

4492

SURVEY FOR PREBLE'S MEADOW JUMPING MICE
ALONG BOULDER CREEK AT 75TH
BOULDER, COLORADO
[Boulder Wastewater Treatment Plant Outfall Relocation Project]

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Boulder Creek, downstream of the bridge at 75th Street.

Summary

The City of Boulder is proposing to relocate the outfall pipe for the Boulder wastewater treatment plant. (UTM at east end of transects: 13T 0485270/ 4433253). The site of disturbance will run from Boulder Creek (about 250 feet downstream of the 75th Street bridge across the creek), at a 45° angle from the creek to 75th Street, south along the Right of Way for about 190 feet, across 75th Street and then to the wastewater treatment plant. We evaluated this site for the presence of Preble's meadow jumping mice (*Zapus hudsonius preblei*.) and found none.

Preble's meadow jumping mouse

The Preble's meadow jumping mouse was listed as threatened under the Endangered Species Act by the U.S. Fish and Wildlife Service on May 13, 1998 (63FR26517). It is a rare subspecies of meadow jumping mouse whose distribution is limited to portions of Colorado and Wyoming. It is known, historically, from eight counties along the South Platte River drainage (Armstrong 1972, Warren 1942) and once had a wider distribution in the tallgrass prairie across the eastern plains of Colorado and Wyoming (Fitzgerald et al. 1994). While its current distribution and status in Colorado are under investigation, there have been a number of successful trapping efforts in Larimer, Weld, Boulder, Jefferson, Douglas, Elbert and El Paso counties in the past few years.

The preferred habitat of Preble's meadow jumping mouse consists of drainages with well-developed vegetation characterized by high plant species richness and structural diversity (Bakeman 1997, Clippinger 2001). Such areas include feeding areas consisting of grasslands and riparian areas which have a dense ground cover of grasses and sedges (Tester et al. 1993). Day nests are found in dense riparian shrub (Tanya Shank, personal communication), hibernation sites are located in dense upland shrubs (Rob Schorr personal com., Tom Ryon, personal communication) and the riparian corridor provides a movement corridor. (Choate et al. 1991, Tester et al. 1993).

In Boulder County, jumping mice have been found on Coal Creek, St. Vrain Creek and its ditches, South Boulder Creek and its ditches including Doudy Draw, Bear Creek, Gregory Creek, Long Creek and Harmon gulch. Historic records indicate they had occupied Left Hand Creek and Boulder Creek.

Jumping mice were captured along Boulder Creek at Sawhill Ponds in 1968, but trapping efforts along this creek in recent years have been unsuccessful (Ruggles, et al 2000).

South Boulder Creek (6.5km straight line distance upstream of this location) is occupied by a large population of jumping mice (mean linear density = 34.5 ± 4.1 mice/km) between Eldorado Springs and Baseline Road (Meaney et al. 1999 and 2001), but jumping mice are not known from the stretch between Baseline Road and the confluence with Boulder Creek. In 1999 Meaney et al trapped at the confluence of Boulder Creek and South Boulder Creek and found no jumping mice.

Site Description

The proposed construction site is approximately 250 feet downstream of the 75th Street bridge across Boulder Creek (Fig. 1). Upstream of 75th St. to Sawhill Ponds, Boulder Creek runs mostly through private property and upstream of Sawhill Ponds is a gravel mine. Downstream and east of 75th Street almost to Highway 287, the creek runs through land managed by City of Boulder Open Space Mountain Parks.

This stretch of Boulder Creek is a riparian forest (Plates 1-3) consisting primarily of plains cottonwood, crack willow and Russian Olive with patches of coyote willow, snowberry, golden currant and wild rose underneath. The understory is primarily reed canary grass and smooth brome, with patches of dogbane, wild licorice, Canada thistle, teasle, jewelweed, bouncingbet, perennial pepperweed and blue vervain (Table 1). The site, though structurally diverse is dominated by introduced weedy species. Outside of the riparian corridor on either side of the creek are pastures dominated by non-native grass species. Cattle have highly constrained access to the creek at one site on the north side of the creek.

Overall the site could provide feeding, hibernation, and day nest sites as well as a movement corridor for jumping mice. There are uplands dominated by grasses for feeding, dense shrubs for active season daybeds, upland shrubs for hibernacula and the creek for a movement corridor from known occupation sites upstream of this site.

