City of New Braunfels

SOLICITATION, OFFER AND AWARD

City of New Braunfels
Purchasing
424 S. Castell Avenue
New Braunfels, Texas 78130

Solicitation No. 12-031 Habitat Restoration - Landa Lake	☐ Invitation for Bid (IFB) ☒ Request for Proposal (RFP)	Date Issued: August 28, 2012

SOLICITATION

Page 1 of 28 Pages

Proposers must submit sealed proposals in triplicate signed original and one CD for furnishing the services identified in the Schedule. Proposals will be received at the office of the City Secretary at the address shown above until: 10:00 a.m. on September 14, 2012
Proposals received after the time and date set for submission will be returned unopened.

For Information Call: Mary Quinones (NO collect calls, Telegraphic, Email, On-Line or Fax offers accepted)	Phone No.: (830) 221-4389 Email mquinones@nbtexas.org	Fax No.: (830) 608-2112

5% Proposal Bond Required:	☐ YES	☒ NO	(If YES, See Para 4(d) of Terms and Conditions)
100% Performance Bond Required:	☐ YES	☒ NO	(If YES, See Para 4(d) of Terms and Conditions)

OFFER (Must be fully completed by offeror)

Offeror's State of Residence: Texas (See Para. 6(f) of Terms and Conditions)

Pre-Proposal Conference on September 6, 2012 at 10:00 am. in Parks Admin Office. 100 Golf Course Rd. New Braunfels. TX 78130.

Prompt Payment Terms: ___% Discount if paid within ____ days.

In compliance with the above, the undersigned offers and agrees to furnish any or all items or services awarded at the prices stipulated for each item delivered At the designated point(s) and within the time specified herein. Award shall include all solicitation documents and attachments.
FOR INFORMATION, CONTACT THE PERSON ABOVE.
MANUALLY SIGN ALL COPIES SUBMITTED. SIGNATURE IS MANDATORY.

Submit Signed Offers in Triplicate Original Tim D. Osting, P.E., D.WRE RPS Espey 4801 Southwest Pkwy, Pkwy 2, Ste. 150, Austin, TX 78724 of Offeror		Proposer E-Mail Address: Name and Title of Person Authorized to Sign Offer (Type or Print): Tim D. Osting, Managing Engineer Tim.Osting@rpsgroup.com	
Signature:	Date: 9/13/2012	Phone No.: 512.326.5659	Fax No.: 512.326.5723

Name, Address and telephone No. of Person authorized to conduct negotiations on behalf of Offeror. (Applies to Request for Proposal only)	Tim Osting, P.E., D.WRE, Managing Engineer, 4801 Southwest Parkway, Pkwy 2, Ste. 150, Austin, TX 78735; 512.326.5659

AWARD (To be Completed by CITY)

Contract # NB13-004	Awarded as to item(s): All	Contract Amount: $123,050.00
Vendor Code #: 0003959		Delivery Date or Term of Contract: August 31, 2013

Remarks: This contract inforporates the RFP, attachments and the Contractor's Proposal.

This contract issued pursuant to award made by City Council. Date: November 12, 2012 Agenda Item No.: 4H

Important: Award may be made on this form or by other

Michael Morrison City Manager 12/8/12

RPS Espey

Habitat Restoration – Landa Lake

Statement of Qualifications for RFP #12-031

Client: City of New Braunfels, Texas
Proposal Number: P0125.12
Date Submitted: September 14, 2012

RPS Espey

Habitat Restoration – Landa Lake
Statement of Qualifications for RFP #12-031

Prepared for:
City of New Braunfels
Purchasing
424 S. Castell Avenue
New Braunfels, TX 78130

City of New Braunfels

By:
RPS Espey
4801 Southwest Parkway
Parkway 2, Suite 150
Austin, Texas 78735
T (512) 326-5659
F (512) 326-5723
www.rpsgroup.com

Proposal No. P0125.12

In Association with:
Harkins Engineering, Inc.
BIO-WEST, Inc.
American Underwater Services, Inc.

Harkins Engineering, Inc.

BIO-WEST, Inc.

Table of Contents

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RPS Espey

4801 Southwest Parkway, Parkway 2, Suite 150, Austin, Texas 78735, USA
T +1 512 326 5659 F +1 512 326 5723 W www.rpsgroup.com

September 14, 2012
City of New Braunfels
Purchasing
424 S. Castell Avenue
New Braunfels, TX 78130

Re: Request for Proposal – Habitat Restoration Landa Lake – RFP No. #12-031

Dear Sir or Madam:

RPS Espey is pleased to submit this proposal to provide services to the City of New Braunfels (City) to improve conditions for the Comal Springs Riffle Beetle habitat, an endangered species. This work will supplement conditions for the beetle in Spring Run 3 and Lake Landa Lake by increasing the amount of usable habitat and available food sources. RPS Espey understands this project also consists of controlling erosion, constructing a walking path and removing fine sediment in Spring Run 3 and 100 meters of the western bank of Landa Lake.

RPS Espey, Harkins Engineering, Inc. (HEI) and American Underwater Services, Inc., (AUS) represent the personnel involved in the national award-winning Hamilton Creek and Hamilton Pool Restoration project. That project involved removal of ultra-fine sediment from sensitive spring-fed creek and spring pool, as well as consideration of endangered species. Team members also have a history of successful collaboration with BIO-WEST, Inc., whose staff have been instrumental in development of the Edwards Aquifer Habitat Conservation Plan (EAHCP). Specifically, **RPS Espey and BIO-WEST** partnered on an EARIP project involving water temperature modeling in Spring Run 3, Landa Lake, Old Channel and New Channel for potential future alternative management measures involving flow split management. RPS Espey and BIO-WEST also worked together to evaluate improvement of fountain darter habitat in the Old Channel. AUS has a history of successful completion of sediment removal and re-vegetation projects in sensitive areas including Spring Lake in San Marcos.

Combined, team members have experience in providing assessments related to restoration and re-vegetation. Experience includes field assessments, data presentation, riparian re-vegetation, erosion prevention, sediment removal, endangered species handling, habitat restoration or enhancement, construction assessments and methodologies and permitting.

RPS Espey and this assessment team have developed strong working relationships with the City, Edwards Aquifer Authority, City of San Marcos, New Braunfels Utilities, Guadalupe Blanco River Authority, Texas Parks and Wildlife Department, Texas Water Development Board, Texas Commission on Environmental Quality, US Fish and Wildlife Service, the Texas Instream Flow Program, US Army Corps of Engineers and many other public and private entities.

We look forward to working with the City on this restoration project. Should you have any questions regarding this proposal, please feel free to contact us at 512.326.5659.

Sincerely,

Tim D. Osting, P.E., D.WRE
Managing Engineer
cc: David Harkins, PhD, P.E., D.WRE – Vice President

1 Executive Summary

RPS Espey is pleased to submit this proposal to provide services to the City of New Braunfels to optimize conditions for the Comal Springs riffle beetle habitat by restoring Spring Run 3 and 100 meters of Landa Lake shoreline by increasing the amount of usable habitat and available food sources for the Comal Springs riffle beetle. RPS Espey understands this project also consists of constructing erosion control structures, constructing a walking path along Spring Run 3 and 100 meter of the western bank of Landa Lake, and removing fine sediment and along 100 meters of the western bank of Landa Lake.

RPS Espey has unique and un-matched experience in providing assessments, field data collection, riparian re-vegetation and erosion prevention, sediment removal, endangered species handling, habitat restoration or enhancement, construction assessments and methodologies, and permitting, as necessary.

RPS Espey is an environmental and engineering consulting firm with offices in Austin, Beaumont, Corpus Christi, Dallas, Fort Worth, Houston, and Amarillo, Texas. RPS Espey is an established leader in the water resources industry with extensive experience evaluating our natural environment. RPS Espey is dedicated to giving our clients the highest quality product.

Our outstanding staff has many years of experience providing environmental and engineering services to clients throughout the state of Texas, the nation, and the world. RPS Espey staff has extensive design, management and planning experience to successfully complete a broad range of complex projects in municipal, water resources, environmental, water quality, modeling, development and planning disciplines. RPS Espey's clients include municipal, state and federal agencies, regional water authorities and a wide range of private, commercial, manufacturing and industrial clients. Staff assembled for this project exhibit extensive recent work experience relevant to site assessments and planning, riparian re-vegetation, erosion prevention, sediment removal, endangered species, habitat restoration, and walking path construction.

RPS Espey project managers are supported by a diverse staff including engineers, scientists, and technicians. We will provide effective and efficient services for the restoration of Comal riffle beetle habitat in Spring Run 3 and Landa Lake by increasing the amount of usable habitat and available food sources for he Comal Springs riffle beetle.

2 Degree of Compliance

All services quoted in this proposal are in full accord with the general requirements to which RPS Espey Assessment Team takes no exceptions.

The RFP does not request cost information for provision of engineering services. Any costs provided in this proposal do not include cost for engineering services.

3 Proposal Pricing

The RFP requests do not exceed cost information on construction activities to be included in the proposal. Additionally, pricing is requested for professional services associated with development of riparian restoration and sediment removal plans including presentation and coordination with stakeholders. Costs for these items are included in this proposal. If the City requests additional meetings or additional work in excess of those noted in this proposal, those work activities will be charged on a time and materials basis, or as otherwise negotiated after selection. No cost for engineering services are included as part of this proposal since no engineering services are requested in the proposal; cost for engineering services must be negotiated after selection of a most qualified firm.

The costs estimated for assessment and planning include time for stakeholder meetings. Costs include two persons for two-hour meetings that also includes travel time. The two persons in attendance will be the persons most responsible for the task. For example, the riparian work will include Ed Oborny or Melissa Romigh, and the sediment removal will include Victoria Harkins, Ph.D., P.E.

Included in the assessment and planning task are two reports and one technical memo. The two reports include the Riparian Non-Native Identification Plan and Restoration Plan and the Sediment Removal Plan. Each of the reports will be presented for discussion and approval. Costs include one review and final draft. The third deliverable is a technical memo to describe the layout and materials for the walking path.

The costs included in the walking path include a porous paver and labor for installation along approximately 200 meters two feet wide.

The cost estimated for Riparian Restoration includes appropriate removal of those vegetation species identified as non-native in the Riparian Non-Native Identification Plan and Restoration Plan and installation of native trees, plants and grasses as described in the same plan. Costs include the installation of approximately thirteen trees and a variety of shrubs and grasses. Consideration includes border vegetation along and adjacent to the walking trail. Costs include temporary watering of restored vegetation for three weeks post installation. Unless directed by City to leave in place, the temporary irrigation will be removed after one month.

Cost Estimation for Fine Sediment Removal includes the use of a small pump with a diving barge and three divers. The diver will have dredge pipe and a 4 inch suction hose with a gross

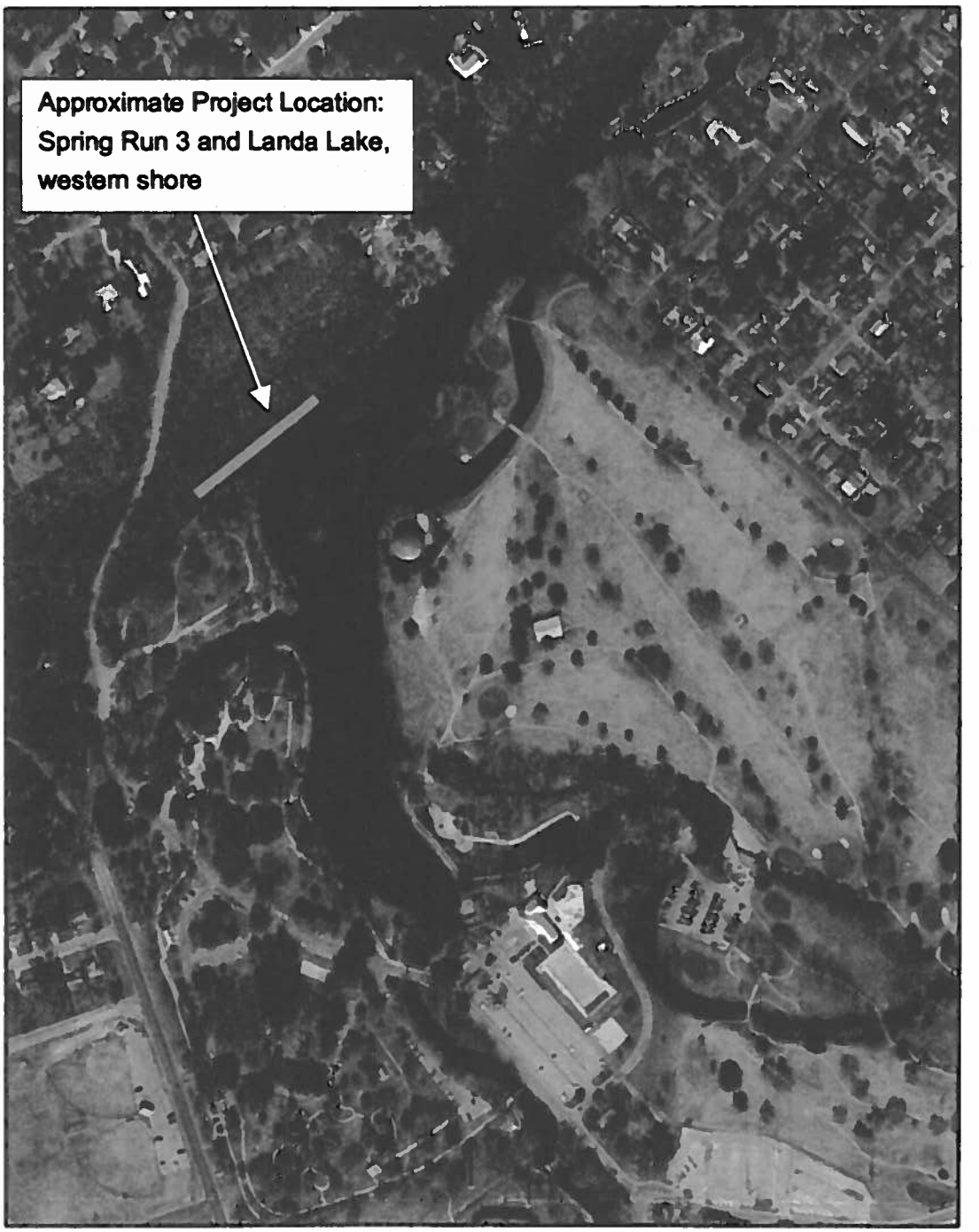
and 0.25 inch orifice screen. Costs include ten days of diving with suction to a filter bag, disposal of the filter bag and disposal of the sediment at a composting facility in the Creedmoor Maha area. During the assessment period, additional alternatives for disposal will be completed.

