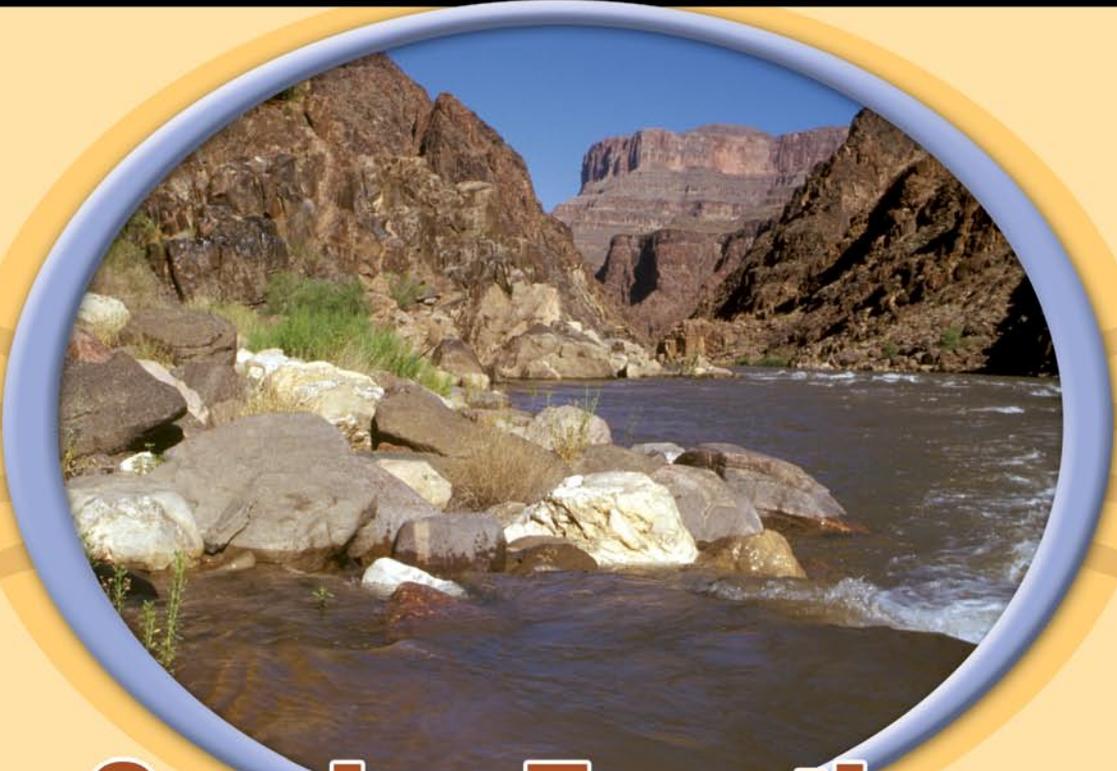


PROGRAM

Colorado River Basin Science and Resource Management Symposium



Coming Together:

Coordination of Science and Restoration Activities for the Colorado River Ecosystem

- Conference Sponsors -



November 18-20, 2008

Doubletree Resort Hotel, Scottsdale, Arizona

The Colorado River Basin Science and Resource Management Symposium will promote the exchange of information on research and management activities related to the restoration/conservation of the Colorado River and its major tributaries from the headwaters to the U.S./Mexico border.

Highlights

Plenary Sessions: These sessions offer a broad overview of the Colorado River Basin, its ecological challenges and discuss the effectiveness of the multiple programs that have evolved since 1980 to restore and conserve the Colorado River's native species and habitat.

Technical Sessions: A full day of four concurrent technical sessions on Wednesday will feature more than 60 speakers on a wide range of ecosystem issues related to dam and reservoir operations, fish propagation, native and non-native species management and monitoring programs.

Exhibits: Be sure and stop by the Forum Exhibit Area. Booths on display include Biomark, Inc.; Bureau of Reclamation Glen Canyon Dam Adaptive Management Program; Bureau of Reclamation Lower Colorado River Multi-Species Conservation Program; San Juan River Basin Recov-

ery Implementation Program; Sequoia Scientific, Inc.; Sonotronics; Upper Colorado River Endangered Fish Recovery Program; U.S. Geological Survey, Southwest Biological Center; and the Water Education Foundation.

Tuesday Night Reception: A no-host reception will be held at 5 p.m. Tuesday in the Forum Exhibit Area.

Wednesday Social and Poster Session: More than 30 posters will be on display from 5 to 10 p.m. in the Forum Exhibit Area. Each symposium attendee will receive a ticket for one complimentary beverage; hors d'oeuvres also will be served. Be sure to be on hand for the raffle!

