

Intermountain Region  
Resource Stewardship and Science

National Park Service  
U.S. Department of the Interior



# CROSSROADS IN SCIENCE

*Where the Intermountain Region's Resource Stewardship and Science Programs and Centers Meet*

Fall 2016

*Centennial Issue*



2016

National Park Service™  
CENTENNIAL

**Editorial Director:**

Nida Shaheen, [nida\\_shaheen@nps.gov](mailto:nida_shaheen@nps.gov)

**Editors:**

Robert Parmenter, [robert\\_parmenter@nps.gov](mailto:robert_parmenter@nps.gov)

Nida Shaheen, [nida\\_shaheen@nps.gov](mailto:nida_shaheen@nps.gov)

**Visual Layout:**

Damien Joseph, [damien\\_joseph@nps.gov](mailto:damien_joseph@nps.gov)

**Front Cover:**

Desert View Watchtower at Sunset, Grand Canyon National Park, AZ. (NPS photo).  
A. Sayre Hutchison, Photographer.

# Contents

<b>Welcome Patrick Walsh - Associate Regional Director for Resource Stewardship &amp; Science</b>	<b>1</b>
<b>The Escalante River Watershed Partnership – Glen Canyon National Recreation Area Teams up with Regional Partners to Restore the Escalante River Watershed—Feature NPS Unit</b>	<b>3</b>
<b>Rangeland Health Assessments Inform Grazing Management in Capitol Reef National Park</b>	<b>9</b>
<b>The Intermountain Region’s CESUs: 17 Years of Accomplishments and Future Directions—Feature Program</b>	<b>17</b>
<b>Green Sunfish Early Detection and Rapid Response</b>	<b>27</b>
<b>Park Places: An Innovative Approach to Visitor Engagement—Centennial Project</b>	<b>35</b>
<b>Sonic Booms and Resource Effects: An Unmanned Measurement System for Shock Waves, Structural Vibration, and Potential Damage</b>	<b>39</b>
<b>Underwater Archeology and Climate Change in the NPS Intermountain Region</b>	<b>49</b>
<b>Water Resource Management in an Overtaxed System: The Colorado River Basin</b>	<b>57</b>
<b>An Interdisciplinary Approach to Architectural Analysis at Montezuma Castle National Monument</b>	<b>63</b>
<b>National Park Service Student Internships – Helping to Bridge Natural Resource Science Needs in the Intermountain Region Parks While Developing the Next Generation of Conservation Stewards—Feature Story</b>	<b>71</b>
<b>A Fragile Union of Nature and Culture: Aspen Dendroglyphs in the Valles Caldera National Preserve, A Citizen-Science Success Story</b>	<b>77</b>
<b>When Modern becomes Historic: Mission 66 Era and the National Park Service—Cultural Feature</b>	<b>85</b>



Double rainbow over Glen Canyon National Recreation Area, Lake Powell - Padre Bay. (NPS Photo).

## Patrick Walsh Named Associate Regional Director for Resource Stewardship and Science for the NPS Intermountain Region

Patrick Walsh, a 12-year veteran of the National Park Service (NPS), is the new Associate Regional Director (ARD) for the Resource Stewardship & Science Directorate (RSS) of the Intermountain Region (IMR). Walsh has 22 years professional experience in natural and cultural resource management, and served as the acting IMR RSS ARD in spring of 2016. He served in a similar role at the Midwest Region, in 2012, as acting ARD for Natural Resource Stewardship and Science (NRSS).

“Patrick brings a wealth of resource management experience to the management team of the Intermountain Region,” said Sue E. Masica, Regional Director, IMR.

Walsh had been with the WASO NRSS since 2009, where he served as a Branch Chief of the Environmental Quality Division (EQD). In this position, he oversaw the completion of 22 high-profile environmental planning projects addressing a wide range of park resource management and visitor use challenges. He also led the effort to revise the NPS National Environmental Policy Act (NEPA) Handbook.

“I’m very excited about joining the Intermountain Region team. I’ve seen firsthand the great work they do to help parks protect and manage resources, support informed decision making and improve visitor experience.” Walsh said.