The stretch of land over which the pipeline will run from the wastewater treatment plant is a mown pasture more than 300 feet from the creek and (Plate 4) dominated by non-native species including smooth brome, alfalfa, milkweed, sweet clover and Canada thistle. It would probably not be an important component of jumping mouse habitat as there are other grassy areas closer to the creek corridor and shrub patches.

Methods

We followed recommendations of the National Biological Survey and National Museum of Natural History for standard field methods for qualitative and quantitative sampling of

biological diversity (Wilson et. al. 1996). Standard mammalogical procedures, using Sherman live traps for small mammal trapping and following guidelines approved by the Animal Care and Use Committee of the American Society of Mammalogists (1998) were followed. Polyester batting and bait (a sweet feed mix of oats and corn) were placed in each trap and traps were set at night, checked in the early morning and closed during the day. We sampled approximately 0.9km along both sides of the creek east of the bridge at 75th Street and 0.30km upstream of the bridge on the south side of the creek. Traps were set 5m apart and marked with survey flagging which was removed at the conclusion of the survey.

This methodology specifically targets small nocturnal, surface-dwelling mammals and may not reflect the presence of diurnal ground squirrels, tree squirrels, shrews or pocket gophers. However, as these animals or evidence of their presence were observed, the information was collected and incorporated into the results.

Results

No Preble's meadow jumping mice were found. There were 70 animals captured and 38 recaptured for an overall capture rate of 11%. Of these 41% were deer mice, 30% were plains harvest mice, 12% meadow voles, 10% house mice, 4% prairie voles and 3% masked shrews. (Table 2)

By contrast we experienced a 7% capture rate on Boulder Creek at Sawhill Ponds in 2000 (Ruggles et al 2000). Sixtyfour percent of captures were deer mice, 17% meadow voles, 11% prairie voles, 2% western harvest mice, 1% masked shrew and 1% Norway rat. In 1995 Armstrong had a 7% capture rate capturing 4 species with deer mice comprising 59% of the capture, meadow voles 26% of the capture, house mice 10% of the capture and prairie voles 5% of the capture. In 1965 Cruzan (1968) had a 9% capture rate with deer mice and meadow voles comprising 35% of the capture respectively while Preble's Meadow Jumping Mice represented 17% of the capture and masked shrews comprised 12% of the capture. Trapping on Boulder Creek upstream of Sawhill Ponds over the past 3 years has yielded no jumping mice. City and County Open Space trapped at Boulder Creek and 61st in 1998 and Meaney et al (1999) trapped at the confluence of Boulder Creek and South Boulder Creek in 1999. Neither survey yielded Prebles Meadow Jumping Mice. (Table 3).

There are no physical barriers to movement of jumping mice from their known occupation along South Boulder Creek into Boulder Creek and downstream. Much of the riparian

corridor appears to support the suite of vegetative characteristics preferred by jumping mice. However most of the creek corridor has been highly disturbed at one time or another over the past century including gravel mining, intensive grazing and development. The cumulative impacts over time have apparently eliminated populations of jumping mice which once existed between South Boulder Creek and this site. As the riparian corridor recovers and a structurally diverse and species rich plant community is established jumping mice may once again occupy Boulder Creek downstream of South Boulder Creek and Baseline Road.

