U.S. GEOLOGICAL SURVEY
RESEARCH/DEVELOPMENT SCIENTIST RECORD

Please Circle One:
Research Grade Review (RGE)
Equipment Development Grade Evaluation (EDGE)

(1) NAME Scott A. Bonar

(2) DATE UPDATED July 12, 2017

(3) DUTY STATION AZCFWRU, Tucson, AZ

(4) REGION Western

(5) CLASSIFICATION TITLE, SERIES, AND GRADE Research Fisheries Biologist, GS-0482-14

(6) DATE OF ENTRANCE ON DUTY TO FEDERAL SERVICE July 1, 2000

(7) DATE OF LAST PROMOTION October 2008

(8) DATE OF LAST RESEARCH or DEVELOPMENT PANEL REVIEW
May 2013

(9) EDUCATION

School	**Major**	**Dates Attended**	**Degree**
University of Evansville	Secondary Science Education	8/79 – 5/83	B.S. 1983
University of Washington	Fisheries	10/83 – 8/90	Ph.D. 1990

(10) TECHNICAL TRAINING RECEIVED

- *PADI Open Water Diver; PADI Advanced Open Water Diver, University of Washington Research SCUBA Diver Training* – Evansville, Indiana; Seattle, Washington; took a variety of dive training courses 1983-1992 (1-more months each)
- *Piscicide Applications* - Boise, Idaho, August 18-20, 1992. Presented by the U.S. Fish and Wildlife Service and Instructors from Auburn University, and Utah DNR (3 days)
- *Warmwater Fisheries Management Short Course* - Auburn University, Alabama, May 18-23, 1993 (6 days)
- *Warmwater Fisheries Management Short Course* - Bend, Oregon, June 29-July 1, 1993. Presented by the U.S. Forest Service, Faculty of Auburn University and Oregon State University (3 days)

- *Entry Management Development Program (Supervisor's Course)* - Olympia, Washington, September 28-October 1, 1993. Presented by the Washington State Department of Personnel (1 week)
- *Principles and Techniques of Electrofishing* - Olympia, Washington, June 27, 1995. Presented by the U.S. Fish and Wildlife Service (2 days)
- *U.S. Coast Guard Power Boating Course* - Seattle, Washington, 1995 (12 weeks)
- *Warmwater Fisheries Management for Pacific Northwest Biologists*, Olympia, Washington, June 28-29, 1995. Presented by Faculty of Auburn University, Alabama (2 days)
- *Technical Writing* - Olympia, Washington, September 9-11, 1996. Presented by the Washington State Department of Personnel. (3 days)
- *Biometrics Workshop* - Olympia Washington, January 1998. Presented by the Northwest Indian Fish Commission and the Washington Department of Fish and Wildlife Biometrics Unit. (1 week)
- *Warmwater Fisheries Sampling, Assessment and Management* - Olympia, Washington, August 3-6 1998. Presented by the U.S. Fish and Wildlife Service and South Dakota State University. (1 week)
- *Desert Safety*- Tucson, Arizona, Fall 2000. Presented by staff at the University of Arizona. (1 day)
- *Cooperative Research Units Orientation Session* – Reston, Virginia, April 17-18, 2001. Presented by the U.S.G.S. Cooperative Research Units Headquarters Staff. (2 days)
- *U.S. Department of the Interior Motorboat Operators Training Course* – San Carlos, Arizona, 2001. (3 days)
- *U.S. Department of the Interior Motorboat Operators Instructor Training Course*- Dauphin Island, Alabama, 2014 (1 week).
- *Natural Resources Litigation Training*- Office of the General Counsel, U.S. Forest Service, Tucson, Arizona, Fall 2014.
- *Arizona Game and Fish Department Agency School* – Flagstaff, Arizona, June 12-14, 2001. Attended courses in Genetics, Water Law, Customer Service, Arizona Habitat presented by various university and state instructors. (2 days)
- *Basic GIS Techniques for Fish Biologists* – American Fisheries Society Short Course, AFS Annual Meeting, Baltimore, Maryland, August 18, 2002. (1 day)
- *Leadership Development Program* – USFWS National Conservation Training Center, Shepherdstown, West Virginia, February 3-7, 2002. (1 week)
- *Arizona Game and Fish Department Agency School* – Flagstaff, Arizona, June 2003. Attended courses in Negotiation, Waterfowl Identification, Predator Management presented by various university and state instructors. (2 days)
- *Principles of Electrofishing* – American Fisheries Society Short Course, AFS Annual Meeting, Quebec City, Canada, August 8-9, 2003. (2 days)
- Introduction to Structured Decision Making – USFWS National Conservation Training Center, Shepherdstown, West Virginia (1 week)
- *Model based inference in the life sciences*, University of Arizona Workshop Presented by Visiting Scientist David Anderson (3 days)

- *Drupal Web Development Programming* – University of Arizona, July 1 - August 30, 2011 (8 weeks).
- *Publish not Perish Workshop* – University of Arizona, September 4, 2014 (1 day). Discussed the latest data on academic publishing and writing strategies.
- *IT Security, Ethics, and related courses* – took a variety of on-line courses in these areas as required by the Department of Interior. 2000-2017 (1hr – ½ day each).
- *Communications and Natural Resources Management Seminars* – Attended various weekly seminars by outside speakers during School of Natural Resources and the Environment Seminar Series, 2000 – 2017.
- Update First Aid and CPR approximately every year.

PROFESSIONAL EXPERIENCE

a. PRESENT ASSIGNMENT

DATES From: July 1, 2000 To: Present

Unit Leader and Professor, USGS Arizona Cooperative Fish and Wildlife Research Unit, Tucson, Arizona. Research (65%), Research Unit and Team Administration (35%) – Supervisor: Kevin Whalen.

- Lead Cooperative Fish and Wildlife Research Unit, collaborating with State and Federal agencies to conduct aquatic and terrestrial natural resources research. Scope of unit activities since becoming leader (July 2000), $13,929,085 research funds obtained by unit, over 330 projects supported, 2 "Best in Nation" awards, 84 graduate students or post-docs current or graduated, 292 peer-reviewed articles, books, book chapters or technical reports published by Unit; 47 University courses, 32 agency short courses taught by unit staff.
- Lead and coordinate actions of national and international research teams consisting of scientists from this institution and other agencies, academic institutions, or organizations to investigate critical issues in standard sampling techniques, western fisheries management or natural resources communication.
- Supervise management of three fisheries laboratories, an outdoor storage and experimental facility, equipment (electrofishing boats, other motorized watercraft, whitewater rafts, trucks, etc.), and office space.
- Supervise two assistant unit leaders, an administrative assistant, biologists, post-docs, technicians and graduate students.
- Work with leadership of the Arizona Game and Fish, U.S. Fish and Wildlife, University of Arizona and other organizations to prioritize research issues most important to management. Design, obtain funding and direct aquatic research projects of national and international significance including: Standard methods for sampling freshwater fish across North America, communication strategies among conservation professionals and between conservation professionals and the public; methods to diagnose problems in fish communities (introduced species, habitat degradation etc.) and manage recovery; captive breeding of threatened and

endangered desert fishes, effects of water temperature on fishes of the western United States and Mexico; management and recovery of western fishes.

- Taught graduate courses in Communication and Public Relations for Natural Resource Professionals, Advanced Fisheries Management, Fisheries Management, and Fisheries Seminars. Managed School of Natural Resources Seminar one semester.
- See Section 12(a) for specifics on recent research accomplishments.

b. PREVIOUS PROFESSIONAL POSITIONS

DATES From: July 1994 To: June 2000

Unit Leader – Inland Fisheries Research Unit, (Biologist 3,4,Research Scientist 1), Washington Department of Fish and Wildlife, Olympia. Directed inland fisheries research for WDFW Supervised up to nine scientists and technicians conducting research used to develop state laws and policies. (70% Research).

DATES From: July 1992 To: July 1994

Team Leader-Warmwater Fisheries Research Team, Biologist 3, Washington Department of Fish and Wildlife, Olympia. Directed warmwater fisheries research for WDFW. Supervised four scientists and technicians conducting research used to develop state laws and policies. (70% Research)

DATES From: August 1990 To: July 1992

Fisheries Research Biologist 3, Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle. Supervised, designed, analyzed experiments in lake restoration and warmwater fisheries research. Managed staff of 5-8, wrote publications, presented research. (80% Research)

DATES From: June 1989 To: August 1990

Fisheries Biologist 3- Ph.D. Candidate, Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle. Designed, supervised, and analyzed field and lab experiments in lake restoration, fish feeding behavior, aquatic plant control, fisheries management. (80% Research)

DATES From: October 1983 To: June 1989

Research Assistant – Ph.D. Student, Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle. Designed and conducted research on first legal grass carp stockings in Pacific Northwest. Bypassed M.S. and proceeded directly to Ph.D. program because of high work quality. (80% Research)

DATES From: Summers 1979 To: Summers 1983

Agricultural Research Worker, Pioneer Hi-Bred Incorporated, Corn Research Station, Princeton, Indiana. Evaluated susceptibility of various corn strains to disease, water damage, and insect damage. Research results used to improve strains of corn for agricultural production. (90% Research).

(12) SIGNIFICANT RESEARCH or DEVELOPMENT ACCOMPLISHMENTS

I have participated in over 110 research projects concerned with resident, marine or estuarine fisheries biology and management, and fish and habitat survey methodology. This has resulted in 187 publications (2 books, 6 book chapters, 71 peer-reviewed journal, 22 agency peer-reviewed, 12 symposium, 13 popular, 59 technical reports, 1 dissertation). I was lead author on 82 publications. Study results from this research were used to develop 14 state laws, policies and management plans in the western United States related to fisheries and aquatic sciences. I have been invited to give 15 keynote or special presentations to organizations, and have authored 285 presentations to scientific societies. I have authored 62 publications (1 book) 1 computer program and 4 films since my last promotion.

a. RECENT ACCOMPLISHMENTS - Within Last 5 years

Continued to Lead International Efforts to Standardize Freshwater Fish Sampling.
Background: -- Standardization in industry, medicine and science has led to great advances, and nonstandard methods of common monitoring techniques are typically discouraged. For example, physicians would not think of collecting cholesterol samples differently in different regions of the nation. However, freshwater fish monitoring was generally unstandardized, or at most standardized locally. Standardization across large regions allows for measurement of large-scale effects of climate or geography on fish populations; larger sample sizes to evaluate management techniques; reliable means to document rare species; easier communication; and simpler data sharing. Development of standard sampling methods across North America – and among continents - has been of interest for decades.
Role: -- I led international efforts for the first text of continent-wide standard freshwater fish sampling methods in the history of fisheries science which was published in 2009 (48). In the last five years I have continued work and publish on techniques of method standardization, largely working on international standardization issues investigating opportunities and collaborating with scientists at AFS, CEN(Europe), the World Fisheries Congress, and the United Nations. I have also investigated and new standard techniques, and have been invited to educate scientists internationally about standardization techniques. I was lead editor of the 2009 book, authored two chapters, chaired AFS Standard Sampling Committee, Fisheries Management Section. I obtained funding from 10 federal, state and private agencies and coordinated work of 2 coeditors and 284 authors, reviewers and sponsors from 107 agencies, universities, private industry and organizations from across Canada, Mexico and the US. I used social research reported

in my previous book *The Conservation Professional's Guide to Working With People* (63) to help arrive at consensus and complete project successfully. Following book publication, I was invited by different organizations in North America and worldwide (e.g., CEN European Standards Commission, London; United Nations FAO, Rome; International Fish Sampling Conference, České Budějovice, Czech Republic; World Fisheries Congress, Pusan Korea) to describe the North American Standard Freshwater Fish Sampling project and how it was designed. I further led efforts to collaborate with biologists involved in standard freshwater fish sampling on five different continents. This led to an AFS symposium, which I chaired, and was supported by sponsorship of 2 federal agencies, 2 AFS sections, and 2 private organizations to examine means to compare fisheries data across continents and a structured-decision making exercise to identify means to best move forward (3). Biologists from all continents except Australia and Antarctica participated. It was agreed continental efforts would be maintained, but the World Fisheries Congress would serve as a useful venue to compare methods and discuss where coordination among continents would be appropriate. The first of these WFC meetings was in Pusan, South Korea. Furthermore, I led a team of three programmers to develop a website describing the AFS standard methods, and a web-based tool to analyze standard fish data with a simple click of a button. Web development was collaborative among AFS, two Universities and three agencies. Finally, a 2nd edition of Standard Methods has now been initiated, with full support of the lead officers of the American Fisheries Society.

Results: -- *Standard Methods for Sampling North American Freshwater Fishes* (48) describes AFS recommended methods and gear types to sample fish in specific environments so population indices can be more easily compared across regions and time. The book also provides other information necessary for standard sampling programs such as tables of comparison data averaged from over 4000 data sets from 42 states and provinces; methods to convert nonstandard to standard data; statistical and database procedures for standard sampling, gear calibration methods, and methods to prevent transfer of invasive species while sampling. The Structured Decision Making session and associated international efforts to compare techniques resulted in a decision to leave most standardization at the continental scale and look for opportunities to compare specific techniques at World Fisheries Congress or other appropriate international meetings (3). The first of these international meetings was held at Pusan, South Korea in 2016. Following the symposium I was invited to the Inland Fisheries Institute of South Korea to present the methods to agency heads and biologists. Discussion about standardization was also part of inland fish assessment activities at a United Nations FAO panel in Rome (11,13). The 1.0 version of the website *http://fisheriesstandardsampling.org* was described in a *Fisheries* publication (14). It provides a short overview of Standard Methods, and allows users to quickly compare condition, growth and abundance of fish collected in a particular waterbody with rangewide, ecoregion and state averages and percentiles based on thousands of data sets collected across North America. It also allows easy entry of new standardized data, enabling crowd sourcing to constantly improve summaries.

Impact: -- **(1)** Book consistently in top 1-4 bestsellers of AFS since publication in 2009; **(2)** methods adopted by numerous state, provincial, federal agencies, across North America. I have not made an official count; however, I have heard methods suggested in

this text are now the standard freshwater fish monitoring methods being used by state agencies in most of the central states, and selected Southern and Eastern states. States in the Pacific Region are slower to officially adopt the techniques, but are inadvertently using many. **(3)** Work subject of 5 international symposia: AFS Annual Meetings in Ontario, Minnesota (standing room only) and Oregon; World Fisheries Congresses in Edinburgh Scotland, U.K. and in Pusan, South Korea, **(4)** I was invited to give keynote addresses on project at 2 international fisheries sampling meetings in the Czech Republic, and address the European Committee for Standardization (CEN) in London, which consists of fisheries biologists from countries across Europe, speak at the United Nations (FAO) in Rome and serve on a U.N. fish assessment panel; speak to the Inland Fisheries Institute of South Korea on the standardization project, and give the keynote at the symposium in Pusan, South Korea. **(5)** Methods now subject of considerable research by others – validation, calibration studies, computer intensive techniques **(6)** Unanimous vote from AFS Fisheries Management Section to increase international scope of standardization, collaboration with biologists on five continents; resulted in a process to share methodology across continents **(7)** http://fisheriesstandardsampling.org invited for demonstration at AFS Annual Meetings in Minneapolis and Seattle; and at workshops and symposia at various AFS Division Meetings. Fisheries biologists from some state agencies required by management to attend. (8) 2nd Edition of book approved by all officers of AFS, plans underway to provide.

Developed Methods to Captively-Breed Threatened and Endangered Desert Fishes.-
Background: -- Captive breeding has been important to preserve critically endangered animals such as California condor and black-footed ferret. Desert fishes are some of the most imperiled fishes worldwide, some *species* falling to only 40-500 individual animals. Furthermore, some species are notoriously hard to breed. Previous attempts to breed Devils Hole pupfish at San Francisco's Steinhardt Aquarium; Las Vegas' Mandalay Bay Aquarium; USFWS all unsuccessful. Furthermore, these fish are important to both the ecosystems and Southwest history and are subject to intense public interest. The Death Valley National Park's Devil's Hole pupfish was important for US endangered species legislation - its preservation argued up to the US Supreme Court, and it has appeared in many articles in the Los Angeles Times, the Las Vegas Review and other popular publications and numerous TV documentaries. At one time it's population fell to 35 individuals. Other desert fishes, such as Nevada's Moapa Dace are only slightly less endangered (declined to approximately 400 individuals). Captive breeding doesn't replace restoration of wild habitats, but sometimes is the only way to preserve species while habitats are restored.
Role: -- Led team of staff/students to study spawning in the wild and based on this information, to develop propagation techniques for 7 T&E desert fish species of Arizona, Nevada and California, critical to conservation efforts of USFWS, National Park Service (NPS) and state agencies. In the last five years, research used to develop propagation techniques for two of the most challenging species to spawn, Devils Hole Pupfish and Moapa Dace.
Results: -- Successfully developed techniques for 6 of 7 species reported in (7,9,12,16,18,26,27,28,29,40,50,56,58,67,76). Staff engineered facilities most conducive to propagation, allowing wild conditions to be replicated. This includes development of

11,360-L Devil's Hole replica which mimics temperature, substrate, lighting, tidal fluctuation, DO, other parameters, and artificial stream systems for selected species (12). Staff used underwater camera systems to study spawning of critically-endangered Moapa Dace and developed methods to propagate, testing 14 different treatments until success was achieved (16).
Impact**:** -- **(1)** Techniques used by USFWS, NPS and State of Nevada to breed many of the fishes; **(2)** Received Award from USFWS for research on captive propagation and ecology of Devils Hole pupfish and assistance in commissioning new USFWS Ash Meadows NWR Aquatic Conservation Facility (Ash Meadows NV/CA reportedly has the highest number of endemic species in such a small area in North America) **(3)** The $3.5 million desert fish conservation facility was built near Death Valley, primarily for Devils Hole pupfish – USFWS consulted heavily with our team on construction design and hired one of our staff/students as lead aquarist, and another of our students was hired to assist; **(4)** Nevada Department of Wildlife produces Moapa Dace using techniques and equipment we designed and donated, doubling the number of Moapa Dace in existence.

Led projects to research desert fish habitat needs and restoration techniques.
Background: -- For agencies to manage for climate change and human demands on desert water, habitat needs of fishes need quantification and restoration options investigated.
Role: -- I supervised staff/students teams to: (1) research effects of increasing water temperatures on 19 fishes of the Southwest; (2) develop habitat suitability criteria for desert and salmonid fishes to support USFS and USDOJ litigation to protect water rights of stream fishes from mining activity; (3) investigate methods to cool streams through habitat alteration. (4) test effects of US Border Operations on T&E fishes in streams crossing the US/Mexico border;
Results: -- (**1**) We designed and built a computerized 36-aquarium facility featured in (34) to replicate natural thermographs and test effects of fluctuating and long-term, chronic temperature increases; **(2)** estimated temperature tolerances of 19 desert fishes (31,34,37,38,58,64,68,72,74,86). **(3)** developed habitat suitability criteria for desert fishes (5,16,17,25,32,44,70, seven theses/dissertation); **(4)** researched effects of US/Mexico border operations on T&E fish habitat (22).
Impact: **--** (1) Research results being used by state and federal agencies to develop temperature criteria for streams. (2) scientist testified as an expert witness in US DOJ litigation to protect water rights for native aquatic species in Arizona streams – one stream labeled as the most intact native fish community in Arizona (3) results from habitat suitability studies being used by USFS and others in litigation, and following publication of studies, copper company pulled out of litigation and allowed stream protection (4) results from habitat studies being used by USFWS, tribal nations, and others to manage habitat to conserve native Arizona fishes (5) one publication from this research was a top-ten viewed article in AFS journals. (6) information on border operations to be used by USFWS to help mitigate or modify border activities (7) stream cooling investigations to be used by AZGFD, USFWS, and USFS to conserve Apache trout habitat.

Investigated eDNA as a freshwater fish sampling tool.
Background:--eDNA is being developed as a tool to detect fishes in various areas. However, we tested if eDNA could be used to enumerate fish population sizes and biomass in streams and lakes, and identify fish locations within various areas of streams and lakes.
Role:--I supervised graduate students who were familiar with AFS methods of fish sampling. We collaborated with researchers at the USGS Upper Midwest Environmental Science Center, LaCrosse Wisconsin Laboratory and the University of Arizona Genomics Lab who had conducted much research on eDNA. We compared abundance and location of fishes obtained using standard AFS sampling techniques with results obtained using eDNA.
Results: - We published articles on the use of eDNA in Arizona streams (6) and lakes (4) for monitoring biomass and locations;
Impact:--This information just published, and of interest to managers who are investigating the utility of eDNA for various monitoring efforts.

Other current research includes: **Optimizing control methods for northern crayfish**, testing rotenone formulations (21), habitat alteration methods and trapping using population viability analysis (36) to determine effective times and methods to control introduced northern crayfish; **Developing and synthesizing communication techniques for biologists** (1,2,8,10,15,19,24,46,55,63) including underwater HD videography methods; **Use of ultrasonic imaging to investigate reproduction in endangered Grand Canyon fishes,** which is currently being prepared for publication; and **Synthesizing effects of climate change on desert fishes** by coauthoring a book chapter with a climate researcher on the effects of climate change on these species. Chapter has been written and submitted for review. All funded by state and federal agencies and to be used in their management strategies;

b. OTHER CAREER ACCOMPLISHMENTS

Researched and Authored Book on Communications Techniques for Natural Resources Professionals.
Background: -- Because human behavior is so critical for natural resource conservation, researching and mastering skills to alter human behavior is critical for all conservationists. To help scientific researchers and agency personnel become more effective in the social arena, I researched social science and historical information to compile effective techniques used by the most successful conservationists, government workers and scientists, and synthesized this information into a book. ***Role:*** -- I observed communication habits of successful conservationists for over 20 years; studied hundreds of pages of historical accounts of past successful conservationists and conservation events; and researched successful practices used to better communication and increase efficiency in business, government and science to aid conservation professionals in the social arena. ***Results:*** -- I authored a 2007 book based on these research results entitled *The Conservation Professional's Guide to Working With People* (63). ***Impact:***-- This text was called "a must-read for the conservation professional" by the journal *Ecology*;

"reassuring, wise, and entertaining guidance" by Paul R. Ehrlich, Bing Professor of Population Studies, Stanford University and author of The Population Bomb; a "guidepost" that "should be a part of college curricula in every natural resources program", by Mamie Parker, Assistant Director of the USFWS; and "required reading for all my graduate and undergraduate students. I am just sorry it was not available earlier" by a reviewer in *Quarterly Review of Biology*. "Will raise your skills--personal and professional-- to a higher level." *Ecological Restoration*. I presented workshops on the techniques at US Fish and Wildlife Service Headquarters, Arlington; a USGS national webinar series; Arizona Game and Fish Department; Texas Parks and Wildlife; Montana AFS; National Arbor Day. Contributed workshop at AFS annual meeting, San Francisco. The book is used in human dimensions courses across the nation and is currently listed by Google in 459 libraries across the world. Because of this work, I was invited to lead author chapter on *Communication in Fisheries* (46) for the latest edition of *Inland Fisheries Management in North America*, currently a lead best-seller at AFS.

Developed Management Strategies and Evaluated Effects of Introduced Fishes in Western United States. -- I led several research studies evaluating management and biology of introduced fishes in the western United States. Specific projects include:

(1) *Mechanical methods to control introduced northern pike in Arizona lakes*.
Background:--Control methods needed for Northern pike, a voracious introduced predator in Arizona lakes.
Role: -- Funded by USFWS and AZGFD to recruit and supervise scientists from the Ukraine, where mechanical methods have collapsed northern pike populations. Ukrainian scientists came to Arizona and we tested both US and Ukrainian methods to capture nuisance pike in AZ lakes.
Results: -- A variety of methods, reported in (45), were 60-90% effective.
Impact: -- (1) Methods being used by AZGFD to control northern pike in AZ lakes. (2) I was invited to speak at the Environmental Security Council at NATO headquarters in Brussels, Belgium on research with these Ukrainian scientists (45,49,60), and investigate potential for further collaboration.

(2) *Effects of Asian tapeworm on small desert fishes*.
Background: -- Asian tapeworm is an introduced parasite that has resulted in up to 90% mortality in pond fishes in its former range (Eurasia). It supposedly affects cyprinids in warm water to the greatest extent, some of the most endangered fishes in the Southwest.
Role: -- Funded by NPS and USFWS to examine effects of Asian tapeworm spreading throughout Southwest. Led research team of staff/students, investigating waters in Mohave and Sonoran Deserts of California/Arizona, and conducting laboratory research.
Results: -- Field and laboratory results presented in (39,43). Spread of tapeworm across Southwest substantial (43). Effects of tapeworm initially intense, but populations decline over time (62,66). Some treatment methods leave possibility eggs may be transported (51). We developed novel pond treatment methods (39).

