AVRA VALLEY SNAKES: MARANA SURVEY REPORT FOR GROUND SNAKE (*SONORA SEMIANNULATA*)

(Final Report on Ground Snake)

29 August 2004

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Prepared for Town of Marana

Figure 1. An adult Ground Snake from Redington Pass. Photo by Young D. Cage. This phase, with red dorsal stripe pattern, is often seen in Avra Valley and Santa Cruz Flats. Photo by Y. D. Cage.

SUMMARY

We surveyed for snakes in Avra Valley and adjoining areas, including Santa Cruz Flats and Tortolita Mountains in June 2003 and February-June 2004. As previously reported, we found no Tucson Shovel-nosed Snakes (*Chionactis occipitalis klauberi*) in 2003, but one was found near Picacho in 2004, the first regional record since 1979, showing that the species is not regionally extinct, and may yet be found in Avra Valley. We have assembled 10 verifiable records of the Ground Snake (*Sonora semiannulata*) in the Tucson region for 2003-4: 1 in Oracle, 1 in Redington Pass, 1 in Ruelas Canyon, 3 at Stone Canyon, 1 at Red Rock, and 3 at Blanco Wash.

In Avra Valley, one Ground Snake was found in June 2003 at Blanco Wash and Silverbell Road, 6 miles north of a single previous (1969) record on Blanco Wash at Avra Valley Road. In 2004, we confirmed that the Ground Snake persists at Red Rock (Pinal County), is reasonably abundant at Blanco Wash in at least local areas between the two records described above, and has not been re-confirmed since 1995 in the area of Interstate Highway 10, near Marana exit. An extant population was confirmed with photo vouchers from the base of the Tortolita Mountains in Marana, from Ruelas and Stone Canyons.

The known distribution of the Ground Snake is and was (1) the productive flats on both the west and east edge of Avra Valley's central flats (but not in the central flats, which were occupied by the Western Shovel-nosed Snake), and the semi-desert grassland and upper Sonoran desertscrub in the Tortolita Mountains (but not on the bajada, which is occupied by Banded Sand Snakes). It is possible that the Ground Snake may be found in the middle of Avra Valley with further work, but we did not find it during surveys there, and there are no historic records or reliable reports for that area. The valley center was occupied by the ecologically similar Tucson Shovel-nosed Snake (and may still be, in local places), but this species may have been eliminated, and the Banded Sand Snake may have replaced it. On the bajadas and in upstream areas in Tucson, the niche for small snakes in this group was and is occupied by the ecologically similar Banded Sand Snake. The Ground Snake also occupies desert grassland areas around and on the base of the Tortolita, Rincon, and Santa Catalina mountains.

Additional surveys should be conducted for the Ground Snake as follows: (1) north and south of the known population limits (Silverbell and Avra Valley roads) near Blanco Wash, (2) between I-10 and CAP Canal from about Tangerine Road to County Line, and (3) in Marana near Sanders Road and Santa Cruz River, along field and pasture margins. Methods used (cover turning, including cover we put out on state and county land; and opportunistic road cruising) are sufficient if the survey is conducted when temperature and soil moisture conditions are ideal (September-early November after good summer rains). Soil moisture levels should be monitored properly (by observing ephemeral plant growth, and soil moisture and invertebrates under boards and other surface debris) before survey effort is expended.

Additional survey for the Tucson Shovel-nosed Snake should focus on (1) cruising a few road segments with desertscrub on both sides of the road, and (2) tracking and, if feasible, trapping, on remaining desertscrub plots $\geq$ 1 square mile near historic localities. Turning

cover may supplement these methods, but is not currently a well-established method for this species. Suitable plots for potential trapping surveys in Avra Valley are within 3 miles of Avra Valley and Sandario Road, within 2 miles of Avra Valley and Trico Road, and within 3 miles north or south of Missile Base Road and west of the CAP canal. It would take at least 3 years of intensive sampling with no snakes found to support a conclusion that the species is extirpated in Marana, and the conclusions reached for Marana would be significantly clarified by knowledge of the species' status in the Santa Cruz Flats, where we now know it persists. A number of other species characteristic of the Lower Colorado Valley desertscrub, the habitat for the shovel-nosed snake, also appear to have declined markedly in the Avra Valley and Santa Cruz Flats in recent decades.

In conjunction with this study, and its companion study on the shovel-nosed snake in the Marana region, conservation strategies and/or mitigation for both species in Marana have been developed.

INTRODUCTION

The Ground Snake (*Sonora semiannulata*, see Frost 1983; Frost and Van Devender 1979) is a small (10-14 inch long) harmless snake that may use venom to subdue its arthropod prey. It is polymorphic, meaning that within many populations there may be two distinctly different coloration types, a unicolored or red-striped phase, like that shown on the cover (Fig. 1), and a black cross-banded or saddled form in which the bands may overlie a red stripe (Fig. 2). At Red Rock, Pinal County, the population is mostly, if not entirely composed of tan-brown individuals with little or no reddish stripe, and no cross-bands, while in Avra Valley most individuals have red stripes. Juvenile Ground Snakes resemble the Southwestern Black-headed Snake (*Tantilla hobartsmithi*), and are sometimes confused with it.

Although the Ground Snake is within the same sub-group of snakes (the tribe Sonorini) as burrowing specialists like the Shovel-nosed Snakes and Banded Sand Snake, it does not have distinctive morphological features for burrowing, and looks very much like an "average" non-venomous snake in the large family Colubridae, which are the familiar snakes such as racers, gopher snakes, garter snakes, etc. In eastern Pima County, the Ground Snake lives on harder soils than the Tucson Shovel-nosed Snake, and on rocky slopes in semi-desert grassland, rather than on bajadas, sandy valley floors, and Arizona Upland Sonoran Desert canyon environments, like the Banded Sand Snake.

In our region, the Sonorini includes the Ground Snake, Western Shovel-nosed Snake (including the Tucson Shovel-nosed Snake), the Organ Pipe Shovel-Nosed Snake, the Banded Sand Snake, and the black-headed snakes. The first four species are similar in size, and tend to segregate ecologically, each associated with characteristic biotic communities and substrata (soil types). The Ground Snake is the most generalized of the four, living from Oklahoma to California in a variety of grassy environments and in desertscrub, whereas the other three are Sonoran-Mohave Desert endemics, and have relatively more specific habitat occupancy. However, the Banded Sand Snake occupies sandy valley areas, especially riparian and xeroriparian margins, canyons and desert uplands in mesquite duff (dry humus), and even rock slopes in Arizona Upland Sonoran Desertscrub. In our area, the Banded Sand

Snake is present and often abundant, and the Ground Snake is absent, in all these habitat types occupied by the Banded Sand Snake; this segregates the Ground Snake's population into two distinct, separated environments (Fig. 3). Within Arizona Upland valleys, the Ground Snake appears to be confined to hard and clayey soils unsuitable for either the Banded Sand Snake or Tucson Shovel-nosed Snake, apparently explaining the Ground Snake's absence from Tucson. In contrast, the Ground Snake has become the most conspicuous and successful urban snake in Phoenix.

Figure 2. Ground Snake color phases in eastern Pima County: cross-banded phase from Sabino Canyon (above), and patternless phase from near Red Rock (below). Photos by P. C. Rosen.

