Bald Eagle Communal Night Roost Surveys for the Skagit River, WA.: Winter 1986-87 and for the Skagit and Nooksack Rivers, WA.: Winter 1987-88

E-4270
Same report for
1985-1986 Season

United States Department of Agriculture | Forest Service | Mt. Baker Ranger District | 2105 Highway 20 Sedro Woolley, WA 98284

Reply To: 2670

Date: September 23, 1988

Jim Michaels
US Fish & Wildlife Service
Endangered Species
Olympia Field Office
2625 Parkmont Lane, SW, B-3
Olympia, WA 98502

Re: Final Report Bald Eagle Communal Night Roost Surveys
Skagit & NF Nooksack Rivers

Dear Jim:

Please find enclosed the original and one copy of the final report for the Skagit River and North Fork Nooksack River bald eagle communal night roost surveys as per contracts #13410-87-00288 and #13410-87-0030. The summary of both rivers is included in one report and covers the winter periods of 1986-87 and 1987-88.

I appreciate the assistance in this survey effort and hope we can continue a cooperative effort in FY 89.

Sincerely,

D. Brady Green

D. BRADY GREEN
District Fish & Wildlife Biologist

cc. S. Knight, SO
Ruth Scott, FWS Portland
Mailing list

ENCLOSURE

BALD EAGLE COMMUNAL NIGHT ROOST SURVEYS FOR THE SKAGIT RIVER, WASHINGTON WINTER 1986-87 AND FOR THE SKAGIT AND NOOKSACK RIVERS, WASHINGTON WINTER 1987-88

Submitted To:

U.S. Fish & Wildlife Service
Endangered Species
Olympia Field Office
2625 Parkmont Lane SW, B-2
Olympia, WA 98502

Under:

Contract No. 13410-86-00509

By:

D. Brady Green, Claire CdeBaca, and Pat Wharton
Mt. Baker Ranger District, Mt. Baker-Snoqualmie National Forest
Sedro Woolley, WA 98284

September 23, 1988

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INTRODUCTION

During the 1986-87 winter season (December 4, 1986-February 26, 1987) and the 1987-88 winter season (December 3, 1987-February 25, 1988), the Mt. Baker Ranger District, Mt. Baker-Snoqualmie National Forest, with assistance from various agencies, groups and individuals, conducted surveys of bald eagle night roost activity from 18 viewpoints in 1986-87 (19 viewpoints in 1987-88) in the Skagit River area, between Bacon Creek (RM 82.9) downstream to Big Eddy Osprey (RM 62.0) including the Cascade River from the mouth to the Upper Bridge (RM 16.6) in 1987-88 (Figs. 1a, b, c, and d) as well as 3 viewpoints in 1987-88 in the Nooksack River area, between Wells Creek (RM 65.5) downstream to Warnick (RM 55.0) (Figs. 1a and e). The primary objectives of the surveys were to:

1. Meet bald eagle consultation requirements under Section 7(a)(2) of the Endangered Species Act of 1973, as amended. The bald eagle was classified as threatened in the state of Washington by the USDI Fish and Wildlife Service (USFWS) in 1978 (USDI Fish and Wildlife Service 1978) which requires consultation with the USFWS on any federal action which may affect a threatened species.

2. Respond to concerns by the Washington Department of Wildlife and The Nature Conservancy (Skagen 1980) about the locations of night roosts in relation to planned timber sale activity on National Forest lands adjacent to the Skagit and Nooksack Rivers.

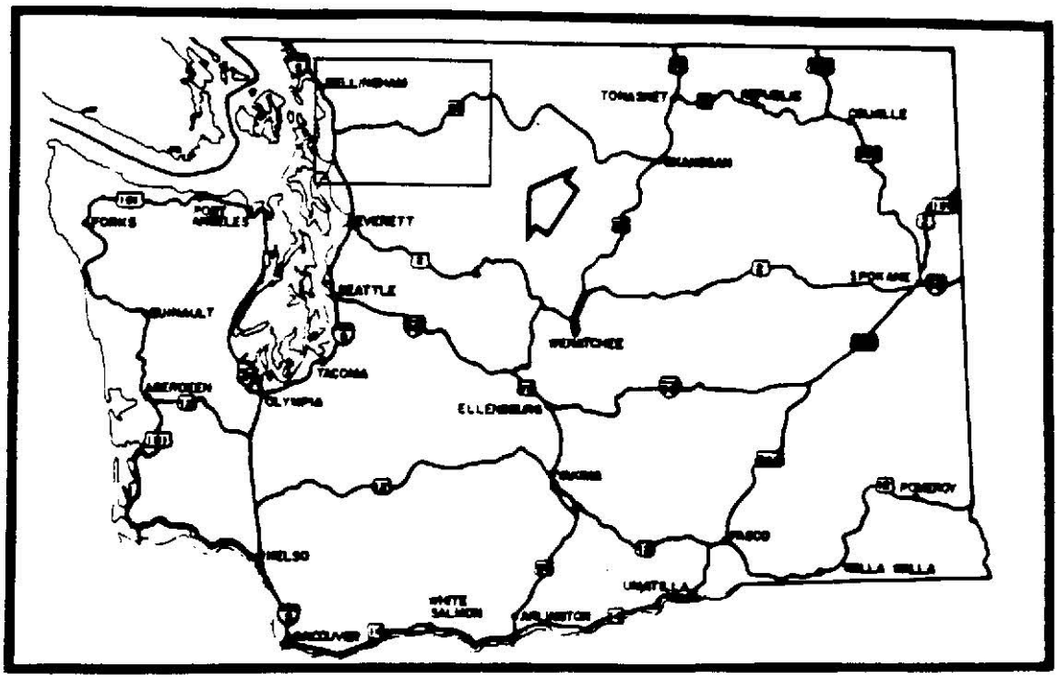
3. Assist the USDA Forest Service (FS), USFWS, USDI National Park Service (NPS), Washington Department of Wildlife (WDW), The Nature Conservancy (TNC), and other interested agencies and groups, in maintaining and enhancing important bald eagle habitat within, and adjacent to, the Wild and Scenic River corridor, including the "Skagit River Bald Eagle Natural Area" (SRBENA) that is jointly managed by TNC and WDW.

4. Assist the FS in meeting management direction for the Skagit River, River Management Plan, National Wild and Scenic River System (USDA Forest Service 1983), and the unofficial action plan developed to initiate the proposed management plan (Smith 1984). This includes conducting an assessment of the impacts of the proposed action on bald eagles prior to implementing the management plan. Bald eagle habitat management is an important part of the Skagit Wild and Scenic River Management Plan and a major reason for the Skagit River being designated as Wild and Scenic in 1978.

5. Meet direction provided for in the "Pacific States Bald Eagle Recovery Plan (Draft)-August 1984."

Wintering bald eagles typically roost communally in mature/old growth trees, which often are located some distance from the bodies of water which they use for feeding. Frequently the location of these areas is not known, resulting in roost sites sometimes unintentionally being destroyed by logging and other forms of human disturbance (Hansen 1978). The Skagit and Nooksack River Basins contain many stands of timber with significant economic value and logging has been a major industry in the area for years. Hansen (1978) found that the

KEY MAP OF WASHINGTON, SHOWING LOCATION OF PROJECT



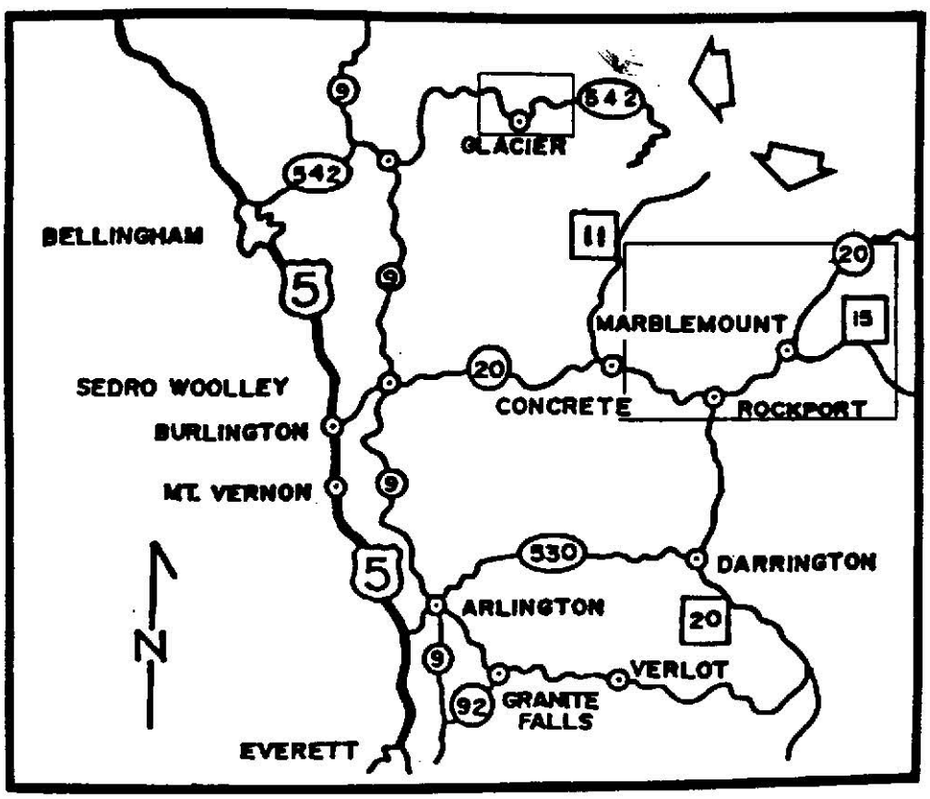
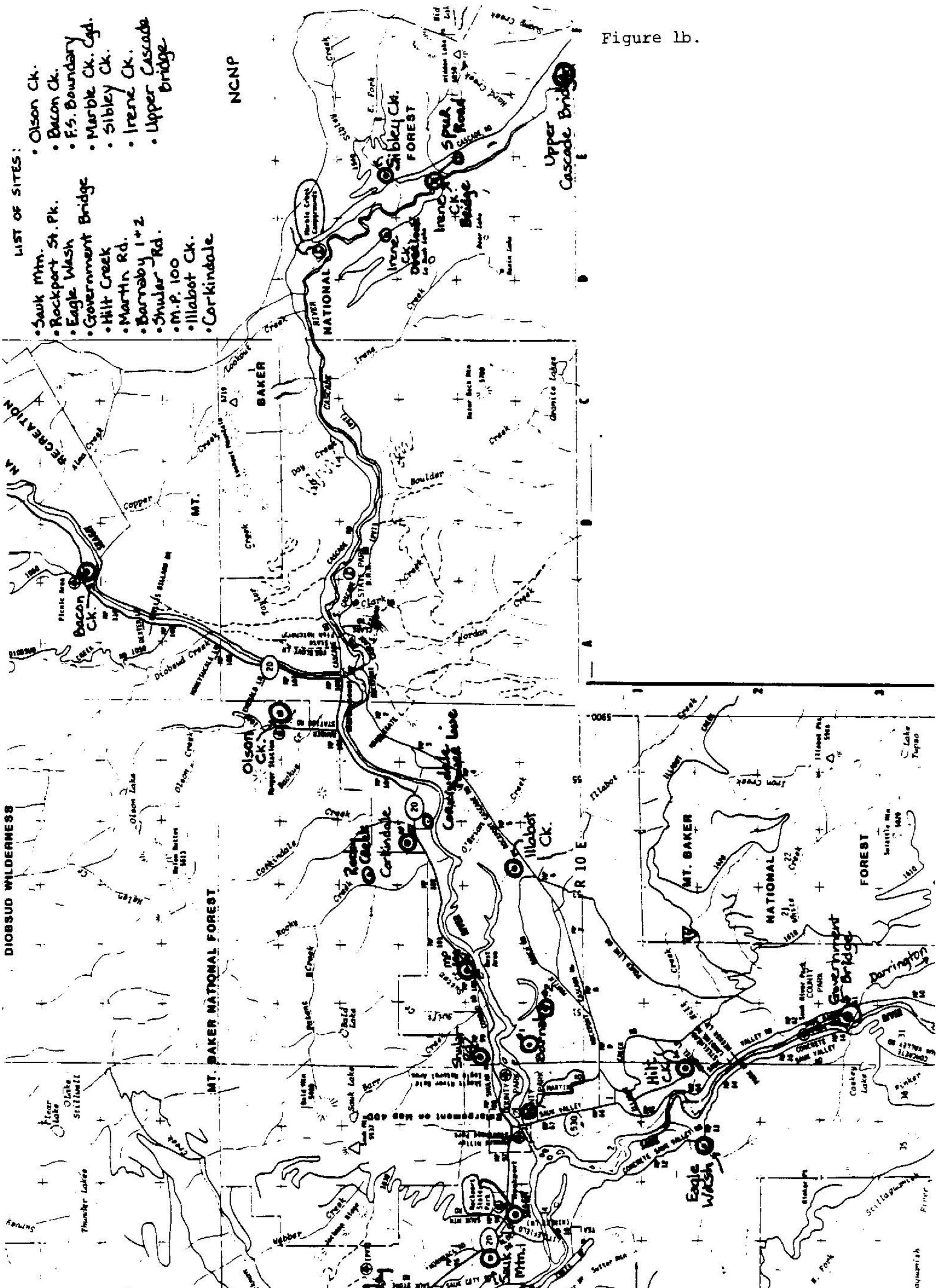


Figure 1a.

Figure 1b.


LIST OF SITES:
• Sauk Mtn.
• Rockport St. Pk.
• Eagle Wash
• Government Bridge
• Hilt Creek
• Martin Rd.
• Barnaby 1 + 2
• Shuler Rd.
• M.P. 100
• Illabot Ck.
• Corkindale
• Olson Ck.
• Bacon Ck.
• F.S. Boundary
• Marble Ck. Cgd.
• Sibley Ck.
• Irene Ck.
• Upper Cascade Bridge
NCNP
DIOBSUD WILDERNESS
MT. BAKER NATIONAL FOREST
Bacon Ck.
Olson Ck.
Corkindale
Illabot Ck.
Sibley Ck.
Irene Ck. Bridge
Spur Road
Upper Cascade Bridge
Eagle Wash
Government Bridge
Darrington
Hilt Ck.
Sauk Mtn.
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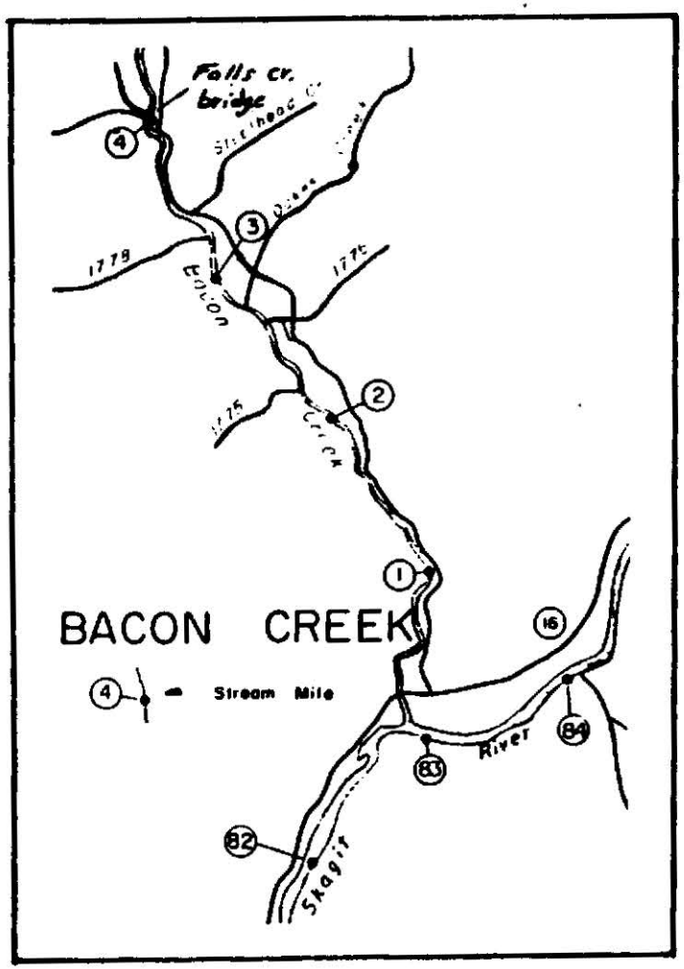


Figure 1c.

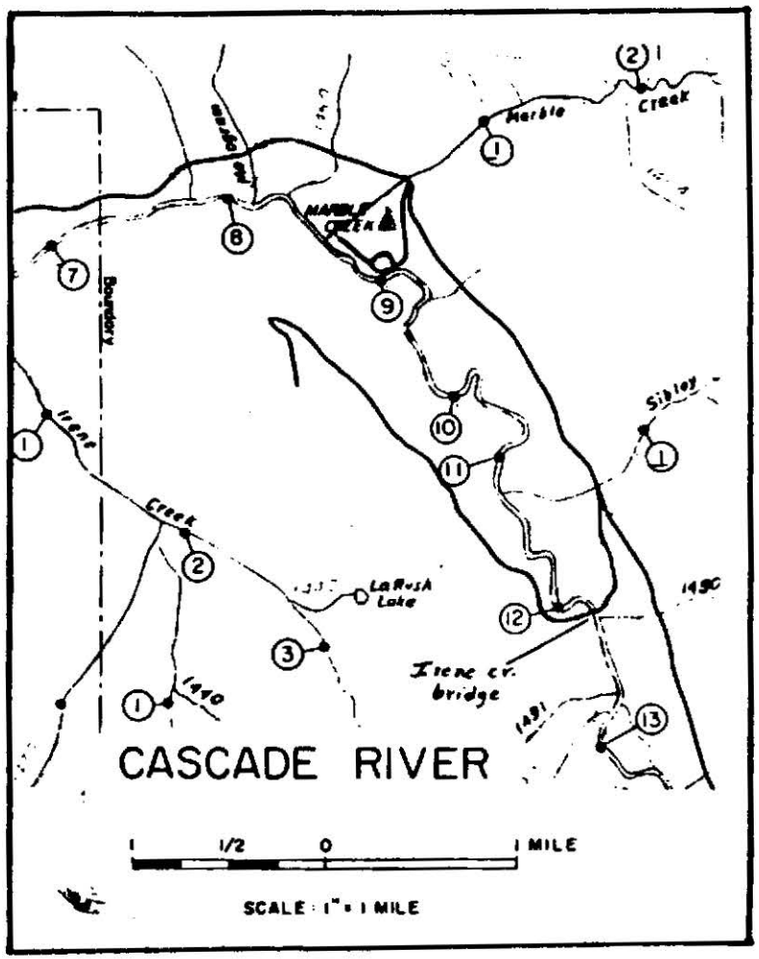
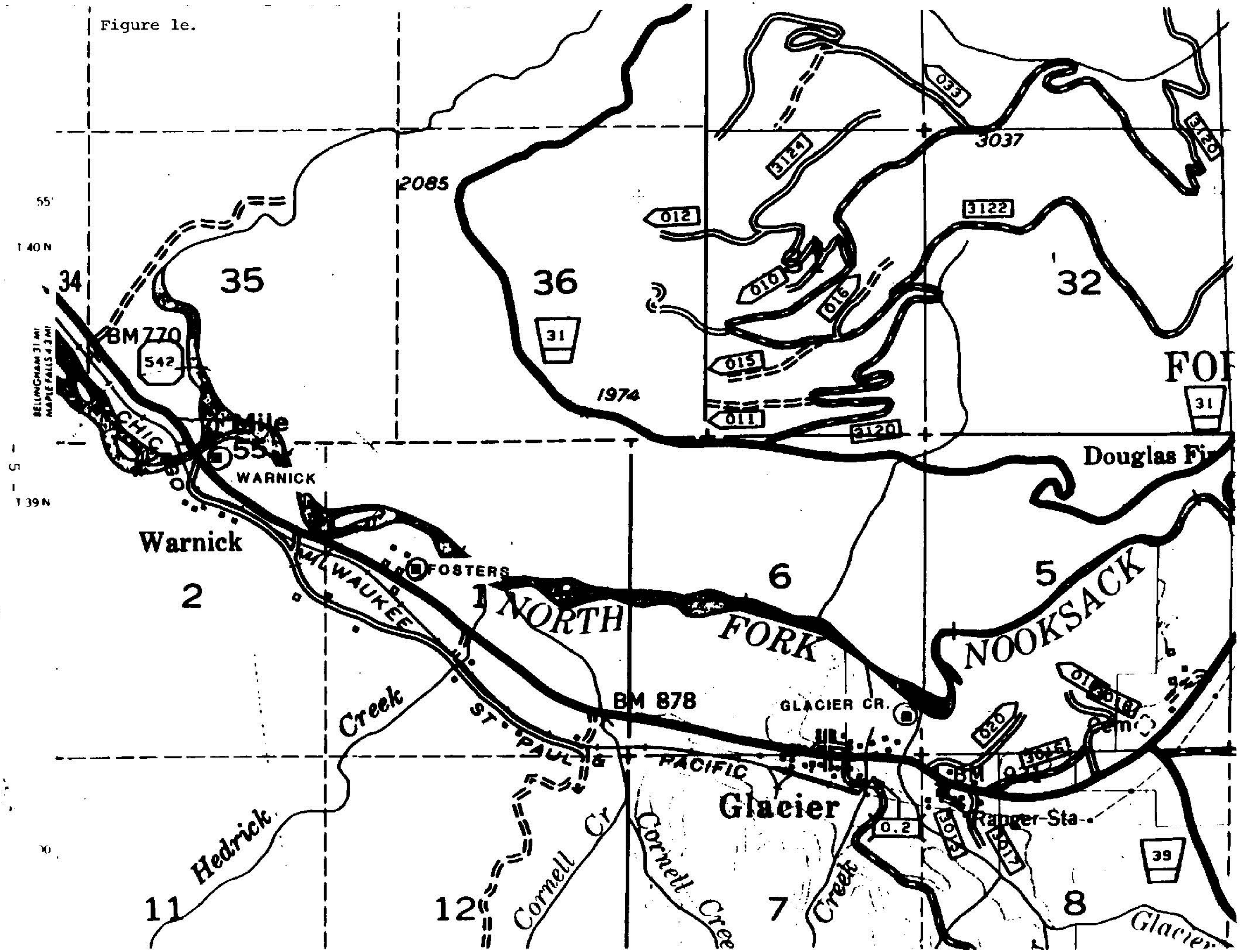


Figure 1d.

Figure le.



2085
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BM 878
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Creek
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MILWAUKEE
ST PAUL & PACIFIC
Cornell Cr
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Creek
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Glacier
T 40 N
T 39 N

12-15 eagles previously using a communal night roost, in the Nooksack River Basin during the winter of 1976, did not return to the vicinity after the roost was totally removed by logging the following spring and summer. Known Skagit River Basin communal night roosts (Appendix 2) have been described previously by Servheen (1975), Biosystems Analysis, Inc. (1980), Skagen (1980), Keister (1981b), Hamer (1984), and Hamer and Green (1985).

USFWS guidelines and regulations (USDI Fish and Wildlife Service 1981; Stalmaster et al. 1985) define core area and buffer zones for bald eagle roosting/staging areas and WDW is developing site-by-site management guidelines for communal night roosts in the Nooksack River area (Washington Dept. of Natural Resources pers. comm. 1988).

BACKGROUND

General:

The first scientific study of eagles on the Skagit River was conducted by Servheen (1975) during the winters of 1973-74 and 1974-75. Since 1976, several persons have yearly served as "stewards" of the TNC preserve (SRBENA). Eagle censuses are now conducted annually by various resource agencies. In 1979-80 and 1980-81, Seattle City Light Co. funded an intensive study of the Skagit River to assess the impacts of a proposed Copper Creek Dam on bald eagles (Hunt and Johnson 1981; Biosystems Analysis, Inc. 1980). This study substantially increased the knowledge of bald eagle habitat and behavior in the Skagit River.

It is well documented that winter concentrations of bald eagles in the Skagit River Basin are among the largest in the continental US, reaching peaks of from 200 to 450 individuals per day (Servheen 1975; TNC 1976; Wiley 1977, 1978; Skagen 1979, 1980; Biosystems Analysis, Inc. 1980). Eagle radio-tracking, and related studies conducted to date, indicate that eagle populations wintering in the Skagit Basin are a combination of resident and migrant birds coming from the San Juan Islands, coastal areas in Puget Sound, coastal and interior areas of British Columbia, the Strait of Georgia, and southeast Alaska (Servheen and English 1979; Biosystems Analysis, Inc. 1980; Hunt and Johnson 1981; Stalmaster 1987).

Many of these eagles winter along the Skagit River corridor, 150 miles of which have been designated by Congress as the Skagit Wild and Scenic River System (USDA Forest Service 1983). Eagles are usually in the area between October and March, reaching peak numbers in January and February (Biosystems Analysis, Inc. 1980). The greatest concentrations of eagles are usually reported between Rockport (RM 68.0) and Rocky Creek (RM 73.5), which includes the SRBENA. Their occurrence coincides with the spawning of chum salmon (Servheen 1975) in the river, although other salmon species, including coho (Stalmaster 1975, 1976; Biosystems Analysis, Inc. 1980; Hamer 1984), pink and chinook salmon are also used (Servheen 1975). After spawning, these salmon die and their carcasses are deposited on sand and gravel bars where they are available as an abundant, easily exploited food source for eagles (Servheen 1975; Stalmaster et al. 1979; Biosystems Analysis, Inc. 1980; Russell 1980; and Stalmaster 1987). A correlation between the number of eagles counted annually and the total chum salmon escapement in the Skagit River has been noted by a number of researchers

(Servheen 1975; Biosystems Analysis, Inc. 1980; and Mills 1986). Winter movements and distribution of eagles along rivers in the Pacific Northwest are greatly dependent upon the availability of salmon carcasses (Servheen 1975; Stalmaster 1976, Stalmaster et al. 1985). Servheen (1975) observed eagles feeding on deer carcasses on two occasions during February 1975, but attributed this to flood conditions in the Skagit River that limited the availability of salmon carcasses to the eagles.

Following is a summary of pertinent observations and findings reported by Servheen (1975) in his pioneering study of bald eagle ecology in the Skagit River area. These are important to understand due to their direct and indirect effects on bald eagle roosting activity.

1. Feeding sites were used consistently from day to day until food was depleted at the site or river conditions changed the availability of food (i.e. flooding).

2. When food was plentiful, feeding was intensive until approximately 10:00 am, and again in late afternoon until eagles moved to night roosts.

3. When food was scarce, feeding and searching occurred at any time during the day.

4. Perching usually followed feeding and usually occurred near previously used feeding areas.

5. After eating, eagles may perch for several hours, often for 6-8 hours on the same perch.

6. The longest time spent perching usually occurred during poor weather.

7. Flights along the river, to and from feeding areas, perches and night roost areas, usually was done at a height of 100 m (270 feet) or less.

The first scientific study of eagles on the Nooksack River was conducted by Stalmaster (1976) during the winter of 1974-75. This research was continued through the winter of 1979-80 by Stalmaster (Stalmaster et al. 1979). Since 1980, Knight and Knight have conducted several studies (Knight and Knight 1983; Skagen 1988). The USFWS began conducting mid-winter bald eagle surveys in the United States during the winter of 1979-80. The Washington Department of Game (now the Washington Department of Wildlife), assumed this responsibility in the winter of 1980-81 and is still conducting these surveys.

Stalmaster (1976) found that eagle use of the Nooksack River is significantly lower above Warnick, Washington (RM 55.0) than below Warnick. This is due in part to low use by coho and chum salmon for spawning, although a remnant run of chum uses the Nooksack Campground slough (RM 62.5) and a few coho have been observed using Deadhorse Creek (RM 63.5) in mid- to late December. Another reason that low eagle use has been observed may be due to timing of observations. Chinook and pink salmon runs occur earlier in the year, September and October respectively, when surveys are not taking place. Hamer (1984) suggested that bald eagle surveys of the Nooksack River begin in late August or early September in order to ascertain eagle use during the chinook and pink salmon spawning runs.

Soaring:

Wintering eagles may soar for hours on windy days or when the sun creates thermals, and thus may reduce the amount of time that they are involved in feeding activities (Servheen 1975; Biosystems Analysis, Inc. 1980). Knight and Knight (1983) found that the percentage of eagles, flying or soaring, was negatively correlated with relative food availability along the Nooksack River, Washington. Servheen (1975) found that soaring was an important behavior in eagles wintering on the Skagit River during 1973-74 and 1974-75. The following is a summary of his findings on soaring in the Skagit River Basin:

1. Soaring usually occurred on windy days or when there were few clouds on warm days.

2. Soaring usually took place along the ridges on the north side of the river between RM 68.0 and 72.5.

3. Soaring was usually done in a group, often accompanied by chasing and diving.

4. Soaring eagles appeared to stimulate or attract other eagles (into soaring) that had previously been perched in the area.

5. Soaring may initiate eagle movements to soar between drainages or induce long distance migratory movements.

6. Soaring in a group may be advantageous in locating food sources.

Communal Night Roosts:

During the day, eagles are typically observed feeding on gravel bars or perching in trees along the river bank. Morning feeding periods are intensive when food is abundant, and foraging is usually repeated during the last two hours of light and occasionally throughout the day except during periods of reduced food availability, when feeding may occur all day long (Servheen 1975; Biosystems Analysis, Inc. 1980; Stalmaster 1987). In the evening, eagles will frequently fly up to 3.34 km away from the river to favorite communal night roosting areas (Southern 1964; Lish 1975; Servheen 1975; Hansen 1978; Stalmaster 1981, 1987; Anthony et al. 1982). Keister (1981a) noted that eagles sometimes began returning to Klamath Basin roosts as early as 11:00 am.

Some of the roosting areas in the Skagit River Basin are known (Biosystems Analysis, Inc. 1980; Skagen 1980; Green, Hamer and Goldner 1986) (Appendices 1 & 2), but others are suspected (Biosystems Analysis, Inc. 1980; Keister 1981b), or yet to be discovered. In general, eagles leave their night roosting areas at first light, or within the first few morning hours, but movement away from the roost may be postponed on cloudy or foggy days (Servheen 1975; Biosystems Analysis, Inc. 1980; Stalmaster 1987).

Eagles roost singly, in small groups, or as densely as 80 (Edwards 1969; Stalmaster et al. 1985). Hansen (1975) seldom found more than one eagle per tree in Nooksack River area roosts. Eagles have been known to congregate at staging areas (Lish 1975) until just before dark and then fly into roosts, one

after the other. Often these staging areas are visible for great distances both up and down the river and may be used by eagles to advertise the location of the roost to other eagles (Hansen 1978; Knight and Knight 1980; Stalmaster 1987). Eagles are known to use more or less definite pathways, or flight lines, from day use to night roost perch areas, where they are attracted to particular trees and even to favorite limbs (Hansen 1978; Stalmaster 1981). These trees are noticeably large and open with sufficient room for take-off and landing, but are not noticeably different from other trees in the same general area (Biosystems Analysis, Inc. 1980; Keister 1981a; Anthony et al. 1982). The first eagles to arrive at these roosts select the favorite trees and limbs. Eagles arriving later will land as close as possible, even on the same limb. Some jostling for position may occur including a more dominant eagle replacing the previous occupant of a favorite limb with a subsequent reshuffling of eagles in the tree and/or within the roost (Stalmaster 1987). A favorite tree may hold as many as 20 to 25 eagles before nearby trees are used. Typically, as an eagle enters a roost, both it and other eagles already in the roost vocalize loudly. This often lasts for several minutes after an incoming eagle lands (Hansen 1978; Stalmaster 1987), which suggests that a social hierarchy may exist (Lish 1975; Hansen 1986).

Macroclimate differences between day and night roost perch areas have been documented (Hansen 1978; Keister 1981a; Stalmaster 1981; Hamer and Green 1985). Factors that may affect timing of eagle night roost activity include: Light intensity, temperature, cloud cover, and time of sunset (Servheen 1975; Keister 1981a; Stalmaster 1981; Stalmaster and Gessaman 1984). It has been noted that areas selected by eagles appear to offer protection from the wind (Cooksey 1962; Edwards 1969; Crehore 1974; Lish 1975; Keister 1981a; Stalmaster and Gessaman 1984). Hansen (1978) found that a night roost in the Nooksack had an average nightly temperature that was 1.73 degrees warmer than the day perch and noted that roosting sites, protected from the wind, may effectively prevent increased metabolism due to increased heat loss, resulting from air movements. Thus less food would need to be consumed by an eagle to maintain a constant body temperature. Kiester (1981a) found a lower metabolic production rate for eagles within Klamath Basin roosts and suggested that the resultant reduction in energy demand may be one reason for winter roosting by bald eagles.

Microclimate differences have been well documented by Stalmaster and Gessaman (1984) who found night roost temperatures in the Nooksack to be 1.9 degrees cooler diurnally and 1.7 degrees warmer nocturnally than the exposed gravel bars where feeding took place. The following is a summary of their pertinent findings concerning the function of habitat selection of night roosts:

1. Temperatures varied least in coniferous habitats (0.7 degrees compared to 4.3 degrees on gravel bars in January).

2. Rainfall was 38.5% lower in coniferous habitats than gravel bars.

3. Wind speed in coniferous habitats was 10% of the speed measured at the gravel bars.

4. Net long wave radiation was nearly equal for coniferous habitats in contrast to wider fluctuations both night and day on gravel bars.

5. Bald eagle inactivity creates a 1.8 degree body temperature depression (mild hypothermia) while roosting, which results in an energy savings equal to 4.6% of their daily energy requirements due to lower heat loss.

6. Energy metabolism during direct rain stress increases slightly during the first hour of precipitation, increases sharply during the second and third hour, and reaches a plateau during the fourth hour. Bald eagle body temperatures begin decreasing after four hours of continuous heavy rain. Energy requirements increased very slightly (0.016%) during natural precipitation (1.3 cm/wk) in the Nooksack Basin for eagles utilizing coniferous habitats.

7. The net energy savings of bald eagles by utilizing coniferous habitats as roosting sites averaged 61.1 kJ/d. This equals the cost of flying to and from a roost 3.88 km distant from a feeding site or the cost of flying to and from a roost 2.6 km distant from a feeding site and searching 3.9 km of river for food.

Stalmaster and Gessaman (1984) also provided information concerning communal roosting. Coniferous habitats were used in 76.3% of the observations. In the remaining 23.7%, riparian deciduous habitats were used, primarily by subadults, giving a competitive advantage in early morning feeding. This correlates well with Knight and Knight (1983) observations of subadults arriving ahead of adults at feeding sites. Huddling has not been reported in communal roosts, but it has been suggested that information concerning food locations is exchanged or stolen (Ward and Zahavi 1972; Servheen 1975; Steenhof 1976; Hansen 1978; Knight and Knight 1983), foraging efficiency is increased (Stalmaster 1983; Stalmaster et al. 1985), and an advantage in predator avoidance is offered (Hansen 1978; Knight and Knight 1983).

METHODS AND PROCEDURES

A. Census Procedures:

During the survey period, a total of 18 viewpoints in 1986-87 and 22 viewpoints in 1987-88 (Fig. 1) was used to observe bald eagle movement toward areas suspected as being communal night roosts. Roost areas were located by observing the direction of eagle flights just before or at dusk. Census methods were similar to those used by Stalmaster (1976), Hansen (1978), and Hamer and Green (1985). Bald eagles that displayed adult characteristics (white head and tail) were classified as adults. Eagles that didn't exhibit adult characteristics were classifed as immature. No attempt was made to break them down further into age classes. Eagles that were too far away for proper identification, or were not distinguishable because of poor visibility, were classified as "unknown". Some golden eagles were observed wintering in the Skagit River area by Mills (1986), D. Drummond (pers. comm.), and WDW personnel. It is possible that some of the eagles classified as immature and/or unknown were golden eagles. Every effort was made to ensure that observers were able to distinguish between immature bald and golden eagles. Notes were kept discerning possible anthropogenically-caused disturbances to bald eagles such as chainsaw noise, helicopter logging activities, and human weekend activities (i.e. rafting and eagle watching) (Mills 1984).

Forty different observers during the winter of 1986-87 and thirty-two different observers during the winter of 1987-88 participated in the survey. Eagle identification experience of the participants was variable. Their experience ranged from being professional birders to being very inexperienced. However, every effort was made to ensure that all observers could distinguish between bald eagles, golden eagles, other raptors, ravens, and crows that might be found in the survey area. All observation form packets (Appendix 3) included diagrams that showed key differences between bald and golden eagles.

The following information was collected at each of the viewpoints on each date:

1. Number of eagles using each roost.
2. Ratio of immatures to adults in the roosting population.
3. Timing of movement to the roosts and location of the roosts.
4. Weather observations (wind speed and direction, precipitation).
5. Ambient air temperature (every half hour).
6. Direction and time of flight.
7. Visibility and cloud cover.
8. Notes on eagle behavior.

An example of the data collection form, a modification of the forms used by Hamer (1984) and Hamer and Green (1985), is included in Appendices 3 and 4.

Observations were timed to correspond to the time of day when eagle movement toward night roosts, based upon past experience (Hamer 1984; Hamer and Green 1985), was suspected to be the greatest. Generally observations began at 3:00 p.m. and ended when visibility was no longer possible due to darkness. Sunset times reported are from the National Weather Service, Olympia, Washington. Observation methods used were based on information collected by Hamer (1984) and Hamer and Green (1985) for the Illabot Creek night roost over a two year period during the winters of 1983-84 and 1984-85. Observations were conducted at most viewpoints one day per week, usually taking place on Thursdays, to correspond with the Skagit River interagency daytime bald eagle population census conducted by TNC (Mills 1987; Mills 1988), NPS, FS, Puget Power and Light Co., and WDW (Appendices 5 and 6). These night roost activity data were then compared to the total TNC count reported by Mills (1987 and 1988) for each date.

More than one observer was used at certain viewpoints (Barnaby, Mile Post 100, Rockport State Park, and Illabot Creek) where heavy eagle activity occurred, in order to more adequately record the observations. Observers were in radio contact with each other at all times, so that eagle movements from one area to another could be monitored. This strategy previously helped locate the Illabot Creek night roost in 1985 and sort out activity from one roost area to another (Hamer and Green 1985). Not all viewpoints were surveyed on every date due to limitations on availability of personnel. Those locations that consistently

had low eagle counts were usually replaced by other, more likely, observation points in order to get better overall coverage of the area. However, major activity areas were covered each week throughout the survey period and lower priority sites were surveyed as observers were available.

Depending upon the circumstances encountered, all observations were made using one or more of the following: The naked eye, binoculars, or a spotting scope (20x - 45x).

B. Observation Locations and Related Information (Fig. 1):

1. Cascade River-Upper Bridge (RM 15.5)

This site is located 1.7 miles on FS road 1570 (SE 1/4, Sec. 34, R12E, T35N) (Fig. 2).

2. Cascade River-Spur Road (RM 12.3)

Follow FS road 15 to MP 7. The site is located approximately 20 m south of the Irene Creek Bridge and 50 m from the river (SE 1/4, Sec. 21, R12E, T35N) (Fig. 3).

3. Cascade River-Irene Creek Bridge (RM 12.2)

Observations were made from the bridge at MP 1 on FS road 1550 (SW 1/4, Sec. 21, R12E, T35N) (Fig. 3).

4. Cascade River-Sibley Creek (RM 11.3)

The observation site is located at MP 6 on FS road 15 (E 1/2, on the line between Sec. 16 & 21, R12E, T35N) (Fig. 3).

5. Cascade River-Irene Creek Overlook (RM 10.5)

Observations were made at a site located at MP 2.5 on FS road 1550 (SE 1/4, Sec. 17, R12E, T35N) (Fig. 3).

6. Bacon Creek (RM 82.9)

Refer to Green, Hamer, and Goldner (1986) for this site description. Observations were conducted by NPS personnel. This observation site is a motor route due to the length of time and area covered at this location (Fig. 4).

7. Olson Creek (RM 77.1)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 5).

8. Corkindale (RM 74.1)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 6).

FIG. 2

CASCADE - UPPER BRIDGE

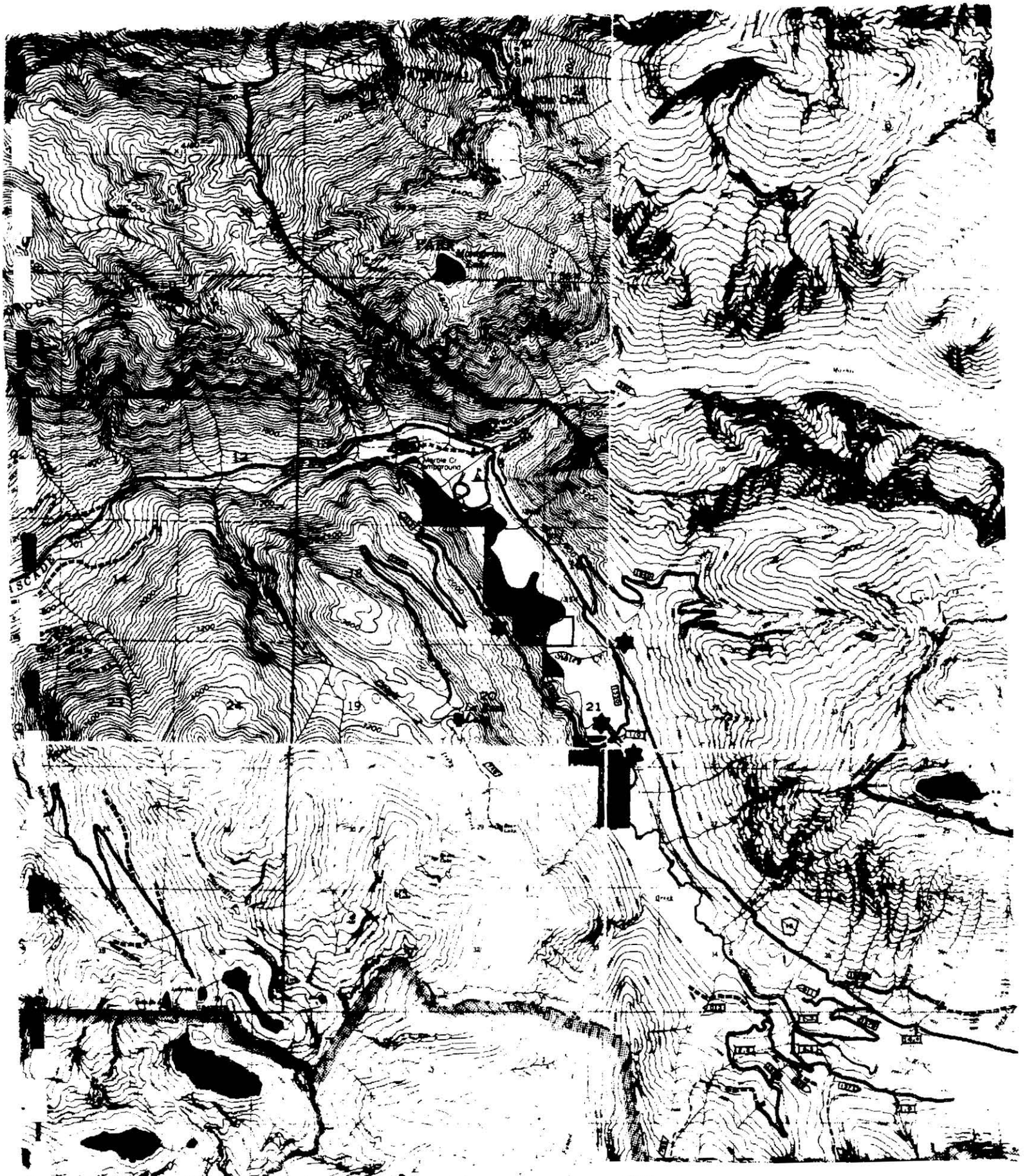

CASCADE SPUR RD, IRENE CR BRIDGE,
SIBLEY CR, IRENE CR OVERLOOK
OBSERVATION SITE

FIG. 3

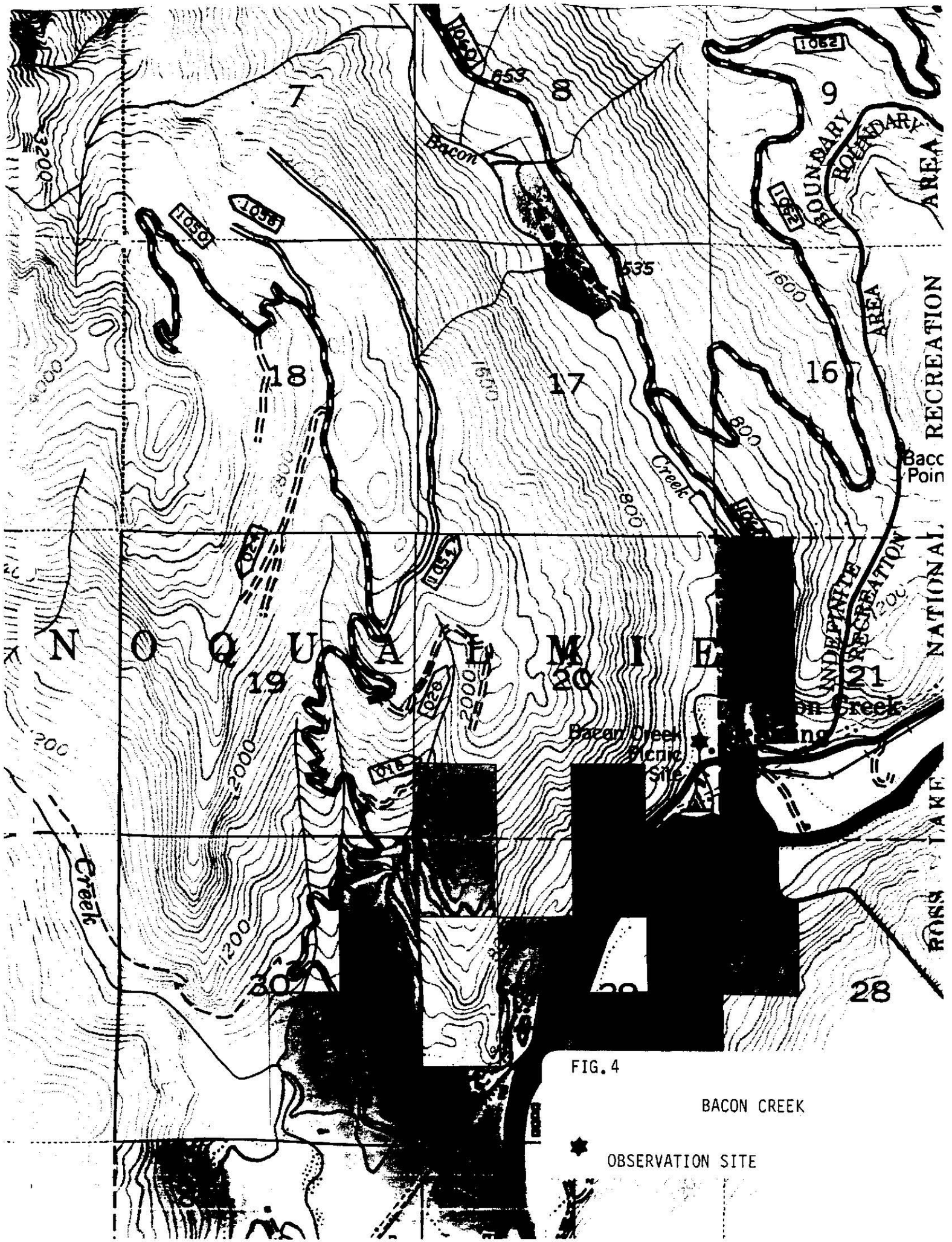


FIG. 4

BACON CREEK

OBSERVATION SITE

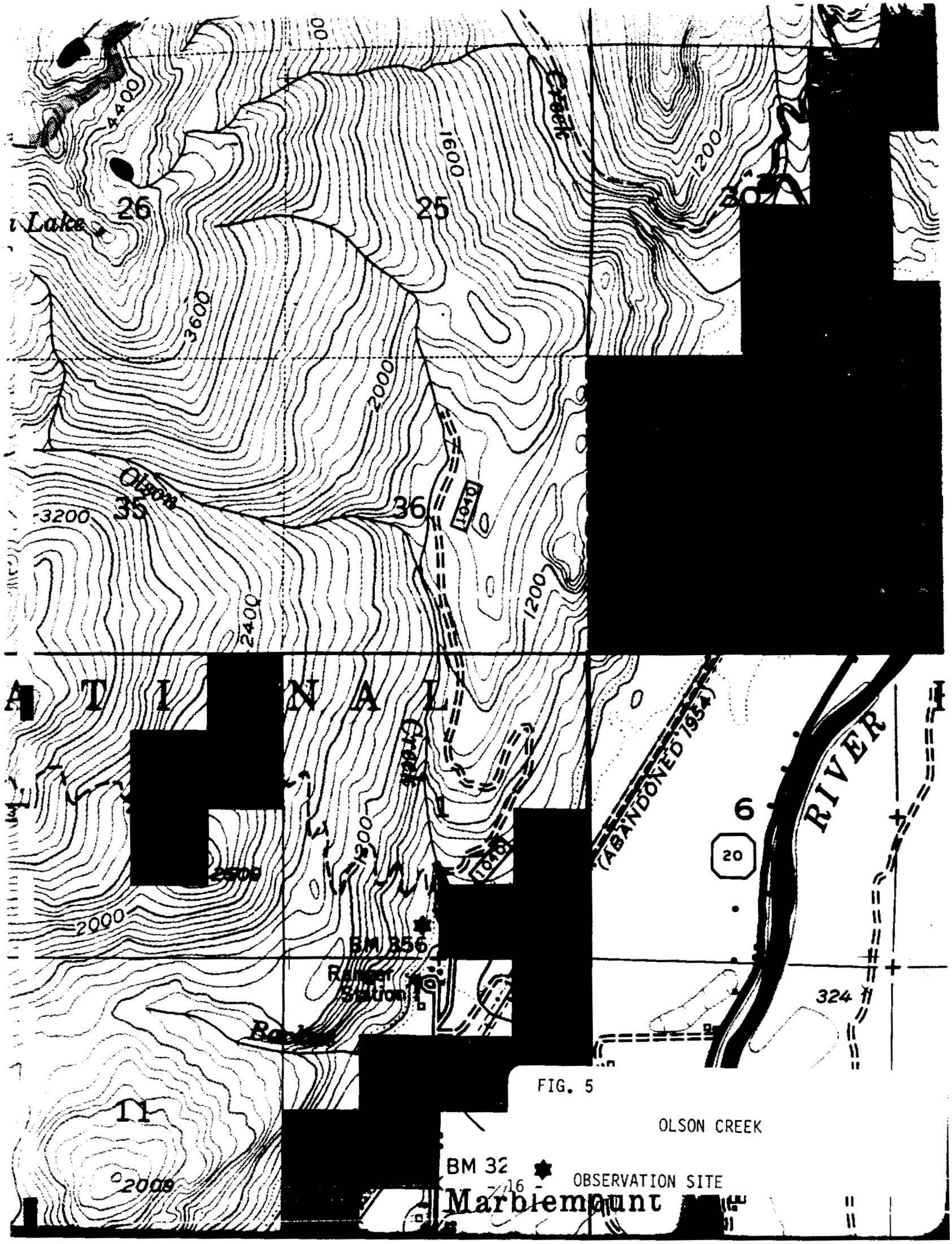


FIG. 5

OLSON CREEK

✡ OBSERVATION SITE

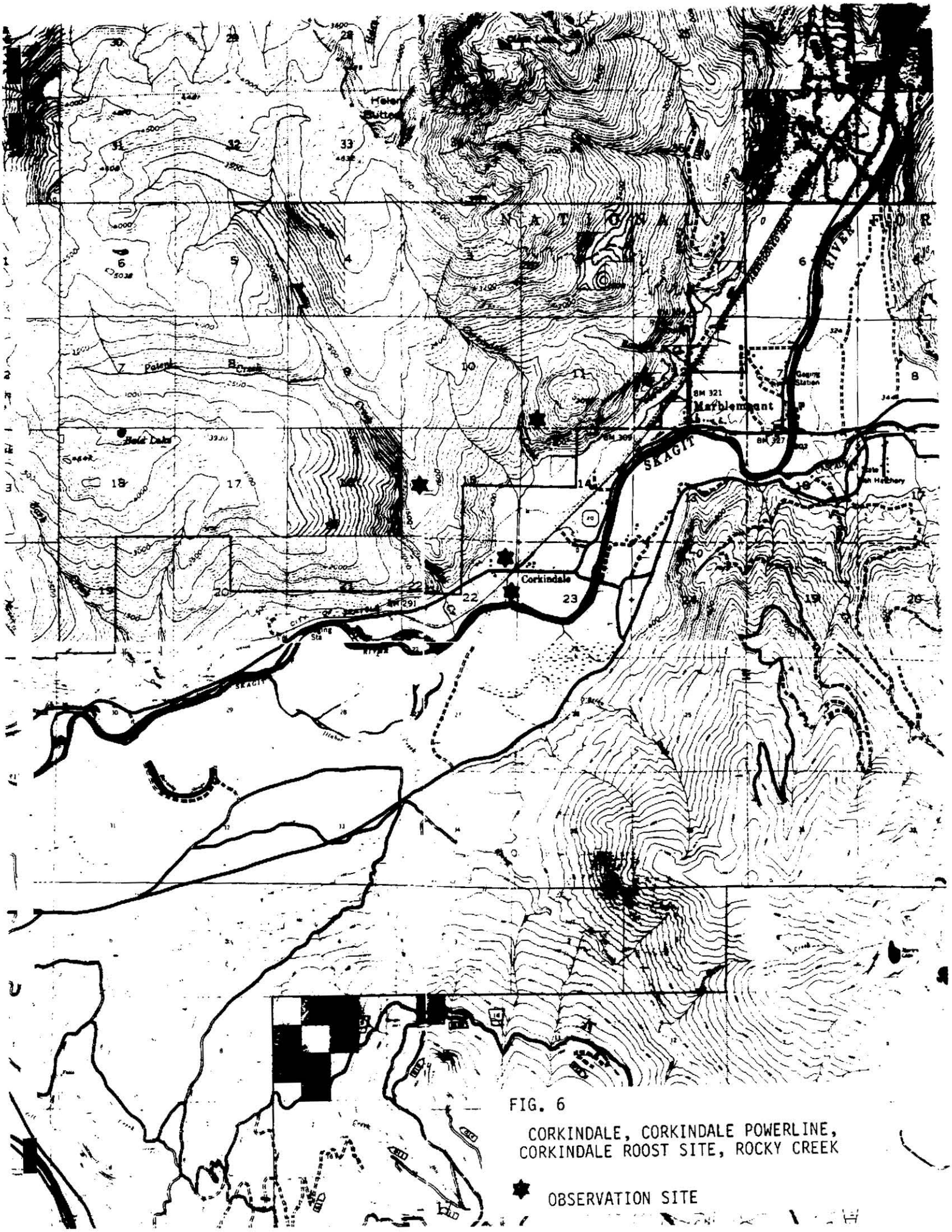


FIG. 6

CORKINDALE, CORKINDALE POWERLINE, CORKINDALE ROOST SITE, ROCKY CREEK

★ OBSERVATION SITE

9. Corkindale Powerline (RM 74.0)

Locate this site from the Corkindale observation point at MP 103. Follow the powerlines south approximately 50 m to the river. This site was selected to ascertain if it afforded a better view of the Corkindale roost (E 1/2, Sec. 22, R10E, T35N) (Fig. 6).

10. Rocky Creek (RM 73.5)

The trailhead is just north of the Rocky Creek Bridge and Hwy 20 at MP 102.5. Follow the Rocky Creek Trail 1-1/2 miles (SW 1/4, Sec. 15, R10E, T35N) (Fig. 6). This site was chosen to determine if it provided a better view of the Corkindale roost from the north.

11. Illabot Creek (RM 71.6)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 7).

12. Mile Post 100 (Cascadian Farm) (RM 71.0)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 7).

13. Martin Road (RM 68.8)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 8).

14. Barnaby Slough (RM 70.2)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 7).

15. Shular Road (RM 69.0)

The Shular Road turnoff is located at Hwy. 20 MP 98. The observation point is situated on the north side of the road near a residence (NE 1/4, Sec. 25, R09E, T35N) (Fig. 8).

