Report on Genetic Divergence, Population Variability and Management Strategies for the Mojave Fringe-toed Lizard (*Uma scoparia*) at Fort Irwin National Training Center

Contract K-98-MURPH-01

Robert W. Murphy, Ph.D.

Centre for Biodiversity and Conservation Biology

Royal Ontario Museum, 100 Queen's Park

Toronto, Ontario M5S 2C6 CANADA

Ph: (416) 586-8099

Fax: (416) 586-5553

E-mail: drbob@rom.on.ca

F. Report on Genetic Divergence, Population Variability and Management Strategies for the Mojave Fringe-toed Lizard(*Uma scoparia*) at Fort Irwin, National Training Center (by R.W. Murphy, Subcontractor).

Table of Contents

Title Page i

Table of Contents ii

Introduction 1

Results 5

Discussion 18

Recommendations 20

Literature Cited 21

Technical Appendices

1. Sample sizes and localities of fringe-toed lizard samples sequenced 24
2. DNA sequencing methods and data analysis 25
3. Aligned sequences for mitochondrial DNA ATPase 6 gene 28
4. Aligned sequences for mitochondrial DNA cytochrome *b* gene 38

Tables

1. Primers used for gene amplification 7
2. Absolute number of differences in ATPase 6 gene sequences between species and populations of fringe-toed lizards, *Uma* 11
3. Absolute number of differences in cytochrome *b* gene sequences between species and populations of fringe-toed lizards, *Uma*. 14

Figures

1. Strict consensus tree for fringe-toed lizards based on combined ATPase 6 and cytochrome *b* gene sequences 17

Introduction

The Mojave fringe-toed lizard, *Uma scoparia*, is a remarkable, medium-sized, pale-colored lizard whose distribution is restricted to sand dunes in the Mojave Desert from extreme southern Inyo County, California, through most of San Bernadino County and barely into the northeastern corner of Los Angeles County, southward and eastward through the eastern half of Riverside County in the vicinity of Blythe. Outside of California it has been reported from Parker, Yuma County, Arizona. Because of this species' restriction to sand dunes, it has been considered a species of special concern (Jennings and Hays, 1994). As with Desert Tortoises, *Gopherus agassizii*, the Mojave fringe-toed lizards are on the decline due to habitat destruction and misuse of off-road vehicles.

Molecular genetics can provide markers that are increasingly relevant to the conservation and management of a species. For example, these data yield estimates of within-population genetic variability (heterozygosity), the mixing of genetic material between-populations (gene flow), and the geographic distinctiveness of species and other named groupings of organisms (e.g., population, subspecies, genera, etc.) (Avise, 1995; Moritz, 1994). Such data are critical for the effective management of endangered and threatened species, as well as species of special concern. If a population is to remain reproductively viable, then genetic variability and integrity, including local adaptations, must be maintained. If a population of a given species is extirpated from a particular site, then surely reintroductions should be made by 'sister' populations, and not from those whose genetic divergences may be relatively great.

The determination of the extent and geographic distribution of genetic diversity among the Mojave fringe-toed lizards, *Uma scoparia*, is imperative for conservation and potential reintroduction of extirpated populations. Although two studies have examined various aspects of the genetics of the genus (Adest, 1977; de Queiroz, 1992), neither assessed the variation among populations of a given species but rather only examined interspecific variability, assuming a single population to represent the species. Consequently, it is possible that there are several genetic units that could be recognized as species. Thus, interpopulation and intrapopulation variability must examined in fringe-toed lizards.

The fringe-toed lizards are an excellent case study for conservation using genetic methods, due to their disjunct and genetically distinct population structure, the diverse U.S. and Mexican endangered statuses of the five species, and necessity for assistance along with the interest and support of scientists and governmental agencies from Canada, the United States and Mexico. Intervention is essential not only for endangered species, or those species in immediate peril, but also for species listed as special concern. Proactive tactics have the potential to be more effective and successful than reactive tactics, in which conservation efforts focus on protecting and restoring populations and species, rather than resorting to saving species which often demands intrusive methods and drastic measures. Specifically, conservation and protection of genetically distinct population segments within each species of fringe-toed lizard, or those populations determined to be evolutionarily significant units, is essential and most effective for the maintenance of their diversity. The term evolutionarily significant units was first coined by Ryder (1986) and is used in the Endangered Species Act to identify distinct population

segments for conservation and management purposes, that are unique as demonstrated by "quantitative measures of genetic or morphological discontinuity" (U.S. Department of the Interior et al., 1996). Evaluations of these populations within Fort Irwin are essential for conservation and management of *Uma scoparia*, because protection of the populations at Fort Irwin has already been established, which would achieve the goal of conserving this unit, if in fact it is determined to be a single evolutionarily significant unit. If the population at Bitter Springs and/or the populations at Red Pass Dunes were distinct segments, then conservation of each unit would be necessary. Determining the status of the Mojave fringe-toed lizards within Fort Irwin is valuable, because these populations have the potential to be remarkably divergent and distinct population segments, thereby establishing Fort Irwin as an important reserve for the Mojave fringe-toed lizards.

The purpose of this study was to investigate the extent and geographic distribution of genetic variation within and among Mojave fringe-toed lizard populations both at NTC Fort Irwin as well as throughout the range of the species. During this investigation of genetic variability, significant progress was made in obtaining sequences from the mitochondrial genes ATPase 6 and cytochrome *b* for multiple populations of Mojave, Colorado Desert and Coachella Valley fringe-toed lizards. In this report, I will provide an overview of what has been accomplished during the duration of this contract.

Goals

The original goals of the contract were to accomplish the following:

1. To collect approximately 5-10 tail tips from as many populations of fringe-toed lizards as possible in the southwestern United States and Mexico. This included collections for Mojave, Colorado Desert, Coachella Valley, Chihuahuan and Coahuilla fringe-toed lizards.
2. From extracted blood or tissue samples, characterize genetic variability within and among local populations (demes) of Mojave fringe-toed lizards both at NTC Fort Irwin as well as off base.
3. Analyze DNA differentiation using algorithms, specifically PAUP and MEGA, for the reconstruction of the history of the genes.
4. Compare derived histories and multiple genes to examine concordance in pattern of DNA differentiation and evolution.
5. Access variability among variously sized sand dune populations to correlate dune size with genetic variability, and to estimate the likelihood of inbreeding depression.
6. Compare DNA from this study with fringe-toed lizard sequences outside the Fort Irwin study area, as well as sequences of other species of fringe-toed lizards, to provide an outgroup for reference.
7. If possible, use the data to reconstruct dispersion patterns of female fringe-toed lizards on Fort Irwin.
8. Identify regions of Fort Irwin for follow-up genetic characterization.

Results

Blood samples from three species of fringe-toed lizards, genus *Uma*, were available for sequencing. These included the Mojave fringe-toed lizard *Uma scoparia*, the endangered Coachella Valley fringe-toed lizard *Uma inornata* from Palm Springs, as well as the Colorado Desert fringe-toed lizard *Uma notata* from Arizona and the California and Baja California portions of the Sonoran Desert. For the comparison of species, thirty-one individuals of *U. notata* from twelve different localities in the United States and Mexico were sequenced, as well as 7 individuals of *U. inornata* from 7 different localities near Palm Springs, California. Multiple samples were available for the Mojave fringe-toed lizard, *U. scoparia*, including specimens from Cadiz Dry Lake, Coyote Dry Lake, Dale Dry Lake, Dumont Dunes, Kelso Dunes, Lenwood Wash, Palen Dry Lake, Pisgah Crater, and Rice Dunes in California, as well as Bouse Dunes in Arizona. These samples were used to gain perspective on the significance of any genetic variation found in the Fort Irwin samples. From Fort Irwin, samples from two sites were available. In total, five specimens from Bitter Springs located at the southeast corner of Fort Irwin were sequenced, and one additional specimen was evaluated from Red Pass dunes (Technical Appendix 1).

Significant progress was made with respect to collections during the contract year. Specifically, field work in Mexico resulted in 59 individuals from 13 populations of the Chihuahuan fringe-toed lizard *Uma paraphygas*, as well as 31 individuals from 6 populations of the Coahuilla fringe-toed lizard *Uma exsul*. In California, collections on base included samples from the population at Red Pass dunes, and samples from

populations off base from nearby Afton Canyon, Cronise Dry Lake and Coyote Dry Lake. Further away, samples of *U. scoparia* were collected from Palen and Cadiz Dry Lakes, Lenwood Wash and Pisgah Crater. For *U. notata*, populations were sampled from Anza-Borrego, Salton Sea and Superstition Mountains. In all cases, a maximum of 5 tail tips was collected per population when possible. From our previous studies of fringe-toed lizard genetics, a sample size of 5 tail tips was sufficient to provide adequate genetic characterization for each population, and among populations.

DNA was extracted from either blood samples or muscle tissue obtained from tail tips for all fringe-toed lizards. Based on previous contract work (Tortoise Project: Contracts K-96-MURPH-01and K-97-MURPH-02, Fringe-toed Lizard Project: Contract K-97-MURPH-02), as well as other previous lab work, specific primers were utilized to accomplish the sequencing of two genes that appeared to be most variable among the tortoises as well as side-blotched lizards (Table1). These genes included mitochondrial DNA (mtDNA) ATPase 6 and cytochrome *b*. In comparison to fringe-toed lizards, Upton and Murphy (1997) have recently used partial sequences of cytochrome *b* and ATPase 6 genes to examine variability in closely related side-blotched lizards and found sufficient variation to discern recent relationships. These two genes were sequenced following standard DNA amplification and sequencing protocols (Technical Appendix 2).

A total of 599 base pairs from the ATPase 6 gene were sequenced (Technical Appendix 3), where both DNA strands were sequenced to minimize errors.

In addition, a total of 1031 base pairs from cytochrome *b* were obtained (Technical Appendix 4). As with ATPase 6, both strands of DNA were sequenced to minimize sequencing errors.

Table 1. Primers used in this study

ATPase 6 gene primers	
5' atg aac cta agc ttc ttc gac caa tt 3'	Haddrath (pers. com.)
5' acg aat acg tag gct tgg att a 3'	Fu, 1999
Cytochrome *b* gene primers	
5' cca tcc aac atc tca gca tga tga aa 3'	Kocher et al., 1989
5' gtc ttc agt ttt tgg ttt aca aga c 3'	Kocher et al., 1989
5' tga gga caa ara tcc ttc tga gg 3'	Fu, 1999

Intraspecific variation for the three northernmost species including Fort Irwin

ATPase 6. Of the 599 base pairs sequenced, 145 (24.2%) were variable, of which 58 (9.7%) were potentially phylogenetically informative. As a result, 19 clones were detected. For the Mojave fringe-toed lizard, the clones were detected from (1) Rice Dunes, (2) Bouse Dunes, (3) Dumont Dunes (ROM 19840-1) and (4) Dumont Dunes (ROM 19842-6), (5) Cadiz Dry Lake, (6) Palen Dry Lake, (7) Dale Dry Lake (ROM 19850-1, 19853-4), and (8) a single clone distributed among Kelso Dunes, Pisgah Crater, Red Pass, Bitter Springs, Dale Dry Lake (ROM 19852, 19855) and Coyote Dry Lake.

