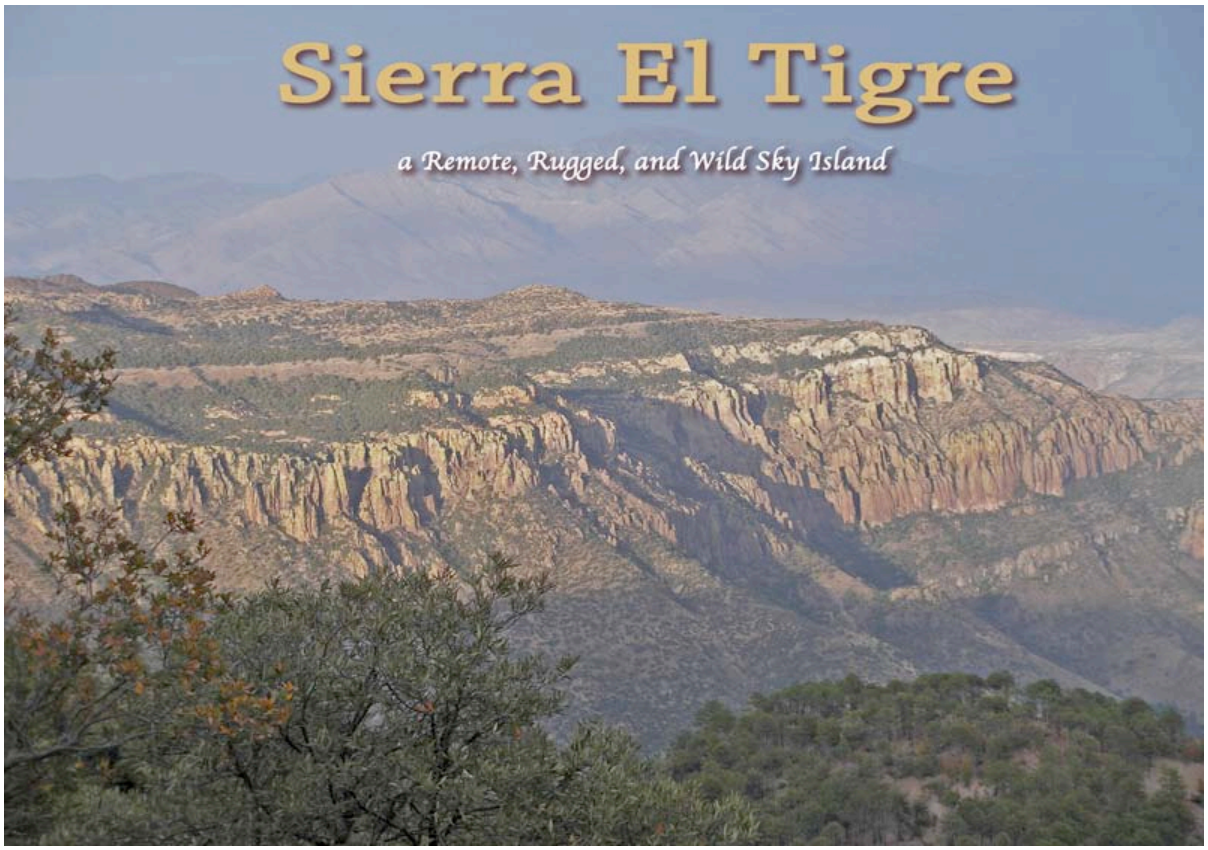

TRIP REPORT
SIERRA EL TIGRE, SONORA, MEXICO

Sergio Avila and Sky Jacobs, 2008

APRIL 28 – MAY 2, 2008

"*One of the least known regions of the north Mexican border*": S.S. White, 1948.

