



Arizona Rivers

Martha Whitaker - PI Arizona Rivers

Jim Washburne – co-PI Arizona Rivers

John Madden - Science Education Program Coordinator

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Contacts : www.azrivers.org

Tucson



- Martha P.L. Whitaker
mplw@hwr.arizona.edu
- Jim Washburne
jwash@hwr.arizona.edu
- John Madden
maddenj1@hwr.arizona.edu

Phoenix



❖ Phil Pepe

phil.pepe@pcmail.maricopa.edu

❖ Elena Ortiz

elena.ortiz@pcmail.maricopa.edu

Flagstaff



❖ Joe Shannon

Joseph.Shannon@nau.edu

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Science Foundation AZ - goals



- Science Technology Engineering Math
“STEM” workforce development
- K-12 Innovative Experience Program
 - Motivate students and carry them beyond traditional classrooms
 - Hands-on engagement with actual professionals
 - Goal-directed context that encourages design, implementation and use of knowledge in science & math.
 - Target under-represented groups



Arizona Rivers - goals

1. Facilitate local collaborations between students, volunteer monitoring groups, and state & local agencies for the purpose of re-energizing the spirit of scientific discovery & inquiry.
 - Study riparian or other aquatic ecosystems and habitats
 - Monitor riparian ecology and water quality
 - Develop student-based research projects
 - Collect baseline data on stream restoration
2. Develop a lasting collaborative network of teachers and citizens interested in Arizona water issues.
3. Contribute to GLOBE, Arizona Audubon and Phenology long-term data bases



How do we do this?

- Workshops (Teachers, Students & Mentors)
 - Summer workshops in Tucson, Phoenix & Flagstaff
 - Training stipends for teachers (depends on avail funds)
 - Travel & Lodging (depends on avail funds)
- Mini-Grants (depends on avail funds)
- Summer Riparian Research Experience!!!
- Equipment check-out via
 - Project WET & HWHP
 - WATER Kit Program - SAHRA



What are the workshops about?

- Fast-paced!
Goal: Familiarity – not a Ph.D.
- Mostly topical introductions and field practice
What is riparian monitoring/restoration and how do I do it?
- Field trips to learn & practice skills at a local site
(e.g. Rio Salado, Sabino Canyon, Santa Cruz, Verde River)
- Involvement by agency/organization reps as to help develop long-term collaborations & research projects
(e.g. Arizona Game & Fish, Audubon Society, National Park Service)
- Training on developing inquiry-driven, student research projects
How do I integrate field research into my curriculum? How do I coordinate & monitor student-driven research projects?



What is the summer RRE all about?

- 14-day summer field research exposure for 10 H.S. juniors & seniors in riparian studies
- Learn how to make Rapid Environmental Assessments of riparian areas
- Eight days in the field studying many different riparian areas around the state (Cienega Creek & San Pedro River, Gila & San Francisco Rivers, Fossil Ck, and the Verde River)
- Two days back at base camp to share results from field experiences and develop research program for the following year



Classroom benefits

- Raised awareness – sensitivity to ecosystems
- Fostering of environmental stewardship
- Application of **intuitive** interdisciplinary skills
- Higher-order science skills (Scientific Method)
 - Learn, describe, apply, collect, analyze, design, adjust, hypothesize, report, assess
- Meet NSF goals
 - Scientific Literacy, Discovery/Inquiry Learning, Understanding the Varied Processes of Science
- Fulfillment of Senior Capstone Projects or Community Service graduation requirements



Practical Aspects – how do I participate?

- Define an area of interest
- Ask a question (we can help)
- Conduct background research on issues – context!
- Develop needed skills (AZrivers training!)
- Acquire/borrow equipment
- Recruit a mentor (we can help)
- Start making measurements
- Analyze your data & share your research

(not necessarily the order in which they need to be done!)



Who can participate?

Students

- School-based
- Home-schooled
- K-16 => Community college

Clubs

- After school (science or environmental club)
- Scouts, 4-H, FFA

Organizations

- Citizen scientists
- Watershed monitoring groups



Current Participants

- Community colleges
- Public, charter, private schools
- Science centers
- Volunteer monitors, Citizen scientists
- Tribal communities
- Cooperative extension
- State & Federal agencies



Mentors

Possible Roles

- Help define critical research questions
- Provide classroom support
 - Context & background
 - Scientific & career advice
 - Skills development
- Provide field support
 - Access & transport
 - Equipment
 - Training
- One-on-one mentoring



Potential Collaborators

Federal Agencies

- US Geological Survey
- US Army Corp of Eng.
- Bureau of Land Mgmt.

State & Co. Agencies

- AZ Game & Fish
- AZ State Parks
- Pima Parks & Rec.
- Pima/Maricopa Flood

Watershed Monitors

- Rio Salado, Santa Cruz, Gila, Verde, San Pedro

Others

- AZ Riparian Council
- AZ Audubon
- AZ Hydrologic Society
- AZ Science Center
- Biosphere 2
- Master WS Stewards
- Nature Conservancy
- Central AZ Project
- Salt River Project

