

# AMARGOSA TOAD SURVEY SUMMARY 2009

## Nevada Department of Wildlife

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### INTRODUCTION

Amargosa toad surveys were completed during the weeks of 11 May and 15 June 2008. This is the twelfth consecutive year using the PIT marking survey methodology. The following agencies participated in this year's surveys: US Fish and Wildlife Service, Bureau of Land Management, Nevada Department of Transportation, Nevada Natural Heritage Program, Southern Nevada Water Authority and the Nevada Department of Wildlife.

### METHODS

Estimates of the population size, at each parcel group, of toads greater than 50 millimeters (mm) were made using the program MARK (Robust Design with Closed Captures model, capture (c) and recapture (p) probabilities were set equal each other and immigration (G") and emigration (G') were set equal to each other). The parcel groups were created not only to aid in data analysis efficiency, but also because of the geographic proximity of the component parcels and the fact that we have documented the movement of toads between the properties in these groups (Table 1). For more detailed descriptions of the methods that we use to conduct the survey, see the Amargosa Toad Management Plan.

Attachment 1 contains several maps showing the distribution of toads at the various survey sites.

Parcel Group	Parcels			
Harlan/Keal	Harlan/Keal	Crystal Spring	Trespass	Wild Burro Seep
Amargosa River	River north of town	River through town	River south of town	
Spicer/Mullin/Torrance	Spicer	Mullin	Torrance	
Angel's Ladies	Angel's Ladies brothel			

### RESULTS/DISCUSSION

We have now tagged 6,739 Amargosa toads in Oasis Valley. A total of 768 toads were captured this year, which is 77% more than last year. Of those, 519 toads were captured for the first time this year. The combined population estimates for all of the surveyed sites was 1623 (Figure 1). This estimate is 13.6% less than the average (1826) of the estimates from 1998 to 2008. Estimates only include toads greater than or equal to 50 millimeters (mm) in length.

Nearly 68% of the toads captured this year were new toads and almost 30% of those were greater than 80 mm. The poor weather encountered during the 2007 and 2008 surveys meant that many toads were simply not available for capture until better conditions prevailed this year.