Planning	**$ 13,800**
Stakeholder, 8 Meetings, 2 people, 2-hour Meetings (2-hours Travel)	
Reports: Riparian Restoration Plan, Sediment Removal Plan, and Walking Path technical memo	
Walking Path	**$ 13,000**
Materials	
Labor, Ten days, 3 person crew	
Riparian Restoration	**$ 32,750**
Identify Non-Native Species and Native Restoration Plan	
Labor to remove and restore, Ten days, 3 person crew	
On-site Endangered Species Permit	
On-site Management	
Materials, Plants and Trees	
Post Vegetation Water	
Inspection monitoring	
Fine Sediment Removal	**$ 63,500**
Mobilization and Demobilization	
Diving, Ten 8-hour days	
On-site Endangered Species Permit	
On-site Management	
Sediment Bag	
Disposal of Bag	
Trucking and Disposal of Sediment at Composting Facility, 430 cubic yards	
Grand Total	$ 123,050

4 Literature

General company brochures and background information is included in this section.

Area Map



Water Resources

Espey Consultants, Inc. (EC) is an environmental and engineering consulting firm with offices Austin (corporate headquarters), Dallas, Houston, Laredo, New Braunfels, and Amarillo, Texas. The President of EC, W. H. Espey, Jr., Ph.D., P.E., D.WRE, has amassed over 40 years of experience in providing civil engineering services to clients located throughout the United States. Dr. Espey has a reputation in civil engineering and a commitment to clients that is nationally recognized in both the public and private sectors. Understanding, responsiveness, quality, and integrity are benchmarks of EC.

Being responsive to our clients' needs is our No. 1 priority.

The water resources team at EC is best characterized by a very distinguished group of professional engineers. EC staff members have authored over 500 publications in water resource engineering journals, held teaching and research positions with major universities, developed analysis techniques currently used in the industry, and work experience with the US Geological Survey and the US Army Corps' Hydrologic Engineering Center.

These individuals are supported by a diverse staff, which includes engineers, scientists, and technicians that enable them to provide quality engineering services to clients located throughout the United States. Our staff has extensive project management and engineering experience to successfully complete a broad range of complex projects in all areas of water resources. EC has completed projects for various municipal, state and federal agencies, and regional water authorities, as well as a wide range of private, commercial, manufacturing, and industrial clients.

WHY EC?

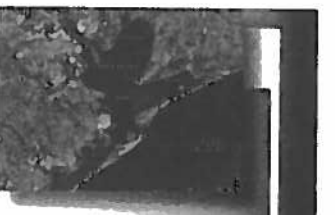
EC will assign key staff members to each project to provide the necessary commitment of the firm to ensure efficient and timely completion of each task and request.

- Experience Working with Local, State, and Federal Agencies
- Responsiveness to Clients
- Project Communication Among the Development Team
- Commitment to Project Schedule
- Delivery of Services On Time, Every Time
- Track Record and Name Recognition as a Leader in the Industry
- Eager and Ready to Serve

EC

www.espeyconsultants.com

Water Resources (continued)



RIVERINE

- Water Rights Permit Development
- Water Rights Modeling and Evaluations
- Re-use Development and Permitting
- Water Availability Modeling
- Unappropriated Water Analysis
- Water Demand Analysis
- Feasibility Studies for New Water Supplies
- Water Quality Modeling and Assessment Studies
- Instream Flow Analysis and Studies
- TMDL Studies
- Evaluations for Delisting of 303D Classified Water Bodies

GROUNDWATER

- Contamination Investigations
- Transport Modeling
- Availability Modeling
- Aquifer Testing and Modeling
- Feasibility Studies
- Plume Identification and Remediation

URBAN STORMWATER

- Flood Control Master Planning
- Culvert and Bridge Hydraulic Design
- Channel Analysis and Design
- Statistical Flood Frequency Analysis
- Flood Damage Evaluations
- FEMA Map Revisions (CLOMR, LOMR, LOMA)
- Dam Safety
- Master Planning
- Erosion and Sediment Control Systems
- Water Quality Assessment Studies
- Wetland Hydrology
- Stream Restoration
- NPDES Stormwater Compliance
- Monitoring
- Sampling
- Modeling

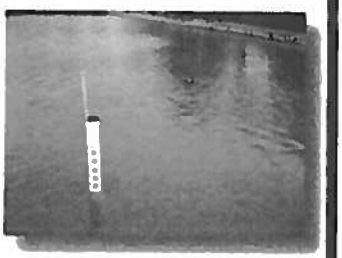
EC

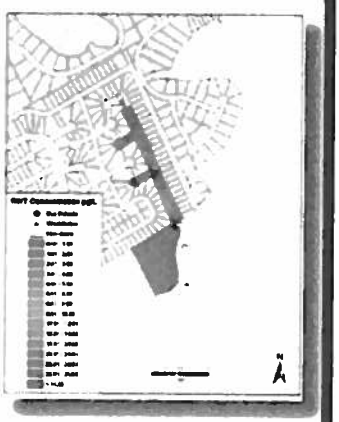
www.especonsultants.com

Bacterial Assessments and Water Quality Analyses

Being ***responsive*** *to our clients' needs is our No. 1 priority.*

Espey Consultants, Inc. (EC) is an environmental and engineering consulting firm with offices in Austin (corporate headquarters), Dallas, Houston, Laredo, New Braunfels, and Amarillo, Texas. EC is composed of highly qualified staff with many years of experience in environmental and engineering services. EC serves private, industrial, municipal, state ,and federal government clients throughout the state of Texas, across the nation, and abroad.





Bacterial pathogens are the leading cause of water quality impairment in the U.S. and Texas. Assessing and recommending efficient solutions to bacterial impairments requires interdisciplinary and expert knowledge. EC staff have the combined experience and knowledge related to point and non-point source water quality issues, watershed best management practices, and modeling to perform bacterial watershed assessments and to implement practical solutions leading to improvement of water quality. Because of these comprehensive capabilities, EC has developed strong relationships with renowned researchers, engineers, biologists, model developers, scientists and experts on bacterial impairment issues. EC has been involved in many stakeholder-based processes, including Watershed Protection Plans and TMDLs.

WHY EC?

EC offers comprehensive, specialized water quality capabilities for assessment, source identification, and management of bacterial impairments. EC project experience includes:

- Study Design
- Monitoring and Field Data Collection
- Non-Point and Point Source Identification
- Water Quality Modeling for Watersheds and Water-Bodies
- Implementation (BMPs and Alternative Analysis)
- Stakeholder Involvement
- Watershed Protection Plans (WPP)
- Total Maximum Daily Loads (TMDL)

www.espeyconsultants.com

Bacterial Assessments and Water Quality Analyses

STUDY DESIGN

- Reconnaissance Studies
- Historical Database Development and GIS Analysis
- Advanced Statistical Analysis to Characterize Data or Identify Trends
- Assessment of Data Gaps
- Development of a Comprehensive Study Design

FIELD DATA COLLECTION

- QAPP Development and Management
- Monitoring Plan Design and Cost Estimating
- Dye Tracer Studies
- Circulation Studies
- Sample Collection and Preservation
- Database Development and Data Archiving

NON-POINT SOURCE INDENTICATION

- Field Reconnaissance
- Land Use Mapping and Classification
- Source Habitat Suitability
- Development of Load Duration Curves

MODELING

- Watershed Modeling (SELECT, SWAT, and Spatial Watershed Analyses)
- Water-Body Modeling for Rivers, Coves, and Lakes (Decay Kinetics, QualTX, and WASP)
- Custom Computer Programming for Modeling, Integration, and Visualization
- Evaluation of Alternatives

IMPLEMENTATION

- Best Management Practice (BMP) Recommendations
- Alternative Scenario and Impact Analysis
- Long-Term Monitoring Plans
- Watershed Protection Plans
- TMDL Determinations

REPRESENTATIVE PROJECTS

- Lake Granbury Watershed Protection Plan
- Cypress Basin/Caddo Lake Watershed Protection Plan
- Houston Bayou TMDL Evaluation
- Dickinson Bayou TMDL Evaluation
- Expert Advisory to the Bacteria TMDL Taskforce

EC

www.espey.com/charts.com

RPS Espey

4801 Southwest Parkway, Parkway 2, Suite 150, Austin, Texas 78735, USA
T +1 512 326 5659 F +1 512 326 5723 W www.rpsgroup.com

Restoration of Hamilton Pool and its Receiving Watershed

2012 American Council of Engineering Companies (ACEC) Texas Engineering Excellence Award

Gold Medal for Environmental Excellence

Press Release

Hamilton Pool is a naturally occurring pool on Hamilton Creek maintained by Travis County Parks. This natural feature has been a landmark for the Texas Hill Country and Austin area for centuries. In late 2007, the discharge of materials from an upstream residential development in Hays and Travis Counties into the Hamilton Creek watershed polluted and impacted the water quality of Hamilton and Davis Creeks and Hamilton Pool (HP).

RPS Espey (Espey), formerly known as Espey Consultants, Inc., was retained by Travis County to assess the condition of Hamilton and Davis Creeks and HP and subsequently develop a remediation and restoration plan. The restoration of HP and its receiving watershed addressed very complex criteria and unique problems, which involved removing a tremendous amount of silt from environmentally sensitive and inaccessible locations in and along six miles of a Texas Hill Country creek system. A project of this type and scale has not been done before. Special care and design was needed to combine the project tasks and goals while also remaining sensitive to the natural character of the creek, landowner concerns, and minimizing any potential impacts on endangered species.

EC applied a creative and innovative sediment removal and restoration plan, which included manual and equipment-assisted silt removal for environmentally sensitive areas with special attention to local wildlife, livestock, vegetation, and aquatic species. The project had measureable positive impacts with re-establishment of the creek system and HP to restore the system's vegetative, wildlife, aquatic, and recreational values. HP is part of the Balcones Canyonland Preserve, home to the endangered Golden Cheek Warbler (GCW). Special attention with design changes were made to address the GCW.

The Hamilton Pool Restoration project, which was designed by Victoria Harkins, Ph.D., P.E., D.WRE, received the 2012 American Council of Engineering Companies (ACEC) Texas Engineering Excellence Award (Gold Medal) for Environmental Excellence. The distinguished panel of judges from around the state selected 13 Gold Medal and 8 Silver Medal winning projects from 44 entries based on uniqueness, originality, technical, value to the engineering profession, complexity and how successfully the project met the needs of the client.

For more information, please contact Dr. Victoria Harkins, P.E., D.WRE, at (512) 326-5659.

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BIO-WEST CONTRACTOR BACKGROUND INFORMATION

BIO-WEST HIGHLIGHTS

BIO-WEST, Inc. (BIO-WEST) is a multi-discipline, environmental consulting firm with a permanent core staff of senior level scientists and an experienced support staff. Established in 1976, BIO-WEST conducts research, inventories, and assessments of natural resource systems throughout the United States. The firm is a leader in environmental consulting and problem solving, and has earned a reputation for providing objective, credible services and superior products to a wide variety of agencies, organizations, and private clients. BIO-WEST has an outstanding reputation regarding endangered species investigations and environmental restoration throughout the United States and maintains excellent working relationships with federal and state agencies. BIO-WEST's staff consists of 60 professionals specializing in a vast range of natural resource and environmental compliance services. BIO-WEST has specialized environmental restoration capabilities and is particularly suited to assist RPS Espey on the proposed project. BIO-WEST will provide endangered species expertise along with riparian zone analysis associated with restoration efforts.

BIO-WEST has extensive technical expertise and experience regarding the ecology of Spring Run 3, the Western Shoreline of Landa Lake and the entire Comal Springs/River Ecosystem. Factors that set BIO-WEST apart from the competition include:

- An extensive knowledge of the aquatic biota and ecological relationships of the Comal River/Springs Ecosystem. BIO-WEST aquatic ecologists have been conducting continuous monitoring and research related to the endangered species in the Comal System for over 12 years. This work includes monitoring all three federally listed Comal Springs invertebrates, and federally listed fountain darter, as well as the Comal Springs salamander (all which reside in the project study area). Additionally, Ed Oborny, BIO-WEST Principal, is an active member of the Southern Edwards Aquifer Species Recovery Team and former member of the EARIP Science Subcommittee.
- BIO-WEST maintains all required state and federal endangered species permits and certifications allowing work to begin immediately.
- BIO-WEST has extensive experience with riparian resources in central Texas. BIO-WEST has conducted on-the-ground riparian assessments on the following basin

streams (Martinez Creek, Salatrillo Creek, Comal River, San Marcos River, and Guadalupe River). BIO-WEST understands the constraints of restoration in an urban environment, and recently completed a multi-discipline ecological study of Brackenridge Park in downtown San Antonio. This study is serving as the foundation for potential aquatic, riparian, or terrestrial restoration within this urban confined park.

- Unparalleled scientific integrity. BIO-WEST has worked for and with a wide range of clients and the firm maintains strong working relationships with both state and Federal resource agency personnel, along with stakeholders.

BIO-WEST REFERENCES

REFERENCES	
Edwards Aquifer Authority 1615 N. St. Mary's Street San Antonio, TX 78215	Rick Illgner – Research Coordinator Phone: (210) 222-2204 Email: rillgner@edwardsaquifer.org
Lower Colorado River Authority 3700 Lake Austin Blvd. Austin, TX 78767	Leah Manning – Project Manager Phone: (512) 473-3589 Email: leah.manning@lcra.org
San Antonio River Authority PO Box 839980 San Antonio, TX 78283-9980	Steve Raabe – Director of Technical Services Phone: (210) 302-3614 Email: sraabe@sara-tx.org
Texas Parks and Wildlife Department Resource Protection, River Studies Program Aquarena Center, The Landing San Marcos, TX 78666	Kevin Mayes – Senior Aquatic Biologist Phone: (512) 754-6844 Email: kevin.mayes@tpwd.state.tx.us
U.S. Fish and Wildlife Service National Fish Hatchery & Technology Center 500 E. McCarty Lane San Marcos, TX 78666	Tom Brandt – Supervisor Phone: (512) 353-0011 ext. 224 Email: Tom_Brandt@fws.gov

BIO-WEST FEDERAL FISH AND WILDLIFE PERMIT

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

3-200
(1/97)

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

BIO-WEST, INC.
1063 WEST 1400 NORTH
LOGAN, UT 84321
U.S.A.

2. AUTHORITY-STATUTES
16 USC 1539(a)

REGULATIONS
50 CFR 17.22
50 CFR 17.32

50 CFR 13

3. NUMBER
TE097198-0

4. RENEWABLE ☒ YES ☐ NO

5. MAY COPY ☒ YES ☐ NO

6. EFFECTIVE 03/02/2011

7. EXPIRES 03/31/2014

8. NAME AND TITLE OF PRINCIPAL OFFICER (If it is a business)
EDMUND L. OBORNY, JR.
PRINCIPAL

9. TYPE OF PERMIT
NATIVE ENDANGERED SP. RECOVERY - E WILDLIFE; E PLANTS

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
At locations specified within permit terms and conditions.

