FREEPORT-McMoRan

Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

Sherry Burt-Kested
Manager, Environmental Services
Telephone: 575-912-5927
e-mail: sburtkest@fmi.com

September 16, 2019

Certified Mail #70182290000117902993
Return Receipt Requested

Ms. Rebecca Roose, Director
New Mexico Environment
Department Water Protection Division
P.O. Box 5469
Santa Fe, NM 87502

Dear Ms. Roose:

Re: Chiricahua Leopard Frog Survey Workplan
Lampbright Investigation Unit - Chino Administrative Order on Consent

Freeport-McMoRan Chino Mines Company (Chino) submits under separate cover a *Chiricahua Leopard Frog Survey Workplan, Fall 2019* for the Lampbright Investigation Unit (LIU) under the Chino Administrative Order on Consent (AOC). The New Mexico Environment Department (NMED) provided the Chiricahua Leopard Frog (CLF) survey and work plan request in a letter dated June 5, 2019. In letters dated July 12, 2019 and August 28, 2019 to the NMED, Chino documented its agreement to conduct a survey to assess for CLF presence in LIU during the 2019 field season to address identified uncertainty concerning presence of habitat identified in the LIU Ecological Risk Assessment (ERA). This workplan for the above-mentioned CLF survey for habitat and presence/absence is in support to expedite the LIU progression.

This CLF survey workplan for LIU was submitted today to Mr. David Mercer, NMED AOC Project Manager. Please contact Ms. Pam Pinson at (575) 912-5213 for any questions.

Sincerely,

Sherry Burt-Kested, Manager
Environmental Services

SBK:pp
20190913-001

c via email: David Mercer, NMED
Joseph Fox, NMED
Kurt Vollbrecht, NMED
Petra Sanchez, U.S. Environmental Protection Agency
Susan Millsap, USFWS
Ron Kellermueller, NMDGF
Mike Steward, Freeport-McMoRan Minerals Corporation

CHINO MINES AOC LAMPBRIGHT IU, CHIRICAHUA LEOPARD FROG SURVEY WORKPLAN, FALL 2019

Submitted To

Pam Pinson, Senior Environment Engineer
Chino Mines Company
575-912-5213
Via Email

Submitted By

BIOME, Ecological and Wildlife Research
Bryce Marshall, Principal Investigator

12 September 2019

OVERVIEW

After a well-documented disappearance, primarily due to chytridiomycosis, of the federally listed Chiricahua Leopard Frog (CLF, *Lithobates chiricahuensis*) the New Mexico Environmental Department (NMED) is requesting that surveys be completed in several tributaries adjacent to the Chino Mine operations, near Hurley. Specifically, to address ecological risk uncertainties under the Chino Administrative Order on Consent (AOC) for the Lampbright Investigation Unit. The 2019 field season surveys will focus on the Lampbright Canyon area of west-central New Mexico. BIOME, Ecological & Wildlife Research, has been requested to submit this workplan proposal to conduct these activities for the fall of 2019. As part of this workplan, we are providing a brief explanation of our professional experience for the completion of work provided in the Project Objectives. BIOME will use the standardized approach thoroughly described in the Recovery Plan, Appendix E (USFWS 2007) to assist in Chino Mine's continued natural resource management activities.

KEY PERSONNEL – SURVEY TEAM

Bryce Marshall, Principal and Project Manager – BIOME, Ecological & Wildlife Research

The Principal has twenty-five years' experience as a professional biologist in the Southwest where he has worked on numerous endangered species, including avifauna, fisheries, herpetofauna, mammals, and ecological studies. He has twenty years' experience with National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) compliance projects and completed various wildlife survey and monitoring projects in Arizona, New Mexico, Utah, and Texas. Mr. Marshall will coordinate all aspects of the project and function as the prime contractor for all survey work and reporting. Also see Attachment A for Resumes of Personnel. Copies of Mr. Marshall's USFW and state NMGF permits are also included in Attachment A.

PROJECT OBJECTIVES

Project objectives will be to identify presence or document absence of CLF within the survey area identified in **Figures 1 and 2**, factors that may be contributing to this species status in the survey area, and habitat quality/quantity within the survey area. Surveys will be coordinated with Chino Mine personnel to identify all habitats including those previously surveyed for CLF within the Lambright survey area, as identified in **Figures 1 and 2**.

Methodology

To meet Chino Mines safety guideline requirements, CLF survey work will be completed using two daytime surveys to identify species status within the survey area. Although a single nighttime survey is more than adequate, especially for complex habitats, two daytime surveys are sufficient when surveying less complex habitat types (i.e. cattle tanks, plunge pools, isolated seeps and springs) (USFWS, 2007). As per the 2007 USFWS CLF Final Recovery Plan Appendix E, to determine presence of CLF, a combination of visual pedestrian surveys, high powered optics, and dip netting will be used for individuals observed during surveys to confirm identity of the frog presence. Digital photography will be used to fully document each aquatic habitat surveyed and will be included in a summary report to support survey methodology. Water quality data will be collected at each site that will include pH, conductivity, and water temperature, while abiotic terrestrial data including temperature and humidity will also be collected. Any CLF observed or captured during surveys will be examined for health status, photographed and released at the place of capture. All surveys at each location will be documented using standardized CLF survey datasheets. See attached Appendix E Survey Protocols (USFWS 2007) for sample survey datasheet. All surveys will include the Principal Investigator and a biological technician/safety technician (BIOME) as well as Chino Mines and NMED representatives, anticipating a team of 4 to 5 in the field during the two primary days of surveying.

To reduce the potential for spreading chytrid fungus between sites, a quaternary ammonia solution will be used, both in the field and at the field vehicle, to sanitize waders, dipnets, and other field equipment that contacts aquatic surfaces. If possible, the survey team will avoid wading in and through wet habitats unnecessarily and will use a combination of hiking boots and thigh-high waders to complete these surveys. This will be most important when moving between tributaries or isolated pond/pool structures.

Analyses, Reports and Archival.

All data will be entered into the digital entry format required by NMGFD and submitted as required by October 15, 2019. The data for each tank, stretch of drainage, or plunge pool location surveyed will be collated with the photo documentation, water measurement parameters, and size data. A summary of the size, water parameters, and survey results will be included in the CLF survey report.

A CLF Survey report detailing all activities involved with this work will be submitted to the NMED within the fourth quarter of 2019. When appropriate, survey results will be compared to previous data.

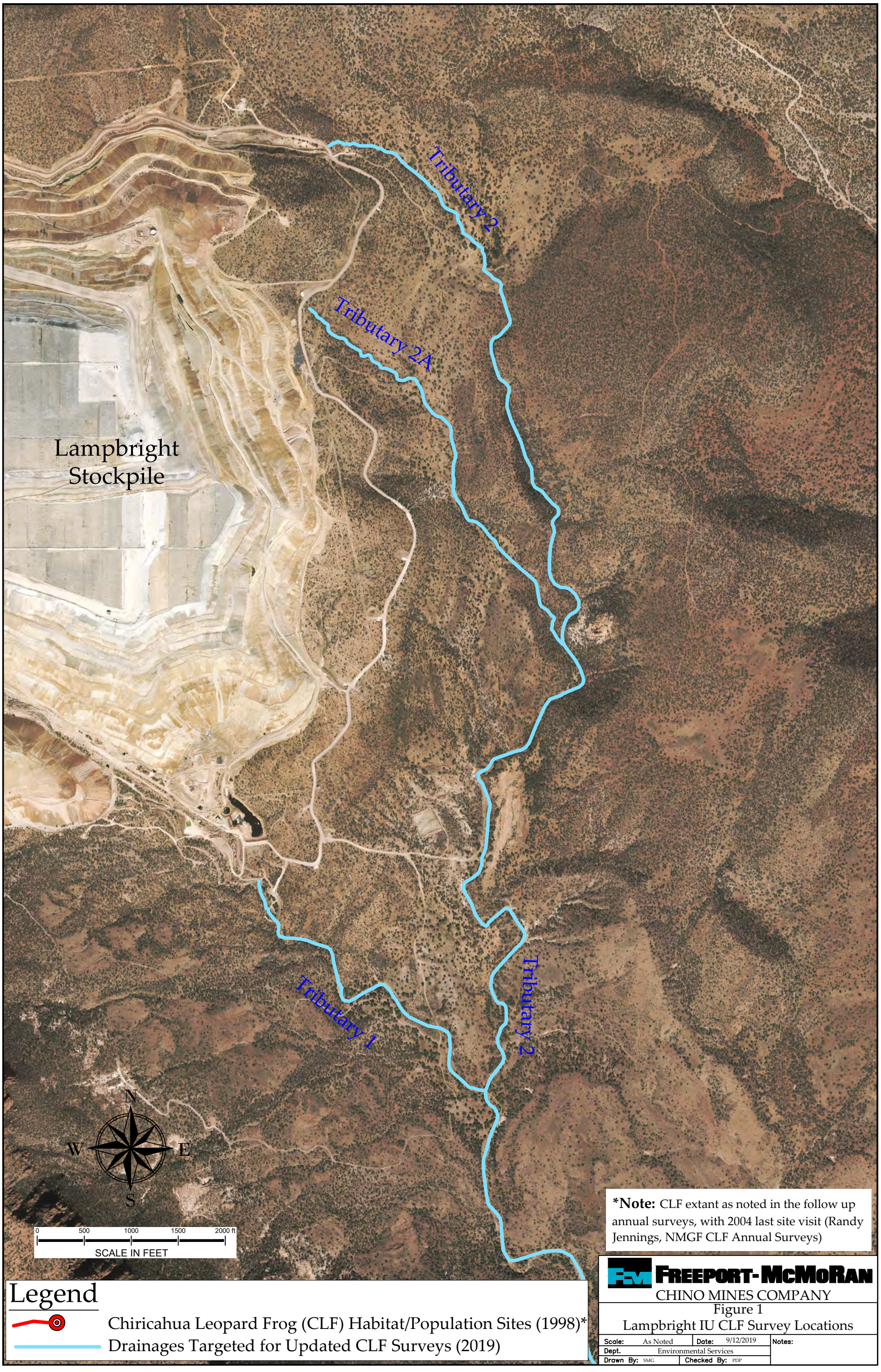
Timing of Proposed Tasks

It is anticipated that the wildlife surveys will require one day of reconnaissance and

two days of sampling to complete the surveys under the survey protocol. These two survey days will be spaced out by two days between surveys during the week of September 23rd, targeting the 24th and 26th. Survey days should be completed within a single week.

SURVEY PERMITTING

To complete these surveys, the Principal Investigator will be working under Section 10 permit #TE054791-3 (Exp 2021) and New Mexico Game and Fish Department (NMGFD) scientific collecting permit #3671. Copies of these referenced permits are included in Attachment A. All survey work completed under these permits will be copied to the appropriate agency upon completion of work and reporting. Both FWS and NMGFD have been notified of the upcoming survey plans per the requirements of each permit.


Tributary 2
Tributary 2A
Lampbright
Stockpile
Tributary 1
Tributary 2
N
W
E
S
0
500
1000
1500
2000 ft
SCALE IN FEET
Legend
Chiricahua Leopard Frog (CLF) Habitat/Population Sites (1998)*
Drainages Targeted for Updated CLF Surveys (2019)
*Note: CLF extant as noted in the follow up annual surveys, with 2004 last site visit (Randy Jennings, NMGF CLF Annual Surveys)
FREEPORT-McMoRan
CHINO MINES COMPANY
Figure 1
Lampbright IU CLF Survey Locations
Scale: As Noted
Date: 9/12/2019
Notes:
Dept. Environmental Services
Drawn By: SMG
Checked By: PDP

Tributary 1

Tributary 2

West Fork Lampbright

N
W
E
S

0 500 1000 1500 2000 ft
SCALE IN FEET

***Note:** CLF extant as noted in the follow up annual surveys, with 2004 last site visit (Randy Jennings, NMGF CLF Annual Surveys)

Rustler Canyon

Rustler Canyon West Branch

Legend

Chiricahua Leopard Frog (CLF) Habitat/Population Sites (1998)*

Drainages Targeted for Updated CLF Surveys (2019)

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CHINO MINES COMPANY

Figure 2
Lampbright IU CLF Survey Locations

Scale: As Noted	Date: 9/12/2019	Notes:
Dept. Environmental Services		
Drawn By: SMG	Checked By: PDP	

Attachment A

Resumes of Personnel

BRYCE L. MARSHALL
2771 Bird Springs Ovi
Flagstaff, AZ 86005
Phone: 928-607-3361
bryce_marshall@hotmail.com

Education

Masters Candidate, Biology-Evolutionary Ecology. Northern Arizona University, Flagstaff, Arizona.
B.S. Biology. Northern Arizona University, Flagstaff, Arizona. 1997.

