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The Resources Agency
Department of Fish and Game

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THE FRESNO KANGAROO RAT STUDY
1975^{1/}

by

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ABSTRACT

In October 1974 an aerial survey was made to determine the existing native vegetation areas in western Fresno County. Within these areas ground search and live trapping were done to locate colonies of the Fresno kangaroo rat (Dipodomys nitratoides exilis). In February 1975 a species diversity study was initiated to determine the flora and fauna in the native alkali sink plant communities. Two areas of native vegetation were selected for study based on habitat evaluation, trapping success, accessibility, and suitability of future administration.

It was recommended that the Fresno kangaroo rat be given endangered status and the James Road and Whitesbridge study areas be established as ecological reserves.

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"Nongame Wildlife Investigations" Job I-1.8, Final Report.

RECOMMENDATIONS

To assure continued survival of the Fresno kangaroo rat and the natural ecosystem in which it evolved it is recommended that:

1. The Fresno kangaroo rat be given endangered species status.
2. The James Road and Whitesbridge study areas totalling 1,000 acres, as herein described, be established as ecological reserves for the Fresno kangaroo rat, blunt-nosed leopard lizard, and San Joaquin kit fox.
3. A management plan be developed to preserve and enhance these ecological reserves for endangered species and to provide for future scientific study of the alkali sink plant community.

INTRODUCTION

The Fresno kangaroo rat (Dipodomys nitratoides exilis), first collected in 1891, was thought to have become extinct until rediscovered in 1934 near Kerman, California. On May 21, 1971 the Fish and Game Commission declared the Fresno kangaroo rat to be a rare mammal. A search was made in 1972-1973 within a 15-mile radius of Fresno, California for the type locality of the Fresno kangaroo rat. Three colonies were found near Raisin City and the continued existence of the Fresno kangaroo rat near Kerman was confirmed. All colonies were found restricted to the alkali sink plant community which is rapidly disappearing from western Fresno County (Hoffman 1974). The Raisin City habitat was destroyed in 1974 through land leveling and conversion of these native lands to crop land.

The Fresno kangaroo rat has been identified as a separate subspecies of the San Joaquin kangaroo rat by examination of 758 museum specimens and chromosome analysis. The Fresno kangaroo rat is now threatened with extinction by the destruction of remaining habitat.



Figure 1. The Fresno Kangaroo Rat is Now Threatened With Extinction Because of Rapidly Changing Land-use.

SCOPE OF STUDY

Objectives of this study were to: (1) identify the existing native alkali sink habitat in western Fresno County, (2) determine the distribution of the Fresno kangaroo rat in these native vegetation areas, and (3) identify and evaluate critical habitat of the Fresno kangaroo rat.

The present native vegetation areas were searched out west and east of Kerman, east of Mendota, south of the San Joaquin river, and north of the Fresno Slough. Colonies of Dipodomys nitratoides exilis were located within these native vegetation areas. The critical habitat in which the Fresno kangaroo rat was found was evaluated.

The alkali sink plant communities of western Fresno County are poorly drained alkali flats and playas (Munz 1959). The topography is a hummocky micro-relief. The hummocks have been formed by local heaping of material moved by wind. Most hummocks are partly eroded by wind or by local washing during the rainy season. Protective vegetation is varied and patchy because of strong saline-alkali conditions in the surface layer of the Fresno series soils. Dominant vegetation includes Bromus rubens, Bromus mollis, Festuca megalura, Allenrolfea occidentalis, and Suaeda fruticosa (Huntington 1971).

The native vegetation areas range in elevation from 175 to 250 feet. The average rainfall is about 8 inches. The average temperature is about 62°F with highly variable seasonal and diurnal temperatures. The average growing season ranges by locality from 225 to 250 days (Huntington 1971).

The Fresno kangaroo rat (Figures 2 and 3) is found on alkali soil in the valley grassland and alkali sink plant communities in western San Joaquin Valley, California in the lower Sonoran life zone (Ingles 1965). The Fresno kangaroo rat is the smallest of the California kangaroo rats (Grinnell 1922). It is a dark yellowish buff color above with white underparts. It possesses dark whisker patches connected by dark fur across the nose. The hind foot is four-toed as the small claw on the side of the hind foot is lacking. The tail is buffy tipped with a tuft of longer hairs at the distal end. The tail has light tail stripes which are not wider than the dark tail stripes (Ingles 1965). The tail is used as a rudder to make sudden turns in this animal's saltatorial locomotion (Sanderson 1955).