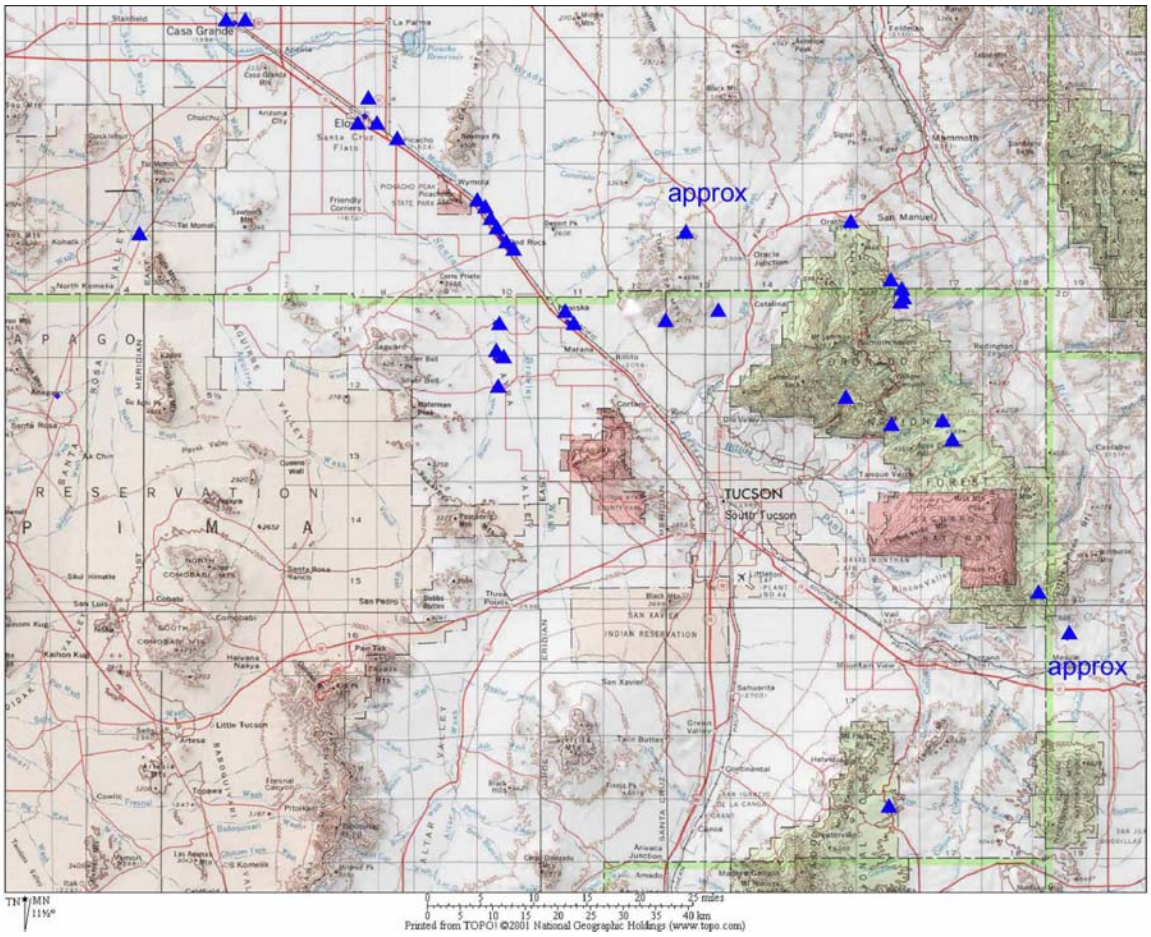

Figure 3. Distribution of Ground Snake (*Sonora semiannualta*) in eastern Pima County and adjoining areas , Arizona, based on plotable museum records, 1900-2004, and observations and reliable records obtained by the author. Records occur in two environments: valley flats (mesquite- and grass-dominated desertscrub) and lower mountain slopes (semi-desert grassland and upper edge of Arizona Upland desertscrub). Base image from TOPO! digital mapware.

The conservation status and taxonomy of the Ground Snake have not been recently treated in the published literature (white or gray), and there is considerable uncertainty about both. The species was split into a number of species and subspecies, but variation is complex and currently a single highly polymorphic species, with no subspecies, is recognized (Frost and Van Devender 1979). There is evidence of local variation in Arizona, and the color pattern phases tend to separate between mountain and valley environments, although not absolutely. This species and the Tucson Shovel-nosed Snake have been recognized as Priority Vulnerable Species in Pima County's Sonoran Desert Conservation Plan, and both are being considered as important species by the Town of Marana within a Habitat Conservation Plan under preparation.

The study area for this project is the Avra Valley and adjoining mountain slopes northwest of Tucson, Pima County, Arizona, especially near the expanding and growing town of Marana. Prior to this study, the Ground Snake was known in only two areas in the region. There was a known Ground Snake population centered at Red Rock in adjoining Pinal County, which

extended from Eloy to Marana. There was one older and one more recent record for Marana on the Tucson-Phoenix highways (old U.S. 84 and present I-10). There was also a single record for the other side of the Avra Valley on Avra Valley Road at Blanco Wash. The wider distribution of the Ground Snake regionally extends (1) in the desert – down the Gila Valley through Casa Grande, Phoenix, and Buckeye, to Yuma, and in less arid areas with Mohavean influence (thus, a Lower Colorado Valley-Mohave Desert pattern), and (2) in semi-desert grassland – on lower slopes and rolling bajadas in southeastern Arizona (associated with southern Great Plains and Chihuahuan semi-arid grassland environments). These two distinctive distributional patterns approach closely in the Marana area, but the populations are apparently separated by interceding bajadas of Arizona Upland desertscrub. There is a large gap in the distribution in the middle Santa Cruz Valley, eastern and southern Tohono O'odham Nation, and the Pinal-Pioneer Parkway region – the heart of the Arizona Upland. The ecological and geographic distribution of the Ground Snake in the Southwest is complex and not well understood.

Our objective here is to evaluate the status and distribution of the Ground Snake in the Tucson and Marana region, with recommendations for habitat conservation planning. The most threatened part of the regional distribution of this species is on the valley floor, where the species occurs in the remnants of mesquite thickets (probably originally also including grassland [McAuliffe 1997]). This habitat type (Figs. 4 and 5) may need to be protected, and incorporated within the urban development process planned for Marana, if these valley populations are to survive.

Although these environments currently are unappealing, this is largely because they have been severely degraded by woodcutting, grazing, plowing, and desiccation. Desiccation was triggered by downcutting triggered by grazing, and, more recently, by interruption of stormwater inflow channels from the bajada to the flats by the Central Arizona Project canal. Under natural conditions, these relatively water-enriched valley environments host an attractive, open to dense mesquite woodland with perennial and annual grasses, other desert trees and shrubs, and a diversity of wildflowers. Such environments could be incorporated within the urban landscaping scheme, and the Ground Snake and other native species would then be expected to survive as part of an urban wildlife community.

METHODS

This brief report is focused primarily on results from a last-minute survey conducted during late February though mid-June 2004, which was designed to take advantage of a window of opportunity created by good mid-late winter rains, and suitable soil moisture conditions. We evaluated soil moisture, and tracked rainfall, starting in early February, and recommended the survey as soon as it became evident that enough rain had fallen to stimulate activity of the snakes and their invertebrate prey. We then searched for sites with boards, rocks, concrete slabs, and other surface objects ("cover") under which snakes might be found resting and thermoregulating. Cover was turned at a time when its thermal characteristics were suitable for snakes (75-90 degF). In areas of good habitat, we added cover (approximately 75 pieces of cover at 40 sites) that may be useful in future surveys. Working with Tyler Jones, Leslie Liberti, and Mark Cochran, we modeled the expected distribution of both the Ground Snake

Figure 4. Ground Snake microhabitat (above) and habitat (below) near Red Rock, February 2003. Photos by P. C. Rosen.

Figure 5. Ground Snake microhabitat (above) and habitat (below) along Blanco Wash between Avra Valley Road and Silverbell Road, April 2004. Photos by P. C. Rosen.

and Shovel-nosed Snake in Avra Valley, and conducted road-cruising surveys at night in appropriate habitat, primarily focusing on the Ground Snake.

We examined all museum records available to us, which included those from most major U.S. museum collections for Pima, Pinal, Maricopa, and Yuma Counties. We surveyed Avra Valley from Manville Road on the south to Sasco Road at Red Rock, Pinal County, on the north, with limited work on the bajada and lower mountain canyons of the Tortolita Mountains. Adequate previous work has been done in Tucson, on the Tortolita and Silverbell bajadas to make these most unlikely areas to find the Ground Snake. We obtained new information on distribution of snakes at the base of the Tortolita Mountains from a resident in the new suburban desert community at Ruelas Canyon, and from other researchers' ongoing project on urbanization and reptile populations in Stone Canyon. Current distributional information is illustrated in Fig. 3.

We investigated the seasonal activity cycle of the Ground Snake by examining museum record collection dates. The species has been recorded from late winter through fall, with a spring peak. However, herpetological survey work has tended to under-represent winter activity, and our experience, along with the museum records interpreted in this light, indicated that February-early May and later September to November are optimal sampling times. However, sampling is likely to be fruitless after poor rainy seasons (either winter or summer), and even within the optimal months for sampling, the window of opportunity depends on moisture conditions.

RESULTS AND DISCUSSION

We made about 709 observations of 37 species of amphibians and reptiles in 2004 (see Appendix 2), including 76 snakes in 20 species. Notable observations include the 7 Ground Snakes and 1 Tucson Shovel-nosed Snake.