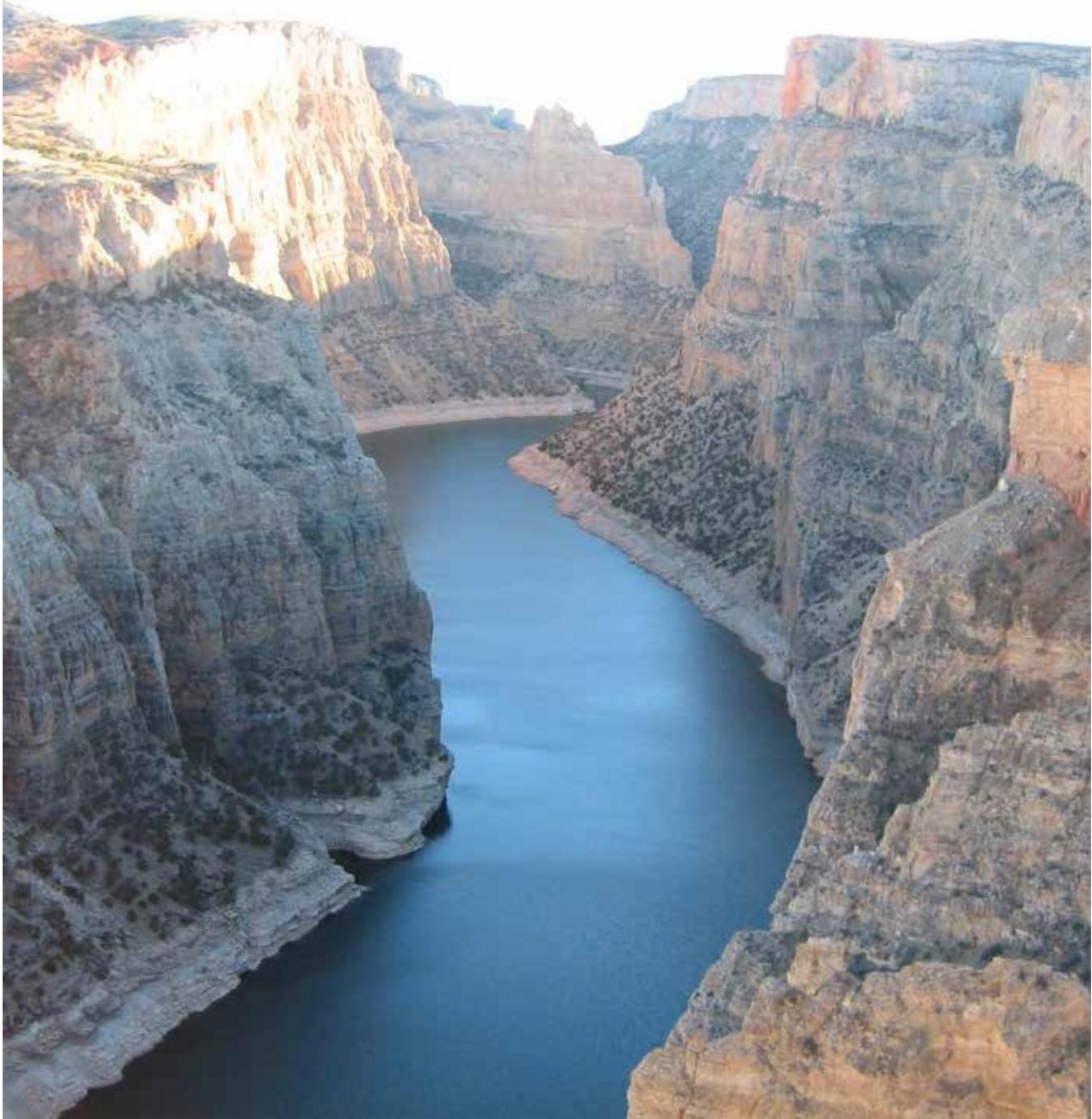
While with NRSS, Walsh completed the Executive Potential Program, a 12-month leadership development program. He also completed details as acting EQD Division Chief, acting NRSS Biological Resources Division Chief, and acting Chief of Compliance & Science Coordination at Yellowstone National Park.

