

Final Report

Translocation Long-term Monitoring, Tortoise Density Evaluation, and Establishment of New LSTSs

Project Number 2003-UNR-BRRC-289-P

EXECUTIVE SUMMARY

Featured Project:

Translocation Long-term Monitoring, Tortoise Density Evaluation, and Establishment of New LSTSs

Project Type:

Monitoring, research

Species Addressed:

Desert tortoise (*Gopherus agassizii*)

Summary Project Description:

This project addresses three requirements Clark County must fulfill as part of the Desert Conservation Program. Those are:

1. The DCP proposed desert tortoise translocation into the Larger-scale Translocation Study Site (LSTS Site) to address the problem of disposition of displaced desert tortoises. The U. S. Fish and Wildlife Service (Service) required Clark County to monitor tortoise populations in the LSTS to insure that translocation does not create population threats or result in inhumane treatment of translocated or resident tortoises. This project provides that monitoring effort.
2. The Service required Clark County to experimentally evaluate the impact of tortoise density on tortoise survivorship and health and to monitor density in the LSTS to insure density does not result in decreased survivorship opr health risks to translocated or resident tortoises. This project provides this density evaluation.
3. The Bureau of Land Management and the Service required Clark County to evaluate the historical and current use of the LSTS and to evaluate the future uses and needs for additional areas into which displaced tortoises might be translocated. Clark County contracted to have an Environmental Assessment (EA) prepared for continued desert tortoise translocation. That EA was finalized in January 2005. This project provided technical and scientific assistance to the Desert Tortoise Working Group and the consultant in the evaluation of data and the production of the EA.

Project Status/Accomplishments

The LSTS and density monitoring elements of this project are an on-going requirement of the Permit. To establish LSTS population trend, monitoring must occur regularly over the duration of the Permit (30 years). In addition, the rate of translocation and distribution of translocated animals needs to be monitored. The identification of alternate translocation sites has been completed.

Partners

Phil Medica, U.S.G.S. – BRD, Las Vegas

P. Steve Corn, U.S.G.S. – BRD, Missola

Project Contact

Richard Tracy

Funding

\$162,000

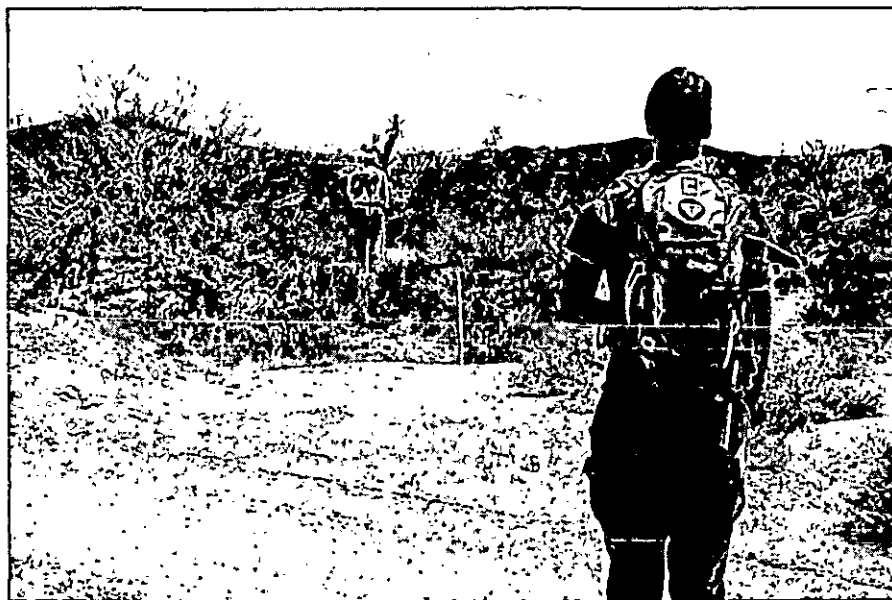
Completion Date or Status

The LSTS and density monitoring elements of this project are an on-going requirement of the Permit and will not be completed until the termination of the Permit.

