

A Salamander Survey at Minute Man National Historical Park

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Report does not have all figures.

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Abstract

A survey of the salamander species within Minute Man National Historical Park was conducted from March to September, 1992. The study assessed the diversity of species and located breeding and potential breeding sites for salamanders within the park. The data were used to generate a species list of the park. Locations of salamanders that were found were plotted on a map of the park; breeding and potential breeding sites were also recorded on the map. Photographs were taken of each salamander species found within park boundaries.

Introduction

Minute Man National Historical Park (MMNHP) was established in 1959 (Fig. 1). Located in Middlesex County, Massachusetts, the park has a total area of 750 acres. The land has a history of disturbance: agriculture, war, permanent residences, and as a national park handling numerous visitors. These factors seem to have contributed to what is now disjunct populations of salamanders within the park. Today the park consists of woodlands, wetlands, open fields, and residences with many roads.

Materials and Methods

The study began at the onset of the breeding season at the end of March and continued throughout the summer until September. The

monitoring for salamander migration into breeding ponds began during rainy nights in early spring. The monitoring included road and pond edge searches. After the initial spring rains, vernal pools were located and sampled for breeding adult salamanders and egg masses. Pond sampling methods at night employed dipnets, flashlights and headlamps. Daytime methods included extensive land searches, i.e. turning logs, stones, and other debris, and seining ponds. Local residents were asked for any information about salamander activity on their property. During the summer, land searches for terrestrial salamanders were continued. Stream edges were also explored for aquatic forms. When located, salamanders were identified and photographed, and their locations were recorded. The animals were then released at the site where they were found.

Results

Four species of salamanders were found within MMNHIP during the survey period (Table 1). These include *Ambystoma maculatum* (the spotted salamander, Fig. 2), *Eurycea bislineata bislineata* (the northern two-lined salamander, Fig. 3), *Plethodon cinereus* (the redback salamander, Fig. 4), and *Notophthalmus viridescens viridescens* (the red-spotted newt, Fig. 5).

Locality A (Table 1, Fig. 6) is a pond located northwest of Fiske Hill that contained three breeding adults, eighteen egg masses, and two transforming juveniles of *Ambystoma maculatum*. One newly transformed juvenile of *A. maculatum* was found on a hillside (Locality I) just southwest of breeding site A (Fig. 7). Seven adults of the aquatic stage of *Notophthalmus v. viridescens* were also found within pond A. In the woods directly adjacent to locality A, two adult *Plethodon cinereus* were

Discussion

Nine species of salamanders are known to occur in eastern Massachusetts (Conant and Collins, 1991). These include:

(1) *Ambystoma maculatum* (spotted salamander), (2) *A. opacum* (marbled salamander), (3) *A. jeffersonianum* (Jefferson salamander), (4) *A. laterale* (blue-spotted salamander), (5) *Eurycea b. bislineata* (northern two-lined salamander), (6) *Plethodon cinereus* (redback salamander), (7) *Hemidactylium scutatum* (four-toed salamander), (8) *Desmognathus f. fuscus* (northern dusky salamander), and (9) *Notophthalmus v. viridescens* (red-spotted newt).

The four species found within the park include *Ambystoma maculatum*, *Eurycea b. bislineata*, *Plethodon cinereus*, and *Notophthalmus v. viridescens*.

Ambystoma maculatum was not abundant throughout the park. The largest populations occurred at localities A and B (Fig. 6). These two sites were quite different; locality A was a fairly large pond, while locality B was a much smaller pond. At locality A there appeared to be a small though productive population. Only three adult spotted salamanders were found in the pond. The two newly transformed juveniles found at this site were located at the pond edge under a thin board. They were found at the east end of the pond on the August 15, 1992. Eighteen *A. maculatum* egg masses were also located at locality A. Locality B was a small pond which supported the largest adult population of *A. maculatum* in the park. Seventeen adults and seventy juveniles were observed at this site. The third largest population of spotted salamanders occurred at locality F. This site was a wetland area lacking deep water but containing many small pools. Twenty egg masses of *A. maculatum* were found in this area.