We made other significant herpetological findings. We found Desert Iguanas to be widespread and reasonably abundant, whereas Tree Lizards were remarkably rare (probably due to drought effects). A Long-tailed Brush Lizard, 4 Desert Iguanas, and 3 Southwestern Black-headed Snakes were found near the north tip of the Tucson Mountains, all representing extreme species range limits. We also found a new locality for the Banded Sand Snake along Santa Cruz River 2 miles southeast of Marana, and found Bullfrogs and native Sonoran Mud Turtles there in the river. In addition, a Black-headed Snake and 4 species of toads were recorded at the Santa Cruz River at downtown Tucson. However, several more Regal Horned Lizards, but no Desert Horned Lizards, were found in the Avra Valley, indicating that the latter, like the Shovel-nosed Snake, may have suffered a large population decline.

Overall, sampling was successful, but abundances of most species remained below average, and road driving for snakes yielded even lower returns than in 2003. By mid-May, soil moisture was so low that cover turning was no longer an effective sampling method.

I. Occurrence and Jurisdictional Boundaries

The distribution of the Ground Snake in and near Marana is shown in Fig. 6. It occurs or occurred in Marana along I-10 within about 1 mile of the administrative center of town (north of the I-10 Marana exit ramp). The two museum localities at this site probably represent individuals that are part of the deme centered near Red Rock, and as such, lead to an expectation that the species is or was on the silty-clayey flats between the CAP canal and the highway from near Picacho Peak south to at least Tangerine Road. However, our sampling success for all kinds of animals was low in 2004 throughout this area east of I-10, probably due to lingering drought effects. The most recent record (1995) suggests a population is probably still extant. This population may live in the mesquite along the freeway, frontage road, and railroad tracks; it may be more widespread on the flats in the region; or it may be gone.

Records from two Tortolita Mountain areas in and near Marana – Ruelas Canyon and Stone Canyon near Rancho Vistoso – along with a record from semi-desert grassland on the north side of the mountain range, and records in similar habitat in the Catalina-Rincon Mountains, represent the semi-desert grassland occurrence of the Ground Snake in eastern Pima County. The Tortolitas have a strong representation of semi-desert grassland, as well as very rich Arizona Upland desertscrub, and they are transitional in position between biotas of desertscrub, desert grassland, and woodland. The existing records and these habitat characteristics lead to the expectation that the mountain range supports a significant Ground Snake population. Next to nothing is known about the extent of its distribution or abundance in the Tortolitas, however.

Despite intensive sampling in Avra Valley during the 1950's – 1990's, only one Ground Snake record was obtained, on Avra Valley Road at or near Blanco Wash in 1969 by Tom Van Devender. In 2003, we found one at the same wash, 6 miles to the north, at Silverbell Road, and in 2004, two were found at the riparian mesquite thicket along Blanco Wash in the area between these two records. It appears likely that a more or less continuous population exists within this 6-mile long by about ½ mile wide area, and that it may also exist in adjoining neighborhoods near the Blanco Wash floodplain. The Ground Snake also may occur south of Avra Valley Road and north into the Santa Cruz Flats. Limited sampling was carried out in 2004 near the county line, and south of Avra Valley Road, but no snakes of any kind were found, and no conclusions can be drawn about the north and south limits of this narrowly distributed population segment.

II. Habitat and Geography

The picture that emerges is one of a valley center originally occupied by the Tucson Shovel-nosed Snake (now rare or absent), with sandy river- and river bottom-edge environments occupied by the Banded Sand Snake (which now appears to occupy a broader area in the valley center than formerly), with Ground Snakes found in narrow bands on each margin of the valley center flats, where bajada washes discharged water and fine sediment onto densely vegetated xeroriparian plains. This suggests that the Ground Snake should be found, or at least might originally have occurred, on the denser soils of the Brawley floodplain, which,

however, are severely degraded and interdigitate with sandier soils where the Shovel-nosed Snake was abundant. Thus, although there is reason to suspect the species may be absent on Brawley, the sampling opportunities – except for the history of road-cruising on Avra Valley Road – have been very few. Regardless, it is unlikely that this population area of the Ground Snake extends into the current boundaries of Marana.

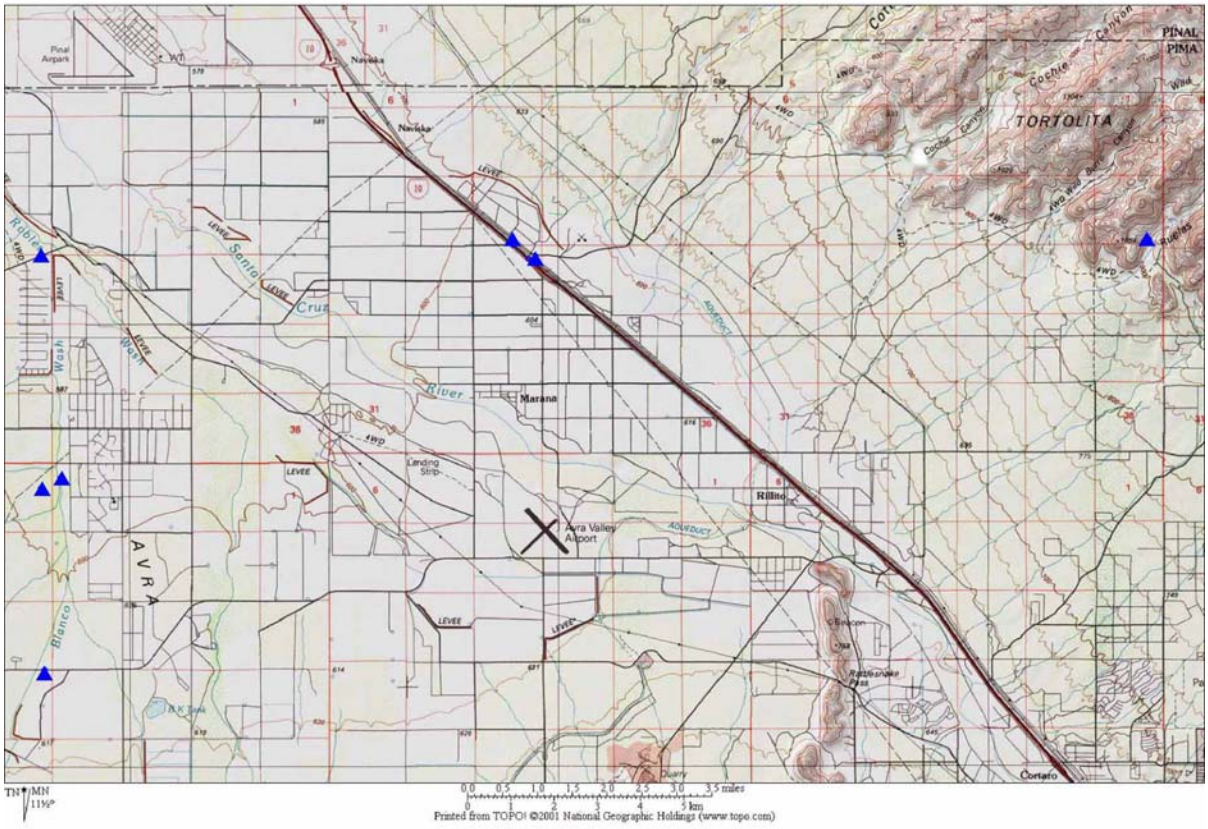

Figure 6. Known distribution of the Ground Snake in the Marana area as of June 2004. The location of the north-most record in Tortolita Mountains is in Cochie Canyon, and is not precisely given.

Suitable habitat may exist in the old Marana residential community near the Santa Cruz River south of Sanders Road. Sampling in this region in 2004 yielded 3 Common Kingsnakes, but was largely unsuccessful for snakes. Ground Snakes might occur there as a population that survived in town and along agricultural margins. Further south, on sandy soils near the Santa Cruz River, two Banded Sand Snakes, a Night Snake, and three Western Diamondbacks were found in 2004, and habitat appears unsuitable for the Ground Snake.

Based on habitat requirements and known elevational ranges, models were constructed for habitat suitability for the Ground Snake and Western Shovel-nosed Snake in eastern Pima County. The potential habitat model for the Ground Snake, with known occurrences, and arrows for key areas for further survey based on field-observed conditions, is shown in Fig. 7, and the model for the Western Shovel-nosed Snake is in Fig. 8.