Walsh joined the NPS in 2003 as a Cultural Resource Specialist for the Denver Service Center’s Transportation Division, where he also served as the Compliance Section Supervisor and a Project Manager. Before coming to NPS, Walsh worked for six years as an Archeologist and Environmental Planner for the Naval Facilities Engineering Command at Pearl Harbor, HI. He also worked six years as an Archeologist for private consulting companies in the 1990s.

Walsh earned his bachelor’s degree in Anthropology from the University of Vermont in Burlington, VT, and his master’s in International Studies from the University of Washington in Seattle, WA.



Associate Regional Director Patrick Walsh (NPS photo).



Through the heart of Bighorn Canyon. (NPS Photo).

## — Natural Resources —

**Feature NPS Unit—Glen Canyon National Recreation Area****The Escalante River Watershed Partnership – Glen Canyon National Recreation Area Teams up with Regional Partners to Restore the Escalante River Watershed**

By John Spence, Chief Scientist, Science & Resource Management, Glen Canyon National Recreation Area, [John\\_Spence@nps.gov](mailto:John_Spence@nps.gov); Lonnie Pilkington, Ecologist, Science & Resource Management, Glen Canyon National Recreation Area, [Lonnie\\_Pilkington@nps.gov](mailto:Lonnie_Pilkington@nps.gov); Linda Whitham, Central Canyonlands Program Director, The Nature Conservancy, Moab Project Office, [lwhitham@tnc.org](mailto:lwhitham@tnc.org); Joel Tuhy, Conservation Science Director, The Nature Conservancy, Moab Project Office, [jtuhy@tnc.org](mailto:jtuhy@tnc.org); Michele Straube, Director, Environmental Dispute Resolution Center, Wallace Stegner Center for Land, Resources & Environment, S.J. Quinney College of Law, University of Utah, [Michele.straube@law.utah.edu](mailto:Michele.straube@law.utah.edu); Mike Wight, Corps River Conservation Director, Southwest Conservation Corps, Durango, CO, [mike@conservationlegacy.org](mailto:mike@conservationlegacy.org)

**Introduction**

The Escalante River is one of the last free-flowing rivers in the American Southwest, arising on the Aquarius Plateau and Boulder Mountain in southern Utah at elevations of 3350 meters. It then flows east and south 150 kilometers through deep sandstone canyons, ending at Lake Powell at an elevation of 1130 meters. The watershed includes land managed by three federal agencies, the National Park Service (Glen Canyon National Recreation Area-GLCA), the Bureau of Land Management (Grand Staircase-Escalante National Monument-GSENM) and the USDA Forest Service (Dixie National Forest-DNF), as well as Utah State lands and private lands (Figure 1). The watershed of the river is ca. 525,000 hectares in size, with highly diverse plant and animal communities ranging from high elevation aspen and mixed conifer forests to desert shrublands. Recent surveys in a 1600 hectare area along Deer Creek, a tributary of the Escalante River, revealed remarkable levels of biodiversity (Fertig et al. 2011). For example, about 10% of the native vascular plant flora of the state of Utah was documented in this area, although it only represents 0.3% of the watershed.



Figure 1. The Escalante River Watershed, south-central Utah. NPS lands are in pink, BLM lands in light yellow, and US Forest Service lands in green. Private lands are in gray. The small bright green area near Escalante is the Box-Death Hollow Wilderness Area.

In a scenario played out throughout the western U.S., encroachment by Russian olive (*Elaeagnus angustifolia*, hereafter RO), an exotic tree from Eurasia, has channelized and significantly altered the hydrology, riparian communities and aquatic life along the river. With funding provided by the National Park Foundation, a workshop was organized in 2009 by Glen Canyon National Recreation Area and The Nature



Figure 2. The initial National Park Foundation-supported meeting that led to the creation of the Escalante River Watershed Partnership was held on June 9, 2009, at the Boulder Community Center.

