Arizona Water Protection Fund
FY 2014 Grant Application Review

Application # WPF0415 **Applicant:** AZ Board of Regents for ASU ORSPA

Title of Project: Ecosystem Services of Urban Riparian Forests

Additional materials were submitted with this application that could not be reproduced and distributed for review. These materials may be reviewed in person at the Arizona Water Protection Fund offices at (3550 N. Central Avenue, 2nd Floor, Phoenix). The additional materials available are the following:

_____ **Maps**
_____ **Photographs**
____✓____ **Disk**
_____ **Other**

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Water Protection Fund

WPF0415

Arizona Water Protection Fund
Application Cover Page
FY 2014

Title of Project: Ecosystem Services of Urban Riparian Forests

Type of Project:
- ☐ Capital or Other
- ☐ Water Conservation
- ☒ Research

Stream Type:
- ☒ Perennial
- ☐ Intermittent
- ☒ Ephemeral

Your level of commitment to maintenance of project benefits and capital improvements:
☐ < 5 years ☒ 5-10 years ☐ 11-15 years ☐ 16-20 years

Applicant Information:

Name/Organization:	Arizona Board of Regents for Arizona State Univ
Address 1:	ORSPA
Address 2:	P.O. Box 876011
City:	Tempe
State:	Arizona
ZIP Code:	85287
Phone:	480-727-7983
Fax:	480-965-2455
Tax ID No.:	[redacted]

Inside an AMA: Yes ☒ No ☐

If yes, which AMA:
- ☒ Phoenix
- ☐ Tucson
- ☐ Prescott
- ☐ Pinal
- ☐ Santa Cruz

Type of Application:
- ☒ New
- ☐ Continuation

Contact Person:

Name:	Avery Wright
Title:	Grant and Contract Officer, Principal
Phone:	480-727-7983
Fax:	480-965-2455
e-mail:	asu.awards@asu.edu

Any Previous AWPF Grants:
☐ Yes ☒ No

If yes, please provide Grant #(s):

Arizona Water Protection Fund Grant Amount Requested:

$45,000.00

If the application is funded, will the Grantee intend to request an advance:
☐ **Yes** ☒ **No**

Matching Funds Obtained and Secured:

Applicant/Agency/Organization:	Amount ($):
1. Applicant	33,268.00
2.	
3.	
Total:	33,268.00

Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions?
☐ Yes ☒ No ☐ N/A In event proposal is approved for award, Arizona State University will negotiate in good faith to develop agreement to support the proposed effort.

Signature of the undersigned certifies understanding and compliance with all terms, conditions and specifications in the attached application. Additionally, signature certifies that all information provided by the applicant is true and accurate. The undersigned acknowledges that intentional presentation of any false or fraudulent information, or knowingly concealing a material fact regarding this application is subject to criminal penalties as provided in A.R.S. Title 13. The Arizona Water Protection Fund Commission may approve Grant Awards with modifications to scope items, methodology, schedule, final products and/or budget.

Avery Wright	Grant and Contract Officer, Principal 480-727-7983
Typed Name of Applicant or Applicant's Authorized Representative	**Title and Telephone Number**
*Avery Wright	08/26/13
Signature	**Date Signed**

Knowledge Enterprise Development
ARIZONA STATE UNIVERSITY

Operations
Office of Research & Sponsored Projects Administration

August 27, 2013

Arizona Water Protection Fund Commission
3550 North Central Avenue, Suite 200
hoenix, Arizona 85012

Subject: Arizona State University proposal no. 14020410; Bateman

To Whom It May Concern,

Enclosed for consideration is a proposal entitled, "Ecosystem Services of Urban Riparian Forests." The University's Principal Investigator is Heather Bateman, PhD, of the Human and Environmental Systems. The proposed performance period is 3/15/14-3/14/15; $45,000 is requested to support the effort.

The proposal was prepared in accordance with Arizona State University, Sponsor program requirements, and Federal policies and guidelines. The proposed budget was developed in accordance with 2 CFR Part 220, ASU Disclosure Statement (DS-2), and the DHHS-negotiated F&A rate agreement dated May 3, 2012. The ASU CAGE code is 4B29; the DUNS is 943360412. In the event the proposal is selected for award, Arizona State University will negotiate in good faith to develop an agreement to support the effort. Any award resulting from this proposal should reflect the recipient as "Arizona Board of Regents for and on behalf of Arizona State University."

Your consideration of this proposal is appreciated. If questions arise regarding technical components of the ASU proposal please contact, Dr. Bateman at Heather.L.Bateman@asu.edu or 480-727-1131. If questions arise regarding budget, administrative, or award matters, please contact the undersigned at ASU.awards@asu.edu.
Thank you for your consideration.

Sincerely,

Avery Wright

Avery Wright, MBA, CRA
Grant and Contract Officer, Principal

EXECUTIVE SUMMARY

One of the most important ecosystem services that arid-region riparian ecosystems provide is the provision of habitat for birds and other wildlife. The relationships between habitat structure and animal species diversity are well established in the ecological literature, particularly for birds. Habitats that are structurally and compositionally diverse, such as riparian corridors along perennial, free-flowing streams, provide greater area and varied resources (thus more species) compared to more compositionally and structurally homogeneous habitats. The relationship between stream flow regime and riparian vegetation structure, composition and diversity also is well documented, with winter flood pulses creating opportunities for establishment of regionally-adapted tree species and base lows critical for maintaining then throughout the summer dry season.

As the desert Southwest increases in human population, rivers increasingly are being influenced by urbanization. Urbanization typically results in altered flow regimes, and drives shifts in plant and animal communities, often reducing valued ecosystem services. However, urban rivers do retain some degree of flood pulsing and have "new" water sources including municipal effluent and storm drain outflows. Research is needed to determine the extent to which these urban river flows are sustaining wildlife populations and the riparian habitat they depend on, and to determine effective ways to increase wildlife habitat and associated recreational opportunities.