Documents/Information Produced

Project Photos





INTRODUCTION

Description of Project

This project addresses three requirements Clark County must fulfill as part of the Desert Conservation Program. Those are:

4. The DCP proposed desert tortoise translocation into the Larger-scale Translocation Study Site (LSTS Site) to address the problem of disposition of displaced desert tortoises. The U. S. Fish and Wildlife Service (Service) required Clark County to monitor tortoise populations in the LSTS to insure that translocation does not create population threats or result in inhumane treatment of translocated or resident tortoises. This project provides that monitoring effort.
5. The Service required Clark County to experimentally evaluate the impact of tortoise density on tortoise survivorship and health and to monitor density in the LSTS to insure density does not result in decreased survivorship or health risks to translocated or resident tortoises. This project provides this density evaluation.
6. The Bureau of Land Management and the Service required Clark County to evaluate the historical and current use of the LSTS and to evaluate the future uses and needs for additional areas into which displaced tortoises might be translocated. Clark County contracted to have an Environmental Assessment (EA) prepared for continued desert tortoise translocation. That EA was finalized in January 2005. This project provided technical and scientific assistance to the Desert Tortoise Working Group and the consultant in the evaluation of data and the production of the EA.

Background and Need

The MSHCP states the following:

“In February of 1996, Clark County contracted with BRD and UNR to develop and implement an experimental desert tortoise translocation program. The five- to six-year program was to examine the feasibility of large-scale translocations into different habitats and the release conditions maximizing success and the long-term efficacy of translocation. The first programmatic group of tortoises was released on April 23, 1997. The translocation program has proceeded much more quickly, efficiently, and effectively than was anticipated. The 1,200 tortoises being held at the Desert Tortoise Conservation Center were translocated during the first year of the program, and by November 1, 1998 over 1,500 tortoises had been translocated into the Large-scale Translocation Study Site adjacent to Interstate 15, south of Jean, Nevada.

The translocation program has been controversial and expensive. The controversy has resulted from an overwhelming public sentiment opposed to euthanasia of displaced and surplus tortoises and a lack of options for disposition of those tortoises. The expense has resulted from the necessity of properly and humanely housing these tortoises and the cost of conducting credible research into translocation. Many experts throughout the country voiced the opinion that large-scale translocations would be unsuccessful. Many biologists and conservation experts opined that lack of evaluation through credible research made translocation an experimental option for disposition of displaced tortoises and a

conservation benefit only if scientifically validated. The USFWS allowed the programmatic translocation of tortoises by Clark County only as part of a credible scientific study.

Preliminary results indicate that more than 85 percent of the translocated tortoises are surviving. This figure is much higher than was anticipated and certainly reflects the good environmental conditions during the fall of 1997 and throughout the spring and summer of 1998. It is anticipated that translocations during dry years, and when less forage is available will result in lower survivorship. Nonetheless, these preliminary results are encouraging and refute the pessimistic predictions of many of the critics of translocation. The efficiency of the translocation program in moving a much larger number of tortoises in the first year has saved Clark County the cost of housing and maintaining these tortoises. The translocation study has resulted in a number of recommendations that will be presented to the USFWS that should streamline the handling of tortoises that, if adopted, would result in further savings. Finally, successful completion of the first phase of the translocation study should result in additional cost savings to Clark County. While a final conclusion is still premature, the Clark County Translocation Program seems to be a resounding success and will significantly expand knowledge of tortoise translocation, handling, housing, and maintenance."