For the Colorado Valley fringe-toed lizards, the clones were detected from (1) Mohawk dunes, (2) Pinta Sands (ROM 19896), (3) Pinta Sands (ROM 19897), (4) Yuma Dunes (ROM 19861), (5) Yuma Dunes (ROM 19862), (6) San Pedro, (7) Puerto Penasco, (8) Algodones (ROM 19875), and (9) Algodones (ROM 19876).

For the Coachella Valley fringe-toed lizard, the two clones were detected from (1) Coachella Valley Preserve, Coachella Valley Preserve North, Indio Hills, Sleeping Man Dunes, Whitewater Reserve, Willow Hole, and (2) Windy Point.

Cytochrome *b*. Of the 1031 base pairs sequenced, 140 (13.6%) were variable, which resulted in the occurrence of 25 clones, or different genetic combinations. Across the range of *Uma scoparia*, the three clones were detected from (1) Bitter Springs, (2) a single clone distributed among Kelso Dunes, Pisgah Crater, Lenwood Wash and Coyote Dry Lake, (3) Red Pass, (4) Dale Dry Lake, (5) Rice Dunes, (6) Bouse Dunes, (7) Dumont Dunes (ROM 19840-2) and (8) Dumont Dunes (ROM 19843-6), (9) Cadiz Dry Lake, (10) Palen Dry Lake, (11) Dale Dry Lake (ROM 19851-5), and (12) Dale Dry Lake (ROM 19850).

For the Colorado Valley fringe-toed lizards, the clones were detected from (1) Mohawk Dunes (ROM 19893), (2) Mohawk Dunes (ROM 19894), (3) Mohawk Dunes (ROM 19895), (4) Pinta Sands (ROM 19896), (5) Pinta Sands (ROM 19897), (6) Yuma Dunes (ROM 19861), (7) Yuma Dunes (ROM 19862), (8) San Pedro, (9) Puerto Penasco, (10) Algodones (ROM 19875), and (11) Algodones (ROM 19876).

For the Coachella Valley fringe-toed lizard, the two clones were detected from (1) Coachella Valley Preserve North, Indio Hills and Whitewater Reserve, and (2) Coachella Valley Preserve, Sleeping Man Dunes, Willow Hole and Windy Point.

Combined data. When the ATPase 6 and cytochrome *b* data are combined, 24 clones were detected. For *U. scoparia*, these clones were detected from (1) Bitter Springs, (2) a

single clone distributed among Kelso Dunes, Pisgah Crater and Coyote Dry Lake, (3) Lenwood Wash, (3) Red Pass, (4) Dale Dry Lake (ROM 19852, 19855), (5) Dale Dry Lake (ROM 19850-1, 19853-4), (6) Rice Dunes, (7) Bouse Dunes, (8) Dumont Dunes (ROM 19840-2) and (9) Dumont Dunes (ROM 19843-6), (10) Cadiz Dry Lake, and (11) Palen Dry Lake. Sequence site variation within *U. scoparia* ranged from 0.06-2.88%.

For the Colorado Valley fringe-toed lizards, the clones were detected from (1) Mohawk Dunes (ROM 19893), (2) Mohawk Dunes (ROM 19894), (3) Mohawk Dunes (ROM 19895), (4) Pinta Sands (ROM 19896), (5) Pinta Sands (ROM 19897), (6) Yuma Dunes (ROM 19861), (7) Yuma Dunes (ROM 19862), (8) San Pedro, (9) Puerto Penasco, (10) Algodones (ROM 19875), and (11) Algodones (ROM 19876). Sequence site variation for *U. notata* ranged from 0.06-3.43%.

For the Coachella Valley fringe-toed lizard, the two clones were detected from (1) Coachella Valley Preserve North, Indio Hills and Whitewater Reserve, and (2) Coachella Valley Preserve, Sleeping Man Dunes, Willow Hole and Windy Point. Sequence site variation for *U. inornata* ranged from 0.06-0.25%.

Interspecific variation

ATPase 6. Among the three species of *Uma*, 145 of 599 (24.2%) nucleotides were variable, of which 58 (9.7%) were potentially phylogenetically informative. All three species can be easily differentiated from one another based on the sequences of ATPase 6 alone. The numbers of differences between sequences are given in Table 2.

Cytochrome b. In comparison to ATPase 6, this gene showed a similar level of variation among the species of fringe-toed lizards. Among the three species, 245 of 1031 (23.8%)

nucleotide positions varied, of which 140 (13.6%) were potentially phylogenetically informative. The numbers of differences between sequences are given in Table 3.

Combined data. *Uma scoparia* differed from *U. notata* at 7.05-8.16% of the sites sequenced. Similarly, *U. scoparia* differed from *U. inornata* at 7.48-8.16% of the sites sequenced. In contrast, *U. inornata* differed from *U. notata* at only 0.98-3.31% of the sites sequenced.

Phylogenetic evaluation. Variation in mtDNA sequence data was evaluated and summarized in the form of a "phylogenetic tree" or cladogram. A standard evaluation of the DNA sequence data was performed using all potentially phylogenetically informative sites (Technical Appendix 3). An evaluation of the combined gene sequences resulted in 56 most parsimonious trees. A strict consensus tree was computed (Figure 1). In the construction of the tree, there was complete agreement among the sequence data. The reason for the number of multiple equally parsimonious trees is that the placement of individuals from Yuma Dunes and Pinta Sands is not consistent. The consistency index (CI) for the strict consensus tree is 0.67, and a retention index (RI) of 0.95, with a tree length of 353 steps. In the cladogram, Red Pass Dunes and Bitter Springs, along with the off base locations at Coyote Dry Lake, Kelso Dunes, Lenwood Wash and Pisgah Crater are depicted as being all from a single ancestor, or most closely related to one another than to any other populations. However, the population at Bitter Springs was found to be genetically distinct from the other populations. The populations that share a most recent common ancestor with the previous grouping are the populations at Dale and Palen Dry Lakes. The populations at Bouse and Rice Dunes share the next most recent ancestor, then the populations at Cadiz Dry Lake and then Dumont Dunes (Figure 1).

Table 2. Absolute number of differences in ATPase 6 gene sequences between species and populations of fringe-toed lizards, *Uma*.

Taxa are labeled as follows: 1= Kelso, Pisgah Crater, Coyote Dry Lake, 2= Red Pass, 3 = Bitter Springs, 4 = Rice (ROM 19847), 5 = Rice (ROM 19858), 6 = Rice (ROM 19849), 7 = Dumont (ROM 19840), 8 = Dumont (ROM 19841), 9 = Dumont (ROM 19842), 10 = Dumont (ROM 19843-6), 11 = Dale Dry Lake (ROM 19850), 12 = Dale Dr Lake (ROM 19851), 13 = Dale Dry Lake (ROM 19852, 19855), 14 = Dale Dry Lake (ROM 19853), 15 = Dale Dry Lake (ROM 19854), 16 = Bouse (ROM 19885), 17 = Bouse (ROM 19886), 18 = Bouse (ROM 19887) 19 = Palen Dry Lake, 20 = Cadiz Dry Lake, 21 = Lenwood Wash, 22 = *Callisaurus*, 23 = San Pedro, 24 = Puerto Penasco, 25 = Algodones (ROM 19875), 26 = Algodones (ROM 19876), 27 = Mohawk (ROM 19893), 28 = Mohawk (ROM 19894), 29 = Mohawk (ROM 19895), 30 = Pinta Sands (ROM 19896), 31 = Pinta Sands (ROM 19897), 32 = Yuma (ROM 19861), 33 = Yuma (ROM 19862), 34 = Coachella Valley Preserve North, Windy Point, Indio Hills, 35 = Coachella Valley Preserve, 36 = Willow Hole, 37 = Windy Point, and 38 = Sleeping Man Dunes.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	—	0	0	5	5	5	4	5	4	5	1	2	0	2
2		—	0	5	5	5	4	5	4	5	1	2	0	2
3			—	5	5	5	4	5	4	5	1	2	0	2
4				—	0	0	8	9	8	9	6	7	5	7
5					—	0	8	9	8	9	6	7	5	7
6						—	8	9	8	9	6	7	5	7
7							—	2	0	2	5	6	4	6
8								—	2	0	6	7	5	7
9									—	2	5	6	4	6
10										—	6	7	5	7
11											—	1	1	1
12												—	2	2
13													—	2
14														—
15														

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	2	5	5	4	1	2	1	99	40	38	32	33	33	33
2	2	5	5	4	1	2	1	99	40	38	32	33	33	33
3	2	5	5	4	1	2	1	99	40	38	32	33	33	33
4	7	4	4	3	6	7	6	102	43	41	35	36	36	36
5	7	4	4	3	6	7	6	102	43	41	35	36	36	36
6	7	4	4	3	6	7	6	102	43	41	35	36	36	36
7	6	9	9	8	5	6	5	103	44	42	36	37	37	37
8	7	10	10	9	6	7	6	103	45	43	37	38	38	38
9	6	9	9	8	5	6	5	103	44	42	36	37	37	37
10	7	10	10	9	6	7	6	103	45	43	37	38	38	38
11	1	6	6	5	2	3	2	100	41	39	33	34	34	34
12	2	7	7	6	3	4	3	101	42	40	34	35	35	35
13	2	5	5	4	1	2	1	99	40	38	32	33	33	33
14	2	7	7	6	2	4	3	101	42	40	34	35	35	35
15	—	7	7	6	2	4	3	101	42	40	34	35	35	35
16		—	0	1	6	7	6	99	44	42	36	37	37	37
17			—	1	6	7	6	99	44	42	36	37	37	37
18				—	5	6	5	100	44	42	36	37	37	37
19					—	3	2	100	41	39	33	34	34	34
20						—	3	99	40	40	32	33	35	35
21							—	100	41	39	33	34	34	34
22								—	106	104	98	99	102	102
23									—	4	10	11	16	16
24										—	10	11	14	14
25											—	3	12	12
26												—	15	15
27													—	0
28														—
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														

	29	30	31	32	33	34	35	36	37	38
1	33	36	36	33	37	35	35	35	36	35
2	33	36	36	33	37	35	35	35	36	35
3	33	36	36	33	37	35	35	35	36	35
4	36	39	39	36	40	38	38	38	39	38
5	36	39	39	36	40	38	38	38	39	38
6	36	39	39	36	40	38	38	38	39	38
7	37	40	40	37	41	39	39	39	40	39
8	38	41	41	38	42	40	40	40	41	40
9	37	40	40	37	41	39	39	39	40	39
10	38	41	41	38	42	40	40	40	41	40
11	34	37	37	34	38	36	36	36	37	36
12	35	38	38	35	39	37	37	37	38	37
13	33	36	36	33	37	35	35	35	36	35
14	35	38	38	35	39	37	37	37	38	37
15	35	38	38	35	39	37	37	37	38	37
16	37	40	40	37	41	39	39	39	40	39
17	37	40	40	37	41	39	39	39	40	39
18	37	40	40	37	41	39	39	39	40	39
19	34	37	37	34	38	36	36	36	37	36
20	35	36	38	33	37	35	35	35	36	35
21	34	37	37	34	38	36	36	36	37	36
22	102	104	103	100	103	100	100	100	101	100
23	16	8	6	7	13	13	13	13	14	13
24	14	8	4	7	13	13	13	13	14	13
25	12	6	8	5	7	5	5	5	6	5
26	15	7	9	8	10	8	8	8	9	8
27	0	12	12	11	15	15	15	15	16	15
28	0	12	12	11	15	15	15	15	16	15
29	—	12	12	11	15	15	15	15	16	15
30		—	6	5	9	9	9	9	10	9
31			—	5	11	11	11	11	12	11
32				—	8	8	8	8	9	8
33					—	10	10	10	11	10
34						—	0	0	1	0
35							—	0	1	0
36								—	1	0
37									—	1
38										

Table 3. Absolute number of differences in cytochrome *b* gene sequences between species and populations of fringe-toed lizards, *Uma*.