SKY ISLAND ALLIANCE
Protecting our Mountain Islands and Desert Seas

General

Trip crew

Francisco Tarazón: Owner of "Fracción Número III El Tigre"
Sergio Juarez: BIDA, A.C. Employee.
Matt Skroch, Sky Jacobs, Sergio Avila: Sky Island Alliance.
Robert Villa and Paul Condon (herpetofauna). Sky Island Alliance volunteers.
Rodolfo Villa
Enrique Salmo, Sr and Enrique Salmo, Jr. - Ciudad Obregón, Sonora.

Trip goal

The goal in traveling to the Sierra El Tigre - one of the most extensive of the sky islands - was to complete a basic bio-geographical assessment of the area, listing species of flora and fauna present in the Sierra El Tigre and especially "Fracción Número III Sierra El Tigre" property of Francisco Tarazón, located within the limits of the Ajos-Bavispe Reserve. We also sought to determine the extent of past and present human disturbance and impact as well as the extent of wilderness character in the range.

Introduction

The Sierra El Tigre of Northeastern Sonora is a rugged sky island mountain range. It covers substantial terrain – its basal area spreads out over 600 square miles. Surrounded by the Rio Bavispe valley on three sides, it is somewhat isolated from neighboring high country, except from the south where it is nearly a peninsula extending from the spine of the Sierra Madre Occidental (see Map 1 below). Sierra El Tigre is separated from the Sierra Madre by a low pass of rugged hills that rise to around 1200 to 1600 meters (INEGI, 1998). Sierra El Tigre's altitudinal gradient and rugged topography influence microclimates, soil types and vegetation, translating to diverse economic and cultural land use by human settlements (SEMARNAT). Historically, the Sierra El Tigre was one of the last places for Apache resisters to take refuge from a changing region. Apaches used the rugged terrain as protection from Mexican and U.S. Apache hunting parties into the 1930's.

Our group met and commenced the trip in Agua Prieta, Sonora on April 29, 2008. From Agua Prieta we drove south on highway Mex-17 to the town of Esqueda, where we last saw pavement. From Esqueda, we headed east, towards presa angostura and the Sierra El Tigre. We traveled for 8 hours from Esqueda, gaining elevation and observing the changing vegetation types (mesquital, Chihuahuan desert scrub, riparian galleries, Madrean oak and oak-pine woodlands). The drive was rough, long and demanded constant attention. Portions of the road from the mine at El Tigre to our first campsite were nearly impassable.

We established Camp 1, "Ridge Camp", at 2187 meters (see Map below) beyond the summit of Cerro El Tigre and initiated exploration hikes from that point. Camp 2 was set up at "Campo Bonito", the merging point of two drainages, where local ranchers have established the head quarters for Campo

Bonito ranch. This camp was at 1240 meters and was dominated by riparian vegetation along El Tigre wash and oak-grasslands and desert and thorn scrub in the surrounding hills. From these two points, we explored several areas, recording relevant species and photo-documenting our observations. Lists of observed plants, bird and mammal species are contained in this report.

Camp locations:

Camp 1- "Ridge Camp" – altitude 2187 meters (UTM 0673815 x 3385512)
Camp 2 - "Campo Bonito" – altitude 1240 meters (UTM 0665868 x 3383930)

Social perspective

Land ownership

Fracción Número III El Tigre, is a 2694 hectare (6657 acre) privately owned ranch purchased by Francisco Tarazón in 1976. Initially, Francisco Tarazón purchased this ranch with the interest in timber extraction; however, due to the inclusion of this ranch within the boundaries of the Ajos-Bavispe Reserve, permits for timber harvesting were cancelled (Francisco Tarazón, *pers. comm.*). Due to the remoteness, rough topography and lack of water sources, Mr. Tarazón does not exploit the ranch for the common economic activities such as cattle grazing or mining; there are no facilities built in his property. This property is registered as a 'Wildlife Managing Unit' (UMA, as defined by SEMARNAT) - UMA "El Tigre" Registration number UMA-EX-0394-SON. Current extractive activities include deer and javelina hunting in regulated seasons.

