



**PIMA COUNTY
REGIONAL FLOOD CONTROL DISTRICT**
97 EAST CONGRESS STREET, THIRD FLOOR
TUCSON, ARIZONA 85701-1797

**SUZANNE SHIELDS, P.E.
DIRECTOR**

**(520) 243-1800
FAX (520) 243-1821**

February 25, 2010

Brian Linenlaub, Principal
Westland Resources
2343 E. Broadway, Suite 202
Tucson, AZ 85719

Subject: Costs Associated with Riparian Restoration Projects

Dear Mr. Linenlaub:

Pima County Regional Flood Control District (District) is in the process of revising their off-site mitigation policies for impacts to regulated riparian habitat. The District is compiling data to determine actual costs associated with riparian restoration projects in the arid West. Your help is greatly appreciated and will ensure that the new policies are fair, cost-effective, and based on sound data.

We have attached example cost data and we hope you will be able to provide similar cost breakdowns for some of your projects. Infrastructure improvements vary widely with each site (water harvesting basins to complex irrigation systems, flood protection, etc.) so descriptions of the project will be helpful in determining real costs. A short description of the restoration and irrigation methods used and project site conditions would allow us to compare restoration and maintenance costs for similar projects, thus comparing "apples to apples".

For each project, please include the total acreage, as the District is exploring the feasibility of using a cost-per-acre basis for impact fees. We are seeking cost information for the following categories:

- 1) Planning and Design
- 2) Maintenance
- 3) Monitoring
- 4) Water Costs
- 5) Total Cost

Brian Linenlaub, Principal
Costs Associated with Riparian Restoration Projects
February 25, 2010
Page Two

Partial information is very helpful, include what is available. If possible, please return the information by March 24, 2010. The data will be discussed in a draft report presented to a stakeholders group which is providing oversight on our mitigation guideline development later this spring. The cost information may be mailed, faxed, or emailed to:

Carla Danforth
Pima County Regional Flood Control District
97 E Congress, 2nd Floor
Tucson, Arizona 85701

Email: carla.danforth@rfcd.pima.gov
520-243-1800 (phone) 520-243-1826 (fax)

Thank you for any information you may be able to provide.

Sincerely,



Carla F. Danforth
Environmental Planning Manager

Attachment

Contact List

Name	Title	Organization	Address	Address II	Email	Phone
Karen Caesare	President	Novak Environmental	4574 N First Ave, Ste 100	Tucson, Arizona 85718	karen@novakenvironmental.com	520-206-0591
John Hucko		Olsson Associates	3861 N. First Ave	Tucson, Arizona 85719	jhucko@oaconsulting.com	520-407-9071
Timoth Johnson	Project Landscap Architect	The Planning Center	110 South Church, Suite 6320	Tucson, Arizona 85701	tjohnson@azplanningcenter.com	(520) 623-6146
Brian Linenlaub	Principal	Westland Resources	2343 E Broadway, Ste 202	Tucson, Arizona 85719	blinenlaub@westland.com	520-206-9585
?	Landscape Architect	WLB Group	4444 E. Broadway	Tucson, Arizona 85711	msmith@wlbgroup.com	520-881-7480
Rich Underwood	President	AAA Landscape	4742 N Romero Road	Tucson, Arizona 85705	richardu@aaalandscape.com	520-696-3223
Lori Woods	President	RECON Consultants, Inc	1745 E River Road, Ste 101A	Tucson, Arizona 85718	ljwoods@reconaz.com	520-325-9977
Cindy Zisner	Secretary	AZ Riparian Council	Post to List Serve		Cindy.Zisner@asu.edu	
Eric Gardner	Nongame Branch Chief	AZ Game and Fish Dept.	500 W. Carefree Highway	Phoenix, AZ 85086		623-236-7507
?	?	Pima County Parks and Rec				
Leslie Liberti	Stormwater Management	City of Tucson Department of Transportation, Stormwater Management Section	P.O. Box 27210	Tucson, Arizona 85726-7210	karen.rahn@tucsonaz.gov	(520) 791-4251
Jane Bixler		City of Phoenix, Rio Salado Project	200 West Washington St., 12th Floor	Phoenix, AZ 85007	jane.bixler@phoenix.gov	602-495-3793
Armando Muñoz		City of Phoenix, Rio Salado Project	200 West Washihgton St., 12th Floor	Phoenix, AZ 85007	armando.munoz@phoenix.gov	602-495-3793
Debbi Radford	Tres Rios Project Coordinator	City of Phoenix, Tres Rios Project	200 West Washington St., 9th Floor	Phoenix, AZ 85007	debbi.radford@phoenix.gov	602-495-7927
Nancy Ryan	Rio Salado Project Manager	City of Tempe	PO Box 5002	Tempe, AZ 85280	nancy_ryan@tempe.gov	480-350-8096
Diana Stuart	Environmental Program Manager	Maricopa County Flood Control District	2801 W Durango St	Phoenix, AZ 85009	dms@mail.maricopa.gov	602-506-4766
Sam Kathryn Campana	VP and Executive Director	Audubon Society of Arizona	4250 East Camelback Rd., Ste. 310K	Phoenix AZ 85018	scampana@audubon.org	602-468-6470 x 1
Pat Graham	State Director	The Nature Conservancy - Phoenix Conservation Center	The Plaza at Squaw Peak III 7600 N. 15th St., #100	Phoenix, AZ 85020	pgraham@tnc.org	(602) 712-0048
Sherry Barrett	Assistant Field Supervisor for Southern AZ	USFWS	201 N Bonita, Suite 141	Tucson, AZ 85745	Sherry_Barrett@fws.gov	520-670-6144
Bruce D. Ellis	Env. Resource Mangement Division	Bureau of Reclamation	6150 West Thunderbird Road	Glendale AZ. 85306-4001		(623) 773-6250
Nancy Zierenberg	Vice President	AZ Native Plant Society	Post to List Serve		nzberg4@cox.net	
Karen Reichhardt	Botanist	Bureau of Land Management, Yuma Field Office	2555 E Gila Ridge Rd	Yuma, AZ 85365	karen_reichhart@blm.gov	928-317-3234

