

## LITERATURE CITED

- Barbour, R. W. and W. H. Davis. 1969. Bats of America. University Press of Kentucky, Lexington. 286 pp.
- Barclay, R. M. R. and R. M. Brigham. 1994. Constraints on optimal foraging: a field test of prey discrimination by echolocating insectivorous bats. *Animal Behaviour*. 48:1013-1021.
- Bassett, J. E. 1982. Habitat aridity and intraspecific differences in the urine concentrating ability of insectivorous bats. *Comparative Biochemistry and Physiology*. 72(A): 703-708.
- Best, T. L. 1988. Morphologic variation in the spotted bat *Euderma maculatum*. *The American Midland Naturalist*. 119:244-252.
- Bonnichsen, B. 1984. The Bruneau-Jarbridge eruptive center, southwestern Idaho. in B. Bonnichsen and R.M. Breckenridge, editors, *Cenozoic Geology of Idaho: Idaho Bureau of Mines and Geology Bulletin 26*.
- Brigham, R. M., J. E. Cebek and M. B. C. Hickey. 1989. Intraspecific variation in the echolocation calls of two species of insectivorous bats. *Journal of Mammalogy*. 70:426-428.
- Carpenter, R. E. 1969. Structure and function of the kidney and the water balance of desert bats. *Physiological Zoology*. 42: 288-302.
- Conservation Data Center Home Page World Wide Web. 1996. Element tracking database subset. Idaho Department of Fish and Game, Boise.
- Fenton, M. B. and G. P. Bell. 1981. Recognition of species of insectivorous bats by their echolocation calls. *Journal of Mammalogy*. 62:233-243.
- Fenton, M. B., D. C. Tennant and J. Wyszecski. 1987. Using echolocation calls to measure the distribution of bats: the case of *Euderma maculatum*. *Journal of Mammalogy*. 68:142-144.
- Geluso, K. N. 1975. Urine concentrating cycles in insectivorous bats in the laboratory. *Journal of Comparative Physiology*. 99: 305-319.

- Hall, E. R. 1946. Mammals of Nevada. University of California Press, Berkeley. 710 pp.
- Hoffmeister, D. F. 1986. Mammals of Arizona. The University of Arizona Press. 602 pp.
- Keller, B. L. 1985. A simplified key to Idaho bats. *Tebiwa*. 22:57-63.
- Keller, B. L. 1987. Final Report. Analysis of the bat species present in Idaho, with special attention to the spotted bat, *Euderma maculatum*. Prepared for Nongame and Endangered Wildlife Program, Idaho Department of Fish and Game, Boise. 25 pp.
- Kunz, T. H. and A. Kurta. 1988. Capture methods and holding devices. pp. 1-29, In: Ecological and behavioral methods for the study of bats. T. H. Kunz, ed. Smithsonian Press. Washington. 533 pp.
- Kurta, A. and R. H. Baker. 1990. *Eptesicus fuscus*. Mammalian Species. 356: 1-10.
- McMahon, E. E., C. C. Oakley and S. P. Cross. 1981. First record of the spotted bat (*Euderma maculatum*) from Oregon. *Great Basin Naturalist*. 41: 270.
- Nowak, R. M. 1991. Walker's Mammals of the World. Fifth edition The Johns Hopkins University Press. Baltimore. 1629 pp.
- Thomas, D. W., G. P. Bell and M. B. Fenton. 1987. Variation in echolocation call frequencies recorded from North American vespertilionid bats: a cautionary note. *Journal of Mammalogy*. 68:842-847.
- Warner, R. M. and N. J. Czaplewski. 1984. *Myotis volans*. Mammalian Species. 175: 1-4.
- Watkins, L. C. 1977. *Euderma maculatum*. Mammalian Species. 77: 1-4.
- Wilkins, K.T. 1989. *Tadarida brasiliensis*. Mammalian Species. 331: 1-10.
- Woodsworth, G. C., G. P. Bell and M. B. Fenton. 1981. Observations of the echolocation, feeding behaviour and habitat use of *Euderma maculatum* (Chiroptera: Vespertilionidae) in southcentral British Columbia. *Canadian Journal of Zoology*. 59: 1009-1102.

COMMON NAME	SPECIES NAME	Abbreviation	STATUS			
			State Rank	IDFG	BLM	USFWS
Pallid bat	<i>Antrozous pallidus</i>	ANPA	S1?	none	none	none
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	COTO	S2?	SC	none	S
Spotted Bat	<i>Euderma maculatum</i>	EUMA	S2	SC	S	none
Big brown bat	<i>Eptesicus fuscus</i>	EPFU	none	none	none	none
California myotis	<i>Myotis californicus</i>	MYCA	S1?	none	none	none
Western small-footed myotis	<i>Myotis ciliolabrum</i>	MYCI	S4?	none	none	none
Long-eared myotis	<i>Myotis evotis</i>	MYEV	S3?	none	none	none
Little brown bat	<i>Myotis lucifugus</i>	MYLU	none	none	none	none
Fringed myotis	<i>Myotis thysanodes</i>	MYTH	S1?	SC	none	none
Long-legged myotis	<i>Myotis volans</i>	MYVO	S3?	none	none	none
Yuma myotis	<i>Myotis yumanensis</i>	MYYU	S3?	none	none	none
Western pipistrelle	<i>Pipistrellus hesperus</i>	PIHE	S1?	SC	none	none

Table 1. Species list and status of bats that have were predicted to occur in the study area. Species abbreviations used in this report are defined here.