Ajos-Bavispe Reserve – "Reserva Forestal Nacional y Refugio de Fauna Silvestre"

The Ajos-Bavispe Reserve, first established in 1936 and administered by different Federal agencies during its history, had as an initial goal, the protection and management of forests, fire and regulation of timber harvests. The Ajos-Bavispe reserve has an extension of 184,908 hectares in its five fractions, 11.67% are Federal lands and 88.32% are private properties, such as Fraccion Numero III El Tigre. Due to the promoted use of timber for mining and other local industry in the mid- 1900's, some parts of the preserve were overexploited, and Sierra El Tigre contributed its share to the Pilares mine, in Nacozari de Garcia (SEMARNAT). In the 1990's, the region called Bavispe-El Tigre was defined as "Area Number 44" of priority for conservation by CONABIO, based on the presence of endemic, rare, threatened and endangered species, and ecological, hydrological and evolutionary processes (SEMARNAT).

Mining

Mina El Tigre, or its abandoned facilities, located at 1700 meter of altitude, has a long history and supported as many as 5,000 inhabitants in the early 1900's in the former town of El Tigre. Tailings, rusted machinery and run-down buildings hide in a box canyon on the western flank of the Sierra El Tigre. There are still a few houses, old buildings and inhabitants living in the area. There is a large cemetery with many dozens if not a hundred or more graves from the early to mid 1900's.

The mine itself appears to be a deep shaft mine that has since filled in. It is now an avenue for ground water to make its way to the surface. There is a substantial flow of water from the shaft of at least 15 gallons a minute making the drainage perennial for at least a kilometer below. The yellow-colored water with its strong metallic taste and smell is substantially contaminated with heavy metals; it is not considered safe to drink by the locals and has contaminated the drainage below for several kilometers. Downstream, below the mine, there is a large tailings area that is slowly disintegrating in the rain as it is washed down the drainage.

On the first part of the drive, between Esqueda and the Rio Bavispe, the road follows the bed of a dry arroyo, "Carro Quebrado", where we crossed an extensive site of flagstone extraction. Damage to the drainage and slopes appeared to be fairly limited, possibly only a few hectares. On the western side of the Rio Bavispe there is a power line that runs parallel to the River and a network of roads that was possibly built by construction crews of this facility. In general, this power line does not seem to heavily impact the area, except for the minor fragmentation from its associated network of roads. There are likely positive impacts for the local population due to the creation and maintenance of roads.

Flora and Fauna

Plant Communities

The Sierra El Tigre and surrounding valleys and foothills have an interesting mix of vegetation associations. The Chihuahuan Desert heavily influences the Bavispe valley north of Presa Angostura, but there are also Sinaloan Thorn-scrub and Sonoran Desert elements, especially as you climb higher into the foothills or on steeper slopes and hillsides. In this part of the Bavispe valley *Acacia neovernicosa* mixes on flats and low hills with *Cercidium praecox* and *Mimosa laxiflora*. The higher country of the Tigre is very Madrean with a high diversity of oak (*Quercus* spp). Pine (*Pinus* spp) forests cover a substantial area in the high country in the Sierra El Tigre. Arizona, Chihuahua, Apache pines are dominate. Mexican Piñon and Arizona White Pine also occur in their respective zones and micro-climates.

There is a substantial number of Douglas Fir (*Pseudotsuga lindleyana* or *P. menziesii var. glauca*) trees in sheltered canyons and north facing slopes. We did not encounter any White Fir (*Abies concolor subsp. concolor*) apparently collected in the Sierra El Tigre in 1940. If White Fir does exist in the Tigre it is likely limited to a very small population. The only other records in Sonora are from the Sierra Los Ajos, which has a healthy population and possibly from the Sierra San Jose (Mearns, 1907).

Both species of Madrone (*Arbutus*

xalapensis and A. Arizonica) inhabit the Tigre. Both were common in our area.

Oaks and oak woodland certainly dominate most the Sierra El Tigre. We observed 9 species, with the most interesting being *Quercus coccolobifolia, and Q. mcvaughii*. Species other than those we observed possibly exist in these vast mountains.

