

IBS #2301

Breeding Bird Census of Mature Red Pine Forest

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Ornithology EEB 5834

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Abstract:

A Breeding Bird Census was performed in an undisturbed red pine forest with deciduous understory between June 25 and July 19, 1997. Results were analyzed by comparing 1992, 1991, 1990, and 1980 data with the 1997 results. The most common birds were found to be the Ovenbird, Red-eyed Vireo, Pine Warbler, and Eastern Wood Pewee. This year's study was of particular interest because it was the first census taken since the 1995 windstorm, which took down many of the large, old-growth trees in the forest.

Introduction:

The Breeding Bird Census (BBC) is a standardized method for determining songbird population size and territory. We performed a BBC on eight days between June 25, 1997 and July 19, 1997 using a 10 ha. plot in the red pine forest of Itasca State Park. This same plot was used during the summers of 1990, 1991, and 1992; a nearby plot was also used in the summer of 1980. This year's census is of particular interest because it is the first done since the windstorm of 1995. Itasca State Park experienced tremendous changes with this windstorm as a large percentage of the standing trees fell, including many large, old-growth trees.

Methods:

Study Plot and Breeding Bird Census:

The studied plot is located in the protected wilderness area of Itasca State Park, Clearwater County, Minnesota. A 50m square grid was marked, and the census was performed by walking along the lines of the grid so that every point in the area was covered within 50 m or less. To ensure an accurate census of birds from all areas of our plot, we began our census at different points along the southern boundary. We found it was more efficient to begin the survey at transect C or D and then branch into two groups at the north end of the plot, one group moving west to A or B and the other group moving east to E or F. This method allowed us to cover more of the plot during peak singing hours. It is important to note that this method was only used for half of the censuses. The census was performed on eight different occasions, six times within 1.5 hours of sunrise, and twice within 3 hours of sunset. Weather conditions and time of day were recorded for each census (Figure 1). Areas of singing, activity by males, and/or observation of nests were used to establish the individual breeding territories. Each member of this research team was responsible for recording the songs or sightings of specific species. This data was then compiled to estimate the number of and the territories of these song birds.

Vegitation Survey:

A quantitative survey of vegetation (James and Shugart, 1970; James, 1978) was done by Marsollek and Menke (1997) and gave the following results: Trees 7.5 cm diameter and over, based on five 0.04 ha circular samples; 545 trees/ha; total basal area 7.0 m²/ha. Species comprising total number of trees [figures after each species give the number of trees/ha, relative density, (%), relative dominance (%), frequency (%)]: Red Pine (*Pinus resinosa*), 135, 24.8, 47.1, 80; White Pine (*Pinus strobus*), 80, 14.7, 29.2, 60; Hophornbeam (*Ostrya virginiana*), 70, 12.8, 1.9, 60; Paper Birch (*Betula papyrifera*), 15, 2.8, 1.7, 20; White Spruce (*Picea glauca*), 10, 2.0, 1.6, 40; Red Oak (*Quercus rubra*), 25, 4.6, 1.0, 40; Sugar Maple (*Acer saccharum*), 60, 11.0, 5.3, 40; American Elm (*Ulnus americana*), 15, 2.8, 2.0, 20; Quaking Aspen (*Populus tremuloides*), 30, 5.5, 3.4, 20; Mountain Maple (*Acer spicatum*), 70, 12.8, 2.7, 60; Balsam Fir (*Abies balsamea*), 35, 6.4, 4.1, 20. Trees by diameter size class [figures after each size class give the number of trees/ha, relative density (%), basa area in m²/ha, relative dominance (%)]: A (7.5-16 cm) 220, 40.4, 0.42, 6.0; B (16-22.5 cm) 35, 6.4, 0.21, 3.0; C (22.5-37.5 cm) 120, 22.0, 1.34, 19.1; D (37.5-52.5 cm) 85, 15.6, 1.58, 22.6; E (52.5-67.5 cm) 60, 11.0, 2.01, 28.7; F (67.5-82.5 cm) 25, 4.6, 1.44, 20.6. Shrub stems/ha, 11500; ground cover, 100.0%, canopy cover, 100.0%; mean canopy height, 16.4 m (range 3-30 m). Ground cover primarily consists Beaked Hazelnut (*Corlus cornuta*)and Hophornbeam (*Ostrya virginiana*).

Results:

A total of 22 species were found to hold territories on the red pine plot. Ovenbirds were the most abundant bird on the plot, holding 27.5 territories. The next ten most common birds were Red-eyed Vireo (16 territories), Pine Warbler (12.5 territories), Eastern Wood-Pewee (10.5 territories), Black-throated Green Warbler (8.5 territories), Canada Warbler (6.5 territories), Common Yellow-throat (5 territories), Nashville Warbler (5 territories), Chestnut-sided Warbler (4 territories), Hermit Thrush (4 territories) and

Black-Capped Chickadee (4 territories). Other species having territories on the plot included the Great-crested Flycatcher (3 territories), Red-breasted Nuthatch (3 territories), American Redstart (3 territories), Northern Parula (3 territories), Scarlet Tanager (2 territories) and Winter Wren (1.5 territories). Species found to have only one territory were the Mourning Warbler, Ruffed Grouse, Solitary Vireo, Yellow-Bellied Sapsucker and Least Flycatcher. Visiting species included the Blue Jay, Cedar Waxwing, Hairy Woodpecker, Rose-Breasted Grosbeak, American Crow, American Robin, Pileated Woodpecker, Broad-winged hawk, Gray jay and Common Loon.

A Yellow-bellied Sapsucker nest was observed on the northwest border of the plot. In the northern quarter of the plot a pair of Ruffed Grouse were accidentally flushed from a possible nest during the second census. Four juvenile Gray Jays were seen entering the western edge of the plot during the fifth census. Loons were heard flying over the plot during six of the eight censuses.

Discussion:

Comparisons between previous breeding bird censuses (1980, 1990-1992) indicate that the number of territories has remained stable for many of the red pine plot species (Figure 2). These species include: Hermit Thrush, Yellow-bellied Sapsucker, Northern Parula, Scarlet Tanager, Nashville Warbler (data available from 1992 only) and Ruffed Grouse.

1997 data suggests that the 1990-1992 decline of Ovenbird territories has reversed, territory numbers increasing in 1997 by 4% from 1990 and 15% from 1992. The reverse of this negative trend may be due to the severe windstorm of 1995 which blew down a large percentage of large, old-growth red pines. The opening of the plot into a more gap-like habitat increased the secondary shrub layer by two-fold, providing a protective cover for breeding ovenbirds.

The number of Red-eyed Vireo territories has been highly variable since 1990, though the numbers do not seem to have been affected by the 1995 windstorm. The 1990-

1992 trend of increasing Black-throated Green territories was reversed in 1997, dropping by 38%. Black-throated Green Warbler habitat includes northern coniferous forests (Robbins et al., 1983); the loss of red pines in the 1995 windstorm may explain the decrease in their number of territories. A decrease (47% from 1992) was also noted in the number of Chestnut-sided Warbler territories, which had displayed a trend of increasing territory number from 1980 to 1992. The Chestnut-sided Warbler is common in deciduous brush and thus would be expected to increase following the 1995 windstorm.

A significant decrease in Pine Warbler territories was observed between 1991 and 1992, however the 1997 data suggest that the number of territories has stabilized and thus the 1995 windstorm had little effect on the Pine Warbler population. Similarly, the Winter Wren experienced a decrease in territory number from 1991 to 1992 but has since stabilized at the 1992 level.

Following the four-fold increase from 1990 to 1992 of Brown Creeper territories, 1997 data indicate that the red pine plot is no longer habitable for this woodland species, which may be due to the 1995 windstorm.

Significant increases were observed in the number of Canada Warbler (117%) and Common Yellow-throat (40%) territories since 1992. Data of years previous to 1992, however, are similar to our data, which suggest that the number of these territories are highly variable. A significant increase was also observed in the Eastern Wood Pewee territories (91% from 1992) which continues an increasing trend (250% from 1990).

It is notable that the Yellow-bellied Sapsucker nested in the same vicinity as in 1992. Furthermore, a group of juvenile Gray Jays was observed in the same location as in 1992.

Overall, the territorial trends for individual species are lower than those quantified in previous years. This difference may be attributed to the timing of the survey, which occurred late in the breeding season when birds are less territorial. Other explanations may

be due to successional changes of plant species within the plot, which may affect bird habitats.

Acknowledgments:

We would like to thank Dr. Robert Zink and John Klicka for their valuable insights which helped us throughout this project. We would also like to thank Paul and Juan for properly re-marking our majestic plot. A special thanks goes out to Mac Daddy for some groovin' off roading adventures.

Notes to Future Students:

Mosquitos and deer flies are abundant in the Red Pine Plot and they often interfere with listening if you are not properly equipt to avoid them. Items that will be helpful for more comfortable surveying include: mosquito netting, insect repellant with a high percentage of deet (20-100%) and rubber boots for wet, swampy areas. Avoid wearing excessive rain gear (especially pants) as they make a lot of noise when walking; the plot should not be surveyed in extreme rain anyway, because it will be very difficult to hear the birds. We also recommend the method of splitting up into two groups at the north end of the plot as described in the methods; the method is quicker and you will hear more birds during their peak singing time. Finally, it is important to make a schedule of mornings and evenings that you will conduct the survey. It is easy to put off doing the censuses until the last few weeks, but you will hear more birds if you begin early in the term.

Literature Cited:

Coller, M. 1992. A breeding bird census in a red pine forest with deciduous undergrowth:
the effects of a changing habitat on avian populations. IBS paper # 1941 - A.

Cornell Laboratory of Ornithology. 1991. Instructions for the Breeding Bird Census.

James, F. C. 1978. On understanding quantitative surveys of vegetation. American
Birds. **32**: 18-21.

James, F. C., and H. H. Shugart, Jr. 1970. A quantitative method of habitat description.
Audubon Field Notes **24**: 1133-1134.

Noyes, Karyn L. 1990. Breeding bird census of a red pine forest. IBS paper # 1860 - A

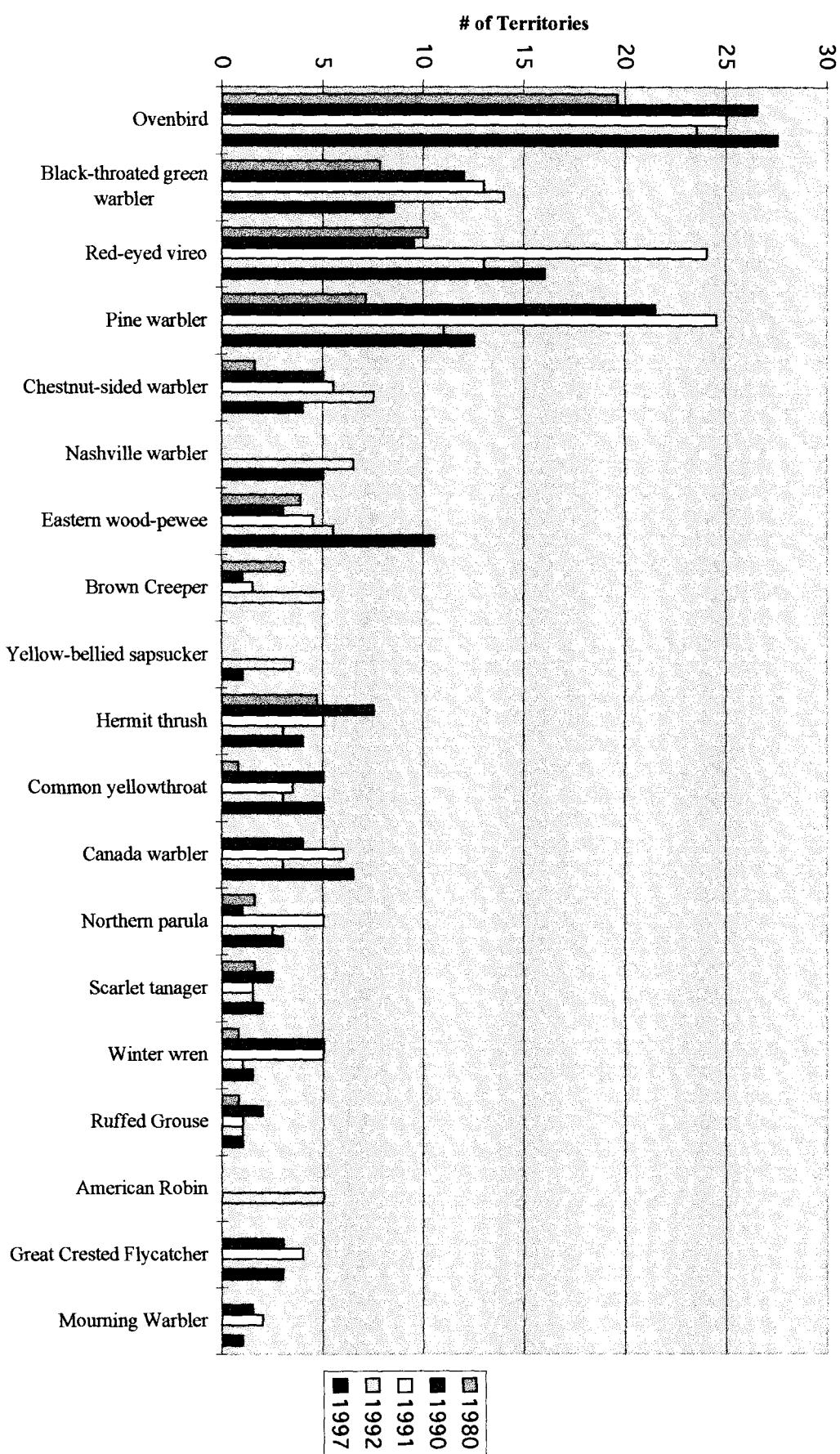
Podeszwa, Catherine N. 1991. A breeding bird census in Itasca State Park: red pine forest
with a deciduous understory. IBS paper # 1898-B.

Robbins, C. S., B. Bruun, and H. S. Zim. 1983. Birds of North America: A guide to
field identification. Golden Books Publishing Company. Racine, Wi.

Figure 1. Times, Weather Conditions and Dates of Breeding Bird Census in Itasca State Park's Red Pine Plot (1997)

Date	Start Time	End Time	Total Time (min)	Temp (F)	Wind	Sky	# of Observers
25-Jun	1910	2113	123	77	calm (0)	Clear	5
1-Jul	0528	0732	124	58	calm (0)	Overcast	5
8-Jul	0534	0650	76	52	slight (1-3)	Light Rain	2:2 split
9-Jul	0520	0645	85	47	calm (0)	Clear	2:2 split
10-Jul	0522	0715	115	57	slight (1-3)	Clear	5
12-Jul	0520	0715	115	51	slight (1-3)	Overcast	2
16-Jul	2015	2100	45	84	calm (0)	Clear	2:2 split
19-Jul	0525	0710	105	53	slight (1-3)	Partly Sunny	3

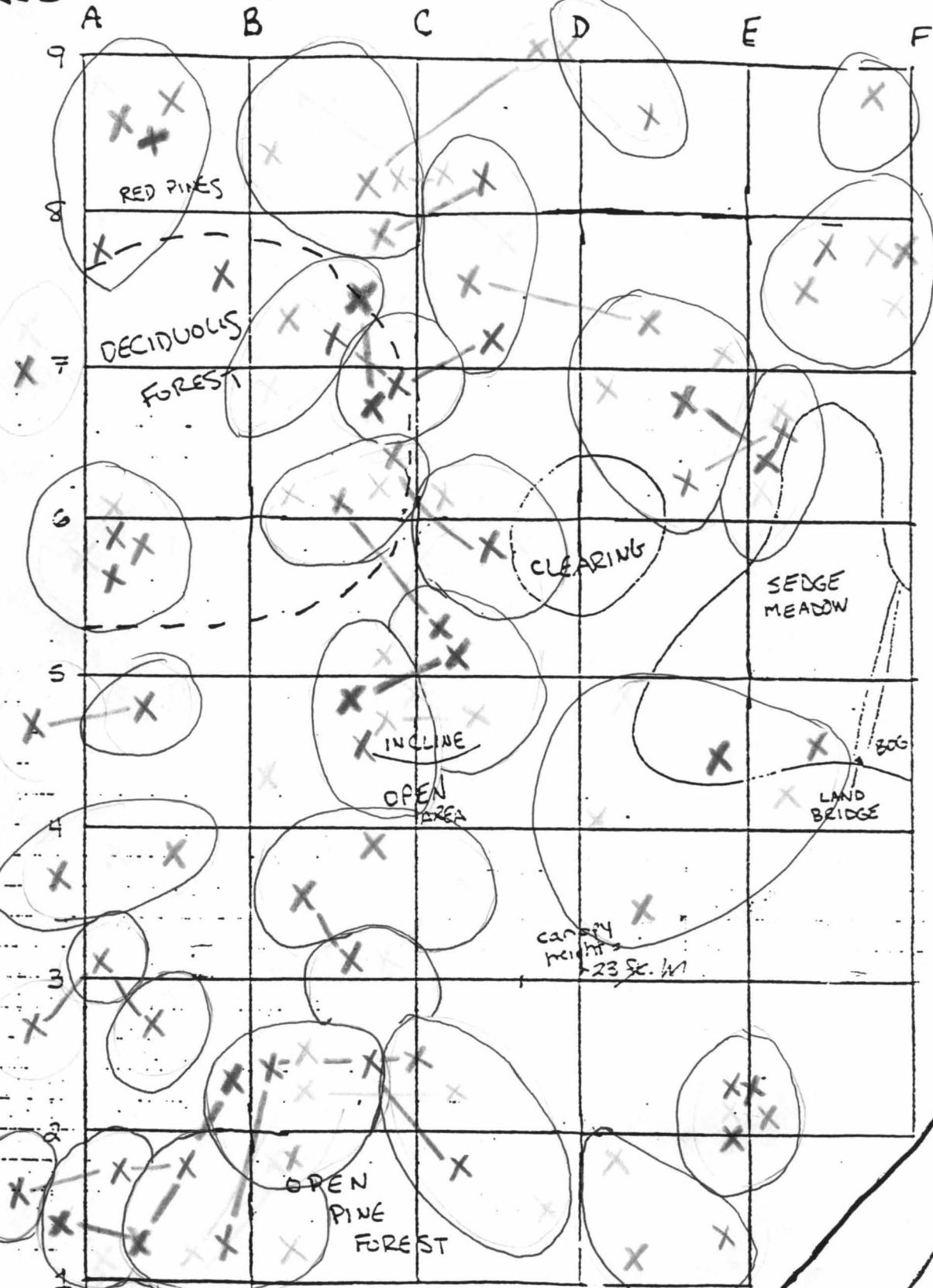
Figure 2. Number of Breeding Bird Territories in Lake Itasca State Park's Red Pine Plot (1980, 1990-1992, 1997)
(Coller, 1992; Noyes, 1990; Podeszwa, 1991)