Experience

Twenty years of experience as a field biologist and research scientist in the Southwest focusing on vertebrate and ecological research with supervisory, project planning and management, and proposal writing experience. Mr. Marshall has extensive experience with project design, data analysis, and reporting of biological data. Has worked with both large and small datasets, derived using both field and literature resources, using parametric and nonparametric analysis methods. He has experience in multiple fields of biological study including ornithology, mammalogy, herpetology, ichthyology, vertebrate ecology, botany, and forestry practices. His specific experience in these fields includes:

- 20 years avian experience with Mexican spotted owl (MSO), southwestern willow flycatcher (SWFL), golden-cheeked warbler, black-capped vireo, cactus ferruginous pygmy-owl, northern goshawk, peregrine falcon, golden eagle and other raptors, and numerous projects involving songbird inventory. Experience includes call-playback surveys, point count, spot mapping and mist netting methods. Currently holds a U.S. Fish and Wildlife Service Threatened and Endangered Species survey permit for MSO, and SWFL.
- 15 years fisheries experience using electroshocking, kick sein, gill netting, trammel netting, presence/absence monitoring, population modeling, and non-native removal/relocation. Survey methods include backpack electroshocking and boat electroshocking in both riverine and lake habitats. He has experience with native species including spikedace, loach minnow, long-finned dace, speckled dace, Sonoran and desert suckers, and Gila (roundtail) chub in central and southeastern Arizona.
- 15 years experience live trapping of small mammals, ungulate and predator surveys and monitoring, and mist netting and acoustic surveys for bats.
- 15 years experience conducting desert tortoise surveys, line transect surveys for U.S. Forest Service sensitive herpetofauna including narrow-headed garter snake, Mexican garter snake, northern leopard frog, and modified Emlen transects for general herpetofauna.
- Identification of native plants, surveys for threatened and endangered species, and habitat quantification techniques.
- Laboratory experience includes microbiological, genetic, and lab assay work completed in pursuit of larger, field-based projects. Is well versed in clean-room procedures and clean bench techniques, and MSDS procedures for radioactive and caustic chemicals.
- Fourteen years experience with National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) compliance projects. Documentation for such projects includes Environmental Impact Statements (EISs), Environmental Assessments (EAs), Biological Assessments (BAs), Biological Evaluations (BEs), Categorical Exclusions and Habitat Conservation Plans.

Professional Experience

2002-present Principle Biologist, Owner. BIOME, Ecological & Wildlife Research. Flagstaff, Arizona. Coordinates and implements project-specific field research and surveys for various projects throughout the Southwest.

2000-2006 Graduate Research Assistant Northern Arizona University, Flagstaff, Arizona. Russell P. Balda, Reagents Professor. Responsible for the coordination of a long-term field study on pinyon jays (Gymnorhinus cyanocephalus) in east Flagstaff.

1997-2001 Biologist. SWCA, Inc., Environmental Consultants. Steven W. Carothers, Flagstaff, Arizona. Planned and implemented numerous environmental projects for clients throughout the Southwest.

1996-97 Research Assistant. Northern Arizona University, Flagstaff, Arizona. Paul Beier, School of Forestry. Trained surveyors, established survey plots, and conducted avian point counts in forested habitats in northern Arizona.

1996 Volunteer. Arizona Game and Fish, Region II, Flagstaff, Arizona. Assisted in gill netting for census purposes at Upper Lake Mary.

1995 Assistant Curator. Northern Arizona University Vertebrate Museum, Flagstaff, Arizona. Stephen Shuster, Biology Department. Organized the invertebrate collection for teaching purposes.

1994 Student Field Technician. Northern Arizona University, Flagstaff, Arizona. William Gaud, Kachina Wetlands Habitat Project.

1992 Northern Goshawk Inventory Technician. Southwest Environmental Consultants, Sedona, Arizona.

Additional Training

Fundamentals of acoustical monitoring techniques. Bat Conservation International, Portal, Arizona.

ANABAT acoustic surveying techniques. Bat Conservation International, Portal, Arizona.

Bats and Mine Assessment Training. Bureau of Land Management, Soccorro, New Mexico.

Southwestern Willow Flycatcher Surveyor Training. Arizona Game and Fish Department, Dudleyville, Arizona.

Desert Tortoise Monitoring and Surveying Training. Nevada Division of Wildlife, Lake Mead, Nevada.

Northern Goshawk Survey Training. U.S. Forest Service, Flagstaff, Arizona.

Community First Responder. Arizona Red Cross, Flagstaff, Arizona.

Miners Safety Hazard Training. Arizona State Mine Inspectors Office. Phoenix, Arizona.

Presentations and Publications

Marshall, B.L. 2002. Mensural characteristics of eight pinyon jay (Gymnorhinus cyanocephalus) flocks in east Flagstaff, Arizona: Morphological patterns within a population of socially monogamous, monochromatic birds. Poster Presentation, 3rd place award. Northern Arizona University Graduate Student Exposition. Flagstaff, Arizona.

Marshall, B.L. 2001. The use of closed basins as wildlife refugia on reclaimed mine lands. Oral presentation. Office of Surface Mining and Reclamation Bond Release Forum. Gillette, Wyoming.

Marshall, B.L. 2001. The bib in the New World Corvidae: Derived by Phylogeny, or a Function of Sociality and Habitat? Annual meeting of the Coopers Ornithological Society. Albuquerque, New Mexico.

Marshall, B.L. 2000. Small mammal use of closed basins on a northern Arizona surface mine. Oral presentation. Annual meeting of The Wildlife Society, Arizona and New Mexico Chapters. Sierra Vista, Arizona.

Unpublished Reports and Projects for Clients

2015

2015 Survey Report in Participation with Stantec, Inc.: Surveys for the Mexican spotted owl on 4,000 acres of Arizona State and U.S. Forest lands near Flagstaff, Arizona. 28 pp.

2015 Survey Report: Annual surveys for native fishes along the San Francisco River and Eagle Creek, Greenlee County Arizona. 110 pp.

Final Biological Assessment: Development of the West Port Gold Placer Operation, La Paz County, Arizona. Report to West Port Energy, Inc. 34 pp.

Final Biological Assessment: Proposed Development of the Arizona State Veteran Home – Yuma on approximately 8 acres of Agricultural Land Southeast of 32nd Street and Avenue 6E, Yuma, Yuma County, Arizona. 21 pp.

2014

2014 Survey Report: Surveys for the Mexican spotted owl on 4,000 acres of Arizona State and U.S. Forest lands near Flagstaff, Arizona. 31 pp.

2013-14 Project Report: Formal monitoring report for the Mexican spotted owl (Strix occidentalis lucida)on the Santa Fe National Forest, U.S. Forest Service, Will Amy. Technical Coordinator. 19 pp.

2014 Survey Report: Annual fish survey of Eagle Creek and the San Francisco River, Greenlee and Graham Counties, Arizona. 85 pp.

2013

2013 Survey Report: Formal monitoring for Mexican spotted owl (Strix occidentalis lucida)on the Santa Fe National Forest, U.S. Forest Service, Will Amy. Technical Coordinator.

2013: Biological Evaluation of the Little Colorado River Gorge proposed Highwire Walk Site: Conducted surveys for peregrine falcon, golden eagle, Fickeisen's Plains cactus, and Wupatki pocket mouse near the Little Colorado River gorge in preparation for a live television highwire walk of the 335m gorge.

2013 Surveys for Mexican spotted owl, Northern Goshawk, and avian point counts on the Wildcat Silver Mine Plan site. Sierra Vista Ranger District, Coronado National Forest. Westland Resources, David Cerasale, Project Manager.

2013 Survey Report: Fisheries survey of the Eagle Creek and San Francisco Rivers focusing on spikedace and loach minnow habitat, Greenlee County, Arizona. Jeffers Campbell, Freeport MacMoRan.

2012

2012 Survey Report: Surveys for the Mexican Spotted Owl (Strix occidentalis lucida) on the LeBarron/Auza Tanks survey area. Arizona State Lands Department, Keith Pajkos.

2012 Survey Report: Fisheries survey of the Eagle Creek and San Francisco Rivers focusing on spikedace and loach minnow habitat, Greenlee County, Arizona. Jeffers Campbell, Freeport MacMoRan.

2013 Surveys for Mexican spotted owl, western yellow-billed cuckoo, and avian point counts on the Wildcat Silver Mine Plan site. Sierra Vista Ranger District, Coronado National Forest. Westland Resources, David Cerasale, Project Manager.

2011

2011 Survey Report: Surveys for the Mexican Spotted Owl (Strix occidentalis lucida) on the Magdalena Ranger District, Cibola National Forest, Magdalena, New Mexico. Cibola National Forest, Beverly DeGruyter.

2011 Survey Report: Fisheries survey of the Eagle Creek and San Francisco Rivers focusing on spikedace and loach minnow habitat, Greenlee County, Arizona. Jeffers Campbell, Freeport MacMoRan.

2010

2010 Survey Report: Surveys for the Mexican Spotted Owl (Strix occidentalis lucida) on the Magdalena Ranger District, Cibola National Forest, Magdalena, New Mexico. Cibola National Forest, Beverly DeGruyter.
Final Biological Report: Surveys for the Mexican Spotted Owl (Strix occidentalis lucida) on the LeBarron/Auza Tanks survey area. Arizona State Lands Department, Keith Pajkos.
2010 Survey Report: Fisheries survey of the Eagle Creek and San Francisco Rivers focusing on spikedace and loach minnow habitat, Greenlee County, Arizona. Jeffers Campbell, Freeport MacMoRan.
2009
Biological Resources Report: Habitat delineation and Evaluation of the Gray Mountain Resource area. SEMPRA Energy. Joan Heredia.
2009 Survey Report: Fisheries survey of the Eagle Creek and San Francisco Rivers focusing on spikedace and loach minnow habitat, Greenlee County, Arizona. Jeffers Campbell, Freeport MacMoRan.
2008
2008 Survey Report: Species-specific Surveys at the Proposed Little Colorado River Helicopter Landing Site, Coconino County, Arizona. Maverick Airstar, Brian Brusa.
Final Biological Report: Surveys for the Mexican Spotted Owl (Strix occidentalis lucida) at the Gaddes Canyon PAC in the Black Hills, Prescott National Forest. Prescott National Forest, Larry Bright.
Biological Evaluation: Installation of Five Anemometer Towers: Gray Mountain Wind Testing Project. International Piping Products, Bruce McAlvain.
2007
2007 Survey Report: Species-specific Surveys at the Proposed Little Colorado River Helicopter Landing Site, Coconino County, Arizona. Maverick Airstar, Brian Brusa.
Final Biological Report: 2007 Surveys for the Mexican Spotted Owl (Strix occidentalis lucida) at the Ash Creek Survey Area Near Dugas, Arizona. Prescott National Forest, Larry Bright.
2006
2006 Survey Report: Species-specific Surveys for the Proposed Little Colorado River Landing Site, Coconino County, Arizona. Maverick Airstar, Brian Brusa.
Biological Report: Mexican Spotted Owl Habitat Delineation within the Baboquivari Mountains, Pima County, Arizona
2002-2003
2002-2003 Surveys: Conducted formal monitoring and inventory within the Catalina Mountains, Coronado National Forest.
Biological Report: Mexican Spotted Owl Habitat Delineation within the Baboquivari Mountains, Pima County, Arizona

References:

1. Alvin Medina, Senior Ecologist/Restoration Specialist, Medina Consulting, LLC, Flagstaff, Arizona. 928-853-7078
2. Brian Brusa, Maverick Aviation Group. 1410 Jet Stream Drive, Henderson, NV 89052, 702-405-4351
3. Beverly DeGruyter, Program Manager, 2113 Osuna Rd, NE, Albuquerque, NM 87113-1001 505-346-3808
4. Tad Theimer, Associate Professor of Biology, Department of Biological Sciences, Northern Arizona University. Bld 21 Room 301. 928-523-8374
5. Joe Ganey, USDA Forest Service. Rocky Mountain Research Station. 2500 S. Pine Knoll, Flagstaff, AZ 86001, 928-556-2156

NATIVE ENDANGERED & THREATENED SP. RECOVERY
ENDANGERED & THREATENED WILDLIFE

Permit Number: TE054791-3

Effective: 06/30/2017 Expires: 11/08/2021

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
500 Gold Avenue S.W.
P.O.Box 1306
Albuquerque, NM 87103-1306

Susan Jacobsen
CHIEF, DIVISION OF CLASSIFICATION AND RESTORATION

Permittee:

BRYCE L. MARSHALL
dba BIOME, ECOLOGICAL AND WILDLIFE RESEARCH
2771 BIRD SPRINGS OVI
FLAGSTAFF, AZ 86005
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a), 16 USC 1533(d); 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13.

Location where authorized activity may be conducted:
At locations specified within permit terms and conditions.

Reporting requirements:
See terms and conditions.