We test three hypotheses relating to linkages between surface water flows, habitat structure (vegetation attributes), and bird abundance along the Salt River in central Arizona. We build upon two years of previously collected data to determine the drivers shaping the plant and bird communities. Based on our research results, we will be able to provide recommendations to managers interested in restoring ecosystem services to the Salt River and other urban streams in the Southwest.

PROJECT OVERVIEW

Background

Two of the important ecosystem services provided by arid-region riparian ecosystems are the creation of habitat for birds and other wildlife and the creation of desirable spaces for recreation. The relationships between habitat structure and animal species diversity are well established in the ecological literature, particularly for birds (MacArthur and MacArthur 1961). Habitats that are structurally and compositionally diverse with respect to their vegetation and flora can sustain larger numbers of bird species compared to more compositionally and structurally homogeneous habitats (McElhinny et al. 2005; Kissling et al. 2008). Free-flowing riparian corridors in the arid Southwest are known to provide these heterogeneous habitats and sustain a high diversity of bird species (Powell and Steidl 2000; Powell and Steidl 2002). In turn, these species-rich areas provide locations for people to engage in recreational activities including bird-watching (McFarlane and Boxall 1996).

As cities expand throughout the world, rivers and their riparian zone increasingly are being influenced by urbanization. Many of the rivers that flow through urban areas, including the Salt River in Phoenix, have different flow regimes from their rural counterparts and support different biotic communities (Graf 2000). Most urban rivers are regulated by upstream dams, and thus have altered timing, duration and frequency of floods. Although many urban river channels in arid regions have been dewatered, there are reaches that flow owing to a combination of discharge from municipal wastewater treatment plants and outflow from storm drains. Alterations to the ecological disturbance regime are well known to influence composition and diversity of plant species and of vegetation structural types, as do alterations to the resources (water and nutrients) used by plants (Stromberg et al. 2007).

There are many questions in need of answer relating to how urbanization alters stream flow patterns, riparian plant communities and their associated bird life. Can urban rivers sustain diverse bird communities, and can water flows and vegetation can be managed or restored to provide the desired range of ecosystem services (Bernhardt and Palmer 2007). To effectively manage urban streams and provide desired levels of wildlife habitat and recreational opportunities, we need a better understanding of the linkages between abiotic factors, riparian vegetation, and birds (Everard and Moggridge 2012).

Goals and Objectives

Applied management and restoration requires place-specific study. We focus on the urban Salt River with overall goals of:

1) determining how the urban stream flow regime has been altered
2) determining how stream flow alterations have influenced the floristic composition, species diversity, and phsyiognomic structure of riparian forests
3) compare bird habitat quality between reaches of the river with different degrees of structural and compositional complexity
4) suggest management strategies to restore bird-rich riparian forests to urban rivers

Issue #1. Stream flow patterns, and particularly flood timing, are known to regulate establishment of the two keystone pioneer tree species-Fremont cottonwood (*Populus fremontii*) and Goodding willow (*Salix goodingii*) that dominates the floodplain forests of wildland rivers (Stromberg et al. 2007). Because of its great height and dense canopy, Fremont cottonwood

creates a high degree of vertical habitat complexity. On the urbanized Salt River, however, this species is very sparse (Fig. 1), being most prevalent in the planted and restored Rio Salado restoration area (Fig. 2). Goodding willow, in contrast, is thriving in the urban riparian environment. What environmental conditions are allowing for recruitment and survival of Gooding willow but restricting the abundance of Fremont cottonwood? Both species are salt intolerant, and both are fairly shallow rooted and drought intolerant (Busch and Smith 1995). They differ, however, in their timing of seed dispersal.

Urban rivers such as the Salt support a diverse mix of tree species, including many not found on wild rivers (Fig. 1). One common species along the Salt River is the circum-global Chinese tamarisk (*Tamarix chinensis*). A related plant, Athel tamarisk (*Tamarix aphylla),* however, is very sparse on the Salt River. Other naturalized trees species that are common along the urban Salt River are Chaste tree (*Vitex agnus-castus*) and various species of Australian *Acacia* such as shoestring acacia (*A. stenophylla*). Many factors can influence the establishment and population dynamics of tree species including seed size, mechanisms of seed dispersal, and timing of seed dispersal relative to flood disturbance (Stella et al. 2006; Stromberg and Boudell 2013; Kehr et al. in press). For example, our preliminary data indicates that Athel tamarisk sets seed late in summer, while Chinese tamarisk has a bimodal seed production pattern; thus, Athel tamarisk may be precluded from rivers such as the flow-regulated Salt which do not experience a strong monsoon flooding season. Understanding why certain landscape tree species establish on the urban river, while others do not, is important. It also is important to determine the degree to which these new species provide valued ecosystem services. These issues will only increase in importance as Arizona continues to urbanize.

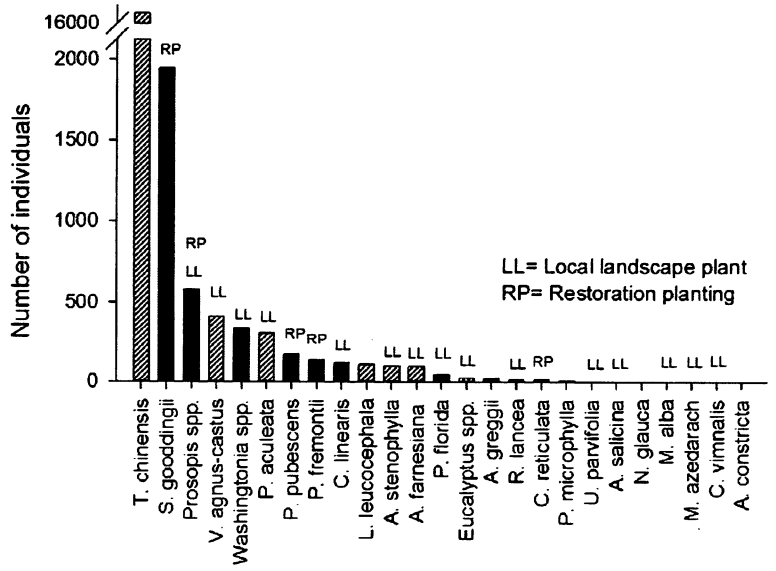


Fig 1. Total number of individuals, by tree species, sampled along the urban Salt River within 34 belt transects (Stromberg, unpub. data). Introduced species are indicated by cross-hatching. Species that are common landscape plants are indicated by "LL". "RP" indicates a species that was planted as part of an ecosystem restoration project.