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Your permit has been renewed as follows. The terms and conditions set forth in the original permit February 8, 2008, and any subsequent amendments or renewals are hereby superseded by this document.

E. Acceptance of this permit serves as evidence that the Permittees agree to abide by the "General Conditions for Native Endangered and Threatened Wildlife Species Permits" (copy attached).

F. Acceptance of this permit serves as evidence that the Permittees agree to abide by all conditions stated. Some **terms and conditions within this permit may have changed, either to reflect the most current language available or in response to requests by applicants or requirements by species' lead biologist(s).** Terms and conditions of this permit are inclusive. Any activity not specifically permitted is prohibited. Please read through these conditions carefully as violations of permit terms and conditions could result in your permit being revoked or denial of a new permit when the current one expires. Violations of your permit terms and conditions which contribute to a violation of the Endangered Species Act (ESA) could also subject the Permittee to criminal or civil penalties.

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
See Terms and Conditions

ISSUED BY: [signature]

TITLE: ASSISTANT REGIONAL DIRECTOR / ECOLOGICAL SERVICES

DATE: 03/02/2011

G. Disposal, transplant, or release of live wildlife/plants or plant parts taken or held under the terms of this permit, unless specifically authorized, requires prior written approval by the species lead U.S. Fish and Wildlife Service (USFWS) office. You must dispose of dead wildlife/plants or plant parts as specified by the terms of this permit. If terms are not specified, they can be destroyed or transferred to a public institution. A copy of the permit and this letter, along with a cover letter referencing your permit number, must accompany each shipment and must be retained with the specimens. The cover letter must specify who will receive the specimens and the numbers involved. A copy of the letter must be furnished to the following addresses:

U.S. Fish and Wildlife Service - Regional Office
Division of Endangered Species - Section 10 Permits
P.O. Box 1306
Albuquerque, New Mexico 87103
505/248-6665 or 505/248-6920

Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
602/242-0210

Arizona Fish and Wildlife Conservation Office
323 N. Leroux, Suite 401
Flagstaff, Arizona 86001
928/226-1289 ext 113

Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Compass Bank Building
Austin, Texas 78758
512/490-0057

California/Nevada Operations Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846
916/414-6600

New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
505/346-2525

Program Coordinator
San Juan River Basin Recovery Implementation Program
2015 Osuna Road, NE
Albuqeurque, New Mexico 87113
505/346-2525

Upper Colorado River Endangered Fish Recovery Program
P.O. Box 25486
Denver Federal Center
Denver, Colorado 80225
303/969-7322 ext. 228

Utah Ecological Services Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah 84119-7679
801/975-3330

A copy should also be retained in your files. Transfers deviating from the above conditions require prior written approval by the USFWS.

H. *Unless otherwise instructed within the species-specific language below*, an **annual report** based on each species and activity conducted under the authority of this permit (including where activities took place, number and location of species collected/captured, and field data forms, if appropriate) must be submitted to the respective **Ecological Services Field Office (ESFO)** listed above, including negative data (i.e., negative survey findings or lack of breeding success). If no activities were conducted under this permit, for one or more species during the calendar year, a report stating such will satisfy the annual reporting requirements. The annual report should also include recovery permit number, species' common and scientific name, date of survey, observer, observer contact information (in case of questions), location (provide GPS or UTM coordinates, or Township and Range and at least quarter Section), number of individuals observed, their sex, age class, and breeding condition, if known or determined in recovery permit report for all surveys conducted. If habitat quality/condition was noted at time of survey, please include that information. Annual reports may also be submitted on a CD. Failure to submit a report, or failure to submit an adequate report, is a violation of the permit and is cause for suspension or revocation of the permit. A violation may disqualify a person from receiving or exercising the privileges of a permit as long as the deficiency exists.

Data collected in lat/long, NAD 83 is preferred. If collected in an alternate coordinate system, please report the coordinate system and datum the information was collected in. Optional information that can be included to help further define the precision of the locational information includes: 1) Positional Dilution of Precision (PDOP) level at time of acquisition, and 2) whether the Wide Area Augmentation System (WAAS) was enabled.

I. An annual report transmittal letter is the only document to be submitted to the **Regional Office**, Division of Endangered Species - Section 10 Permits, Albuquerque, NM at the above address (or to the following electronic mailing address: *FW2_TE_Permits@fws.gov* on or before December 15 of each year (unless date is otherwise stated). The transmittal letter should state the following information: name of field office(s) and name of species where data was forwarded; date report(s) sent to field office; and list of species for which no activities were conducted, if applicable.

If an amendment or renewal request is also needed at this time, please make sure the annual report transmittal letter and request(s) are submitted under separate cover. Do not include permit requests along with annual reports.

J. Copies of any unpublished or published reports generated by the study and other data that would be useful for the conservation or recovery of the species should also be submitted to the ESFO(s). The reports should include one copy of USGS 7.5 minute quad sheets or larger scale maps, depicting sites where listed species covered by this permit were found or not found. These reports may be disclosed pursuant to the Freedom of Information Act.

K. Should any mortality or physical injury occur to an individual of the species during permitted activities (above the amount that may be specified below for a specific species) all operations must immediately cease and you are required to contact the appropriate ESFO(s) above within 24 hours.

L. Please note that this permit is limited to the activities and species described below, and is functional only when used in combination with a valid state permit.

M. Activities involving migratory birds and their parts (see 50 CFR 10, Migratory Bird Treaty Act (16 USC 703 et seq.) and implementing Regulations at 50 CFR 21) or bald and golden eagles (see Bald and Golden Eagle Protection Act (16 USC 668a) and 50 CFR 22), may require additional permits or authorizations. Please contact the respective Regional Migratory Bird Permit Office for additional information at: *http://www.fws.gov/permits/contacts/contacts.shtml*.

N. This permit does not, either directly or by implication, allow, or grant right of trespass. Permission to enter lands must be obtained in writing from the landowner or land managing agency.

O. If conducting research on a National Wildlife Refuge, you must obtain a refuge special use permit. The refuge permit will need to be used in conjunction with this permit and a valid state permit in order to meet all applicable laws.

P. You must furnish the USFWS, Division of Endangered Species - Section 10 Permits (address above) with a copy of the permit issued to you by the Indian Tribal Government(s) prior to conducting research and recovery activities on Tribal lands.

Q. You must have a copy of this permit and any other pertinent information in your possession while conducting the authorized activities.

R. A request for renewal, if appropriate, must be submitted to the USFWS Division of Endangered Species - Section 10 Permits (at the above address) at least 30 days prior to the expiration date of the current permit. Any person holding a valid, renewable permit who submits a written request (application form 3-200-55) for renewal at least 30 days prior to the expiration date, may continue to conduct those activities under the expired permit while the USFWS takes action on such person's request for renewal.

All requests to renew, amend, or obtain a new permit will require submittal of an application. The application may be obtained by going to the following website: *http://forms.fws.gov/3-200-55.pdf*. Please submit this application and a cover letter describing your request to the attention of the Section 10 Coordinator located in the Regional Office. The address is listed under condition G above. If you wish to confirm your application request was received, please send your application via certified mail or Federal Express, or provide an e-mail address for electronic notification.

SOUTHWESTERN WILLOW FLYCATCHER

S. Mike Sipos, Craig Fosdick, Alyson Eddie, and Travis Taylor (Permittees) are authorized for scientific research and recovery purposes to survey for southwestern willow flycatchers (*Empidonax traillii extimus*) using vocalization tape playback within New Mexico. The following conditions also apply:

1. Permittees are required to participate in and complete one of the SWWF survey training seminars conducted by the USFWS, USGS Biological Resources Division, and state game and fish agencies prior to conducting any SWWF surveys. Additionally, any Permittees who have not conducted surveys with positive results for a couple of years are encouraged by the USFWS to attend another SWWF training seminar as a refresher course.

2. All surveys shall be conducted according to the most recent USFWS-accepted survey protocol. Currently, that protocol is: Sogge, M.K., Ahlers, Darrell, and Sferra, S.J., 2010, A natural history summary and survey protocol for the Southwestern Willow Flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 p. A copy of this revision can be retrieved from the SWWF document library located on the following USGS link: *http://pubs.usgs.gov/tm/tm2a10/*. The new survey forms to be used should also be retrieved from this web site.

3. Permittees are not authorized to conduct nest monitoring, nest searching, capture, and/or handle any SWWF unless stated so below.

4. Permittees shall make reasonable efforts to determine if SWWFs are marked with a silver aluminum band and/or color bands. If banded birds are sighted, you shall also make reasonable efforts to determine the band combination noting the number of bands, colors, and band location and sequence on the SWWFs legs (e.g., red over yellow right leg/blue split pink over silver left leg).

5. If banded or unbanded SWWFs are sighted during the 2nd and 3rd survey periods (1-21 June and 22 June - 17 July) you must notify the following personnel via e-mail.

In New Mexico Debra Hill at *Debra_Hill@fws.gov*
Mark Sogge at *Mark_K_Sogge@usgs.gov* (banded birds only)

If banded SWWFs are sighted in New Mexico, contact the New Mexico ESFO at 505/346-2525, and Mark Sogge, of the USGS Southwest Biological Science Center, at 928/556-7311 x232, within 24 hours. Additionally, when surveying in New Mexico, if SWWFs are detected during the 2nd or 3rd survey periods (1-21 June or 22 June - 17 July) in a location where they were not present the previous breeding season, please contact the New Mexico ESFO and the New Mexico Department of Game and Fish (NMDGF) at 505/476-8109 or -8098, within 24 hours.

6. You are required to furnish copies of all field data forms with positive or negative survey results, including copies of USGS 7.5 minute quadrangle maps and copies of any aerial photos used in surveying or reconnaissance to the appropriate ESFO Supervisor, and State Game and Fish Nongame Birds Program Coordinator at the addresses listed below. Photos and/or maps must clearly delineate all areas covered during each survey and the locations of SWWF detections. Results must be furnished by August 15, following each survey season covered by this permit. These survey requirements will replace the annual reporting activities listed in G/H above, for this species only.

New Mexico Department of Game and Fish
Attn: Hira A. Walker
P.O. Box 25112
Santa Fe, New Mexico 87504
505/476-8109

SAN MARCOS SALAMANDER

T. Edmund L. Oborny, Jr., Paul B. Holden, Michael S. Robertson, James R. Gibson, Melissa Romigh, Brad Littrell, Jeremy Webster, Brandon Albreht, and Martin Heaney (Permittees) are authorized for recovery purposes to conduct presence/absence surveys, including estimating densities, for the San Marcos salamander (*Eurycea nana*) in Spring Lake in Texas. The following conditions also apply:

1. Annual reports for San Marcos salamanders should include:

a. Location of sample (from GPS or small scale mapping with reference points);
b. Local discharge in cubic feet per second, if measured or estimated;
c. A descriptions of the sampling method and listing of habitat data, including water quality measurements;
d. Date and time (to the nearest hours) of sampling;
e. Total length (mm) of the San Marcos salamanders, if measured; and
f. A list of people involved in the sampling effort.

FOUNTAIN DARTER and SAN MARCOS GAMBUSIA

U. Edmund L. Oborny, Jr., Paul B. Holden, Michael S. Robertson, James R. Gibson, Melissa Romigh, Brad Littrell, Jeremy Webster, Brandon Albrecht and Martin Heaney (Permittees) are authorized for recovery purposes to conduct presence/absence surveys, including estimating densities, for the fountain darter (*Etheostoma fonticola*) and San Marcos gambusia (*Gambusia georgei*) in the Comal and San Marcos rivers in Texas. The following conditions apply.

1. Each round of sampling may have up to 100 drop net samples and there may be as many as 8 rounds of sampling in a calendar year.

2. Permittees are authorized to use drift nets in spring runs including over spring orifices and in the spring run waterway. Nets may be staked with rebar. Nets must be checked at least every 5 hours and may be set up for a maximum of 48 hours in any one location.

3. All efforts with minnow traps must be closely monitored with traps checked in same manner as drift nets.

4. Electrofishing is not authorized.

5. Fountain darters collected in drop nets may be measured and sexed.

6. Fountain darters will either be released immediately in the area collected or transferred to staff at the San Marcos National Fish Hatchery and Technology Center (SMNFH&TC). If fountain darters are to be transferred and USFWS staff are not present to accept live material, the fish are to be kept in coolers maintaining spring ambient conditions. These coolers must contain only fountain darters; these coolers must not contain any macroinvertebrates or other fishes.

7. No equipment used in Comal sampling is to be used in the San Marcos Springs River system (including Spring Lake). No equipment used in San Marcos sampling is to be used in the Comal Springs River system.

8. All live *Marisa* snails collected must be killed and preserved in alcohol. No live thiarid snails (*Melanoides tuberculata* and *Thiaria granifera*) are to be transported from the Comal Springs River system.

9. In addition to conditions outlined in Section H above, annual reports for fountain darters are to include the following:

a. Location of sample (from Global Positioning System or other source);
b. Local discharge in cubic feet per second, if measure or estimated;
c. Habitat data, inlcuding water quality measurements;
d. Method of capture (drop and dip net, minnow trap, etc.);
e. Date and time (to the nearest hour) of sampling;
f. Length and sex of fountain darters collected;
g. Observations of the condition of the fountain darter (e.g., gills flared);
h. Other fish and macroinvertebrate species collected and enumerated;
i. Disposition of individual fountain darters (e.g., number of individuals returned to the wild or transferred to SMNFH&TC); and
j. A list of people involved in the sampling effort.

COLORADO PIKEMINNOW and RAZORBACK SUCKER

V. Paul B. Holden, Edmund L. Oborny, Jr., Michael S. Robertson, Jeremy Webster, Brandon Albrecht, Brad Littrell, and Melissa Romigh (Permittees) are authorized for scientific research and recovery purposes to conduct surveys for the Colorado pikeminnow (*Ptychocheilus lucius*) and razorback sucker (*Xyrauchen texanus*) on the San Juan River in Utah, Colorado, California, Nevada, and New Mexico. The following conditions apply.

1. Volunteers and/or personnel from the University of New Mexico may assist with survey efforts while under the direct supervision of Paul B. Holden, Michael S. Roberston, and/or Brandon Albrecht.

2. Surveys must be conducted using accepted methods. Electrofishing is authorized for sampling activities on the San Juan River.

