USGS Arkansas Cooperative
Fish & Wildlife Research Unit

A quarter of a century in review
1988-2013

University of Arkansas
1 University, SCEN 632
Fayetteville, AR 72701
UNIT STAFF:

Dr. David G. Krementz, Leader (1999-present)

Dr. Daniel D. Magoulick, Assistant Leader, Fisheries (2000-present)

Vacant, Assistant Leader (2004-present)

Ms. Diane Moler, Administrative Analyst (2000-present)

UNIT COOPERATORS:

U.S. Geological Survey

Arkansas Game and Fish Commission

University of Arkansas

Wildlife Management Institute

UNIT COORDINATING COMMITTEE:

Mr. Mike Knoedl, Director, Arkansas Game and Fish Commission

Dr. James Fleming, Southeastern Coordinator, U.S. Geological Survey

Dr. Jim Rankin, Vice Provost for Research & Economic Development, University of Arkansas

Mr. Steven A. Williams, President, Wildlife Management Institute
1. PAST COOP UNIT STAFF:

Dr. James E. Johnson, Leader (1988-1998)
Dr. William L. Thompson, Assistant Leader, Wildlife (2001-2004)
Dr. Brad Griffith, Assistant Leader, Wildlife (1995-1996)
Dr. Thomas E. Martin, Assistant Leader, Wildlife (1989-1994)
Dr. Thomas J. Kwak, Assistant Leader, Fisheries (1994-1998)
Dr. Cynthia Annett, Assistant Leader, Fisheries (1989-1993)
Barbara T. Parker, Administrative Assistant (1996-2000)
Cherylnann Koldjeski, Administrative Assistant (1993-1996)
Robin L. Kimbrough, Administrative Assistant (1988-1993)
Dr. Scott D. Longing, Postdoctoral Fellow (2011-2012)
Dr. Sarah E. Lehn, Postdoctoral Fellow (2008-2010)
Dr. Kirsten LeMar, Postdoctoral Fellow (2003-2004)
Glenn L. Piercey, Research Specialist (2000-2001)
Christy L. Kitterman, Research Technician (2004-2007)
Jesse A. Bahm, Research Technician (2004-2005)
Dennis A. Lichtenberg, Research Technician (1996-1999)

2. COOP UNIT GRADUATE STUDENTS:

(name, degree, date, advisor, current position, thesis/dissertation title):

Prabhaikan, Thoniot (PhD 1989 University of Arkansas) Dr. James E. Johnson (Fisheries)
Senior Lecturer, Texas State University, San Marcos, TX
Comparative evaluation of four methods of age and growth assessment of largemouth bass from Lake Elmdale, Arkansas

Coody, Christopher (MS 1991 University of Arkansas) Dr. Thomas E. Martin (Wildlife)
Unknown
An improved census technique of the northern bobwhite (Colinus virginianus) using recorded calls of the female
Scott, Michael (MS 1991 University of Arkansas) Dr. Kimberly G. Smith (Wildlife) (PhD 2000 University of Tennessee)
Associate Professor of Biology, Lincoln University, Jefferson City, MO
Body fat prediction, nutrition and reproduction of black bears in the interior highlands of Arkansas

Dabbert, Brad (MS 1991 University of Arkansas) Dr. Thomas E. Martin (Wildlife) (PhD 1995 Oklahoma State University)
Assistant Professor, Texas Tech University, Lubbock, TX
Nutrition and the physiological status of wintering mallards

Doster, Robert H. (MS 1991 University of Arkansas) Dr. Douglas A. James (Wildlife)
Wildlife Biologist, U.S. Department of the Interior, U.S. Fish and Wildlife Services, Region 8, Sacramento, CA
Home range and foraging of the Red-cockaded Woodpecker in West-Central Arkansas

Raulston, Barbara (MS 1992 University of Arkansas) Dr. Douglas A. James (Wildlife)
Wildlife Biologist, U.S. Bureau of Reclamation, Lower Colorado River Multi-Species Conservation Program, Boulder City, NV
Effects of cavity restrictors on red-cockaded woodpeckers

Hustead, Lynda (MS 1992 University of Arkansas) Dr. James E. Johnson (Fisheries)
Unknown
Selection and monitoring of stenothermal algal assemblages in Logan Cave Spring and its associated stream