Special thanks to the Watershed Research and Education Program Northern Arizona University for cosponsoring Wednesday's social reception

TUESDAY, NOVEMBER 18

Plenary Session I – Looking Across the Basin • The Forum

8:00 a.m. **Welcome and Opening Remarks on Conference Theme**

*John F. Hamill, Chief, Grand Canyon Monitoring and Research Center, U.S. Geological Survey
Rita Schmidt Sudman, Executive Director, Water Education Foundation*

8:15 **Keynote Talk I**

Comments on Colorado River Management Efforts from the Department of the Interior

Kameran Onley, Acting Assistant Secretary for Water and Science, U.S. Department of the Interior

8:45 **Survey of Adaptive Programs Throughout the Colorado River Basin**

The Upper Colorado River Endangered Fish Recovery Program

Robert T. Muth, Program Director, U.S. Fish and Wildlife Service

Summary Overview of the San Juan River Basin Recovery Implementation Program

David L. Campbell, Director, San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service

The Glen Canyon Dam Adaptive Management Program

Dennis M. Kubly, Chief, Adaptive Management Group, Bureau of Reclamation

The Lower Colorado River Multi-Species Conservation Program

John Swett, Program Manager, Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation

9:45 **Break**

10:00 **Keynote Talk II**

Restoration of Colorado River Ecosystems: Law and Policy Perspectives for Scientists

Robert W. Adler, Associate Dean for Academic Affairs, James I. Farr Chair, and Professor of Law, University of Utah, S.J. Quinney College of Law

10:30 **Resource Status and Trends I: Sediment, Geomorphology and Climate**

10:30 **The Challenge of Large-Scale Restoration: A Watershed Perspective of Changes in Stream Flow, Sediment Supply, and Geomorphology of the Colorado River**

John C. Schmidt, Professor, Department of Watershed Sciences, Utah State University and Director, Intermountain Center for River Rehabilitation and Restoration

11:00 **Effects of Interannual Variability and Climate Change on the Colorado River: A Perspective**

Kelly Redmond, Deputy Director and Regional Climatologist, Western Regional Climate Center

11:30 – 1:00 p.m. **Lunch • Grand Ballroom**

Keynote Talk III

Streamflow Management for River Restoration: Lessons From Outside the Colorado River Basin for Moving From Sites to Systems

Christopher Konrad, River Science Coordinator, The Nature Conservancy's Global Freshwater Team, and Research Hydrologist, U.S. Geological Survey

TUESDAY, NOVEMBER 18

Plenary Session II – Perspectives on Adaptive Management • The Forum

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| <p>1:00 p.m. In-Stream Flow Management: Past, Current, and Future Operation of Upper Colorado River Reservoirs
<i>Tom Ryan, Environmental Resources Division Manager, Upper Colorado Region, Bureau of Reclamation</i></p> <p>Past, Current, and Future Operation of Lower Colorado River Reservoirs and the Coordinated Operation of Lake Powell and Lake Mead
<i>Terry Fulp, Deputy Regional Director, Lower Colorado Region, Bureau of Reclamation</i></p> <p>1:45 Sustainability and River Restoration in the Colorado River Basin
<i>Kathy Jacobs, Executive Director, Arizona Water Institute/University of Arizona</i></p> <p>2:15 – 4:00 Resource Status and Trends II: Historical and Current Perspectives on the Colorado River Ecosystem and its Native and Nonnative Fishes</p> <p>2:15 Part A – The Ecology and Historical Distribution of Native Fish and Insight on the Role of NonNative Fishes in Their Demise
<i>Gordon A. Mueller, Research Fishery Biologist, Retired, U.S. Geological Survey</i></p> | <p>2:45 Break</p> <p>3:00 Part B – Current Status of Colorado River Native Fishes
<i>Matthew E. Andersen, Supervisory Biologist, Grand Canyon Monitoring and Research Center, U.S. Geological Survey</i></p> <p>3:30 Part C – Aquatic Production and Carbon Flow in the Colorado River
<i>Robert O. Hall, Associate Professor, Department of Zoology and Physiology, University of Wyoming</i></p> <p>4:00 Glen Canyon Dam Adaptive Management Program Effectiveness: A Decadal Assessment
<i>L. David Garrett, Principal, M3Research</i></p> <p>4:30 Panel Discussion
<i>Moderated by John Hamill, Chief, Grand Canyon Monitoring and Research Center, U.S. Geological Survey</i></p> <p>5:00 Reception (no-host) • The Forum
Dinner (on your own)</p> |
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WEDNESDAY NOVEMBER 19