Management recommendations

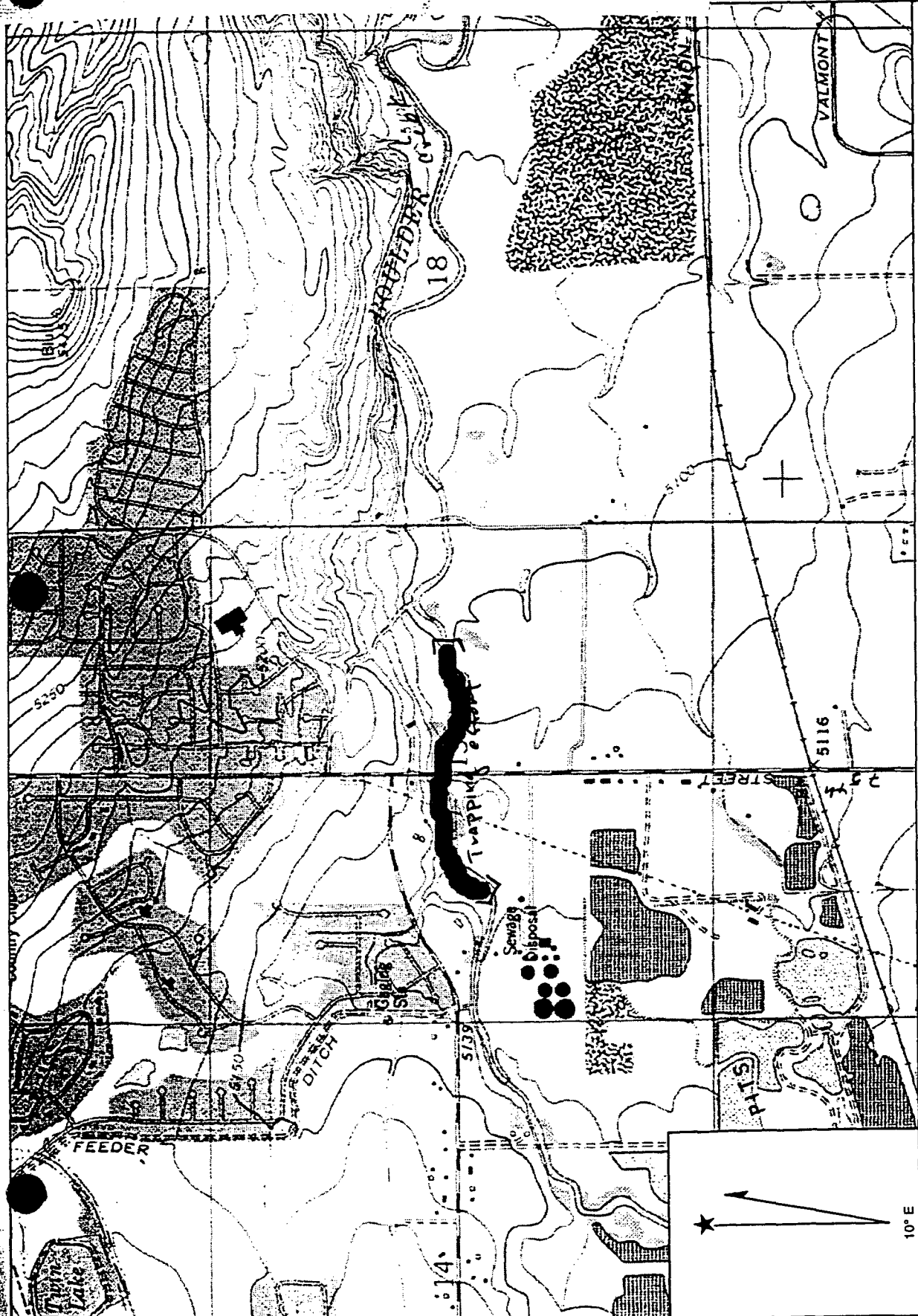
Vegetation at this site consists of a high number of weed species. Weed management is strongly encouraged during and after construction. Control of existing weed populations and preventing the introduction of new populations, thus preventing degradation of wildlife habitat, should be a priority throughout the project. Bare ground and roadsides are notorious for their susceptibility to weed invasion and establishment. This is primarily due to two processes: 1) they are often unvegetated, providing a seed bed in which weed propagules can establish without any competition from existing vegetation, and 2) vehicles serve as vectors for transporting and depositing weed propagules into the roadsides from other locations.

It has been noted throughout ecological and reclamation literature that abundant and well-established grass communities are one of the best and most proactive measures to resist weed encroachment. Appropriate revegetation using native plants will provide a net gain of seed source and cover for small mammals and will preclude invasion by non-native weeds. Prevention of weed invasion and establishment is also necessary for general ecosystem health, and is mandated by the Colorado Weed Management Act. It is for these reasons that we recommend restoring all areas both within and outside of the disturbed areas.

