

SEEDING CUT-OVER PINE LANDS
BURGESS SPRING EXPERIMENTAL RANGE

Purpose

Location

Methods

- A. Quadrat establishment
 - 1. Primary control
 - 2. Secondary control
 - 3. Placing quadrats
- B. Quadrat seeding
 - 1. Planting method
 - 2. Germination of seed
- C. Rodent poisoning
 - 1. Poisoning of seed
 - 2. Poisoning of area
 - 3. Control

Personnel

- A. Setting quadrats
- B. Planting
- C. Poisoning

Purpose

The purpose of the project is to simulate a good "catch" of pine seedlings in mechanically spaced quadrats by artificial seeding. In order to study the effect of cattle grazing on the establishment and growth of pine reproduction it is necessary to produce the germination of ~~pine~~ seeds and the growth of pine seedlings. It was not practical to wait for a good seed year, which occurs very infrequently in the pine type, before starting the study; hence the mechanical seeding. The seeding project offered a good study in reforestation of pine ranges; consequently it was undertaken jointly by the silviculture and range research groups of the Station.

Location

The project is located in the cut-over pine timber of the Burgess Spring Experimental Range, covering all of pasture 1, an area of ___ acres, including portions of sections 18 and 19, T 33 N, R 9 E. M.D.M.

Methods

A. Quadrat establishment

1. Primary control

The primary control consisted of a base line ~~run~~ ^{surveyed} with transit, chain and plumb bob on the section line between sections 18 and 19. Stakes were set at every 2 1/2 chain point on this line and numbered from 0 - 26 starting from the range line between R 8 E and R 9 E. Elevations were carried between stakes with a transit, starting with ^{at the zero stake} the base elevation of ~~at the zero stake~~ ₇₁ determined by Parker in 1934.

A random line was run with a transit, from the zero stake, south on the range line to intersect the section corner common to sections 24 and

25, R 8 E and sections 19 and 30, R 9 E. The angle between this line and the base line was determined to be $89^{\circ} 58'$. This angle was then turned off south of each stake on the base line and stakes were set on line as far as possible without excess brushing. An angle of $90^{\circ} 2'$ was turned off south of each base-line stake and stakes set on line as before.

2. Secondary control

The lines turned off from each base-line stake were projected to the fence line with a compass and chain, using backsights. Each line was checked across to the preceding line at every five chain mark. On these lines quadrats were set $1 \frac{1}{4}$ chain from the base line and each $2 \frac{1}{2}$ chains thereafter, making a $2 \frac{1}{2}$ chain grid of the area. No quadrats were set ~~less than $\frac{1}{2}$ chain~~ ^{to} from the fence line. Stakes were set $2 \frac{1}{2}$ chains from the base line and every $2 \frac{1}{2}$ chains thereafter. 5

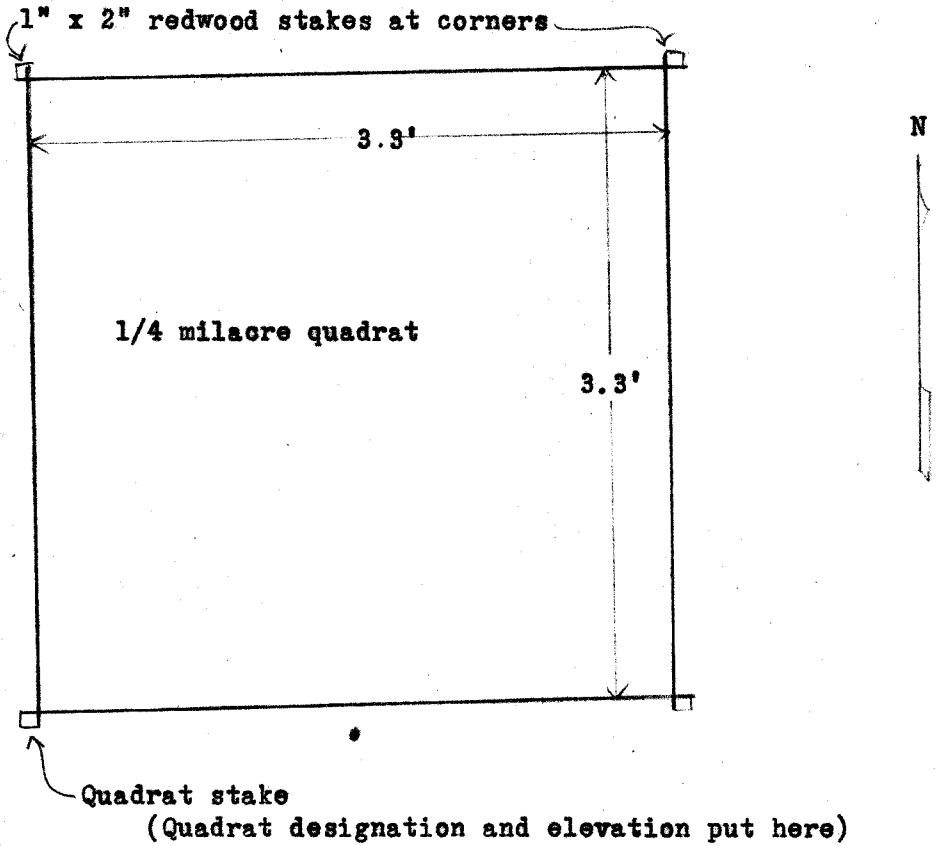
On even numbered lines ^{a) Reference posts} ~~posts~~ were set 4 feet north of the ~~base-line~~ ^{stake} and each 5 chain ^{point marking} ~~stake~~ thereafter, making a five chain grid of the ~~area for quick field reference.~~ ^{the location of reference posts which were to be set later.} Approximately ~~200~~ ¹⁷⁰ posts remained to be set at the end of the 1935 season.