Invasive Species • The Forum

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| <p>8:00 a.m. Announcements
<i>Rita Schmidt Sudman, Executive Director, Water Education Foundation</i></p> <p>8:15 Keynote Talk IV
An Overview Of The Spread And Ecological Impacts of The Quagga Mussel With Possible Implications Of Its Recent Discovery In The Colorado River Basin
<i>Thomas F. Nalepa, Research Biologist, Great Lakes Environmental Research Laboratory, NOAA</i></p> | <p>9:00 Keynote Talk V
Natural Flows, Invasive Fishes, and Native Fish Conservation in the Green River Downstream of Flaming Gorge Dam, 1962 to Present
<i>Kevin R. Bestgen, Director and Research Scientist, Larval Fish Laboratory, Department of Fishery and Wildlife Biology, Colorado State University</i></p> <p>9:45 Break</p> |
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10:00 a.m. – 5:00 p.m. • Concurrent Technical Sessions

Session 1 • The Forum

Effects of Dam and Reservoir Operations on Downstream Physical and Biological Resources

Session Chairs: Theodore S. Melis, Paul E. Grams, Theodore A. Kennedy and Michael D. Yard, U.S. Geological Survey

- 10:00 **The Effects of Experimental Ramping Rates on the Invertebrate Community of a Boreal Shield River**
Karen Smokorowski, Great Lakes Laboratory for Fisheries and Aquatic Sciences, Fisheries and Oceans
- 10:20 **Status and Trends in Selected Water Chemistry Parameters of the Green, Yampa, Gunnison, and Colorado Rivers in Dinosaur, Black Canyon, and Canyonlands National Parks**
David P. Thoma, National Park Service
- 10:40 **Physical and Chemical Data for Lake Powell and Glen Canyon Dam Releases, 1965-2007**
William S. Vernieu, USGS GCMRC
- 11:00 **Projecting Temperature and Water Quality in Lake Powell and the Glen Canyon Dam Tailrace**
Nicholas T. Williams, Bureau of Reclamation

Session 2 • Center Ballroom

Native Fishes Propagation & Genetic Management and Associated Challenges in Co-managing Native and Non-native Fishes in the Colorado River: Seeking Solutions

Session Chairs: Lewis G. Coggins, U.S. Geological Survey, Connie Keeler-Foster and Sam Spiller, U.S. Fish and Wildlife Service

- 10:00 a.m. **Distribution of Marker Genotypes in Wild and Managed Populations: Where Do They Come From? What Are They? Where Are They Going?**
Allan Strand, College of Charleston/Grice Marine Laboratory
- 10:20 **Integrating Genetic Information into the Management of Captive Propagation Programs**
Connie Keeler-Foster, Dexter National Fish Hatchery and Technology Center
- 10:40 **Endangered Species Facilities Designed to Minimize Genetic Changes During Breeding and Propagation**
Kenneth P. Ferjancic, HDR, Inc.
- 11:00 **Survival Rate Estimation of Hatchery-Reared Razorback Suckers *Xyrauchen texanus* in the Upper Colorado River Basin, Utah and Colorado**
Koreen A. Zelasko, Colorado State University

Session 1 • The Forum

- 11:20 **Hydrodynamic Modeling of Lake Mead Under Changing Water Levels**
Mark Stone, Desert Research Institute
- 11:40 **Large-Scale Geomorphic Organization of the Colorado River: Connections with Channel, Change, and Riverine Ecology**
Paul E. Grams, USGS GCMRC
- Noon **Lunch • Paradise Park** (Tent)
- 1:00 p.m. **Comparison of Sediment-Transport and Bar-Response Results from the 1996 and 2004 Controlled-Flood Experiments on the Colorado River in Grand Canyon**
David J. Topping, USGS GCMRC
- 1:20 **A Tale of Two Rivers: Adjustment of Bars to Controlled Flood Releases from Large Dams, Green River in the Canyon of Lodore and Colorado River in Marble Canyon**
John C. Schmidt, Utah State University
- 1:40 **Velocity Distribution in the Pools and Rapids of the Colorado River and the Impact on Aquatic Ecology**
Christopher S. Magirl, USGS
- 2:00 **Effects of the 2008 BHBF on Invertebrates Downstream of Glen Canyon Dam**
Emma J. Rosi-Marshall, Loyola University Chicago
- 2:20 **Evaluating the Effects of Hydropeaking and a Selective Withdrawal Structure on Food Production using Artificial Streams**
Theodore A. Kennedy, USGS GCMRC
- 2:40 **Entrainment of Beads and Marked Razorback Sucker, *Xyrauchen texanus*, Larvae into Depression Floodplain Wetlands of the Middle Green River, Utah, 2004-2006**
Trina N. Hedrick, Utah Division of Wildlife Resources
- 3:00 **Break**
- 3:20 **Establishing Ecological Baselines: How has Over-Allocating the Colorado River Affected Species in the Gulf of California?**
Kirsten Rowell, University of Washington
- 3:40 **A Quantitative Food Web and Ecosystem Production Budget for Glen Canyon, Colorado River**
Colden V. Baxter, Idaho State University
- 4:00 **Characterization of Selenium and Mercury Exposure in the Colorado River Food Web in the Grand Canyon**
David M. Walters, USGS
- 4:20 **Shoreline Habitat and Geomorphic Mapping of the Colorado River Ecosystem in Grand Canyon, Arizona**
Thomas M. Gushue, USGS GCMRC
- 4:40 **Models and Management: Issues of Scale**
Scott A. Wright, USGS
- 5:00 – 10:00 **Informal Social and Poster Session**
The Forum Exhibit Area