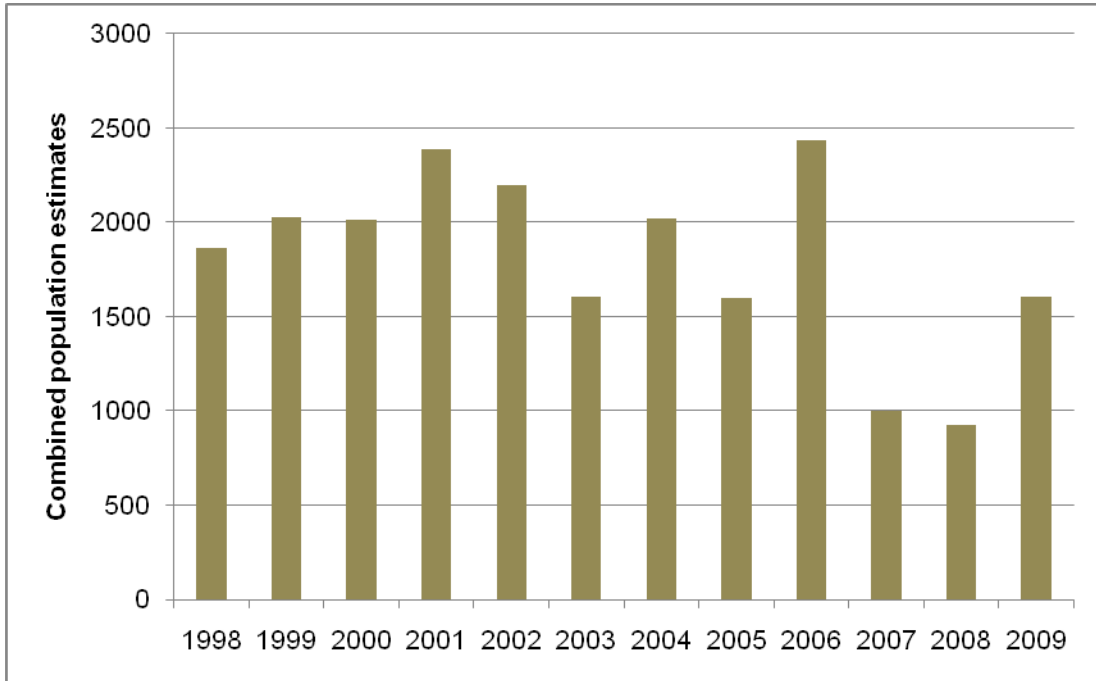


Figure 1. Combined Amargosa toad population estimates for all surveyed sites (Table 1) in Oasis Valley (for toads greater than 50 mm).

#### Harlan/Keal group

The population estimate for the Harlan/Keal parcel group was 156 (123-225, 95% confidence interval [CI]). This estimate is 22% less than the 10 year average from 1998 to 2008 (201) but was 70% larger than last year's estimate (92) (Figure 2). One hundred six toads were caught this year at Harlan/Keal.

The habitat improvements that contributed to the large population increase in 2006 are still in place and the habitat is still functioning well with several thousand tadpoles present throughout the summer. The presence of black bullhead catfish at this site may still be affecting rearing and recruitment success.

Only one toad was captured outside of the Harlan/Keal residence. This toad was captured at Wild Burro Seep and was first captured here last year.

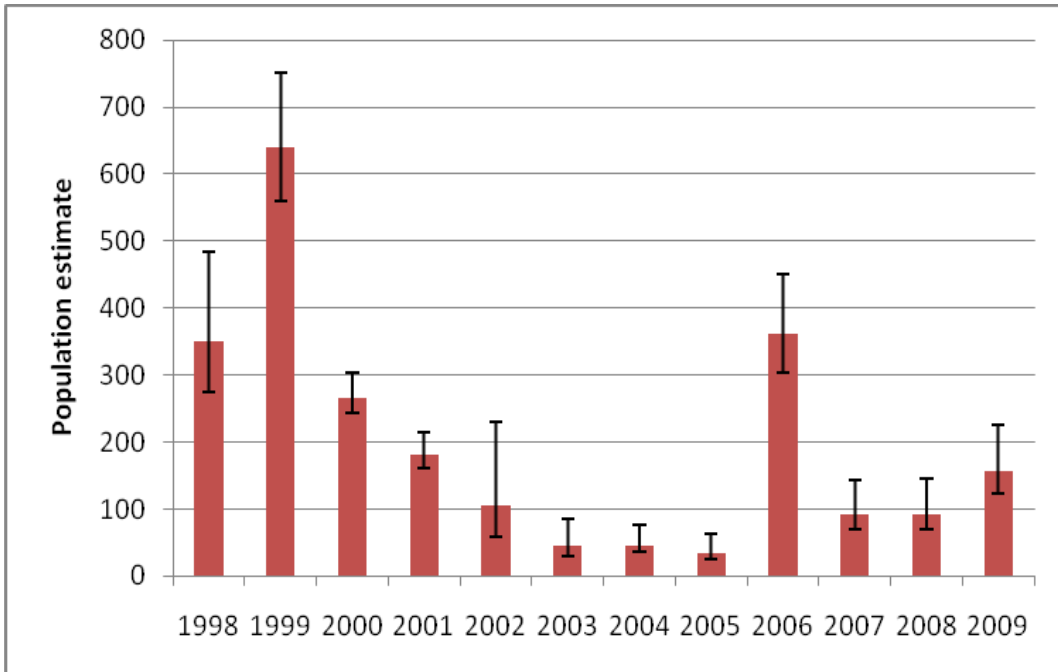


Figure 2. Amargosa toad population estimates for the Harlan/Keal Parcel Group shown in Table 1. Bars indicate 95% confidence intervals.