Summary of Restoration Cost Responses:

The Nature Conservancy: no data

City of Phoenix, Parks & Recreation Department: operations per year = \$0.06/square foot, including water. Don't know if that includes monitoring, maintenance, etc.

Novak Environmental Inc.: planting & installation of irrigation system = \$1.00 to \$1.30 per s.f., planning and design costs can run between 10-20% of construction costs. Just design costs are typically 10% of construction costs.

Rio Salado: We had already included their info in our calculations. The info they provided roughly matched what we already had.

UA Extension Water Resources: no data

U.S. Bureau of Reclamation: fencing costs only: \$0.07/sf. They don't do restoration/creation, only fencing, and nature does the rest.

U.S. Army Corps of Engineers: provided what they charge for a mitigation credit at an existing Tucson Audubon site, which is \$0.34/sf (\$15,000/ac). No further info, but presume land costs and design/construction are not included.

Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 9:53 AM
To: Eleanor Gladding
Subject: FW: Tempe & USACE Environmental Restoration projects
Attachments: USACE Phases Cost per acre.xls; IBW plan.jpg; Rio Salado Habitat Restoration map (12a).pdf

I will forward you all the responses I have received
Carla

From: Ryan, Nancy [mailto:nancy_ryan@tempe.gov]
Sent: Friday, March 26, 2010 4:19 PM
To: Carla Danforth
Subject: Tempe & USACE Environmental Restoration projects

<<USACE Phases Cost per acre.xls>>

Carla:

I am lacking some specific numbers but have provided an estimate. If I get detailed numbers I will update and send the .XLS again

There is a much greater amount of infrastructure in Phase 1 that is not a part of Phase 2. Also the density of planting in Phase 2 was reduced beyond what is shown in the concept drawing enclosed because of concerns that 1) the Salt River flows would destroy the area, and it was too heavy of a burden for Tempe to replace, and 2) significant concerns raised by PHX Sky Harbor - 2 miles west that it would attract too many birds and create a hazard to air navigation. That is why you see such different numbers for the cost per acre.

We treat the habitat areas with more of a hands-off approach to maintenance.
<<IBW plan.jpg>> <<Rio Salado Habitat Restoration map (12a).pdf>>

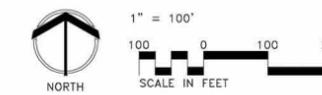
If you have questions, please call.