^{b) Topographic map} Elevations were carried ^{along the lines} ~~between quadrats and~~ stakes with ~~a~~ double abney. From the intense grid of elevations thus secured, a topographic map of the area was prepared in the office after the field work was completed. The boundaries of the area were determined on a grid in the office by measurements made in the field from the last stake or quadrat in each line to the fence line.

3. Placing quadrats

The $\frac{1}{4}$ milacre quadrats, 3.3 feet square, were placed northeast of each quadrat stake. A redwood stake was set on the outside of each of the four corners of the quadrats where possible, ~~being~~ "rocked-up" ^{In some cases they were} ✓

~~Instances~~ and sometimes driven into ~~fallen~~ fallen trees. When it was not possible to set stakes the ~~positions of the~~ quadrat corners were chipped or marked on rocks, trees, stumps, etc. *All irregularities in the placement of the stakes were recorded.*



Quadrat designations and quadrat elevations were put on the ~~quadrat~~ ~~stake~~ ~~the~~ southwest ~~stake~~, of each quadrat unless otherwise noted. The designations used were "line-number" and number of chains south or north of the base line; e.g., a quadrat 6 1/4 chains north of the base line on line 3, (7 1/2 chains east of range line) would be designated ~~7 1/2~~ "3-6 1/4 N."