SITE NAME	LOCALITY	DATE(S)	YEAR	Netting effort (Net Foot Hours)	ANABAT effort (Hours monitoring)
Grasmere-Blackstone Rd. (Pond I and Crowbar Gulch)	T9S R6E sec 3 SE1/4	8/7-8/8	1996	N/A	4
Head of Canyon (Hot Springs I)	T7S R6E sec 34 SW1/4ofSE1/4	9/16	1995	252.0	2
Indian Hot Springs	T12S R7E sec 33 NW1/4ofSW1/4	9/2-9/3	1995	1039.5	5
		8/14-8/16	1996	2310.0	12
Long Lake	T13S R6E sec 23 NW1/4ofNW1/4	9/8-9/9	1995	1372.6	6
Mary Creek Crossing	T13S R5E sec 11 SE1/4ofNE1/4	9/9-9/10	1995	1609.4	6
		7/24-7/27	1996	1134.0	10
Murphy Hot Springs I	T16S R9E sec 14 SE1/4ofSE1/4	8/16-8/17	1996	1344.0	4
Murphy Hot Springs at Fork	T16S R9E sec 10 SW1/4ofNE1/4	9/15-9/16	1995	1260.0	6
Roberson Ford	T9S R6E sec 12 SW1/4ofSW1/4	8/13-8/14	1996	378.0	5
Roberson Ford Rim	T9S R6E sec 11 SE1/4	8/6-8/7	1996	N/A	4
Roberson Ford Upland (@Gras-Black Rd Pond II)	T9S R6E sec 14 SW1/4ofNW1/4	8/12-8/13	1996	378.0	4.5
Winter Camp I	T10S R8E sec 9 SW1/4ofSE1/4 & NE1/4ofSW1/4	9/1-9/2	1995	1218.0	5
TOTAL EFFORT				12295.5	69.5

Table 2. Summary of survey site locations and sampling effort expended for 1995 and 1996 survey seasons. Mist netting effort is in Net Foot Hours. This is calculated as the number of linear feet of mist net deployed times the number of hours that the nets were open. This allows for mist netting effort to be compared across sites. ANABAT effort describes hours of monitoring not hours of calls recorded or analysed. Survey effort was weighted toward ultrasonic analysis in 1995 and less ambiguous mist netting in 1996.

SITE	DATE(S)	COTO	EUMA	EPFU	MYCA	MYCI	MYEV	MYLU	MYTH	MYVO	MYYU	PIHE	TABR	MYsp	Specimens	
															Retained	
Grasmere-Blackstone Rd. (Pond I and Crowbar Gulch)	8/7-8/8/96					A?									A	
Indian Hot Springs	9/2-9/3/95	A?	H	A		A?	A		A?		A?	A?	A	A		
	8/14-8/15/96		H	A/H							M(6)			A		
	8/15-8/16/96		H	A							M(7)			A	5 MYYU	
Long Lake	9/8-9/9/95		H													
Mary Creek Crossing	9/9-9/10/95		H					M(1)						A	1 MYLU	
	7/24-7/25/96	M(1)	H			M(2)		M(6)						A		
	7/25-7/26/96		H											A	1 EUMA	
	7/26-7/27/96		M(1)											A		
Murphy Hot Springs I	8/16-8/17/96						A			A?				A		
Murphy Hot Springs at Fork	9/15-9/16/95	A?		A		A?	A						A	A		
Roberson Ford	8/13-8/14/96		H					M(1)			M(2)			A		
Roberson Ford Upland	8/12-8/13/96													A		
Winter Camp I	9/1-9/2/95		H	A	A?	A	A?	A?						A		

Table 3. Bat detection and capture results for the entire study. Letters designate method of detection. A =ANABAT detection. M =Mist net capture. H =unaided Hearing of a bat. MYsp = uncertain Myotis detection. Numbers in parenthesis indicate the number of individuals of that species captured on that date. Question marks (?) indicate "likely" or low certainty ANABAT identifications. TABR =Tadarida brasiliensis. Patterns identified as TABR were consistent strong narrow-band constant-frequency calls but, this would be a new bat species for the state.

<b>SITE</b>	<b>DATE(S)</b>	<b>Relative EUMA activity level</b>
Grasmere-Blackstone Rd. (Pond I and Crowbar Gulch)	8/7-8/8/96	0
Head of Canyon (Hot Springs I)	9/16/95	0
Indian Hot Springs	9/2-9/3/95	3
	8/14-8/15/96	7
	8/15-8/16/96	5
Long Lake	9/8-9/9/95	1
Mary Creek Crossing	9/9-9/10/95	5
	7/24-7/25/96	11
	7/25-7/26/96	N/A
	7/26-7/27/96	9
Murphy Hot Springs I	8/16-8/17/96	0
Murphy Hot Springs at Fork	9/15-9/16/95	0
Roberson Ford	8/13-8/14/96	2
Roberson Ford Rim	8/6-8/7/96	0
Roberson Ford Upland	8/12-8/13/96	0
Winter Camp I	9/1-9/2/95	1

Table 4. Relative measure of EUMA activity at all surveyed areas. Values represent the total number of spotted bat passes detected during the evening observation period from sunset until 01:00 am. They should not be interpreted as the total number of spotted bats present. Frequently, other incidental spotted bat detections occurred throughout the night but, were not added to totals here. This allowed for more appropriate between site comparisons.

<b>SPECIES</b>	<b>OCCURENCE</b>
COTO	Yes
EUMA	Yes
EPFU	Yes
MYCI	Yes
MYEV	Yes
MYLU	Yes
MYYU	Yes
MYCA	<i>Highly likely</i>
MYVO	<i>Highly likely</i>
PIHE	<i>Highly likely</i>
MYTH	<i>Possible</i>
ANPA	<i>Unconfirmed</i>
TABR	<i>May occur</i>

Table 5. Summary of bat species occurrence data from this study. Positive occurrence classifications are based on mist net or unambiguous ANABAT results. "Highly likely" species classifications are based on low confidence ANABAT results. "Possible" species classifications are based on lower confidence ANABAT results. "Unconfirmed" species were predicted but not detected. "May occur" species refers to an unlikely or nonpredicted species (TABR) whose ANABAT results suggest occurrence (see text).