The body length is 211-267 mm; tail 120-162 mm; hind foot 33-38 mm; ear (notch) 11-13 mm; skull 30.7-35.6 mm; baculum 13.3 mm; and width of maxillary arch 4.1-5.0 mm with a sharp angle (Ingles 1965).

The surface area of the burrows varies from 7 by 7 feet to 12 by 12 feet. The number of surface holes is variable with two kinds of openings, slanting and vertical. The vertical holes usually serve as escape exits while the slanting holes serve more general purposes. The regular tunnels are 2 inches in diameter and 8 to 10 inches below the surface. The tunnels have enlarged pockets with bottoms covered with grass and seed hulls (Culbertson 1946).

METHODS

The past range of native vegetation of western Fresno County was ascertained from a 1938 aerial survey done by the U. S. Army Corps of Engineers (Goodall 1939). In this survey alkali sink plant community is shown as pasture or fallow.



FIGURE 2. James Road Study Area



FIGURE 3. Whitesbridge Study Area

Figures 2 and 3 illustrate the vegetation characteristic of the alkali sink plant community of western Fresno county.

Determination of the present range of native vegetation was done on October 22, 1974 by aerial survey at an elevation of 3,000 feet. Native vegetation areas were located and mapped on an enlarged map of western Fresno County. Ground survey by vehicle was done on October 26, 1974 to confirm mapped areas. These areas were then delineated on California Department of Water Resources 1972 aerial survey maps of land use for computation of acreage by planimetry.

Ground search was utilized to determine kangaroo rat activity. Signs of activity were active burrows, fresh tracks and scat, recently used dust baths, and runways. The delineated native vegetation areas were searched on foot for these signs and recorded as positive or negative for that section.

In areas of positive activity live trapping with folding Sherman traps was done to determine the presence of the Fresno kangaroo rat. Rolled barley and poultry feed were used as bait.

In February 1975 a coordinated study of avian, floral, and invertebrate species was initiated by graduate students at California State University, Fresno at known sites of the Fresno kangaroo rat. Mammalian and reptilian fauna were also noted. This study provided a list of the diverse floral and faunal species found in the alkali sink plant community.

RESULTS

Distribution of native vegetation in 1938 is represented in Figure 4. Thirty-seven years ago alkali sink plant community represented most of western Fresno County.

Present distribution of native vegetation is shown in Figure 5. This area represents 14,618 acres.

Ground search results (Table 1) show that not all areas of native vegetation are inhabited by kangaroo rats. There was no evidence of kangaroo rat east of Kerman.

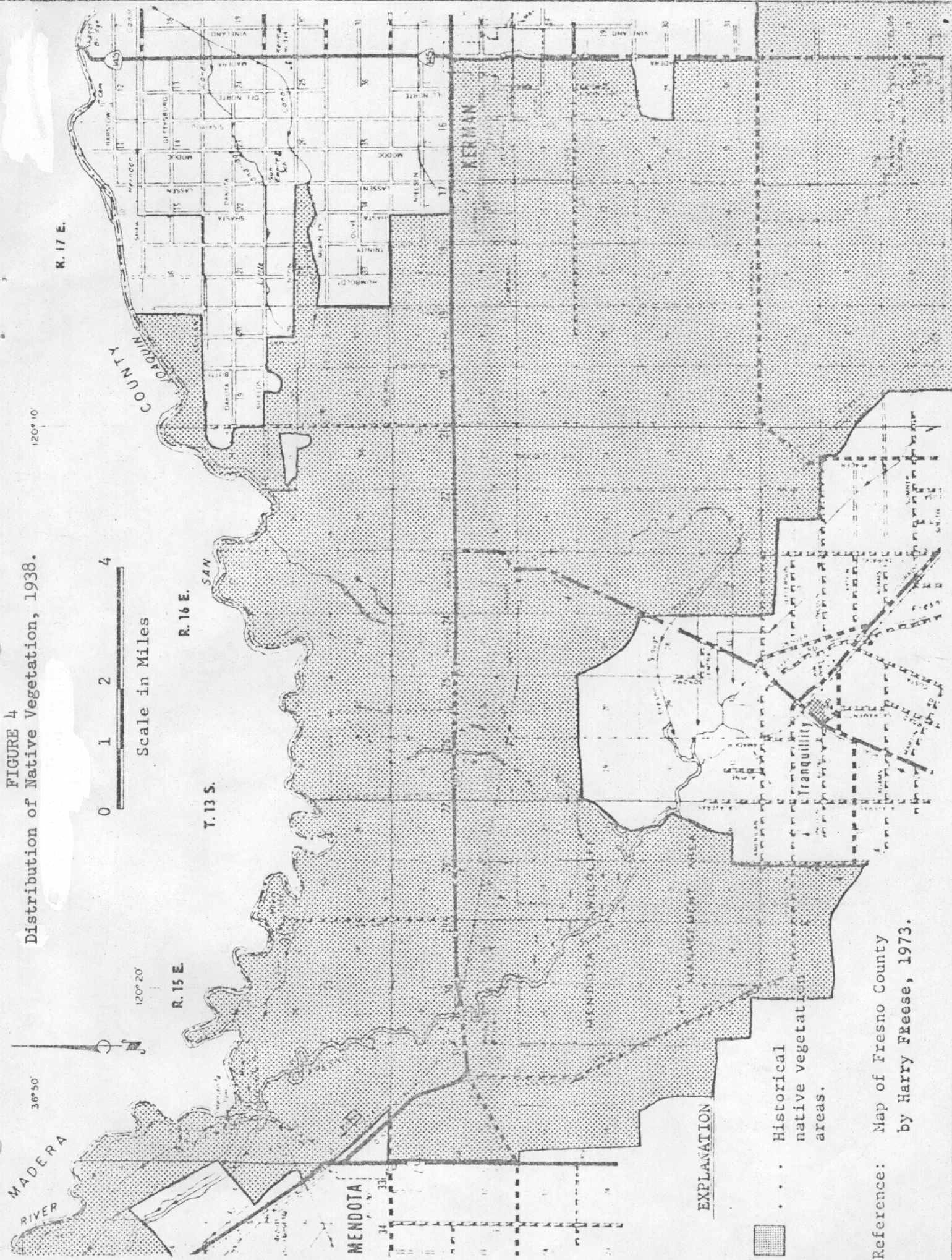
TABLE 1
Areas Surveyed for Fresno Kangaroo Rat Occurrence
1974-75

