

SECONDARY PLANT SUCCESSION AT
CRATERS OF THE MOON NATIONAL MONUMENT, IDAHO

Project #1: Martin Road Closure Area

In late August of 1965 that portion of the Martin Road lying within the boundaries of Craters of the Moon National Monument was permanently closed. Since the area was situated within a protected area free from heavy range useage, it was considered suitable for one of several study sites to be analyzed over a long term period in an attempt to determine the relative rates and patterns of secondary plant succession on the relatively recent basaltic lava flows of Craters of the Moon National Monument.

Location and Description of the Area

The study site is located in the northeastern corner of the Monument (N. ^{Sec. 25} $\frac{1}{2}$ T. 2N., R. 24E., Butte County, Idaho) on a relatively flat lava plain lying at an elevation of approximately 5730 feet. The closure area is approximately .7 mile in length and varies in width from 19 to 23 feet. It courses through a plant community supporting regional climax vegetation of Artemisia arbuscula and Festuca idahoensis. The substrate consists largely of fine cinder which apparently covers an older lava flow and probably

represents an aeolian deposition or wind erosion pavement superimposed upon the northeastern Sunset Cone pahoehoe type lava flow.

Objectives of the Study

The following objectives are deemed essential for completion of the study:

1. Compilation of a workable checklist of plants peculiar to the northeast corner of the Monument.
2. Erection of suitable shrub community successional quadrats both within the closure area and in the area surrounding the closure area.
3. Analysis of vegetational changes within quadrats over such period as is required for the climax community vegetation to become established in the closure area.
4. Completion of a photographic record of secondary succession, preferably by means of photographs taken at annual intervals.
5. Determination of abiotic factors operative in the area including detailed soil analyses.

6. Synthesis of successional patterns
from data acquired over the required
period.

Methods

Initially, checklists of plants growing only in the roadbed and on the adjacent plain were compiled. Using the successional methods outlined by Phillips (1959), the investigator erected ten one-meter-square quadrats in random order along the full length of the road closure. Vegetative analyses were completed in August 1966 and consisted of the determination of abundance and cover class of each species. The quadrats were then graphed with relative area determined by direct metric measurement. A photographic record was not completed during the first year of the study.

Results: The First Year

1. Vegetational Notes on the Plain Adjacent to the Closure Area:

Apparent order of abundance would list Artemisia arbuscula, Purshia tridentata, Elymus cinereus, Chrysothamnus viscidiflorus, and Bromus tectorum as the most abundant species. Incidentals include Ribes aureum, Lithospermum ruderales, Crepis acuminata, Tragopogon dubius, Eriogonum ovalifolium, Phlox hoodii, Phacelia hastata, Delphinium andersonii, Chenopodium album, Mentzelia albicaulis, M. dispersa, M. laevicaulis, Mimulus nanus, Gayophytum ramosissimum, Collomia linearis, Carex spp., and Opuntia polyacantha.

2. Checklist of Plants Growing in the Roadbed:

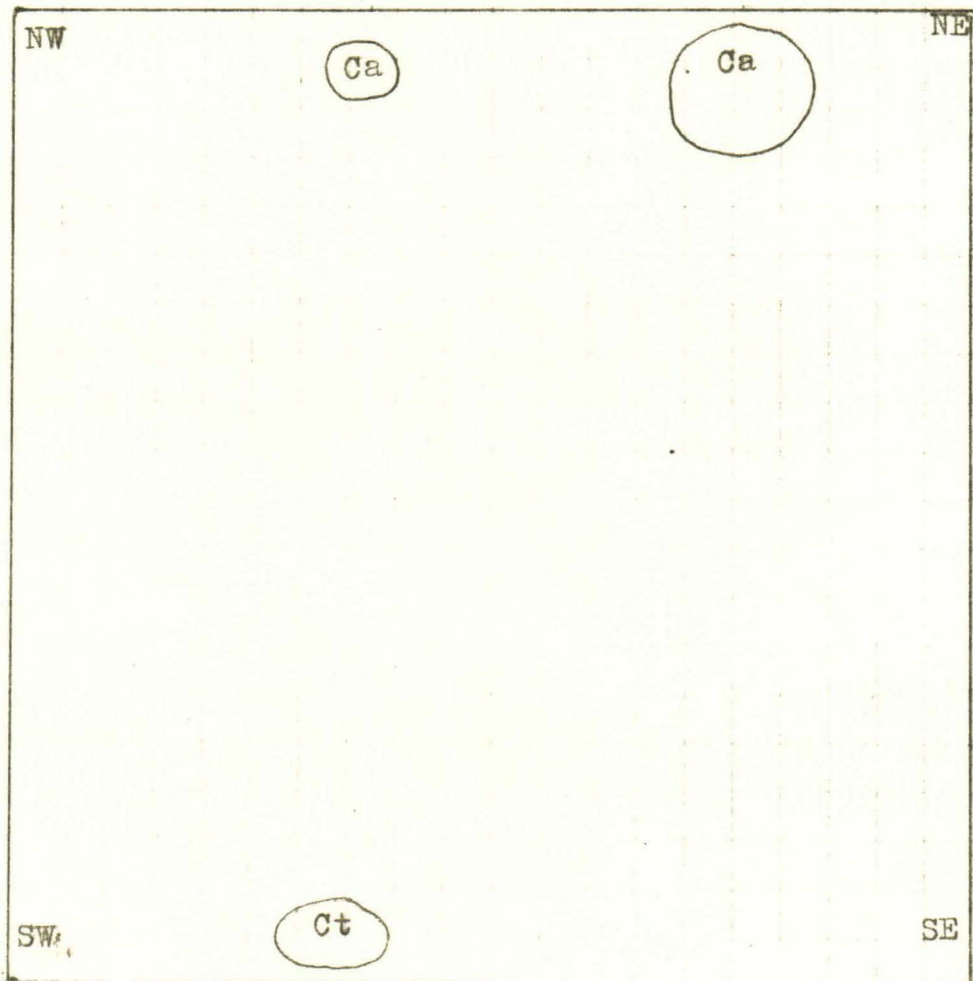
Polygonaceae	<u>Eriogonum vimineum</u>	Ev
	<u>Rumex crispus</u>	Rc
Chenopodiaceae	<u>Chenopodium album</u>	Ca
	<u>Salsola kali</u> var. <u>tenuifolia</u>	Sk
Amaranthaceae	<u>Amaranthus graecizans</u>	Ag
Cruciferae	<u>Sisymbrium altissimum</u>	Sa
	<u>Thlaspi arvense</u>	Ta
Rosaceae	<u>Purshia tridentata</u>	Pt
Leguminosae	<u>Melilotus officinalis</u>	Mo
Loasaceae	<u>Mentzelia albicaulis</u>	Ma

	<u>Mentzelia dispersa</u>	Md
	<u>Mentzelia laevicaulis</u>	Ml
Onagraceae	<u>Gayophytum ramosissimum</u>	Gr
Hydrophyllaceae	<u>Phacelia hastata</u>	Ph
Boraginaceae	<u>Cryptantha torreyana</u>	Ct
Solanaceae	<u>Nicotiana attenuata</u>	Na
Scrophulariaceae	<u>Mimulus nanus</u>	Mn
	<u>Verbascum thapsus</u>	Vt
Compositae	<u>Artemisia arbuscula</u>	Aa
	<u>Chaenactis douglasii</u>	Cd
	<u>Chrysothamnus viscidiflorus</u>	Cv
	<u>Grindelia squarrosa</u>	Gs
	<u>Matricaria inodora</u>	Mi
Gramineae	<u>Bromus tectorum</u>	Bt
	<u>Elymus cinereus</u>	Ec
	<u>Stipa occidentalis</u>	So
	<u>Sitanion hystrix</u>	Sh