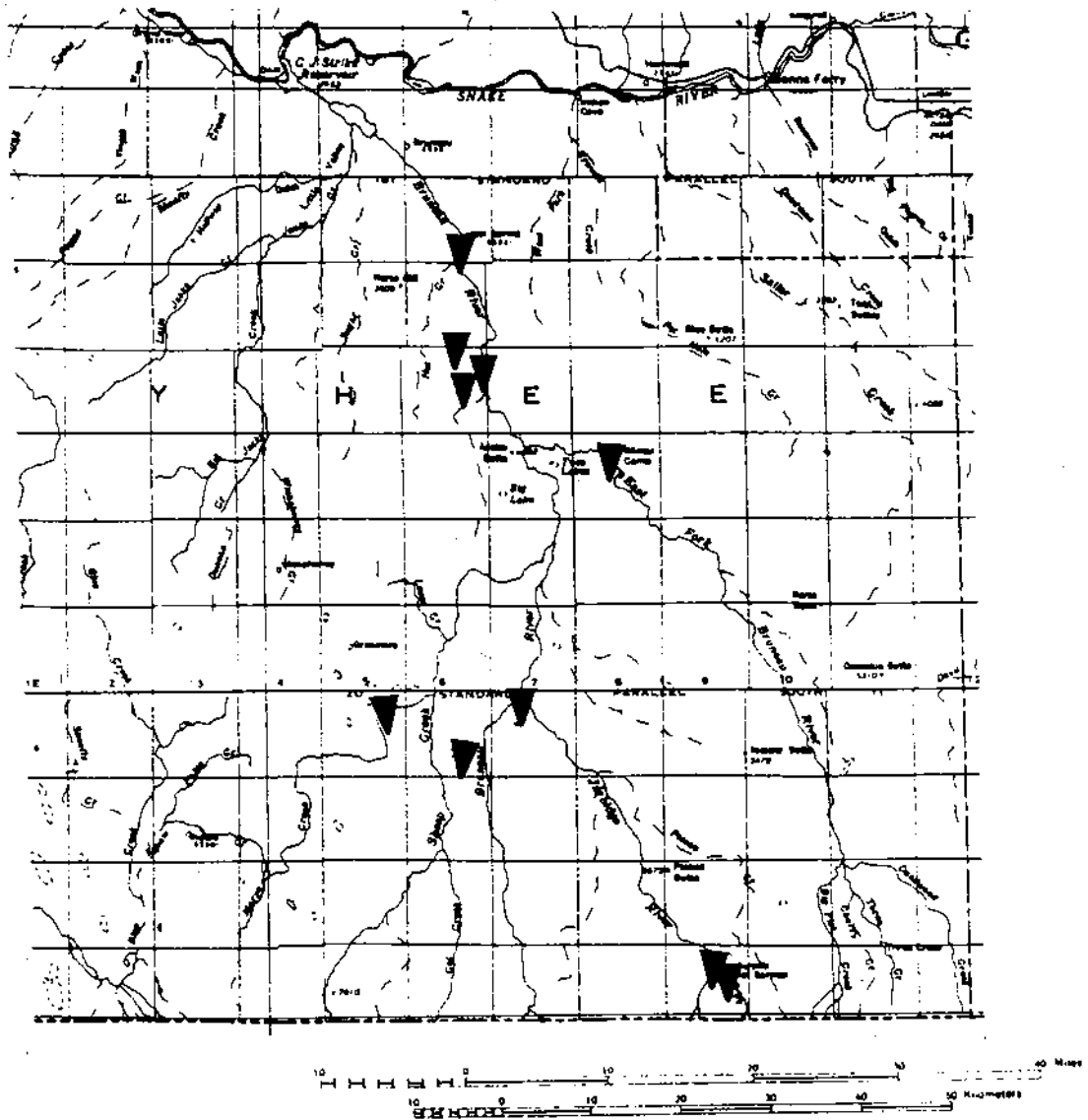
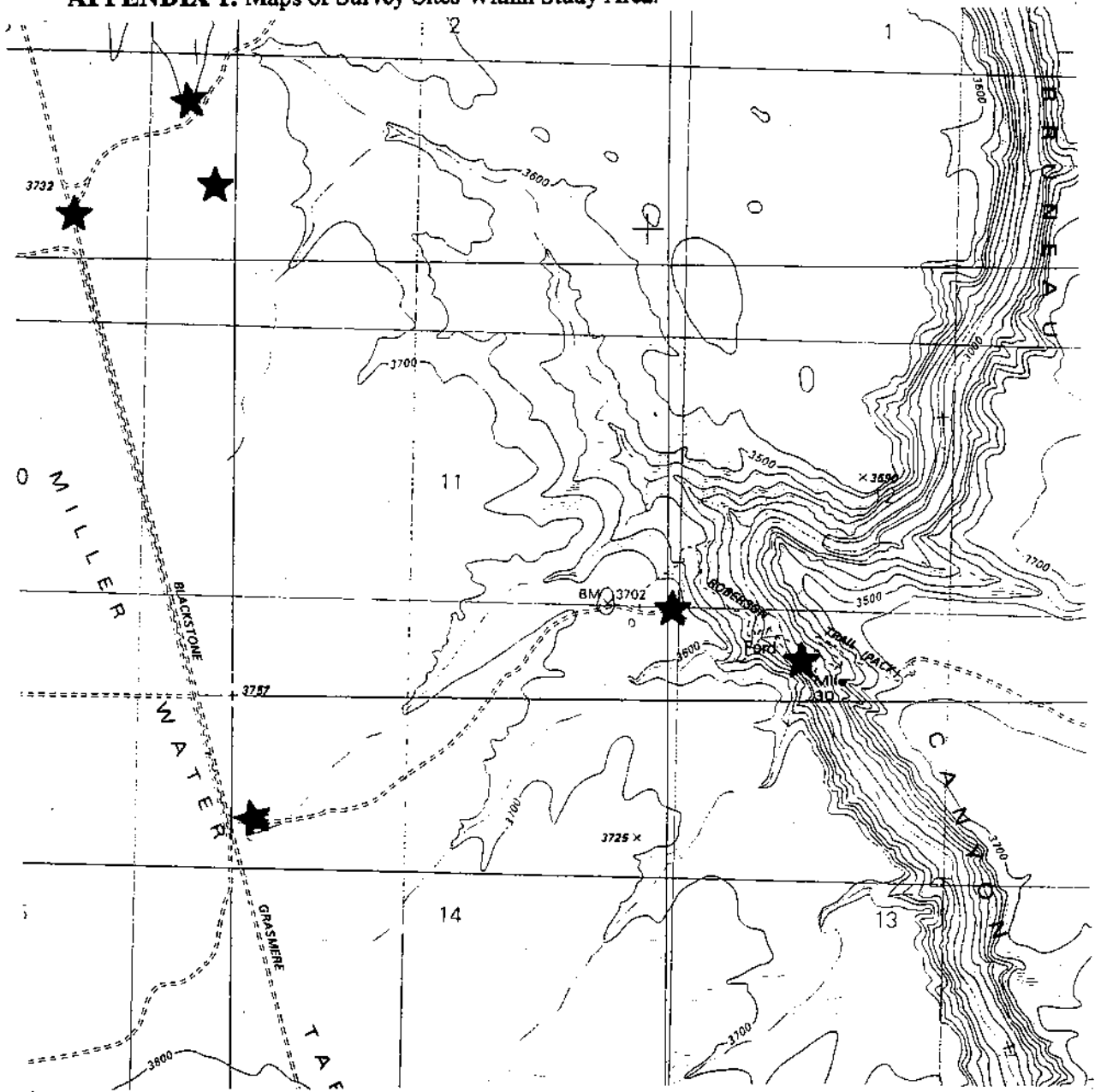


Figure 1. Map of study area with locations of survey locations marked. Triangular symbols represent areas where ultrasonic and/or mist net surveys occurred. Areas included deep canyon, shallow canyon, canyon head, rim and upland sites of the Bruneau-Jarvis River Area of Owyhee County, Idaho and associated creeks and uplands. Repeated surveys of sites are not indicated.