3. Any suspected listed fish will be processed first to minimize stress in these animals.

4. Permittees are not authorized to take any Colorado pikeminnows or razorback suckers as voucher specimens.

RIO GRANDE SILVERY MINNOW

W. Ron Kegerries, Ronald J. Rogers, and Robert P. Carpen (Permittees) are authorized for recovery purposes to use seines and conduct presence/absence monitoring of Rio Grande silvery minnows (*Hybognathus amarus*) at habitat restoration sites in the Middle Rio Grande. This monitoring may be conducted in habitat restoration sites for the purpose of monitoring entrapment of silvery minnows in constructed features. The following conditions also apply:

1. Jeremy R. Hull, Martin R. Heaney, Edmund L. Oborny, Jr., Brandon Albrecht, Jeremy J. Webster, Bradley M. Littrell, and Melissa M. Romigh may assist in all activities authorized in Section W only under the direct on-site supervision of the Permittees. Permittees retain full responsibility for ensuring that individuals adhere to all applicable conditions of the permit.

2. Permittees are authorized to conduct entrapment monitoring using seining. Permittees are required to follow the protocol set forth by the Service (see *Protocol for Monitoring Silvery Minnow Entrapment at Habitat Restoration Sites)*, or any subsequent amendments to this protocol approved by the Service's New Mexico ESFO.

3. Entrapment monitoring will be conducted only at completed habitat restoration sites in the Albuquerque and Isleta Reaches of the Middle Rio Grande, or at additional sites after sending a proposal and receiving written approval from the New Mexico ESFO.

4. In advance of conducting entrapment monitoring in any portion of the Middle Rio Grande, Permittees must notify the New Mexico ESFO in writing of proposed locations.

5. Activities other than those described in the entrapment monitoring protocol are ***not*** authorized.

6. Rio Grande silvery minnows must be processed first to minimize stress.

7. All live fish must be released to a continuous stretch of the Rio Grande closest to the site of capture. If continuous river is not present, Permittees shall release fish back to the seined location.

8. Tagging of Rio Grande silvery minnows is ***not*** authorized. Tag readers may be used to record data from existing tags during entrapment monitoring.

9. The results of all authorized entrapment monitoring will be reported yearly to the New Mexico ESFO, including all accounts of Rio Grande silvery minnows and their condition, as well as a description of monitoring localities.

10. Collection of voucher specimens, eggs, or tissue samples is *not* authorized. Any mortalities during the authorized activities shall be preserved in accordance with the University of New Mexico's Museum of Southwestern Biology protocols and accessioned to:

Museum of Southwestern Biology
Department of Biology, MSC03
Albuquerque, New Mexico 87131

11. Terms and conditions of this permit are subject to change based on annual review by the New Mexico ESFO and a determination as to the need for ongoing entrapment monitoring.

SPECIAL RULE FISH

X. Exempt Fishes. In accordance with the provisions of 50 CFR 17.31 and 17.44 Special Rules--fishes, the following fish species are listed as Threatened with Special Rules and do not need to be covered under a USFWS Endangered Species Permit. Thus, the requested activities for the loach minnow, beautiful shiner, Pecos bluntnose shiner, and spikedace do not need a 10 (a) (1) (A) Recovery Permit from the USFWS. However, individuals taking any of these special rule species listed below, must possess a valid State permit and must adhere to all applicable state Fish and Wildlife Conservation laws and regulations.

Apache trout (*Onchorynchus (Salmo) apache*)
Gila trout (*Oncorhynchus gilae*)
beautiful shiner (*Cyprinella formosa*)
Chihuahua chub (*Gila nigrescens*)
spikedace (*Meda fulgida*)
loach minnow (*Rhinichthys (Tiaroga) cobitis*)
leopard darter (*Percina pantherina*)
Pecos bluntnose shiner (*Notropis simus pecosensis*)
Little Colorado spinedace (*Lepidomeda vittata*)
Yaqui catfish (*Ictalurus pricei*)
Sonora chub (*Gila ditaenia*)

COMAL SPRINGS RIFFLE BEETLE, COMAL SPRINGS DRYOPID BEETLE, and PECK'S CAVE AMPHIPOD

Y. Edmund L. Oborny, Jr., Paul B. Holden, Michael S. Robertson, James R. Gibson, Melissa Romigh, Brad Littrell, Jeremy Webster, and Brandon Albrecht (Permittees) are authorized for scientific research and recovery purposes to conduct presence/absence surveys on the Comal and San Marcos rivers for the following invertebrates species: Comal Springs riffle beetle (*Heterelmis comalensis*), Comal Springs dryopid beetle (*Stygoparnus comalensis*), and Peck's Cave amphipod (*Stygobromus pecki*). The following conditions apply.

1. The following two survey methods are authorized for these invertebrates:

a. Drift net sampling is permitted for (a) 4 quarterly rounds (= efforts) per year and (b) 4 critical period monitoring rounds per year. Each of the Comal Spring runs numbered 1, 2, and 3 may have up to 3 drift nets set per round.

b. Surber (or other similar benthic) sampling is permitted on a strictly limited basis. Individual samples must not disturb an area greater than 1 meter square. The number of benthic samples per round will not exceed 6. The number of rounds will not exceed 4 per year.

2. Authorization is provided to collect and preserve for identification purposes the following:

Comal Springs riffle beetle - not to exceed 20 individuals per year
Comal Springs dryopid beetle - not to exceed 20 individuals per year
Peck's cave amphipod - not to exceed 50 individuals per year

3. In order to help avoid collecting more than 20 (or 50 Peck's cave amphipod)) individuals, samples should be reviewed and listed species enumerated from a given round prior to the next round. The preserved material should be transferred within three years of collection to a museum such as the Texas Memorial Museum.

4. In addition to conditions outlined in Section H above, annual reports for fountain darters are to include the following:

a. Habitat data, including water quality information;
b. Method of capture (drift net, benthic sampling, etc.);
c. The date and time (to the nearest hour) of sampling;
d. Other fish and macroinvertebrate species collected and enumerated; and
e. A list of people involved in the sampling effort.

5. James R. Gibson is additionally authorized for scientific research and recovery purposes to maintain the 54 beetles collected in March 2002 by the SMNFH&TC and conduct a laboratory evaluation of the Comal Springs riffle beetle response to low-flow conditions according to the study design entitled "Laboratory evaluation of the Comal Springs riffle beetle *(Heterelimis comalensis: Elmidae)* responses to low-flow conditions (December 2001)" reviewed by the Austin ES office.

a. Permittees are required to submit a copy of the final report upon completion of the laboratory evaluation to the Austin Ecological Services Office detailing the materials and methods used during the investigation, results of the investigation and the data.
b. Upon completion of the study, the beetles will be maintained by the SMNFH&TC staff at the facility.
c. Any subsequent experiments must be approved by the Austin ES Office.

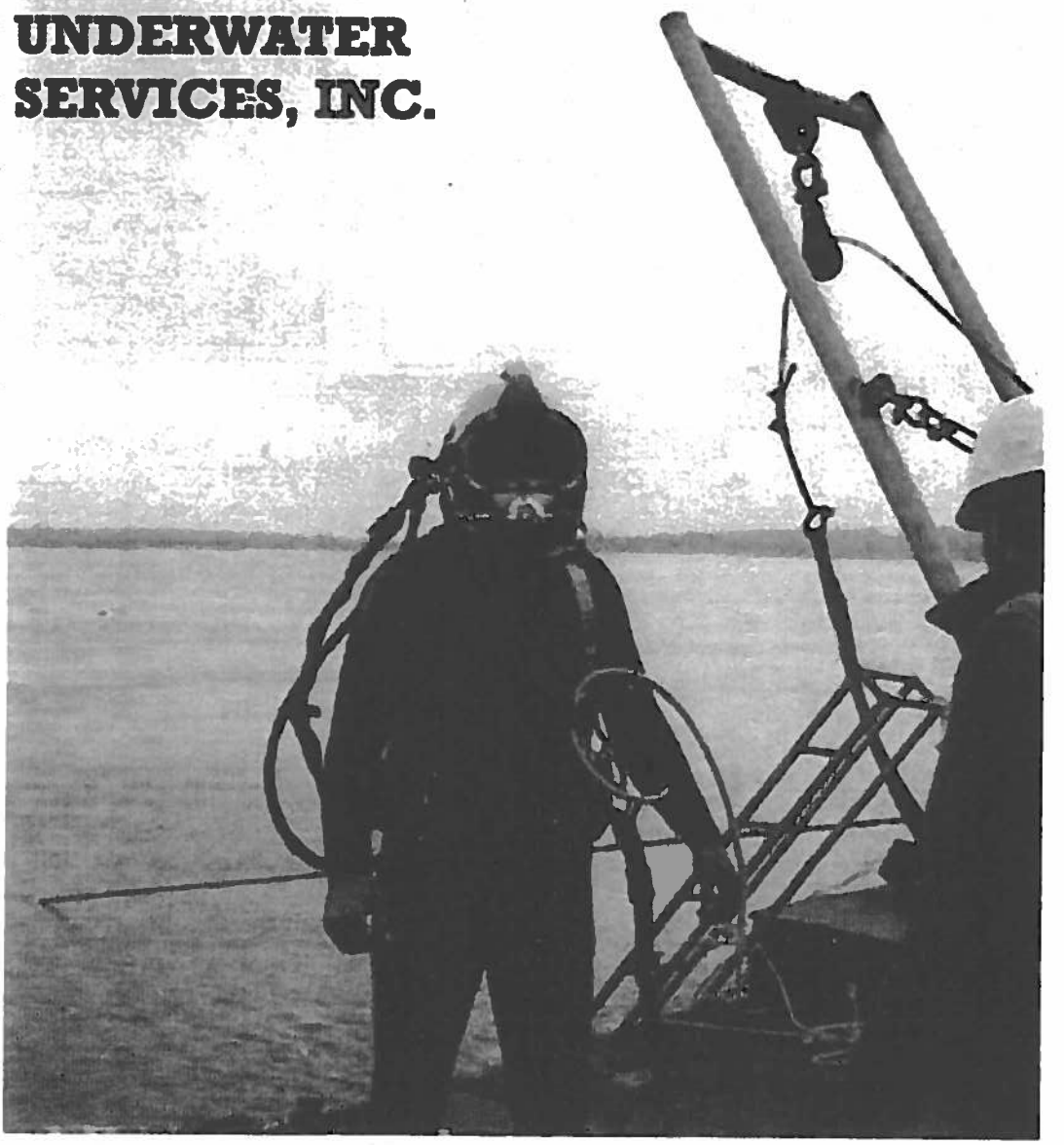
TEXAS WILD-RICE

Z. A permit from the USFWS is not required for presence/absence surveys of endangered and/or threatened plants, thus no permit is required for Texas wild-rice (*Zizania texana*), provided no collection is involved. However, information regarding endangered plants would be helpful to the Austin ESFO and a copy of survey findings would be appreciated. Collection or survey activities causing damage and destruction of listed plant species may require a USFWS permit if Federal jurisdiction is involved and you are subject to all other local, State, and Federal laws.

End Permit TE037155

AUS

AMERICAN UNDERWATER SERVICES, INC.



INTRODUCTION

American Underwater Services, Inc. shares a belief with its customers: Success is an endless journey, not a destination. It's a belief that solving customers' problems and servicing their needs are not enough.

Efficient performance and cost effective problem solving are integral parts of our services philosophy. We serve as a specialized member of our clients engineering, construction and maintenance teams, routinely providing services that minimize downtime and maximize budgets.

When quality and performance count, call American Underwater Services, Inc.
We look forward to the opportunity to perform as a specialized member of your team. For more information call us today.

American Underwater Services, Inc.
P.O. Box 126216
Fort Worth, Texas 76126-0216
(817)- 377-8512

GENERAL COMMERCIAL DIVING SERVICES

Background

- Diving personnel have been trained in accordance with ANSI ACDE minimum standards for commercial diving operations
- Work in water temperatures ranging from 28 to 98 deg. F
- Zero Visibility
- Depths for extended periods
- Adhere to OSHA, USGC and Army Corps of Engineers requirements

Services

- Marine construction
- Inspection
- Maintenance
- Repair

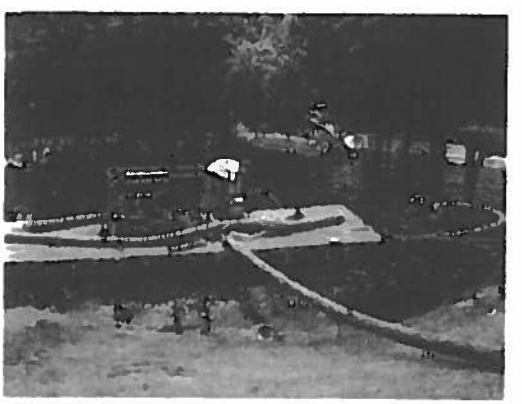
Equipment

- Diving equipment
- Contamination dress
- Sectional Barges

Underwater Services

- Cleaning intake systems
- Outfall systems
- Potable water facilities
- Cooling towers
- Clarifiers
- Settling ponds
- Pipeline networks
- Wet-wells and pump basins
- Burning and welding
- Pile encapsulation
- Fabric grout mats

DREDGING



A.U.S. also specializes in small inland dredging projects. These projects would oftentimes seem impossible due to limited access and limited sediment disposal methods. The clients that usually fit this type of service are homeowners, golf courses, business properties and municipalities.

Some Dredging Methods:

Hydraulic (portable floating dredge with auger to agitate the material to be sucked up by a pump and transferred to a sediment pit.)

Mechanical (long 60' reach trac-hoe that loads haul trucks directly.)

Diver hand dredging (diver holds onto a 6" hose and sucks up all the debris, this process causes minimal damage to surrounding areas.)

Sediment Disposal Methods:

- Haul off material to a local land fill using 18 wheeled sealed trailers.
- Discharge sediment into large fabric bags. (Water decants out of the fabric leaving sediment within bag to be hauled off dry.)
- Discharge sediment onto large flat area for drying.
- Portable solids separation systems.

Blind salamanders get new pipe dream

San Antonio Express-News
http://www.mysanantonio.com/

San Antonio Express-News (06/21/2005)

by Jerry Needham

SAN MARCOS—For decades, tourists flocked to the old Aquarena Springs amusement park to watch the swimming pigs and South Texas mermaids. To make sure they got a good look, the owners capped one of the springs and aimed its crystal-clear flow at a glass-walled "submarine."

The eyeless white salamanders that occasionally came shooting out of the pipe were a bonus. The "mermaids" would hold the salamanders up to the glass so those in the submarine theater could get a closer look.

"As I understand it, they put that diving bell and pipe over the spring to divert water into the show area to keep it clear," said Glenn Longley, director of the Edwards Aquifer Research and Data Center at Texas State University, which bought the amusement park in 1994 and turned into a preserve and learning center.

About a decade after the Texas blind salamander was placed on the federal endangered species list in 1967, Longley got a government permit to collect the salamanders. He put a net over the end of the 2-foot-diameter pipe to catch them.

He collected and handed over hundreds of the 5-inch-long salamanders to the U.S. Fish and Wildlife Service for a captive breeding program at the nearby San Marcos National Fish Hatchery.