Nancy Ryan, AICP, CPM

Rio Salado Project Manager
Community Development
City of Tempe
480.350.8096
nancy_ryan@tempe.gov



Rio Salado Tempe Reach - Town Lake to Priest Drive





Rio Salado Tempe - Indian Bend Wash Reach

U. S. Army Corps of Engineers - Los Angeles District / City of Tempe • McGann & Associates / Novak Environmental, Inc. Joint Venture • December 2002



Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 9:56 AM
To: Eleanor Gladding
Subject: FW: Costs Associated with Riparian Restoration Projects

From: Kristine Uhlman [mailto:kuhlman@Ag.arizona.edu]
Sent: Monday, March 08, 2010 10:37 AM
To: Krista Osterberg
Cc: Carla Danforth
Subject: Costs Associated with Riparian Restoration Projects

Dear Carla - - I am in receipt of your letter dated February 25, 2010 requesting costs associated with riparian restoration projects. I understand that you are seeking data to generate an estimated cost-per-acre basis, and are requesting short descriptions of restoration methods and site conditions so as to allow you to compare restoration and maintenance costs for similar projects.

I have copied this email to Krista Osterberg with the Arizona Department of Environmental Quality (ADEQ) '319' grant program. The '319' grant program has been funding watershed restoration projects in the effort to reduce nonpoint source pollution. Many of these projects are riparian restoration projects. I believe ADEQ has compiled cost data that may be of use to you, but I don't know if those data are in a form that could readily sort between riparian vrs. upland-type projects. In any event, please coordinate with Krista (or her designee) to address your request. Thank you!

Kristine Uhlman, RG
Assistant Area Agent
Cooperative Extension
University of Arizona
Water Resources Research Center
350 N. Campbell Avenue
Tucson, AZ 85721
(520) 621-9591 ext. 51 NOTE PHONE # CHANGE!!!
fax: (520) 792-8518
kuhlman@ag.arizona.edu
www.cals.arizona.edu/azwater

Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 10:59 AM
To: Eleanor Gladding
Subject: FW: Costs Associated with Riparian Restoration Projects

From: Annette Plicato
Sent: Friday, February 26, 2010 11:01 AM
To: 'Olson, Theresa M'
Cc: Carla Danforth
Subject: RE: Costs Associated with Riparian Restoration Projects

Theresa, we look forward to hearing from you.

Thanks, Annette

From: Olson, Theresa M [mailto:TOlson@usbr.gov]
Sent: Friday, February 26, 2010 10:40 AM
To: Annette Plicato
Subject: RE: Costs Associated with Riparian Restoration Projects

Hi Annette, Thank-you for your letter and interest. I have forwarded it to our Restoration manager and our Program manager to gather the information. Theresa.

From: Annette Plicato [mailto:Annette.Plicato@rfcd.pima.gov]
Sent: Thursday, February 25, 2010 1:53 PM
To: Olson, Theresa M
Cc: Carla Danforth
Subject: Costs Associated with Riparian Restoration Projects

Dear Ms. Olson:

Pima County Regional Flood Control District (District) is in the process of revising their off-site mitigation policies for impacts to regulated riparian habitat. The District is compiling data to determine actual costs associated with riparian restoration projects in the arid West. Attached is a letter from Carla Danforth explaining the information we are requesting from the Bureau of Reclamation. Your input will be valued in this endeavor.

Thank You, Annette Plicato

<<Teresa Olson.pdf>>

Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 9:56 AM
To: Eleanor Gladding
Subject: FW: Costs associated with riparian restoration projects/US Bureau of Reclamation

From: Messing, Henry J [mailto:HMessing@usbr.gov]
Sent: Tuesday, March 16, 2010 10:10 AM
To: Carla Danforth
Cc: Ellis, Bruce D
Subject: Costs associated with riparian restoration projects/US Bureau of Reclamation

Carla,

We have received your February 25, 2010, request for costs associated with riparian restoration projects. We have two projects that qualify as riparian restoration. However, please note that water costs are not associated with either project.