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Quadrat #1

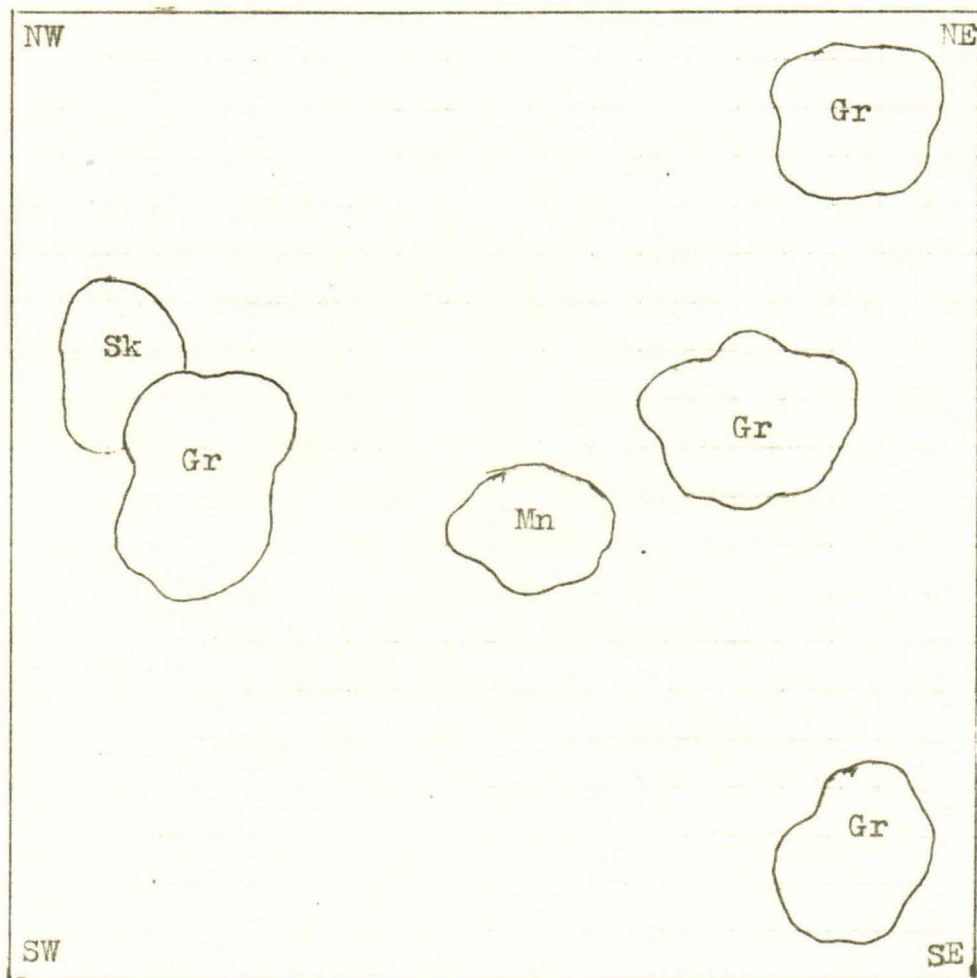
Scale: 1" = 12.89"

Easternmost of 10 one-meter-square quadrats

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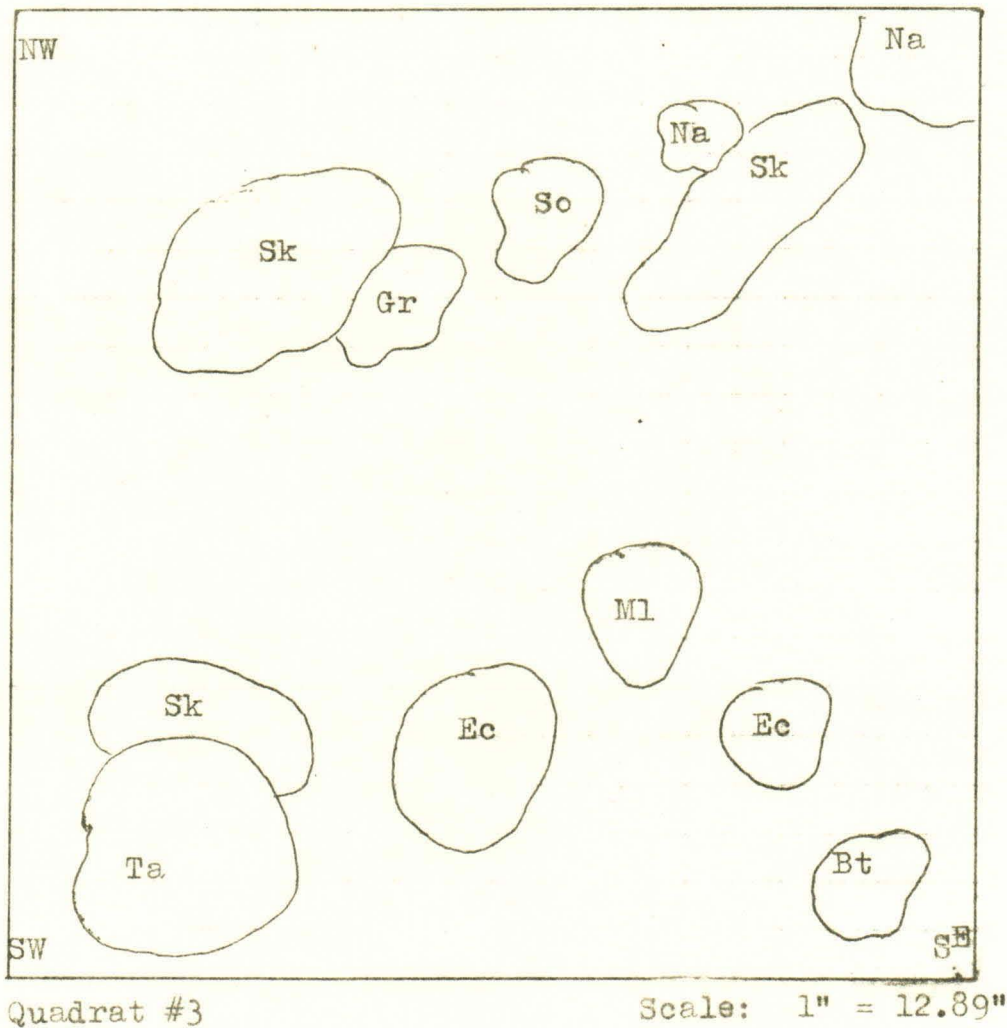
Quadrat #2

Scale: 1" = 12.89"