RED PINE PLOT

N
W E
S

6-25
7-1
7-8
7-9
7-10
7-12
7-19

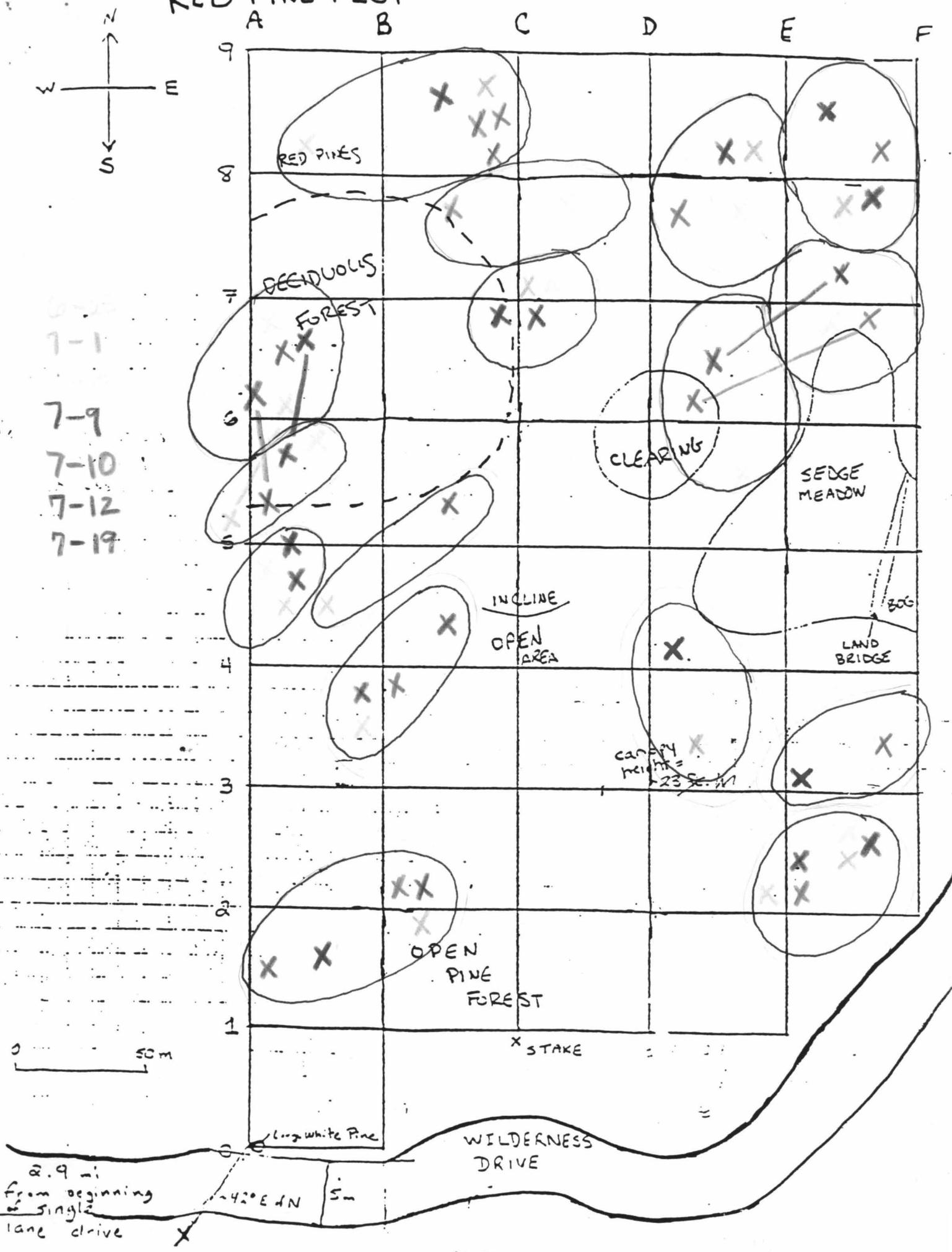


2.9 mi
from beginning
of single
lane drive

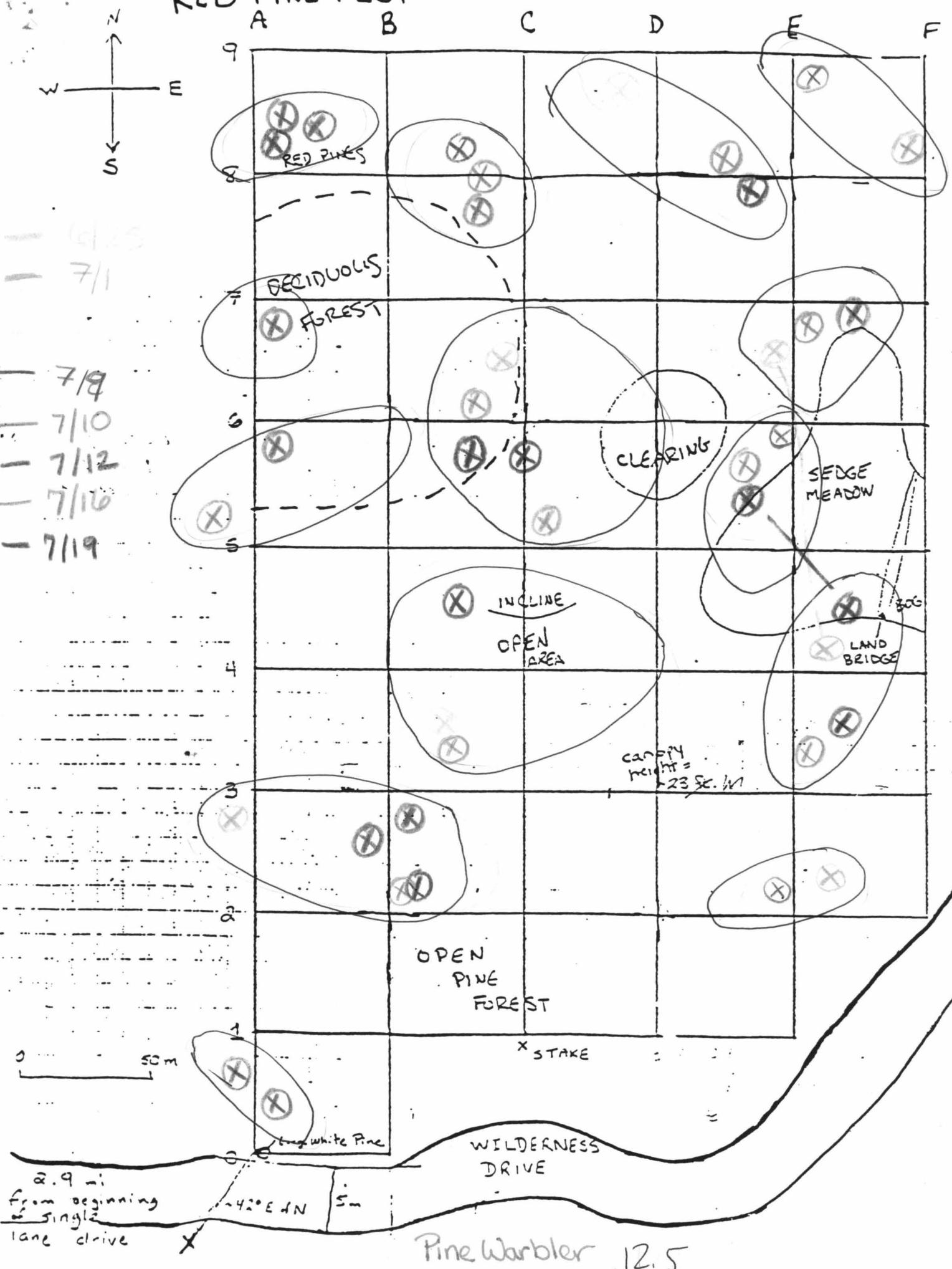
~42° E & N
5m

OVENBIRD 27.5

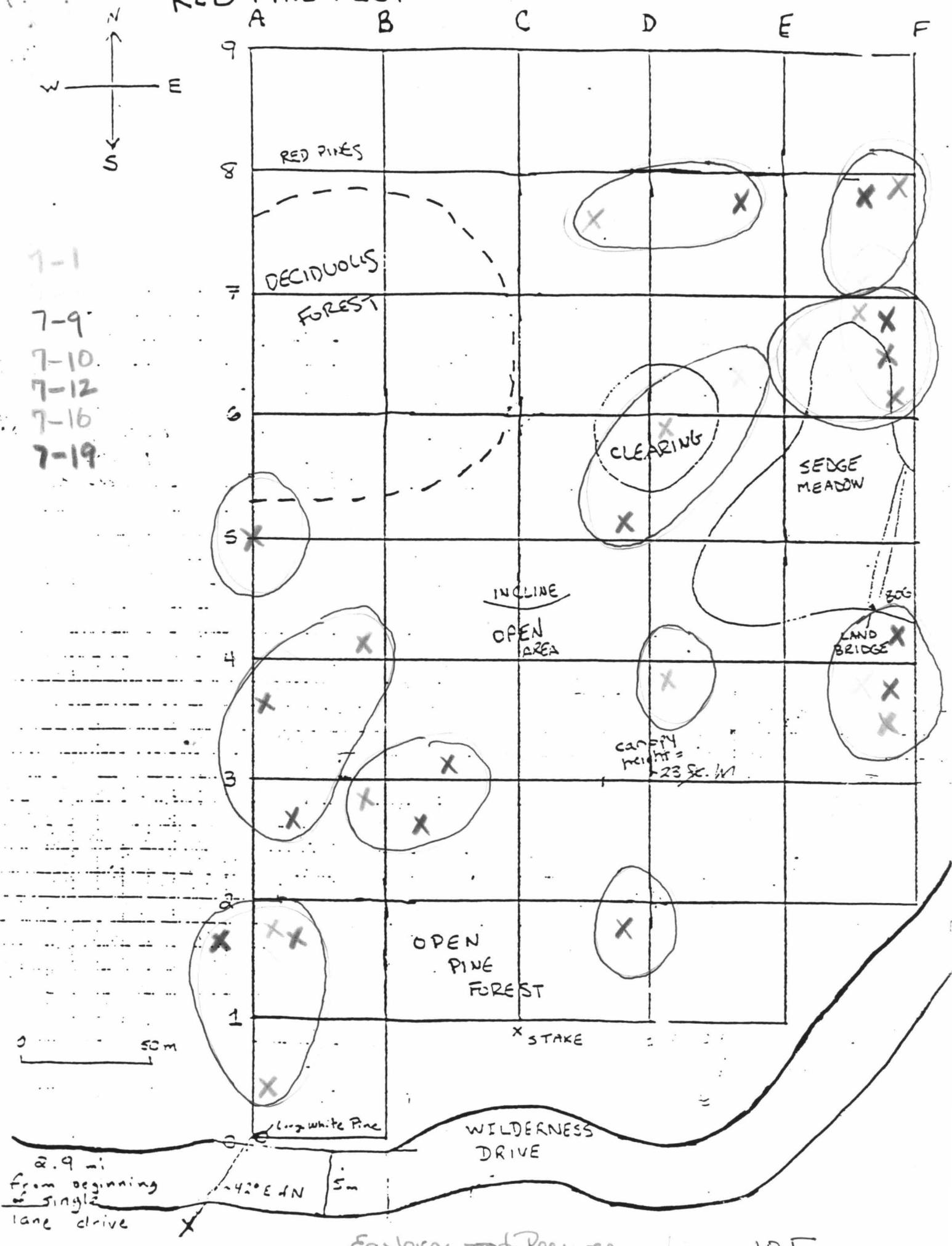
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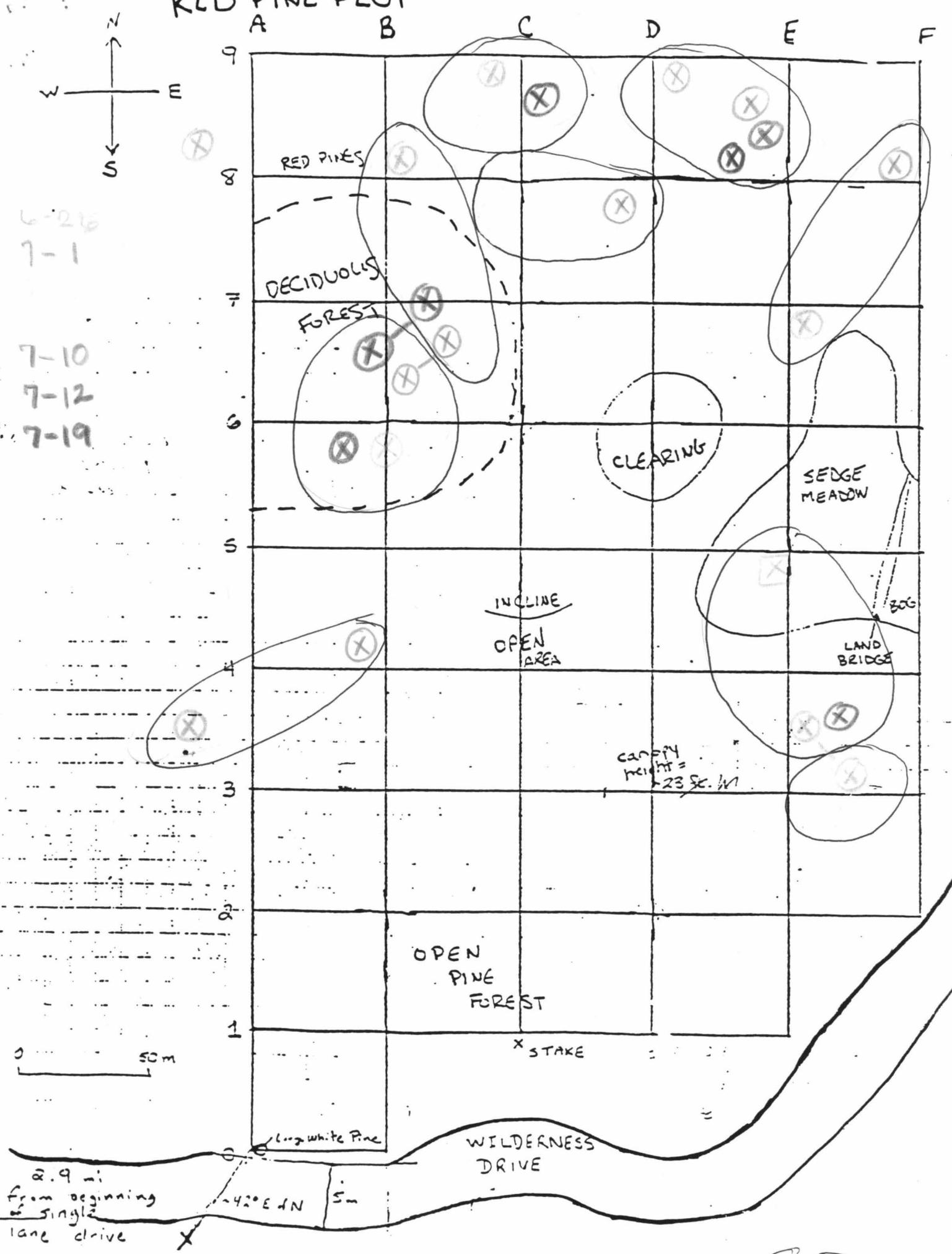
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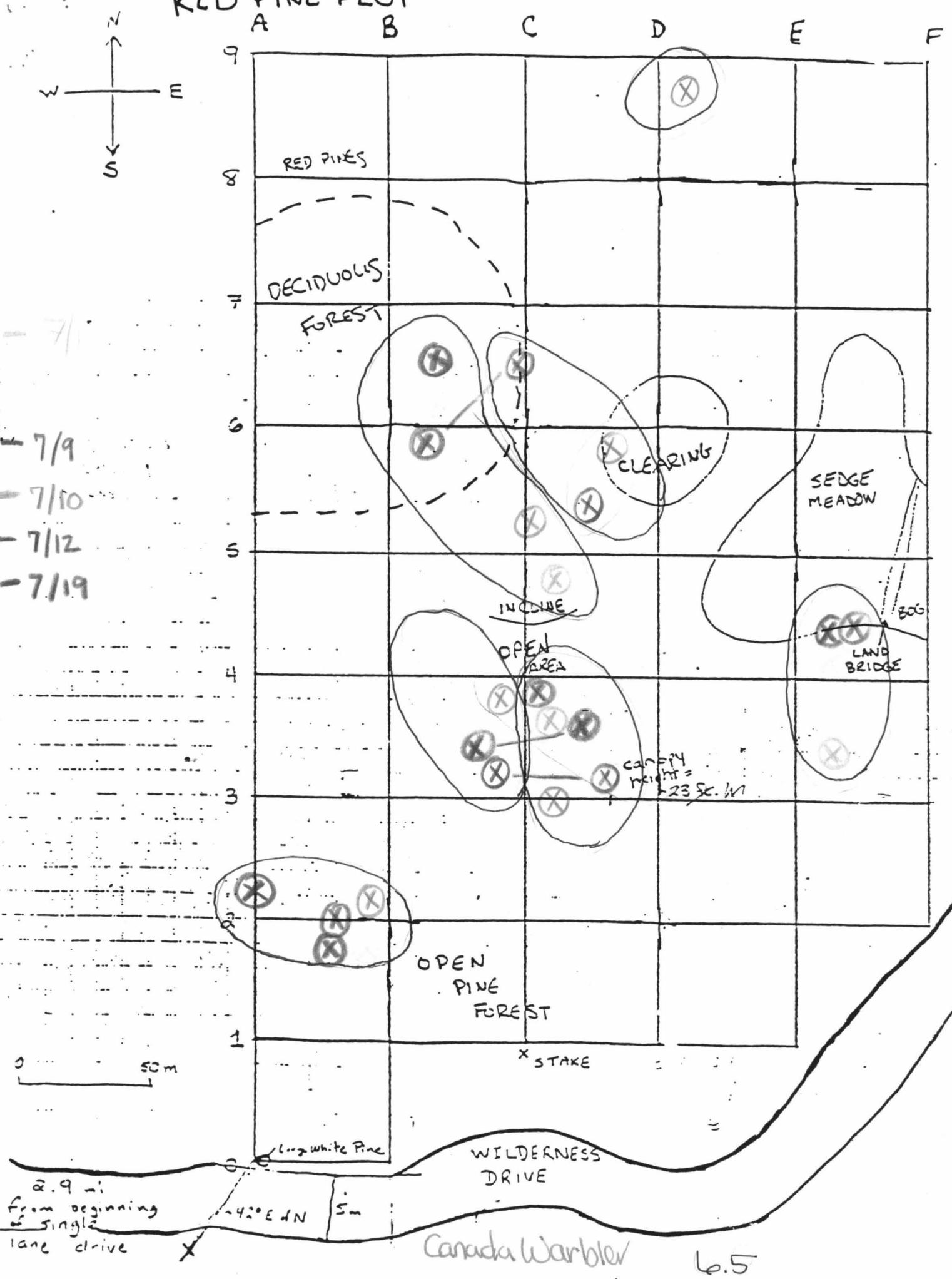