But about three years ago, the number of salamanders snagged by the net began to decline. The old corrugated steel pipe, it turned out, was rusted through. Salamanders escaped into the San Marcos River, where they swam sightlessly into the jaws of bigger fish.

"One of my biologists mentioned the old rusty pipe in a meeting, and immediately several partners jumped in to make something happen," said Bob Pine, supervisor of the federal wildlife service's Austin office.

So over the next month, the old pipe will be replaced with a specially fabricated 11-foot-long high-density polyethylene pipe donated and delivered Friday by the San Antonio Water System at a cost of almost $15,000, said Patrick Shriver, a water resources planner for the utility.
The installation by a crew from American Underwater Services out of Fort Worth will take about five days.

Only about 40 percent of the water from what's called Diversion Spring goes through the pipe now because the spring has washed out around the concrete base below where the pipe connects, said Ron Coley, director of the renamed Aquarena Center.

When the new pipe is installed, the base will be fitted with a heavy polyethylene curtain that should capture most of the flow — and the salamanders.

Joe Fries, a federal fisheries biologist who has been working with rare Edwards Aquifer salamanders at the hatchery since 1996, said the captive wild population is down significantly since the pipe rusted out.

"We have about 20 wild stock now," he said. "We have around 50 offspring, and those basically are research animals. At one time we had over 200 wild stock, and then the pipe deteriorated so much that we weren't getting much. Hopefully, we'll get back up to several hundred, like we're supposed to have."

Fries said before the pipe started rusting out, Longley was delivering about 200 salamanders each year to the hatchery. About 100 more were dead by the time Longley retrieved them from the net, he said.

"The bad news is that about half of the ones we got didn't make it because it's a rough ride in there," Fries said. "You're basically shooting out of the ground and being plastered against a net by the pressure of the water, and you're talking about a little salamander."

The rare salamander — one of several known to live only in the Edwards Aquifer or its springs — spends its life in complete darkness underground in water-filled limestone caves near San Marcos — unless it gets too close to a natural spring.

Then the force of the water flow shoots the salamander out of the groundwater and into the river. Fries said the goals of the captive breeding program are to keep the salamanders alive and have them reproduce.

"We have had reproduction in captivity, but it's been real sporadic, and we don't really have control at all," he said. "Ideally, what we want is to put a male and female together, have them reproduce and know who the parents are so we can control the genetics.

"Right now we have no control and the salamanders reproduce whenever they want to. The only thing we can really tell you is that you have to have a male and a female."

He said the oldest one in captivity is almost 9 years old.

"We still have a lot to learn from these little guys and we are all looking forward to seeing these critters come out of Diversion Springs again," said Carrie Thompson, a federal biologist.

5 Background Information and Relevant Experience

RPS Espey is an international professional services company with a vast array of resources, assurances and professional licenses. Post award, the project team will diligently work to address any financial resource concerns.

RPS Espey will submit a monthly statement to the City setting forth the appropriate billing information. Monthly reporting will provide details to costs submitted for payment. Payment of the invoice is due within 30 days of receipt. Outstanding balances in excess of 30 days may accrue interest at a rate of 1% in subsequent invoice periods, and project work will cease until payment is received.

5.1 Assessment Team

RPS Espey is prime contractor for this project teaming with Harkins Engineering, Inc. (HEI), BIO-WEST, Inc. (Bio-West), and American Underwater Services, Inc. (AUS) as subcontractors. Harkins Engineering's role will be that of assessment, planning, permitting, and on-site monitoring. American Underwater Services' role will provide diving (if necessary), sediment removal, planning, and remediation. Bio-West's role will include planning, permitting, endangered species and riparian services for this project.

Espey has worked with all the subconsultants on numerous projects; and RPS Espey with HEI and AUS were instrumental in completing the award winning Hamilton Pool Restoration project on time and under budget. Espey and BIO-WEST have successfully collaborated to complete studies for the EARIP on the Comal system including Spring Run 3 and Landa Lake, as well as several other projects including the Colorado River Aquatic Habitat/Instream Flow Study and Brazos River Long-term environmental flows Initiatives to develop instream flow guidelines supportive of a sound ecological environment by considering all of the major instream flow components: biology, hydrology & hydraulics, water quality, geomorpohology and connectivity. Espey and Bio-West are currently collaborating on both the Senate Bill 2 (SB2) Lower San Antonio River and Cibolo Creek Instream Flow Study and a TCEQ/SARA project to evaluate Water Quality Model Needs for the TIFP and San Antonio River Instream Flow Study. Espey Assessment Team has developed strong working relationships with the City, Edwards Aquifer

Authority, TWDB, TCEQ, and the TIFP Project team. Espey's Assessment Team subconsultants' address information is as follows:

Harkins Engineering, Inc. (HEI)	American Underwater Services, Inc.	BIO-WEST, Inc.
3300 Lost Oasis Hollow Austin, TX 78739 512.784.8511 512.280.1462 (fax) www.Harkinsengineering.com	P.O. Box 126216 Ft. Worth, TX 76126 817.377.8512 www.americanunderwaterservices.com	1812 Central Commerce Court Round Rock, TX 78664 512.990.3954 512.990.5153 (fax) www.bio-west.com

RPS Espey staff has extensive knowledge and experience in water resources and environmental projects including erosion prevention, sediment removal and control, riparian and non-native riparian vegetation, and habitat restoration. RPS Espey staff has in-depth knowledge of the Edwards Aquifer Recovery Implementation Program (EARIP), State of Texas regulations, standards, and techniques, as well as the recommended Habitat Conservation Plan (HCP). The RPS Espey team has regional hydrology, geography, and environmental characteristics of the Comal River and Edwards Aquifer, and has worked with the City of New Braunfels, City of San Marcos, Guadalupe Blanco River Authority, and Edwards Aquifer Authority.

Recent relevant projects or responsibilities completed by the team include:

- Hamilton Pool Remediation and Restoration, Travis County
- Water Quality Assessment and Remediation, Hays County (confidential client)
- City of New Braunfels Schlitterbahn/Comal River floodplain project
- Geronimo Creek Watershed Protection Plan in Guadalupe and Comal Counties
- City of New Braunfels Drainage Utility Program
- City of New Braunfels Reclaimed Water Irrigation Feasibility Study
- City of New Braunfels Capital Improvements Program Assistance
- Edwards Aquifer Authority - Streamflow Conditions in Guadalupe River Basin
- Edwards Aquifer Authority - Special Study – Comal Springs Riffle Beetle Habitat Survey
- Edwards Aquifer Authority – Critical Periods Monitoring and Variable Flow Study
- Edwards Aquifer Recovery Implementation Program – Comal River ERPA evaluation project
- Edwards Aquifer Recovery Implementation Program Science Subcommittee Member: 2008-2011(Oborny).
- Edwards Aquifer Recovery Implementation Program Biological Modeling Team: 2008-present (Oborny).
- Southern Edwards Aquifer Species Recovery Team Member: 2008-present (Oborny).
- Texas State University - Spring Lake sediment removal
- US Fish and Wildlife Service and City of Austin – Barton Creek sediment removal

RPS Espey and HEI have experience with numerous environmental restoration activities with public funds including the Hamilton Pool Remediation and Restoration project in Travis and Hays counties, and the Long Branch Creek project in Hays County.

The RPS Espey Assessment Team has experience with innovative structural replacement technologies and techniques, including GIS mapping techniques and high-resolution GPS and echosounding bathymetry surveys. The Espey project team has extensive experience using GIS to develop large and complex databases, advanced geo-statistical analysis, watershed protection planning and BMP application, TMDL determination, FEMA floodplain mapping, Flood Protection Plans, the management and development of instream flow models for the TCEQ In-stream Flow Program, and field data collection and mapping. Specific large scale and complex projects having a GIS emphasis include SJRA Highland Canal and Reservoir System (including onsite bathymetric/volumetric survey of Highlands Reservoir), the SWIM and GIS analysis of watershed runoff covering nine Texas counties, a 13 mile Routing study and Water Quality mitigation design project evaluating impacts to 43 stream crossings to facilitate permit issuance, a GIS interactive database for the Trinity River Instream Flow Study, the development of the ArcSWAT, SELECT, and WASP Water Quality Models for the Caddo Lake Watershed Protection Plan, and the development and application of SELECT for the Lake Granbury Watershed Protection Plan. Espey staff specializes in using GIS as a tool to predict potential reservoir impacts upon jurisdictional areas and integrate regional goals, watershed goals, and project goals into conceptual plans. Small scale GIS expertise at the city-level includes the development of parcel base mapping, utilities mapping, zoning and land use mapping, floodplain mapping, and HAZUS cost benefit analysis.

Harkins Engineering, Inc. (HEI) provides environmental, municipal and civil engineering consulting services to governmental and private corporation clients. HEI is a small, woman-owned business and is registered with the State of Texas Board of Professional Engineers. President, Victoria Richards Harkins, Ph.D., P.E. has over 13 years experience providing a wide array of civil and environmental engineering services. Services include water and wastewater utility services: including rate analyses, certificates of convenience and necessity (CCN), asset evaluations, etc.; water and wastewater treatment design, permitting, groundwater well and treatment plant design, environmental assessments, environmental remediation (small to multi million dollars) and water quality modeling. HEI is certified with the South Central Texas Certification Agency, City of Austin, and the Texas Building and Procurement Commission as a small, minority, and woman owned business. HEI is also a certified disadvantaged business enterprise with the State of Texas certified through the COA.

BIO-WEST, Inc. (BW) is a multi-discipline, environmental consulting firm with a permanent core staff of senior level scientists and an experienced support staff. Mr. Edmund L. Oborny, Jr., a BW principal and distinguished fisheries biologist, will be involved in this project. Established in 1976, BW conducts research, inventories, and assessments of natural resource systems throughout the United States. The firm is a leader in environmental consulting and problem solving, and has earned a reputation for providing objective, credible services and superior products to a wide variety of agencies, organizations, and private clients. BW has an outstanding reputation for restoration and instream flow investigations throughout the United States and maintains excellent working relationships with Federal and state agencies. This is a key factor in successful project development and assessment, and many firms do not adequately address it. BW has extensive field equipment to conduct restoration, instream flow, sediment transport, channel maintenance, and aquatic and terrestrial investigations. **BIO-WEST maintains all required state and federal endangered species permits and certifications allowing work to begin immediately.**

An extensive knowledge of the aquatic biota and ecological relationships of the Comal River/Springs Ecosystem. BIO-WEST aquatic ecologists have been conducting continuous monitoring and research related to the endangered species in the Comal System for over 12 years. This work includes monitoring all three federally listed Comal Springs invertebrates, and federally listed fountain darter, as well as the Comal Springs salamander (all which reside in the project study area). Additionally, Ed Oborny, BIO-WEST Principal, is an active member of the Southern Edwards Aquifer Species Recovery Team and former member of the EARIP Science Subcommittee.

BIO-WEST has extensive experience with riparian resources in central Texas. BIO-WEST has conducted on-the-ground riparian assessments on the following basin streams (Martinez Creek, Salatrillo Creek, Comal River, San Marcos River, and Guadalupe River). BIO-WEST understands the constraints of restoration in an urban environment, and recently completed a multi-discipline ecological study of Brackenridge Park in downtown San Antonio. This study is serving as the foundation for potential aquatic, riparian, or terrestrial restoration within this urban confined park.

Unparalleled scientific integrity, BIO-WEST has worked for and with a wide range of clients and the firm maintains strong working relationships with both state and Federal resource agency personnel, along with stakeholders.

American Underwater Services, Inc (AUS) is licensed and certified to perform commercial underwater and diving services including

riparian restoration construction, wet well cleaning, potable water services, intake structure, and dredging services. The Fort Worth-based commercial diving and dredging company specializes in underwater construction, heavy marine salvage, and industrial and environmental diving. Common projects include creating, cleaning, restoring and maintaining waterways for golf courses, homeowner associations, industrial companies, water treatment and chemical treatment plants, and local and county governments. Recent AUS projects include **sediment removal near endangered species habitat: Spring Lake in San Marcos for Texas State University, and in Barton Springs Pool in Austin, TX for the City of Austin and US Fish and Wildlife Service**.

RPS Espey and HEI worked closely with the American Underwater Services, Inc. to perform commercial diving and dredging services on the Hamilton Pool Remediation and Restoration Project. AUS used a commercial-diver assisted hand-dredge barge with a materials pump with a six-inch intake and discharge line. The dive teams vacuumed the sediment and debris from the pool bottom. The silt-laden slurry was pumped from the barge straight up the 50 foot cliff where a booster pump pushed the slurry a remaining 3,100 feet to the temporary treatment setup.

Technical qualifications for relevant team staff are provided in this section along with recent project descriptions.

Project Manager: Tim D. Osting, P.E., D.WRE of Espey in Austin, Texas, will serve as the primary point of contact, project manager, and will coordinate riparian and sediment field activities. Mr. Osting has many years of experience in analysis of complex water resources and environmental issues in Texas. His specialties include hydrology, river-floodplain interaction, multidimensional hydrodynamic modeling, water quality evaluation and modeling, aquatic habitat modeling, watershed modeling, sediment transport and GIS analysis. Mr. Osting conducted water quality (temperature) modeling for the Landa Lake/Comal channels and flow split scenarios with BIO-WEST, and assisted in evaluation of potential ERPA concepts. He is currently serving as Espey project manager on the Brazos River Authority Work Plan for WMP environmental studies, riparian assessments on the Brazos and San Antonio Rivers, water quality evaluation of Brazos, Navasota and Little Rivers, the Lake Granbury WPP and on the lower Brazos salinity monitoring project. Mr. Osting has participated in many Texas environmental flow projects including: (1) development of instream flow guidelines from a detailed, multi-year study of the lower Colorado River; (2) development of inflow criteria and marsh habitat-salinity-flow relationships for the Matagorda Bay Health Evaluation; (3) ongoing participation with SARA, TWDB, TPWD and TCEQ staff in development of Senate Bill 2 design of detailed instream flow studies of the lower San Antonio River and Cibolo Creek; (4) Senate

Bill 3 literature review for the San Jacinto River basin; (5) participation in the Cypress Basin/Caddo Lake Flow-Ecology process; and (6) participation in extensive analytical and field studies in the Sulphur River and the Brazos River basins related to instream flows and overbank (oxbow lake) processes.