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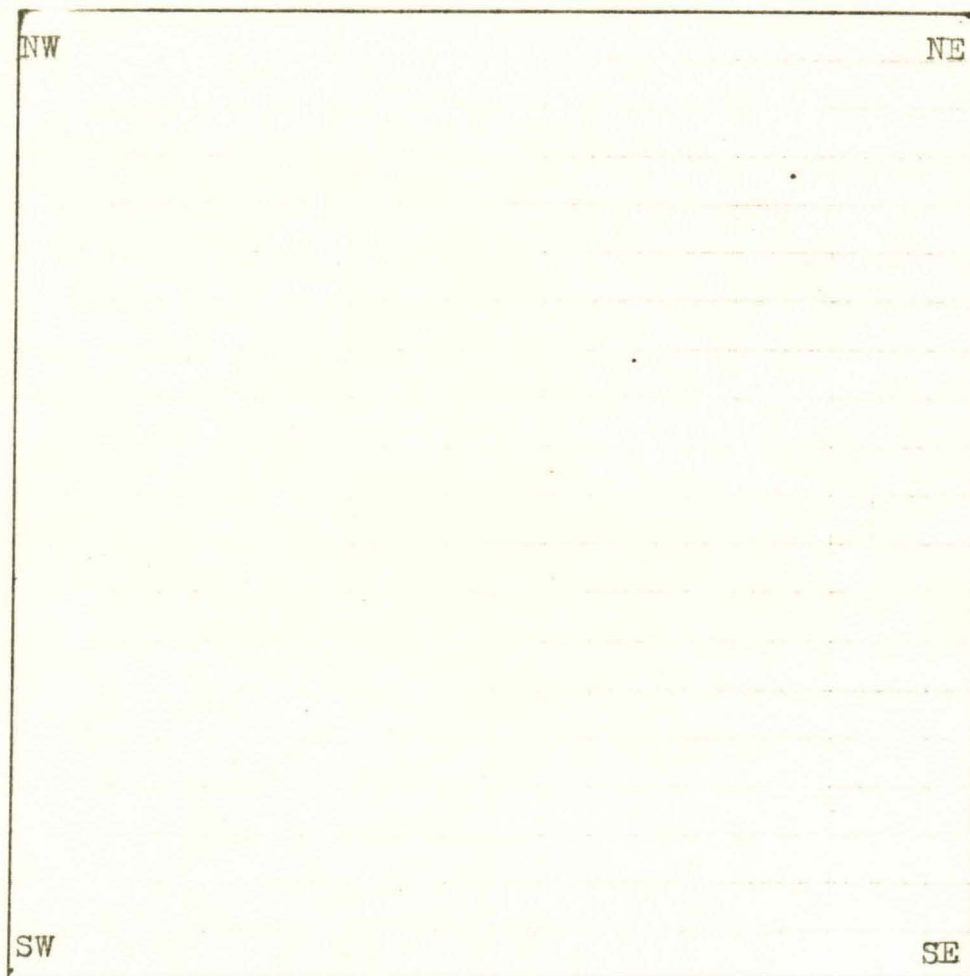
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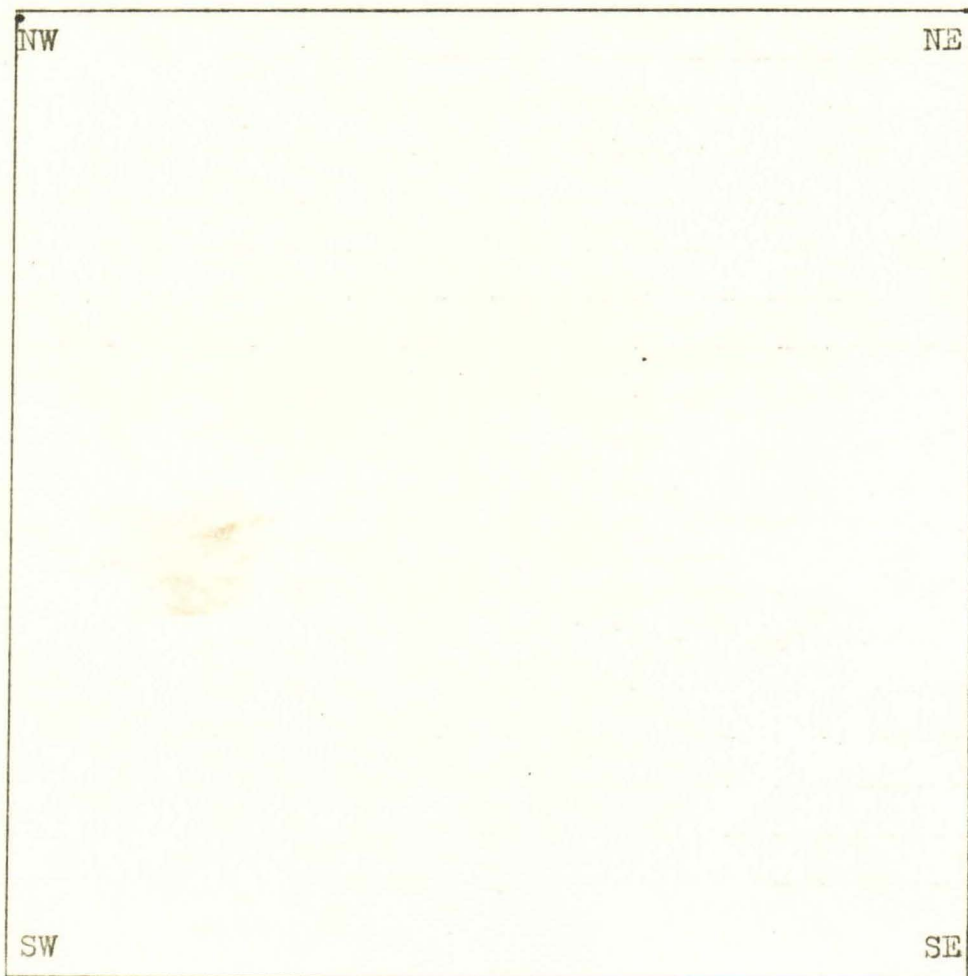
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Scale: 1" = 12.89"

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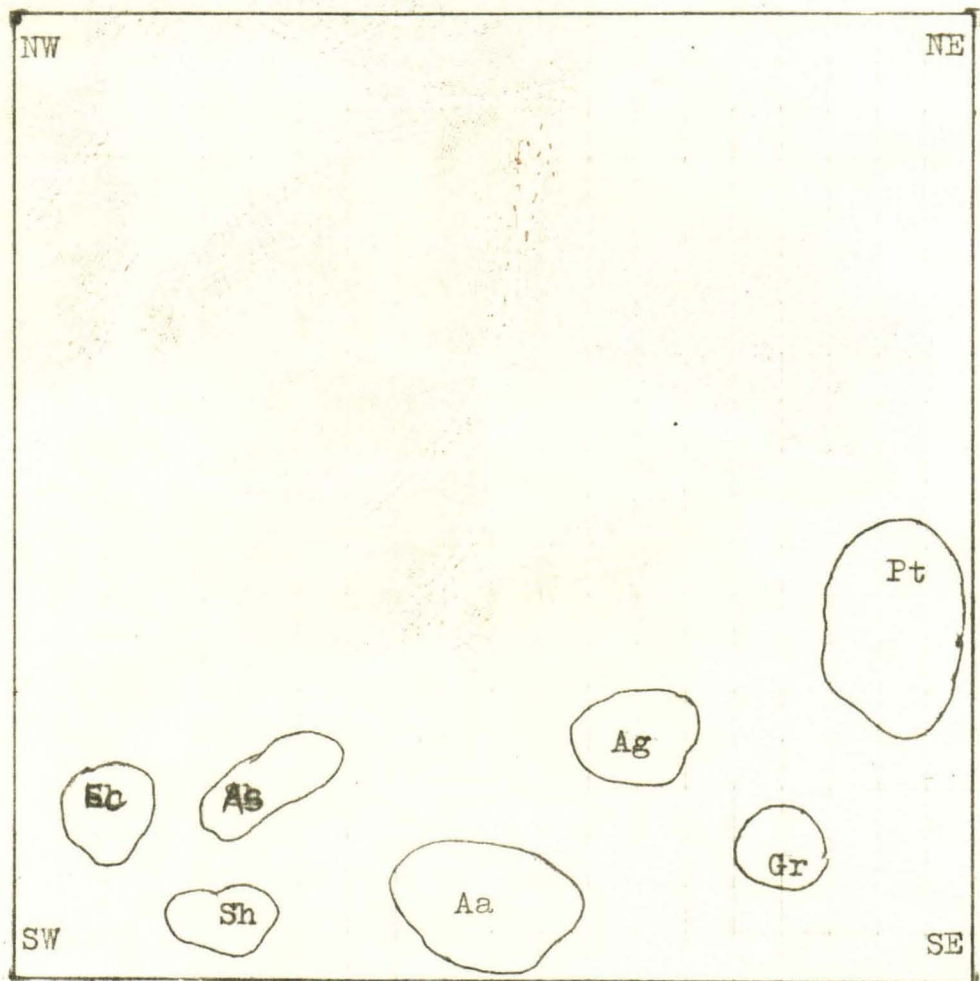
Quadrat # 5

Scale: 1" = 12.89"

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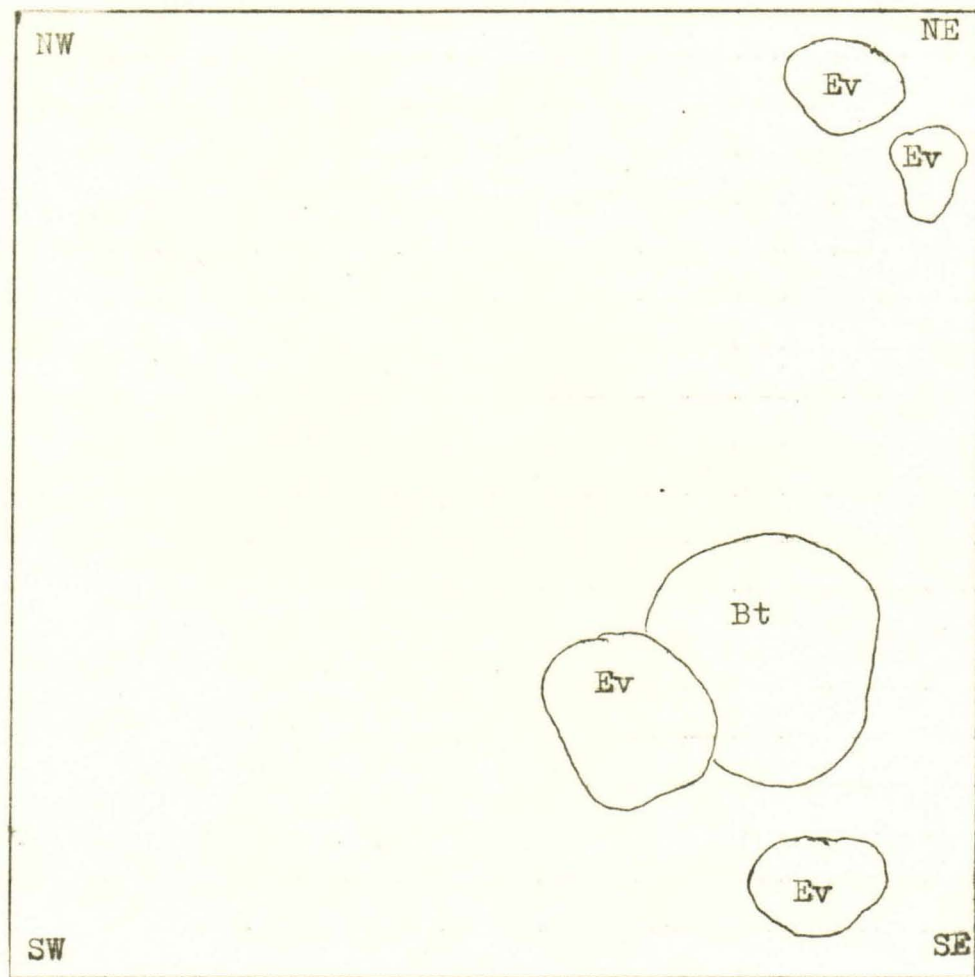
Quadrat #6