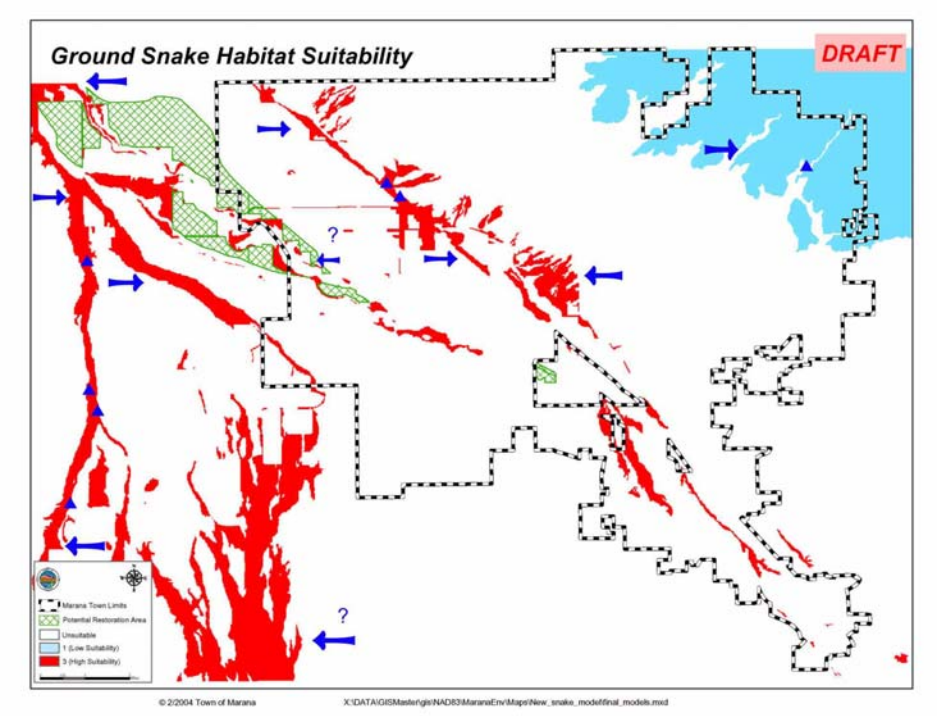

Figure 7. Habitat suitability model for the Ground Snake (*Sonora semiannulata*) in eastern Pima County, Arizona, based on soil type determined from pre-2003 records. Triangular symbols are actual records; arrows indicate possible sites for further surveys. Records to the left are on Blanco Wash; those on the right (east) are near I-10. The potentially suitable area at lower left is Brawley Wash south of Avra Valley Road; the small potential site is north of the Santa Cruz River at Sanders Road.

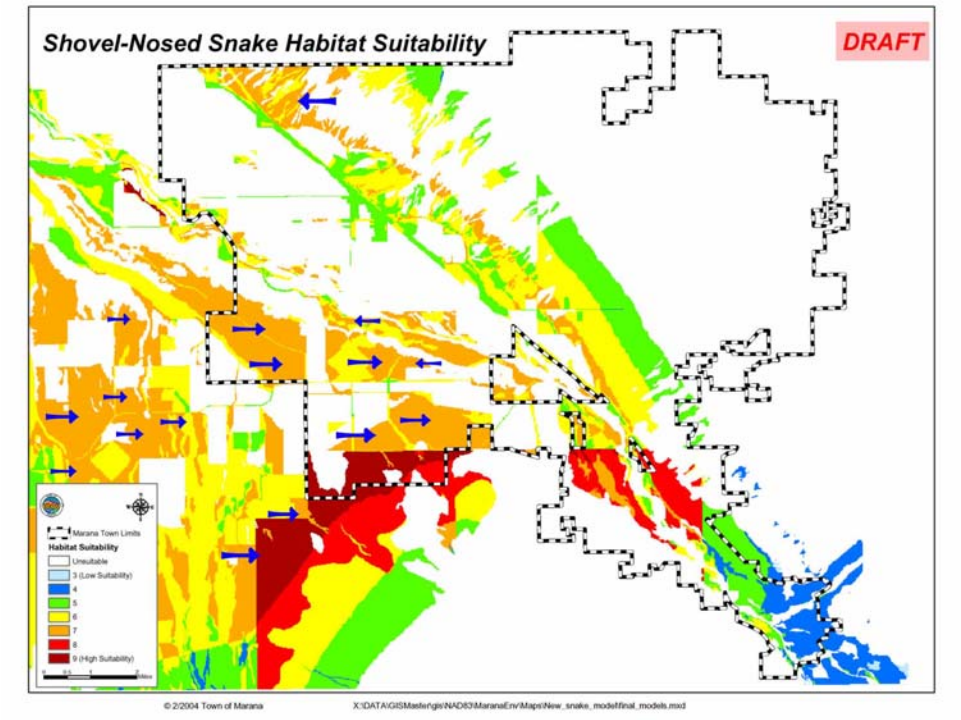

Figure 8. Habitat suitability model for the Tucson Shovel-Nosed Snake with arrows at areas identified for further survey. Other details for this species are in a companion report (Rosen 2003).

IV. Potential Conservation Areas

Based on our sampling of the snake assemblage as a whole, the best potential conservation area in Marana proper, in Avra Valley (i.e., not including on the Tortolita bajada or in Tortolita Mountains), are the sections of land west of Sanders Road and north of Avra Valley Road, along Silverbell Road to the village of Nelson (sections 5, 6, 7, and 8 in T12S, R11E).

Although this area may support the Tucson Shovel-nosed Snake, it has low likelihood for the Ground Snake, which could, however, exist on the adjoining and nearby Brawley Wash floodplain. Other areas for the Shovel-nosed Snake are indicated in Fig. 8, while areas for the Ground Snake are in Fig. 7, with a brief guide below, going from west to east.

Blanco Wash. This area supports the only definitely known valley population of the Ground Snake in eastern Pima County. We have done adequate work to confirm that the species persists and is probably reasonable abundant from Silverbell Road to about halfway south to Avra Valley Road. The wash is incised 2 m, causing the landscape to drain more rapidly than if un-incised, and thus reducing its productivity. The area is also subject to unregulated development, which, while not as damaging as planned development, may damage the land surface and cause the permanent degradation of the habitat and loss of the snake population. South of Avra Valley Road, limited sampling failed to yield any snakes, and the upper elevational limit of the valley population might be exceeded. To the north, sampling was difficult in 2004, and also unsuccessful. Blanco Wash joins the combined Brawley-Los Robles Wash near Silverbell Road, and these emerge onto the floodplain of the Santa Cruz River about ¼ mile north of Silverbell Road. The destruction wrought during 2003 at La Osa Ranch, in immediately adjoining Pinal County, may also endanger these environments and their species. At present, Blanco Wash is not included within the biological core for the Sonoran Desert Conservation Plan, but careful planning, and possible addition to this category, would be justified.

Brawley Flats. This area contains a relatively open tract of desert primarily south of Avra Valley Road. We still have had little success sampling there, and have found no Ground or Shovel-nosed Snakes. Parts of this area are included in the planned Biological Reserve of the Sonoran Desert Conservation Plan, and part of it is disturbed by down-cutting (incision), as described for Blanco Wash but with more severe effects. Extensive areas have been converted to barren adobe, or to adobe with dead or dying mesquite. The same is true north of Avra Valley Road, in the sections southeast of where the wash passes under Trico Road. Additional sampling, with establishment of cover traps, is needed on Brawley Wash, and ecological restoration may be required to enhance the area's aesthetic quality and wildlife potential.

Central Marana. The small area east of the Santa Cruz River near Sanders Road appears potentially suitable for the Ground Snake, and observations around established residential areas, and in mesquite lines adjoining fields and pastures may yield records. In 2004, our success in these areas was limited, but adequate cover exists for further sampling at appropriate seasons.

Mesquite Environments Between I-10 and CAP Canal. Although sampling was ineffective in this area in 2004, adequate habitat for the Ground Snake may occur in the mesquite along the I-10 Frontage Road, and in areas with dense, fine soils east of the railroad tracks. In Fig. 7, arrows indicate the mostly likely looking areas. To the north, along Missile Base Road, the habitat appears suitable for the Shovel-nosed Snake, and to the south of this, both species might occur.