River group

The number of toads estimated in the Amargosa River from the Stagecoach to the Amargosa Narrows, south of the town of Beatty, was 14% lower than the 11-year average this year (1001) (Figure 3). The estimate was 460 (366-614, 95% CI) toads. This group was not the largest population in the valley and no significant changes to the habitat have occurred in the last few years which may be why we are seeing a decrease in the number of toads at this site.

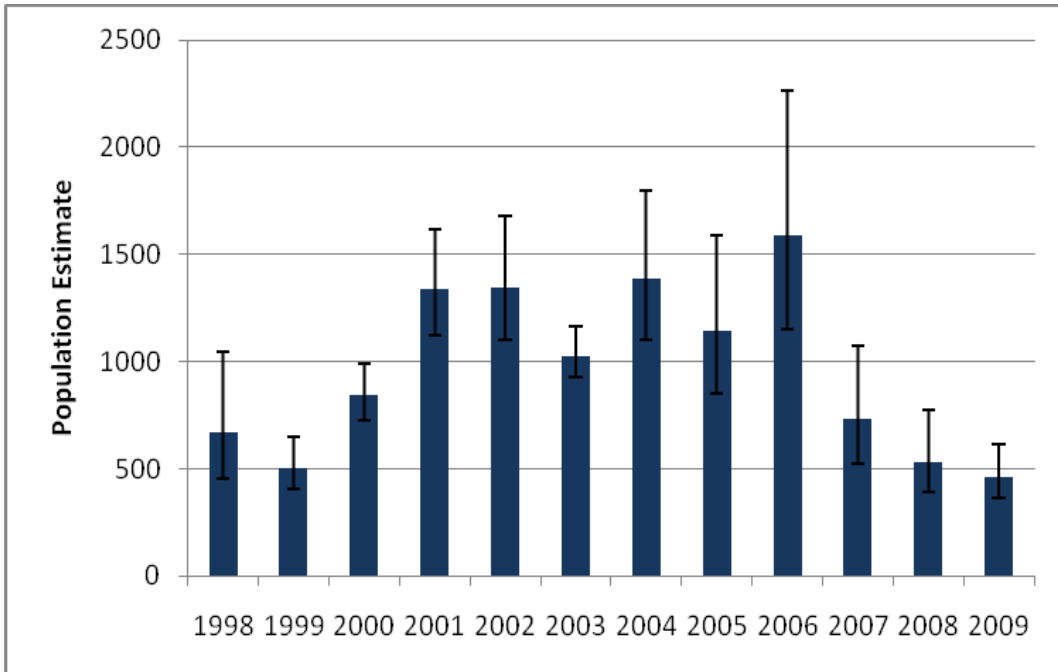


Figure 3. Amargosa toad population estimates for the Amargosa River parcels shown in Table 1. Bars indicate 95% confidence intervals.

Spicer/Mullin/Torrance group

The estimate for the Spicer/Mullin/Torrance group was 882 (717-1111, 95% CI) which was 86% higher compared to the ten-year average (473) and 548% higher than last year's estimate (136). This year's estimate was the highest estimate on record (Figure 4). The large increase is due to the greater number of toads captured at the Spicer and Mullin parcels. In 2008, 53 toads were captured at Spicer's and only 42 at Mullin's. This year 167 toads were captured at Spicer's and 137 were captured at Mullin's. Habitat conditions at both parcels have been recently modified and have favored the toads.