Scale: 1" = 12.89"

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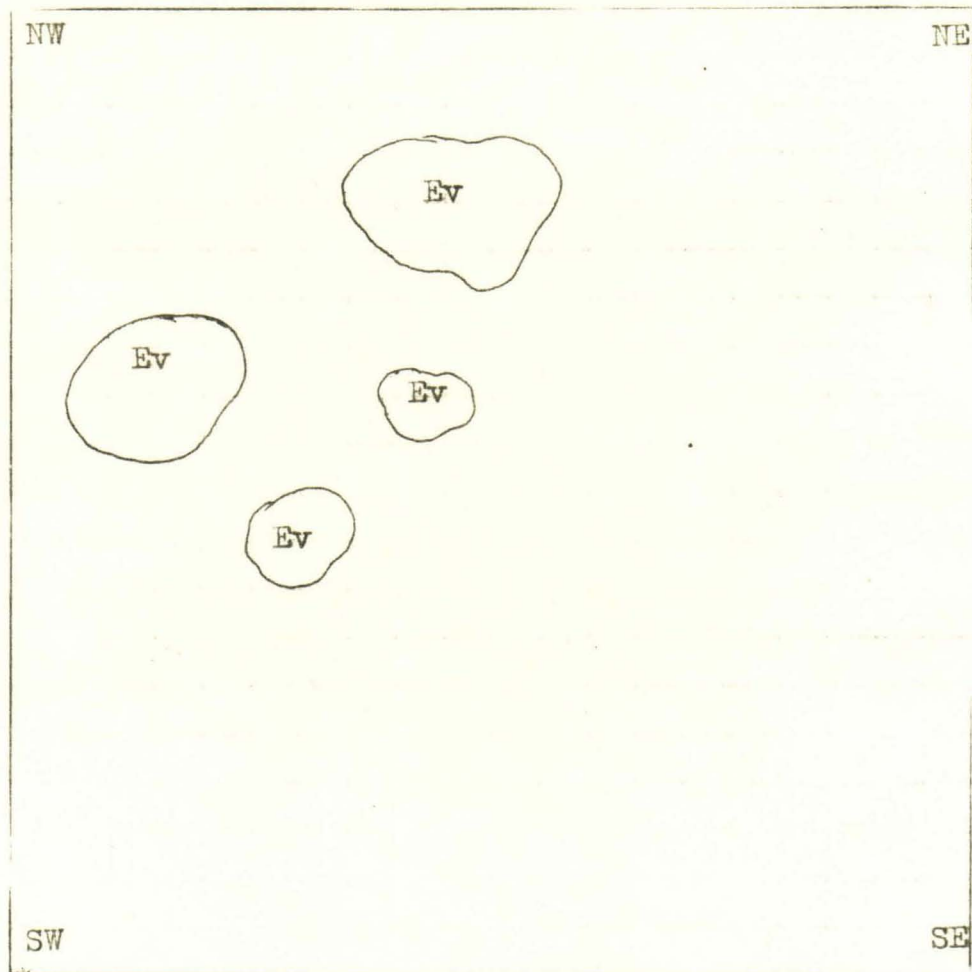
Quadrat #7

Scale: 1" = 12.89"

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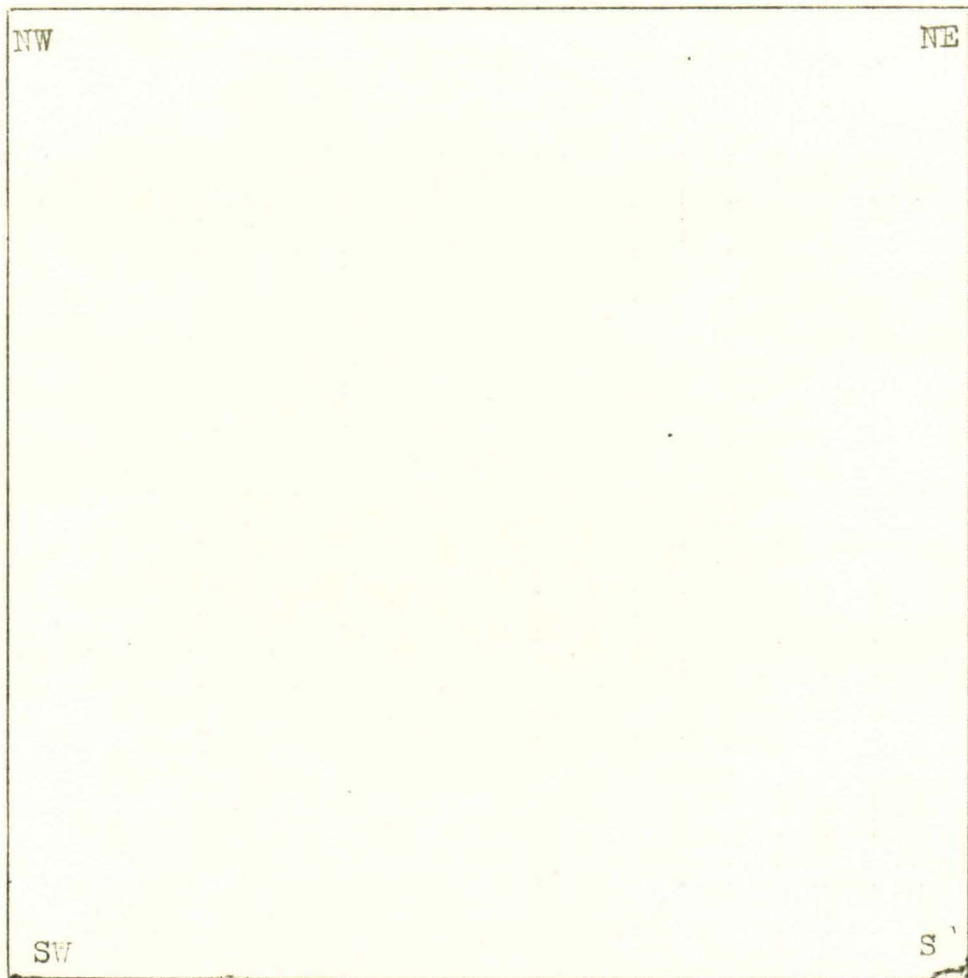
Quadrat #8

Scale: 1" = 12.89"