Our first objective is to test the following two related hypotheses: **Hypothesis #1: Fremont cottonwood is sparse on flow-regulated urban desert rivers because the flood hydrographs are skewed against early-seeding species (such as Fremont cottonwood) and**

in favor of later-seeding species (such as Goodding willow and Chinese tamarisk). To test this hypothesis we will quantify phenological patterns of seed dispersal and relate these to USGS stream gage data. If phenology is a key factor, then Fremont cottonwood could be restored to flow-regulated urban rivers by modifying patterns of water release during wet years.

Hypothesis #2. Introduced trees that have naturalized along the urban Salt River share a suite of common factors including viable seeds present over long periods of time providing them with flexibility in germnination time. We address this hypothesis by tracking seed dispersal phenology and measuring seed traits of tree species that are abundant in the urban Salt River and of species that are sparse along the River.

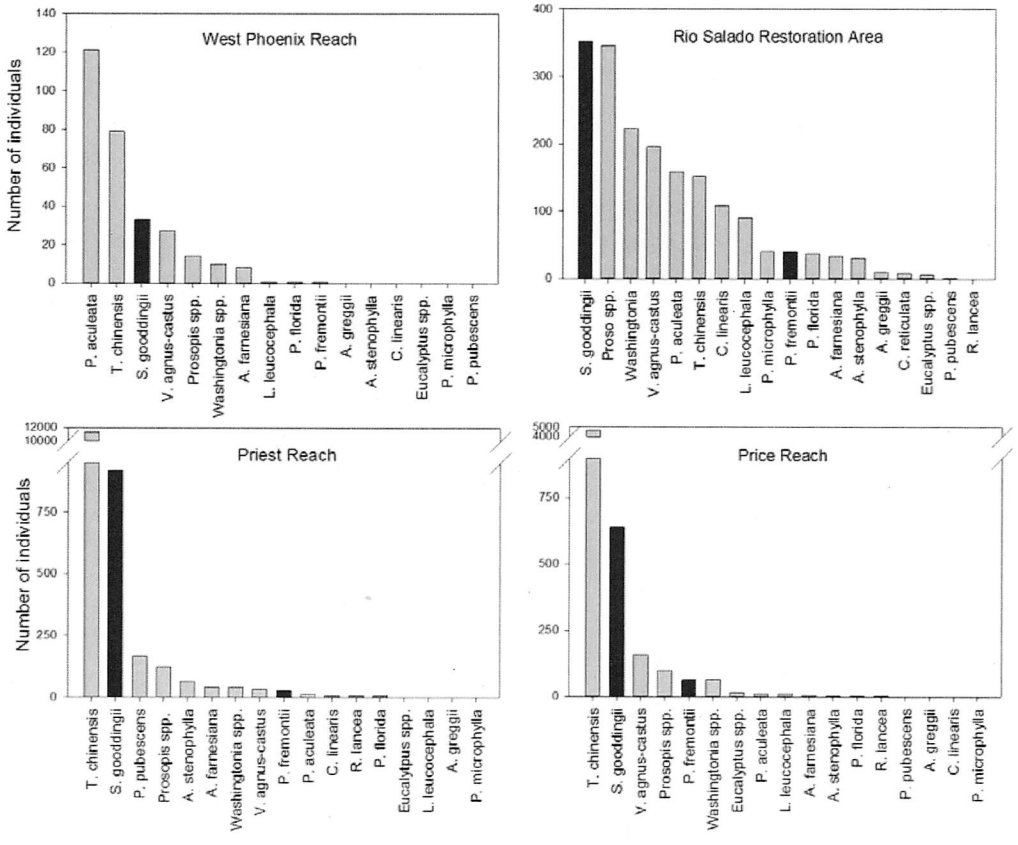


Fig 2. Total number of individuals, by tree species and river reach, sampled in belt transects along the urban Salt River (Stromberg, unpub. data). Keystone species of wild rivers are highlighted in black. Sampling area varies between river reaches.

Issue #2. Preliminary data collected over a two-year period along the Salt River (Fig. 3), during fall and spring migration, indicates that pockets of riparian and wetland vegetation created by storm drain discharge (urban runoff) support diverse riparian and wetland taxa, including waterbirds and neotropical migrants (Bateman et al. unpub. data). The habitats that sustain these birds vary in composition, ranging from single-species stands of cottonwood, to mixtures of willow and tamarisk, and to more species-rich assemblage that includes naturalized landscape plants. They also differ in structure, with some supporting tall multi-layer forests and others consisting of a single layer, and in food resources provided, with some providing fruit for fruit-eating birds or large seeds for small mammals. This urban riparian habitat can be defined in