Conservancy to explore options for cooperation and coordination in restoring the Escalante River watershed (Figure 2). As a result, the Escalante River Watershed Partnership (ERWP) was formed, and in the years since has continued to work on numerous issues, expanding beyond RO control to sensitive species and fisheries, spring surveys, forest health, beaver reintroduction, scholarly research and education, and outreach. Currently this award-winning partnership includes partners from federal, state, local, NGO and community stakeholders (Spence and Whitham 2015). This article describes the approach used by ERWP to develop conservation priorities, examines the role collaboration has played in leveraging support, how woody-invasive control and long-term monitoring are used to inform management, and how youth have been engaged in the NPS mission of preserving America's special places, in the context of RO control.

## Initial Planning

Within a year of its creation in 2009, the ERWP realized that its scope needed to be broader than control of woody invasive plants (RO), if it was to work effectively toward its Mission. Therefore a subgroup of the ERWP formed in early 2010 in order to:

Develop and ratify a guiding document that will serve the Partnership as the blueprint

for short and long term goals *“to restore and maintain the natural ecological conditions of the Escalante River and its watershed and involve local communities in promoting and implementing sustainable land and water use practices.”*  
[Mission Statement in italics]

This guiding document came to be known as the Action Plan for the ERWP, and its contents were intended to cover a period of ten years. The subgroup, named the Action Plan Committee, went through a systematic and comprehensive process to develop the Action Plan that would:

1. Address various concerns known to exist in the Escalante River watershed, such as invasive riparian plants, invasive aquatic animals, tree mortality in headwaters forests, and others; and
2. Identify specific actions that, when fully implemented, would achieve the Partnership's mission.

For these purposes, the Action Plan Committee adopted a process developed by The Nature Conservancy known as **Conservation Action Planning (CAP)**. CAP is a relatively fine scale of planning designed to identify specific “things to do” in order to achieve a particular purpose (in this case the mission of ERWP). The fundamental components of the CAP process are shown in the box on the next page.

## Conservation Action Planning (CAP)

### Components / Steps:

1. **SELECT** key features within the area that are the “targets” to be restored or maintained. Within the Escalante River watershed, these targets took the form of particular habitats, several of which had imbedded species of concern such as coldwater and warmwater fishes.
2. **ASSESS** the integrity or “health” of selected habitats and species of concern.
3. **IDENTIFY** factors and activities (“threats”) that are adversely affecting or inhibiting the health of the selected habitats and species of concern.
4. **DEVELOP** strategies and actions with stakeholders to abate impacts, and thus restore or maintain desired levels of health, of selected habitats and species of concern.

Over a period of 1½ years the Action Plan Committee worked through this process, and produced the Partnership’s Ten-Year Action Plan on October 31, 2011 (Tuhy and Spence 2011). The Committee also knew that this plan would require periodic revision as various activities listed within it were accomplished, or as unforeseen opportunities or challenges arose. The Committee therefore created a companion product in tabular (Excel spreadsheet) format that lists for each activity its **timeline**, the **responsible party(ies)** that lead the activity, and estimates of **funding needs and sources**. This Excel table was named the ‘Framework for Action Plan’ and has been updated several times since its original version of October 2011.

## Collaborative Process

ERWP is an informal collaboration, rather than a legal entity of its own, and operates through its committees. Nineteen individuals and organizations have signed the ERWP Partnership Agreement over the past five years, but many more individuals and organizations have participated in ERWP activities and engaged meaningfully in ERWP conversations over the same period of time. Funding is often requested collaboratively (to implement the strategies and actions identified in the Ten-Year Action Plan), but the dollars are received and distributed by a partner organization.

ERWP’s work is identified and monitored through committees, with partner organizations taking responsibility for implementing the coordinated effort. The Coordinating Committee—which includes a representative from each public land management agency (NPS, BLM, USFS), the local NGOs (originally two, now one is most active), conservation corps, and the substantive committee co-chairs—meets regularly to develop full partnership meeting agendas, check in

on the substantive committees’ progress and identify possible areas of duplication, as well as develop outreach about the partnership as a whole, and identify funding opportunities to support partnership capacity. ERWP started with a multitude of committees. Due to overlapping membership and responsibilities, only two substantive committees remain in 2016 – a Woody Invasives Control and Restoration Committee, and a combined Science/Conservation Targets Committee. Each of these committees is responsible for fundraising and outreach related to its specific projects as informed by the Ten-Year Action Plan.