<u>Date</u>	<u>Location</u>	<u>Result</u>
	T14S, R16E	
October 19, 1974	Section 10	+
October 19, 1974	Section 11	+
October 19, 1974	Section 12	+
October 19, 1974	Section 1	+
October 19, 1974	Section 2	+
October 21, 1974	Section 15	-
October 21, 1974	Section 22	-
	T14S, R15E	
November 14, 1974	Section 1	-
November 14, 1974	Section 2	-
November 18, 1974	Section 12	+
November 19, 1974	Section 8	-
	T14S, R17E	
June 10, 1975	Section 32	-

Trapping success for the Fresno kangaroo rat in areas of positive ground activity is shown in Table 2. Stations occupied by species other than Dipodomys nitratoides were subtracted from the total number of stations to calculate percentage of traps occupied by only Dipodomys nitratoides.

The results of the habitat evaluation of species diversity are summarized in Appendices I, II, III, and IV.

FIGURE 4
Distribution of Native Vegetation, 1938.



EXPLANATION

..... Historical native vegetation areas.

Reference: Map of Fresno County by Harry Freese, 1973.

FIGURE 5
Distribution of Native Vegetation, June 1975.



EXPLANATION

- Existing native vegetation areas.

Reference: Map of Fresno County by Harry Freese, 1973.