Victoria R. Harkins, Ph.D., P.E., D.WRE (Assessment and Planning, On-site Construction and Monitoring, Permitting), is the president and managing engineer of Harkins Engineering, Inc. Harkins Engineering, Inc. (HEI) provides environmental, municipal and civil engineering consulting services to governmental and private corporation clients. Dr. Victoria Harkins has over 15 years experience providing a wide array of civil and environmental engineering services. Dr. V. Harkins has extensive and expert knowledge **of current water code and administrative rules and regulations**. Dr. Harkins has served as the project manager of a number of water quality and river, stream and creek bed assessments from small residential sections to miles long of entire watershed areas. Dr. Harkins has successfully completed small to multi-million dollar remediations and restorations from investigation, assessment, litigation, planning, permitting, design, to implementation and final reporting. Dr. V. Harkins was a senior engineer with the Texas Commission on Environmental Quality (TCEQ) and is considered an expert in water and wastewater utility services.

Edmund L. Oborny is the Fisheries Section Leader and BIO-WEST's Vice-President. He specializes in aquatic ecology, threatened and endangered species, water quality, biological modeling, and instream flow issues and concepts. He has 18 years of professional project experience, is familiar with all levels of project management, and has worked on many environmental flow projects involving endangered species components. Mr. Oborny has extensive experience and expertise with fisheries investigations throughout Texas and the western United States. He has managed several large ecological and water resource projects and has taken courses in Two-Dimensional Hydraulic Modeling with SMS, Instream Flow Incremental Methodology (IFIM), Physical Habitat Simulation Modeling (PHABSIM), Water Surface Profiling and Floodplain Analysis (HEC-RAS), and Applied River Geomorphology.

Mr. Oborny is currently project manager and principal aquatic resources investigator for the multi-discipline, multi-year Variable Flows and Water Quality Study for the Edwards Aquifer Authority. This large-scale applied research project involves intensive sampling, data analyses and interpretation regarding the importance of various flow regimes and associated impacts to the threatened and endangered species of the Comal and San Marcos Springs/River ecosystems.

Mr. Oborny's experience and expertise with environmental flow issues and endangered species is also illustrated by the number of professional appointments that he has received in

the past 5 years. These appointments are listed in their entirety in Mr. Oborny's resume, but are summarized below:

- Edwards Aquifer Recovery Implementation Program Science Subcommittee Member: 2008–2011.
- Edwards Aquifer Recovery Implementation Program Biological Modeling Team: 2008–present.
- Southern Edwards Aquifer Species Recovery Team Member: 2008–present.
- Special Consultant to the Biological Working Group in Spring Valley, Nevada: 2007–present.
- Blue Ribbon Science Advisory Panel Member (Aquatic Resources) in Owens Valley, California: 2009–present.

Melissa Fontenot is a senior level ecologist at BIO-WEST with considerable experience in riparian habitat assessment, vegetation monitoring, and ecological studies. She has conducted vegetation monitoring and riparian habitat assessments across Texas from participating in riparian assessments as well as instream flow studies on the lower San Antonio River, Cibolo Creek, Martinez Creek, Salatrillo Creek, lower Colorado River, Hamilton Creek, and the upper Brazos River. Additionally, Ms. Fontenot has been participating in an ongoing long-term variable flow monitoring study on the San Marcos and Comal Rivers, which has involved native, non-native, and threatened and endangered species assessment, including monitoring of the endangered Texas wild-rice plant, *Zizania texana*. She maintains professional certifications with the Ecological Society of America and the Society of Wetland Scientists, and has performed ecological studies, native and invasive vegetation surveys, water-quality assessments, wetland delineations, and habitat assessments for multiple projects. Ms. Fontenot is also well-versed in the use of GPS equipment and the principles and techniques of mapping and statistical software.

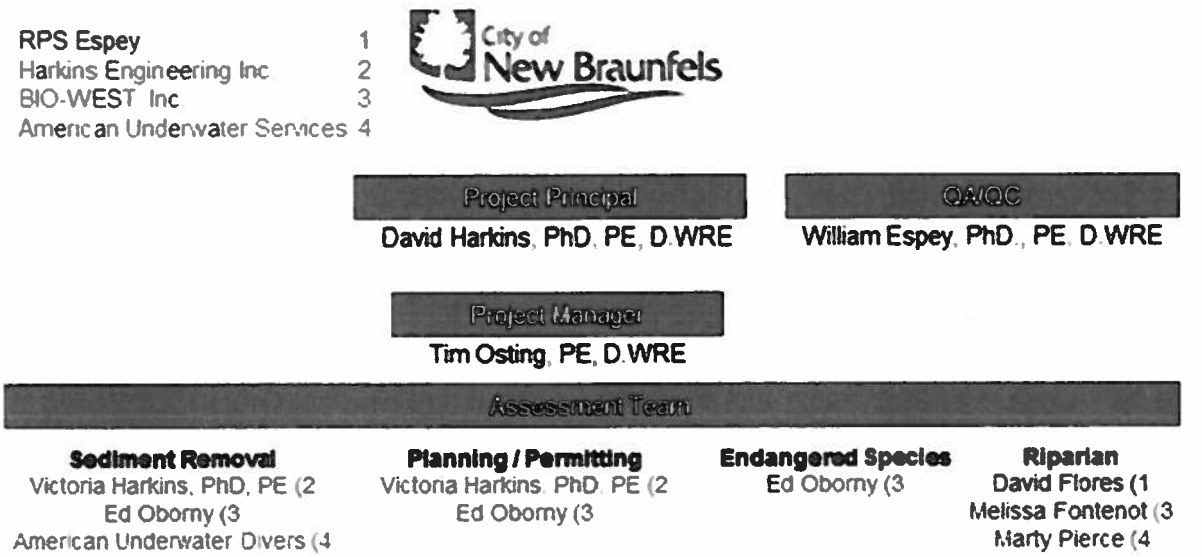
Currently, Ms. Fontenot is serving as the project manager and principal riparian investigator for a riparian monitoring study in collaboration with the San Antonio River Authority to collect valuable recruitment and growth information for native riparian tree species along the San Antonio River. This study incorporates environmental influences of river flow, pulse flow events, groundwater levels, precipitation, soil moisture, and sedimentation on vegetation within the riparian zone at two locations between San Antonio and the Gulf coast. BIO-WEST is also currently beginning a similar effort to study riparian responses to instream flows along the Guadalupe River. In addition to participating in and managing field data collection efforts, Ms. Fontenot also has considerable expertise in data analysis and report preparation. She has been heavily involved in spatial analysis of aquatic and riparian vegetation datasets to develop relationships between environmental parameters, topography, and vegetation maps. She is also proficient in analysis of ecological data using standard and multivariate statistical techniques.

David Flores (Data Collection, On-Site, and Riparian Habitat) recently joined the RPS Espey Water Resources team as a Biologist and Aquatic Scientist. He has expansive experience in rivers across the state, coming to us from the Texas Water Development Board (TWDB) Instream Flows team where he spent the last three years conducting field research. David led TWDB field efforts for instream flow studies (Senate Bill 2) on the San Antonio and Brazos River, as well as led Senate Bill 3 and other studies for the Sabine, Pecos, Devils, Brazos, San Marcos, Nueces, Frio, Blanco, Aransas and Colorado Rivers. David has also worked on the Water Quality Standards Team at the TCEQ conducting environmental reviews on Texas Pollution Discharge and Elimination System (TPDES) and 401/404 permits, conducted Receiving Water Assessments (RWA), Use Attainability Analysis (UAA), and other water quality studies which included biological (fish and invertebrates) and habitat studies.

David K. Harkins, Ph.D., P.E., D.WRE (Project Principal), is the vice president and managing engineer of the water resources/environmental section of Espey in Austin, Texas. Dr. Harkins has over 15 years of experience in water resources and environmental engineering including studies dealing with water supply, water availability modeling, water quality analysis, modeling and permitting, water resources management, instream flow analysis, environmental flow analysis, bay and estuary evaluations, groundwater modeling and management planning. Dr. Harkins served as expert witness for the Brazos River Authority in the SOAH contested case hearings for SysOps permit. He provides oversight for integrating environmental studies with the operations and accounting plan.

William H. Espey, Ph.D., P.E., D.WRE (QA/QC). Dr. Espey is senior vice president of RPS Espey in Austin, Texas. Dr. Espey has over 40 years of experience working with water supply, water availability, water quality, groundwater, surface water, water conservation, reuse, return flows, and several major water reservoir projects. Dr. Espey's teaching and research experiences are principally in the fields of water resources and environmental engineering. He is currently serving as chairman of the SB3 Trinity-San Jacinto Basins Bay-Basin Expert Science Team (BBEST). Dr. Espey will serve as QAQC on this project.

The RPS Espey Assessment Team organizational chart is as follows: Resumes for team members are in Appendix A.



5.2 Relevant Project Experience

EARIP – Comal River Experimental Resource Protection Area	
Client:	**BIO-WEST, Inc., 1812 Commerce Court, Round Rock, TX 78664**
Contact:	**Ed Oborny, 512.990.3954**
Construction Cost:	**$38,000 (fees)**
Project Duration:	**2010 – in progress**
Project Relevance:	**Aquatic Habitat Evaluation for Endangered Species, Conceptual Engineering Design and Cost, Low Flow Experimentation, Stakeholder meetings.**

RPS Espey (Espey) worked with BIO-WEST, Inc., to evaluate conceptual designs for an Intensive Management Area (IMA), later renamed an Experimental Resource Protection Area (ERPA), for Landa Lake and the Comal River. This project was conducted for the Edwards Aquifer Recovery Implementation Program (EARIP) and was intended to provide guidance on specific measures to protect endangered species during high-stress, extreme conditions. The ERPA would serve as (1) refugia habitat for fountain darters and riffle beetles during periods of extreme low flow and (2) will be useful as a testbed for implementation experiments to inform on adaptive management strategies. Espey was responsible for conceptual engineering design of

hydraulic structures and conveyances, for modeling as required, for value/cost assessment and for development of visualization tools.

Services Provided:
Espey assisted Bio-West with evaluation of scenarios and identification of most feasible means to protect endangered species. Espey services include data analysis, participation at stakeholder meetings, conceptual engineering design and cost for this implementation plan.

Scenarios evaluation conducted by Espey considered details such as old channel/new channel flow split, flow trigger levels initiating operation of a recirculation design, and schedules of operation of potential flow control devices (e.g. culverts, weirs, pipelines, etc.). This task also involved water quality modeling simulation and evaluation of the ability of conceptual designs to maintain appropriate water quality conditions (primarily water temperatures) during low-flow periods or under experimental conditions. Espey also examined temporary versus permanent structures and the feasibility of the conceptual plan to meet the project goals.

Hamilton Pool Remediation and Restoration Project	
Client:	**Travis County, 1010 Lavaca, Ste. 315, Austin, TX 78701**
Contact:	**Steve Cappelle or Keith Coburn, 512.854.9462**
Construction Cost:	**$2.5 million ($219,925 fees)**
Project Duration:	**August 2007 - April 2011**
Project Relevance:	**Environmental Remediation, Sedimentation Removal, Water Quality Assessment, Endangered Species Handling, Habitat Restoration/Enhancement, Stakeholder meeting/public involvement**

Hamilton Pool is a naturally occurring pool on Hamilton Creek in Travis County, Texas. In late 2007, the discharge of sediment from an upstream residential development project in Hays and Travis Counties into the Hamilton Creek watershed polluted and impacted the water quality of Hamilton and Davis Creeks and Hamilton Pool.

In August 2007, RPS Espey was retained by Travis County to assess the condition of Hamilton Creek and Pool and develop a remediation and restoration plan. RPS Espey and HEI provided a detailed assessment of the water quality, physical and chemical analyses, literature review, and report of findings and recommendations. This project was completed on time and under budget.

RPS Espey and HEI were tasked with the direct removal of silt and invasive vegetation from six miles of Davis and Hamilton Creeks. **Up to nine feet of silt and sediment were removed from the bottom and surface of Hamilton Pool.** Clarity of the water improved from less than a meter to more than four meters in less than a week post sediment removal. Special care and design was needed to combine the project tasks and goals while also remaining sensitive to the natural character of the creek, landowner concerns, and minimizing any potential impacts on endangered species.

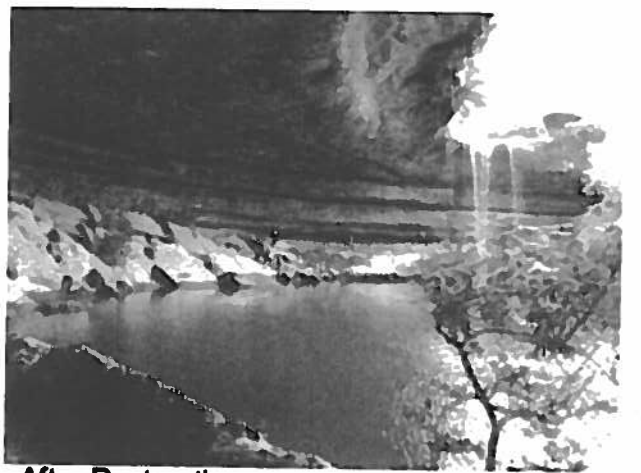
Espey subcontracted American Underwater Services, Inc. (AUS) to perform commercial diving and dredging services. AUS used a commercial-diver-assisted hand-dredge barge with a materials pump with a six-inch intake and discharge line. The dive teams vacuumed the sediment and debris from the pool at approximately 1,800 gallons per minute (gpm). The silt-

laden slurry was pumped from the barge straight up the cliff where a booster pump pushed the slurry the remaining 3,100 ft to the temporary treatment setup.

Espey and HEI applied a creative and innovative sediment removal and restoration plan, which included manual and equipment-assisted silt removal for environmentally sensitive areas with special attention to local wildlife, livestock, vegetation, and aquatic species. The project had measureable positive impacts with re-establishment of the creek system and HP to restore the system's vegetative, wildlife, aquatic, and recreational values. HP is part of the Balcones Canyonland Preserve.

RPS Espey's Hamilton Pool and its Receiving Watersheds Restoration Project has been recognized by the American Council of Engineering Companies (ACEC) of Texas with the 2012 ACEC National and Texas Engineering Excellence Award. RPS Espey received the Gold Medal for Environmental Engineering Excellence. The project also received the 2012 ACEC Eminent Conceptor Award, the highest award granted for the State of Texas.

Before Restoration



After Restoration

Streamflow Conditions in Guadalupe River Basin	
Client:	Edwards Aquifer Authority (EAA), 1615 N. St. Mary's Street, San Antonio, TX 78215
Contact:	Rick Illgner, 210.222.2204
Fees:	$3,000
Project Duration:	2007 - 2008
Project Relevance:	Streamflow conditions review

The U.S. Geological Survey (USGS) report entitled Streamflow Conditions in the Guadalupe River Basin, South-Central Texas: An Assessment of the Contribution of major Springs to Overall Streamflow was written by the USGS in cooperation with the Edwards Aquifer Authority (EAA) as an assessment of the streamflow conditions in the Guadalupe River Basin to determine the contributions of major springs; Comal Springs, San Marcos Springs, and Hueco Springs, to streamflow.