A neutral facilitator from the Environmental Dispute Resolution Program at the University of Utah has been working with ERWP since the beginning to support constructive conversation during full partnership meetings and select committee meetings, and working with the Coordinating Committee to design processes that engage the widest range of stakeholders and encourage full dialogue on controversial issues. Given the partnership’s efforts to continually engage a broader spectrum of stakeholders, including highly diverse national and local community voices, the Coordinating Committee has decided to continue using a facilitator for the foreseeable future. There is the possibility that the group will move toward self-facilitation at some point.

ERWP uses consensus as its decision-making model, striving at all times to explore options that respect the diverse interests at the table. While disagreement is welcome, no partner has veto authority and all participants share the responsibility to identify possible solutions that address the varying perspectives represented in the group. If no consensus can be reached after extensive discussion and additional fact-finding, the group’s Charter does outline a super-majority voting process.

Coordination and collaboration across the three land management agencies working in the Escalante River Watershed is itself challenging, given the geographic distance between their offices and their different institutional missions and organizational structures. Accomplishing the ERWP's goals requires further coordination and collaboration among the interests of state agencies, private landowners, and NGOs. The full partnership meets in Escalante on a quarterly basis to share accomplishments, discuss future activities, and reinvigorate personal connections. The substantive committees often schedule face-to-face meetings built around the partnership meeting. In addition, field trips and educational community evening events are built around the quarterly partnership meetings, to allow the local residents of the watershed to become familiar with the watershed's resources, challenges and potential.

## Woody Invasive Species Control

Starting in 2000, GLCA initiated work removing RO in the lower watershed. By 2008 it was clear that there were not sufficient funds and staff to complete the project. Budgets for both GLCA and the BLM were less than \$50,000 per year for control work. Thus the ERWP was formed to help leverage more support, with remarkable success. Current budgets typically exceed \$1,000,000 per year. Initial planning watershed-wide was completed using satellite imagery (NDVI) and GIS mapping. Estimated total remaining acres of infestation was calculated, and a 5-year plan was initiated throughout the watershed (revised in 2015 to an 8-year plan; online at: <http://escalanteriverwatershedpartnership.org/>).

Much of the river corridor is in remote backcountry settings and proposed wilderness, and the concept of active restoration was not logistically feasible. Fortunately, most portions of the river corridor continued to support native species. In 2010, demonstration projects at the river headwaters and the Highway 12 Bridge were initiated not only to show the type of restoration being done, but to determine the effectiveness of passive restoration. Initial assessments were encouraging, as native species, particularly coyote willow (*Salix exigua*) responded rapidly and developed into dense riparian thickets (Figures 3-4). In order to assess whether the goals of the ERWP were being met for passive restoration, ten long-term permanent monitoring plots were established along the river corridor. At these plots, cross-channel transects sampled riparian vegetation, channel geomorphology,



Figure 3. The Escalante River upstream from the Highway 12 Bridge at Calf Creek, prior to Russian Olive control. The dense silvery-leaved trees in the foreground are Russian Olive.



Figure 4. The Escalante River upstream from the Highway 12 Bridge at Calf Creek, following Russian Olive control. The picture was taken two years after the control work was done.

and stream width and depth (Spence 2012). Current efforts are analyzing the initial monitoring data and will determine whether sufficient statistical power exists in the monitoring program to be able to detect change in riparian vegetation following RO control. This data will be important in reporting back to the federal agencies as well as the funders of the ERWP.

To date, about 80% of the Escalante River corridor and its side canyons has been cleared of RO. A stretch of about 15 miles in upper GLCA and adjacent GSENM portions of the river still need to be cleared. It is likely that control efforts on public lands will be largely completed by 2018, although additional work on

private lands in the watershed will be needed. So after 16 years of work by hundreds of volunteers and youth corps crews, the light at the end of the long arduous RO tunnel can be seen. Once completed, regular maintenance of the river corridor will become the responsibility of the federal agencies.