Table 2
Fresno Kangaroo Rat Trapping Success, 1974-75

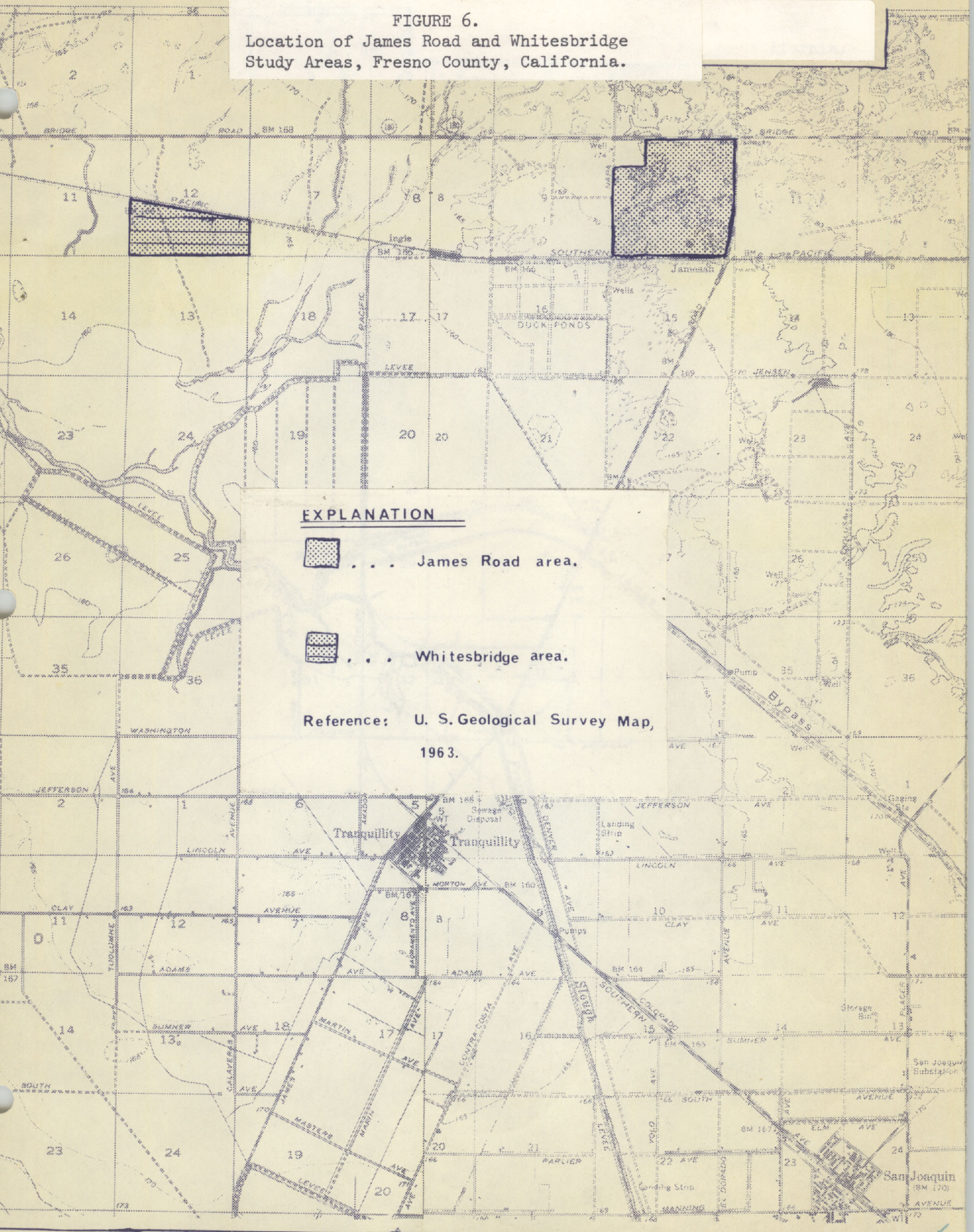
<u>Date</u>	<u>Location</u>	<u>Stations</u>	<u>Percent</u>	<u>(n)</u>
T14S, R16E				
October 22, 1974	Section 10	67	.000	(0)
November 2, 1974	Section 10	70	.014	(1)
November 5, 1974	Section 10	68	.015	(1)
November 14, 1974	Section 10	88	.011	(1)
November 21, 1974	Section 10	67	.075	(5)
January 3, 1975	Section 10	42	.024	(1)
April 19, 1975	Section 10	96	.042	(4)
April 20, 1975	Section 10	98	.000	(0)
April 26, 1975	Section 10	98	.010	(1)
April 27, 1975	Section 10	98	.010	(0)
			Average	
October 20, 1974	Section 2	56	.020	
			.036	(2)
			Average	
October 19, 1974	Section 11	70	.036	
November 3, 1974	Section 11	69	.014	(1)
			.000	(0)
			Average	
			.007	
T14S, R15E				
November 19, 1974	Section 12	60	.015	(9)
November 26, 1974	Section 12	56	.107	(6)
January 3, 1975	Section 12	14	.286	(4)
April 19, 1975	Section 12	92	.000	(0)
April 20, 1975	Section 12	87	.000	(0)
April 26, 1975	Section 12	93	.000	(0)
April 27, 1975	Section 12	93	.000	(0)
June 12, 1975	Section 12	24	.125	(3)
June 23, 1975	Section 12	29	.103	(3)
			Average	
			.071	

DISCUSSION

A critical habitat, as considered in this study, is that portion of the natural ecosystem presently occupied by an endangered species, that if preserved and enhanced will ensure the survival of that species. The James Road and Whitesbridge areas (Figure 6) were selected as critical habitat areas based on habitat evaluation, trapping success for the Fresno kangaroo rat, accessibility, and suitability for future administration.