16. Government Bridge (RM 12.3)

The observation point is on the bridge at MP 112 on the Rockport-Darrington Road (SE 1/4, Sec. 30, R10E, T34N) (Fig. 10).

17. Hilt Creek (RM 4.0)

Follow the Rockport-Darrington Road to MP 104. Turn off onto FS road 16 and proceed to MP 1 (SE 1/4, Sec. 12, R09E, T34N) (Fig. 11).

18. Eagle Wash (RM 3.5)

This observation site is located near a residence at MP 13 on the Concrete-Sauk Valley Road (SE 1/4, Sec. 11, R09E, T34N) (Fig. 12).

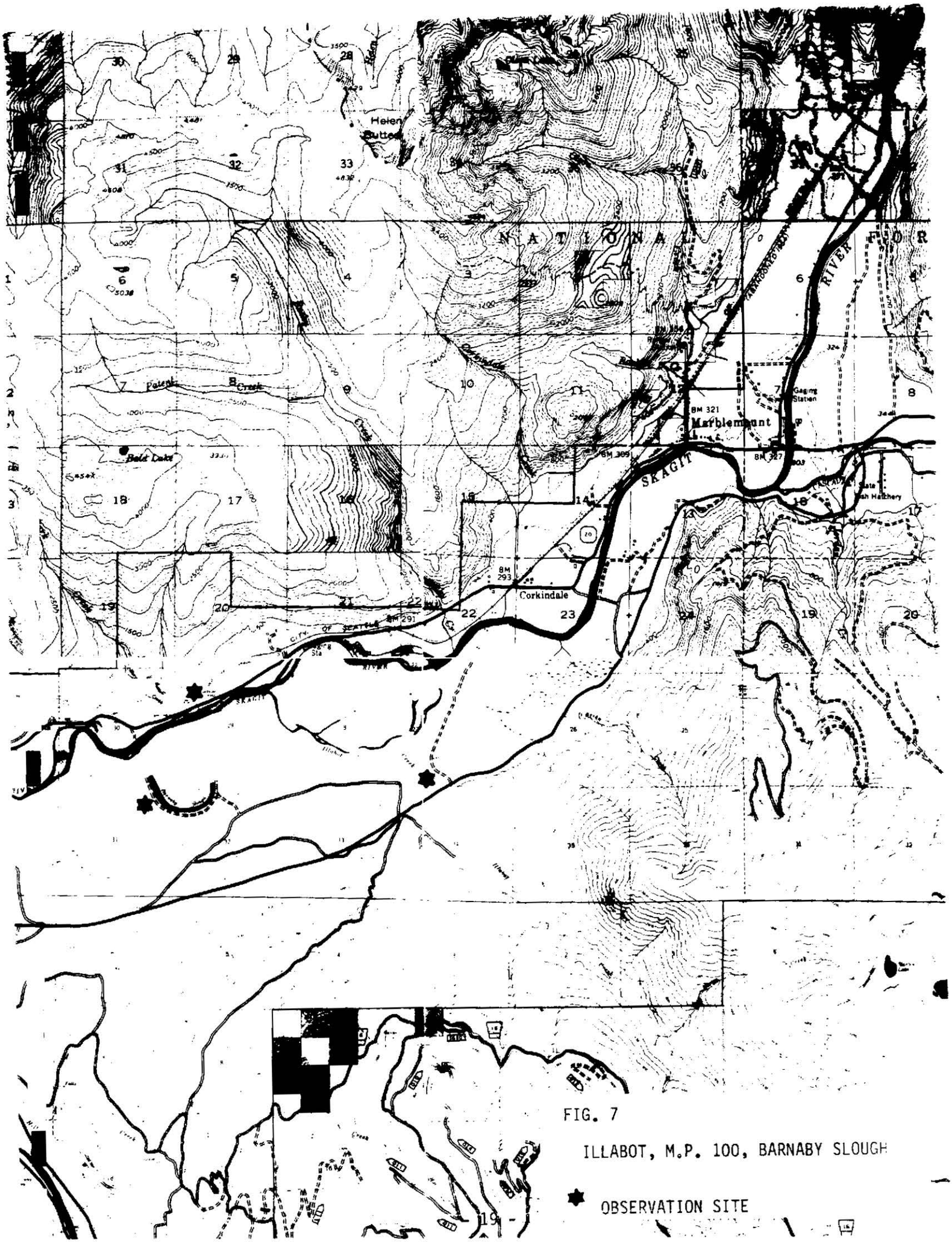


FIG. 7

ILLABOT, M.P. 100, BARNABY SLOUGH

★ OBSERVATION SITE

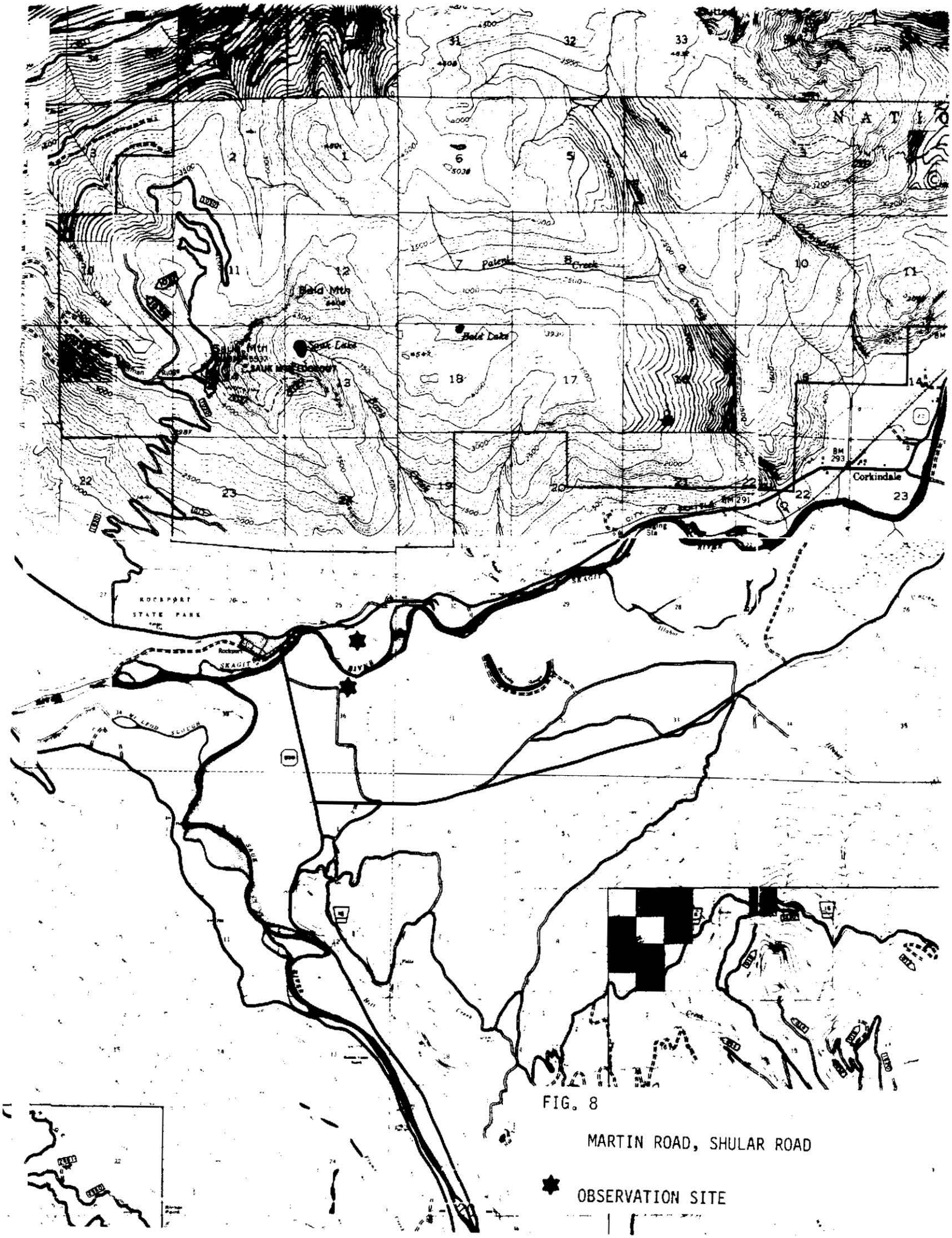


FIG. 8

MARTIN ROAD, SHULAR ROAD

OBSERVATION SITE

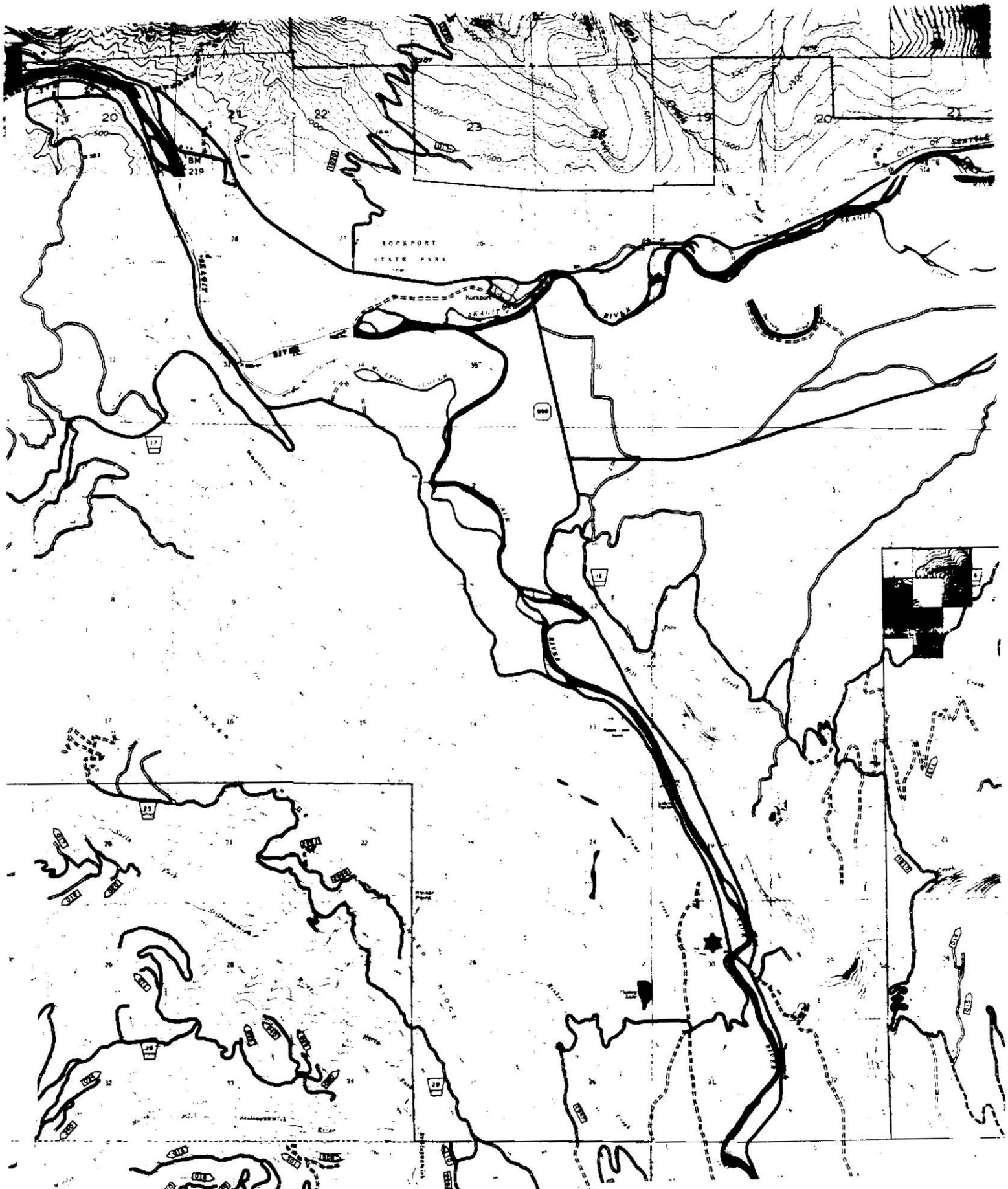

ROCKPORT
STATE PARK
SKAGIT
RIVER
GOVERNMENT BRIDGE
OBSERVATION SITE

FIG. 9

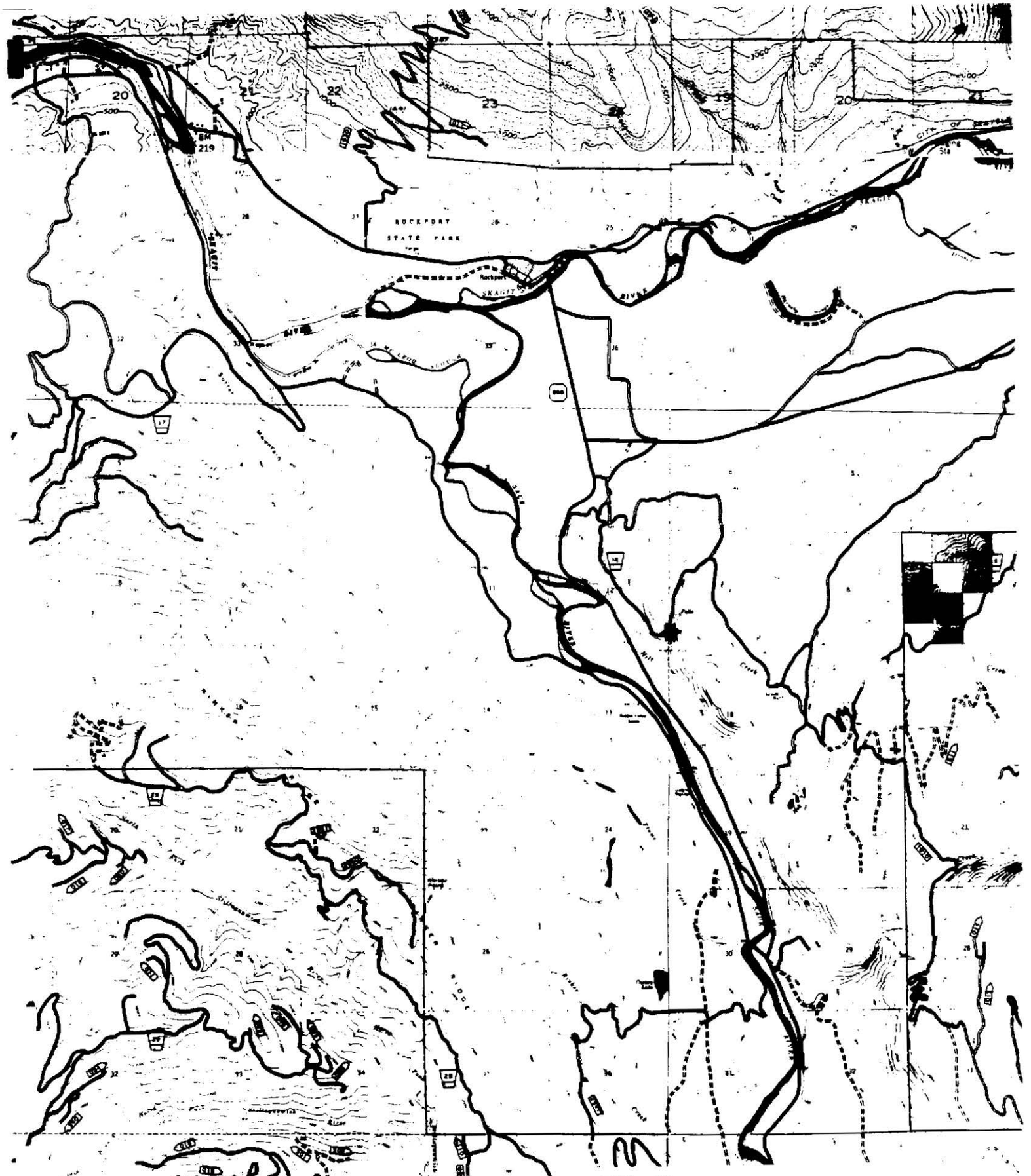


FIG. 10

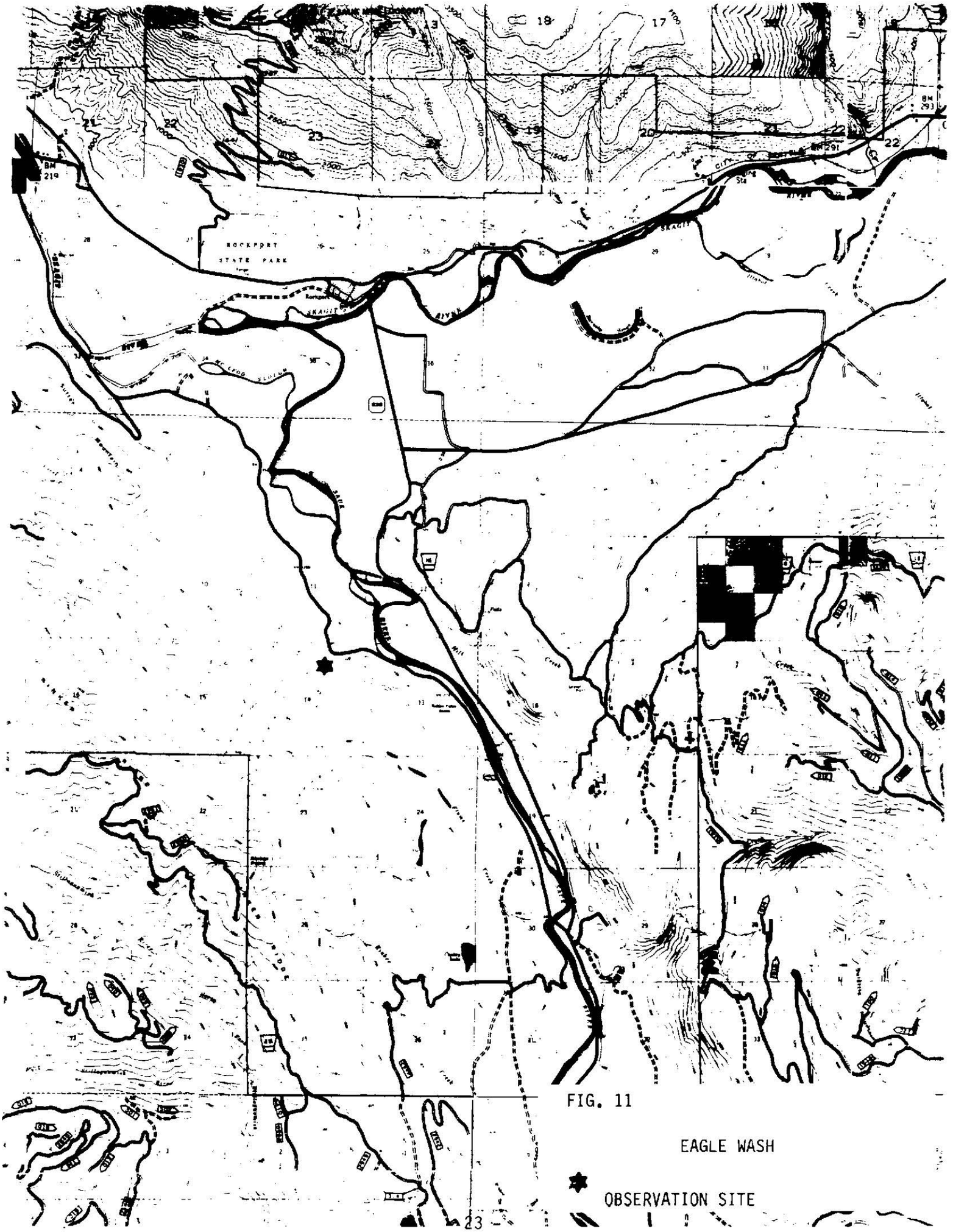


FIG. 11

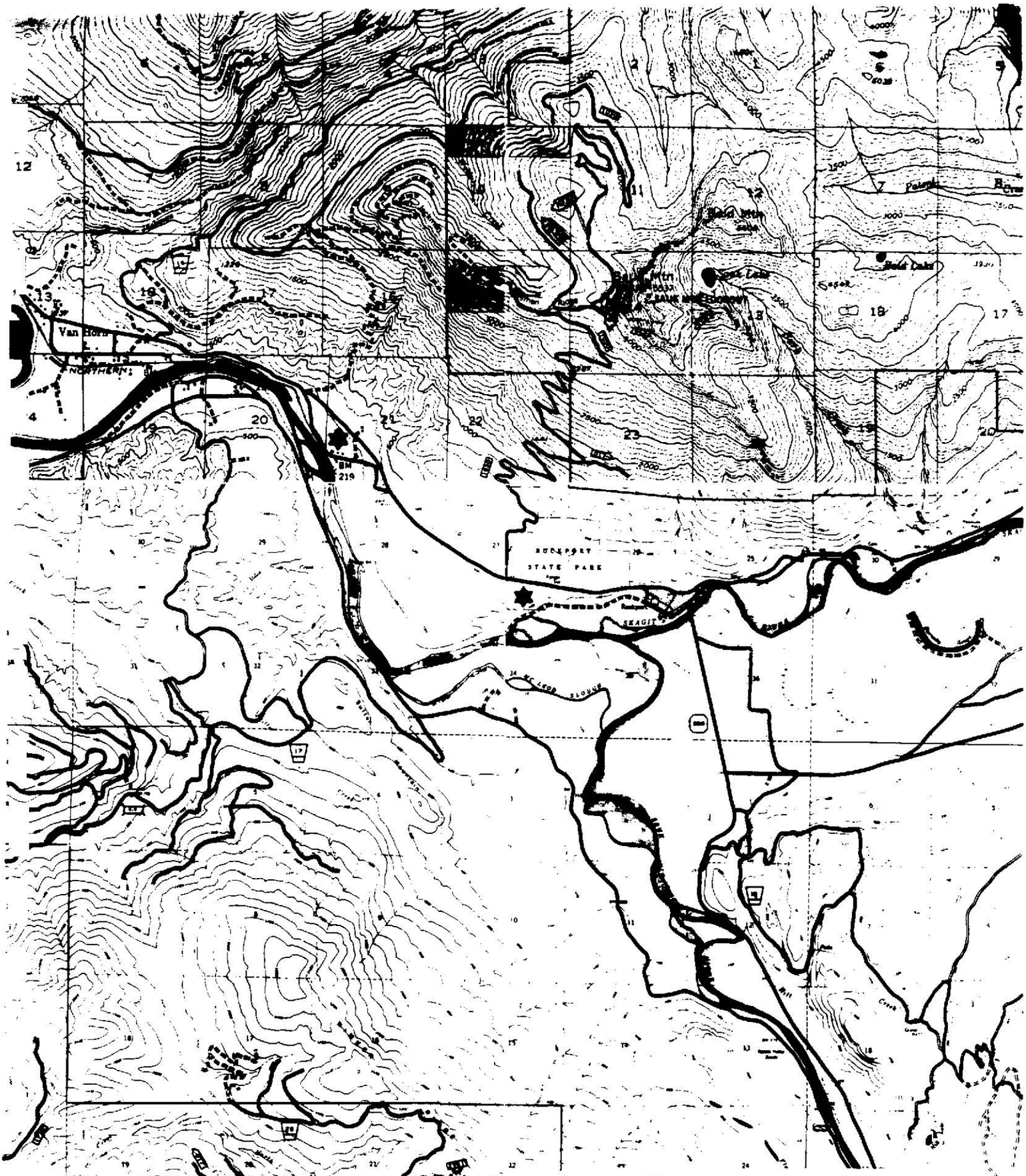


FIG. 12

19. Rockport State Park (RM 67.0)

Follow Hwy. 20 to the park at MP 96. The site is located on the footpath 35 m west of the south side access (SE 1/4, Sec. 27, R09E, T35N) (Fig. 13).

20. Sauk Mountain (RM 66.0)

Refer to Green, Hamer, and Goldner (1986) for this site description (Fig. 13).

21. Big Eddy Osprey (RM 60.0)

Follow Hwy. 20 to MP 84 to the Concrete-Sauk Road; turn north. The site is located 3 miles from Dalls Bridge on the Sauk/Concrete Road (SE 1/4, Sec. 24, R8E, T35N) (Fig. 14).

SKAGIT RIVER RESULTS AND DISCUSSION

1. Cascade River - Upper Bridge

During both survey years, 1986-87 and 1987-88, there was a lack of data for this site due to a lack of available personnel. A total of 4 observation dates, comprised of 7 person-hours, was conducted at this site both years. In the 1986-87 survey, there was only one January observation date and February was entirely omitted. In the 1987-88 survey, December was entirely omitted. The maximum number of eagles counted in 1986-87 was 18 (11 adults, 5 immatures, and 2 unknowns) on February 5. These were the only birds observed at this site during the survey (Fig. 15).

The maximum number of eagles counted in 1987-88 was 1 unknown on December 17 (Fig. 16). A helicopter was reported being used to lift cedar shake bolts on December 3 and 10, 1987. No eagle activity was reported for either observation day, although eagles had been seen earlier on December 3, but they left when the helicopter arrived in the area.

2. Cascade River - Spur Road

This site was surveyed in 1988 only, with a lack of data for half of the January observation dates. Observations conducted on 5 dates, totalling 10 person-hours, resulted in a total count of 15 eagles with a peak of 5 eagles (4 adults and 1 immature) on January 21 (Fig. 17). Chainsaws were heard on January 28, February 11, February 18, and February 25 with a total of 3, 0, 2, and 3 eagles observed, respectively. All the eagles were flying in a southerly direction (SE - S - SW) up the Cascade River.

3. Cascade River - Irene Creek Bridge

A total of 9 observation dates, comprising 16 person-hours, was conducted during the 1986-87 survey. A peak count of 23 eagles (14 adults and 9 immatures) was made on February 5. On January 8, 22 eagles (5 adults, 2 immatures and 15 unknowns) were observed. This site was observed on only one date in December with no eagle activity reported. A total of 71 eagles was observed through January and February (Fig. 18).

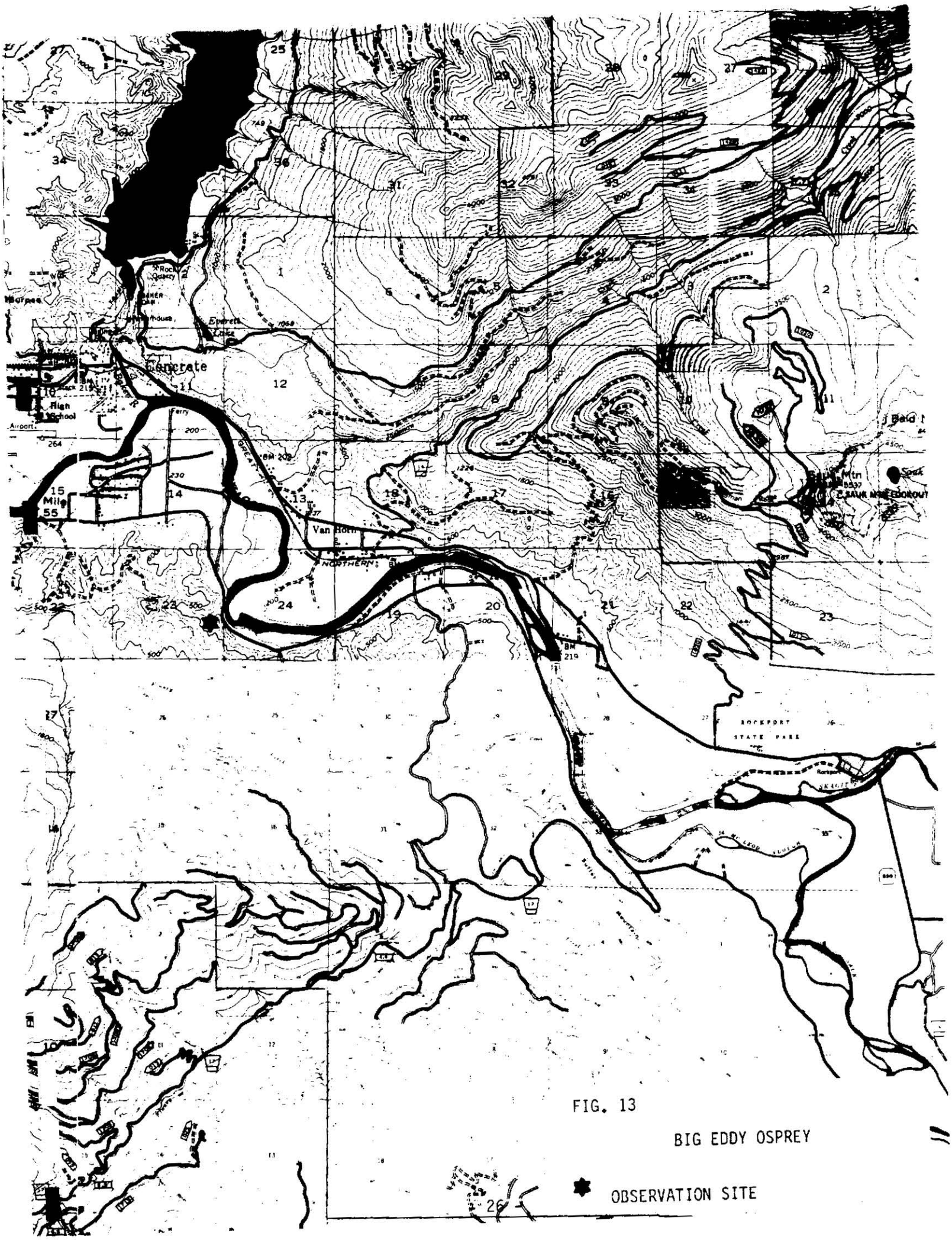


FIG. 13

BIG EDDY OSPREY

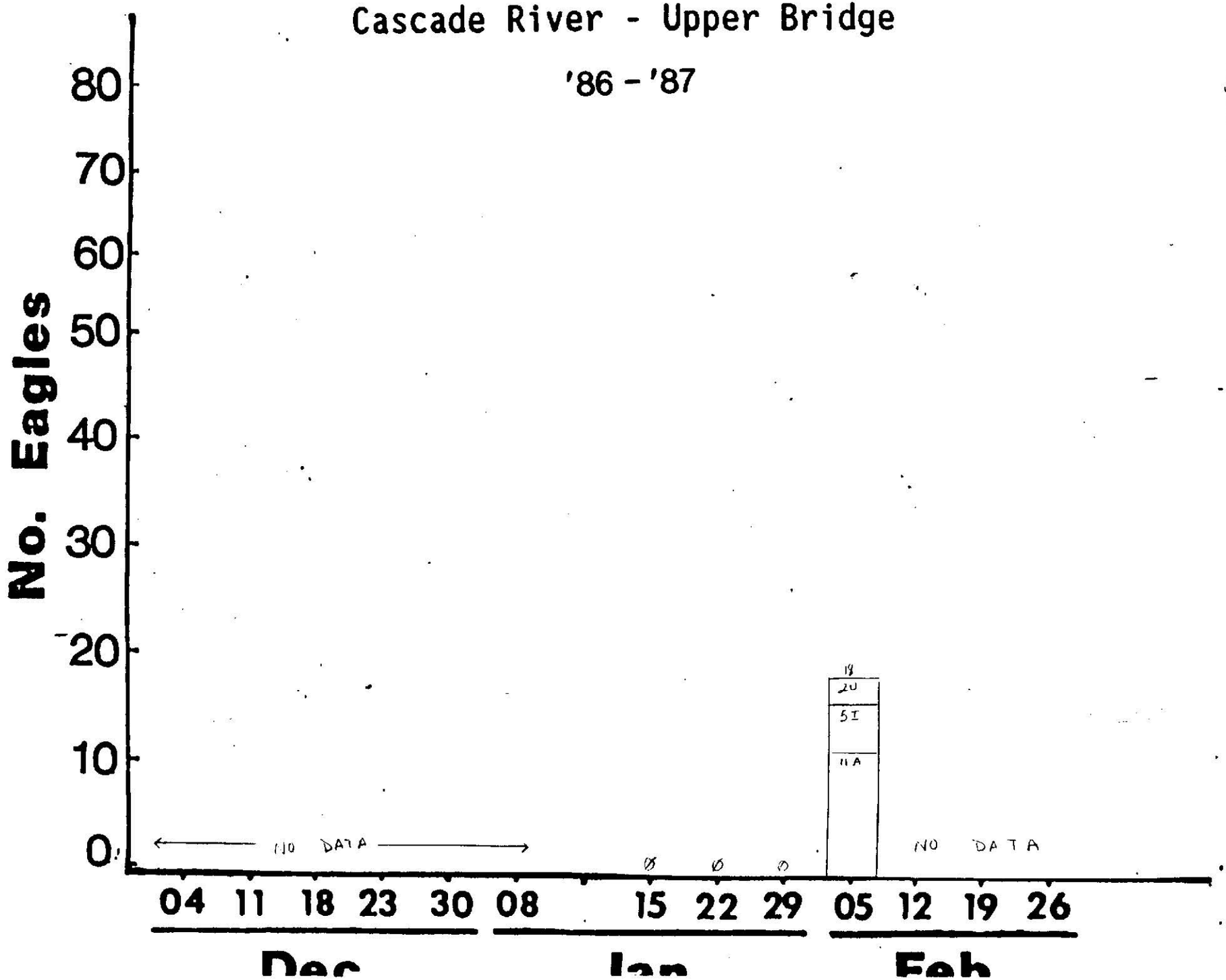

Number of Eagles observed
Cascade River - Upper Bridge
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
NO DATA
Ø
Ø
Ø
18
20
51
11A
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec
Jan
Feb

Figure 14.

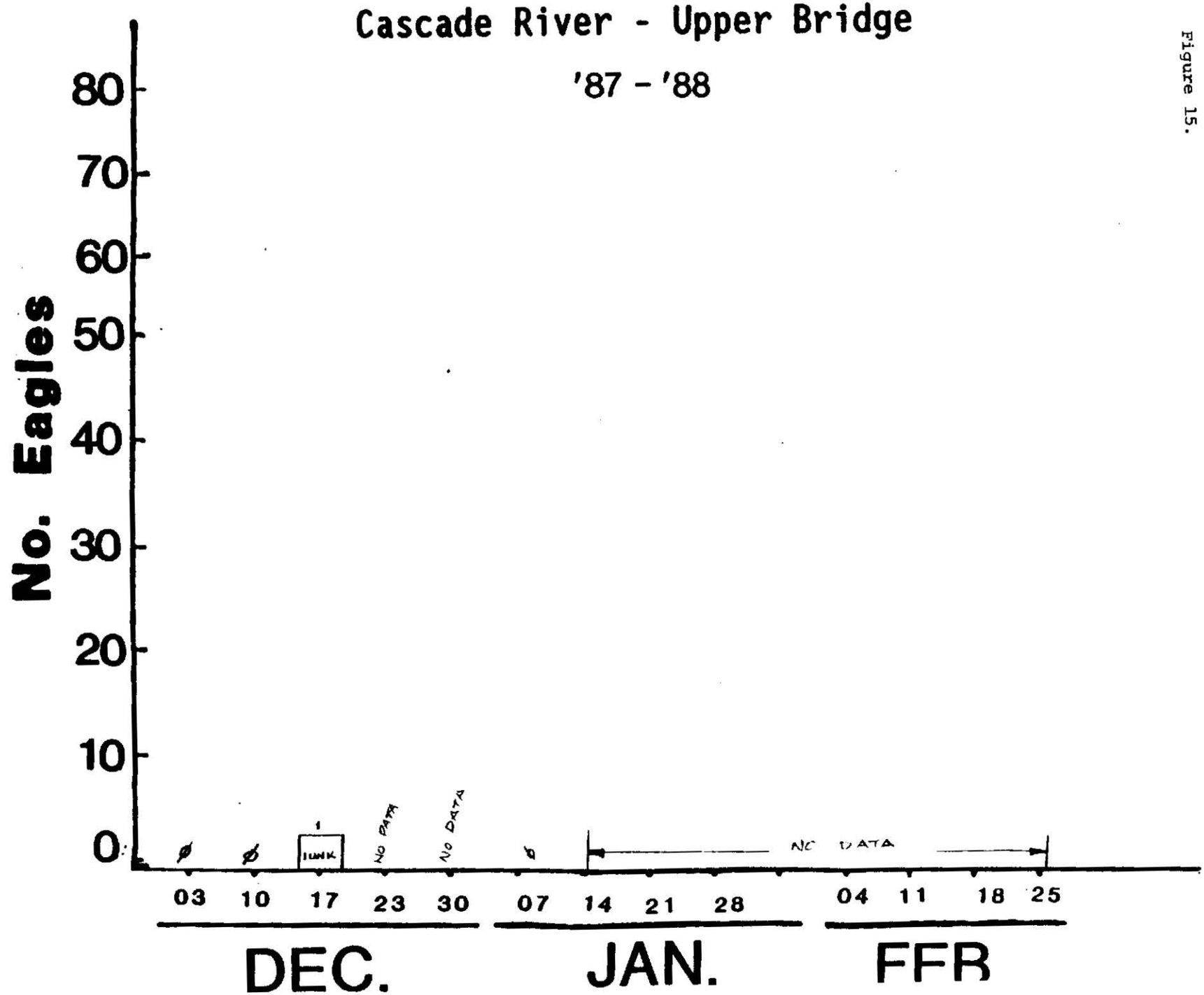

Number of Eagles observed at
Cascade River - Upper Bridge
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
1
LINK
NO DATA
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB

Figure 15.

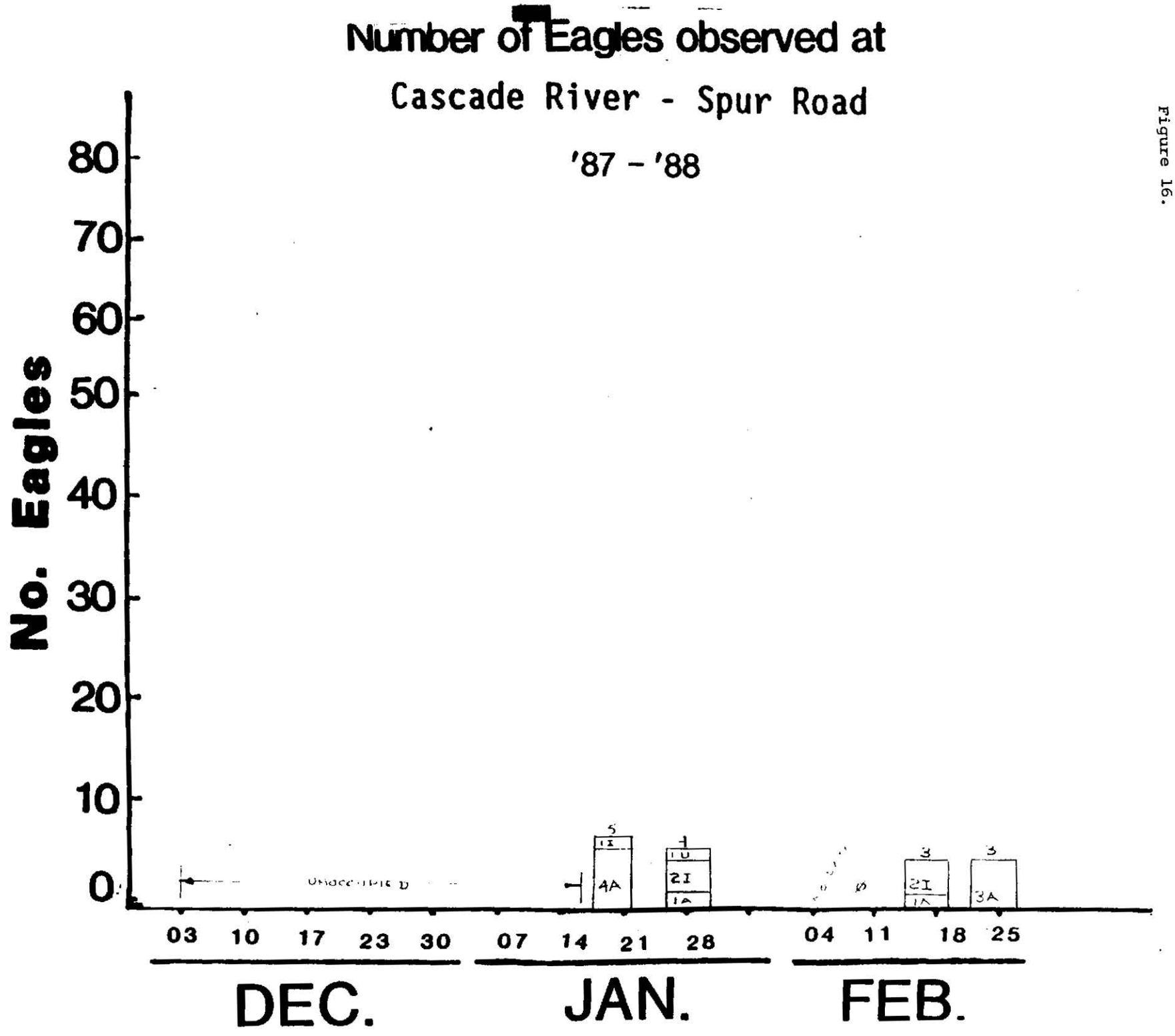

Number of Eagles observed at
Cascade River - Spur Road
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.
4A
2I
1A
2I
1A
3A

Figure 16.

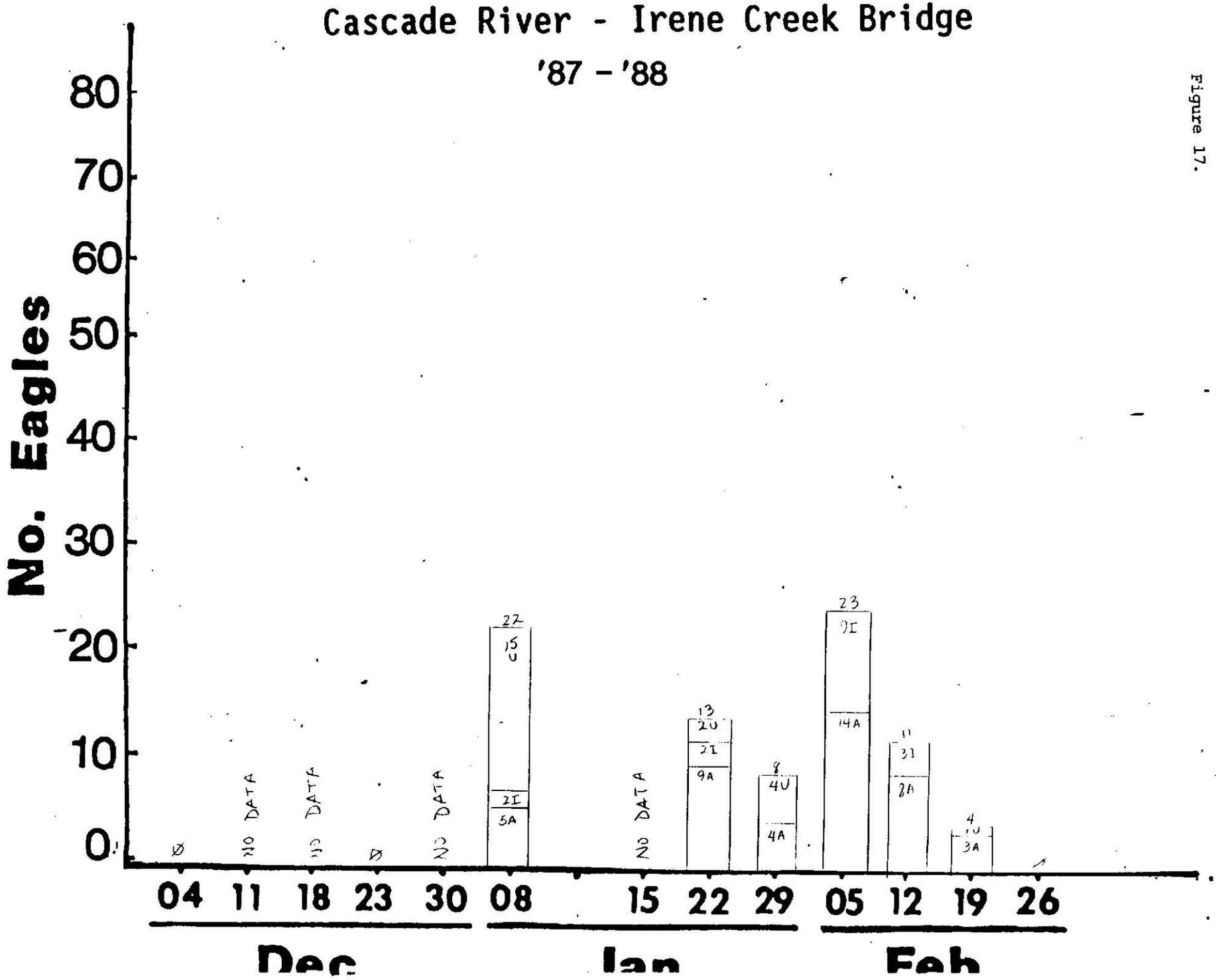

Number of Eagles observed
Cascade River - Irene Creek Bridge
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
NO DATA
NO DATA
NO DATA
22
15 U
2I
5A
13
2U
2I
9A
8
4U
4A
23
9I
14A
11
3I
8A
4
3A
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec
Jan
Feb

Figure 17.

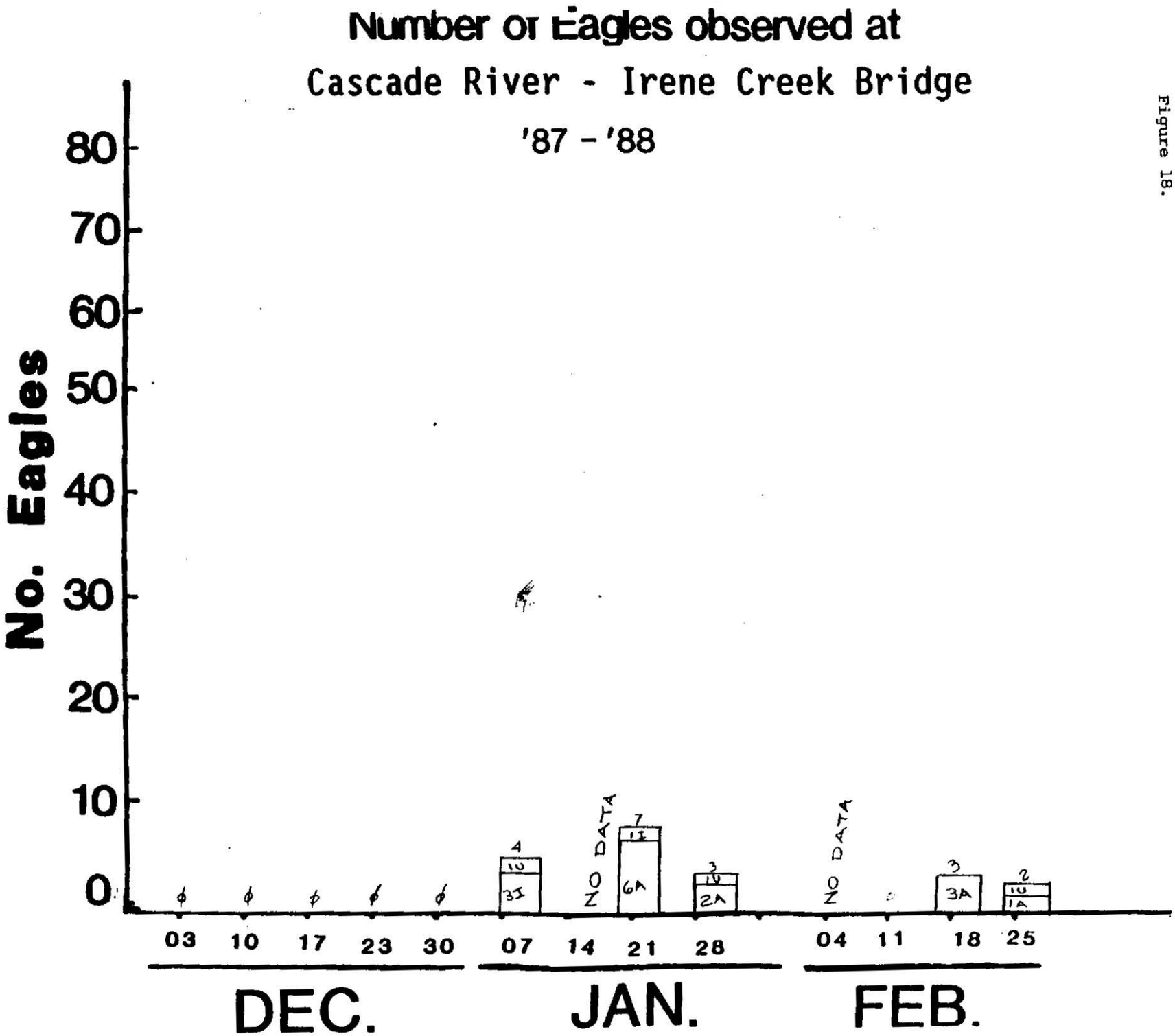

Number of Eagles observed at
Cascade River - Irene Creek Bridge
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Figure 18.

Observations were conducted on 12 dates, totalling 24 person-hours, during the 1987-88 survey. No eagles were observed during December. The same helicopter logging activity was noted on December 3 and 10 as above with no eagle activity observed. A peak count of 7 eagles (6 adults and 1 immature) was reported on January 21. Total eagle observations consisted of 19 eagles (Fig. 19).

4. Cascade River - Sibley Creek

During the 1986-87 survey, 9 observation dates, totalling 20 person-hours, were conducted. Two adult eagles were observed on December 18. These 2 eagles were the only birds observed at this site (Fig. 20).

A total of 9 observation dates, comprising 37 person-hours, was conducted during the 1987-88 survey. Eagle observations totalled 5 eagles (1 adult, 1 immature and 3 unknowns) with a peak of 2 unknowns on December 30 (Fig. 21). The same helicopter logging activity was noted on December 3 with no eagle activity observed. No February observations were conducted.

5. Cascade River - Irene Creek Overlook

Observations during the 1986-87 survey were conducted on 8 dates, comprising 20 person-hours. The total of 29 eagles (22 adults, 4 immatures, and 3 unknowns) is an underestimate, since the February 19 data contained eagle observations rendered useless by poor reporting techniques (Fig. 22). A peak of 10 eagles (4 adults, 3 immatures, and 3 unknowns) occurred on January 29.

The 1987-88 survey conducted observations on 8 dates, totalling 19 person-hours. There is a lack of data for portions of December and January due to a lack of available observers. A peak of 9 eagles (3 adults and 6 immatures) were observed on February 18. A total of 14 eagles (7 adults and 7 immatures) was reported for this site (Fig. 23). Helicopter logging activity in the area was reported for December 3 with no eagle activity observed.

6. Bacon Creek

Observation dates and person-hours totalled 13 and 53, respectively, for the 1986-87 survey. A peak of 7 eagles was reported on two dates (6 adults and 1 immature on January 15; and 5 adults and 2 immatures on January 29), comprising 5.3 and 3.9% of the TNC counts, respectively. A total of 34 eagles (29 adults and 5 immatures) was observed at this site (Fig. 24). Eagles were already present when observers arrived (approximately 120 minutes prior to sunset) on several dates, but peak activity occurred from 25 minutes before sunset to five minutes after sunset (Fig. 25).

Observation dates for the 1987-88 survey totalled 13 with 72 person-hours. Peak eagle observations occurred on January 21 with 13 eagles (11 adults, 1 immature and 1 unknown), January 28 with 22 eagles (19 adults and 3 immatures), February 11 with 9 eagles (4 adults and 5 immatures), and February 18 with 9 eagles (8 adults and 1 immature). These counts comprised 7.1, 17.2, 9.9 and 17.0%, respectively, of the TNC daily counts. A total of 80 eagles (63 adults, 16 immatures and 1 unknown) was reported (Fig. 26). Bald eagles were already at the site when observers arrived (approximately 120 minutes before sunset) on several dates but peak activity was noted at 55-75 minutes before sunset and

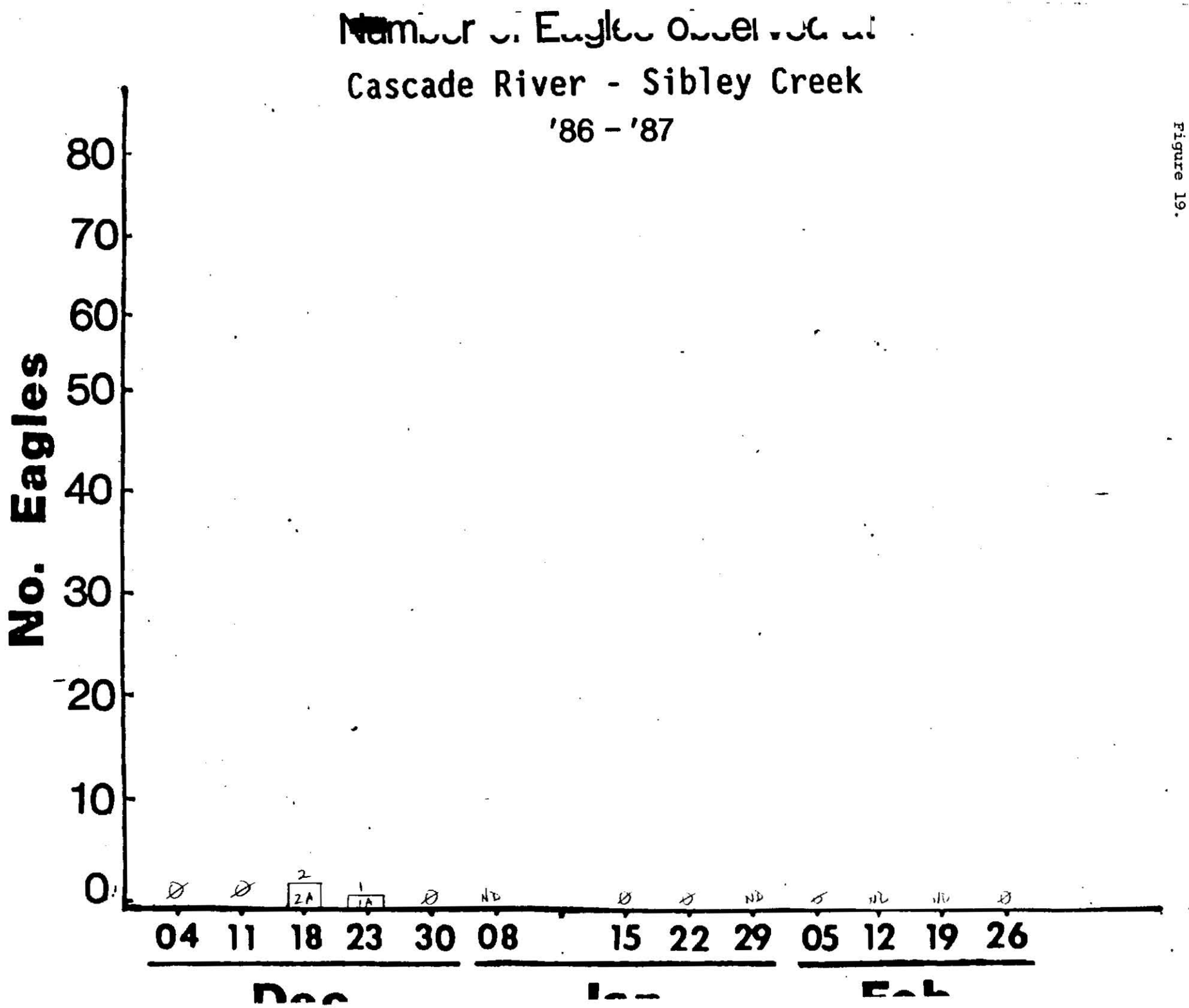

Number of Eagles observed at
Cascade River - Sibley Creek
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
2
2A
1
1A
ND
ND
ND
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec
Jan
Feb

Figure 19.