Conditions and Authorizations:

A. General conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited 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 tribal, or other Federal law.

C. Valid for use by Permittee named above.

D. Your permit has been amended as follows. The terms and conditions set forth in the most recent permit, dated November 8, 2016, and any previous amendments or renewals are hereby superseded by this document.

E. Acceptance of this permit serves as evidence that 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 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 or Act) could also subject the Permittees to criminal or civil penalties.

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, specimens can be destroyed or transferred to a public institution. A copy of this permit and 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 Classification and Restoration - Recovery Permits
P.O. Box 1306
Albuquerque, New Mexico 87103
505/248-6420 or 505/248-6920

Arizona Ecological Services Field Office
9828 North 31st Avenue, #C3
Phoenix, Arizona 85051-2517
602/242-0210

Arizona Ecological Services Tucson Sub-Office
201 N. Bonita Ave., Suite 141
Tucson, Arizona 85745
520/670-6145

Arizona Ecological Services – Flagstaff Sub-Office
U.S. Fish and Wildlife Service
Southwest Forest Science Complex
2500 South Pine Knoll Drive
Flagstaff, AZ 86001-6381
928/556-2001

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

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

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 the time of surveys, 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.
For all surveys conducted within New Mexico, you must submit your annual report in the University of New Mexico's Natural Heritage Program **USFWS Permit Data Template** available at ***http://nhnm.unm.edu/data/fws_permit_template***. Completed annual reports must be submitted to ***nhnm@unm.edu*** as well as the appropriate ESFO listed above in Condition G. If your annual report is too large to send via e-mail, you may submit required copies on a CD. To send a CD to the Natural Heritage Program by mail or courier, please use the following addresses:

Mail To:
Natural Heritage New Mexico
UNM Biology Dept.
MSC03 2020
1 University of New Mexico
Albuquerque, NM 87131-0001
505/277-3822
Email: ***nhnm@unm.edu***

Courier Delivery:
Natural Heritage New Mexico
University of New Mexico Main Campus
Castetter Hall - Room 167
Albuquerque, NM 87131

I. An annual report transmittal letter is the only document to be submitted to the **Regional Office**, Division of Classification and Restoration - Recovery 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 the time that the annual report is submitted, 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 studies or projects covered by this permit and other data that would be useful for the conservation or recovery of the species should also be submitted to the ESFO(s). 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 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, ***http://www.fws.gov/permits/contacts/contacts.html***, for additional information.

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 Classification and Restoration - Recovery 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 Classification and Restoration - Recovery Permits (at the above address) 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.

If a request for permit renewal is received in the Regional Office **less than 30 days prior to permit expiration**, ***all activities authorized by the permit must cease upon permit expiration***.

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 Recovery Permits 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.

LESSER LONG-NOSED BAT

S. Bryce Marshall (Permittee) is authorized for the incidental capture of lesser long-nosed bats (*Leptonycteris curasoae yerbabuenae*) (LLNB) during the lawful mist netting of other bat species within Maricopa, Pima, Coconino, and Pinal counties, Arizona. Authorization is also given to conduct evening "fly-out" exit counts at potential lesser long-nosed bat roost sites (see Condition S.8). The following conditions apply:

1. Activities conducted under this permit shall be coordinated with the appropriate USFWS Field Offices so that survey duplication and excessive disturbance of LLNBs are avoided. Entering roost sites, including night roosts, known to contain listed bats is **not** authorized, but may be authorized in future amendments if the appropriate USFWS Field Offices approve a monitoring or research plan. Permittee must coordinate with the USFWS regarding permitted activities at any roost or other location where ongoing research or monitoring is occurring. Ongoing research and monitoring is defined as an USFWS approved and permitted research or monitoring proposal. Authorizations for entering LLNB roosts are described in the conditions below if appropriate.

The USFWS lead office for LLNB is the Arizona Ecological Services Office, Tucson Suboffice. Please coordinate all activities and reporting concerning the LLNB with this office at 520/670-6150.

2. Permittee may enter **known** LLNB roost sites, including night roosts, only during the time of year when LLNBs are not using, or are not thought to use, the roosts. If *Leptonycteris* of either species are discovered in any of the roost sites, the permittee will immediately exit the roost and cause no further disturbance to the bats.

3. Permittee may enter **previously undocumented** roost sites, including night roosts, to determine the identity of bats using the roost. Permittee shall utilize red light or infrared (IR) light if possible while inside roosts. Permittee shall not "hold" lights directly on bats in a roost. Instead lights shall pass briefly over the bats or use the periphery of the light to identify the species. No more than two individuals may enter the roost, unless safety concerns dictate otherwise. Permittee shall make every effort to minimize their impacts on the roost site and surrounding habitat. If LLNBs occupy, or there is evidence to suggest they occupy, the roost, the permittee will immediately exit the roost and cause no further disturbance to the bats.

4. To guard against White-nose Syndrome (WNS) in the West, we ask that the Permittee assist with prevention and surveillance of this disease. Decontamination protocols for western states are still in development and evolving as we learn more about this disease. Please contact Angie McIntire, AZGFD Bat Management Coordinator (623/236-7574; ***amcintire@azgfd.gov***) with questions. The Permittee shall follow the

decontamination actions below, as well as updated actions posted on the FWS White Nose Syndrome website (***www.fws.gov/whitenosesyndrome/***):

a. To prevent the spread of WNS, disinfect bat processing equipment between **capture sites** (i.e., wipe down calipers/ruler, processing table, scales, light box, and other surfaces that will come in contact with bats), always use clean holding bags for each individual bat on a survey night, and wash bags between use. Use quaternary disinfectant with a minimum of 0.3% quaternary ammonium compound – 1:128 dilution or 1oz:1 gallon water (e.g. Lysol IC Quaternary Disinfectant Cleaner). Disposable gloves shall be used and disposed of properly following the handling of each individual bat.

b. For surveillance, we request that the permittee and agents be familiar with the wing damage index used for characterizing White-nose syndrome. Wing damage characteristic of WNS is described as "de-pigmentation in the shape of bulls eye-like markings" on bat wings. Please use digital photos to document any suspicious lesions or other abnormalities on bats and send AZGFD Bat Management Coordinator (***amcintire@azgfd.gov***).

c. If you travel from the West to visit eastern roost sites, particularly caves and mines, take disposable clothing, footwear, and gear that you can discard in the east before returning west to avoid potential transportation of contaminants. Also, avoid contamination of your vehicle by changing out of clothes used in eastern sites and disposing of or sealing them prior to getting in your vehicle.

d. Do not enter caves or mines with gear or clothing from a WNS affected area. When entering sites that are used or have the potential to be used as hibernacula: to facilitate footwear decontamination, use rubber boots; remove all soil and organic material from boots, clothing and equipment; wash all clothing in hot cycle and dry in dryer; and rinse and disinfect footwear using quaternary ammonium compound and air dry.

e. If entering more than one roost per day, please use disposable coveralls (preferably Tyvex® coveralls) and dispose of properly after each roost, or change clothes and wash contaminated clothing as describe above prior to wearing in another roost. Disinfect, as described above, all headlamps, gas meters, cameras, nets, etc. used when entering a roost prior to entering another roost.

5. Permittee is authorized to install or deploy environmental monitoring equipment in known LLNB roosts **because** it is included in a USFWS approved monitoring or research proposal (Contract F11PX05678) that will further the conservation and recovery of the LLNB. Permittee shall follow the approved monitoring and research proposal unless otherwise approved in writing by the USFWS.

6. All personnel who are authorized to handle LLNB should have received rabies pre-exposure shots as a preventative to contracting rabies.

7. Permittee is authorized to conduct exit counts at roosts to make visual identification and count estimates. Exit counts shall be conducted an appropriate distance from roost entrances and from inconspicuous observation points. Exit counts shall occur no more often than once weekly. The use of IR video, night vision, or thermal imaging technology to record/count the exit flight is encouraged, but shall utilize a set-up design that will reduce disturbance to exiting bats.

8. Permittee may capture LLNBs using mist nets, harp traps, and hand nets only. Capture activities at roost sites are not authorized. Capture equipment must not be left unattended at any time and captured bats must be removed from the capture equipment immediately. During capture activities, LLNBs will not be held for more than 5 minutes for the purpose of species identification. At whatever time 25 listed bats, regardless of species, are captured, capture activity will cease and capture equipment will be closed down or removed. At whatever time 10 listed adult female bats, regardless of species, are captured during the maternity season, capture activity will cease and capture equipment will be closed down or removed. All bats shall be released unharmed at the capture site.

9. Permittee is not authorized to conduct acoustic monitoring to determine presence or activity patterns. Capture for the purpose of obtaining acoustic samples or vocalizations for an acoustic catalog is not authorized **unless** part of a USFWS approved monitoring or research proposal that contributes to the conservation or recovery of the LLNB. This activity is not currently part of FWS Contract F11PX05678.

10. In the event that significant injury or mortality of a lesser long-nosed bat occurs during permit activities, all activities must immediately cease and permittee is required to contact the appropriate USFWS Ecological Services Office (see addresses in Section G above) within one business day for further instructions.

11. Copies of all field data forms with survey, capture, or monitoring results (positive and negative) for all permit activities will be submitted to the appropriate USFWS Ecological Services Office by December 1 of each year (see addresses in Section G above). Copies of quad maps (7.5 minute or larger scale), GIS layers (with appropriate reference layers such as roads, political boundaries, etc.), or Digital Ortho Quarter Quads (DOQQs) clearly delineating all areas covered by permit activities shall be provided. Reports submitted shall also include: 1) detailed location information; 2) vital information (sex, age, weight, etc.), if collected; 3) dates and times of activities; 4) observations on the condition of bats handled; and 5) list of individuals involved in the permit activities. These reporting requirements will replace the annual reporting activities listed in H above, for this species only.

CACTUS FERRUGINOUS PYGMY-OWL

T. A final rule to delist the cactus ferruginous pygmy owl was published in the Federal Register on April 14, 2006. Therefore, at the time of this issuance a 10(a)(1)(A) permit is not required for this species. However, information regarding cactus ferruginous pygmy owls would be helpful toward recovery efforts. The USFWS would appreciate copies of such information, plus any survey findings, and request that the information be sent to the appropriate ESFO based upon where the activities occur. All applicable local, State, and Federal laws will apply.

MEXICAN SPOTTED OWL

U. Bryce Marshall, Charles LaRue, Gabriel Martinez, Gerald Monks, Andrew Marshall, Logan Marshall, and Cole Harris (Permittees) are authorized for research and recovery purposes to conduct presence/absence surveys for Mexican spotted owl (*Strix occidentalis lucida*) within Arizona and New Mexico. The following conditions also apply:

1. Surveys must be conducted according to the USFWS's "2012 Mexican Spotted Owl Survey Protocol" (or most recent version located at ***http://www.fws.gov/southwest/es/arizona/MSO.htm***).

2. Permittees must have at least 40 hours of experience or be accompanied by a permitted individual who has one year or more of experience surveying. In addition, we recommend all new surveyors complete a USFWS-approved Mexican spotted owl survey training prior to conducting surveys.

3. Permittees are required to avoid calling Mexican spotted owls during periods of rain, snow, thunder, or in winds greater than 15 miles per hour.

4. Permittees are required to watch for and record aggression by known Mexican spotted owl predators, including northern goshawks (*Accipiter gentilis*), red-tailed hawks (*Buteo jamaicensis*), and great horned owls (*Bubo virginianus*). If this behavior is observed, Permittees are to proceed with caution and use good judgment whether to continue or discontinue surveying.

5. Permittees are not authorized to capture and/or handle Mexican spotted owls during surveying activities, except in the case of a dead Mexican spotted owl(s) encountered during surveys. Any dead birds are to be properly preserved and Permittees should immediately contact the local ESFO (contact information in Condition G above) and Shaula Hedwall, Arizona ESFO - Flagstaff Sub-Office (928/556-2118) for disposition instructions. Injured birds should be reported immediately to the office above as well, but not collected.

6. In the event of a fatality of any Mexican spotted owl during permitted activities, all operations must immediately cease and Permittees are required to contact the local ESFO and Shaula Hedwall within 24 hours.

7. Collection of Mexican spotted owl feathers, eggs, or parts thereof is not authorized.

8. Mexican spotted owl locations found while working under this permit may not be posted on eBird or other public bird location forums.

9. In addition to annual reporting requirements outlined in Section H above, copies of all reports, data forms with positive and negative survey results for Mexican spotted owls, USGS quad maps clearly delineating survey areas and detections, should be submitted to the local ESFO and Arizona ESFO - Flagstaff Sub-Office by December 1 of each year.