The James Road area is in Section 10, T14S, R16E. It is 627 acres at an elevation of 175 feet. This area is owned by the A. F. Gilmore Land Company, 160 S. Fairfax, Los Angeles, California 90036. The Whitesbridge area is in the south half of Section 12, T14S, R15E. It is 300 acres at an elevation of 165 feet. This area is owned by the Goodman-Traction Ranch, P. O. Box 427, Tranquillity, California.

FIGURE 6.
Location of James Road and Whitesbridge
Study Areas, Fresno County, California.



Both areas are overgrazed alkali sink plant communities with undulating topography with the James Road area having greater differences in elevation than the Whitesbridge area, but never more than + 3 feet. The hummocks support the vegetation of the areas. Allenrolfea occidentalis is the dominant plant in the Whitesbridge area and Suaeda fruticosa in the James Road area. Vegetation common to both areas includes Koeleria phleoides, Bromus rubens, Atriplex canescens, Stellaria media, and Lasthenia chrysostoma. The lower elevations are flat playas with a paucity of flora and fauna. During seasonal flooding the water table rises to within 6 feet or less of the surface. This allows capillary action to deposit the salts on the surface (Huntington 1971). These areas are poorly drained creating vernal ponds in the flat-bottomed playas after rainfall.

Dominant terrestrial fauna in the areas are Lepus californicus, Dipodomys heermanni, Dipodomys nitratoide exilis, Peromyscus maniculatus, Perognathus inornatus, Uta stansburiana, Phrynosoma coronatum, Crotaphytus wislizenii silus, and Crotalus viridis. Evidence of Vulpes macrotis mutica has also been found.

Habitat evaluation shows these two areas have diverse floral and faunal life with the presence of the Fresno kangaroo rat, blunt-nosed leopard lizard, and San Joaquin kit fox. Currently the State classes the Fresno kangaroo rat and San Joaquin kit fox as rare and the blunt-nosed leopard lizard as endangered. The Secretary of the Interior includes the San Joaquin kit fox on the federal listing of endangered species. Trapping success for Dipodomys nitratoide is the highest in the Whitesbridge area. This area is accessible by dirt road and is adjacent to the Mendota Wildlife Management Area facilitating future stewardship. The James Road area has a consistently lower trap success, but the area is five miles directly east of the Mendota Wildlife Management Area on paved Highway 180 facilitating accessibility and stewardship. Both areas are currently used for grazing of domestic stock and duck hunting. There is no future land use change predicted.

ACKNOWLEDGEMENTS

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BIBLIOGRAPHY

- Culbertson, A. E. 1946. Observations on the natural history of the Fresno kangaroo rat. Jour. Mammal. 27 pp. 189-203.
- Goodall, G. E. 1939. Kings river and Tulare lake proposed flood control improvement. U. S. Army Corps of Engineers. U. S. Engineer Office. Sacramento, California. Map.
- Grinnell, J. 1922. A geographical study of the kangaroo rats of California. Univ. California Pub. Zool. 124 pp. 1-124.
- Hoffman, W. M. 1974. The Fresno kangaroo rat study. Calif. Dept. of Fish and Game, Nongame Wildl. Invest., Final Rept., Job II-5.4. 19 pp.
- Huntington, G. L. 1971. Soil Survey of eastern Fresno area, California. United States Dept. Agric. Soil Conserv. Serv. 393 pp.
- Ingles, L. G. 1965. Mammals of the Pacific states. Stanford Univ. Press. Stanford, California. 486 pp.
- Munz, P. A. 1959. A California flora and supplement. Univ. Calif. Press, Berkeley, California. 1,681 pp.
- Sanderson, I. 1955. Living mammals of the world. Hanover House. Garden City, New York. 303 pp.

APPENDIX I
Checklist of Plants Found on the
James Road and Whitesbridge Study Areas
1975¹/₇

Aizoaceae

Sesuvium verrucosum Raf.

Amaryllidaceae

Dichelostemma pulchella Heller.

Triteleia hyacinthina Greene.

Boraginaceae

Amsinckia intermedia F. & M.

Heliotropium curassavicum L. var. oculatum (Heller) Jtn.

Pectocarya penicillata (H. & A.) A.DC.

Plagiobothrys acanthocarpus (Piper) Jtn.

Plagiobothrys arizonicus (Gray) Greene ex Gray

Plagiobothrys canescens Benth.

Plagiobothrys leptocladus (Greene) Jtn.

Plagiobothrys stipitatus (Greene) Jtn. var. Micranthus (Piper) Jtn.

Caryophyllaceae

Spergularia macrotheca (Hornem) Heynh. var. leucantha (Greene) Rob.