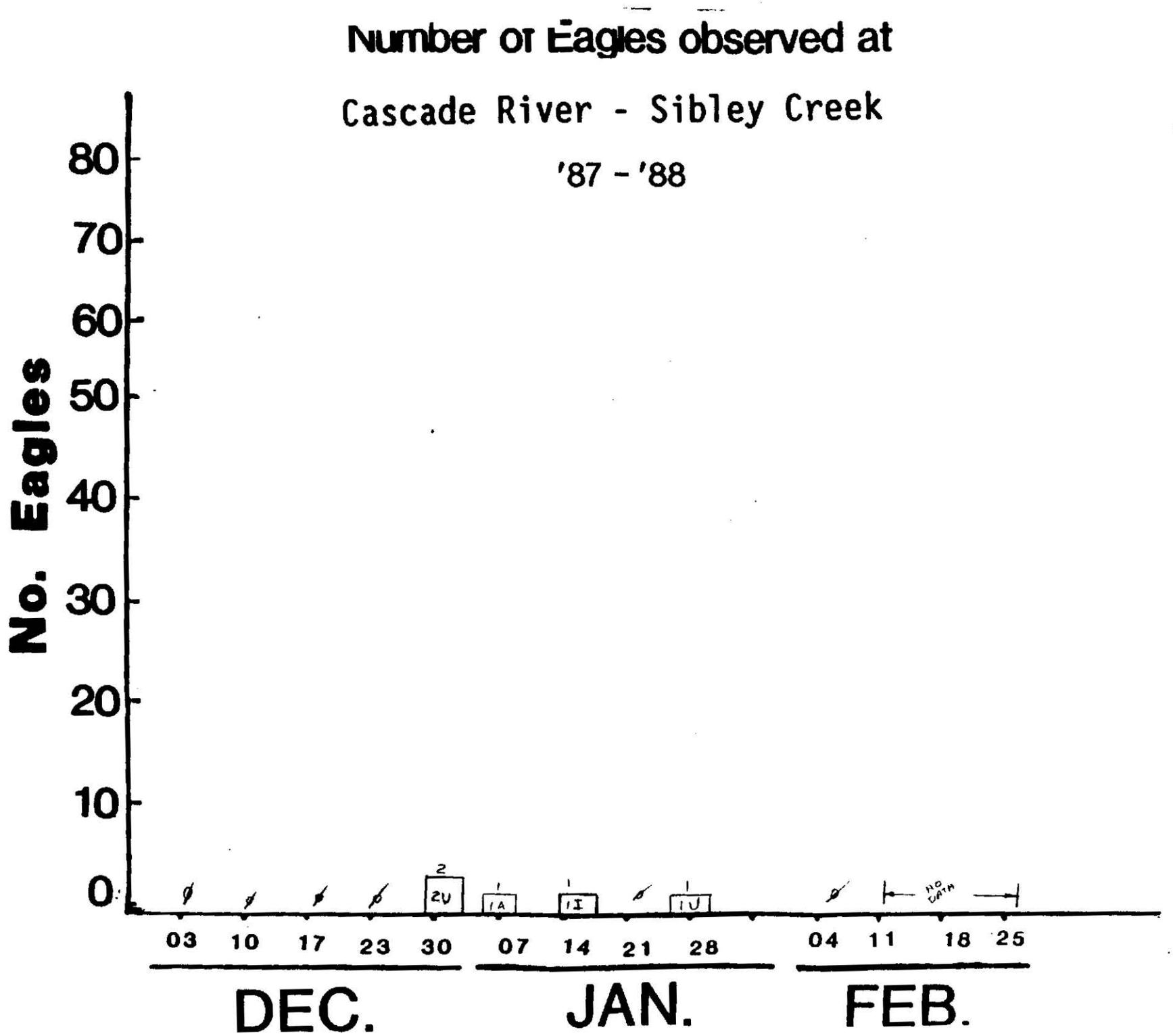

Number of Eagles observed at
Cascade River - Sibley Creek
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
2
2U
1A
1I
1U
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Figure 20.

Number of Eagles observed at

Cascade River - Irene Creek Overlook

'86 - '87

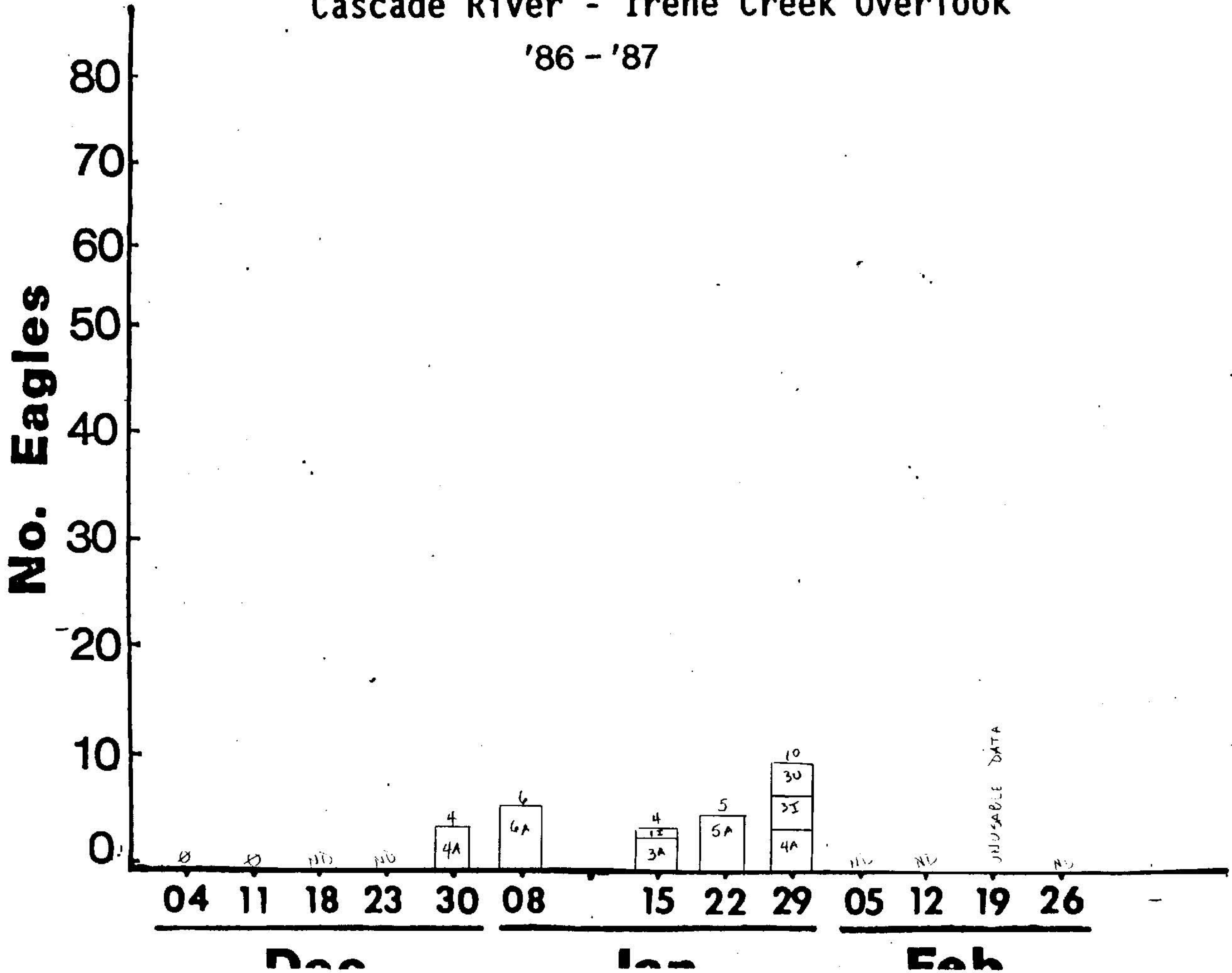


Figure 21.

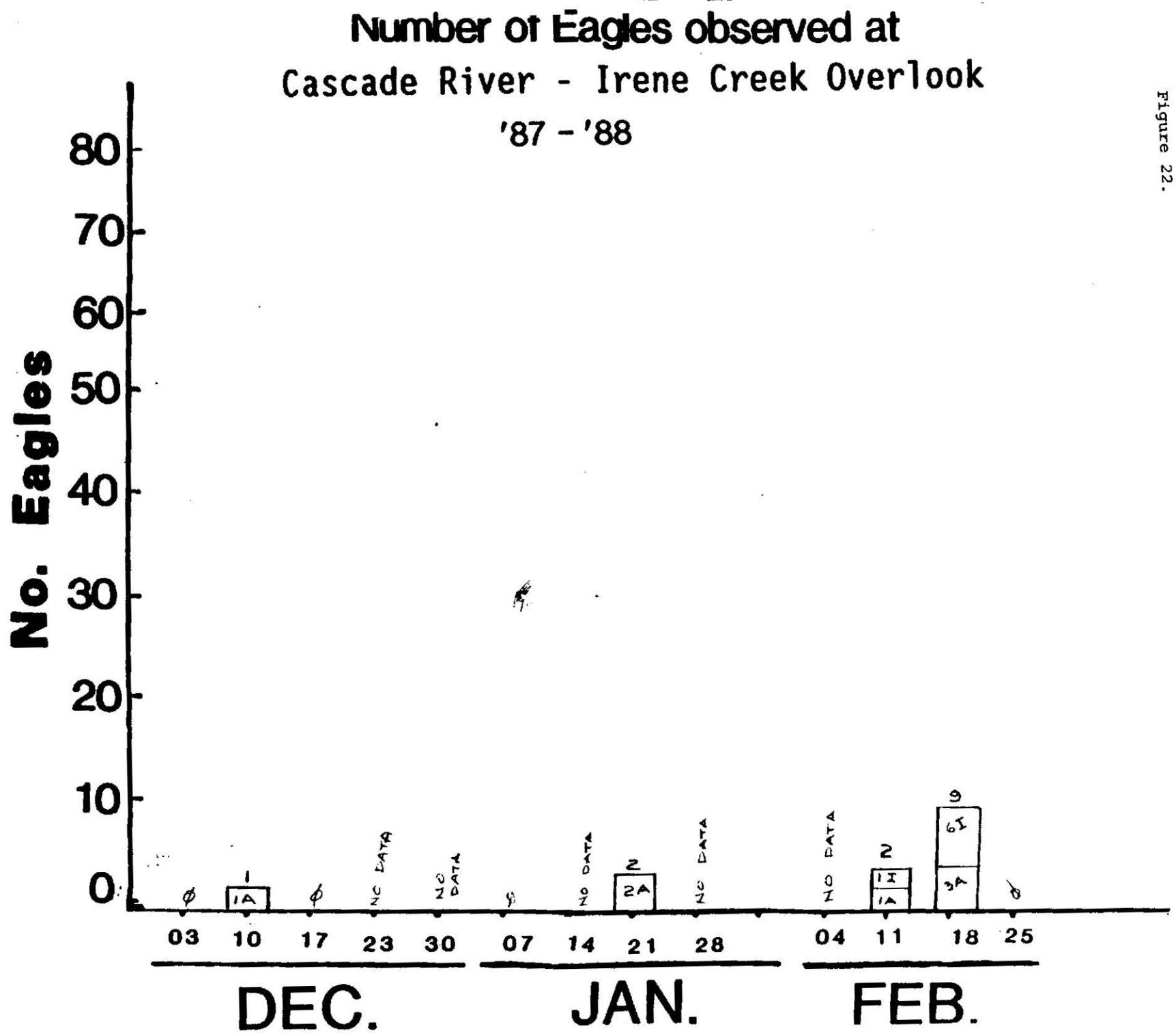

Number of Eagles observed at
Cascade River - Irene Creek Overlook
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
1
1A
2
2A
NO DATA
9
6A
3A
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 22.

Number of Eagles Observed at

Bacon Creek

'86 - '87

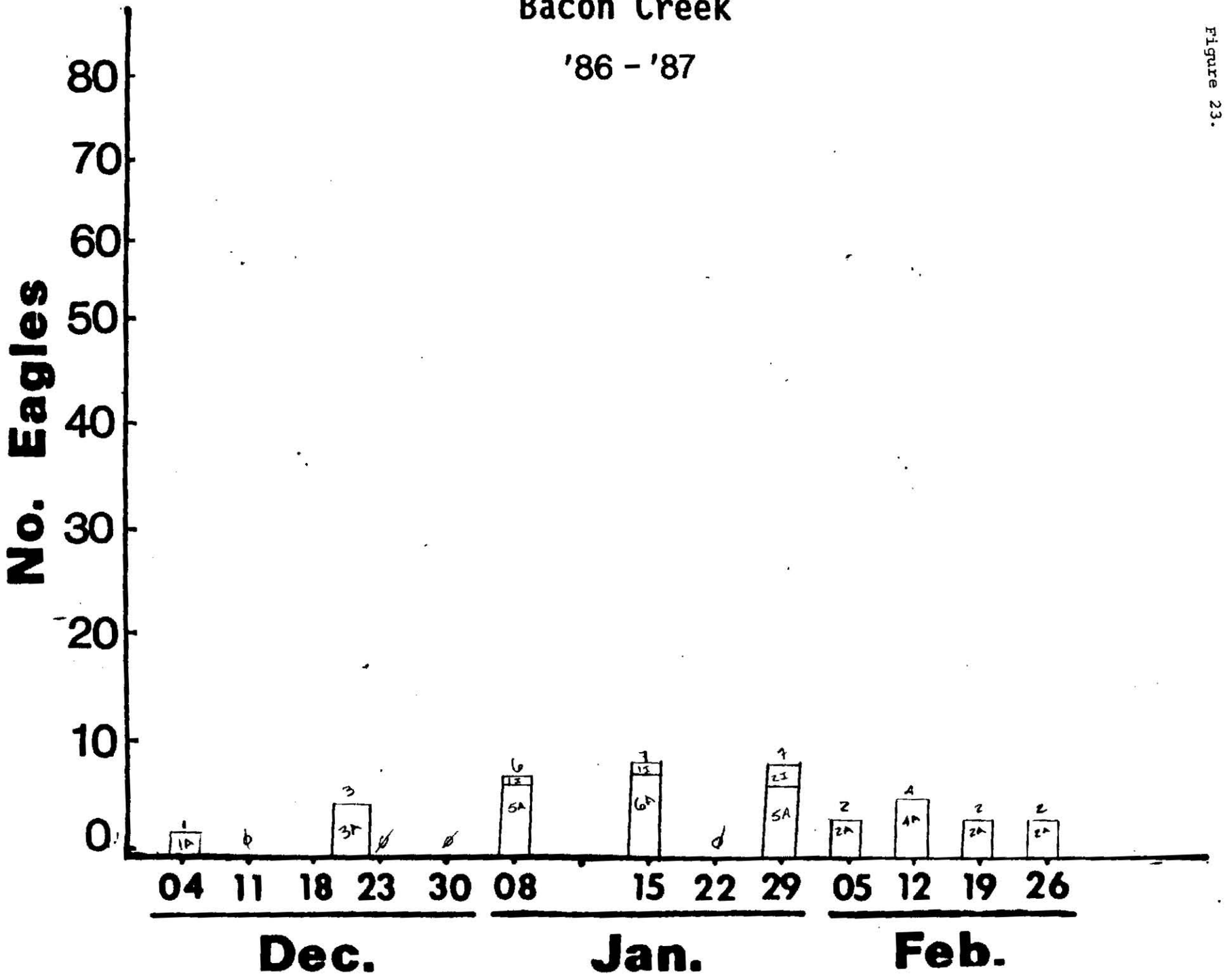


Figure 23.

Bald Eagles Observed Flying up Bacon Creek in Relation to Sunset '86 - '87

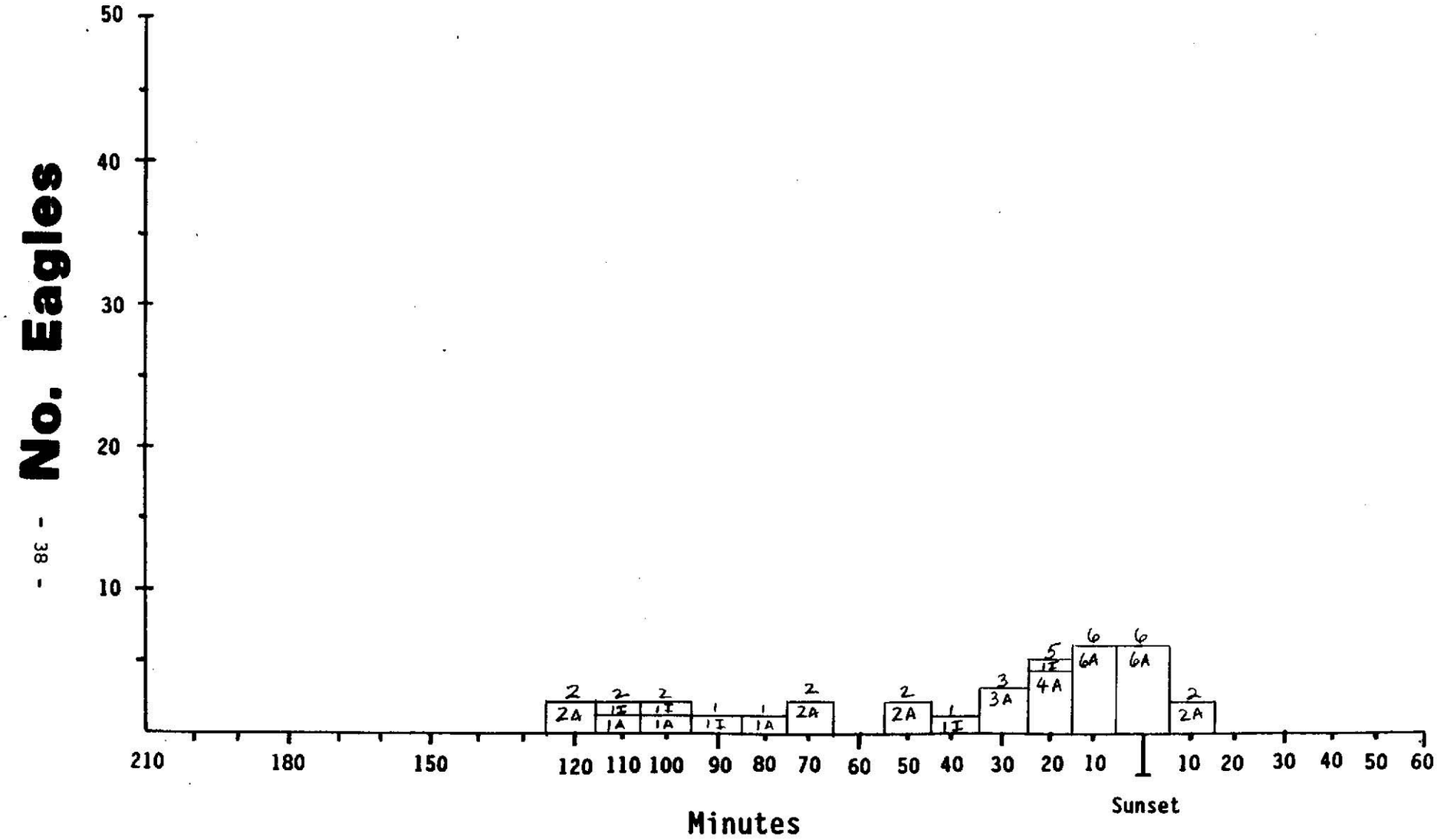


Figure 24.

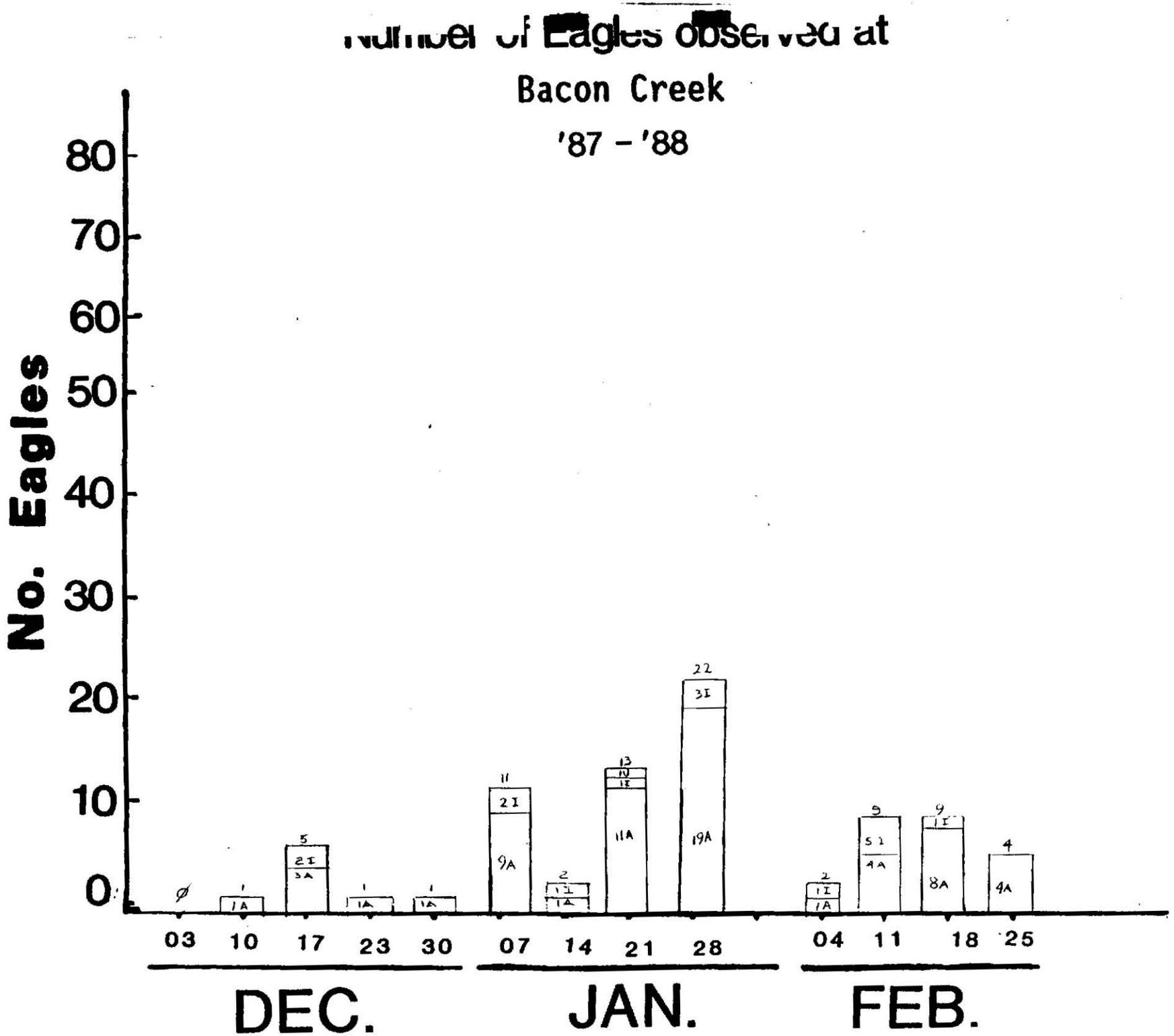

Number of Eagles observed at
Bacon Creek
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 25.

Bald Eagles Observed Flying up Bacon Creek in Relation to Sunset '87 - '88

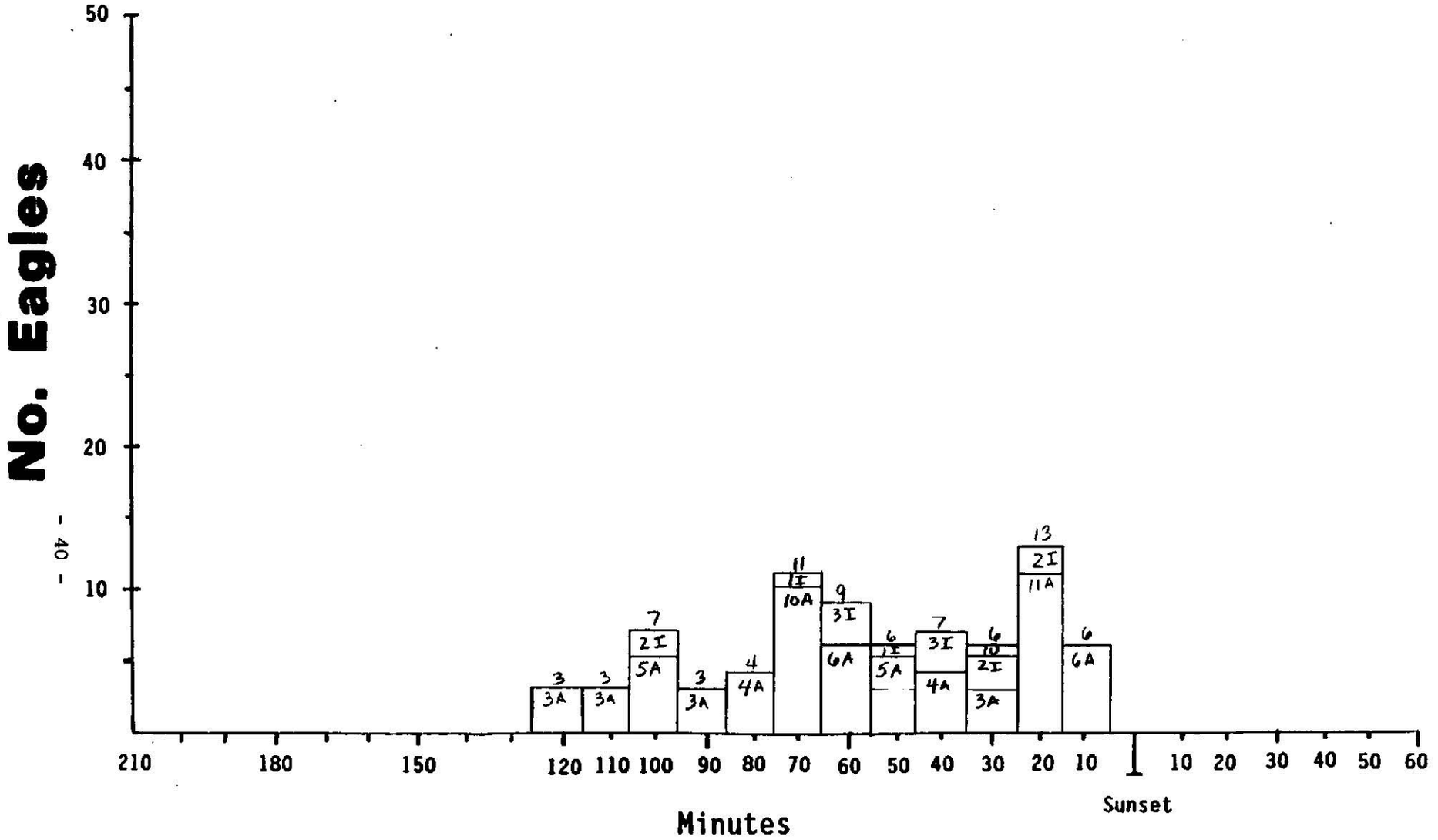


Figure 26.

again at 15-25 minutes before sunset. No activity was reported after sunset (Fig. 27).

7. Olson Creek

This site was surveyed during 10 observation dates totalling 20 person-hours. A total of 7 eagles (4 immatures and 3 unknowns) was reported (Fig. 28).

During the 1987-88 survey, 6 observation dates were conducted totalling 16 person-hours. Only 2 eagles (1 immature and 1 unknown) were observed, but there is no data for December and half of January due to a lack of available observers (Fig. 29).

8. Corkindale

Observation during the 1986-87 survey comprised 13 dates and 36 person-hours. A total of 16 eagles (10 adults, 1 immatures and 5 unknowns) was observed at this site (Fig. 30).

The 1987-88 survey conducted 13 observation dates totalling 39 person-hours. Peak eagle observations occurred on December 23 with 11 eagles (5 adults, 5 immatures and 1 unknown) and January 7 with 22 eagles (2 adults, 8 immatures and 12 unknowns) constituting 5.4 and 10.7% of the TNC count, respectively. A total of 57 eagles (21 adults, 20 immatures and 16 unknowns) was reported (Fig. 31).

9. Corkindale Powerline

This site was added to the 1987-88 survey, but little data was recorded due to a lack of available observers. Observations were conducted on 5 dates totalling 15 person-hours. A peak of 2 eagles was observed on February 4 (1 adult and 1 immature), February 11 (1 adult and 1 immature), and February 18 (2 adults) yielding 1.8, 2.2, and 3.8% of the TNC daily count, respectively. These were the only 6 eagles observed at this site (Fig. 32).

10. Rocky Creek

This site was added to give a different perspective to the north of Corkindale Roost in the 1987-88 survey. No eagles were observed during the 6 observation dates which totalled 16 person-hours. Observers were not available throughout the survey for this lower priority site.

11. Illabot Creek

Observations were conducted on 11 dates for a total of 55 person-hours during the 1986-87 survey. A total of 217 eagles (121 adults, 61 immatures and 35 unknowns) was observed with peak observations on December 30 with 48 eagles (23 adults, 8 immatures and 11 unknowns), January 22 with 36 eagles (22 adults, 13 immatures and 1 unknown), January 29 with 53 eagles (31 adults, 20 immatures and 2 unknowns), and February 5 with 26 eagles (13 adults, 12 immatures and 1 unknown) (Fig. 33). These peak observations comprised 39.7, 23.2, 29.8, and 31.3% of the TNC counts for the same dates. Eagle activity began at 140 minutes prior to sunset and ended approximately 30 minutes after sunset. Peak

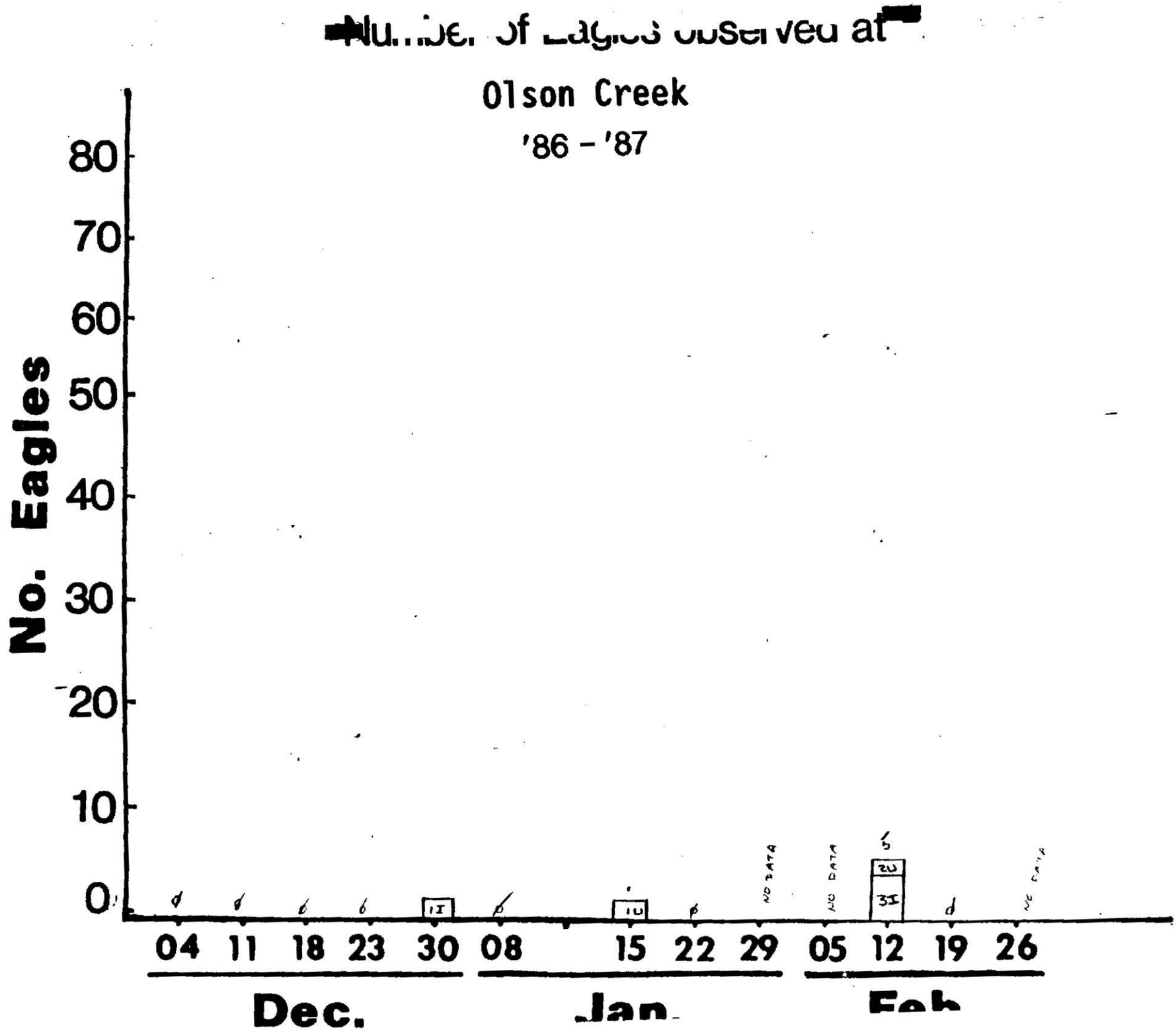

Number of Eagles observed at
Olson Creek
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
11
6
6
6
6
11
6
10
6
NO DATA
NO DATA
5
20
31
6
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Figure 27.

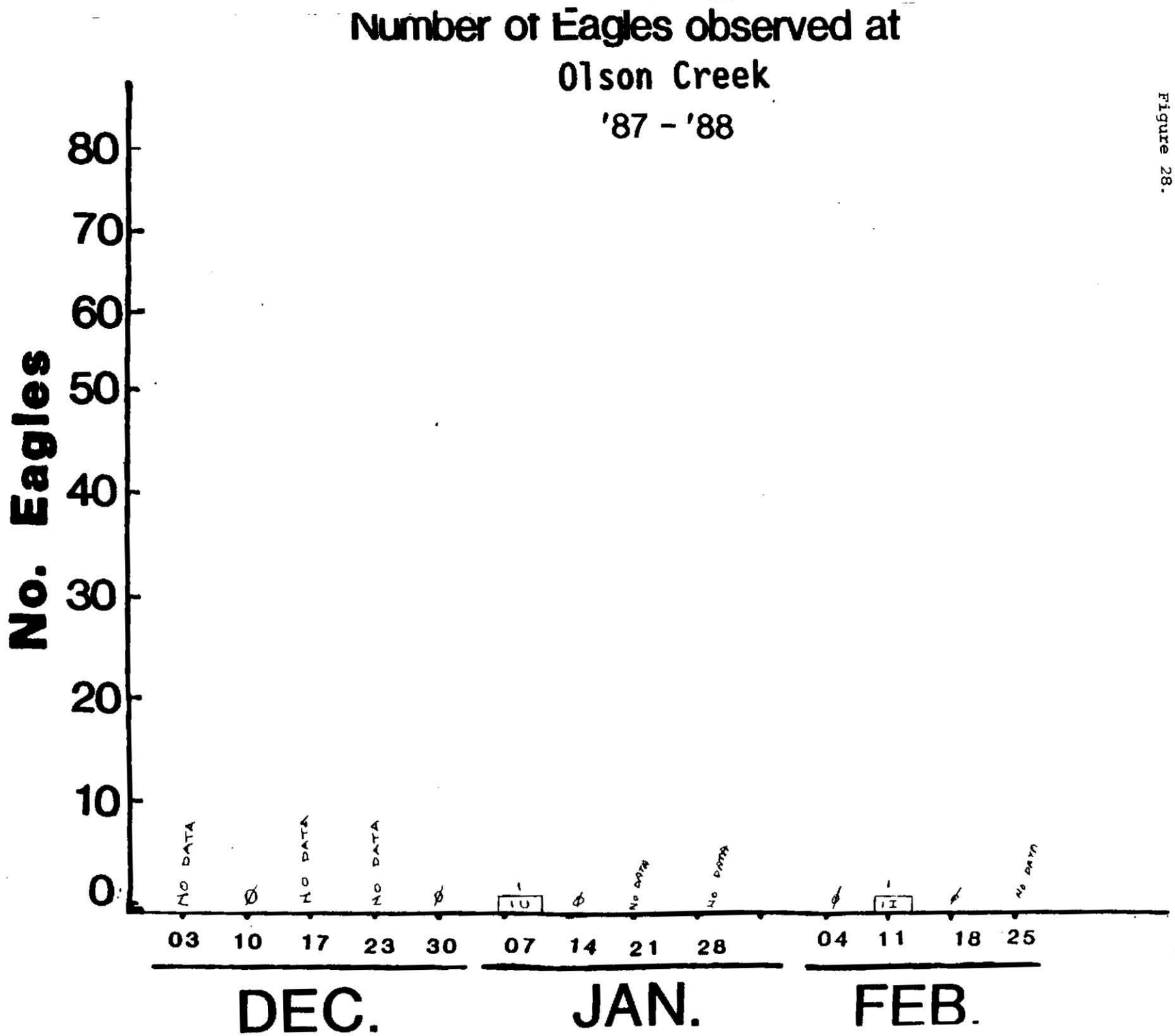

Number of Eagles observed at
Olson Creek
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
Ø
NO DATA
NO DATA
Ø
1
Ø
NO DATA
NO DATA
Ø
1
Ø
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 28.

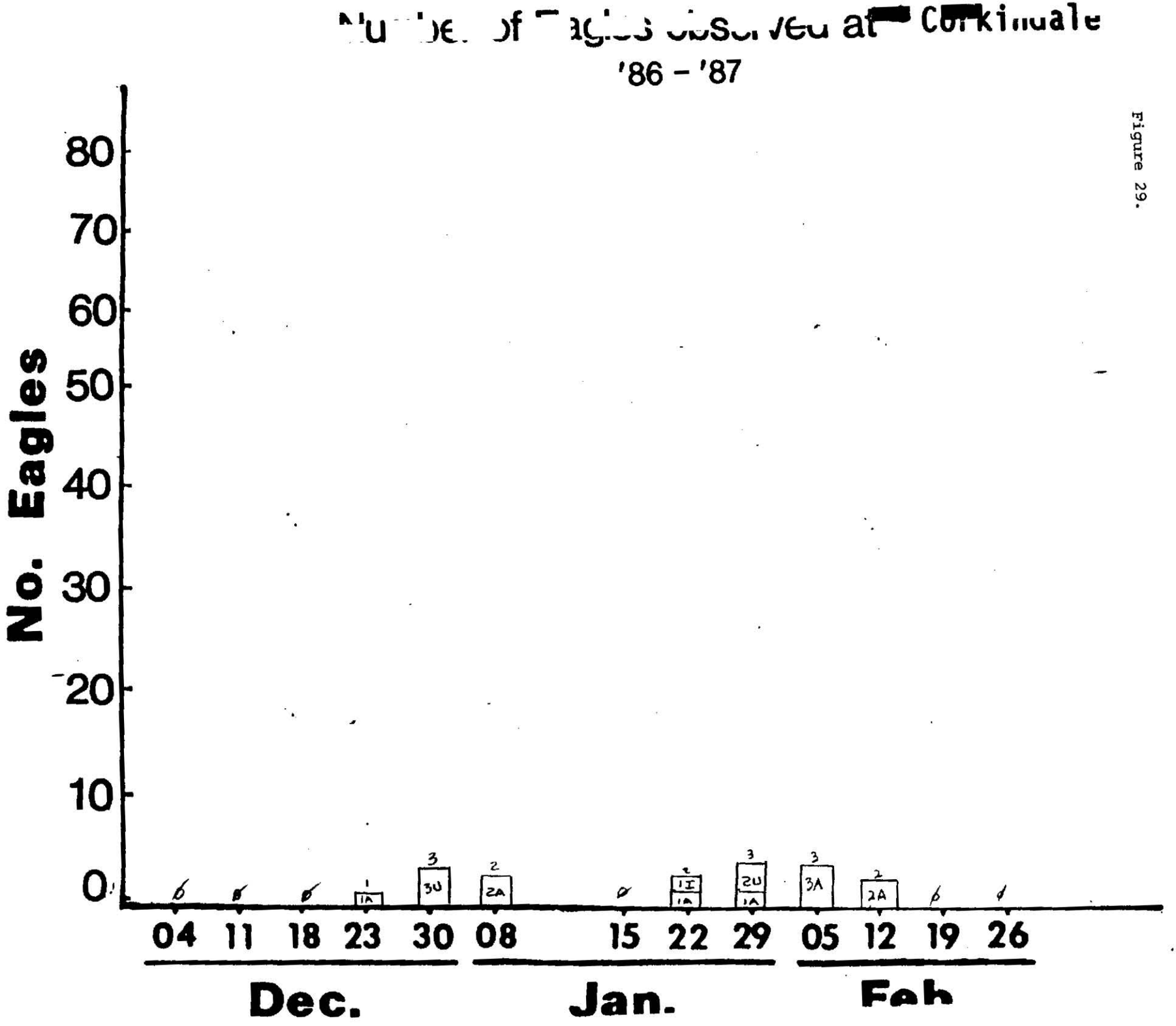
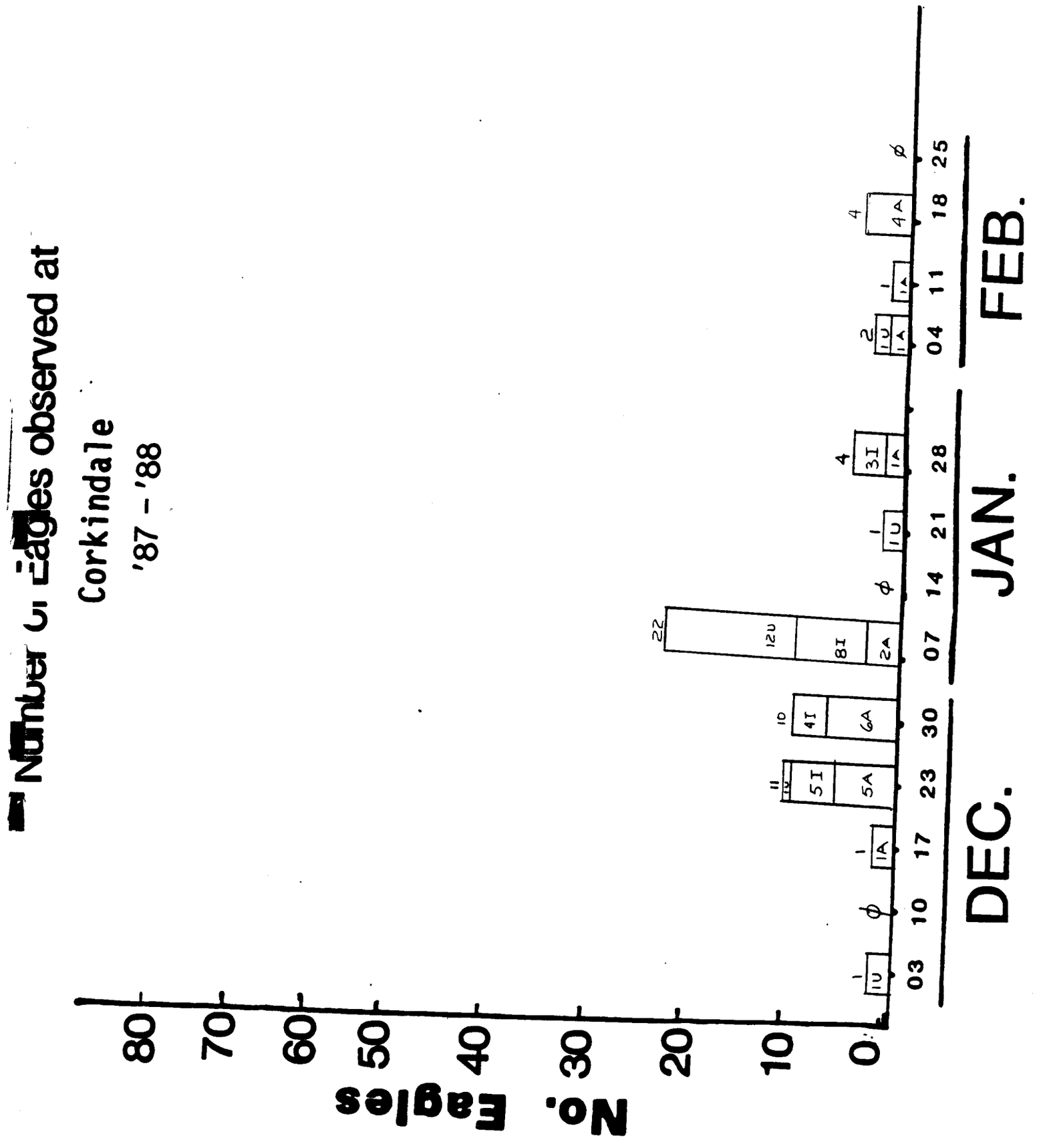

Number of Eagles observed at [redacted] Corkindale
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
3
3U
2
2A
2
1A
3
2U
1A
3
3A
2
2A
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb

Figure 29.

Figure 30.


Number of Eagles observed at
Corkindale
'87 - '88
No. Eagles
0
10
20
30
40
50
60
70
80
DEC.
JAN.
FEB.
03
10
17
23
30
07
14
21
28
04
11
18
25

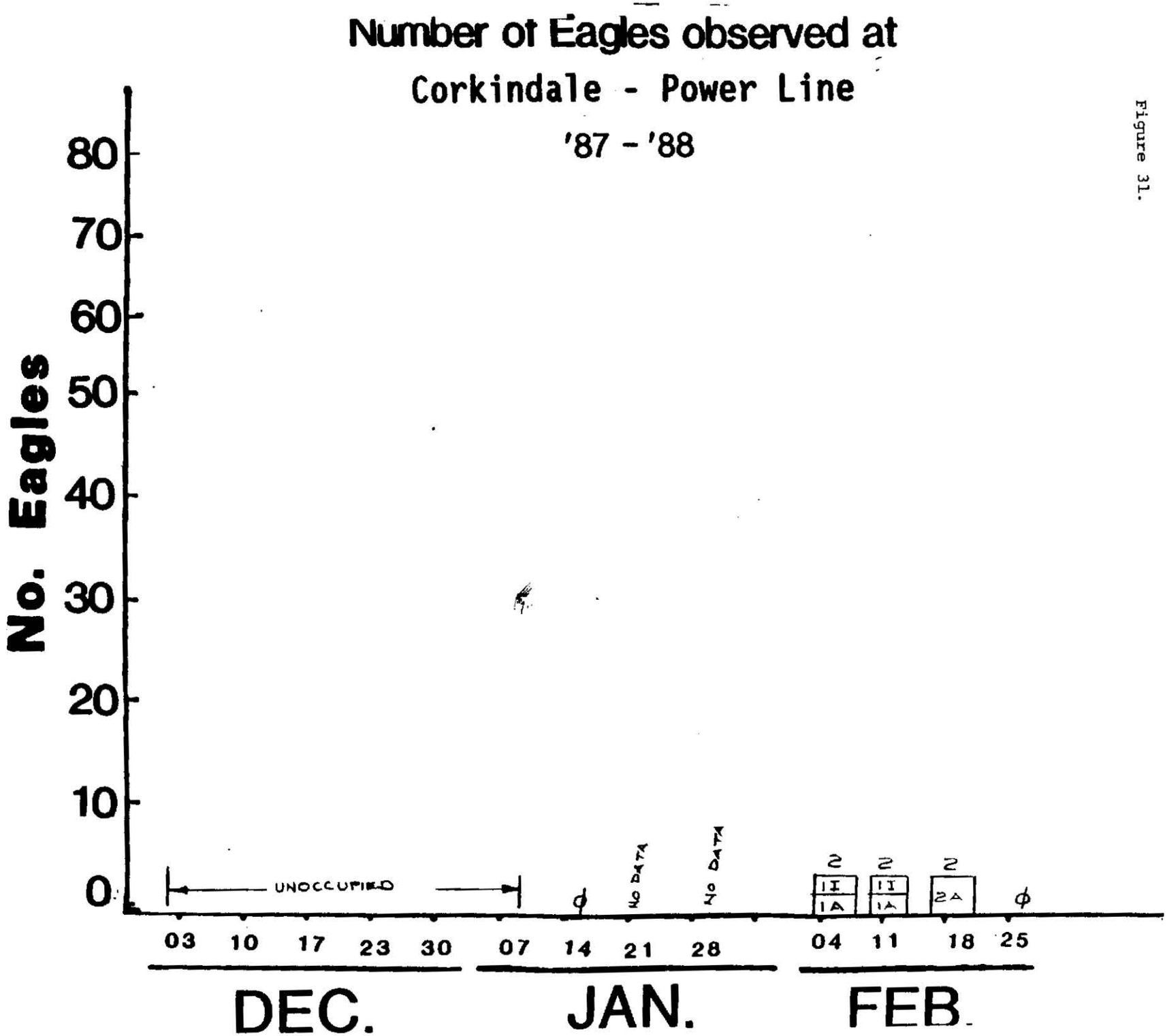

Number of Eagles observed at
Corkindale - Power Line
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
UNOCCUPIED
ϕ
NO DATA
NO DATA
2
1I
1A
2
1I
1A
2
2A
ϕ
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 31.

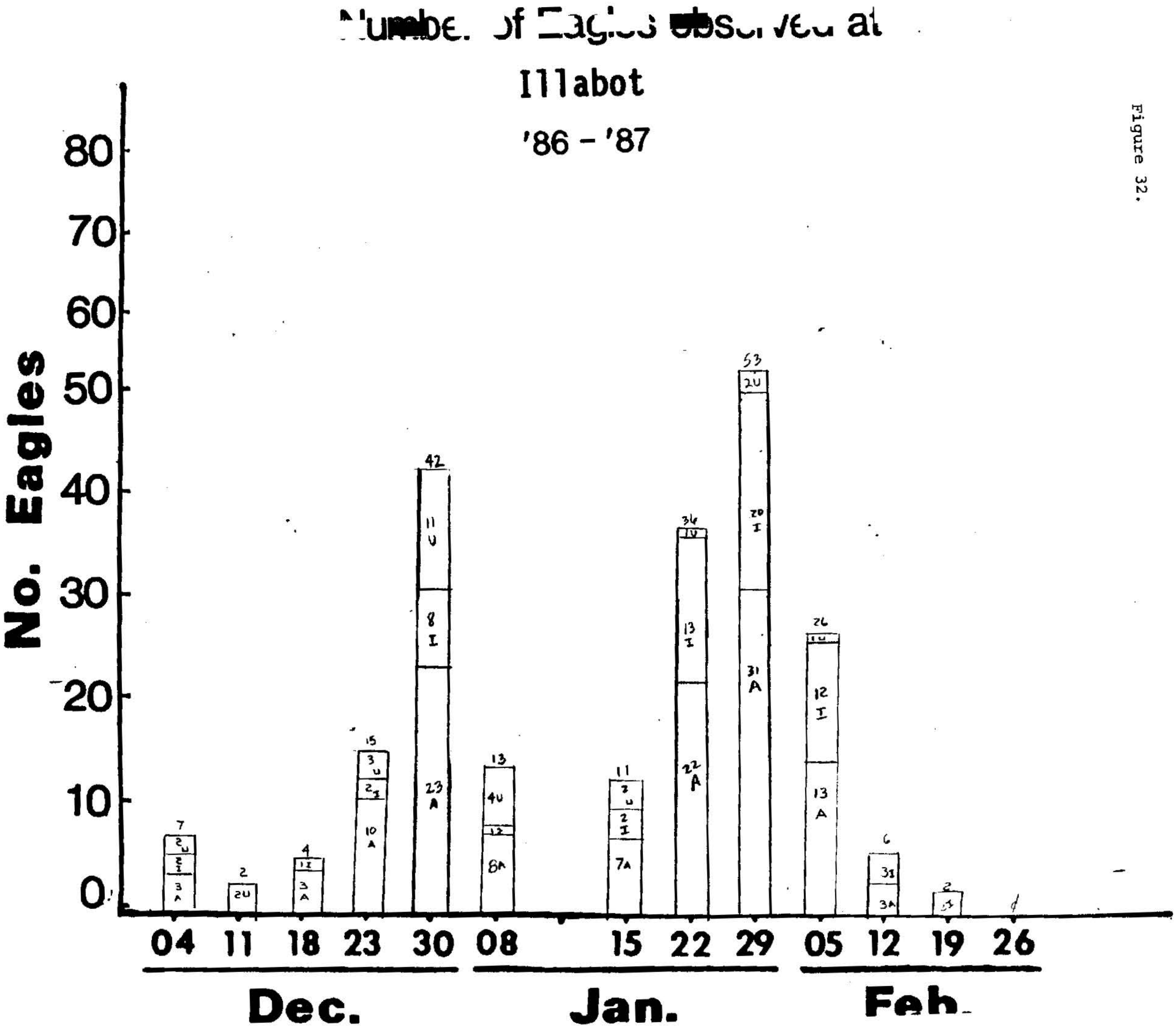

Number of Eagles observed at
Illabot
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
04
11
18
23
30
08
15
22
29
05
12
19
26
Dec.
Jan.
Feb.
7
2
4
15
42
13
11
34
53
26
6
2

Figure 32.

Bald Eagles Observed Flying up Illabot in Relation to Sunset '86 - '87

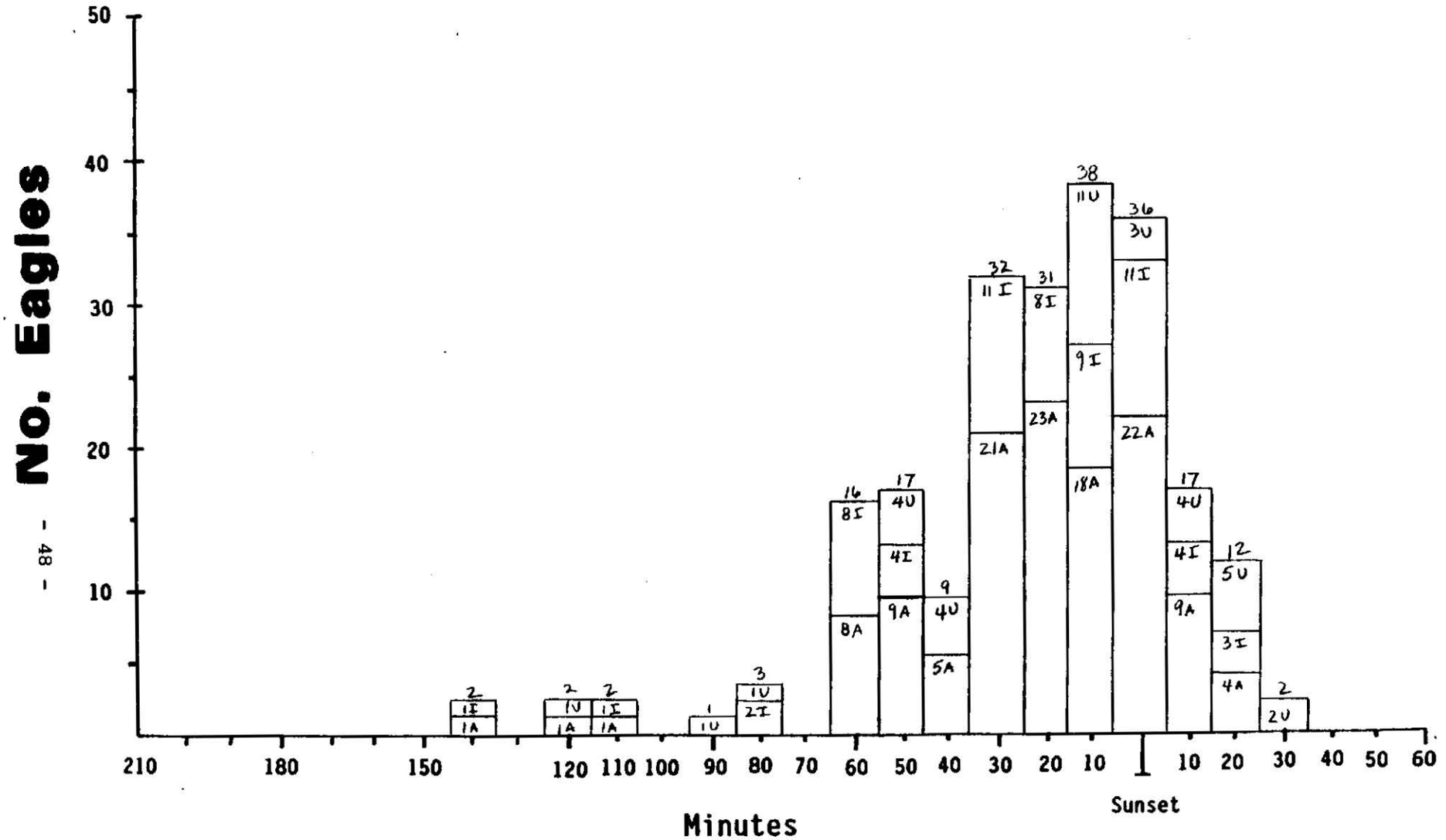


Figure 33.