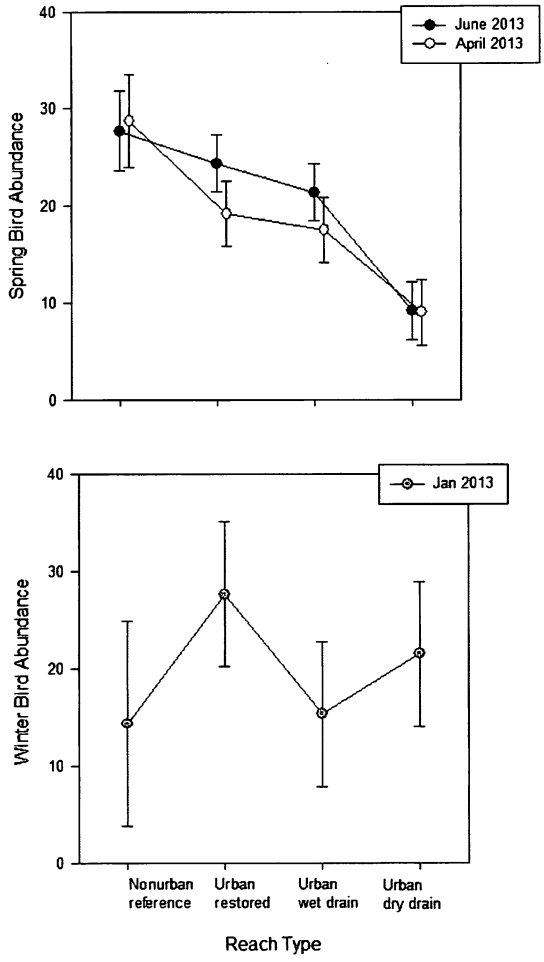


Fig 3. Mean and SE of bird abundance detected along the urban Salt River within four different reach types (Bateman, unpub. data). Bird abundance is lowest at urban dry drain sites during spring and summer surveys.

terms of vegetation structure and provisions (sensu Canterbury et al. 2000). The combination of certain tree species may create a more diverse bird assemblage, particularly if it is rich in structural complexity (Sogge et al. 2013).

Our second objective is to test the following hypothesis: **Riparian stands of varying tree species composition can support a diverse bird assemblage if their vegetation structure is similar**. To test our hypothesis, we relate riparian bird abundance to vegetation structural characteristics and compare bird communities across riparian stand types using multivariate analyses and ordinations.

Our final objective is to provide recommendations to resource managers based upon the results of this study. We will suggest management strategies for allowing for natural recruitment of keystone riparian tree species and identify important elements of habitat to restore bird-rich riparian forests to urban rivers.

Project Location & Environmental Contaminant Information
FY 2014

Project Location Information

1. County: Maricopa	2. Section: 1 N	3. Township: 1E to 4E	4. Range: see attached

5. Watershed: Salt River

6. 8 or 10 Digit Hydrologic Unit Code (HUC): 15060106 and 15060105

7. Name of USGS Topographic Map where project area is located: Tempe; Mesa; Phoenix; Fowler; Granite Reef Dam; Stewart Mountain Dam

8. State Legislative District: 19, 23, 25, 26, 27

(Information available at: http://azredistricting.org/districtlocator/

9. Land ownership of project area: City of Phoenix, City of Tempe, Maricopa Flood Control Dist., Tonto National Forest

10. Current land use of project area: Urban and Rural

11. Size of project area (in acres): 250

12. Stream Name: Salt River

13. Length of stream through project area: 45 miles

14. Miles of stream benefited: 45 miles

15. Acres of riparian habitat: See attached Table acres will be:

- ☐ Enhanced
- ☐ Maintained
- ☐ Restored
- ☐ Created

16. Provide directions to the project site from the nearest city or town. List any special access requirements:

See Attached Table

Environmental Contaminant Location Information

1. Does your project site contain known environmental contaminants? ☐ **YES** ☒ **NO** If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:

2. Are there known environmental contaminants in the project vicinity? ☐ **YES** ☒ **NO** If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:

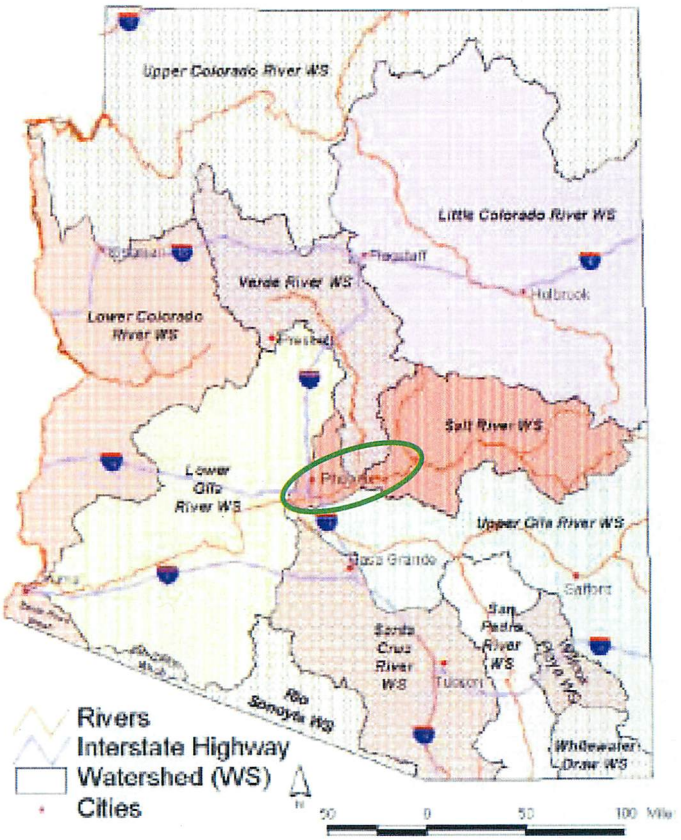
3. Are you asking for Arizona Water Protection Fund monies to identify whether or not environmental contaminants are present? ☐ **YES** ☒ **NO**