SOUTHWESTERN WILLOW FLYCATCHER

V. Bryce Marshall and Charles LaRue (Permittees) are authorized for scientific research and recovery purposes to survey for southwestern willow flycatchers (*Empidonax traillii extimus*) using vocalization tape playback within Arizona and New Mexico. The following conditions apply:

1. All Permittees conducting surveys are required to participate in and complete one of the southwestern willow flycatcher (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 pp. 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 when surveying in **Arizona**, you must contact the Arizona ESFO at 602/242-0210, within 24 hours. If banded SWWFs are sighted in **New Mexico**, contact the New Mexico ESFO at 505/346-2525, within 24 hours. For sightings 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 Arizona	Greg Beatty at ***Greg_Beatty@fws.gov***
	Mark Sogge at ***Mark_K_Sogge@usgs.gov*** (banded birds only)
In New Mexico	Vicky Ryan at ***Vicky_Ryan@fws.gov***
	Mark Sogge at ***Mark_K_Sogge@usgs.gov*** (banded birds only)

For surveyors issued a permit covering large geographic areas, you must contact the respective ESFO where surveys are to be conducted to coordinate survey efforts so that survey duplication is avoided and disturbance minimized.

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 Condition H above, for this species only.

Arizona Game and Fish Department
Attn: Tom Jones
Nongame Branch
5000 W. Carefree Hwy
Phoenix, AZ 85086
623/236-7625

7. Permittees must possess valid state permits where required and follow terms and reporting requirements. This Federal recovery permit is not valid without the necessary state permits, which may differ between states. It is the responsibility of the Permittees to ensure that they have the proper permits in the states in which surveys will be conducted. If you are unsure if a state permit is required, you may contact the USFWS species lead in the state in which you wish to conduct surveys.

Nest Monitoring:

W. Bryce Marshall and Charles LaRue (Permittees) are authorized to conduct nest searches and nest monitoring activities for SWWF populations within Arizona.

1. Nest monitoring for specific sites/populations in Arizona will be conducted only after discussing locations and justifying the need with the Arizona ESFO and AGFD.

2. The following document will be used as guidance to properly discover, monitor, and report nesting SWWF: Rourke, J.W., T.D. McCarthey, R.F. Davidson, and A.M. Santaniello. 1999. Southwestern Willow Flycatcher Nest Monitoring Protocol. Nongame and Endangered Wildlife Program Technical Report 144. Arizona Game and Fish Department, Phoenix, Arizona. All nest monitoring activities will use the Nest Monitoring Form included with the AGFD Nest Monitoring Protocol. These raw nest search data forms can be found on the USGS website (***http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/cprsmain.asp***). Permittees shall submit forms to the Arizona ESFO by August 15 of each year.

3. When locating and monitoring SWWFs and nests, the following conditions must be followed:

a. Birds or nests may not be located during inclement weather conditions (e.g., rain, hail, strong wind, or extreme temperatures).

b. Locating and monitoring of nests should only be conducted by one or two individuals during any visit.

c. SWWF nest trees, nests, and eggs should not be touched or handled. Use an extension pole with a mirror to check nest contents only when necessary.

d. Use behavioral clues to guide you to the nesting area and nest, rather than random searching.

e. Once a nest is located, observe the behavior of the adult SWWF(s) to ascertain what reproductive stage is occurring (nest building, egg-laying, incubation, nesting, or fledging). This can be done with binoculars or a scope from a distance. If the nest must be inspected, do so with great care and limit time at the nest to the minimum needed to determine status.

f. Do not visit nests more frequently than what is needed to accomplish study objectives, and never visit nests more frequently than once every 4 days. The most desirable monitoring strategy is to determine actual nest visits by the anticipated developmental stage of the nestlings and the behavior of the adults. The following time periods will help determine nest stage:

Nest construction - 3 to 8 days;
Egg laying - 3 to 5 days after nest construction;
Incubation - 12 to 13 days after egg laying;
Fledging - 12 to 15 days after hatching.

g. Be aware of brown-headed cowbirds and avoid drawing them to the area or nest. Cowbird parasitism will be noted and monitored.

h. Should the Permittee's actions or activities lead indirectly or directly to nest abandonment, nest predation or parasitism, damage or loss of eggs, injury, or death of SWWFs, the Permittee will stop all activities immediately and notify the AGFD and Arizona ESFO of the situation.

i. Nest monitoring data should be considered sensitive and released only to appropriate agency personnel.

4. Permittees must possess valid state and/or land use permits where required and follow terms and reporting requirements. This Federal recovery permit is not valid without the necessary state and/or land use permits, which may differ between states and land owners. It is the responsibility of the Permittees to ensure that they have the proper permits in the areas where nest monitoring will be conducted. If you are unsure if a state and/or land use permit is required, you may contact the USFWS species lead in the state in which you wish to conduct nest monitoring.

WESTERN YELLOW-BILLED CUCKOO

X. Bryce Marshall, Gerald Monks, John Yerger, Seth Watkins, Andrew Marshall, Logan Marshall, and Cole Harris (Permittees) are authorized for scientific research and recovery purposes to survey for western yellow-billed cuckoos (*Coccyzus americanus*, YBCU) using vocalization playback within Arizona, New Mexico, and Texas. The following conditions also apply:

1. Permittees and agents who have not attended training within the last two years are encouraged to attend a USFWS-approved training workshop to ensure they receive new information on yellow-billed cuckoo status of the species, survey protocol, field forms, and permits. Permittees planning to conduct surveys within Arizona or New Mexico are encouraged to take training within one of these states to learn about unique habitat conditions where YBCU are found.

2. Permittees must notify Susan Sferra at ***susan_sferra@fws.gov*** (Arizona ESFO Tucson Sub-Office) and Vicky Ryan at ***vicky_ryan@fws.gov*** and Clinton Smith at ***clinton_smith@fws.gov*** (New Mexico ESFO), and Clayton Napier at ***clayton_napier@fws.gov*** (Texas Austin ESFO) respectively where surveys will be conducted in Arizona, New Mexico, and Texas prior to the beginning of the each field season.

3. All surveys shall be conducted according to the most recent USFWS-accepted survey protocol which can be found at: ***https://www.fws.gov/southwest/es/arizona/Yellow.htm.*** Permittees must visit this website prior to conducting YBCU surveys.

4. Permittees conducting surveys must be able to hear and distinguish between all YBCU vocalizations in the field. Permittees with little previous bird survey and YBCU observation experience are highly encouraged to accompany experienced surveyors to hone auditory and visual identification skills.

5. Nesting YBCU can be very sensitive to human disturbance and may abandon nests. Permittee shall exercise extreme caution while surveying by minimizing noise and time spent in suspected nest areas. Permittee shall avoid making new trails or damaging vegetation. Surveyors must be alert to YBCUs' behavioral signs of disturbance near a nest, which include alarm calls given repeatedly while watching the intruder, broken wing displays, or flying in with prey and eating the prey item instead of going to the nest. If these occur, the observer has been detected, the YBCU is distressed, and the observer should move back (Halterman et al. 2016).

6. If a nest is inadvertently found, observers should move away slowly to avoid startling the birds or force-fledging the young. Avoid physical contact with the nest or nest tree, to prevent physical disturbance and leaving a scent. Do not leave the nest area by the same route that you approached. This leaves a "dead end" trail that could guide a potential predator to the nest/nest tree. Mark the general nest location with a GPS and record the general description of the nest site (e.g., plant species used for nest substrate, approximate height of nest, and placement within the tree/shrub canopy). GPS readings are taken no closer than 10 m from the nest, to avoid disturbance. A general description of the nest site should be completed soon after leaving the area. This information may be used for follow-up monitoring by an appropriately permitted individual (Halterman et al. 2016).

7. Non-indigenous plants and animals can pose a significant threat to YBCU habitat and may be unintentionally spread by field personnel, including those conducting surveys. Simple avoidance and sanitation measures can help prevent the spread of these organisms to other environments. To avoid being a carrier of non-indigenous plants or animals from one field site to another, visually inspect and clean your clothing, gear, and vehicles before moving to a different field site. A detailed description on how to prevent and control the spread of these species is available by visiting the Hazard Analysis and Critical Control Point Planning for Natural Resource Management web site (***http://www.haccp-nrm.org***). Several non-native species of concern in survey locations are: the tamarisk leaf beetle (*Diorhabda* spp.), quagga mussel (*Dreissena rostriformis bugensis*), cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens*), giant salvinia (*Salvinia molesta*), water milfoil (*Myriophyllum spicatum*), parrot's feather (*M. aquaticum*), and amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) (Halterman et al. 2016).

8. Permittee shall note if YBCUs are fitted with attachments such as transmitters with antennae or geolocators and/or marked with a silver aluminum band and/or color bands. If banded birds are sighted and the band combination can be determined without disturbing the birds, note the number of bands, colors, and band location and sequence on the birds' legs (e.g., blue over pink over silver left leg/red over yellow right leg).

9. If banded YBCUs are sighted when surveying in Arizona, Permittees must contact Susan Sferra at ***susan_sferra@fws.gov*** at the Arizona ESFO Tucson Sub-Office within 24 hours. If banded YBCUs are sighted when surveying in New Mexico, permittee must contact Vicky Ryan at ***vicky_ryan@fws.gov*** and Clinton Smith at ***clinton_smith@fws.gov*** at the New Mexico ESFO within 24 hours. If banded YBCUs are sighted when surveying in Texas, Permittee must contact Clayton Napier at ***clayton_napier@fws.gov*** at the Austin ESFO within 24 hours.

10. Permittee must possess valid State permits where required and follow terms and reporting requirements. This Federal recovery permit is not valid without the necessary state permits, which may differ between states. It is the responsibility of the Permittees to ensure that they have the proper permits in the states in which surveys will be conducted.

11. For annual reports, Permittees are required to furnish digitally: (1) copies of all field data forms with positive or negative survey results; (2) copy of USGS quad/topographical map or similar (REQUIRED) of survey area, outlining survey site and location of YBCU detections; (3) sketch or aerial photo showing site location, patch shape, survey route covered during each survey, location of any detected YBCU or their nests; (4) photos (if taken) of the interior of the patch, exterior of the patch, and overall site and (5) bird photos (if taken) to the appropriate ESFO listed in Section G (***susan_sferra@fws.gov, vicky_ryan@fws.gov, clinton_smith@fws.gov, clayton_napier@fws.gov***). Permittees will be responsible for making sure that they submit the appropriate data to the states in which surveys were conducted. Permittees must complete the forms digitally (Microsoft Word or Excel posted at ***http://www.fws.gov/southwest/es/arizona/Yellow.htm***) and submit them via email with attached or embedded topographic maps, GIS data (i.e., shapefile, personal or file geodatabase), and photographs. Results

must be furnished by October 15, following each survey season covered by this permit (***susan_sferra@fws.gov*** for Arizona or ***vicky_ryan@fws.gov*** and ***clinton_smith@fws.gov*** for New Mexico, ***clayton_napier@fws.gov*** for Texas). These survey requirements will replace the annual USFWS reporting activities for this species.

12. Permittees are not authorized to monitor nests, mist net, capture, handle, band, or fit YBCU with geolocator or telemetry gear unless indicated below.

Literature Cited:
Halterman, M., M.J. Johnson, J.A. Holmes, and S.A. Laymon. 2016. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo.

AQUATIC SPECIES DISEASE CONTROL PROTOCOL

Y. To prevent inadvertent movement of pathogens, parasites, and invasive non-native species, research and management activities shall conform to the Declining Amphibians Population Task Force Fieldwork Code of Practice (***https://www.fws.gov/ventura/docs/species/protocols/DAFTA.pdf***), with the exception that 1% quaternary ammonia (Quat 128) should be used to clean equipment rather than 70% ethanol. Abiding by this Code would effectively limit the potential spread of pathogens via fish sampling equipment.

CHIRICAHUA LEOPARD FROG

Z. Bryce Marshall (Permittee) is authorized for scientific research and recovery purposes to survey for Chiricahua leopard frog (*Lithobates chiricahuensis*) in Arizona and New Mexico. The following conditions also apply:

1. All surveys shall be conducted in accordance with the USFWS/AGFD/NMDGF "Chiricahua leopard frog Survey Protocol for Project Evaluation 2010" (attached).

2. Any finding of Chiricahua leopard frogs at new localities or localities where the species was thought to be extirpated, negative survey results at localities thought to be occupied, and/or die-offs of Chiricahua leopard frogs shall be reported to the species lead, Cat Crawford in Arizona 520/670-6150 (x232) and Michelle Christman in New Mexico 505/761-4715 within 10 business days. All survey results, including scanned survey forms and annual reports shall be submitted in electronic format to the species lead at ***cat_crawford@fws.gov***. For surveys conducted in New Mexico, also send scanned survey forms and annual reports to the New Mexico ESFO at ***michelle_christman@fws.gov***. In the event excessive file sizes prevent e-mail correspondence, please submit a CD by mail to the Arizona ESFO Tucson Sub-Office and to the New Mexico ESFO, as appropriate.