Siegwarth, Gary (MS 1992 University of Arkansas) Dr. James E. Johnson (Fisheries)
Natural Resource Fisheries Biologist, Iowa Department of Natural Resources, Big Springs Fish Hatchery, Elkader, IA
Channel catfish of the Buffalo National River, Arkansas: population abundance, reproductive output, and assessment of stocking catchable size fish

Pardew (Cole), Mitzi (MS 1992 University of Arkansas) Dr. James E. Johnson (Fisheries)
Unknown
Dispersal of stocked young of year smallmouth bass (Micropterus dolomieu) in Beaver Reservoir, Northwest Arkansas in 1990

Neal, Joseph (MS 1992 University of Arkansas) Drs. Douglas A. James & James E. Johnson (Wildlife)
Factors affecting breeding success of red-cockaded woodpeckers in the Ouachita National Forest, Arkansas
**Timmerman, Cindy** (MS 1992 University of Arkansas) Dr. Claudia F. Bailey (Fisheries) (PhD 2001 University of Florida)
Unknown
   The morphometrics of the feeding apparatus in relation to the behavior of larval and juvenile (*Micropterus salmoides*) as related to their transition in diet

**Barber, David** (MS 1993 University of Arkansas) Dr. Thomas E. Martin (Wildlife)
Research Biologist, Hawk Mountain Sanctuary, Kempton, PA
   Effects of alternate host densities on brown-headed cowbird parasitism rates in black-capped vireos

**Walters, Jody P.** (MS 1993 University of Arkansas) Dr. Cynthia Annett (Fisheries)
Fish Biologist, National Marine Fisheries Service, Lacey, WA
   Intraspecific habitat segregation of smallmouth bass in the Buffalo River, Arkansas

**Bowman, Darrell** (MS 1993 University of Arkansas) Dr. James E. Johnson (Fisheries)
Lake Ecologist and Fisheries Manger, Property Owners Association, Bella Vista, AR
   Black bass in Beaver Reservoir and its tributaries: distribution and abundance in relation to water quality

**Lyttle, Madeline** (MS 1993 University of Arkansas) Dr. Arthur V. Brown (Fisheries)
Fish Passage Coordinator, Lake Champlain, U.S. Fish and Wildlife Services, Essex Junction, VT
   Impacts of gravel mining on fish communities in three Ozark streams

**Dibble, Eric** (MS 1989 University of Wisconsin) (PhD 1993 University of Arkansas) Dr. Cynthia Annett (Fisheries)
Professor, Aquatic Sciences, Coordinator of Graduate Studies, Department of Wildlife, Fisheries & Aquaculture, Mississippi State University, Mississippi State, MS
   A patch-dynamics study of habitat use by juvenile Centrarchids in an Ozark reservoir: factors affecting habitat availability and an experimental test of the predator avoidance hypothesis

**Means, Myron** (MS 1993 University of Arkansas) Dr. James E. Johnson (Fisheries)
Statewide Bear Program Coordinator, Arkansas Game and Fish Commission, Barling, AR
   Population dynamics and movements of Ozark cavefish in Logan Cave NWR, Benton County, Arkansas with additional baseline water quality information

**Heckathorn, Jr., W. Dean** (MS 1993 University of Arkansas) Dr. James E. Johnson (Fisheries)
U.S. Fish and Wildlife Service, AL
   Polychlorinated dibenzo-para-dioxins and pesticides in Bayou Meto and the ecology of a contaminated stream in east-central Arkansas
Zyskowski, Krzysztof (MS 1993 University of Arkansas) Drs. William J. Etges & Thomas E. Martin (Wildlife) (PhD 2000 University of Kansas)
Collections Manager: Ornithology & Mammalogy, Yale Peabody Museum of Natural History, New Haven, CT
  Nest-site selection in orange-crowned and Virginia’s warblers in high-elevation forests of the Mogollon Rim (Arizona): variation in nest placement, phenology, and microclimate

Shull, Scott D. (MS 1994 University of Arkansas) Dr. Kimberly G. Smith (Wildlife)
Deceased October 8, 1994
  Management of nuisance black bears (Ursus americanus) in the interior highlands of Arkansas

Thompson, Andrew (MS 1994 University of Arkansas) Dr. James E. Johnson (Fisheries)
Assistant Area Fisheries Supervisor, Bemidji Fisheries Management Area, Minnesota Department of Natural Resources, Bemidji, MN
  Environmental assessment of the benthic macroinvertebrate community of Bayou Meto, Arkansas

