AG Contract No KR02-2092TRN
ADOT ECS File No **JPA 02-175-Amendment 1**
TRACS No P6000 11P
Project: Mitigation of Road Design for
Cactus Ferruginous Pygmy-owls

INTERAGENCY AGREEMENT

BETWEEN
STATE OF ARIZONA

THE DEPARTMENT OF TRANSPORTATION
AND
THE DEPARTMENT OF GAME AND FISH

THIS AGREEMENT AMENDMENT is entered into 13th February 2003, to amend JPA 02-175, AG Contract No : KR02-2092TRN, approved by the Attorney General's Office January 8, 2003, pursuant to Arizona Revised Statutes, 28-401 and 17-231 as amended, between agencies of the STATE OF ARIZONA, the Department of Transportation, acting by and through its TRANSPORTATION PLANNING DIVISION ("ADOT") and the DEPARTMENT OF GAME AND FISH, acting by and through its Director (" G&F")

I. RECITALS

1 ADOT is empowered by Arizona Revised Statutes Section 28-401 to enter into this agreement and has delegated to the undersigned the authority to execute this agreement on behalf of ADOT

2 G&F is empowered by Arizona Revised Statutes Section 17-231 to enter into this agreement and has delegated to the undersigned authority to execute this agreement on behalf of the G&F

In the original agreement:

3 ADOT and the G&F desire to document the physiographic characteristics, traffic regimes, and vegetation structure used by pygmy-owls along currently used roadways Such work will be conducted in northwest Tucson and the Altar Valley (vicinity of SR-286), generally in accordance with Exhibit A, which is attached hereto and made a part hereof, at a estimated cost of **$150,783.00,** hereinafter referred to as the "Project" The parties hereto agree that the G&F shall be the lead agency for the Project

Changes to the referenced Agreement are warranted to accommodate the following:

3 ADOT and the G&F desire to document the physiographic characteristics, traffic regimes, and vegetation structure used by pygmy-owls along currently used roadways Such work will be conducted in northwest Tucson and the Altar Valley (vicinity of SR-286), generally in accordance with Exhibit A, which is attached hereto and made a part hereof, at a estimated cost of **$150,000.00**, hereinafter referred to as the "Project" The parties hereto agree that the G&F shall be the lead agency for the Project

THEREFORE, in consideration of the mutual agreements expressed herein, it is agreed as follows.

APPROVED

Susan Davis

Assistant Attorney General
Attorney for Department
of Transportation

Date 2-13-03

Therefore, the following is added to the agreement:

II. SCOPE OF WORK

1. The G&F will:

a Appoint a Project Coordinator at G&F to interface with ADOT relating to the project.

b **Contribute in-kind services to the Project in the amount of $37,500.** In strict compliance with all State procurement laws, rules and regulations, procure and obtain project necessary Project materials and supplies, select an hire assistance or research firms to assist in the evaluation Provide the ADOT such progress reports and deliverables as they are developed.

c No more often than monthly, invoice the ADOT in the form of Exhibit B attached hereto, supported by narrative reports **and an accounting of monthly costs & expenditures, including the match, associated with the Project, to the Project Manager for the ADOT, as noted in III. 7 below.**

2 ADOT will.

a. Appoint a Project Coordinator within ADOT to interface with the G&F relating to the Project.

b. Provide the G&F with information and data as may be reasonably available to assist in the Project work.

c Contribute a maximum of **$150,000.00** to the Project on a reimbursement basis Reimburse the G&F within forty-five (45) days after receipt and approval of monthly invoices, in a total amount not to exceed **$150,000.00.**

III. MISCELLANEOUS PROVISIONS

1 Title to all documents, reports and other deliverables prepared by the G&F in performance of this agreement shall rest jointly with the ADOT and the G&F

2. This agreement shall become effective upon signature by the parties hereto, and shall remain in force and effect until on or about 31 August 2006, or upon completion of said Project and reimbursements, provided, however, that this agreement, may be cancelled at any time prior to the commencement of performance under this agreement, upon thirty (30) days written notice to the other party

3 The parties agree to comply with all applicable state and federal laws, rules, regulations and executive orders governing equal employment opportunity, immigration, nondiscrimination and affirmative action

4 This agreement may be cancelled in accordance with Arizona Revised Statutes Section 38-511.

5. The provisions of Arizona Revised Statutes Section 35-214 are applicable to this contract.

6. In the event of any controversy which may arise out of this agreement, the parties hereto agree to abide by required arbitration as is set forth for public works contracts in Arizona Revised Statutes Section 12-1518.