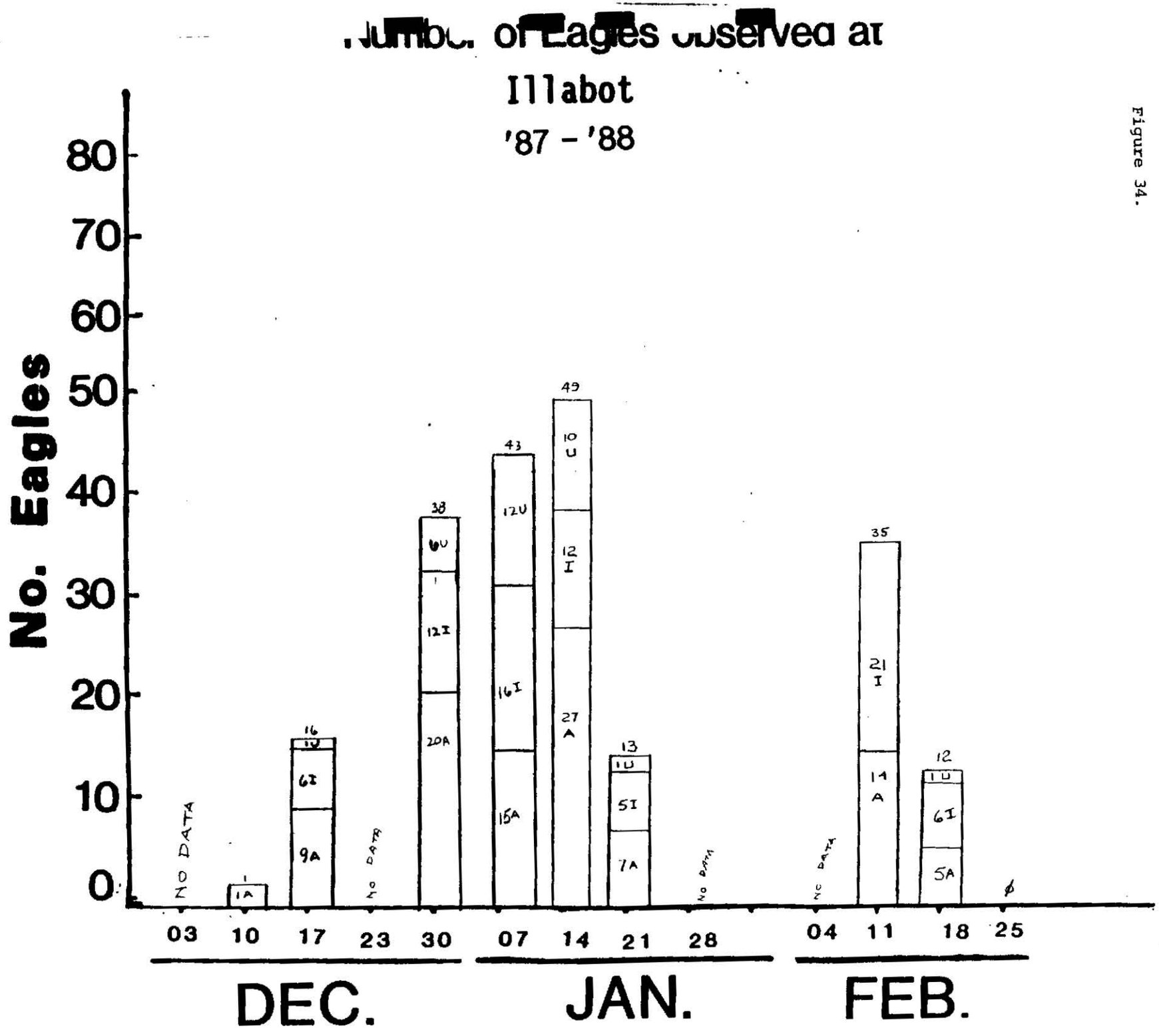

Number of Eagles observed at
Illabot
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
1A
16
1U
6I
9A
NO DATA
38
6U
1
12I
20A
43
12U
16I
15A
49
10 U
12 I
27 A
13
1U
5I
7A
NO DATA
NO DATA
35
21 I
14 A
12
1U
6I
5A
ϕ
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 34.

Bald Eagles Observed Flying up Illabot in Relation to Sunset '87 - '88

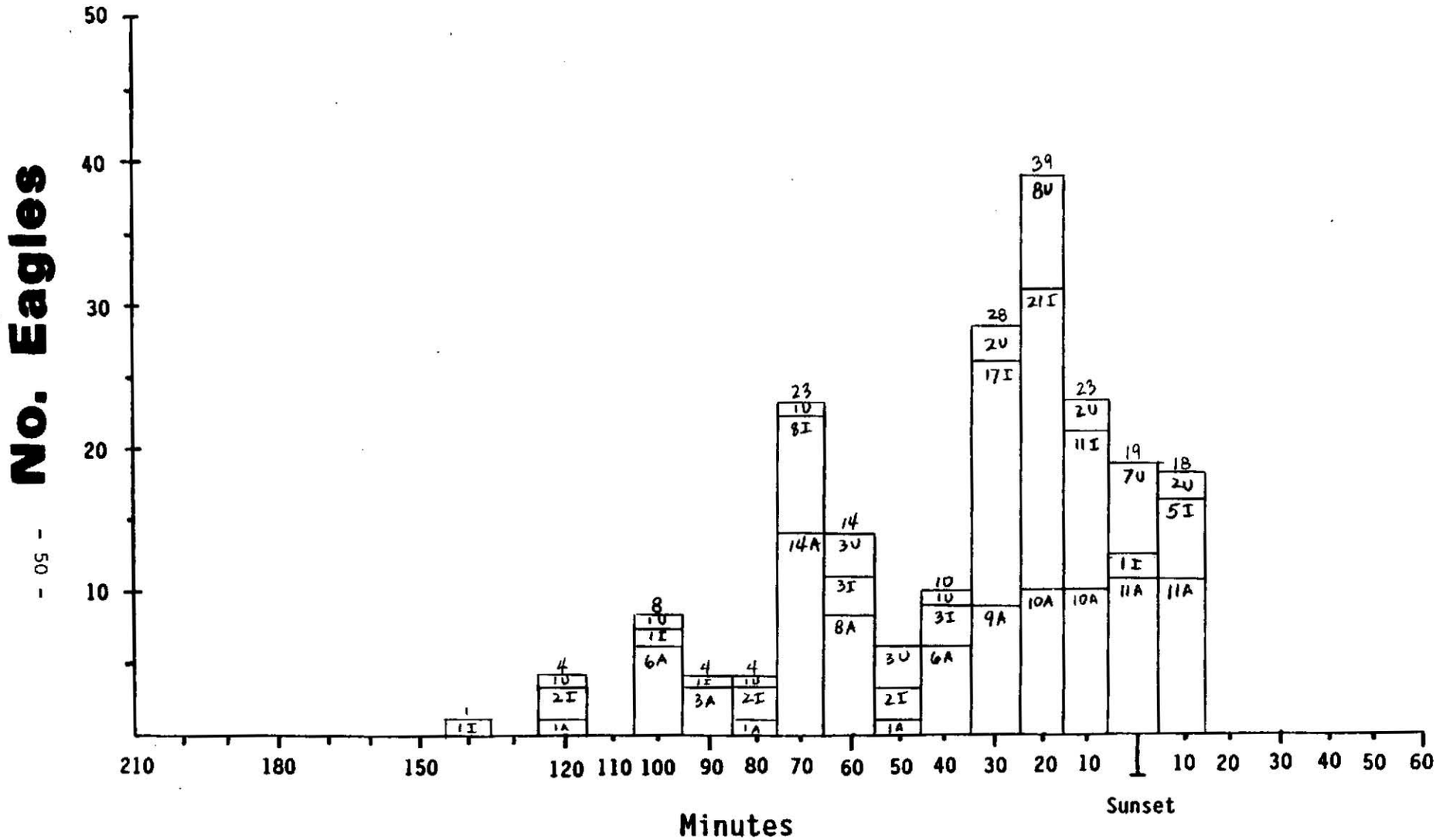


Figure 35.

activity began at 35 minutes before sunset and continued until 5 minutes after sunset (Fig. 34).

The 1987-88 survey conducted observations on 9 dates comprising 34 person-hours. Peak observations yielded 16 eagles (9 adults, 6 immatures and 1 unknown) on December 17; 38 eagles (20 adults, 12 immatures, and 6 unknowns) on December 30; 43 eagles (15 adults, 16 immatures and 12 unknowns) on January 7; 49 eagles (27 adults, 12 immatures and 10 unknowns) on January 14; 35 eagles (14 adults and 21 immatures) on February 11 and 12 eagles (5 adults, 6 immatures and 1 unknown) on February 18. These observations comprised 17.2, 12.0, 20.9, 18.8, 38.5, and 22.6% of the TNC counts for these dates, respectively. Total eagles observed was 201 eagles (91 adults, 78 immatures and 32 unknowns) (Fig. 35). Eagle activity ranged from 145 minutes before sunset to 25 minutes after sunset. Peak activity occurred at 70 minutes before sunset, but the greatest activity occurred from 25 minutes prior to sunset until 25 minutes after sunset (Fig. 36).

12. Mile Post 100

Eagles were observed on all 13 observation dates, totalling 56 person-hours, during the 1986-87 survey. A total of 326 eagles (173 adults, 48 immatures, and 105 unknowns) was observed, which comprised 23.8% of the TNC total eagle count for the winter (Fig. 37). Peak observations consisted of 179 eagles (61 adults, 23 immatures and 95 unknowns) on December 30, 21 eagles (16 adults, 3 immatures and 2 unknowns) on January 8, 27 eagles (23 adults, 3 immatures and 1 unknown) on January 29, and 18 eagles (12 adults, 3 immatures and 3 unknowns) on February 5. The 179 eagles comprised 147.9% of the TNC count. The other observations equalled 11.7, 15.2, and 21.7% of the TNC count, respectively. Eagle activity at this site occurred over a very wide span of time from 210 minutes before sunset to 35 minutes after sunset (Fig. 38). There were three distinct periods of peak activity. The first occurred at 125-115 minutes prior to sunset, the second took place at 85-75 minutes before sunset and the third period lasted from 15 minutes before sunset to 5 minutes after sunset.

Observations were conducted on 13 dates consisting of 69 person-hours during the 1987-88 survey. Fewer eagles were observed at this site than during the previous survey. A total of 206 eagles (119 adults, 69 immatures and 18 unknowns) was observed (Fig. 39). Peak observations occurred on December 17 with 18 eagles (12 adults, 5 immatures and 1 unknown), December 23 with 26 eagles (19 adults and 7 immatures), January 7 with 38 eagles (27 adults and 11 immatures), January 21 with 30 eagles (16 adults and 14 immatures), and February 25 with 10 eagles (4 adults and 6 unknowns). These observations equalled 19.4, 12.7, 18.4, 16.3, and 41.7% of the TNC counts, respectively. Total eagle observations comprised 11.5% of the total TNC count, which is down from the previous survey's total of 23.8%. There was an increase in the total number of eagles counted by the TNC during this winter's survey. The FS count for this site was 36.8% less than the previous survey's count. The lack of available observers makes it difficult to ascertain the reason for this difference. Eagle activity occurred from 185 minutes before sunset to 25 minutes after sunset (Fig. 40). Peak activity was recorded at 120 minutes before sunset, at 90 minutes before sunset, from 45-75 minutes before sunset and at 20 minutes before sunset.

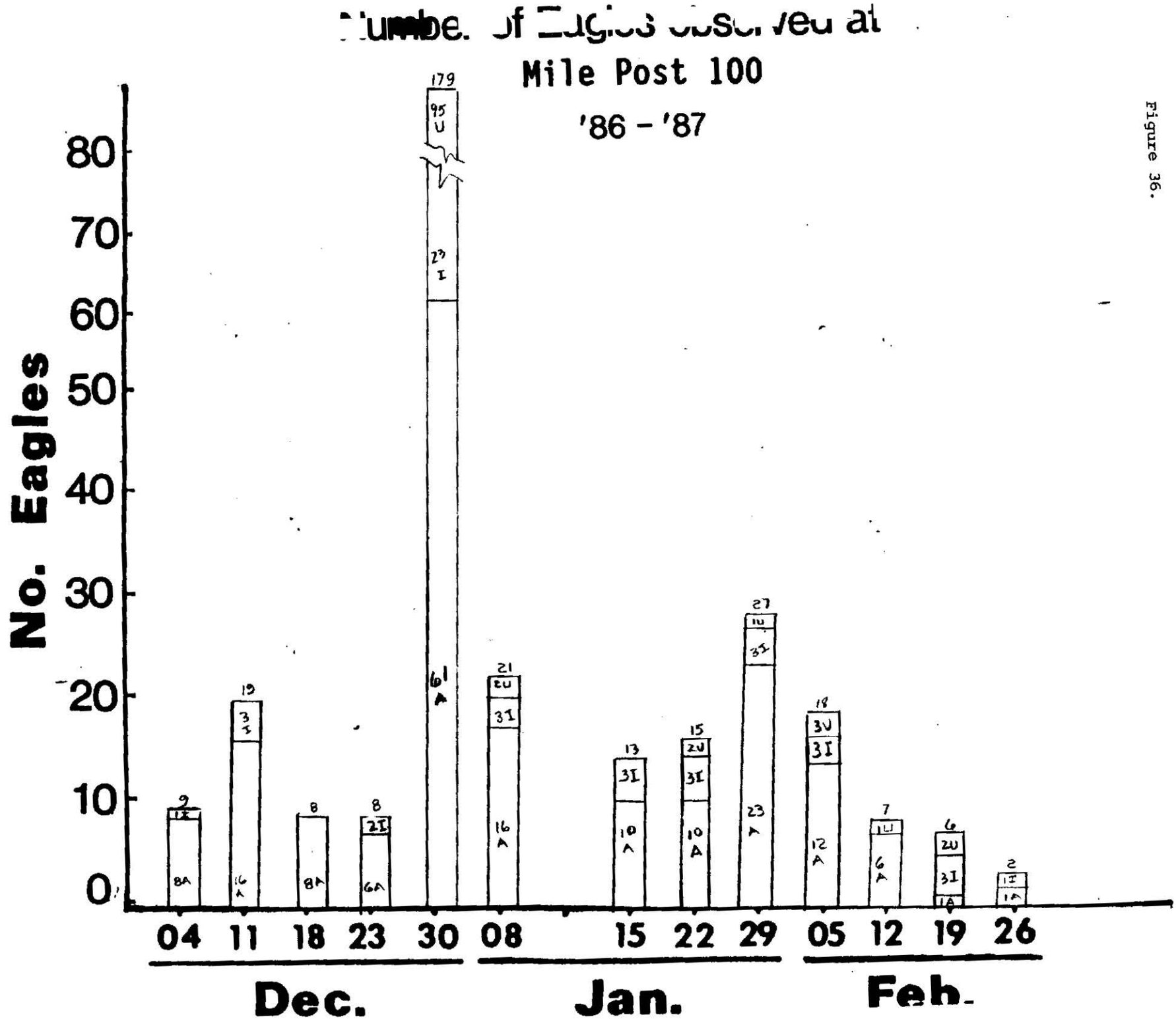

Number of Eagles observed at
Mile Post 100
'86 - '87
No. Eagles
0
10
20
30
40
50
60
70
80
04
11
18
23
30
08
15
22
29
05
12
19
26
Dec.
Jan.
Feb.

Figure 36.

Bald Eagles Observed Flying up Mile Post 100 in Relation to Sunset '86 - '87

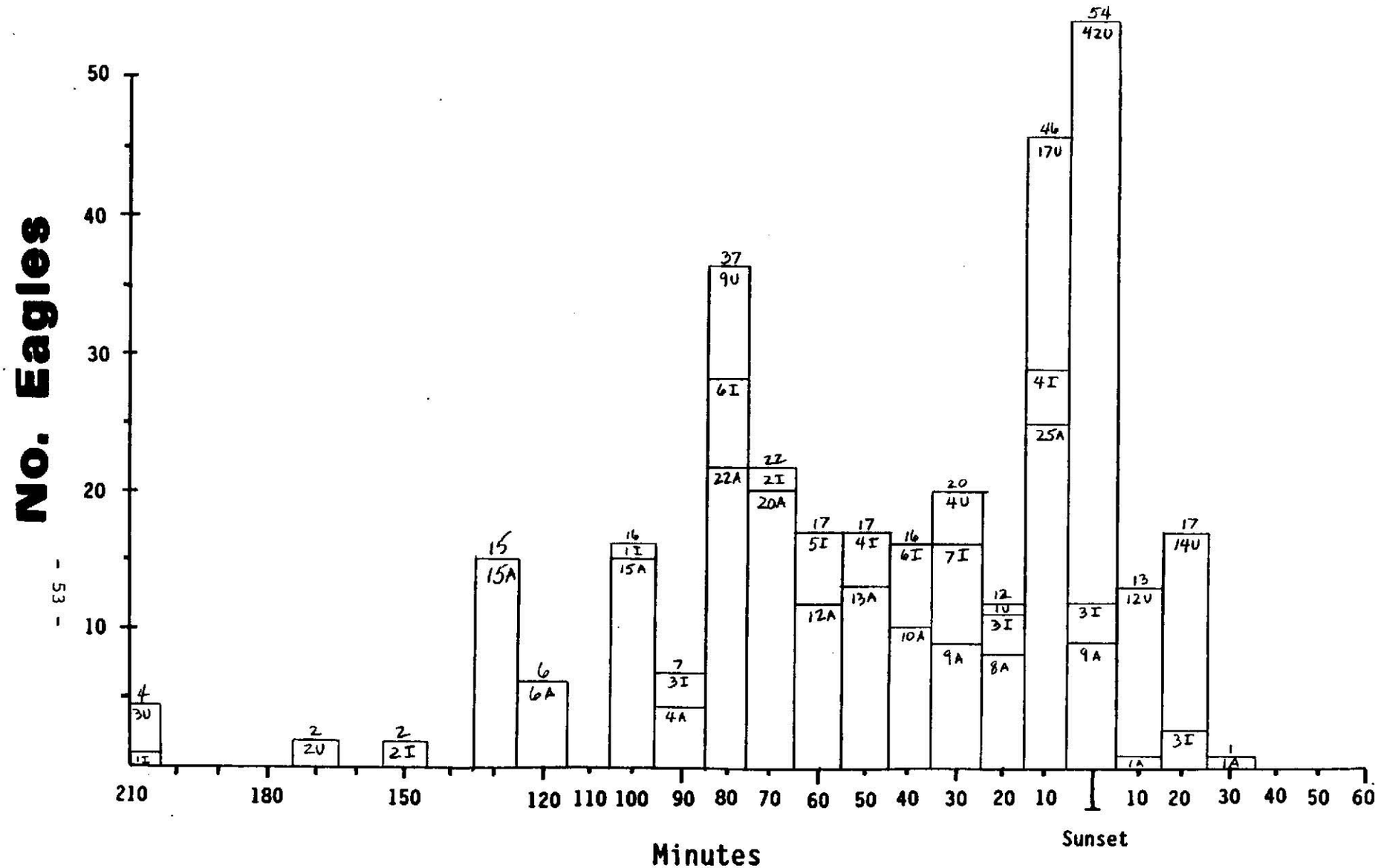


Figure 37.

Number of Eagles observed at
Mile Post 100
'87 - '88

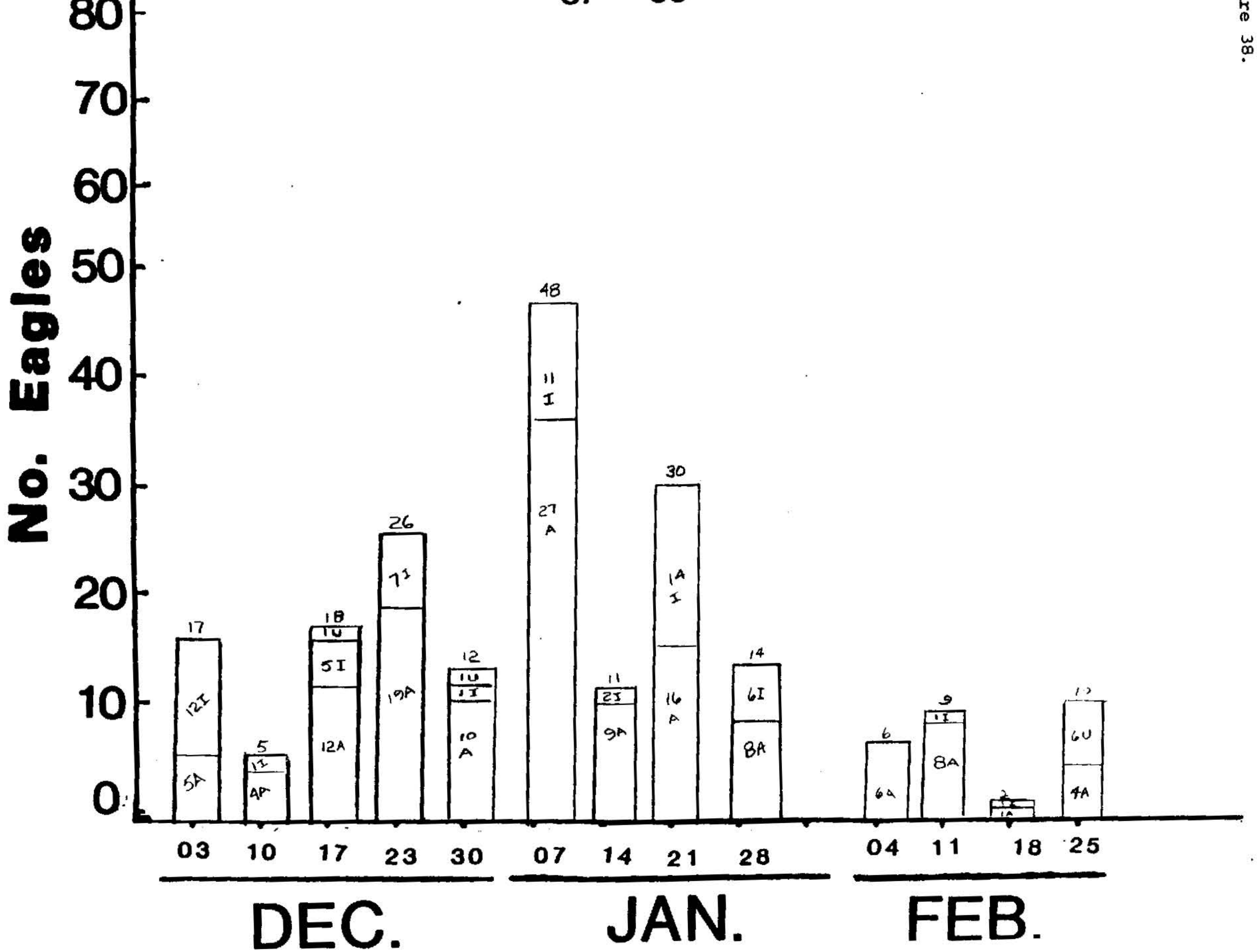


Figure 38.

Bald Eagles Observed Flying up Mile Post 100 in Relation to Sunset '87 - '88

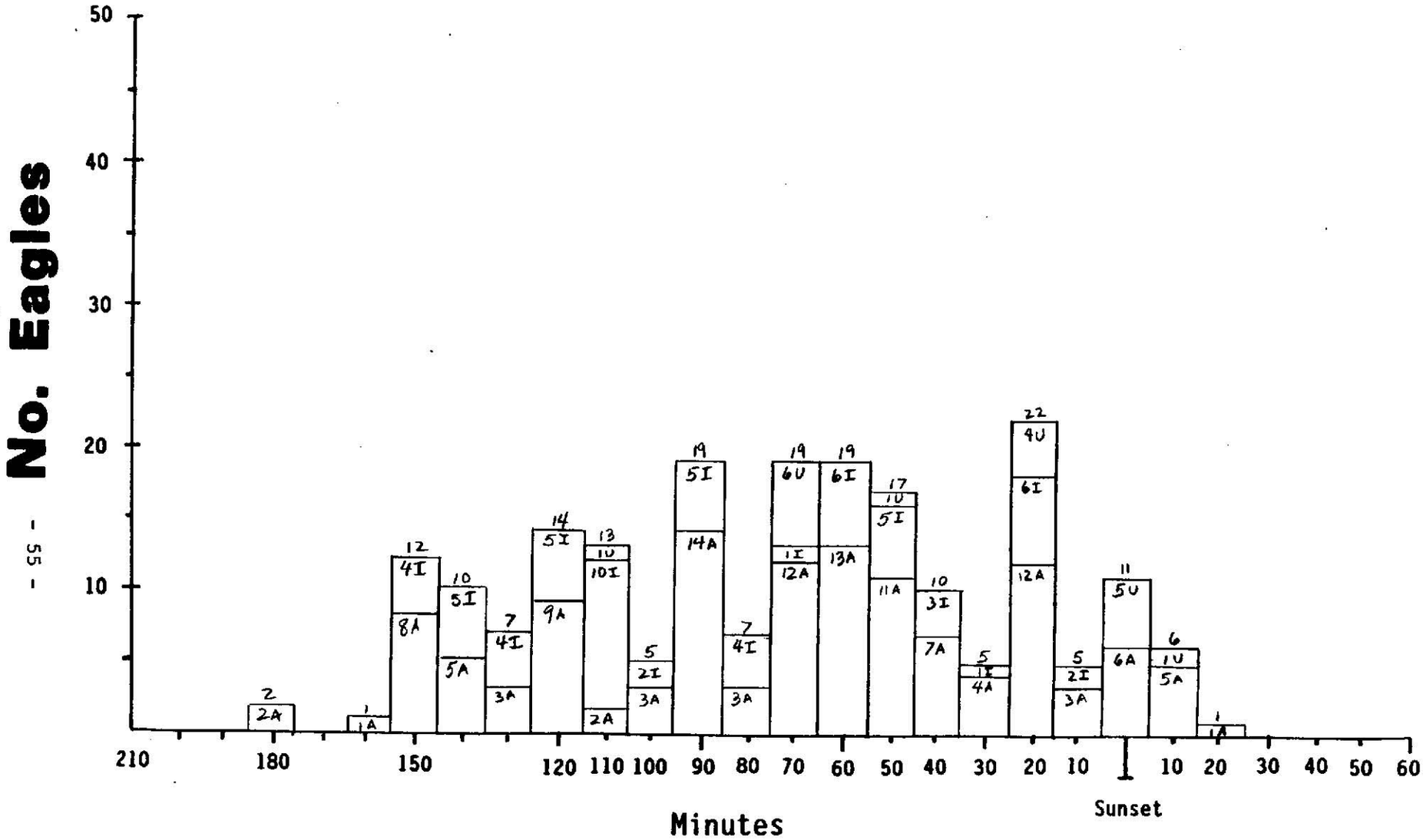


Figure 39.

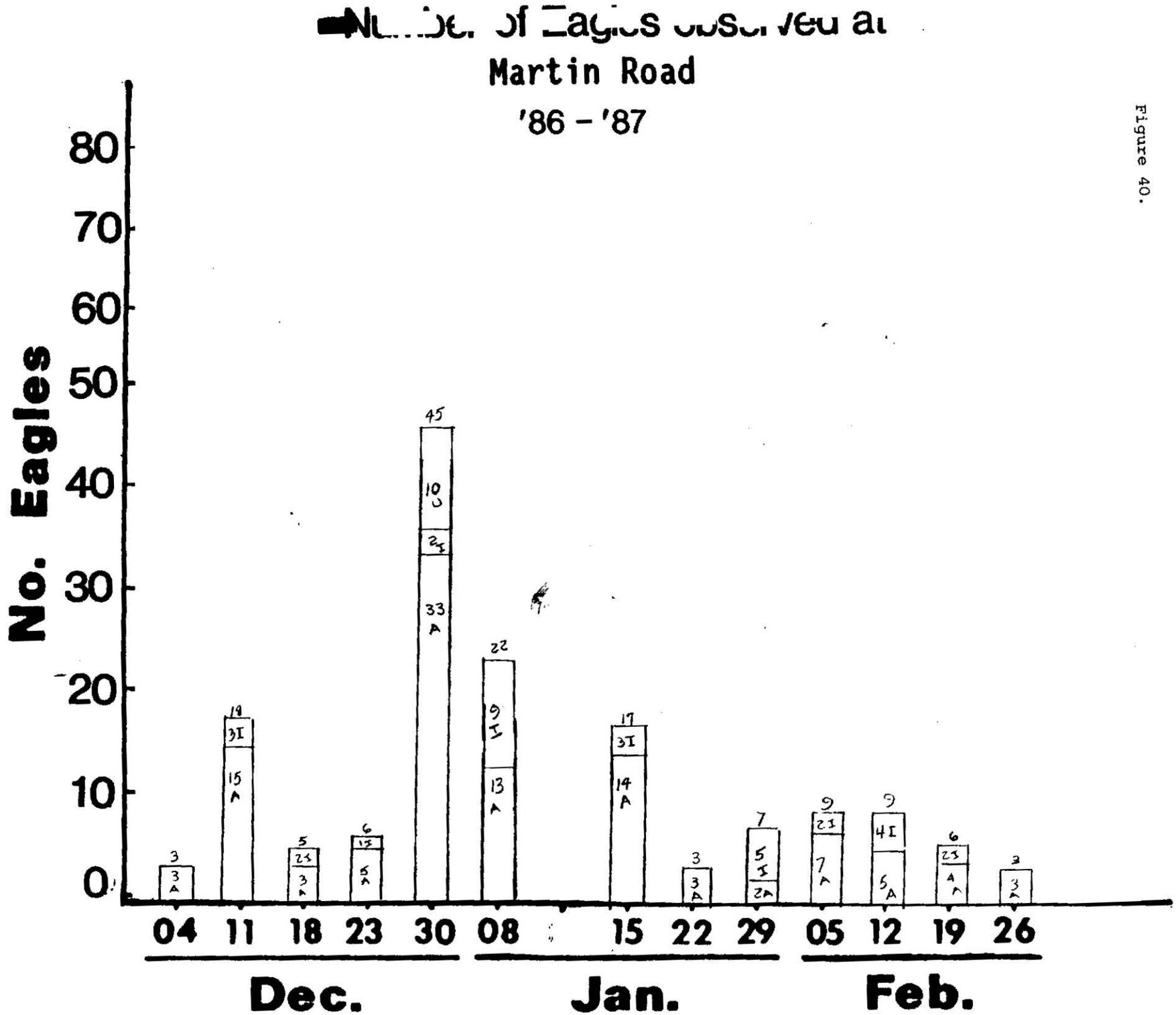

Number of Eagles observed at
Martin Road
'86 - '87
No. Eagles
0
10
20
30
40
50
60
70
80
04
11
18
23
30
08
15
22
29
05
12
19
26
Dec.
Jan.
Feb.

Figure 40.

13. Martin Road

Observations conducted at this site occurred on 13 dates comprising 41 person-hours. A total of 153 eagles (110 adults, 33 immatures and 10 unknowns) was observed (Fig. 41). Peak observations occurred on December 11 with 18 eagles (15 adults and 3 immatures), December 30 with 45 eagles (33 adults, 2 immatures and 10 unknowns), and January 8 with 22 eagles (13 adults and 9 immatures), consti- tuting 24.7, 37.2, and 12.3% of the TNC count.

This site was not surveyed during the winter of 1987-88 due to the absence of the landowner and a lack of available observers.

14. Barnaby Slough

During the 1986-87 survey, observations were conducted on 13 dates, totalling 47 person-hours. A total of 247 eagles (156 adults, 50 immatures and 41 unknowns) was observed (Fig. 42). Peak observations were reported on 6 dates: December 11 had 19 eagles (11 adults, 2 immatures and 6 unknowns), December 23 reported 67 eagles (28 adults, 14 immatures and 25 unknowns), January 8 had 32 eagles (24 adults and 8 immatures) on site, January 22 had 31 eagles (21 adults, 7 immatures and 3 unknowns), January 29 totalled 24 eagles (18 adults and 6 immatures), and February 19 reported 10 eagles (6 adults and 4 immatures) which comprised 26.0, 59.8, 17.9, 20.0, 13.5, and 20.4% of the TNC counts, respectively. The total FS count comprised 18.1% of the total TNC count. Peak eagle activity occurred at 80 minutes before sunset and again from 35 minutes before sunset until 25 minutes after sunset. Activity ranged from 165 minutes before sunset to 25 minutes after sunset (Fig. 43).

Observations were conducted on 13 dates comprising 34 person-hours during the 1987-88 survey. Total eagle observations numbered 433 eagles (341 adults, 73 immatures and 19 unknowns), comprising 24.1% of the total TNC count (Fig. 44). Peak observations occurred on 6 dates: December 17 reported 32 eagles (23 adults, 5 immatures and 4 unknowns), December 30 had 40 eagles (27 adults and 13 immatures), 60 eagles (54 adults and 6 immatures) were reported on January 7, 91 eagles (78 adults, 3 immatures and 10 unknowns) were counted on January 14, January 21 reported 67 eagles (44 adults, 20 immatures and 3 unknowns), and January 28 had 58 eagles (51 adults and 7 immatures). These counts comprised 34.4, 12.7, 29.1, 34.9, 36.4, and 45.3% of the TNC counts for the same dates. Eagle activity began at 180 minutes before sunset and ended at 25 minutes after sunset (Fig. 45). Peak activity occurred at 110 minutes before sunset, at 90 minutes before sunset, and then from 75 minutes before sunset until 15 minutes before sunset, with a small peak at 10 minutes after sunset.

15. Shular Road

During the 1986-87 survey, observations were conducted on 12 dates with a total of 40 person-hours. Observations totalled 103 eagles (26 adults, 29 immatures and 48 unknowns) (Fig. 46). Peak observations recorded 17 eagles (12 adults, 4 immatures and 1 unknown) on December 30, 53 eagles (12 adults, 22 immatures and 19 unknowns) on January 8, and 17 eagles (1 adult, 1 immature and 15 unknowns) on February 12. These observations comprised 14.0, 29.6, and 33.3% of the TNC counts, respectively. Eagle activity ranged from 215 minutes before sunset to 15 minutes after sunset (Fig. 47). Peak activity occurred at 215 minutes before sunset (this peak entailed a group of 15 eagles of unknown

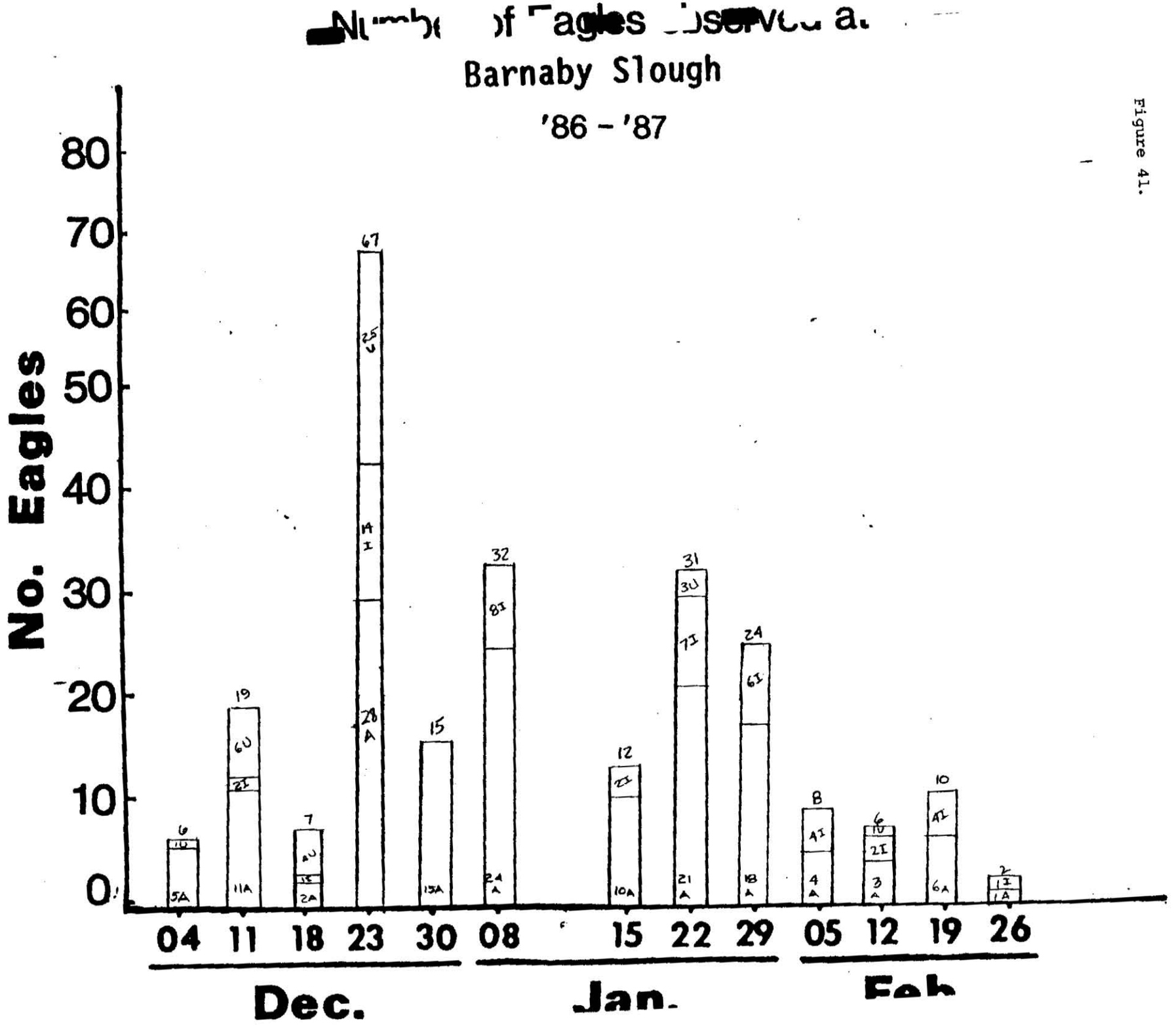

Number of Eagles Observed at
Barnaby Slough
'86 - '87
No. Eagles
0
10
20
30
40
50
60
70
80
04
11
18
23
30
08
15
22
29
05
12
19
26
Dec.
Jan.
Feb

Figure 41.

Bald Eagles Observed Flying up Barnaby in Relation to Sunset '86 - '87

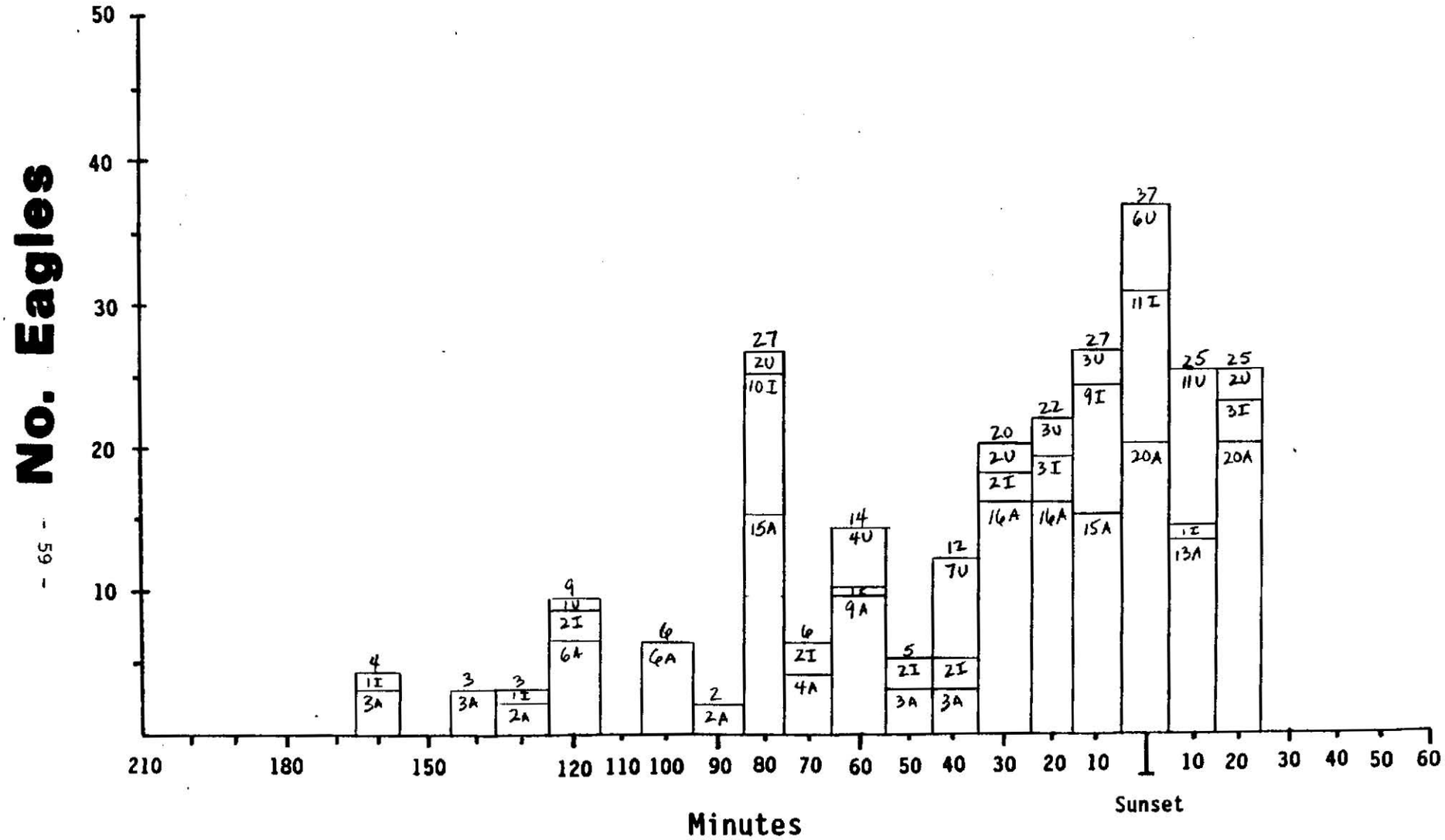


Figure 42.

Number of Eagles observed at Barnaby Slough

'87 - '88

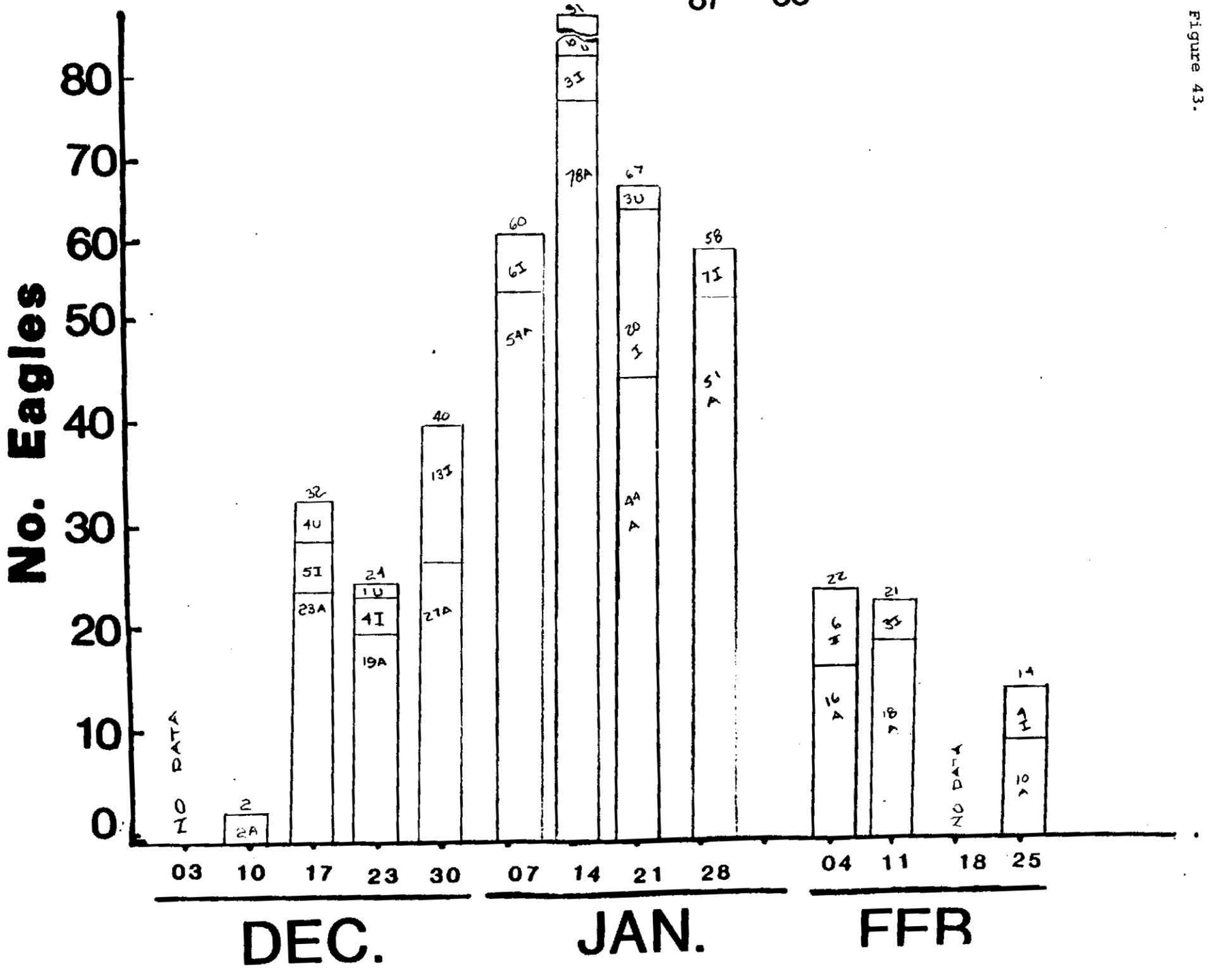


Figure 43.

Bald Eagles Observed Flying up Barnaby in Relation to Sunset '87 - '88

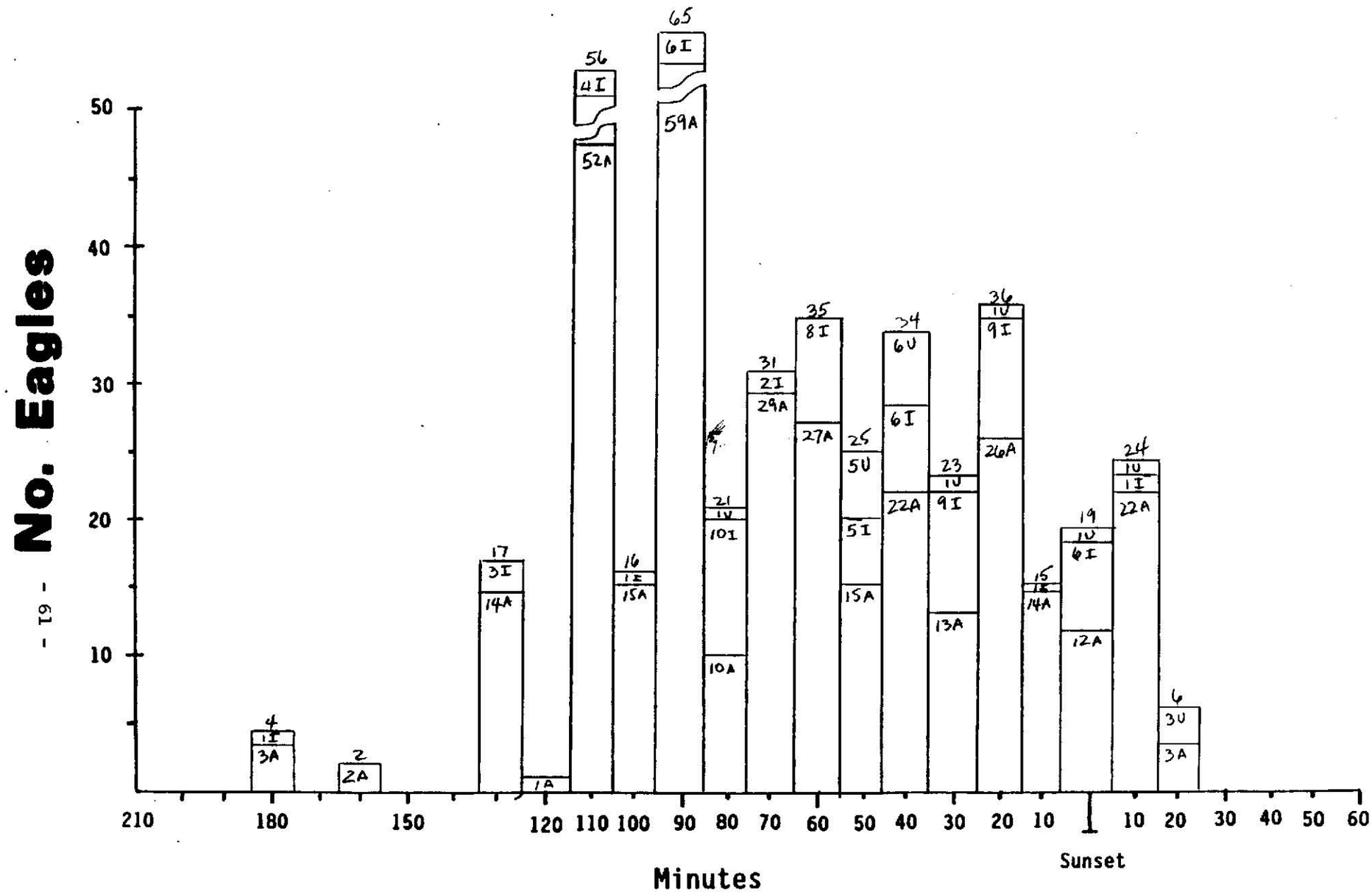


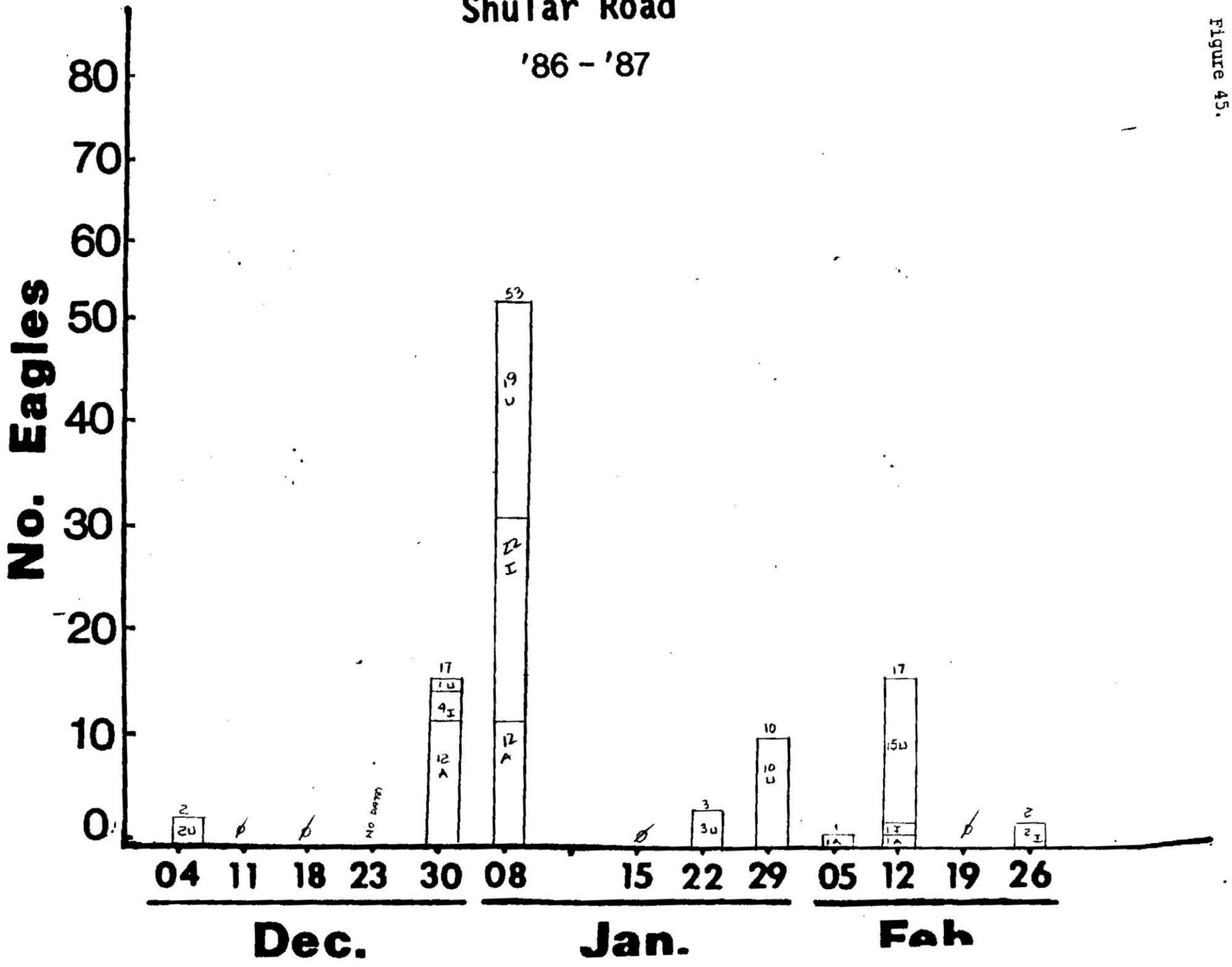
Figure 44.

Figure 45.

Number of Eagles observed at

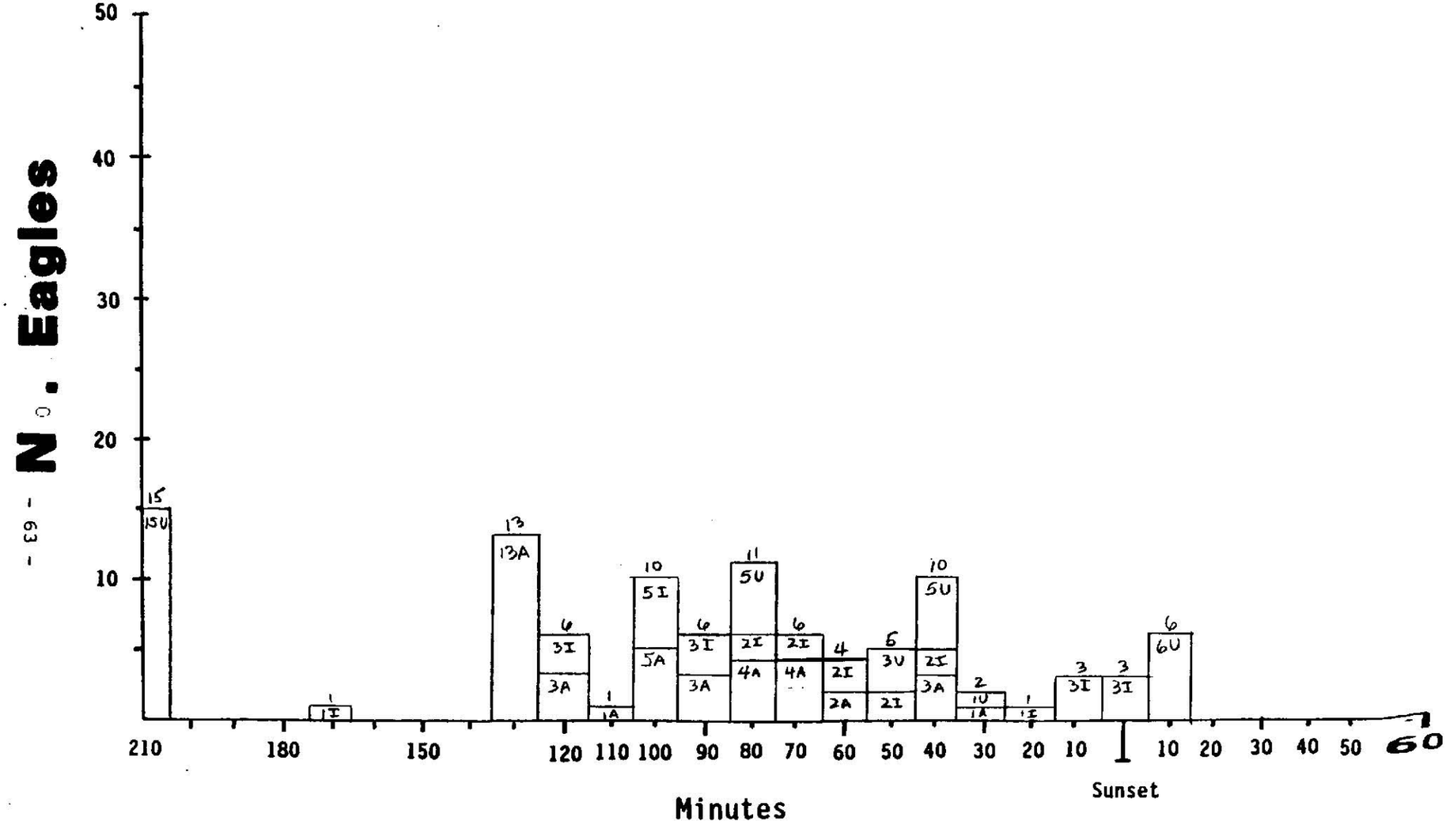
Shular Road

'86 - '87



Bald Eagles Observed Flying up Shular Road in Relation to Sunset '86 - '87

Figure 46.