Impact: -- Study results used by management agencies to estimate effects of Asian tapeworm, manage shipments of fish, and potentially treat pond systems.

(3) Identified Factors Associated with Distribution and Relative Abundance of Introduced Fishes Across the American West.

Background: -- Western streams are inhabited by introduced fish, but the full extent of this was not known. ***Role:*** -- I led efforts to use data from the largest standardized survey of Western streams to date (approx. 900 sites) to examine factors related to relative abundance and distribution of introduced fishes in 12 Western states. ***Results:*** -- The study, published in the North American Journal of Fisheries Management (75), found one fourth of fish in the West were nonnative and about 50% of Western stream km were inhabited by nonnative fishes. ***Impact:*** -- Was the 2nd most viewed publication in all AFS journals when published, and featured in a USGS national press release.

(4) Assessed Impacts of Nonnative Fish Predation on Native Fishes of a Desert River.

Background: The Verde River is important habitat for native fishes that is occupied by a variety of nonnative species. Management agencies needed information to manage the interactions. Few studies had evaluated predation of nonnative fishes across an entire river system, especially a desert ecosystem. ***Role:*** -- I was principal investigator of a study employing 259 students, staff and volunteers that evaluated impact of nonnative fish on native fishes of the Verde. ***Results:*** -- The study, conducted over the entire 300 km river, combined bioenergetics and population estimation techniques (78). ***Impact:*** -- Information used by AZGFD and USFWS to determine management strategies for desert rivers. One USFWS Ecological Services biologist told me he uses his dog-eared copy continuously.

(5) Evaluated Impact of Competition and Predation of Introduced Fishes on Coho Salmon Using Shallow Pacific Northwest Lakes.

Background:--Declines in Pacific salmon stocks have been blamed on hydropower, overfishing, ocean conditions and land-use practices, but less is known about the impacts of nonnative fish, especially in small standing waters important for salmon rearing.

Over 450 lakes provide rearing habitat for juvenile salmon in western Washington alone.

Role: -- I led a team examining effects of introduced fishes on wild coho salmon in shallow western Washington lakes. ***Results:*** -- Largemouth bass were responsible for an average of 98% of the predation on coho salmon in studied lakes. Largemouth bass are found in > 75% of lowland warmwater lakes in Washington, Oregon, and in eight northwestern counties of California, many important for coho salmon rearing. This research showed that predation by largemouth bass could significantly affect juvenile coho salmon survival in these systems (73,100). ***Impact:*** -- Research used by USFWS, Canadian Government, and State Agency biologists to manage lakes across the Pacific Northwest used by anadromous salmon. In top ten viewed articles in *North*

American Journal of Fisheries Management. Presented at regional, national and international conferences.

(6) Evaluated Efficacy of Triploid Grass Carp for Aquatic Plant Control in Pacific Northwest.
Background:--Management agencies wished to use grass carp for aquatic plant control in Pacific Northwest ponds and lakes. ***Role:*** -- I conducted my dissertation work and led a team at WDFW to research effects. ***Results:*** -- Research on sterile triploid grass carp in the Pacific Northwest was presented at many national and international conferences and in journals. ***Impact:--*** Research used to develop legislation and management policies regarding this species in Washington, Oregon, British Columbia and Montana (90,99,101,103,104,106,107,108,114,116,123,124,125,126,127,128,129,130,131,132, 133134,135,138,139,140,141,144,145,146,147,148, and others). Research among first to investigate use of this species for aquatic plant control in northern climates in North America. Recognized as an important contribution nationally and internationally by both the scientific and management community.

Published Many Other Studies on the Biology, Management and Sampling of Western Fishes Affecting State Laws, Policy and Management Strategies Across the West. These included: Relative length frequency: A simple, visual technique to evaluate size structure of fish populations (89); Biology and impacts of northern pike introduced into Arizona lakes (61); the first relative weight equations for native desert fishes (80); effects of water temperature on the predation susceptibility and swimming performance of flannelmouth sucker (92); factors associated with razorback sucker recruitment in small southern Arizona ponds (87); effects of flooding on abundance of native and nonnative fishes downstream from a small impoundment (85); sampling protocols for endangered bull trout (91,112); standard methods to sample fish in Washington state lakes and ponds (98); identifying factors influencing survival of stocked channel catfish in Washington lakes (113); developing management strategies for largemouth bass in Washington (73,77,105,137); examining effects of trout stocking regimes on amphibians in high mountain Washington lakes (97); and developing management recommendations for burbot in Washington (95).

(13) SCIENTIFIC LEADERSHIP

I was elected president of the American Fisheries Society in 2016, the oldest and largest fisheries society in the world (see 14 below). I am currently the 2nd Vice President, and will move up through the officer positions to serve as President in 2019-2020. I was also elected President of the AFS Introduced Fish Section (2012-2014) and the President of the Western Division, the largest division of the AFS (2008-2009).

When I entered the Unit Program at the Arizona Cooperative Fish and Wildlife Research Unit in July 2000, all positions were vacant (unit leader, two assistant unit leaders, all technical staff) with the exception of one administrative secretary. First as Acting Unit Leader, then as Unit Leader, I worked with state and federal cooperators to hire two

additional faculty (assistant unit leader wildlife, assistant unit leader fisheries), attract grants, recruit staff and hire and finish graduate students. Three years later the Arizona Cooperative Fish and Wildlife Research Unit was fully staffed and had attracted $2,740,592 in research grants during this three-year period. Scope of unit activities since becoming leader (July 2000), $13,929,085 research funds obtained by unit, over 330 projects supported, USGS Cooperative Research Unit national awards for Excellence in Customer Service in 2005 and Outstanding Science in 2007 (These awards are given throughout the entire Unit system for best cooperator relations in the nation, and for the best science in the nation), 84 graduate students or post-docs current or graduated, 292 peer-reviewed articles, books, book chapters or technical reports published by Unit; 47 University courses, 32 agency short courses taught by unit staff.

Since my last promotion, in my aquatic research program alone, 16 MS/Ph.D. thesis have been completed, I have lead or coauthored 125 presentations at regional, national and international conferences and meetings, and I gave 10 keynote addresses at local, national and international scientific conferences. The numbers and types of publications were discussed in (12) above.

I have lead international research projects, coordinating work of over 284 state, federal and private scientists from 107 agencies across the United States, Canada and Mexico to develop standard fish sampling methods for North America. I was invited to give plenary talks at international conferences in the U.K., South Korea, and the Czech Republic, along with numerous talks, workshops and plenary presentations at annual AFS, state and federal biologist/managers' meetings (see 14 below). I chaired 5 international symposia. I was approached by scientists of the former Soviet Union to be a principle investigator on joint research on piscivorous fish management (northern pike). These scientists came to the United States to conduct research under my leadership. NATO funded me to meet with scientists at the Ukrainian Institutes of Hydrobiology and Fisheries in Kiev, and at Zaporizhazha State University, Zaporizhazha to develop a joint research proposal on northern pike management.

(14) SCIENTIFIC AND PUBLIC SERVICE

a. MEMBERSHIPS IN PROFESSIONAL SOCIETIES

American Fisheries Society

- **Elected President of the Society – to serve 2019-2020**
- **2nd Vice President of the Society – 2016-2017.**
- **Past President, Introduced Fish Section, American Fisheries Society** (August 2015 – August 2016)

- **President, Introduced Fish Section, American Fisheries Society** (August 2012 - August 2014). International section of AFS devoted to management and study of nonnative fishes.

- **President Elect – Introduced Fish Section, American Fisheries Society** (August 2011-2012).

- **President – Western Division, American Fisheries Society.** 2008 - 2009. President of the largest division of the American Fisheries Society, encompassing all of the western United States, Canada and Mexico.

- **President Elect – Western Division, American Fisheries Society.** 2007- 2008.

- **Vice President – Western Division, American Fisheries Society.** 2006 - 2007.

- **Chair - Standard Sampling Committee – Fisheries Management Section, AFS**. Appointed to lead development of standard methods for sampling freshwater fisheries across the United States, Mexico and Canada. 2004 – Present.

- **Symposium Co-Chair - Interactions Between Hydrology and Nonnative Aquatic Species, AFS 2016 Annual Meeting, Kansas City, MO**. Co-chaired a symposium on how hydrology effects interactions between native and nonnative fishes.

- **Lead Organizer and Symposium Chair - Standard Methods of Sampling Freshwater Fishes: Opportunities for International Collaboration, AFS 2015 Annual Meeting, August, 2015, Portland, OR.** Chaired this symposium to investigate international possibilities to collaborate on standard inland fish sampling methods.

- **Symposium Co-Chair - New Frontiers in the Management, Status, and Biology of Western Native Freshwater Fishes – AFS 2011 Annual Meeting, Seattle, WA**. Invited to co-chair a session on western native fishes at the annual AFS, Seattle, Washington Meeting (International Meeting).

- **Symposium Co-Chair - Calibration, Validation and Other Recent Progress on the AFS Standard Methods for Sampling Freshwater Fish – AFS 2012 Annual Meeting, St. Paul, MN.** Invited to co-chair symposium on recent progress with the AFS Standard Sampling Methods (International Meeting).

- **Member - National Governing Board** – AFS – 2007- 2009; 2011-Present. Member of the international committee that governs the American Fisheries Society (Approx. 20 members).

- **Member - National Management Committee** – AFS – 2007 – 2009. Member of the international committee that manages the American Fisheries Society (Approx. 10 members).

- **Elected Member - Nominating Committee**, American Fisheries Society (September 2008 - September 2009).

- **Member - Scholarship Committee** – Western Division, American Fisheries Society 2006-2009.

- **Symposium Chair - Standard Sampling Symposium – AFS 2008 Annual Meeting, Ottawa, ON, Canada**. Chaired AFS standard fisheries sampling symposium (International Meeting) .

- **Co-Chair - Western Division AFS Annual Meeting - AFS 2008 Annual Meeting, Portland, OR** (International Meeting).

- **Program Committee Co-Chair - Western Division AFS 2008 Annual Meeting, Portland, OR (International Meeting). .**

- **Member - American Fisheries Society -** 1984 - Present

- **Member - Western Division -** American Fisheries Society

- **Member - Arizona/New Mexico Chapter -** American Fisheries Society - 2000 - Present

- **Member - Introduced Fish Section -** American Fisheries Society – 2000- Present

- **Member - Fisheries Management Section -** American Fisheries Society – 2000 – Present

- **Member - Education Section -** American Fisheries Society – 2006 – Present

- **Member – Fish Habitat Section** – American Fisheries Society -2004 - Present

- **Student Paper Judge - AFS 2006 Annual Meeting, Lake Placid, NY** (International Meeting).

- **Student Subunit Advisor - AFS University of Arizona Subunit, 2004- Present**.

- **Chair - 2001 National Conference, Washington State Delegation**. Chosen by Washington Department of Fish and Wildlife administration to lead effort to attract the national conference to Washington State in 2001. The national AFS Conference is the largest fisheries conference in the United States. Collaborated with the East King County and the Seattle Convention Bureaus, the North Pacific International Chapter of the American Fisheries Society and WDFW staff to prepare a bid package for presentation at the 1998 AFS Annual Conference in Monterey, California.

- **Author - AFS Bull trout sampling protocol -** Elected by American Fisheries Society to co-author, with four other scientists, a survey protocol for bull trout populations in North America.

- **Member - National Publication Oversight Committee** – Serve as member and liaison to the Book Advisory Board.

World Fisheries Congress

- **Symposium Co-Chair - Standard Methods of Sampling Freshwater Fishes: Opportunities for Global Collaboration, 2016 World Fisheries Congress, Pusan, South Korea, May 2016.** Invited to co-chair a symposium on inland fish standard sampling methods, and opportunities for international collaboration involving scientists from five continents. (International Meeting)

- **Organizer – Sub Symposium – Standard Freshwater Fish Sampling Methods.** – **World Fisheries Congress, Edinburgh, Scotland, U.K. May, 2012**. Co-chaired this sub symposium as part of the inland fish symposium (International Meeting).

Desert Fishes Council

- **Local Arrangements Chair - 2004 Annual Meeting, Tucson, AZ.** Elected to chair local arrangements for the 2004 Annual Conference of this U.S./Mexican Organization.

North American Lake Management Society

- **Session Co-Chair - Nutrient/Fish Trophic Dynamics**. International Symposium of the North American Lake Management Society, Seattle, Washington, November 30 - December 4, 1993. (International Meeting).

North Pacific International Chapter of the American Fisheries Society

- **Session Chair - Warmwater Fisheries: Current Research and Management.** 1994 Annual General Meeting, North Pacific International Chapter of the American Fisheries Society, February 10, 1994, Wenatchee, Washington (Regional Meeting).

- **Session Co-Chair - Bull Trout.** 1998 Annual General Meeting, North Pacific International Chapter of the American Fisheries Society, March 18-20, 1998, Union, Washington (Regional Meeting).

Pacific Fishery Biologists

- **Program Chair - Pacific Fishery Biologist Annual Conference**, Silverdale, Washington, March 18-20, 1996 (Regional Meeting).

- **Session Chair - Contributed Papers**. Pacific Fishery Biologist Annual Conference, Silverdale, Washington, March 18-20, 1996 (Regional Meeting).

***Salvelinus confluentus* (Bull Trout) Curiosity Society**

- **Moderator - Bull Trout Presence and Absence Survey Methodologies**. *Salvelinus confluentus* Curiosity Society Annual Meeting. McKenzie Bridge, Oregon, October 15-17, 1996 (National Meeting).

Washington State Lakes Protection Association

- **Elected to Board of Directors** 1994-1996.

- **Member of Editorial Committee** 1994 -1996.

- **Program Co-Chair - Washington State Lake Protection Ninth Annual Conference**. Ocean Shores, Washington, September 8-9, 1995 (Regional Meeting).

- **Session Chair. Fish and Fish Habitat - Washington State Lakes Protection Association Tenth Annual Conference**. Spokane, Washington, September 26-28, 1996 (Regional Meeting).

- **Session Chair - Managing Lakes for Quality Fish Populations. Washington State Lake Protection Ninth Annual Conference**. Ocean Shores, Washington, September 8-9, 1995 (Regional Meeting).

Other

- **Program Co-Chair - Washington Department of Fish and Wildlife Bass Management Meeting**. Olympia, Washington, July 9-10, 1996 (Regional Meeting).

- **Session Co-Chair - Wetland Restoration**. Washington Cooperative Fish and Wildlife Research Unit Annual Cooperator's Meeting. Seattle, Washington, April 22, 1998 (Regional Meeting).

Past member of the following organizations: Northwest Scientific Association, Aquatic Plant Management Society, Washington State Lakes Protection Association, Pacific Fishery Biologists, North Pacific International American Fisheries Society Chapter, *Salvelinus confluentus* (Bull Trout) Curiosity Society.

b. TECHNICAL PRESENTATIONS

Keynote or Special Presentations

Bonar, S. A. 2017. (Keynote/Plenary Address). A survival guide to an accelerating future in fish and wildlife management. 50th Joint Annual Meeting of the AZ/NM American Fisheries Society, AZ Chapter of The Wildlife Society, NM Chapter of The Wildlife Society, Farmington, New Mexico, February 9-11, 2017. INVITED.

Bonar, S. A. and nine coauthors. 2016. (Keynote/Plenary Address Symposium). Standard Methods for Sampling Freshwater Fishes: Opportunities for International Collaboration. World Fisheries Congress, Busan, Korea, May 23-27, 2016. INVITED.

Bonar, S. A. 2016. (Invited Seminar). Progress on international collaboration on inland fish standard sampling methods. Invited seminar for the Inland Fisheries Institute, National Institute of Fisheries Science, Cheongpyeong, South Korea, May 2016. INVITED.

Bonar, S.A. 2015. (Keynote/Plenary Address). The Conservation Professional's Guide to Working With People, Keynote Address to the Texas Parks and Wildlife Annual Meeting August 25, 2015. INVITED.

Bonar, S.A. 2015. (Invited Panel Member, Biological Assessment). Global Conference on Inland Fisheries, FAO Headquarters, United Nations, Rome, Italy, January 26-28, 2015. INVITED.

Bonar, S.A. 2015. (Keynote/Plenary Address). Standardization and management of fish data for rivers and streams of the Southern U.S., Southern Division AFS Workshop, January 29- February 1, 2015. INVITED.

Bonar, S.A. 2012. (Keynote/Plenary Address). The Conservation Professional's Guide to Working with People. Keynote Address to the 45th Annual Meeting of the Montana Chapter of the American Fisheries Society, Helena, Montana, February 6-10, 2012. INVITED.

Bonar, S.A. 2011. Standard methods for sampling North American freshwater fishes. An overview for European Fisheries Standards Committee (CEN). British Standards Institute, London, United Kingdom, March 16, 2011. INVITED ADDRESS.

Bonar, S.A. 2010. (Keynote/Plenary Address). Case Histories of standard sampling in North America. Keynote Address to Conference, Fish Sampling with Active Methods. September 8-11, 2010. Ceske Budejovice, Czech Republic. INVITED.

Bonar, S.A. 2010. (Keynote/Plenary Address). An evolving profession: how fisheries management has changed in the far west. Plenary Address to the Texas Chapter of the American Fisheries Society. January 21-23, 2010, Athens, Texas. INVITED.

Bonar, S.A. 2007. (Keynote/Plenary Address – Student Breakfast) The conservation professional's guide to working with people. The Wildlife Society 14th Annual Conference, Tucson, Arizona. September 22-26, 2007. INVITED.

Bonar, S.A. 2007. (Keynote/Plenary Address) Standard sampling methods for North American inland fish: A multi-agency project coordinated by the American Fisheries Society. Fish Stock Assessment Methods for Lakes and Reservoirs: Towards the True Picture of the Fish Stock. Ceske Budejovice, Czech Republic, September 11-15, 2007. INVITED.

Bonar, S.A. 2007. (Keynote/Plenary Address). The conservation professional's guide to working with people. Keynote Address to the Urban Wildlife Management National Conference, Arbor Day Foundation, June 18-20, 2007. INVITED.

Bonar S.A. and Y. Kuzmenko. 2006. Managing inland populations of large, piscivorous fish, from important commercial fisheries to invasive, economically harmful species. Address to the NATO (North Atlantic Treaty Organization) Environmental Security Council, NATO Headquarters, Brussels, Belgium, September 28, 2006. INVITED ADDRESS.

Bonar, S.A. 2006. (Keynote/Plenary Address) Nonnative aquatic species in the American West: Their weird history, current research and thoughts for the future. Arizona-New Mexico Chapter of the American Fisheries Society/The Wildlife Society, Flagstaff, Arizona, February 2-4, 2006. INVITED.

Meeting Presentations

All oral presentations unless noted.

Lee, L. N., Z. C. Nemec, and S. A. Bonar. 2017. Assessing modified prepositioned areal electrofishing devices (PAEDs) for surveying fish habitat use in desert streams. 50th Joint Annual Meeting of the AZ/NM American Fisheries Society, AZ Chapter of The Wildlife Society, NM Chapter of The Wildlife Society, Farmington, New Mexico, February 9-11, 2017. CONTRIBUTED.

Ulrich, T. L., S. A. Bonar, C. M. Sheehy, and D. Bogner. 2017. Use of high-definition video technology to acquaint the public with cryptic desert fishes of the southern Nevada/Death Valley Region. 50th Joint Annual Meeting of the AZ/NM American Fisheries Society, AZ Chapter of The Wildlife Society, NM Chapter of The Wildlife Society, Farmington, New Mexico, February 9-11, 2017. CONTRIBUTED.

Hannifan, J. K., M. L. Caballero-Reynolds, T. L. Ulrich, and S. A. Bonar. 2016. Videography presentations to educate the public about Arizona trouts. 48th Annual Meeting of the Desert Fishes Council, November 15-19, 2016. Albuquerque, New Mexico. CONTRIBUTED.

Nemec, Z. C., Lee, L N., and S. A. Bonar. 2016. Assessing modified prepositioned areal electrofishing devices (PAEDs) for surveying fish habitat use in desert streams. 48th Annual Meeting of the Desert Fishes Council, November 15-19, Albuquerque, New Mexico. CONTRIBUTED.

Perez, C. R., S. A. Bonar, T. Edwards, B. Stewart, J. Amberg, B. Ladell, C. Rees, and C. Gill. 2016. Relationship between American Fisheries Society standard fish sampling techniques and environmental DNA (eDNA) for characterizing fish presence, relative abundance, biomass, and species composition in Arizona standing waters. 48th Annual Meeting of the Desert Fishes Council, November 15-19th, 2016. Albuquerque, New Mexico. CONTRIBUTED.

Bonar, S. A. 2016. An overview of stream flow effects on Western native/nonnative fish interactions. 146th Annual Meeting of the American Fisheries Society, Kansas City, Missouri, August 19-25, 2016. CONTRIBUTED.

Bonar, S. A., W. A. Hubert and N. Mercado-Silva. 2016. An Overview of North American AFS Freshwater Fish Sampling Standardization. World Fisheries Congress, Busan, Korea, May 23-27, 2016. INVITED.

Bonar, S. A., W. A. Hubert and N. Mercado-Silva. 2016. An Overview of North American AFS Freshwater Fish Sampling Standardization. World Fisheries Congress, Busan, Korea, May 23-27, 2016. INVITED.

Bonar, S. A. 2016. An Insider's View on Applying For and Succeeding In Graduate School! - Advice from a Professor. Presentation to the Annual Meeting of the Western Division of the American Fisheries Society, Reno, Nevada. March 20, 2016. INVITED.

Perez, C., S. Bonar, J. Amberg, C. Rees, T. Edwards, and W. Stewart, 2016. Relationship between AFS standard fish sampling techniques and environmental DNA (eDNA) for characterizing fish relative abundance, biomass, and species composition in Arizona standing waters. 41st Annual Meeting of the Western Division of the American Fisheries Society, Reno Nevada March 21-24, Reno, Nevada. CONTRIBUTED.

Bonar, S. A. and S. Petre. 2016. Ground-Based Thermal Imaging of Stream Surface Temperatures: Technique and Evaluation. 49th Joint Annual Meeting Arizona and New Mexico Chapters of The Wildlife Society and Arizona/New Mexico Chapter of The American Fisheries Society, February 4-6, 2016, Flagstaff, Arizona. CONTRIBUTED.

Brizendine, M. E., D. L. Ward, S. A. Bonar, and W. J. Matter. 2016. Use of ultrasonic imaging to evaluate egg maturation of humpback chub Gila cypha in the Grand Canyon. 49th Joint Annual Meeting of the Arizona and New Mexico Chapters of The Wildlife Society and Arizona/New Mexico Chapter of The American Fisheries Society, February 4-6, 2016, Flagstaff, Arizona CONTRIBUTED.

Perez, C. R., S. A. Bonar, J. J. Amberg, C. Rees, B. Ladell, T. Edwards, W. T. Stewart, C. Gill, and C. Cantrell. 2016. Relationship between AFS standard fish sampling techniques and environmental DNA (eDNA) for characterizing fish relative abundance, biomass, and species composition in Arizona standing waters. 49th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of the American Fisheries Society, February 4-6, 2016, Flagstaff, Arizona CONTRIBUTED.

Svancara, C., A. M. Lien, W. T. Vanasco, S. A. Bonar, G. B. Ruyle, and L. López-Hoffman. 2016. Can incentives help overcome landowner concerns about conserving endangered species on their land? A rancher case study about jaguar critical habitat and rangeland conservation.; 49th Joint Annual Meeting Arizona and New Mexico Chapters of The Wildlife Society and Arizona/New Mexico Chapter of The American Fisheries Society, February 4-6, 2016, Flagstaff, Arizona. CONTRIBUTED.

Brizendine, M. E., D. L. Ward, S. A. Bonar, and W. J. Matter. 2015 ,Use of ultrasonic imaging to evaluate egg maturation of Humpback Chub, *Gila cypha,* in Grand Canyon 47th Annual Meeting 18-22 November 2015 Death Valley National Park, California, U.S.A. CONTRIBUTED.

Ulibarri, R., S. Bonar , C. Rees, C, Jackson, M. Mata, G. Selby, J. Cole, Jeff. 2015. Comparing snorkelling and eDNA sampling techniques for monitoring presence and abundance of endangered Zuni Bluehead Sucker, *Catostomus discobolus yarrowi*, and Navajo Nation genetic subunit Bluehead Sucker, *Catostomus discobolus*, in Southwestern streams Desert Fishes Council 47th Annual Meeting 18-22 November 2015 Death Valley National Park, California, U.S.A. CONTRIBUTED.