In the high country deciduous trees are regular in moister areas, north slopes and canyons and most commonly include Bigtooth Maple (*Acer grandidentatum*), Ash (*Fraxinus* sp), and Choke Cherry (*Prunus virginiana*). In our area there did not appear to be any Aspens (*Populus tremuloides*), but exist farther south in the range (George Ferguson, *pers. comm.*). There are a wide variety of deciduous riparian trees in the middle and lower Tigre. Huérigo (Populus brandegeei) is widespread in the Tigre's riparian areas, as well as Sycamore (*Platanus wrightii*) and AZ Black Walnut (*Juglans major*).

There appears to be very little grass in the high country of the Tigre, from our experience. Oak scrub tends to take over fire-cleared areas readily. Soil buildup is not common in these rugged and steep mountains.

Although much of Tigre is impacted by fire, pine forests remain intact and are generally healthy in our opinion. Nearly every mature pine tree is fire-scared in the Tigre's high country. Many ridges and a few steep slopes had burned heavily in recent years and were being re-vegetated by oak thickets. There is little buildup of excess flammable debris and as with many Sonoran Sky Islands, the Sierra El Tigre appears to have a healthy history of forest fire.

Pine forests of El Tigre were heavily logged last century, primarily in the 1940's and 1950's. They appear to be recovering well. We will likely never know the extent of permanent changes from logging to this ecosystem. Tree age is still somewhat young with very few old-growth or "yellow-bellies" remaining.

Logging effects were observed by Marshall in 1957: "*All that I could see had been completely logged and burned, with an all too obvious affect upon the Imperial Ivory-billed Woodpecker and Eared Trogon which might have lived on this mountain.*" – (Marshall, 1957).

The Sierra El Tigre's lower country is certain to harbor an unusually high diversity of plant species. Influences in foothills and canyons come from several bio-geographical regions, meeting in the Tigre. We did not have sufficient time to cover even the one canyon we traversed. Many subtropical plants at the northern end of their range are likely to inhabit sheltered areas in some of the numerous canyons of the Tigre, especially in their southwest portion.

Below is a list of woody trees and shrubs seen and identified. Unfortunately some species were not recorded due to occasional lack of note taking.

Family	Genus	Species	Common Name
Acanthaceae			
	Anisacanthus		
		thurberi	Desert Honeysuckle, Chuparosa
Achatocarpaceae			
	Phaulothamnus		
		spinescens	Snake Eyes
Agavaceae			
	Agave		
		palmeri	Palmer's Agave
	Hesperaloe		
		nocturna	Night Flowering Hesperaloe
	Dasylirion		
		wheeleri	Sotol
	Nolina		
		microcarpa	Beargrass
	Yucca		
		arizonica	Arizona Yucca
		schottii	Schott's Yucca
Anacardiaceae			
	Rhus		
		toxicodendron	Poison Ivy
		choriophylla	Mearn's Sumac
Asteraceae			
	Baccharis		
		sarothroides	Desert Broom
		salicifolia	Seep Willow
	Ericameria		
		laricifolia	Turpentine Bush
Berberidaceae			
	Berberis		
		freemontii or haematocarpa	Unidentified Barberry
Betulaceae			
	Alnus		
		incana subsp. oblongifolia	Arizona Alder
Bignoniaceae			
	Catalpa		
		speciosa	Non-native Catalpa
	Tecoma		
		stans	Yellow Bells
Cactaceae			
	Carnegiea		
		gigantea	Saguaro
	Cylindropuntia		
		versicolor	Staghorn Cholla
	Ferocactus		