Arizona Watershed Map
FY 2014

Title of Project: Ecosystem Services of Urban Riparian Forests

PROJECT MAPS

Arizona Watershed Map and Project Location Information



The Salt River (green circle) is a large desert river that drains a watershed of 35,000 km^2 at Priest Drive (USGS 09512165, Salt River at Priest Drive) and has mean annual flow of 28,000 cfs below Stewart Mountain Dam (USGS 09502000, Salt River below Stewart Mountain Dam; http://nwis.waterdata.usgs.gov). In the early 1900s, the Salt River was dammed and flow regulated upstream of Phoenix to provide water for irrigated agriculture. Prior to this time, the Salt River laterally migrated within a flood plain that was up to two miles wide and sustained riparian plant communities including Sonoran Riparian cottonwood- willow forests (*P. fremontii – S. goodingii*), marshlands, mesquite (*Prosopis* sp.) forests, and saltbush *Atriplex* sp. shrublands. The Salt River today is wholly diverted into a series of delivery canals at Granite Reef Diversion Dam, resulting in a desiccated river bed over much of its length through Phoenix. Although much of the riverbed is dry, portions receive water seasonally or year-round owing to storm water discharge, release of municipal effluent, or discharge of pumped groundwater. Following large floods in the 1970s and 1980s, portions of the river were channelized (creating a deep but narrow river bed) to allow for greater flood water conveyance, and the storage capacity of the upstream reservoir system was expanded (Graf 2000; Roberge 2002).

At the Salt River, we focus on five reaches: 1) **a non-urban reference** site in the Tonto National Forest near the intersection of Bush Highway and Usery Pass Road. This site is upstream of Granite Reef Diversion Dam and has perennial flow, although the magnitude and timing of flows are altered by upstream dams. 2) **An area wetted by storm drains** near the Price Drained. 3) **An area recently wetted by storm drains** in Tempe between Tempe Town Lake Dam and Priest Road. This site has only recently had perennial flows. When Tempe Town Lake was constructed, storm drains in the area were rerouted and combined, creating perennial flow from the storm drain located just below the dam (Basil Boyd, 2013, City of Tempe, pers. comm.) 4) A**n urban restored site**, the Phoenix Rio Salado Habitat Restoration Area, which spans a 5-mile stretch of the Salt River from 24th Street to 19th Ave. Restoration actions that were taken here include re-contouring the landscape, installing drip irrigation systems, planting of trees and

shrubs, low flow channel stabilization, and construction of a groundwater delivery system (supply wells provide water for the terrace plantings and the constructed wetlands). The low-flow channel has intermittent to perennial flow owing to outfall from storm drains. No plantings were made in the low-flow channel zone. 4) **An area that is ephemerally wetted by storm drains.** The 5 miles of the river downstream from the Rio Salado Habitat Restoration Area is the driest of the reaches, being mostly ephemeral, with seasonal discharge of water from several storm drains. Reach elevation ranges from 285 to 420 meters.

SCOPE OF WORK

Task 1. Permits
Description: Obtain permits to access riparian land owned or managed by the Cities of Phoenix and Tempe, and the U.S. Forest Service (Tonto).
Purpose: We require access to field sites along the Salt River.
Deliverable: Access letters.
Due Date: Prior to data collection in Spring 2014
Task Cost: $450 (1% of total budget)

Task 2. Stream hydrology
Description: The presence or absence of stream flow will be measured monthly at each of our study reaches, to characterize the dry-season flow patterns. Mean daily stream flow data will be downloaded from USGS stream gauge sites located along the urban and non-urban sections of the Salt River, to characterize flood patterns. For all major floods that have occurred in the Salt River during the past 20 years, we will examine the descending limb of the hydrographs and determine the time period over which near-channel study sites would be wetted.
Purpose: The data will tell us when and how frequently soils in the Salt River are wetted by flood pulses and by other urban water sources. Together with the phenology data (see below), this will tell us which tree species have seeds available to germinate, and which do not, during periods with wetted soils. This will help us determine whether altered flood timing is preventing some species from establishing along the rivers.
Deliverables: 1) Figures of stream flow and flood hydrographs, including large events that occur in different seasons of the year. 2) Written summary of analysis of flood patterns in relation to phenology of tree seedling establishment.
Due date: December 31, 2014
Task cost: $6,750 (15% of total budget)

Task 3. Riparian vegetation: phenology, traits, composition, and structure
Description. Vegetation will be measured at point count stations to quantify habitat structure. We will quantify vegetation cover, foliage height diversity, canopy heterogeneity and tree size class (by species) in 30-m plots around each bird point count station (see below). The onset and duration of flowering and seed dispersal will be determined for five tree species that are abundant along the Salt River and five tree species that are sparse along the River. Seeds will be

collected from these 10 tree species and assessed for viability, longevity, size and dispersal mechanisms.
Purpose: The vegetation structure data will tell us how structurally diverse the riparian forests are in reaches of the Salt River with different stream flow regimes. The size structure data will be an indicator of how frequently each tree species has established along the river, and will tell us which tree species are increasing in abundance and which are decreasing. The phenology and seed trait data will tell us when seeds are ripe and germinable, and when they are not. This is important as it relates to when soils are wetted and when germination can occur. The seed trait data also will provide us with an indication of the food resources available for seed and fruit-eating birds.
Deliverables: 1) Tables and figures describing the vertical and horizontal structural complexity of the riparian forests, by study reach. 2) Figures of abundance by stem size class for the tree species. 3) Figures of phenology patterns through time for ten tree species, including those abundant along the Salt River and those that are sparse. 4) Tables indicating seed size and seed dispersal mechanism of the dominant tree species present in each study reach. 5) Written summaries of the tables and figures.
Due date: March 14, 2015
Task cost: $15,300 (34% of total budget)