Perez, C., S. Bonar, J. Amberg, C. Rees, B. Ladell, T. Edwards, W. Stewart, and C. Gill. 2015. Relationship between AFS standard fish sampling techniques and environmental DNA (eDNA) for characterizing fish relative abundance, biomass, and species composition in Arizona standing waters. Desert Fishes Council, 47th Annual Meeting 18-22 November 2015 Death Valley National Park, California, U.S.A. CONTRIBUTED.

Brizendine, M., D. Ward, S. A. Bonar, and W. Matter. 2015. Use of Ultrasonic Imaging to Evaluate Egg Maturation of Humpback Chub *Gila cypha* in the Grand Canyon. 145th Annual Meeting of the American Fisheries Society, Portland, Oregon. CONTRIBUTED.

Cowx, I. G., S. J. Cooke, K. Lorenzen, J. Koehn, S. A. Bonar, D. Bunnell 2015. Assessment of Inland Fish Populations and Fisheries: The Foundation for Sustainable Management. 145th Annual Meeting of the American Fisheries Society, Portland, Oregon, August 16-20, 2015. INVITED.

Loftus, A., S. A. Bonar, and D. Austen. 2015. Data Management: A Companion to Standard Methodologies for Improving International Collaboration. 145th Annual Meeting of the American Fisheries Society, Portland, Oregon, August 16-20, 2015. INVITED.

Perez C., S. A. Bonar, J. J. Amberg, C. Rees, B. Ladell, B. T. Stewart, C. Gill, and C. Cantrell. 2015. Standard Fish Sampling Techniques and Environmental DNA (eDNA) As Tools to Characterize Fish Presence and Relative Abundance in Arizona Standing Waters. 145th Annual Meeting of the American Fisheries Society, Portland, Oregon, August 16-20. CONTRIBUTED.

Perez, C., S. A. Bonar, B. T. Stewart, C. Gill, C. Cantrell. 2015. Use of the AFS Standard Sampling Web Tool to Compare Length Frequency, Condition, and Catch per Unit Effort of Largemouth Bass *Micropterus salmoides*. 145th Annual Meeting of the American Fisheries Society, Portland, Oregon, August 16-20, 2015. INVITED POSTER.

Petre, S., J. J. Amberg, C. Rees, M. Brizendine, S. A. Bonar, A. Chaudoin, O. Feuerbacher, C. Perez, J. E. Ruggirello, and R. Ulibarri. 2015. Incorporating Technological Advances in Standard Inland Fish Sampling Programs: Challenges and Opportunities. 145th Annual Meeting of the American Fisheries Society, Portland, Oregon, August 16-20, 2015. INVITED.

Bonar, S. A., W. A. Hubert, and N. Mercado Silva, 2015. An Overview of North American AFS Freshwater Fish Sampling Standardization. 145th Annual Meeting of the American Fisheries Society, Portland Oregon, August 16-20, 2015. INVITED.

Brizendine, M.E., D.L. Ward, S.A. Bonar, and W.J. Matter. 2015. Use of ultrasonic imaging to evaluate egg maturation of humpback chub Gila cypha. The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 – February 7, 2015. Oral Presentation. CONTRIBUTED.

Powers, C. J., and S. A. Bonar. 2015. Display of underwater high-definition videography of Gila chub to increase public awareness and conservation. The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 –7, 2015. Poster Presentation. CONTRIBUTED.

Ruggirello, J. E., S. A. Bonar, O. G. Feuerbacher, and C. Powers. 2015. Spawning ecology and captive husbandry of endangered Moapa dace. The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 – February 7, 2015. Oral Presentation. CONTRIBUTED.

Svancara, C., A. Lien, W. Vanasco, L. Lopez-Hoffman, S. Bonar, and G. Ruyle. Identifying ranching leaders' opinions of jaguar conservation and concerns with endangered species management through focused interviews. 47th Joint Annual Meeting of the Arizona/New Mexico Chapters of the Wildlife Society and the American Fisheries Society, Las Cruces, New Mexico, February 5-7, 2015. CONTRIBUTED.

Ulibarri, R. M., S. Bonar, C. Rees, and J. Amberg. 2015. Detecting and quantifying biomass of Navajo Nation subunit bluehead sucker and Zuni bluehead sucker using environmental DNA. The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 –7, 2015. Poster Presentation. CONTRIBUTED.

Ulibarri, R., S. Bonar, M. Mata, G. Selby, and C. Kitcheyan. 2015. Habitat suitability criteria for Navajo Nation subunit bluehead sucker (*Catostomus discobolus*) and Zuni bluehead sucker (*Catostomus discobolus yarrowi*). The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 – February 7, 2015. CONTRIBUTED.

Perez, C. R., S. A. Bonar, J. J. Amberg, C. Rees, W. T. Stewart, C. Gill, C. Cantrell. 2015. Correlation of eDNA (Environmental DNA) surveys with traditional fish sampling surveys in standing waters. The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 – February 7, 2015. Contributed Oral Presentation. CONTRIBUTED.

Perez, C. R., S. A. Bonar, W. T. Stewart, C. Gill, and C. Cantrell. 2015. Comparison of length frequency, condition, and growth of select sport fish species in Arizona with those in other areas of North America. The Joint Annual Meeting of the Arizona/New Mexico American Fisheries Society and the Wildlife Society, Las Cruces, New Mexico. February 5 – February 7, 2015. Poster Presentation. CONTRIBUTED.

Bonar, S.A. 2015. How standard fish sampling methods help improve biological assessment across political boundaries. Global Conference on Inland Fisheries, Food and Agriculture Organization of the United Nations, Rome, Italy, January 26-28, 2015. Presentation and Scientific Panel Member. INVITED.

Bonar, S. A. 2014. Comparing Standard Fish Data using a Web-Accessible Database. Western Warmwater Fisheries Meeting, July 15-16, Spokane Washington. INVITED.

Bonar, S. A. 2014. Comparison of Mechanical Techniques to Suppress Northern Pike Populations in Small Arizona Reservoirs. Western Warmwater Fisheries Meeting, July 15-16, Spokane Washington. INVITED.

Bonar, S. A. 2014. How to Persuade People – Lessons from Psychology and Marketing for the Fish and Wildlife Biologist. Western Warmwater Fisheries Meeting, July 15-16, Spokane Washington. INVITED.

Brizendine, M.E., S. A. Bonar, D. L. Ward, and W. J. Matter. 2014. Use of ultrasonic imaging and Ovaprim® to evaluate egg maturation of humpback chub *Gila cypha*. The Western Division of the American Fisheries Society Annual Meeting, Mazatlán, Mexico. April 7 – April 11, 2014. CONTRIBUTED POSTER PRESENTATION.

Bonar, S. A. 2014. Effects of increasing water temperature on desert fishes and options for management. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED.

Brizendine, M. E., S. A. Bonar, D. L. Ward and W. J. Matter. 2014. Use of ultrasonic imaging and Ovaprim® to evaluate egg maturation of Humpback Chub. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED.

Clark Barkalow, S. and S. A. Bonar. 2014. Total suspended sediment tolerance of Yaqui Chub eggs and fry. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED.

Clark Barkalow, S. and S. A. Bonar. 2014. Effects of total suspended sediment on abundance and diversity of invertebrates in Black Draw. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED POSTER PRESENTATION.

Hickerson, B. T., J. E. Ruggirello and S. A. Bonar. 2014. Spawning site preference of the endangered Moapa White River Springfish. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. BEST POSTER PRESENTATION AWARD.

Petre, S., and S. A. Bonar. 2014. Using habitat suitability criteria and life history characteristics to manage for Apache Trout and against Virile Crayfish. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED.

Petre, S. J., and S. A. Bonar. 2014. Habitat Suitability Criteria for Virile Crayfish, a Non-Native Species in Arizona 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED POSTER.

Ruggirello, J. E., S. A. Bonar and O. G. Feuerbacher. 2014. Endangered Moapa Dace in captivity and spawning ecology. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED.

Ruggirello, J. E., S. A. Bonar, and O. G. Feuerbacher. 2014. An attempt to spawn endangered Moapa Dace in captivity. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED POSTER PRESENTATION.

Svancara, C., L. Lopez-Hoffman, and S. Bonar. 2014. Perceptions and concerns with jaguar conservation: nine rancher case studies in southern Arizona. 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, February 6-8, 2014. CONTRIBUTED POSTER PRESENTATION.

Brizendine, M. E., D. L. Ward and S. A. Bonar. 2013 Use of ultrasonic imaging and Ovaprim® to evaluate egg maturation of humpback chub, *Gila cypha*. 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED.

Clark Barkalow, S. and S. Bonar. 2013. Effects of total suspended sediment on survival of Yaqui chub eggs and larvae. 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED. WINNER BEST STUDENT PAPER AWARD.

Mercado-Silva, N., and S. Bonar. 2013 Habitat use of larval fishes in a Southwestern desert stream. 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED.

Petre, S., and S. Bonar. 2013 Habitat suitability criteria for Virile Crayfish, a non-native species in Arizona 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED POSTER PRESENTATION.

Petre, S., and S. Bonar. 2013. What habitat parameters can be modified to reduce interactions between imperiled Apache trout and invasive crayfish? 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED.

Ruggirello, J., S. Bonar and O. Feuerbacher. 2013. An attempt to spawn endangered Moapa dace in captivity. 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED.

Ruggirello, J., S. Bonar, and O. Feuerbacher. 2013. Spawning ecology of the endangered Moapa dace revealed through underwater videography. 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED.

Bonar, S. A. 2013 Effects of increasing water temperatures on desert fishes and options for management. 45th Annual Meeting of the Desert Fishes Council. November 20-24, Flagstaff, Arizona. CONTRIBUTED.

Clark, S. and S. A. Bonar. 2013. Effects of total suspended sediment on survival of Yaqui Chub eggs and larvae. 143nd Annual Meeting of the American Fisheries Society, Little Rock, Arkansas, September 8-12, 2013. CONTRIBUTED.

Petre, S., and S. A. Bonar. 2013. Habitat suitability criteria for Virile Crayfish, a non-native species in Arizona. 143nd Annual Meeting of the American Fisheries Society, Little Rock, Arkansas, September 8-12, 2013. CONTRIBUTED POSTER PRESENTATION.

Petre, S., and S. A. Bonar. 2013. Using habitat to understand the distribution of Apache Trout, a rare Southwestern salmonid impacted by non-native crayfish. 143nd Annual Meeting of the American Fisheries Society, Little Rock, Arkansas, September 8-12, 2013. CONTRIBUTED.

Ruggirello, J. E., S. A. Bonar, and O. G. Feuerbacher. 2013. Spawning ecology of the critically endangered Moapa Dace revealed through underwater videography. 143nd Annual Meeting of the American Fisheries Society, Little Rock, Arkansas, September 8-12, 2013. CONTRIBUTED.

Bonar, S. A. 2013. New options for managing native trout habitat with climate change implications. 4th Annual Native Trout Conference, Phoenix, Arizona, April 18, 2013. INVITED.

Bonar, S.A. 2013. http://fisheriesstandardsampling.org :A simple web-based tool to analyze standard fish data with a click of a button. 46th Joint Annual Meeting of the Arizona/New Mexico Chapters of The Wildlife Society and American Fisheries Society. Albuquerque, New Mexico, February 7-9, 2013. CONTRIBUTED.

Clark, S.L. and S.A. Bonar. 2013. Relationship between U.S.-Mexico border operations and suspended sediment in headwaters of the Rio Yaqui. 46th Joint Annual Meeting of the Arizona/New Mexico Chapters of The Wildlife Society and American Fisheries Society. Albuquerque, New Mexico, February 7-9, 2013. CONTRIBUTED.

Mercado-Silva, N., S.A. Bonar, M. Rahr, T. Torey, and A. Cate Jr. 2013. Comparing standard North American freshwater fish data using a simple online tool: fisheriesstandardsampling.org. Annual Meeting of the Southern Division of the American Fisheries Society. Nashville, Tennessee, February 7-10, 2013. CONTRIBUTED.

Mercado-Silva, N., S.A. Bonar, M. Rahr, T. Torey, and A. Cate Jr. 2013. Comparing standard North American freshwater fish data using a simple online tool: fisheriesstandardsampling.org. 93rd Joint Meeting of Ichthyology and Herpetology, Albuquerque, New Mexico, July 10-15 2013. CONTRIBUTED.

Petre, S., S.A. Bonar, Mercado-Silva, N., M. Rahr, T. Torey, and A. Cate Jr. 2013. Comparing standard North American freshwater fish data using a simple online tool: fisheriesstandardsampling.org. Annual Meeting of the Western Division of the American Fisheries Society. Boise, Idaho, April 15-18, 2013. CONTRIBUTED.

Petre, S. and S.A. Bonar. 2013. Using habitat suitability criteria as a tool to understand distribution dilemmas for Apache Trout, a rare Southwestern salmonid impacted by non-native crayfish. Annual Meeting of the Western Division of the American Fisheries Society. Boise, Idaho, April 15-18, 2013. CONTRIBUTED.

Price, J.E. and S.A. Bonar. 2013. Potential methods to cool streams containing Apache trout in the White Mountains of Arizona with implication for climate change. 46th Joint Annual Meeting of the Arizona/New Mexico Chapters of The Wildlife Society and American Fisheries Society. Albuquerque, New Mexico, February 7-9, 2013. CONTRIBUTED.

Petre, S. and S.A. Bonar. 2013. A comparison of habitat suitability criteria for Apache trout and the non-native virile crayfish. 46th Joint Annual Meeting of the Arizona/New Mexico Chapters of The Wildlife Society and American Fisheries Society. Albuquerque, New Mexico, February 7-9, 2013. CONTRIBUTED.

Ruggirello, J.E., S.A. Bonar, and O.G. Feuerbacher. 2013. Spawning ecology of the critically endangered Moapa Dace, *Moapa coriacea*, revealed through underwater videography. 46th Joint Annual Meeting of the Arizona/New Mexico Chapters of The Wildlife Society and American Fisheries Society. Albuquerque, New Mexico, February 7-9, 2013. CONTRIBUTED.

Bonar, S.A. 2012. Why restore and protect desert fishes? Lessons from history, economics and biology. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. INVITED.

Clark, S.L. and S.A. Bonar. 2012. Relationship between U.S.-Mexico border operations and total suspended sediment in headwaters of the Rio Yaqui. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P. J. Barrett. 2012. Using video to investigate relationships between environmental conditions and spawning behavior in Devils Hole pupfish. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. CONTRIBUTED.

Feuerbacher, O.G., S.A. Bonar, and P. Barrett. 2012. Detection, disease characteristics, and control of non-tuberculosis mycobacteria in hybrid Devils Hole pupfish. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. CONTRIBUTED.

Petre, S. and S.A. Bonar. 2012. A comparison of habitat suitability criteria for Apache trout and the non-native virile crayfish. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. CONTRIBUTED.

Price, J. and S.A. Bonar. 2012. Can streams containing Apache Trout be cooled? Relationships between environmental variables and stream temperature with management implications under climate change. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. CONTRIBUTED.

Ruggirello, J.E., S.A. Bonar, and O.G. Feuerbacher. 2012. Spawning ecology of the critically endangered Moapa dace, *Moapa coriacea,* revealed through underwater videography. 44th Annual Meeting of the Desert Fishes Council. Death Valley National Park, California, November 14-18, 2012. CONTRIBUTED.

Bonar, S.A. 2012. Recent Advances and an Overview of North American AFS Freshwater Fish Sampling Standardization. 142nd Annual Meeting of the American Fisheries Society, Minneapolis-St. Paul, Minnesota, August 19-23, 2012. INVITED.

Bonar, S.A., M. Rahr, T. Torrey, A. Cate Jr., and N. Mercado Silva, 2012. Comparing Standard North American Freshwater Fish Data Using a Web-Accessible Database. 142nd Annual Meeting of the American Fisheries Society, Minneapolis-St. Paul, Minnesota, August 19-23, 2012. INVITED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2012. Using Video to Investigate Relationships Between Environmental Conditions and Spawning Behavior in Devils Hole Pupfish. 142nd Annual Meeting of the American Fisheries Society, Minneapolis-St. Paul, Minnesota, August 19-23, 2012. CONTRIBUTED.

Feuerbacher, O.G., S.A. Bonar, and P.J. Barrett. 2012. Detection, Disease Characteristics, and Control of Non-Tuberculosis Mycobacteria in Hybrid Devils Hole Pupfish. 142nd Annual Meeting of the American Fisheries Society, Minneapolis-St. Paul, Minnesota, August 19-23, 2012. CONTRIBUTED.

Mercado-Silva, N. and S.A. Bonar 2012. Standardized methods for sampling inland fishes in Mexico: Development, utilization and validation. 142nd Annual Meeting of the American Fisheries Society, Minneapolis-St. Paul, Minnesota, August 19-23, 2012. INVITED.

Bonar, S.A. 2012. Recent advances and an overview of North American freshwater fish sampling standardization. 6th World Fisheries Congress, Edinburgh, Scotland, May 7-11, 2012. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2012. Using remote systems to assess relationships between environmental conditions and reproductive behavior in Devils Hole pupfish . 45th Joint Annual Meeting of the Arizona/New Mexico Chapters of The Wildlife Society and American Fisheries Society. Phoenix, Arizona, February 2-4, 2012. CONTRIBUTED-BEST STUDENT PAPER AWARD.

Mercado-Silva, N. and S.A. Bonar. 2012. Habitat requirements for two catostomids in an Arizona stream. 45th Joint annual meeting of the Arizona and New Mexico chapters of the American Fisheries Society. Phoenix, Arizona, February 2-4, 2012. CONTRIBUTED.

Bonar, S.A. 2011. Advances in fish sampling: An overview of techniques and standardization. 141st Annual Meeting of the American Fisheries Society, September 4-8, 2011. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2011. Environmental factors and spawning behavior in the Devils Hole pupfish. 141st Annual Meeting of the American Fisheries Society. Seattle, Washington, September 4-8, 2011. INVITED.

Feuerbacher, O.G., S.A. Bonar, A.L. Chaudoin, and P.J. Barrett. 2011. Construction of a mesocosm recreation of Devils Hole. 141st Annual Meeting of the American Fisheries Society. Seattle, WA, Sept 4-8, 2011. CONTRIBUTED.

Mapula, J., O.G. Feuerbacher, S.A. Bonar, K. Wilson, and P.J. Barrett. 2011. Food Bottlenecks to Larval Recruitment of Devils Hole Pupfish. 141st Annual Meeting of the American Fisheries Society. Seattle, Washington, September 4-8, 2011. INVITED.

Recsetar, M.S., S.A. Bonar, O.G. Feuerbacher, and C.A. Caldwell. 2011. Assessing the thermal tolerance of Apache trout at critical life stages. 141st Annual Meeting of the American Fisheries Society. Seattle, Washington, September 4-8, 2011. INVITED.

Bonar, S.A. 2011. Aquatic research at the Arizona Cooperative Fish and Wildlife Research Unit. U.S. Fish and Wildlife Service Devils Hole Pupfish Biologists' Meeting, Las Vegas, Nevada, June 23-24, 2011. INVITED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2011. Using stand-alone video to monitor reproductive behavior in Devils Hole pupfish. U.S. Fish and Wildlife Service Devils Hole Pupfish Biologists' Meeting, Las Vegas, Nevada, June 23-24, 2011. INVITED.

Feuerbacher, O.G., S.A. Bonar, and A.L. Chaudoin. 2011. Construction of a mesocosm recreation of Devils Hole. U.S. Fish and Wildlife Service Devils Hole Pupfish Biologists' Meeting, Las Vegas, Nevada, June 23-24, 2011. INVITED.

Feuerbacher, O.G., S.A. Bonar, and P.J. Barrett. 2011. Applications of surface disinfectants and antibiotics to hybrid Devils Hole pupfish eggs. U.S. Fish and Wildlife Service Devils Hole Pupfish Biologists' Meeting, Las Vegas, Nevada, June 23-24, 2011. INVITED.

Mapula, J., O.G. Feuerbacher, S.A. Bonar, K. Wilson, and P.J. Barrett. 2011. Food bottlenecks to larval recruitment of Devils Hole pupfish. U.S. Fish and Wildlife Service Devils Hole Pupfish Biologists' Meeting, Las Vegas, Nevada, June 23-24, 2011. INVITED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2011. Using stand-alone video to monitor reproductive behavior in Devils Hole pupfish. 2011 Devils Hole Workshop, Pahrump, Nevada, May 4-6, 2011. INVITED.

Feuerbacher, O.G., S.A. Bonar, and A.L. Chaudoin. 2011. Construction of a mesocosm recreation of Devils Hole. 2011 Devils Hole Workshop, Pahrump, Nevada, May 4-6, 2011. INVITED.

Mapula, J., O.G. Feuerbacher, S.A. Bonar, K. Wilson, and P.J. Barrett. 2011. Food bottlenecks to larval recruitment of Devils Hole pupfish. 2011 Devils Hole Workshop, Pahrump, Nevada, May 4-6, 2011. INVITED.

Bonar, S.A. 2011. Advances in fish sampling: An overview of techniques and standardization. The Arizona/New Mexico Chapters of the American Fisheries Society and The Wildlife Society, Joint Annual Meeting, Pinetop, Arizona, February 3-5, 2011. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2011. Using stand-alone video to monitor reproductive behavior in Devils Hole pupfish. The Arizona/New Mexico Chapters of the American Fisheries Society and The Wildlife Society Joint Annual Meeting, Pinetop, Arizona, February 3-5, 2011. CONTRIBUTED.

Feuerbacher, O.G., S.A. Bonar, and A.L. Chaudoin. 2011. Construction of a mesocosm recreation of Devils Hole. The Arizona/New Mexico Chapters of the American Fisheries Society and The Wildlife Society Joint Annual Meeting, Pinetop, Arizona, February 3-5, 2011. CONTRIBUTED.

Mapula, J., O.G. Feuerbacher, and S.A. Bonar. 2011. Food bottlenecks to larval recruitment of the Devils Hole pupfish. The Arizona/New Mexico Chapters of the American Fisheries Society and The Wildlife Society Joint Annual Meeting, Pinetop, Arizona, February 3-5, 2011. CONTRIBUTED.

Mercado-Silva, N. and S.A. Bonar. 2011. Larval fish habitat preference and distribution in an unregulated Arizona desert stream. The Arizona/New Mexico Chapters of the American Fisheries Society and The Wildlife Society Joint Annual Meeting, Pinetop, Arizona, February 3-5, 2011. CONTRIBUTED.

Price, J.E. and S.A. Bonar. 2011. Habitat variables associated with stream temperature resiliency in the White Mountains of Arizona with implications for Apache trout distribution in response to climate change. The Arizona/New Mexico Chapters of the American Fisheries Society and The Wildlife Society Joint Annual Meeting, Pinetop, Arizona, February 3-5, 2011. CONTRIBUTED – BEST STUDENT PAPER AWARD.

Bonar, S.A. 2010. Advances in fish sampling: An overview of techniques and standardization. 42nd Annual Meeting of the Desert Fishes Council, Moab, Utah, November 17-21, 2010. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2010. Using stand-alone video to monitor reproductive behavior in Devils Hole pupfish. 42nd Annual Meeting of the Desert Fishes Council, Moab, Utah, November 17-21, 2010. CONTRIBUTED.

Mercado-Silva, N. and S.A. Bonar. 2010. Metodos estandarizados para el muestreo de peces dulceacuicolas en Norteamerica. 2010 Meeting of the Sociedad Ictiologica Mexicana, Nuevo Vallarta, Nayarit, Mexico. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2010. Using remote systems to assess relationships between environmental conditions and reproductive behavior in Devils Hole pupfish. 43rd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. February 4-6, 2010, Flagstaff, Arizona. CONTRIBUTED.

Feuerbacher, O.G., S.A. Bonar, and P.J. Barrett. 2010. Control of pathogens in laboratory-reared hybrid Devils Hole pupfish. 43rd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. February 4-6, 2010, Flagstaff, Arizona. CONTRIBUTED.

Mapula, J., O.G. Feuerbacher, S.A. Bonar, K. Wilson, and P.J. Barrett. 2010. Food Bottlenecks to Larval Recruitment of Devils Hole Pupfish. 43rd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. February 4-6, 2010, Flagstaff, Arizona. CONTRIBUTED.

Recsetar, M., M. Zeigler, D. Ward, S.A. Bonar, and C. Caldwell. 2010. Testing the Thermal Tolerance of Various Life Stages of Fish Using the Critical Thermal Method. 43rd Joint Annual Meeting of the Arizona/New Mexico Chapter of the American Fisheries Society. February 4-6, 2010, Flagstaff, Arizona. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2009. Using stand-alone videography and water quality sensing to assess relationships between environmental conditions and reproductive behavior in Devils Hole pupfish. 41st Annual Meeting of the Desert Fishes Council. Death Valley, California, November 19-22, 2009. CONTRIBUTED.