		emoryi	Barrel Cactus
	Opuntia		
		2 unknown species	Prickly Pear
Caprifoliaceae			
	Lonicera		
		arizonica	Arizona Honeysuckle
Crossosomataceae			
	Crossosoma		
		bigelovii	Ragged Rockflower
Cupressaceae			
	Juniperus		
		monosperma	One Seed Juniper
		deppeana	Alligator Juniper
Ericaceae			
	Arctostaphylos		
		Unknown Species	Manzanita
	Arbutus		
		xalapensis	Texas Madrone
		arizonica	Arizona Madrone
Fabaceae			
	Acacia		
		greggii	Catclaw Acacia
		farnesiana	Sweet Acacia
	Coursetia		
		glandulosa	Coursetia
	Dalea		
		versicolor (likely)	
	Eysenhardtia		
		polystachya	Kidneywood
	Havardia		
		mexicana	Chino, Palo Chino
	Mimisa		
		dysocarpa	Velvetpod Mimosa
		grahmii	Graham's Mimosa
		biuncifera	Wait-a-minute Bush
		laxiflora	?
	Parkinsonia		
		praecox	Sonoran Palo Verde
	Prosopis		
		velutina	Velvet Mesquite
	Robinia		
		neomexicana	New Mexican Locust
Fagaceae			
	Quercus		
		arizonica	Arizona White Oak
		emoryi	Emory Oak
		oblongifolia	Mexican Blue Oak

		toumeyi	Toumey Oak
		coccolobifolia	
		hypoleucoides	Silverleaf Oak
		mcvaughii	
		rugosa	Netleaf Oak
		viminea	Willow-leaf Oak
Fouquieriaceae			
	Fouquieria		
		splendens	Ocotillo
		macdougalii	Tree Ocotillo
Juglandaceae			
	Juglans		
		major	Arizona Black Walnut
Moraceae			
	Morus		
		microphylla	Texas Mulberry
Oleaceae			
	Fraxinus		
		velutina	Velvet Ash
		greggii	Gregg's Ash
Pinaceae			
	Pinus		
		cembroides	Mexican Pinyon Pine
		engelmannii	Apache Pine
		leiophylla	Chihuahua Pine
		strobiformis	Southwestern White Pine
		arizonica	Arizona Pine
	Pseudotsuga		
		menziesii	Douglas Fir
Platanaceae			
	Platanus		
		wrightii	Arizona sycamore
Rhamnaceae:			
	Ceanothus		
		greggii	Desert Ceanothus
		depressus (fendleri)	Fendler's ceanothus
	Rhamnus (Frangula)		
		betulaefolia	Birchleaf Buckthorn
	Zizyphus		
		obtusifolia	Greythorn
Rosaceae			
	Prunus		
		virginiana	Wild Cherry
	Cercocarpus		
		Uncertain on Species	Mountain Mahogany
Salicaceae			
	Populus		

		brandegeei	Guerigo
		fremontii	Fremont Cottonwood
	Salix		
		bonplandiana	Bonpland Willow
		gooddingii	Goodding Willow
Sapindaceae			
	Acer		
		grandidentatum	Bigtooth Maple
	Dodonaea		
		viscosa	Hop Bush
	Sapindus		
		drummondii	Western Soapberry
Sapotaceae			
	Sideroxylon		
		occidentale	Bebelama
Simmondsiaceae			
	Simmondsia		
		chinensis	Jojoba
Ulmaceae			
	Celtis		
		reticulata	Netleaf Hackberry
		pallida	Desert Hackberry
Verbenaceae			
	Aloysia		
		wrightii	Bee Brush, Oregonillo

Birds

We were able to identify 62 species of avifauna during our 4 days and two camps in the Sierra El Tigre. Unfortunately, due to the dates of our trip, determining breeding status was often difficult. Warblers were seen in mixed flocks on several occasions and some other species were certainly in migration.

During the entirety of our trip wind was exceptionally strong making birding somewhat more difficult. We were unable to successfully survey for owls due to the wind, except at Campo Bonito, which is at a much lower elevation. In the 1950's Joe Marshall had high numbers of Flammulated Owls, as well as Whiskered Screech and Northern Pygmy Owls. Spotted Owls are certainly a possibility, if not likely, in this range.