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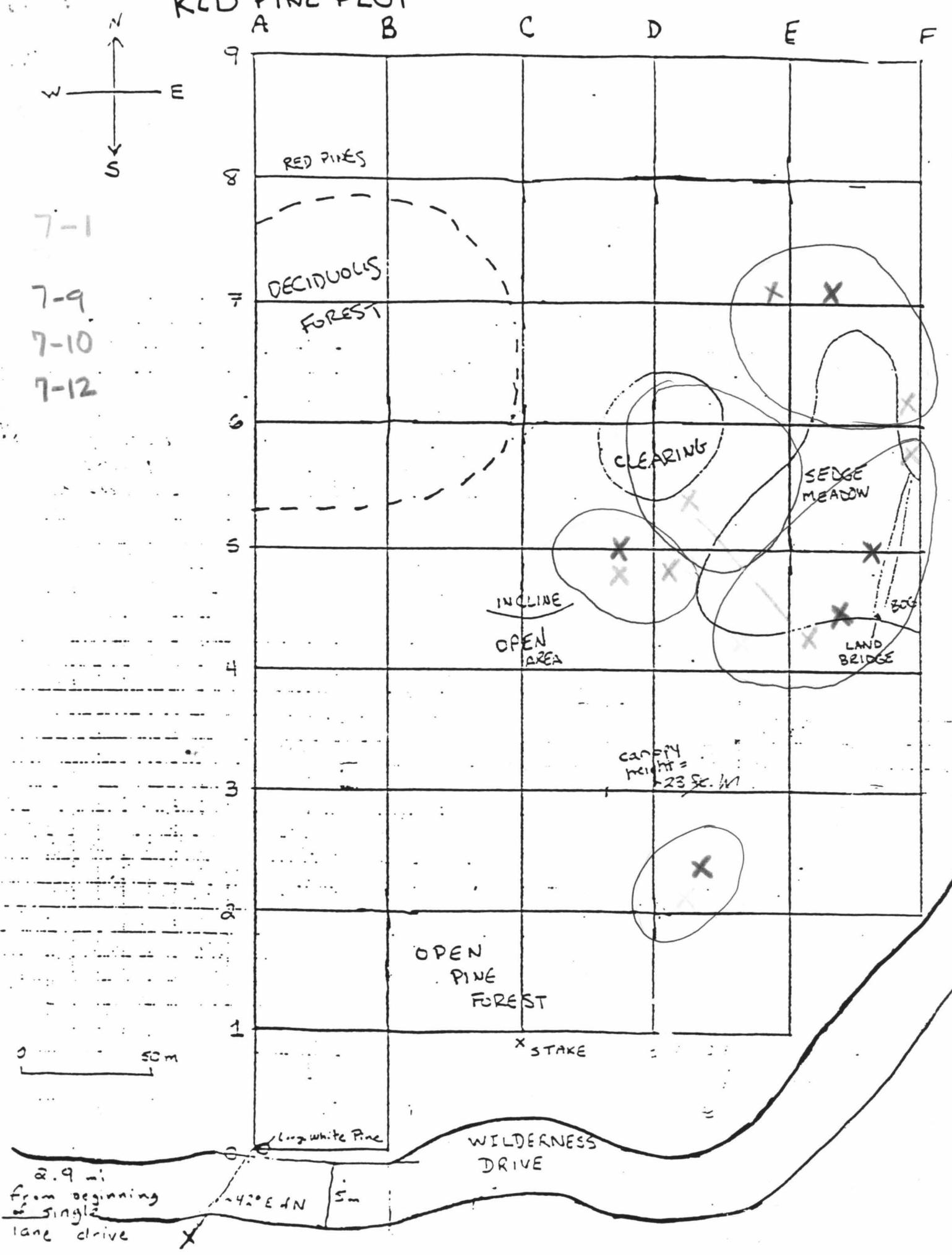
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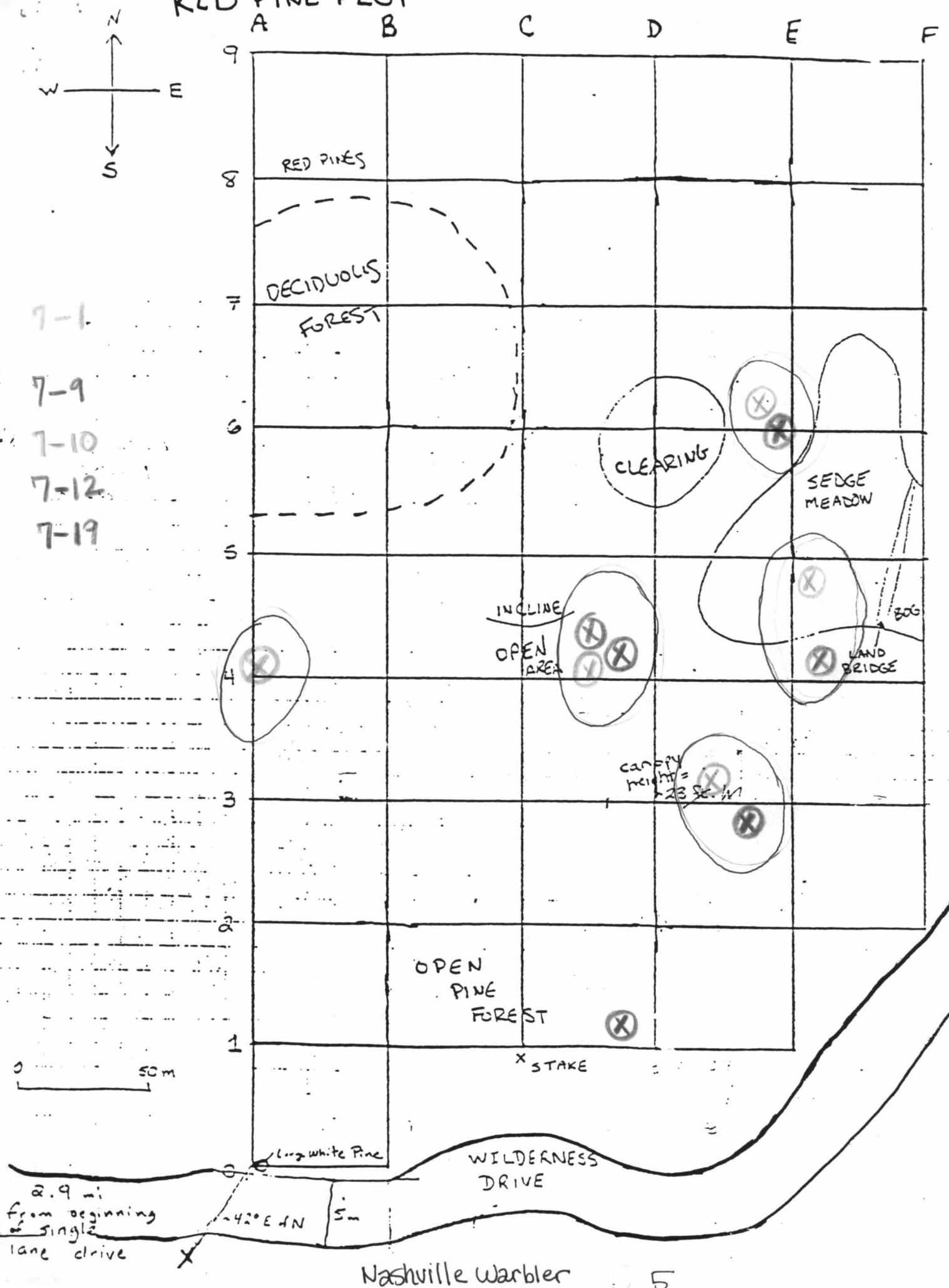
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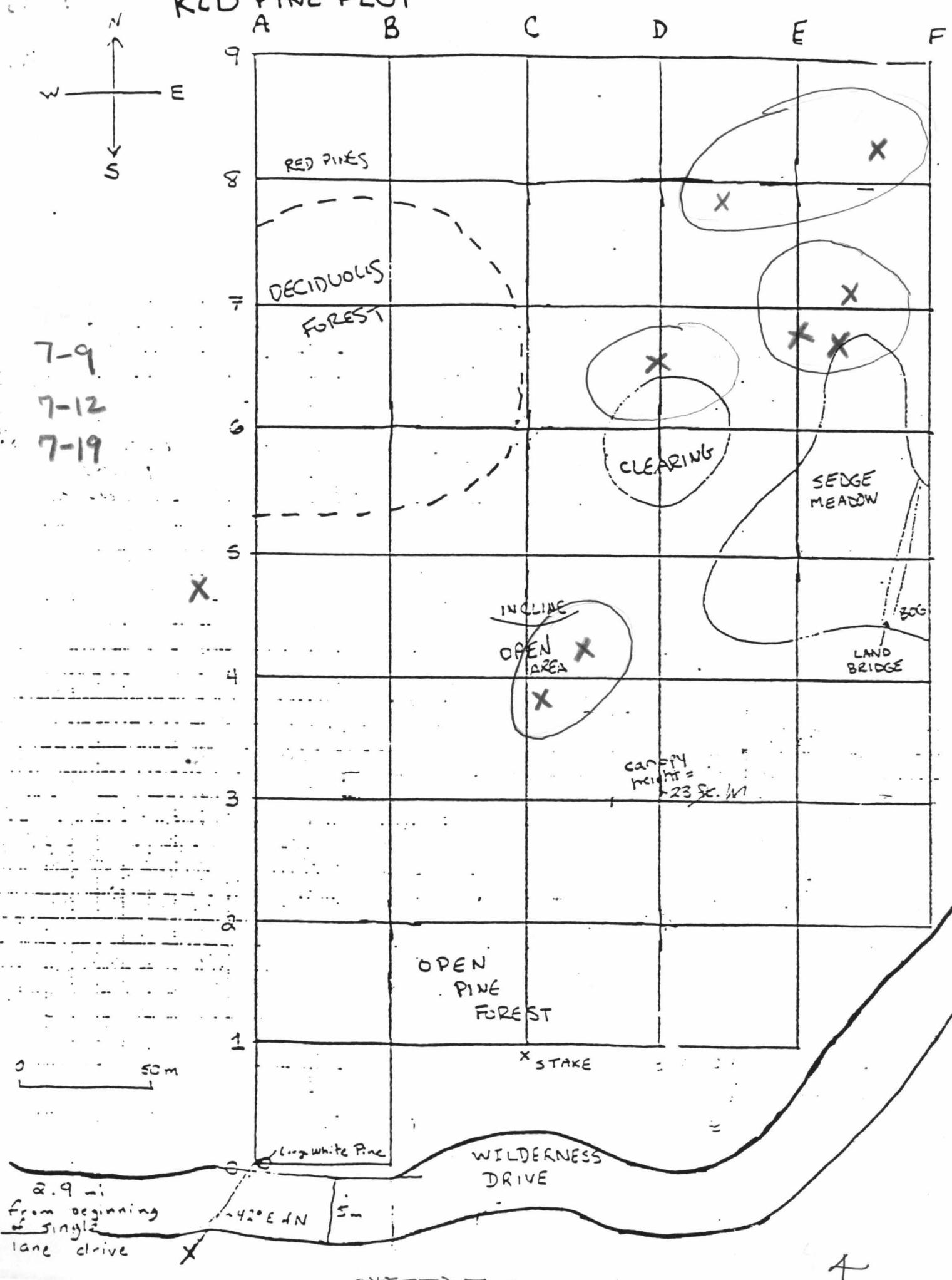
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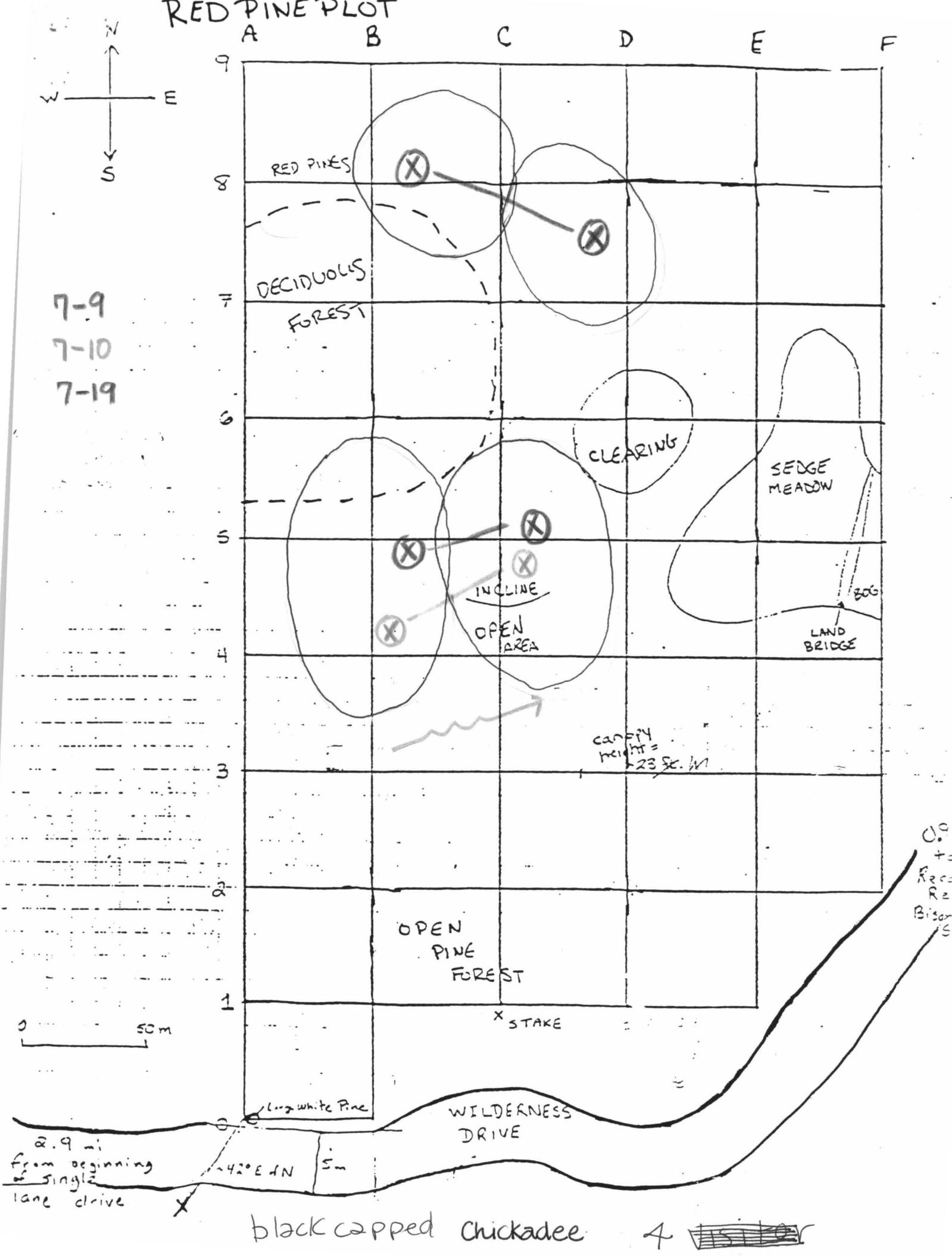
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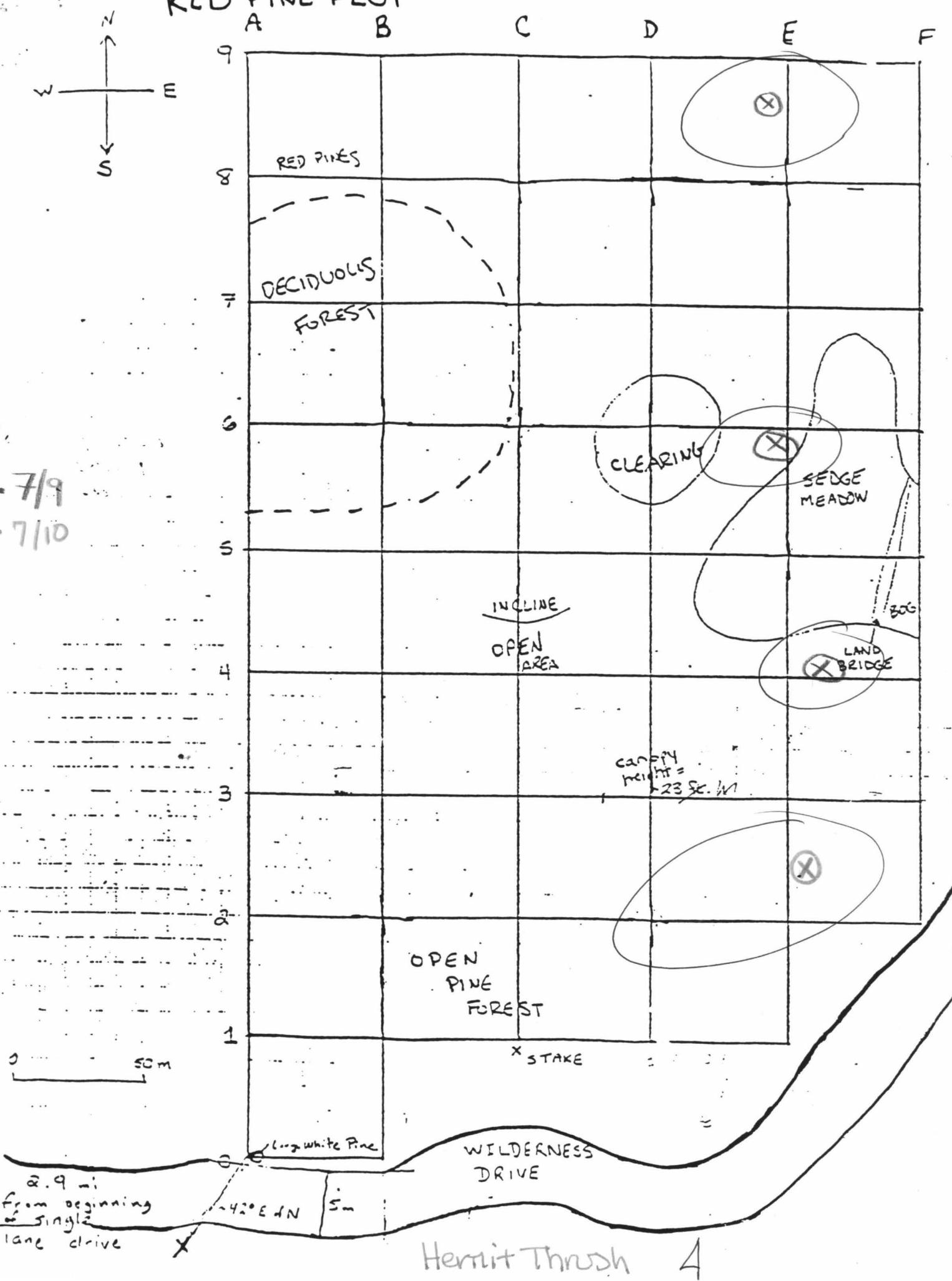