Feuerbacher, O.G., S.A. Bonar, and P.J. Barrett. 2009. Application of prophylactic disease treatments in laboratory rearing of hybrid Devils Hole pupfish. 41st Annual Meeting of the Desert Fishes Council. Death Valley, California, November 19-22, 2009. INVITED.

Mapula, J., O.G. Feuerbacher, S.A. Bonar, and K. Wilson. 2009. Laboratory replication of Devils Hole algal and zooplankton communities. 41st Annual Meeting of the Desert Fishes Council. Death Valley, California, November 19-22, 2009. INVITED.

Recsetar, M., M. Zeigler, S.A. Bonar, D. Ward, and C. Caldwell. 2009. Testing the thermal tolerance of various life stages of fish using the critical thermal method. 41st Annual Meeting of the Desert Fishes Council. November 19-22, 2009. CONTRIBUTED.

Bonar, S.A., M. Brouder, and A. Iles. 2009. Aggregating disparate fish data sets: challenges, techniques and a bit of social psychology. 139th Annual Meeting of the American Fisheries Society, Nashville, Tennessee. August 30 - September 3, 2009. INVITED.

Bonar, S.A., W. Hubert, and D. Willis. 2009. Standard methods for sampling North American freshwater fishes. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico, May 3-7, 2009. CONTRIBUTED.

Bonar, S.A., T.P. Archdeacon, A. Iles, S.J. Kline, A. A. Schultz, and E. Sontz. 2009. An overview of captive breeding methods for five imperiled desert chub and topminnow species. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico, May 3-7, 2009. CONTRIBUTED.

Chaudoin, A.L., O.G. Feuerbacher, S.A. Bonar, and P.J. Barrett. 2009. Using stand-alone videography and water quality sensing to assess relationships between environmental conditions and reproductive behavior in Devils Hole Pupfish. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico. May 3-7, 2009. CONTRIBUTED.

Feuerbacher, O.G., S.A. Bonar, and P. Barrett. 2009. Application of prophylactic disease treatments in laboratory rearing of hybrid Devils Hole pupfish. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico. May 3-7, 2009. CONTRIBUTED.

Kretschmann, A., S.A. Bonar, K. Young, J. Whittier, C. Paukert, and D. Guertin. 2009. Using Geographic Information Systems to delineate native fish and sport fish management areas in the Verde River watershed, Arizona. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico, May 3-7, 2009. INVITED.

Recsetar, M., M. Zeigler, D. Ward, S.A. Bonar, and C. Caldwell. Testing the Thermal Tolerance of Various Life Stages of Fish Using the Critical Thermal Method. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico. May 3-7, 2009. CONTRIBUTED.

Rogowski, D., S. Sitko, and S.A. Bonar. 2009. Optimizing northern crayfish (*Orconectes virilis*) control methods in Arizona streams. Annual Meeting of the Western Division of the American Fisheries Society. Albuquerque, New Mexico. May 3-7, 2009. CONTRIBUTED.

Bonar, S.A., T.P., Archdeacon, A. Iles, S.J. Kline, A.A. Schultz, and E. Sontz. 2008. An overview of captive breeding methods for five imperiled desert chub and topminnow species 40th Annual Meeting of the Desert Fishes Council, Cuatro Cienegas, Mexico, November 12-16, 2008. CONTRIBUTED.

Bonar, S.A., O. Feuerbacher, A. Chaudoin, and J. Mapula. 2008. Proposed propagation research for Devils Hole pupfish. Devils Hole Pupfish Research Meeting, Las Vegas, Nevada, October, 2008. INVITED.

Bonar, S.A., W.A. Hubert, and D.W. Willis. 2008. Standard methods for sampling North American freshwater fishes. 138th Annual Meeting of the American Fisheries Society, Ottawa, Ontario August 17-21, 2008. Introductory presentation of Standard methods for sampling North American Freshwater Fishes symposium. INVITED.

Bonar, S.A., W.A. Hubert, and D.W. Willis. 2008. Standard methods for sampling North American freshwater fishes. Western Division of the American Fisheries Society, Portland, Oregon. May 5-7, 2008. CONTRIBUTED.

Kretschmann, A., S. A. Bonar, and K. Young. 2007. Using geographic information systems as a tool to delineate native fish and sport fish management areas for use in a fisheries management plan of the Verde River watershed, Arizona. Desert Fishes Council Meeting, Ventura CA, December, 2007. CONTRIBUTED.

Kuzmenko, Y., S.A. Bonar, and T. Spesivy. 2007. Can we mechanically control nuisance populations of northern pike in Southwestern lakes? Desert Fishes Council Annual Meeting, Ventura CA, December, 2007. CONTRIBUTED.

Sontz, E. and S.A. Bonar 2007. Propagation and rearing of headwaters chub. Desert Fishes Council, Ventura CA, December 2007. CONTRIBUTED.

Bonar, S.A. 2007. How to persuade people – Lessons from psychology and marketing for the wildlife biologist. The Wildlife Society 14th Annual Conference, Tucson, Arizona. September 22-26, 2007. CONTRIBUTED.

Bonar, S.A. 2007. How to persuade people – Lessons from psychology and marketing for the fisheries biologist. American Fisheries Society 137th Annual Meeting, San Francisco, California. September 2-6, 2007. CONTRIBUTED.

Bonar, S.A., W.A. Hubert, and D.W. Willis. 2007. Standard methods to sample inland fishes of North America. Progress report. Fisheries Management Section, American Fisheries Society 137th Annual Meeting, San Francisco, California. September 2-6, 2007. INVITED.

Bonar, S.A., W.A. Hubert, and D.W. Willis. 2007. Standard methods to sample inland fishes of North America. Progress report. Education Section, American Fisheries Society 137th Annual Meeting, San Francisco, California. September 2-6, 2007. INVITED.

Bonar, S.A. 2007. Fishes in the Desert. Aquatic research at the Arizona Cooperative Fish and Wildlife Research Unit. Guest Speaker at the Washington Cooperative Fish and Wildife Research Unit Annual Cooperator's Meeting. May 15, 2007. INVITED.

Archdeacon, T.P. and S.A. Bonar. 2007. Effects of Asian fish tapeworm and western mosquitofish on Mohave tui chub growth and survivial. Mohave National Preserve Meeting, Palm Desert, California, May 10, 2007. INVITED.

DuBey, R., S. Schrader, C. Caldwell, D. L. Winkleman, P. Budy, and S. Bonar. 2007. Southwest regional risk assessment for whirling disease in native salmonids: Data assembly and conceptual model development. 13th Annual Whirling Disease Symposium "Resistance on Two Fronts". Denver, Colorado, February 12-13, 2007. CONTRIBUTED.

Bonar, S. A., W.A. Hubert, and D.W. Willis. 2008. Standard methods for sampling North American freshwater fishes. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Prescott, Arizona. February 7-9, 2007. CONTRIBUTED.

Kretschmann, A. and S.A. Bonar. 2008. Using geographic information systems to delineate native fish and sport fish management areas in the Verde River Watershed, Arizona. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Prescott, Arizona. February 7-9, 2007. CONTRIBUTED.

Kuzmenko, Y., S.A. Bonar, and T. Specivy. 2008. Efficiency of mechanical control of nuisance populations of northern pike in small Arizona lakes. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Prescott, Arizona. February 7-9, 2007. CONTRIBUTED.

Rogowski, D. and S.A. Bonar. 2008. Optimizing control methods for an invasive crayfish. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Prescott, Arizona. February 7-9, 2007. CONTRIBUTED.

Sontz, E. and S.A. Bonar. 2008. Captive breeding of headwaters chub, an imperiled Southwestern cyprinid. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Prescott, Arizona. February 7-9, 2007. CONTRIBUTED.

Archdeacon, T.P. and S.A. Bonar. 2007. Effects of Asian fish tapeworm and western mosquitofish on Mohave tui chub growth and survival. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Albuquerque, New Mexico February 6-8, 2007. CONTRIBUTED.

Kretschmann, A., S.A. Bonar, and K. Young. 2007. Using geographic information systems as a tool to delineate native fish and sport fish management areas for use in a fisheries management plan of the Verde River watershed, Arizona. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Albuquerque, New Mexico. February 6-8, 2007. CONTRIBUTED – BEST STUDENT POSTER.

Kuzmenko, Y., S.A. Bonar, and T. Spesivy. 2007. Can we mechanically control nuisance populations of northern pike in Southwestern lakes? Lessons from the Ukraine. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Albuquerque, New Mexico. February 6-8, 2007. CONTRIBUTED.

Schultz, A.A. and S.A. Bonar, 2007. Selected aspects of the natural history of Gila chub. Arizona/New Mexico Chapter of the American Fisheries Society Annual Meeting, Albuquerque, New Mexico February 6-8 2007. CONTRIBUTED.

Kline, S.J. and S.A. Bonar. 2006. Effect of Asian tapeworm on the growth and mortality of Yaqui chub and Yaqui topminnow. 38th Annual Meeting of the Desert Fishes Council, Death Valley, California, November 15-19, 2006. CONTRIBUTED – BEST STUDENT PAPER AWARD.

Iles, A.C., S.A. Bonar, W.A. Hubert, and D.W. Willis. 2006. Standard Sampling Methods for North American Freshwater Fishes: an example of a data standards initiative. National Fisheries Data Summit - Focusing on Applications to the National Fish Habitat Initiative, Salt Lake City, Utah, October 31-November 2, 2006. INVITED.

Archdeacon, T.P. and S.A. Bonar. 2006. Laboratory spawning of Mojave tui chub. 136th American Fisheries Society Annual Meeting, Lake Placid, New York, September 10-14, 2006. CONTRIBUTED.

Kline, S.J. and S.A. Bonar. 2006. Effects of Asian tapeworm on the growth and mortality of Yaqui chub and Yaqui topminnow. 136th American Fisheries Society Annual Meeting, Lake Placid, New York, September 10-14, 2006. CONTRIBUTED.

Schultz, A. and S.A. Bonar. 2006. Spawning and culture of Gila chub. 136th American Fisheries Society Annual Meeting, Lake Placid, New York, September 10-14, 2006. CONTRIBUTED.

Kline, S.J. and S.A. Bonar. 2006. Effect of Asian tapeworm on the growth and mortality of Yaqui chub and Yaqui topminnow. AZ/NV Academy of Science, Tucson, Arizona, April 8, 2006. INVITED – BEST STUDENT PAPER AWARD.

Bonar, S.A., W. Hubert, D. Willis, M. Brouder, and A. Iles. 2005. Standard sampling methods for North American freshwater fishes: Averages and standards for commonly used fisheries indices. Desert Fishes Council. Cuatro Cienegas, Coahuila, Mexico, November 16-20, 2005. CONTRIBUTED.

Kline, J.S., S.A. Bonar, and A. Francis. 2005. Propagation of Yaqui chub (*Gila purpurea*), and Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*) in a controlled environment. Presented to the Desert Fishes Council. Cuatro Cienegas, Coahuila, Mexico, November 16-20, 2005. CONTRIBUTED (Poster).

Schade, C.B. and S.A. Bonar. 2005. Distribution and abundance on non-native fishes in streams of the American West. Presented to the Desert Fishes Council. Cuatro Cienegas, Coahuila, Mexico, November 16-20 2005. CONTRIBUTED.

Sponholtz, P., J. Voeltz, D. Mitchell, J. Simms, C. Carter, D. Propst, and S.A. Bonar. 2005. Lower Colorado River Area Report, November 2004-2005. Presented to the Desert Fishes Council. Cuatro Cienegas, Coahuila, Mexico, November 16-20, 2005. INVITED.

Archdeacon, T.P. and S.A. Bonar. 2006. Techniques for laboratory spawning of Mohave tui chub. 38th Annual Meeting of the Desert Fishes Council, Death Valley, California, November 15-19 2005. CONTRIBUTED.

Bonar, S.A. 2005. An update of the new book, Standardized Sampling of North American Freshwater Fishes. Presented to the Fisheries Management Section of the 135th Annual Meeting of the American Fisheries Society, Anchorage, Alaska, September 11-15, 2005. INVITED.

Bonar, S.A. 2005. An update of the new book, Standardized Sampling of North American Freshwater Fishes. Presented to the Education Section of the 135th Annual Meeting of the American Fisheries Society, Anchorage, Alaska, September 11-15, 2005. INVITED.

Bonar, S.A., D.W. Willis, and W.A. Hubert. 2005. **Standard Sampling Methods for North American Freshwater Fishes**. 135th Annual Meeting of the American Fisheries Society, Anchorage, Alaska, September 11-15, 2005. CONTRIBUTED.

Archdeacon, T.P. and S.A. Bonar. 2006. Propagation of Mohave tui chub. Presented to the Arizona-New Mexico Chapter of the American Fisheries Society, Flagstaff, Arizona February 2-4, 2005. CONTRIBUTED (Poster).

Bonar, S.A., A. Iles, D.W. Willis, and W.A. Hubert 2006. Standard Sampling Methods for North American Freshwater Fishes. Presented to the Arizona-New Mexico Chapter of the American Fisheries Society, Flagstaff, Arizona. February 2-4, 2005. CONTRIBUTED.

Kline, J., S.A. Bonar, and A. Choudhury. 2006. Effects of Asian tapeworm on fishes of the Rio Yaqui basin. Presented to the Arizona-New Mexico Chapter of the American Fisheries Society, Flagstaff, Arizona, February 2-4, 2005. CONTRIBUTED.

Bonar, S.A. 2004. Can people be influenced to improve their conservation ethic towards desert fishes? Lessons from psychology and marketing. Desert Fishes Council Annual Meeting. Tucson, Arizona, November 10-14, 2004. CONTRIBUTED.

Carveth, C.J., A.W. Widmer, and S.A. Bonar. 2004. Upper lethal tolerance of Arizona's native fishes. Desert Fishes Council Annual Meeting. Tucson, Arizona, November 10-14, 2004. CONTRIBUTED.

Schultz, A.A. and S.A. Bonar. 2004. Determining effective culture temperatures for larval and juvenile Gila chub (*Gila intermedia*). Desert Fishes Council Meeting. Tucson, Arizona, November 10-14, 2004. CONTRIBUTED.

Widmer, A.M., C. J. Carveth, S.A. Bonar, and J.R. Simms. 2004. Upper thermal tolerance of loach minnow (*Tiaroga cobitis*) Desert Fishes Council Meeting. Tucson, Arizona, November 10-14, 2004. CONTRIBUTED.

Bonar, S.A., B. Bolding, M. Divens, and W. Meyer. 2003. Effects of introduced fishes on coho salmon in small Pacific Northwest lakes and implications for management. Seminar, Washington Department of Fish and Wildlife, Olympia, Washington. September 15th, 2003. CONTRIBUTED.

Bonar, S.A. 2004. A description of the new book, Standardized Sampling of North American Freshwater Fishes. Presented to the Fisheries Management Section of the 134th Annual Meeting of the American Fisheries Society, Madison, Wisconsin, August 23-26, 2004. CONTRIBUTED.

Bonar, S.A. 2004. A description of the new book, Standardized Sampling of North American Freshwater Fishes. Presented to the Education Section of the 134th Annual Meeting of the American Fisheries Society, Madison, Wisconsin, August 23-26, 2004. CONTRIBUTED.

Carveth, C. J., A. Widmer, and S.A. Bonar. 2004. Critical thermal maxima of Arizona's native and nonnative fish species: have Arizona's native fish finally reached their boiling point? Presented to the 134th Annual Meeting of the American Fisheries Society, Madison, Wisconsin, August 23-26, 2004. CONTRIBUTED.

Widmer, A., C.J. Carveth, and S.A. Bonar. 2004. A comparison of methods for measuring thermal tolerance: loach minnow and spikedace as examples. Presented to the 134th Annual Meeting of the American Fisheries Society, Madison, Wisconsin, August 23-26, 2004. CONTRIBUTED.

Leslie, L.L., C.E. Velez, and S.A. Bonar. 2003. Diet and consumption rates of introduced fishes in the Verde River, Arizona. Arizona Game and Fish Department, Statewide Research Meeting, Phoenix Arizona, December 17, 2003. INVITED.

Leslie, L.L., C.E. Velez, and S.A. Bonar. 2003. Diet and consumption rates of introduced fishes in the Verde River, Arizona. Desert Fishes Council, Annual Meeting, Death Valley, California, November 20-23, 2003. CONTRIBUTED.

Schultz, A.A., O.E. Maughan, S.A. Bonar, and W. Matter. 2003. Effect of a reservoir on downstream abundance of native and nonnative fishes in a small desert stream. Desert Fishes Council, Annual Meeting, Death Valley, California, November 20-23, 2003, Poster Presentation. CONTRIBUTED.

Schade, C.S. and S.A. Bonar. 2003. Patterns in the distribution and relative abundance of exotic fish species in the American West. Desert Fishes Council, Annual Meeting, Death Valley, California, November 20-23, 2003, Poster Presentation CONTRIBUTED.

Velez, C.E., L.L. Leslie, and S.A. Bonar. 2003. Impact of predation by nonnative fishes on native fishes in the Verde River, Arizona. Desert Fishes Council, Annual Meeting, Death Valley, California, November 20-23, 2003, Poster Presentation. CONTRIBUTED.

Widmer, A.M., C.J. Carveth, and S.A. Bonar. 2003. Lethal thermal maxima of native and nonnative fishes in the San Pedro River, Arizona. Desert Fishes Council, Annual Meeting, Death Valley, California, November 20-23, 2003. CONTRIBUTED.

Bonar, S.A., B. Bolding, M. Divens, and W. Meyer. 2003. Effects of introduced fishes on coho salmon in small Pacific Northwest lakes and implications for management. 133rd Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada, August 10-14, 2003. CONTRIBUTED.

Carveth, C.J., A.M. Widmer, and S.A. Bonar. 2003. Lethal thermal maxima of fishes in the San Pedro River, Arizona. 133rd Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada, August 10-14, 2003. CONTRIBUTED.

Flinders, J.M. and S.A. Bonar. 2003. The biology and foraging demands of northern pike in Arizona lakes and reservoirs. 133rd Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada, August 10-14, 2003. CONTRIBUTED.

Leslie, L.L., C.E. Velez, and S.A. Bonar. 2003. Diet and consumption rates of introduced fishes in the Verde River, Arizona. 133rd Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada, August 10-14, 2003 CONTRIBUTED.

Schade, C.S. and S.A. Bonar. 2003. Patterns in the distribution and relative abundance of exotic fish species in the American West. 133rd Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada, August 10-14, 2003. CONTRIBUTED.

Velez, C.E., L.L. Leslie, and S.A. Bonar. 2003. Impact of predation by nonnative fishes on native fishes in the Verde River, Arizona. 133rd Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada, August 10-14, 2003. CONTRIBUTED.

Bonar, S.A. 2003. An overview of the Arizona Cooperative Fish and Wildlife Research Unit's Fisheries Programs. Arizona Anglers Rountable, Phoenix, Arizona. July 14, 2003. INVITED.

Bonar, S.A. 2003. Capabilities of the Arizona Cooperative Research Unit. USFWS Region 2 Research Coordinators' Meeting, Albuquerque, New Mexico. May 22, 2003. INVITED.

Leslie, L.L., C.E. Velez, and S.A. Bonar. 2003. Fishes of the Verde River. Interactions among native and nonnative fishes. Center for Impacts of Urban Development in Southern Arizona's Desert Environment (CIUDAD) Annual Meeting, April 25, 2003. CONTRIBUTED.

Flinders, J.M. and S.A. Bonar. 2003. The biology and foraging demands of northern pike in Arizona lakes and reservoirs. Western Division Meeting of the American Fisheries Society, San Diego, California. April 14-17, 2003. CONTRIBUTED.

Bonar, S.A. 2003. Interactions between non-native and native aquatic species and challenges to managing recovery. USFWS Southwestern Regional Meeting. San Antonio, Texas. January 14-17, 2003. INVITED.

Bonar, S.A. and A. Didenko. 2002. Standard sampling of desert fish: recent progress, and a call for action. Desert Fishes Council, Annual Meeting San Luis Potosi, SLP, Mexico, November 14-17, 2002. CONTRIBUTED.

Bonar, S.A. and W.A. Hubert. 2002. Standard sampling of inland fish: benefits, challenges, and a call for action. 132nd Annual Meeting of the American Fisheries Society, Baltimore, Maryland, August 18-22, 2002. CONTRIBUTED.

Bonar, S.A. 2002. An overview of the Arizona Cooperative Fish and Wildlife Research Unit. USFWS Gila, Salt, Verde Watershed Ecoteam Meeting, Phoenix, Arizona, August 6, 2002. INVITED.

Bonar, S.A. 2002. An overview of the Arizona Cooperative Fish and Wildlife Research Unit. USFWS Southwest Regional Research Meeting, Albuquerque, New Mexico, May, 2002. INVITED.

Bonar, S.A., J. Flinders, O.E. Maughan, and W.J. Matter. 2002. Factors associated with razorback sucker recruitment in a small southern Arizona pond. Arizona-New Mexico American Fisheries Society, Safford, Arizona, February 7-9, 2002. CONTRIBUTED.

Bonar, S.A. and W.A. Hubert. 2002. Standard sampling of inland fish: benefits, challenges, and a call for action. Arizona-New Mexico American Fisheries Society, Safford, Arizona, February 7-9, 2002. CONTRIBUTED.

Didenko, A., S.A. Bonar, and W.J. Matter. 2002. Standard weight equations for rare desert fishes. Arizona-New Mexico American Fisheries Society, Safford, Arizona, February 7-9, 2002. CONTRIBUTED.

Flinders, J.M. and S.A. Bonar. 2002. The biology and foraging demands of northern pike in Arizona lakes and reservoirs. Arizona-New Mexico American Fisheries Society, Safford, Arizona, February 7-9, 2002. CONTRIBUTED.

Leslie, L.L., C.E. Velez, and S.A. Bonar. 2002. Fishes of the Verde River. Interactions among native and nonnative fishes. Arizona-New Mexico American Fisheries Society, Safford, Arizona, February 7-9, 2002. CONTRIBUTED.

Velez, C.E., L.L. Leslie, and S.A. Bonar. 2002. Interactions between native and nonnative fishes in the Verde River, Arizona. Annual Meeting of the New Mexico/Arizona Chapter of the American Fisheries Society, Safford, Arizona February 7-9, 2002. CONTRIBUTED.

Bonar, S.A. 2001. Relative length frequency: A simple visual technique to evaluate size structure in fish populations. 131st Annual Meeting of the American Fisheries Society, Phoenix, Arizona, August 19-23, 2001. CONTRIBUTED.

Bonar, S.A., B. Bolding, M. Divens, and W. Meyer. 2001. Effects of introduced fishes on coho salmon in small Pacific Northwest lakes and implications for management. 131st Annual Meeting of the American Fisheries Society, Phoenix, Arizona, August 19-23, 2001. CONTRIBUTED.

Schultz, A.A., O.E. Maughan, S.A. Bonar, and W.J. Matter. 2001. Effect of a reservoir on downstream abundance of native and nonnative fishes in a small desert stream. 131st Annual Meeting of the American Fisheries Society, Phoenix, Arizona, August 19-23, 2001 CONTRIBUTED.

Bonar, S.A. 2001. Relative length frequency: A simple visual technique to evaluate size structure in fish populations. Arizona Game and Fish Department Agency School. Flagstaff, Arizona, June 12-14, 2001. INVITED.

Bonar, S.A. 2001. Examining interactions between introduced fish and native aquatic species in Washington state: Implications for Southwestern aquatic ecosystems. Arizona-New Mexico American Fisheries Society, Gallup, New Mexico, February 1-3, 2001. CONTRIBUTED.

Bonar, S.A. 2001. Relative length frequency: A simple visual technique to evaluate size structure in fish populations. Arizona-New Mexico American Fisheries Society, Gallup, New Mexico, February 1-3, 2001. CONTRIBUTED.

Schultz, A.A., O.E. Maughan, S.A. Bonar, and W.J. Matter. 2001. Effect of a reservoir on downstream abundance of native and nonnative fishes in a small desert stream. Best Student Paper Award, Arizona-New Mexico American Fisheries Society, Gallup, New Mexico, February 1-3, 2001. CONTRIBUTED.

Ward, D.L. and S.A. Bonar. 2001. Effects of water temperature and cold shock on predation of flannelmouth suckers by rainbow trout. Best Student Paper - Arizona-New Mexico American Fisheries Society, Gallup, New Mexico, February 1-3, 2001. CONTRIBUTED.