Session 2 • Center Ballroom

- 11:20 **Salinity Tolerances for Egg and Larval Stages of Razorback Sucker**
James R. Stolberg, Bureau of Reclamation
- 11:40 **Effectiveness of the Barrier-and-Renovate Approach to Recovery of Warmwater Native Fishes in the Gila River Basin**
Robert W. Clarkson, Bureau of Reclamation
- Noon **Lunch • Paradise Park** (Tent)
- 1:00 p.m. **Modeling the Management of the Lees Ferry Rainbow Trout Fishery**
Andrew S. Makinster, Arizona Game and Fish Department
- 1:20 **Preliminary Results of Rainbow Trout Movement During the 2008 High Flow Experiment**
R. Scott Rogers, Arizona Game and Fish Department
- 1:40 **Effects of a High Flow Event on Sonic Tagged Juvenile and Adult Rainbow Trout Movement in Glen and Marble Canyons, Arizona**
Kara D. Hilwig, USGS GCMRC
- 2:00 **Mechanical Removal of Non-Native Fishes in the Colorado River Within Grand Canyon**
Lewis G. Coggins, USGS GCMRC
- 2:20 **Foraging Ecology of Nonnative Trout in the Colorado River, Grand Canyon: Predation on Native Fishes and the Effects of Turbidity**
Michael D. Yard, USGS GCMRC
- 2:40 **Changes in the Grand Canyon Flannelmouth Sucker Population During a Period of Reduced Salmonid Densities and Warmer Water Temperatures**
R. Scott Rogers, Arizona Game and Fish Department
- 3:00 **Break**
- 3:20 **Opportunities for Co-Managing Native and Non-Native Fishes in a Colorado River Reservoir: Lake Mead, Nevada-Arizona as a Case Study**
Jon C. Sjoberg, Nevada Department of Wildlife
- 3:40 **A National Park Service Plan to Translocate Humpback Chub into Shinumo Creek, Grand Canyon National Park**
William Leibfried, W. Leibfried Environmental Services
- 4:00 **Fish Management in National Park Units Along the Colorado River**
Melissa A. Trammell, National Park Service
- 4:20 **Panel Discussion**
Moderator Sam Spiller, U.S. Fish & Wildlife Service
- 5:00 to 10:00 **Informal Social and Poster Session**
The Forum Exhibit Area

WEDNESDAY NOVEMBER 19

10:00 a.m. – 5:00 p.m. **Concurrent Technical Sessions** (Continued)

Session 3 • Sonora/San Carlos

Monitoring Programs: Design, Case Studies and Linkages to Management

Session Chairs: Dennis M. Kubly and Theresa Olson, Bureau of Reclamation

10:00 a.m. **Monitoring on the Upper Mississippi River System:**

Working Toward Adaptive Management

Barry L. Johnson, USGS, Upper Midwest Environmental Sciences Center

10:20 **Terrestrial LiDAR Topographic Change Monitoring at Archaeological Sites Along the Colorado River Corridor of Grand Canyon National Park, Arizona**

Brian D. Collins, USGS, Western Earth Surface Processes Team

10:40 **High-Resolution Monitoring of Suspended-Sediment Concentration and Grain Size in the Colorado River in Grand Canyon National Park Using Laser-Diffraction Instruments and a Multi-Frequency Acoustic System**

David J. Topping, USGS GCMRC

11:00 **Four Decades of Attempts to Measure Sand Storage in the Colorado River in Grand Canyon: Why Is It So Difficult?**

David M. Rubin, USGS

11:20 **Utah Streamstats: A Web Based GIS Program for Estimating the Magnitude and Frequency of Peak Flows, Monthly Streamflow Statistics, and Annual Streamflow Statistics at Ungaged Sites in Utah**

Christopher D. Wilkowske, USGS, Utah Water Science Center

11:40 **Spatially Referenced Statistical Assessment of Dissolved-Solids Load Sources and Transport in Streams of the Upper Colorado River Basin**

Terry A. Kenney, USGS, Utah Water Science Center

Noon **Lunch • Paradise Park** (Tent)

1:00 p.m. **Yellow-Billed Cuckoo Habitat Use and Its Implications for Riparian Conservation and Restoration**

Matthew J. Johnson, USGS Southwest Biological Science Center

1:20 **Bat Monitoring at Habitat Creation Areas as Part of the Lower Colorado River Multi-Species Conservation Program**

Allen Calvert, Bureau of Reclamation

1:40 **Pit-Tags, Implanters, Readers, and Antennas: Status of the Technology**

Audrey T. Hopkins, Biomark, Inc.