Badyaev, Alexander (MS 1994 University of Arkansas) Dr. William J. Etges (Wildlife) (PhD 1999 University of Montana)
Professor, University of Arizona, Ecology and Evolutionary Biology, Tucson, AZ
  Spring and breeding dispersal in an Arkansas Ozark population of wild turkeys; causes of and consequences for reproductive performance

Li, Pingjun (PhD 1994 University of Arkansas) Dr. Thomas E. Martin (Wildlife)
Unknown
  Breeding productivity, microhabitat requirements, and parental care of neotropical migrant birds in the Ozarks of Arkansas

Herbert (Garner), Kristine (MS 1994 University of Arkansas) Dr. James E. Johnson (Fisheries) (EdD 2012 University of Arkansas)
Assistant Professor of Biology, University of Arkansas-Fort Smith, Fort Smith, AR
  Drift of aquatic macrofauna in Logan Cave stream, Benton County, Arkansas

Burnley, Tim (MS 1994 University of Arkansas) Dr. Claudia F. Bailey (Fisheries)
Trout Habitat Manager, Arkansas Game and Fish Commission, Mountain Home, AR
  Wild and hatchery reared largemouth bass, Micropterus salmoides: condition factor in four small Arkansas lakes and habitat selection comparisons
Moore (Barnhill), Laurel (MS 1995 University of Arkansas) Dr. William J. Etges (Wildlife)  
Branch Chief, Inventory and Monitoring, Southeast Region, U.S. Fish and Wildlife Services,  
Southeast Region-National Wildlife Refuge System, Athens, GA  
Factors influencing reproductive success of wild turkeys (Meleagris gallopavo) in the  
Ouachita Mountains in Arkansas

Hargis, April (MS 1995 University of Arkansas) Dr. James E. Johnson (Fisheries)  
U.S. Forest Service, NE  
A comparative study of the flora, fauna, and water quality of springs in the Ozark  
National Forest, Arkansas

Kupriyanova, Elena (MS 1995 University of Arkansas) Dr. Claudia F. Bailey (Fisheries) (PhD 2004  
Flinders University, Australia)  
Research Scientist, Marine Research, Research & Collections, Australian Museum, Sydney,  
Australia  
Biotic interactions between benthic macroinvertebrates and largemouth bass  
(Micropterus salmoide) during the fish reproductive period in Lake Wedington,  
Arkansas, U.S.A.

Brown, J. Zack (MS 1996 University of Arkansas) Dr. James E. Johnson (Fisheries)  
Unknown  
Population dynamics and growth of Ozark cavefish in Logan Cave National Wildlife  
Refuge, Benton County, Arkansas

Allee, Rebecca (PhD 1997 University of Arkansas) Dr. James E. Johnson (Fisheries)  
Senior Scientist, National Oceanic and Atmospheric Administration’s (NOAA), Gulf Coast Service  
Center, c/o EPA Gulf of Mexico Program, Stennis Space Center, MS  
Use of satellite imagery to monitor various parameters of Bull Shoals Reservoir,  
Arkansas USA

Boyd (Adams), Ginny (MS 1997 University of Arkansas) Dr. James E. Johnson (Fisheries) (PhD  
2005 Southern Illinois University)  
Associate Professor and Environmental Science Program Coordinator, Department of Biology,  
University of Central Arkansas  
Metabolic rates and life history of aquatic organisms inhabiting Logan Cave stream in  
Northwest Arkansas

Quinn, Jeff (MS 1998 University of Arkansas) Dr. Thomas J. Kwak (Fisheries)  
Statewide Stream Management Biologist, Arkansas Game and Fish Commission, Mayflower, AR  
Fish populations and trout microhabitat use of rehabilitated habitat in an Ozark  
tailwater river

6
Thogmartin, Wayne (MS 1998 University of Arkansas) Dr. James E. Johnson (Fisheries) (PhD 2002 Southern Illinois University)
Quantitative Ecologist (Research Statistician Biology) USGS Upper Midwest Environmental Sciences Center, Onalaska, WI
Factors influencing the decline of an eastern wild turkey (Melearis gallopavo silvestri) population in the Ouachita Mountains of Arkansas