7 All notices or demands upon any party to this agreement relating to the agreement shall be in writing and shall be delivered in person or sent by mail addressed as follows:

Department of Transportation Joint Project Administration 205 S 17th Avenue - 616E Phoenix, AZ 85007	Game and Fish Department Duane L. Shroufe, Director 2221 West Greenway Road Phoenix, AZ 85023

8 The parties recognize that performance by the G&F under this agreement may be dependent upon the appropriation of funds by the State Legislature of Arizona and the federal government Should they at any time fail to appropriate the necessary funds for such performance, then, by written notice to the other party, either party may cancel this agreement Should the Project not be completed, be partially completed, or be completed at a lower cost than the paid amount, or for any other reason should any of these funds not be expended, a proportionate amount of the funds provided under this agreement shall be reimbursed to the ADOT.

IN WITNESS WHEREOF, the parties have executed this agreement the day and year first above written.

GAME AND FISH DEPARTMENT	**STATE OF ARIZONA** **DEPARTMENT OF TRANSPORTATION**
Bruce Taubert, Assistant Director (Acting) By _____ DUANE L. SHROUFE Director	By _____ DALE BUSKIRK, Acting Division Director Transportation Planning Division

G:02-175/:PygmyOwl/Game&Fish
24Jan2003

PROPOSAL

Mitigation of Road Design for Cactus Ferruginous Pygmy-owls

Michael Ingraldi, Ph.D
Research Biologist
Arizona Game and Fish Department
2221 West Greenway Road
Phoenix, Arizona 85023

INTRODUCTION

The need for more efficient transportation corridors within the northwest Tucson and southern Pinal County necessitates consultation with the U.S. Fish and Wildlife Service (FWS) because most of the transportation corridors pass through critical habitat for the Cactus Ferruginous Pygmy-owl (*Glaucidium brasilianum cactorum*, hereafter pygmy-owl). The Arizona Department of Transportation (ADOT) is proposing improvements to SR 79, 85, 86, 77 and I-10. The lack of pertinent information regarding the impact road construction would have on the viability of this federally endangered owl may lead to delays in construction due to the lack of information on potential mitigation. By studying how birds use habitat about roadways (e.g., habitat characteristics where pygmy-owls cross roads, how far will pygmy-owls cross open pavement, do pygmy-owls avoid roads with certain traffic volumes, etc.) will allow us to make credible management recommendations.

Regulatory guidance exists for pygmy-owl protection in the form of designated critical habitat. In the near future, the Recovery Plan for the pygmy-owl will be published by the United States Fish and Wildlife Service, providing additional guidance. Sonoran desertscrub presently supports more known pygmy-owls than other Arizona habitats and is threatened by habitat fragmentation from urban development and other activities. The influence of practices such as land development (commercial and residential), road construction and maintenance, recreation, and livestock grazing on habitat selection and habitat availability for this subspecies are poorly understood, as is much of its general life history. Specifically, little is known of the habitat conditions necessary for successful nesting, foraging, and dispersal of pygmy-owls.

The conservation of biologically connected patches of landscapes or systems is essential to protection of species. Pygmy-owls most probably exist in a series of local populations connected by dispersing individuals. This metapopulation of pygmy-owls may be limited by the availability of movement corridors, especially with past and current habitat modifications associated with urban development. It is essential that we identify current and potential barriers (e.g., roads) so that habitat links among these local populations can be preserved. Also, determining the current numbers and distribution of pygmy-owls, as well as subsequent habitat

requirements, dispersal patterns, and demographics is essential to guide mitigation efforts. The purpose of this study is to provide the necessary information on how pygmy-owls use habitat associated with roadways. We will provide management recommendations that will ensure minimal impact associated with roadway design. The knowledge gathered from this study will provide (e.g., vegetation structure used, distance owls fly across open land, habitat characteristics along owl road crossings) information that will allow ADOT to design road improvements that have minimal impact to pygmy-owls.

OBJECTIVES

We propose to study two populations of pygmy-owls (NW Tucson and Altar Valley) which have a wide variety of road designs within their home ranges and document how they use this habitat. We will document the physiographic characteristics, traffic regimes, and vegetation structure used by pygmy-owls along currently used roadways. From this research, we will be able to make recommendations to mitigate the impact of highways, road widening, and vegetation clearing may have on pygmy owls.

Objectives of this project are to:

1) locate nesting pygmy-owls within southern Arizona;

2) determine the flight distances traveled by radio tagged juvenile and adult pygmy-owls in southern Arizona with emphasis on their flights across roads;

3) identify habitat characteristics associated with road crossings used by adult and dispersing pygmy-owls.

APPROACH

The following procedures and analysis address the above objectives.

Objective 1: Locate nesting pygmy-owls within southern Arizona.

Our efforts to locate pygmy-owls will be conducted from June and July (nesting period), with some limited work in the fall (September and October) during the dispersal period. We will take advantage of currently known territories in NW Tucson and Altar Valley. We will choose pygmy-owl territories that have a wide degree of road types within close proximity to their nest sites. Road types include: single track dirt, double lane dirt, paved single lane (e.g., residential), paved double lane with and without divider, paved four lane highways.