Number of Eagles observed at

Shular Road

'87 - '88

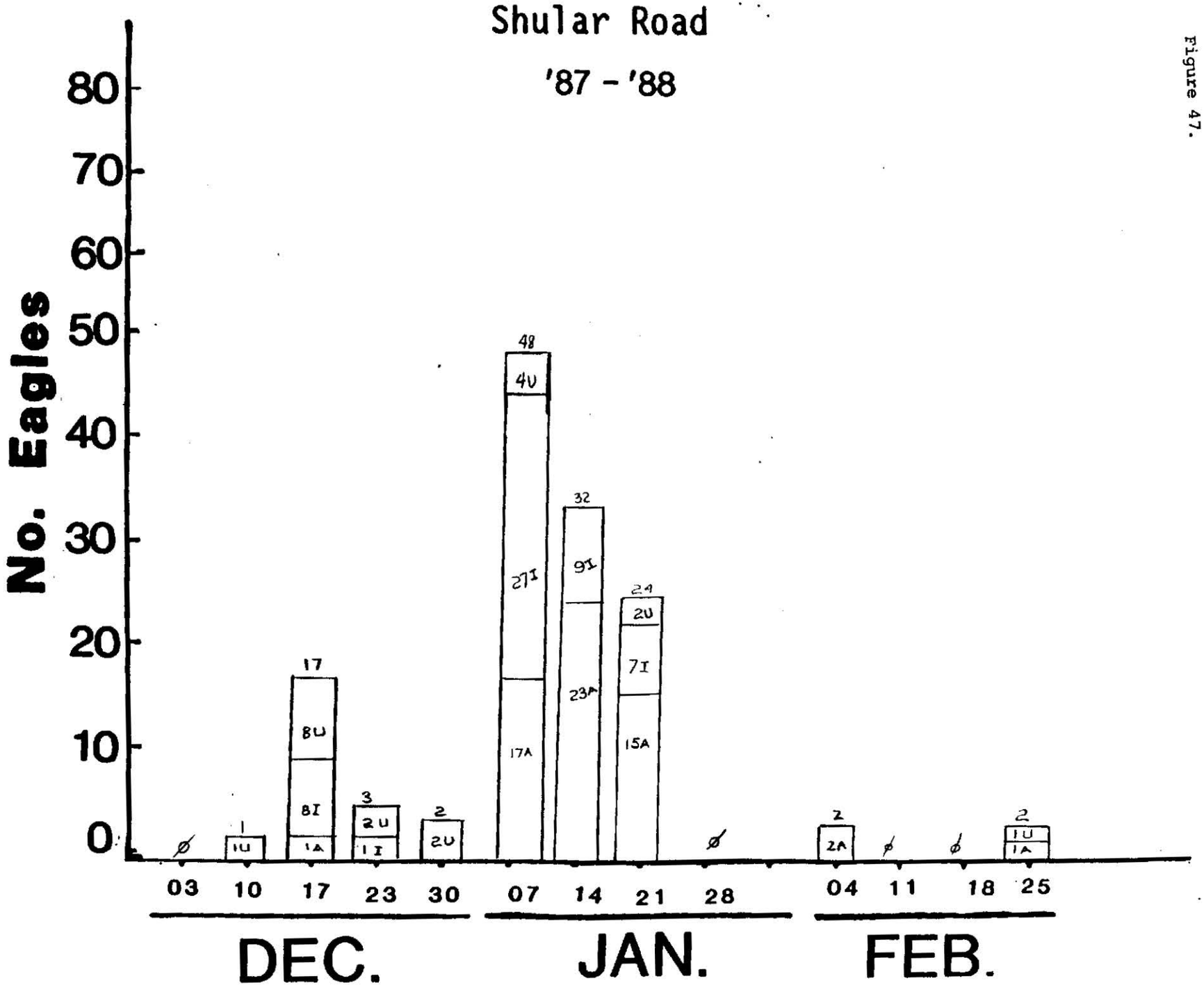


Figure 47.

Bald Eagles Observed Flying up Shular Road in Relation to Sunset '87 - '88

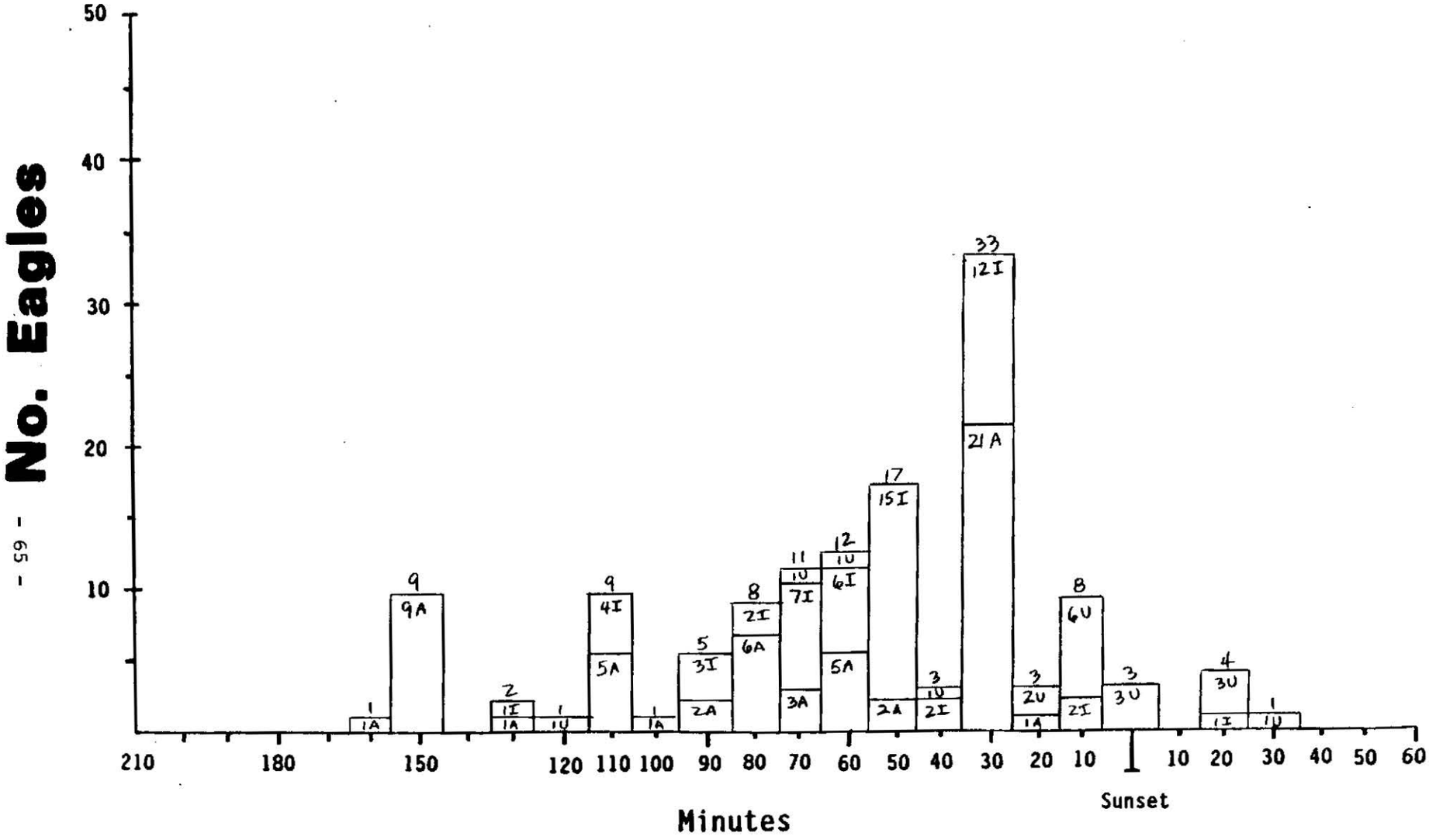


Figure 48.

classification flying through the site), 120 minutes before sunset, 80 minutes before sunset and 40 minutes before sunset.

Observations occurred on 13 dates comprising 41 person-hours during the 1987-88 survey. A total count of 131 eagles (57 adults, 55 immatures and 19 unknowns) were reported (Fig. 48). Peak observations were recorded on December 17 with 17 eagles (1 adult, 8 immatures and 8 unknowns), January 7 with 48 eagles (17 adults, 27 immatures and 4 unknowns), January 14 with 32 eagles (23 adults and 9 immatures), and January 21 with 24 eagles (15 adults, 7 immatures and 2 unknowns). These observations comprised 18.3, 23.3, 12.3, and 13.0% of the TNC counts for the same dates, respectively. Eagle activity began at 165 minutes before sunset and concluded by 35 minutes after sunset (Fig. 49). Peak activity occurred from 45-75 minutes before sunset and again at 30 minutes prior to sunset.

16. Government Bridge

This site was only surveyed during the winter of 1986-87. Observations occurred on 12 dates for a total of 27 person-hours. A total of 10 eagles (8 adults and 2 immatures) was observed throughout the survey (Fig. 50).

17. Hilt Creek

Observations were conducted on 11 dates comprising 31 person-hours during the 1986-87 survey. A total of 19 eagles (11 adults, 1 immature and 7 unknowns) was recorded (Fig. 51). A peak of 9 eagles (2 adults and 7 unknowns) were recorded for December 30, comprising 7.4% of the TNC count.

Observations during the 1987-88 survey were conducted on 6 dates totalling 11 person-hours. A total of 3 adult eagles was recorded (Fig. 52) but a lack of available observers resulted in the site not being surveyed in January and February.

18. Eagle Wash

During the 1986-87 survey, observations were conducted on 10 dates comprising 44 person-hours. A total of 42 eagles (29 adults, 7 immatures, 6 unknowns) with a peak observation of 11 eagles (8 adults, 1 immature and 2 unknowns) was observed on January 15, comprising 8.3% of the TNC count (Fig. 53).

Observation dates totalled 11, consisting of 34 person-hours during the 1987-88 survey. A total of 20 eagles (8 adults, 9 immatures and 3 unknowns) with a peak of 7 eagles (5 adults, 1 immature and 1 unknown) was observed, comprising 3.8% of the TNC count (Fig. 54).

19. Rockport State Park

Observations were conducted on 13 dates, totalling 62 person-hours for the winter of 1986-87 survey. A total of 334 eagles (258 adults, 72 immatures and 4 unknowns) was reported (Fig. 55). This total comprised 24.4% of the total TNC count. Peak observations were reported for 6 dates; 25 eagles (21 adults and 4 immatures) on December 23, 83 eagles (58 adults, 22 immatures and 3 unknowns) on December 30, 60 eagles (49 adults, 11 immatures) on January 7, 56 eagles (47 adults and 9 immatures) on January 14, 34 eagles (29 adults and 5

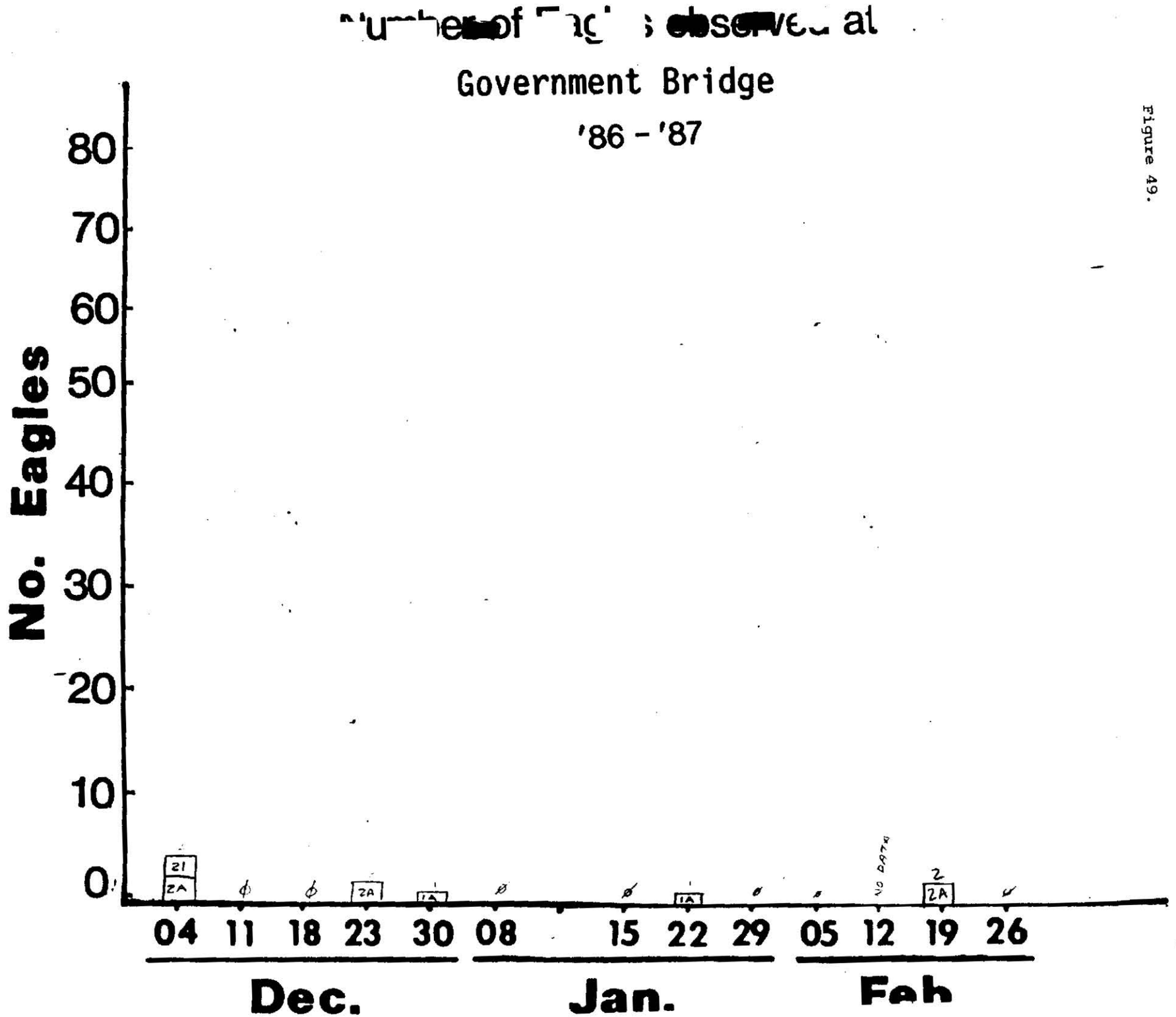

Number of Eagles observed at
Government Bridge
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb

Figure 49.

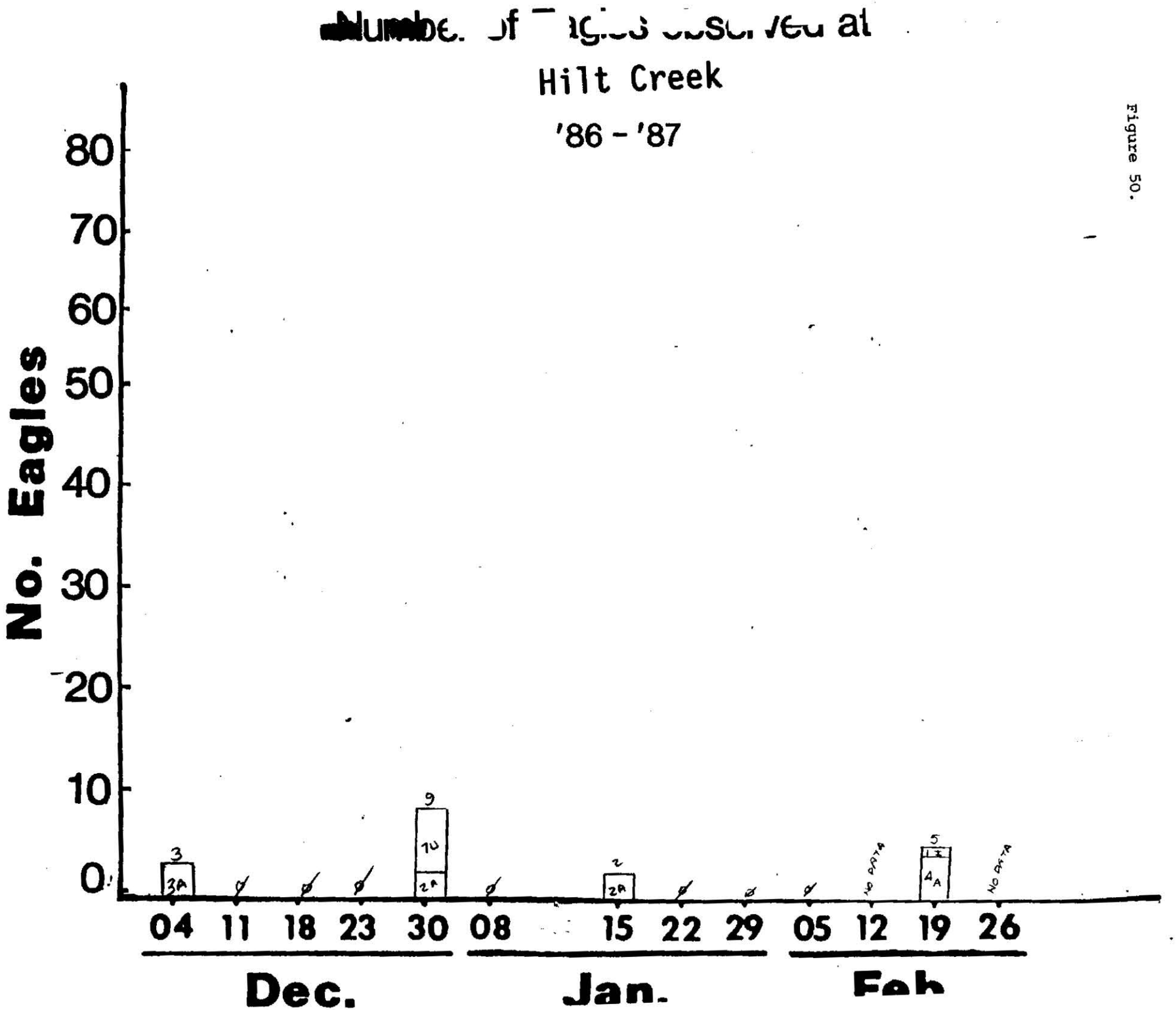

Number of Eagles observed at
Hilt Creek
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
3
3A
9
7U
2A
2
2A
5
1X
4A
NO DATA
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb

Figure 50.

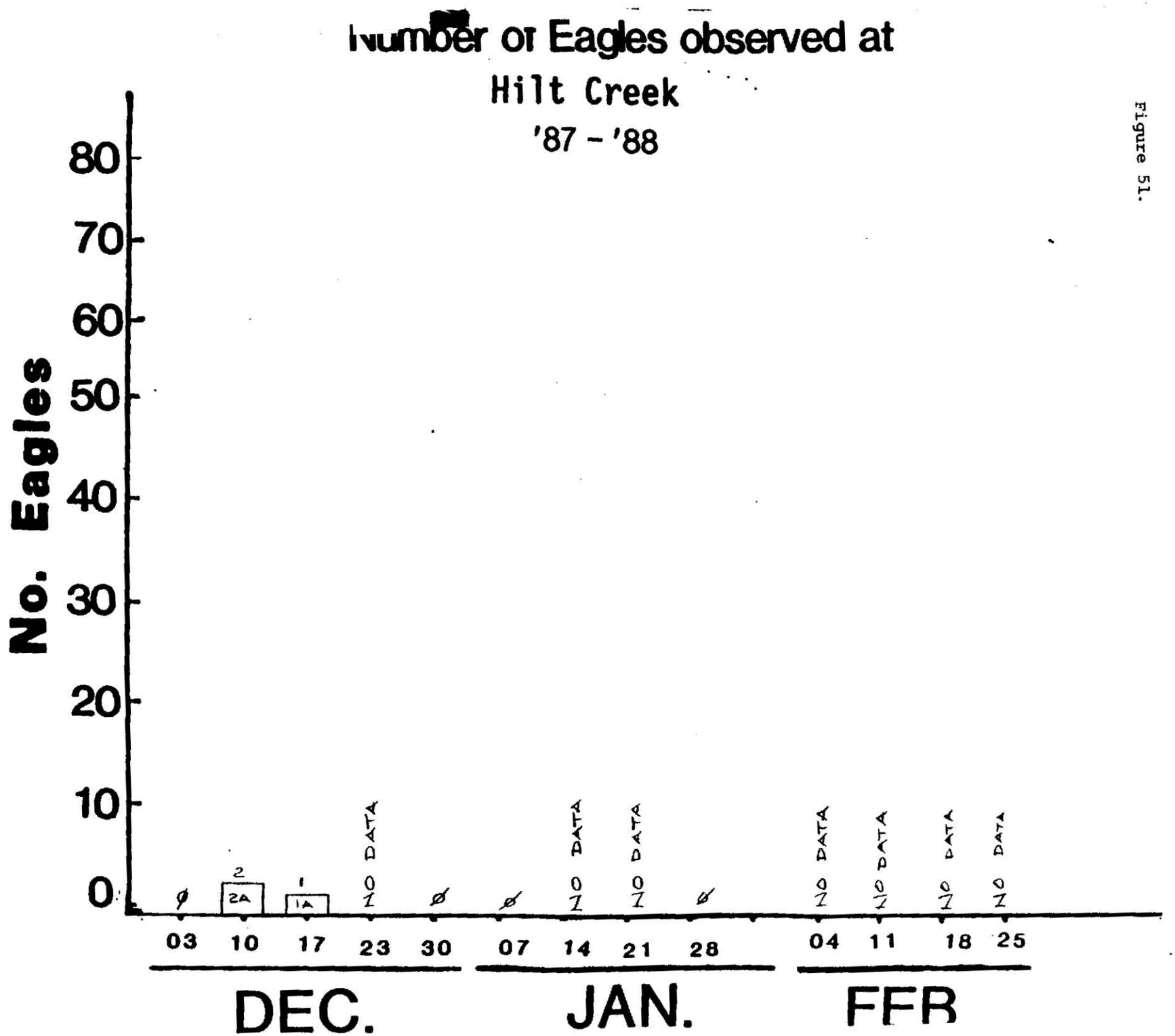

Number of Eagles observed at
Hilt Creek
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
2
2A
1
1A
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB

Figure 51.

Number of Eagles observed at

Eagle Wash

'86 - '87

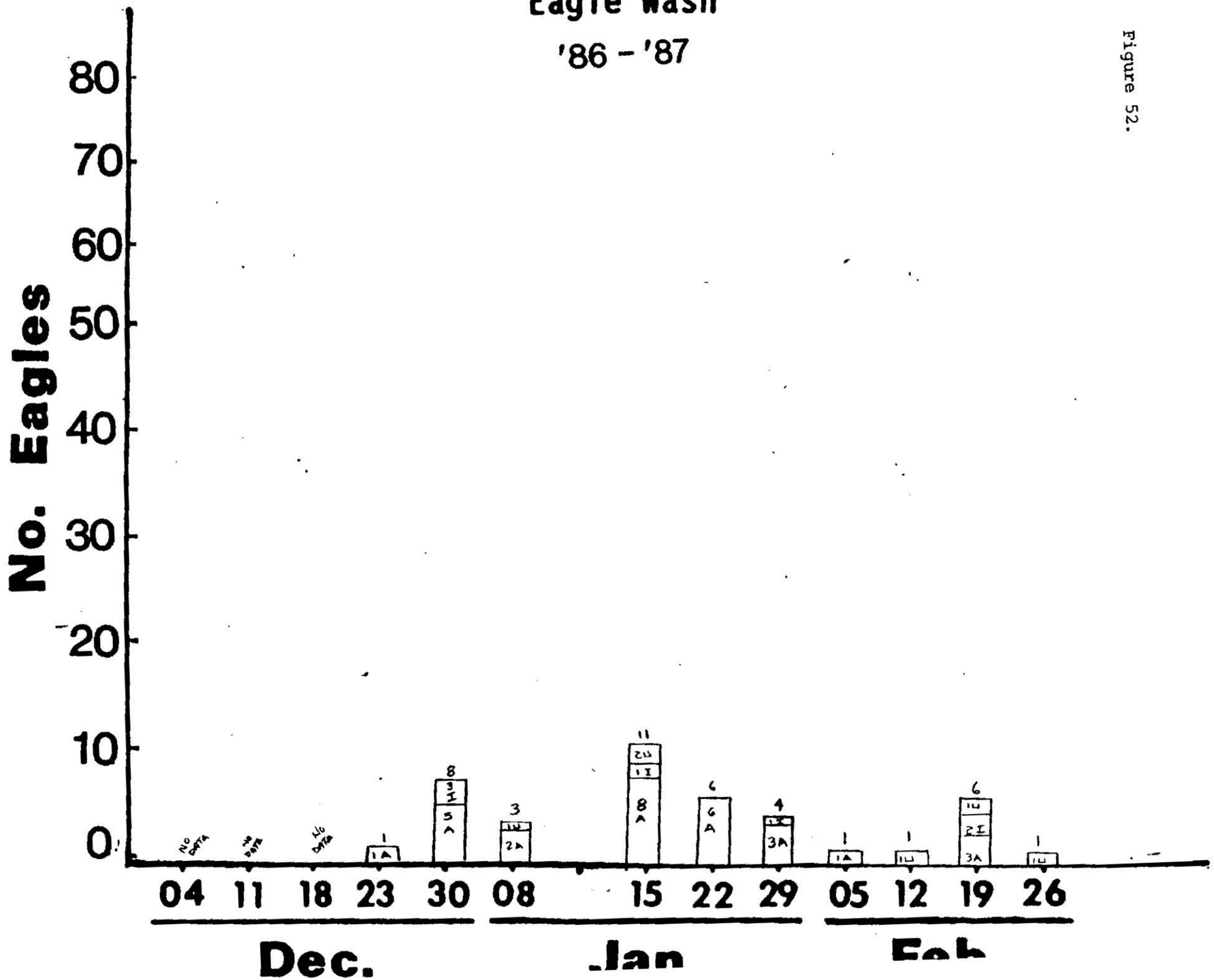


Figure 52.

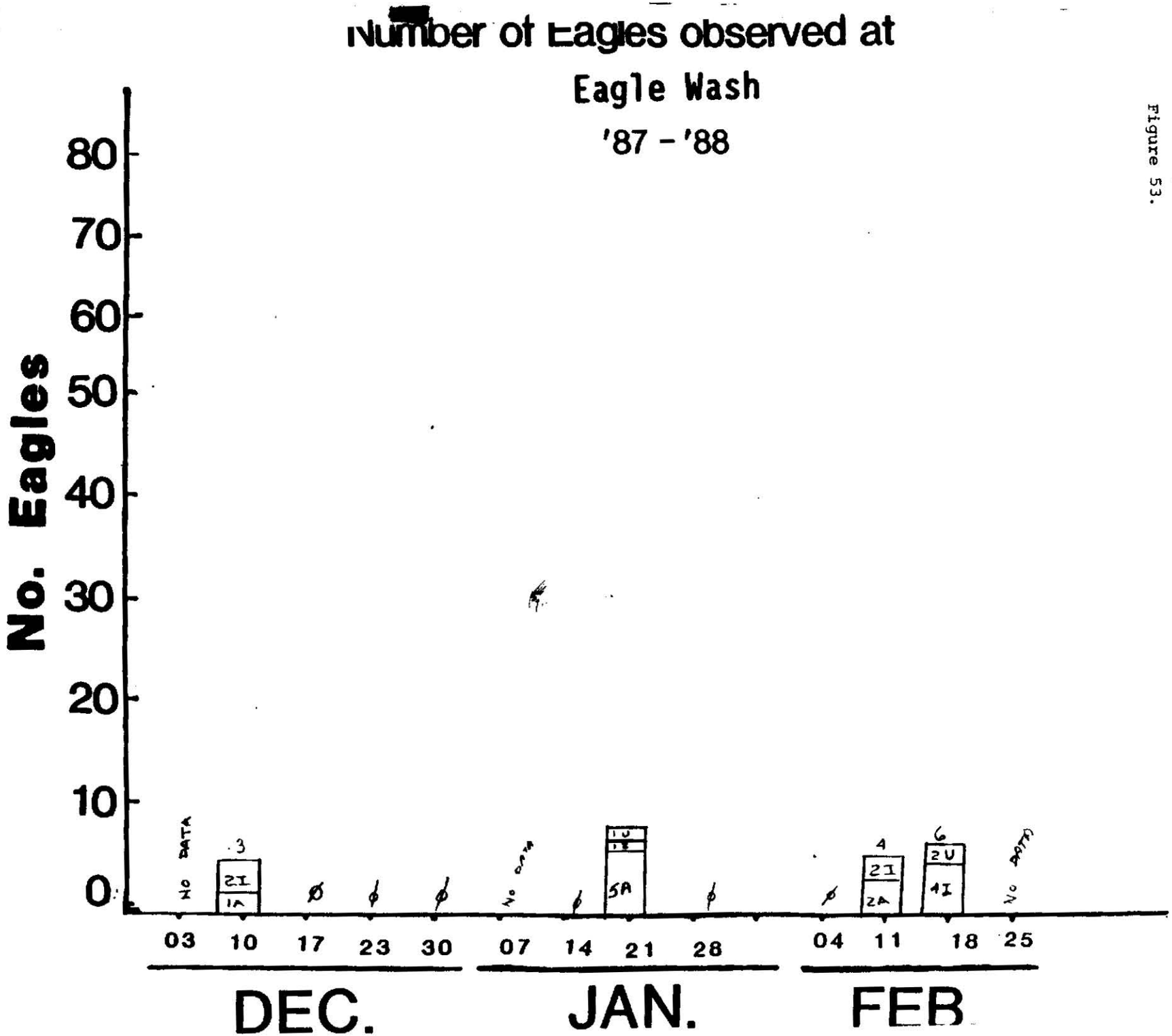

Number of Eagles observed at
Eagle Wash
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
3
2I
1A
Ø
Ø
Ø
NO DATA
Ø
5A
Ø
Ø
4
2I
2A
6
2U
4I
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB

Figure 53.

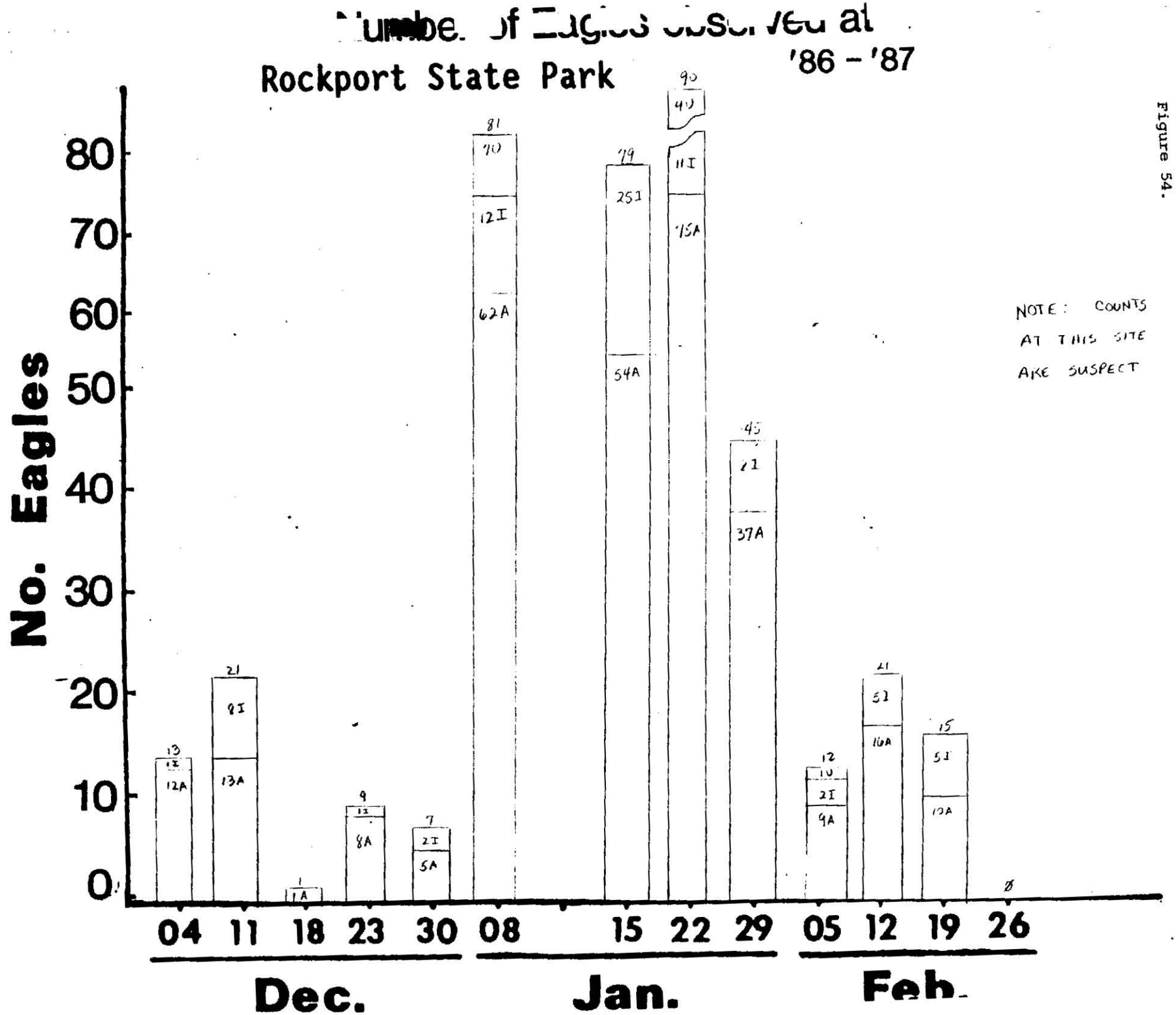

Number of Eagles observed at
Rockport State Park
'86 - '87
No. Eagles
0
10
20
30
40
50
60
70
80
13
1I
12A
21
8I
13A
1
1A
9
1I
8A
7
2I
5A
81
7O
12I
62A
79
25I
54A
9O
4O
11I
45A
45
7I
37A
12
1O
2I
9A
21
5I
16A
15
5I
10A
Ø
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec. Jan. Feb.
NOTE: COUNTS AT THIS SITE ARE SUSPECT

Figure 54.

Bald Eagles Observed Flying up Rockport State Park in Relation to Sunset '86 - '87

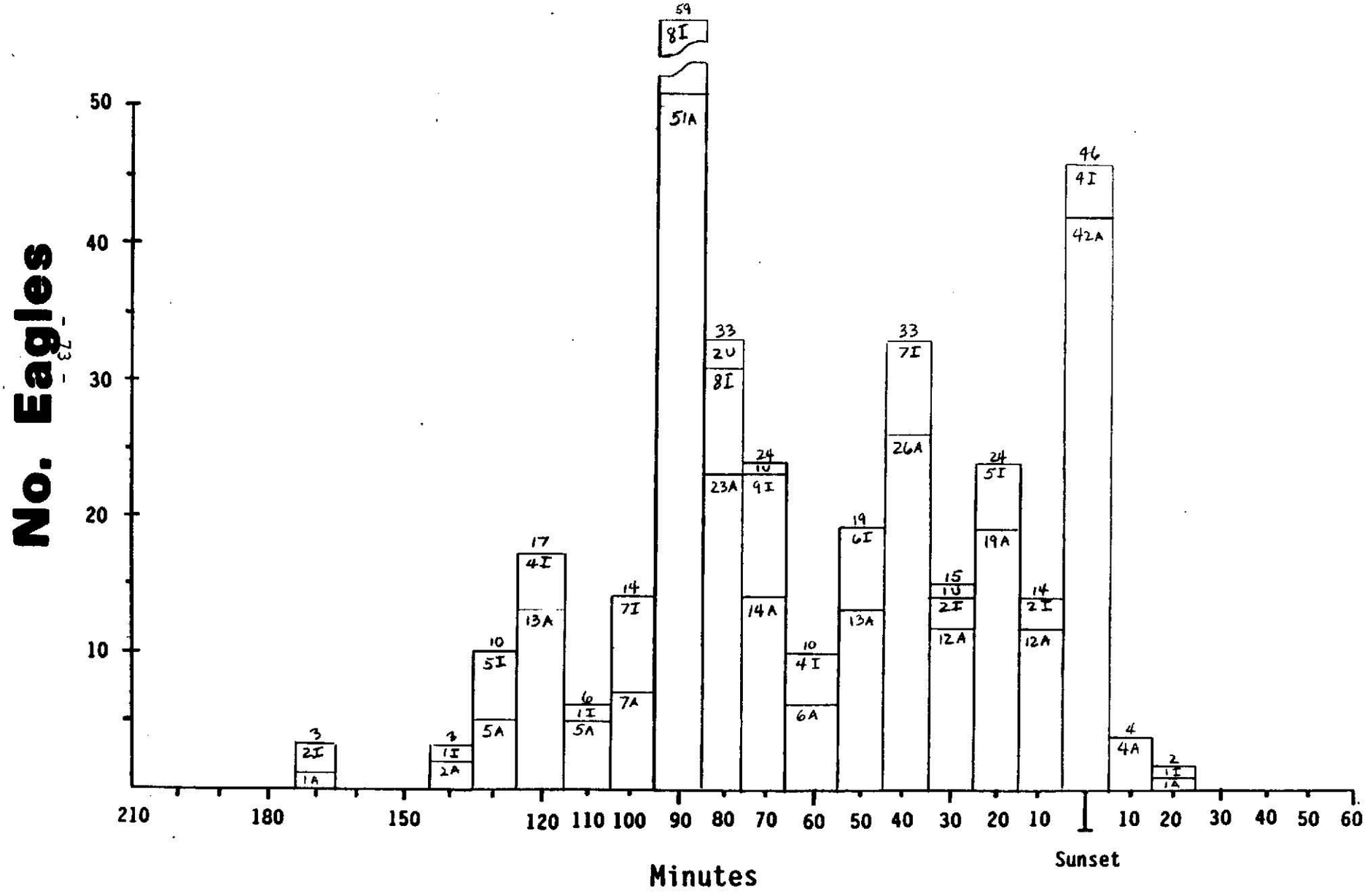


Figure 55.

immatures) on January 21, and 29 eagles (25 adults and 4 immatures) on January 28. These peak totals comprised 12.3, 26.3, 29.1, 21.5, 18.4, and 22.6% of the TNC counts for these dates. Eagle activity occurred between 145 minutes before sunset and 25 minutes after sunset (Fig. 56). Peak activity was reported at 120 minutes before sunset, between 95 minutes and 65 minutes before sunset, at 40 minutes before sunset, and at sunset.

During the 1987-88 survey, observations were conducted on 13 dates, totalling 65 person-hours. A total of 388 eagles (307 adults, 75 immatures and 6 unknowns) was reported, comprising 21.6% of the total TNC count (Fig. 57). Six peak observation dates were reported: 21 eagles (13 adults and 8 immatures) on December 11, 38 eagles (29 adults and 9 immatures) on January 8, 65 eagles (46 adults, 18 immatures and 1 unknown) on January 15, 90 eagles (75 adults, 11 immatures and 4 unknowns) on January 22, 34 eagles (30 adults and 4 immatures) on January 29, and 39 eagles (28 adults and 11 immatures) on February 12. These totals equalled 28.8, 21.2, 48.9, 58.1, 19.1, and 76.5% of the TNC counts for these dates. Eagle activity was observed to occur between 185 minutes before sunset until 5 minutes after sunset (Fig. 58). Peak activity was reported as occurring from 115-185 minutes before sunset, at 90 minutes before sunset, and from 25-45 minutes before sunset. Many eagles were already in the roost when observers arrived on several observation dates.

Note: Due to the nature of eagle activity at this site, counts are highly suspect.

20. Sauk Mountain

Observations were conducted on 13 dates, totalling 38 person-hours, during the 1986-87 survey. Peak observations occurred on December 30 with 7 eagles (3 adults, 1 immature and 3 unknowns) and January 8 with 8 eagles (2 adults and 6 unknowns) reported, comprising 5.8 and 4.5% of the TNC counts. A total of 34 eagles (15 adults, 1 immature and 18 unknowns) was observed at this site (Fig. 59).

During the 1987-88 survey, observations were conducted on 12 dates consisting os 53 person-hours. A total of 6 eagles (2 adults and 4 unknowns) was reported for this site (Fig. 60), which comprised less than 1% of the total TNC count.

21. Big Eddy Osprey

During the 1986-87 survey, observations were conducted on 8 dates with a total of 20 person-hours. A total of 158 eagles (78 adults, 40 immatures and 40 unknowns) was reported which comprised 11.6% of the total TNC count (Fig. 61). Peak observations were recorded on January 8 with 38 eagles (16 adults, 5 immatures and 17 unknowns), January 22 with 31 eagles (19 adults, 9 immatures and 3 unknowns), January 29 with 31 eagles (18 adults, 12 immatures and 1 unknown), and 16 eagles (7 adults, 5 immatures and 4 unknowns) on February 12. This comprised 21.2, 20.0, 17.4, and 31.4% of the TNC counts for these dates. December was not surveyed due to a lack of available observers. Eagle activity was observed to begin at 210 minutes before sunset and end around 45 minutes after sunset (Fig. 62). Peak activity was reported at 70 minutes before sunset and from 25 minutes before sunset to 15 minutes after sunset.

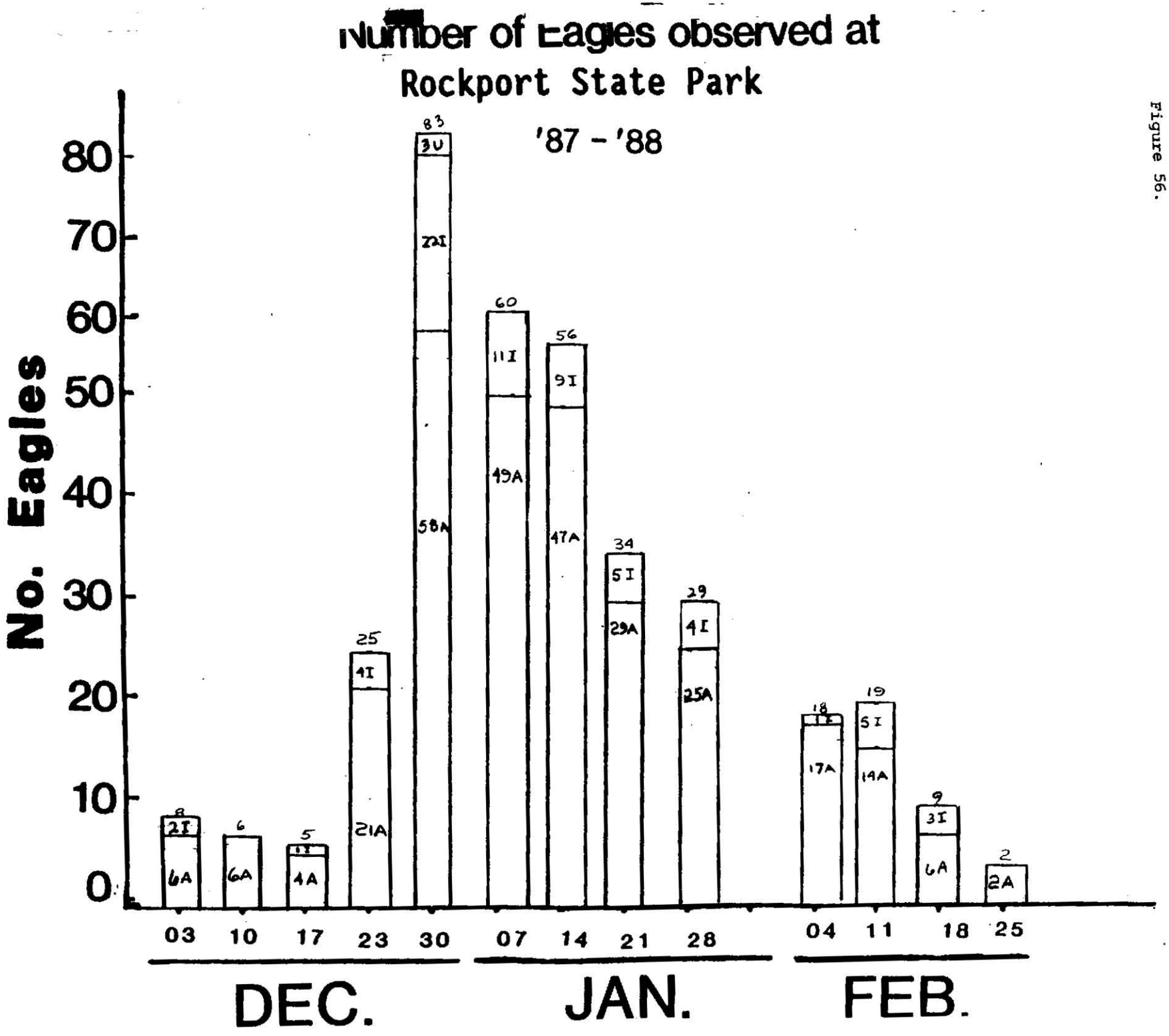

Number of Eagles observed at
Rockport State Park
'87 - '88
No. Eagles
0
10
20
30
40
50
60
70
80
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.
8
2I
6A
6
6A
5
1I
4A
25
4I
21A
83
3U
22I
58A
60
11I
49A
56
9I
47A
34
5I
29A
29
4I
25A
18
1I
17A
19
5I
14A
9
3I
6A
2
2A

Figure 56.

Bald Eagles Observed Flying up Rockport State Park in Relation to Sunset '87 - '88

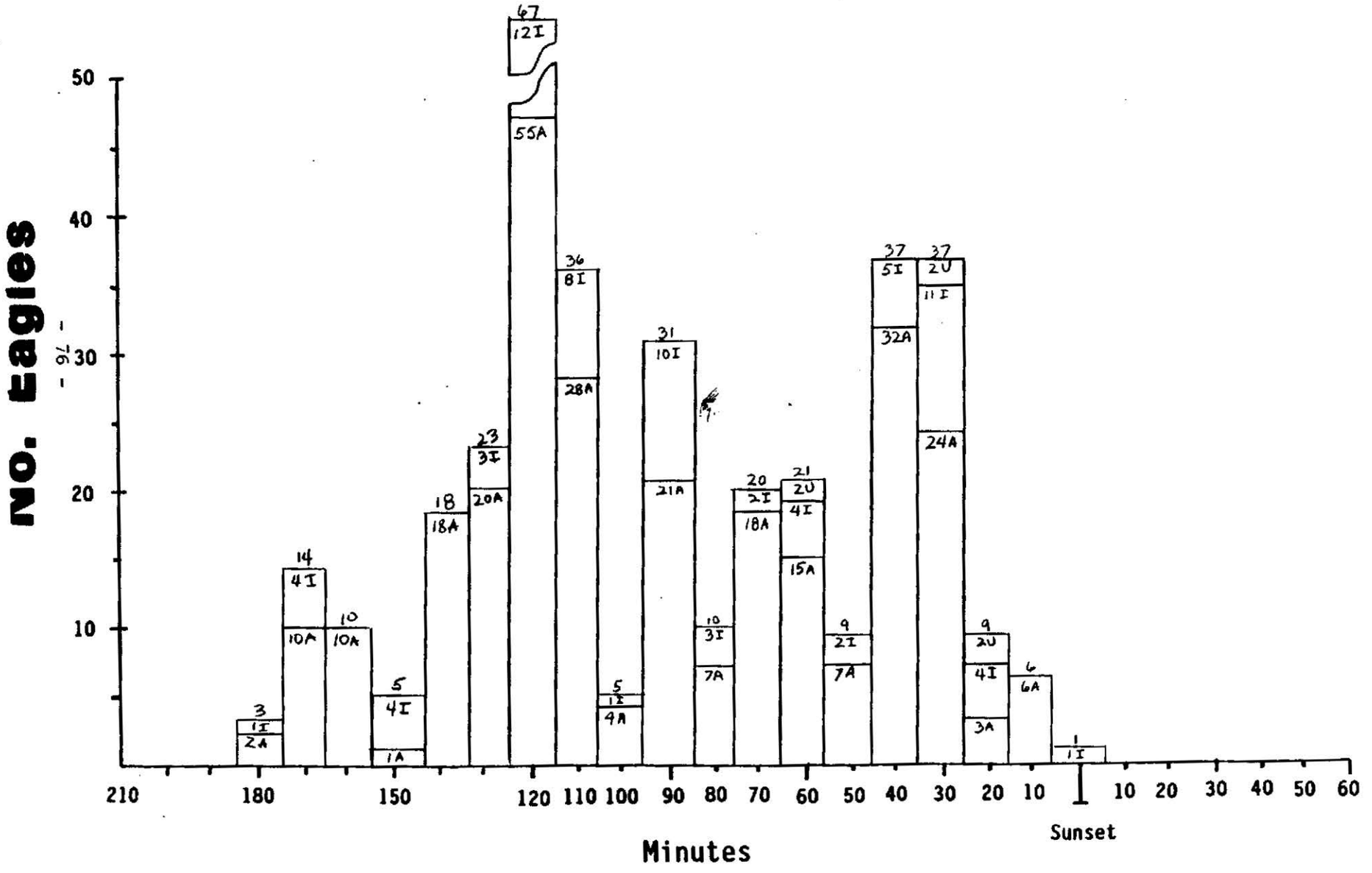


Figure 57.

Number of Eagles observed at
Sauk Mountain
'86 - '87

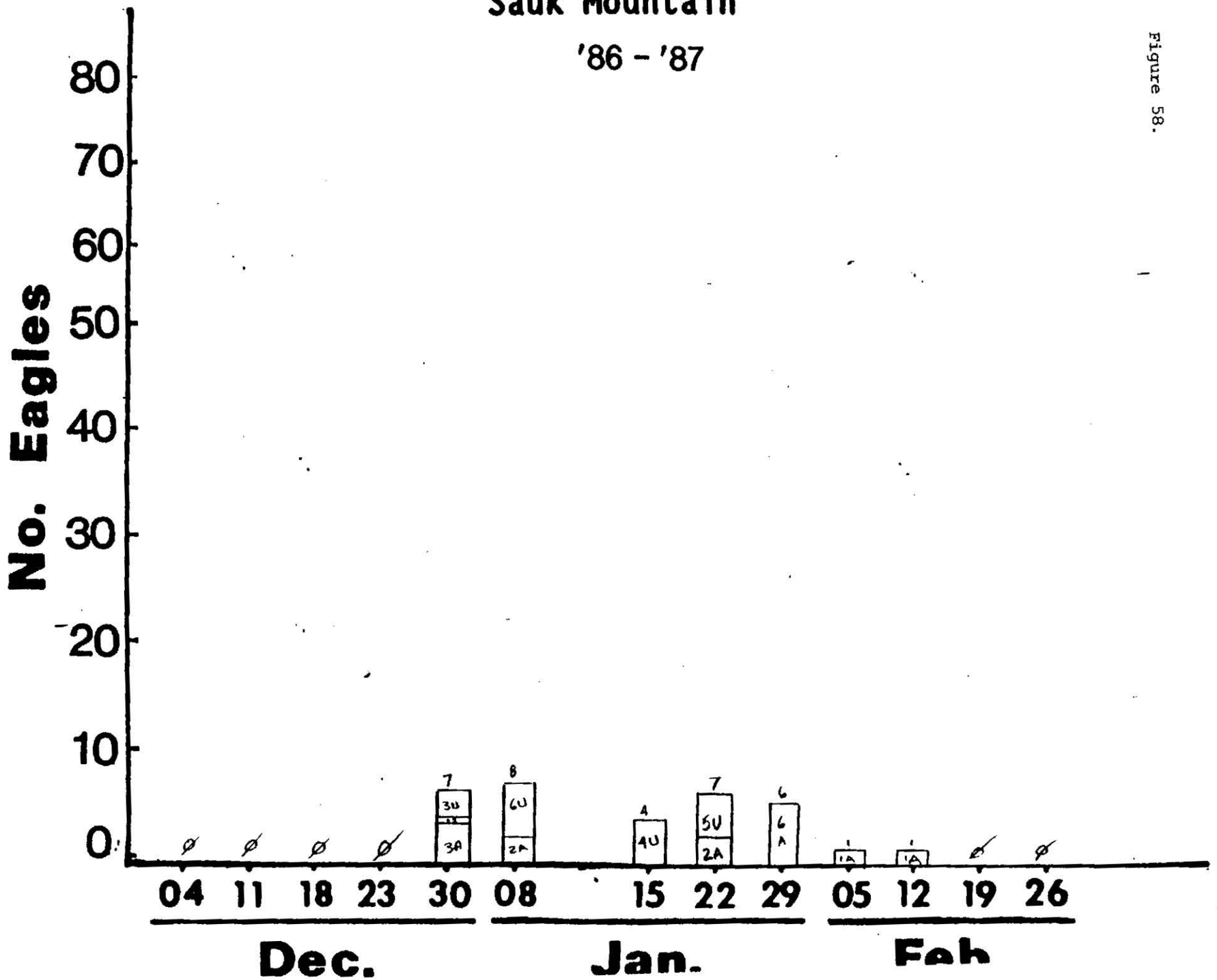


Figure 58.