Rambo, R. Dwayne (MS 1998 University of Arkansas) Dr. Thomas J. Kwak (Fisheries)
Fisheries Biologist, U.S. Forest Services, Big Piney Ranger District of the Ozark-St. Francis National Forest
Ozark stream fish assemblages and black bass population dynamics associated with watersheds of varying land use

Painter-Pender, Danielle (MS 1998 University of Arkansas) Dr. Thomas J. Kwak (Fisheries)
Shad in the Classroom Program Specialist, (Part-time), North Carolina State Museum of Natural Sciences, Raleigh, NC
Factors influencing brown trout reproductive success in Ozark tailwater rivers

Herner-Thogmartin, Jennifer (MS 1999 University of Arkansas) Dr. Kimberly G. Smith (Wildlife)
Wildlife Biologist, Independent Contractor for USGS and US Fish and Wildlife Services, La Crosse, WI
Ecology of an introduced Rocky Mountain elk (Cervus elaphus nelsoni) herd in Arkansas

Radwell, Andrea (MS 2000 University of Arkansas) Dr. Thomas J. Kwak (Fisheries) (PhD 2005 University of Arkansas-Biology)
Research Assistant Professor, Department of Biological Sciences, University of Arkansas, Fayetteville, AR
Ecological integrity assessment of Ozark rivers to determine suitability for protective status

Schaffer, Bradley (MS 2002 University of Arkansas) Dr. R. Dave Evans (Wildlife)
Project Manager and Senior Environmental Scientist, Tetra Tech, Complex World Clear Solutions, Buffalo, NY
Ouachita wild turkey biology

Loncarich, Frankie (MS 2003 University of Arkansas) Dr. David G. Krementz (Wildlife)
Wildlife Biologist, Missouri Department of Natural Resources, Russell, MO
Survival and movements of greater prairie-chickens in the Flint Hills of Kansas
Clifton, Amy (MS 2003 University of Arkansas) Dr. David G. Krementz (Wildlife)
District Biologist, Florida Fish and Wildlife Conservation Commission, Southwest Regional Office, Lakeland, FL
Greater prairie-chicken populations in Chase County, Kansas

Thatcher, Benjamin (MS 2003 University of Arkansas) Dr. David G. Krementz (Wildlife) (PhD 2007 University of Tennessee)
Wildlife Biologist, U.S. Fish and Wildlife Service, Lafayette, LA
Impacts of prescribed burns on Henslow’s sparrows (Ammodramus henslowii) winter home range and survival in coastal pine savanna habitats

James, R. Andrew (MS 2003 University of Arkansas) Dr. David G. Krementz (Wildlife)
National Wetlands Reserve Program Specialist, Natural Resources Conservation Service, Monroe, LA
Population status and distribution of resident Canada geese in the Western Arkansas River Valley, Arkansas

Lehnen, Sarah (MS 2003 University of Arkansas) Dr. David G. Krementz (Wildlife) (PhD 2008 Ohio State University)
Consultant, Biological Sciences/Cooperative Fish & Wildlife Research Unit, University of Arkansas, Fayetteville, AR
Turnover rates of pectoral and least sandpipers during fall migration in the Lower Mississippi Alluvial Valley

Myatt, Nicholas (MS 2004 University of Arkansas) Dr. David G. Krementz (Wildlife)
Acting Deputy Director, Oregon Department of Fish and Wildlife, Salem, OR
Fall migration ecology of American Woodcock in the Central Region of the United States

Rabalais, Michael R. (MS 2004 University of Arkansas) Dr. Daniel D. Magoulick (Fisheries)
Biologist, CH2M Hill, Consulting Firm, Baton Rouge, LA
The effects of the invasive crayfish Orconectes Neglectus Chaenodactylus on the native crayfish Orconectes Eupunctus in the Spring River Drainage on Arkansas and Missouri

Dekar, Matthew P. (MS 2004 University of Arkansas) Dr. Daniel D. Magoulick (Fisheries)
Program Manager, Delta Juvenile Fish Monitoring Program, U.S. Fish and Wildlife Service, Lodi, CA
Factors affecting fish assemblage structure and growth during seasonal stream drying
**Luscier, Jason D.** (MS 2004 University of Arkansas) Dr. William L. Thompson (Wildlife) (PhD 2009 University of Arkansas-Biology)
Assistant Professor of Vertebrate Biology, Truman State University, Kirksville, MO
  Short-term responses of grassland bird populations to timing of haying in Northwest Arkansas