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Analyst: K. Urban



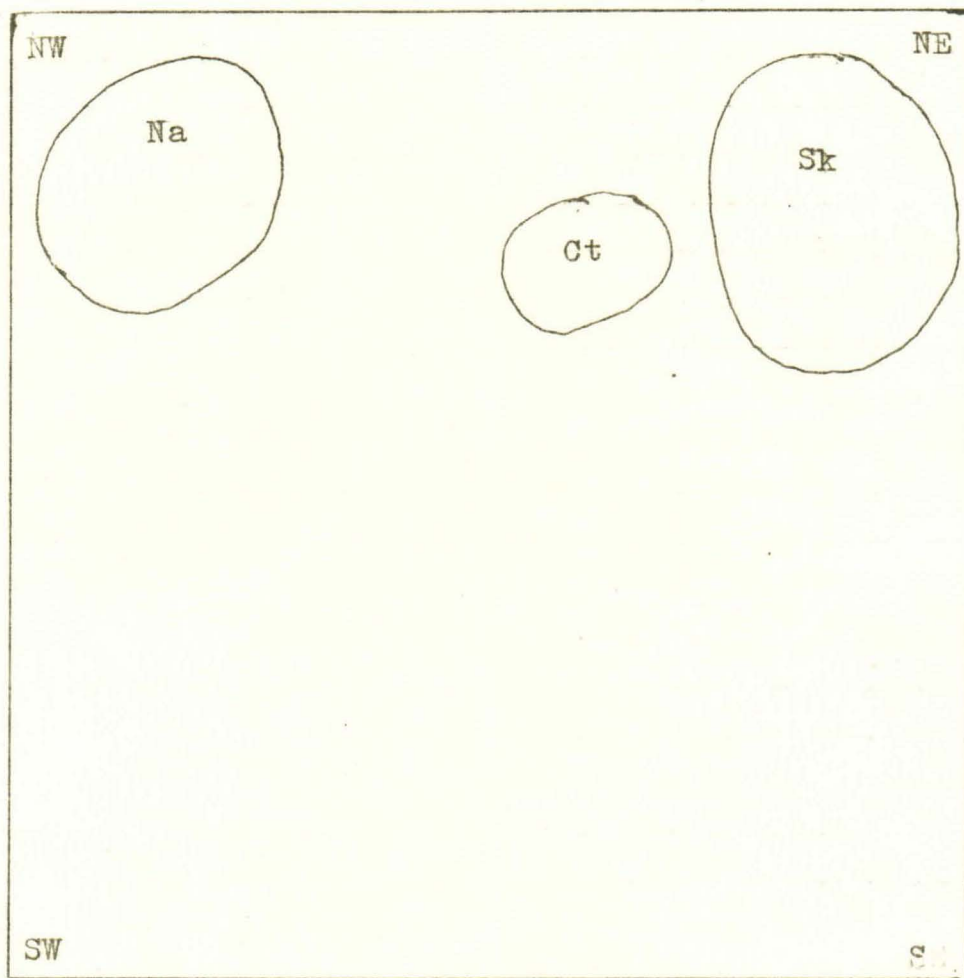
Quadrat # 9

Scale: 1" = 12.89"

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Quadrat #10

Scale: 1" = 12.89"

Analysis by Quadrat of the First Year's Vegetation
 Braun-Blanquet Combined Scale of Abundance and Cover

Quadrat #1:	<u>Chenopodium album</u>	X
	<u>Cryptantha torreyana</u>	X
Quadrat #2:	<u>Gayophytum ramosissimum</u>	2
	<u>Salsola kali</u> var. <u>tenuifolia</u>	X
	<u>Mimulus nanus</u>	X
Quadrat #3:	<u>Salsola kali</u> var. <u>tenuifolia</u>	2
	<u>Bromus tectorum</u>	X
	<u>Stipa occidentalis</u>	X
	<u>Elymus cinereus</u>	X
	<u>Gayophytum ramosissimum</u>	X
	<u>Nicotiana attenuata</u>	X
	<u>Mentzelia laevicaulis</u>	X
	<u>Thlaspi arvense</u>	X
Quadrat #4:	No Vegetation	
Quadrat #5:	No Vegetation	
Quadrat #6:	<u>Purshia tridentata</u>	X
	<u>Amaranthus graecizans</u>	X
	<u>Gayophytum ramosissimum</u>	X
	<u>Sitanion hystrix</u>	X
Quadrat #7:	<u>Eriogonum vimineum</u>	1
	<u>Bromus tectorum</u>	X
Quadrat #8:	<u>Eriogonum vimineum</u>	2
Quadrat #9:	No Vegetation	

Quadrat #10: Salsola kali var. tenuifolia 2

Nicotiana attenuata X

Cryptantha torreyana X

Results: The Second Year

The following additions were made to the checklist of plants growing on the Martin Road:

Polygonaceae	<u>Polygonum aviculare</u>	Pa
Chenopodiaceae	<u>Chenopodium murale</u>	Cm
Polemoniaceae	<u>Collomia linearis</u>	Cl
Boraginaceae	<u>Cryptantha nana</u>	Cn
Compositae	<u>Helianthus annuus</u>	Ha
	<u>Lactuca serriola</u>	Ls
Gramineae	<u>Agropyron cristatum</u>	Ac
	<u>Agropyron spicatum</u>	As

Additions to the checklist of the plants growing in the immediate vicinity of the closure area included: Leptodactylon pungens, Chrysothamnus nauseosus, Agropyron spicatum, Oryzopsis hymenoides, and Poa secunda.

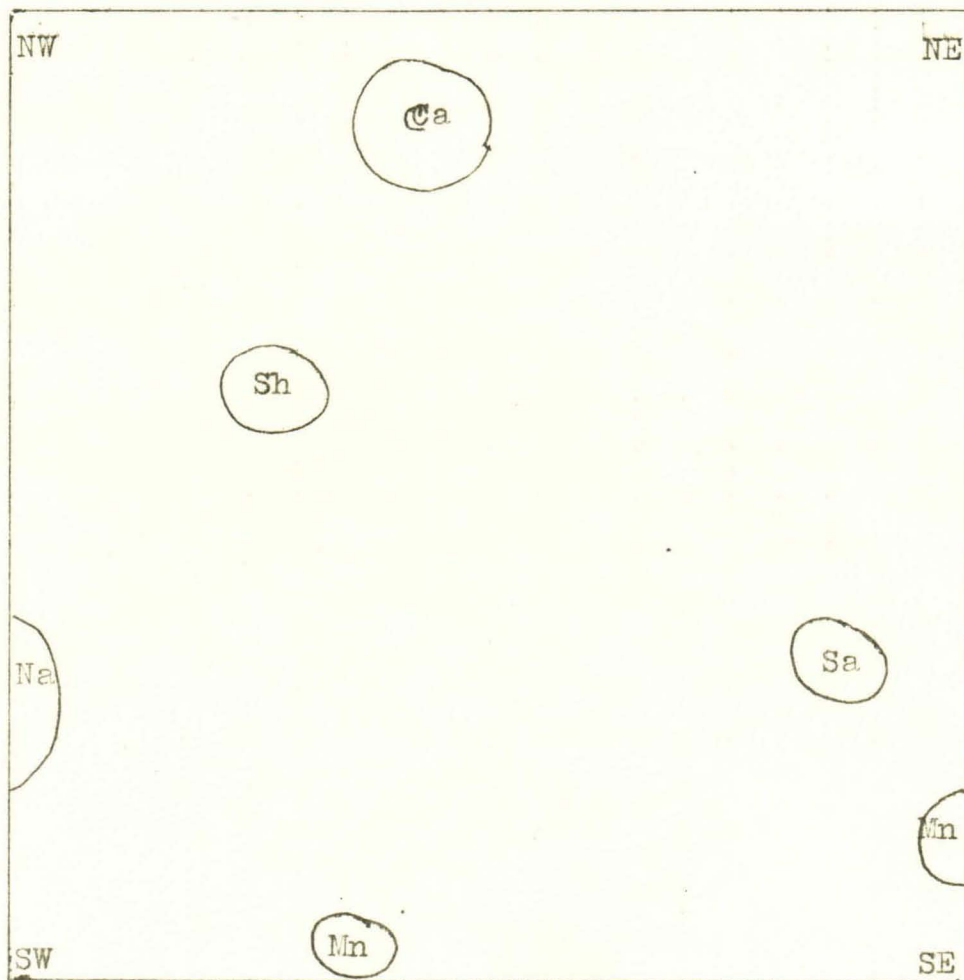
Analysis:

Analysis of the ten quadrats was completed by Karl Urban. Photographs of the quadrats were taken 18 August 1967 by Warren Van Camp, a seasonal naturalist at the Monument.