Literature Cited

- Animal Care and Use Committee. 1998. Guidelines for the capture, handling and care of mammals as approved by the American Society of Mammalogists. *Journal of Mammalogy*. 79 (40): 1416-1431.
- Armstrong, D.M. 1972. Distribution of mammals in Colorado. Monograph, University of Kansas Museum of Natural History 3: 1-415.
- Bakeman, M.E., ed. 1997. Report on habitat findings of the Preble's meadow jumping mouse. Report to the U.S. Fish and Wildlife Service and the Colorado Division of Wildlife. 91pp.
- Clippinger, N. 2001. Vegetative characteristics of habitat used by Preble's meadow jumping mouse in the Front Range of Colorado. Poster presented at the Annual Meeting of the Society of Mammalogists.
- Choate, J.R., D.W. Moore and J.K. Frey. 1991. Dispersal of the meadow jumping mouse in northern Kansas. *Prairie Naturalist* 23(3): 127-130.
- Fitzgerald, J.P., C.A. Meaney and D.A. Armstrong. 1994. *Mammals of Colorado*. Denver Museum of Natural History and University of Colorado Press. 467pp.
- Meaney, C., Ruggles, A., Clippinger, N. and Lubow, B. 2001. The impact of recreational trails and grazing on small mammals in the Colorado piedmont. submitted to *Great Plains Naturalist*.
- Meaney, C. and Ruggles A. 1999. Survey For Preble's meadow jumping mice along the Pearl Parkway Corridor Bicycle and Pedestrian Connection. unpub. rpt. to Boulder Greenways Program. 27pp.
- Ruggles, A.K., Clippinger, N., Whittemore, L., Ahrens, C. and Meaney C. 2000. Small mammal inventory and monitoring protocol in riparian habitats in Boulder Mountain Parks. unpub. rpt. 42pp
- Ruggles, A.K., Meaney, C. and Clippinger, N.,. 1999. Small mammal inventory and monitoring protocol in selected habitats of Boulder Mountain Parks. unpub. rpt. 46pp.
- Tester, J.R., S. Malchow, C. McClain and J.B. Leher. 1993. Movements and habitat use by meadow jumping mice in northwestern Minnesota. *Prairie Naturalist*. 25(1) 33-37.
- Warren, E. R. 1942. *The mammals of Colorado, their habits and distribution*. Second ed. University of Oklahoma Press, Norman, 330pp.
- Wilson, D.E., F. Cole, J. Nichols, R. Rudran and M. Foster, eds. 1996. *Measuring and monitoring biological diversity. Standard methods for mammals*. Smithsonian Institution Press. Washington, D.C. 409pp.
- Wilson, E.O. and W.H. Bossert. 1971. *A primer of population biology*. Sinaur Assoc. Mass. 192 pp.

Figure 1 Map of Preble's meadow jumping mouse trapping site



Location: 13 485188 E 4433212 N
Caption: City of Boulder Waste Water Treatment Plant/ Boulder Creek at 75th

Name: NIWOT
Date: 8/23/2001
Scale: 1 inch equals 1333 feet

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Plate 1 Typical plant community along the north side of Boulder Creek just below the 75th Street Bridge



Plate 2 Riparian corridor showing typical vegetation structure including shrubs and grasslands.



Plate 3 Riparian corridor showing typical patch of willow carr. Extensive grasslands can be seen beyond the willows.



Plate 4 Looking at the pipeline corridor across a mowed pasture.

Table 1 Species list of plants found: Boulder Creek at 75th, Boulder, Colorado. August 2001.

Trees

<i>Elaeagnus angustifolia</i> *	Russian Olive*
<i>Fraxiannus pennsylvanica</i> *	ash
<i>Populus deltoides</i>	plains cottonwood
<i>Salix fragilis</i> *	crack willow*
<i>Ulmus pemila</i> *	Siberian elm*

Shrubs

<i>Corylus cornuta</i>	beaked hazlenut
<i>Craegus erythropoda</i>	hawthorne
<i>Negundo aceroides</i> *	boxelder*
<i>Ribes aureum</i>	golden currant
<i>Rosa arkansana</i>	wild rose
<i>Salix exigua</i>	coyote willow
<i>Symphoricarpus occidentalis</i>	snowberry
<i>Toxicodendron rydbergii</i>	poison ivy

Forbs

<i>Ambrosia sp</i>	ragweed
<i>Aesclepias speciosa</i>	showy milkweed
<i>Apocynum cannabinum</i>	dogbane
<i>Arcticum minus</i> *	burdock*
<i>Cirsium arvense</i> *	Canada thistle*
<i>Clematis ligustifolia</i>	clematis
<i>Convolvulus arvensis</i> *	bindweed*
<i>Cynoglossam officinale</i> *	houndstongue*
<i>Dipsacus fullonum</i> *	teasle*
<i>Equisetum arvense</i>	horsetail
<i>Grindelia squarrosa</i>	gumweed
<i>Glycyrrhiza lepidota</i>	wild licorice
<i>Impatiens lepidota</i>	jewel weed
<i>Lepidium latifolium</i> *	perennial pepperweed*
<i>Linaria vulgaris</i> *	butter and eggs*
<i>Marrabium vulgare</i> *	horehound*
<i>Medigo sativo</i> *	alfalfa*
<i>Melilotus officinalis</i> *	yellow sweet clover*
<i>Opuntia macrorrhiza</i>	prickly pear cactus
<i>Saponaria officinalis</i> *	bouncing bet*
<i>Trifolium repens</i> *	Dutch clover*
<i>Typha latifolia</i>	cattail
<i>Verbascum thaspus</i> *	mullein*
<i>Verbena hastata</i>	blue vervain