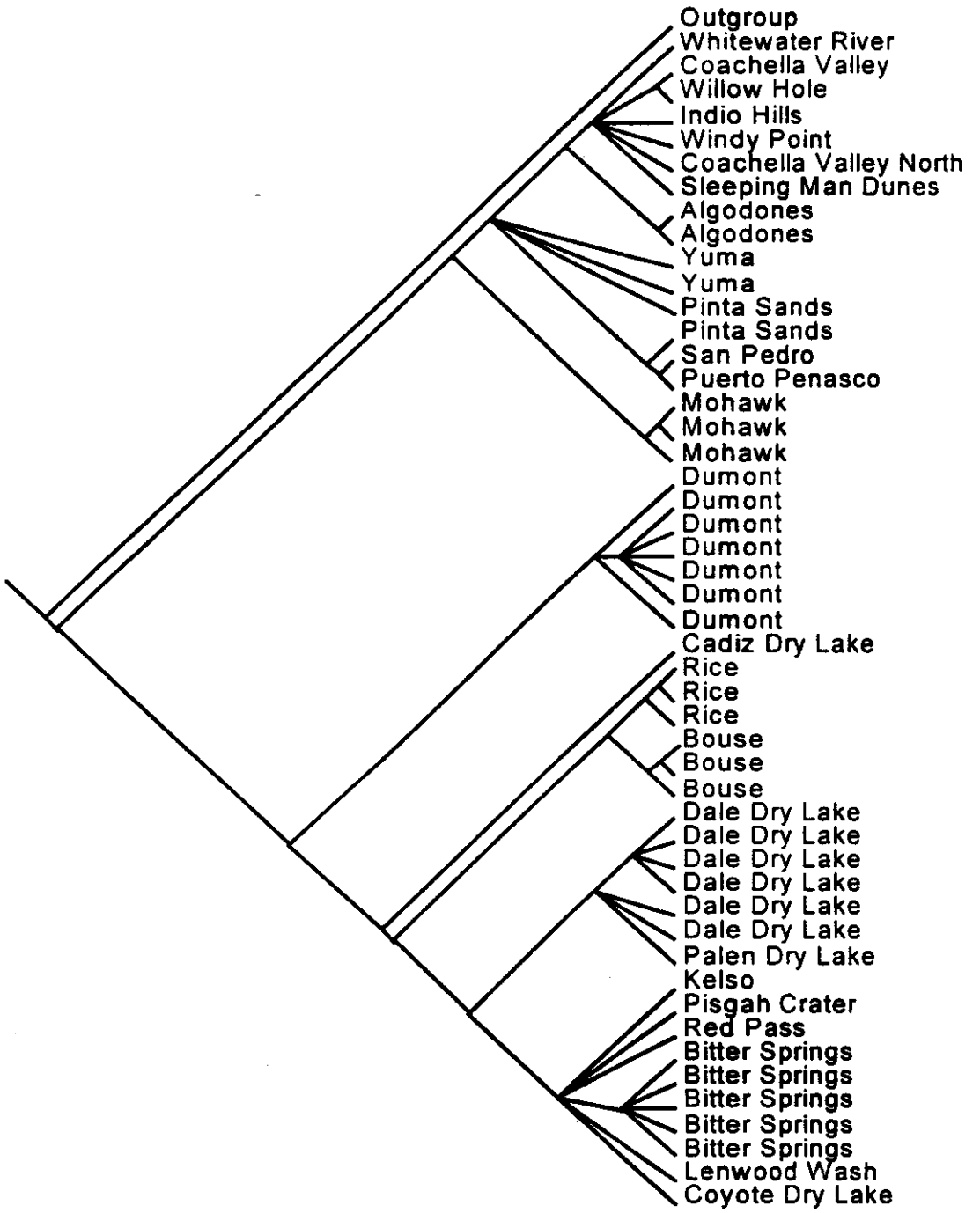
Taxa are labeled as follows: 1= Kelso, Pisgah Crater, Coyote Dry Lake, 2= Red Pass, 3 = Bitter Springs. 4 = Rice (ROM 19847), 5 = Rice (ROM 19858), 6 = Rice (ROM 19849), 7 = Dumont (ROM 19840), 8 = Dumont (ROM 19841), 9 = Dumont (ROM 19842), 10 = Dumont (ROM 19843-6), 11 = Dale Dry Lake (ROM 19850), 12 = Dale Dr Lake (ROM 19851), 13 = Dale Dry Lake (ROM 19852, 19855), 14 = Dale Dry Lake (ROM 19853), 15 = Dale Dry Lake (ROM 19854), 16 = Bouse (ROM 19885), 17 = Bouse (ROM 19886), 18 = Bouse (ROM 19887) 19 = Palen Dry Lake, 20 = Cadiz Dry Lake, 21 = Lenwood Wash, 22 = *Callisaurus*, 23 = San Pedro, 24 = Puerto Penasco, 25 = Algodones (ROM 19875), 26 = Algodones (ROM 19876), 27 = Mohawk (ROM 19893), 28 = Mohawk (ROM 19894), 29 = Mohawk (ROM 19895), 30 = Pinta Sands (ROM 19896), 31 = Pinta Sands (ROM 19897), 32 = Yuma (ROM 19861), 33 = Yuma (ROM 19862), 34 = Coachella Valley Preserve North, Windy Point, Indio Hills, 35 = Coachella Valley Preserve, 36 = Willow Hole, 37 = Windy Point, and 38 = Sleeping Man Dunes.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1	—	1	2	13	12	11	33	35	34	33	6	4	4	4
2		—	3	14	13	12	34	36	35	34	7	5	5	5
3			—	15	14	13	35	37	36	35	8	6	6	6
4				—	3	5	36	38	37	36	15	13	1313	
5					—	2	33	35	34	33	14	12	12	12
6						—	33	35	34	33	13	11	11	11
7							—	3	2	1	33	31	31	31
8								—	1	2	35	33	33	33
9									—	1	34	32	32	32
10										—	33	31	31	31
11											—	2	2	2
12												—	0	0
13													—	0
14														—
15														

	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	4	15	14	14	7	20	0	161	84	84	88	91	83	82
2	5	16	15	15	8	21	1	162	85	85	89	92	84	83
3	6	17	16	16	9	22	2	161	86	86	90	93	85	84
4	13	10	9	9	16	21	13	160	83	83	89	92	82	81
5	12	7	6	6	15	18	12	161	82	82	88	91	81	80
6	11	7	6	6	14	18	11	160	82	82	88	91	81	80
7	31	34	33	33	34	35	33	171	86	84	86	87	89	88
8	33	36	35	35	36	37	35	171	88	86	88	89	91	90
9	32	35	34	34	35	36	34	170	87	85	87	88	90	89
10	31	34	33	33	34	35	33	171	86	84	86	87	89	88
11	2	17	16	16	5	20	6	158	85	86	92	95	85	84
12	0	15	14	14	3	18	4	160	84	84	90	93	83	82
13	0	15	14	14	3	18	4	160	84	84	90	93	83	82
14	0	15	14	14	3	18	4	160	84	84	90	93	83	82
15	—	15	14	14	3	18	4	160	84	84	90	93	83	82
16		—	3	3	18	21	15	164	85	85	91	94	84	83
17			—	4	17	20	14	161	84	84	90	93	83	82
18				—	17	20	14	161	84	84	90	93	83	82
19					—	21	7	163	86	86	92	95	85	84
20						—	20	162	86	84	92	95	85	84
21							—	161	84	84	88	91	83	82
22								—	157	158	162	165	156	155
23									—	4	21	18	27	28
24										—	23	20	29	30
25											—	7	40	41
26												—	39	40
27													—	1
28														—

	29	30	31	32	33	34	35	36	37	38
1	85	87	83	88	86	87	88	87	88	88
2	86	88	84	89	87	88	89	88	89	89
3	87	89	85	90	88	89	90	89	90	90
4	84	86	84	89	85	88	88	87	89	89
5	83	85	81	86	84	87	87	86	88	88
6	83	85	81	86	84	87	87	86	88	88
7	91	89	83	88	84	89	89	88	90	90
8	93	91	85	90	86	91	91	90	92	92
9	92	90	84	89	85	90	90	89	91	91
10	91	89	83	88	84	89	89	88	90	90
11	87	89	85	90	88	91	92	91	92	92
12	85	87	83	88	86	89	90	89	90	90
13	85	87	83	88	86	89	90	89	90	90
14	85	87	83	88	86	89	90	89	90	90
15	85	87	83	88	86	89	90	89	90	90
16	86	90	84	89	87	90	90	89	91	91
17	85	89	83	88	86	89	89	88	90	90
18	85	89	83	88	86	89	89	88	90	90
19	87	89	85	90	88	91	92	91	92	92
20	87	89	85	90	88	91	91	90	92	90
21	85	87	83	88	86	87	88	87	88	88
22	158	161	164	160	156	160	160	160	161	159
23	29	11	11	12	19	16	18	17	17	17
24	31	13	13	12	21	18	20	19	19	19
25	42	24	28	25	26	11	13	12	12	12
26	41	21	23	22	23	10	12	11	11	11
27	2	30	32	35	36	35	35	36	36	36
28	3	31	33	36	37	36	36	37	37	37
29	—	32	34	37	38	37	37	38	38	38
30		—	16	15	20	19	19	20	20	20
31			—	15	24	23	23	24	24	24
32				—	21	20	20	21	21	21
33					—	21	21	22	22	22
34						—	2	1	1	1
35							—	1	3	3
36								—	2	2
37									—	2
38										—

Figure 1. Strict consensus tree based on ATPase 6 and cytochrome *b* combined gene sequences.



Discussion

Low variation was detected within fringe-toed lizard populations for the ATPase 6 and cytochrome *b* gene sequences. In contrast, significant variation was detected among most populations and species of fringe-toed lizards. This variation revealed that the endangered Coachella Valley fringe-toed lizard is not a phylogenetically recognizable species because *U. inornata* clusters within the *U. notata* complex. In addition, the recognition of the sub-species *U. n. rufopunctata* is not valid because *Uma notata notata* is paraphyletic with respect to *U. n. rufopunctata*.