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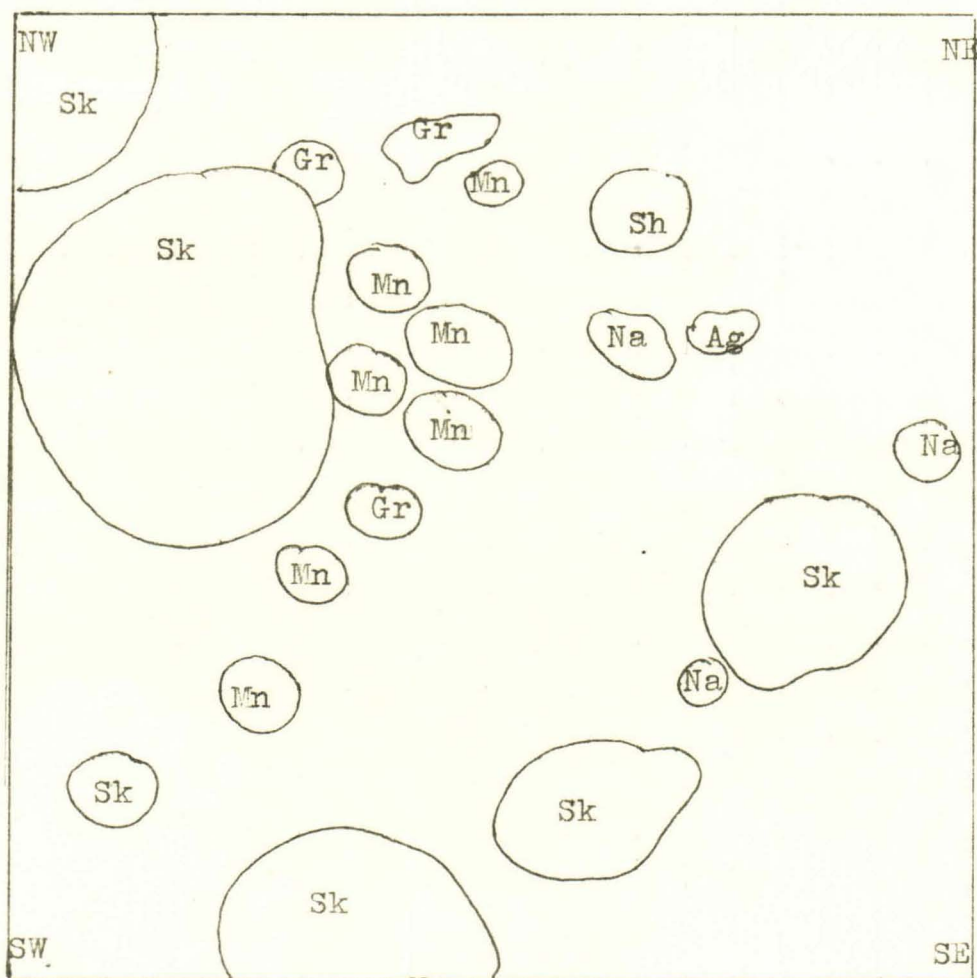
Quadrat #1

Scale: 1" = 12.89"

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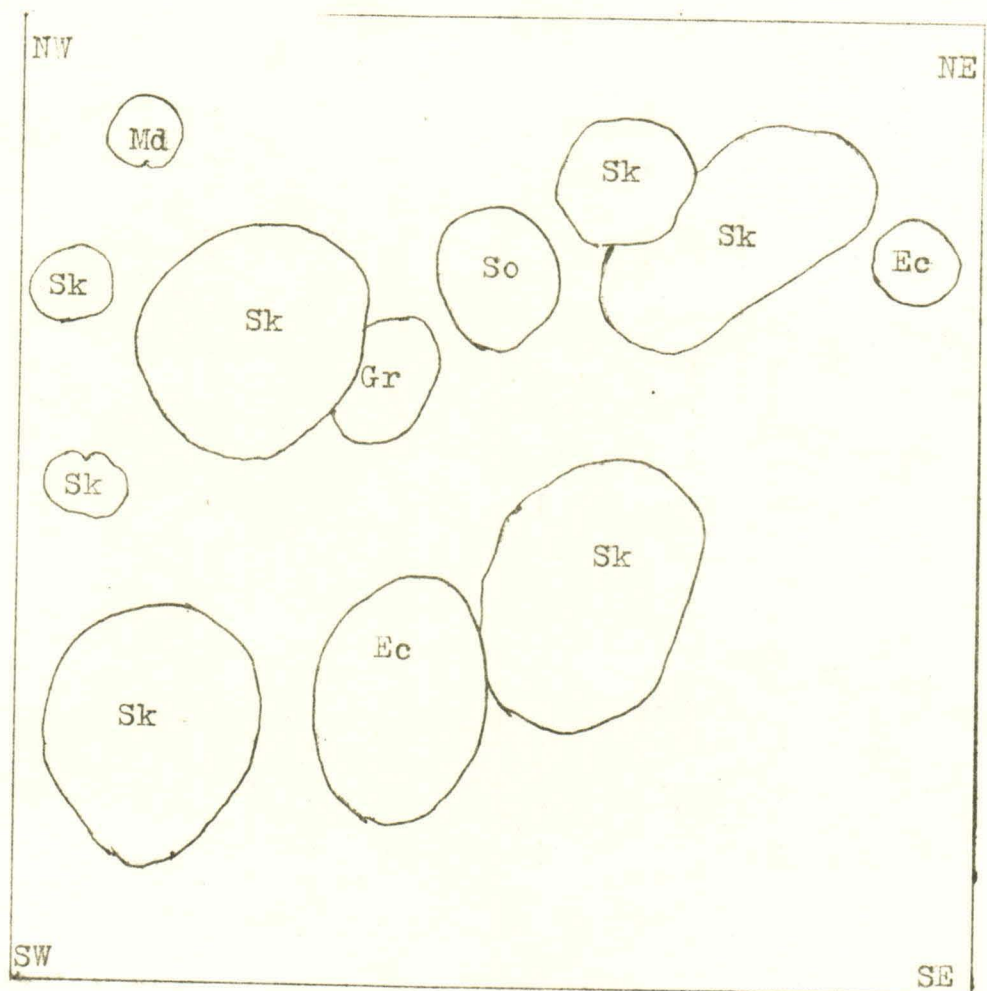
Quadrat #2

Scale: 1" = 12.89"

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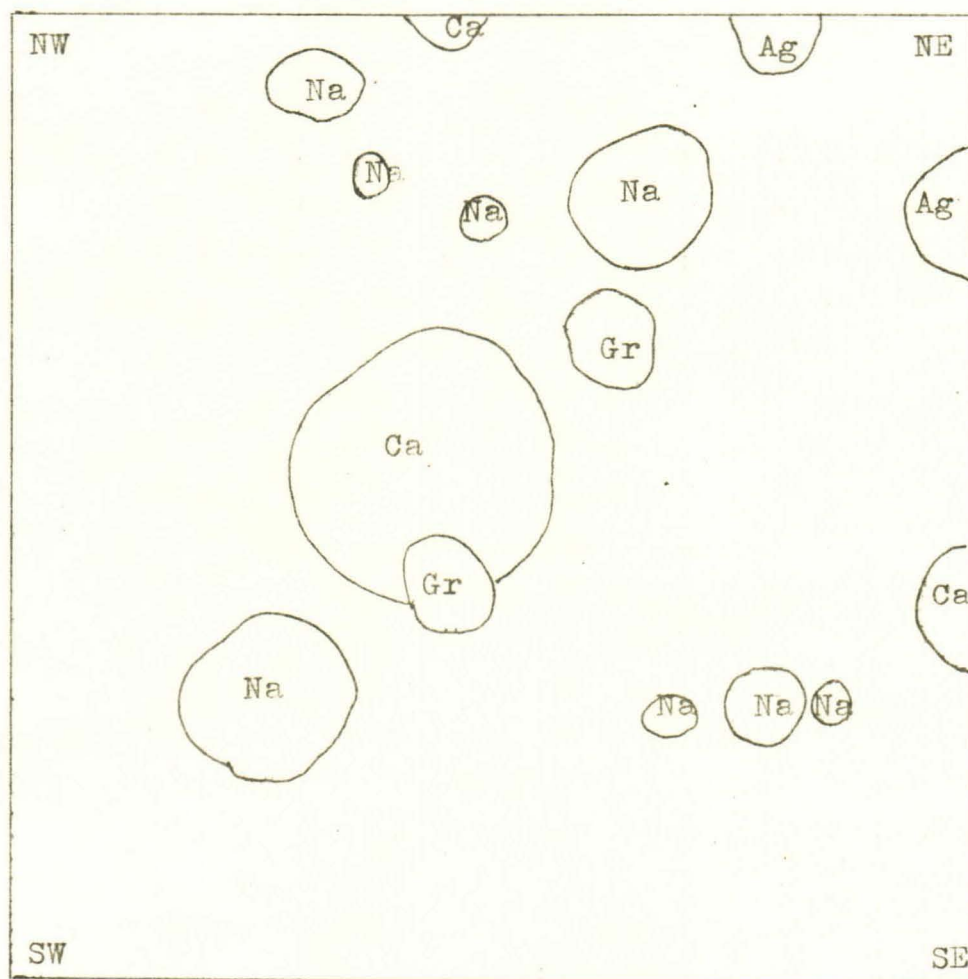
Quadrat #3