Graminoids

<i>Bromus inermis</i> *	smooth brome
<i>Phalanis arundacea</i> *	reed canary grass

* indicates a non-native species

Table 2. Total individual captures of small mammals on Boulder Creek at 75th St., Boulder, Colorado. 21-25 August 2001.

Species	Adult		Subadult		Juvenile		Total			Total All
	Male	Female	Male	Female	Male	Female	Male	Female	Unknown	
<i>Microtus ochrogaster</i> Prairie Vole	1	1	0	0	1	0	2	1	0	3 (1) ¹
<i>Microtus pennsylvanicus</i> Meadow Vole	2	3	1	0	1	0	4	3	0	7 (5)
<i>Microtus species</i> Vole species	0	0	0	0	2	0	2	0	0	2
<i>Mus musculus</i> House Mouse	3	1	2	1	0	0	5	2	0	7 (4)
<i>Peromyscus maniculatus</i> Deer Mouse	10	2	4	5	0	0	14	7	1	22 (23)
<i>Reithrodontomys megalotis</i> Western Harvest Mouse	8	6	1	7	2	3	11	16	0	27 (5)
<i>Sorex cinereus</i> Masked Shrew	1	1	0	0	0	1	2	1	0	3
<i>Zapus hudsonius preblei</i> Preble's Meadow Jumping Mouse	0	10	0	0	0	0	0	0	0	0
Total										71 (38)

All values based on 1000 trap-nights. 95% availability of traps.

¹ values in parentheses () indicate recaptures

Table 3 Small mammal captures on Boulder Creek in the vicinity of the Boulder wastewater treatment plant.

year	deer mice	meadow vole	prairie vole	jumping mice	masked shrew	W. harvest mouse	house mouse	Norway rat	capture rate
1965	0.35	0.35	--	0.17	0.12	--	--	--	9%
1995	0.59	0.26	0.05	--	--	--	0.10	--	7%
2000	0.64	0.17	0.11	--	0.01	0.02	--	0.01	7%
2001	0.41	0.12	0.04	--	0.03	0.30	0.10	--	11%

Appendix A

U. S. fish and Wildlife Service Survey Field Data Compilation Form for Preble's Meadow
Jumping Mouse

SURVEY FIELD DATA COMPILATION FORM
Zapus hudsonius preblei, Preble's Meadow Jumping Mouse
(submit this field data form with the survey report)

Z. h. preblei found? Yes No

Date of Survey 21-25 Aug 01

Surveyor:

Organization/Company Anne Ruggles, Lauren Whittmore, Norm Clippinger,

Full name(s) Collin Ahrens

Location:

Descriptive site name (creek, nearby road intersection, etc.) Boulder Ct. @ 75th St.

USGS quad name N100T

County Boulder Elevation 5098 ft

Section(s) center Sec. 13 Township(s) 1N Range(s) 70W

UTM Coordinates, Zone 13 Northing 13T 0485270 Easting 4433253

Directions to location Baseline Road E. to 75th. North on 75th to Boulder Creek

Land ownership City of Boulder Open Space Mtn. Parks

Habitat:

General habitat description Plains Riparian Gallery Forest

Dominant plant community overtory: P. deltoides & Salix fragilis w/ Symphoricarpos occidentalis, Apocynum spp., Bromus inermis Phalaroides arundinacea

Drainage Type: Perennial Stream Ephemeral Stream Pond/Lake Ditch Other

Trapping Information:

Type of trap Sherman Live

Type of bait sweet feed

Percent available (unsprung) 95%

Number of nights trapped 4

Total trapnights 1000

Weather conditions prior to and during survey to 80's during the day
in the 50's at night; no wind, no rain

Associated animal species (especially urban predators, rats house mice) house mice (100%)

of capture) deer mice, plains harvest mice, meadow voles,
prairie voles, masked shrews, raccoons