**Collier, Bret A.** (PhD 2004 University of Arkansas) Dr. David G. Krementz (Wildlife)
Director, Science Program, Institute of Renewable Natural Resources, Texas A & M University, College Station, TX
  Evaluating impact of selective harvest management on age structure and sex ration of White-Tailed Deer (*Odocoileus virginianus*) in Arkansas

**Bare, Christopher M.** (MS 2005 University of Arkansas) Dr. Daniel D. Magoulick (Fisheries)
Fish Research Biologist, Oregon Department of Fish and Wildlife, John Day, OR
  Movement and habitat use of smallmouth bass (*Micropterus dolomieu*) in the Buffalo National River drainage of Arkansas

**Coulter (McLean), Sarah C.** (MS 2005 University of Arkansas) Dr. David G. Krementz (Wildlife)
Environmental Impact Assessment Specialist, Wildlife, Alberta Environment and Sustainable Resource Development, Canada
  The effects of forest management on Wood Thrush in the bottomland hardwood forests of Louisiana

**Doster, Robert H.** (PhD 2005 University of Arkansas) Drs. Douglas A. James & David G. Krementz (Wildlife)
Wildlife Biologist, U.S. Department of the Interior, U.S. Fish and Wildlife Services, Region 8, Sacramento, CA
  The importance of Lower Mississippi River Alluvial Valley reforestation and wetland restoration sites to wintering migratory birds

**Scott, Mandy K.** (MS 2005 University of Arkansas) Dr. Daniel D. Magoulick (Fisheries)
District Fisheries Leader, Texas Parks and Wildlife Department, San Angelo, TX
  Effects of land use, stream flow and habitat complexity of fish assemblage structure of Arkansas Ozark streams

**Green, Adam W.** (MS 2006 University of Arkansas) Dr. David G. Krementz (Wildlife)
PhD student at Colorado State University
  Harvest and winter distributions of mallards in the Mississippi and Central Flyways
Hodges, Shawn W. (MS 2007 University of Arkansas) Dr. Daniel D. Magoullick (Fisheries)  
Hydrologic Technician, National Park Service, Buffalo National River, Harrison, AR  
Movement, survival and refuge use of three minnow species during seasonal drying in an intermittent Ozark Mountain Stream

Budd, Michael J. (MS 2007 University of Arkansas) Dr. David G. Krementz (Wildlife)  
Wildlife Biologist, U.S. Fish and Wildlife Service, Crossett, AR  
Status, distribution, and habitat selection of secretive marsh birds in the Delta of Arkansas

Larson, Eric R. (MS 2007 University of Arkansas) Dr. Daniel D. Magoullick (Fisheries) (PhD 2011 University of Washington)  
Post-Doctoral Researcher, University of Tennessee, Department of Ecology Evolutionary Biology, Knoxville, TN  
Effects of an introduced crayfish on a native crayfish in an Ozark stream: the role of life history and Juvenile completion

Cushing, Aaron W. (MS 2007 University of Arkansas) Dr. Daniel D. Magoullick (Fisheries)  
Fisheries Biologist, Solitude Lake Management, Pacific Northwest National Laboratory, Fredericksburg, VA  
Effects of catch-and-release areas on movement and survival of rainbow trout in Arkansas tail waters

Darrah, Abigail J. (MS 2008 University of Arkansas) Dr. David G. Krementz (Wildlife)  
PhD University of Arkansas Department of Biological Sciences  
Distribution, habitat use, and reproductive ecology of the King Rail in the Illinois and Upper Mississippi River Valleys

Ludlam III, John P. (PhD 2009 University of Arkansas) Dr. Daniel D. Magoullick (Fisheries)  
Assistant Professor, Fitchburg State University, Fitchburg, MA  
Effects of fish and crayfish on ecosystem structure and function during stream drying

Dekar, Matthew P. (PhD 2009 University of Arkansas) Dr. Daniel D. Magoullick (Fisheries)  
Program Manager, Delta Juvenile Fish Monitoring Program, U.S. Fish and Wildlife Service, Lodi, CA  
Spatial and temporal variation in the structure of stream food webs: Investigating the effects of shifting basal resources and predation from a top predator, the River Otter (Lontra Canadensis)