2:00 **Effects of Trammel Nets on Native Arizona Fishes Using Cortisol as a Stress Index**

Teresa A. Hunt, Arizona Game and Fish Department

2:20 **Examination of a Turbidity Threshold That Dictates Hoop Net Catch Rates of Native Fishes in the Little Colorado River, Arizona**

Dennis Stone, U.S. Fish and Wildlife Service

2:40 **Little Colorado River Long-Term Fish Monitoring Trends, 1987-2008**

Brian C. Clark, Arizona Game and Fish Department

3:00 **Break**

3:20 **Closed Population Estimates of Endangered Humpback Chub (*Gila Cypha*) in the Little Colorado River, Grand Canyon, AZ**

David R. VanHaverbeke, U.S. Fish and Wildlife Service

Session 4 • Coronado/Palomas

Riparian System Restoration, Monitoring and Exotic Species Control Efforts

Session Chairs: Barbara E. Ralston, U.S. Geological Survey, and John Swett, Bureau of Reclamation

10:00 a.m. **Irrigation Regime and Vegetation Density Effects on Success of Riparian Revegetation**

Daniel P. Bunting, University of Arizona

10:20 **Direct Seeding for Riparian Revegetation: Feasibility Studies on the Lower Colorado River**

Matthew R. Grabau, GeoSystems Analysis, Inc.,

10:40 **Yuma East Wetlands Restoration Project: A Progress Report**

Frank Protiva, Shephard Wesnitzer, Inc.

11:00 **Imperial Ponds Conservation Area - Accomplishments and Status as of November 2008**

Nathan E. Lenon, Bureau of Reclamation

11:20 **Use Of Tamarisk By Breeding And Migrating Birds Of The Southwest: Implications For Riparian Management**

Charles van Riper III, USGS, Southwest Biological Science Center

11:40 **Two Subspecies of Brown-Headed Cowbird Captured at a Trapping Site Along the Lower Colorado River**

Thomas J. Koronkiewicz, SWCA Environmental Consultants

Noon **Lunch • Paradise Park** (Tent)

1:00 p.m. **Saltcedar (*Tamarix ssp*) Water Use and Ecohydrological Niches on the Lower Colorado River**

Pamela L. Nagler, USGS, Sonoran Desert Research Station

1:20 **Quantifying Soil and Groundwater Chemistry in Areas Invaded by *Tamarix spp* Along the Middle Rio Grande, New Mexico**

Michelle K. Ohrtman, University of Denver

1:40 **Status of Riparian Birds of the Lower Colorado River: Implications for Riparian Habitat Restoration**

Amy J. Leist, Great Basin Bird Observatory

2:00 **Causes, Management and the Future of Exotic Riparian Plant Invasion in Canyon De Chelly National Monument, Arizona**

Lindsay V. Reynolds, Colorado State University

2:20 **Importance of Springs and Springs Ecosystems to Species and Habitats of the Colorado River**

Abraham E. Springer, Northern Arizona University

2:40 **Developing a Long-Term Monitoring Program for Upper Basin National Parks: Challenges and Opportunities of Partnerships**

Dustin W. Perkins, National Park Service

3:00 **Break**

3:20 **Formation of the Green River's Floodplain and Implications for Riparian Ecology**

John C. Schmidt, Utah State University

WEDNESDAY NOVEMBER 19

10:00 a.m. – 5:00 p.m. **Concurrent Technical Sessions** (Continued)

Session 3 • Sonora/San Carlos

- 3:40 **Population Status and Habitat Use of the Flannelmouth Sucker in the Colorado River Below Davis Dam**
Jeff Lantow, Bureau of Reclamation
- 4:00 **Razorback Sucker Population Status in Lake Mohave: Monitoring, Database, Analysis, and Repatriation Program Optimization**
Carol A. Pacey, Arizona State University
- 4:20 **A Standardized Design for Long-Term Quagga Mussel Monitoring in Lake Mead**
David Wong, University of Nevada at Las Vegas
- 4:40 **Campsite Area Monitoring in the Colorado River Ecosystem, 1998-2006, Grand Canyon National Park, Arizona**
Matt Kaplinski, Northern Arizona University
- 5:00 to 10:00 **Informal Social and Poster Session**
Forum Exhibit Area

Session 4 • Coronado/Palomas

- 3:40 **Geologic Controls on Floodplain Lakes in the Lower Colorado River**
Daniel Malmon, USGS
- 4:00 **Can Controlled Floods be used to Restore Floodplain Forests? Experience From the Green River**
David J. Cooper, Colorado State University
- 4:20 **Ecosystem Restoration – Alamo Lake and the Bill Williams River**
William E. Werner, Arizona Department of Water Resources
- 4:40 **15 Years of Managed Reservoir Releases for Native Riparian Tree Recruitment and Tamarix Control Along the Bill Williams River, Arizona**
Patrick B. Shafroth, USGS, Fort Collins Science Center
- 5:00 to 10:00 **Informal Social and Poster Session**
Forum Exhibit Area

