of little-known invertebrates such as mollusks and millipedes

Bruce Hansen

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Keywords:

Current projects:

- Salmonid and freshwater mollusk life history and habitat associations
- Effects of road-crossing culverts on aquatic organism passage and population connectivity
- Aquatic invasive species monitoring and management

Sherri Johnson

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Keywords: stream ecosystems; temperature; biogeochemistry; foodwebs

Current projects:

- Stream ecosystem responses to forest harvest in the Trask River Watershed (coast range Oregon)
- Understanding stream food web linkages and trophic dynamics using abundance of natural isotopes (coast range Oregon)



- Climate change influences on phenology of insects and macroinvertebrates (Andrews Experimental Forest)
- Effects of extended reservoir drawdown on carbon and nitrogen fluxes, productivity and food webs (Andrews Experimental Forest)

Deanna Olson

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Keywords: amphibians; reptiles; conservation; ecology; riparian management

Current projects:

- Effects of forest thinning and alternative riparian buffer widths on headwater species and habitats
- Spatial and taxonomic patterns of the amphibian chytrid fungus and ranaviruses, Bsal monitoring
- Climate metrics and amphibian and reptile ecology and management

Brooke Penaluna

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Keywords: ecology of native fishes; patterns and ecological process at the individual, community and population levels; effects of invasive species, eDNA

Current projects:

- Instream cover and emigration as drivers of population dynamics in fish
- Development of environmental DNA (eDNA) techniques to monitor and inventory aquatic species

Karl Polivka

PNW (Wenatchee, WA)

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Keywords: ecology and evolution; habitat selection and foraging behavior of fishes; food webs and aquatic communities

Current projects:

- Individual and population-level responses by fishes to in-stream habitat restoration
- Influence of riparian vegetation and microclimate on the structure of aquatic communities

Gordie Reeves

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Keywords: aquatic abundance and recovery cycles in aquatic and riparian ecosystems; climate change and potential impacts on Pacific salmon

Current projects:

- Impacts of downscaled climate change projections on aquatic ecosystems on National Forests in Region 6 and the Copper River Delta, AK
- Evaluation of silvicultural thinning on riparian and aquatic ecosystems

Ashley Steel

PNW (Seattle, WA)

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Keywords: landscape; rivers; watershed; temperature; metrics; statistics; network

Current projects:

- Effects of land-use on water temperature and flow
- Modelling coho salmon distribution and their habitats using landscape scale predictors
- Mapping and describing water temperature variance across networks



Steve Wondzell

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Keywords: hyporheic zone; nutrient cycling; stream temperature; riparian management; decision support models; climate change; grazing

Current projects:

- Aquatic-riparian stream network state-and-transition decision support models (Oregon Coast range and the Blue Mountains of eastern Oregon)
- Projecting the influence of future climate on stream temperature (upper Middle Fork of the John Day River, Blue Mountains, OR)

- Spatial heterogeneity in stream temperature regimes and interactions with salmon life history diversity (Copper River Delta, AK)
- Hydrologic connectivity and carbon transport from hillslopes, through riparian and hyporheic zones, and to streams in a small, forested catchment (western Cascade Mountains)



Yellow-legged frog, USFS

Pacific Southwest Research Station

Bret Harvey

PSW (Arcata, CA)

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Keywords: individual-based modeling; stream fish ecology; riparian management; fish genetics; monitoring design

Current projects:

- Model-based assessment of habitat restoration for anadromous salmonids in Trinity and Sacramento river tributaries
- Understanding invasion success of fishes in northwestern California
- Quantifying sustainable population sizes for Smith River cutthroat trout

Current projects:

- Kings River Experimental Watersheds - integrated ecosystem project for headwater streams to monitor ecosystem changes from forest restoration activities (tree thinning and prescribed fire)
- Southern Sierra Critical Zone Observatory - research includes water budget, watershed modeling, soil carbon and nitrogen, geomorphology and soil development
- Sierra Nevada Science Synthesis- summarizing 10 years of new research that is relevant to forest land management planning
- Southern Sierra meadow chemistry and hydrology for Yosemite toad habitat and movement during forest restoration activities
- Testing radar and laser altimetry (Lidar) for their ability to characterize forest structure at multiple spatial scales