B. ~~the~~ Quadrat seeding

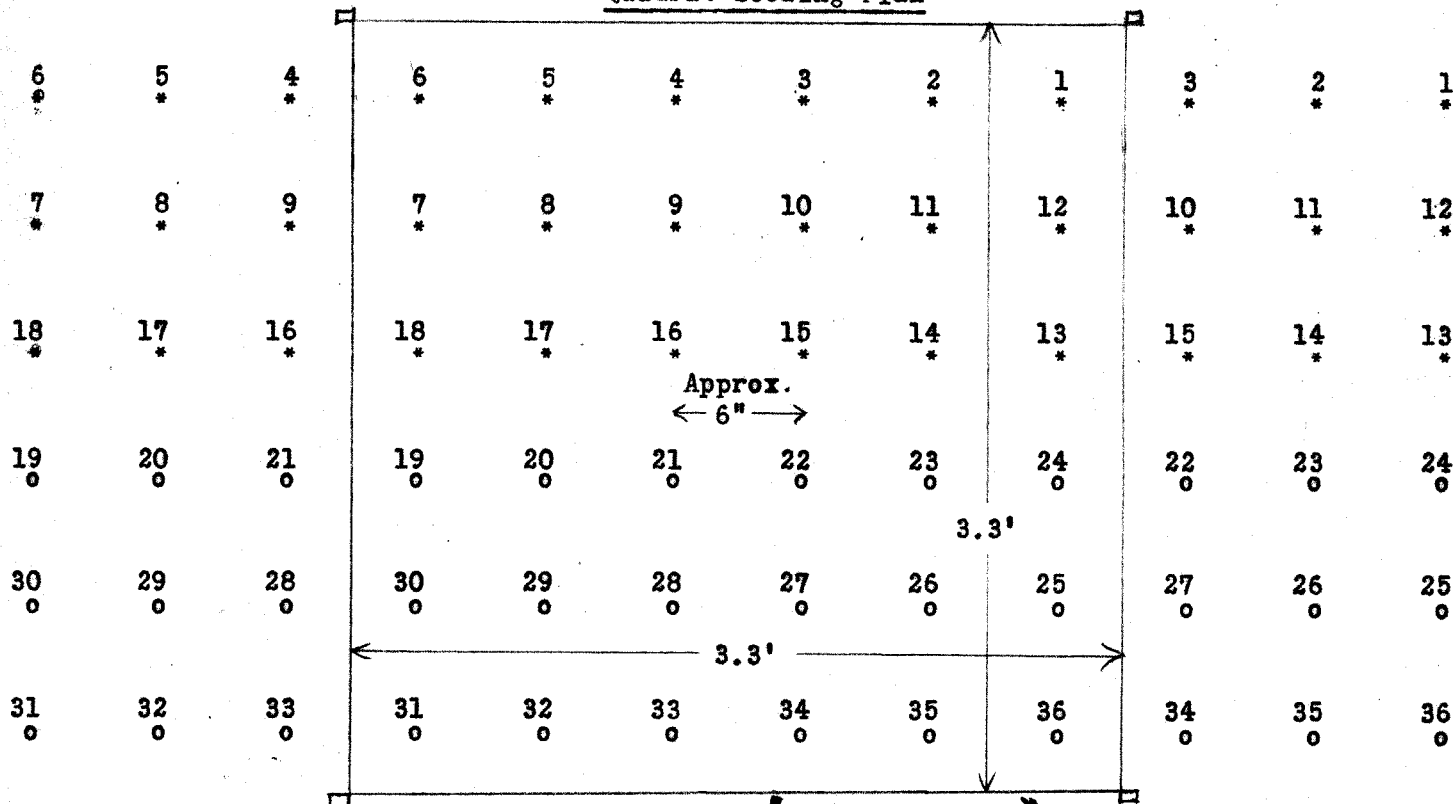
Each quadrat was seeded to simulate a good "catch" of seed. Thirty-six "spots" of 1 to 3 seeds each were planted approximately 6 inches apart inside ~~the~~ ^{each} quadrat and the same number were planted outside so that the seedlings would not ~~necessarily~~ form an island in the pasture, the boundaries

contained in or concided with

of which were the edges of the quadrat. The south half of each quadrat was planted ~~with~~^{to} ponderosa pine, lot Kennett 2064. and the north half ^{to} jeffrey pine, lot 2030. The 36 spots inside the quadrat were numbered ~~as~~^{like} sections in a township and the spots outside were numbered in a similar manner. A record was made of all spots which ^{could be} were not planted because of the presence of rocks, trees, etc. Of the ~~35~~⁸⁵⁴ quadrats established a total of 836 were planted.

The planting was done with a ^{remodeled} ~~revamped~~ hand corn planter. The planting lips were cut wedge-shaped and the seed desiminater set to plant from 1 to 3 seeds in a spot. The seeds ^{were placed} ~~was~~ planted approximately one quarter inch into mineral soil. The seeding was done after a few light rains and snows ~~had fallen and moistened~~^{the ground}.

Quadrat Seeding Plan



- * 1-3 Jeffrey pine seed (lot Kennet 2064)
- o 1-3 Ponderosa pine seed, (lot 2030)
- 1" x 2" redwood stake

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c. Rodent poisoning

Get data from Fair

Poison seed coating

Poisoned area

How

Control

Fig 1 X

Ponderosa and Jeffrey

Mortality and survival of pine seedlings in the first year of growth

Burgess Spring Experimental Range 1936

Mortality by causes	Seedlings Number	Percent
Drought	2199	39.1
Insects	1099	19.5
Frost	952	16.9
Rodents	106	1.9
Cattle	55	1.0
Other weather and site factors:		
Heat, hail, rain, snow, shade, & debris	27	} 0.9
Man - trampling	10	
Other wild animals not listed above	7	
Poor seed vitality	10	
Unknown factors	776	12.9
	<hr/> 5191	<hr/> 92.2
Survival	436	7.8
Total seedlings observed	<hr/> 5627	<hr/> 100