Sharp-shinned Hawks are seldomly seen nesting in Sonora. We are uncertain if this hawk was a resident, but suspect that it is.

Below is a list of species along with approximate locations and other notes on abundance and possible breeding status.

Species	Location	Numbers Observed, Breeding Status, Notes
Black Hawk	Campo Bonito, Bavispe Crossing	Both in nesting habitat
Sharp-shinned Hawk	Ridge Camp	Resident? -- seen foraging consecutive days in same area
Turkey Vulture	Everywhere	Abundant
Elf Owl	Campo Bonito	Heard one night
Whiskered Screech-owl	Campo Bonito	Heard one night - Too windy previous days
Western Screech-owl	Campo Bonito	Heard one night
Chihuahuan Raven	Everywhere	Abundant
Wild Turkey	Ridge Camp	Common -- Calling often, Scat, and Tracks
Spotted Towhee	Ridge Camp	Common -- Calling and Singing
White-breasted Nuthatch	Ridge Camp	Common
Yellow-eyed Junco	Ridge Camp	Seen only once
Mexican Chickadee	Ridge Camp	Common
Blue-grey Gnatcatcher	Ridge Camp	Common
Bushtit	Ridge Camp	Common
White-throated Swift	Ridge Camp	Common
Canyon Wren	Ridge Camp, Campo Bonito	Common -- Singing
House Wren	Campo Bonito	Uncommon
Bewick's Wren	Ridge Camp	Abundant
Costa's Hummingbird	Campo Bonito	Seen Once
Broad-tailed Hummingbird	Ridge Camp	Common
Summer Tanager	Campo Bonito	Uncommon
Hepatic Tanager	Ridge Camp	Common -- Paired, Singing
Northern Cardinal	Campo Bonito	Common -- Singing
Black-headed Grosbeak	Ridge Camp, Campo Bonito	Uncommon
Lazuli Bunting	Ridge Camp	Uncommon -- Male and Female
Mexican Jay	Ridge Camp	Common -- On Nest
Steller's Jay	Ridge Camp	Uncommon
Ruby-crowned Kinglet	Ridge Camp	Uncommon
Brown Creeper	Ridge Camp	Uncommon
Hairy Woodpecker	Ridge Camp	Uncommon
Ladder-backed Woodpecker	Campo Bonito	Uncommon
Red-shafted Flicker	Ridge Camp	Uncommon
American Robin	Ridge Camp	Common
Western Tanager	Ridge Camp, Campo Bonito	Uncommon
Bridled Titmouse	Ridge Camp	Uncommon
Phainopepla	Campo Bonito	Common
Townsend's Solitaire	Ridge Camp	Seen only once
Curve-billed Thrasher	Campo Bonito	Seen only once

Swainson's Thrush	Ridge Camp	Uncommon
Vermillion Flycatcher	Campo Bonito	Uncommon
Northern-beardless Tyrranulet	Campo Bonito	Common
Greater Pewee	Ridge Camp	Uncommon -- Singing
Dusky-capped Flycatcher	Campo Bonito	Common
Ash-throated Flycatcher	Campo Bonito	Common
Painted Redstart	Ridge Camp	Abundant -- Singing
Olive Warbler	Ridge Camp	Common -- Singing
Grace's Warbler	Ridge Camp	Common
Wilson's Warber	Ridge Camp, Campo Bonito	Uncommon
Audubon's Warbler	Ridge Camp	Common
Townsend's Warbler	Ridge Camp	Uncommon
Hermit Warbler	Ridge Camp	Common
Plumbeous Vireo	Ridge Camp	Uncommon
Bell's Vireo	Campo Bonito, Bavispe Crossing	Common
Black-throated Grey Warber	Ridge Camp	Common
Lark Sparrow	Campo Bonito	Common
Gambel's Quail	Campo Bonito	Common
Thick-billed Kingbird	Campo Bonito	Paired, singing
Common Ground Dove	Campo Bonito	Common
White-winged Dove	Campo Bonito	Common
Mourning Dove	Campo Bonito	Uncommon
Elegant Trogon	Campo Bonito	Seen only once
Hooded Oriole	Campo Bonito	Paired, Seen once