Carolyn Hunsaker

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www.fs.fed.us/psw/topics/water/kingsriver

Keywords: mountain streams; mountain meadows; terrestrial-aquatic linkages; Sierra Nevada; forest restoration; climate change; water quality; air pollution; Kings River Experimental Watersheds



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Keywords: Non-native wildlife; Hawaii; amphibians; radio-tracking; landscape genomics

Current projects:

- Impacts of non-native coqui frog in forest systems (Hawaii)
- Effects of non-native predators on pollinators and plant reproduction (Hawaii)
- Landscape genomics of native tree species (Hawaii, California)
- Movement and habitat use of the Yosemite toad (California)
- Density of the non-native black rat (*Rattus rattus*) in Hawaiian forest ecosystems

Richard MacKenzie

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Keywords: fish and invertebrate assemblages; habitat; wetlands; mangroves; streams; climate change; invasive species; Pacific Islands

Current projects:

- Impacts of climate change and invasive species on Pacific Island water resources
- Impacts of increased nitrogen loading to coastal ecosystems
- Increasing resiliency of mangroves to sea level rise
- Determining effective strategies to eradicate or control exotic fish in tropical wetlands

Kathleen Matthews

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Keywords: amphibian declines in the Sierra Nevada; climate change and invasive trout-effects on native amphibian and fish in the Sierra Nevada; wilderness protection for aquatic species

Current projects:

- California golden trout stream temperature vulnerability study
- Restoring Sierra yellow-legged frog high elevation aquatic ecosystems
- Long-term demographic study of the Sierra yellow-legged frog

Karen Pope

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Keywords: amphibian conservation ecology; community ecology of freshwater and adjacent terrestrial systems; impacts of aquatic invasives; effectiveness of aquatic restoration

Current projects:

- Impacts of a fungal pathogen and contaminants on amphibians of northern California
- Ecological effectiveness of meadow restoration
- Sierra Nevada amphibian monitoring GTR
- Projected climate change effects to amphibians at range edges



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Keywords: amphibians; reptiles; herpetofauna; forest ecosystems; ecological roles, habitat associations, stream network dynamics; ecosystem services

Current projects:

- Determining multi-scale spatial relationships of herpetofaunal metacommunities of whole catchments

- The ecology and conservation of western pond turtle (*Actinemys marmorata*) populations
- Unifying the perspectives of fluvial networks, land/water interfaces, disturbance processes, and the non-equilibrium nature of ecosystems, with the distributions of amphibians and reptiles
- Examining water temperatures and amphibian assemblages of headwater streams over a decade in a mid-latitude catchment in northern California: is there evidence of change due to climate warming?

International Institute of Tropical Forestry

Grizelle Gonzalez

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Keywords: soil ecology and biology; ecosystem ecology; tropical ecology; earthworm ecology

Current projects:

- Luquillo - Long Term Ecological Research Program
- Ecological Gradient Analyses in Tropical Ecosystems
- Earthworm Effects on Ecosystem Processes

Tamara Heartsill-Scalley

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Keywords: ecosystem services of riparian zones and streams; riparian vegetation and stream dynamics in headwater catchments; ecosystem responses to disturbance; knowledge and perceptions of wetlands by adjacent communities and stakeholders

Current projects:

- Assessment of mitigation in a mixed land cover headwater catchment
- Export of coarse particulate organic matter from headwater streams
- Land cover and stream water quality parameters

William Gould

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<http://prgap.org/>

Keywords: conservation ecology; remote sensing; species distribution modeling; habitat mapping

Current projects:

- Modeling future habitat scenarios
- Puerto Rico and USVI freshwater, marine, and aquatic gap analyses projects



Freshwater Shrimp. E. Greathouse. USFS