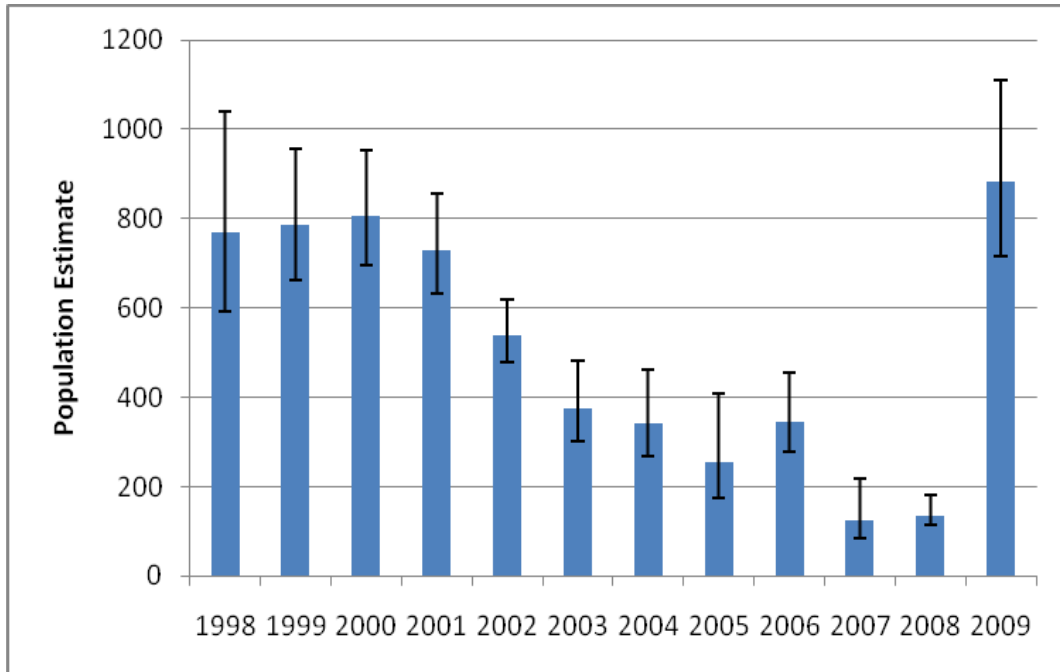


Figure 4. Amargosa toad population estimates for the Spicer, Mullin, and Torrance parcels (Table 1). Bars indicate 95% confidence intervals.

Angel's Ladies

The Angel's Ladies' toad population declined 33% this year compared to last year. This year's estimate was 108 toads (86-158, 95% CI). This estimate is 23% lower than the average from 1998 to 2008 (141). The pond south of the entrance road just east of the parking lot that was used for successful breeding from 2004 to 2006 but was dry in 2007, had water last year and this year but no evidence of reproduction.