Tortolita Mountains. There is clearly a population of the Ground Snake on the lower slopes and in lower, main canyons in the Tortolita Mountains both inside and outside of Marana. Sampling is needed is needed to determine the extent of this population: it is not know if it occurs in all major canyons, or if it occurs within the elevated interior of the mountain range.

CONCLUSIONS

The Ground Snake persists in Avra Valley on Blanco Wash, in the Santa Cruz Flats near Red Rock, and in the Tortolita Mountains in Ruelas Canyon and to the east at Stone Canyon. It may also occur near I-10 in the central part of Marana, north and south along I-10 within 10-20 miles of Red Rock, in other areas of the Tortolita Mountains, and at La Osa Ranch. The Tucson Shovel-Nosed Snake persists on the Santa Cruz Flats near Picacho, and may persist in Avra Valley, per the earlier report on this project (Rosen 2003).

Both species have declined in this region, and both could be extirpated from some or all of it as a result of planned urban expansion. The Ground Snake could be preserved by avoiding decimation of remaining populations during the construction phase, followed by measures to encourage the existence of an urban wildlife assemblage of harmless species. The Tucson Shovel-nosed Snake would probably need to be preserved in reserves of natural vegetation and undisturbed soil, although its ability to tolerate low-density housing is unknown.

Ground Snake Conservation Strategy. In Phoenix, the Ground Snake does not necessarily require native vegetation open space, although it does best in such areas or in areas with old, established vegetation with untended native or mixed native and non-native vegetation. In order to persist as part of an urban biota, it must first survive the development process and then requires relatively mesic landscaping or native mesquite and riparian habitat types. The Ground Snake may use gardens, lawns, and other landscaping, if they are not maintained in the currently usual, highly cultivated and orderly way. The best approach would be to use native species and natural vegetation structure, with an emphasis on the more mesic-adapted plant species, along with lawns and other plantings as desired. This would also maximize the presence of other desirable urban wildlife, and minimize the presence of non-natives like pigeons, starlings, and English sparrows.

The Ground Snake was originally abundant in Phoenix, whereas it is rare here, so care is needed to prevent extinction here during the expected urbanization process over the next decade or two. During development, key factors would be to avoid blading remaining mesquite areas, and to avoid blading other areas when feasible. We would need to survey

more intensively to see (a) if any are left, (b) if they are using any areas other than the I-10 mesquite woodland, and (c) if they are using anything but areas with mesquite. This would be done with cover boards, and opportunistic road-driving, etc.

Shovel-nosed Snake Conservation Strategy. First and foremost, additional survey is needed to determine if this species is present or absent in Avra Valley, in and near is historically recorded range. Using road-cruising methodology, it will not be possible to confirm that the species is extirpated without 5 or more years of organized as well as opportunistic sampling. With the use of other methods, this determination could be made sooner, perhaps in three years, assuming no Shovel-nosed Snakes are found and good seasons allow regional snake populations to flourish and sampling to be carried out effectively.

If the species is determined to persist in Avra Valley, its survival would require preserving all or most of the remaining patches of relatively undisturbed creosotebush and creosotebush-mesquite upland desertscrub. These existing patches are few and relatively small, perhaps accounting for the apparent extirpation. They could be incorporated as parks into a developing urban setting, adding to quality of life as well as preserving some of the natural heritage of the Lower Colorado Valley Sonoran desertscrub in Avra Valley.

ACKNOWLEDGEMENTS

The survey was made possible by the capable and timely survey and data management work of Robert Bezy, Kit Bezy, George Bradley, Dennis Caldwell, and Erik Enderson. Young Cage, Matt Goode, Jeff Smith, and Brent Martin provided important information about occurrence of the Ground Snake in the Tortolita Mountains. Marit Alanen, Bret Canale, Mark Cochran, Tyler Jones, Leslie Liberti, Janine McCabe, Verma Miera, and Matt Knox provided additional assistance with fieldwork, mapping, and habitat analysis. Museum records have been critical to understanding the status of snakes in Avra Valley. The following institutions deserve thanks for supplying data: by acronym, the museums are AMNH, ANSP, ASU, BYU, CAS, CM, FMNH, INHS, KU, LACM, LSU, MVZ, SDNHM, UAZ, UIMNH, UMMZ, USNM, UTEP (acronyms as in Leviton *et al.* 1985).

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Appendix I. Cover trap sites established during Spring 2004. UTM zone is 12R.

Easting	Northing	Date	Description	Elev. (ft)
478608	3587393	18-Apr-04	Cover Trap 1 , N of C.A.P., N of rd	2007
478952	3587017	18-Apr-04	Cover Trap 2 , N of C.A.P., N of rd	2003
479411	3586952	18-Apr-04	Cover Trap 3 , N of C.A.P., N of rd	2003
479862	3586817	18-Apr-04	Cover Trap 4 , N of C.A.P., N of rd	2014
480123	3587010	18-Apr-04	Cover Trap 5 , N of C.A.P., N of rd	2008
480545	3587018	18-Apr-04	Cover Trap 6 , N of C.A.P., N of rd	2021
480891	3586770	18-Apr-04	Cover Trap 7 , N of C.A.P., S of rd	2021
480831	3586460	18-Apr-04	Cover Trap 8 , N of C.A.P., S of rd	2020
481164	3586229	18-Apr-04	Cover Trap 9 , N of C.A.P., SE of rd	2034
481188	3585792	18-Apr-04	Cover Trap 10 , N of C.A.P., N (rt) of rd	2047
480758	3584935	18-Apr-04	Cover Trap 11 , N of C.A.P., W of rd, at CAP and AV Rd	2041
480841	3585255	18-Apr-04	Cover Trap 12 , N of C.A.P., NW of rd jct. (mesquite)	2054
480421	3585243	18-Apr-04	Cover Trap 13 , N of C.A.P., NE of airport T in rd	2047
480244	3585658	18-Apr-04	Cover Trap 14 , N of C.A.P., W of rd, mesquite-creosote	2040
479945	3586060	18-Apr-04	Cover Trap 15 , N of C.A.P., E of rd, behind mesquite	2042
477731	3584955	28-Apr-04	Cover Trap 16, E of Powerline Rd - Larrea	2018
477741	3584952	28-Apr-04	Cover Trap 17, E of rd - mesq	2018
477618	3584959	28-Apr-04	Cover Trap 19, W of rd - Larrea	2028
477684	3584922	28-Apr-04	Cover Trap 18, W of rd - Larrea	2018
477582	3585025	28-Apr-04	Cover Trap 21, W of rd - mesq, Larrea	2019
477644	3585104	28-Apr-04	Cover Trap 20, W of rd - mesq, Larrea	2022
477134	3585388	28-Apr-04	Cover Trap 22, W of rd - mesq, cholla	2024
476724	3585829	28-Apr-04	Cover Trap 23, E of rd - open, mesq	2019
476288	3586209	28-Apr-04	Cover Trap 24, E of rd - open	1999
475793	3586653	28-Apr-04	Cover Trap 25, E of rd - mesq	2002
475285	3587077	28-Apr-04	Cover Trap 26, E of rd - mesq	2016
475101	3587262	28-Apr-04	Cover Trap 27, E of rd - mesq	1986
474228	3587581	28-Apr-04	Cover Trap 28, W of rd - Larrea (onto 2ndary powerline rd)	1988
473677	3588048	28-Apr-04	Cover Trap 29, W of rd - Larrea	1986
473227	3588466	28-Apr-04	Cover Trap 30, E or rd - mesq-Larrea	1984
472767	3588809	28-Apr-04	Cover Trap 31, W of rd - Larrea	1978
474461	3597788	7-May-04	Cover Trap 32 S Missile Base Rd, E-mesq	1958
474732	3597609	7-May-04	Cover Trap 33 S Missile Base Rd, E-mesq-Larrea	1970
475024	3597376	7-May-04	Cover Trap 34 S Missile Base Rd, E of levee, mesq-Larrea	1985
474977	3597402	7-May-04	Cover Trap 35 S Missile Base Rd, E of levee, mesq-Larrea	1991
475032	3597399	7-May-04	Cover Trap 36 S Missile Base Rd, E of levee, mesq-Larrea	1991
475070	3597396	7-May-04	Cover Trap 37 S Missile Base Rd, E of levee, mesq-Larrea	1991
475035	3597328	7-May-04	Cover Trap 38 S Missile Base Rd, E of levee, mesq-Larrea	1991
482652	3590445	7-May-04	Cover Trap 39 S Missile Base Rd, W of levee, in Larrea	1991
471872	3600130	7-May-04	Cover Trap 40 S Missile Base Rd, W of levee, in Larrea	1991

Appendix II. Reptiles and amphibians observed in Marana region, Pima and Pinal counties, Arizona, during surveys for the Ground Snake, February 18 – June 19, 2004.