The Clark County Short-Term HCP, the extension the Desert Conservation Plan and the MSHCP, and the Desert tortoise (Mojave population) Recovery Plan all identify and efficacy study and long-term monitoring of translocation as necessary. Clark County directed and funded a translocation study that demonstrated efficacy. That study was ended early in 1999. Since the initiation of the study, more than 4,000 tortoises that would otherwise have been euthanized or maintained in captivity at great expense have been given a chance to live wild in the Large-Scale Translocation Study Site. This has been one of the outstanding successes of the Clark County Desert Conservation Program. The Fish and wildlife Service has asked that Clark County identify other potential translocation sites in case the current Large-Scale Translocation Study Site(LSTS) becomes full. In addition the Fish and Wildlife Service has requested that in order for Clark County to continue translocation tortoises into the LSTS it should monitor densities in the LSTS and establish a study at the Desert Tortoise Conservation Center that might predict those densities where crowding in the LSTS may become a management concern.

In 2000, we began a study of the impacts of crowding on desert tortoises at the DTCC. The intent of the study was to identify densities at which crowding effects might negatively impact tortoises. This was done so that the number of tortoises being translocated into the LSTS will not reach levels at which such negatives impacts (if any) might occur. To date, that study has shown that after an initial period (2-4 weeks) of accommodation (spending less time pacing the fence and interacting aggressively with other tortoises) tortoises placed in pens with very high densities adjust to those higher levels with very few indications of negative impact. Under drought conditions all tortoises, regardless of pen density lose body mass. Under lush conditions all tortoises regardless of pen density gain body mass. Thus, the initial conclusions are that density dependent effects of crowding are likely to be rare.

In 2001, we, in collaboration with the Fencing Working Group, the Fish and Wildlife Service, Bureau of Land Management and other interested parties made an initial evaluation of other potential translocation sites. Several were examined and those remaining prioritized. At this time, uncertainty about pending legislation identifying public lands for disposal makes planning a second translocation site impossible. The Tortoise Working Group with the federal land managers, the FWS and all interested parties will review all prospective translocation sites. Site characterization including

biological and tortoise surveys will need to occur and necessary NEPA documents will have to be prepared.

We propose to continue monitoring tortoise densities in the LSTS. We will monitor the survival, movement, ELISA, and health status of the translocation experimental populations at Lake Mead, Bird Springs Valley, and the LSTS. We will meet with the Fish and wildlife Service to review the density study results to develop a efficacious and economical density monitoring trigger a biological parameter that predicts a maximum possible tortoise density in the LSTS. We will assist in the development of the necessary NEPA documents for permitting a new translocation site when pending legislation allows identification of that site.

Management Actions Addressed

Research on Monitoring a Covered Species

Goals and Objectives

METHODS AND MATERIALS

Field aspects of tortoise density monitoring in the LSTS is initiated in the early spring and continues for approximately 2-3 months. The sampling techniques currently followed are those discussed at the "Monitoring Workshop" held in Laughlin, NV in November 1996, and a variety of subsequent meetings including the most recent MOG-TAC meeting December 11, 2000. Transect surveys have consisted of lines 1600 m. or 3200 m. in length arranged in squares. As a result of evaluation of past monitoring efforts this year, transects will be 4000 m long (final protocol and techniques are continuing to be refined by us and approve by the Desert Tortoise Coordinator). The location of the transect start points within the DWMA's has been determined randomly. Currently, we are measuring encounter rates in all of the proposed Desert Wildlife Management Areas (DWMA) in Nevada. It is necessary to estimate encounter rates in order to plan the monitoring effort in each DWMA necessary to obtain an adequate sample size to statistically estimate density

Tortoise observers navigate to the start points from the nearest road using Global Positioning System (GPS) instruments. At the start point a 100 m. tape will be stretched along the ground and a 2-person team will thoroughly search along the tape. Tortoise encountered will be weighed, measured, have sex determined, have health assessed and location recorded. The stretching and searching of the line will continue until the transect length has been completed.

While the transect teams search for tortoises an additional 1, or 2-person, team will monitor radio transmitter equipped tortoises, "focal animals" to determine tortoise activity. This value allows the density estimate to be calibrated for variations in tortoise activity levels. A sample of approximately 10-20 tortoises will be equipped and monitored in each of the DWMA's.