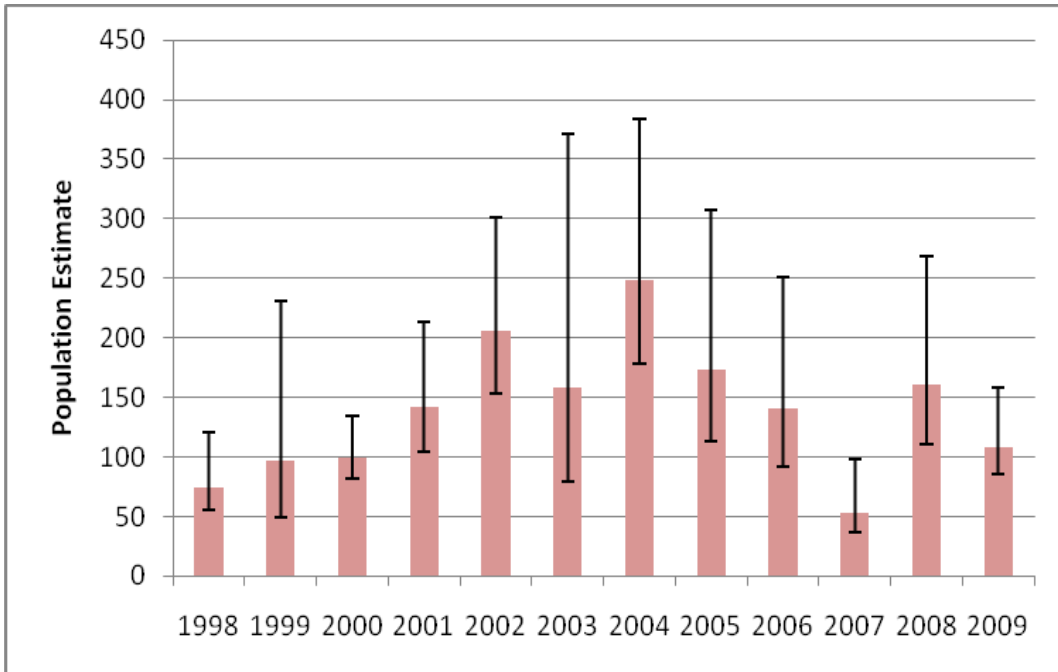


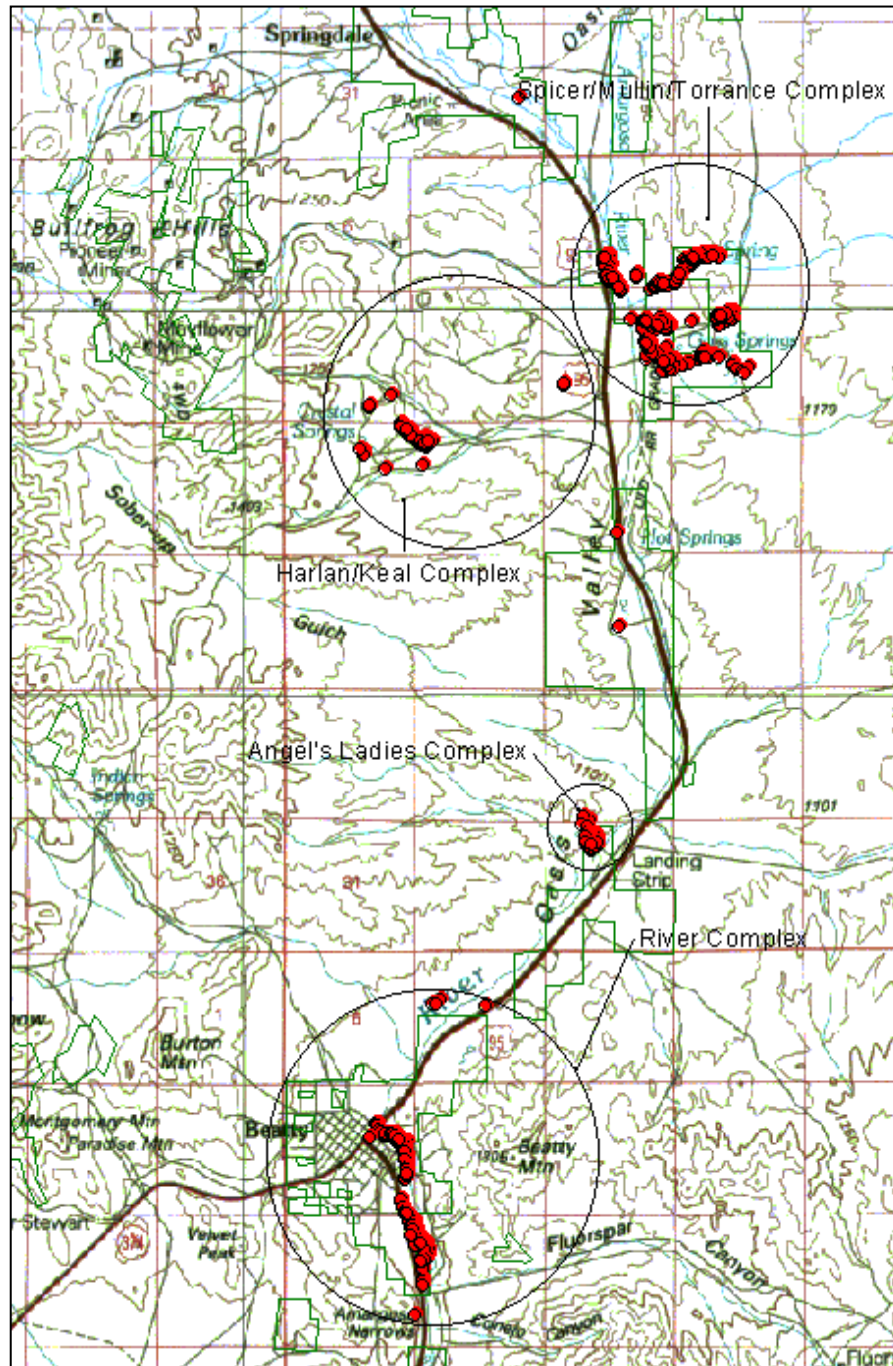
Figure 5. Amargosa toad population estimates for the Angel's Ladies parcel (Table 1). Bars indicate 95% confidence intervals.