We will use the standardized protocol currently approved by the FWS. This protocol uses conspecific playback recordings to solicit pygmy-owl responses. Our search effort will take place one hour before sunrise to two hours post sunrise, and one hour before sunset to one hour after sunset. We also will attempt to locate pygmy-owls at night, two days prior and after the full moon phase, while the moon is visible. Broadcast stations will be spaced at 300 m intervals in rural areas and 150 m in urban areas. Pygmy-owl calls will be played for 30 sec followed by a

60 sec listening period. This calling sequence will be repeated six times at each broadcast station. Our search efforts will include habitat adjacent to, and branching out from previously known pygmy-owl locations. Known habitat includes all Sonoran desertscrub, desert riparian habitats and residential green space. Examples of areas considered non-habitat for nesting include defoliated areas, creosote bush (*Larrea tridentata*) flats, agricultural fields, and human made non-vegetated structures (e.g., parking lots).

<u>Objective 2</u>: Determine the flight distances traveled by radio tagged juvenile and adult pygmy-owls in southern Arizona with emphasis on their flights across roads.

We will trap all adult pygmy-owls detected using either with a bal-chatri, noose carpet, dho-gaza set or a bow net trap. All captured owls will be marked with FWS bands and a unique aluminum-anodized, alpha-numeric, colored leg band. Standard morphometric measurements (e.g., weight, wing chord, etc.) will be collected. Feathers will also be collected, catalogued, and stored for genetic identification.

Adult and juvenile pygmy-owls will be fitted with a backpack style, 1.85 g radio transmitter (Holohil Systems, Ltd., Ontario, Canada). Only adult male pygmy-owls will be transmittered because they tend to do most of the foraging during the breeding season and travel widely defending their territory. These transmitters possess a battery life of approximately 12 to 16 weeks. Because currently available transmitters will not last the duration of the study, successive transmitters will be attached. This requires the subsequent capture and transmitter replacement for each transmittered pygmy-owl about every 11 weeks, or a minimum of three times per bird. Current research by the Department has shown no observable impact on pygmy-owl nest attentiveness or change in behavior due to the periodic capture and replacement of transmitters.

Fledgling pygmy-owls will be captured directly by hand soon after leaving nest cavities. A 36cm diameter hand net with 5 cm^2 mesh attached to a telescoping pole will be used for hard to reach pygmy-owls. Fledglings will be marked with FWS bands and a unique aluminum-anodized, alpha-numeric, colored leg band. Also, standard morphometric measurements will be collected, and a feather sample will be collected, catalogued, and stored for future genetic analysis. No more than two birds per nest site will be transmittered in a given year.

We will attempt to mark and monitor at least six adults (3 per study area) per year of study. We will also attempt to mark and monitor six fledglings from each of the study areas (NW Tucson and Altar Valley) per year of study. The day will be partitioned into three evenly hour blocks of time from sunrise to sunset. We will monitor the activity of at least three birds per week for each of the three blocks of time (i.e., an individual bird will be monitored in each of the three time blocks during the course of one week). We will monitor birds a minimum of two weeks per month in each of the study areas (except during peak dispersal (September - October) when we will monitor fledgling each week).

During the monitoring sessions we will record the location, movements and behavior of the bird.

We will record the UTM coordinate as well as the location description (e.g., perch type, location within a tree) for every perch location during the monitoring periods. Special attention will be paid to the distance flown between successive perches and the location where a bird flies across a road and lands on the other side. Behaviors recorded will include: perched, striking at prey, flap sailing, preening, carrying prey. During the observation periods, special care will be taken not to approach birds within < 75 meters (i.e., we will take special care not to influence the behavior and movements of the birds under observation).

Objective 3: Identify habitat characteristics associated with road crossings used by adult and dispersing pygmy-owls.

We will characterize structure and composition of vegetation around perch structures used by pygmy-owls on either side of roads. We will have three scales of study, the perch structure, a 15 m diameter circular plot centered on each identified perch, and a 30 m wide and 60 m long plot along the road centered on the perches used on either side of the road. We will record the type of perch used (e.g., tree species, fence post, cacti), its height, crown diameter, and distance to road edge. Within the 15m diameter circular plot we will set six 15 m transects radiating from the center and along each transect the point-intercept method will be used to determine percent of ground cover in five categories (bare ground, litter, dead woody debris, live vegetation, or rock). Vertical height indexes for plant species will also be determined along a Robel pole at the point-intercepts along each transect. The average height and mean crown diameters will be calculated for the all tree species within the plot. Within the 30 by 60 m plot we will record the distance and direction of each tree and saguaro (> 2 m tall) from the used perch structure. We will also measure the crown diameters of all the trees within this large plot.