3. For surveyors who are issued a permit covering large geographic areas (e.g., Arizona and New Mexico), you must contact the respective ESFO a minimum of 5 business days prior to conducting surveys to coordinate survey efforts so survey duplication is avoided, disturbance is minimized, and the risk of disease transmission is greatly reduced.

4. Prior to submitting amendment requests to add individuals to conduct Chiricahua leopard frog surveys, please be sure all individuals have met the following criteria: all Permittees conducting surveys are required to either participate in and complete one of the Chiricahua leopard frog survey training seminars conducted by the USFWS and state game and fish agencies, or be trained in the field for 40 hours by a qualified individual, permitted by the USFWS to conduct Chiricahua leopard frog surveys. You may contact Michelle Christman at the New Mexico

ESFO at 505/761-4715 or Cat Crawford at the Arizona ESFO Tucson Sub-Office at 520/670-6150 for further information regarding permitted individuals to train with.

5. **In order to become/remain qualified, permit applicant must provide adequate documentation in future permit applications that he/she:**

a. Has attended the Chiricahua leopard frog survey workshop within the last three calendar years ***or*** has performed an average of at least one survey per year since the workshop was attended. If the applicant has remained active in surveying for Chiricahua leopard frogs according to this required timing and frequency of surveys, he/she is not required to re-attend the workshop after three years. If the applicant has not conducted an average of at least one survey per year since last attending a workshop, he/she is required to attend the Chiricahua leopard frog survey workshop as a refresher to become qualified for a Federal permit; or

b. Has been trained in the field for 40 hours by a qualified individual (species expert) approved and permitted by the USFWS prior to conducting any Chiricahua leopard frog surveys. During the period of 40-hour apprenticeship, unpermitted personnel are authorized to net, pursue, capture, collect, or handle Chiricahua leopard frogs or tadpoles only under the direct, on-site supervision of the qualified and permitted individual. The permit applicant is not authorized to perform these activities when not under the direct, on-site supervision of an approved, qualified, and permitted individual. You may contact Michelle Christman at the New Mexico ESFO at 505/761-4715 or Cat Crawford at the Arizona ESFO Tucson Sub-Office at 520/670-6150 (x232) for further information regarding USFWS permitted individuals in their respective states.

NOTE: All individuals must be approved and permitted prior to conducting any independent Chiricahua leopard frog surveys (not under the direct, on-site supervision of an approved, qualified, and permitted individual).

6. Surveys that involve only observation of Chiricahua leopard frogs or listening for their calls (i.e., no netting, pursuit, capture, collection, or handling of Chiricahua leopard frogs or tadpoles) do not require a permit from the USFWS; however, negative survey results will not be considered conclusive.

7. Please ensure you are subscribed to the Chiricahua leopard frog listserve to stay updated on relevant news, literature, etc. with respect to management, conservation, and recovery of the species.

To subscribe to the list go to: ***https://www.fws.gov/lists/listinfo/chiricahuensis***

Postings can be made by sending an e-mail to: ***chiricahuensis@lists.fws.gov***

NORTHERN MEXICAN AND NARROW-HEADED GARTERSNAKES

AA. Bryce Marshall (Permittee) is authorized to conduct specific recovery activities for northern Mexican (*Thamnophis eques megalops*) and/or narrow-headed (*Thamnophis rufipunctatus*) gartersnakes ("gartersnakes") in Arizona and New Mexico. The following specific activities, with conditions, are authorized:

1. Incidental hand capture. Bryce Marshall is authorized to incidentally hand-capture and temporarily restrain individual gartersnakes for the purpose of photography and identification when observed while performing other activities (e.g. sampling for other aquatic species, etc.)

2. Salvage. Bryce Marshall is authorized to collect and photograph (see condition 3 below), and document locality data on deceased gartersnakes that are observed. We also encourage deceased individuals be preserved in ethanol, and accessioned into an in-state museum collection recommended by the USFWS species lead or New Mexico ESFO Lead.

3. Photo-documentation. Each time a gartersnake suspected to be either *Thamnophis rufipunctatus* or *Thamnophis eques megalops* is captured or observed as authorized by conditions 1 or 2 (above), a minimum of three (3) digital photographs should be taken (see guidance below). The camera used should have sufficient image resolution (megapixels) to definitively distinguish physical characters, individual uniqueness (size, scars, etc.), and habitat characteristics. Records of northern Mexican or narrow-headed gartersnakes that are not photo-documented will be considered potential, but unverified, unless reported by a recognized species expert.

a. At least one photograph should be taken of the specimen in hand to definitively distinguish the characters used to identify each species. For *T. eques megalops*, it is important to capture the position of the lateral stripe in the anterior region; an additional photograph of the ventral side can also be useful. A close-up (macro setting may be required) photograph taken of the anterior portion of the specimen, including its head, is very important.

b. At least one additional photograph of the entire body of the specimen should be taken to document its physical condition (scarring, broken tails, relative girth, etc.). This photograph should be taken with a familiar object (i.e. lens cap, pen, etc.) in the frame for size perspective.

c. Another photograph should be taken of sufficient distance away (ca. 15-20 feet) of the exact location it was observed to document the habitat characters present.

d. Every photograph taken for this purpose must: i) have an appropriate filename which provides information on the date and location of every capture; and, ii) be very closely reviewed in the field for exposure and sharpness to ensure characters are accurately depicted, prior to the release of the specimen.

4. Project monitoring and subsequent relocations. Bryce Marshall is authorized to act as a "biological monitor" on projects of any type that occur within occupied, or potentially occupied gartersnake habitat in order to relocate any individual gartersnakes that are observed within the project's footprint, out of harm's way. Individual gartersnakes may only be relocated to the nearest, safe distance (i.e. tens or hundreds of meters; up- or downstream) of the project site. Long distance relocation is prohibited.

5. Prohibited activities. Surveys of any type, trapping, invasive procedures (such as transmitter surgeries, passive integrated transponder (PIT) tagging, scale clipping, scale cauterization, sexing, blood or tissue sample collection, etc.) are prohibited until or unless authorized by the USFWS species lead (or New Mexico ESFO Lead) after providing documentation of either of the following:

a. Has attended a gartersnake survey training seminar and performed, on average, one (1) survey per year since attending the seminar. If this condition is not met, Bryce Marshall will be required to attend the seminar again, as a refresher, to become qualified for permit renewal.

b. Has been trained in the field for 40 hours by a permitted species expert (as determined by the USFWS). During the period of 40-hour apprenticeship, unpermitted personnel are authorized to gain experience and practice techniques such as visual encounter surveys, hand-capture, trap-setting and checking, PIT tagging, measuring, photography, and species ID confirmation. Any training shall take place **only** under the direct, on-site supervision of the species expert. Applicants must provide the name(s) of permitted species experts they anticipate using for an apprenticeship and training activities requested to the respective state lead for prior approval.

NOTE: All individuals must be approved and permitted prior to conducting any independent (not under the direct, on-site supervision of an approved, qualified, and permitted individual) surveys for gartersnakes.

6. Injuries. Any gartersnake injury or fatality observed as part of activities authorized herein must be reported to the USFWS species lead (see below) within 48 hours of the incident.

7. Potential range extensions. Any record(s) of either gartersnake in locations outside of proposed critical habitat shall be reported to the USFWS species lead, via email, within one week of the observation.

8. Reporting. An annual report, documenting all gartersnake observations (alive or deceased) and locality data, including all photographs (see condition 3), shall be submitted in electronic format to the USFWS species lead by December 31. In the event excessive file sizes prevent e-mail correspondence, please submit a CD by U.S. mail or other means to the USFWS species lead.

9. Permits will be valid for five (5) years, but can be amended to address modifications. However, the original five (5) year time frame will remain effective regardless of when a permit modification is made.

10. USFWS Contact Information

USFWS Species Lead
Jeff Servoss
Arizona Ecological Services Office
Tucson Sub-Office
201 N. Bonita Avenue; Suite 141
Tucson, Arizona 85745
520/670-6150 x231
jeff_servoss@fws.gov

New Mexico Species Lead
Michelle Christman
New Mexico Ecological Services Office
2105 Osuna Road NE
Albuquerque, New Mexico 87113
505/761-4715

michelle_christman@fws.gov

SPIKEDACE AND LOACH MINNOW

BB. Bryce Marshall and Bill Leibfried (Permittees) are authorized for scientific research and recovery purposes to survey for spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*) in Arizona. The following conditions also apply:

1. Prior to surveying, all surveys must be coordinated with the species lead biologists in order to minimize survey duplication and/or harm to highly sensitive populations. Activities conducted in Arizona shall be coordinated with the Arizona ESFO, Mary Richardson 602/242-0210 or ***mary_richardson@fws.gov***. Prior to surveying, the Permittees shall submit their survey schedule, including probabilistic sites, to the Arizona ESFO for evaluation. The Service shall be allowed 30 days to review the survey schedule before surveys are initiated.

2. Upon reviewing survey schedules and locations in a permit application, the Service shall provide specific information on whether or not voucher specimens are necessary. In general, two specimens should be collected from any area not listed as occupied in the 2012 reclassification and critical habitat rule for the species at 77 FR 10810 (February 23, 2012). All vouchered and non-hatchery fish mortalities shall be preserved in alcohol appropriately and sent to the museum collection at Arizona State University if collected in Arizona.

3. In general, all projects should be conducted outside of the spawning season of January through March in Arizona for loach minnow, and April to June for spikedace. Where the breeding season cannot be avoided, survey activity should be designed to include a minimal portion of the overall area of occupied and potentially occupied spawning habitat. Exceptions may occur where long-term monitoring has occurred and it can be demonstrated that no harm has come to the species.

4. Permittees must have prior experience (3 individual survey efforts and positive identification of spikedace and loach minnows) with survey techniques and spikedace/loach minnow identification under the supervision of a permitted individual with the required knowledge. Individuals with no prior identification experience shall work under the direct, on-site supervision of a Permittee.

5. Aquatic sampling is authorized using the following gear: seines, dip-nets, block nets, and kick seines. Electroshocking or other methods may be used as appropriate with prior approval.

6. At each site, live wells, in-stream confinement structures, or buckets filled with water from the active stream shall be used for temporarily holding spikedace/loach minnow that shall be returned to the river. Buckets should only be used in those situations in which fish shall be returned to the stream immediately following completion of the survey. Fish should be held in confinement and returned to the river only after all seine hauls have been conducted at that site. This will minimize multiple captures and potential trampling and over-handling of spikedace/loach minnow. Any live wells or buckets used shall be properly aerated and water temperatures similar to river temperatures shall be maintained. Any fish suspected to be listed fish shall be processed and returned to the stream first following completion of the survey effort for that area in order to minimize stress to those species. All fish shall be released at the site of capture upon identification.

7. Should spikedace or loach minnow be detected in a previously unoccupied area, the Permittee shall provide this information to the lead biologist within 48 hours of return from sampling. Voucher specimens should be collected

to ensure correct identification of the species as well as documentation of occupancy of the area. Any listed fish found in previously undocumented locations or areas thought to be unoccupied or extirpated must be reported to the appropriate lead biologist within 48 hours of return from sampling. The Permittee shall submit their findings to the Arizona ESFO on an annual basis.

8. Trampling or disturbance of habitat in and adjacent to occupied streams will be minimized. Whenever possible, surveyors should travel outside of the active stream channel to avoid habitat disturbance.

9. Mortalities shall not exceed four spikedace and four loach minnow per year at any survey site. If four mortalities occur, monitoring efforts will be suspended and notification provided within 48 hours to the Arizona. Should mortalities occur, specimens shall be preserved and submitted to the appropriate location, as noted above.

10. Annual reports should specify where activities took place, the number and location of species collected/captured, and field data forms, if appropriate. Permittees should include any negative data (i.e., negative survey findings). If no activities were conducted under this permit during a given 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, names and contact information for those conducting the survey, location (provide GPS or UTM coordinates, or Township and Range at at least quarter section), number of individuals observed, their sex, age class, and breeding condition, catch per unit effort (i.e., the number of seine hauls or shocking seconds and the number of individuals captured using that technique), and any general observations regarding overall health (i.e., presence of parasites, etc.). Annual reports may also be submitted on a CD.

*****End Permit TE054791-3*****

NEW MEXICO DEPARTMENT OF GAME AND FISH AUTHORIZATION FOR TAKING PROTECTED WILDLIFE FOR SCIENTIFIC PURPOSES

**amendment request (7 August 2019); approved per authorization period below*

Name of Permittee: **Bryce Marshall**

Address: BIOME, Ecological & Wildlife Research; 2771 Bird Springs OVI, Flagstaff, AZ 86005; Phone: 928-607-3361; Email: bryce_marshall@hotmail.com

Name(s) of Subpermittee(s): Cole Harris, Andrew Marshall, Logan Marshall, and Alvin Medina.