#### DISCUSSION & RECOMMENDATIONS

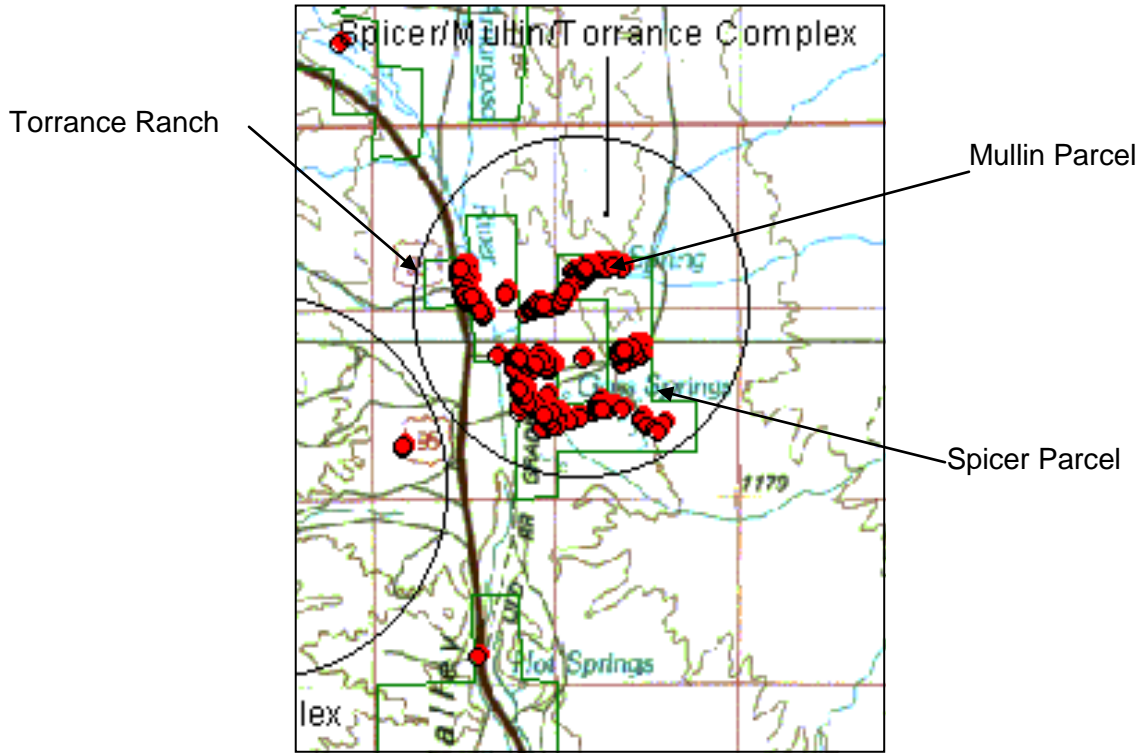
The Spicer/Mullin/Torrance group accounted for 55% of the valley-wide population estimates this year. In most years, the River group contributes the highest percentage to the valley-wide total but larger numbers of toads were captured at the Spicer and Mullin parcels this year than in the River parcels. Habitat conditions were more favorable at these two locations compared to the past several years and the toads responded well.