To calibrate the transect sampling technique, we observe behavior of focal animals. Each focal animal team consists of a technician or graduate student and one Student Conservation Association volunteer. These individuals work closely together each day using two radio receivers to document tortoise activity.

For a detailed description of tortoise monitoring procedures see Appendix 1 Handbook for Monitoring Desert Tortoise Populations Using Line Distance Sampling Technique

RESULTS

The Fish and wildlife Service has asked that Clark County identify other potential translocation sites in case the current Large-Scale Translocation Study Site (LSTS) becomes full. In addition the Fish and Wildlife Service has requested that for Clark County to continue translocation tortoises into the LSTS, it should monitor densities in the LSTS and establish a study at the Desert Tortoise Conservation Center that might predict those densities where crowding in the LSTS may become a management concern. In 2000-2002, we conducted a study of the impacts of crowding on desert tortoises at the DTCC. The intent of the study was to identify densities at which crowding effects might negatively impact tortoises. This was done so that the number of tortoises being translocated into the LSTS will not reach levels at which such negatives impacts (if any) might occur. To date, that study has shown that after an initial period (2-4 weeks) of accommodation (spending less time pacing the fence and interacting aggressively with other tortoises) tortoises placed in pens with very high densities adjust to those higher levels with very few indications of negative impact. Under drought conditions all tortoises, regardless of pen density lose body mass. Under lush conditions all tortoises regardless of pen density gain body mass. Thus, the initial conclusions are that density-dependent effects of crowding are likely to be rare.

In 2001, we, in collaboration with the Fencing Working Group, the Fish and Wildlife Service, Bureau of Land Management and other interested parties made an initial evaluation of other potential translocation sites. Several were examined and those remaining prioritized. At this time, uncertainty about pending legislation identifying public lands for disposal makes planning a second translocation site impossible. The Tortoise Working Group with the federal land managers, the FWS and all interested parties will review all prospective translocation sites. Site characterization including biological and tortoise surveys will need to occur and necessary NEPA documents will have to be prepared.

In project 289, we continued to monitor tortoise densities in the LSTS. The data from that monitoring is somewhat baffling unless put into the perspective of density data in other parts of Clark County. Specifically, it appears that, in spite of translocating more than 6000 tortoises to the LSTS (perhaps half of those being large enough to be discovered during monitoring – i.e., larger than 180mm carapace length; Table 1), the total number of tortoises in the LSTS is estimated to be the same as it was before translocation began (Table 2, Fig. 1). How can this happen? How can 6000 tortoises be added to the LSTS and not increase the total number of tortoises in the plot? Actually, the number of dead tortoises increased in the LSTS over time, so the increases from translocation were offset by the losses due to tortoises dying (Table 3, Fig. 2).

Table 1 - Disposition of tortoises picked up from by Clark County.

Current as of June 2006		# of Tortoises
Incoming		
Total Collected		14206
Outgoing		
Total transferred to research, adoption, etc.		2688
Translocated as part of experiments		105
Translocated to LSTS		6115
Died at DTCC from URTD		24
Died at DTCC for any other reason		1171
Lost at the DTCC		310
Euthanized because ELISA Positive		2830
Total Euthanized by Clark County		302
Total currently held at DTCC		1131

Table 2 - Sampling effort and estimated density and abundance of adult tortoises (MCL!180mm) in the 103.8 km² LSTS. Sampling in 1996 was conducted using a 2-pass hectare plot technique; 1999–2005 estimates were made using line-distance transects.

Year	Transects	Length (km)	N (adults)	Encounter Rate	Density (SE)	N-hat (SE)	95% CI
1996	60*	–	35	–	15.2 (2.26)	1449 (215)	1018 – 1880
1999	10	90	38	0.422	23.9 (4.14)	2485 (430)	1731 – 3567
2000	32	288	48	0.167	15.1 (3.87)	1563 (402)	943 – 2590
2001	62	77.3	19	0.246	16.0 (4.22)	1659 (438)	987 – 2786
2002	52	176.6	21	0.119	9.8 (2.15)	1015 (224)	656 – 1570
2003	47	156.7	47	0.3	16.6 (2.79)	1723 (290)	1231 – 2411
2004	17	158.1	19	0.12	9.1 (2.66)	941 (276)	512 – 1728
2005	37	364.2	50	0.137	13.3 (2.18)	1376 (226)	989 – 1915

*60 groups of 4 hectare plots; no line transects. Density and abundance adjusted for detection probability after 2 passes on each plot (0.957).