Within *U. scoparia*, the populations from NTC Fort Irwin, along with the populations at Coyote Dry Lake, Kelso Dunes, Lenwood Wash and Pisgah Crater shared a most recent common ancestor. However, the population at Bitter Springs is genetically distinct within this clade. Our analyses reveal that the ancestor of these six localities share a most recent common ancestor with the ancestor from the populations at Dale and Palen Dry Lake. In general, a northward and westward pattern of dispersal is evident from the phylogeny, with exception of the population at Dumont dunes. The phylogenetic position of the population at Dumont dunes has been found to be the basal lineage within the species. In addition, the population of fringe-toed lizards at Dumont dunes has been found to be remarkably genetically divergent from all other Mojave fringe-toed lizard populations. This result is intriguing genetically and biogeographically, and not consistent with former theories of dispersal of *Uma* (Norris, 1958). From our analyses, multiple populations can be viewed as evolutionarily significant units. The populations with NTC Fort Irwin would both be deemed

evolutionarily significant units due to the distinctiveness of the population at Bitter Springs within this clade comprised of the six nearby populations. Although, an increase in sample size, and addition of populations analyzed within the vicinity of the base would be preferred before any conclusive statements are reported.

Formulating strategies for augmentation or protection of the Fort Irwin populations should not proceed until further studies are completed. An assessment of population size as well as further conclusions about female dispersal and genetic variation at Fort Irwin are valuable and extremely useful. Mark-recapture and ecological studies have the ability to assess whether populations are numerically viable in addition to being individually viable. Specifically, the correlation between population size with dune size, shape, vegetation and connectivity will provide habitat models that can guide Resource managers to those populations that are numerically viable. This information is extremely useful and complimentary to the genetic study, and can further enhance recommendations for conservation and management of those populations most worthy of conservation efforts. In addition, our sample sizes are inadequate for accurately estimating population variation on Fort Irwin, especially at Red Pass Dunes. Newly acquired collections from Red Pass have been completed and the gene sequencing is underway.

Recommendations

- Given that we have found significant variation in mtDNA among most populations of fringe-toed lizards, there are a number of recommendations for follow-up work. The existing mtDNA sequence database clearly demonstrates the **desirability of additional sequencing**. These data will be critical to the primary goal of the study. Thus, I would recommend the following:
- From newly collected fringe-toed lizard tail muscle tissues within Death Valley National Park (D.Morafka and T.Trépanier) as well as recently collected tail tips from Mexico and California, extract DNA samples from specimens to increase the sample size per population as well as the number of populations sampled. Characterize the variability within and among local populations (demes) of fringe-toed lizards.
- Analyze DNA differentiation using algorithms, particularly PAUP and MEGA, for the reconstruction of the history of the genes. Compare the derived histories of multiple genes to examine concordance in patterns of DNA differentiation and evolution.
- Evaluate evolutionarily significant units based on genetic divergences among populations, and propose conservation strategies based on these units. Conservation and management of evolutionarily significant units, or those populations or group of populations that comprise genetically distinct population segments, should have priority.

Literature Cited

Adest, G. A. (1977). Genetic relationships in the genus *Uma* (Iguanidae). *Copeia* 1977: 47-52.

Avise, J.C. 1995. Mitochondrial DNA polymorphism and a connection between genetics and demography of relevance to conservation. Conservation Biol. 9:683-690.

Cabot, E.L., and A.T. Beckenbach. 1989. Simultaneous editing of multiple nucleic acid sequences with ESEE. Computer Appl. Biosci. 5:233-234.

de Queiroz, K. (1992). Phylogenetic relationships and rates of allozyme evolution among the lineages of sceloporine sand lizards. *Biol. J. Linnean Soc.* **45**: 333-362.

Faith, D.P., and P.S. Cranston 1991. Could a cladogram this short have arisen by chance alone?: On permutation tests for cladistic structure. *Cladistics* 7:1-28.

Farris, J.S. 1969. A successive approximations approach to character weighting. Syst. Zool. 18:374-385.

Farris, J.S. 1988. "Hennig86, Version 1.5: Computer program and documentation," Port Jefferson Station. New York.

Felsenstein, J. 1985. Confidence limits on phylogenies: An approach using the bootstrap. *Evolution* 39:783-791.

Fu, J. 1999. Phylogeny of lacertid lizards (Squamata: Lacertidae) and the evolution of unisexuality. Ph.D. dissertation. University of Toronto, Toronto.

Hillis, D.M. 1991. Discriminating between phylogenetic signal and random noise in DNA sequences. *In* "Phylogenetic Analysis of DNA Sequences" (M.M. Miyamoto, and J. Cracraft, Eds.), pp. 278-294, (Oxford University Press, Oxford.

Hillis, D.M., M.W. Allard, and M.M. Miyamoto. 1994. Discriminating between phylogenetic signal and random noise in DNA sequences. *In* "Analysis of DNA sequence data: phylogenetic inference" (M.M. Miyamoto, and J. Cracraft Eds.), pp. 278-294, Oxford University Press, New York.

Hillis, D.M., and J.P. Huelsenbeck 1992. Signal, noise, and reliability in molecular phylogenetic analyses. J. Hered. 83:189-195.

Jennings, M.R., and Hays, M.P. (1994). Amphibian and reptile species of special concern in California. California Department of Fish and Game, Rancho Cordova, California. Final Report.

Kocher, T.D., W.K. Thomas, A. Meyer, S.V. Edwards, S. Paabo, F.X. Villablanca, and A.C. Wilson. 1989. Dynamics of mitochondrial DNA evolution in animals: Amplification and sequencing with conserved primers. Proc. Natl. Acad. Sci. (USA) 86:6196-6200.

Kumar, S., K. Tamura, and M Nei. 1993. "MEGA: Molecular evolutionary genetics analysis, Version 1.0," The Pennsylvania State University, University Park, PA.

Maddison, W., D. Maddison. 1994. "MacClade: Analysis of phylogeny and character evolution, Version 3.05," Sinauer Associates Inc. Sunderland, Massachusetts.

Moritz, C. 1994. Applications of mitochondrial DNA analysis in conservation: A critical review. Mol. Ecol. 3:401-411.

Norris, K.S. 1958, The evolution and systematics of the iguanid genus Uma and its relation to the evolution of other North American desert reptiles. *Bull. American Museum of Natural History* 114(3): 251-326.

Ryder, O.A. 1986. Species conservation and systematics: the dilemma of subspecies. *Trends in Ecology and Evolution* 1:9-10.

Saiki, R.K., D.H. Gelfand, S. Stoeffel, S.J. Scharf, R. Higuchi, G.T. Horn, K.B. Mullis, and H.A. Erlich. 1988. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. Science 239:487-491.

Siddall, M.E. 1995. "Random Cladistics, Version 4.0," Department of Zoology, University of Toronto, Toronto.

Swofford, D.L. 1993. "PAUP: Phylogenetic analysis using parsimony, Version 3.1.: Computer program and documentation." Illinois Natur. Hist. Survey, Urbana.

Upton, D. E., and R. W. Murphy. 1997. Phylogeny of the Side-Blotched Lizards (Phrynosomatidae: Uta) Based on mtDNA Sequences: Support for a Midpeninsular Seaway in Baja California. Molecular Phylogenetics and Evolution Vol.8, No.1: 104-113.

U.S. Department of the Interior and U.S. Department of Commerce. 1996. Policy regarding the recognition of distinct vertebrate population segments under the Endangered Species Act. Federal Register 61:4722-4725.

Technical Appendix 1

Sample Sizes and Localities of Lizard Samples Sequenced

Sample numbers are freezer identification numbers of frozen blood samples maintained at the Royal Ontario Museum, Canada.

Locality	Sample Size	Voucher[1]
U. scoparia		
Dumont Dunes, Inyo Co., CA	7	ROM 19840-6
Rice Dunes, San Bernadino Co., CA	3	ROM 19847-9
Dale Dry Lake, San Bernadino Co., CA	6	ROM 19850-5
Red Pass, Fort Irwin, San Bernadino Co., CA	1	ROM 01531
Bitter Springs, Fort Irwin, San Bernadino Co., CA	5	ROM 00095-99
Cadiz Dry Lake, San Bernadino Co., CA	1	ROM 03426
Palen Dry Lake, Riverside Co., CA	1	ROM 03418
Kelso Dunes, San Bernadino Co., CA	1	ROM 04115
Pisgah Crater, San Bernadino Co., CA	1	ROM 04735
Lenwood Wash, San Bernadino Co., CA	1	ROM 03428
Coyote Dry Lake, San Bernadino Co., CA	1	ROM 03436
Bouse Dunes, Yuma Co., AZ	3	ROM 19885-87
U. n. notata		
Algodones, Imperial Co., CA	2	ROM 19875-6
U. n. rufopunctata		
Mohawk, Yuma Co., AZ	3	ROM 19893-5
Yuma, Yuma Co., AZ	2	ROM 19861-2
Pinta Sands, Yuma Co., AZ	2	ROM 19896-7
San Pedro, Sonora, Mexico	1	ROM 4276
Puerto Peñasco, Sonora, Mexico	1	ROM 4333
U. inornata		
Whitewater River Reserve, Riverside Co., CA	1	CAP 1718
Coachella Valley Preserve, Riverside Co., CA	1	CAP 1723
Willow Hole Preserve, Riverside Co., CA	1	CAP 1735
Eastern Indio Hills, Riverside Co., CA	1	CAP 1747
Windy Point, Riverside Co., CA	1	CAP 1755
Coachella Valley Preserve N, Riverside Co., CA	1	CAP 1767
Sleeping Man Dunes, Riverside Co., CA	1	CAP 1771
C. draconoides		
Yuma, Yuma Co., AZ	1	ROM 19874

[1]ROM = Royal Ontario Museum; CAP = Christopher A. Phillips

Technical Appendix 2

DNA Sequencing and Data Analysis

DNA Isolation

Total DNA was extracted from approximately 0.20 grams of alcohol preserved blood or tail muscle tissue. Blood or muscle was added to 500ul of lysis buffer containing 100mM Tris HCl (Sigma), 10mM EDTA (Sigma), 100mM NaCl (BDH), 12.5ul of stock proteinase K (10mg/ml, Gibco) and 50ul of 20% SDS (Schwartz/Mann Biotech). Samples were placed in an incubator (37°C) and left overnight. Samples were extracted three times with equal volumes (450ul) of PCI (25:24:1). One final wash of CI (24:1, 450ul) was used.

DNA amplification

Double stranded DNA was prepared for sequencing using the polymerase chain reaction (PCR, Saiki et al., 1988). Reactions of 25ul were set up using 1ul of genomic DNA (0.05ug/ul), 1ul of each primer (10mM), 0.08ul of a dNTP's mix (containing 10mM of each dATP, dGTP, dTTP, dCTP) (Perkin Elmer Cetus), 0.2ul of Amplitaq polymerase (Perkin Elmer Cetus), and 2.5ul of a reaction buffer (containing 67mM Tris pH8.8, 2mM MgCl (Sigma). The 0.5ml reaction tubes were placed in a thermal cycler. The parameters varied as follows: Initial cycle 93°C for 3 min, 43-50°C for 1 min, 72°C for 1.5 min; 93°C for 45 sec., 43-50°C for 45 sec., 72°C for 1.5 min for 36-38 cycles; final extension file at 72°C for 5 min. Double stranded amplified product was electrophoresed

in a 2% agarose (BDH) gel containing ethidium bromide (1ug/ml; BDH) for 15-30 min at 100V-120V in a Tris-acetate buffer. Successful amplifications were excised from the gel and purified by GeneClean (TM. Bio/Can Scientific). Protocols followed directly the manufacturer's instructions.