A. Tonto Creek Riparian Unit (TCRU)

This project was implemented on Tonto National Forest lands along the Tonto Creek inflow to Roosevelt Lake. In the 1989 Fish and Wildlife Service, Fish and Wildlife Coordination Act Report, Reclamation committed to the construction and monitoring of the TCRU to offset the losses of 460 acres of riparian habitat associated with the raising of Roosevelt Lake and the formation of New Waddell Reservoir. The Clean Water Act Section 404 Permit required Reclamation to improve riparian habitat conditions equivalent to 80 acres, the amount of riparian habitat to be inundated at Roosevelt Lake. The TCRU encompasses 18 miles of Tonto Creek and 9,483 acres. Tonto Creek was grazed year round and was highly degraded. Under the Rosgen stream classification system, Tonto Creek was a "D" channel, typified by a very wide "braided channel...with eroding banks...in broad valleys...{and an} abundance of sediment supply." We funded the Tonto National Forest to construct a fence around the area as well as water developments for livestock that would no longer have access to the creek. Grazing was permitted between January 1 and April 15. Every third year was a rest period with no grazing permitted.

Costs for fencing the TCRU and for alternative water developments were \$591,202. We also contracted for a monitoring study to determine if we met our commitment. GANDA, Inc. concluded that we accrued 654 riparian habitat credits from the 1993 base year to the end of the 1998 study year and exceeded our 80 acre mitigation requirement. This study cost \$990,000.

The TCRU is now managed by the Tonto National Forest. I have no information as to the condition of Tonto Creek as of 2010. I do know that we have endangered southwestern willow flycatchers breeding in habitat within the TCRU in areas where none existed in 1993.

- B. Agua Fria fencing project** - we fenced off an area of approximately 152 acres downstream of New Waddell Dam and where Morgan City Wash flows into the Agua Fria River. This was to meet a mitigation commitment for another 404 Permit. We constructed a fence around the area to exclude livestock, burros, and OHV use. Flows from seepage under the dam and from Morgan City Wash support a healthy cottonwood/willow community that was being degraded by these activities. The fence cost \$144,000 to construct. Other than

occasional visits to assess the status of the fence, we do not have any plans to intensively monitor the recovery of the area. However, both AGFD and Reclamation biologists conduct bird surveys during migration and make note of any trespass activities or improvement in the habitat.

In general, we try and stay away from any restoration via pole plantings, etc. Our guiding philosophy is to get rid of or manage the limiting or degrading variables/factors.and with enough water, the habitat will recover.

If you have any questions about either of these two projects, please contact me at 623-773-6257.

Regards

Henry Messing
USBR
Glendale, Arizona

Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 10:58 AM
To: Eleanor Gladding
Subject: FW: Mitigation letter

-----Original Message-----

From: Blaine, Marjorie E SPL [mailto:Marjorie.E.Blaine@usace.army.mil]
Sent: Tuesday, March 02, 2010 2:50 PM
To: Carla Danforth
Subject: RE: Mitigation letter

Super. He probably has a better tracking system than I do :)

Marjorie

In the interest of the environment, please print only if necessary and recycle

-----Original Message-----

From: Carla Danforth [mailto:Carla.Danforth@rfcd.pima.gov]
Sent: Tuesday, March 02, 2010 2:48 PM
To: Blaine, Marjorie E SPL
Subject: RE: Mitigation letter

Thanks Marjorie, I have asked Kendall for info also.
Carla Danforth

From: Blaine, Marjorie E SPL [mailto:Marjorie.E.Blaine@usace.army.mil]
Sent: Tuesday, March 02, 2010 2:26 PM
To: Carla Danforth
Cc: Laurie, Jesse
Subject: Mitigation letter

Carla

I received your letter dated February 25, 2010 regarding mitigation. I do not recall any projects in Pima County we have authorized in the last several years that were permittee responsible mitigation. To my best recollection, the mitigation has been in-lieu-fee primarily to the Tucson Audubon Society at North Simpson Farm. The mitigation costs there are \$15,000/acre.

Based

on this, we are not be able to provide you with a tabular response as your example indicated.

I hope this information helps you. Thank you very much.