Spergularia marina (L.) Griseb. var. tenuis (Greene) R.P. Rossb.

Stellaria media (L.) Vill.

Stellaria nitens Nutt.

Chenopodiaceae

Allenrolfea occidentalis (Wats.) Kuntze.

Atriplex canescens (Pursh.) Nutt.

Atriplex phyllostegia (Torr.) Wats.

Kochia californica Wats.

Suaeda fruticosa (L.) Forsk.

Compositae

Hemizonia pungens (H. & A.) T. & G.

Lasthenia chrysantha (Greene ex Gray) Greene.

Lasthenia chrysostoma (F. & M.) Greene.

Matricaria occidentalis Greene.

Psilocarphus brevissimus Nutt.

Senecio vulgaris L.

Convolvulaceae

Cressa truxillensis HBK var. vallicola (Heller) Munz.

Crassulaceae

Tilleaea erecta H. & A.

Cruciferae

Athysanus pusillus (Hook.) Greene.

Capsella Bursa-pastoris (L.) Medic.

Hutchinsia procumvens (L.) Desv.

Lepidium dictyotum Gray.

Lepidium dictyotum Gray. var. acutidens Gray.

Lepidium nitidum Nutt.

Tropidocarpum gracile Hook.

APPENDIX I (Cont.)

Cuscutaceae

Cuscuta spp. (one growing on Suaeda fruticosa & another on Hemizonia pungens)

Cyperaceae

Scirpus probustus Pursh.

Frankeniaceae

Frankenia grandiflora Cham. & Schlecht. var. campestris Gray.

Geraniaceae

Erodium cicutarium (L.) L'Her.

Erodium obtusiplicatum (Maire, Weiller & Wilcz.) J.T. Howell.

Graminaeae

Avena fatua L.

Bromus carinatus H. & A.

Bromus diandrus Roth.

Bromus mollis L.

Bromus racemosus L.

Bromus rubens L.

Deschampsia danthonioides (Trin.) Munro ex Benth

Distichlis spicata (L.) Greene var. nana Beetle.

Festuca megalura Nutt.

Hordeum leporium Link.

Hordeum depressum (Scribn. & Snr.) Rydb.

Koeleria phleoides (Vill.) Pers.

Poa scabrella (Thurb.) Benth. ex Vasey.

Polypogon monspeliensis (L.) Desf.

Vulpia microstachys (Nutt.) Benth. var. ciliata (Beal) Lonard & Gould.

Vulpia microstachys (Nutt.) Benth. var. microstachys (Nutt.) Benth.

Vulpia microstachys (Nutt.) Benth. var. pauciflora (Beal) Lonard & Gould.

Vulpia myuros (L.) K.C. Gremlin var. hirsuta Hack.

Hydrophyllaceae

Phacelia distans Benth.

Juncaceae

Juncus mexicanus Willd.

Leguminosae

Astragalus lentiginosus Dougl. var. migricalycis Jones.

Lotus corniculatus L.

Medicago polymorpha L.

Melilotus indica (L.) All.

Trifolium amplexans T. & G. var. truncatum (Greene.) Jeps.

Trifolium obtusiflorum Hook.

Trifolium tridentatum Lindl.

Malvaceae

Malvastrum Parryi Greene.

APPENDIX I (Cont.)

Onagraceae

- Camissonia campestris (Greene.) Raven.
- Camissonia contorta (Dougl.) Kearney.

Plantaginaceae

- Plantago elongata Pursh. ssp. pentasperma Bassett.
- Plantago Hookeriana F. & M. var. californica (Greene) Poe.

Polemoniaceae

- Eriastrum Hooveri (Jeps.) Mason.
- Gilia tricolor Benth. ssp. tricolor Benth.
- Linanthus dichotomus Benth.
- Linanthus liniflorus (Benth.) Greene.

Polygonaceae

- Polygonum argyrocolon Steud. ex Kunze.
- Polygonum aviculare L.
- Rumex crispus L.

Ranunculaceae

- Myosurus minimus L. var. minimus L.

Salicaceae

- Salix Goodingii Ball.

Scrophulariaceae

- Orthocarpus attenuata Gray.
- Orthocarpus brevistylus Hoover.
- Orthocarpus purpurascens Benth.
- Veronica peregrina L. ssp. xalapensis (HBK.) Penn.

SEEN BUT NOT COLLECTED

Chenopodiaceae

- Salsola Kali L. var. tenuifolia Tausch.

Typhaceae

- Typha spp.