**APPENDIX 1. Maps of Survey Sites Within Study Area.**



**Figure A. Location of survey sites "Grasmere-Blackstone Rd. Pond I and Crowbar Gulch" (T9S R6E sec. 3 SE 1/4), "Roberson Ford" (T9S R6E sec. 12 SW 1/4 of SW 1/4), "Roberson Ford Rim" (T9S R6E sec. 11 SE 1/4) and "Roberson Ford Upland" (T9S R6E sec. 14 SW 1/4 of NW 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.**

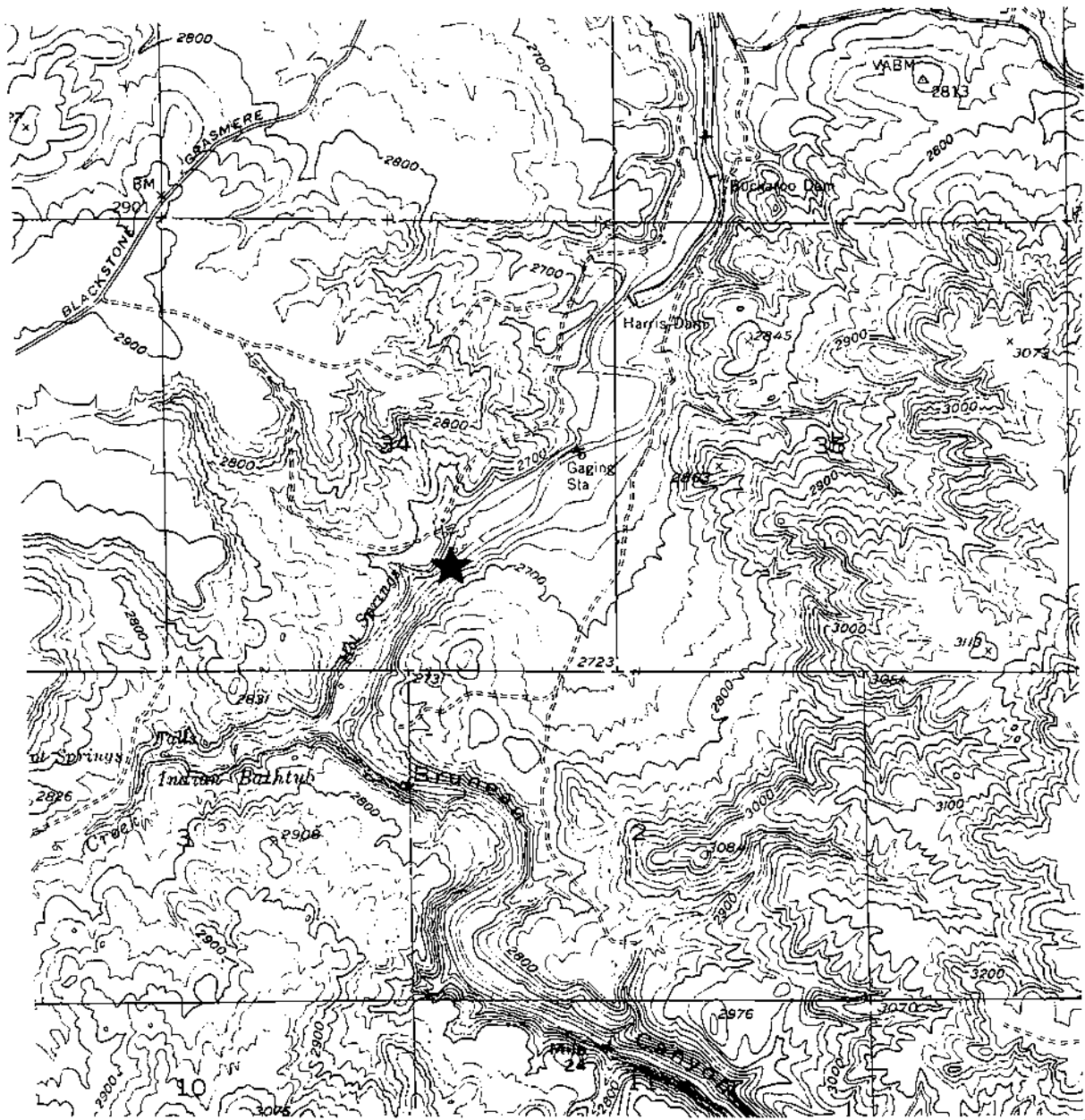


Figure B. Location of survey sites "Head of Canyon, Hot Springs I" (T7S R6E sec. 34 SW 1/4 of SE 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