Authorization Number: **3671**

Period of Authorization: *Period beginning with date of Director's signature (see below)* to Dec. 31, 2019.

Means of Taking Wildlife: Backpack electrofisher, dip nets, sienes, and bad nets.

Disposition of Wildlife: Incidental mortalities will be deposited with the Northern Arizona University Vertebrate Museum.

Locations: Grant county.

Conditions of Authorization:

Permittee may capture, collect data, and release the following fish species, only on lands owned by Pacific Western Land Company in Grant County:

Common Name	Scientific Name	Common Name	Scientific Name
Loach Minnow	*Rhinichthys cobitis*	Desert sucker	*Catostomus insignis*
Spikedace	*Meda fulgida*	Longfin Dace	*Agosia chrysogaster*
Sonoran sucker	*Catostomus clarki*	----------	----------

Permittee may also conduct presence/absence surveys, with the aid of artificial light, on the Chiricahua leopard frog, *Lithobates chiricahuensis*, along the Lampbright Draw near Silver City, in Grant County.

- Permittee must notify a NMDGF conservation officer **at least 24 hours prior** to surveying activities:
  - Derek.Theobald@state.nm.us at (575)-323-4481 or
  - Adan.Jacquez@state.nm.us at (575)-956-5500

All equipment left unattended in the field for any period of time shall be marked with a metal tag affixed to or engraved directly on the equipment with permittee's NMDGF permit type and number (i.e. NMDGF Sci # 3671).

For any species authorized by this permit that is also federally protected, this permit is valid only when it is held in conjunction with appropriate federal permits.

May salvage dead amphibians provided that state endangered/threatened species are reported to DGF.Permits@state.nm.us within 14 days of salvage.

Any state protected species captured, other than those specifically covered by this permit, must be immediately released and reported to DGF.Permits@state.nm.us within 24 hours of capture.

Permittee is prohibited from salvaging, tampering with or removing any protected species that they are not specifically permitted for. Permittee is required to immediately contact the NMDGF office or local Conservation Officer should they find any protected species that may have been shot, illegally possessed or appears suspicious (any cause of death other than natural or accidental).

In addition to this permit, permittee or sub-permittees must purchase and also have in their possession an over-the-counter license and stamps appropriate for the activities being conducted by this permit. License purchases are available online at the NMDGF website.

May possess and transport specimens within the state. The State of New Mexico cannot authorize permission to possess or transport specimens outside of New Mexico. Permission to possess specimens in other states or to transport specimens to other states must be obtained from the affected states.

This permit does not authorize activity on private land without consent of the landowner and does not apply to tribal or other lands where the New Mexico Department of Game and Fish does not have jurisdiction. Information collected on private property concerning species listed or proposed for listing under the Wildlife Conservation Act (17-2-37 NMSA) is confidential and may only be released under specific conditions, pursuant to 19.33.4 NMAC.

For each year that the permit is active, a scientific collecting annual report shall be submitted to the NMDGF's Field Operations Division DGF.Permits@state.nm.us by January 31st following each calendar year for which the permit is in place. This report shall provide all information requested on the NMDGF Scientific Collecting Permit Annual Report form, including the number of specimens of each species handled, or possessed during the previous calendar year, location, date of collection, and the disposition of those animals.

End conditions of authorizations

End conditions of authorizations

End conditions of authorizations

End conditions of authorizations

End conditions of authorizations

End conditions of authorizations

Signature: ***Date:*** August 16, 2019

Signature of Permittee
[Sign and retain in your possession]

Director, Department of Game and Fish
P.O. Box 25112, Santa Fe, NM 87504 USA

This permit must be in your possession while conducting activities authorized above.

APPENDIX E

Survey and Preliminary Monitoring Protocols - *Rana chiricahuensis* - Survey Protocol for Project Evaluation

The following describes the survey protocol adopted by the USFWS, AGFD, and NMDGF. The purpose of the protocol is to detect Chiricahua leopard frogs where they occur and to, in some cases, confirm absence. Additional information is collected about habitats, associated organisms, and threats. Surveys conducted under a USFWS enhancement of survival (10a1A) permit must adhere to this protocol. We recommend its usage for monitoring Chiricahua leopard frog populations until a more comprehensive monitoring plan and schedule is developed (recovery action 5).

Permits/Certification

Surveyors must be permitted by the USFWS and the appropriate State agency. To obtain a permit, surveyors must attend USFWS/State approved certification training.

Procedure

Surveys shall include a night visit to all suitable habitats (see definition in Attachment 1) in the project's action area (the area affected directly and indirectly by the action). This will typically involve walking stream and river banks, along the edges of wet meadows, and around the perimeters of stock tanks and lakes in the action area. Surveys shall be carried out with flashlights/headlamps, and a dip net shall be used to sample for tadpoles and frogs concealed in undercut banks or at the base of emergent vegetation. Watch for frogs on banklines, but also floating in the water or visible on the bottom, and in areas away from water - particularly during or after rains. Surveyors shall also listen for the distinctive call of the Chiricahua leopard frog and watch for egg masses. Audible plops may indicate frogs are present, but their identity to species must be confirmed. Plops preceded by an escape call ("eeep") indicate American bullfrog presence. In order to survey when frogs are most active, surveys shall be carried out from April through September, and when water temperatures are at least 14^{o}C at elevations below 5,500 feet and at least 12^{o}C at 5,500 feet and above, and winds are light or absent. A diurnal survey can substitute for a nocturnal survey, but if frogs are not detected, surveyors should return at night. In simple habitats, such as typical livestock tanks with little or no bankline and emergent cover, 2 diurnal surveys carried out at least 3 hours after sunrise can substitute for a nocturnal survey. If surveyors have valid State and Federal permits for collecting, and populations appear large enough to sustain collection, a sample of up to 3 tadpoles should be collected as vouchers. Such a population is defined here as one in which 20 or more adult frogs are visible within 100 meters of shoreline or stock tank perimeter and tadpoles are visibly abundant. Surveyors should note observations of fishes to species, if possible, American bullfrogs, crayfish, salamanders, gartersnakes to species, and other native frogs. Additional information on how to survey sites is contained in Attachment 1 (General Visual Encounter Survey Method - AGFD). Data should be recorded on standard field survey

forms (Attachment 2), and data should be collected in accordance with the instructions for the form (Attachment 3).

Disease Prevention

To prevent inadvertent movement of disease or parasitic organisms among sites, surveys shall conform to Appendix G: Field Work Disease Prevention Protocol.

Survey Frequency

In simple habitats, such as stock tanks (not dry) with little or no bankline or emergent vegetation, a single nocturnal survey as described above will detect frogs, if they are present, over 90 percent of the time. Numbers of frogs detected are also likely a rough index of the relative abundance of frogs (Howland *et al.* 1997). If one nocturnal or two diurnal surveys of simple systems, such as typical livestock tanks with little or no bankline or emergent cover, are conducted and frogs are not detected, you may, for the purposes of section 7 consultation, conclude the species is absent. Negative survey results in complex habitats do not indicate with certainty the species is absent; however, if frogs are not detected, the species is likely rare or absent. In complex habitats, a case can be built for absence with repeated negative surveys, preferably over one or more seasons, as well as other information, such as absence of historic or recent records of the species at the project site and within reasonable dispersal distance[1], and/or that habitat suitability is marginal.

Site occupancy often changes, particularly at stock tanks or other small, dynamic aquatic systems. Some sites may only be used by transient frogs during wet periods. Frogs may be extirpated due to drought, floods, disease, or other factors. Isolated, small populations are particularly subject to extirpation and warrant more frequent surveys to assess current status. Larger populations in natural systems are less likely to be extirpated, and as a result, survey results and assessments of presence are valid for a longer period of time. Similarly, larger sites that are unoccupied due to presence of non-native predators are unlikely to be occupied in the foreseeable future and do not warrant frequent surveys.

Site occupancy can also change due to immigration and colonization, which may occur anytime during the warmer months (however, dispersal and colonization is most likely to occur during the summer monsoons). If extant populations occur within reasonable dispersal distance[1] of a site under assessment supporting suitable habitat, colonization is likely to occur and surveys more than once a year as part of project planning or BA/E preparation may be warranted to assess presence/absence. Surveys conducted in May or June, and then repeated after the monsoon season in September, can detect occupancy in both the permanently wet habitats and the seasonally colonized habitats. For long-term projects, such as 10-year grazing permits, you should assume frogs will colonize suitable habitats within reasonable dispersal distance during the life of the project. For short-term projects, surveys immediately prior to and possibly during construction or project implementation may be needed in habitats within reasonable dispersal distance of occupied sites to evaluate if frogs will be directly affected.

[1]Reasonable dispersal distance includes the following distances from occupied habitat to sites being evaluated for occupancy: a) within one mile overland, b) within three miles along an ephemeral or intermittent drainage, or c) within five miles along a perennial stream.

Ranid tadpoles can be identified using:

Scott, N.J., and R.D. Jennings. 1985. The tadpoles of five species of New Mexican leopard frogs. The Museum of Southwestern Biology, Occasional Papers 3:1-21.

Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. Amphibians and reptiles of New Mexico. University of New Mexico Press, Albuquerque. (See key by R. Altig at pages 15-16, and species accounts).

Recordings of the calls of Southwestern anurans, including the Chiricahua leopard frog, are found in:

Davidson, C. 1996. Frog and toad calls of the Rocky Mountains. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, NY.

To identify Southwestern ranids and other anurans, see:

Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. Amphibians and reptiles of New Mexico. University of New Mexico Press, Albuquerque. (Especially see page 79, comparison of Southwestern leopard frogs).

ATTACHMENT 1

General Visual Encounter Survey Method
(Adapted from Arizona Game and Fish Department, May 2002)

This standard visual encounter survey (VES) method is to be used for Chiricahua leopard frog surveys. This method was adopted from Heyer *et al*. (1994) and modified based on statewide ranid surveys in Arizona. The method is designed to be simple and repeatable with minimal training of personnel. However, all personnel should be trained and have survey technique checked periodically by a more experienced individual. The VES method described here will generate presence/absence data if used independently and generate information from which inferences about abundance and trends can be made if used in a statistically valid monitoring program. Before designing a monitoring program, it is recommended that the user consult Gibbs' (1996) program MONITOR or Gerodette's (1987, 1993) program TRENDS to test the statistical power of the proposed monitoring program.

Equipment needed:

The observer should always have the following when conducting a VES:

- a dip net
- a Global Positioning System unit set to read in the North American Datum 1927 (NAD27Conus) and the appropriate Universal Transverse Mercator (UTM) Zone
- a clipboard with the Chiricahua leopard frog Survey Form and instructions
- a pen with waterproof ink
- a time piece with a stop watch
- a pH meter
- 2 thermometers
- a conductivity meter
- a sling psychrometer or hygrometer
- binoculars
- the appropriate United States Geologic Survey quadrangles
- bleach or Quat128 for disinfecting all gear before and after surveying each site

Other suggested items are the following:

- a counter or clicker for keeping a tally of frogs observed
- a field notebook
- a headlamp or spotlight for night surveys
- rubber boots, hip waders, or chest waders depending on the habitat
- guides to identification of aquatic insects, fish, amphibian larvae, and adult amphibians
- a digital or conventional camera with slide film
- the appropriate land ownership maps
- database reports of historic surveys done in the area
- wind meter
- measuring tape
- "dead box" (whirl pack or ziplock bags, MS 222, and formalin for collecting specimens)

- pocket magnifier (to help identify tadpoles, look at mouthparts, etc.)
- tape player (for call backs and identifying calls)
- taped recordings of anuran calls (e.g. Davidson 1996)
- compass

Survey Method:

All "suitable" habitats within an action area (area to be affected by a project) should be surveyed.

Suitable Habitat

The frog is a habitat generalist that is found in cienegas, pools, beaver ponds, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet. They are occasionally found in livestock drinkers, irrigation sloughs and acequias, wells, abandoned swimming pools, back yard ponds, and mine adits. Table E1 provides elevations at which frogs have been found by National Forest and Region in Arizona. Lower limits, below which frogs are not expected to be found, are also presented for each National Forest and Region (groups of counties). No surveys are recommended for habitats below those lower limits. However, any suitable habitat at or above those limits are potentially occupied. The limits given by Forest should guide surveys on those National Forests. If surveys are being considered outside of a National Forest, then the Regional lower limits should guide survey necessity. A similar analysis has not been conducted in New Mexico or Mexico; however, the lower limit for the Coronado National Forest can be used for Hidalgo County, New Mexico. We recommend 3,280 feet as a lower limit elsewhere in New Mexico and in Mexico.

The frog uses permanent or nearly permanent pools and ponds for breeding. Most sites that support populations of this frog will hold water year long in most years. Time from hatching to metamorphosis is shorter in warm waters than cold water, thus water permanency is probably more important at higher elevation and in the northern portion of the species' range. The species is rarely found in aquatic sites inhabited by non-native fish, American bullfrogs, or crayfish. However, in complex systems or large aquatic sites, Chiricahua leopard frog may occur with low densities of non-native predators.