Mammals

We searched and recorded mammal sign found along roads, trails, canyons and wherever available. Animal sign, composed mostly by tracks, scats, scratches or scrapes, kill sites and refugia is usually a fair way to register the presence of species that are difficult to see directly. In the upland areas, we found evidence of: Black bear (*Ursus americanus*), mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), White-tail deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), chipmunks (*Sciurus* spp), unknown tree squirrel (*Sciurus sp.*), possibly *Sciurus nayaritensis*, as a deceased individual of this species has been found in the Tigre since this report.

In lowland areas we found: Black bear, bobcat, mountain lion, opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), coati (*Nasua narica*), lagomorphs (*Sylvilagus* sp, *Lepus* sp.).

Species	Direct observation	Tracks	Scat	Other
Black Bear		X	X	
Mountain Lion		X	X	Scrapes
Bobcat	X		X	
Coyote			X	
Gray fox			X	
White-tail Deer		X	X	Shed Antlers
Chipmunk*	X			

Tree Squirrel sp.	X (sign)			Cone remnants
Raccoon		X		
Coati		X	X	
Rabbits and Jackrabbits	X			
Opossum		X		

*possibly Cliff Chipmunk

Reptiles and Amphibians

Cortiles willardi silus, Klauber 1949
(Chihuahuan Ridge-nosed Rattlesnake/Cascabel Nariz-surcada Chihuahua) – by Robert Villa

This subspecies of the Ridge-nosed Rattlesnake (*Crotalus willardi*) is found from the sky islands of southeastern Arizona, southwestern New Mexico, northeastern Sonora, and northwestern Chihuahua, south throughout the Sierra Madre Occidental to Durango and northwestern Zacatecas (one specimen: the first Ridge-nosed collected for science in 1897 on the famous Smithsonian Institution/US National Museum's Nelson-Goldman Expedition) (Campbell and Lamar 2004, Villa in prep). The species was described in 1905 by Meek.

Five subspecies are recognized pending further work (Barker 1992, Audio and Greene in prep). Subspeciation is thought to have occurred when the tropics receded from the northern Sierra Madre Occidental and the Madrean Evergreen Woodland and pine forests were formed in the higher elevations and isolated by drier and hotter climates at lower elevations (Harris and Simmons 1976 using Axlerod 1950).

The subspecies found in the Sierra El Tigre is *Crotalus willardi silus*. This subspecies was described by Laurence Klauber in 1949; in 1935, the first specimens of *Crotalus willardi* were collected for the Mexican state of Sonora by Berry Campbell from the University of Michigan Museum of Zoology at "above Santa Maria Mine" in the Sierra El Tigre. Attempts to verify the existence of a Santa Maria mine have not been fruitful. So far, *C. w. silus* has been collected in the northeastern portion of the Sierra El Tigre, however there might be a zone of integrade between this and the *C. w. obscurus* subspecies. As it is *C. w. silus* specimens from the Sierra El Tigre look very much like the *obscurus* subspecies, and it may turn out that specimens from the eastern sky islands may be allied to the *obscurus* subspecies, populations from the eastern sky islands may be allied to the *willardi* subspecies, and specimens from the Sierra Purica/Nacozari and the Sierra Madre Occidental may be more unique respectively. Areas of sympatry and what appears to be integradation have been observed between the *willardi* and *silus* subspecies in western sky islands that fall on the biogeographic lines of Marshall (1957).

Other species observed include *Sceloporus virgatus* (Striped Plateau Lizard), *Hyla arenicolor* (Canyon Treefrog), and at least two unknown species of *Aspidoscelis* (Whiptail).