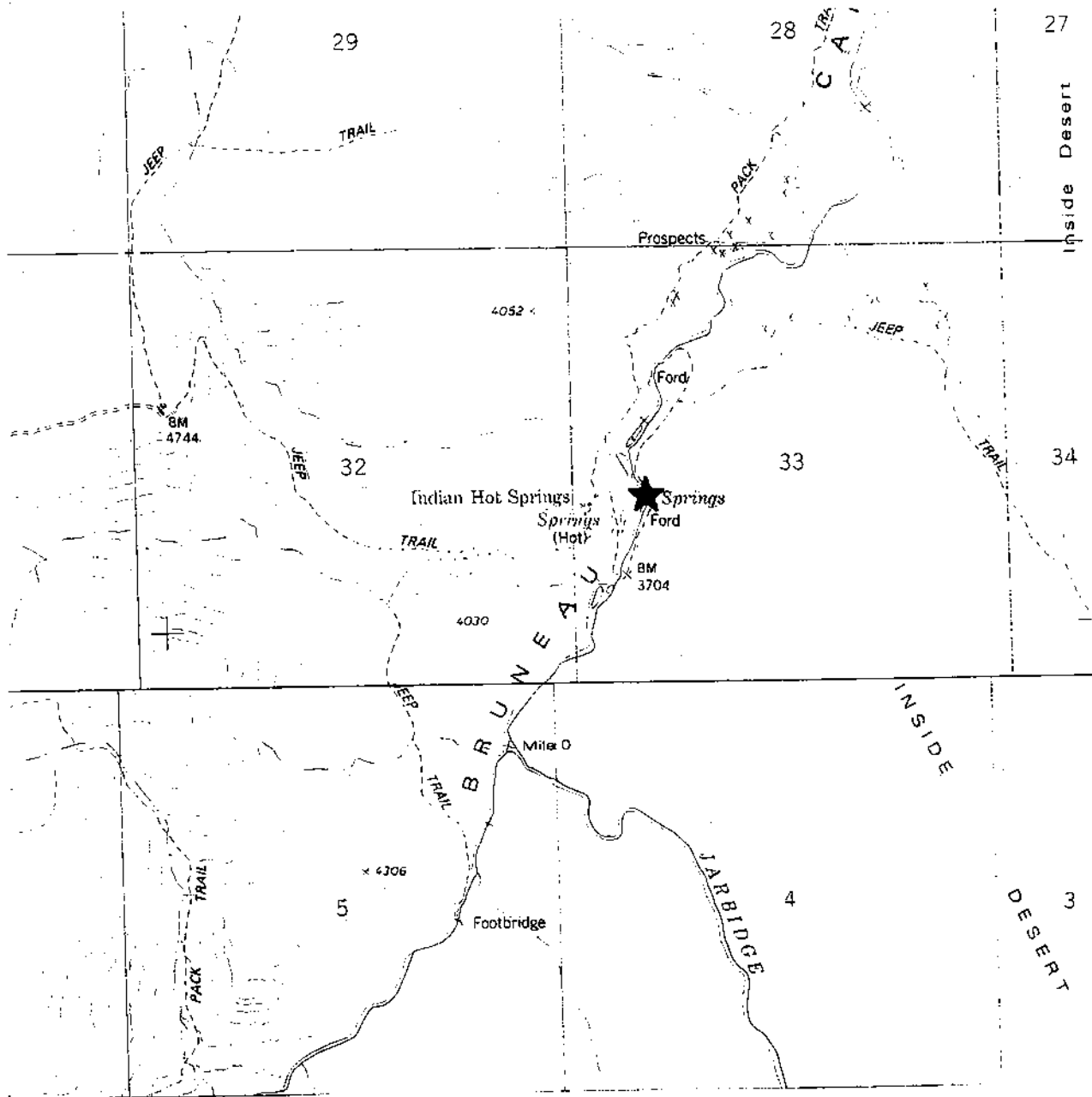


Figure C. Location of survey sites "Indian Hot Springs" (T12S R7E sec. 33 NW 1/4 of SW 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

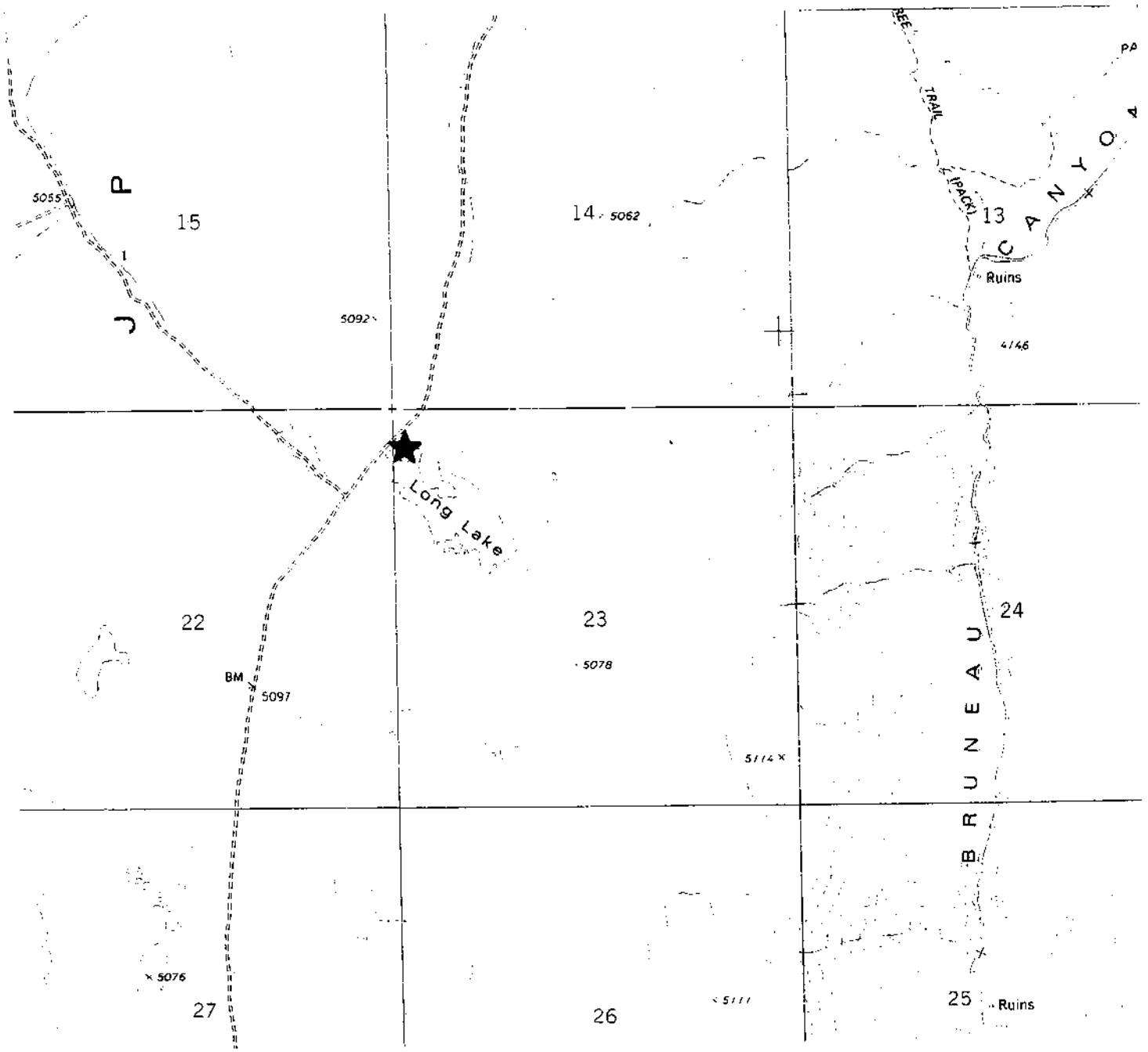


Figure D. Location of survey sites "Long Lake" (T13S R6E sec. 23 NW 1/4 of NW 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