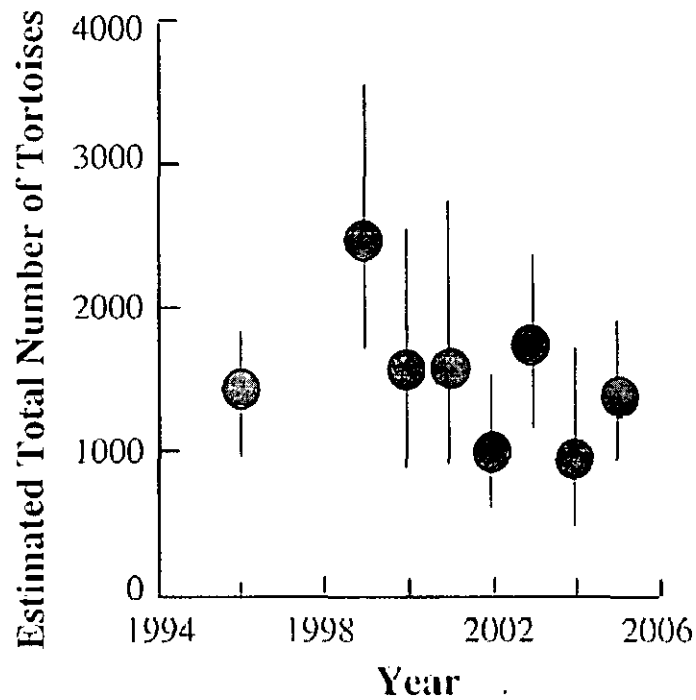


Figure 1 - Estimated numbers of adult tortoises (with 95% confidence intervals) occurring within the boundary of the LSTS.

Table 3. Inventory of living and dead tortoises in the LSTS during the history of the translocation program.

Year	Live Tortoises	Intact Carcasses	Broken and/or scattered Shell	Intact Carcass/ Live Tortoise
1999	53	12	14	0.226
2000	27	6	12	0.222
2001	21	8	7	0.381
2002	26(4)	27(15)	34(4)	1.038
2003	63(18)	49(9)	44(1)	0.778
2004	30(9)	22(7)	6	0.733
2005	63(14)	62(8)	26	0.983