The evaluation was based upon measured discharges from the springs, gaged streamflow data, reported discharges, and withdrawals. This data was used to determine the sources, gains, losses, and availability of water in the basin. The streamflow data was collected from the USGS streamflow gaging stations and discharge and withdrawal data was obtained from the Texas Commission on Environmental Quality (TCEQ). Contribution percentages of major springs were determined for various reaches in the basin. The analyses were performed during long-term conditions (stated as 1987 – 2006) as well as conditions during four selected short-term baseflow periods.

Services Provided: Espey was contracted by the EAA to review the USGS report evaluating the contribution of spring flow in the Guadalupe River Basin. The objective of the report was to provide a basin-wide characterization of the streamflow conditions in the GRB to help understand the sources and gains/losses of streamflow throughout the basin. The report utilized 27 stream segments within the river basin for the analysis. Water budget calculations were performed based on USGS gaging station data and reported discharges and withdrawals to determine streamflow gain or losses in each reach or segment. The evaluation of the contributions of the major springs included calculating ratios of spring discharge to total streamflow at the reach outlets. Espey's evaluation of this report was performed to determine if the approach utilized by the USGS was appropriate to evaluate the springflow contributions and to identify areas where additional data or differing techniques could be utilized to improve the understanding of springflow to streamflow.

Water Quality Assessment and Remediation	
Client:	**Private**
Contact:	**Confidential**
Fees:	**$270,000**
Project Duration:	**2007 - 2007**
Project Relevance:	**Water Quality Assessment, Remediation**

RPS Espey has been retained by a private client for the purposes of performing a site evaluation and water quality analysis in northern Hays County. The purpose of the evaluation was to determine the existing water quality of and to present potential strategies and/or recommendations to improve the water quality. The site is a naturally occurring pool which drains a watershed of roughly nine square miles in the Pedernales River Basin. Construction activities upstream have resulted in the accumulation of fine sediments along the bottom and within the water column.

Services Provided: Espey and HEI provided water quality assessment and remediation services for a natural pond due to point and non-point source pollution upstream. The project contains many sensitive biological and ecological factors. Remediation will encompass a pump and treat system with careful return of treated water. Project assessment included a detailed assessment of the current water quality, background concentrations, and comparable water quality concentrations. A detailed literature review was completed as well as an extensive field assessment.

Remediation encompassed a pump and treat system with careful return of treated water. Project assessment included a detailed assessment of the current water quality, nutrient loadings from sediments (in the pool and upstream), background concentrations, and comparable water quality concentrations. A detailed literature review has been completed as well as an extensive field assessment. The project met its goals and was successfully completed.

Long-Term Environmental Flows Management – Brazos River Riparian and Sediment Evaluation	
Client:	**Brazos River Authority, 4600 Cobbs Drive, Waco, TX 76714**
Contact:	**Tiffany Morgan, (254) 761-3100**
Fees:	**$1,005,000**
Project Duration:	**2011 - 2016**
Project Relevance:	**Instream Flows, Water Quality Assessment, Riparian and Sediment Evaluation**

The overall purpose of this project is to assist Brazos River Authority (BRA) staff with hydrology evaluations, biological and habitat assessment, water quality evaluations and instream flow guideline development necessary to complete a Water Management Plan (WMP) for 11 reservoirs and over 1,200 stream miles. This is a multi-component, multi-year project.

One component of the project involves a sediment and riparian survey. This survey was conducted in support of Brazos River Authority (BRA) initiatives to collect baseline data on current conditions of the Brazos River, and data may be useful for evaluation of water quality protection points identified in the draft System Operation Permit currently pending before the Texas Commission on Environmental Quality (TCEQ). Biological data collection has occurred in cooperation with subcontractor BIO-WEST in the vicinity (within 1 mile downstream) of this site within the preceding year. Several historical cross-section measurements, measured by the US Army Corps of Engineers (USACE) in 1939, are available for the area; best estimate of the location of one cross-section is within 1,000 feet of the site.

For this effort on this site, the purpose of measurements is to help characterize the range of riparian vegetation species, channel bed sediment, cross-section geometry, and inundation level. For these purposes, this site is one of several sites anticipated in the area. Additional on-site surveys are intended to be completed in the near future. The intent is to use data from multiple sites, both left-bank and right-bank, to characterize baseline conditions. This project is on-going.

New Braunfels Reclaimed Water Irrigation Feasibility Study	
Clients:	**City of New Braunfels**
Contact:	**Robert Camereno, Assistant City Manager, 830.221.4280**
Project Duration:	**2011**
Project Relevance:	**Recent experience with City of New Braunfels**

The City of New Braunfels received a Regional Water and Wastewater Planning Grant from the Texas Water Development Board (TWDB) to aid in evaluating the feasibility of developing a reclaimed water system to supply irrigation water for the City's parks. Espey Consultants, Inc. (EC) prepared a detailed technical analysis of the potential for developing direct water reuse as an alternative supply source for irrigation of the City's parks.

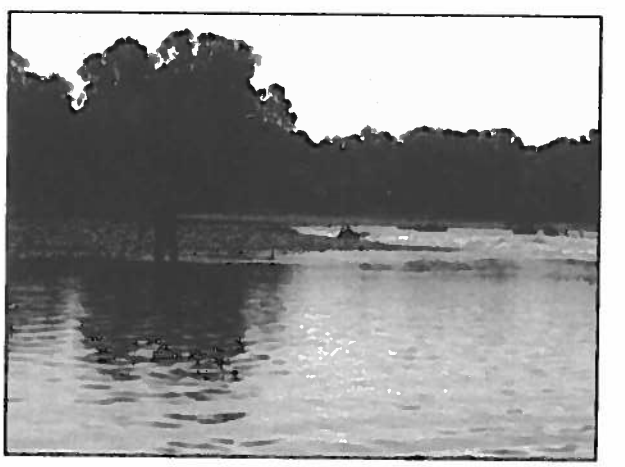
Joining the City in conducting the feasibility study were New Braunfels Utilities (NBU), Guadalupe-Blanco River Authority (GBRA), and the Edwards Aquifer Authority (EAA). Unlike other feasibility studies that incorporate an analysis of the potential for marketing reclaimed water for anticipated uses, this study addressed the feasibility of developing a single user system. The irrigated area of the City's primary parklands provided the basis for determining the capacity of a reclaimed water system.

Of the City's total park area of 513.9 acres, the feasibility study examined a total of 172.8 acres of parkland that is presently irrigated, or will be irrigated in the future, located in Landa Park, Hinman Island, Prince Solms Park, Camp Comal, Fischer Park, HEB Soccer Complex, Walnut Avenue, Fredericksburg Fields, and a portion of the Landa Golf Course. The NBU water utility relies on surface water treatment for the base load of the system, but peaks during the summer months with groundwater from the Edwards Aquifer. Outdoor irrigation, including that used for public parks, is restricted as the level of the aquifer falls during dry summer periods.

Services Provided:
Espey Consultants, Inc. prepared the City's application to the TWDB for regional planning grant funding and conducted the feasibility study. In its analysis, EC determined that a single user system would need a capacity for up to 295 million gallons per year. Effluent from the NBU wastewater treatment plants would require a minimal amount of treatment to meet Type I reclaimed water quality as prescribed by TCEQ. EC also evaluated the potential benefits of water reuse, including the potential reduction of demand on the Edwards Aquifer and enhanced recreational opportunities by maintaining park turf grasses.

Colorado River Evaluation Project	
Clients:	San Antonio Water System, 2800 US Hwy 281 North, San Antonio, TX 78212 and Lower Colorado River Authority, 3700 Lake Austin Blvd., Austin, TX 78703
Contact:	Ed Oborny, BIO-WEST, 512.990.3954
Project Duration:	2005 - 2009
Project Relevance:	Habitat and Recreation models, Sediment transport analysis, Alternative analysis, Permitting, Support Design of Intake Facilities, Hydraulic Models, Endangered species

The lower Colorado River basin supports a diverse ecological community that relies on the quality, quantity, and timing of water moving through the system. The LCRA-SAWS Water Project (LSWP) has the potential to alter characteristics of the flow regime for the lower Colorado River, including the possibility of using instream structures to facilitate the removal of water for off-channel storage facilities (OCSF). Because of these potential impacts, the Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker Study was developed to assess potential impacts/benefits on the aquatic resources of the lower Colorado River with and without implementation of the project. An additional study objective is to quantify the condition of the aquatic environment under different flow scenarios to satisfy federal and state permitting requirements and ensure compliance with the environmental principles set forth for this project.



Services Provided: Through a sub-contract with Bio West, RPS Espey was responsible for reconnaissance, aerial photo interpretation, GIS analysis, field data collection, hydrological analysis, two-dimensional hydrodynamic modeling, aquatic habitat analysis, data management and flow regime recommendations to maintain the ecological health of the lower Colorado River. Flow regime recommendations are consistent with Texas Instream Flow Program framework and methods and have been initially well-received by state agency staff.

Espey was responsible for ARCGIS development to define existing habitat classifications on the Colorado River. These habitat classifications included riffle, pool, run, etc., to

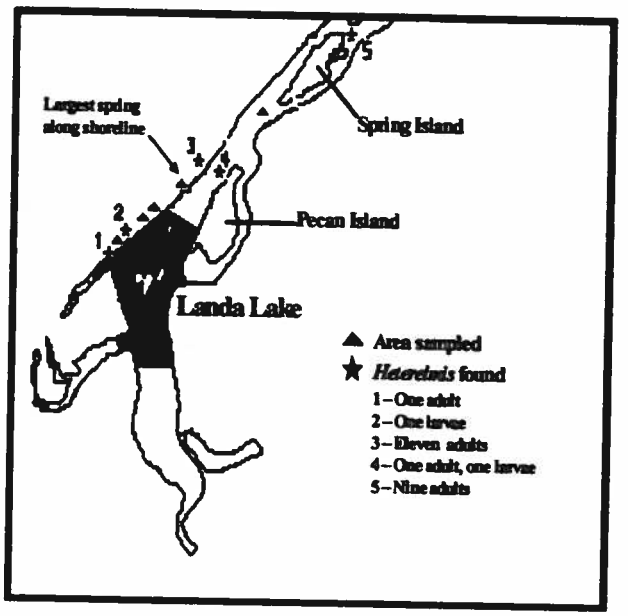
assist in developing a baseline habitat. The GIS layers were used to query the amount and location of various habitat types along the Colorado River. Riparian vegetation categories were also delineated on the photos, digitized, and incorporated into a GIS layer. This information is initially used to locate appropriate intensive sites that adequately represent habitat found in the entire reach. **The maps were developed to assist the project team in the evaluation of what type of percentage habitat is currently available for biologic production.** The project team will utilize this information to determine the most appropriate locations to plan the detailed study sites.

Espey staff was responsible for engineering data collection and analysis to support Espey's development, calibration and validation of in-channel 2D (depth-averaged) hydraulic models of the Colorado River. The model chosen for this study was River2D. Data collected for this project included high resolution bathymetry (echosounder/ GPS), water surface elevation (FastStatic/ RTK GPS), flow rate (ADCP), velocity (ADV) and depth data. Hydraulic model velocity and depth output was combined with substrate maps and habitat utilization guilds to quantify available aquatic habitat area. Hydrological analysis was performed to compare pre-1940 (pre-flood control), naturalized and current-period flows.

BIO-WEST INC. RELATIVE PROJECTS

Edwards Aquifer Authority Comprehensive and Critical Period Monitoring Program Evaluate the Effects of Variable Flow on Biological Resources in the Comal and San Marcos Springs Aquatic Ecosystems (Variable Flow Study)	
Client:	Edwards Aquifer Authority, 1615 N. St. Mary's Street, San Antonio, TX 78215
Contact:	Rick Illgner, Research Coordinator, 210.222.2204
Project Relevance:	Flow conditions assessment, monitor and special study of threatened and endangered species

BIO-WEST was contracted in January 2001 to conduct the Variable Flow Study (a holistic study with the goal of assessing variable flow conditions via an ecosystem approach while including monitoring and special studies specific to individual threatened and endangered species). Throughout the course of the Variable Flow Study to date, BIO-WEST has worked with a plethora of scientists who have provided scope input or comments, assisted in study design, and/or have participated in fieldwork activities and data analysis. Four of the five special studies were designed and conducted in conjunction with U.S. Fish and Wildlife Service (USFWS) National Fish Hatchery and Technology Center (NFHTC) scientists or Texas State University (TSU) professors and graduate students. Four Master's theses have been published to date through the collaboration of BIO-WEST and Texas State University. The extensive interactions and associations with resource agency and academic professionals over the past decade have provided the Variable Flow Study with a high level of peer review, comment, and critique.



The study includes intensive monitoring directed toward each of the eight threatened and endangered species found in the Comal and San Marcos Springs ecosystems. In addition to each of the study components, applied research efforts were specifically conducted for the Comal Springs riffle beetle as follows. In 2001, a comprehensive survey of Landa Lake (BIO-WEST 2002a) revealed that the Comal Springs riffle beetle was found in areas outside of the Spring Runs, specifically in one area along the western shoreline of Landa Lake and in the lake around Spring Island. Additional laboratory efforts with the Comal Springs riffle beetle (BIO-WEST 2002b) provided data that suggest Comal Springs riffle beetles oriented toward lateral flow and upwelling flow.

San Antonio River Riparian Recruitment Study	
Client:	San Antonio River Authority, PO Box 839980, San Antonio, TX 78283
Contact:	Steve Raabe, Director of Technical Services, 210.302.3614
Completion Dates:	2012-2014
Project Relevance:	Environmental flows, Riparian study

San Antonio River Riparian Recruitment Study

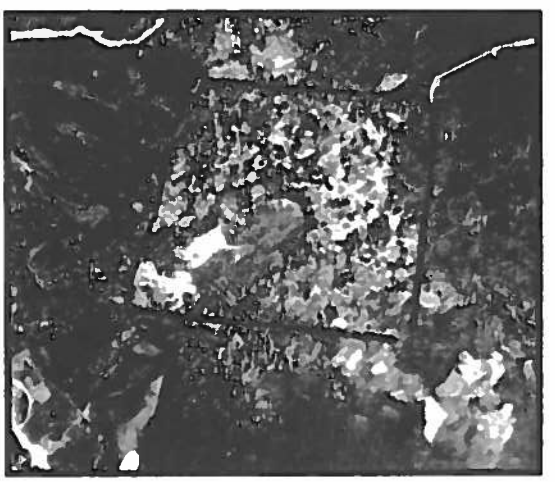
The San Antonio River Authority (SARA) is currently collaborating with scientists and resource agency personnel to study environmental flows of the San Antonio River. As part of that collaborative study, BIO-WEST was hired to characterize the riparian community's response to varying flow regimes. Two key problems in identifying the flow needs of riparian trees are the physical and hydrological complexity of this transitional zone in the landscape and the differing germination and growth requirements of the diverse group of taxa that occur in it. In order to enhance the riparian study component, SARA contracted BIO-WEST to monitor seedling recruitment at two sites on the San Antonio River to determine the influence of environmental flows on germination and survival. The extent of inundation of the riparian zone by pulse and overbank flows, in addition to microhabitat characteristics, will be assessed in relation to recruitment areas and seedling survival between spring 2012 through 2014.