Widmer, A.M., C.J. Carveth, and S.A. Bonar. 2001. Lethal thermal maxima of native and nonnative fishes in the San Pedro River, Arizona. Arizona-New Mexico American Fisheries Society, Gallup, New Mexico, February 1-3, 2001. CONTRIBUTED.

Bonar, S.A. 2000. Introduced fishes in the American West: Case histories and current research. School of Renewable Natural Resources Seminar, University of Arizona, Tucson, October, 2000. INVITED.

Bonar, S.A. 2000. Introduced fishes in the American West: Case histories and current research. Department of Zoology Seminar, University of Wyoming, Laramie, October 2000. INVITED.

Bolding, B., S.A. Bonar, and M. Divens. 1999. Use of artificial structure to enhance freshwater sportfish communities. Washington Department of Fish and Wildlife Warmwater Program Winter Workshop. Wenatchee, Washington, January 25-26, 1999. INVITED.

Bonar, S.A. 1999. Standard sampling procedures for warmwater fish populations in Washington lakes less than 300 acres. Washington Department of Fish and Wildlife Warmwater Program Winter Workshop. Wenatchee, Washington, January 25-26, 1999. INVITED.

Bonar, S.A. and M. Divens. 1999. How to use indexes to evaluate "balance" in a warmwater fish community. Washington Department of Fish and Wildlife Warmwater Program Winter Workshop. Wenatchee, Washington, January 25-26, 1999. CONTRIBUTED.

Bonar, S.A., M. Divens, B. Bolding, and W. Meyer. 1999. Recent inland fisheries research at the Washington Department of Fish and Wildlife. Washington Department of Fish and Wildlife Inland Fish Advisory Board Meeting. Olympia, Washington, January 22, 1999. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1998. An overview of the Washington Department of Fish and Wildlife Inland Fisheries Investigations Unit. Washington Department of Fish and Wildlife Commission Workshop. Olympia, Washington, November 14, 1998. INVITED.

Bonar, S.A., M. Divens, and B. Bolding. 1998. Methods for sampling the distribution and abundance of bull trout. King County Biologists Bull Trout Meeting. Seattle, Washington November 10, 1998. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1998. An overview of the Washington Department of Fish and Wildlife Inland Fisheries Investigations Unit. Washington Department of Ecology, Lakes Group Meeting. Winter, 1998. INVITED.

Bonar, S.A., B. Bolding, M. Divens, and W. Meyer. 1998. Interactions between warmwater fish and salmon in Washington state lakes. Management Implications of Co-occurring Native and Non-Native Species Workshop. Portland, Oregon, October 27-28, 1998. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1998. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. Management Implications of Co-occurring Native and Non-Native Species Workshop. Portland, Oregon. October 27-28, 1998. INVITED.

Baldwin, C., M. Polacek, and S.A. Bonar. 1998. Factors Limiting Pelagic Fish Production in Lake Roosevelt, Washington: A progress report on research. Lake Roosevelt Project Meeting. Spokane, Washington, Fall 1998 INVITED.

Bonar, S.A. 1998. Standard sampling procedures for warmwater fish populations in large Washington lakes. Washington Department of Fish and Wildlife Warmwater Program Summer Workshop. Olympia, Washington, August 20, 1998. INVITED.

Bonar, S.A., M. Divens, and B. Bolding. 1998. Methods for sampling the distribution and abundance of bull trout. *Salvelinus confluentus* Curiosity Society Annual Meeting. Rock Creek, Montana, August 4-6, 1997. INVITED.

Loch, J. and S.A. Bonar. 1998. Occurrence of Grass Carp in the Lower Columbia and Snake Rivers. Washington State Lakes Protection Association Annual Meeting. Issaquah, Washington, April 3-4, 1998 INVITED.

Divens, M. and S.A. Bonar. 1998. Trout stocking in alpine lakes: Proposed research for Washington State. Washington Department of Fish and Wildlife High Lakes Management Group. Mill Creek, Washington, April, 1998 INVITED.

Bonar, S.A., M. Divens, and B. Bolding. 1998. Methods for sampling the distribution and abundance of bull trout. North Pacific International Chapter of the American Fisheries Society General Annual Meeting. Union, Washington, March 18-20, 1998. INVITED.

Bonar, S.A., B. Bolding, M. Divens, and W. Meyer. 1998. Interactions between warmwater fish and salmon in Washington state lakes. Washington Department of Fish and Wildlife Inland Fish Advisory Board Meeting. Olympia, Washington, 1998. INVITED.

Divens, M. and S.A. Bonar. 1998. Trout stocking in alpine lakes: Proposed research for Washington State. Pacific Northwest Amphibian and Reptile Consortium. Olympia, Washington. INVITED.

Divens, M. and S.A. Bonar. 1998. Trout stocking in alpine lakes: Proposed research for Washington State. Washington Department of Fish and Wildlife Inland Fish Advisory Board Meeting. Olympia, Washington, 1998 INVITED.

Bonar, S.A., M. Divens, and B. Bolding. 1997. Methods for sampling the distribution and abundance of bull trout. Annual Meeting of the American Fisheries Society. Monterey, California, August 24-28, 1997. CONTRIBUTED.

Bonar, S.A., B. Bolding, and M. Divens. 1997. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. Western Aquatic Plant Management Society, 16th Annual Conference, Seattle, Washington, March 27-28, 1997. INVITED.

Bolding, B., S.A. Bonar, and E. Anderson. 1997. Diet of walleye in a percid-centrarchid community. North Pacific International Chapter of the American Fisheries Society General Annual Meeting. Everett, Washington. March 20, 1997. CONTRIBUTED.

Divens, M., P. James, S.A. Bonar, B. Bolding, and E. Anderson. 1997. An evaluation of proportional stock density use in Washington State. North Pacific International Chapter of the American Fisheries Society General Annual Meeting. Everett, Washington. March 20, 1997. CONTRIBUTED.

Bonar, S.A., B. Bolding, and M. Divens. 1997. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. North Pacific International Chapter of the American Fisheries Society General Annual Meeting. Everett, Washington, March 19-21, 1997. CONTRIBUTED.

Bonar, S.A., B. Bolding, and M. Divens. 1996. An overview of the Washington Department of Fish and Wildlife Inland Fisheries Investigations Unit. Washington Department of Fish and Wildlife Inland Fish Advisory Board Meeting. Coulee City, Washington, October 4, 1996. INVITED.

Bolding, B., S.A. Bonar, M. Divens, and E. Anderson. 1996. Use of walleye to manipulate size and growth rate of stunted yellow perch. Washington State Lakes Protection Association Tenth Annual Conference. Spokane, Washington, September 26-28, 1996. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1996. An overview of the Washington Department of Fish and Wildlife Inland Fisheries Investigations Unit. Washington State Lakes Protection Association Tenth Annual Conference. Spokane, Washington, September 26-28, 1996. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1996. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. American Fisheries Society Annual Conference. Dearborn, Michigan, August 25-29, 1996. CONTRIBUTED.

Bonar, S.A. 1996. Biotic factors affecting harvestable numbers of bass in Washington State. Washington Department of Fish and Wildlife Bass Management Meeting. Olympia, Washington, July 9-10, 1996. CONTRIBUTED.

Bolding, B., S.A. Bonar, and E. Anderson. 1996. Diet of walleye in a percid-centrarchid community. Pacific Fishery Biologist Annual Conference. Silverdale, Washington, March 18-20, 1996. CONTRIBUTED.

Bonar, S.A., B. Bolding, and M. Divens. 1996. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. Pacific Fishery Biologist Annual Conference. Silverdale, Washington, March 18-20, 1996. INVITED.

Divens, M., P. James, S.A. Bonar, B. Bolding, and E. Anderson. 1996. An evaluation of proportional stock density use in Washington State. Pacific Fishery Biologist Annual Conference. Silverdale, Washington, March 18-20, 1996. CONTRIBUTED.

Bolding, B., S.A. Bonar, and E. Anderson. 1996. Diet of walleye in a percid-centrarchid community. Washington Department of Fish and Wildlife Inland Fisheries Division Annual Meeting. Wenatchee, Washington. February 28-29, 1996. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1996. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. Washington Department of Fish and Wildlife Inland Fisheries Division Annual Meeting. Wenatchee, Washington, February 28-29, 1996. INVITED.

Bonar, S.A., M. Divens, and B. Bolding. 1996. Methods for sampling the distribution and abundance of bull trout. Washington Department of Fish and Wildlife Inland Fisheries Division Annual Meeting. Wenatchee, Washington, February 28-29, 1996. INVITED.

Divens, M., P. James, S.A. Bonar, B. Bolding, and E. Anderson. 1996. An evaluation of proportional stock density use in Washington State. Washington Department of Fish and Wildlife Inland Fisheries Division Annual Meeting. Wenatchee, Washington, February 28-29, 1996. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1995. An overview of the Washington Department of Fish and Wildlife Inland Fisheries Investigations Unit. Federal Aid Coordinators Annual Conference, Seattle, Washington, October 30-November 3, 1995. INVITED.

Bonar, S.A., B. Bolding, and M. Divens. 1995. Management of aquatic plants in Washington State using grass carp, *Ctenopharyngodon idella*. Effects on aquatic plants, water quality and public satisfaction, 1990-1995. Washington State Lake Protection Ninth Annual Conference. Ocean Shores, Washington, September 8-9, 1995. INVITED.

Bonar, S.A., J. Pahutski, B. Bolding, and M. Divens. 1995. Factors affecting survival and growth of channel catfish in Washington State. Annual Meeting of the American Fisheries Society. Tampa, Florida, August 27-31, 1995. CONTRIBUTED.

Bonar, S.A., B. Bolding, and M. Divens. 1995. An overview of the Washington Department of Fish and Wildlife Inland Fisheries Investigations Unit. Washington Department of Fish and Wildlife, Resource Assessment Division Seminar. Olympia, Washington, May 17, 1995. INVITED.

Bolding, B., S.A. Bonar, M. Divens, and E. Anderson. 1995. Use of walleye to manipulate size and growth rate of stunted yellow perch. Pacific Fishery Biologist Annual Conference, Poster Presentation. Newport, Oregon, March 20, 1995. CONTRIBUTED.

Bolding, B., S.A. Bonar, M. Divens, and E. Anderson. 1995. Use of walleye to manipulate size and growth rate of stunted yellow perch. Washington Department of Fish and Wildlife Inland Fisheries Division Meeting. Lacey, Washington, February 23-24, 1995 (Regional Meeting). INVITED.

Bonar, S.A., J. Pahutski, B. Bolding, and M. Divens. 1995. Factors affecting survival and growth of channel catfish in Washington State. Washington Department of Fish and Wildlife Inland Fisheries Division Meeting. Lacey, Washington, February 23-24, 1995. INVITED.

Bonar, S.A. 1994. Grass carp policy in Washington State. Grass Carp Symposium. Gainesville, Florida, March 7-9, 1994. INVITED.

Bonar, S.A., G.B. Pauley, G.L. Thomas, J.D. Frodge, D.A. Marino, S.L. Thiesfeld, S. Vecht, K.L. Bowers, and H. Sehgal. 1994. Use of grass carp for aquatic plant control in the Pacific Northwest: Case histories and current research. Grass Carp Symposium. Gainesville, Florida, March 7-9, 1994. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1994. An empirical approach to grass carp stocking rates. Grass Carp Symposium. Gainesville, Florida, March 7-9, 1994. INVITED.

Bolding, B., S.A. Bonar, M. Divens, and E. Anderson. 1994. Use of walleye to manipulate size and growth rate of stunted yellow perch. 1994 Annual General Meeting, North Pacific International Chapter of the American Fisheries Society. Wenatchee, Washington, February 10, 1994. INVITED.

Bonar, S.A., B. Bolding, D. Fletcher, and W. Zook. 1994. Warmwater fish communities in Washington lakes: Assessment and implications for management. Annual General Meeting, North Pacific International Chapter of the American Fisheries Society. Wenatchee, Washington, February 10, 1994. CONTRIBUTED.

Bonar, S.A. 1993. An overview of Washington Department of Wildlife warmwater fisheries research. Warmwater Fisheries Shortcourse. Auburn University, Auburn, Alabama, May 18-21, 1993. INVITED.

Bonar, S.A. 1993. An overview of Washington Department of Wildlife warmwater fisheries research. Washington Department of Wildlife Annual Biologists Meeting. Yelm, Washington, February 16-19, 1993. INVITED.

Bonar, S.A. 1992. Comparison of limnological requirements for warmwater and coldwater fish. Washington State Lakes Protection Association Sixth Annual Conference. Spokane, Washington, September 10-12, 1992. INVITED.

Bonar, S.A., G.B. Pauley, G.L. Thomas, J.D. Frodge, D.A. Marino, S.L. Thiesfeld, S. Vecht, K.L. Bowers, and H. Sehgal. 1992. Use of grass carp for aquatic plant control in the Pacific Northwest: Case histories and current research. Washington State Lakes Protection Association Sixth Annual Conference. Spokane, Washington, September 10-12, 1992. INVITED.

Bonar, S.A., G.B. Pauley, and G.L. Thomas. 1991. Effect of aquatic plant tissue composition, fish size, circadian rhythm, and disturbance on the feeding preference and consumption rate of triploid grass carp. Annual Meeting of the Western Aquatic Plant Management Society. Seattle, Washington, March 14-15, 1991. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1991. Recent advances on an interactive data-base model to predict grass carp stocking rates for aquatic plant control. Annual Meeting of the Western Aquatic Plant Management Society. Seattle, Washington, March 14-15, 1991. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1990. Recent advances on an interactive data-base model to predict grass carp stocking rates for aquatic plant control. Annual Meeting of the American Fisheries Society. Pittsburgh, Pennsylvania, August 26-30, 1990. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1989. An interactive data-base model to predict grass carp stocking rates for aquatic plant control. Annual Meeting of the American Fisheries Society. Anchorage, Alaska, September 4-8, 1989. CONTRIBUTED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and R.W. Martin. 1989. Use of ultrasonic imaging for rapid, non-lethal determination of the sex and maturity of pacific herring (*Clupea harengus pallasi*). North Pacific International Chapter Meeting of the American Fisheries Society. New Westminster, British Columbia, March 7-8, 1989. CONTRIBUTED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1988. Determination of stocking densities for triploid grass carp for the Pacific Northwest. Annual USFWS Workshop (Seattle Area). Port Townsend, Washington, August 10, 1988. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1987. Determination of stocking densities for triploid grass carp for the Pacific Northwest. Annual Washington State Department of Game. Fisheries Biologist Meeting, Port Townsend, Washington, June 15, 1987. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1987. Determination of stocking densities for triploid grass carp for the Pacific Northwest. Northwest Scientific Association 60th Annual Meeting. March 26-28, 1987. CONTRIBUTED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1987. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. Annual Washington State Department of Game Fisheries Biologist Meeting. Port Townsend, Washington, March 3-5, 1987. INVITED.

Thomas, G.L., S.L. Thiesfeld, and S.A. Bonar. 1987. Hydroacoustic quantification of fish habitat in lakes infested with aquatic macrophytes. International Symposium on Fisheries Acoustics. Seattle, Washington 1987 CONTRIBUTED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1986. Determination of stocking densities for triploid grass carp for the Pacific Northwest. North American Lake Management Meeting. Portland, Oregon, November 3-7, 1986. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1986. Determination of stocking densities for triploid grass carp for the Pacific Northwest. 21st Annual Meeting of the Aquatic Plant Control Program. Mobile, Alabama, November, 1986. INVITED.

Bonar, S.A., G.L. Thomas, and G.B. Pauley. 1986. Estimation of triploid white amur stocking densities for aquatic plant control for Devils Lake, Oregon. 21st Annual Meeting, Aquatic Plant Control Research Program. Mobile, Alabama, November 1986. INVITED.

Pauley, G.B., G.L. Thomas, S.L. Thiesfeld, S.A. Bonar, and K.L. Bowers. 1986. An overview of the use of triploid grass carp (*Ctenopharyngodon idella*) as a biological control of aquatic macrophytes in Devils Lake, Oregon. 21st Annual Meeting of the Aquatic Plant Control Research Program. Mobile, Alabama, November 1986. INVITED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1985. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. Annual American Fisheries Society Meeting. Sun Valley, Idaho, September 13-18, 1985 (National Meeting). Poster Session. CONTRIBUTED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1985. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. Aquatic Plant Management Society Meeting. Vancouver, British Columbia, July 21-24, 1985. CONTRIBUTED.

Pauley, G.B., G.L. Thomas, S.A. Bonar, and A. Unthank. 1985. An overview of the use of triploid grass carp (*Ctenopharyngodon idella*) as a biological control of aquatic macrophytes in Washington State. Aquatic Plant Management Society Meeting. Vancouver, British Columbia, July 21-24, 1985. CONTRIBUTED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1985. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. North Pacific International Chapter Meeting of the American Fisheries Society. Port Angeles, Washington, March 25-27, 1985. CONTRIBUTED.

Pauley, G.B., G.L. Thomas, S.A. Bonar, and A. Unthank. 1985. An overview of the use of triploid grass carp (*Ctenopharyngodon idella*) as a biological control of aquatic macrophytes in Washington State. North Pacific International Chapter Meeting of the American Fisheries Society. Port Angeles, Washington, March 25-27, 1985 CONTRIBUTED.

Pauley, G.B., G.L. Thomas, S.A. Bonar, and A. Unthank. 1985. An overview of the use of triploid grass carp (*Ctenopharyngodon idella*) as a biological control of aquatic macrophytes in Washington State. Annual Washington State Department of Game Fisheries Biologist Meeting. Lake Flora, Washington, February 25-27, 1985. INVITED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1985. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. Annual Washington State Department of Game Fisheries Biologist Meeting. Lake Flora, Washington, February 25-27, 1985. INVITED.

Pauley, G.B., G.L. Thomas, S.A. Bonar, and A. Unthank. 1985. An overview of the use of triploid grass carp (*Ctenopharyngodon idella*) as a biological control of aquatic macrophytes in Washington State. Annual Weed Science Society of America Meeting. Seattle, Washington, February 6-8, 1985 INVITED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1985. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. Annual Weed Science Society of America Meeting. Seattle, Washington, February 6-8, 1985. INVITED.

Bonar, S.A., G.L. Thomas, G.B. Pauley, and A. Unthank. 1984. Evaluation of ploidy separation techniques with the grass carp (*Ctenopharyngodon idella*), a potential biological control of aquatic macrophytes in Washington State. 19th Annual Meeting of the Aquatic Plant Control Research Program. Galveston, Texas, November 27-29, 1984. INVITED.

Pauley, G.B., G.L. Thomas, S.A. Bonar, and A. Unthank. 1984. An overview of the use of triploid grass carp (*Ctenopharyngodon idella*) as a biological control of aquatic macrophytes in Washington State. 19th Annual Meeting of the Aquatic Plant Control Research Program. Galveston, Texas, November 27-29, 1984. INVITED.

c. RENDERING SCIENTIFIC JUDGMENT

- **Reviewer** - Asked to review articles for the *Canadian Journal of Fisheries and Aquatic Sciences, Environmental Biology of Fishes, Western North American Naturalist, Journal of Aquatic Plant Management, Transactions of the American Fisheries Society, Journal of Fish Biology, North American Journal of Fisheries Management, Fisheries Management and Ecology, Northwest Science, and Great Basin Naturalist.*

- **National American Fisheries Society Book Editorial Advisory Board** – Member-May 2002 to present. Board function is to recommend which books the American Fisheries Society publishes.

- **Desert Fish Scientific Advisor. U.S. Forest Service In-Stream Flow Legal Team**, U.S. Forest Service, Arizona Game and Fish Department, (January 2008 - Present). Provides advice on in-stream flow requirements for imperiled native fishes for court cases, mainly those concerned with mining activities near desert streams.

- **Desert Fish Scientific Advisor. U.S. Department of Justice and Bureau of Land Management Legal Team,** U.S. DOJ, BLM, (March 2013 – Present). Provides advice and testimony on in-stream flow requirements for imperiled native fishes for

court cases. Testified on stand in Superior Court, Maricopa County, on the importance of conserving streamflow from diversion by mining interests.

- **Desert Fishes Conservation Team** – Arizona Game and Fish Department – Makes recommendations to AGFD Management on Desert Fish activities statewide. Coordinates activities with other agencies. Member March 2003 to present.

- **Devils Hole Pupfish Recovery Team** – Asked to provide input to Devils Hole Pupfish recovery, U.S. Fish and Wildlife Service/National Park Service. (Critically endangered, 35 - 120 individual fish now in existence, fish subject of U.S. Supreme Court Decision on water rights)

- **Moapa Dace Recovery Team** – Asked to provide input to Moapa Dace recovery, U.S. Fish and Wildlife Service. (Critically endangered, 500-1000 individual fish in existence). Propagation research from our team doubled the number of fishes in existence.

- **Mohave Tui Chub Recovery Team** – U.S. Fish and Wildlife Service/National Park Service. Part of a team recommending recovery actions for the endangered Mohave Tui Chub of the Mohave Desert, California. (Critically endangered, three populations exist in the world).

- **USGS Research Grade Evaluation Panel**, San Antonio Texas, February 9, 2006

d. LECTURESHIPS AND OTHER ACADEMIC SERVICE

I served as major professor for the following graduate students and post-docs who graduated or were employed at the University of Arizona:

- **Brizendine, Morgan E.** *Use of ultrasonic imaging to evaluate egg maturation of humpback chub Gila cypha.* Master's Thesis, University of Arizona, Tucson. Spring 2016. Currently employed as a fish biologist by the U.S. Fish and Wildlife Service, San Marcos, Texas.

- **Perez, Christina R.** *Relationship between American Fisheries Society standard fish sampling techniques and environmental DNA (eDNA) for characterizing fish presence, relative abundance, biomass and species composition in Arizona standing waters.* Master's Thesis, University of Arizona, Tucson, Spring 2016. Currently employed as a fish biologist, U.S. Fish and Wildlife Service, Lodi, California.

- **Ulibarri, Roy M.** *Habitat Suitability Criteria for Zuni Bluehead Sucker Catostomus discobolus yarrowi and Navajo Nation Genetic Subunit Bluehead Sucker Catostomus discobolus and Comparison of AFS standard snorkeling techniques to eDNA sampling techniques*. Master's Thesis. University of Arizona, Tucson, Spring 2016. Currently employed as a fish biologist, U.S. Fish and Wildlife Service, Houston, Texas.

- **Feuerbacher, Olin.** *Development of methods and technologies for captive propagation of Devils Hole Pupfish*. MS Thesis, University of Arizona, Tucson, Fall 2015. Currently employed as lead aquarist, USFWS Ash Meadows National Wildlife Refuge, Nevada-California.

- **Svancara, Colleen M.** *Human dimensions of endangered species conservation: Southwestern ranchers' concerns about jaguar (Panthera onca) critical habitat designation and interest in conservation incentives*. MS. Thesis, University of Arizona, Tucson, AZ. 2015. Currently applying for positions.

- **Ruggirello, Jack E**. *Spawning Ecology and Captive Husbandry of Endangered Moapa Dace.* MS. Thesis, University of Arizona, Tucson, AZ. Fall 2014. Employed with USFS Tongass National Forest Alaska, Deceased, 2016.

- **Kuzmenko, Yuliya**. *Mechanical suppression of Northern Pike Esox Lucius populations in small Arizona reservoirs.* Post-Doctoral Researcher, University of Arizona, Tucson, 2007 – 2009. Currently employed as a fish biologist at the University of British Columbia, Vancouver.

- **Mercado-Silva, Norman**. *Habitat use by desert fishes.* Post-Doctoral, University of Arizona, Tucson. 2008 - 2011. Hired as a Professor, Centro de Investigación en Biodiversidad y Conservación (CIByC),Universidad Autónoma del Estado de Morelos, Cuernavaca, Morelos, México.

- **Chaudoin, Ambre L.** *Video and visual surveys of spawning in Devils Hole pupfish Cyprinodon diabolis.* MS. Thesis, University of Arizona, Tucson Spring 2014. Currently employed as a fisheries biologist with the National Park Service, Death Valley, California.

- **Clark Barkalow, Stephani L.** *Effects of suspended sediment exposure on Yaqui chub Gila purpurea.* MS. Thesis, University of Arizona, Tucson, Spring 2014. Currently employed as a fisheries biologist at American Southwest Ichthyological Researchers, L.L.C. Albuquerque, New Mexico.

- **Petre, Sally J.** *Habitat suitability criteria for Apache trout Oncorhynchus gilae apache and virile crayfish Orconectes virilis.* MS. Thesis, University of Arizona, Tucson, Spring 2014. Currently employed as a regional fisheries biologist at Arizona Game and Fish Department, Pinetop, Arizona.