Surveys in suitable lentic and lotic systems should be conducted as follows:

Lentic systems

Upon approaching a survey site, stop approximately 65 feet from the bank and search the site with binoculars. Search for frogs floating in water away from the bank as well as scanning the bank as best as possible. Walk around the entire perimeter of the site. If the entire perimeter is not surveyed, record the start and stop points as UTM coordinates. While walking along banks, use a dip net to sweep vegetation to flush frogs that do not respond to the observer's approach. After the initial perimeter survey, search mud cracks, divots, under rocks and downed branches, and any other places where frogs might find cover. If the lentic system allows, walk though the site in a zigzag fashion to further flush frogs that may be sitting on the bottom of the water. Dip net to determine the presence of amphibian larvae, fish, and aquatic insects. Record all visual

observations and audible "plops" of frogs escaping into water. Be careful not to count frogs more than once.

Table E1: Highest and lowest records for Chiricahua leopard frogs on Arizona National Forests and Regions, and recommended lower elevational limit for conducting surveys. Any suitable habitat above that lower limit could be occupied by frogs.

National Forest	Lowest Record (ft)	Highest Record (ft)	Region	Lowest Record	Highest Record	Comments	Lower Limit National Forest	Lower Limit Region
Apache-Sitgreaves NF (all but Clifton RD)	5,785	8,485	Coconino, Navajo, Apache, and Greenlee counties	4,240	8,895	Low elevation regional records all near Clifton RD	4,803	4,232
Apache-Sitgreaves NF (Clifton RD)	4,240	7,445	Coconino, Navajo, Apache, and Greenlee counties	4,240	8,895		4,240	4,232
Coconino NF	5,000	7,326	Coconino, Yavapai, and Gila counties	4,042	7,326	2 low elevation records from San Carlos Apache lands, Gila Co	4,803	4,035
Coronado	3,480	6,605	Graham, Pima, Cochise, and Santa Cruz counties	3,480	6,605		3,202	3,202
Tonto	6,000	6,405	Gila and Yavapai counties	4,040	6,405	2 low elevation records from San Carlos Apache lands, Gila Co	4,803	4,035

Lotic systems

Upon arriving at the starting point of a lotic system, record the starting point (or the most downstream point of the site) as UTM coordinates. Proceed upstream searching the banks, surrounding vegetation, and water along a minimum of 1,300 feet of a lotic system. Search under rocks, downed branches, undercut banks, and any other places where frogs might find cover as

best as possible. Where the lotic system allows, walk though the site in a zigzag fashion to further flush frogs that may be sitting on the bottom of the water. Dip net to determine the presence of amphibian larvae, fish, and aquatic insects. Record all visual observations and audible "plops" of frogs escaping into water. Be careful not to count frogs more than once.

Data collection

Data should be collected according to the Chiricahua Leopard Frog Survey Form Instructions (Attachment 3). Collect the following data at the specified locations, but note any major changes that occurred during the survey on the data form. Record the site name, UTM points, elevation, USGS quad, date, observers, and time the survey starts at the starting point of the survey. Record time the survey stops, time spent actively searching for herps, effort, any voucher specimens taken, water class, water type, search methods, water pH, relative humidity, air and water temperature, habitat characteristics (water clarity, vegetation types present, primary substrate, site width and/or length), weather conditions (wind, cloud cover, precipitation), land use, sign of potential vertebrate and invertebrate predators, as well as comments at the end point of the survey. Record any herp observations.

ATTACHMENT 2

Chiricahua Leopard Frog Survey Form

Locality Data

*SITE: | SITE AT:

For use by central data repository only:
NEW SITE: Y N | NUM: ---

*UTM ZONE: 11 12 13 | *EASTING | *NORTHING | *ELEV m ft

*QUAD: | *MIN: 7.5 15 | *YEAR: __ __ __ __ | *COUNTY: __ __---__ __ __

DIRECTIONS:

Site and Visit Conditions

*DATE: m m d d y y y y | *START TIME | *STOP TIME | *SEARCH TIME min | *OBSERVERS:

*EFFORT: meters | Total Perimeter | Partial Perimeter | Left Bank | Right Bank | Both Banks

* VOUCHERS: Specimen Photo : Habitat Photo : Specimen(s) : Y N Specimen #s:

*H_2O CLASS: Lentic Lotic | *H_2O TYPE: Canal Plant outflow Riverine Wetland Stock tank Lake Reservoir Small metal/concrete tanks or drinkers

* SEARCH METHODS: Dip net Seine Trap Hand exploration Snorkel Boat Call playback | EC: | pH:

REL. HUM. | *T_{AIR}: °C F | *T_{WATER}: °C F | WATER CLARITY: Extremely clear Moderately clear Extremely heavily turbid

*LENTIC LENGTH: | *LENTIC WIDTH: m | *LOTIC WIDTH: 0-2m 3-5m 6-10m 11-20m 21-50m 51-100m

*RIPARIAN WIDTH: 0-2 m 3-5 m 6-10 m 11-20 m 21-50 >50 m | *PRIMARY SUBSTRATE (mark 1-3) : Mud/Silt Sand Gravel Cobble Boulder

*WIND: < 1 mph 1-3 mph 4-7 mph 8-12 mph 13-18 mph 19-24 mph >24 | *CLOUD COVER: 0-20% 21-40% 41-60% 61-80% 81-100%

*PRECIPITATION: None Intermittent Steady & Light Steady & Heavy Snow/Sleet | DRY SITE: Y N

VEGETATION	%	PROMINENT SPECIES
FLOATING		
SUBMERGED		
EMERGENT		
PERIMETER		
CANOPY		

*PREDATORS: (include scat and tracks)
Leeches Boatmen/Backswimmer Dragonflies
Belostomatids Beetles Warm water fish
Cold water fish Tiger salamanders Bullfrogs
Mud turtles Gartersnakes Wading birds
Blackhawk Mammals Crayfish

*OTHER ORGANISMS: | OTHER ORG. NOTES:

SITE / SURVEY NOTES:

Continued on back? Y N

Herpetofauna Observations

*SPECIES	CERTAINTY	LIFE STAGE	#	NOTES
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		
	Uncertain Certain	Egg Larvae Juvenile Adult		

ATTACHMENT 3

Site and Visit Conditions
Herpetofaunal observations

Adapted from Riparian Herp Survey Form Instructions (AGFD)

- Fields with an asterisk (*) are to be filled out for every survey, regardless of results.
- Check the site's Locality Data upon returning to the office for consistency (i.e. the site name filled out is consistent with the site name used in previous surveys).
- Upon return to the office, check each Survey Form for completeness, conciseness, and clarity prior to submitting for entry.

Locality Data:

*****SITE: A "site" is any aquatic system (or piece of an aquatic system) that is > 1 mile from any other survey locality, or if less than 1 mile apart, represents a **distinct** change in aquatic habitat types (e.g., riverine vs. lake or cienega). Features with unique names are considered unique sites regardless of how far apart they are. Record the site name as it is marked on the United States Geologic Survey (USGS) quadrangle (hereafter quadrangle or quad). If the site is unnamed on the quad, refer to the corresponding land management map (e.g., U.S. Forest Service map, BLM Surface Management Responsibility map). If the site doesn't have a name, write "unnamed" preceding the feature; similarly, if the site is not marked on any map, write "unmarked" preceding the feature (e.g., Unnamed Wash, Unmarked Tank).

SITE AT: This field should always be filled out for unnamed and unmarked sites and for large/long aquatic systems. For other localities, use this field *as needed* to enhance a site name (i.e., to verbally pin-point a site in space). Use such features as the nearest road crossing (e.g., East Verde River at **Highway 87**) stream confluence (e.g., East Fork Gila River at **Diamond Creek**) or topographic feature (e.g., San Francisco River, W of Glenwood) in the description.

NEW SITE: This field is used for central database management purposes only and is not to be filled out by survey personnel.

NUM: This field is used for central database management purposes only and is not to be filled out by survey personnel. A site number is a unique number that, once assigned to a site, will always be used in conjunction with that site. The site number starts with a 3-letter code that describes the land manager. These 3 letters are followed by a hyphen and then a 4-digit number (e.g., TON-0001, COC-0153).

*UTM ZONE: Circle "11", "12" or "13" to note whether the **starting point** of the survey is in UTM grid zone 11 (west of 114 degrees longitude) or 12 (east of 114 degrees longitude). Most of Arizona except for the extreme western portion of the state is Zone 12. Most of New Mexico, except for the extreme western portion is in Zone 13.

*****EASTING: Record the **starting point** of the survey as a 6-digit number. An example of a UTM x-coordinate is 295440E. Use a Global Positioning System (GPS) unit to measure the UTM coordinate. The UTM coordinate should be measured in North American Datum 1927 (NAD27Conus for Garmin units). Check that the GPS unit is reading the appropriate Zone (most of AZ is Zone 12, most of NM is Zone 13). Alternatively, read

UTM coordinate. The UTM coordinate should be measured in North American Datum 1927 (NAD27Conus for Garmin units). Check that the GPS unit is reading the appropriate Zone (most of AZ is Zone 12, most of NM is Zone 13). Alternatively, read the UTM coordinate from the quad. The first 3 numbers will be found on the top or bottom edge of the quad. These numbers are in 100,000-meter increments. The fourth number describes a point with 100-meters accuracy. The fifth number describes a point with 10-meters accuracy. The last number will be a zero. Use a coordinate scale to determine the fourth and fifth numbers.

*NORTHING: Record the **starting point** of the survey as a 7-digit number. An example of a UTM y-coordinate is 4318410N. Use a Global Positioning System (GPS) unit to measure the UTM coordinate. The UTM coordinate should be measured in North American Datum 1927 (NAD27). Check that the GPS unit is reading the appropriate Zone (most of AZ is Zone 12, most of NM is Zone 13). Alternatively, read the UTM coordinate from the quad. The first 4 numbers will be found along the left or right edge of the quad. These numbers are in 1,000,000-meter increments that tell you how far north of the equator you are. The fifth number describes a point with 100-meter accuracy. The sixth number describes a point with 10-meter accuracy. The last number will be a zero. Use a coordinate scale to determine the fifth and sixth numbers.

*****ELEV: Record the elevation at which the **starting point** of the survey occurs. Read the elevation off of the survey quad or GPS unit. Be sure to indicate the measurement units (ft or m). The contour interval and unit (meters or feet) is written in the center of the bottom margin of the quadrangle. To convert meters to feet multiply by 3.281. To convert feet to meters multiply by 0.3048. If using a GPS unit, ensure you have adequate satellite coverage for an accurate elevation reading (at least 4 satellites).

*****QUAD: Record the quadrangle name as it appears on the quadrangle. The name of the quadrangle appears in the upper and lower right hand corners of the quadrangle. If more than one quad is used in the survey, record the name of the quad in which the survey starts and note the name(s) of the other quad(s) in the DIRECTIONS.

*****MIN: Circle "7.5" or "15" to note whether the quadrangle series is 7.5 or 15 minutes. The series of the quadrangle can be found in the upper right hand corner of the quadrangle.

*****YEAR: Record the year of the quadrangle as it is printed in the lower right corner of the quadrangle. If more than one year appears on the map, record the year of the most recent revision.

*****COUNTY: Record the state abbreviation (e.g., AZ, NM) followed by a hyphen and then the first 4 letters of the county (e.g., AZ-MARI, AZ-YAVA, NM-CATR, NM-SIER). The county name can be found in the upper right corner of the quadrangle if the quad covers an area within a single county. For quads that cover areas in two or more counties, the names of the counties will appear somewhere in the topographic region of the quad. National forest maps, road maps, and gazetteers are also useful in identifying counties.

DIRECTIONS: Write the directions to the site. **Keep them short and pertinent** (e.g., on FS 105˜ 4.3 MI N of FS 105/FS 393 jct.). Directions are especially important when there are no roads or when existing roads are not marked on your maps. Use the directions N, NE, E, SE, S, SW, W, and NW instead of "turn right" or "veer left". This field can also contain any information or comments you want to convey to other field personnel. For example: "Contact landowner for permission to access (602) 555-9683"; "Also survey adjacent tank and draw"; etc.

Site and Visit Conditions:

*****DATE: Record the date of the survey as eight numbers giving the month first, followed by the day then the year (e.g., 10-27-1993, 06-02-1994).

*****START TIME: Record the time the surveyor begins searching for herps using a 24-hour clock.

*****STOP TIME: Record the time the surveyor stops searching for herps using a 24-hour clock.

*SEARCH TIME: Record the time spent actively searching for herps in minutes. The time recorded should include only time spent actively searching for herps and should not include time taken to write field notes, complete data sheets, read data sheet instructions, or other activities that may be performed while at the site.