THURSDAY, NOVEMBER 20

Plenary Session III – Measuring Societal Values • The Forum

- 8:00 a.m. **Keynote Talk VI**
Economic Values for National Park Service Resources within the Colorado River Watershed
John W. Duffield, Research Professor, Departments of Economics and Mathematical Sciences, University of Montana
- 8:30 **Ex Post Economic Analysis of the Electrical Power System Impacts of Environmental Restrictions at Glen Canyon Dam Following the 1996 Record of Decision**
Thomas Veselka, Energy Systems Engineer, Argonne National Laboratory
- 8:50 **Economic Analysis of Five Options for the Operation of Glen Canyon Dam as Part of Long-Term Experimentation**
S. Clayton Palmer, Environmental Protection Specialist, Western Area Power Administration
- 9:10 **Confluence Of Values: The Role Of Science And Native Americans In The Glen Canyon Dam Adaptive Management Program**
Kurt Dongoske, Acting Director, Zuni Heritage and Historic Preservation Office, Pueblo of Zuni
- 9:40 **Take Home Messages – Stakeholder Perspectives**
Leslie James, Executive Director, Colorado River Energy Distributors Association
Gerald Zimmerman, Executive Director, Colorado River Board of California
John Shields, Interstate Streams Engineer, Wyoming State Engineers Office
Lynn Hamilton, Executive Director, Grand Canyon River Guides
Taylor Hawes, Director, Colorado River Program, The Nature Conservancy
- 10:30 **Break**
- 10:50 **Take Home Messages – Program Leaders**
Upper Colorado River Basin – Recovery Implementation Program
Robert T. Muth, Program Director, U.S. Fish and Wildlife Service
San Juan River Program
David L. Campbell, Director, San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service
Glen Canyon Dam Adaptive Management Program
Dennis M. Kubly, Chief, Adaptive Management Group, Bureau of Reclamation
Lower Colorado River Multi Species Conservation Program
John Swett, Program Manager, Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation
- 11:30 **The Promise and Peril of Collaboration in the Colorado River Basin**
Kirk Emerson, Visiting Professor, School of Public Administration and Policy, University of Arizona and Senior Policy Associate, Udall Center for Studies in Public Policy
- Noon **Closing Remarks**
John F. Hamill, Chief, Grand Canyon Monitoring and Research Center, U.S. Geological Survey

Posters

RELATIONSHIPS BETWEEN STREAMFLOW, BEAVER DAM DYNAMICS, AND AQUATIC HABITAT ON THE BILL WILLIAMS RIVER, ARIZONA

ANDERSEN, DOUGLAS C.¹ and Patrick B. Shafroth²,
¹U.S. Geological Survey, Fort Collins Science Center, c/o Bureau of Reclamation, P.O. Box 25007 86-68220, Denver, CO 80225
²U.S. Geological Survey, Fort Collins Science Center, 2150 Centre Ave., Bldg. C, Fort Collins, CO 80526

DISCREPANCIES IN COLORADO RIVER WATER VOLUMES AND THE NEED TO ADDRESS DISCHARGE ACCURACY AND GAINS IN STREAMFLOW ON THE COLORADO RIVER BETWEEN GLEN CANYON DAM AND LEES FERRY, ARIZONA

ANNING, DAVID W.¹, Hart, Robert J.², and Fisk, Greg G.³
¹U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ 86001; dwanning@usgs.gov
²U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ 86001; bhart@usgs.gov
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FOOD PRODUCTION IN BACKWATERS MAY BE LIMITED DURING FLUCTUATING FLOWS BECAUSE WATER RESIDENCE TIME IS SHORT

BEHN, KATHRINE¹, Theodore A. Kennedy², Robert O. Hall Jr.³
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³Department of Zoology and Physiology, University of Wyoming, Laramie, WY 82071, bhall@uwyo.edu

AEOLIAN REWORKING OF SEDIMENT DEPOSITS FROM THE MARCH 2008 GRAND CANYON HIGH-FLOW EXPERIMENT

DRAUT, AMY E.¹, Hazel, Joseph E. Jr.², Fairley, Helen C.³, and Brown, Christopher R.²
¹U.S. Geological Survey, 400 Natural Bridges Drive, Santa Cruz, CA 95060
²Northern Arizona University, Flagstaff, AZ 86004
³USGS Grand Canyon Monitoring and Research Center, Flagstaff, AZ 86001