- **Price, Joy E.** *Potential methods to cool streams containing Apache trout in the White Mountains of Arizona and implications for climate change.* MS. Thesis, University of Arizona, Tucson Spring, 2013. Currently employed as a lecturer at local community colleges, Sierra Vista, Arizona.

- **Recsetar, Matthew S.** *Thermal tolerance of Apache trout at various life stages*. MS. Thesis, University of Arizona, Tucson, Spring 2011. Employed as an Extension Aquaculture Specialist at University of Arkansas at Pine Bluff, now enrolled in a Ph.D. program in aquaculture.

- **Mapula, Justin A.** *Relationship between food type and growth and survival of larval hybrid Devils Hole pupfish*. MS. Thesis, University of Arizona, Tucson, Fall 2011. Currently employed as a U.S. Forest Service biologist in Shasta, California.

- **Sontz, Erica A.** *Spawning and culture of headwater chub (Gila nigra) and roundtail chub (Gila robusta).* MS. Thesis, University of Arizona, Tucson Fall 2010. Currently employed with the University of Arizona Animal Care and Use Facility.

- **Schultz, Andrew A.** *Selected aspects of the natural history and culture of Gila chub.* Ph.D. Dissertation. Spring 2009. Currently employed as a fisheries research biologist with the U.S. Bureau of Reclamation in Byron, California.

- **Archdeacon, Thomas P.** *Effects of Asian tapeworm, mosquitofish, and food ration on growth and survival of Mohave tui chub.* MS. Thesis, University of Arizona, Tucson Spring 2007. Currently employed as a fish biologist with the U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

- **Carveth, Cori.** *A comparison of the upper thermal tolerance of native and nonnative fish species in Arizona*. M.S. Student. Spring 2005. Currently employed as a fisheries manager with the Ontario Ministry of the Environment.

- **Didenko, Alexander.** *Development of standard weight (Ws) equations for roundtail chub, flannelmouth sucker, razorback sucker, and humpback chub.* M.S. Thesis, University of Arizona, Tucson. Spring 2002. Currently employed at the Institute of Fisheries of the Ukrainian Academy of Agrarian Sciences in Kiev, Ukraine as a research fisheries biologist.

- **Kline, S. Jason**. *Effects of Asian tapeworm (Bothriocephalus acheilognathi) exposure on growth and mortality of Yaqui chub (Gila purpurea) and Yaqui topminnow (Poeciliopsis occidentalis sonoriensis).* M.S. Thesis, University of Arizona, Tucson, Spring 2007. Currently employed as a biologist with the Arizona Game and Fish Department, Tucson Arizona.

- **Flinders, Jon.** *Biology and foraging demands of northern pike in three Arizona reservoirs and their distribution and status in the southwestern United States*. M.S. Thesis, University of Arizona, Tucson. Fall/Winter 2003-4. Currently a fisheries biologist with the Idaho Department of Fish and Game.

- **Leslie, Laura.** *Diet and consumption rates of nonnative fishes in the Verde River, Arizona*. M.S. Thesis, University of Arizona, Tucson. Summer 2003.Currently employed as a fish biologist with the Wyoming Game and Fish Department in Cody, Wyoming.

- **Rogers, Scott.** *Spawning and recruitment of flannelmouth suckers in the tailwater to Glen Canyon Dam, Colorado River, Arizona*. M.S. Thesis, University of Arizona, Tucson. Spring 2003.Currently employed as a Regional Fisheries Biologist by the Arizona Game and Fish Department in Flagstaff, Arizona.

- **Rogowski, David.** *Optimizing methods to control nuisance northern crayfish, Orconectes virilis in Arizona*. Post-Doctoral, University of Arizona, Tucson. 2007-2008. Hired as an Assistant Professor of Fisheries at Texas Tech University, Lubbock, Texas.

- **Schade, Charles.** *Factors associated with the distribution and abundance of non-native fishes in streams of the American West*. M.S. Thesis, University of Arizona, Tucson. Fall 2003. Currently employed as a biologist with the USFWS in Ventura, California.

- **Velez, Cristina.** *Impact of nonnative fish predation on native fishes in the Verde River, Arizona.* M.S. Thesis, University of Arizona, Tucson Spring, 2004. Currently employed as Research Station Manager, Cuatro Cienegas Research Station, Cuatro Cienegas, Coahilla, Mexico.

- **Ward, David.** *Effects of reduced water temperature on swimming performance and predation vulnerability of age-0 flannelmouth sucker*, M. S. Thesis, University of Arizona, Tucson. Summer 2001. Currently employed as a Grand Canyon Fisheries Research Biologist by the USGS Grand Canyon Monitoring and Research Center, Flagstaff, Arizona.

- **Widmer, Ann.** *Upper temperature tolerance of loach minnow under acute, chronic, and fluctuating thermal regimes*. M.S. Student. Fall 2004. Currently employed as an environmental consultant in Denver, Colorado.

I am the major professor of the following students who are currently in the program at the University of Arizona:

- **Larissa Lee** – MS
- **Zachary Nemec** – MS
- **Taylor Ulrich** - MS

I have also served on the graduate committees of eight MS and three Ph.D. students.

Teaching Service

- Taught Advanced Inland Fisheries Management, Wildlife and Fisheries Science 515, University of Arizona. Responsible for lectures, field trips, testing and special projects. Alternate years, starting Spring 2002. Combine and co-teach with Fisheries Management until 2014.

- Teach Fisheries Management Wildlife and Fisheries Science 455L and Fisheries Management Laboratory Wildlife and Fisheries Science 455R. Lead teaching responsibilities for the course and lab 2016- present.

- Teach the graduate course Biopolitics (Renamed Communication in Conservation), Wildlife and Fisheries Science 595a, University of Arizona. Responsible for lectures, coordinating speakers, testing and special projects. Alternate years, starting Spring 2001.

- Lectured in many undergraduate and graduate courses. These include: Wildlife Conservation and Society WFSC 225, Principles of Research RNR 546, Conservation Biology ECOL 406R, Adaptation to Climate Change: Perspectives at the Nexus of Science, Society, and Resource Management RNR 440/540, Wildlife Management RNR 444, Introduction to Wildlife Fire RNR 355, Introduction to Wildlife Conservation WFSC 125 at the University of Arizona; Fisheries 101, Fisheries 367, and Civil Engineering 555 at the University of Washington, Schools of Engineering and Fisheries; Warmwater Fisheries Management Short Course, Auburn University, Auburn, Alabama, Wildlife Management Class, University of Idaho.

- Invited Seminar, ON TRIAL: Biologists views of serving as expert witnesses, September, 2016, University of Arizona Law School Seminar Series.

- Invited Seminar, On trial! Biologists' views of serving as expert witnesses, January 27, 2016. University of Arizona School of Natural Resources and the Environment Seminar Series.

- Invited Seminar, Conservation professional's guide to working with people. February, 2016, University of Idaho Department of Fish and Wildlife Sciences Seminar Series, Moscow, Idaho.

- Taught Independent Study, RNR 599 for international Ph.D. student on subject of North American Fisheries Management. Fall, 2012.

- Invited Seminar, The rarest fish in the world. Desert fish management and recovery. University of Arizona, April 2008.

- Seminar, How to persuade people – Lessons from psychology and marketing for the fish and wildlife biologist. US Fish and Wildlife Service Headquarters, Arlington, Virginia, December 2007.

- Seminar, Conservation Seminar Series, The conservation professional's guide to working with people. Fall, 2007.

- Co-Taught, Fish and Wildlife Ecology, Wildlife and Fisheries Sciences 696a, University of Arizona. Discussion and readings course on subjects in aquatic ecology and management. Responsible for assigning topics, grading and co-leading class discussions. Spring 2004.

- Before 2003 - The researcher presented several seminars on western fisheries subjects at the University of Wyoming, Laramie, the University of Washington, Seattle and at the University of Arizona, Tucson.

- Co-Taught Recreational Fisheries, Fisheries 367, University of Washington, School of Fisheries, 1994. Taught sections on management and biology of warm water fisheries; aquatic ecology, and limnology in other years. Prepared lesson plans, prepared and graded tests, prepared laboratory material.

- Advised many other undergraduate and graduate students from the University of Washington, Washington State University, Central Washington University and the University of Arizona on research design and techniques.

- Supervised student interns on Washington Department of Fish and Wildlife research projects from The Evergreen State University and Peninsula College. Supervised many student volunteers on WDFW projects from the University of Washington, Washington State University, Peninsula College and Central Washington University.

- Served as Teaching Assistant, Fisheries 367, Recreational Fisheries, University of Washington, 1984. Assisted professors with preparation of lecture materials, field trip logistics and grading of tests and homework assignments for an upper division fisheries class of approximately 40 individuals.

Other academic service:

- Faculty Co-Supervisor of the Doris Duke Conservation Scholars Program 2012-Present. This program supports 3-6 Undergraduate Students from underrepresented groups in an intense training program on Wildlife and Fisheries Topics. The researcher works with UA Supervisor and National Program Coordinator to pair students with graduate students mentors and provide learning experiences in Wildlife and Fisheries.

- Faculty Advisor of the University of Arizona American Fisheries Society Subunit 2006- present. Helps with fisheries activities of the Wildlife and Fisheries Organization on Campus. Helped students with organization of the 2012 Western Division AFS Student Colloquium in Tucson which invited fisheries students across the western United States to meet in Tucson for three days to see desert fish communities and give talks on their areas of research. Led field trip to see desert fish communities in nearby wilderness.

- Faculty supervisor of the Minority Student Training Program at the University of Arizona's School of Natural Resources. 2000 – 2006. This program supports up to 12 graduate and undergraduate minority students with an interest in natural resources. It pays 2 graduate stipends and for undergraduate internships with University faculty and graduate students, and government agencies. The researcher works with the Minority Student Training Program Coordinator (a Ph.D. student) to mentor students, help find them internship experience, and help them with employment during graduation. In 2006, I asked assistant unit leader to lead program.

- The researcher serve(d) on the Laboratory, Policy (elected by faculty), Awards and Recruitment Committees for the School of Renewable Natural Resources at the University of Arizona. 2000-present.

e. TECHNICAL TRAINING PROVIDED

- Bonar, S. A., *Essential, Practical Communication Skills for Natural Resource Professionals.* Arizona Game and Fish Department, Phoenix, Arizona, April 2016 (Invited Workshop).

- Bonar, S. A., *AFS Standard Methods for Sampling and Comparing Your Data with North American Standards*. 73rd Midwest Fish and Wildlife Conference, Wichita, Kansas December 9 – 12, 2012 (Invited Workshop).

- Bonar, S. A., *The Conservation Professional's Guide to Working with People*. The 45th annual meeting of the Montana Chapter of the American Fisheries Society. Helena Montana, 6 – 10 February 2012 (Invited Workshop).

- Bonar, S. A., *The Conservation Professional's Guide to Working with People*. Texas Parks and Wildlife, Inland Fisheries Biologists Annual Meeting, Fredricksburg, Texas, August 2008 (Invited Workshop).

- Bonar, S. A., *The Conservation Professional's Guide to Working with People*. Arizona Game and Fish Department Agency School, Flagstaff, Arizona, June 2008 (Invited Workshop).

- Bonar, S. A., *Biology of Aquatic Weeds: Fish and Plant Interactions.* University of California Davis Aquatic Weed School, Davis, California. November 2007 (Invited Short Course).

- Bonar, S.A., *The Conservation Professional's Guide to Working with People*. U.S. Fish and Wildlife Service, Arlington, Virginia, November 2007 (Invited Workshop).

- Bonar, S.A., *The Conservation Professional's Guide to Working with People*, American Fisheries Society 137th Annual Meeting, San Francisco, California. September 2-6, 2007 (Contributed Workshop).

- Bonar, S.A., *Use of Grass Carp for Aquatic Plant Control.* Portland State University, Aquatic Plant Control School. Portland, Oregon, September 2004 (Invited Short Course).

- Bonar, S.A. *Aquatic Plants – Fish Interactions*. Portland State University, Aquatic Plant Control School. Portland, Oregon, September 2004 (Invited Short Course).

- Bonar, S.A., *Biopolitics.* Arizona Game and Fish Department Agency School. Flagstaff, Arizona. June 2003 (Invited Short Course).

- Bonar, S.A., *Standard Sampling Techniques for Fish Surveys.* Arizona Game and Fish Department Agency School. Flagstaff, Arizona. June 2001 (Invited Short Course).

f. SPECIAL ASSIGNMENTS.

See under 13 for information about assignment to work with scientists in the Ukraine on piscivore management.

g. OTHER TECHNICAL ACTIVITIES

I regularly consult for and exchange information with government agencies, primarily Arizona Game and Fish Department, Nevada Department of Wildlife, many other state agencies, U.S. Fish and Wildlife Service, U.S. Forest Service, Bureau of Land Management, Bureau of Reclamation and National Park Service biologists on fish sampling techniques and desert fish management. The nature of the position requires me to consult closely with management biologists to conduct research critical to management interests. I provide technical support to Arizona Game and Fish Department biologists and managers on standard sampling protocols, native-nonnative fish interactions and management, habitat management and native fish propagation techniques. Technical support is being used by the Agency to develop management plans, sampling protocols and policies. Information on the life history, flow requirements and temperature tolerances of Arizona fishes is being provided to the Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Forest Service and U.S. Department of Justice for use in court cases to protect water levels in desert rivers. Technical advice on introduced

species (Asian tapeworm, and nonnative sportfish) has been provided to managers with the U.S. Fish and Wildlife, the Utah Division of Wildlife, the Arizona Game and Fish Department, the Nevada Department of Wildlife, California Fish and Game, the National Park Service, the USGS to aid in management strategies. I provide technical advice on endangered desert fish ecology, management and captive breeding to the U.S. Fish and Wildlife Service, the National Park Service, Nevada Division of Wildlife, and Southern Nevada Water Authority. I provided technical support to the Washington Department of Fish and Wildlife and the Washington Department of Ecology on grass carp management and biology, native fish management, the management of warmwater fishes and introduced fish/native fish interactions, and standard sampling protocols for lake and pond fishes and bull trout. Technical support on the interactions between salmon and introduced fishes was provided to managers from the Provincial Government of British Columbia, Canada to protect rivers and lakes in that province from private stockings of introduced sportfishes.

I have been asked to give workshops on standard fisheries sampling and communications techniques to USGS, USFWS, Texas, Montana, Arizona and Kansas state biologists and international biologists in Europe.

In addition to working with government agencies on fisheries issues, I have also provided technical information to private organizations. For example, I was a regular contributor to Bass Angler's Sportsmen Society newsletters, discussing angling regulations and the dangers of illegally introducing nonnative fish. I consult with Trout Unlimited on issues regarding the protection of Apache Trout in the White Mountains, Arizona. I consult with biologists and managers of the Salt River Project (Hydroelectric and Irrigation), Arizona on managing Arizona Rivers for native fish enhancement. I work with Pima County on management and education about fishes in local streams. I regularly met with lake management groups to discuss small lake fishery management, and the use of grass carp to control aquatic plants.

(15) TECHNOLOGY AND INFORMATION TRANSFER AND DISSEMINATION

Developed the Following Educational Videos about Aquatic Environments in the Desert. I have worked closely with videographers at the University of Arizona, and have also learned and further developed underwater HD video techniques. This has resulted in the following presentations:

> **Streams of Mt. Graham.** Coop students and I produced and filmed this video about threatened Gila Trout and Apache Trout that inhabit the isolated streams of Mt. Graham. Describes fish and aquatic life behavior, and what management agencies are doing to protect these unique ecosystems. Includes extensive underwater footage. Slated to be shown at the U.S. Forest Service Columbine Visitor Center on Mt Graham. This won the best video award at the School of Natural Resources and the Environment, University of Arizona.

Tips for Keeping Safe – Even Enjoying – Desert Flash Floods. Produced and filmed by S. A. Bonar. I filmed flash floods occurring in slot canyons and broad canyons in Arizona, and produced a short film to provide safety tips to researchers who are working in areas where flash floods may occur. This film is shown to coop students who will be working in flood environments.

Sabino Canyon Underwater. Coop student and I produced and filmed this video about the habits of endangered Gila Chub living in Sabino Canyon, Arizona. Sabino Canyon is one of the most popular tourist attractions in Tucson, and our high-definition film has shown continuously in the U.S. Forest Service Sabino Canyon Visitor Center on a large-screen TV for over two years.

Fish of the Nevada Deserts. Traveled with students, film production crews from UA multimedia, and biologists from the U.S. Fish and Wildlife Service and Nevada Department of Wildlife to film the spring and creek systems and the accompanying rare fishes found within. Served as principal investigator and an underwater videographer. MS Draft of film completed, and MS student is now testing different versions of the film to see which people respond to best.

Devils Hole Pupfish Video Connection – Ash Meadows Fish Conservation Facility to U.S. Fish and Wildlife Service, Ash Meadows National Wildlife Refuge Visitors Center. As part of the "Fish of the Nevada Deserts" project, arranged for electronic experts to connect a video feed from the AMFCF, where Devils Hole pupfish are being captively-bred to the nearby USFWS visitor center, so visitors can see real time activity at the center.

Fishes of the Navajo Nation. UA Students working on Navajo Nation provided underwater video clips to Nation of native fishes found in their streams.

Other short video clips presented on YouTube and sent to researchers: Freshwater fish of Korea (underwater clips sent to Korean Inland Fisheries Institute); Underwater Loch Ness, Scotland; Freshwater fishes of Dominica; Lesser Antillies; Sunfish Nests in an Indiana Lake; Sockdolager Rapids in the Grand Canyon.

Developed North American Standard Database on Fish Growth, Condition, Catch per Effort and Length Frequency. As part of a three-person team, I obtained over 4000 data sets from 42 states and Canadian provinces and developed ranges and means (rangewide and by ecoregion) of common fisheries indices for North America. Comparison with these indices can be used to help evaluate the health of a fish population. These data were presented in *Standard Methods for Sampling Freshwater Fishes in North America.*

Developed http://fisheriesstandardsampling.org: A simple web-based tool to analyze standard fish data. I led a team of three programmers to develop an on-line web-accessible tool to compare fish growth, condition, length-frequency, and catch per unit effort data collected using AFS standard methods with a simple click of a button. This tool continues to build on itself, and calculates new, updated summaries when new data is entered, similar to Wikipedia. Development of this tool was a collaborative effort among the American Fisheries Society, the US Geological Survey, the National Park Service, the U.S. Forest Service, the University of Arizona, the University of Guadalajara, and others. This web-based tool (1) provides on-line summaries of more than 4000 data sets of condition, length-frequency, CPUE and growth indices of common freshwater fishes, collected using standard gears from 42 states and provinces across North America; (2) allows easy entry of new data collected using standardized methods, so summaries can be rapidly updated; and (3) allows users to quickly compare condition, growth and abundance of fish collected in a particular water body with regional (continent, ecoregion and state) and rangewide averages and percentiles, thus increasing resource information for a variety of areas. The site was programmed in a PHP-based Drupal framework and was invited for demonstration at the AFS Annual Meeting in Minneapolis, and at workshops and symposia at the AFS Division Meetings in the South and Midwest. It will be the subject of a workshop at the AFS Annual Meeting in Little Rock this September.

Developed Arizona Cooperative Fish and Wildlife Research Unit Web Page. I worked with other members of the USGS Arizona Cooperative Fish and Wildlife Research Unit to develop a home page of the unit's activities and purpose.

Provided Informal Learning Opportunities for Volunteers. My graduate students enlisted the help of over 300 volunteers on USGS Arizona Coop Unit aquatic projects. These volunteers have included media representatives, management officials of state and federal agencies, representatives of various outdoor sports groups (angling groups) and conservation organizations (Sierra Club). My students used their experience to write an article in *Fisheries* on volunteer management techniques.

Visited Schools to Interest Students in Fisheries. I have given presentations to many public school classes on desert fish biology and general fish biology and management. Demonstrated electrofishing techniques to students in Pima County outdoors conservation program.

Rescued Endangered Fishes During the Aspen Wildfire. My lab and I aided the USFWS, the Arizona Game and Fish Department, and the USFS to rescue a population of endangered fishes from the advancing Aspen Wildfire in Sabino Canyon, Arizona. We helped capture fish in advance of the fire, and held them while habitat was restored. This project was featured on CBS, and many local TV news stations. Several newspaper articles on this project appeared throughout the Southwest.

Media Interviews and Press Releases. My research and/or that of my graduate students has been featured in the Seattle Times, Los Angeles Times, Las Vegas Sun, several Seattle TV stations, the Bremerton (WA) Sun, and Arizona newspapers. It has been used in the development of the Arizona Game and Fish Department's TV program, *The Desert Speaks*. My research has also been featured in Arizona Game and Fish Department instructional videos.

The following news articles, press releases and television interviews have appeared about research and activities in which I was involved.

1. Pupfish's 'Tsunami' struggle captured on video for first time. Thaindian News and Asian News International, 5/12/2010.
2. Video Captures Pupfish Struggling During Earthquake. Discovery News, 5/12/2010. *Tsunami in Devils Hole captured on videography project of my graduate student.*
3. Caught on tape: Mexican quake causes mini-tsunami in Nevada desert, 5/11/2010. Tucson News Now, KOLD and KMSB news.
4. UA 'Tsunami' Video Sheds Light on Struggling Pupfish. UA News, 5/10/2010. *Describes first time earthquake in Devils Hole was captured by video (by one of my graduate students), and its effect on pupfish.*
5. Devil's Hole pupfish surf through a mini tsunami. Los Angeles Times, 4/27/2010.
6. People skills for the conservation professional. Cagan H. Sekercioglu. Ecology 89(3)882-883., March 2008. *Describes and reviews my book, "The conservation professional's guide to working with people"*.
7. Book Review: The conservation professional's guide to working with people. Jeffery V. Yule. Quarterly Review of Biology. March, 2008. *Describes and reviews my book, "The conservation professional's guide to working with people".*
8. New Books: The conservation professional's guide to working with people. Fish Soup. 38(3), Fall 2007. AZ-NM Chapter, American Fisheries Society Newsletter. *Describes and reviews my book, "The conservation professional's guide to working with people".*
9. Environmentalists should learn to work well with people, book argues. Anne W. Howard, The Chronicle of Philanthropy, Pg. 56 Vol. 19 No. 23. 9/20/2007. *Describes and reviews my book, "The conservation professional's guide to working with people".*
10. Conservation news you can use. Journal of Soil and Water Conservation/Aug 2007. *Describes and reviews my book, "The conservation professional's guide to working with people".*
11. Book Review: The conservation professional's guide to working with people, by Scott Bonar. Wendy Rash. Runoff. California-Nevada Chapter Newsletter of the Soil and Water Conservation Society. Summer 2007. *Describes and reviews my book, "The conservation professional's guide to working with people".*
12. The conservation professional's guide to working with people. John Cangany, Island Press Release 5/16/2007. *Describes my book, "The conservation professional's guide to working with people".*

13. Coalition hopes to reduce non-native fish in Nevada streams. Steve Timko, Reno Gazette-Journal (NV), 5/14/06. *Describes nonnative fish distribution in Nevada obtained from our on nonnative fishes across the western United States.*
14. Latest news in brief from northern Nevada. Las Vegas Sun, 5/14/2006. *Describes study we conducted estimating distribution and abundance of nonnative fishes across the Western United States.*
15. Non-Native Fish Taking Over Western Streams. FOX News. 5/08/2006. *Describes study we conducted showing distribution and abundance of nonnative fishes across the Western United States.*
16. Non-native fish invade Western streams. Robert Roy Britt, LiveScience, 5/5/2006. *Describes study we conducted estimating distribution and abundance of nonnative fishes across the Western United States.*
17. USGS finds one in four fishes in non-native in 12 Western states: Non-natives flourish in half of streams studied. USGS Press Release. Federal News Service, Reston Virginia 5/4/2006. *Describes study we conducted estimating distribution and abundance of nonnative fishes across the Western United States.*
18. Fisheries; Non-native fish widespread in West, study says. April Reese, Land Letter, 4/27/2006. *Describes study we conducted estimating distribution and abundance of nonnative fishes across the Western United States.*
19. Non-native fish major issue in state's waters. Some imports prized by Montana anglers. Mike Stark, Billings Gazette, Billings, Montana. 4/21/2006. *Describes our study on nonnative fishes across the western United States and implications for Montana.*
20. Gila Chub Return Home. KOLD News, Tucson 5/10/05. *Describes repatriation of Gila chub into Sabino Canyon following the Aspen Fire.*
21. Endangered Gila chub fish return home. Associated Press 5/11/05. *Describes repatriation of Gila chub in Sabino Canyon following the Aspen fire.*
22. Researchers study parasites in mosquitofish collected from local waters. News Release, Dominican University, San Rafael, California, Spring 2005. *Describes studies on Asian tapeworm conducted with advice/collaboration with me.*
23. Arizona hopes to return rare fish to the wild. Associated Press 4/7/2004. *Describes holding and propagation of Gila Chub.*
24. Fish evacuated because of wildfire may return by year's end. The Associated Press State and Local Wire. 4/7/2004. *Describes holding and repatriation of Gila chub.*
25. Sabino Creek chub standing by. Mitch Tobin, Arizona Daily Star, Tucson, Arizona. 4/7/2004. *Describes holding and propagation of Gila Chub.*
26. Crews rescue rare fish from wildfire's residue – Gila chubs proposed for federal protection. Seattle Times (WA) July 2, 2003. *Describes relocation of Gila chub population threatened by wildfire by my staff in collaboration with USFWS, USFS and AZGFD.*
27. Saviors scoop up hundreds of rare fish – Gila chubs' creek at risk from post – fire runoff. Arthur H. Rotstein, Associated Press. Lexington Herald-Leader (KY)-7/2/2003. *Describes relocation of Gila chub population threatened by wildfire by my staff in collaboration with USFWS, USFS and AZGFD.*

28. Fish rescue in Arizona. Species threatened by wildfire debris is moved to clear water. CBS News. 7/1/2003. *Describes relocation of Gila chub population threatened by wildfire by my staff in collaboration with USFWS, USFS and AZGFD.*

29. Shocking science: Sampling the Verde. Art Merill, Prescott Valley Tribune 5/15/02. *Describes our research on nonnative predator –prey interactions conducted on the Verde River.*

Popular Articles

1. **Photographs taken by S. Bonar (or students about S. Bonar research) on cover of three issues of *Fisheries Magazine*** (March 2002, July 2009, December 2015) and one issue of Lake and Reservoir Management (2008).