Taxon	No. Obs.	Locality	UTM-E (NAD 27)	UTM-N (NAD 27)	Date	Obs.
Arizona elegans	1	Sanders Rd 0.3 mi S of Santa Cruz River	478016	3588030	6/18/2004	GLB
Aspidoscelis sonorae	3	SCR, within bank protected zone, 1/2 mi S of St. Mary's Rd	501629	3565347	4/18/2004	PCR
Bufo alvarius	1	SCR, within bank protected zone, 1/2 mi S of St. Mary's Rd	501629	3565347	4/18/2004	PCR
Bufo cognatus	1	Picacho Blvd (Pinal Co.) 1.1 mi S of I-10	453229	3617666	5/8/2004	GLB
Bufo cognatus	1	SCR floodplain (S side) E of Sanders Rd	NA	NA	6/9/2004	PCR
Callisaurus draconoides	5	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Callisaurus draconoides	5	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Callisaurus draconoides	1	SCR levee 1 mi SE old Marana	NA	NA	4/9/2004	PCR
Callisaurus draconoides	15	Ruelas Cyn in central and lower main canyon	NA	NA	4/14/2004	PCR
Callisaurus draconoides	2	Avra Valley, W side (Blanco Wash region	NA	NA	4/16/2004	PCR
Callisaurus draconoides	1	Twin Peaks Rd 0.95 mi W Sandario	478072	3582453	4/17/2004	GLB
Callisaurus draconoides	1	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Chilomeniscus cinctus	2	Creosote bench NE Marana Airport	479646	3587084	4/18/2004	PCR
Chionactis occipitalis	1	Picacho Blvd (Pinal Co.)	NA	NA	5/24/2004	RLB
Cnemidophorus tigris	2	Marana area, 1.4 mi NNE at lowermost bajada edge	481414	3592575	4/8/2004	GLB
Cnemidophorus tigris	17	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Cnemidophorus tigris	4	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Cnemidophorus tigris	3	Tangerine Rd W of main city dump ("landfill")	481838	3587279	4/9/2004	PCR
Cnemidophorus tigris	2	Tangerine Rd well W of main city dump ("landfill")	481256	3587283	4/9/2004	PCR
Cnemidophorus tigris	1	Tangerine Rd W of Postvale Rd	480633	3587309	4/9/2004	PCR
Cnemidophorus tigris	5	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	48065	3587047	4/10/2004	PCR
Cnemidophorus tigris	1	Blue Silo outside SCR levee NW Tangerine Rd	NA	NA	4/12/2004	PCR
Cnemidophorus tigris	4	Santa Cruz riprap at Shady Lane, old Marana	478321	3588612	4/12/2004	PCR
Cnemidophorus tigris	1	Ditch thicket bet. Fields and SCR 0.1 - 0.8 mi W Sanders	477446	3588919	4/12/2004	PCR
Cnemidophorus tigris	1	Levee corners E of SCR, NW of old Marana	477029	3588939	4/12/2004	PCR
Cnemidophorus tigris	10	Elderberry thicket near Grier and Wentz Rd	NA	NA	4/12/2004	PCR
Cnemidophorus tigris	2	Camino Tres Arroyos area, E of Anway Rd	470908	3587315	4/16/2004	PCR
Cnemidophorus tigris	10	Oldfield-bosque area nr C TresArroyoes, running E fr TricoRd	NA	NA	4/16/2004	PCR
Cnemidophorus tigris	2	Blanco Wash N and W from Jaguar Lane, in bosque	NA	NA	4/16/2004	PCR
Cnemidophorus tigris	2	Blanco Wash Tr. ca. 0.9 mi S Tucker Rd	465336	3576236	4/16/2004	PCR
Cnemidophorus tigris	1	Anway Rd 3.5 mi S of Avra Valley Rd	469825	3576628	4/17/2004	GLB
Cnemidophorus tigris	20	Twin Peaks Rd 0.95 mi W Sandario	478072	3582453	4/17/2004	GLB
Cnemidophorus tigris	1	SCR, within bank protected zone, 1/2 mi S of St. Mary's Rd	501629	3565347	4/18/2004	PCR
Cnemidophorus tigris	8	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Cnemidophorus tigris	8	old homestead site, E of I-10 nr A-V Rd	487886	3585068	4/28/2004	PCR
Cnemidophorus tigris	3	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Cnemidophorus tigris	5	Hse w/ cottonwood gallery swamp nr Co. line, S Pinal Air Park	NA	NA	4/30/2004	PCR
Cnemidophorus tigris	4	Pond nr Co. line S of Pinal Air Park	470329	3595684	4/30/2004	PCR
Cnemidophorus tigris	5	ENE Marana, at Hohokam area E I10, & field-edge thicket	NA	NA	5/7/2004	PCR
Cnemidophorus tigris	3	Park Link Dr at I10 Access Rd	468482	3606020	5/7/2004	PCR
Cnemidophorus tigris	1	Field edge ca. 2 mi SE Marana, E of I10	NA	NA	5/7/2004	PCR
Coleonyx variegatus	1	Marana area, 1.4 mi NNE at lowermost bajada edge	481414	3592575	4/8/2004	GLB
Coleonyx variegatus	9	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Coleonyx variegatus	2	Tangerine Rd W of main city dump ("landfill")	481838	3587279	4/9/2004	PCR
Coleonyx variegatus	1	Tangerine Rd well W of main city dump ("landfill")	481256	3587283	4/9/2004	PCR
Coleonyx variegatus	2	Tangerine Rd W of Postvale Rd	480633	3587309	4/9/2004	PCR
Coleonyx variegatus	1	Field corner NW Sanders and SCR	NA	NA	4/9/2004	PCR
Coleonyx variegatus	2	Aguirre Ranch Rd at county line on Brawley floodplain	NA	NA	4/9/2004	PCR
Coleonyx variegatus	10	Blue Silo outside SCR levee NW Tangerine Rd	NA	NA	4/12/2004	PCR
Coleonyx variegatus	1	Santa Cruz riprap at Shady Lane, old Marana	478321	3588612	4/12/2004	PCR
Coleonyx variegatus	1	Elderberry thicket near Grier and Wentz Rd	NA	NA	4/12/2004	PCR
Coleonyx variegatus	3	Camino Tres Arroyos area, E of Anway Rd	470908	3587315	4/16/2004	PCR
Coleonyx variegatus	5	Oldfield-bosque area nr C TresArroyoes, running E fr TricoRd	NA	NA	4/16/2004	PCR