## Youth Engagement

In 2011, the ERWP was recognized as a model for the Department of Interior's **Americas Great Outdoors (AGO) River Initiative**. AGO has a focus on engaging young people in conservation, connecting Americans to the great outdoors through providing quality jobs, career pathways and service opportunities, enhancing recreational access and opportunities, and raising awareness of the value of the outdoors. ERWP was a perfect match.

The effort to restore the Escalante requires not only coordination and collaboration, but many hands and partners. The partnership has played an integral role in connecting young people to their public lands. Since 2009, ERWP has provided job training opportunities to over 450 AmeriCorps participants working within four corps programs! This is a true collaborative effort to prepare young adults to become the next generation of land and water stewards while enhancing resumes, gaining exposure to land management across agencies and completing miles of watershed restoration in one of the most remote canyons of the Western US.

Multiple 21<sup>st</sup> Century Conservation Service Corps ([www.21CSC.org](http://www.21CSC.org)) member organizations have joined forces to provide numerous youth with opportunities to gain valuable training and experience in habitat restoration, riparian ecology, geology, archaeology, leadership, and risk management. Each fall the ERWP coordinates the largest riparian restoration training in the country, engaging and preparing 80 young adults for chainsaw use, backcountry living, horsepacking, Leave No Trace, plant identification, Wilderness First Aid, flash flood preparedness and more. The trainings are staffed and enhanced by agency participation through field supervision educational talks to help members understand why the grueling work they are about

to undertake is important, and perk their interest in agency careers. Participants "graduate" the training prepared for the work, geared with certifications for the future, and excited to make a difference. Without this enthusiastic, energetic youthful input to the project, completing the RO treatments throughout the watershed would be much more daunting (Figure 5).



Figure 5. A Youth Corps work crew pair cutting Russian Olive along the Escalante River, 2009.

This project has provided youth with marketable resource stewardship job skills and with the knowledge to inspire other youth to become NPS stewards and outdoor enthusiasts. Over \$400,000 in AmeriCorps Education Awards have been earned by participants while restoring nearly 70 miles of river to date. These awards can be used to go to college, earn an EMT certification, go to trade school or pay existing loans. Through the collaboration with corps programs, the ERWP is furthering participants' connection with watershed health, agency positions and future education. ERWP activities embody each of the major themes of the NPS *A Call to Action*, including items such as Step by Step (# 2), Next Generation Stewards (#7), Follow the Flow (# 12), Stop Talking and Listen (# 13), Posterity Partners (# 29), Value Diversity (#36), and Crystal Clear (#37).

## Acknowledgements

The authors would like to thank the many volunteers and youth corps members who have worked tirelessly for years to eliminate Russian olive in the watershed. Financial and in-kind support for the work is gratefully

acknowledged from the Walton Family Foundation, Utah Partners for Conservation Development, The Nature Conservancy-Utah Chapter, Wilderness Volunteers, Sierra Club, and the Tamarisk Coalition. The vision of Bill Wolverton, who started the control work in 2001, was the initial impetus for this project.

---

## References

Fertig, W., L. Whitham and J.R. Spence. 2012. Chapter 9: Knowing the cogs and wheels: the utility of bioblitzes for conservation. Pp. 149-183 In Van Riper, C. III and D. Mattson (eds.). Colorado Plateau IV. Biophysical, socioeconomic and cultural research. Proceedings of the Ninth Biennial Conference. University of Arizona Press, Tucson.

Spence, J.R. 2012. Long-term monitoring following Russian Olive control in the Escalante River Watershed. Monitoring plan and adaptive management. Unpublished Report to the Escalante River Watershed Partnership. National Park Service (available online at: <http://escalanteriverwatershedpartnership.org/>).

Spence, J.R., and L. Whitham. 2015. The Escalante River Watershed Partnership: Conservation of an endangered ecosystem. Pp. 339-352 In: Huenneke, L.F., C. Van Riper III and K.A. Hays-Gilpin (eds.). Colorado Plateau VI. Science and Management at the Landscape Scale. University of Arizona Press, Tucson.

Tuhy, J.S. and J.R. Spence. 2011. Escalante River Watershed Partnership Action Plan. The Nature Conservancy, UT. 15pp+ Appendices (latest version online at: <http://escalanteriverwatershedpartnership.org/>).