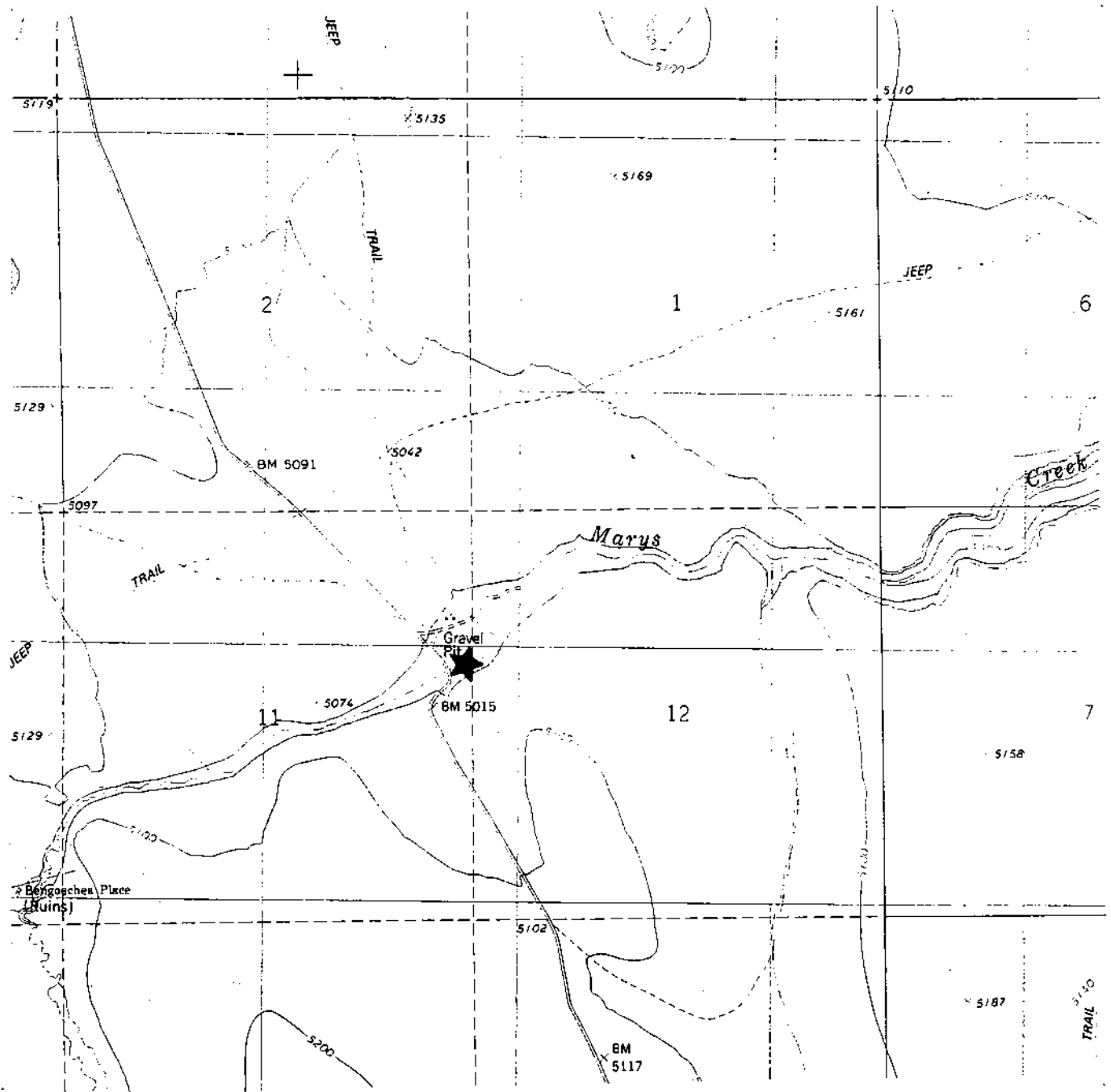


Figure E. Location of survey sites "Marys Creek Crossing" (T13S R5E sec. 11 SE 1/4 of NE 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