2. **Underwater photograph taken by S. Bonar of Gila Chub appeared in *National Geographic's Water Currents***, Controversy at Cienega Creek: Water for Copper Mining and Streamflow? July 2, 2014.

3. **Bonar, S. A. 2016. Candidate statement: AFS Second Vice President. Feburary 2, 2016.** Described my platform for presidency of the American Fisheries Society.

4. **Bonar, S.A. 1998. Recent activities in warmwater fisheries research at the Washington Department of Fish and Wildlife. *Washington State B.A.S.S. Federation Newsletter 8(4):13.*** Reported recent progress on inland fisheries research projects such as: warmwater-salmon interactions, development of warmwater fish community survey protocols, and use of artificial structure to enhance warmwater fisheries in Washington lakes.

5. **Bonar, S.A. 1998. New research on interactions between warmwater fish and salmon in Washington State. *Washington State B.A.S.S. Federation Newsletter 8(1):10.*** Describes a new project at the WDFW examining interactions between warmwater fish and salmon in various Washington watersheds.

6. **Bonar, S.A. 1997. New warmwater fisheries research in Washington State. *Washington State B.A.S.S. Federation Newsletter 7(2):12.*** Reported new warmwater fisheries research projects at the WDFW including: warmwater-salmon interactions, development of warmwater fish community survey protocols, and use of artificial structure to enhance warmwater fisheries in Washington lakes.

7. **Bonar, S.A. 1997. Washington Department of Fish and Wildlife reports results of grass carp study.** ***Waterline. February/March/April: 4.*** Describes results of a statewide inland fisheries research study investigating grass carp impacts in 100 Washington lakes and associated lakefront property owner satisfaction.

8. **Bonar, S.A. 1996. Why use rotenone in Washington lakes?** ***Waterline. May/June/July: 6.*** Reports how and why rotenone is used to manage fish populations in Washington.

9. **Bonar, S.A. 1994. Illegal stocking of fish in Washington lakes.** ***Washington State B.A.S.S. Federation Newsletter. 4(2):14-15.*** Describes the dangers and penalties associated with illegally stocking fish.

10. **Bonar, S.A. 1994. Personal fish stocking is illegal.** ***Waterline. May/June: 4.*** Describes the dangers and penalties associated with illegally stocking fish.

11. **Bonar, S.A. 1994. How do aquatic plants affect warmwater fishing?** ***Washington State B.A.S.S. Federation Newsletter 4(4):12-13.*** Describes the role of aquatic plants in structuring a warmwater fish community.

12. **Bonar, S.A. 1994. All you ever wanted to know about rotenone but were afraid to ask.** ***Washington State B.A.S.S. Federation Newsletter 4(1):2,5.*** Reports how and why rotenone is used to manage fish populations in Washington.

13. **Bonar, S.A. 1994. Anglers can help balance warmwater fish communities.** ***Waterline, April.*** Describes how fishing pressure can impact structure of warmwater fish communities.

14. **Bonar, S.A. 1993. Warmwater fish community balance and the Washington bass angler.** ***Washington State B.A.S.S. Federation Newsletter (3)4 :14.*** Discusses the feeding ecology of largemouth bass in Washington lakes and how anglers can use this information.

15. **Bonar, S.A. and D. Fletcher. 1993. Chapters in Review: Washington. Improving angling and water clarity through predator manipulation.** ***LakeLine 13(4):48.*** Describes a predator manipulation study near Yakima, Washington where Inland Research investigated the use of cascading trophic dynamics for algae control.

(16) INVENTIONS, PATENTS HELD

I designed a computerized water temperature 36 tank aquarium system with my students to test the effects of static and fluctuating water temperatures on Southwestern fishes. This system was built and reported in *Aquaculture Engineering* (see Widmer et al. 2006). As part of this system we invented a hot and cold-water temperature-boosting device using an air-conditioning compressor, titanium piping, and HVAC equipment.

(17) HONORS, AWARDS, RECOGNITION, ELECTED MEMBERSHIPS

- Elected Fellow, The American Institute of Fishery Research Biologists, 2016.

- 1st Place Video Production, UA School of Natural Resources and the Environment Video Contest. Streams of Mt. Graham. Produced and filmed by Coop students and S. Bonar, 2016.

- Conservationist of the Year Award, Legal Team Protecting Stream Flow in Aravaipa Canyon, Arizona. Part of Scientific Advisory Team that received award. Arizona/New Mexico Chapters of the Wildlife Society and the American Fisheries Society, February 5, 2016.

- Conservationist of the Year Award, Legal Team Protecting Stream Flow in Cherry Creek, Arizona. Part of Scientific Advisory Team that received award. Arizona/New Mexico Chapters of the Wildlife Society and the American Fisheries Society, February 5, 2016.

- USGS STAR Award, 2016

- USGS STAR Award 2015

- Invited Panel Member, Biological Assessment, Global Conference on Inland Fisheries, FAO Headquarters, United Nations, Rome Italy (January 26-28, 2015)

- Colleen Svancara, Best Student Paper Award Finalist, 47th Joint Annual Meeting of the Arizona/New Mexico Chapters of the Wildlife Society and the American Fisheries Society, 06/02/15, Scott Bonar Student

- Colleen Svancara, Dr. Bonar Student, University of Arizona Graduate and Professional Student Council Travel Grant, University of Arizona Graduate and Professional Student Council, 15/01/15, Scott Bonar Student

- American Fisheries Society Certificate of Appreciation, American Fisheries Society, (August 8, 2014)

- Professional of the Year, Arizona/New Mexico Chapter of the American Fisheries Society (February 7, 2014).

- Brian Hickerson, and Jack Ruggirello. Best Student Poster Award, 47th Joint Annual Meeting of the AZ and NM Chapters of the American Fisheries Society and The Wildlife Society, Pinetop Arizona, (February 7, 2014). Scott Bonar Graduate Student (Jack) and undergraduate student mentored by Scott (Brian).

- USGS STAR Award (January 13, 2014)

- Stephani Clark Barkalow, Best Student Paper Award, 45th Annual Meeting of the Desert Fishes Council. Scott Bonar Student (November 24, 2013).

- Sally Petre, Best Student Poster Award, 45th Annual Meeting of the Desert Fishes Council. Scott Bonar Student (November 24, 2013).

- U.S. Fish and Wildlife Service Award of Appreciation, Pacific Southwest Region, for supporting the mission of the U.S. Fish and Wildlife Service with research on Devils Hole pupfish and commissioning of the Ash Meadows Fish Conservation Facility. (June 27, 2013).

- Stephani Clark, University of Arizona Graduate and Professional Student Council Travel Grant, Scott Bonar Student (June 3, 2013)

- Jack Ruggirello, University of Arizona Graduate and Professional Student Council Travel Grant, Scott Bonar Student (June 3, 2013)

- Sally Petre, AFS Skinner Award, Scott Bonar Student (Given to only a few MS students across entire United States to provide for attendance at Annual AFS Meeting; July 5, 2013).

- Sally Petre, AFS Western Division Eugene Maughan Scholarship, Scott Bonar Student (Given to one MS student across entire western United States; March 19th, 2013).

- Sally Petre, AFS Western Division Travel Grant, Scott Bonar Student. (March 3, 2013)

- Jack Ruggirello, University of Arizona Graduate and Professional Student Council Travel Grant, Scott Bonar Student (June 3, 2013)

- USGS STAR Award, USGS (December 20, 2012)

- Ambre Chaudoin, Best Student Paper AZ/NM AFS, Scott Bonar Student, AZ/NM Annual AFS Meeting (February 5, 2012)

- Joy Price, Best Student Paper AZ/NM AFS, Scott Bonar Student, AZ/NM Chapter of the American Fisheries Society (February 5, 2011)

- USGS STAR Award, USGS (December 20, 2010)

- American Fisheries Society Certificate of Appreciation, American Fisheries Society (April 21, 2010)

- Arizona Game and Fish Department Mentor of the Year, Arizona Game and Fish Department (January 15, 2010)

- STAR Award, USGS Cooperative Units Program (October 1, 2008)

- The Wildlife Society Nominee, Best Book of Year, Wildlife Society (October 1, 2008)

- Arizona Cooperative Fish and Wildlife Research Unit Award for Best Science – USGS Cooperative Units Program, 2007.

- STAR Award, U.S. Department of the Interior, 2007.

- Anne Kretschmann, a Masters student of Dr. Bonar received Best Student Poster Award at the Arizona/New Mexico American Fisheries Society Annual Meeting. 2007.

- STAR Award, U.S. Department of the Interior, 2006.

- Jason Kline, Best Student Paper (Hubbs Award) Desert Fishes Council Annual Meeting (Bonar Student), 2006.

- Jason Kline, a Masters student of Dr. Bonar, received Best Student Paper at the Arizona/Nevada Academy of Science Annual Meeting, 2006.

- Scott Bonar and Yuliya Kuzmenko, Invited to address the Environmental Security Council, North Atlantic Treaty Organization (NATO), Brussels, Belgium on joint research between scientists of the United States and the former Soviet Union, 2006.

- The Arizona Cooperative Fish and Wildlife Research Unit received the Cooperative Research Unit Excellence in Cooperator Support Award for excellence in furthering the mission of the Cooperative Research Units Program, 2005.

- Andrew Schultz, a Ph.D. student of Dr. Bonar received Best Student Paper Award at the Arizona/New Mexico American Fisheries Society Annual Meeting. 2004.

- STAR Award, U.S. Department of the Interior, 2003.

- STAR Award, U.S. Department of the Interior, 2001.

- David Ward, an MS student of Dr. Bonar received Best Student Paper Award at the Arizona/ New Mexico American Fisheries Society Chapter Meeting. 2001.

- STAR Award, U.S. Department of the Interior, 2000.

- Five and ten-year service awards from the Washington State Department of Fish and Wildlife. 1995, 2000.

- Appreciation Award from Washington Department of Fish and Wildlife Region 5. For service and dedication to the Inland Fisheries Program. 2000.

- Elected by American Fisheries Society to co-author, with four other scientists, a survey protocol for bull trout populations in North America. 1999.

- Washington State Nominee, U.S. Fish and Wildlife Service Division of Federal Aid Media Outreach Project. The project "Relationships between stocked trout density and the occurrence and abundance of amphibians at Washington high mountain lakes" was nominated for national/regional media coverage, 1998.

- Washington State Nominee, U.S. Fish and Wildlife Service Division of Federal Aid Media Outreach Project. The project "Interactions between warmwater fish and native aquatic species in Washington State" was nominated for national/regional media coverage, 1998.

- Cooperative Fish and Wildlife Research Unit, University of Washington, Unit Leaders' Outstanding Student Award $1,000, 1991.

Graduate

- School of Fisheries Cobb Scholarship $1,000, 1989.

- 1st place, Student paper competition at the North Pacific International Chapter Meeting of the American Fisheries Society. March 7-8, 1989.

- School of Fisheries Geil Scholarship $500, 1988.

- School of Fisheries Thompson Scholarship $500, 1987.

- 3rd place, Student paper competition at the Aquatic Plant Management Society Meeting. July 21-24, 1985.

- 1st place, Student paper competition at the North Pacific International Chapter Meeting of American Fisheries Society. March 25-27, 1985.

- School of Fisheries Thompson Scholarship $1,000, 1985.

- School of Fisheries Geil Scholarship $500, 1984.

- School of Fisheries Egtvedt Trust $3,600 and in-state tuition, 1984.

(18) BIBLIOGRAPHY

a. PUBLISHED REPORTS

1. **Bonar, S. A., and J. Trushenski. 2017. The skill we all need. *Fisheries* 42:397.** — IPDS: IP-088624; BAO Date: July 27, 2017. Concept and design of study (80%), Data production (80%), Interpretation (75%), Writing (80%).

2. **Bonar, S. A. 2017. The Dark Side of Safety. *Fisheries* 42:183.** — IPDS: IP-084662; BAO Date: February 23, 2017. Concept and design of study (100%), Data production (100%), Interpretation (100%), Writing (100%).

3. **Bonar, S. A., N. Mercado-Silva, W. A. Hubert, T. D. Beard Jr., G. Dave, J. Kubecka, B. D. S. Graeb, N. P. Lester, M. Porath, I. J. Winfield. 2017. Standard Methods for Sampling Freshwater Fishes: Opportunities for International Collaboration. *Fisheries* 42:150-156.** — IPDS: IP-077095; BAO Date: June 24, 2016. Concept and design of study (50%), Data production (50%), Interpretation (50%), Writing (60%).

4. **Perez, C. R., S. A. Bonar, J. J. Amberg, B. Ladell, C. Reese, W. T. Stewart, C. J. Gill and C. Cantrell. 2017. Comparison of American Fisheries Society Standard Fish Sampling Techniques and Environmental DNA (eDNA) for Characterizing Fish Presence, Relative Abundance, Biomass, and Species Composition in a Large Reservoir. *North American Journal of Fisheries Management*. Currently Published On-Line.**— IPDS: IP-084602; BAO Date: June 15, 2017. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (30%).

5. **Petre, S. J. and S. A. Bonar. 2017. Determination of habitat requirements for Apache Trout *Oncorhynchus apache*. *Transactions of the American Fisheries Society* 146:1-15.** — IPDS: IP-080481; BAO Date: October 11, 2016. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (30%).

6. **Ulibarri, R. M., S. Bonar, C. Rees, J. Amberg, B. Ladell, and C. Jackson. 2017. Comparing Efficiency of American Fisheries Society Standard Snorkeling Techniques to Environmental DNA Sampling Techniques. *North American Journal of Fisheries Management* 37:644-651.** — IPDS: IP-085361; BAO Date: March 15, 2017. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (30%).

7. **Feuerbacher, O. G., S. A. Bonar, and P. J. Barrett. 2016. Enhancing hatch rate and survival in laboratory-reared hybrid Devils Hole pupfish through application of antibiotics to eggs and larvae. 2016. *North American Journal of Aquaculture* 79:106-114.** — IPDS: IP-081149. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (40%).

8. **Bonar, S. A., D. A. Fife, and J. S. Bonar. 2016. How well are you teaching one of the most important biological concepts for humankind? A call to action. *The American Biology Teacher* 78(8)623.** — IPDS: IP-066233; BAO Date: June 9, 2015. Concept and design of study (80%), Data production (80%), Interpretation (75%), Writing (80%).

9. **Schultz, A. A., and S. A. Bonar. 2016. Spawning and hatching of endangered Gila Chub *Gila intermedia* in captivity. *North American Journal of Aquaculture*. 78:279-283.** — IPDS: IP-075850; BAO Date: May 7, 2016. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (30%).

10. **Bonar, S. A. 2016. Biological and Communication Skills Needed for Introduced Fisheries Biologists. *Fisheries* 41:466-467.** — IPDS: IP-076260; BAO Date: May 24, 2016. Concept and design of study (100%), Data production (100%), Interpretation (100%), Writing (100%).

11. **Cooke, S.J., A.H. Arthington, S.A. Bonar, S.D. Bower, D.B. Bunnell, R.E.M. Entsua-Mensah, S. Funge-Smith, J.D. Koehn, N.P. Lester, K. Lorenzen, S. Nam, R.G. Randall, P. Venturelli and I.G. Cowx. 2016. Assessment of inland fisheries: A vision for the future. Pages 45-62 *in* C. Goddard, N. Leonard, W.W. Taylor and D. Bartley, Eds. *Freshwater, Fish, and the Future: Proceedings of the Global Cross-Sectoral Conference*. American Fisheries Society, Bethesda, MD. IPDS: IP-077138; BAO Date: June 27, 2016.** Concept and design of study (10%), Data production (10%), Interpretation (10%), Writing (10%).

12. **Feuerbacher, O., S. A. Bonar, and P.J. Barrett. 2016. Design and testing of a mesocosm-scale habitat for culturing the endangered Devils Hole Pupfish. *North American Journal of Aquaculture* 78:259-269.** IPDS: IP-076020; BAO Date: May 13, 2016. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (40%).

13. **Lorenzen, K., I. G. Cowx, R. E. M. Entsua-Mensah, N. P. Lester, J. D. Koehn, R. G. Randall, S. Nam, S. A. Bonar, D. B. Bunnell, P. Venturelli, S. D. Bower, and S. J. Cooke. 2016. Stock assessment in inland fisheries: a foundation for sustainable use and conservation. *Reviews in Fish Biology and Fisheries*. IPDS: IP-063445.** Concept and design of study (10%), Data production (10%), Interpretation (10%), Writing (10%).

14. **Bonar, S. A., N. Mercado-Silva, M. Rahr, T. Torrey, and A. Cate Jr. 2015. A simple web-based tool to compare freshwater fish data collected using AFS standard methods. *Fisheries* 40(12):580-589.** IPDS: IP-057935; BAO Date: July 1, 2014. Concept and design of study (60%), Data production (50%), Interpretation (50%), Writing (70%).

15. **Chaudoin, A. L., O. G. Feuerbacher, S. A. Bonar and P. J. Barrett. 2015. Underwater Videography Outperforms Above-Water Videography and In-Person Surveys for Monitoring Spawning of Devils Hole Pupfish. *North American Journal of Fisheries Management* 35:1252-1262.** — IPDS: IP-069027; BAO Date: September 10, 2015. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (40%).

16. **Ruggirello, J. E., S. A. Bonar, O. G. Feuerbacher, L. Simons, and C. Powers. 2015. Spawning ecology and captive husbandry of endangered Moapa Dace. *Arizona Cooperative Fish and Wildlife Research Unit Research Report, Tucson*.** — IPDS: IP-070037; BAO Date: October 16, 2015. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (30%).

17. **Bonar, S. A., and S. J. Petre. 2015. Ground-Based Thermal Imaging of Surface Water Temperatures of Streams: Techniques and Relationship to Subsurface Temperatures. *North American Journal of Fisheries Management* 35:1209-1218.** Concept and design of study (80%), Data production (80%), Interpretation (75%), Writing (80%).

18. **Feuerbacher, O. G., J. A. Mapula and S. A. Bonar. 2015. Propagation of Hybrid Devils Hole Pupfish, Cyprinodon diabolis x Cyprinodon nevadensis mionectes. *North American Journal of Aquaculture* 77:513-523.** — IPDS: IP-066121; BAO Date: June 2, 2015. Concept and design of study (30%), Data production (30%), Interpretation (30%), Writing (40%).

19. **Svancara, C. M., A. Lien, W. Vanasco, L. Lopez-Hoffman, S. Bonar and G. Ruyle. 2015. Jaguar critical habitat designation causes concern for Southwestern ranchers. *Rangelands* 37:144-151.** — IPDS: IP-066120; BAO Date: June 2, 2015. Concept and design of study (30%), Data production (30%), Interpretation (30%), Writing (20%).

20. **Bonar, S. A. 2015. Point-counterpoint: Be flexible in the number of talks per speaker at meetings! *Fisheries* 40:295.** — IPDS: IP-065545; BAO Date: May 7, 2015. Concept and design of study (100%), Data production (100%), Interpretation (100%), Writing (100%).

21. **Recsetar, M. S., and S. A. Bonar. 2015. Effectiveness of Two Commercial Rotenone Formulations on the Eradication of Virile Crayfish. *North American Journal of Fisheries Management* 35:616-620.** — IPDS: IP-057198; BAO Date: May 27, 2014. Concept and design of study (30%), Data production (30%), Interpretation (30%), Writing (20%).

22. **Clark Barkalow, S. L., and S. A. Bonar. 2015. Effects of Suspended Sediment on Survival of Yaqui Chub, an Endangered US/Mexico Borderlands Cyprinid. 144:345-351. *Transactions of the American Fisheries Society.*** — IPDS: IP-057199; BAO Date: May 27, 2014. Concept and design of study (30%), Data production (30%), Interpretation (30%), Writing (20%).

23. **Bonar, S. A. 2014. Book Review "Ecology of North American Freshwater Fishes" by Stephen T. Ross. *Journal of Fish Biology* 85:1799–1800.** — IPDS: IP-059466; BAO Date: August 27, 2014. Concept and design of study (100%), Data production (100%), Interpretation (100%), Writing (100%).

24. **Chaudoin, A. L., O.G. Feuerbacher, S. A. Bonar, and P. J. Barrett. 2014. Comparison of Fixed Videography and Visual Surveys for Monitoring Devils Hole Pupfish Spawning Behavior in Devils Hole, Nevada. *Arizona Cooperative Fish and Wildlife Research Unit Fisheries Research Report.*** — IPDS: IP-056749; BAO Date: June 3, 2014. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (40%).

25. **Chaudoin, A. L., O. G. Feuerbacher, S. A. Bonar and P. J. Barrett. 2014. Environmental Conditions Associated with Spawning in Devils Hole Pupfish. *Arizona Cooperative Fish and Wildlife Research Unit Research Report, Tucson Arizona.*** — IPDS: IP-056727; BAO Date: June 3, 2014. Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (40%).

26. **Feuerbacher, O., S. A. Bonar, and P. J. Barrett. 2014. Construction of a mesocosm-scale habitat recreation of Devils Hole for pupfish culture. USGS *Arizona Cooperative Fish and Wildlife Research Unit Final Report*.** Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (40%).

27. **Feuerbacher, O. G., S. A. Bonar, and P. J. Barrett. 2014. Enhancing hatch rate and survival in laboratory-reared hybrid Devils Hole pupfish through application of antibiotics to eggs and larvae. *USGS Arizona Cooperative Fish and Wildlife Research Unit Final Report*.** Concept and design of study (20%), Data production (20%), Interpretation (20%), Writing (30%).

28. **Feuerbacher, O. G., J. A. Mapula and S. A. Bonar. 2014. Propagation of Hybrid Devils Hole Pupfish, Cyprinodon diabolis x Cyprinodon nevadensis mionectes*. USGS Arizona Cooperative Fish and Wildlife Research Unit Final Report.*** Concept and design of study (30%), Data production (30%), Interpretation (30%), Writing (40%).

29. **Mapula, J. A., O. Feuerbacher, and S. A. Bonar. 2014. Relationship between food type and growth and survival of larval hybrid Devils Hole pupfish. *USGS Arizona Cooperative Fish and Wildlife Research Unit Fisheries Research Report.*** Concept and design of study (30%), Data production (30%), Interpretation (30%), Writing (30%).

30. **Mercado-Silva, N., S. A. Bonar, C. Schwalbe, and C. Witt. 2014. Natural Resource Condition Assessment of the Reservoirs of the Aspinall Unit, Curecanti National Recreation Area. *USGS Arizona Cooperative Fish and Wildlife Research Unit Final Report*.** Concept and design of study (25%), Data production (20%), Interpretation (20%), Writing (25%).

31. **Recsetar, M. S., S. A. Bonar, and O. G. Feuerbacher. 2014. Growth and survival of Apache Trout under static and fluctuating temperature regimes. *Transactions of the American Fisheries Society*** 143:1247-1254. Concept and design of study (40%), Data production (40%), Interpretation (40%), Writing (40%).