Number of Eagles observed at
Sauk Mountain
'87 - '88

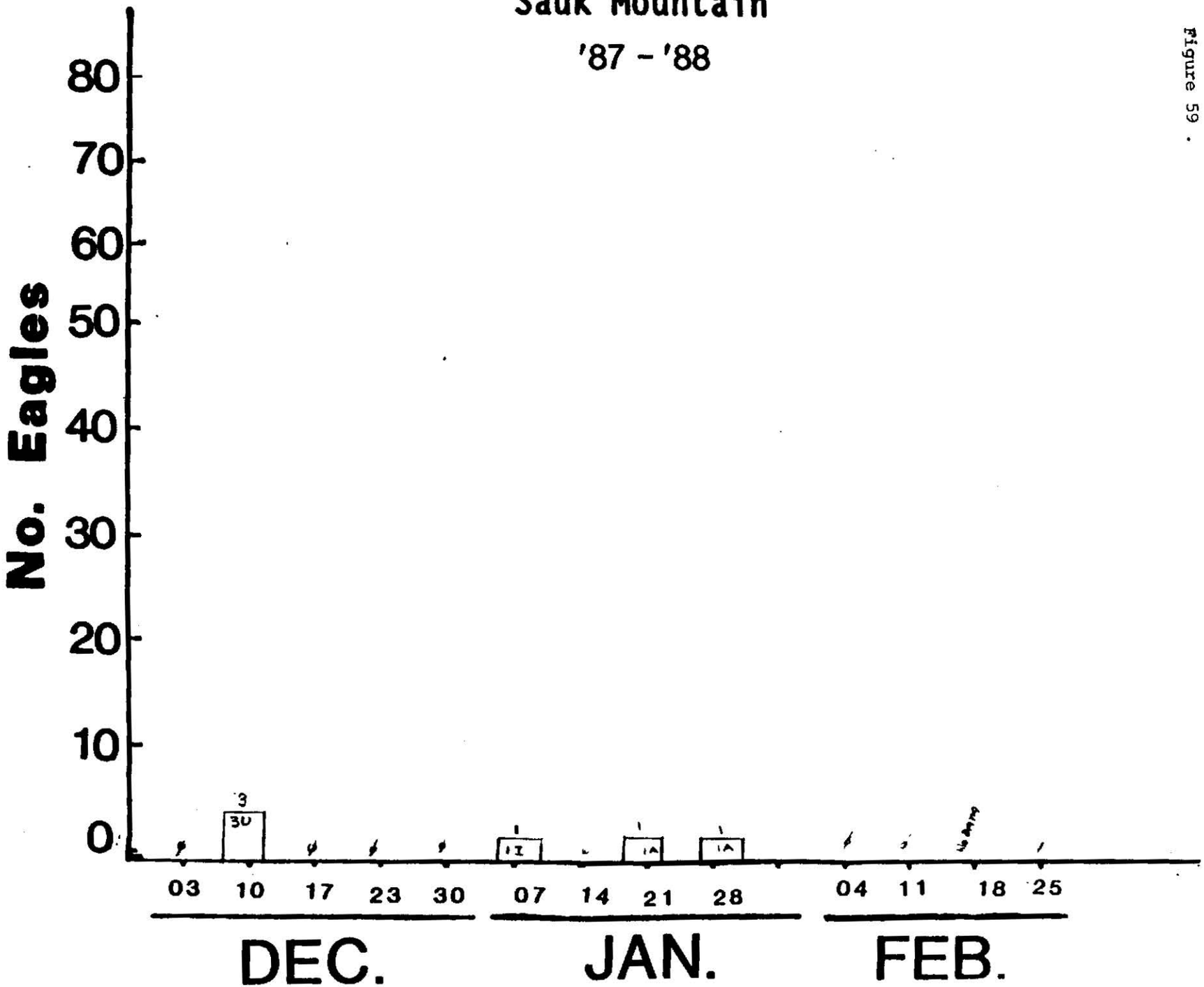


Figure 59 .

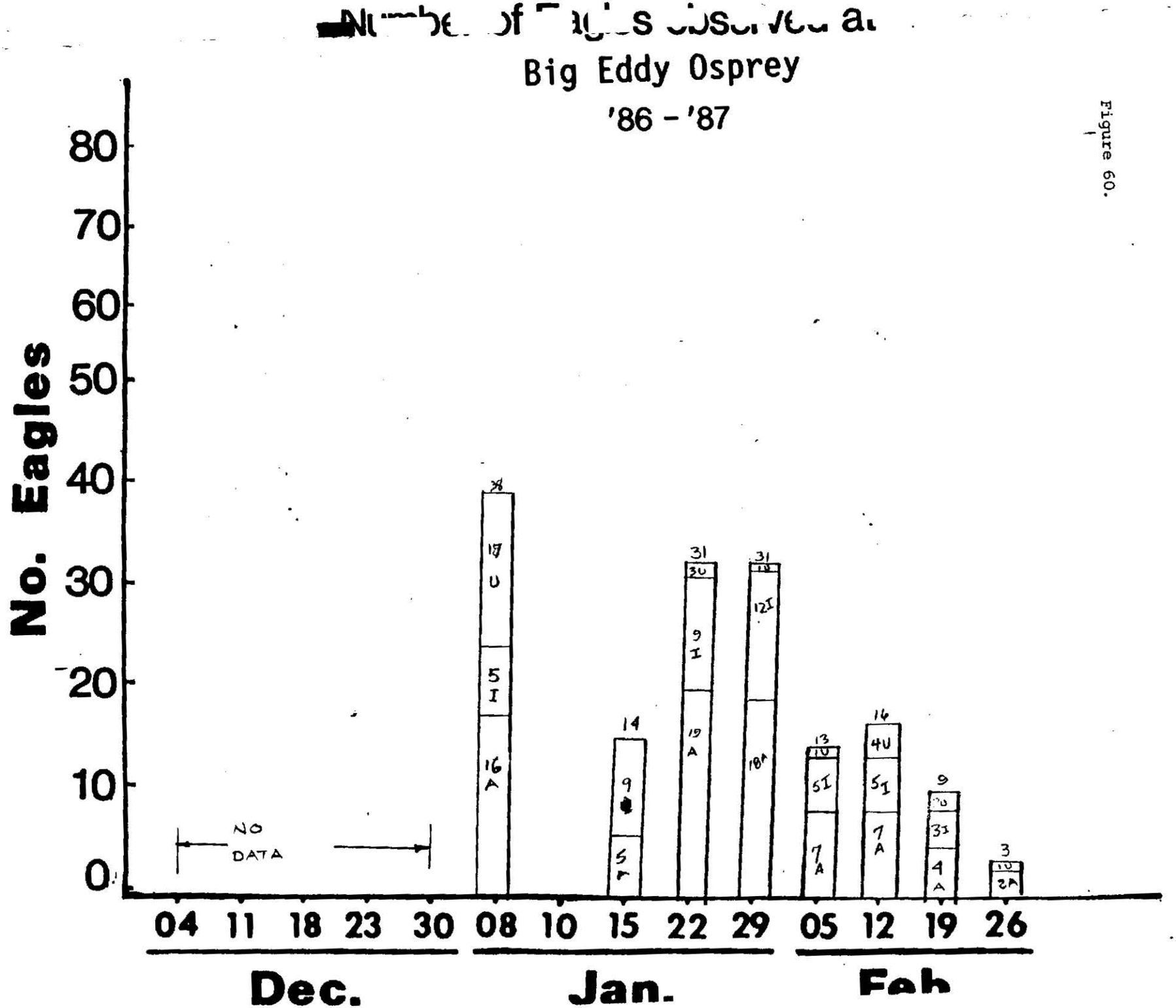

Number of Eagles Observed at
Big Eddy Osprey
'86 - '87
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
38
17 U
5 I
16 A
14
9
5
31
30
9 I
19 A
31
12 I
18
13
10
5 I
7 A
16
4 U
5 I
7 A
9
3
4 A
3
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb

Figure 60.

Bald Eagles Observed Flying up Big Eddy Osprey in Relation to Sunset '86 - '87

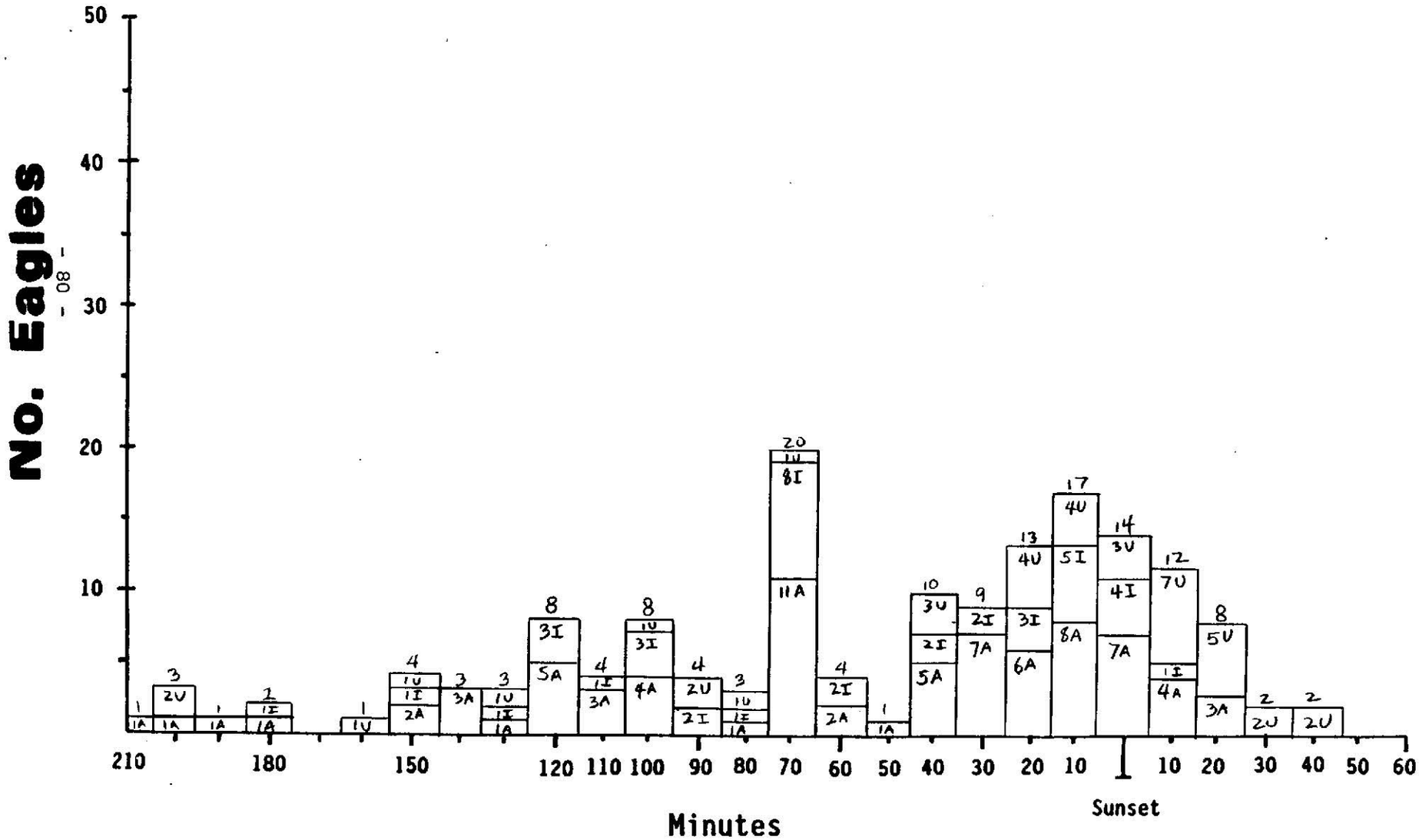
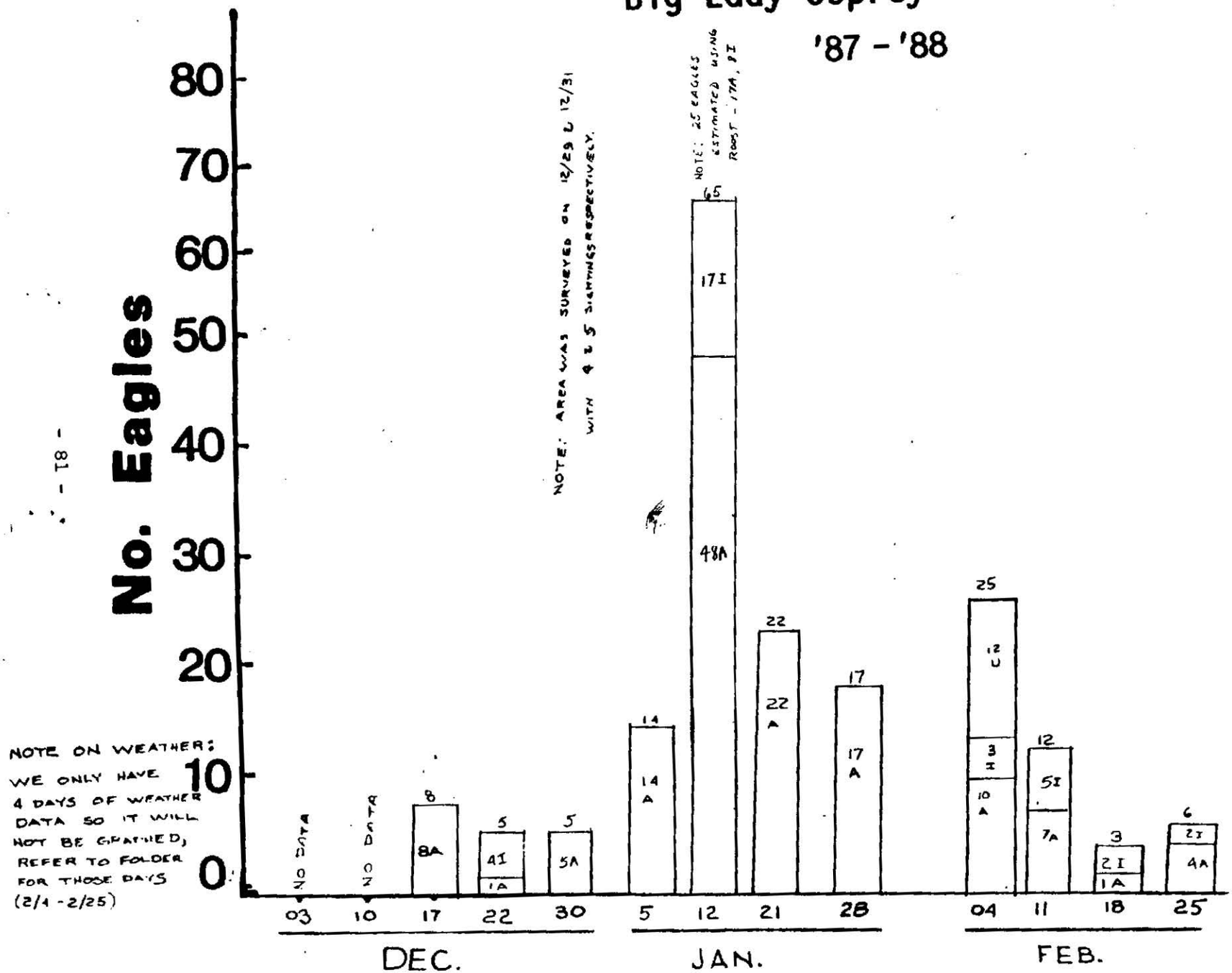


Figure 61.



NOTE ON WEATHER:
WE ONLY HAVE 4 DAYS OF WEATHER DATA SO IT WILL NOT BE GRAPHED, REFER TO FOLDER FOR THOSE DAYS (2/4 - 2/25)

Figure 62.

Bald Eagles Observed Flying up Big Eddy Osprey in Relation to Sunset '87 - '88

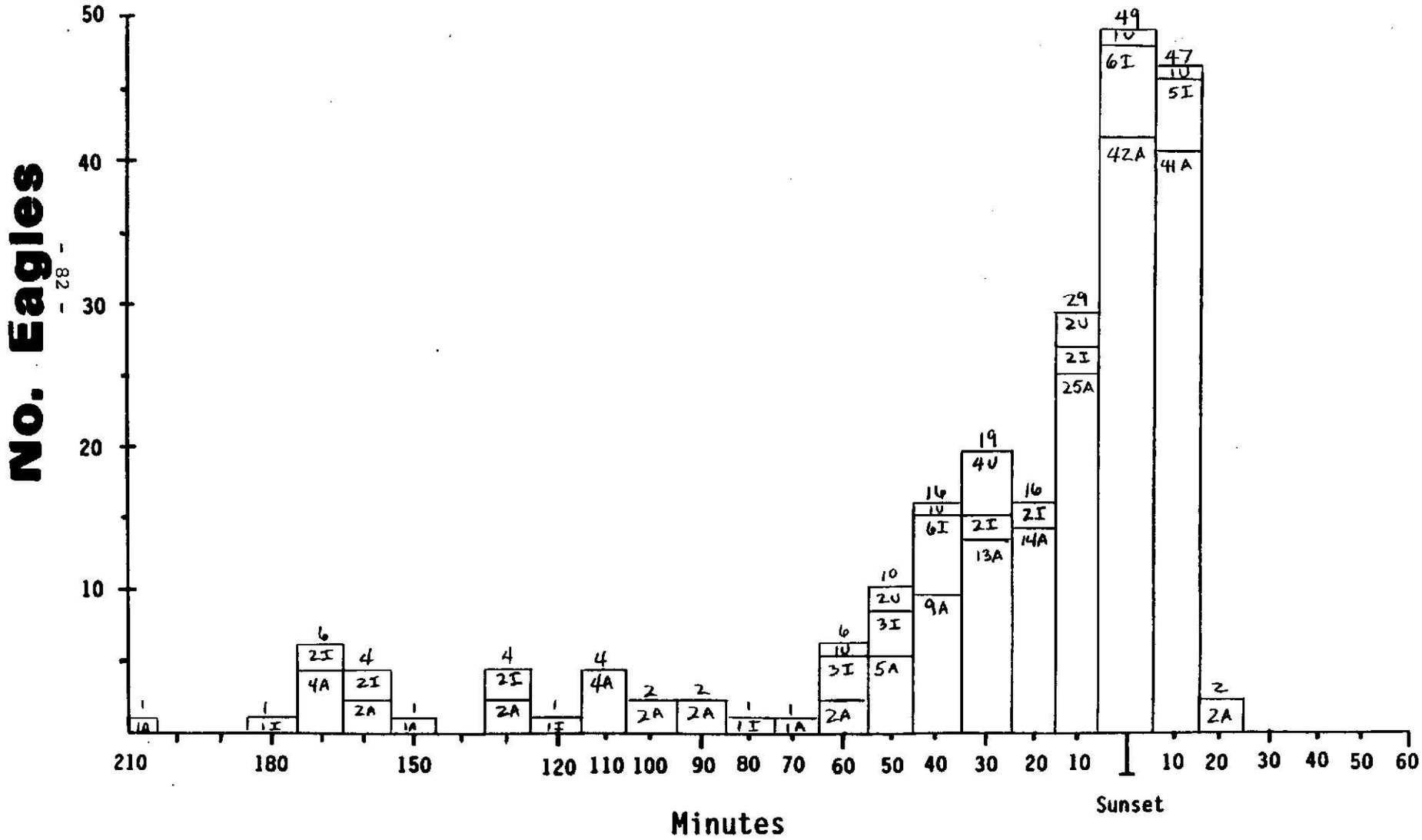


Figure 63.

Observations were conducted on 13 dates for a total of 34 person-hours during the 1987-88 survey. A total of 220 eagles (171 adults, 37 immatures and 12 unknowns) was reported, comprising 12.2% of the total TNC count (Fig. 63). Peak observations were recorded on January 14 with 65 eagles (48 adults and 17 immatures), January 21 with 22 adults eagles, and February 4 with 25 eagles (10 adults, 3 immatures and 12 unknowns). These reports comprised 24.9, 12.0, and 22.3% of the TNC counts. Eagle activity was reported as beginning at 210 minutes before sunset and ending at 25 minutes after sunset (Fig. 64). Peak activity was recorded for 160 minutes before sunset, for 30 minutes before sunset, and from 15 minutes before sunset to 15 minutes after sunset.

SKAGIT RIVER SUMMARY AND RECOMMENDATIONS

Combining night roost observation data from all viewpoints, for the 1986-87 winter season, reveals that peak numbers of bald eagles occurred on December 30, January 8, January 15, January 22, January 29, and February 5 with counts of 339, 264, 161, 243, 224, and 138, respectively (Fig. 65). All these counts exceeded 100% of the TNC counts, comprising 280.2, 147.5, 121.1, 156.8, 226.9, and 169.2%, respectively (Fig. 66). When counts from all observation points are combined, other dates comprising a high percentage of the total TNC counts were December 11, February 12, and February 19, which comprised 108.2% (79), 243.1% (124), and 136.7% (67) of the TNC counts, respectively.

The night roost peak counts were higher than the TNC counts and peaked one week earlier on December 30 as opposed to January 8 for the TNC. But the overall peak counts appear to correlate well from December 30 through January 29 (Fig. 65 and Appendix 5).

Based on Washington Department of Fisheries (WDF) figures, Mills (1987) reported that the Skagit River received good salmon runs during the 1986-87 season. These runs provided eagles with a relatively consistent food supply resulting in fairly regular numbers of eagles being reported for the TNC count. The TNC count was fairly consistent throughout the peak observation period with counts of 121, 179, 133, 155, and 178 for December 30, January 8, January 15, January 22 and January 29, respectively (Appendix 5). The narrative portion of Mills (1987) was not forwarded, rendering further statements purely speculative.

Age class differences in the time of eagle occurrence did not appear to deviate significantly from those reported previously for the Skagit and Nooksack Rivers (Hancock 1964; Servheen 1975; Hansen 1978; Hamer 1984; Hamer and Green 1985; and Mills 1986) (Fig. 65). Adult eagles comprised 60.5%, immatures 20.8%, and the unknown category 18.7% of this winter's population. The TNC count for the same period was 68.6% adults and 31.4% immatures (Appendix 5). Assuming that 11% of the unknown category were immatures and 7.7% were counted as adults, then the night roost surveys would reflect adult/immature ratios similar to those reported in the TNC counts. Hansen (1978) and Stalmaster (1976) reported subadult (immature) eagle winter populations of 32-35.5%, between 1975-77, for the Nooksack River. These data are close to the TNC immature count of 31.4% and the night roost immature count of 20.8% (31.9% if adjusted), and similar to those determined by other research in the west (Hansen 1978).

Total Number of Eagles Observed at All Sites
'86 - '87

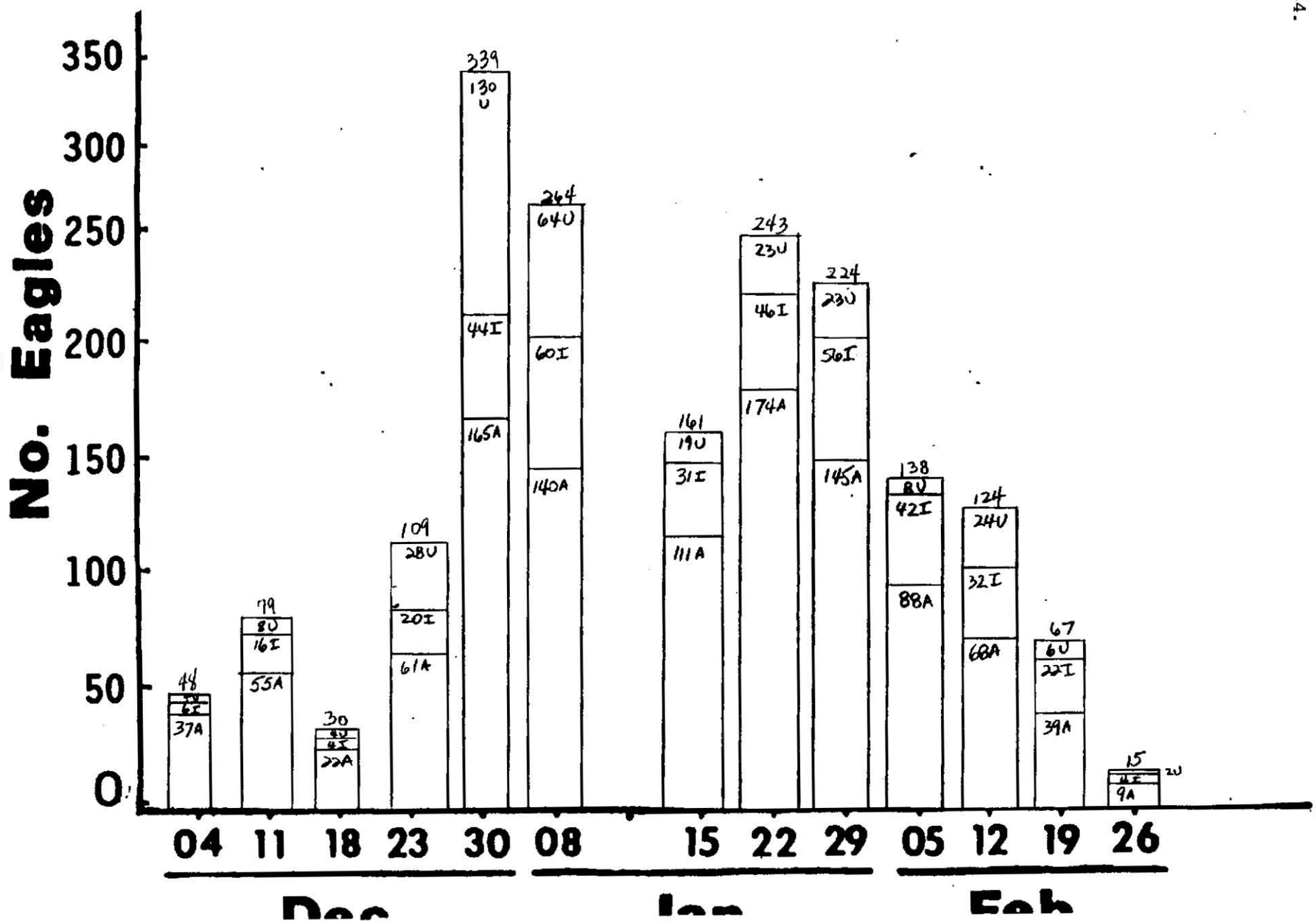


Figure 64.

KEY. x —— %
FS → x/x ← TNC

Bald Eagles Observed Flying as a Percentage of the Total T.N.C. Count '86 - '87

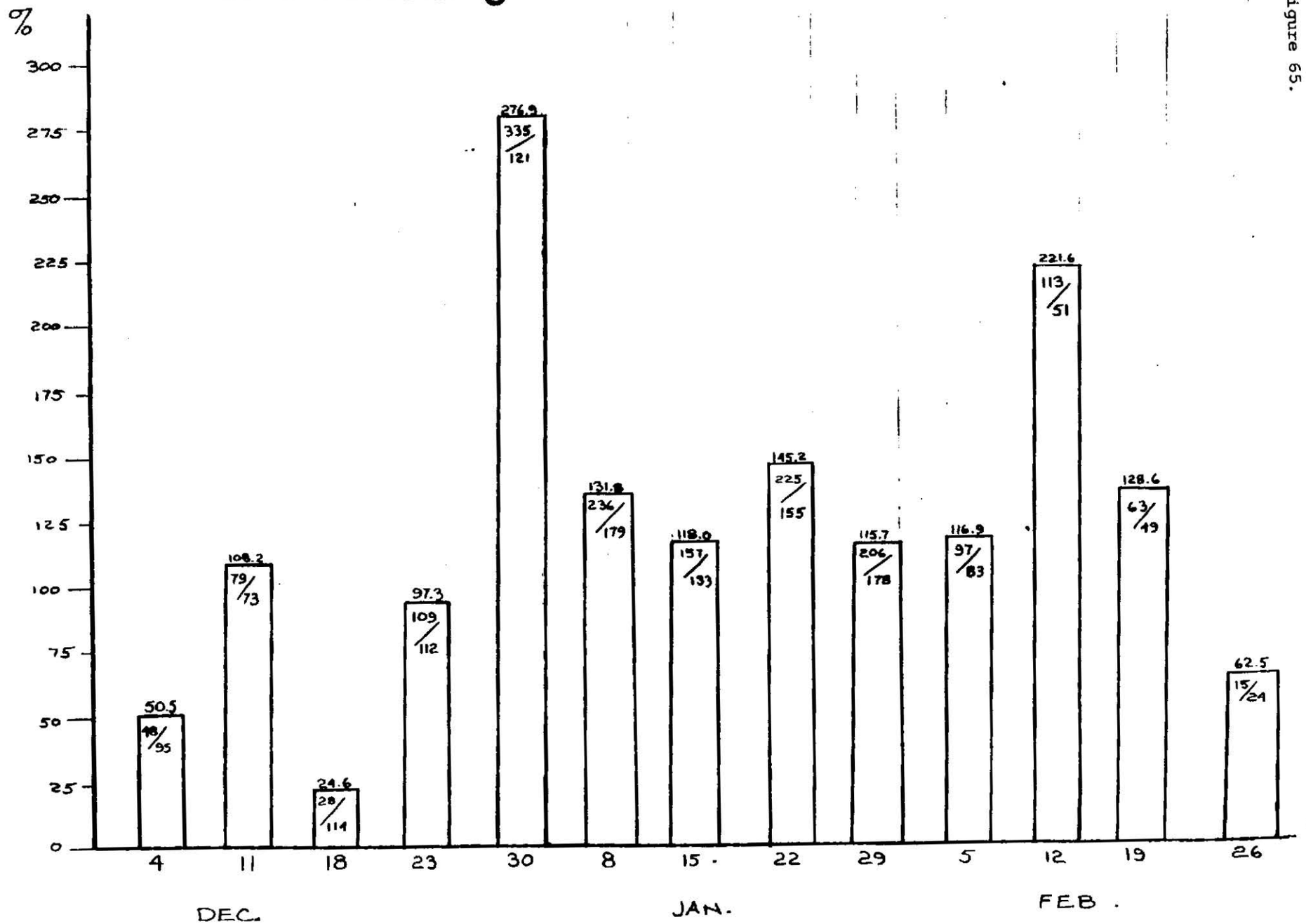
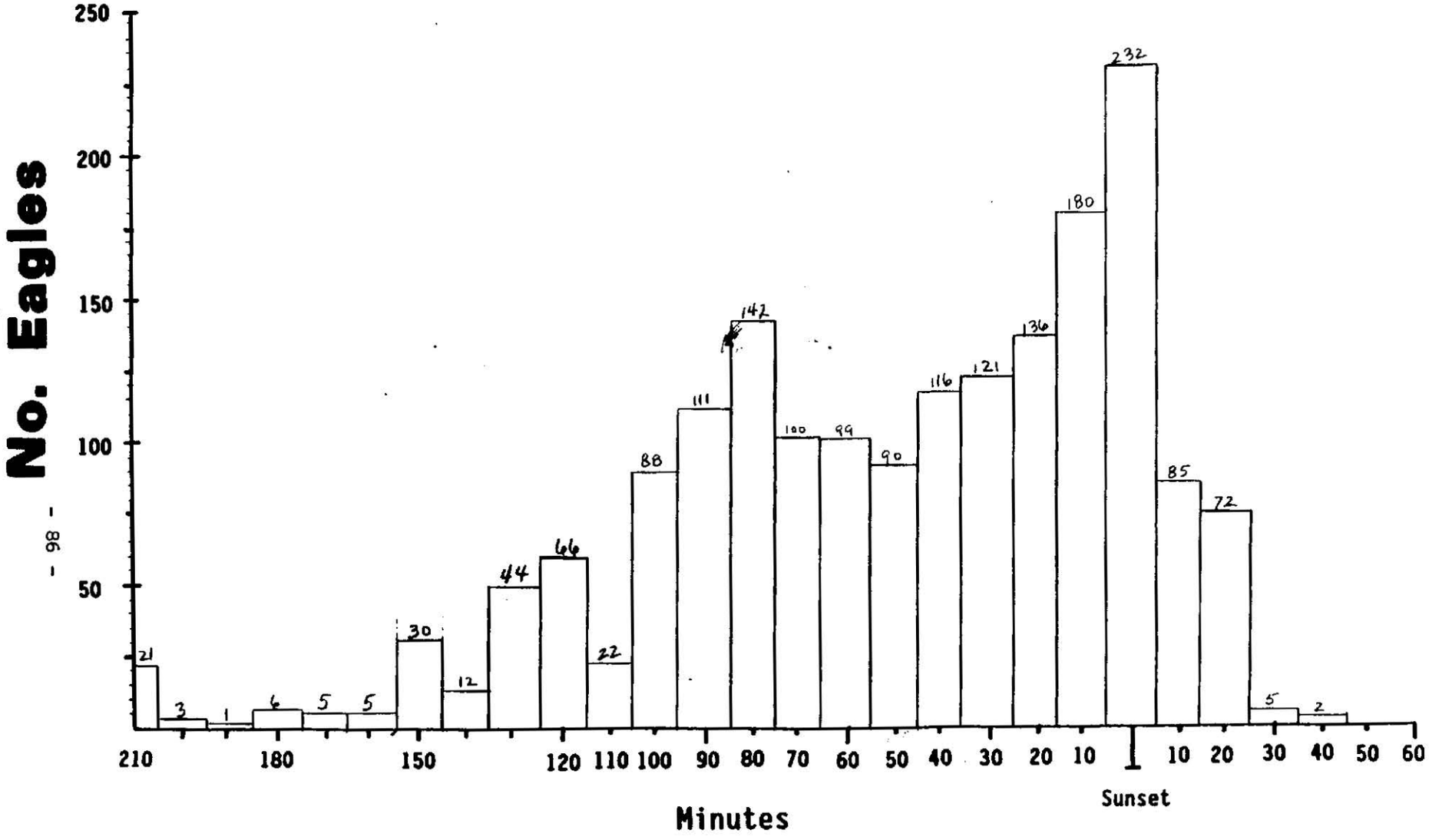


Figure 65.

Bald Eagles Observed Flying
From All Sites
in Relation to Sunset '86 - '87

Figure 66.



There was one long activity period from 105 minutes prior to sunset until 25 minutes after sunset (Fig. 67), with 2 peak activity periods at 80 minutes before sunset and at sunset during the 1986-87 winter.

Combining night roost observation data from all viewpoints, for the 1987-88 winter season, shows peak numbers of bald eagles occurred on December 30, January 7, January 14, January 21, and January 28, with 193, 303, 307, 226, and 162 eagles, respectively (Fig. 68). The January 7, 14, 21, and 28 counts represented 147.1%, 117.6%, 122.8%, and 126.6% of the TNC counts for those dates (Fig. 69). Other dates which comprised a high percentage of the TNC counts were December 17 and February 11 with 104 eagles (111.8%) and 123 eagles (135.2%), respectively.

The night roost peak counts appear to correlate well with the TNC peak counts on January 14, 21, and 28, but not on December 30 and January 7 (Fig. 68 and Appendix 6). The TNC reported a peak of 316 eagles on December 30 and a drop to 206 eagles on January 7 compared to the FS count of 193 eagles and 303 eagles, respectively.

Salmon runs, based on WDW figures (Mills 1988), were good and provided a constant source of food for the winter eagle population, with the exception of the flooding situations on Eagle Wash. The TNC did show some fluctuations in eagle numbers between December 23 and January 21, with 204, 316 (peak count), 206, 261, and 184 eagles reported on December 23 and 30, January 7, 14, and 21, respectively (Appendix 6). The narrative portion of Mills (1988) was not received, making an explanation of the fluctuation indecipherable.

Age class differences in the time of eagle occurrence fluctuated throughout the survey for both the FS and the TNC (Fig. 68 and Appendix 6). Adult eagles comprised 68.2%, immatures 24.6%, and the unknown classification 7.2% of the 1987-88 winter population. The TNC count for the same period was 58.6% adults, 40.5% immatures, and 0.9% in the unknown category. Assuming that all of the unknown category were immatures, the night roost survey would reflect adult/immature ratios similar to those reported by researchers Hansen (1978) and Stalmaster (1976). The TNC adult/immature ratios are inconsistent with these earlier reports.

Eagle activity fluctuated tremendously during the winter of 1987-88 (Fig. 70). Activity began before 210 minutes prior to sunset and ended at 35 minutes after sunset. Peaks occurred at 150, 110, and 90 minutes before sunset as well as from 75-55 minutes before sunset and from 45 minutes before sunset to 15 minutes after sunset.

Hancock (1964) suggested that aging flying or soaring eagles should be easier and less biased that aging eagles perched in trees. Biosystems Analysis, Inc. (1980) data also supported this idea. These studies were primarily conducted during the day under good light conditions. This was not the case in this study, since the primary focus was on eagles flying or soaring to known and suspected night roost areas (Appendices 1 & 2). These activities occurred late in the day and in the evening, when light conditions were poor. The high percentage of eagles reported in the unknown category was probably due to a combination of poor light conditions and the tendency for eagles to fly and soar to great heights. This was particularly apparent in observations at

Total Number of Eagles Observed at All Sites
'87 - '88

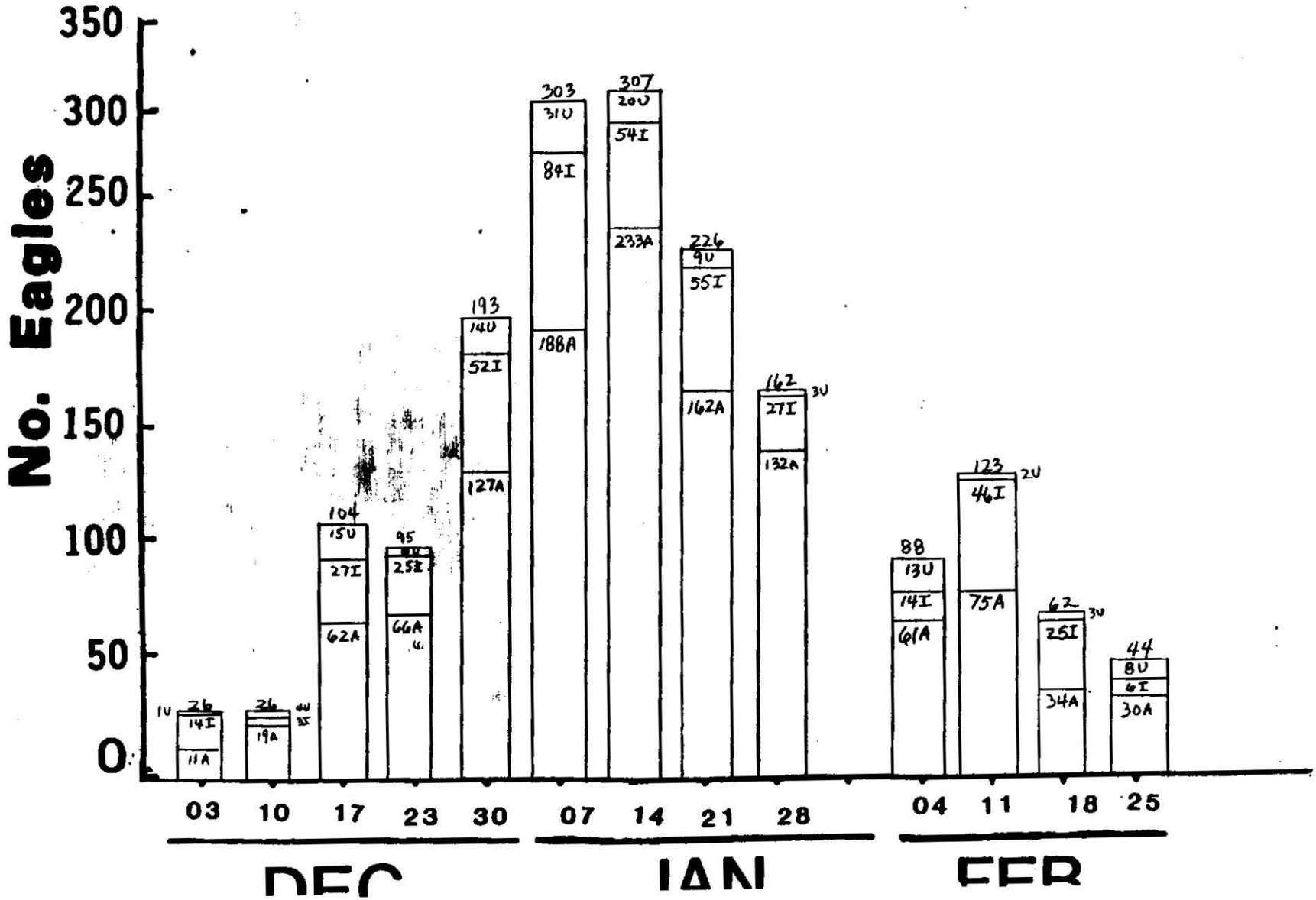
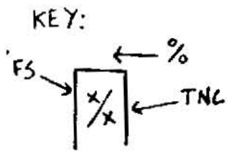


Figure 67.



Bald Eagles Observed Flying as a Percentage of the Total T.N.C. Count '87 - '88

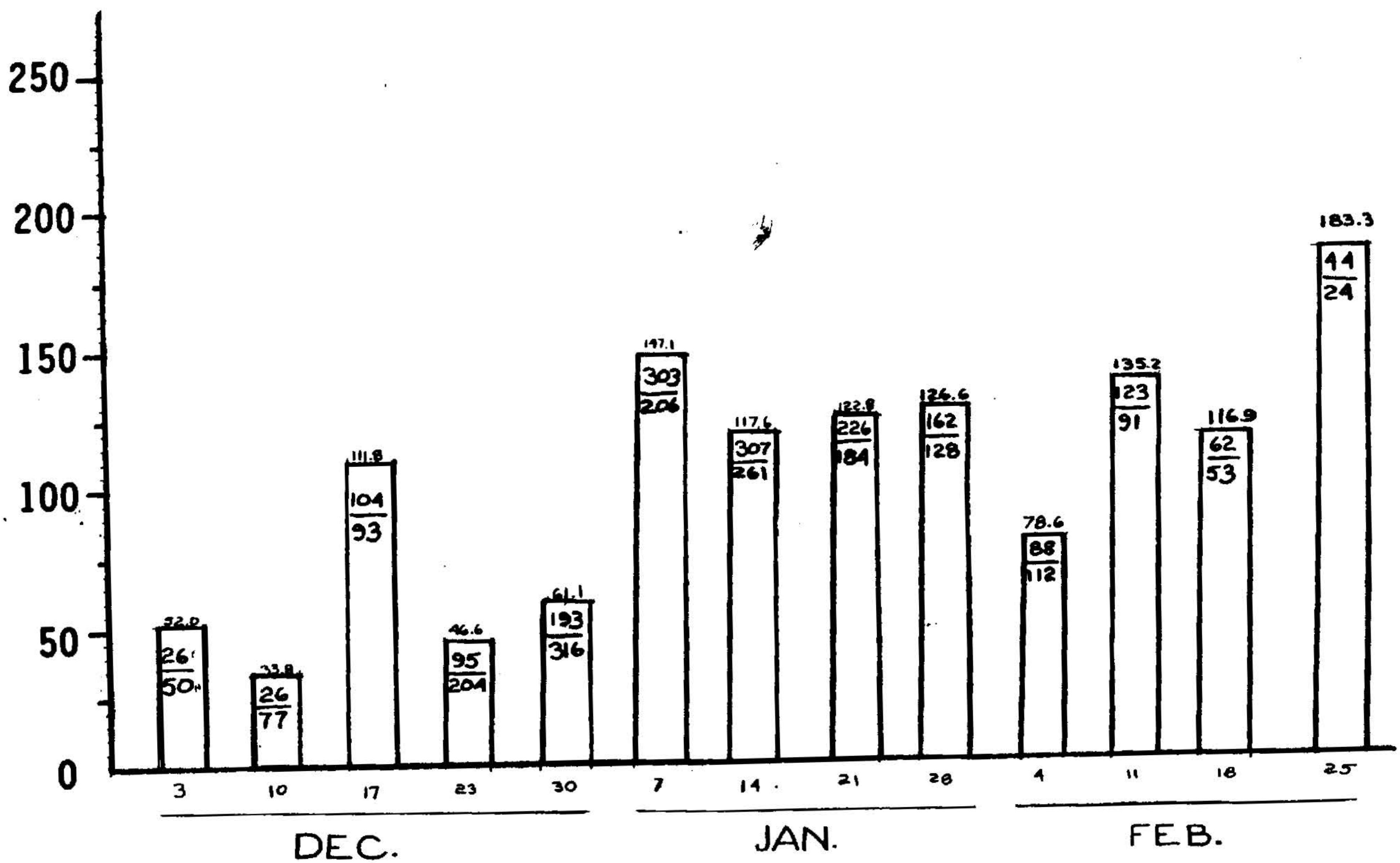


Figure 68.

Bald Eagles Observed Flying

From All Sites

in Relation to Sunset '87 - '88

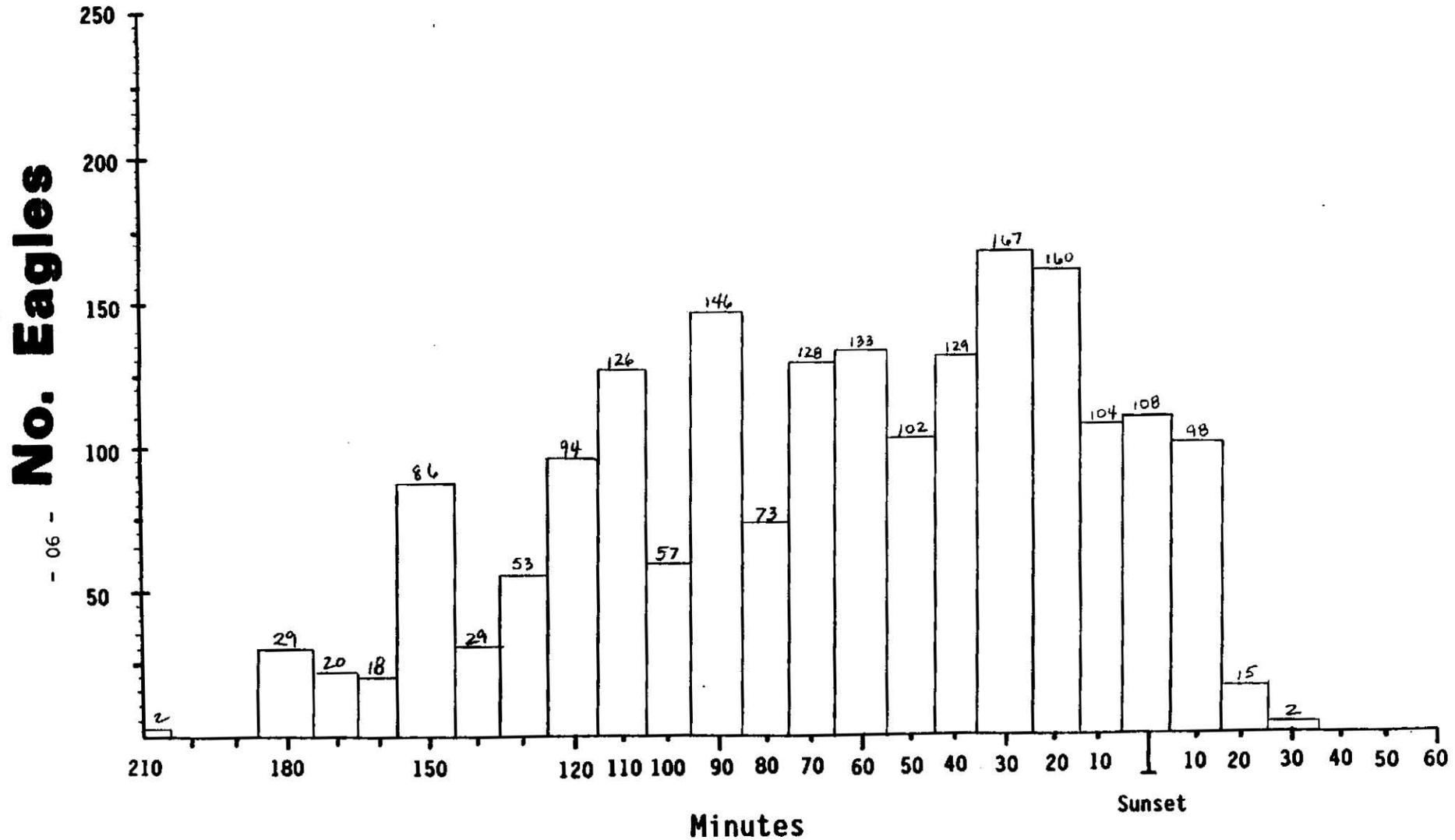


Figure 69.

Illabot Creek (Fig. 33), Mile Post 100 (Fig. 37), Barnaby Slough (Fig. 42), and Big Eddy Osprey (Fig. 61) where large numbers of unknown eagles were reported. Mile Post 100 reported a considerable amount of eagle soaring activity during the 1986-87 survey, as both Corkindale and Illabot Creek reported during the 1987-88 survey.

Seven areas were found to be the most important as communal night roosts during the 1986-87 survey. These are: 1) Mile Post 100, with a maximum count of 179 eagles comprising 147.9% of the TNC count; 2) Rockport State Park, with maximum counts of 90 and 65 eagles, comprising 58.1% and 48.9% of the TNC count, respectively; 3) Barnaby Slough, with maximum counts of 67 and 32 eagles, comprising 59.8% and 17.9% of the TNC count, respectively; 4) Shular Road, with a maximum count of 53 eagles, representing 29.6% of the TNC count; 5) Illabot Creek, with maximum counts of 53 and 48 eagles, constituting 29.8% and 39.7% of the TNC count, respectively; 6) Martin Road, with a maximum count of 45 eagles, comprising 37.2% of the TNC count; and 7) Big Eddy Osprey, with a maximum count of 38 eagles, representing 21.2% of the TNC count for the same dates during the winter of 1986-87.

Five areas were determined to be the most important as communal night roosts during the 1987-88 survey. These are: 1) Barnaby Slough, with maximum counts of 91, 67, 60, 58, and 40 eagles, comprising 34.9%, 36.4%, 29.1%, 45.3%, and 12.7% of the TNC count, respectively; 2) Rockport State Park, with maximum counts of 83, 60, and 56 eagles, constituting 26.3%, 29.1%, and 21.5% of the TNC count, respectively; 3) Big Eddy Osprey, with a maximum count of 65 eagles, comprising 24.9% of the TNC count; 4) Illabot Creek, with maximum counts of 49 and 43 eagles, representing 20.9% and 18.8% of the TNC count, respectively; and 5) Mile Post 100, with a maximum count of 38 eagles, comprising 12.0% of the TNC count for the respective dates in the winter of 1987-88.

Other possible roosts may exist on the Cascadé and Sauk Rivers and above Shular Road, as well as the smaller roost on Bacon Creek. Some of these roosts may only be used during severe winters, as the use of deciduous, riparian roosts during the last two years with mild winters may suggest.

Recommendations-

1. Cascade River sites - Observations need to be continued to determine if a roost exists above Found Creek.

2. Bacon Creek - Observations need to be continued to better define the area being used by eagles on the west side of Bacon Creek.

3. Olson Creek - Observations need to be continued, although with a lower priority, to define the perch area in lower Bacus Creek that appears to be on FS land and is located in the proposed Olson Timber Sale Planning Area.

4. Corkindale - The ridge east of Rocky Creek needs to be upgraded to an intensive effort with three observers to determine if eagles are using the area along Rocky Creek or the slopes to the east. This area is in the proposed Corkindale Timber Sale Planning Area.

5. Corkindale Powerline - This site will be discontinued as efforts are being undertaken to move the site onto private land which affords a better viewpoint.

6. Rocky Creek - This site will be discontinued.

7. Illabot Creek - Continue observations from the powerline corridor to maintain baseline monitoring. Also coordinate with proposed USFWS/Evergreen College microhabitat/environmental monitoring of the Illabot Creek and Barnaby Slough roosts so that eagle numbers and possible correlations with environmental factors can be investigated.

8. Mile Post 100 (Cascadian Farm Roost) - Continue with at least a minimum level of monitoring. The roost areas have been pretty well delineated.

9. Barnaby Slough - Continue observations from the vicinity of the roost so that eagle numbers and possible correlations with environmental factors can be investigated, if the proposed USFWS/Evergreen College study takes place.

10. Martin Road - This site will be discontinued.

11. Government Bridge - Continue observations with volunteers as a lower priority.

12. Hilt Creek - Continue observations to determine eagle use of the area.

13. Eagle Wash - Continue observations with a lower priority.

14. Rockport State Park - Continuation of this site is questionable, as the Skagit Audubon Society is planning to monitor the Park.

15. Sauk Mountain - Continue observations and find a better observation point closer to Jackman Creek.

16. Big Eddy Osprey - Continue observations with volunteers, but with a lower priority.

NORTH FORK NOOKSACK RIVER RESULTS AND DISCUSSION

1. Glacier Creek (RM 57.5)

Follow the Mt. Baker Hwy. (Hwy. 542) to MP 59; turn north and follow the road to the river bank (SE 1/4, Sec. 6, R7E, T39N) (Fig. 71). The Glacier Creek team also observed eagles along Glacier Creek to the Glacier Creek Road Bridge and 1/2 mile of Thompson Creek along Road #3910 (SW 1/4, Sec. 9, R7E, T39N).

2. Fosters (RM 55.6)

All observations were made near a residence north of the Mt. Baker Hwy. (Hwy. 542) at MP 57 (NW 1/4, Sec. 1, R06E, T39N) (Fig. 71).

3. Warnick Bridge (RM 55.0)

Observations were made from the bridge north of the Mt. Baker Hwy. (Hwy. 542) at MP 55 (NE 1/4, Sec. 2, R6E, T39N) (Fig. 72).

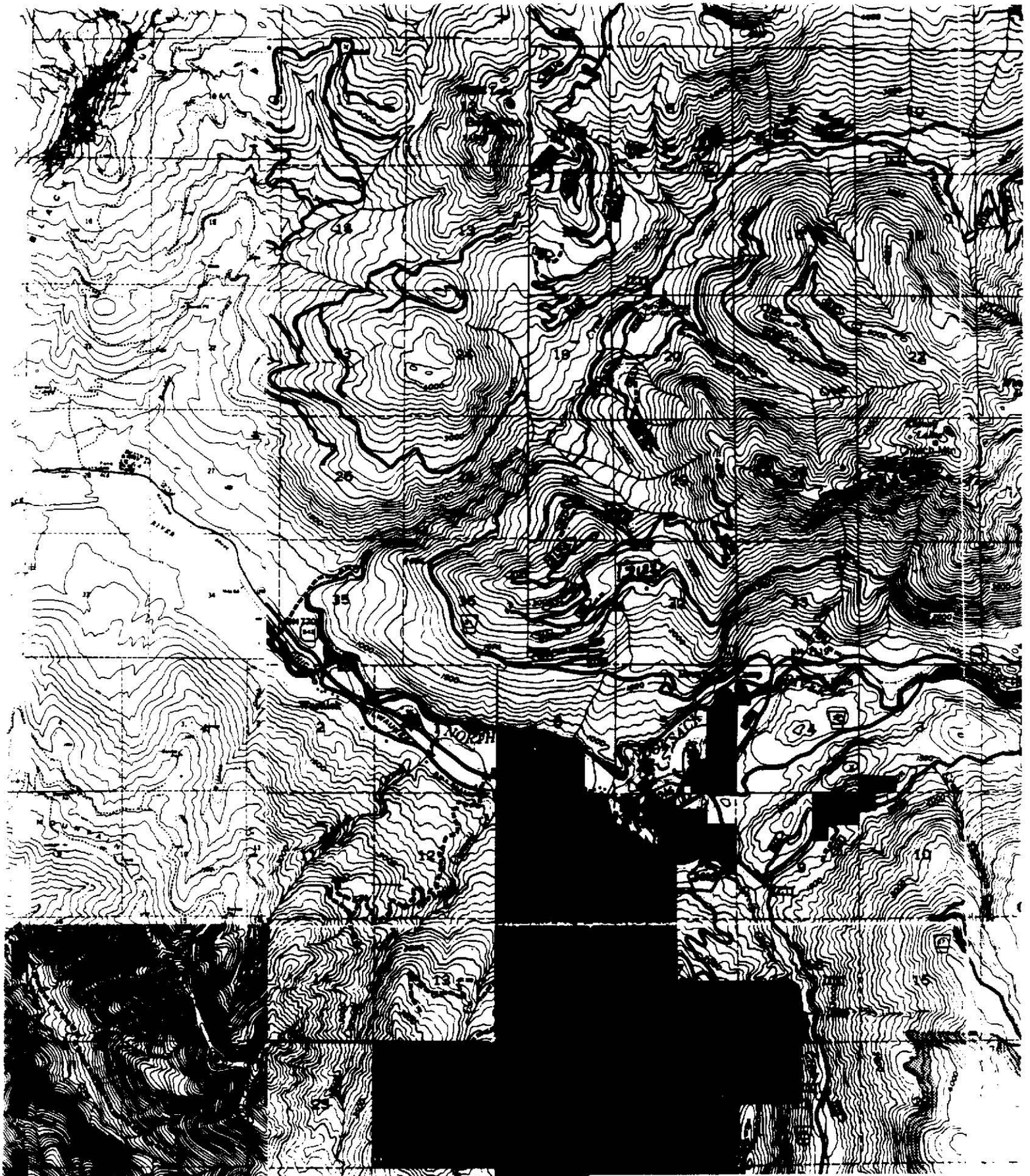
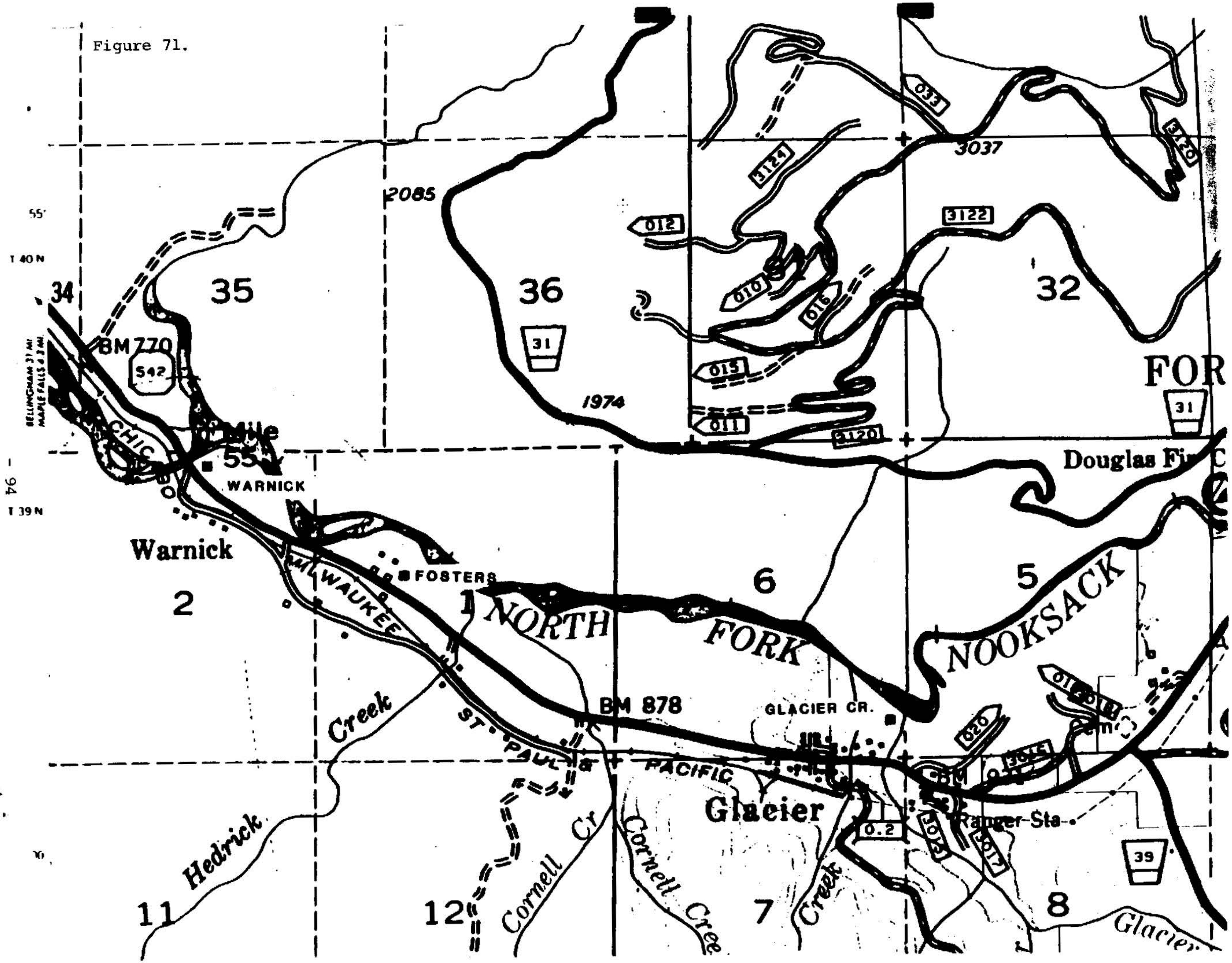


FIG. 70

NORTH FORK NOOKSACK
GLACIER CREEK & FOSTERS

★ OBSERVATION SITE

Figure 71.