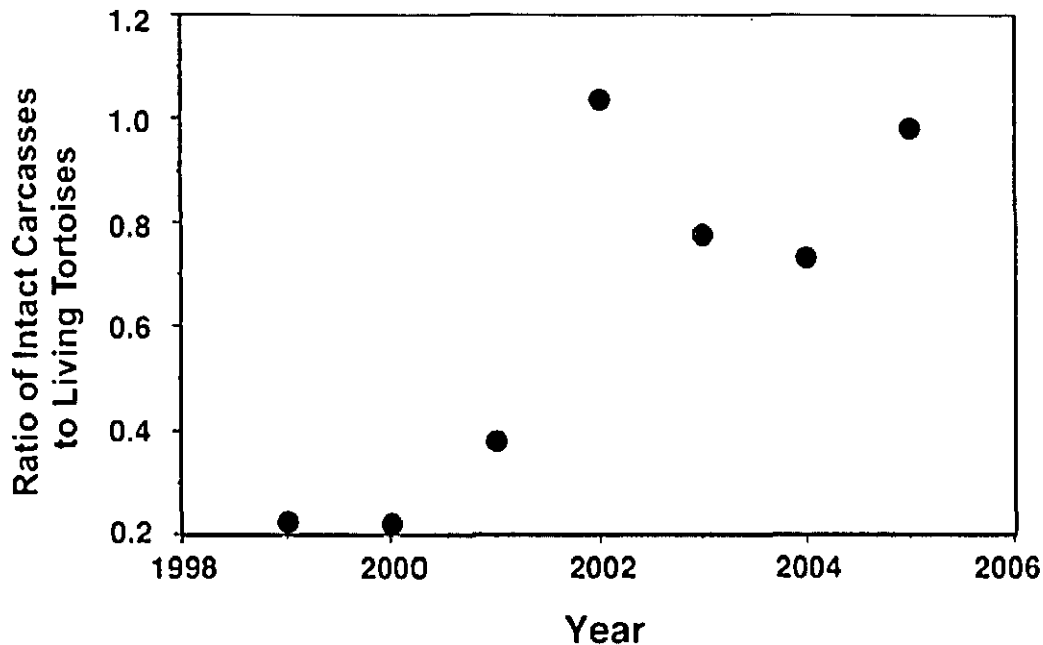


Fig. 2 - Ratio of intact carcasses to living tortoises in the LSTS during the translocation program in Clark County.

EVALUATION/DISCUSSION OF RESULTS

Understanding these population dynamics requires calibration to nearby areas without translocation as a "treatment" (a control site). Thus, we can compare to data from Piute Valley (Fig. 3). In Piute Valley, populations declined by approximately 80%. How can the Piute population be declining after Clark County retired cattle grazing, fenced some roads, paid law enforcement to enforce littering laws, and discussed road closures? In other words, this is one of the populations with the fewest threats to persistence, and yet it has crashed to low levels. The answer may be that the population has crashed due to drought. The Palmer's drought index (Fig. 3) shows that population crashes appear to correlate with a period of persistent drought, and it seems likely that the population crashes at Piute Valley are due to the well-established negative effects drought can have on population dynamics of tortoise. The dynamics in Piute Valley may also explain the results in the LSTS. Specifically, the population in LSTS would likely have declined as did the population in Piute Valley had not the LSTS been supplemented with translocated tortoises. If this is the case, it is a very important observation. In particular, this result predicts that supplementing populations with translocated tortoises can serve to mitigate losses in a diminished or crashing population. There may be circumstances in which we need to use translocation as a conservation strategy, and this experiment provides evidence that translocation can be used to reverse declines in populations.