Task 4. Bird habitat assessment
Description: Bird surveys will be conducted in established bird point count stations along reaches of the Salt River in the greater Phoenix-metro area and adjacent to Tonto National Forest. The birds will be monitored during May and June using 10-minute, 50-m radius point counts. Abundances will be calculated for the following species: Yellow Warbler (*Dendroica petechia*), Yellow-breasted Chat (*Icteria virens*). Additional focal species may include Abert's Towhee (*Pipilo aberti*) and Verdin (*Auriparus flaviceps*). Locations of the bird monitoring correspond to the sites to be measured for vegetation structure and composition.
Purpose: Explanation of factors contributing to variance in bird communities across various riparian stand types and to provide recommendations for managing urban watersheds for sustaining riparian forests and riparian birds.
Deliverables: 1) Lists of bird species recorded along the Salt River, by stream reach types, and habitat conditions associated with each bird. 2) Summary of patterns for forest stands vegetated by trees of different species and of different structure.
Due date: March 14, 2015
Task cost: $13,500; (30% of total budget)

Task 5. Final report
Deliverable: Final report, including introduction, methods, objectives, results, discussion, and conclusions.
Due date: March 14, 2015
Task cost: $9,000; (20% of total budget)

Budget Summary

					Year 1	Summary
Other Personnel*						
Grad Students - MS	Yr 1	2	@	9.00 P-Mos per year	$17,354	$17,354
	Yr 2	0	@	0.00 P-Mos per year		
	Yr 3	0	@	0.00 P-Mos per year		
Hourly Students	Yr 1	2	@	3.00 P-Mos per year	$7,800	$7,800
	Yr 2	0	@	0.00 P-Mos per year		
	Yr 3	0	@	0.00 P-Mos per year		
				Total Other Personnel	$25,154	$25,154
				Total Salaries and Wages	**$25,154**	**$25,154**
Fringe Benefits						
Faculty and Academic Professionals					$0	$0
Staff (50% LOE or more)					$0	$0
Post Doc					$0	$0
Students					$1,601	$1,601
				Total Fringe Benefits	**$1,601**	**$1,601**
				Total Salaries, Wages, & Fringe Benefits	**$26,755**	**$26,755**
Travel						
Domestic Travel					$800	$800
Foreign Travel					$0	$0
				Total Travel	**$800**	**$800**
Other Direct Costs - Included in MTDC						
Materials & Lab Supplies					$300	$300
				Total Other Direct Costs - *Included in MTDC*	**$300**	**$300**
Other Direct Costs - Not included in MTDC						
Tuition Remission					$14,896	$14,896
				Total Other Direct Costs - *Not* *Included in MTDC*	**$14,896**	**$14,896**
Modified Total Direct Costs (MTDC)					**$27,855**	**$27,855**
Total Direct Costs					**$42,751**	**$42,751**
Facilities & Administrative Costs (F&A)						
Rate negotiated with the DHHS					**$2,249**	**$2,249**
Total Project Costs					**$45,000**	**$45,000**

DETAILED BUDGET BREAKDOWN

We request a total of $45,000 for the period of March 15, 2014 through March 14, 2015.

Direct labor costs.
Personnel: Personnel costs come to $25,154. Two Arizona State University graduate students will be funded at 50% time on a Research Assistantship for one academic semester each. Graduate student Research Assistant salary rates are $8,677 per semester. Two hourly students will be funded at a rate of $15/hour for 20 hours per week for 12 weeks.

Fringe benefits: Fringe benefits total $1,601. ASU fringe benefits are budgeted in proposals for sponsored projects based on rates presented in the Federally-negotiated Rate Agreement. The current Rate Agreement was approved May 29, 2013; it defines FY14 fringe benefits rates which are 28.8% for faculty, 7.70% for Graduate RAs, and 2.80% for hourly students. Benefit costs are expected to increase approximately 3% per year; hence, the rates used in the proposal budget is for FY15 and are based on the FY14 approved rate, escalated by 3% per year.

Other direct Costs
Travel: Travel costs of $800 are requested to cover 1) mileage to the field sites (round trips from Phoenix Arizona, at 44.5 cents per mile); 2) travel to a regional conference to present research results.

Supplies: Supplies total $300 for sandpaper and miscellaneous consumables

Graduate Tuition Remission. Tuition is included as a benefit for graduate students and is charged to projects in proportion to the amount of effort the graduate student will work on the project. The tuition charge for graduate students for one semester is $7,448 for FY 15. Tuition charges are exempt from the Facilities and Administrative (F&A) costs.

Administrative costs.

By statute, the total administrative costs charged to AWPF are 5% of the total project costs requested.

Cost Share/Match

Direct labor costs.
Dr. Bateman holds a 9 month appointment as an Assistant Professor. She will donate one month of her time during the summer of 2014. Dr. Bateman's academic salary is $70,703. Fringe benefits total $2,330.

Dr. Stromberg holds a 9 month appointment as an Associate Professor. She will donate one month of her time during summer of 2014. Dr. Stromberg's academic year salary is $63,750. Fringe benefits total $2,158.

ERE (Employee related expenses) rates are 29.66% for FY15.

The ASU indirect rate agreement approved by DHHS on May 29, 2013 is 54%. The difference in IDC between the 54% and the 5% is included as a matching cost. The total cost-share is $33,268.