Coleonyx variegatus	1	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Coleonyx variegatus	1	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Coleonyx variegatus	1	Hse w/ cottonwood gallery swamp nr Co. line, S Pinal Air Park	NA	NA	4/30/2004	PCR
Coleonyx variegatus	1	Silverbell Rd 1 mi NW of Trico Rd	470005	3591036	5/7/2004	GLB
Coleonyx variegatus	1	Picacho Blvd (Pinal Co.) 1.1 mi S of I-10	453229	3617666	5/8/2004	GLB
Coleonyx variegatus	1	I-10 on ramp at Red Rock	469439	3603643	5/21/2004	PCR
Coleonyx variegatus	2	Sasco Rd W of I-10	NA	NA	5/25/2004	PCR
colubrid snake sp.	1	Oldfield-bosque area nr C TresArroyoes, running E fr TricoRd	469945	3585501	4/16/2004	PCR
colubrid snake sp.	6	Avra Rd 0.25 mi S of Emigh	476455	3580449	4/18/2004	GLB
Cophosaurus texanus	1	Rules Cyn at house on Cush Cyn Rd	NA	NA	4/14/2004	PCR
Crotalus atrox	2	Tangerine Rd well W of main city dump ("landfill")	481256	3587283	4/9/2004	PCR
Crotalus atrox	1	Tangerine Rd W of Postvale Rd	480633	3587309	4/9/2004	PCR
Crotalus atrox	1	Marana area, 1.4 mi NNE at lowermost bajada edge	481414	3592575	4/30/2004	GLB
Crotalus atrox	1	Field edge ca. 2 mi SE Marana, E of I10	NA	NA	5/7/2004	PCR
Crotalus atrox	1	I10 Access Rd (E side) 1.3 mi NW Marana	473733	3598190	5/24/2004	GLB
Crotalus atrox	1	I10 Access Rd (E side) 1.7 mi NW Marana	473385	3598697	5/24/2004	GLB
Crotalus cerastes	1	Avra Rd 0.4 mi S of Emigh	476455	3580187	4/18/2004	GLB
Crotalus cerastes	1	Avra Valley Rd vic. Pump Sta. Rd	465361	3581542	4/30/2004	PCR
Crotalus cerastes	1	Picacho Blvd S of I-10	453221	3616823	5/21/2004	PCR
Crotalus cerastes	1	Silverbell Rd 1.7 mi ESE Trico Rd	473886	3588227	6/8/2004	GLB
Crotalus cerastes	1	Avra Valley Rd 1.3 mi W Anway	467730	3582270	6/19/2004	GLB
Crotalus cerastes	1	Avra Valley Rd at Anway	469900	3582270	6/19/2004	GLB
Crotalus scutulatus	1	Reservation Rd, vic. Of Manville or Mile Wide	473748	3568889	4/16/2004	PCR
Crotalus scutulatus	1	Twin Peaks Rd 0.95 mi W Sandario	478072	3582453	4/17/2004	GLB
Crotalus scutulatus	1	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Crotalus scutulatus	1	Avra Rd 1.5 mi S of Emigh	476459	3578431	4/25/2004	GLB
Crotalus scutulatus	1	Picacho Blvd (Pinal Co.) 7.5 mi S of I-10	453133	3607332	5/8/2004	GLB
Crotalus scutulatus	1	Picacho Blvd (Pinal Co.) 2.3 mi S of I-10	453193	3615687	5/8/2004	GLB
Crotalus scutulatus	1	Sasco Rd 0.3 mi E I-10	468852	3603708	5/21/2004	PCR
Dipsosaurus dorsalis	4	Santa Cruz floodplain canal area NE AV Rd	487003	3584758	4/8/2004	PCR
Dipsosaurus dorsalis	1	Tangerine Rd W of main city dump ("landfill")	481838	3587279	4/9/2004	PCR
Dipsosaurus dorsalis	1	Rocket dump near Luckett area pond, near SCR bottom	475381	3590078	4/12/2004	PCR
Dipsosaurus dorsalis	1	Blanco Wash N and W from Jaguar Lane, in bosque	NA	NA	4/16/2004	PCR
Dipsosaurus dorsalis	1	El Tiro Rd 0.02 mi W Derringer Rd	468903	3587895	4/16/2004	PCR
Dipsosaurus dorsalis	1	Creosote bench NE Marana Airport	480104	3586738	4/18/2004	PCR
Dipsosaurus dorsalis	3	Creosote bench NE Marana Airport	479646	3587084	4/18/2004	PCR
Dipsosaurus dorsalis	2	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Dipsosaurus dorsalis	1	SW of Trico and Silverbell, in Larrea upland	472783	3588828	4/28/2004	PCR
Dipsosaurus dorsalis	1	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Dipsosaurus dorsalis	1	Hardin Rd ca. 1/2 mi W Trico	469963	3593575	4/30/2004	PCR
Dipsosaurus dorsalis	1	ENE Marana, at Hohokam area E I10, & field-edge thicket	479386	3593110	5/7/2004	PCR
Dipsosaurus dorsalis	1	ENE Marana, at Hohokam area E I10, & field-edge thicket	479700	3593235	5/7/2004	PCR
Dipsosaurus dorsalis	1	Naviska vic., on main E-W Rd	475761	3596767	5/7/2004	PCR
Gambelia wislizenii	1	Blanco Wash Tr. ca. 0.9 mi S Tucker Rd	465336	3576236	4/16/2004	PCR
Heloderma suspectum	1	Ruelas Cyn at Cush Cyn Rd nr main wash bridge	494893	3593228	4/14/2004	PCR
Hypsiglena torquata	1	Tangerine Rd W of main city dump ("landfill")	481838	3587279	4/9/2004	PCR
Hypsiglena torquata	1	Blanco Wash N and W from Jaguar Lane, in bosque	468381	3586440	4/16/2004	PCR
Hypsiglena torquata	1	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Hypsiglena torquata	1	Silverbell Rd 2 mi WNW Sanders	474934	3587621	6/15/2004	GLB
Hypsiglena torquata	1	Silverbell Rd 1.7 mi ESE Trico Rd	473955	3588205	6/16/2004	GLB
Hypsiglena torquata	1	Trico-El Tiro Rd jct.	471392	3588240	6/17/2004	GLB
Kinosternon sonoriense	1	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	48065	3587047	4/10/2004	PCR
Kinosternon sonoriense	2	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	480388	3587062	5/4/2004	PCR
Lampropeltis getula	1	Santa Cruz riprap at Shady Lane, old Marana	478321	3588612	4/12/2004	PCR
Lampropeltis getula	1	Levee corners E of SCR, NW of old Marana	477029	3588939	4/12/2004	PCR
Lampropeltis getula	1	Honea Pond S of SCR on floodplain at Wentz Rd alignment	476520	3588756	6/11/2004	PCR
Leptotyphlops humilis	1	Oldfield-bosque area nr C TresArroyoes, running E fr TricoRd	470183	3585492	4/16/2004	PCR
Leptotyphlops humilis	1	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Masticophis bilineatus	1	Ruelas Cyn, at spring in core of canyon	495630	3593428	4/14/2004	PCR