This indicates fairly clearly that the estimates reflect habitat conditions. Weather conditions, on the other hand, can affect catch numbers on individual nights but the effect on the estimate is likely minimal in comparison.

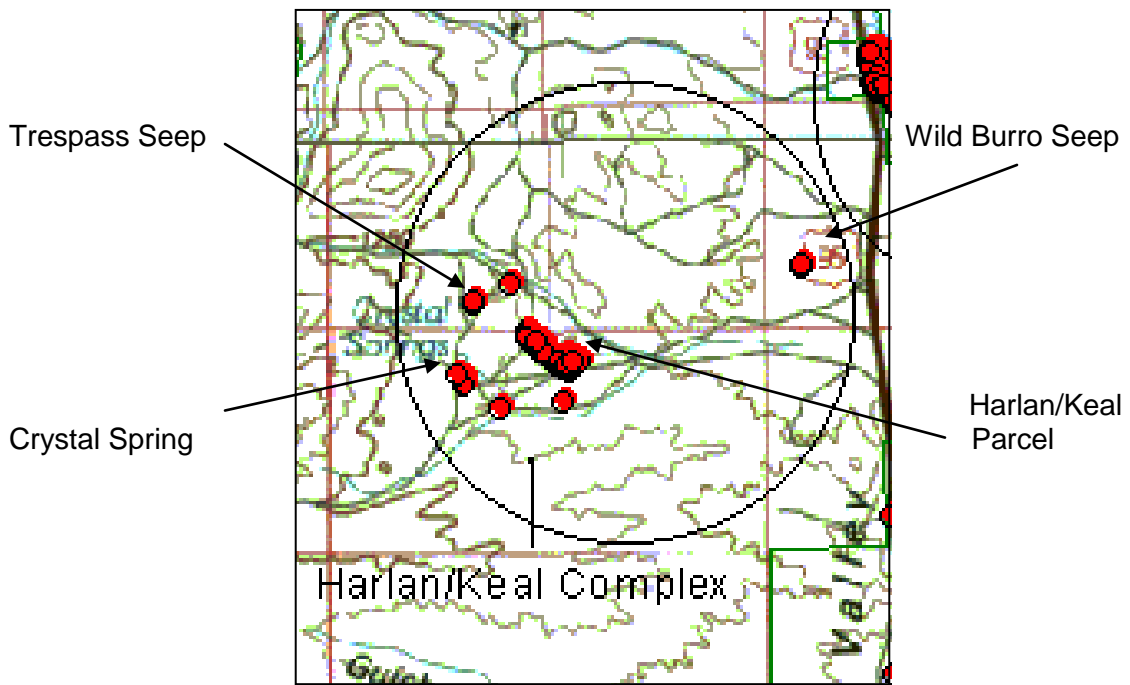
ATTACHMENT 1



Map of Oasis Valley showing all of the surveyed locations with toad capture locations in red.