COST SHARING BUDGET		Start Date: 3/15/2014			Sponsor:			ASU ARIZONA STATE UNIVERSITY	
Year 1 Total =	$33,268	End Date: 3/14/2015						Year 1	Summary
Summary Budget =	$33,268								36 mos
Total Years =	1.00	PI Name: Bateman, Heather			PI Phone:				
1. DIRECT COSTS		PI e-mail:						1.00	
1.A. SALARIES, WAGES, BENEFITS & INS									
				/mos	# mos	% effort			
Faculty Salaries									
PI: Bateman, Heather		AY Salary:	$70,703	$7,856	0.00	0.000%		$0	$0
AY LOE Yr 1 =	0.00	person months							
Sum LOE Yr 1 =	1.00	person months		$7,856	1.00	100.000%		$7,856	$7,856
Total LOE Yr 1 =	1.00								
Count =	1					SUB-TOTAL Salary=		$7,856	$7,856
						ERE		$2,330	$2,330
						Total Salary & ERE		$10,186	$10,186
Co-PI: Stromberg, Juliet		AY Salary:	$65,471	$7,275	0.00	0.000%		$0	$0
AY LOE Yr 1 =	0.00	person months							
Sum LOE Yr 1 =	1.00	person months		$7,275	1.00	100.000%		$7,275	$7,275
Total LOE Yr 1 =	1.00								
Count =	1					SUB-TOTAL Salary=		$7,275	$7,275
						ERE		$2,158	$2,158
						Total Salary & ERE		$9,433	$9,433
Sub-Total Faculty Salaries				2 = # of senior personnel				$15,131	$15,131
TOTAL SALARIES & WAGES								$15,131	$15,131
Faculty Benefits		29.66%	30.55%	31.47%				$4,488	$4,488
Staff Benefits - 50% or more		38.52%	39.68%	40.87%				$0	$0
Post Doctoral Associate		26.06%	26.84%	27.65%				$0	$0
RA/TA Benefits		7.93%	8.17%	8.41%				$0	$0
Hourly Student Benefits		2.88%	2.97%	3.06%				$0	$0
Sub-Total Benefits								$4,488	$4,488
TOTAL SALARIES & BENEFITS								$19,619	$19,619
1.B. TRAVEL									
Travel - In State	Per diem	# days> 0			/day> $0.00			$0	$0
	Lodging	# nights> 0			/night> $0.00			$0	$0
	Transportation	plane fare> $0.00			rental car> $0.00			$0	$0
	Registration	$0.00			other> $0.00			$0	$0
	TOTAL In-State							$0	$0
Travel - Out State	Per diem	# days> 0			/day> $0.00			$0	$0
	Lodging	# nights> 0			/night> $0.00			$0	$0
	Transportation	plane fare> $0.00			rental car> $0.00			$0	$0
	Registration	$0.00			other> $0.00			$0	$0
	TOTAL Out-State							$0	$0
Travel - Foreign	Per diem	# days> 0			/day> $0.00			$0	$0
	Lodging	# nights> 0			/night> $0.00			$0	$0
	Transportation	plane fare> $0.00			rental car> $0.00			$0	$0
	Registration	$0.00			other> $0.00			$0	$0
	TOTAL Foreign							$0	$0
TOTAL TRAVEL								$0	$0
1.E. TOTAL DIRECT COSTS								$19,619	$19,619
FACILITIES & ADMINISTRATIVE COSTS (F&A)				54.0% MTDC Year 1				$0	$0
				54.5% MTDC Year 2					
				54.5% MTDC Year 3					
Year 1 waived F&A from proposal budget =				49.0% of original MTDC				$13,649	$13,649
Year 2 waived F&A from proposal budget =				0.0% of original MTDC					$0
Year 3 waived F&A from proposal budget =				0.0% of original MTDC					$0
2. TOTAL FACILITIES & ADMINISTRATIVE COSTS (F&A)								$13,649	$13,649
3. TOTAL PROJECT COSTS								$33,268	$33,268

SUPPLEMENTAL INFORMATION

STATE HISTORIC PRESERVATION OFFICE
Review Form

In accordance with the State Historic Preservation Act (SHPO), A.R.S. 41-861 *et seq*, effective July 24, 1982, each State agency must consider the potential of activities or projects to impact significant cultural resources. Also, each State agency is required to consult with the State Historic Preservation Officer with regard to those activities or projects that may impact cultural resources. Therefore, it is understood that **recipients of state funds are required to comply with this law** throughout the project period. All projects that affect the ground-surface that are funded by AWPF require SHPO clearance, **including those on private and federal lands.**

The State Historic Preservation Office (SHPO) must review each grant application recommended for funding in order to determine the effect, if any, a proposed project may have on archaeological or cultural resources. To assist the SHPO in this review, the following information MUST be submitted with each application for funding assistance:

- A completed copy of this form, and
- A United States Geological Survey (USGS) 7.5 minute map
- A copy of the cultural resources survey report if a survey of the property has been conducted, and
- A copy of any comments of the land managing agency/landowner (i.e., state, federal, county, municipal) on potential impacts of the project on historic properties.
  NOTE: If a federal agency is involved, the agency must consult with SHPO pursuant to the National Historic Preservation Act (NHPA); a state agency must consult with SHPO pursuant to the State Historic Preservation Act (SHPA),
  OR
- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

Please answer the following questions:

1. Grant Program: Arizona Water Protection Fund

2. Project Title: Ecosystem Services of Urban Riparian Forests

3. Applicant Name and Address: Arizona Board of Regents for Arizona State University, ORSPA, PO Box 876011, Tempe, AZ 85287

4. Current Land Owner/Manager(s): Various

5. Project Location, including Township, Range, Section: See Attached Table

6. Total Project Area in Acres (or total miles if trail): 250

7. Does the proposed project have the potential to disturb the surface and/or subsurface of the ground? ☐ YES ☒ NO

8. Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected: Walking in study area to count plants and animals

9. Describe the condition of the current ground surface within the entire project boundary area (for example, is the ground in a natural undisturbed condition, or has it been bladed, paved, graded,

etc.). Estimate horizontal and vertical extent of existing disturbance. Also, attach photographs of project area to document condition: Floodplain, ground disturbed with sandy or cobble substrate.

10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?
☐ YES ☒ NO

11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?
☐ YES ☐ NO ☒ UNKOWN

If YES, submit a copy of the survey report. Please attach any comments on the survey report made by the managing agency and/or SHPO

12. Are there any buildings or structures (including mines, bridges, dams, canals, etc.). which are 50-years or older in or adjacent to the project area? ☐ YES ☒ NO

If YES, complete an Arizona Historic Property Inventory Form for each building or structure, attach it to this form and submit it with your application.