DNA Sequencing

Purified double stranded DNA was labeled using P^{33} labeled terminator cycle sequencing kit (Amersham). The sequenced DNA was loaded into a 40cm, 5% long ranger (JT Baker) polyacrylamide gel in a 0.6% TBE buffer, and electrophoresed at 60V for 2-4.5 hours. The gels were dried on filter paper and exposed for 20-30 hours on Kodak XAR autoradiograph film.

Sequence Analysis

Nucleotide ratios and proportions will be examined using MacClade 3.05 (Maddison and Maddison, 1994). Divergence will be examined using the number of nucleotides sites at which the two sequences compared are different as calculated in MEGA (Kumar et al., 1993). Species exhibiting intraspecific variation will have all variants included as separate "taxa" in the analyses because each variant represents a distinctive mitochondrial DNA clone. Following distance evaluations, phylogenetically uninformative characters, and those with missing data, due to either compression (most likely) or deletion, will be excluded from the parsimony analyses. Missing data characters will be excluded because they can result in hypotheses of relationships not possible from potential data (Platnick et al., 1991).

Following the recommendations of Hillis *et al.* (in press), before proceeding with our analysis I will assess the phylogenetic structure of the data. Permutation tail probability estimates (PTP: Faith and Cranston, 1991) will be calculated using Random Cladistics version 4.0 (Siddall, 1995). (This program interfaces with Hennig86 version 1.5 [Farris, 1988] for tree building).

Maximum parsimony analyses will be performed using the branch-and-bound algorithm of Hennig86 1.5 (Farris, 1988) and heuristics of PAUP 3.1.1 (Swofford, 1993). Similar branch-and-bound evaluations using PAUP 3.1.1 have proved too slow in previous trials. Bootstrap (Felsenstein, 1985) consensus trees will not be calculated but rather bootstrap values will be assessed for nodes in the most parsimonious solutions using Random Cladistics version 2.1. Tree length comparisons, assessment of character state evolution, and measures of fit will be examined using MacClade 3.05 (Maddison and Maddison, 1994). For transversion weighting, potentially phylogenetically informative transversions will be coded as binary characters and appended to the changes for the nucleotides effectively giving a 2:1 weight of transversions to transitions. These transversion codes subsequently will be accorded increasing weights.

Technical Appendix 3

DNA Sequences of the Mitochondrial DNA ATPase 6 Gene

C. draconoides

TCTAATCCCACAAACCCTAGGTATTCCACTAATTCTAATTGCAATTATTATACCAACACTTATTAT
CTTAAGCTCTTCAAACCGACTTATTTCAAATCGATTACTTACACTACAAGATTGGGCAACAAAAACCTTTAC
AAAACAACTTATTATACCTATCGGAATTCACGGGCATAAATGAGCATCAATACTTTTAGCCCTCACACTCCT
TCTTATATCATTAAATTTAATAGGACTACTACCATATACATTTACACCAACAACACAACTGTCAATAAACAT
GGCACTAGCAGTACCAATGTGAATAACAACTGTACTAATTGGAATGCGAAACCAACCAACAGTATCCCTAGG
ACACCTACTACCAGAAGGAACTCCAACCCCACTAATTCCAATCCTAATTATTATTGAAACCATTAGTCTATT
TATTCGACCACTTGCTCTTGGCGTCCGACTAACCGCTAACCTAACAGCAGGACACCTATTAATTCAACTAAT
TTCAACAGCGGCCTTTGTTTTAATACCATCAATAACACTAACAGCAACTGCAGCATTCATCATTCTTCTACT
ACTAACCGGACTTGAAATCGCTGTAGCAA

U. notata San Pedro

CATAATCCCCCAGGCCCTTGGTATTCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACAATACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTGACAACTGTATTAATTGGTCTACGAAACCAACCAACTATCTCTCTTGG
ACACCTACTACCAGAGGGCACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TACCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACGGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTGACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Puerto Penasco

CATAATCCCCCAGGCCCTTGGTATTCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTGACAACTGTATTAATTGGTCTACGAAACCAACCAACTATCTCTCTTGG
ACACCTACTACCAGAGGGCACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACGGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACTATCAATAACTCTGACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Algodones Dunes (ROM 19875)

CATAATCCCACAGACCCTTGGTATTCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Algodones Dunes (ROM 19876)

CATAATCCCACAGACCCTTGGTATTCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTGACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCACTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT

TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTATAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Mohawk Dunes (ROM 19893)

CATAATCCCCCAGACCCTTGGTATTCCACTAATTCTAATTGCAATCGTCATCCCACCCCTACTTAT
TTTAAGCTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATGTCATTAAATTTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCCATATGACTAACAACTGTATTAATTGGCCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATTATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACGGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACCCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Mohawk Dunes (ROM 19894)

CATAATCCCCCAGACCCTTGGTATTCCACTAATTCTAATTGCAATCGTCATCCCACCCCTACTTAT
TTTAAGCTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATGTCATTAAATTTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCCATATGACTAACAACTGTATTAATTGGCCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATTATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACGGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACCCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Mohawk Dunes (ROM 19895)

CATAATCCCCCAGACCCTTGGTATTCCACTAATTCTAATTGCAATCGTCATCCCACCCCTACTTAT
TTTAAGCTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATGTCATTAAATTTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCCATATGACTAACAACTGTATTAATTGGCCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATTATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACGGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACCCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Pinta Sands (ROM 19896)

CATAATCCCCCAGGCCCTTGGTATTCCACTAATTCTAATTGCAATCGTTATCCCACCCCTACTTAT
TTTAAGTTCATCAAGCCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTGACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Pinta Sands (ROM 19897)

CATAATCCCCCAGGCCCTTGGTATTCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTGACAACTGTATTAATTGGTCTACGGAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGCACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACGGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Yuma Dunes (ROM 19861)

CATAATCCCCCAGGCCCTTGGTATTCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT

TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGCACTCCTACACCACTAATCCCAATCTTAATTATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. notata Yuma Dunes (ROM 19862)

CATAATCCCCCAGACCCTTGGTATCCCACTAATTCTAATTGCAATCATTATCCCACCCCTACTCAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATTATTAAAACCTTTAC
AAAACAACTAATACTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACTCTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATTCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. inornata Whitewater River Reserve

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. inornata Coachella Valley Preserve

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. inornata Willow Hole Preserve

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. inornata Eastern Indio Hils

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. inornata Windy Point

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTATTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. inornata Coachella Valley Preserve North

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. inornata Sleeping Man Dunes

CATAATCCCCCAGACCCTTGGTATTCCACTAATCCTAATTGCAATCATTATCCCACCCCTACTTAT
TTTAAGTTCATCAAACCGATTAGTCTCAAACCGCCTATCAACACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATCAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTCACACTACT
TCTTATATCATTAAATCTATTAGGGTTATTACCCTACACATTTACTCCAACAACACAACTTTCAATAAACAT
AGCATTAGCAGTACCAATATGACTAACAACTGTATTAATTGGTCTACGAAACCAACCAACTATTTCTCTTGG
ACACCTACTACCAGAGGGTACTCCTACACCACTAATCCCAATCTTAATCATTATTGAAACAATTAGTTTATT
TATCCGACCCCTTGCCCTAGGAGTTCGATTAACCGCTAACTTGACAGCAGGACACCTATTAATTCAATTAAT
TTCAACAGCAGCCTTTGTTTTAATACCATCAATAACTCTAACAGCAACAACAGCCTTCATTGTCCTACTACT
ACTAACTGGACTTGAAATTGCCGTAGCAA

U. scoparia Kelso Dunes

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Pisgah Crater

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Red Pass, Fort Irwin

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT

AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bitter Springs, Fort Irwin (ROM 00095)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bitter Springs, Fort Irwin (ROM 00096)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bitter Springs, Fort Irwin (ROM 00097)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bitter Springs, Fort Irwin (ROM 00098)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bitter Springs, Fort Irwin (ROM 00099)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Rice Dunes (ROM 19847)

TATAATCCCACAAACCCTTGGTATTCCATTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
CCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCCAACTTAACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Rice Dunes (ROM 19848)

TATAATCCCACAAACCCTTGGTATTCCATTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
CCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCCAACTTAACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Rice Dunes (ROM 19849)

TATAATCCCACAAACCCTTGGTATTCCATTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
CCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCCAACTTAACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATCCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19840)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCGGGACACAAATGAGCATCCATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19841)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCAGGACACAAATGAGCATCTATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19842)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCGGGACACAAATGAGCATCCATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG

GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19843)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCAGGACACAAATGAGCATCTATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19844)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCAGGACACAAATGAGCATCTATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19845)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCAGGACACAAATGAGCATCTATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dumont Dunes (ROM 19846)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCAGGACACAAATGAGCATCTATACTCCTAGCCATTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAATAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
GCACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dale Dry Lake (ROM 19850)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAACATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dale Dry Lake (ROM 19851)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAACATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAAGTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dale Dry Lake (ROM 19852)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dale Dry Lake (ROM 19853)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAACATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCCACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dale Dry Lake (ROM 19854)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAACATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Dale Dry Lake (ROM 19855)

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bouse Dunes (ROM 19885)

TATAATCCCACAAACCCTTGGTATTCCATTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTACTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGACTACGAAATCAACCAACTATTTCTCTTGG

ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCCAACTTAACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bouse Dunes (ROM 19886)

TATAATCCCACAAACCCTTGGTATTCCATTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTACTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGACTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCCAACTTAACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Bouse Dunes (ROM 19887)

TATAATCCCACAAACCCTTGGTATTCCATTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTACTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCCAACTTAACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Palen Dry Lake

TATAATCCCACAAACCCTTGCTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Cadiz Dry Lake

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATCTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTACTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Lenwood Wash

TATAATTCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

U. scoparia Coyote Dry Lake

TATAATCCCACAAACCCTTGGTATTCCACTAATTTTAATTGCAATCATCATCCCACCCCTACTTAT
TTTAAATTCATCAAATCGATTAGTCTCGAACCGCCTGTCAGCACTACAAACATGAATAATTAAAACCTTTAC
AAAACAACTAATATTACCAATTAGTATTTCCGGACACAAATGAGCATCCATACTCCTAGCCCTTACACTACT
TCTTATATCATTAAATTTATTAGGACTATTACCCTACACATTTACCCCAACAACACAACTTTCAATAAACAT
AGCACTAGCAGTACCAATATGATTAACAACTGTATTAATTGGGCTACGAAATCAACCAACTATTTCTCTTGG
ACACCTCCTACCAGAAGGTACTCCTACCCCACTAATCCCAATCTTAATTATTATTGAAACAATCAGTTTATT
TATCCGACCACTTGCCCTAGGAGTCCGATTAACCGCTAACTTGACAGCAGGACACTTATTAATTCAATTGAT
TTCAACAGCAGCCTTTGTTTTAATACCATCCATAACCCTAACAGCAACAACAGCCTTCATTATTCTACTACT
ACTAACTGGACTTGAAATTGCTGTAGCAA