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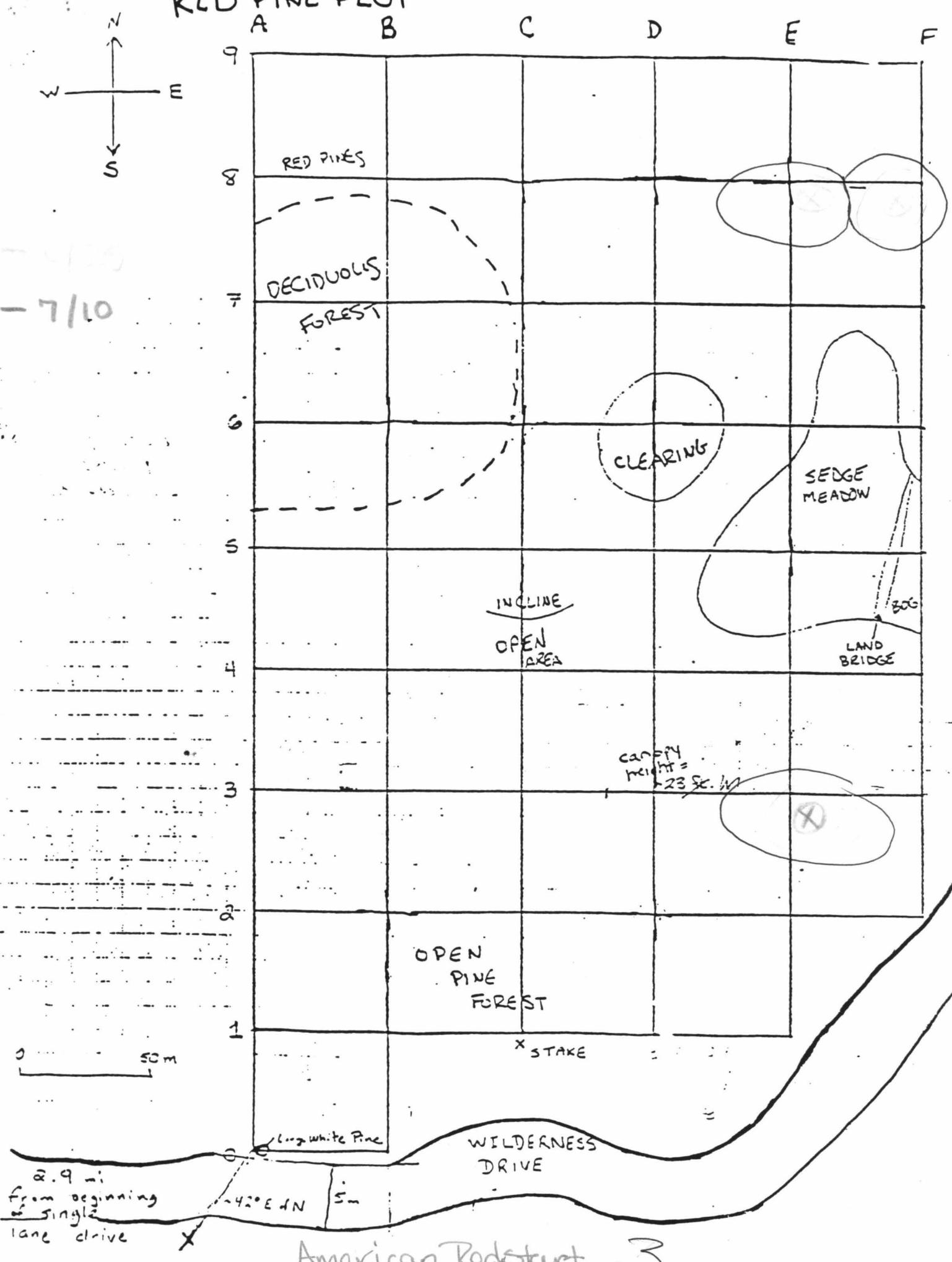
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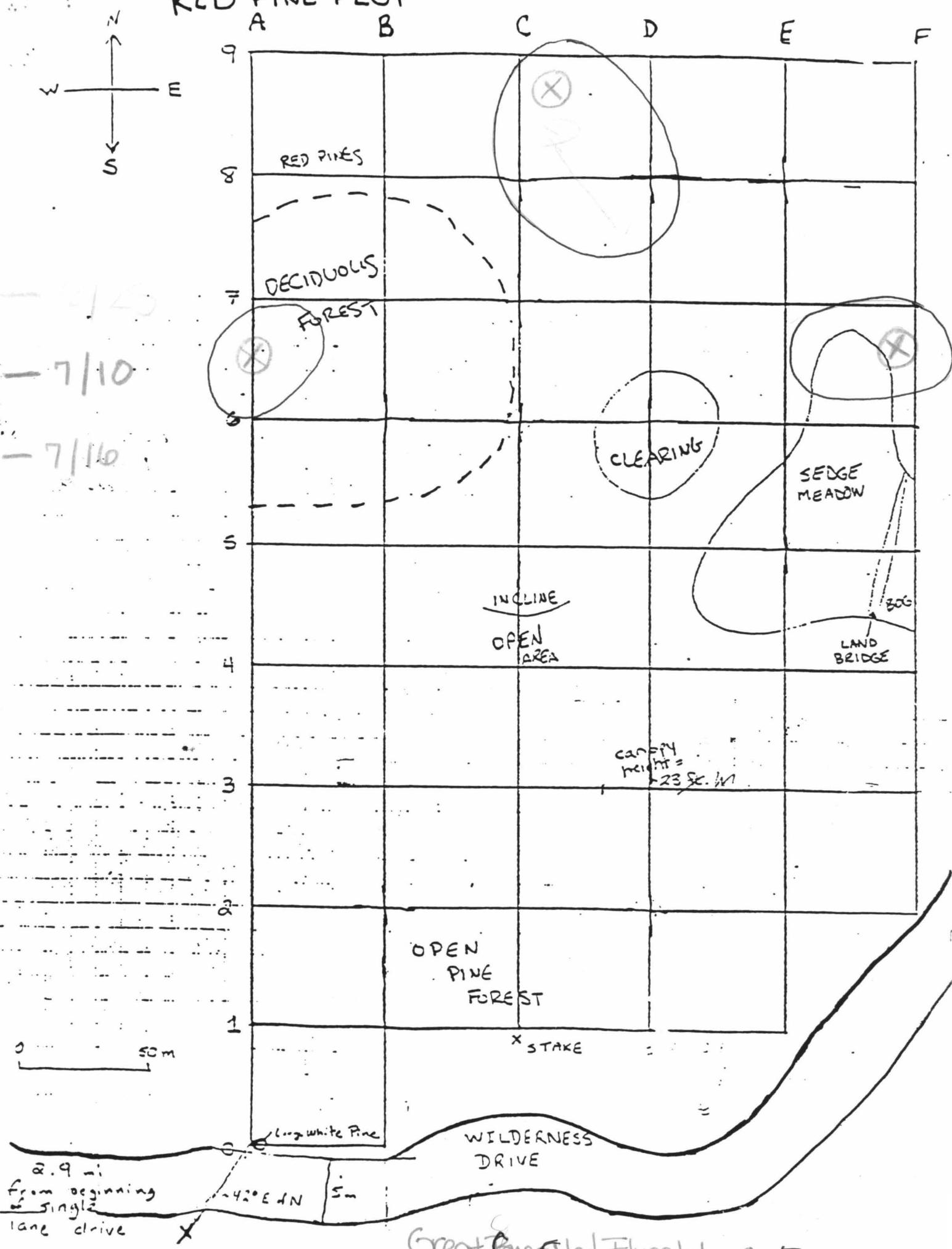
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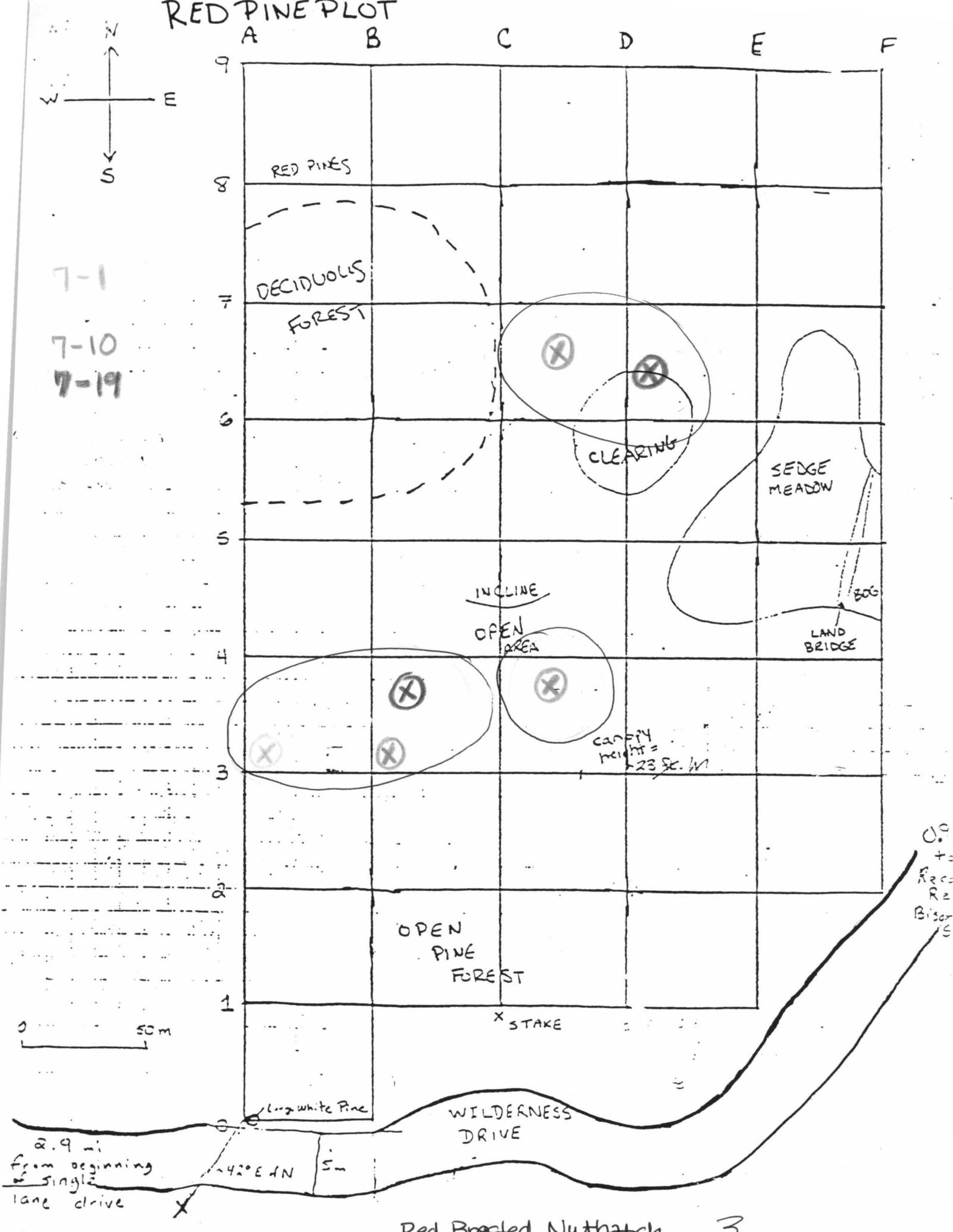
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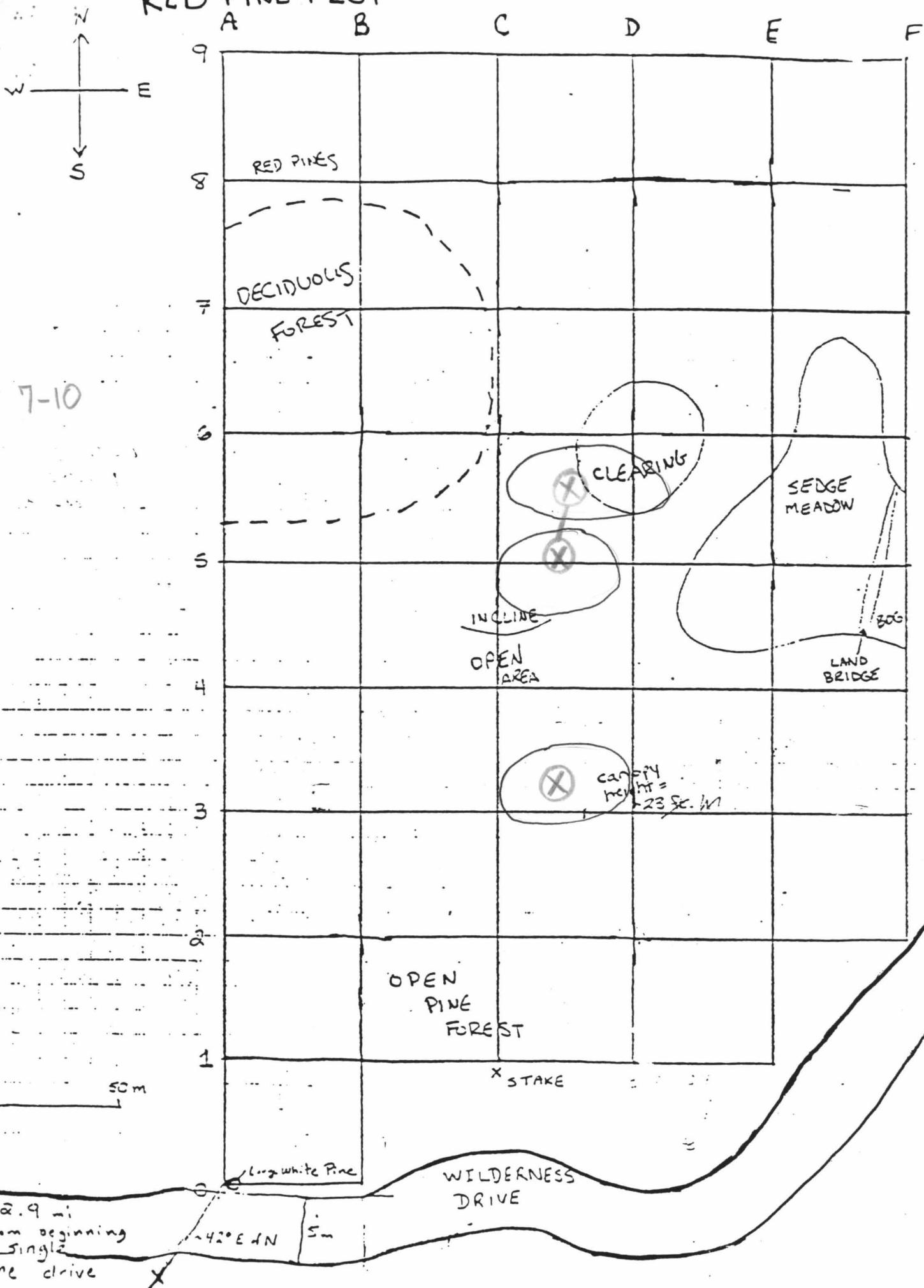