Brackenridge Park Study	
Client:	Brackenridge Park Conservancy
Completion Dates:	2011-2012
Project Relevance:	Assessment, Data collection of vegetation species, water quality, riparian habitat

In 2011-2012, the Brackenridge Park Conservancy contracted with BIO-WEST to document baseline ecological conditions within certain portions of Brackenridge Park and the adjoining San Antonio River. This data will be used to enhance management of the park by informing future education, mitigation, monitoring, restoration, and policy decisions. In order to thoroughly document ecological conditions within the park, a multi-faceted study was designed which surveyed fish, aquatic macroinvertebrates, water quality, mammals, reptiles, amphibians, birds, and riparian communities. The riparian community baseline assessment in included a review of currently available environmental and vegetation information of the park, a mapping effort to define the various vegetation communities present, and a field study to collect vegetation species diversity and density data within each community. The objectives of the baseline assessment were to provide a description of the existing habitat and species diversity that may be enhanced by management activities and allow for the environmental restoration and future monitoring.

Special Study – Comal Springs Riffle Beetle Habitat Survey	
Client:	Edwards Aquifer Authority
Project Relevance:	Assessment, Data collection of vegetation species, water quality, riparian habitat

Objective: The Comal Springs riffle beetle (*Heterelmis comalensis*) is an endangered aquatic beetle which was initially thought to have an extremely narrow range including only Spring Runs 1, 2, and 3 of the Comal Springs ecosystem. This study was conducted to further assess the range of Comal Springs riffle beetles, and to quantify density of riffle beetles within these areas.



Task Description: Three separate surveys (3-4 days each) were conducted to search for Comal Springs riffle beetles in spring outflow areas in and around Landa Lake. Where riffle beetles were discovered, a 0.25 m^2 metal frame was used to make quantitative estimates of riffle beetle densities. The frame was placed over the substrate in areas where riffle beetles were discovered and the number of riffle beetles within the area of the frame was enumerated.

Location: Spring outflows near Landa Lake and Spring Island in the Comal Springs Ecosystem.

Data Analysis and Results: Results indicate Comal Springs riffle beetles occupy several spring outflows beyond Spring Runs 1, 2, and 3, including: seeps along the western shore of Landa Lake, upwellings in the deeper portions of the mid-lake area, and outflows near Spring Island. Although Comal Springs riffle beetles are limited to areas free of silt near spring outflows, these results greatly expand the known range of the beetle. Therefore, the physico-chemical tolerances of the species also may be somewhat broader than initially thought.

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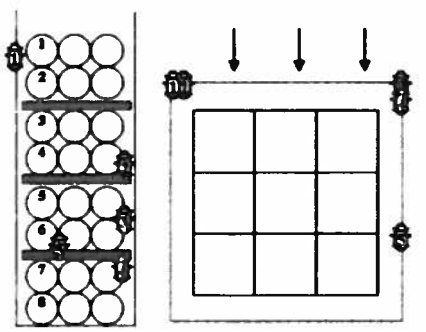
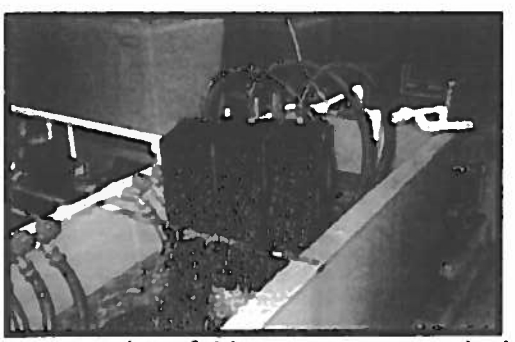
Special Study – Comal Springs Riffle Beetle Lab Study	
Client:	Edwards Aquifer Authority
Project Relevance:	Riffle beetle habitat study

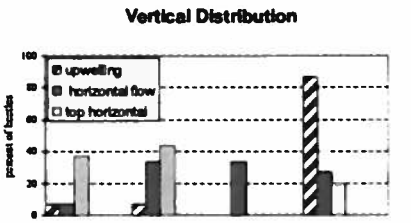


Objective: A paucity of data exists regarding physiological and ecological requirements of the Comal Springs riffle beetle (*Heterelmis comalensis*). To expand on data collected in the Comal Springs riffle beetle habitat survey, a laboratory study was conducted. Of particular interest is that this species must have persisted through low spring flow events such as the period in 1956 when Comal Springs ceased to flow for approximately five months. Potentially, riffle beetles migrate deeper into the substrate during low flow periods where some subterranean flow may still exist. This lab study was designed to test the relationship between substrate depth, vertical and lateral flow, and riffle beetle location.



Location: This study was conducted at laboratory facilities of the San Marcos National Fish Hatchery and Technology Center.

Task Description: In the lab, several detailed experimental blocks were constructed with black acrylic plexiglass and Bio Barrel polypropylene media. The construction of this apparatus was designed to mimic the natural gravel and cobble substrate of



the riffle beetle and allowed for movement through the media via interstitial spaces. Barrier layers were put in place to slow beetle movement and more accurately reflect the decreasing size of interstitial spaces deeper in the substrate, after test runs revealed that beetles were moving quickly to the bottom of the block. Blocks were designed to allow flow manipulation both horizontally and vertically through the apparatus. Riffle beetle locations were noted after experimenting with combinations of horizontal and vertical flows.

Data Analysis and Results: In this laboratory study, Comal Springs riffle beetles displayed a tendency for downward movement through the substrate and a preference to be in, and move toward moving water (current). When horizontal flow was applied to the block, the beetles were most commonly found towards the front. When a vertical upwelling flow was applied to the bottom, most beetles were collected near or moved toward the bottom. Therefore, it is feasible that these beetles would respond to decreased spring flows by moving downward into the substrate in search of a flow stimulus. It is also likely that these beetles inhabit areas deeper in the gravel and sediment than have previously been sampled.

American Underwater Services, Inc. (AUS)

Aquarena Springs – Protecting the Blind Salamander Project	
Client:	Texas State University
Contact:	Ron Coley, Director Aquarina Springs Resort, 512.245.7570
Project Relevance:	De-silt and remove diffuser pipe, endangered species, environmentally sensitive area

AUS commercially certified divers were contracted to de-silt and remove a 36" diffuser pipe, which had been used for over 50 years as a Salamander trap. These are a federally protected species that lives within this body of water which required us to work with very extensive rules/regulations. AUS stayed in full compliance within this to an environmentally sensitive area.

6 Methodology

RPS Espey and team will provide all labor, supervision, materials, equipment and expertise necessary to perform activities.

6.1 Sediment Removal

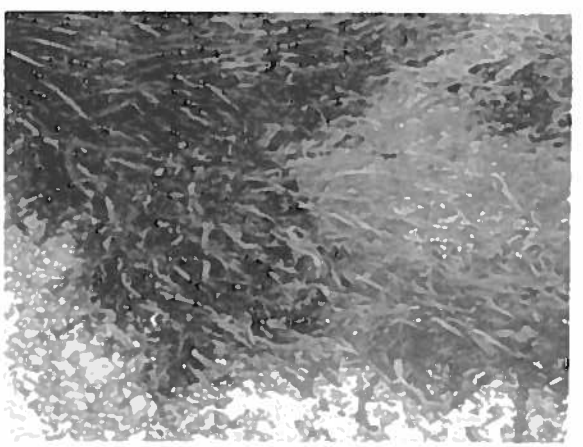
The design and implementation of remediation methods to remove fine silt deposited along the bottom of Landa Lake will require both above surface and below surface equipment.

The RPS Team will conduct a thorough site assessment to identify areas of silt removal along the 100 m of the western edge of Landa Lake. GPS markings will be collected for the creation of maps to visually present areas of dive and sediment removal. An assessment report and work plan will be submitted for approval. Due to the depths of the Lake from the edge to an estimated 15 feet, divers will use a specially designed suction head with a gross screen followed by a series of no more than 0.25 inch orifices to gently move across the bottom surfaces in areas previously identified and marked to contain silt for removal. Pump turn off with no blow back will be used to address potential blinding clean off. No water column pumping will occur, and areas of the springs will be avoided.

Prior to any dives, efforts will be completed to clear the area of all aquatic species by fanning, sweeping, and/or seining with particular attention to the fountain darter and riffle beetle. RPS Espey will subcontract with BW to perform a pre-dive mobilization of aquatic species to a point further downstream. With the noise and movement of the pumps and dredge material, the aquatic life is not expected to return until conditions stabilize post pumping. BW will be on-site to monitor and will have the authorization to slow, move or cease operations to address any potential aquatic species potentially identified and present.

RPS Espey will subcontract American Underwater Services, Inc. (AUS) to perform commercial diving and sediment removal services. As demonstrated prior, AUS has extensive experience in ecologically sensitive areas and specific work with appreciation and sensitivity to endangered species. All dive team members will be formally made aware of the endangered species potentially present and provided with training materials pictures and related information of each species. AUS will use a commercial diver assisted hand-dredge-barge with a 4" pump intake and discharge line. The barge will be placed by hand onto the surface of the lake. The 4" inch pump operates on vegetable oil. The barge itself will act as the staging area for the divers performing sediment removal.

The divers work in groups of three with a diver, an attendant on the barge and a third attendant at the trailer with the communication system. The divers are in constant communication such that any changes needed for speed, location, etc. can be relayed instantly. The dive team will work 8 hour daily shifts (two hour dive increments with one hour at the surface), with a nozzle at approximately 400 gallons per minute (gpm). The nozzle speed will be adjusted on-site to meet the objectives of a gentle sediment removal. The pump can be pinched back to a variety of pumping speeds. The silt-laden slurry will be pumped from the barge to the filter bag placed at the approved staging area for the filter bag. The filter bag will be sized for 130% of the sediment load. Buoys or other on-water equipment will be used, if needed to alert others of the presence of the divers. Water from the filter bags will be allowed to drain back into Landa Lake.



Due to the barge, little access will be needed from the park side for the divers. Site monitoring and construction management (two pair of boots at the most) will be along the perimeter.

In areas of ingress and egress damage due to the movement of the divers, their set-up trailer,

diver's air compressor, and any other ingress and egress, efforts will be made to restore the site to pre-construction conditions. If site access is granted by the golf course, an assessment and agreement will be made with the golf course for restoration of the staging area. On-site time for the larger equipment is estimated to be less than two weeks such that damage from continual aggravation will be minimized.

6.2 Riparian restoration and walking path

The riparian area adjacent to the spring run and lake shore springs plays an important role in suitability of habitat for area endangered species, including the Comal Springs riffle beetle. The City desires to improve the existing condition of the riparian area by removing non-native species and planting native species. Riparian area improvements, including installation of the walking path, will help reduce amount of eroded fine silt material migrating into the spring orifices from the upland and shore areas. Additionally, certain native vegetation species may be beneficial to riffle beetle as a food source.

Prior to initiating any on-site activities, a riparian restoration plan will be provided to the City and stakeholders for approval. Participation in meetings is anticipated as well as one revision of any initially submitted plan materials. Major components of the plan include:

- Non-native vegetation accounting and removal strategy
- Native vegetation species list and planting plan

The riparian work plan will include an accounting of existing non-native species with a proposal for methods used to remove the vegetation while minimizing disturbance to endangered species habitat including the riffle beetle or fountain darters within the water body. The plan will also address measures to minimize impact of constructing the walking path on existing native vegetation.

To prevent increased erosion during on-site activities, need for temporary erosion control measures will be assessed. Traditional silt fences may be needed in some areas along the shore line, but may not be appropriate where installation would disturb existing habitat. Additional alternative measures may be proposed as appropriate to minimize migration of sediment into the water body.

Considering shadey conditions along the shoreline, a list of vegetation species appropriate for the site conditions will be presented to the stakeholder group. Species should be shade and drought tolerant, should have good root structure to promote erosion control, and should not

have characteristics detrimental to the endangered species. The vegetation species will be native trees and understory to minimize level of exposed soil.

Limited access to the west bank may require that all materials transport be manual (non-motorized) along the west bank, across the spring run bridge and into the staging area. This may apply to tree removal as well as to import of materials (vegetation, erosion control, walkway pavers) onto the site. Ingress and egress will be assessed during on-site evaluation and described in the plan.

The new walkway may serve to augment sedimentation control measures. A two-foot wide walkway was discussed in the pre-bid meeting, comprised of porous pavers. No crushed granite will be allowed. Followup information from the City indicated the path should be relatively level so some modification to the existing irregular pathway is anticipated. A recommendation will be included and summarized in the plan.

To promote establishment of vegetation, a temporary watering system will be installed. Temporary PVC pipe with spray nozzles are proposed to be laid on ground surface. Water source will be nearest city water connection, activated with a timer. City employees in the park vicinity can inspect the watering system daily; contractor will visit to inspect once per week for 3 weeks subsequent to installation. Contractor will remove the system after 1 month; however, the City has option to assume responsibility of system before removal to continue watering for a longer duration.

6.3 Timeline

The RPS Espey Assessment Team will complete the Plan and Construction Methodologies no later than April 1, 2013. All erosion prevention, re-vegetation, walking trail construction and sediment removal activities will be completed no later than August 1, 2013.

PROJECT PHASE	START DATE	END DATE
Project Kickoff meeting, Meetings with City for Submittal Requirements, Data Needs and Discussions	1/2/2013	1/4/2013
Sampling and Analysis (standard lab turnaround)	1/7/2013	1/11/2013
Plan and Construction Assessments and Methodologies	1/14/2013	4/1/2013
All erosion prevention, re vegetation, walking trail construction and sediment removal activities	4/2/2013	8/1/2013
Final Report		12/31/2013

6.4 Reporting

Reporting shall occur on a monthly basis and will include summaries of work accomplished to date, remaining tasks, support required from the City of New Braunfels, and expected deviations from work plans and/or schedules until December 2013. Reporting will also include monitoring activities, assessments, etc. Reports will include photographs of all stages of work, paying particular attention to milestones. An initial report detailing assessment, proposed methodologies, design and work plan will be submitted to the City of New Braunfels April 1, 2013.

6.5 Monitoring

Monitoring will be conducted to determine the effectiveness of established riparian vegetation and will include recommendations for revisions to methodologies for expansion of efforts. Accumulation of fine sediments will also be monitored. In the event of heavy rainfall, sediment accumulation levels will be assessed within 7 days through the term of the contract; triggers for monitoring will be negotiated with City staff after award of contract.