A juvenile spotted salamander was discovered at locality H in the woods under a fallen tree limb between localities O and P. This individual may have been at its summer range because of the date when it was located (Aug. 15th). The summer range of the spotted salamander is the area away from the breeding site where the animal spends most of its life. This particular species of salamander moves out of the summer range only to breed. Sites O and P are potential breeding localities for the spotted salamander given the locality of the juvenile found at site H. Locality O was a fairly deep pond, while locality P was a shallow wetland area. Located at site I was also a juvenile spotted salamander. This animal also appeared to have migrated to its summer range because of the location and the time of year found (Aug. 15th). The salamander was located approximately one hundred yards southwest of breeding site A under a fallen tree limb on a hillside. The *A. maculatum* egg mass located at site E (J. Martinez, per. comm.) was later not found by myself or Joe Martinez, so it is assumed that it was eaten prior to hatching. Site E is a vernal pool containing bullhead catfish, which are known to feed upon salamander eggs.

One small population of *Eurycea b. bislineata* was located within MMNHP. No other suitable habitat for this species was found within the park; therefore, these animals had the most restricted distribution of the four species located. Locality G was the only area within the park where this species occurred, and this site supported at least twenty individuals. Both adults and juveniles were found at the site. The first individuals were found on April 18th, while a second trip to the site on May 16th yielded the majority of the animals found. These salamanders were found at the stream edge under submerged rocks.

Notophthalmus v. viridescens was found at three locations within MMNHP. This species of salamander appears to be rare within the park. At locality A seven individuals were found in the pond. The first two individuals were located on April 3th while the remaining five were found on May 2nd. At locality B, one juvenile and one larva were found within the pond. The terrestrial stage of the newt was not located within the park.

Plethodon cinereus was the most abundant species of salamander found within MMNHP (Fig. 7). Both adults and juveniles of this species appeared to be ubiquitous throughout the park, occurring in every locality sampled. At sites A, C — G, J and L, *P. cinereus* was found in the areas immediately surrounding these vernal pools. Both color morphs, the redback and the leadback, were found within the park. These animals were first found on April 5th, and then throughout the summer. Individuals were located under and inside rotten logs, fallen tree limbs, boards, tires, and other human debris. The largest population of redback salamanders found in the park was contained under a pile of red bricks (Locality F).

There were six vernal pool sites found within the park where no breeding salamanders were observed, yet these localities had great potential as breeding areas (Fig. 8). The reason that salamanders were not found at these sites is unknown. These localities were J — M, O and P. Locality J was a small stream approximately one hundred feet south of Route 2A opposite the first parking lot at the east end of the park. Locality K was a large wetland area located west of locality J just south of Route 2A. This pool was fairly deep, with very limited access. Locality J was a small wetland area with shallow pools located southeast of the Samuel Hartwell

Farm Site. Located north and directly off Route 2A was a very small yet deep pool (Locality M). Locality O was a deep pond situated south of Route 2A, just west of locality H. Vernal pool site P was a small stream located south of Route 2A, east of locality H.

The five species not found within the park were: *Ambystoma opacum*, *A. jeffersonianum*, *A. laterale*, *Hemidactylium scutatum*, and *Desmognathus fuscus fuscus*. The first four of these species are relatively rare for this region of Massachusetts (Degraf and Rudis, 1983).

Desmognathus f. fuscus, though common in New England, was not found. The only suitable habitat found within the park for this species was Elm Brook (Site H) which contained the northern two-lined salamander. Both of these species have similar habitat requirements and are often found together at the same locality (F. D. Ross, pers. comm.). *Ambystoma opacum*, *A. jeffersonianum*, and *A. laterale* were not found within MMNHP. Suitable habitat does exist in the park for these species to occur; therefore, these animals may have been able to avoid detection. *Hemidactylium scutatum* also was not found within MMNHP. This species is known to inhabit sphagnum bogs and other sphagnaceous areas. However, individuals may be found in swamps, quiet pools, and larch meadows (Bishop, 1967).