35
36
32
34
2085
1974
3037
3122
012
010
016
015
011
3120
3124
033
31
542
BM770
Mile 55
WARNICK
Warnick
FOSTERS
2
1
6
5
NORTH FORK NOOKSACK
Douglas Fir
FOR
BM 878
GLACIER CR.
MILWAUKEE
ST. PAUL & PACIFIC
Glacier
Ranger Sta.
0.2
39
Hedrick Creek
Cornell Cr
Cornell Cree
Creek
11
12
7
8
Glacier
T 40 N
T 39 N

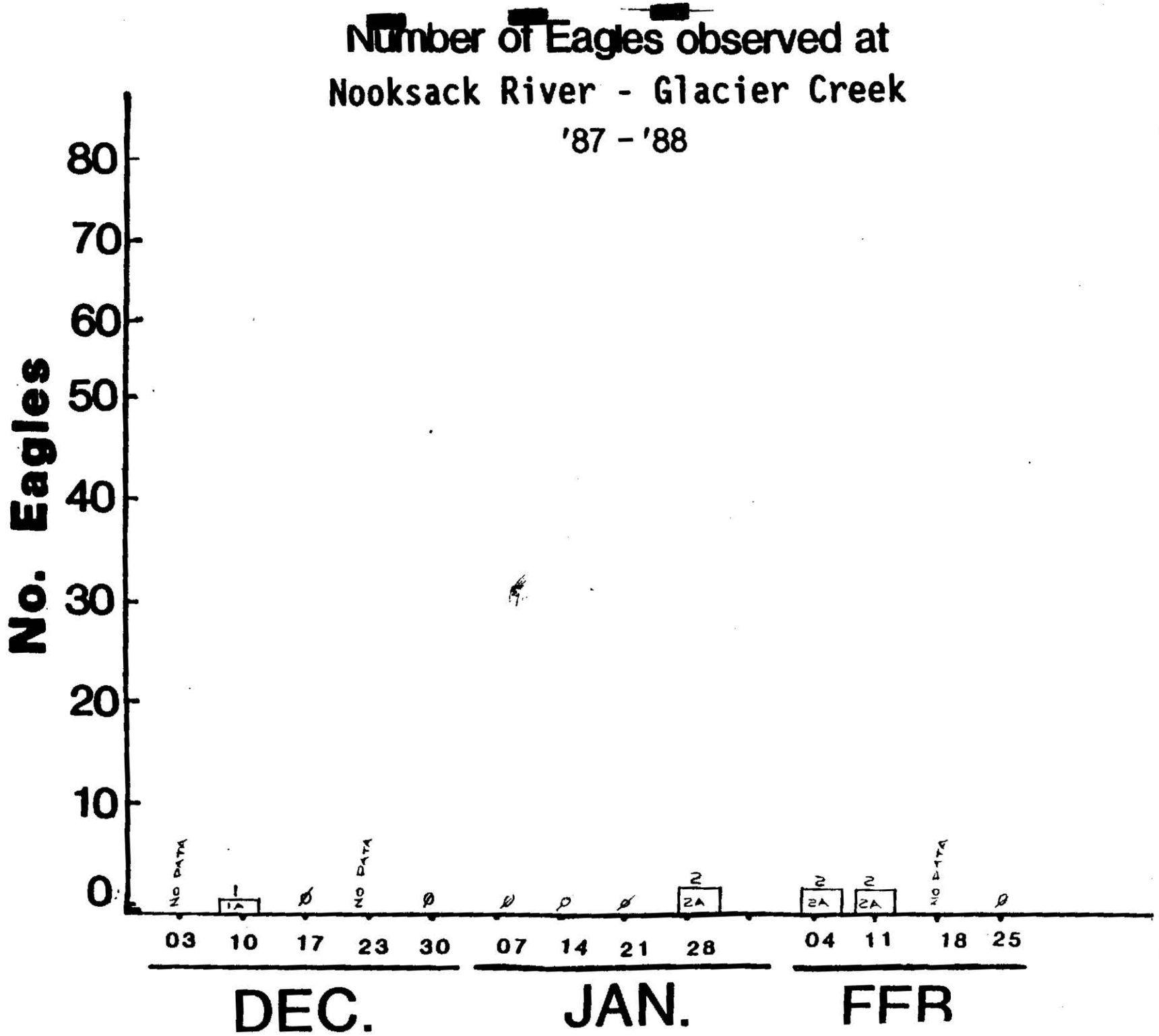

Number of Eagles observed at
Nooksack River - Glacier Creek
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
1
1A
Ø
NO DATA
Ø
Ø
Ø
Ø
2
2A
2
2A
2
2A
NO DATA
Ø
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB

Figure 72.

All observations in the North Fork Nooksack River area were conducted during the 1987-88 winter survey.

1. Glacier Creek

A total of 9 observation dates, totalling 17 person-hours, was conducted. There were 6 adult eagles observed at this site (Fig. 73).

2. Fosters

Observations were conducted on 4 dates with a total of 9 person-hours. A total of 19 eagles (12 adults, 6 immatures and 1 unknown) was reported (Fig. 74). A peak of 7 eagles (5 adults and 2 immatures) were observed on January 28. No data was collected in December or through the first three weeks of January due to a lack of available observers.

3. Warnick Bridge

There were 6 observation dates conducted, comprising 10 person-hours, at this site. A total of 2 adult eagles was reported (Fig. 75). No data was collected for most of December and half of February due to a lack of available observers.

NORTH FORK NOOKSACK RIVER SUMMARY AND RECOMMENDATIONS

Bald eagle use of FS lands above Warnick, Washington, is sparse. This is partly due to the fact that only remnant runs of chum and coho have been observed during the 1980s. The WDF reported a chum escapement of 13,589 and a coho escapement of 5500 for the Nooksack River in 1987-88. With heavy eagle foraging downriver, it is highly unlikely that many salmon get this far upriver.

The possibility exists that pink and chinook salmon may be utilized by eagles in this area earlier in the year. It may be necessary to begin surveying the North Fork of the Nooksack River in September to determine eagle use.

Recommendations-

1. Glacier Creek - Continue observations, but with a lower priority. Begin the survey in September during the pink and chinook salmon runs.

2. Fosters - Continue observations at a lower priority and begin surveying the site during the pink and chinook salmon runs in September and October.

3. Warnick Bridge - Discontinue observations at this site.

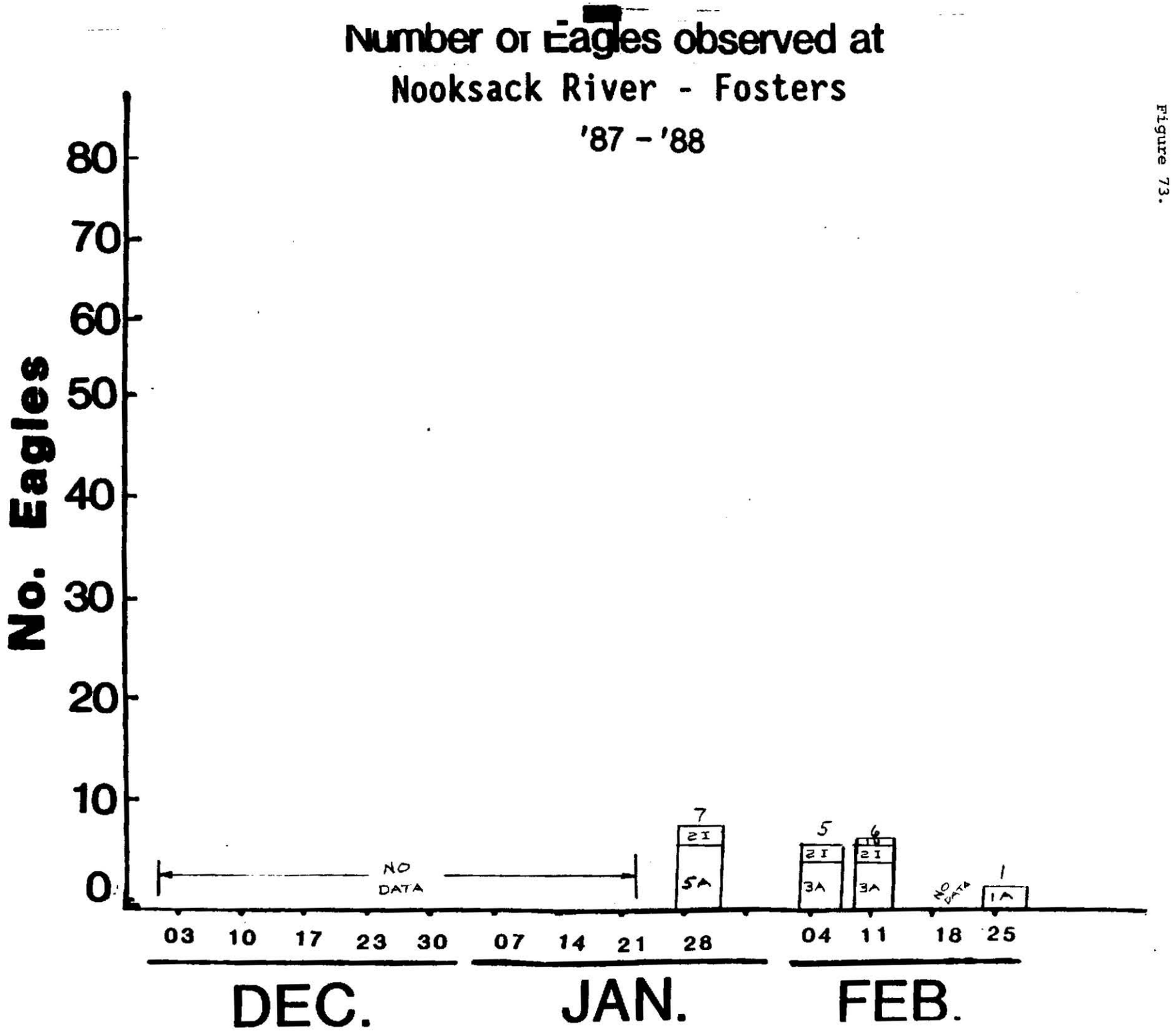
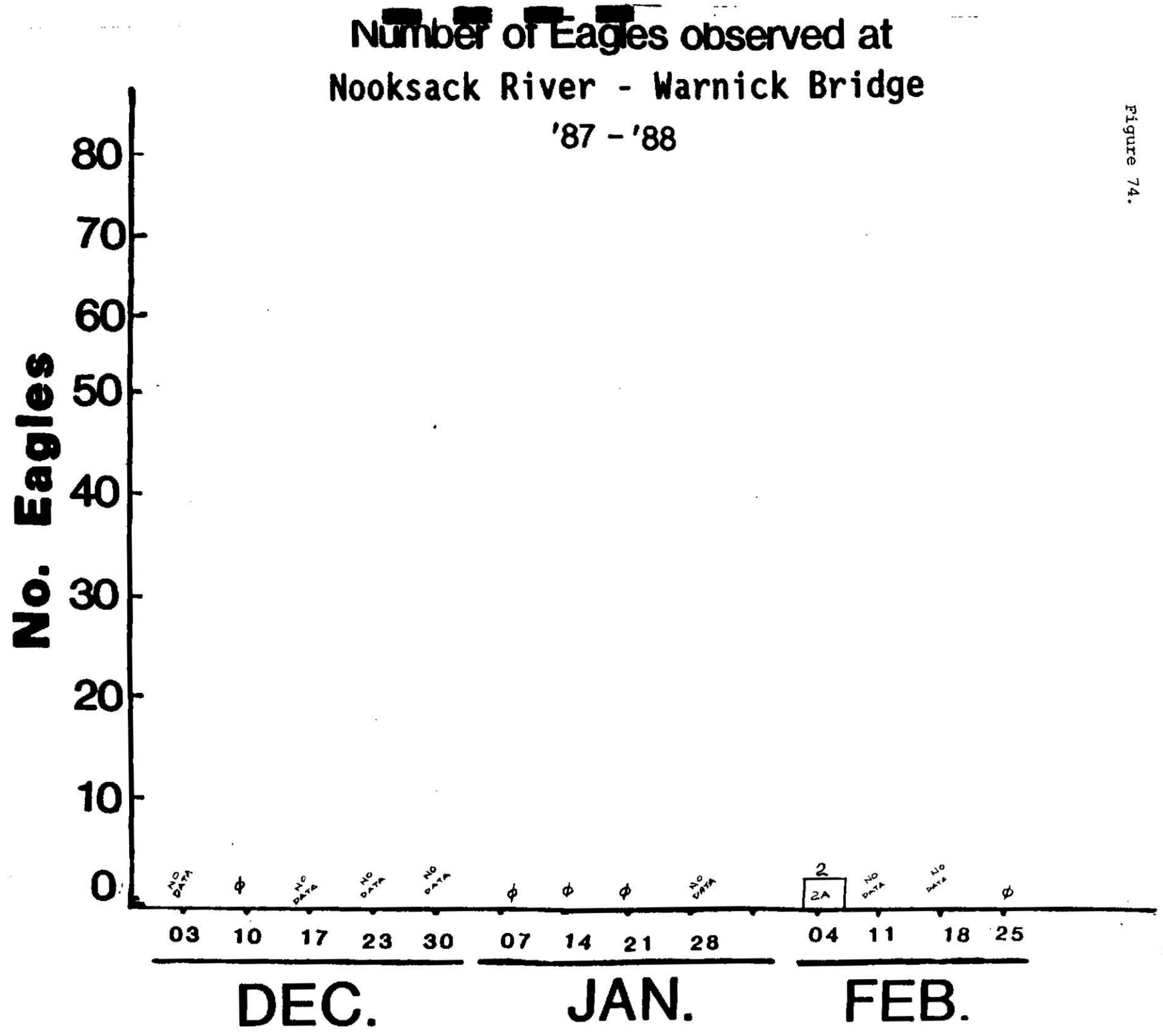

Number of Eagles observed at
Nooksack River - Fosters
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
7
2I
5A
5
2I
3A
6
2I
3A
NO DATA
1
1A
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 73.


Number of Eagles observed at
Nooksack River - Warnick Bridge
'87 - '88
No. Eagles
80
70
60
50
40
30
20
10
0
NO DATA
ϕ
NO DATA
NO DATA
NO DATA
ϕ
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NO DATA
2
2A
NO DATA
NO DATA
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03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

Figure 74.

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ACKNOWLEDGEMENTS

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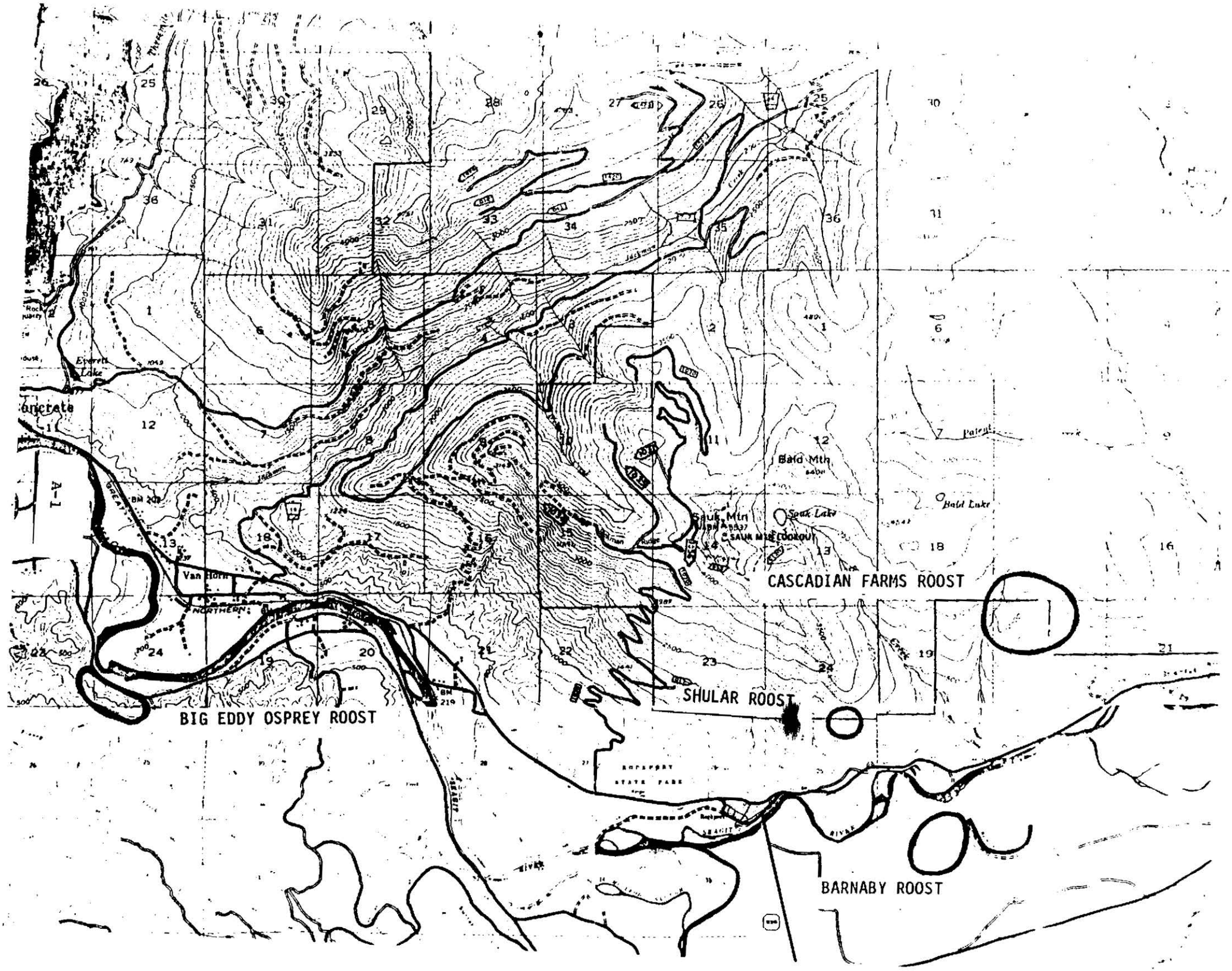
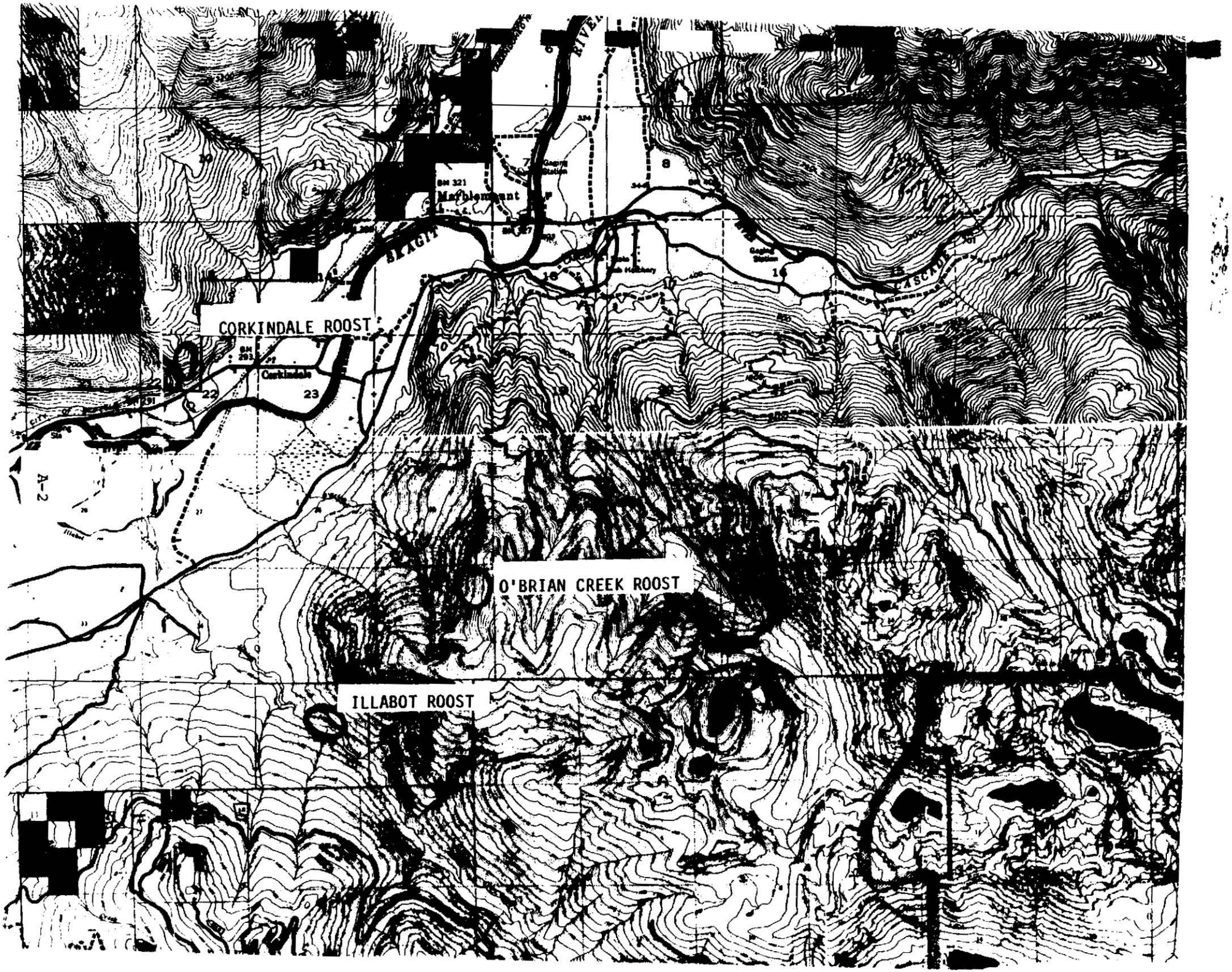
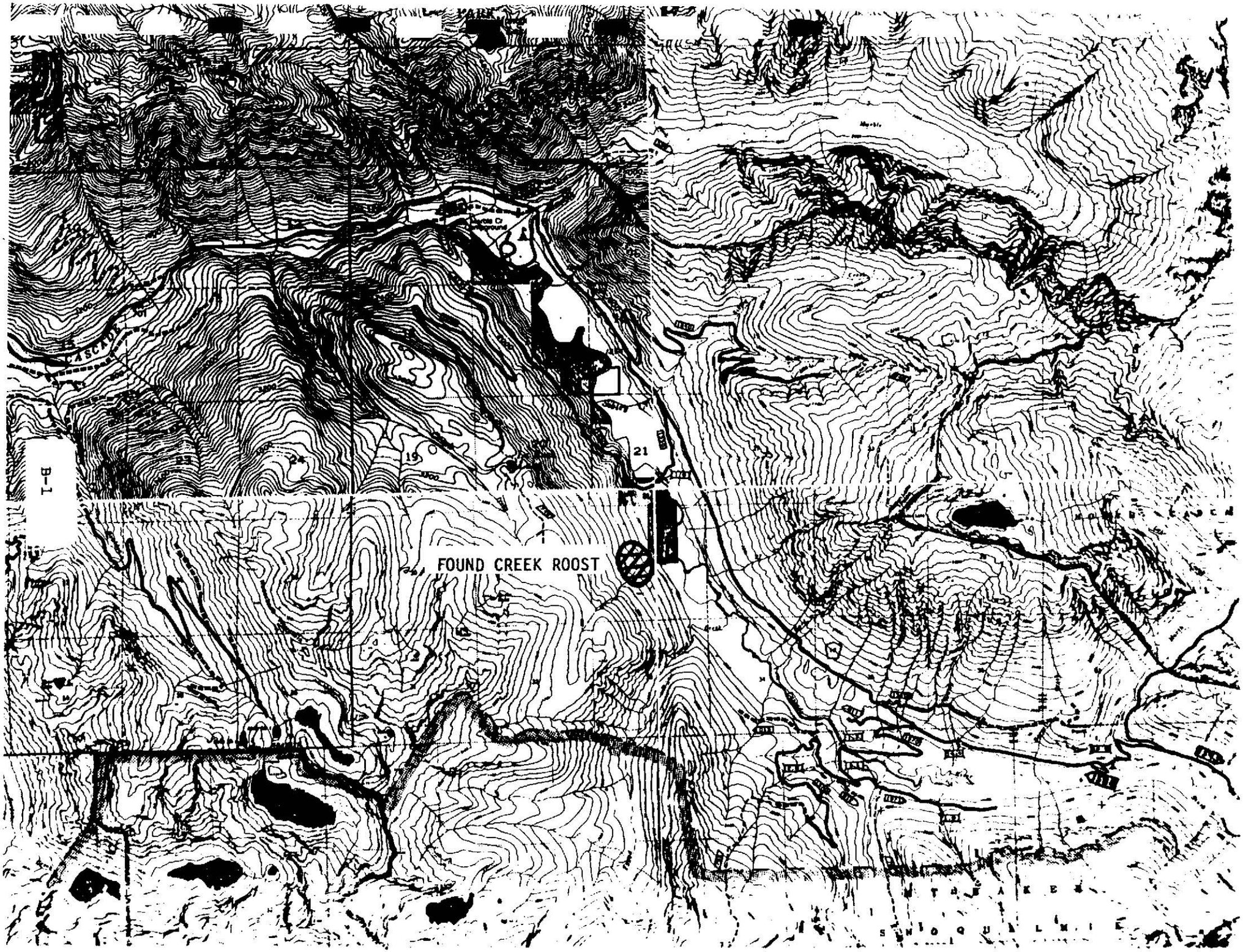
Joanne Stellini from the FWS for her assistance in the field.

APPENDICES


CASCADIAN FARMS ROOST
SHULAR ROOST
BIG EDDY OSPREY ROOST
BARNABY ROOST
Van Horn
Bald Mtn
Bald Lake
Sauk Mtn
Sauk Lake
Everett
Lake
A-1


CORKINDALE ROOST
O'BRIAN CREEK ROOST
ILLABOT ROOST
A-2


B-1
FOUND CREEK ROOST

COMMUNAL NIGHT ROOST OBSERVATION FORM
Mt. Baker Ranger District
1986-87

Observation location:_____ **Date:**_____

Observer(s):_____ **Time: Arrive**_____ **Leave**_____

Temp. (F) :_____, _____, _____, _____, _____, _____, _____, _____
Time: arrive 3:00 3:30 4:00 4:30 5:00 5:30 leave.

Wind Speed (mph):_____ **Wind Direction:** N NE E SE S SW W NW

Cloud Cover (%): 0-25, 26-50, 51-75, 76-100 **Visibility:** Good Fair Poor

Precipitation: Light drizzle Steady rain Downpour Snow

TIME	# ADULTS	# IMM.	# UNK.	DIRECTION	COMMENTS

INSTRUCTIONS TO FILL OUT FORM
1986-87

OBSERVATION LOCATION: Describe your observation point location and show this location on your aerial photo copy.

TIME: Fill out the time you arrive and the time you complete your observations. Please use **NON-MILITARY** TIME, eg. 4:30.

TEMPERATURE: Take the temperature in **Fahrenheit** degrees when you first arrive and then every 1/2 hour after that. Take the temperature again at dusk.

WIND SPEED: Estimate in increments of 5 mph.

WIND DIRECTION: Circle the direction the wind is coming **from.**

CLOUD COVER: Circle the percent cloud cover overhead in 25% increments.

VISIBILITY: Circle the appropriate visibility.

PRECIPITATION: Circle the appropriate condition.

COMMENTS: Note any changes in weather conditions or visibility. Note the flight behavior of the eagles, flight height and interactions with other eagles. Note other birds flying in similar directions, especially crows, ravens, or other special wildlife species. Note staging areas and human disturbances to flying or perched eagles.

EXAMPLE:

2 A, 3:40 = Two adults at 3:40 p.m.

1I, 4:10 = One immature at 4:10 p.m.

On your aerial photo (copy) map, please draw in:

1. Your observation point, eg. o
2. Flight pattern of all eagles, eg. ⟶
3. The number, age, and time of each flight pattern eg. **2A, 3:40.**

Plate 18

EAGLES AND VULTURES

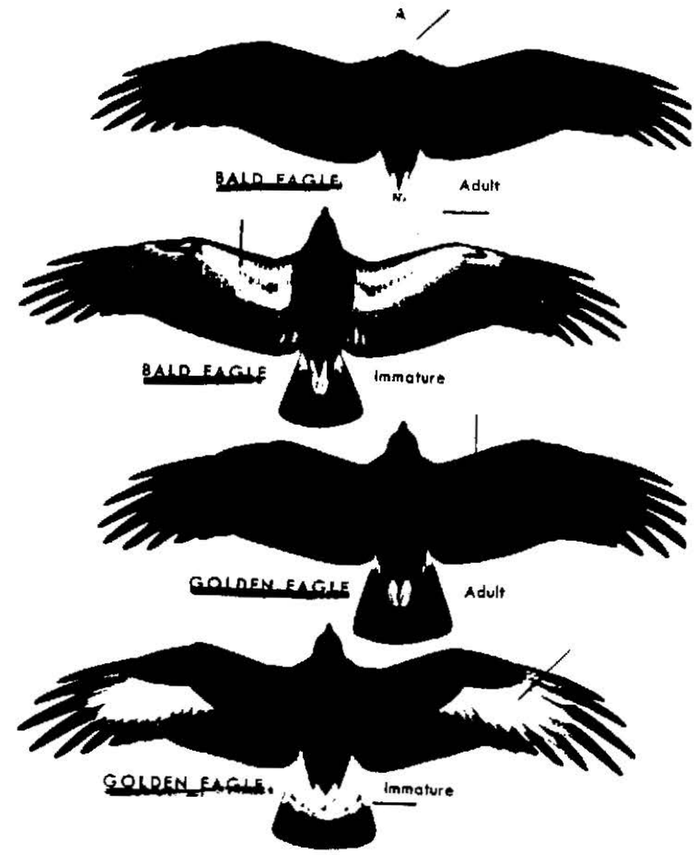
BALD EAGLE p. 57
Adult: White head and white tail.
Immature: Some white in wing-linings.

GOLDEN EAGLE p. 56
Adult: Almost uniformly dark; wing-linings dark.
Immature: "Ringed" tail; white patch at base of primaries.

BLACK VULTURE p. 47
Stubby tail, whitish wing patch.

TURKEY VULTURE p. 47
Two-toned wings, small head, longish tail.

(Above): Where the Bald Eagle, Turkey Vulture, and Osprey all are found, they can be separated at a great distance by their manner of soaring — the Bald Eagle, with flat wings; the Turkey Vulture, with a dihedral; the Osprey, with a kink or crook in its wings.



BALD EAGLE SURVEY DATES

There will be 13 survey dates during the 1986-87 season. Surveys will be conducted every Thursday, except after Christmas and New Years, when they will occur on Tuesday*. Participants should be at the Mt. Baker Ranger Station, ready to leave, no later than 1:30 p.m. on their survey day.

Survey dates are as follows:

DECEMBER 4, 11, 18, 23*, 30*

JANUARY 8, 15, 22, 29

FEBRUARY 5, 12, 19, 26

RECOMMENDED EQUIPMENT

Here is a list of recommended clothing. Weather conditions will be highly variable during the survey period. Rain, wind, snow, and low temperatures may all be expected, so please, for your own comfort, be prepared!

Wool pants, shirt, sweater, hat, and gloves/mittens
Wool/polypropylene long underwear
Rain pants and coat
Sorels/other warm boots

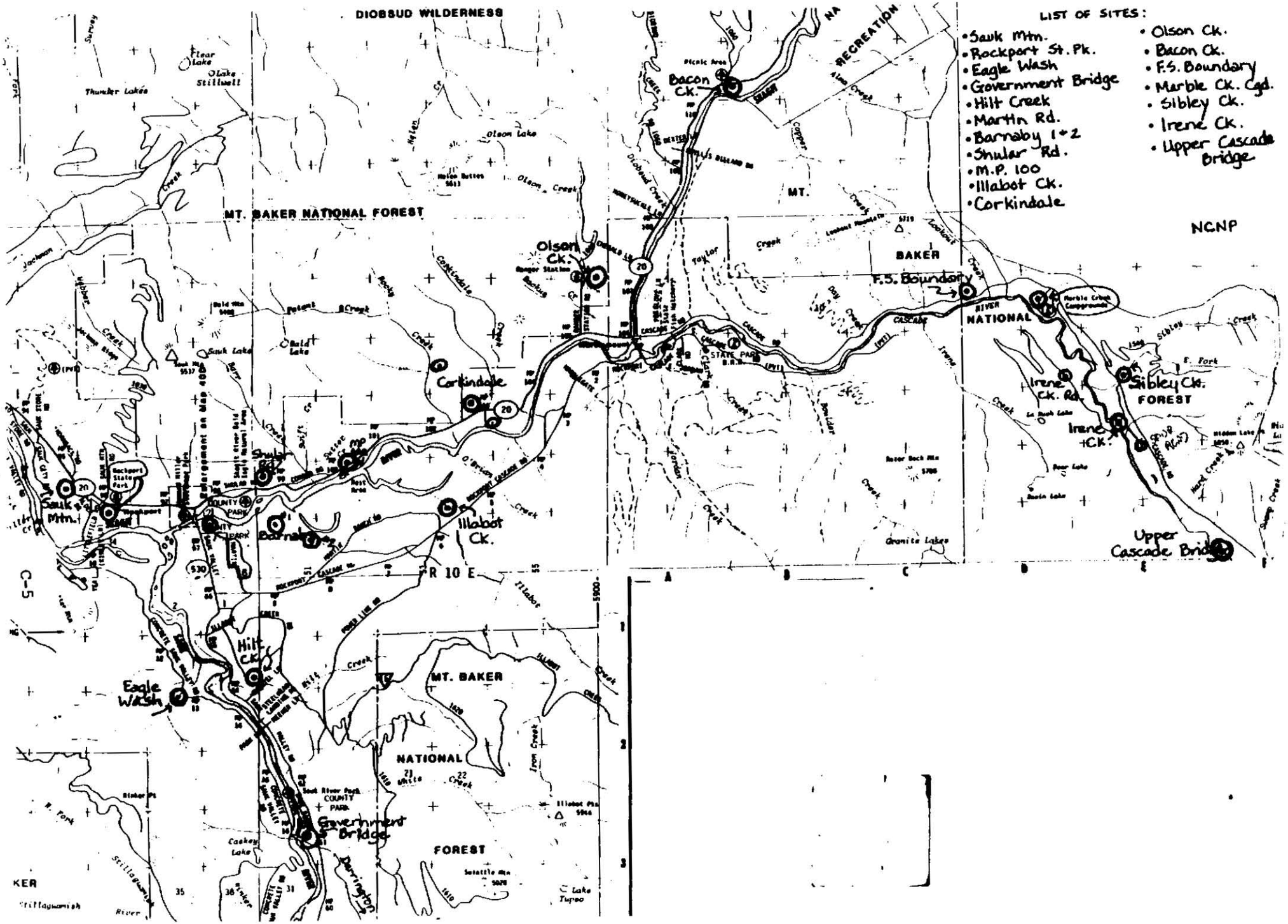
A WATCH!

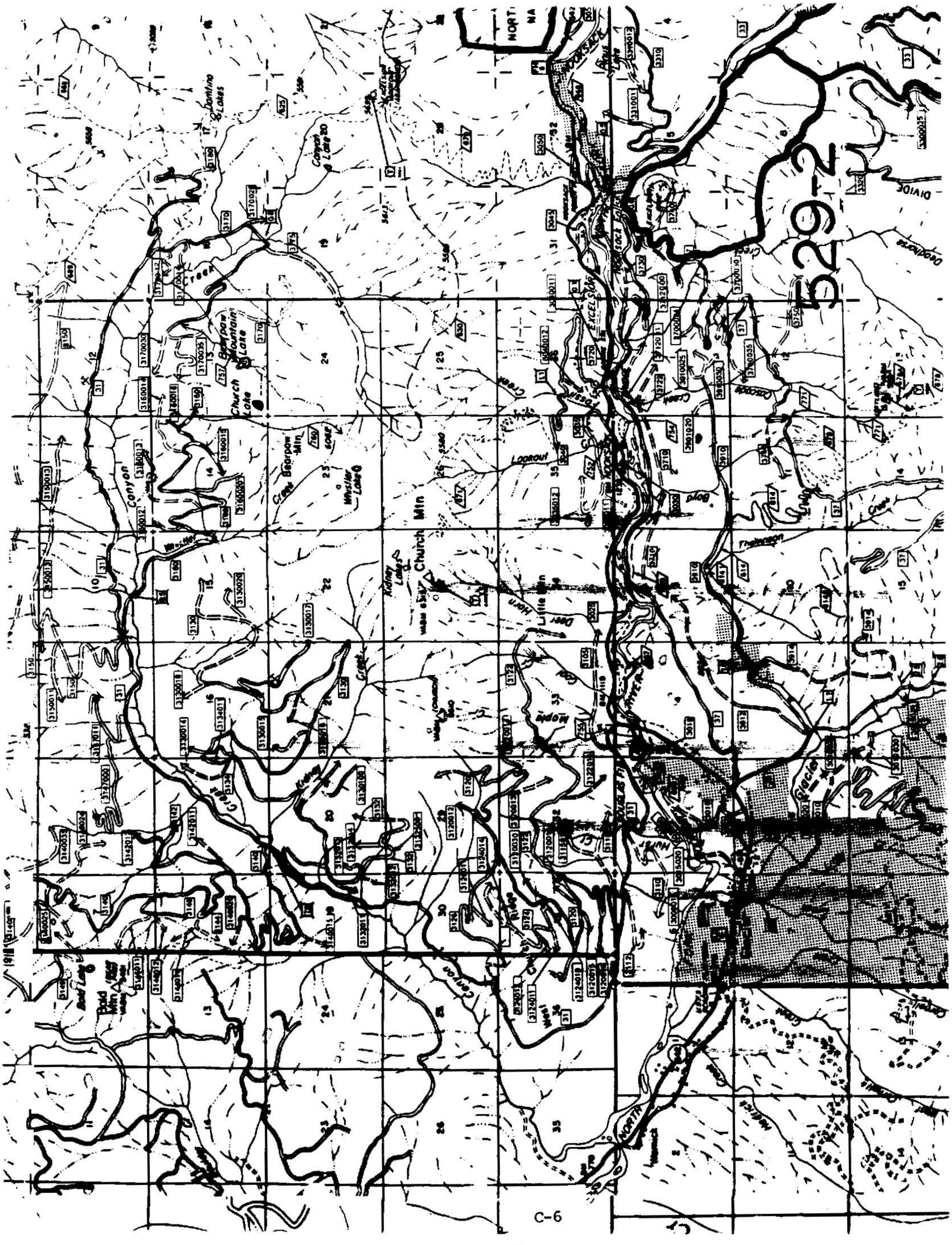
GENERAL

If you can't make it to your "assigned" survey date,
please call by the Monday prior to your survey day.

For more information/cancellations please contact Brady Green or Cam Goldner.
(USFS - Sedro Woolley) 856-5700, ext.234 or 236, respectively.

** THANKS! **


LIST OF SITES:
• Sauk Mtn.
• Rockport St. Pk.
• Eagle Wash
• Government Bridge
• Hilt Creek
• Martin Rd.
• Barnaby 1 & 2
• Shuler Rd.
• M.P. 100
• Illabot Ck.
• Corkindale
• Olson Ck.
• Bacon Ck.
• F.S. Boundary
• Marble Ck. Cgd.
• Sibley Ck.
• Irene Ck.
• Upper Cascade Bridge
DIOBSUD WILDERNESS
MT. BAKER NATIONAL FOREST
NCNP
Bacon Ck.
Olson Ck.
Corkindale
F.S. Boundary
Sibley Ck.
Irene Ck.
Illabot Ck.
Sauk Mtn.
Eagle Wash
Hilt Ck.
Government Bridge
Upper Cascade Bridge
R 10 E
C-5


529-2
Church Mtn
Bearpaw Mtn
Church Lake
Bearpaw Mountain Lake
Whistler Lake
Kidney Lakes
Canyon Lake
Damfino Lakes
NOOKSACK
EXCELSIOR
Canyon
Lookout
Glacier
DIVIDE
Bald Mtn

BALD EAGLE SURVEYS
CONTACT LIST
1986-87

NAME:	PHONE #:	ADDRESS:	SURVEY DATES AVAILABLE:	PREFERRED SURVEY LOCATION(S):

BALD EAGLE NIGHT ROOST SURVEY DATA
1986-87

OBSERVATION LOCATION: _____

DATES:	NUMBER OF BALD EAGLES OBSERVED: ADULT	IMMATURE	UNKNOWN	COMMENTS	TNC COUNT	% TNC COUNT
DEC. 4						
DEC. 11						
DEC. 18						
DEC. 23*						
DEC. 30*						
JAN. 8						
N. 15						
JAN. 22						
JAN.29						
FEB. 5						
FEB. 12						
FEB. 19						
FEB.26						

BALD EAGLE NIGHT ROOST DATA SHEET
1986-87

OBSERVATION LOCATION: _____

DATES:	TEMPERATURE (oF) HIGH	LOW	MEAN	WIND SPEED & DIRECTION	CLOUD COVER	VISIBILITY	PRECIP.
DEC. 4							
DEC. 11							
DEC. 18							
DEC. 23*							
DEC. 30*							
JAN. 8							
JAN. 15							
JAN. 22							
JAN. 29							
FEB. 5							
FEB. 12							
FEB. 19							
FEB. 26							

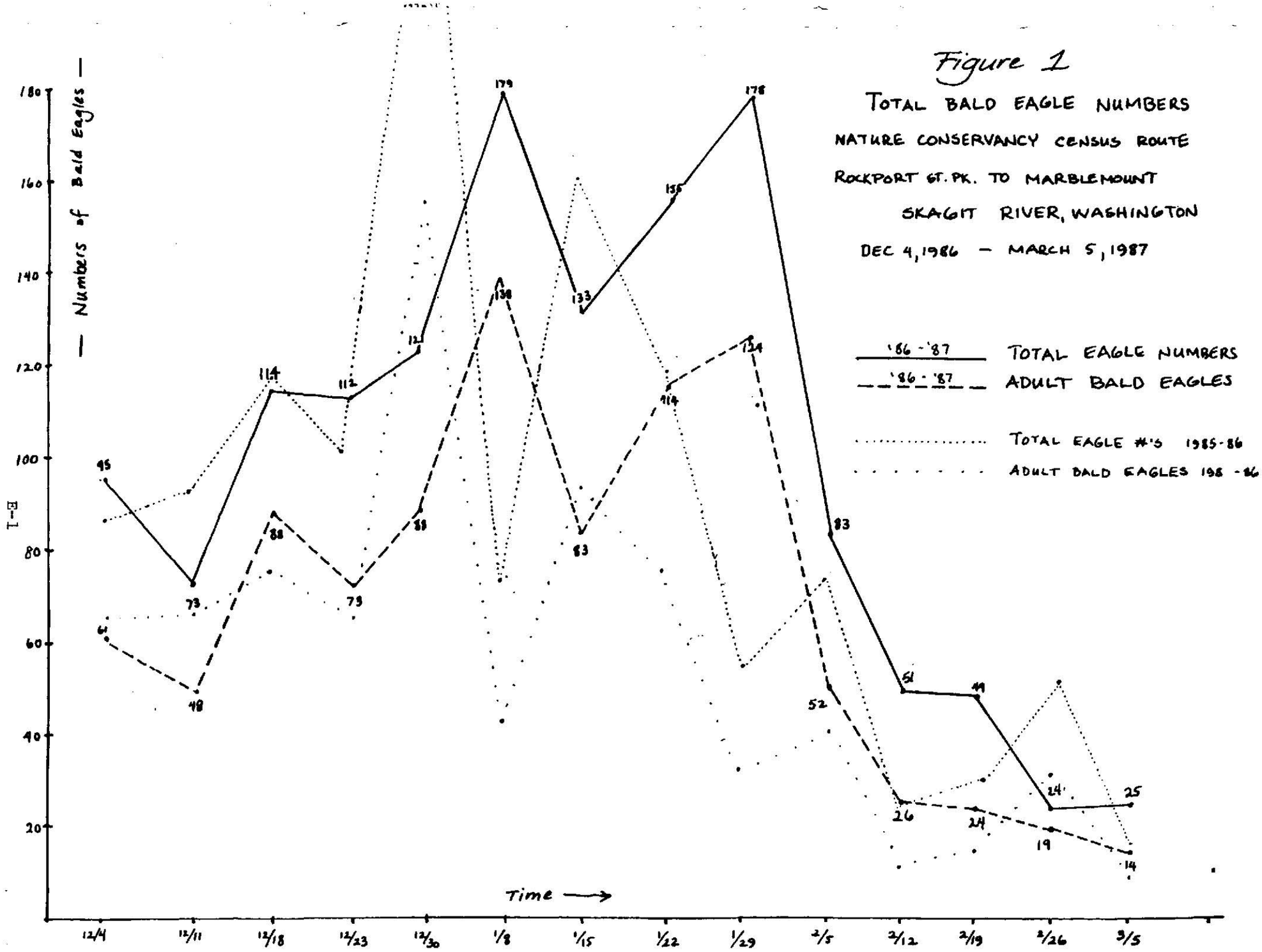


Figure 1
TOTAL BALD EAGLE NUMBERS
NATURE CONSERVANCY CENSUS ROUTE
ROCKPORT ST. PK. TO MARBLEMOUNT
SKAGIT RIVER, WASHINGTON
DEC 4, 1986 – MARCH 5, 1987
'86 - '87 TOTAL EAGLE NUMBERS
'86 - '87 ADULT BALD EAGLES
TOTAL EAGLE #'S 1985-86
ADULT BALD EAGLES 198 -86
— Numbers of Bald Eagles —
Time →
180
160
140
120
100
80
60
40
20
12/4
12/11
12/18
12/23
12/30
1/8
1/15
1/22
1/29
2/5
2/12
2/19
2/26
3/5
95
73
114
112
121
179
133
135
178
83
51
49
25
63
48
88
73
88
138
83
114
134
52
26
24
19
14

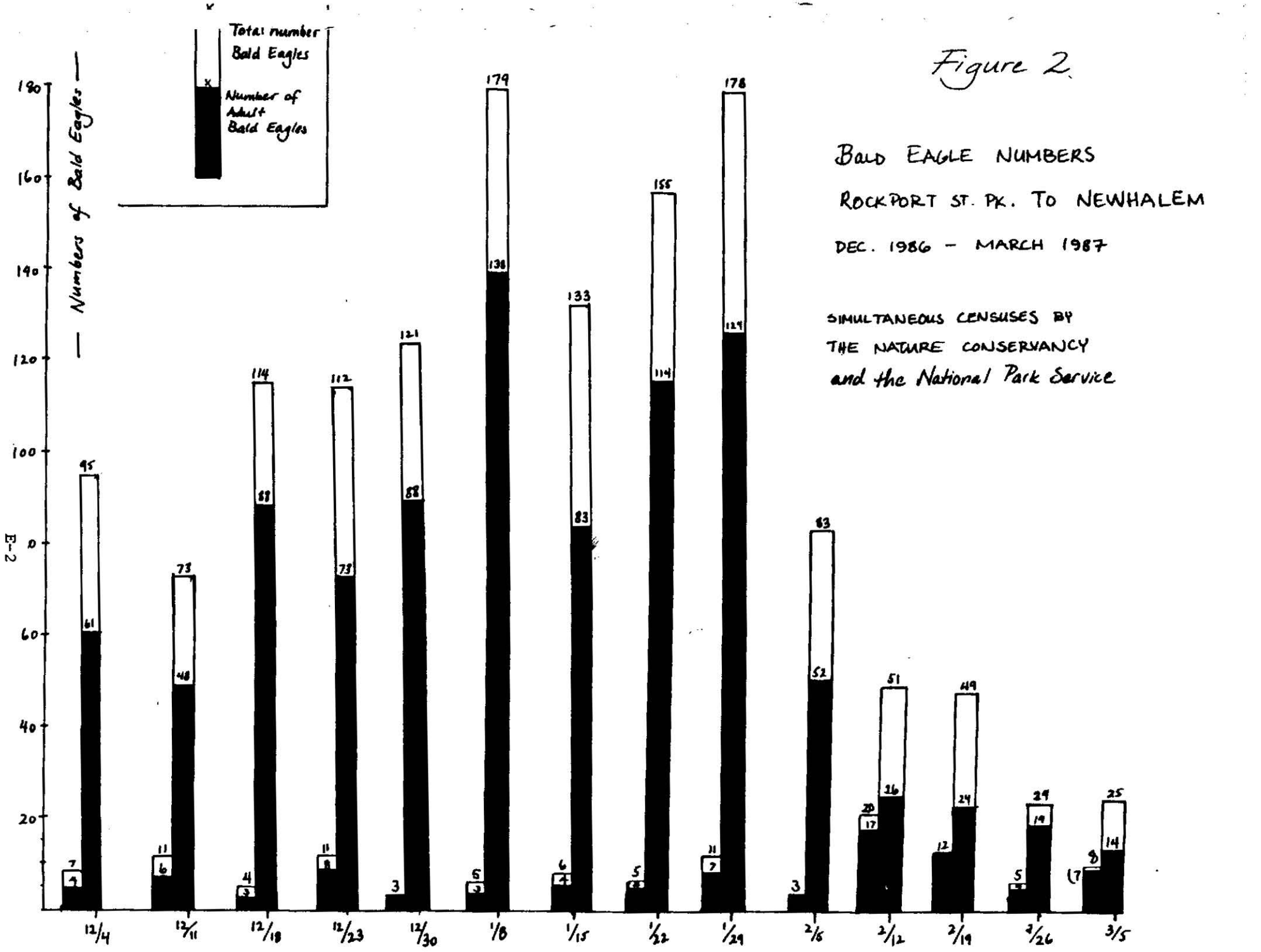


Figure 2.
BALD EAGLE NUMBERS
ROCKPORT ST. PK. TO NEWHALEM
DEC. 1986 - MARCH 1987
SIMULTANEOUS CENSUSES BY
THE NATURE CONSERVANCY
and the National Park Service
Total number Bald Eagles
Number of Adult Bald Eagles
— Numbers of Bald Eagles —
180
160
140
120
100
80
60
40
20
12/4
12/11
12/18
12/23
12/30
1/8
1/15
1/22
1/29
2/6
2/12
2/19
2/26
3/5
95
73
114
112
121
179
133
155
178
63
51
49
29
25
E-2