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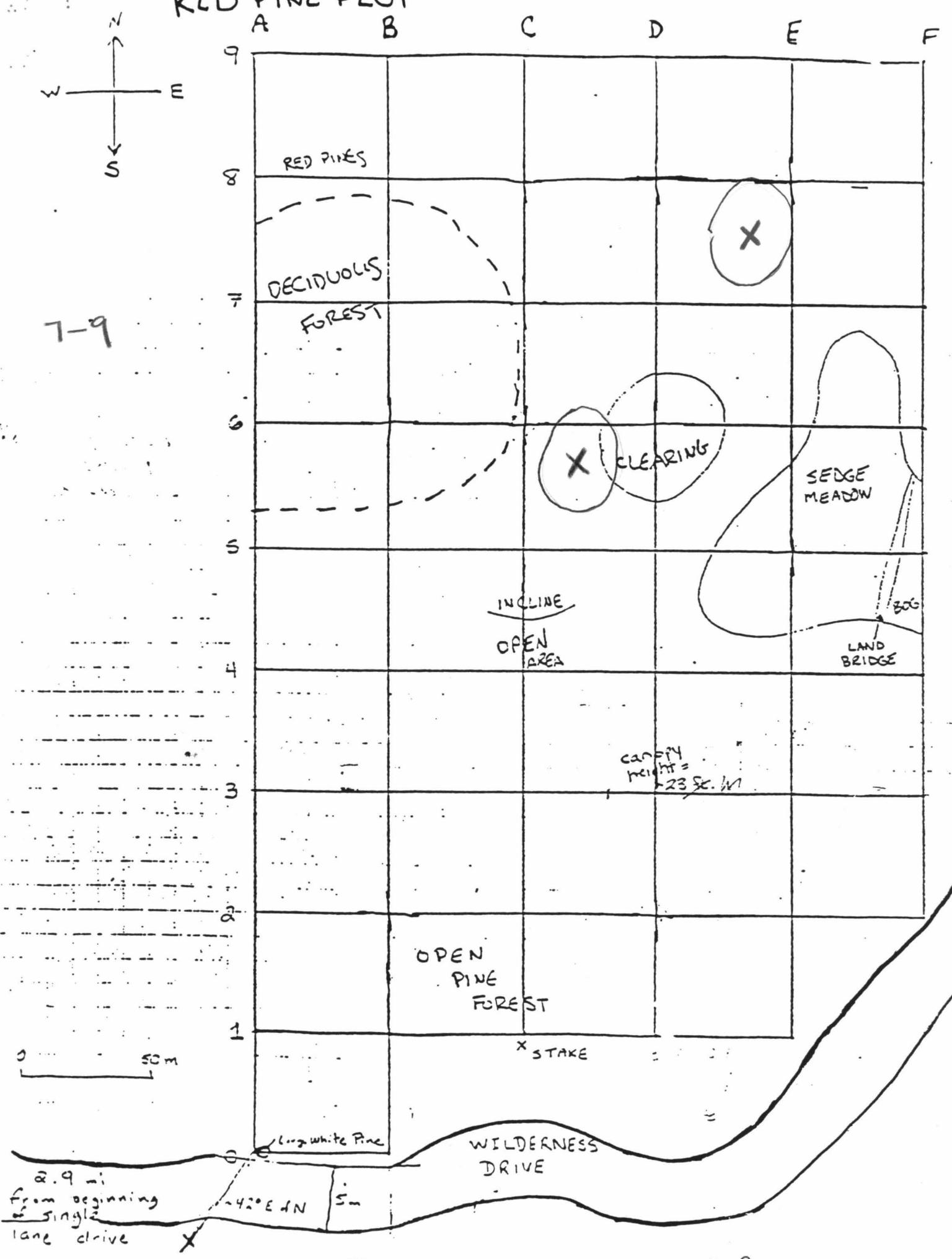
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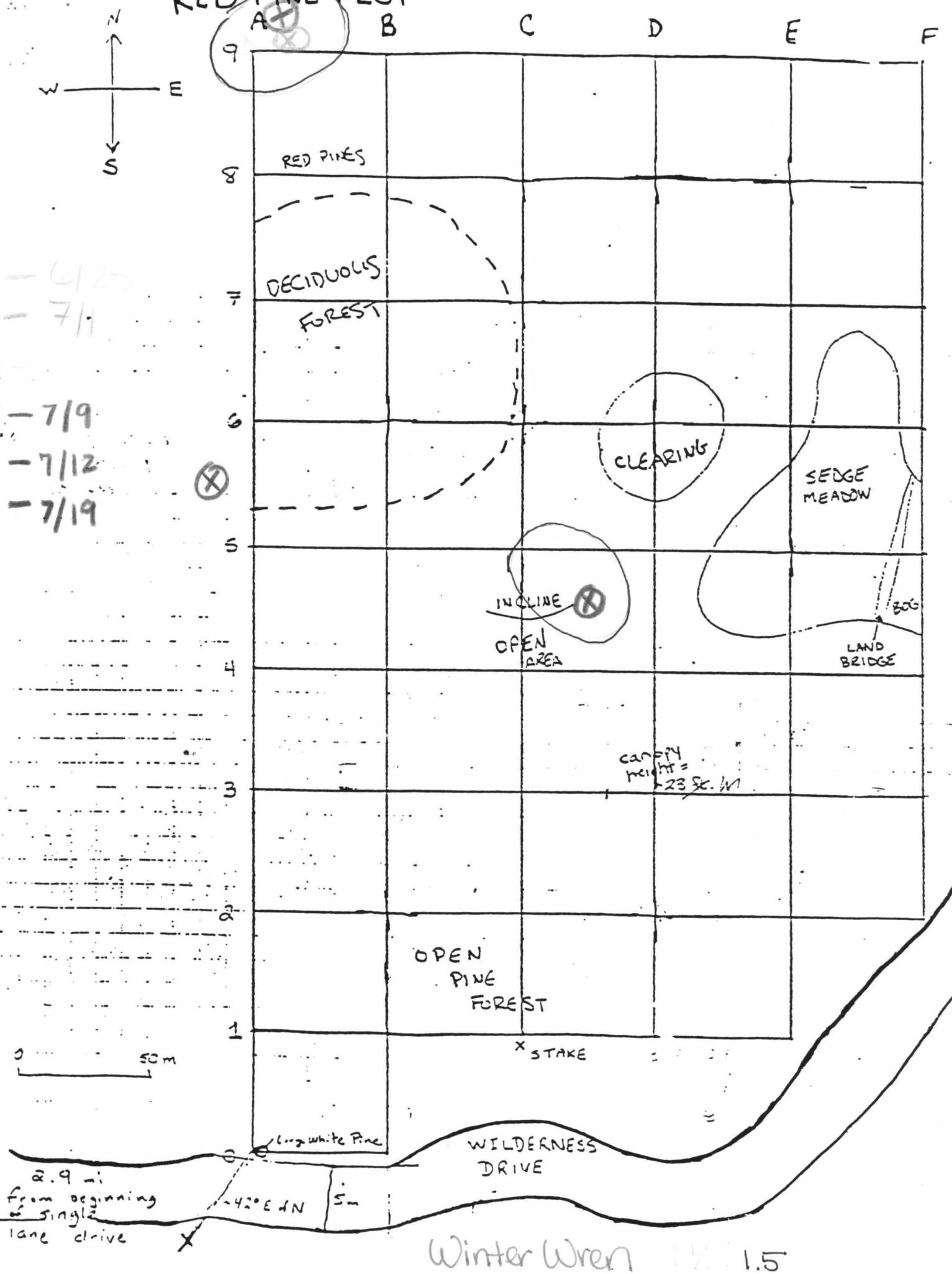
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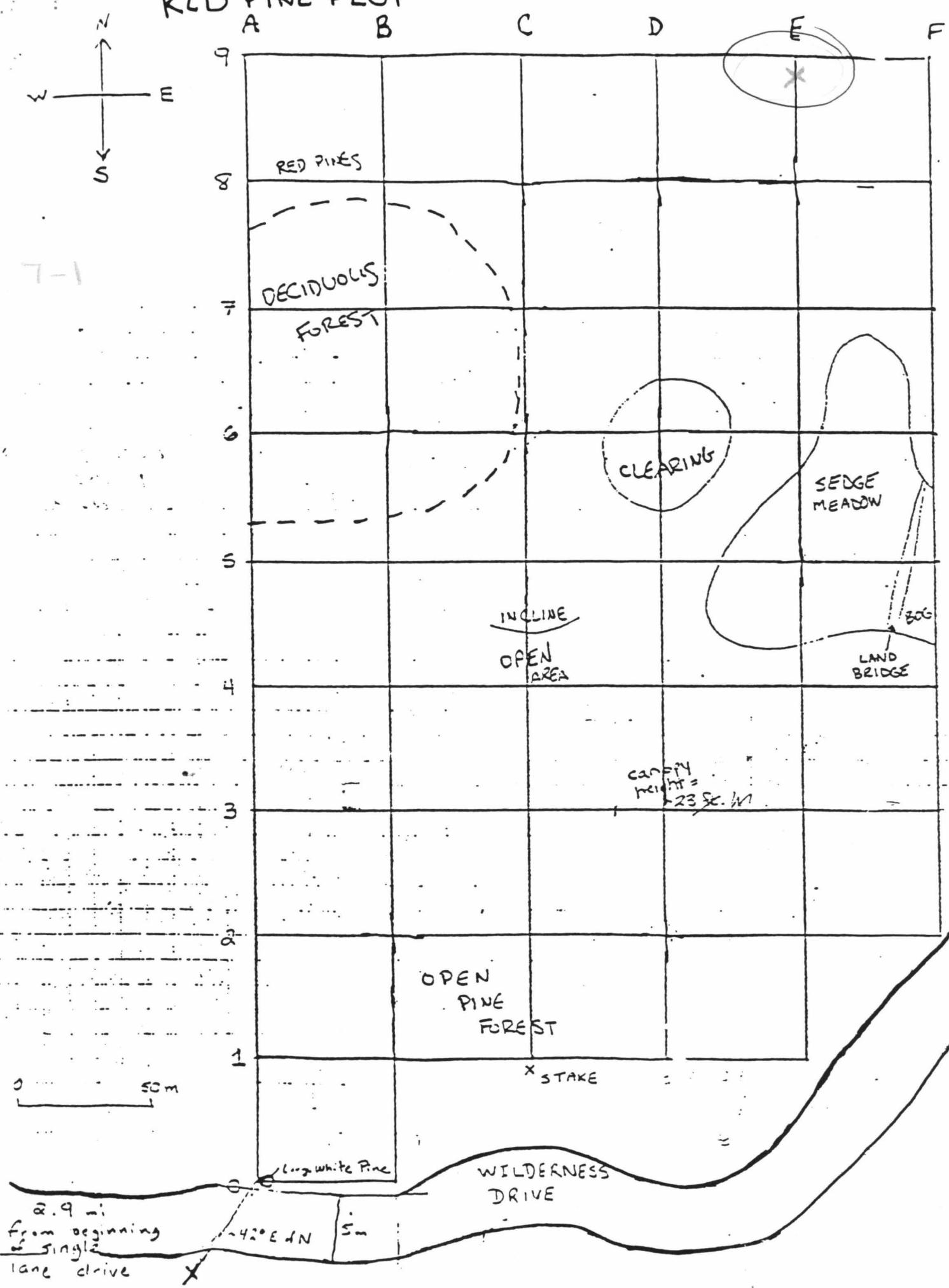
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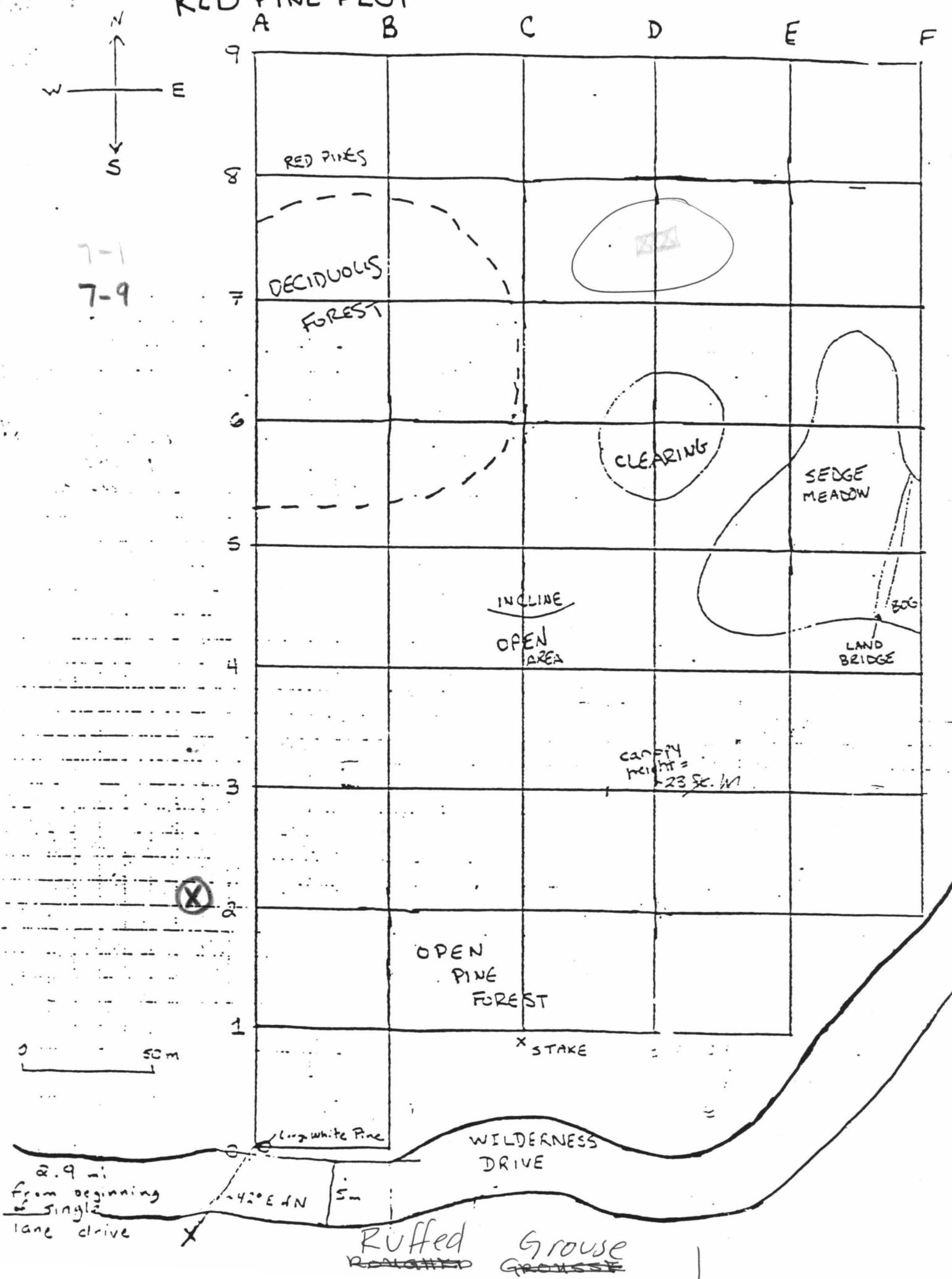
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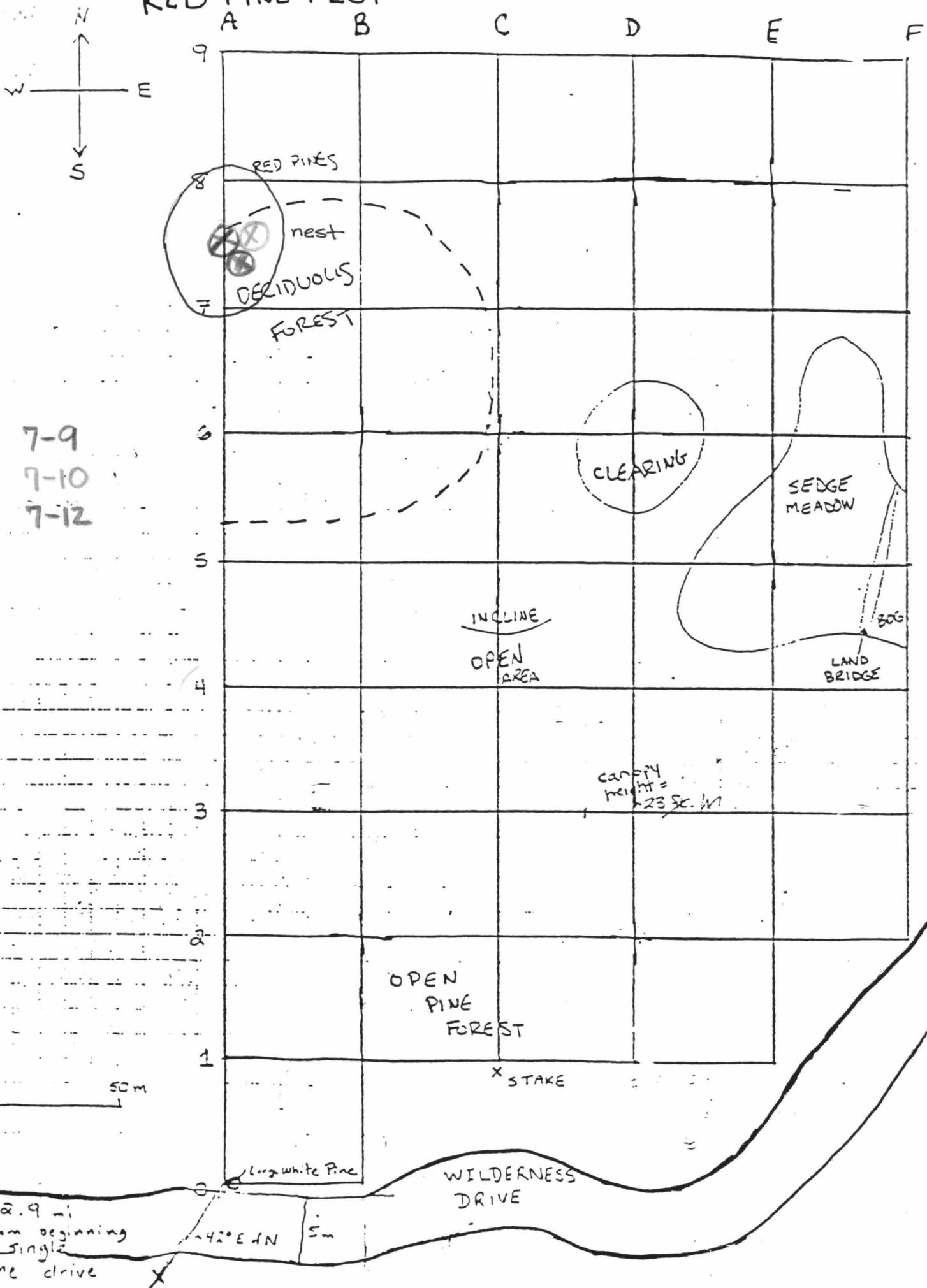
RED PINE PLOT