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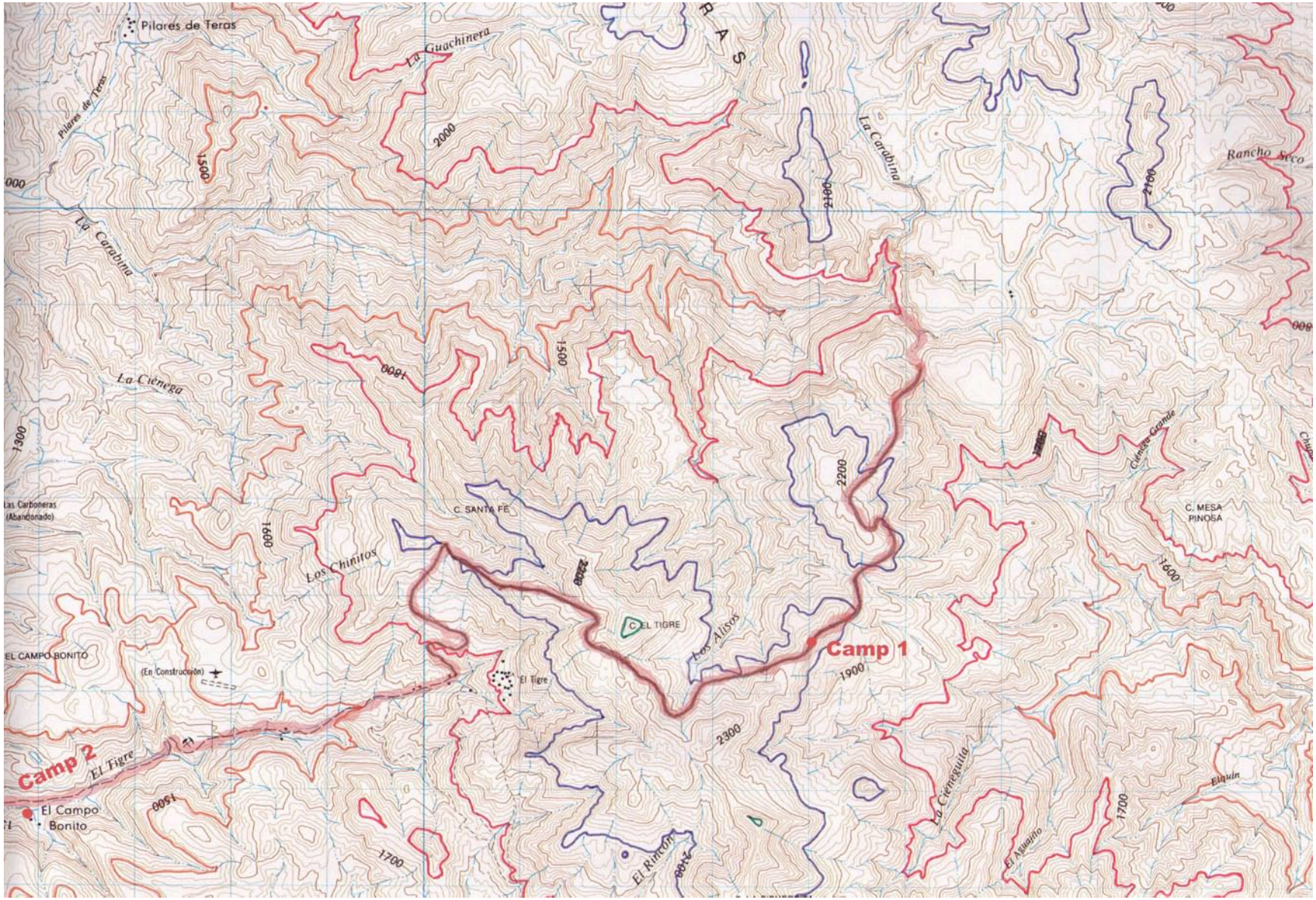

Map 2. Corridor of travel in the Sierra El Tigre
Camp 1 - April 28 – May 1
Camp 2 –May 2