Marjorie Blaine
Senior Project Manager/Biologist

U.S. Army Corps of Engineers
Tucson Project Office, Regulatory Division
5205 E. Comanche Street
Tucson, AZ 85707
(520)584-1684 (phone)
(520)584-1690 (fax)

In the interest of the environment, please print only if necessary and recycle

Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 11:00 AM
To: Eleanor Gladding
Subject: FW: Costs Associated with Riparian Restoration Projects

From: Annette Plicato
Sent: Friday, February 26, 2010 10:04 AM
To: 'David Harris'
Cc: Carla Danforth
Subject: RE: Costs Associated with Riparian Restoration Projects

Dave, we look forward to hearing from you.

Thanks, Annette

From: David Harris [mailto:dharris@TNC.ORG]
Sent: Friday, February 26, 2010 9:37 AM
To: Annette Plicato
Cc: Carla Danforth
Subject: RE: Costs Associated with Riparian Restoration Projects

Hi Annette and Carla, we will pull some information together for you from our most recent restoration work and pass it on to you. Thanks for the opportunity to provide input into your process.

Best Regards

Dave Harris

David B. Harris
Director, Land and Water Protection
1510 E. Ft. Lowell Road
Tucson, Arizona 85719
520-547-3427

From: Annette Plicato [mailto:Annette.Plicato@rfcd.pima.gov]
Sent: Thursday, February 25, 2010 3:00 PM
To: David Harris
Cc: Carla Danforth
Subject: Costs Associated with Riparian Restoration Projects

Dear Mr. Harris:

Pima County Regional Flood Control District (District) is in the process of revising their off-site mitigation policies for impacts to regulated riparian habitat. The District is compiling data to determine actual costs associated with riparian restoration projects in the arid West. Attached is a letter from Carla Danforth

explaining the information we are requesting from the Arizona Nature Conservancy. Your input will be valued in this endeavor.

Thank You, Annette Plicato

<<Dave Harris.pdf>>

Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 10:38 AM
To: Eleanor Gladding
Subject: FW: Riparian Costs
Attachments: image001.gif

From: Karen Cesare [mailto:karen@novakenvironmental.com]
Sent: Monday, March 22, 2010 11:00 AM
To: Carla Danforth
Subject: Riparian Costs

Hi Carla,

I am responding to your request for cost information associated with riparian restoration projects you send last month.

While we don't have any specific projects I can use to provide detailed costs, I will offer some general information which I hope is helpful.

1. Planning and Design Costs
Can run between 10 -20 % of construction costs.

Typically straight design costs, which include design development and cd's, run about 10% of construction costs. Added costs for planning, public input, illustrative graphics and services during construction can increase this percentage.

In addition – a low budget project will have a higher ratio of design to construction cost. Public works projects will have a higher cost than private projects due to the additional requirements for plans and specs for public works.

2. construction costs – plant costs

Prices have not changed significantly in the last 10 years – or even longer. I was doing "reveg" work at La Paloma in the mid 80's and we figured our costs at about \$1.00/sf for installation of plants, irrigation and seeding. This was at densities that are similar to riparian reveg. I think you will find costs are still in the range of \$1.00 - \$1.30 now – assuming small trees.

Biggest variable is water source costs – if needed. (new meters are expensive!)

Hope this helps.

Karen M. Cesare, RLA
President
Novak Environmental, Inc.
(520) 206-0591 p
(520) 882-3006 f
(520) 405-8035 c

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Eleanor Gladding

From: Carla Danforth [Carla.Danforth@rfcd.pima.gov]
Sent: Wednesday, March 31, 2010 9:53 AM
To: Eleanor Gladding
Subject: FW: Request for info
Attachments: ATT1349398.jpg

From: karen.williams@phoenix.gov [mailto:karen.williams@phoenix.gov]
Sent: Friday, March 26, 2010 3:39 PM
To: Carla Danforth
Subject: Request for info

Carla,

I received a request for us to e-mail you the operational costs for our Rio Salado Restoration Area, which is 600-acres, with 16 miles of trails, wetland ponds, mesquite bosques and thickets of cottonwoods and willows costs. The total costs of operations for 2009/10 budget year is \$1,512,887, this includes water costs.



Karen Williams, Deputy Director

City of Phoenix

Parks and Recreation Department - Parks Development and Planning Division

200 W. Washington St, 16th Floor

Phoenix, AZ 85003-1611

(602) 534-1870 / Fax (602) 732-2333

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