The rainfall amount was limited during the winter and spring of the study period. Many small vernal pools found in late winter were dried up by late spring. The small numbers of individuals found may be the result of the lack of adequate rainfall to stimulate the onset of the breeding period, and also to sustain sufficient water levels within breeding pools. Because of this, it is felt that more surveys need to be done since the amount of rainfall fluctuates from year to year.

In addition, the study area had disjunct populations of the salamander species found within the park. Within each population the numbers of individuals found were small. This may be a result of the many roads that transect the park. Populations have become isolated from each other because of the location and the number of roads within the park. In terms of the small number of individuals found within pools, many of the vernal pools lie adjacent to Route 2A, which is heavily used by traffic; individuals may be killed attempting to get to the breeding sites.

The recommendations for further work in MMNHP are to conduct additional salamander surveys. The inability to locate certain species during this initial survey of the park, although suitable habitat is available, justifies additional research. The vernal pool sites where salamanders were not found should be reexamined to verify these sites as non-breeding pools. Also, because of the rarity in this area of species *Ambystoma opacum*, *A. jeffersonianum*, *A. laterale*, and *Hemidactylium scutatum*, further research needs to be done to verify their status within MMNHP.

Acknowledgements

I would like to thank a few individuals whose help was greatly appreciated. Franklin Ross, Van Wallach, Kevin Wong, Joe Martinez, and Jose P. Rosado of the MCZ. Thanks also goes to Bryan Windmiller for the additional data he provided. A special thanks goes to my field partner Jenifer L. Bush also of the MCZ, whose patience helped me survive this project.

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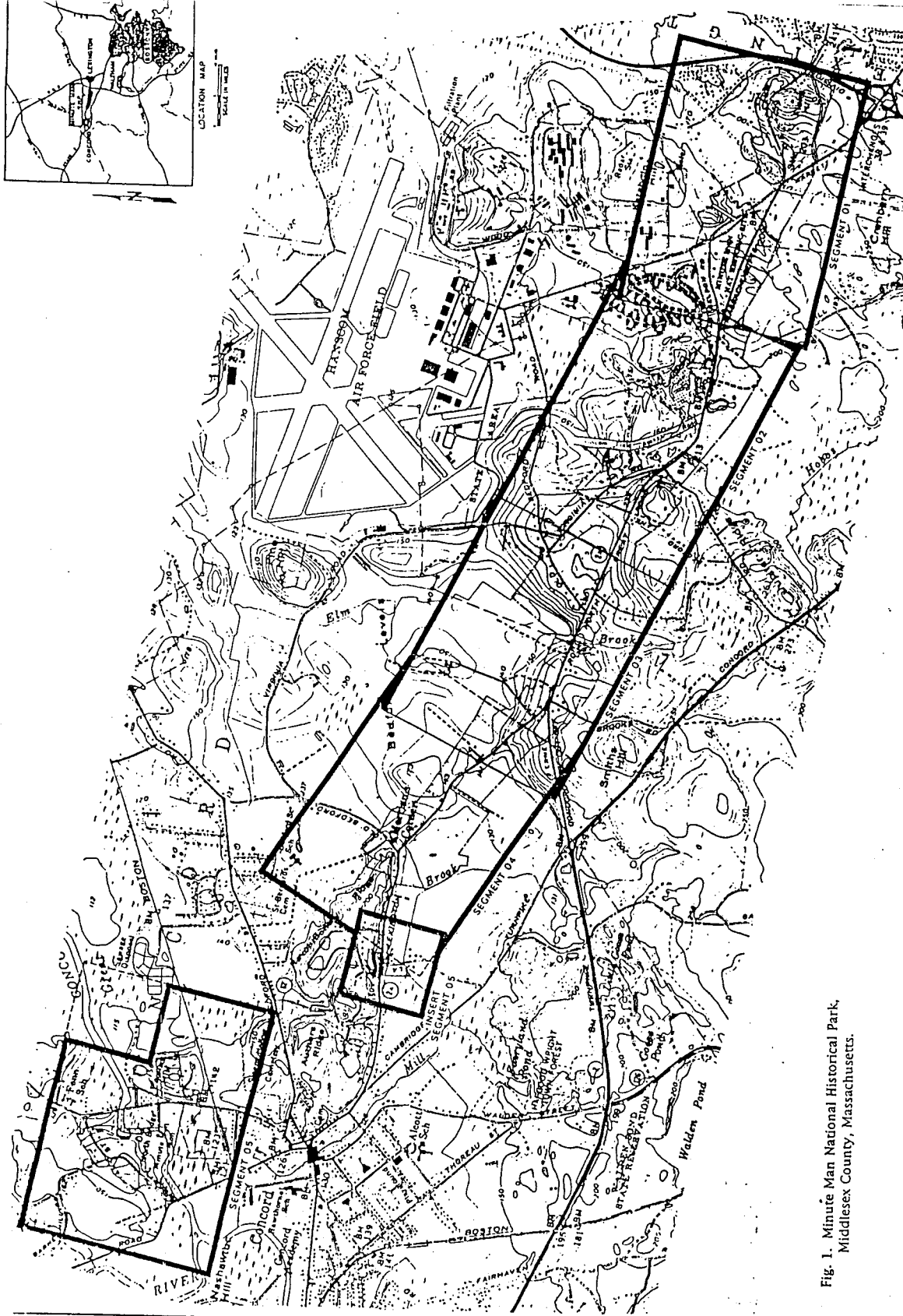