Technical Appendix 4

Aligned sequences for mitochondrial DNA cytochrome *b* gene

C. draconoides

TACTTGGAATTTGCCTAATTATCCAAATCCTAACAGGACTATTTCTAGCCATACACTATACAGCTG
ACATTACATCAGCCTTTTCATCCGTTGCTCACATCTGCCGAGATGTTCAATATGGCTGACTTATCCGAAATA
TTCATGCCAACGGAGCCTCCATATTTTTTATCTGTATTTATCTCCACATTGGACGAGGAATATACTATGGAT
CTTACATGTTTAAAGAAACATGAAACATTGGAGTAATTCTACTACTATTAGTCATAGCAACGGCATTCGTAG
GATACGTCTTACCATGAGGACAAATATCATTTTGAGGAGCAACAGTCATTACTAATTTATTATCAGCTATTC
CTTACGTAGGAACAACCCTAGTAGAATGAATCTGAGGAGGATTCTCCGTCGACAACGCAACACTTACCCGAT
TCTTTACCTTTCACTTTCTCCTCCCATTCATTATTATTGGCATCACCATAATACATCTCCTATTTTTACATG
AAACAGGTTCAAACAACCCAACTGGACTATCCTCAAACACAGACAAAGTTCCATTTCACCCATATTTTTCAT
ACAAAGACCTCCTTGGAGCCCTACTACTAATCATTGTTCTACTAACCCTTGCACTATTTTCACCAAACCTAC
TAGGAGACCCAGAAAACTTTTCACCAGCAAACCCACTAGTAATCCTCCCACACATTAAACCAGAATGGTATT
TCCTATTTGCCTACGCCATCCTACGATCAATTCCAAACAAATTGGGAG-
CGTACTCGCCCTACTTTTCTCAATCCTAATCCTCATACTAGTTCCAATAATACACACATCAAAACAACGAAG
CACCTCCTTCCGACCAATATCTCAAACCATATTTTGACTTTTAATCTCAGACGTCCTCATTCTTACATGAAT
TGGGGGACAACCTGTAGAACACCCATTTATTATTATTGGACAAC-
TGCCTCAATCACTTACTTAATTCTATTCTTATTCATTATACCAACAACAGCAATACTAGAGAACAAACTCCT
AAAATGA

U. notata San Pedro

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTATGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCTGTACCATATGTAGGAACAACCCTAGTGGAATGAATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTCTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTTCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGAGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTCATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TGCCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Puerto Penasco

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTATGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCCTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCTGTACCATATGTAGGAACAACCCTAGTAGAATGAATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTTCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGAGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTCATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAACTATATACTTCTTACTATTTTTAATTGCTA
TGCCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Algodones Dunes (ROM 19875)

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTATACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGTTATTACTAGTAATAGCAA
CAGCATTTGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACCCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTATTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Algodones Dunes (ROM 19876)

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTATACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTTGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGGGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGATCAATCCCAAATAAACTAGGAGGAGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TGCCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Mohawk Dunes (ROM 19893)

TGCTCGGACTCTGCCTAATTATCCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCAGTAGCCCATATTTGTCGAGATGTACAATACGGCTGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATTTGCATCTATTTACACATTGGCCGAGGC-
TATATTATGGATCGTACATATTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACAGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTAGTGGAATGGATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTTGCCATCATTGGTGTCACCATAATACATCTGC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTTCCATTTCACC
CATACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATTTTAACCCTACTACTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACGCCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTATGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGGGTTCTTGCCC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CGGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATCATATACTTCTTATTATTTTTAATTGCTA
TACCAATAACAGCGATTCTAGAAAACAAACTATTAAAATGA

U. notata Mohawk Dunes (ROM 19894)

TGCTCGGACTCTGCCTAATTATCCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCAGTAGCCCATATTTGTCGAGATGTACAATACGGCTGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATTTGCATCTATTTACACATTGGCCGAGGC-
TATATTATGGATCGTACATATTCAAAGAAACATGAAACATTGGAGTAATCCTACTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACAGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTAGTGGAATGGATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTTGCCATCATTGGTGTCACCATAATACATCTGC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTTCCATTTCACC
CATACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATTTTAACCCTACTACTACTAGCACTATTTT

CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACGCCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTATGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGGGTTCTTGCCC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CGGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATCATATACTTCTTATTATTTTTAATTGCTA
TACCAATAACAGCGATTCTAGAAAACAAACTATTAAAATGA

U. notata Mohawk Dunes (ROM 19895)

TGCTCGGACTCTGCCTAATTATCCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCAGTAGCCCATATTTGTCGAGATGTACAATACGGCTGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATTTGCATCTATTTACACATTGGCCGAGGC-
TATATTATGGATCGTACATATTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACAGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTAGTGGAATGGATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTTGCCATCATTGGTGTCACCATAATACATCTGC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTTGGATTTCACC
CATACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATTTTAACCCTACTACTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACGCCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTATGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGGGTTCTTGCCC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CGGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATCATATACTTCTTATTATTTTTAATTGCTA
TACCAATAACAGCGATTCTAGAAAACAAACTATTAAAATGA

U. notata Pinta Sands (ROM 19896)

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCAATATTTTTTATCTGCATCTATTTACATATTGGCCGAGGC-
TATACTATGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATTTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATACATCTAC
TATTCTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CCCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGGGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTCATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATCGCTA
TGCCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Pinta Sands (ROM 19897)

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCCG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTATGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTGCTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGGGCAACGGTCATTACCAACCTCC
TTTCCGCTGTACCATATGTAGGAACAACCCTGGTGGAATGAATTTGAGGCGGGTTCTCCGTTGATAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTTCCATTTCACC
CATACTTTTCTTACAAAGACCTCTTAGGTGCCCTTCTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTTTACGGTCAATTCCAAACAAACTAGGAGGGGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTCATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACCTGAATTGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATCGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TGCCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Yuma Dunes (ROM 19861)

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATCTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAATCCTGCTATTGCTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCCTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCTGTACCATATGTAGGAACAACCCTGGTGGAATGAATTTGAGGCGGGTTCTCCGTCGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTTTACGGTCAATTCCGAACAAACTAGGAGGGGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTCATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTCACTTGAATTGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TGCCAATAACAGCGATTCTAGAAAATAAACTATTAAAATGA

U. notata Yuma Dunes (ROM 19862)

TACTAGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGATGTACAATACGGATGACTCATCCGAAATA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATTTGAGGCGGATTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAATAACCCAACAGGACTTTCCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTTTACGATCAATTCCAAACAAACTAGGAGGGGTTCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCACTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATCCTTATTCTAACCTGAATTGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TGCCAATAACAGCAATTCTAGAAAACAAACTACTAAAATGA

U. inornata Whitewater River Reserve

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGAGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. inornata Coachella Valley Preserve

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGCTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT

CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGGGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. inornata Willow Hole Preserve

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGCTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGAGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. inornata Eastern Indio Hills

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGAGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. inornata Windy Point

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAATCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGAGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. inornata Coachella Valley Preserve North

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATATGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGAGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. inornata Sleeping Man Dunes

TGCTCGGACTCTGCCTAATCATTCAAATCCTAACAGGACTATTTCTAGCCATACACTACACAGCTG
ACATTACATCAGCATTCTCATCCGTAGCCCATATTTGTCGAGACGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAACGGCGCCTCCATATTTTTTATCTGCATCTATTTACACATTGGCCGAGGC-
TATACTACGGATCGTACATGTTCAAAGAAACATGAAACATTGGAGTAATCCTGCTATTACTAGTAATAGCAA
CAGCATTCGTTGGTTACGTCTTACCTTGAGGCCAAATATCATTCTGAGGAGCAACGGTCATTACCAACCTCC
TTTCCGCCGTACCATACGTAGGAACAACCCTGGTGGAATGAATCTGAGGCGGGTTCTCCGTTGACAATGCAA
CACTAACTCGATTTTTTACATTTCACTTCCTACTTCCATTCGCCATCATTGGTGTCACCATAATGCATCTAC
TATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACCTCAAATACAGATAAAGTCCCATTTCACC
CATACTTTTCTTACAAAGATCTCTTAGGTGCCCTACTACTAATTTTAACCCTATTATTACTAGCACTATTTT
CTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACACCCCCACACATTAAGC
CAGAATGATACTTCCTATTTGCTTACGCCATTCTACGGTCAATTCCAAACAAACTAGGAGGAGTCCTTGCAC
TACTTTTCTCAATCTTGATCCTTATACTAGTCCCATTATTACACACATCAAAACAACGAAGCACCTCCTTCC
GCCCAATATCCCAAATCTTATTTTGACTACTAATTTCAGACATTCTTATTCTCACCTGAATCGGAGGACAAC
CAGTAGAACACCCCTTCATCATTATTGGTCAACTTGCCTCAATTATATACTTCTTACTATTTTTAATTGCTA
TACCAATAACAGCAATTCTAGAAAATAAACTATTAAAATGA

U. scoparia Kelso Dunes

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Pisgah Crater

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT

TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Red Pass, Fort Irwin

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTATCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bitter Springs, Fort Irwin (ROM 00095)

TGCTAAGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCATACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bitter Springs, Fort Irwin (ROM 00096)

TGCTAAGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCATACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bitter Springs, Fort Irwin (ROM 00097)

TGCTAAGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCATACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bitter Springs, Fort Irwin (ROM 00098)

TGCTAAGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCATACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bitter Springs, Fort Irwin (ROM 00099)

TGCTAAGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCATACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Rice Dunes (ROM 19847)

TGCTAGGTCTCTGCCTAATTATTCAAATCCTTACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTATATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTACTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCTTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAATGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT

TCTCCAAACCTATTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Rice Dunes (ROM 19848)

TGCTAGGTCTCTGCCTAATTATTCAAATCCTTACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTATATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCTTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAATGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTACTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCGTC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Rice Dunes (ROM 19849)

TGCTAGGTCTATGCCTAATTATTCAAATCCTTACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCTTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAATGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTACTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCGTC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19840)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTCTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19841)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTATTGATAACGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAGCAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19842)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTATTGATAACGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19843)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTATTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19844)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTATTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT

TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19845)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTATTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dumont Dunes (ROM 19846)

TGCTAGGTCTCTGCCTAATCATTCAAATCCTAACAGGACTATTCCTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAATA
TTCATGCTAATGGCGCCTCCATGTTCTTTATTTGCATCTACTTACATATTGGCCGAGG-
CTATACTATGGATCGTACATGTTTAAAGAAACATGAAACATTGGAGTAGTCCTACTTTTGCTAGTAATAGCA
ACAGCATTTGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGGGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTATTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCATCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTTCTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTAGGTGCCCTACTACTAATCTTAACCTTATTATTACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATCCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTGTTCTCAATTTTGATCCTAATACTAGTCCCACTATTGCACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATCATTATTGGCCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTT
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dale Dry Lake (ROM 19850)