RED PINE PLOT

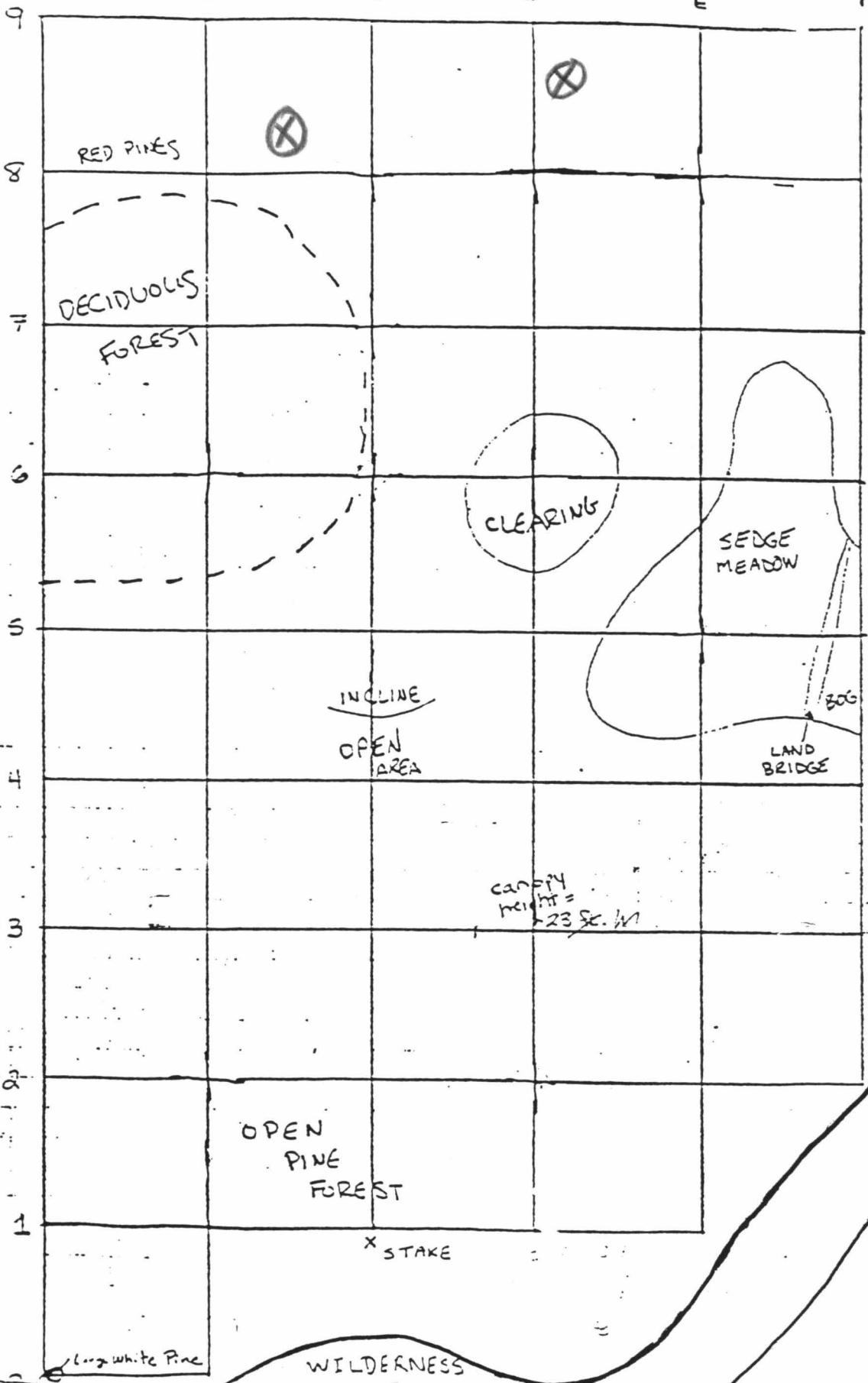


RED PINE PLOT



RED PINE PLOT

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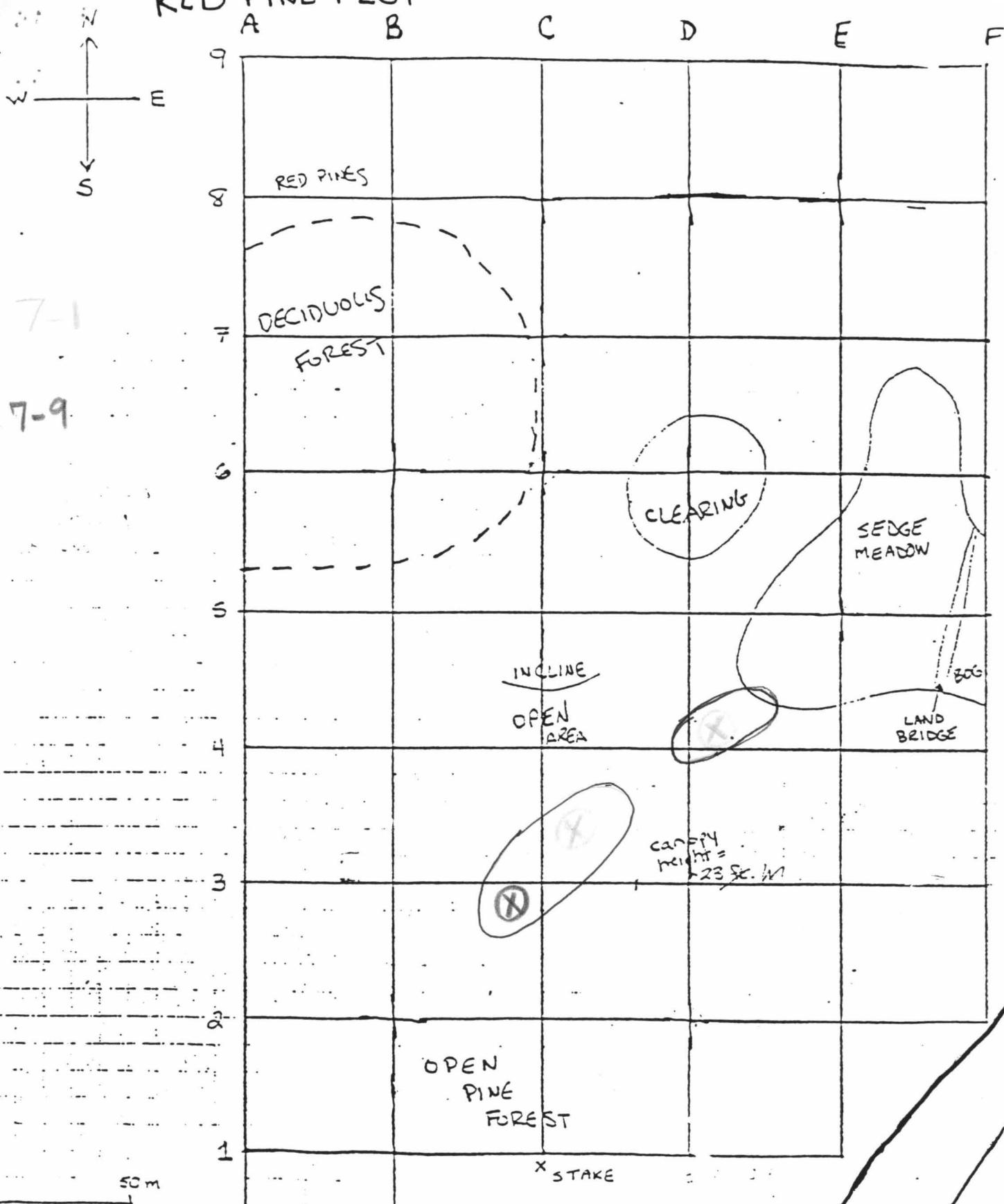


2.9 mi
from beginning
of single
lane drive

American Crow

2 VISITORS

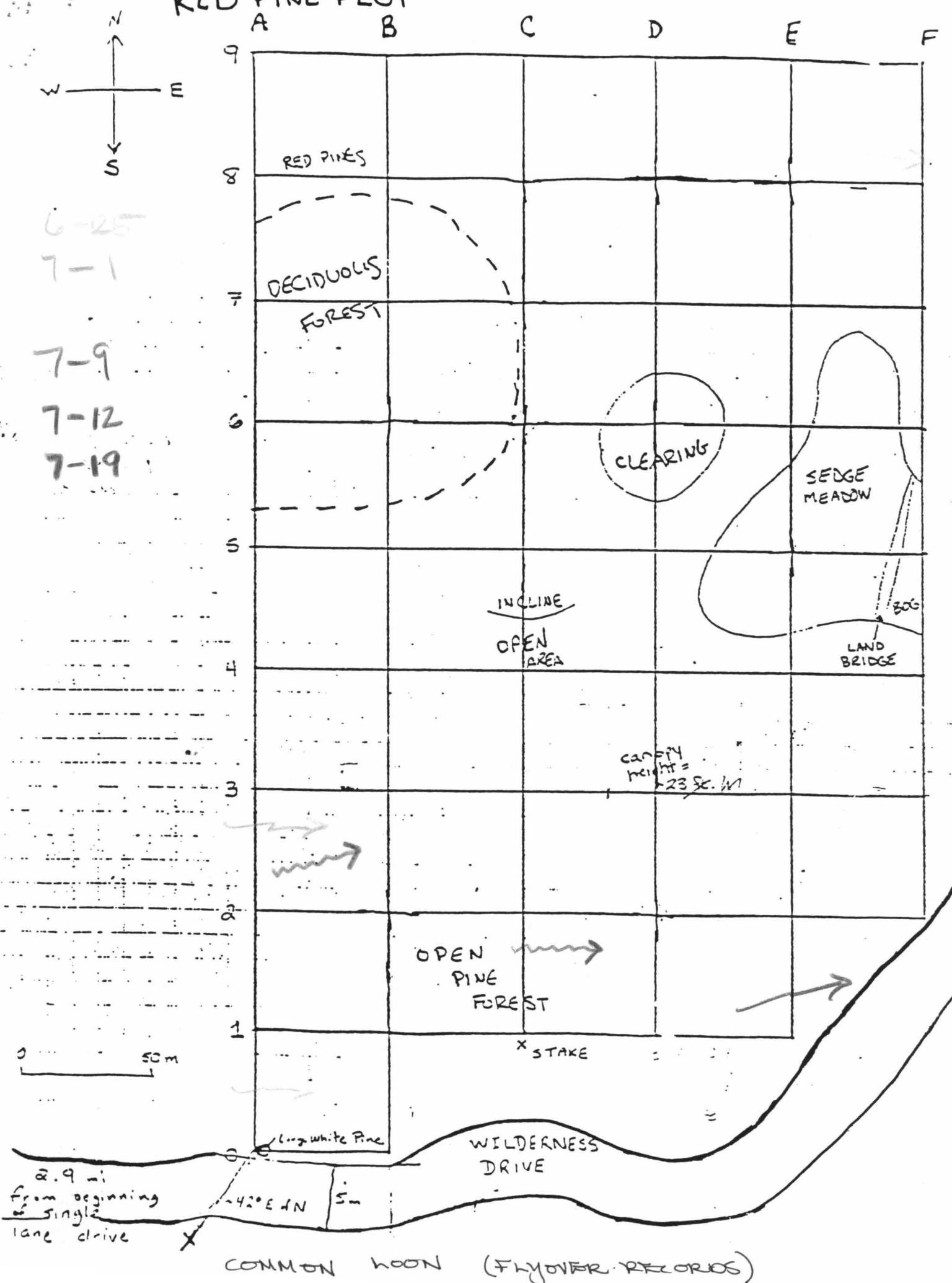
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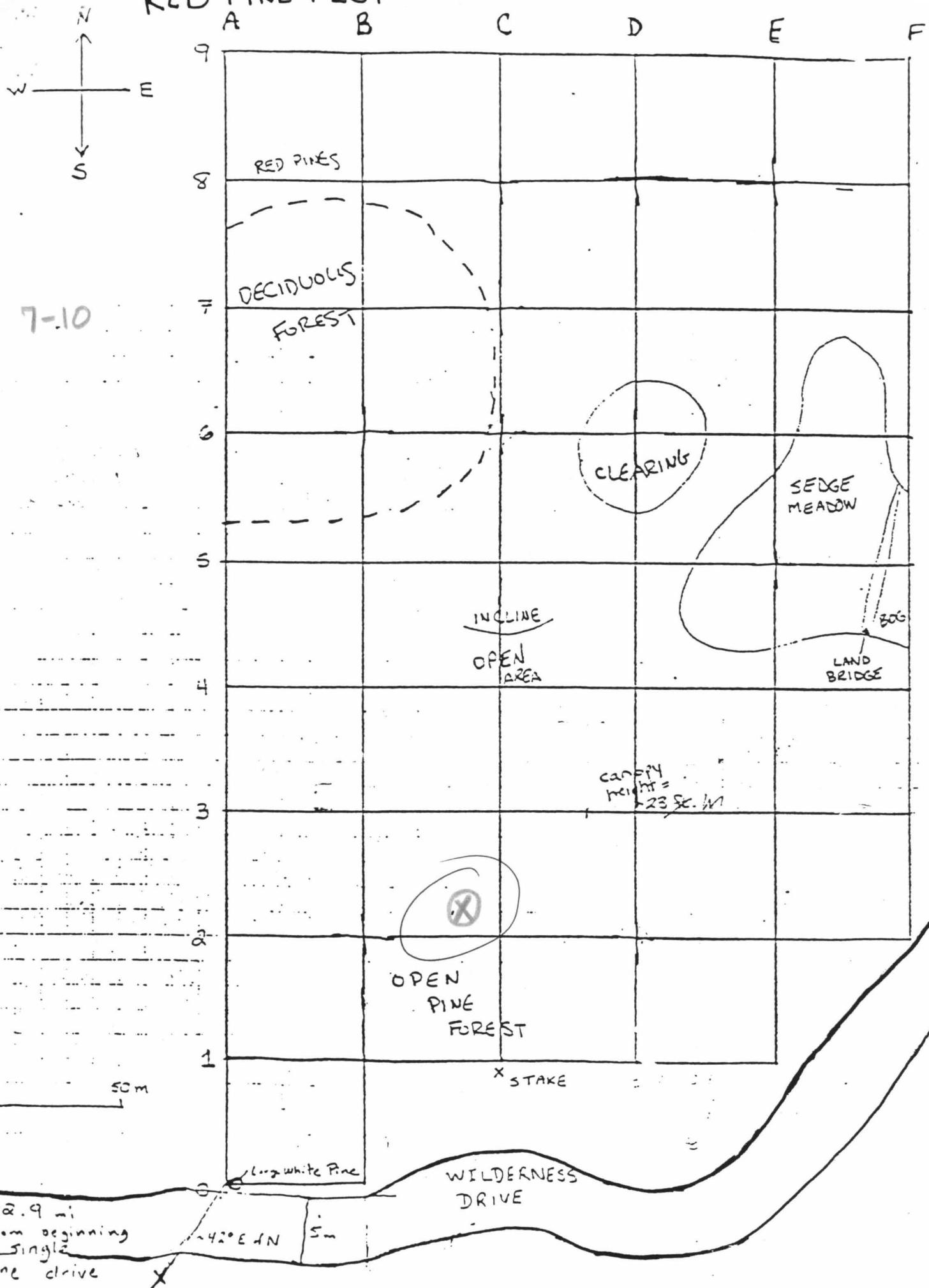
O^o
+
R^o
R^o
B^o
S^o