Masticophis flagellum	1	Ruelas Cyn, side canyon	494316	3590931	4/14/2004	PCR
Masticophis flagellum	1	Magee Rd 0.25 mi W Sandario	479207	3579229	4/16/2004	GLB
Masticophis flagellum	1	Manville Rd E of Brawley Wash	478209	3572594	4/16/2004	PCR
Masticophis flagellum	1	Anway Rd 3.5 mi S of Avra Valley Rd	469825	3576628	4/17/2004	GLB
Masticophis flagellum	1	Twin Peaks Rd 0.95 mi W Sandario	478072	3582453	4/17/2004	GLB
Masticophis flagellum	1	Twin Peaks Rd 0.8 mi W Sandario	478218	3582460	4/25/2004	GLB
Masticophis flagellum	1	I-10 Access Rd (E side), 0.2 mi SE Red Rock jct.	470196	3603193	4/30/2004	PCR
Phrynosoma solare	1	Dirt Rd nr RR, I-10 Access (E side), SE of Picacho	457301	3616802	4/30/2004	PCR
Phrynosoma solare	1	Gasline Rd W of I10, bet. Sasco and Pinal Air Park Rds.	NA	NA	5/7/2004	PCR
Phrynosoma solare	1	Missile Base Rd 0.4 mi E I-10 Access Rd	474538	3598191	5/21/2004	PCR
Phyllorhynchus browni	1	Trico Rd 1.7 mi N Avra Valley Rd	471389	3586355	6/17/2004	GLB
Phyllorhynchus decurtatus	1	Silverbell Rd 1.6 mi ESE Trico Rd	473755	3588241	6/15/2004	GLB
Phyllorhynchus decurtatus	1	Silverbell Rd 1.5 mi NW Trico Rd	469632	3591495	6/16/2004	GLB
Phyllorhynchus decurtatus	1	Silverbell Rd 2 mi NW Trico Rd	468800	3592024	6/16/2004	GLB
Phyllorhynchus decurtatus	1	Silverbell Rd 2 mi NW Trico Rd	468852	3591963	6/16/2004	GLB
Pituophis catenifer	1	At big pumps at CAP canal E of Marana Airport	480965	3585340	4/9/2004	PCR
Pituophis catenifer	1	Camino Tres Arroyos area, E of Anway Rd	470908	3587315	4/16/2004	PCR
Pituophis catenifer	1	I10 Access Rd (E side) 2 mi SE Marana	482988	3588768	4/30/2004	GLB
Pituophis catenifer	1	Silverbell Rd 0.3 mi WNW Sanders Rd	477540	3586034	5/7/2004	GLB
Rana catesbeiana	2	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	48065	3587047	4/10/2004	PCR
Rana catesbeiana	10	Pond nr Co. line S of Pinal Air Park	470329	3595684	4/30/2004	PCR
Rana catesbeiana	12	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	480388	3587062	5/4/2004	PCR
Rana catesbeiana	100	Pond NNE Park Link Dr I10 jct.	468110	3606774	5/7/2004	PCR
Rana catesbeiana	15	Park Link Dr at I10 Access Rd	468443	3605777	5/7/2004	PCR
Rana catesbeiana	35	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	480388	3587062	6/9/2004	PCR
Rana catesbeiana	50	Honea Pond S of SCR on floodplain at Wentz Rd alignment	476520	3588756	6/11/2004	PCR
Rana catesbeiana	12	Pond near Luckett and Linda, NW Marana near SCR	475204	3590519	4/12/2004	PCR
Rhinocheilus lecontei	1	Picture Rocks Rd 0.2 mi E of Sandario	479698	3576573	3/30/2004	GLB
Rhinocheilus lecontei	1	Marana area, 1.4 mi NNE at lowermost bajada edge	481414	3592575	4/8/2004	GLB
Rhinocheilus lecontei	1	Derringer Rd 0.05 mi S C. Tres Arroyos	468992	3586990	4/16/2004	PCR
Rhinocheilus lecontei	1	Avra Valley Rd W of Blanco Wash	467538	3582277	4/30/2004	PCR
Rhinocheilus lecontei	1	Silverbell Rd 1.5 mi ESE Trico Rd	473492	3588407	6/8/2004	GLB
Salvadora hexalepis	1	I10 Access Rd (E side) 0.25 mi NW Pima Co. line	475127	3596169	6/15/2004	GLB
Sceloporus magister	1	Park Link Dr. at I10 Access jct.	468411	3606031	2/18/1934	PCR
Sceloporus magister	1	Marana area, 1.4 mi NNE at lowermost bajada edge	481414	3592575	4/8/2004	GLB
Sceloporus magister	9	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Sceloporus magister	2	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Sceloporus magister	1	Tangerine Rd W of main city dump ("landfill")	481838	3587279	4/9/2004	PCR
Sceloporus magister	2	Santa Cruz riprap at Shady Lane, old Marana	NA	NA	4/9/2004	PCR
Sceloporus magister	1	Ditch thicket bet. Fields and SCR 0.1 - 0.8 mi W Sanders	NA	NA	4/9/2004	PCR
Sceloporus magister	1	Blue Silo outside SCR levee NW Tangerine Rd	NA	NA	4/12/2004	PCR
Sceloporus magister	1	Anway Rd 3.5 mi S of Avra Valley Rd	469825	3576628	4/17/2004	GLB
Sceloporus magister	1	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Sceloporus magister	1	Cover site S CAP nr (N of) A-V Rd	482538	3585217	4/30/2004	PCR
Sceloporus magister	1	Park Link Dr at I10 Access Rd	468482	3606020	5/7/2004	PCR
Sceloporus magister	1	I10 Access Rd ca. 3 mi NW Park Link jct.	NA	NA	5/7/2004	PCR
Sceloporus magister	1	Field edge ca. 2 mi SE Marana, E of I10	NA	NA	5/7/2004	PCR
Sceloporus magister	1	Honea Pond S of SCR on floodplain at Wentz Rd alignment	476520	3588756	6/11/2004	PCR
Sonora semiannulata	1	Park Link Dr. at I10 Access jct.	468411	3606031	2/18/1934	PCR
Sonora semiannulata	1	Oracle, Linda Vista area	520565	3607578	3/21/2004	GLB
Sonora semiannulata	1	Blanco Wash N and W from Jaguar Lane, in bosque	468013	3586516	4/16/2004	PCR
Sonora semiannulata	1	Stone Canyon area, Tortolita Mts.	502241	3591128	4/21/2004	Goode
Sonora semiannulata	1	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Sonora semiannulata	1	Stone Canyon area, Tortolita Mts.	499357	3592270	5/8/2004	Goode
Sonora semiannulata	1	Stone Canyon area, Tortolita Mts.	501368	3591429	5/16/2004	Goode
Tantilla hobartsmithi	1	Santa Cruz floodplain canal area NE AV Rd	487198	3584743	4/8/2004	PCR
Tantilla hobartsmithi	1	Santa Cruz floodplain canal area NE AV Rd	487213	3584759	4/8/2004	PCR
Tantilla hobartsmithi	1	Santa Cruz floodplain canal area NE AV Rd	487287	3584707	4/8/2004	PCR
Tantilla hobartsmithi	1	SCR, within bank protected zone, 1/2 mi S of St. Mary's Rd	501629	3565347	4/18/2004	PCR

Thamnophis marcianus	1	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Trimorphodon biscutatus	1	Ruelas Cyn, lower interior canyon, main wash bottom	493645	3591062	4/14/2004	PCR
Urosaurus graciosus	1	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Urosaurus ornatus	1	Rules Cyn at house on Cush Cyn Rd	NA	NA	4/14/2004	PCR
Urosaurus ornatus	1	Blanco Wash N and W from Jaguar Lane, in bosque	468333	3586468	4/16/2004	PCR
Urosaurus ornatus	1	Blanco Wash N and W from Jaguar Lane, in bosque	467927	3586424	4/16/2004	PCR
Uta stansburiana	1	Flats NE I10 and Tangerine Rd	NA	NA	2/18/1934	PCR
Uta stansburiana	1	Pima Co. line along I10 RR grade	NA	NA	2/18/1934	PCR
Uta stansburiana	8	Marana area, 1.4 mi NNE at lowermost bajada edge	481414	3592575	4/8/2004	GLB
Uta stansburiana	19	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Uta stansburiana	7	Santa Cruz floodplain canal area NE AV Rd	487111	3584710	4/8/2004	PCR
Uta stansburiana	5	Tangerine Rd W of main city dump ("landfill")	481838	3587279	4/9/2004	PCR
Uta stansburiana	3	Tangerine Rd well W of main city dump ("landfill")	481256	3587283	4/9/2004	PCR
Uta stansburiana	1	Tangerine Rd W of Postvale Rd	480633	3587309	4/9/2004	PCR
Uta stansburiana	1	Field corner NW Sanders and SCR	NA	NA	4/9/2004	PCR
Uta stansburiana	8	Aguirre Ranch Rd at county line on Brawley floodplain	NA	NA	4/9/2004	PCR
Uta stansburiana	1	SCR at Honea Diversion levee, ca. 1.5 mi SE Sanders Rd	48065	3587047	4/10/2004	PCR
Uta stansburiana	12	Blue Silo outside SCR levee NW Tangerine Rd	NA	NA	4/12/2004	PCR
Uta stansburiana	8	Santa Cruz riprap at Shady Lane, old Marana	478321	3588612	4/12/2004	PCR
Uta stansburiana	2	Levee corners E of SCR, NW of old Marana	477029	3588939	4/12/2004	PCR
Uta stansburiana	1	Elderberry thicket near Grier and Wentz Rd	NA	NA	4/12/2004	PCR
Uta stansburiana	4	Ruelas Cyn in central and lower main canyon	NA	NA	4/14/2004	PCR
Uta stansburiana	13	Oldfield-bosque area nr C TresArroyoes, running E fr TricoRd	NA	NA	4/16/2004	PCR
Uta stansburiana	2	Anway Rd 3.5 mi S of Avra Valley Rd	469825	3576628	4/17/2004	GLB
Uta stansburiana	10	Twin Peaks Rd 0.95 mi W Sandario	478072	3582453	4/17/2004	GLB
Uta stansburiana	5	Brawley Larrea and mesquite E of Trico Rd, N of Nelson	NA	NA	4/19/2004	PCR
Uta stansburiana	2	Avra Rd 1.5 mi S of Emigh	476459	3578431	4/25/2004	GLB
Uta stansburiana	3	old homestead site, E of I-10 nr A-V Rd	487886	3585068	4/28/2004	PCR
Uta stansburiana	1	Cover site S CAP nr (N of) A-V Rd	482538	3585217	4/30/2004	PCR
Uta stansburiana	5	Blanco Wash (E margin) house ruin at Jaguar Lane	468472	3586764	4/30/2004	PCR
Uta stansburiana	1	ENE Marana, at Hohokam area E I10, & field-edge thicket	NA	NA	5/7/2004	PCR
Uta stansburiana	2	Honea Pond S of SCR on floodplain at Wentz Rd alignment	476520	3588756	6/11/2004	PCR
whiptail *sp.*	3	Ruelas Cyn in central and lower main canyon	NA	NA	4/14/2004	PCR