Scale: 1" = 12.89"

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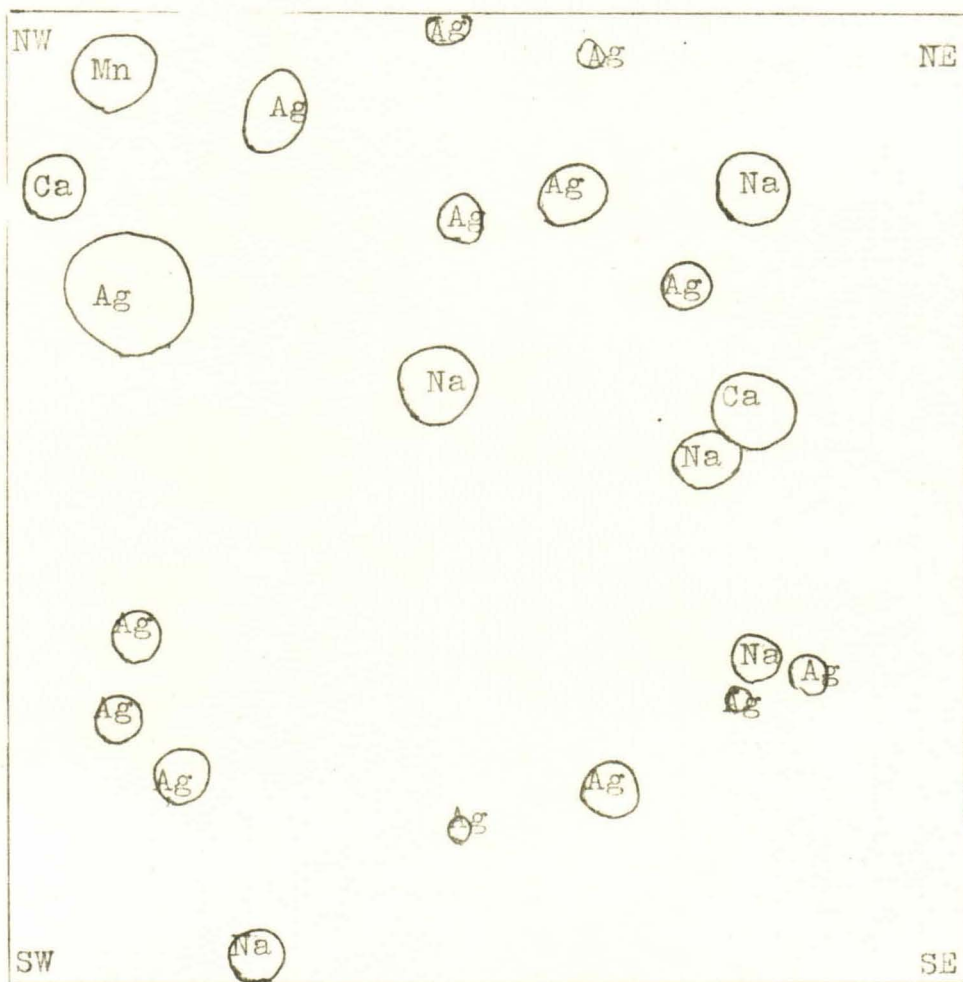
Quadrat #4

Scale: 1" = 12.89"

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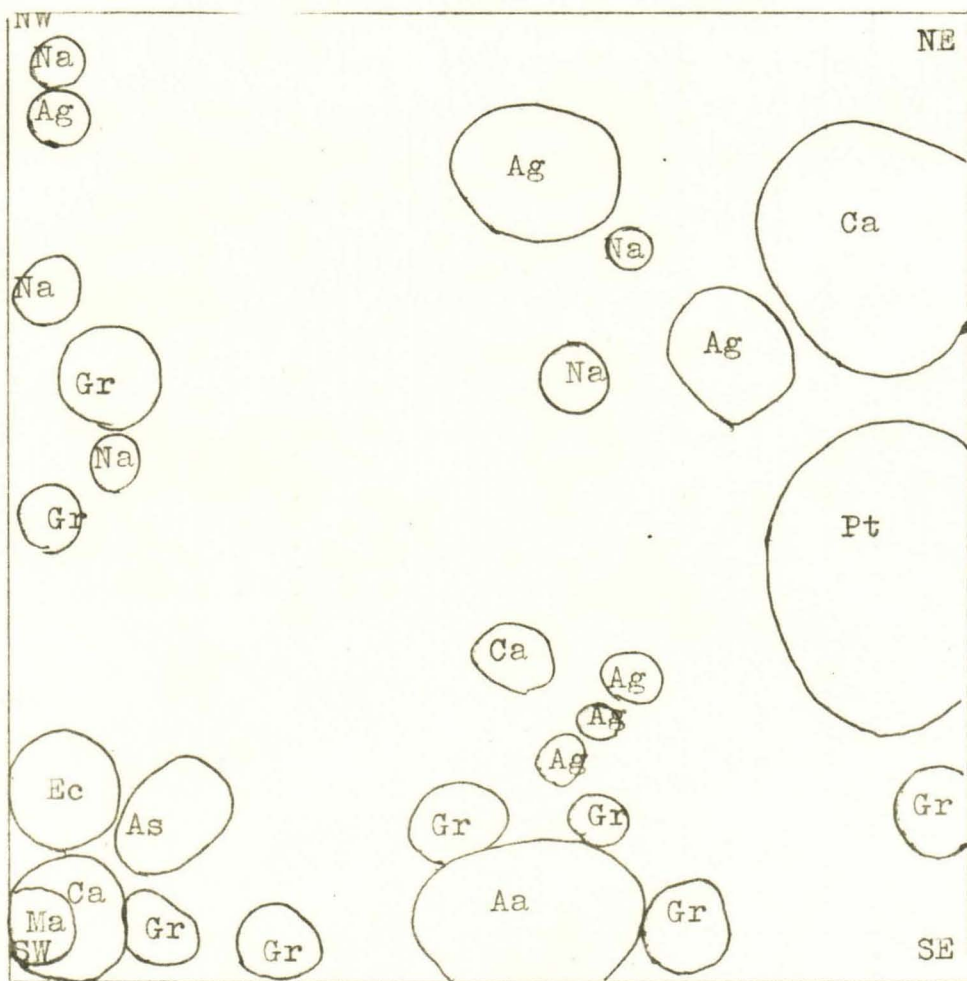
Quadrat #5

Scale: 1" = 12.89"