Sketch of surveyed area showing traplines, specific area disqualified (can be done on required USGS map of site if appropriate:

see attached

Preble's Data:

Number of Preble's trapped or seen none

Distance from water (meters) _____

Sex (m/f) _____

Evidence of reproduction¹ _____

Weight (grams) _____

Marked or tagged? _____

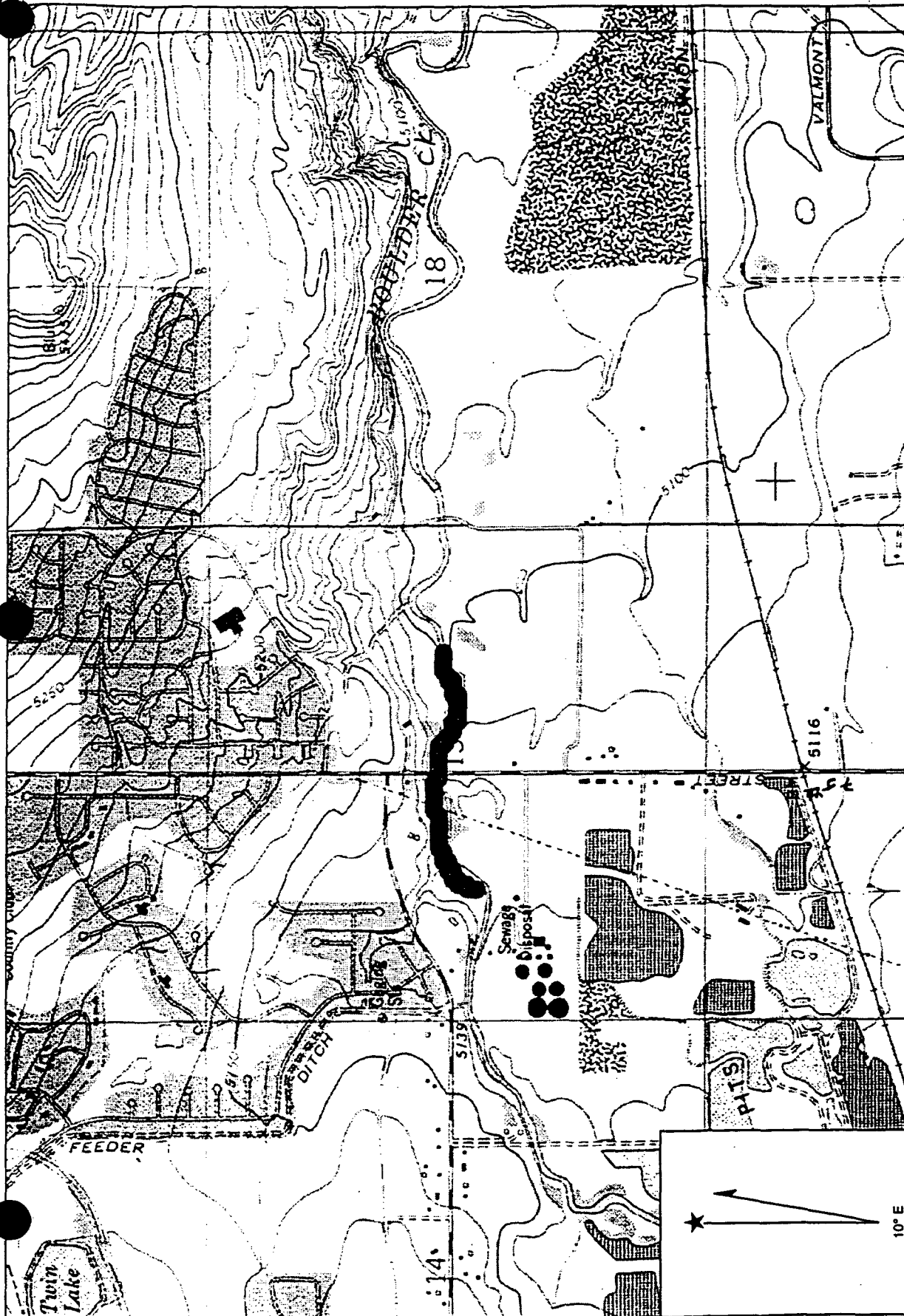
Evidence of disease, predation, or injury² _____

Genetic material obtained? Yes No Forwarded to _____

Additional comments _____

¹ Reproduction evidence for males is descended testes; for females is enlarged nipples.

² Submit injury/mortality form if appropriate.



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