32. **Bonar, S. A., and N. Mercado Silva. No Date. In re Aravaipa Canyon Wilderness Area (W1-11-3342), in the General Adjudication of All Rights to Use Water in the Gila River System and Source, Ariz. Sup. Ct., Case Nos. W1-W4. Aravaipa Canyon Wilderness Area FRWR CLAIMS: Protection of Fish Resources. Prepared for the Environment and Natural Resources Division, U.S. Department of Justice.** Concept and design of study (40%), Data production (20%), Interpretation (30%), Writing (30%).

33. **Mercado-Silva, N., and S. A. Bonar. 2013. Estandarización de métodos para el muestreo de peces de agua dulce en México: Avances y oportunidades. *Ciencia Pesquera* 21(2):57-63**. Concept and design of study (50%), Data production (50%), Interpretation (50%), Writing (20%).

34. **Recsetar, M. S. and Scott A. Bonar. 2013. Survival of Apache trout eggs and alevins under static and fluctuating temperature regimes. *Transactions of the American Fisheries Society* 142:373-379.** Concept and design of study (40%), Data production (40%), Interpretation (40%), Writing (40%).

35. **Recsetar, M.S. and S.A. Bonar. 2013. Effectiveness of two commercial rotenone formulations on the eradication of virile crayfish Orconectes virilis. *USGS Arizona Cooperative Fish and Wildlife Research Unit Fisheries Research Report* 01-13.** Reports effectiveness of rotenone in controlling invasive crayfish. Concept and design of study (40%), Data production (30%), Interpretation (40%), Writing (40%).

36. **Rogowski, D. L., S. Sitko, and S. A. Bonar. 2013. Optimizing control of invasive crayfish using life-history information. *Freshwater Biology* 58:1279-1291.** Concept and design of study (30%), Data production (20%), Interpretation (20%), Writing (20%).

37. **Zeigler, M. P., S. F. Brinkman, C. A. Caldwell, A. S. Todd, M. S. Recsetar and S. A. Bonar. 2013. Upper thermal tolerances of Rio Grande Cutthroat Trout under constant and fluctuating temperatures**. ***Transactions of the American Fisheries Society*** 142:1395-1405. Concept and design of study (20%), Data production (10%), Interpretation (10%), Writing (10%).

38. **Recsetar, M.S., M.P. Zeigler, D.L. Ward, S.A. Bonar, and C.A. Caldwell. 2012. Relationship between fish size and thermal tolerance. *Transactions of the American Fisheries Society* 141:1433-1438.** Investigates how upper temperature tolerance may vary by fish size for six freshwater fish species. Concept and design of study (30%), Data production (20%), Interpretation (30%), Writing (30%).

39. **Iles, A., T P. Archdeacon, and S.A. Bonar. 2012. Novel praziquantel treatment regime for controlling Asian tapeworm infections in pond-reared fishes. *North American Journal of Aquaculture* 74:113-117.** Asian tapeworm is an exotic parasite accidentally brought into the United States. Its range is expanding and this work discusses new treatment methods to remove this parasite from pond-reared fishes. Concept and design of study (20%), Data production (20%), Interpretation (20%), Writing (30%).

40. **Bonar, S.A., A.A. Schultz, and E.A. Sontz. 2011. Captive breeding and culture of Gila chub *Gila intermedia*, Headwater chub *Gila nigra* and roundtail chub *Gila robusta*. *USGS Arizona Cooperative Fish and Wildlife Research Unit Fisheries Research Report* 01-11.** Reports results of captive propagation studies for two listed and one non-listed native desert fishes. Concept and design of study (20%), Data production (20%), Interpretation (20%), Writing (20%).

41. **Bonar, S.A., J.S. Fehmi, and N. Mercado-Silva. 2011. An overview of sampling issues in species diversity and abundance surveys. Pages 11-24 in A. Magurran and B. McGill, editors, *Biological Diversity: Frontiers in Measurement and Assessment*. Oxford University Press, New York.** Concept and design of study (40%), Data production (10%), Interpretation (30%), Writing (40%).

42. **Bonar, S.A. and W.J. Matter. 2011. Cumulative effects on freshwater fishes. *In* P. R. Krausman and L. Harris, editors. *Cumulative effects in wildlife management.* CRC Press, Boca Raton, Florida.** Concept and design of study (80%), Data production (20%), Interpretation (80%), Writing (80%).

43. **Archdeacon, T.P., A. Iles, J. Kline, and S.A. Bonar. 2010. Asian fish tapeworm *Bothriocephalus acheilognathi* in the desert southwestern United States. *Journal of Aquatic Animal Health* 22:274–279.** Describes Asian tapeworm movement across the southwestern United States. Concept and design of study (30%), Data production (20%), Interpretation (20%), Writing (20%).

44. **Bonar, S.A., N. Mercado-Silva, and D. Rogowski. 2010. Habitat use by the fishes of a southwestern desert stream: Cherry Creek, Arizona. Research Report. *USGS Arizona Cooperative Fish and Wildlife Research Unit Report,* University of Arizona.** Reports results of study developing habitat suitability indices for desert fishes. Used in litigation by U.S. Forest Service to protect instream flows for native desert fishes from surface mining. Concept and design of study (40%), Data production (20%), Interpretation (30%), Writing (30%).

45. **Kuzmenko, Y., T. Spesiviy, and S.A. Bonar. 2010. Mechanical suppression of northern pike (*Esox lucius*) populations in small Arizona reservoirs. *USGS Arizona Cooperative Fish and Wildlife Unit Fisheries Research Report* 01-10.** Describes use of Ukrainian and U.S. methods to control nuisance northern pike. Concept and design of study (40%), Data production (20%), Interpretation (30%), Writing (30%).

46. **Bonar, S.A. and M. Fraidenburg. 2010. Communications in fisheries. *In* W. A. Hubert and M. Quist, Editors. *Inland Fisheries Management in North America.* 3rd Edition. American Fisheries Society, Bethesda, Maryland.** Overview of communication techniques useful for fisheries scientists. Concept and design of study (50%), Data production (10%), Interpretation (30%), Writing (50%).

47. **Archdeacon, T.P. and S.A. Bonar. 2010. Intraspecific predation in endangered Mohave tui chub. *California Fish and Game* 96(3):213-215.** Discusses feeding behavior of the highly endangered Mohave tui chub and implications for management. Concept and design of study (10%), Data production (10%), Interpretation (30%), Writing (20%).

48. **Bonar, S.A., W.A. Hubert, and D.W. Willis. 2009. *Standard Methods for Sampling North American Freshwater Fishes.* American Fisheries Society, Bethesda, Maryland. 459 pp.** First text of continent-wide standard freshwater fish sampling methods in the history of fisheries science. Now used for fisheries standard sampling procedures for various states and provinces. Concept and design of study (50%), Data production (20%), Interpretation (20%), Writing (20%).

49. **кузьменко, ю. г., т. в. спесивьій, с.а. боннар. 2009. морфологическая характеристика и рост щуки (Esox lucius L.) некоторьіх водоемов сша. рибне господарство міжвідомчий тематичний науковий збірник випуск 67:131-135. (Kuzmenko, Y.G., T.V. Specivy, and S.A. Bonar. 2009. Morphological characteristics and growth of northern pike in waters of the United States. *Fisheries (Ukrainian Academy of Agrarian Sciences)* 67:131-135.** Compares northern pike populations in the United States with those in Dneiper River system, Ukraine and discusses management implications. Concept and design of study (25%), Data production (20%), Interpretation (25%), Writing (0%).

50. **Archdeacon, T.P. and S.A. Bonar. 2009. Captive breeding of endangered Mohave tui chub. *North American Journal of Aquaculture* 71:360-362.** Discusses methods to captively-breed for the first time one of the most highly endangered fishes in North America. Concept and design of study (30%), Data production (20%), Interpretation (30%), Writing (30%).

51. **Kline, S.J., T.P. Archdeacon, and S.A. Bonar. 2009. Effects of praziquantel on eggs of the Asian tapeworm *Bothriocephalus acheilognathi*. *North American Journal of Aquaculture* 71:380-383.** Shows treatments currently used for eliminating Asian tapeworm in fish may leave viable eggs to be transported to other water bodies. Concept and design of study (30%), Data production (20%), Interpretation (30%), Writing (35%).

52. **Bonar, S.A., S. Contreras-Balderas, and A.C. Iles. 2009. An introduction to standardized sampling. *In* S. A. Bonar, W. A. Hubert, and D. W. Willis, Editors. *Standard Methods for Sampling North American Freshwater Fishes.* American Fisheries Society, Bethesda, Maryland.** Introduces the concept of standardization and discusses its importance in fisheries management. Concept and design of study (70%), Data production (10%), Interpretation (30%), Writing (70%).

53. **Brouder, M., A.C. Iles, and S.A. Bonar. 2009. North American averages of length frequency, condition, growth, and catch per effort. *In* S. A. Bonar, W. A. Hubert, and D. W. Willis, Editors. *Standard Methods for Sampling North American Freshwater Fishes.* American Fisheries Society, Bethesda, Maryland.** Provides comparative condition, length-frequency, catch per effort, and growth summaries by water body type and sampling method for 15 common fish species from analysis of over 4000 data sets from across North America. Concept and design of study (70%), Data production (20%), Interpretation (30%), Writing (30%).

54. **Bonar, S.A. 2009. Book review: Burbot: Ecology, management, and culture. V.L. Paragamian and D.H. Bennett, eds. *The Quarterly Review of Biology* 84: 210-211** Review of recent book on burbot. Concept and design of study (100%), Data production (0%), Interpretation (30%), Writing (100%).

55. **Bonar, S.A., W.A. Hubert, and D.W. Willis. 2009. The North American freshwater fish standard sampling project: Improving fisheries communications. *Fisheries* 34:340-344.** Overview of the North American standard sampling project. Concept and design of study (70%), Data production (20%), Interpretation (30%), Writing (70%).

56. **Kline, S.J. and S.A. Bonar. 2009. Captive breeding of Yaqui topminnow and Yaqui chub. *North American Journal of Aquaculture* 71:73-78.** Describes captive-breeding techniques developed for two highly endangered fish species. Concept and design of study (30%), Data production (20%), Interpretation (30%), Writing (30%).

57. **Kubecka, J., U.S. Amarasinghe, S.A. Bonar, J. Hateley, P. Hickley, E. Hohausova, J. Matena, J. Peterka, P. Suuronen, V. Tereschenko, R. Welcomme, and I.J. Winfield. 2009. The true picture of a lake or reservoir fish stock: a review of needs and progress. *Fisheries Research* 96: 1-5.** Overview of progress in lake and reservoirs fish stock assessment reported in an international conference. Concept and design of study (10%), Data production (10%), Interpretation (10%), Writing (10%).

58. **Schultz, A.A. and S.A. Bonar. 2009. Growth and survival of larval and juvenile Gila chub at different temperatures. *North American Journal of Aquaculture* 71:1-5.** Growth and survival of endangered Gila chub by water temperature. Implications for climate change management and captive breeding. Concept and design of study (30%), Data production (20%), Interpretation (30%), Writing (25%).

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--Date of Last Promotion--

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19. PUBLICATIONS – three most significant scientific impact

Bonar, S.A., W.A. Hubert, and D.W. Willis. 2009. *Standard Methods for Sampling North American Freshwater Fishes*. American Fisheries Society, Bethesda, Maryland.

This is the first text of continent-wide standard freshwater fish sampling procedures in the history of fisheries science. The researcher is lead editor of this book (and author of two chapters) and chairs the Standard Sampling Committee, Fisheries Management Section, American Fisheries Society. The researcher obtained funding and cooperation from ten federal, state and private agencies to fund the project and coordinated the work of two coeditors and 284 authors, reviewers and sponsors from 107 agencies, universities, private industry and organizations from across Canada, Mexico and the United States. *Standard Methods for Sampling North American Freshwater Fishes* describes standard methods and gear types to sample fish in specific environments so population indices can be more easily compared across regions and time. Environments include ponds, reservoirs, natural lakes, streams and rivers containing cold and warmwater fishes. This book also provides other information necessary for standard sampling programs such as tables of comparison data averaged from over 4000 data sets from 43 states and provinces; methods to convert nonstandard to standard data; statistical and database procedures for standard sampling, methods to calibrate electrofishing gear, and methods to prevent transfer of invasive species while sampling. Development of standard sampling methods across North America has been of interest since the 1980's or earlier. However, development was not completed earlier because of disagreements among scientists and managers as to best methods. The researcher used social research reported in his book ***Conservation Professional's Guide to Working With People*** to help arrive at consensus and complete this project successfully.

Furthermore, this book led to efforts to compare sampling techniques internationally (described below) and to development of ***Bonar, S. A., M. Rahr, T. Torrey, A. Cate Jr., and N. Mercado Silva. 2012. http://fisheriesstandardsampling.org A simple web based tool to compare standard inland fish data. Version 1. American Fisheries Society.*** Just as physicians need computer-generated reports to compare cholesterol, blood pressure and body temperature to human population means and percentiles when diagnosing illness in a patient; fisheries professionals need the same when diagnosing problems in fish communities. This website/analysis tool is companion to *Standard Methods*, and required considerable effort to construct; received as much – or more – review than a publication. The researcher led team of three programmers to develop this web-based tool to analyze standard fish data with a simple click of a button. This was a collaborative project among AFS, two Universities and three agencies.

Impact:

- First continental effort to standardize freshwater fisheries sampling in the history of fisheries science.

- Methods generally accepted by the fisheries community at large.
- Book of methods consistently in the top 1-4 bestsellers of the American Fisheries Society since publication in 2009.
- Methods being adopted by numerous state, provincial and federal agencies across North America.
- Work subject of five international fisheries symposiums: AFS Annual Meetings in Ontario, Minnesota, Oregon; World Fisheries Congress, Edinburgh Scotland, U.K, and Pusan, South Korea.
- The researcher was invited to give Keynote addresses at three international fisheries sampling meetings in the Czech Republic and South Korea, and address The European Committee for Standardization (CEN) in London, consisting of fisheries biologists from countries across Europe; and address the Inland Fisheries Institute of South Korea to inform of the contents of this book.
- Researcher asked to serve on a panel with five other biologists on international inland fish assessment methods at the United Nations FAO in Rome, Italy, and present a talk at a conference in Rome on the subject.
- Methods now subject of considerable research by others – validation, calibration studies, computer intensive techniques.
- Meetings at World Fisheries Congress, Edinburgh, Scotland and Pusan, Korea; and AFS in Portland, Oregon held to investigate potential for international standardization.
- Unanimous vote from AFS Fisheries Management Section to increase international scope of standardization, and interest from a variety of European countries to collaborate. International symposium at AFS in Portland Oregon with representatives from five contents discussed sampling standardization and determined ways to best move forward. This work was published in a recent manuscript.
- http://fisheriesstandardsampling.org was invited for demonstration at AFS Annual Meetings in St. Paul and Seattle; and at workshops and symposia at various AFS Division Meetings (Wichita, Nashville). Continuing education course on the program offered at the 2013 Annual AFS Meeting in Little Rock, Arkansas.
- All fisheries biologists from some state agencies were required by management to attend workshops on website.
- The Standard Sampling Website mentioned above is featured on the front page of the AFS website.

Carveth, C.J., A.M. Widmer, and S.A. Bonar. 2006. Comparison of upper thermal tolerances of native and nonnative fish species in Arizona. *Transactions of the American Fisheries Society* 135:1433-1440.

This is one of a series of articles, authored by researcher and his students/staff, that quantifies habitat requirements of desert fishes. Habitat requirements of critically endangered desert fishes are less known than those of fishes in other areas – and information on these requirements are needed now more than ever. Of the 150 full

species included in the fish fauna of the West, as of 1990, 122 taxa west of Rocky Mountains have disappeared, or were listed as threatened or endangered. Although some of these taxa represent subspecies, not full species, the reduction in their numbers remains considerable.

Previously, temperature tolerances of most desert fishes were thought to be higher than those of commonly-introduced species. Here we found that many desert fishes have upper temperature tolerances equal, or lower than nonnative fishes commonly introduced to desert ecosystems. This work has been especially important to climate change biologists to predict effects of increasing stream temperatures on native-nonnative fish interactions. It has also led to a variety of projects examining the habitat needs – especially temperature tolerances – of fishes of arid lands. These projects have been important for climate change managers and those protecting streams from mining activities, border operations, and urbanization.

Impact:

- Research results being used by state and federal agencies to develop temperature criteria for streams.
- Researcher was deposed in 8-hr session in the legal offices of Freeport MacMoRan Mining Corporation and put on the stand in a trial by USDOJ attorneys as an expert witness to provide testimony for conserving flow in Arizona streams. This article and associated research provided critical information for these proceedings.
- Was a top-ten viewed article in AFS journals.
- Led to a series of research projects conducted with my students/staff on desert fish habitat requirements.
- This article and others in our laboratory quantified temperature tolerance/increasing water temperatures on 19 fishes of the Southwest.
- Article and associated research used to develop habitat suitability criteria for desert fishes to support USFS, Department of Justice and BLM litigation to further protect water rights of stream fishes from excess water pumping and mining activity. According to the U.S. Department of Justice Attorneys, protection of water rights of native species in these streams will have landmark consequences on stream management across the nation.
- Article and associated research led to research testing effects of US/Mexico Border Operations on T&E fish habitat in streams crossing the US/Mexico border.
- Article lead to research to investigate methods to cool streams through habitat alteration.
- Led to stream cooling investigations used by AZGFD, USFWS, and USFS to conserve Apache trout habitat.
- Led to further work on Arizona streams to quantify habitat needed by native desert fishes. Critical in litigation to protect the small amount of surface water and fish populations remaining in the desert.

Feuerbacher, O., S. A. Bonar, and P.J. Barrett. 2016. Design and testing of a mesocosm-scale habitat for culturing the endangered Devils Hole Pupfish. ***North American Journal of Aquaculture*** **78:259-269.**

Devils Hole pupfish have been noted by some as one of the rarest fish species on the planet. The species lives in a cavern in Death Valley National Park, and about 10 years ago, numbers dropped to 35 individuals in existence. The species, which has been featured in numerous popular and scientific articles, and television documentaries was integral in the formation of the U.S. Endangered Species Act. Protection of the Devils Hole Pupfish was even the subject of a landmark U.S. Supreme Court Decision (Cappaert vs. U.S.) to prevent water overpumping in the area, preventing the lowering of the water level below the spawning shelf of the fish. Devils Hole Pupfish have been notoriously hard to breed. For example, previous attempts to breed Devils Hole pupfish at San Francisco's Steinhardt Aquarium; Las Vegas' Mandalay Bay Aquarium; and at USFWS facilities were all unsuccessful. The researcher's lab was commissioned to study the breeding habitats of the Devils Hole Pupfish by the USFWS and develop propagation and rearing techniques for the species with a surrogate hybrid Devils Hole x Amargosa Pupfish. Techniques to propagate and rear these pupfish were developed at the researcher's laboratory and used to help inform development of a $ 3.5 million propagation facility on site at Ash Meadows. Two of the researcher's former students (Feuerbacher and Chaudoin) were hired by the facility to rear and breed the Devils Hole Pupfish. These biologists were able to successfully spawn the Devils Hole Pupfish for the first time in history using techniques they perfected at the researcher's lab, and now have an established back-up population at the USFWS facility. This is fish is one of the seven native desert fish species captively-bred by the researcher's laboratory in captivity.

Impact:

- Techniques developed by the researcher's team are used by USFWS, NPS and State of Nevada to breed Devils Hole Pupfish (and many other fishes studied).
- These techniques provide a backup population in the event the wild population goes extinct.
- The $3.5 million desert fish conservation facility built near Death Valley, primarily for Devils Hole pupfish – USFWS consulted heavily with the researcher's team on construction design and hired one of our staff/students to serve as lead aquarist.
- The researcher's other student was hired as a biologist by Death Valley National Park and helps study the pupfish and also assists with propagation.
- Researcher received award from USFWS for research on captive propagation and ecology of Devils Hole pupfish and assistance in commissioning new USFWS Ash Meadows NWR Aquatic Conservation Facility (Ash Meadows NV/CA reportedly has the highest number of endemic species in such a small area in North America).
- One of seven rare desert fish species studied by the researcher's lab to develop captive breeding and rearing techniques.

(20) POSITION DESCRIPTION

Attached please find a copy of the current position description.

Scott A. Bonar

Privacy Act Notice:
Pursuant to Section 3(e)(3) of the Privacy Act of 1974 (Public Law 93-573), the individual furnishing information on this form is hereby advised as follows: 1. the authority for solicitation of the information is 5 USC 552(a). 2. The principal purpose for which the information is intended to be used is for the U.S. Geological Survey research and development peer panel review process. 3. The routine disclosure of the information is to scientific, management and administrative staff who are participants in the peer review process or who are in the human resources office. 4. The effect on the individual of not providing all or any part of the requested information is not having an up-to-date Research and Development Scientific Record for peer review thereby resulting in a delayed or no peer review. 5. This record and information in this record may be used by the Federal government in connection with the hiring of an employee, the issuance of a security clearance, the conducting of a security or suitability investigation of an individual, the classifying of jobs, the letting of a contract, and the issuance of a license, grant, or other benefits or awards to the extent that the information is relevant and necessary.

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Dr. Whalen is my supervisor and a long-term administrator and biologist with the USGS Cooperative Fish and Wildlife Research Unit Program. He is a fisheries biologist and currently Western Regional Supervisor where he supervises all Units across the western United States. I work with Kevin to ensure the production of our science and collaboration with the cooperators is of high quality.

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Dr. Winfield was the President of the Fisheries Society of the British Isles from 2011 to 2015 and is a Fellow of the Institute of Fisheries Management and sit on a number of regional, national and international advisory bodies. Ian has been a freshwater ecologist within the Lake Ecosystems Group of the U.K.'s Centre for Ecology and Hydrology, with over 28 years of research experience encompassing diverse areas of freshwater fish ecology. He leads long-term population studies on the major fish species of Windermere which have been conducted since the 1940s and which now constitute a unique lake fish dataset of global standing leading to frequent international collaborations. Ian has worked with me on many issues regarding international standardization of fisheries sampling methods, including serving with me a co-chair and co-organizer of an international standard sampling symposia at the World Fisheries Congress and AFS Annual Meetings.

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Dr. Overpeck was Director of the University of Arizona's, Institute of the Environment, Thomas R. Brown Distinguished Professor of Science, Regents' Professor, Geosciences, Hydrology and Atmospheric Sciences among other duties. Dr. Overpeck (known as "Peck") just left the UA this summer and will become dean of the University of Michigan's new School for Environment and Sustainability. Peck has published more than 200 works in climate and the environmental sciences and served as a coordinating lead author for the Nobel Prize-winning UN Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment (2007); he was also a lead author of the IPCC Working Group 2 Chapter on Terrestrial and Freshwater Systems (2014). He has been awarded the U.S. Department of Commerce Bronze and Gold Medals and the Walter Orr Roberts award of the American Meteorological Society for his interdisciplinary research. In addition, Peck was a Guggenheim Fellow, a fellow of the American Association for the Advancement of Sciences, as well as of AGU. I coauthored a book chapter with Peck on effects of climate change on desert fishes, and have worked with him in his capacity as Director at UA's Institute of the Environment and the USGS Southwest Climate Science Center.

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Dr. Marsh is Director of the University of Arizona School of Natural Resources and the Environment, the School in which the USGS Arizona Cooperative Fish and Wildlife Research Unit is located. He is an expert in remote sensing and is a former director of the Arizona Remote Sensing Center. As a professor within the school, and a Unit Leader, I work closely with Dr. Marsh on integrating the Unit within the University, and serving the needs of faculty, student and staff.

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Dr. Mercado-Silva is a Professor and Researcher at the Center for Biodiversity and Conservation Research of the Universidad Autónoma del Estado de Morelos, Mexico. He is an expert on Southwest and Mexican freshwater fishes concentrating on invasive species impacts, biomonitoring, habitat suitability criteria, and standard methods. I have collaborated extensively with him on projects involving habitat and on standard sampling issues. Several years ago, he worked with me at the AZ unit and led projects in fish habitat, and sampling standardization.

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Dr. Koprowski is Associate Director of the University of Arizona School of Natural Resources and the Environment, the School in which the USGS Arizona Cooperative Fish and Wildlife Research Unit is located. He is a leading expert on small mammals and conservation biology, and directs the Mount Graham Biological Program at the University. He was named as Outstanding Mentor of Graduate and Professional Students, University of Arizona Graduate & Professional Student Council and IUCN North American Coordinator-Small Mammals. I have lectured in many of Dr. Koprowski's classes, and have worked closely with him and Director Marsh on integrating the Unit within the University, and serving the needs of faculty, student and staff.