Fig. 1. Minute Man National Historical Park,
Middlesex County, Massachusetts.

UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE OFFICE OF LAND ACQUISITION AND WATER RESOURCES		MINUTE MAN NATIONAL HISTORICAL PARK MIDDLESEX COUNTY MASSACHUSETTS	
AUTHORIZED: SEPTEMBER 21, 1959 BOUNDARY CHANGE, DECEMBER 14, 1970 DATE: APRIL 1971 COMPILED BY THE CENTRAL MAP SERVICES EASTERN SERVICE CENTER WASH. D.C.		LAND STATUS M-L-P	
REGION DRAWING NO. DATE	SHEET 1 OF 8 REVISIONS	SCALE IN FEET 0 1000 2000 3000 4000	

Table 1. Salamander Species Found in Minute Man National Historical Park

Species	A ¹	B	C	D	E	F	G	H	I	J	L	N
<u>A. maculatum</u>	3 A ² 2 J	17 A [*] 70 J [*]	1 A	0	0	0	0	1 J	1 J	0	0	0
egg masses	3 15 [*]	0	1	0	1 ⁺	20 [*]	0	0	0	0	0	0
<u>E. b. bislineata</u>	0	0	0	0	0	0	20 A/J	0	0	0	0	0
<u>P. cinereus</u>	2 A	0	6 A	>5A	>5A	>10A/J	2 A	0	0	>5A	2 A	>1A [*]
<u>N. v. viridescens</u>	7 A	1 J [*] 1 L [*]	0	1 J	0	0	0	0	0	0		0

1 = Refer to text and Figs. 5-6 for localities; A through F are vernal pools utilized for breeding