APPENDIX II
Checklist of Invertebrates Found on the
James Road and Whitesbridge Study Areas
1975¹/₇

		<u>James Road</u>	<u>Whitesbridge</u>
Acarina			
Bdellidae	<u>Bdella</u> spp.	x	x
Penthaliidae	<u>Penthaleus</u> spp.	x	x
Cunaxoidae	<u>Cunaxoides</u> spp.	x	x
Rhagididae	<u>Rhagidia</u> spp.	x	x
Caeculidae	<u>Caeculus</u> spp.	x	x
Eupodidae	<u>Linopodes</u> spp.	x	x
	<u>Eupodes</u> spp.	x	-
Ceratozertidae	<u>Ceratozetes</u> spp.	-	x
Haplozetidae	<u>Peloribates</u> spp.	x	-
Zerconidae	Unidentified	x	-
Erythraeidae	Unidentified	x	x
Tydeidae	Unidentified	x	x
Pachygnathidae	Unidentified	-	x
Parasitiformes	Unidentified	x	x
Oribatid	Unidentified	x	x
Arachnida			
Linyphiidae	<u>Dictyna</u> spp.	x	x
Gnaphosidae	Unidentified	x	x
Thomsocidae	Unidentified	x	x
Salticidae	Unidentified	-	x
Phantangiidae	<u>Leptobunus californicus</u>	x	-
Coleoptera			
Staphylinidae			
Aleocharinae			
	<u>Tachyporus</u> spp.	x	x
Cucujidae	<u>Oeyazophilus</u> spp.	x	-
Lathridiidae	<u>Corticaria</u> spp.	x	x
	<u>Enicmus</u> spp.	-	x
	<u>Aridius</u> spp.	x	-
Elateridae	<u>Aeolus</u> spp.	-	x
	<u>Horistonotus</u> spp.	-	x
Melandryidae	<u>Orchesia</u> spp.	-	x
Tenebrionidae	<u>Blapstinus</u> spp.	x	x
	<u>Triorphus</u> spp.	-	x
Carabidae	<u>Pseudaptinus</u> spp.	x	x
	<u>Platynus maculicollis</u>	x	x
	<u>Loxandrus</u> spp.	x	x
	Unidentified	x	x
Clambidae	<u>Clambus</u> spp.	-	x
Coccinellidae	<u>Coccinella californicus</u>	x	x
Dernestidae	<u>Cryptorhopalum</u> spp.	-	x
Tenebrionidae	Unidentified	-	x
Staphylinidae	Unidentified	x	x
Chrysomelidae	Unidentified	x	x
Alleculidae	Unidentified	x	-

APPENDIX II (Cont.)

			<u>James Road</u>	<u>Whitesbridge</u>
Collembola				
	Sminthuridae	Unidentified	X	X
	Isotomidae	Unidentified	X	X
	Entomobryidae	Unidentified	X	X
	Poduridae	Unidentified	X	-
Dipleura				
	Japygidae	Unidentified	-	X
Diptera				
	Drosophilidae	<u>Drosophila</u> spp.	X	X
	Sarcophagidae	<u>Sarcophaga</u> spp.	X	-
	Milichiidae	<u>Meoneura</u> spp.	-	X
	Tipulidae	<u>Erioptera</u> cana	X	X
	Sphaeroceridae	<u>Leptocera</u> spp.	X	X
	Sciaridae	<u>Sciara</u> spp.	-	X
	Calliphoridae	<u>Phormia</u> spp.	-	X
	Ephedridae	Unidentified	X	X
	Tephritidae	Unidentified	-	X
	Chironomidae	Unidentified	X	X
	Phoridae	Unidentified	X	X
	Ascididae	Unidentified	-	X
	Dolichopodidae	Unidentified	X	X
	Muscidae	Unidentified	-	X
	Chironomidae	Unidentified	X	X
	Ephydriidae	<u>Napaea</u> spp.	X	X
	Coenomyidae	Unidentified	X	-
Homoptera				
	Cicadellidae	<u>Erythroneura elegantula</u>	X	X
		<u>Aceratagallia</u> spp.	X	X
		<u>Xerophloea</u> spp.	-	X
		Unidentified	X	X
	Pseudococcidae	<u>Pseudococcus</u> spp.	X	X
	Psyllidae	<u>Eurotica</u> spp.	X	X
	Aphididae	<u>Myzus</u> spp.	X	-
		<u>Aphis gossypii</u>	X	-
		<u>Habronathus</u> spp.	X	-
		Unidentified	-	X
Hemiptera				
	Lygaeidae	<u>Geocorus</u> spp.	X	-
	Coreidae	<u>Corizus hyalinus</u>	X	X
		<u>Arhussus</u> spp.	X	-
	Miridae	Unidentified	X	X
	Corixidae	Unidentified	X	-
	Reduviidae	Unidentified	X	-
	Saldidae	<u>Saldula</u> spp.	X	-

APPENDIX II (Cont.)