*****OBSERVERS: List the names of all people present during the survey. Record the names as: first initial, period, second initial, period, space, and full last name (e.g., M.J. Sredl, C.W. Painter).

*****EFFORT: There are 5 categories of effort:

TP = Total Perimeter
PP = Partial Perimeter
LB = Left Bank
RB = Right Bank
BB = Both Banks

Circle all category(s) that apply. For all categories other than TP, record the distance surveyed in meters. The minimum acceptable survey distance for linear systems and large lentic systems (> 20 acres) is 400m (0.25 mile). Use category BB for any lotic system in which it is possible for you to access both banks (i.e., to meander from shore to shore). Use categories LB and RB for large, deep, and/or swiftly flowing lotic systems in which you are unable to meander shore to shore. LB and RB should always be filled out together even if you didn't survey, or were unable to access, one of the shores (e.g., LB = 0000m, RB = 0350m; RB = 0050m, LB = 0200m). Left and right banks are in reference to a person looking upstream. To calculate meters walked use a map wheel, range finder, or measuring tape. If using a map wheel to determine the distance in kilometers (or miles), be sure to use the scale on the map wheel that corresponds to the scale of your map or quad. Multiply your result by 1000 to get meters. Round the final result to the nearest 25-meter value. Alternatively, multiply the value generated from the map wheel in miles by 5,280 feet/mile. Multiply this new value by 0.3048 meters/foot. Remember, during the course of any survey, the surveyor should dip net, comb through bushes and grasses, turn over rocks, and scan the water and shore for herpetofauna.

*****VOUCHERS: Note how many photo vouchers of specimens were taken at a site. Write the number as 2 digits (e.g., 00 or 13). Photo vouchers of specimens should be close-ups (i.e., macro shots) of diagnostic characters (e.g., thigh pattern and dorsolateral folds of leopard frogs, scale row of lateral stripes in gartersnakes, dorsal and cranial views of Arizona toads). Note how many habitat photographs were taken at a site. Write the number as 2 digits (e.g., 00 or 02). Habitat photos should be taken at any site in which target riparian herps were found, at any historical locality regardless of results, and at any survey site that has suitable habitat even if no target riparian herps were found. Keep a detailed log of all photos taken with the camera. Circle "Y" (yes) or "N" (no) as an indication of whether voucher specimens were collected at a site. If "Y" is circled,

the collection tag number(s) should be written in the Specimen #s field. In New Mexico, all specimens collected should be given to the New Mexico Dept. of Game and Fish, Endangered Species Program for identification and deposition in the Museum of SW Biology at Univ. of New Mexico. In Arizona, give specimens to the Arizona Game and Fish Dept., Nongame Branch in Phoenix for identification and deposition in the Arizona State University Museum.

*****H_2O CLASS: Circle 1 category that best describes the hydrological class of the water system you have surveyed.

Lentic = still water (e.g. pond)
Lotic = flowing water (e.g. stream)

*****H_2O TYPE: Circle 1 category that best describes the type of water you have surveyed. The categories are based upon lotic/lentic characteristics as well as the size/magnitude of the water body:

Canal = manmade (metal, concrete or earthen) diversion of riverine water
Plant outflow = sewage and electric plants; any chemical or mechanical processing of water; storm drainages
Riverine = natural flow, from raging rivers to streams to seeps
Wetland = an inland body of water that is primarily emergent vegetation (e.g., cienega)
Stock tank = an earthen-dammed or dredged basin that catches run-off for livestock or wildlife
Lake = an inland body of water that is primarily open water
Reservoir = a dammed riverine system that is primarily used for recreation and/or human water supply
Small metal/concrete tanks and drinkers = manmade water holding structures

*SEARCH METHODS: Circle all methods used to search for herps. If needed, include a description of other techniques used to search in the SITE / SURVEY NOTES with a footnote reference. Remember, during the course of any survey, the surveyor should dip net, comb through bushes and grasses, turn over rocks, and scan the water and shore for herpetofauna.

EC: Use an electroconductivity meter to measure. The water sample should be taken 1 centimeter below waters' surface and 1 meter from shore. For bodies of water less than 2 meters wide, take the sample from the center. Record value as µS (micro-Seimens). Be sure to: 1) take the cap off the meter before using, 2) keep the level of the water sample below the mark on the meter, 3) turn the meter on before measuring the conductivity of the sample, and 4) turn the meter off when finished sampling. Meters should be calibrated monthly.

pH: Measure pH using a pH meter. The water sample should be taken from water column 1 meter from shore. For bodies of water less than 2 meters wide, take the sample from the center. Be sure to: 1) take the cap off the meter before using, 2) keep the level of the water sample below the mark on the meter, 3) turn the meter on before measuring the pH of the sample, and 4) turn the meter off when finished sampling. Meters should be kept hydrated and calibrated monthly.

REL. HUM.: With a sling psychrometer or hygrometer, measure relative humidity 1.5 meters above ground and 1.5 meters from water. Record as percent.

*T_{AIR}: Measure air temperature to the nearest 10^{th} of a degree (degrees Celsius preferred, circle C or F) 1.5 meters above ground and 1.5 meters from the water. Be sure thermometer is shaded and completely dry.

*T_{WATER}: Measure water temperature to the nearest degree (degrees Celsius preferred, circle C or F) 1 centimeter below water's surface and 1 meter from shore. For bodies of water less than 2 meters wide, measure temperature at the center. Be sure to shade the thermometer.

WATER CLARITY: Circle 1 phrase that best describes the survey area.

*LENTIC LENGTH: For lentic systems, record the length (i.e., longest axis) of the system in meters. Measure the entire system (not just the portion surveyed), and use the standing water at the time of the survey as your boundaries. Do not measure the normal waterline or highwater mark. For large systems, estimate the length using a map. Do not rely on a visual estimate for large systems.

*LENTIC WIDTH: For lentic systems, record the width (i.e., shortest axis) of the system in meters. The width should be the maximum distance perpendicular to the length axis. As with the length, the width should reference the entire lentic system, not just the portion surveyed, and should be determined based upon the standing water present at the time of the survey, not the usual waterline or high water mark. Use a map as a guide for larger systems.

*LOTIC WIDTH: For lotic systems, select one range that best describes the width of water at the time of the survey. Do not measure the normal waterline or the high water mark.

*RIPARIAN WIDTH: Circle the category that includes the maximum width of the riparian area in meters. Riparian width should be measured from the boundary of riparian vegetation and upland vegetation. For a lentic system, include the area of riparian vegetation along the shore of the body of water and any vegetated waters. For a small lotic system in which both banks can be surveyed simultaneously, include the zone of riparian vegetation on both banks of the body of water surveyed and any vegetated waters. For large or swiftly flowing lotic systems, include only bank that was surveyed or the maximum width of riparian vegetation on both banks. Riparian width is measured for the area surveyed.

*PRIMARY SUBSTRATE: Circle from 1 to 3 categories as appropriate. All substrate types may be present, but choose only those that best describe the area potentially inhabited by target species.

Mud/Silt = 0.001-0.1 mm
Sand = 0.1-2 mm
Gravel = 2-32 mm
Cobble = 32-256 mm
Boulder >256 mm
Bedrock = exposed sheet of rock

*WIND: Circle 1 category as appropriate. Wind should be measured 1.5 meters above the ground and 1.5 meters from the water. If using a wind meter, be sure to: 1) hold meter near the top so that you are not blocking any holes, 2) face into the direction of the wind while reading the meter, and 3) use the left scale for wind strengths < 10 mph, and use the right scale (by putting your index finger over the red knob on top of the meter) for wind strengths ≥10 mph. Wind categories are those used in the Beaufort scale:

≤1 mph = smoke rises vertically
1-3 mph = wind direction shown by smoke drift
4-7 mph = wind felt on face, leaves rustle
8-12 mph = leaves and small twigs in constant motion, wind extends light flag
13-18 mph = raises dust and loose paper, small branches are moved
19-24 mph = small trees begin to sway, crested wavelets form on inland waters
>24 mph = greater effect than above

*CLOUD COVER: Circle 1 category as appropriate. Categories are based on percent cover.

*PRECIPITATION: Circle 1 category as appropriate.

*DRY SITE: Circle Y (yes), if the site has no standing or flowing water on the surface. Circle N (no) water is present.

VEGETATION & PROMINENT SPECIES: Record the percent of the area potentially inhabited by target species that is covered by floating vegetation (e.g., broad-leafed macrophytes and dense algal mats), submerged vegetation, emergent vegetation (e.g., cattails, sedges, rushes), perimeter vegetation (i.e., up to 1 m from waters edge), and canopy vegetation. Use increments of 5 percent (i.e., 1percent effectively = 0). Record the genus name or common name (only if positively identified) of the 1-4 most prominent species that best describe the surveyed area.

***PREDATORS:** Circle all predators seen or otherwise detected at a survey site. Most predator categories lump together similar organisms and/or organisms with similar effects on riparian herps. Record amphibians and reptiles that are predators on other herpetofauna in the Herpetofauna Observations table. For **crayfish**, include claws and carapaces as evidence of presence. For **dragonflies**, do not include damselflies. For **beetles**, include any large aquatic beetles observed, such as hydrophilids and dytiscids. **Warm water fish** include bass, carp, catfish, perch, sunfish, and walleye. **Cold water fish** include trout and pike. **Large wading birds** include American bittern, black-crowned night heron, egrets, great blue heron, and green-backed night heron. **Mammals** include only medium-sized mammals such as skunk, ring-tail, and raccoon.

***OTHER ORGANISMS:** This field is to be used for observations of species other than riparian herpetofauna. Riparian herps are to be recorded in the "Herpetofauna Observations" table. List all non-riparian herps by 4-letter genus/species code following the list derived from Stebbins (2003) or common name. List federal or state sensitive species of other organismal groups or any other species whose occurrence merits noting by common name. Use the OTHER ORG. NOTES field as needed to expand upon why you listed a species.

OTHER ORG. NOTES: Use this field to write out noteworthy observations about any or all of the species listed in OTHER ORGANISMS (e.g., side-blotched lizard observed mating, great horned owl roost site observed, area heavily impacted by elk grazing).

SITE / SURVEY NOTES: Use this field to describe the most outstanding features of a survey or site. **Don't be redundant** with fields already completed. Write short, specific comments that emphasize habitat quality and why you think you did or did not find herps. Be sure to comment on any land use in, around, or in proximity of the survey area that may potentially impact the study site (e.g., large mining operation 0.5 mile upstream of survey site, agricultural spraying 1 mile from survey site). You can also use this field to describe any noteworthy similarities or dissimilarities between the area searched and the total area (e.g., wash devoid of vegetation except in area of survey, survey covered the north end of the lake which was the only area with emergent vegetation).

Herpetofauna Observations:

*SPECIES: Record all riparian herp species (target or non-target) detected during a survey in this column. Record non-riparian herpetofauna in the OTHER ORGANISMS and OTHER ORG. NOTES. If no species are observed, record “NONE.” Use the unique 4-letter Genus-species code (Derived from Stebbins (1985)") for all riparian herp species. When an organism cannot be identified to species (e.g., "I saw a ranid-like frog", or "I saw an anuran egg mass"), use the 4-letter code corresponding to the taxonomic classification for which you are confident in your identification. For the examples above, the ranid-like frog would be assigned the code "RANA", and the egg mass would be coded as "ANUR". If you are confident you saw a leopard frog but are not certain which species you saw, use the code "RAPC." Do not use historic information to bias your decision on species identification. Record your most confident observation and justify it in the NOTES or COMMENTS.

CERTAINTY: Circle 1 word to indicate your level of certainty about your identification of each species. Certainty of identification should be based on species-specific diagnostic characters (e.g., thigh pattern and dorsolateral folds in leopard frogs, scale row of lateral stripes in gartersnakes, lack of dorsal stripe and cranial crests in Arizona toads). For information on diagnostic characters of species, see the references listed in the Survey Protocol or other appropriate diagnostic keys.

LIFE STAGE: Circle the life stage of each species observed. Use separate rows for different life stages of the same species. A juvenile leopard frog is usually < 55 mm SVL, while an adult is > 55 mm SVL or exhibits obvious sign of breeding condition (e.g., swollen thumbpads, stretched vocal sacs)

OBSERVED: Enter the number of individuals of each species and life stage you encountered. Do not estimate total numbers within the survey area, but record only the number that you saw. For egg masses, record the number of egg masses, note the overall size of mass, condition, and stage of embryos in the NOTES or COMMENTS sections

NOTES: Record any relevant notes specific to the species or life stage observed. Types of observations to include are as follows: 1) what criteria were used to identify a species; 2) if species identification is uncertain, what was observed including both physical features and behaviors would be of use (e.g., “dorsal spots obs.,” “ranid like plop,” “no bullfrog peep”); 3) note the presence of disease or deformities.