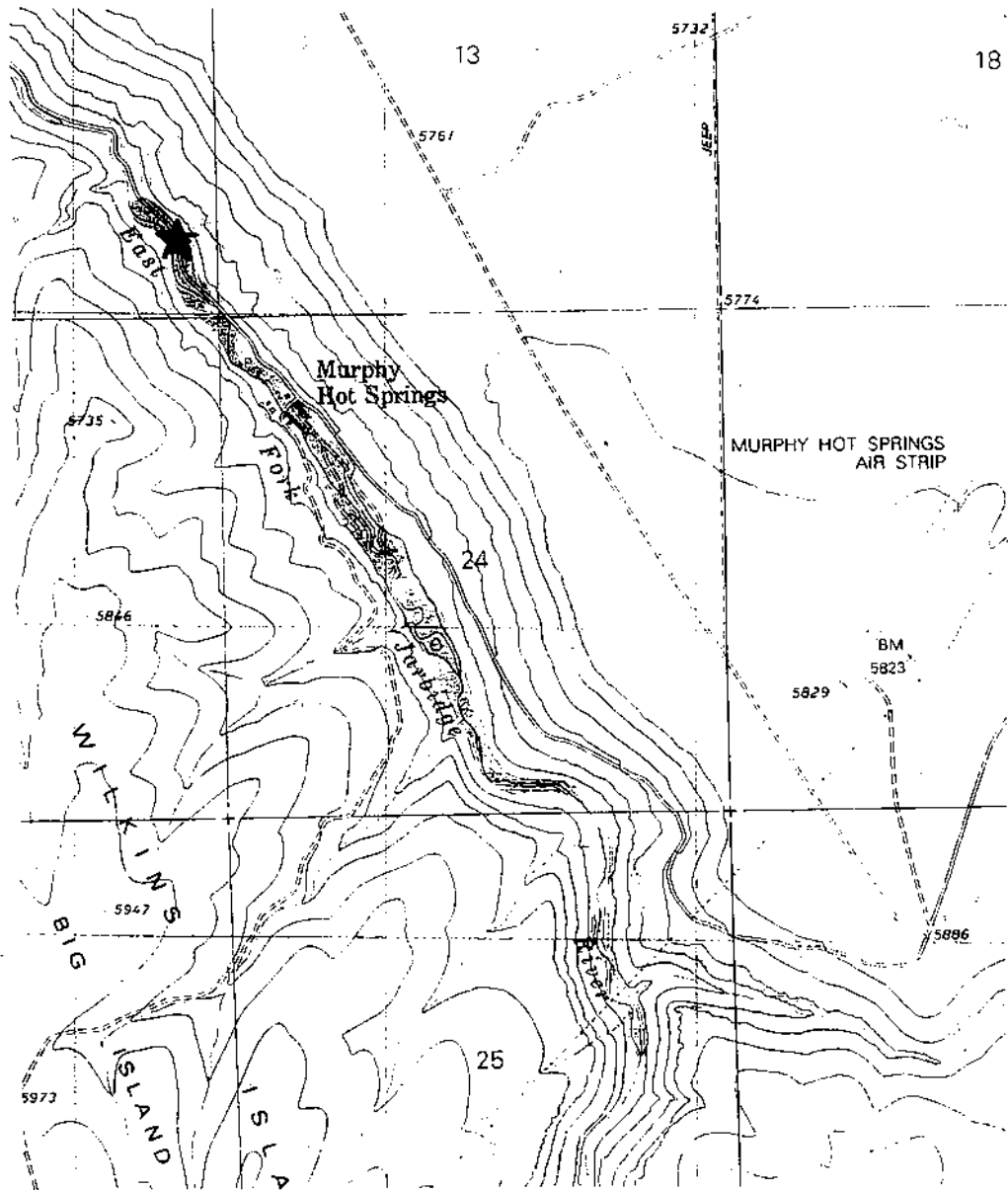


Figure F. Location of survey sites "Murphy Hot Springs I" (T16S R9E sec. 14 SE 1/4 of SE 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

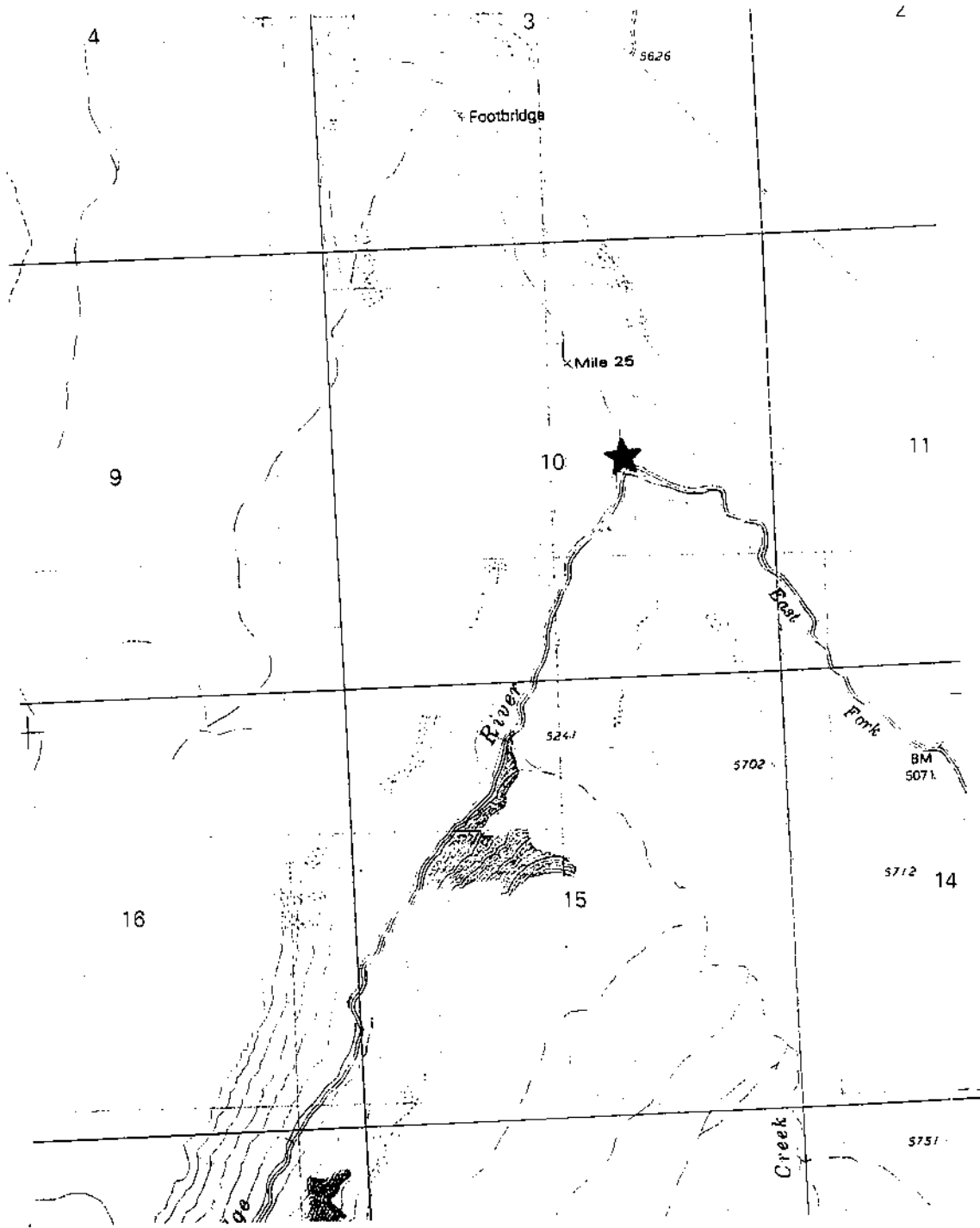


Figure G. Location of survey sites "Murphy Hot Springs at Fork" (T16S R9E sec. 10 SW 1/4 of NE 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