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTTCTACTACCATTTGCCATTATTGGTATTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dale Dry Lake (ROM 19851)

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dale Dry Lake (ROM 19852)

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dale Dry Lake (ROM 19853)

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dale Dry Lake (ROM 19854)

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT

TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Dale Dry Lake (ROM 19855)

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bouse Dunes (ROM 19885)

TGCTAGGTCTCTGCCTAATTATTCAAATCCTTACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGGTCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCTTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTACATGAAACAGGATCGAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTACTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCTTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTTATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bouse Dunes (ROM 19886)

TGCTAGGTCTCTGCCTAATTATTCAAATCCTTACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCTTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTACATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTACTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTAATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCTTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTTATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Bouse Dunes (ROM 19887)

TGCTAGGTCTCTGCCTAATTATTCAAATCCTTACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCTTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTACATGAAACAGGATCGAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTACTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCCACACATTAAA
CCAGAATGATATTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTTATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATTGTC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Palen Dry Lake

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTCACATTTCACTTCCTACTACCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGCAAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Cadiz Dry Lake

TGCTAGGTCTCTGCCTAATTATTCAAATCCTAACAGGACTATTTTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTGCAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTCAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGCTACGTCCTACCCTGAGGACAAATATCGTTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATACGTAGGTACAACCCTAGTAGAGTGAATTTGAGGAGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTACCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCGTACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCTCCCCCACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATCTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATGTCCCAAATCTTATTTTGATTATTGATTTCAGACATCCTTATCCTCACCTGAATTGGTGGACAA
CCAGTAGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCGTC
ATACCAATAACAGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Lenwood Wash

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT

TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

U. scoparia Coyote Dry Lake

TGCTAGGTCTTTGCCTAATTATTCAAATCCTAACAGGACTATTCTTAGCCATACACTACACAGCCG
ATATTACATCAGCATTTTCATCCATTGCCCATATTTGCCGAGATGTACAATACGGATGACTTATCCGAAACA
TTCATGCTAATGGCGCCTCCATATTCTTTATTTGCATCTATTTACACATTGGCCGAGG-
CTATACTATGGATCGTACATATTTAAAGAAACATGAAACATTGGAGTAATCCTACTTTTGCTAGTAATAGCA
ACAGCATTCGTTGGATACGTCTTACCCTGAGGACAAATATCATTCTGAGGAGCAACAGTTATTACCAACCTA
CTCTCCGCCGTACCATATGTAGGAACAACCCTAGTAGAGTGAATTTGAGGGGGATTTTCTGTTGATAATGCA
ACACTAACCCGATTTTTTACATTTCACTTCCTACTGCCATTTGCCATTATTGGTGTTACCATAATGCACCTA
CTATTTTTGCATGAAACAGGATCAAACAACCCAACAGGACTTACTTCAAACACAGACAAAGTCCCATTTCAC
CCATACTTTTCTTACAAAGACCTCTTGGGTGCCCTACTACTAATCTTAACCTTATTATCACTAGCACTATTT
TCTCCAAACCTGCTAGGAGACCCAGAAAACTTCACACCAGCAAACCCATTAGTAACCCCCCCACACATTAAA
CCAGAATGATACTTCCTATTTGCTTATGCCATTTTACGATCAATTCCAAACAAACTAGGAGGAGTTCTCGCC
TTACTATTCTCAATTTTGATCCTAATACTAGTCCCACTACTACACACATCAAAACAACGAAGCACCTCCTTC
CGCCCAATATCCCAAATCTTATTTTGATTATTGATTTCAGACATTCTTATCCTCACCTGAATTGGTGGACAA
CCAGTTGAACACCCATTCATTATTATTGGTCAACTTGCCTCAATTACATATTTTTTATTATTTCTAATCATC
ATACCAATAACGGCAATTCTAGAAAACAAACTATTAAAATGA

Management Recommendations

1. If this Dumont population is described as a new species, it might be afforded endangered species status at that time. Such a change of status should be anticipated in any eastern LAQ proposal by the NTC, especially when coupled with the presence of the endangered Amargosa River pupfish (*Cyprinodon*) at the potential type locality at Dumont Dune. One or more of the populations currently designated as U. scoparia could be designated as threatened or endangered within the next five to 20 years. NTC management should have contingency plans to anticipate that change in status now.

2. Acceptable dune habitat still occurs west of Barstow, but fringe-toed lizards appear to be extirpated from the Antelope Valley and Harper Lake, regions representing the northwestern 20% of their historical range. This observation, coupled with Pt # 1, suggests that the NTC should develop contingency HCP documents, should the species be reassigned to state or federal "threatened or endangered" status. These plans should target the only population within current NTC boundaries which occurs along the valley bordered by the "whale" on its west-extending about 5kms due east,, Langford Road to the north, and Bitter Springs proper to the south. "Off limits" perimeter should be extended north from Bitter Springs proper to the NE corner of the Whale, continuing east 5 kms to enscribe an inverted triangle terminating on Langford Road on its north.

4.In addition, contingency HCPs should target lizard populations at the following LAQ sites: Dumont Dunes, falling dunes at Red Pass, and the small dunes along the NW shore of Coyote Dry Lake. Dunes less than 2kms in greatest diagonal diameter do sustain Mojave Fringe-toed lizards. The most dramatic of these are along the north shore of Coyote Lake. The are completely isolated from all other populations by at least 10 kms, are partially stabilized by well developed perennial vegetation, may fall below 1 km in greatest length. These small dunes lie within the proposed southwest LAO for the NTC. Clearly, very small, isolated, and partially stabilized dunes still harber populations of this species of special concern, as ranked by California Department of Fish and Game. Plans for a southwestern LAO should incorporate protection for these dunes, and for lateral deposition of inappropriate particulate matter (grain size or chemical composition) due to training maneuvers peripheral (especially up wind).

Objectives for 1999-2000 Studies

1. Small dunes along the western periphery of the "Whale" lava flow remain potential habitat for fringe-toed lizards and will be completely mapped (GPS/GIS) surveyed in 1999-2000. In this way minimum dunes sizes, shapes, and connectivity will be determined.

2. Similarly, "archipelagos" of small dunes will be examined along the periphery of East Cronese Dry Lake to determine if replicate correlations exist relative to those reported for the "Whale" and adjacent Bitter Springs.

3. All substates will be assayed quantitatively for grain size, parent materials, organic content, and chemistries. These parameters will be correlated to fringe-toed lizard presence to evaluated their predictive value.

4. Substrate and other habitat variables, both physical and biotic (syntopic lizards, vegetation density & composition), will be used to model potential habitat including minimum viable dune size and condition.

5. Potential habitat for the northwest Mojave Desert will be mapped, including the Antelope Valley, the NTC, and all proposed LAQ sites (Paradise Valley, Soda Mts., and Silurian Valley.

6. Recommendations for "contingency" HCPs will be submitted for potentially sensitive sites, both on the current NTC and at proposed LAQ sites.

Technical Appendix on Distributional Records:
Los Angeles County Museum of Natural History

Comment: The data spread sheets are arranged in trios. For example the columns printed on page 1 are continued across page 2 and completed on page 3, the same for pages 4-6, 7-9, and 10-12.

LACM	Order	Family	Genus	Species	Subspecies	Country	State
4916	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
4917	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
4918	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
4919	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
4920	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19572	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19573	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19574	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19575	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19576	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19577	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19578	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19579	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19580	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19581	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19582	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19583	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19584	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19585	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19586	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19587	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19588	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19589	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19590	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19591	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19592	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19593	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19594	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19595	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19596	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19597	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19598	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19599	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19600	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19601	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19602	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19603	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19604	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19605	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19606	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19607	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19608	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19609	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19610	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19611	SAURIA	Iguanidae	Uma	scoparia	-	USA	California

County	Locality
San Bernardino	10 mi W. Rice
San Bernardino	10 mi W. Rice
San Bernardino	10 mi W. Rice
Los Angeles	Palmdale
Los Angeles	7 mi E Palmdale
San Bernardino	Devil's Playground: E. Soda Lake
San Bernardino	Devil's Playground: E. Soda Lake
San Bernardino	Cadiz Dry Lake
San Bernardino	IBEX Pass; N. of Silurian Dry Lake
San Bernardino	2 mi SE Yerma; Mojave River
San Bernardino	2 mi SE Yerma; Mojave River
San Bernardino	2 mi SE Yerma; Mojave River
San Bernardino	2 mi SE Yerma; Mojave River
San Bernardino	Dunes near Kelso
San Bernardino	Dunes near Kelso
San Bernardino	Dunes near Kelso
San Bernardino	Dunes near Kelso
San Bernardino	Dunes near Kelso
San Bernardino	Silver Lake
San Bernardino	Pisgah Crater
San Bernardino	Pisgah Crater
San Bernardino	Rice
San Bernardino	Rice
San Bernardino	Rice
San Bernardino	Rice
San Bernardino	Harper's Dry Lake
San Bernardino	Harper's Dry Lake
San Bernardino	Harper's Dry Lake
San Bernardino	Harper's Dry Lake
San Bernardino	Harper's Dry Lake
San Bernardino	2 mi S. Saratoga Springs
San Bernardino	2 mi S. Saratoga Springs
San Bernardino	2 mi S. Saratoga Springs
San Bernardino	Dunes at Sperry Cyn; near Tecopa
San Bernardino	Dunes at Sperry Cyn; near Tecopa
San Bernardino	Dunes at Sperry Cyn; near Tecopa
San Bernardino	Dunes at Sperry Cyn; near Tecopa
San Bernardino	Dunes at Sperry Cyn; near Tecopa
San Bernardino	W. slope Alvord Mts.
San Bernardino	W. slope Alvord Mts.
San Bernardino	W. slope Alvord Mts.
San Bernardino	W. slope Alvord Mts.
Los Angeles	nr Wilsona P.O.
Los Angeles	E. slope of Butte at Wilsona
Los Angeles	12 mi E., 3 mi N. Lancaster

Collector	FieldNo	Date	Partial Date	Type	Status	Elevation
A Small		28-May-1951				
A Small		28-May-1951				
A Small		28-May-1951				
G Bendowski		1-Jul-1930				
G Bendowski		24-Jun-1931				
Norris	147	11-May-1949				
Norris	150	11-May-1949				
Norris		24-Apr-1950				
Norris	60	29-Mar-1949				
Norris		24-Apr-1950				
Norris		24-Apr-1950				
Norris		24-Apr-1950				
Norris		24-Apr-1950				
Mosauer		4-May-1935				
Mosauer		4-May-1935				
Mosauer		4-May-1935				
Mosauer		4-May-1935				
Norris	156	12-May-1949				
Norris	124	10-Apr-1949				
Reeder		24-Apr-1950				
Reeder		24-Apr-1950				
Cowles		7-Oct-1939				
Cowles		7-Oct-1939				
Cowles		7-Oct-1939				
Cowles		7-Oct-1939				
Norris	58	22-Apr-1949				
Norris	65	22-Apr-1949				
Norris	65	22-Apr-1949				
Norris	59	22-Apr-1949				
Norris	63	22-Apr-1949				
Norris		11-May-1949				
Norris		11-May-1949				
Norris		11-May-1949				
Norris	137	11-May-1949				
Norris	136	11-May-1949				
Norris	141	11-May-1949				
Norris	140	11-May-1949				
Norris	142	11-May-1949				
Norris		9-May-1949				
Norris		9-May-1949				
Norris		9-May-1949				
Norris		9-May-1949				
Bogert		31-May-1931				
Bogert		3-May-1931				