Hairy Woodpecker 2 VISITORS

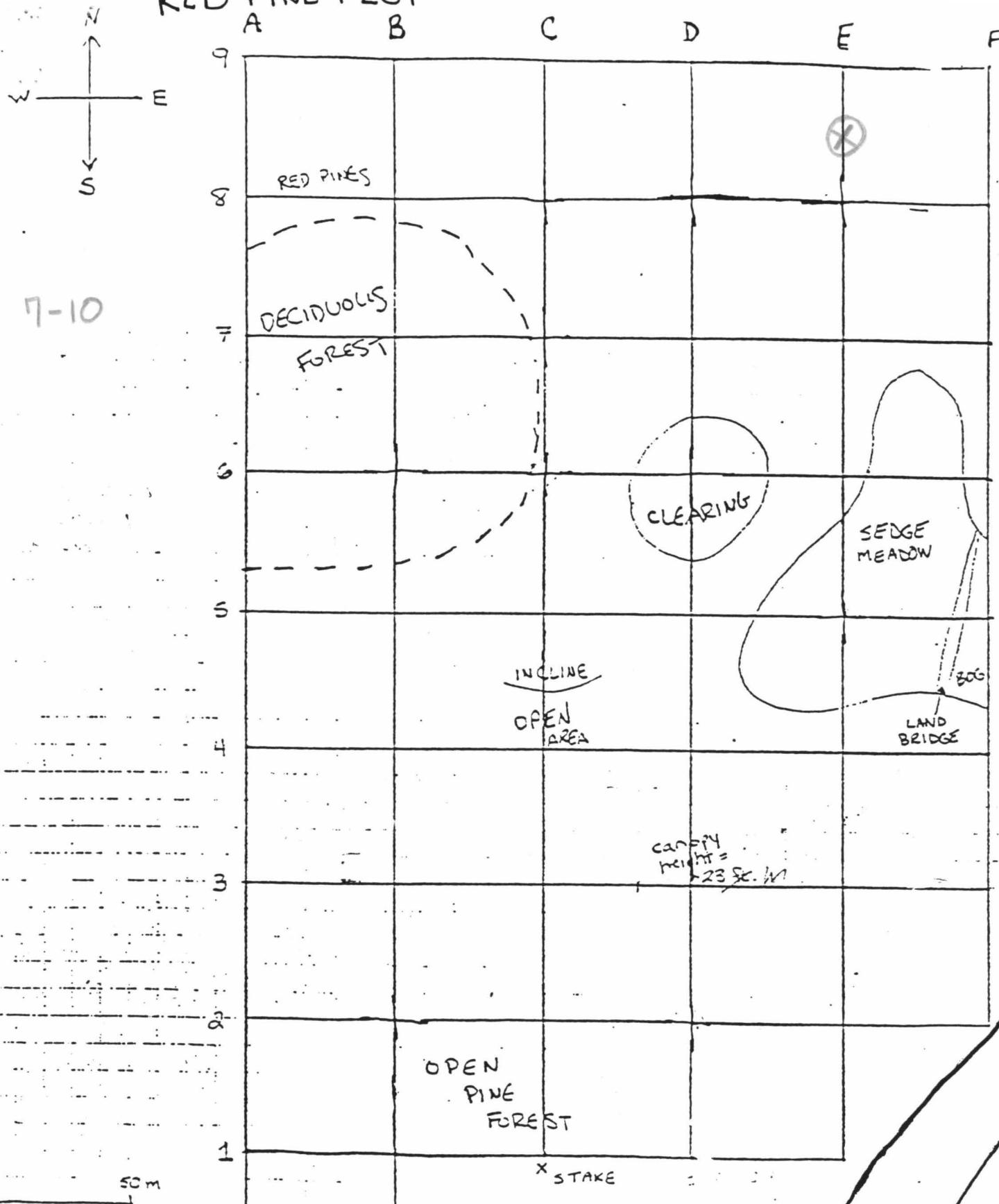
RED PINE PLOT



RED PINE PLOT



RED PINE PLOT



2.9 mi
from beginning
of single
lane drive

X

~42° E & N

S

ROSE

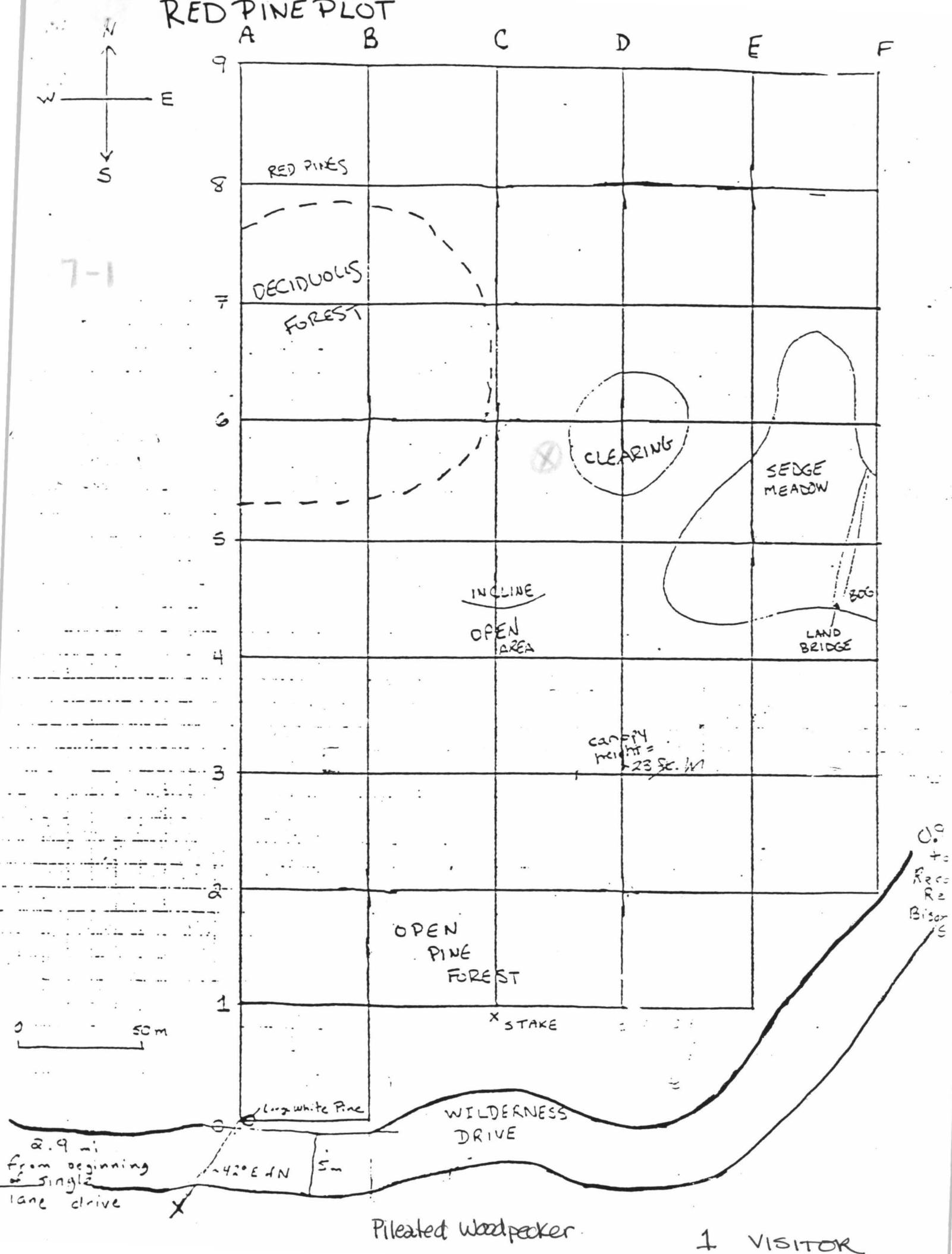
Red Breasted Grosbeak

I

VISITOR

O
+
R1
R2
B1
B2

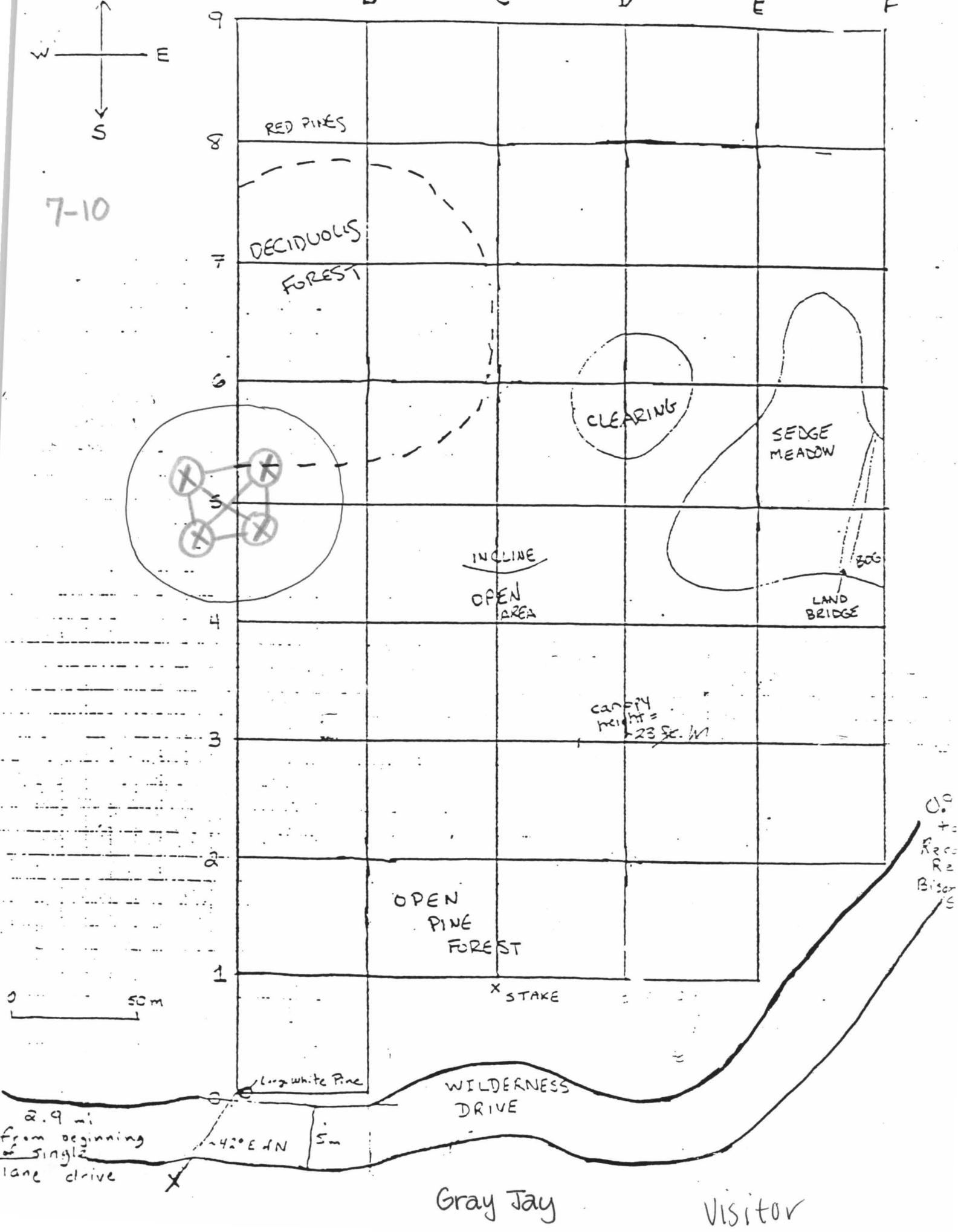
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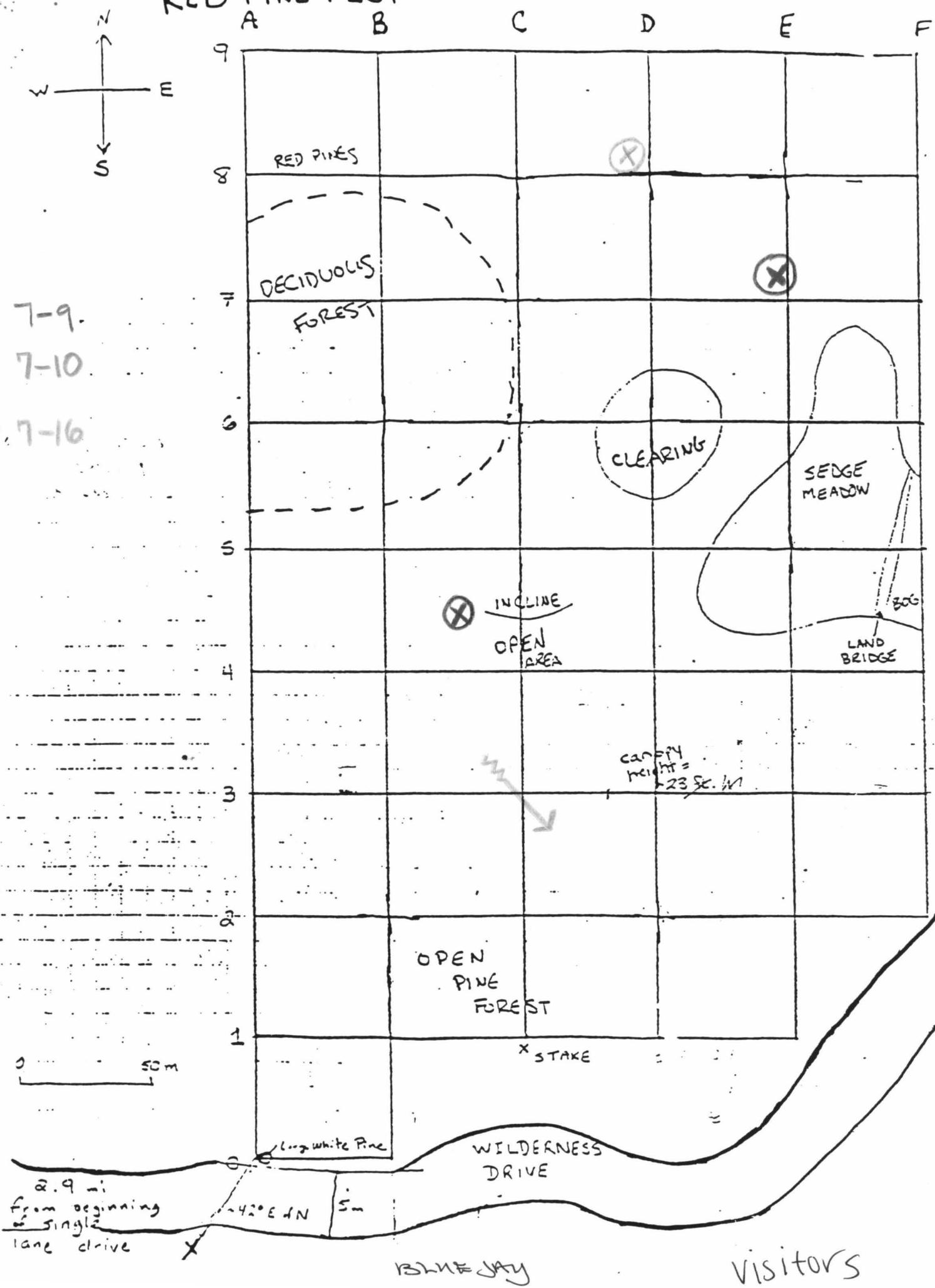
RED PINE PLOT