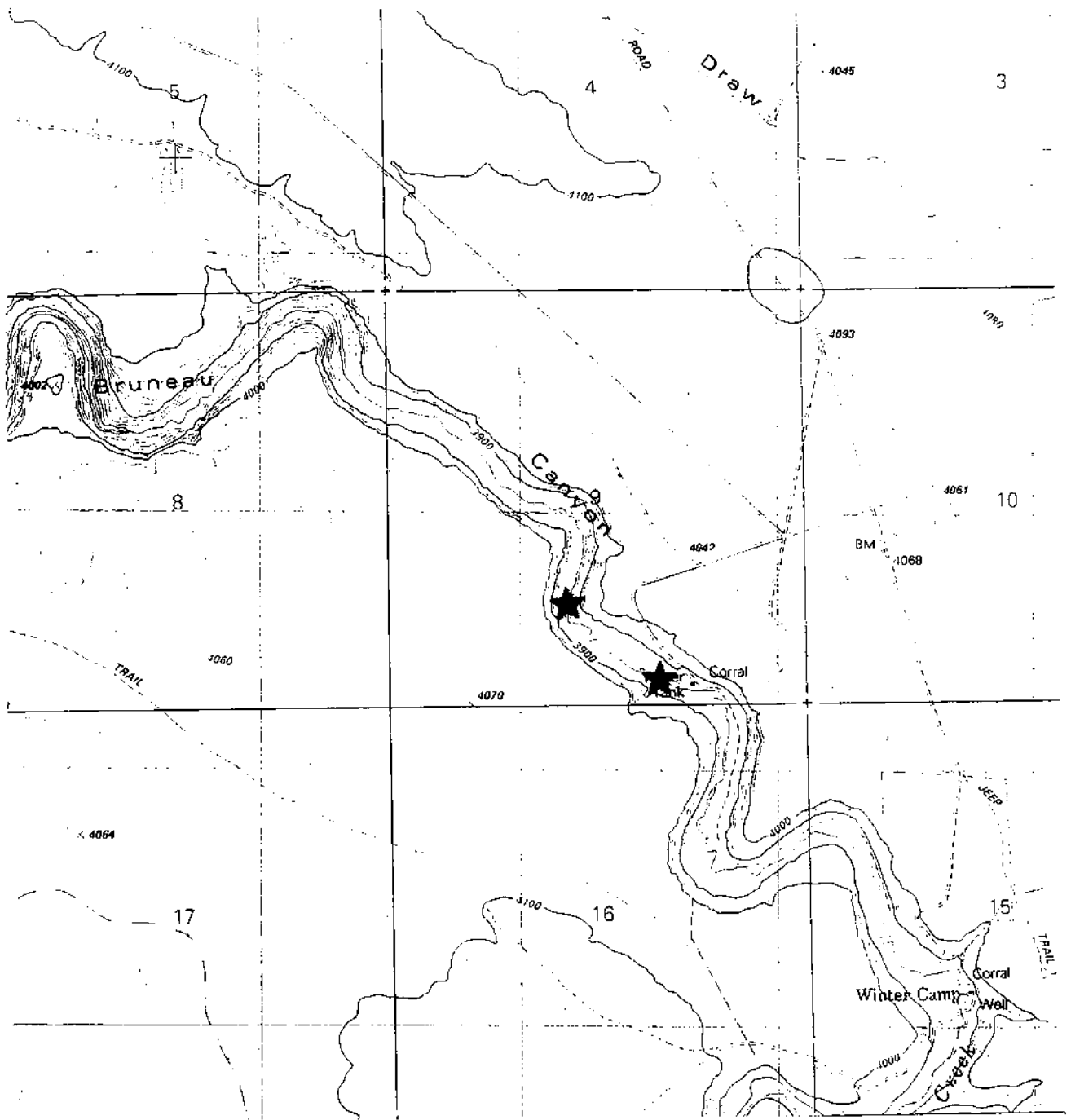


Figure H. Location of survey sites "Winter Camp I" (T10S R8E sec. 9 SW 1/4 of SE 1/4 and NE 1/4 of SW 1/4). Star symbols indicate locations of ultrasonic and/or mist net surveys. See Table 2. for survey dates and effort.

**APPENDIX 2. Description of circumstances and conditions of *Euderma maculatum* voucher collection.**

To place rapidly on record a description of the manner in which the spotted bat voucher specimen obtained during this study was gathered and handled, the following notification was sent to the Idaho Department of Fish and Game. A cover letter written by the p.i. (Dr. Barry Keller) was included.

30 August, 1996

**RE: SPOTTED BAT CAPTURE IN IDAHO** during bat surveys of the Bruneau-Jarbidge Canyon Area.

On 27 July, 1996 a **SPOTTED BAT** (*Euderma maculatum*) was captured during bat survey work being conducted by Idaho State University for the Boise District BLM.

**LOCATION:**

T13S R5E section 11. Owyhee County, Idaho.

The site of collection was the southeast quarter of the northeast quarter of section 11 near a point where a gravel road from Grasmere crosses Marys Creek.

**TIME OF CAPTURE:**

Approximately 4:00 am on the 27th of July, 1996. Mist net arrays were last checked at 3:30 am and no bats were observed. A spotted bat was heard as it passed over camp sometime around 4:00 am. When nets were checked at 5:10 am, the spotted bat was discovered.

**COLLECTED BY:**

Bill Doering, PhD student, Idaho State University.

Doering operates as a subpermittee of Dr. Barry Keller on permit no. 8604221.

**REMARKS:**

The spotted bat was captured in a 38 foot (11.7 meters) long 50 denier two-ply nylon mist net set on telescoped PVC poles. The point of capture in the net was 23 feet (7.1 meters) above the surface of Mary Creek (the net was set across the stream.).

Upon discovery of the spotted bat, all nets were collapsed. The net containing the spotted bat was gently lowered onto the gravel road surface of the bridge. This was done to reduce stress on the animal and prevent accidental escape. The bat was removed unharmed and in good condition. It remained relatively calm and passive. At no time did it appear aggressive. Photographs were taken during removal.

The spotted bat collected was a **MALE** with a capture weight of 17.31 grams. Other physical parameters will be measured during specimen preparation.

Immediately, camp was broken and the field team returned to Idaho State University. The bat was photographed while still alive by Chuck Peterson. It was euthanized by personnel at the animal care facility of Idaho State University using a carbon dioxide chamber and then placed for temporary storage in a secure freezer. The specimen is awaiting permanent preservation and will be curated at the Idaho Museum of Natural History. No IMNH number has been assigned as of this writing.



**Bureau of Land Management**  
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**BLM/ID/PT-99/006+1150**