San Bernardino	1 mi W Ludlow
San Bernardino	1 mi W Ludlow
San Bernardino	10 mi W. Ludlow
San Bernardino	10 mi W. Ludlow
San Bernardino	near Ludlow
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	dunes E. of Cadiz Dry Lake
San Bernardino	5 mi W. Ludlow
San Bernardino	1 mi W. Ludlow
San Bernardino	Bush Dry Lake
San Bernardino	Bush Dry Lake
San Bernardino	Cronise Dry Lake
San Bernardino	Cronise Dry Lake
San Bernardino	Cronise Dry Lake
San Bernardino	Cronise Dry Lake
San Bernardino	Cronise Dry Lake
San Bernardino	Pisgah Crater
Los Angeles	Palmdale
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	5 mi. So. Rice
San Bernardino	Kelso Sand Dunes, 8 mi. SE Kelso
San Bernardino	Kelso Sand Dunes, 7 mi. S, 4 mi. W Kelso
San Bernardino	Kelso Sand Dunes, 8 mi. SE Kelso
San Bernardino	Kelso Sand Dunes, 8 mi. SE Kelso
San Bernardino	5 mi S Rice
San Bernardino	5 mi S Rice
San Bernardino	Pisgah Crater
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms

19548 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19549 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19550 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19551 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19552 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19553 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19554 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19555 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19556 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19557 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19558 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19559 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19560 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19561 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19562 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19563 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19564 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19565 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19566 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19567 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19568 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19569 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19570 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
19571 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
21902 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26943 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26944 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26945 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26946 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26947 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26948 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26949 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26950 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26951 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
26952 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
52740 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
52741 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
52742 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
52743 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
61476 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
61477 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
62220 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70096 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70097 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70098 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70099 SAURIA	Iguanidae	Uma	scoparia	-	USA	California

Brattstrom	1564	25-Apr-1954
Cunningham	1564	25-Apr-1954
Brattstrom	1567	25-Apr-1954
Brattstrom	1567	25-Apr-1954
Beall		23-Apr-1951
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Zweifel & Norris		24-Apr-1950
Tendick		22-Apr-1951
Norris	15	4-Mar-1949
Norris	16	4-Mar-1949
Norris	104	10-Mar-1949
Norris	112	10-Mar-1949
Norris	111	10-Mar-1949
Norris	110	10-Mar-1949
Norris	103	10-Mar-1949
Coulomb		
		1-Jul-1930
J. Savage	S-56-7	5-May-1958
J. Savage	S-56-7	
J. Savage	S-56-7	
J. Savage	S-56-7	
J. Savage	S-56-7	
J. Savage	S-56-7	
J. Savage	S-56-7	5-May-1958
J. Savage	S-56-7	5-May-1958
J. Savage	S-56-7	5-May-1958
Welbourn		29-Apr-1967
Knox		12-Apr-1959
Welbourn		29-Apr-1967
Welbourn		29-Apr-1967
D.R. Paulson	3015	
D.R. Paulson	3016	
B. Banta	1851	30-Aug-1959
E.R. Pianka	5501	27-Apr-1963
E.R. Pianka	5512	28-Apr-1963
E.R. Pianka	5516	28-Apr-1963
E.R. Pianka	5950	19-May-1963

70100 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70101 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70102 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70103 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70104 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70105 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70106 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70107 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70108 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70109 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70110 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70111 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70112 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70113 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70114 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70115 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70116 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70117 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70118 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70119 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70120 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70121 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70122 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70123 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70124 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70125 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70126 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70127 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70128 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70129 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70130 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70131 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70132 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70133 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70134 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70135 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
70136 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
75077 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97713 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97714 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97715 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97716 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97717 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97718 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97719 SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97720 SAURIA	Iguanidae	Uma	scoparia	-	USA	California

San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	13-14 mi E 29 Palms
San Bernardino	Atriplex Dunes, 13 mi. SE 29 Palms
San Bernardino	3 mi S. Pisgah Crater
San Bernardino	3 mi S. Pisgah Crater
San Bernardino	3 mi S. Pisgah Crater
San Bernardino	17 mi W. Riverside Co. line on 29 Palms Hwy
San Bernardino	Twentynine Palms
San Bernardino	3 mi N. 29 Palms
San Bernardino	29 Palms Hwy; 29.4 mi W. 29 Palms Hwy- Rice Rd. inte
San Bernardino	20.5 mi E. 29 Palms, sand dunes on S. edge Dale Dry La

E.R. Pianka	5951	19-May-1963	
E.R. Pianka	5952	19-May-1963	
E.R. Pianka	5975	21-May-1963	
E.R. Pianka	5979	21-May-1963	
E.R. Pianka	5980	21-May-1963	
E.R. Pianka	5982	22-May-1963	
E.R. Pianka	5983	22-May-1963	
E.R. Pianka	5985	22-May-1963	
E.R. Pianka	6296	6-Jun-1963	
E.R. Pianka	6297	6-Jun-1963	
E.R. Pianka	6302	6-Jun-1963	
E.R. Pianka	6314	7-Jun-1963	
E.R. Pianka	6317	7-Jun-1963	
E.R. Pianka	6334	8-Jun-1963	
E.R. Pianka	6342	8-Jun-1963	
E.R. Pianka	6769	27-Jun-1963	
E.R. Pianka	6776	27-Jun-1963	
E.R. Pianka	7071	24-Jul-1963	
E.R. Pianka	7074	24-Jul-1963	
E.R. Pianka	7094	26-Jul-1963	
E.R. Pianka	7517	8-Aug-1963	
E.R. Pianka	7528	9-Aug-1963	
E.R. Pianka	7532	9-Aug-1963	
E.R. Pianka	7534	9-Aug-1963	
E.R. Pianka	7535	9-Aug-1963	
E.R. Pianka	7546	10-Aug-1963	
E.R. Pianka	7551	11-Aug-1963	
E.R. Pianka	7554	11-Aug-1963	
E.R. Pianka	7556	11-Aug-1963	
E.R. Pianka	7558	11-Aug-1963	
E.R. Pianka	7560	11-Aug-1963	
E.R. Pianka	7562	11-Aug-1963	
E.R. Pianka	7564	11-Aug-1963	
E.R. Pianka	7704	30-Mar-1964	
E.R. Pianka	7869	15-Apr-1964	
E.R. Pianka	9037	22-Jul-1964	
E.R. Pianka	9047	23-Jul-1964	
E.R. Pianka	ERP 7566	11-Aug-1963	
F.C. Jahn	690316-4	4-Mar-1969	
F.C. Jahn	690316-5	4-Mar-1969	
F.C. Jahn	690316-7	4-Mar-1969	
B. Burne	630406-6	6-Apr-1963	
J.L. Peters	28	21-Apr-1951	
J.P. Duncan	26	21-Apr-1951	
K. Hillger	630511-6	11-May-1963	
R.M. Jurek	RMJ 66042	23-Apr-1966	610

97721	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97722	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97723	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
97724	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
109414	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
115551	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
115552	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122436	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122437	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122438	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122439	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122440	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122441	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122442	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122443	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
122461	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
123408	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
125981	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
126235	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
126236	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
126237	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
127276	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
127277	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
127278	SAURIA	Iguanidae	Uma	scoparia	-	USA	California
137924	SAURIA	Iguanidae	Uma	scoparia	-	USA	California

San Bernardino	5 mi W. Barstow P.O., Lynwood Rd. sand dunes
San Bernardino	E. slope Kelso Dunes, 9 mi S.W. Kelso
San Bernardino	Kelso Dunes, 12.4 mi S. Kelso
San Bernardino	Kelso Dunes, 12.4 mi S. Kelso
San Bernardino	ca. 2 mi. S Kelso on Kelbaker Rd.
San Bernardino	20 mi. E Twentynine Palms
San Bernardino	20 mi. E Twentynine Palms
San Bernardino	Old Dad Mtn; 3.7 mi. N, 12.3 mi. W. Kelso
San Bernardino	9 mi. S, 4 mi. W. Kelso
San Bernardino	9 mi. S, 4 mi. W. Kelso
San Bernardino	9 mi. S, 4 mi. W. Kelso
San Bernardino	9.2 mi. S, 5.1 mi. W. Kelso
San Bernardino	9.2 mi. S, 5.1 mi. W. Kelso
San Bernardino	9.2 mi. S, 5.1 mi. W. Kelso
San Bernardino	Kelso Dunes; 9.2 mi. S, 5.1 mi. W Kelso
San Bernardino	Pisgah Crater
San Bernardino	Cadiz Dry Lake, 26 mi SE Amboy
San Bernardino	Amboy Crater
San Bernardino	Kelso Dunes, 9.0 mi S., 3.0 mi W Kelso,
San Bernardino	Kelso Dunes, 9.0 mi S., 3.0 mi W Kelso,
San Bernardino	Kelso Dunes, 9.0 mi S., 3.0 mi W Kelso,
San Bernardino	ca 2 mi S Kelso on kelbakar
San Bernardino	ca 2 mi S Kelso on kelbakar
San Bernardino	Kelso Dunes; 9.2 mi S, 5.1 mi W Kelso, T9N, R12E Sec8
San Bernardino	Kelso Sand Dunes, southern end

W.L. Hunter	WLH 63052	25-May-1963	671
T.M. Peters	66	11-Apr-1959	
R.D. Knox, Jr.	600327-1	27-Mar-1960	
R.D. Knox, Jr.	600327-1	27-Mar-1960	
DA & MB Ruggles		26-Apr-1968	
via Marty Ruggles	NSH 286	7-Jul-1962	
via Marty Ruggles	NSH 287	7-Jul-1962	
LA Lester & TC Olmstead		29-Apr-1976	561.2
LA Lester & TC Olmstead		19-Apr-1976	
LA Lester & TC Olmstead		19-Apr-1976	
LA Lester & TC Olmstead		19-Apr-1976	
LA Lester & TC Olmstead		19-Apr-1976	
LA Lester & TC Olmstead		19-Apr-1976	
LA Lester & TC Olmstead		19-Apr-1976	
LA Lester & TC Olmstead		20-Apr-1976	732
		1-Jun-1969	
RN Shirley	272	2-Nov-1971	
M Griffin		16-Mar-1968	
R.L. Bezy and JW Wrig	5270-3	1-Jul-1977	732
R.L. Bezy and JW Wrig	5270-4	1-Jul-1977	732
R.L. Bezy and JW Wrig	5270-5	1-Jul-1977	732
D A & M B Ruggles	OC- 103	26-Apr-1974	
D A & M B Ruggles	OC- 106	26-Apr-1974	
L A Lester, & T Olmste	OC- 151	19-Apr-1976	732
C Rau	CSR 77043	30-Apr-1977	