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7-10



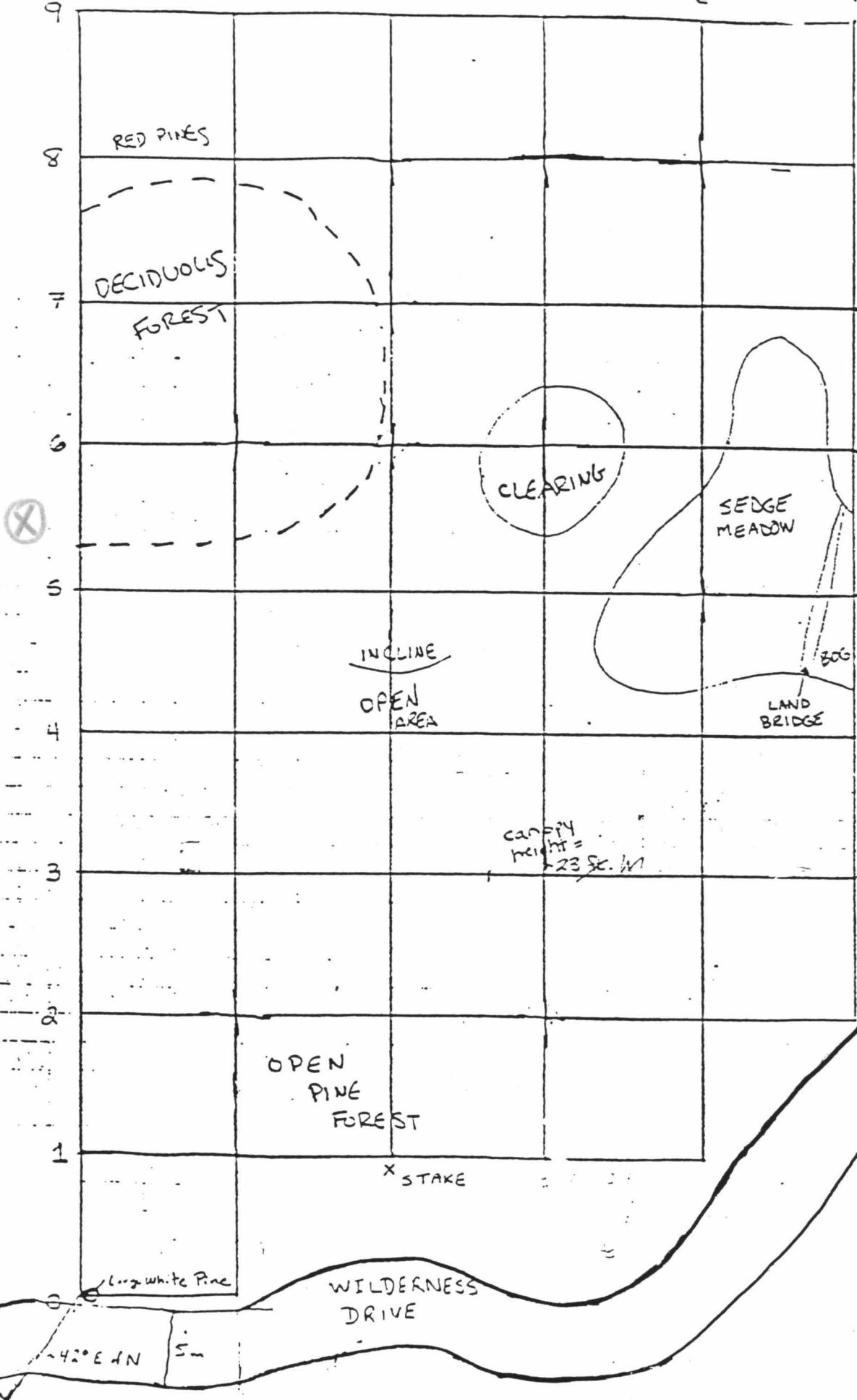
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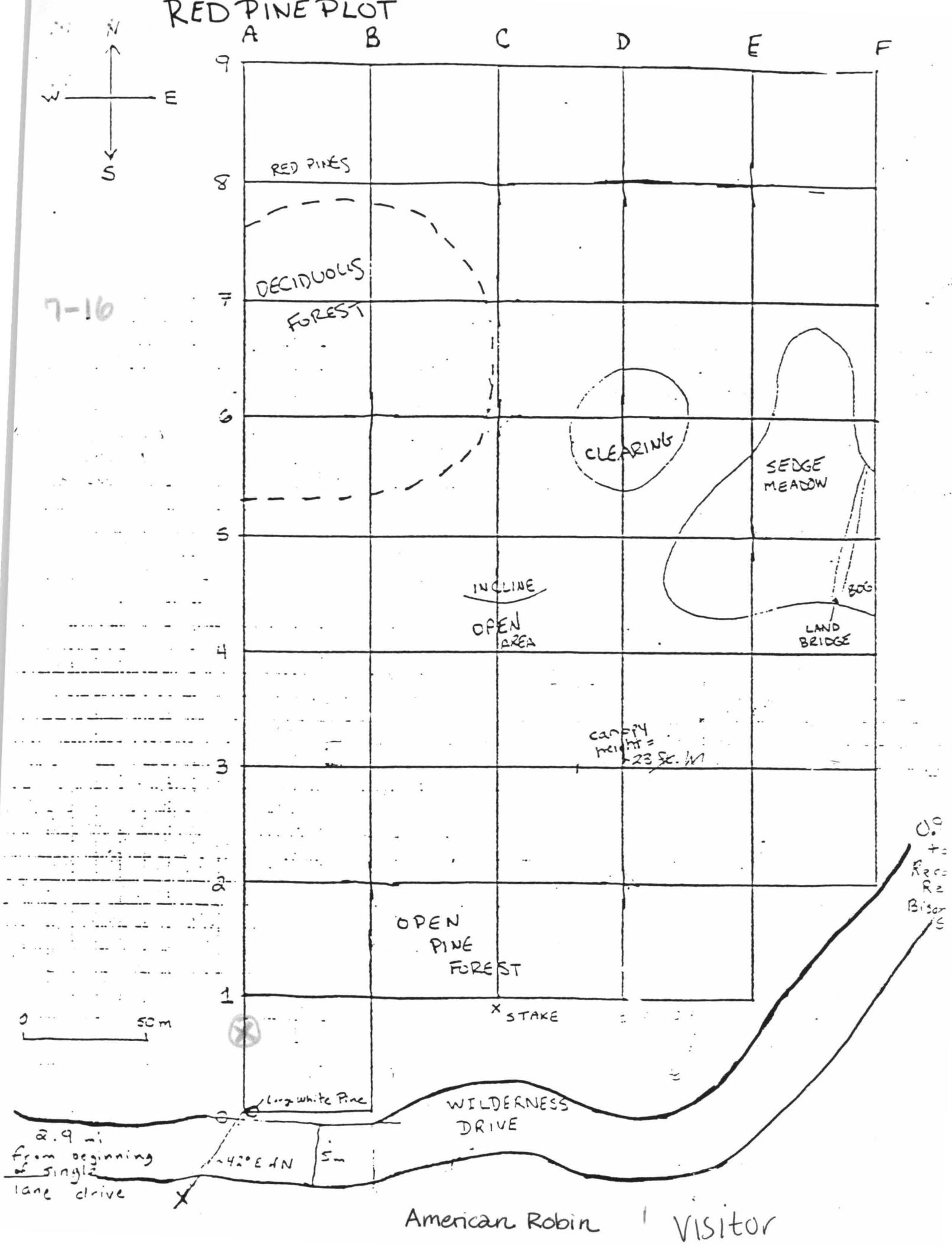
RED PINE PLOT

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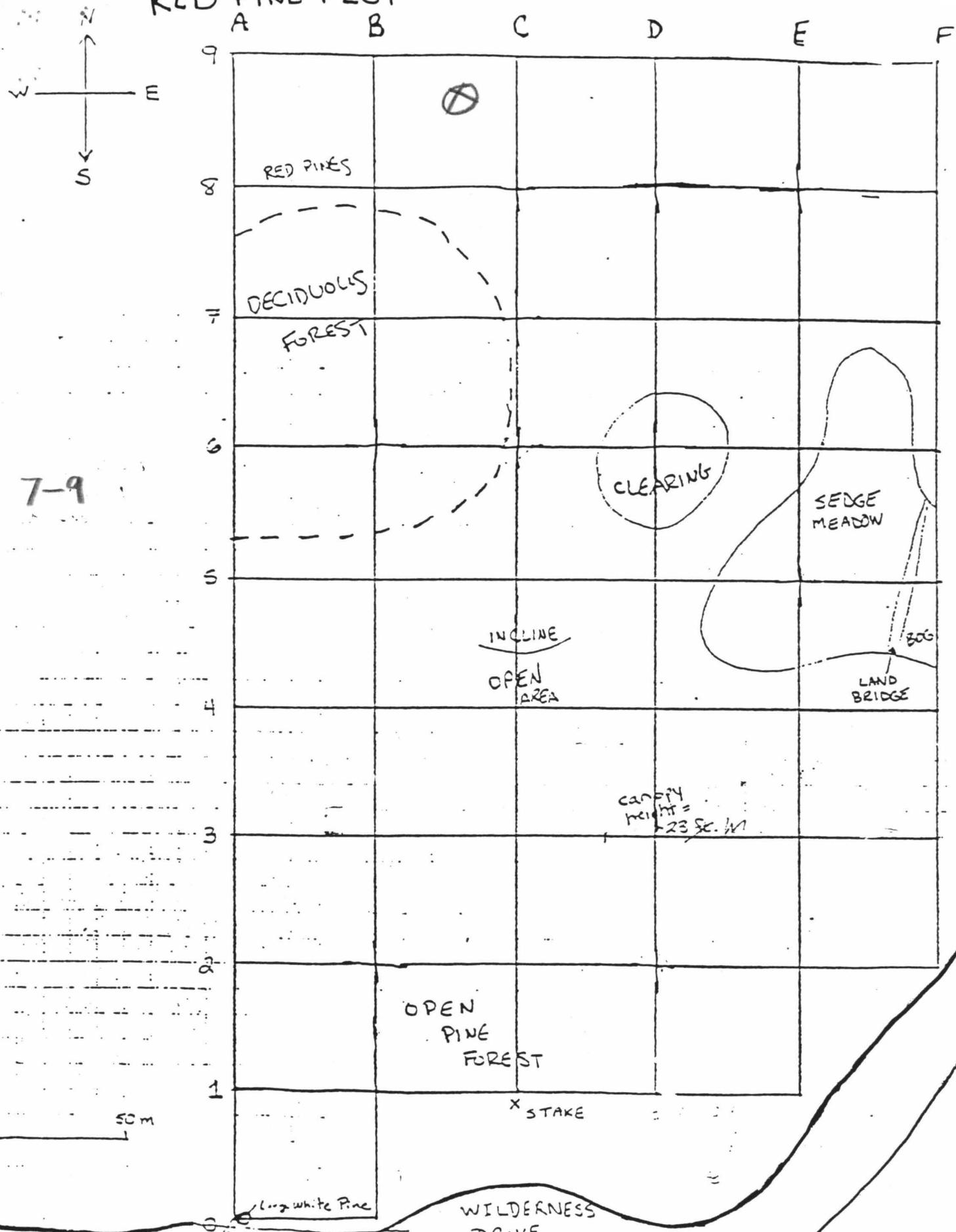
7-16



RED PINE PLOT



RED PINE PLOT

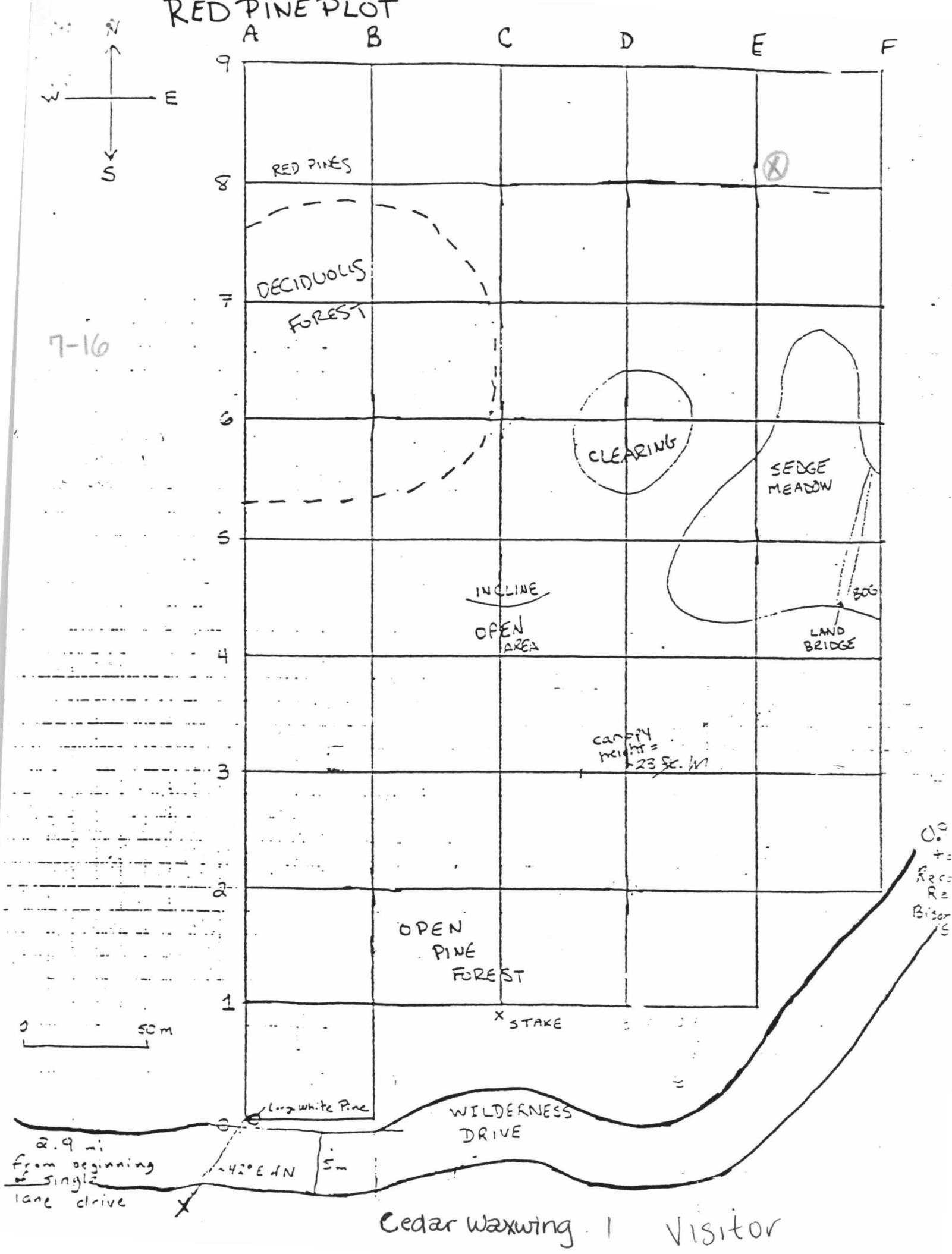


O.
+
R.
R.
B.
S.

Solitary Vireo

VISITOR

RED PINE PLOT



Sean B. Menke
Maureen L. Marsalek 1997

Red Pine Plot on Wilderness Drive

A quantitative survey of vegetation gave the following results: Trees 7.5 cm diameter and over, based on five 0.04 ha circular samples; 545 trees/ha; total basal area 7.0 m²/ha. Species comprising total number of trees [figures after each species give the number of trees/ha, relative density, (%), relative dominance (%), frequency (%)]: Red Pine (*Pinus resinosa*), 135, 24.8, 47.1, 80; White Pine (*Pinus strobus*), 80, 14.7, 29.2, 60; Hophornbeam (*Ostrya virginiana*), 70, 12.8, 1.9, 60; Paper Birch (*Betula papyrifera*), 15, 2.8, 1.7, 20; White Spruce (*Picea glauca*), 10, 2.0, 1.6, 40, Red Oak (*Quercus rubra*)), 25, 4.6, 1.0, 40; Sugar Maple (*Acer saccharum*), 60, 11.0, 5.3, 40; American Elm (*Ulmus americana*), 15, 2.8, 2.0, 20; Quaking Aspen (*Populus tremuloides*), 30, 5.5, 3.4, 20; Mountain Maple (*Acer spicatum*), 70, 12.8, 2.7, 60; Balsam Fir (*Abies balsamea*), 35, 6.4, 4.1, 20. Trees by diameter size class [figures after each size class give the number of trees/ha, relative density (%), basal area in m²/ha, relative dominance (%)]: A (7.5-16 cm) 220, 40.4, 0.42, 6.0 ; B (16-22.5 cm) 35, 6.4, 0.21, 3.0; C (22.5-37.5 cm) 120, 22.0, 1.34, 19.1; D (37.5-52.5 cm) 85, 15.6, 1.58, 22.6; E (52.5-67.5 cm) 60, 11.0, 2.01, 28.7; F (67.5-82.5 cm), 25, 4.6, 1.44, 20.6. Shrub stems/ha, 11500; ground cover, 100.0%, canopy cover, 100.0%; mean canopy height, 16.4 m (range 3-30 m).