2 = A = adult, J = juvenile, L = larva

^{*} = Data provided by Bryan Windmiller⁺ = Data provided by Joe Martinez

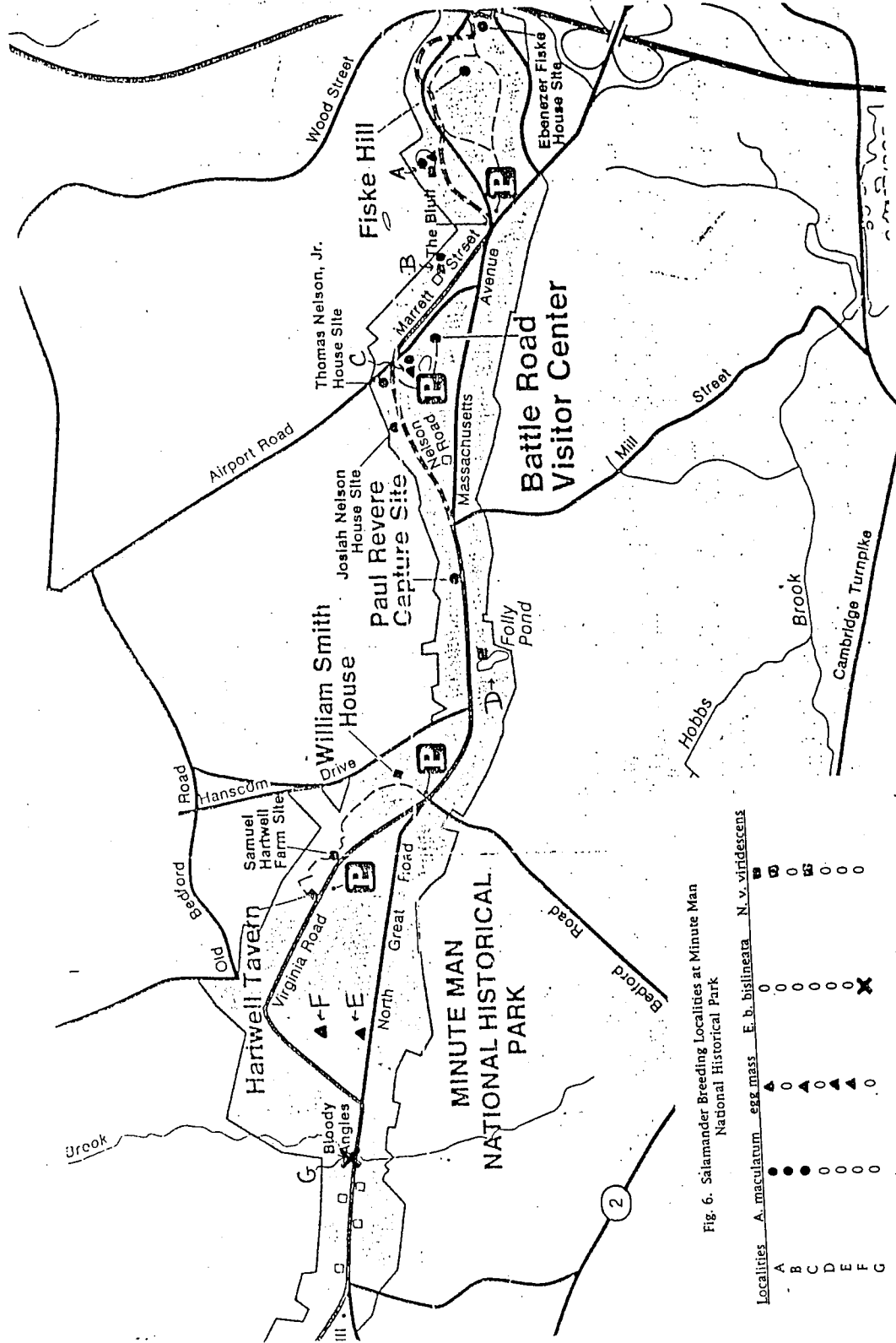


Fig. 6. Salamander Breeding Localities at Minute Man National Historical Park