APPLYING AN ECOSYSTEM FRAMEWORK TO EVALUATE ARCHAEOLOGICAL SITE CONDITION ALONG THE COLORADO RIVER IN GRAND CANYON NATIONAL PARK, ARIZONA

FAIRLEY, HELEN C.¹
¹USGS Grand Canyon Monitoring and Research Center, Flagstaff, AZ 86001

THE RESEARCH COORDINATION NETWORK FOR THE COLORADO RIVER DELTA: FOSTERING HABITAT RESTORATION AND MONITORING

FLESSA, KARL¹, Zamora-Arroyo, Francisco², Brambila, Rocio³
¹University of Arizona, Department of Geosciences, 1040 Fourth St., Tucson, AZ 85721 kflessa@email.arizona.edu
²University of Arizona, Department of Geosciences, 1040 Fourth St., Tucson, AZ 85721 and Sonoran Institute, 7650 E. Broadway, Suite 203, Tucson, AZ 85710 Fzamora@sonoran.org
³University of Arizona, Department of Geosciences, 1040 Fourth St. Tucson, AZ 85721 brambila@email.arizona.edu

USE OF BIRD MONITORING TO DETERMINE THE EFFECTS OF THE INTRODUCTION OF THE TAMARISK-DEFOLIATING BEETLE (*Diorhabda elongata*) IN DINOSAUR NATIONAL MONUMENT

GROIR, GLENN P.¹
¹Rocky Mountain Bird Observatory, 14500 Lark Bunting Lane, P.O. Box 1232, Brighton, CO 80601-1232

A COMPREHENSIVE HISTORY OF BED DEGRADATION AND CHANNEL ADJUSTMENT FOR THE COLORADO RIVER WITHIN GLEN CANYON NATIONAL RECREATION AREA DOWNSTREAM FROM GLEN CANYON DAM

GRAMS, PAUL¹, John C. Schmidt², David Topping¹
¹U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ 86001
²Department of Watershed Sciences, Utah State University, Logan, UT 84322-5210

NEAR REAL-TIME MONITORING OF HIGH-RESOLUTION SUSPENDED-SEDIMENT DATA ON THE COLORADO RIVER IN GRAND CANYON; IMPLICATIONS FOR RIVER CORRIDOR MANAGERS

GRIFFITHS, RONALD E.¹ and David J. Topping²
¹U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ 86001; rgriffiths@usgs.gov
²U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ 86001; dtopping@usgs.gov

INTERNET MAPPING SERVICES FACILITATE DISTRIBUTION AND ANALYSIS OF SHORELINE HABITAT CLASSIFICATIONS OF THE COLORADO RIVER IN GRAND CANYON

GUSHUE, THOMAS M.¹, Breedlove, Michael J.², Timothy Andrews², Jack C. Schmidt³, and Jered R. Hansen⁴
¹U.S. Geological Survey, 2255 N. Gemini Drive, Flagstaff, AZ 86001
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³Utah State University, Department of Watershed Sciences, Logan, UT 84322
⁴Northern Arizona University, 2255 N. Gemini Drive, Flagstaff, AZ 86001

COMPARING EMPIRICAL AND MODELED LENGTH AT AGE DATA FROM LEES FERRY RAINBOW TROUT

HANGSLEBEN, MATTHEW A.¹, and Andrew S. Makinster¹
¹Arizona Game and Fish Department, Research Branch, 5000 W. Carefree Highway, Phoenix, AZ 85086

ECOSYSTEM FLOW REQUIREMENTS FOR THE BILL WILLIAMS RIVER, ARIZONA, USA: A SUSTAINABLE RIVERS PROJECT

HAUTZINGER, A.B.¹, J.T. Hickey², P.B. Shafroth³, and A. Warner⁴
¹U.S. Fish and Wildlife Service, Division of Natural Resources, Albuquerque, NM 87102
²Hydrologic Engineering Center, Institute for Water Resources, U.S. Army Corps of Engineers, Davis, CA 95616 Hydrologic Engineering Center, Institute for Water Resources, U.S. Army Corps of Engineers, Davis, CA 95616
³U.S. Geological Survey, Fort Collins Science Center, 2150 Centre Ave., Bldg. C, Fort Collins, CO 80526
⁴The Nature Conservancy, Sustainable Waters Program, University Park, PA 16802

DEVELOPING COTTONWOOD-WILLOW LAND COVER TYPE ON AGRICULTURAL FIELDS USING MASS PLANTING TECHNIQUE

IGLITZ, GAIL P.¹ and William L. Singleton²
¹U.S. Bureau of Reclamation –Lower Colorado Region, PO Box 61470, Boulder City, NV 89005; giglitz@lc.usbr.gov
²U.S. Bureau of Reclamation –Lower Colorado Region, PO Box 61470, Boulder City, NV 89005; wsingleton@lc.usbr.gov