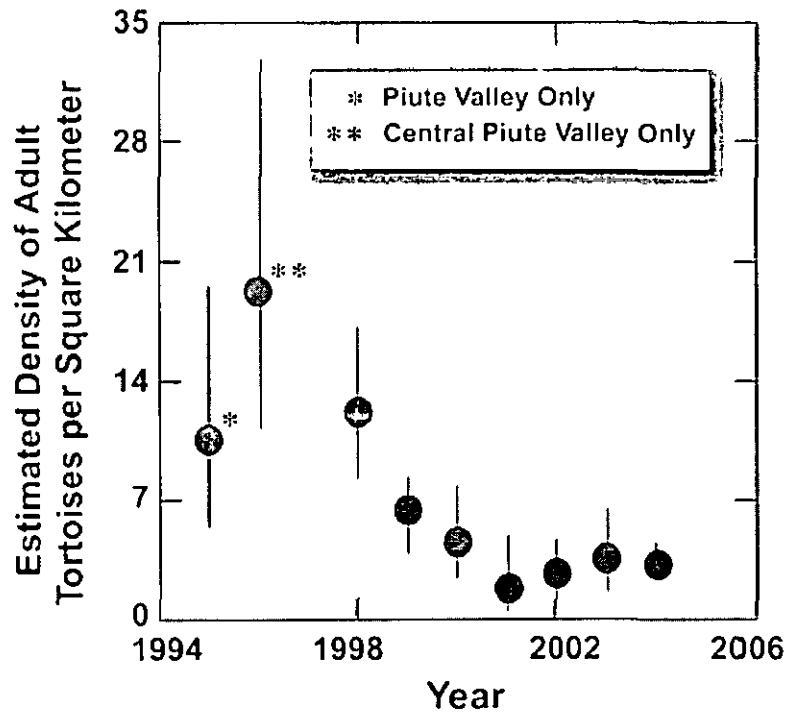


Fig 3. Estimated population densities in Piute Valley

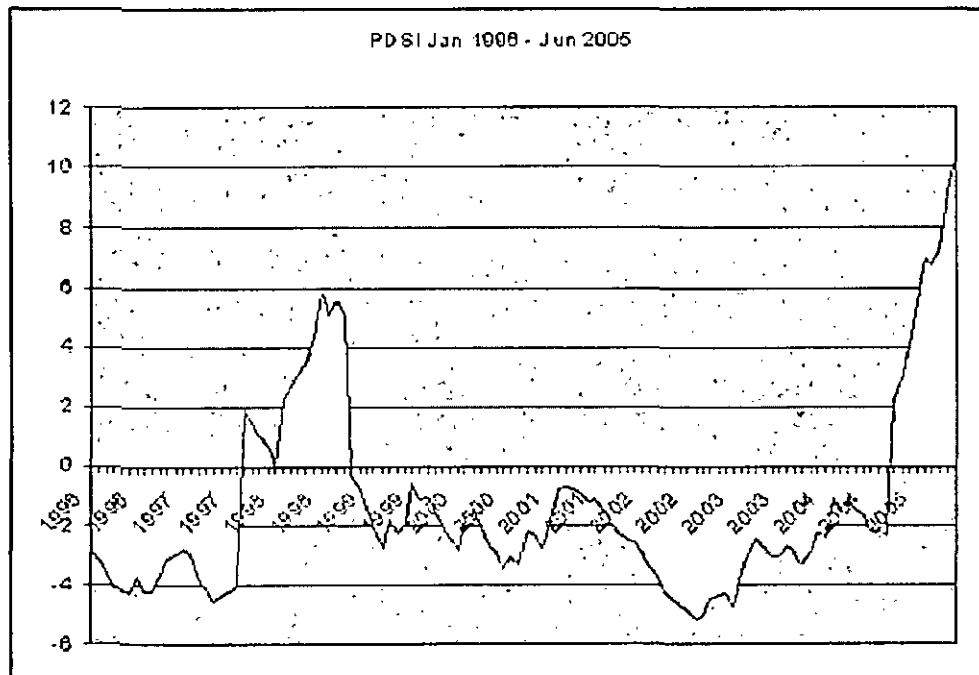


Fig. 3. Palmer drought index as a function of time in the Mojave desert.

CONCLUSIONS

The evaluation of density impacts on tortoises that showed under conditions of ample food and water availability there was no detectable deleterious impact experimental tortoise populations. This observation is consistent with natural history observations of tortoise population worldwide occasionally reaching very high densities and local observations that within the last 100 years desert tortoise populations were much denser (Kristin Berry, pers. com.). Thus at the present time tortoise population densities in the LSTS are high enough to cause negative impacts and translocation of displaced tortoises can continue.

RECOMMENDATIONS

1. Tortoise density monitoring in the LSTS and in wild populations in this area should continue.
2. Habitat monitoring of the LSTS and adjacent areas needs to be developed and implemented.
3. Threats monitoring in the LSTS and adjacent areas need to be developed and implemented



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July 28, 2006

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Re: Interlocal Contract/Collection Agreement between Clark County, Desert Conservation Program and University of Nevada, Reno – Biological Resources Research Center (UNR-BRRC) for Translocation, Long-Term Modeling of LSTS project #2003-UNR-BRRC-289-P

Submitted is a CD with the final report as well as a hard copy of the report.

Sincerely,

Cindy Kiel
Executive Director
Office of Sponsored Projects

CLARK COUNTY DESERT
CONSERVATION PROGRAM
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Library Submittal Form

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