		<u>James Road</u>	<u>Whitesbridge</u>
Hymenoptera			
Formicidae	<u>Solenopsis</u> spp.	x	x
	<u>Aphaenogaster</u> spp.	x	-
Encyrtidae	Unidentified	x	-
Apidae	<u>Apis mellifera</u>	x	-
Bethylidae	Unidentified	-	x
Chalcidoidea	Unidentified	x	x
Lepidoptera			
Arctiidae	Unidentified	x	-
Noctuidae	Unidentified	x	x
Pyralidae	Unidentified	-	x
Microcoryphia			
Machilidae	<u>Machilis</u> spp.	x	x
Psocoptera			
Liposcelidae	<u>Liposcelis</u> spp.	x	x
Thysanoptera			
Thripidae	<u>Franklinella</u> spp.	x	x
	Unidentified	x	x
Thysanura			
Lepismatidae	<u>Thermobia</u> spp.	x	x
Symphyla	Unidentified	-	x
Pseudoscorpionida	Unidentified	x	x
Chilopoda			
Geophilomorpha	Unidentified	x	x
Diplopoda	Unidentified	x	x
Decapoda	<u>Artemia salina</u>	x	-

APPENDIX III

Checklist of Amphibians, Reptiles, Birds and Mammals Found on the James Road and Whitesbridge Study Areas 1975¹/

Amphibians

Western spadefoot toad

Scaphiopus hammondi

Reptiles

Blunt-nosed leopard lizard
Side-blotched lizard
California horned lizard
Pacific gopher snake
California kingsnake
Northern Pacific rattlesnake
Western fence lizard
California whiptail

Crotaphytus wislizenii silus
Uta stansburiana hesperis
Phrynosoma coronatum frontale
Pituophis melanoleucus catenifer
Lampropeltis getulus californiae
Crotalus viridis oreganus
Sceloporous occidentalis ssp.
Cnemidophorous tigris mundus

Birds

American widgeon
Cinnamon teal
Green-winged teal
Turkey vulture
Marsh hawk
Rough-legged hawk
Red-tailed hawk
American kestrel
American bittern
Spoonbill
American coot
Mountain plover
Killdeer
Long-billed curlew
Greater yellowlegs
Long-billed dowitcher
Least sandpiper
Western sandpiper
Common snipe
Mourning dove
Burrowing owl
Horned lark
Long-billed marsh wren
Pipit
Loggerhead shrike
Starling
Audubon's warbler
Meadowlark
Blackbird
Linnet
Lesser goldfinch

Mareca americana
Anas cyanoptera
Anas carolinensis
Cathartes aura
Circus cyaneus
Buteo lagopus
Buteo jamaicensis
Falco sparverius
Botaurus lentiginosus
spp.
Fulica americana
Eupoda montana
Charadrius vociferous
Numenius americanus
Totanus melanoleucus
Limnodromus scolopaceus
Erolia minutilla
Ereunetes mauri
Capella gallinago
Zenaidura macroura
Speotyto cunicularia
Eremophila alpestris
Telmatodytes palustris
Anthus spp.
Lanius ludovicianus
Sturnus vulgaris
Dendroica auduboni
Sturnella spp.
spp.
Carpodacus mexicanus
Spinus psaltria

APPENDIX III (Cont.)

Birds (Continued)

Savannah sparrow
Sage sparrow
White-crowned sparrow
Song sparrow

Passerculus sandwichensis
Amphispiza belli
Zonotrichia leucophrys
Melospiza melodia

Mammals

Black-tailed jackrabbit
Heermann kangaroo rat
Fresno kangaroo rat
San Joaquin pocket mouse
Deer mouse
Coyote
San Joaquin kit fox
Badger
Bobcat
California ground squirrel
Valley pocket gopher
California vole
House mouse

Lepus californicus
Dipodomys heermanni
Dipodomys nitratoides
Perognathus inornatus
Peromyscus maniculatus
Canis latrans
Vulpes macrotis mutica
Taxidea taxus
Lynx rufus
Otospermophilus beecheyi
Thomomys bottae
Microtus californicus
Mus musculus

1/ Compiled by Mike Chapel and Donna Knapp, California State University,
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