TRADITIONAL HUALAPAI ECOLOGICAL KNOWLEDGE AND THE MONITORING PROGRAM IN THE COLORADO RIVER CORRIDOR

JACKSON-KELLY, LORETTA¹, Dawn Hubbs²
¹Hualapai Tribe; Department of Cultural Resources (HDCR),
²Hualapai Tribe; Department of Cultural Resources (HDCR)

RAPID POPULATION EXPANSION AND DISPERSAL OF THE TAMARISK LEAF BEETLE, *DIORHABDA ELONGATA*, IN THE UPPER COLORADO RIVER BASIN

JAMISON, LEVI¹ and Dan W. Bean¹
¹Colorado Department of Agriculture, Biological Pest Control Program, 750 37.8 Rd., Palisade, CO 81526

HIGH-RESOLUTION MULTIBEAM BATHYMETRIC AND TOPOGRAPHIC SURVEYS AT TWO EDDY SANDBARS BEFORE, DURING, AND AFTER THE 2008 HIGH FLOW EXPERIMENT ON THE COLORADO RIVER IN GRAND CANYON

KAPLINSKI, MATT¹, J.E. Hazel, Jr.¹, R. Parnell¹, N. Schott¹, S. Wright²
¹Northern Arizona University, Flagstaff, AZ 86011, matt.kaplinski@nau.edu
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THE DEVELOPMENT OF TWO PORTABLE REMOTE PIT SCANNING SYSTEMS

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ONE-DIMENSIONAL COMPUTER MODEL AND GIS TOOL SET TO PREDICT RIVER STAGE AND INUNDATION ON THE COLORADO RIVER IN GRAND CANYON

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TAKING A STANDARDIZED MULTI-SPECIES APPROACH TO MARSH BIRD MONITORING: A CASE STUDY USING THE YUMA CLAPPER RAIL ON THE LOWER COLORADO RIVER

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USING FIRE TO RESTORE HABITAT QUALITY FOR THE YUMA CLAPPER RAIL AND THE CALIFORNIA BLACK RAIL

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INVASIVE PLANT MANAGEMENT IN THE RIVER CORRIDOR IN DINOSAUR NATIONAL MONUMENT—AN INTEGRATED APPROACH

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SOIL INFILTRATION, SHEAR STRENGTH, AND GULLY EROSION MEASURED ALONG THE COLORADO RIVER—WHAT IS RESPONSIBLE FOR THE EROSION OF CULTURAL SITES?

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NEW CHRONOSTRATIGRAPHIC INVESTIGATIONS OF THE HOLOCENE ALLUVIAL-TERRACE TEMPLATE ALONG THE COLORADO RIVER

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SHORT AND LONG-TERM VEGETATION RESPONSE TO A 60 HOUR, HIGH DISCHARGE RELEASE (41,000 FT³/S) FROM GLEN CANYON DAM

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CHANNEL RESTORATION PLANNING FOR THE COLORADO RIVER AND LULU CREEK, ROCKY MOUNTAIN NATIONAL PARK, COLORADO

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INSTANT GRAINIFICATION: REAL-TIME GRAIN-SIZE ANALYSIS FROM DIGITAL IMAGES IN THE FIELD

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EVALUATION OF SEDIMENT-CONCENTRATION ERRORS ARISING FROM NON-ISOKINETIC INTAKE EFFICIENCY IN DEPTH-INTEGRATING SUSPENDED-SEDIMENT SAMPLERS

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FORAGING ECOLOGY OF PEREGRINE FALCONS (FALCO PEREGRINUS) ALONG THE COLORADO RIVER, GRAND CANYON, ARIZONA

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USING CHANGES IN BED SURFACE GRAIN SIZE AS A PROXY FOR CHANGES IN BED-SAND STORAGE, COLORADO RIVER, GRAND CANYON

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BACKWATER SITE SELECTION FOR RAZORBACK SUCKER (XYRAUCHEN TEXANUS), BONYTAIL (GILA ELEGANS), AND FLANNELMOUTH SUCKER (CATOSTOMUS LATIPINNIS) HABITAT CREATION, IN SUPPORT OF THE LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM

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DISSOLVED ORGANIC CARBON DYNAMICS IN THE COLORADO RIVER, GRAND CANYON

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THE USE OF SPECIFIC CONDUCTANCE IN MEASURING SALINITY AND AS A NATURAL TRACER OF WATER PARCELS IN THE COLORADO RIVER BETWEEN GLEN CANYON DAM AND DIAMOND CREEK, NORTHERN ARIZONA

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INTERACTIONS AMONG RIVER FLOW, GEOMORPHIC PROCESSES, AND RIPARIAN VEGETATION: IMPLICATIONS FOR QUANTIFYING ECOSYSTEM FLOW REQUIREMENTS

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RESTORATION SOUTH OF THE BORDER: OPPORTUNITIES FOR COLLABORATION

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