Bolenbaugh, Jason R. (MS 2010 University of Arkansas) Dr. David G. Krementz (Wildlife)  
Inspection Branch Manager, Arkansas Department of Environmental Quality, Little Rock, AR  
Status, distribution, and habitat use of the king rail and other secretive marsh birds in the Upper Mississippi River/Great Lakes Joint Venture
Scott, Leah A. (MS 2010 University of Arkansas) Dr. David G. Krementz (Wildlife)
Biological Scientist II, Florida Fish and Wildlife Conservation Commission, Tallahassee, FL
Species richness and habitat use of secretive marsh birds in managed wetlands in the
Arkansas River Valley of Western Arkansas

Carroll, James (Matt) (MS 2011 University of Arkansas) Dr. David G. Krementz (Wildlife)
PhD Oklahoma State University
The development of a winter survey for Wilson’s Snipe in the Mississippi flyway

Flinders, Jon M. (PhD 2012 University of Arkansas) Dr. Daniel D. Magoulick (Fisheries)
Regional Fishery Biologist, Idaho Department of Fish and Game, Salmon, ID
Stable isotope analysis (δ¹⁵N and δ¹³C) and bioenergetics modeling of spatial-temporal
foraging patterns and consumption dynamics in brown and rainbow trout populations
within catch-and-release areas of Arkansas tail waters

Nolen, Matthew S. (MS 2012 University of Arkansas) Dr. Daniel D. Magoulick (Fisheries)
Para-Profession, Union Public Schools, Tulsa, OK
Habitat modeling of three endemic crayfish species in the Black River drainage of
Missouri and Arkansas: factors affecting distribution and abundance

3. Current Graduate Students (name, degree, likely date of graduation, advisor, research)

Costello, Phillip H. (M.S. 2014) Advisor: Dr. Daniel D. Magoulick (Fisheries)

Fournier, Auriel M. (Ph.D. 2016) Advisor: Dr. David G. Krementz (Wildlife)
Effects of wetland management strategies on habitat use of autumn migrating rails
on intensively-managed wetland complexes in Missouri

Leasure, Doug R. (Ph.D. 2013) Advisor: Dr. Daniel D. Magoulick (Fisheries)
Classification of Arkansas flow regimes, regional ecological-flow response
relationships and environmental flows assessment for the Ozark region

Lynch, Dustin D. (Ph.D. 2014) Advisor: Dr. Daniel D. Magoulick (Fisheries)
Classification of Arkansas flow regimes, regional ecological-flow response
relationships and environmental flows assessment for the Ozark region
Distribution and abundance of the Yellowcheek Darter in the Little Red River
drainage of Arkansas

Pittman, H. Tyler (Ph.D. 2014) Advisor: Dr. David G. Krementz (Wildlife)
The effects of prescribed fire on the nesting ecology of the Eastern Wild Turkey in the
White Rock Wildlife Management Area, Arkansas
**Reddin, Christopher J.** (M.S. 2014) Advisor: Dr. David G. Krementz (Wildlife)
Small mammal baseline inventory survey of Pea Ridge National Military Park, Benton County, Arkansas

**Ronke, M. Eliese** (M.S. 2014) Advisor: Dr. David G. Krementz (Wildlife)
Survival, abundance, and distribution of temperate-nesting Canada geese in Arkansas

Graduate Student Summary:

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Coop Unit Students are presently employed by:

a. Federal Agencies 17  
b. State Agencies 13  
c. Colleges/Universities 15  
d. Continuing their education 11  
e. Other 10  
f. Deceased 1  
g. Retired 1  
h. Unknown 4

4. **Publications:**

*(Coop Unit Leaders and students in bold):


Kwak, T.J. 1996. Analysis of the food web and fish support functions. Pages 86-88 In (J.B. Zedler, editor.) Tidal wetlands restoration: a scientific perspective and southern California focus. California Sea Grant College, La Jolla, CA.

Kwak, T. J. 1996. Improving methods of assessing fish populations. Pages 84-86 In (J. B. Zedler, editor.) Tidal wetlands restoration: a scientific perspective and southern California focus. California Sea Grant College, La Jolla, CA.


Publication Summary:

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**Total Research Funding** $6,822,135

| Operational Funding | AGFC   | $2,145,000 |
| Operational Funding | USGS   | $6,572,101 |
| Operational Funding or In-Kind | UA   | $2,208,453 |

**Grand Total** $17,747,689