13. Is your project area within or near a historic district? ☐YES ☒ NO

If YES, name of the district:

Please sign on the line below certifying all information provided for this application is accurate to the best of your knowledge.

Avery Wright / 08/27/13
Applicant Signature /Date

Avery Wright, MBA, CRA
Grant and Contract Officer Principal
Applicant Printed Name

FOR SHPO USE ONLY
SHPO Finding: ☐ Funding this project will not affect historic properties. ☐ Survey necessary – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*) ☐ Cultural resources present – further GRANTS/SHPO consultation required (*grant funds will not be released until consultation has been completed*)
SHPO Comments
For State Historic Preservation Office: Date:

Proposal Title: Ecosystem Services of Urban Riparian Forests

Principal Investigators: Heather Bateman and Julie Stromberg, Arizona State University

Study Areas included in research – all within the greater Phoenix metropolitan area.

Reach	Latitude	Longitude	Township	Range(s)	Section(s)	Acres	River miles
Tonto	33.558804	-111.611042	3N	7E	35	29	0.75
	Owner/Manager: Tonto National Forest Driving Directions: From Mesa, AZ head north < 1 mile from intersection of Bush Hwy and N. Usery Pass Road.						
Price	33.437622	-111.887665	1N	5E	7	26	0.50
	Owner/Manager: Flood Control District of Maricopa County Driving Directions: From Mesa, AZ head north < 1 mile from intersection of Bush Hwy and N. Usery Pass Road.						
Priest	33.434624	-111.958743	1N	4E	16	28	0.50
	Owner/Manager: City of Tempe Driving Directions: North of Priest Drive and W Rio Salado Parkway						
Rio	33.422131	-112.074065	1N	R3E	17, 20	37	0.45
	Owner/Manager: City of Phoenix Driving Directions: North of the Nina Mason Pulliam Rio Salado Audubon Center (3131 S Central Ave, Phoenix, AZ)						
Ave35	33.411335	-112.133443	1N	2E	22, 23	17	0.30
	Owner/Manager: City of Phoenix Driving Directions: North of W Broadway Rd and S 35th Ave						
Ave67	33.395838	-112.204064	1N	1E 2E	25 30	60	0.30
	Owner/Manager: City of Phoenix Driving Directions: North of W Southern Ave and S 67th Ave						
B&M	33.383544	-112.302506	1N	1E	31	52	0.75
	Owner/Manager: Arizona Game and Fish Department Driving Directions: 0.5 miles south of W Southern Ave and S Avondale Blvd (S 115th Ave)						

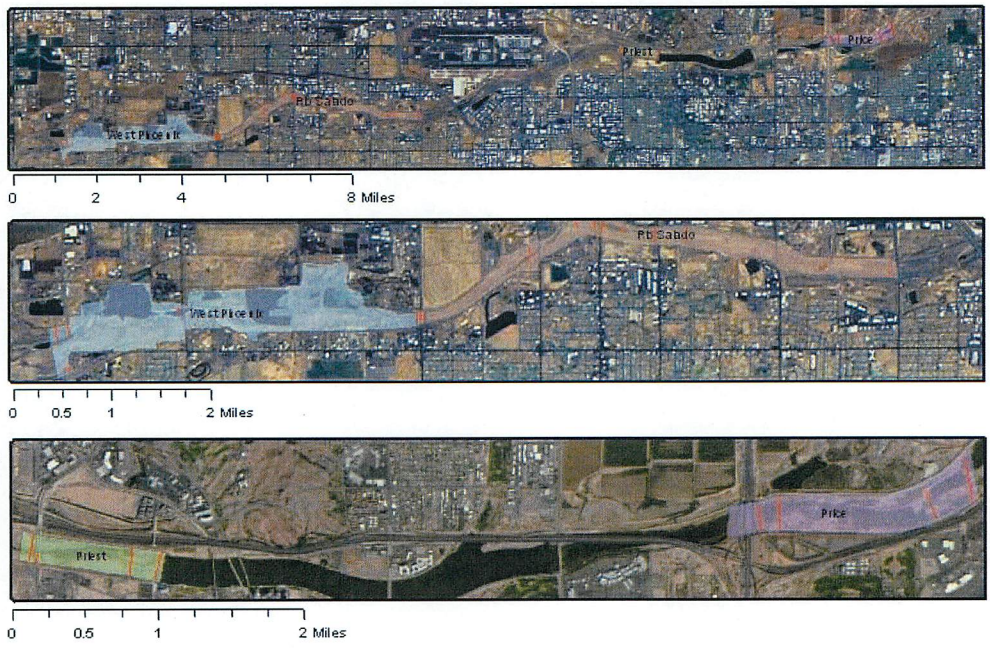
Key Personnel

Dr. Heather L. Bateman an Assistant Professor at Arizona State University will provide project management and coordination among team members, specifically for the bird and habitat components, conduct analyses, present research results, and assist in reporting. Dr. Bateman has extensive experience with over 10 years studying small wildlife in riparian habitats. Dr. Bateman has experience managing technicians and has mentored five MS graduate students and several undergraduate students since arriving at ASU in 2008. Dr. Bateman is currently funded by a Bureau of Reclamation LCC to evaluate saltcedar biocontrol and restoration effects on birds and herpetofauna along the Virgin River in Utah, Arizona, and Nevada.

Dr. Juliet C. Stromberg in the School of Life Sciences at Arizona State University will be the project team leader. Dr. Stromberg is a riparian plant ecologist who has been studying riparian and wetland vegetation of the desert Southwest for over two decades, focusing on stream restoration and on interactions between stream hydrology and plant communities. She has advised more than 30 graduate students and published more than 90 peer-reviewed papers.

Two undergraduate and two graduate students at Arizona State University will be selected by Dr. Bateman and Dr. Stromberg to carry out field data collection and other project-related duties.

Project Site Photographs



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