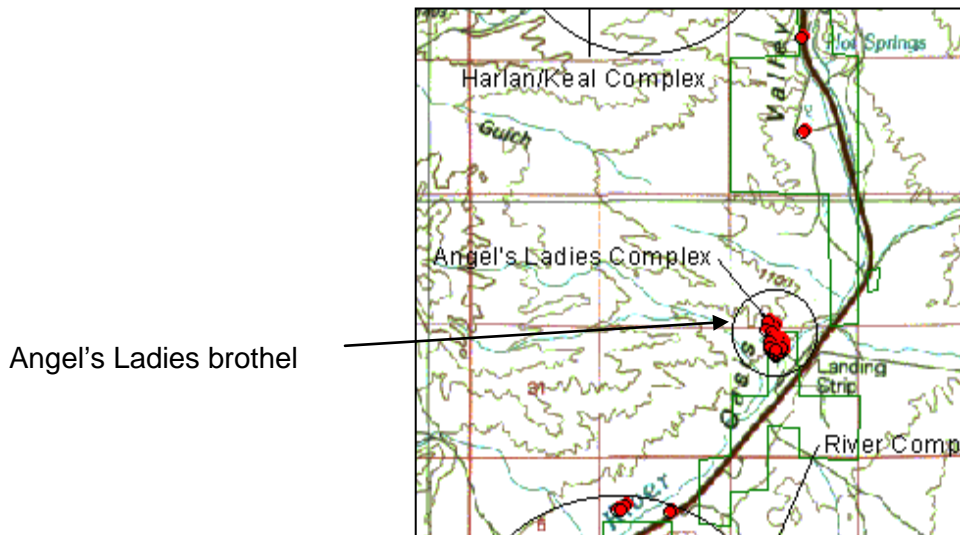


The Spicer/Mullin/Torrance parcel group showing capture locations.

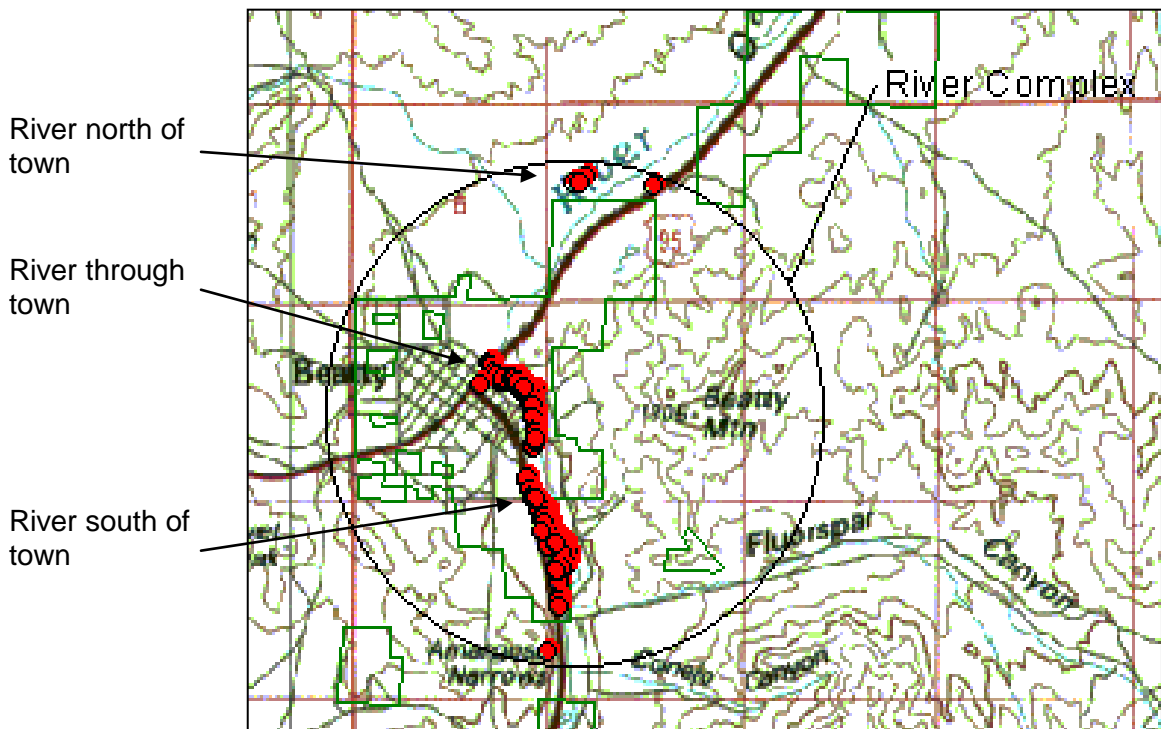


The Harlan/Keal parcel group with toad capture locations.





The Angel's Ladies property with toad capture locations.



The Amargosa River complex with toad capture locations.