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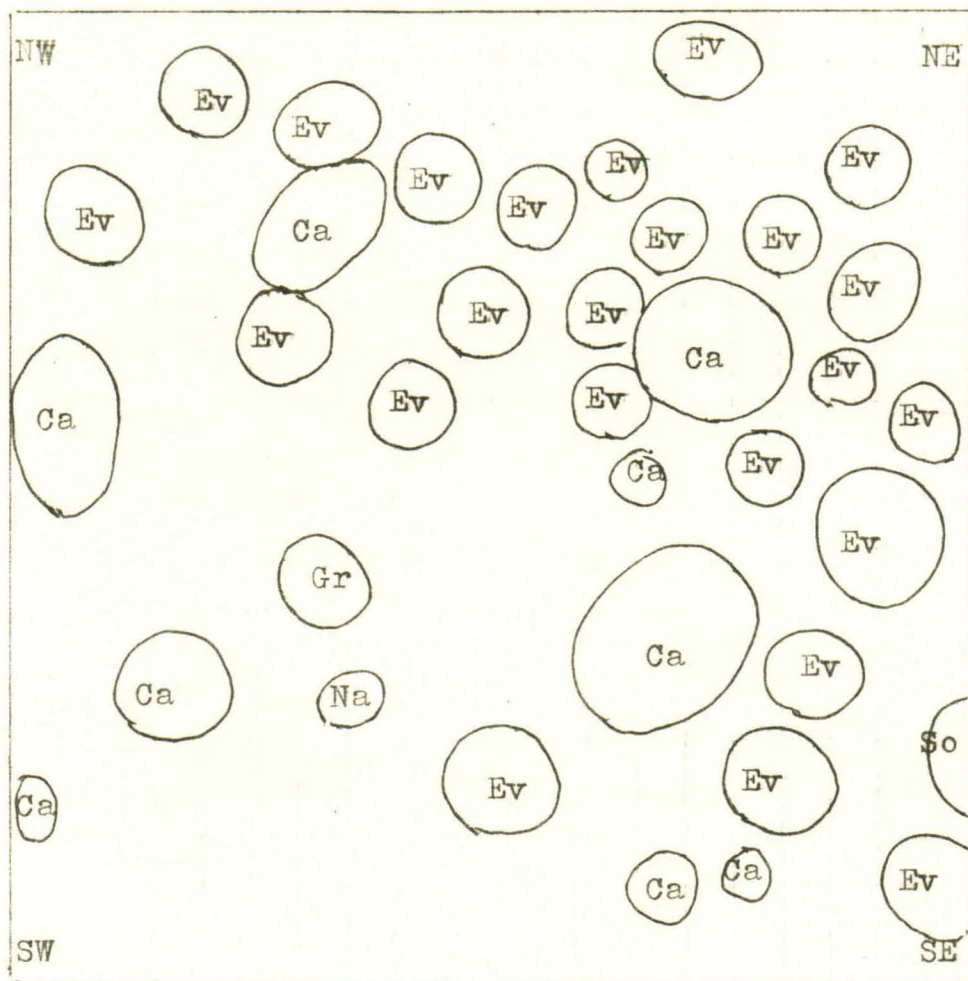
Quadrat #6

Scale: 1" = 12.89"

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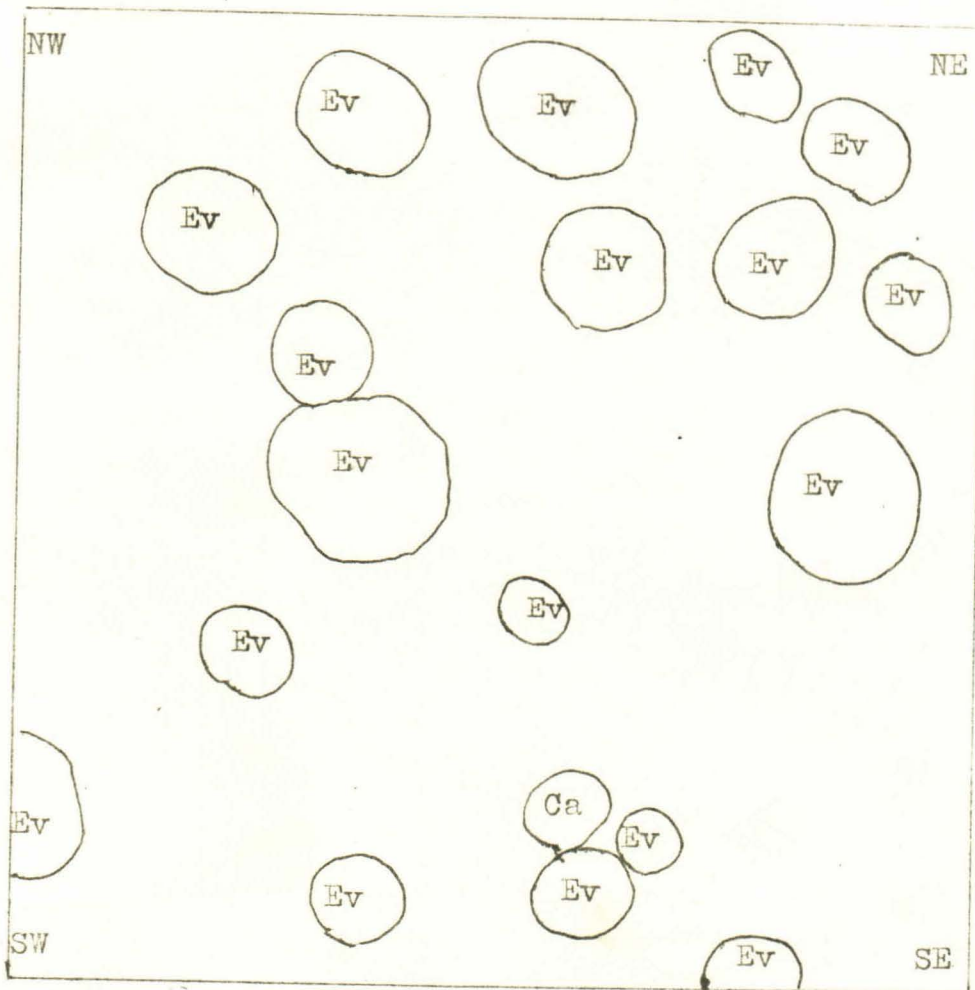
Quadrat #7

Scale: 1" = 12.89"

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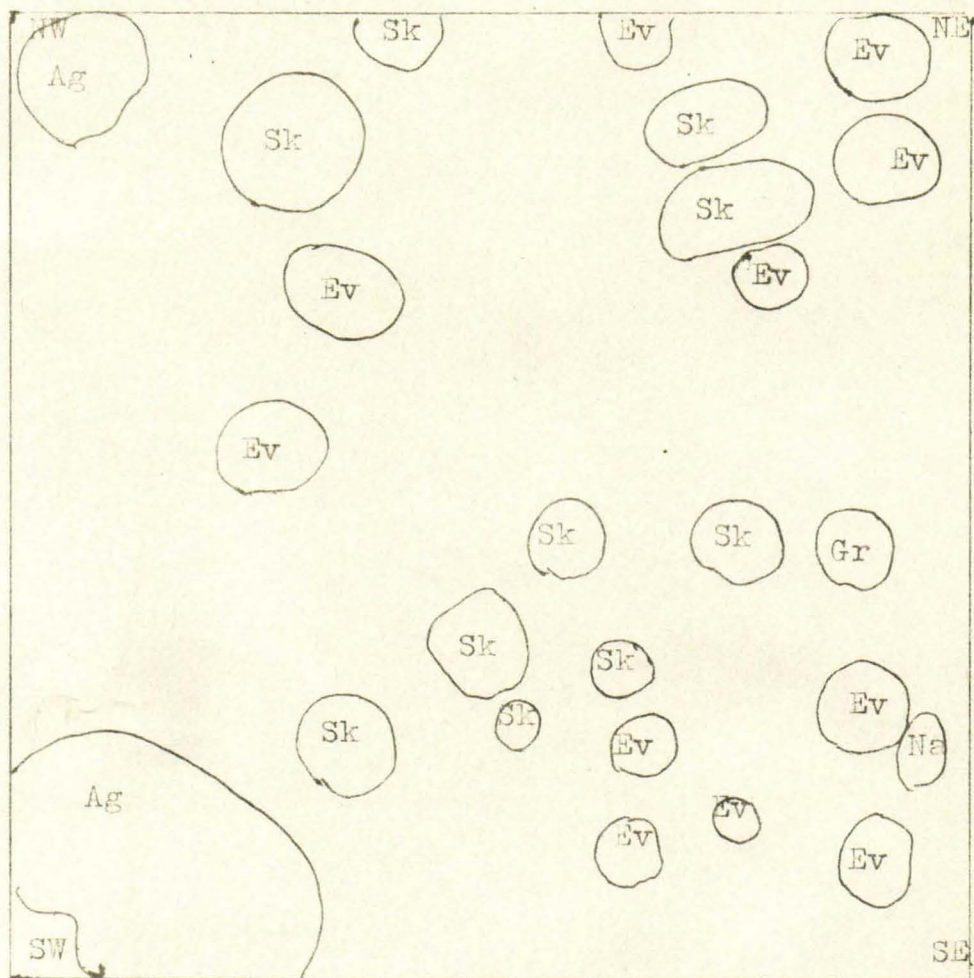
Quadrat #8

Scale: 1" = 12.89"

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Quadrat #10

Scale: 1" = 12.89"