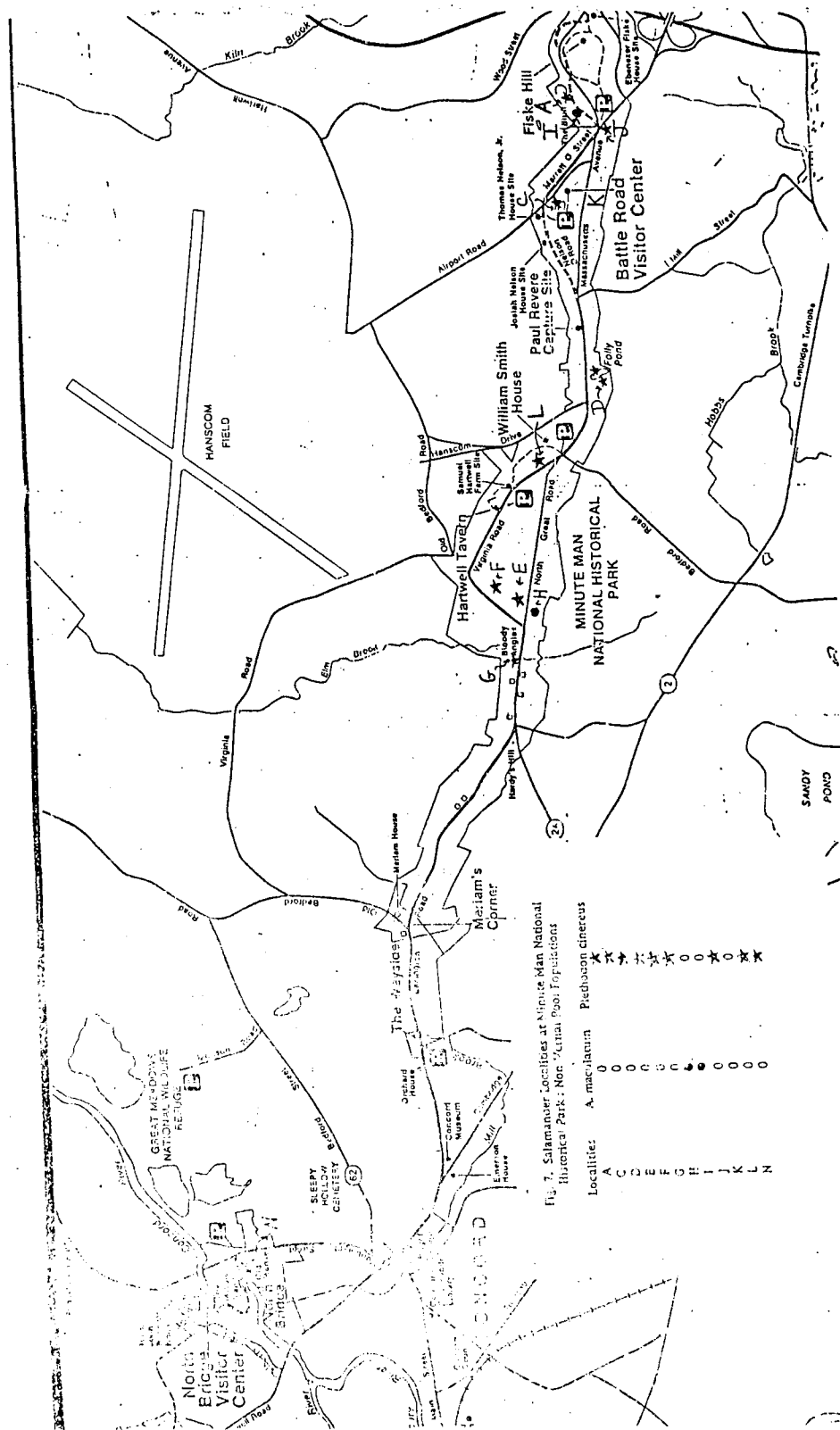


Fig. 7. Salamander Localities at Minute Man National Historical Park: Non-Ventral Spot Populations

Localities	A. maculatum	Pseudoeurycea cinerea
A	0	★
B	0	★
C	0	★
D	0	★
E	0	★
F	0	★
G	0	★
H	0	★
I	0	★
J	0	★
K	0	★
L	0	★
M	0	★
N	0	★