We will measure the traffic volume (number of vehicles by class, e.g., cars, pickup trucks, tractor trailers, busses, etc. per hour) at the road crossing used by the pygmy-owl. We will record traffic volume at the road crossing 24 hours after the crossing was observed (½ hour prior and ½ hour post the time of crossing). Depending on the expected vehicle traffic, we will either use an observer to record the traffic volume for one hour or use a remote camera. The distance between the perch structures used on either side of a road crossing and the width of the road will be measured. We will measure a random paired plot for each road crossing and segregate these by road type. Random plots will be within 500 m of the used perches.

Analysis

Correlations between habitat variables will be calculated using both Pearson and Spearman rank correlation coefficients. Within each pair of correlated variables ($r \geq 0.7$) only one member of a pair will be retained for subsequent analysis. The criteria for retention will be the ease of ecological interpretation and precision of measurement. Summary statistics (e.g., mean, median, coefficient of variation, frequency histograms, etc.) will be calculated for each habitat variable. A contingency table with Yate's correction will be used to test the differences between discrete (e.g., canopy structure) habitat characteristics at pygmy-owl locations and those from random

sites. The vegetation data will be subjected to a logistic regression classification. Data will be grouped a used or a random site. The goal of this analysis will be to find the best combination of habitat variables that classifies perch sites used at road crossings or random. Once an optimal model is selected, member variables will be subjected to a t-test (we will transform non-normal data to fit test assumptions) to determine whether used habitat differs significantly from that randomly available. Because Type I error rates inflate when simultaneous univaritate tests are performed, a Bonferroni correction will be used to adjust the level of significance. Results from statistical tests will be considered significant at $P < 0.05$.

Time Table

Time	Activity
YEAR 1	
January 2003 - April 2003	Reconnaissance of study area and locate nesting sites. Radio-tag adult pygmy-owls.
May - June 2003	Monitor active nest sites. determine number of fledglings
July 2003 - August 2003	Transmitter dispersing pygmy-owls.
July 2003 - June 2004	Track pygmy-owls. Measure habitat and road characteristics.
June 2004	Submit progress report summarizing first year's results.
YEAR 2	
July 2004 - March 2005	Transmitter and track pygmy-owls. Measure habitat and road characteristics.
March 2005 - June 2005	Analyze data and submit draft report for review.
August 2005	Submit final report.

Budget Summary

Category		Cost
Personnel		
Project Biologist (2 months)		8773
Wildlife Specialist II (12 months)		31200
Wildlife Specialist (3 months)		8562
Wildlife Assistant (12 months)		25115
Administration / Secretarial (1 month)		2200
	Sub-total	**75,850**
	18% Overhead	13,653
	Sub-total	**89,503**
Employee Related Expenses (30% of Personnel sub-total)		22,755
	Sub-total	**$112,258**
Mileage		
2 AGFD vehicle ($0.5/mile x 15,000 miles/vehicle)		**$15,000**
Per diem		
Project Biologist ($29.5/day x 20 days)		590
Wildlife Specialist II ($29.5/day x 140 days)		4130
Wildlife Specialist I ($29.5/day x 50 days)		1475
Wildlife Assistant ($29.5/day x 140 days)		4130
	Sub-total	**$10,325**
Other Operating Expenses		
Field equipment (CD players, office space, GPS units, radio transmitters, radio receivers, noise dosimeters, measuring tapes, photocopies, binding, maps, flagging, etc.)		13,200
	Sub-total	**$12,417**
TOTAL		**$150,000.00**

ARIZONA DEPARTMENT OF TRANSPORTATION
PROGRESS PAYMENT REPORT
EXHIBIT B

Report No.			**JPA 02-175**
		PROGRESS	
Item No.		**FINAL**	
Project No.		Date Ending:	
TRACS No.	**P 6000 11P**		
Name of Project	**Mitigation of Road Design for Cactus Ferruginous Pygmy-owls**		
Name of Vendor	**Arizona Department of Fish and Game,**		
REMIT PAYMENT TO:	**Attn: Duane L. Shroufe, 2221 W. Greenway Road, Phoenix, AZ 85023**		
Date Started	Estimated Completion Date: On Going	30% Billed	% Complete

SUMMARY OF WORK FOR WHICH PAYMENT IS REQUESTED

Items	DESCRIPTION	Hours	CONTRACT NOT TO EXCEED	Previous Accumulative Amount	Current Month	Accumulative Amount
	PER JPA 02-175		$ 150,000 00			$150,000 00
						$0 00
						$0 00
						$0 00
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Submitted By *SEE ATTACHED*	Date: 10/29/2002	Total: To: Date.	$0.00
Approved By. ADOT Project Manager	Date.	Total: Previous: Report:	$0.00
Approved By:	Date:	Current. Report.	**$0.00**