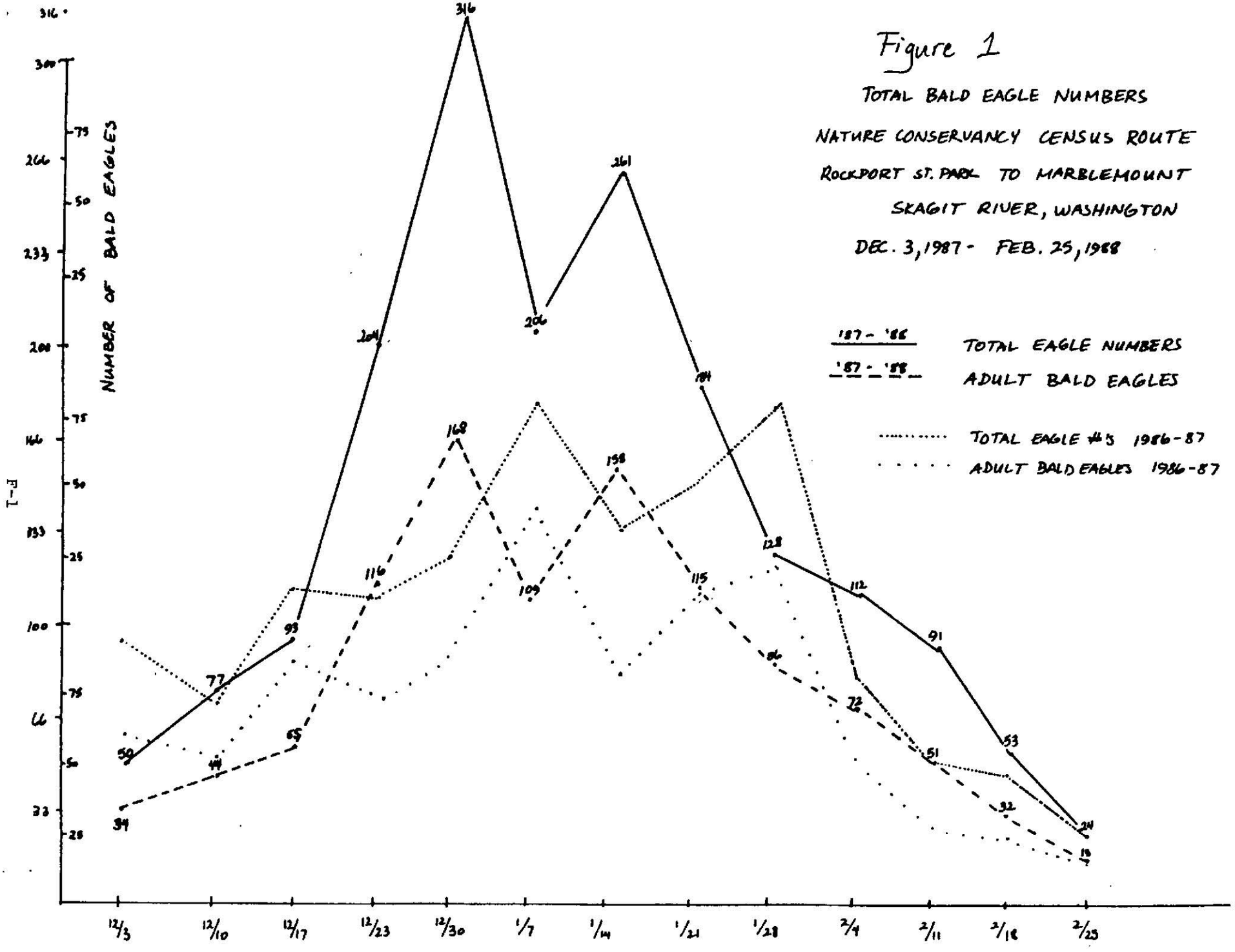


Figure 1
TOTAL BALD EAGLE NUMBERS
NATURE CONSERVANCY CENSUS ROUTE
ROCKPORT ST. PARK TO MARBLEMOUNT
SKAGIT RIVER, WASHINGTON
DEC. 3, 1987 - FEB. 25, 1988
'87 - '88 TOTAL EAGLE NUMBERS
'87 - '88 ADULT BALD EAGLES
TOTAL EAGLE #'S 1986-87
ADULT BALD EAGLES 1986-87
NUMBER OF BALD EAGLES
12/3
12/10
12/17
12/23
12/30
1/7
1/14
1/21
1/28
2/4
2/11
2/18
2/25

Figure 2

BALD EAGLE NUMBERS

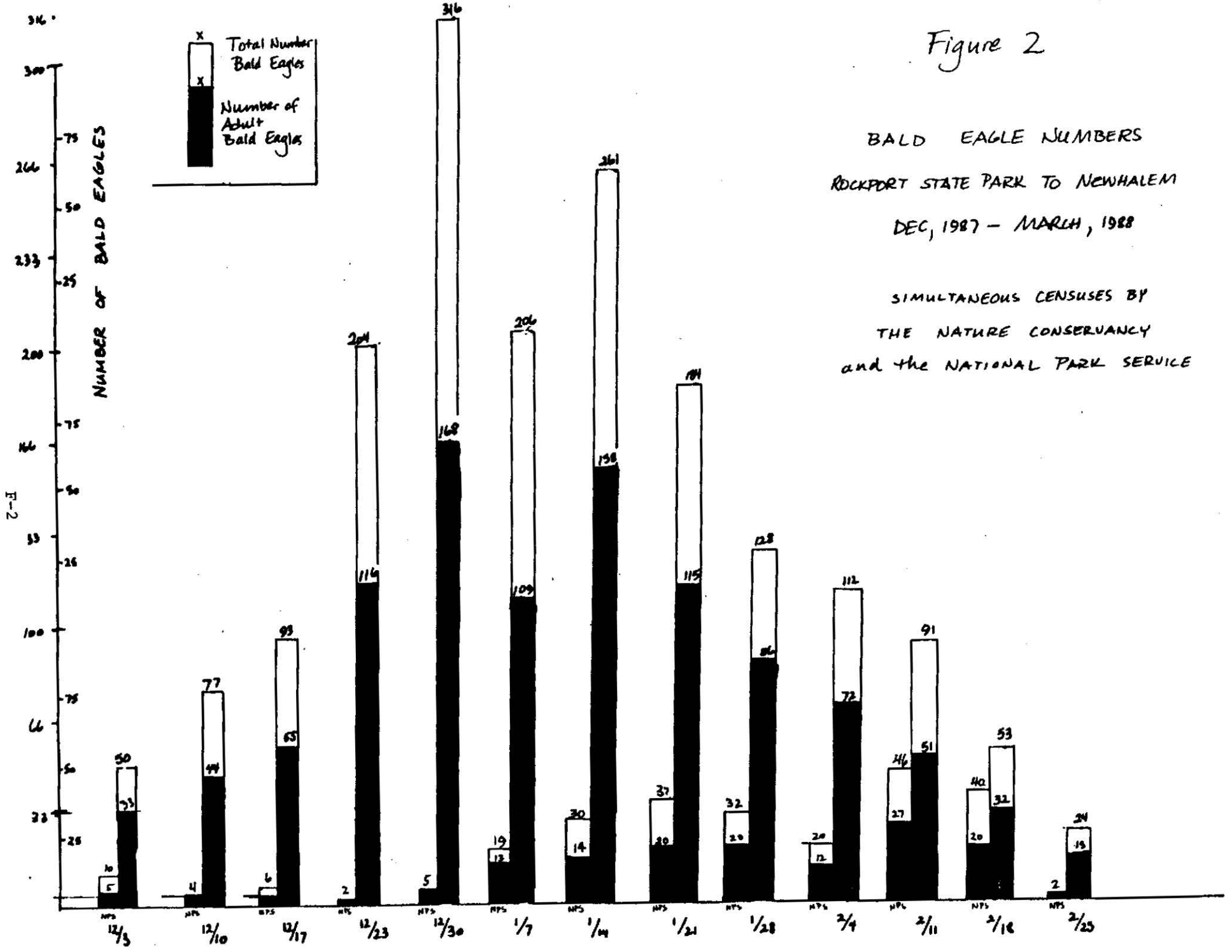
ROCKPORT STATE PARK TO NEWHALEM

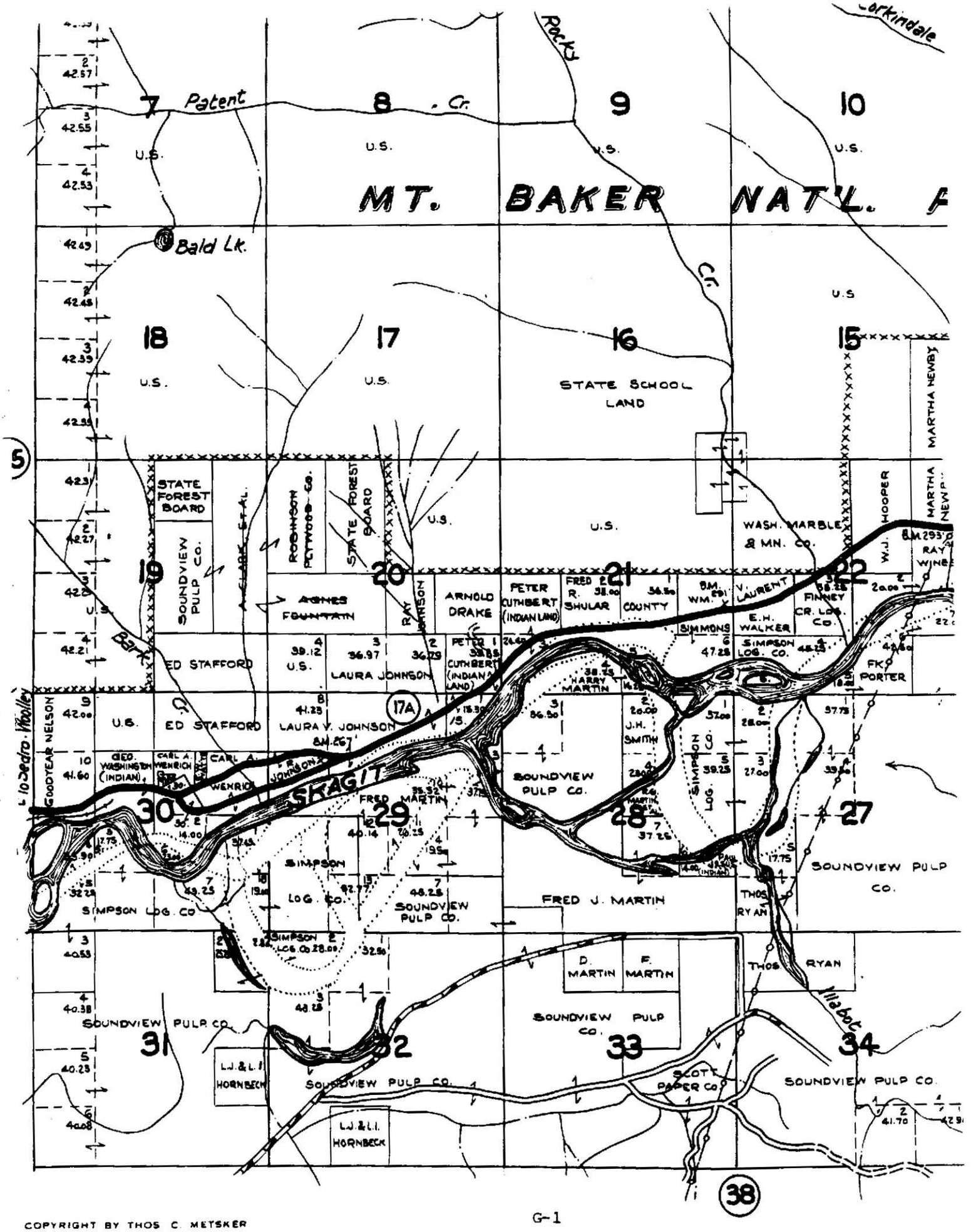
DEC, 1987 – MARCH, 1988

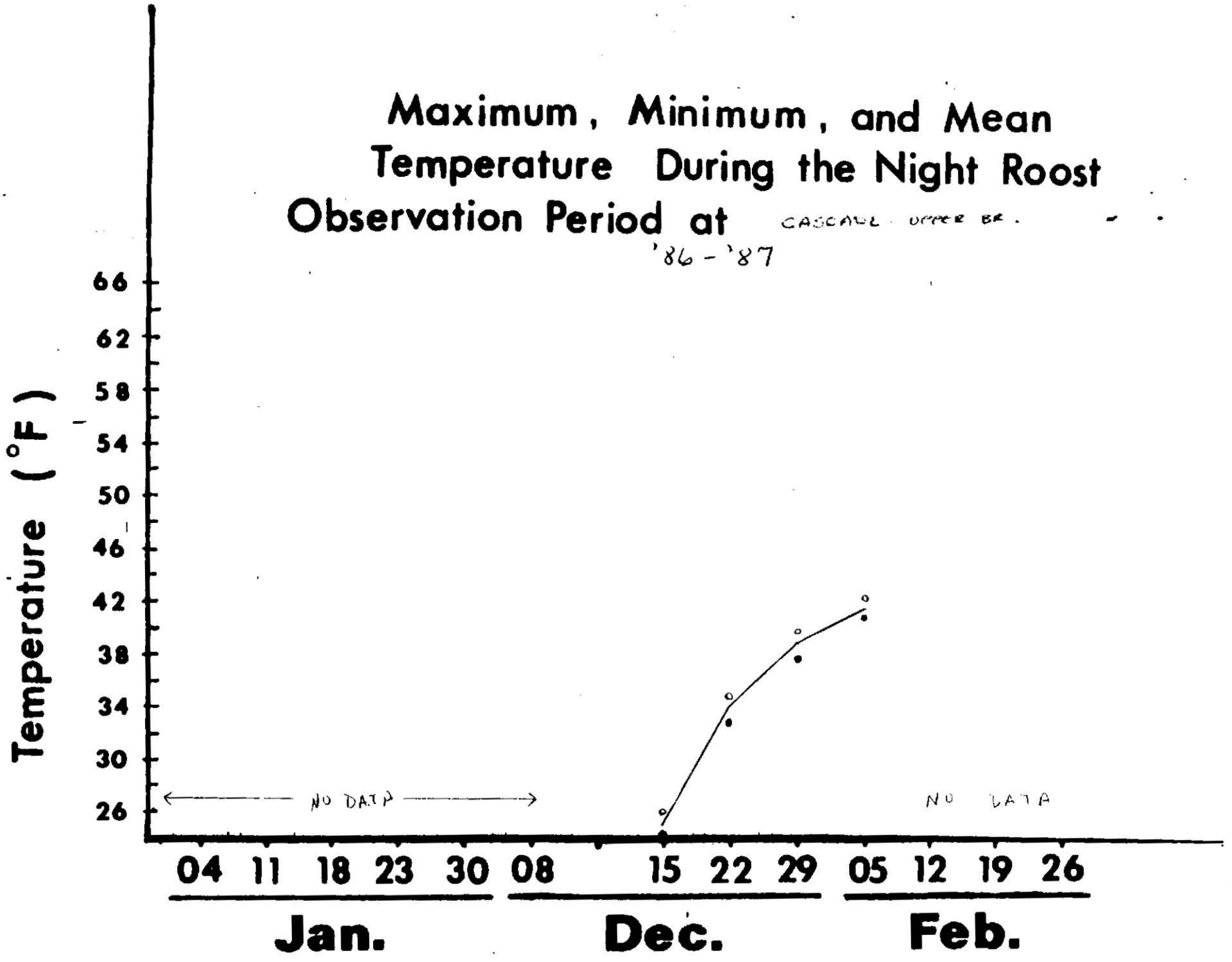
SIMULTANEOUS CENSUSES BY

THE NATURE CONSERVANCY

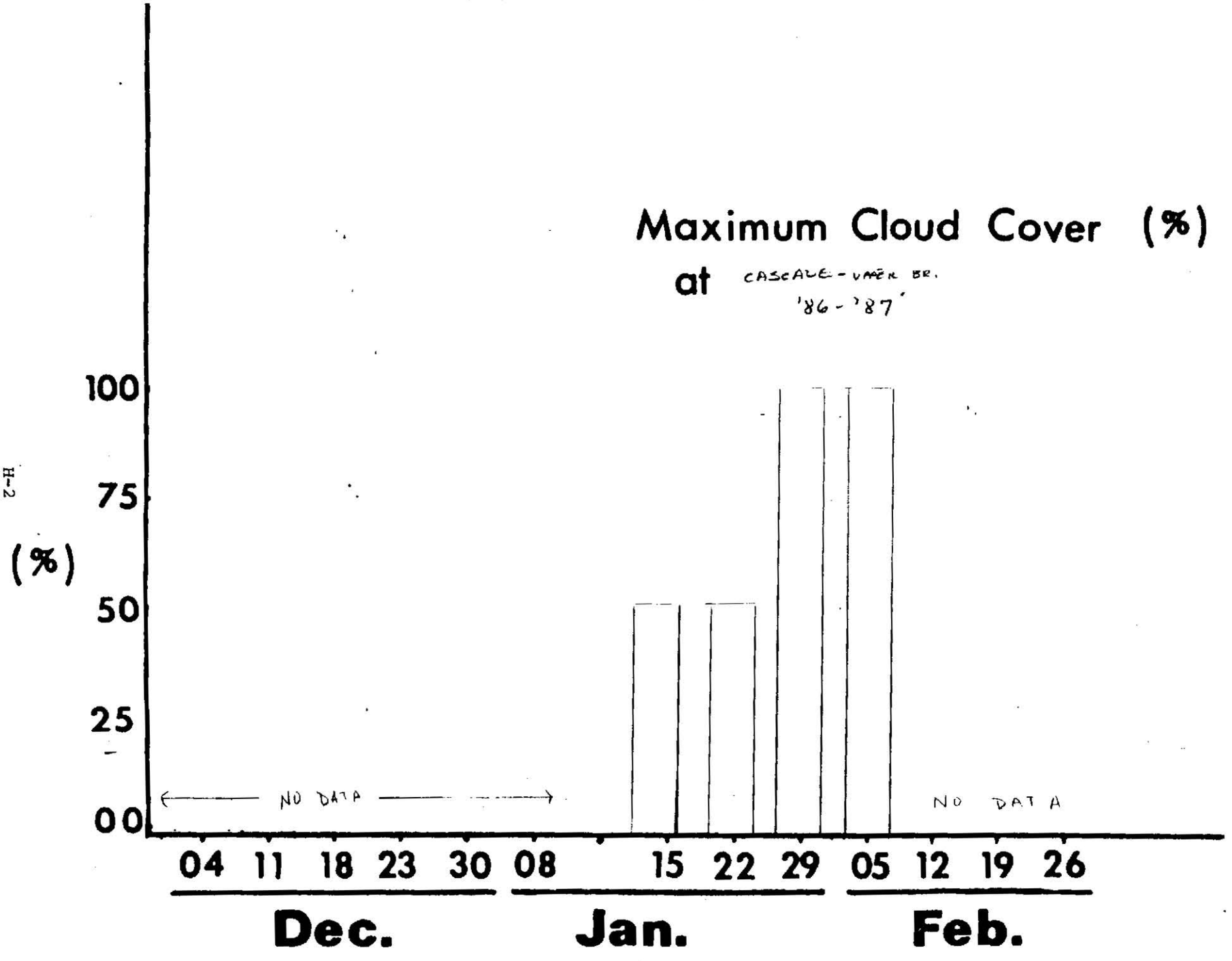
and the NATIONAL PARK SERVICE

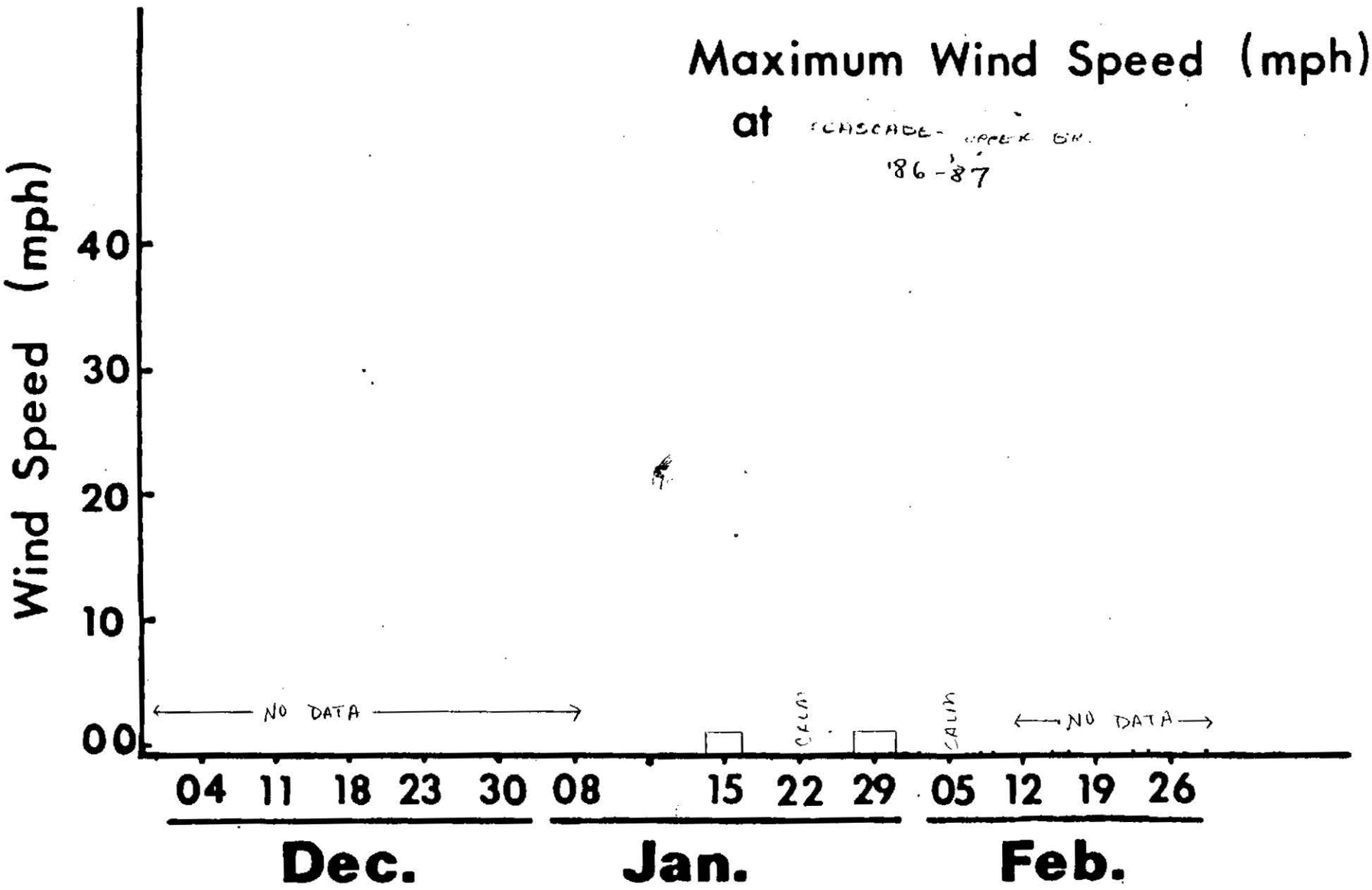





Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at CASCADE UPPER BR.
'86 - '87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

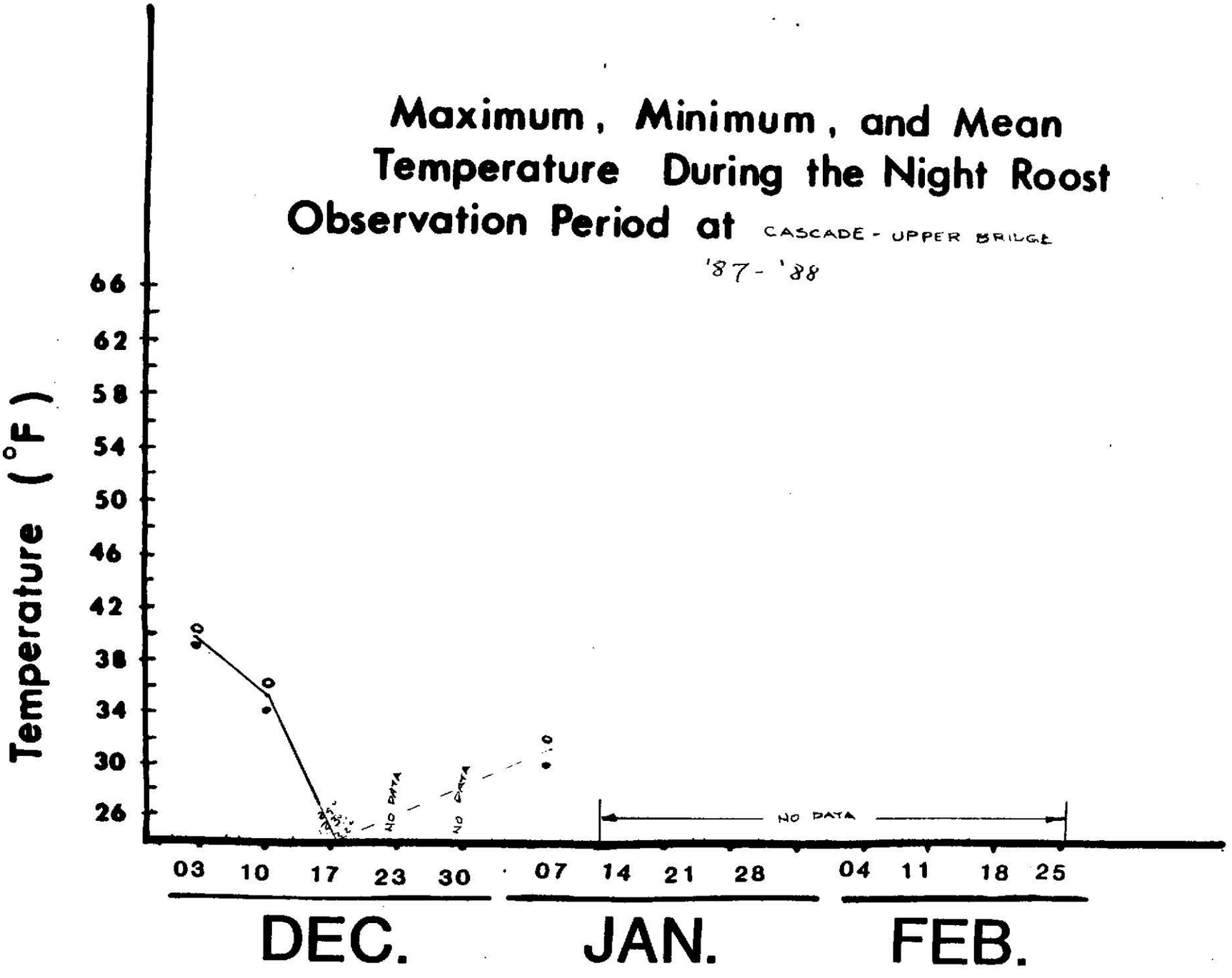
H-1

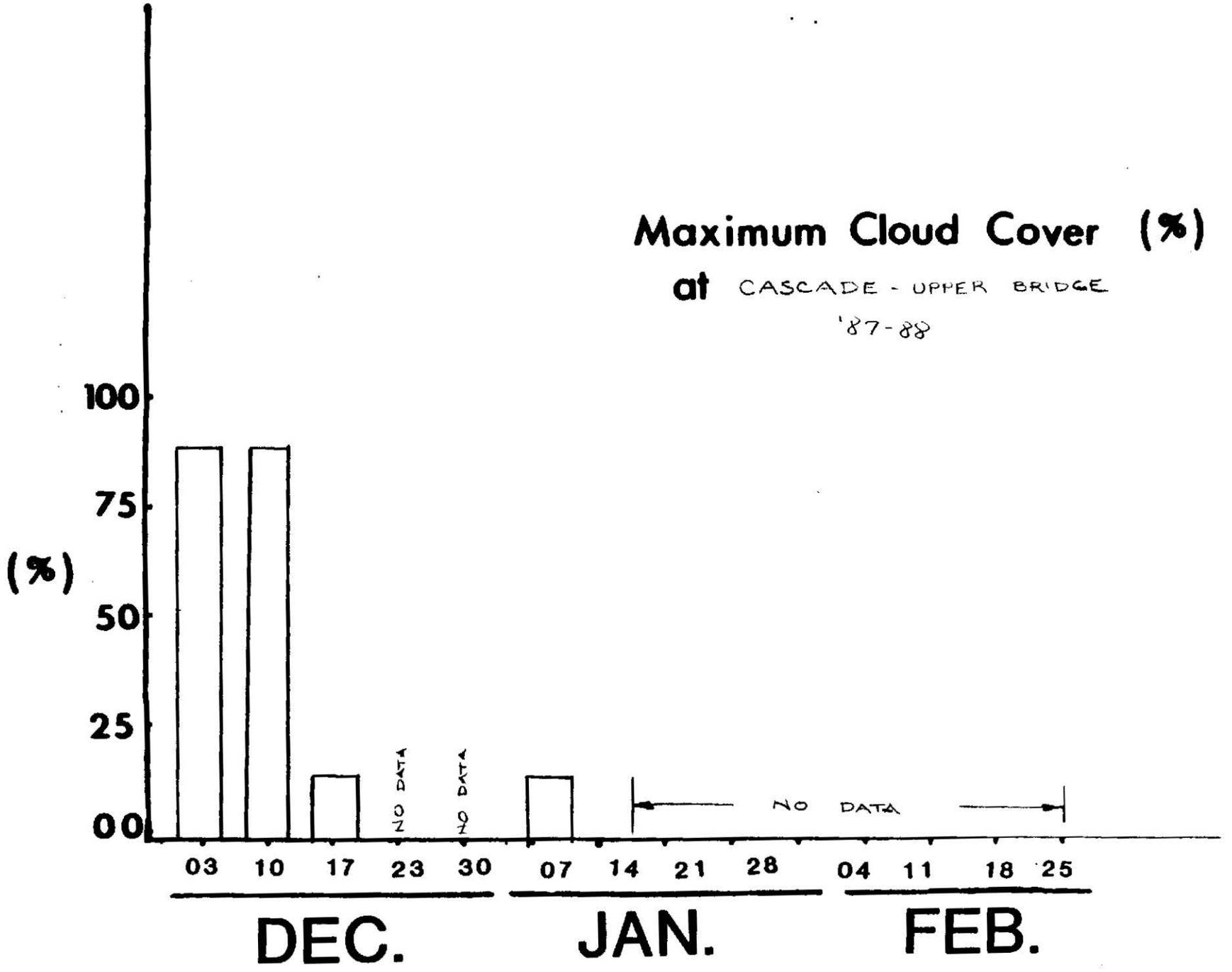

Maximum Cloud Cover (%)
at CASCADE-UMER BR.
'86-'87
100
75
(%)
50
25
00
NO DATA
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Wind Speed (mph)
at CASCADE - UPPER GR.
'86 - '87
Wind Speed (mph)
40
30
20
10
00
NO DATA
CALM
CALM
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at CASCADE - UPPER BRIDGE

'87 - '88

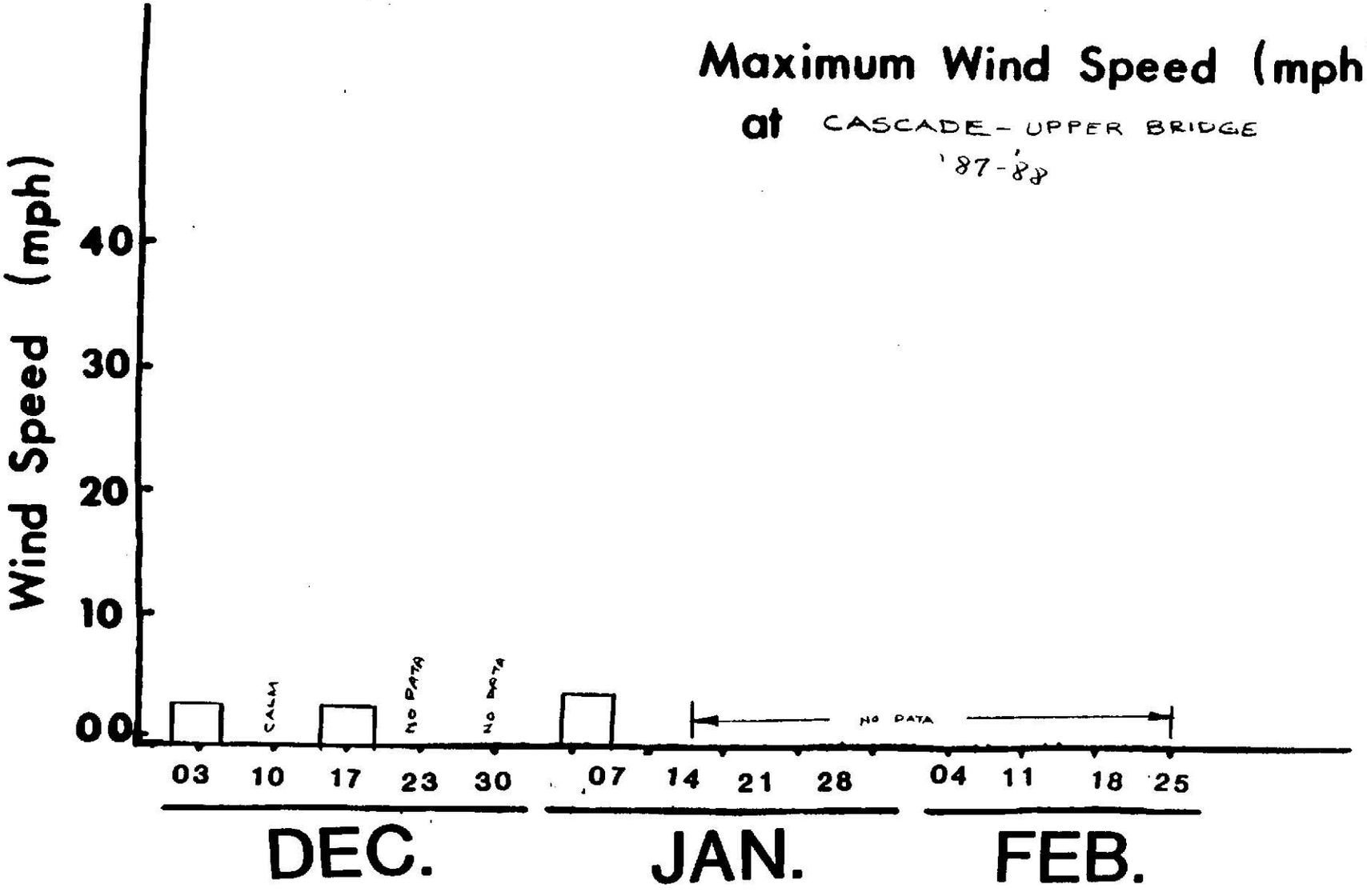



Maximum Cloud Cover (%)
at CASCADE - UPPER BRIDGE
'87-88
100
75
(%)
50
25
00
NO DATA
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Maximum Wind Speed (mph)

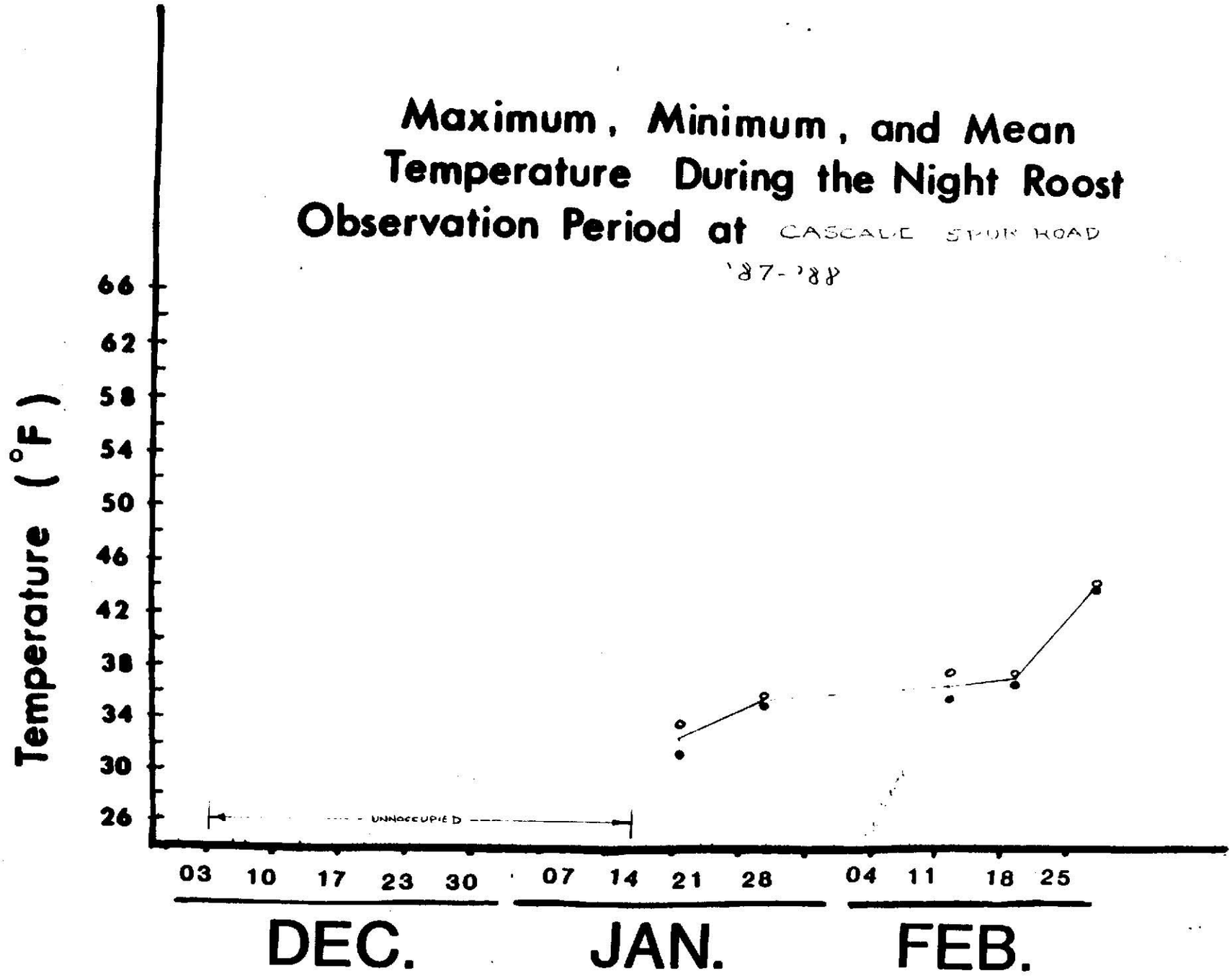
at CASCADE - UPPER BRIDGE

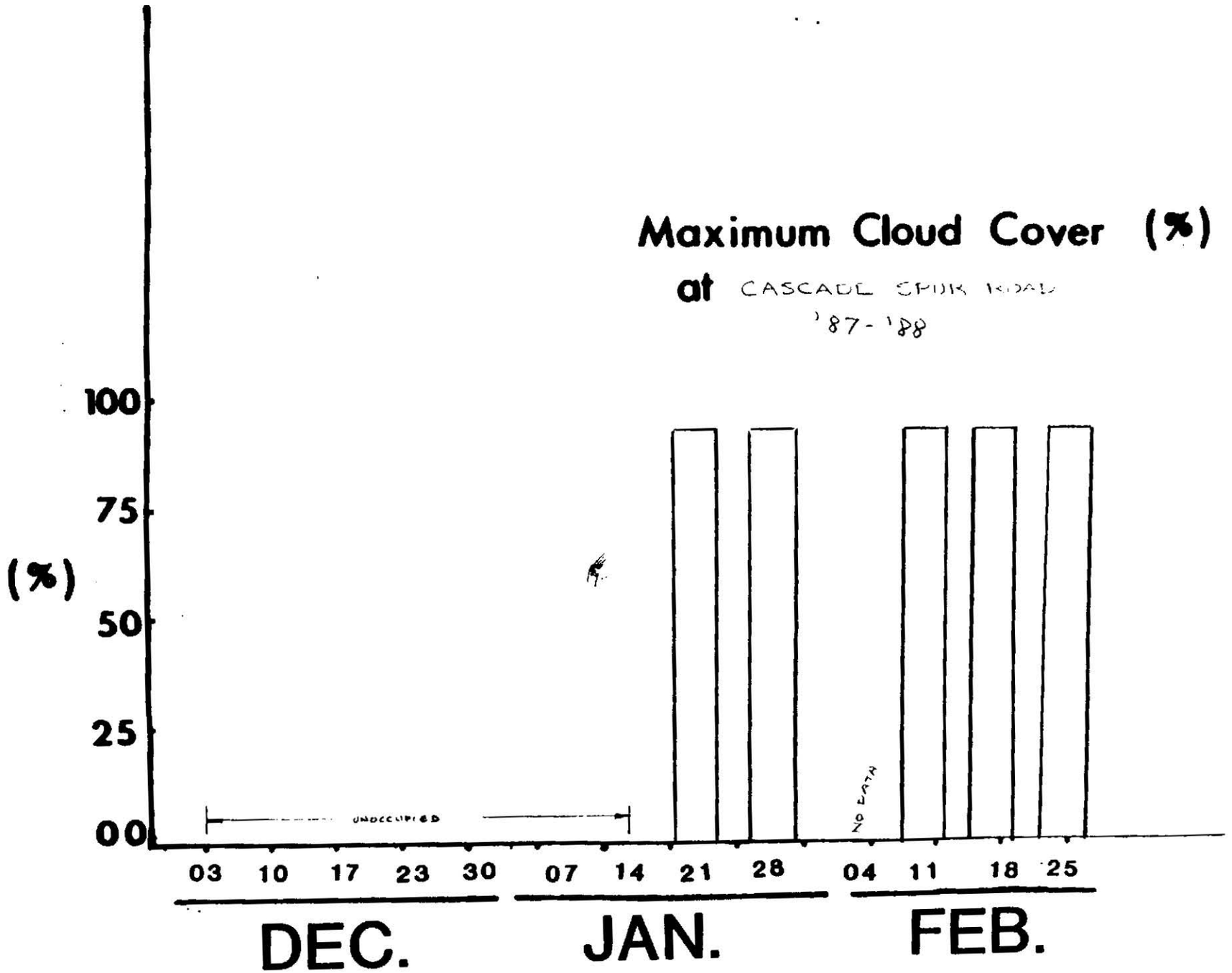
'87-'88

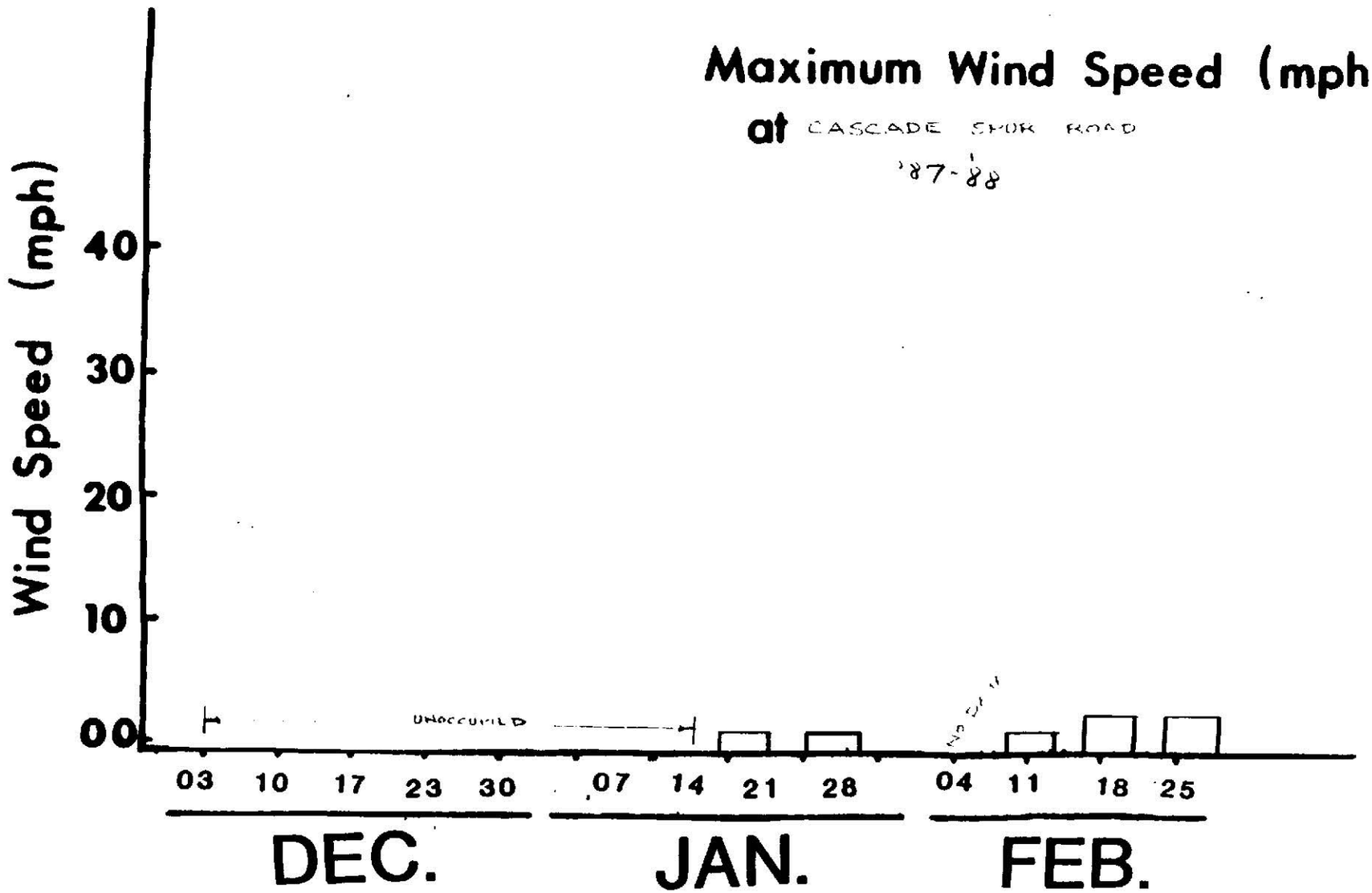


Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at CASCADE SPUR ROAD

'87-'88

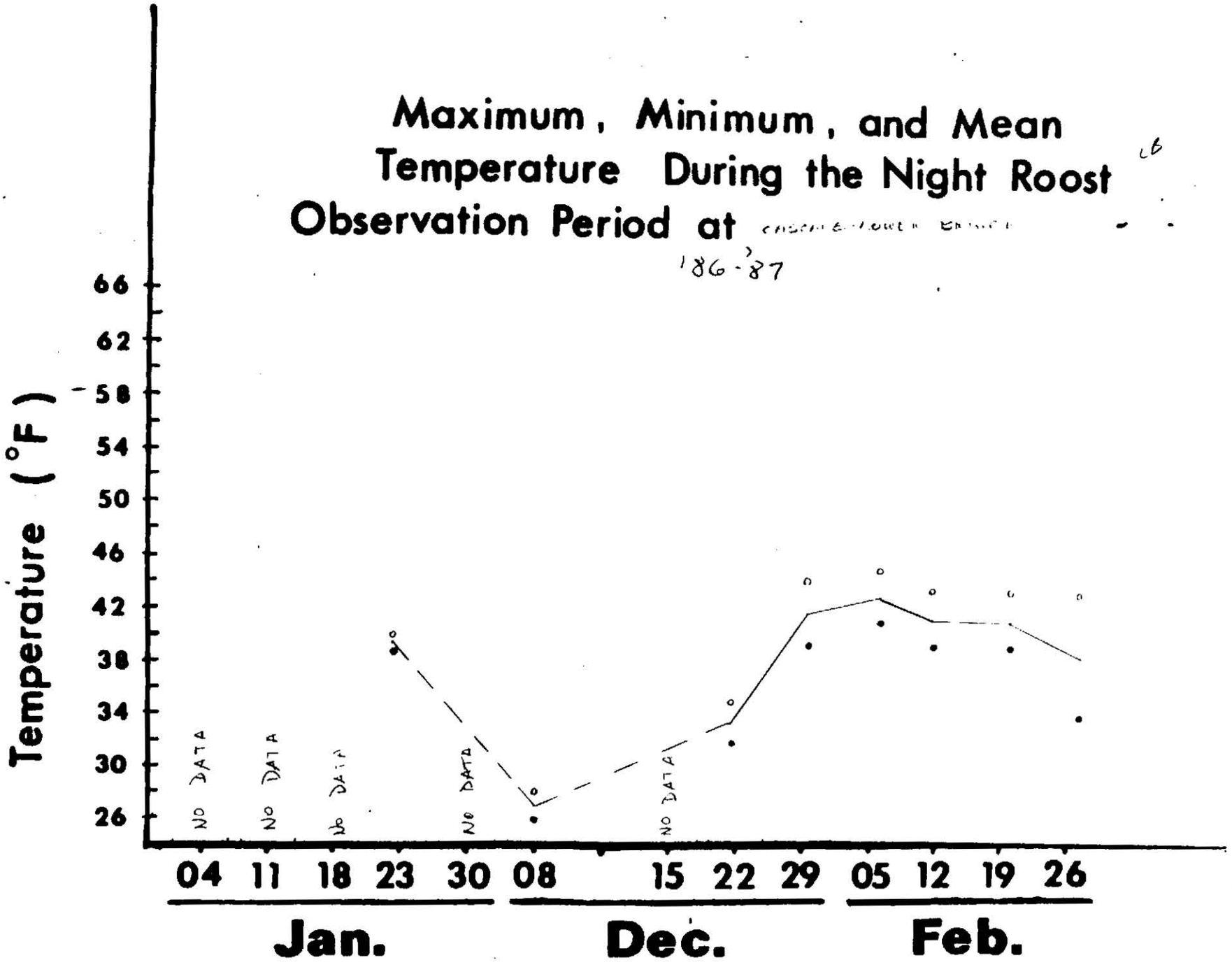


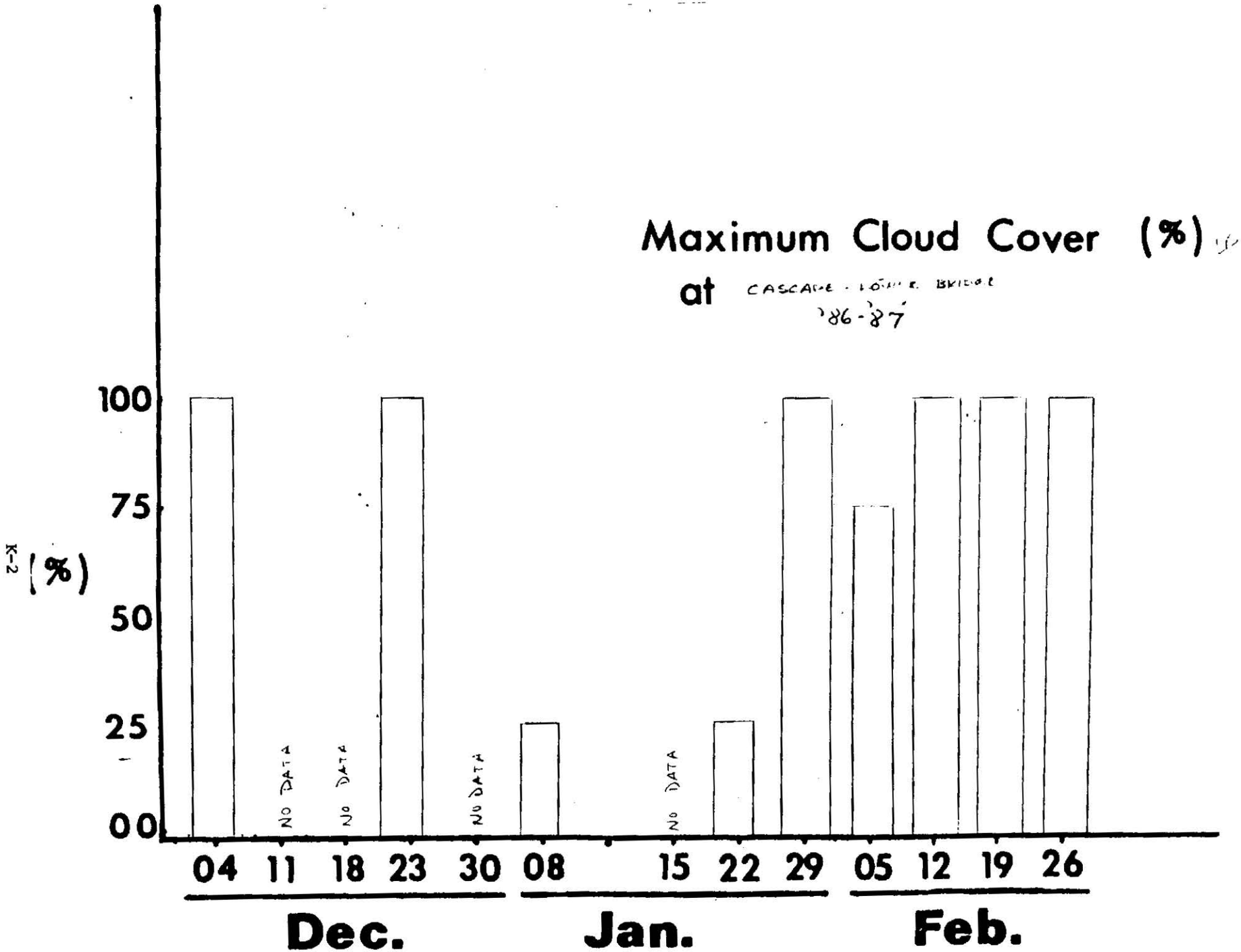

Maximum Cloud Cover (%)
at CASCADE SPUR ROAD
'87-'88
100
75
50
25
00
(%)
UNOCCUPIED
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.


Maximum Wind Speed (mph)
at CASCADE SMOK ROAD
'87-'88
Wind Speed (mph)
40
30
20
10
00
UNOCCUPIED
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC. JAN. FEB.

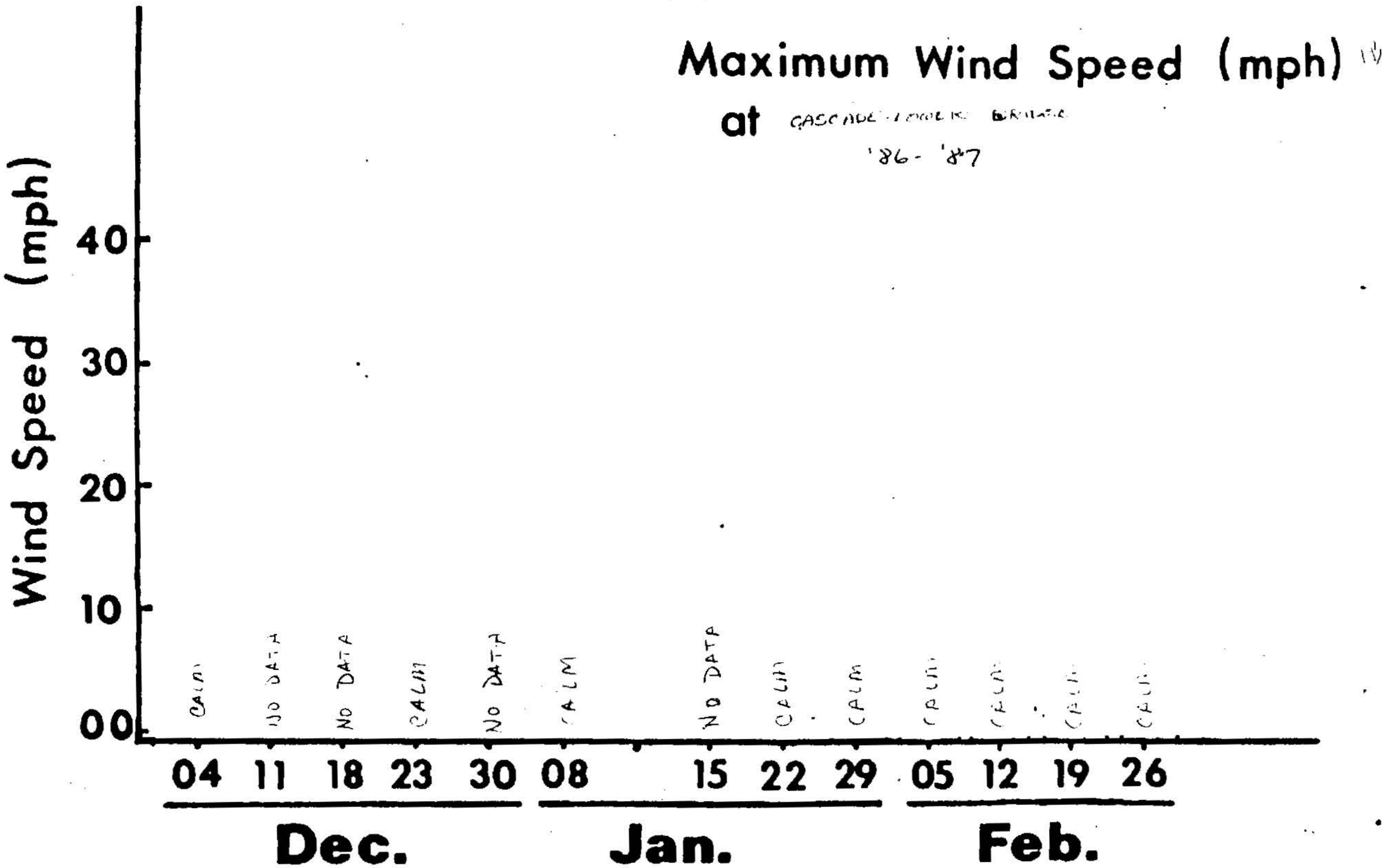
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at [illegible]

1986-87




Maximum Cloud Cover (%)
at CASCADE - LOWER BRIDGE
'86-'87
100
75
50
25
00
(%)
NO DATA
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

K-2


Maximum Wind Speed (mph)
at
'86- '87
Wind Speed (mph)
40
30
20
10
00
CALM
NO DATA
NO DATA
CALM
NO DATA
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NO DATA
CALM
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CALM
CALM
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CALM
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08
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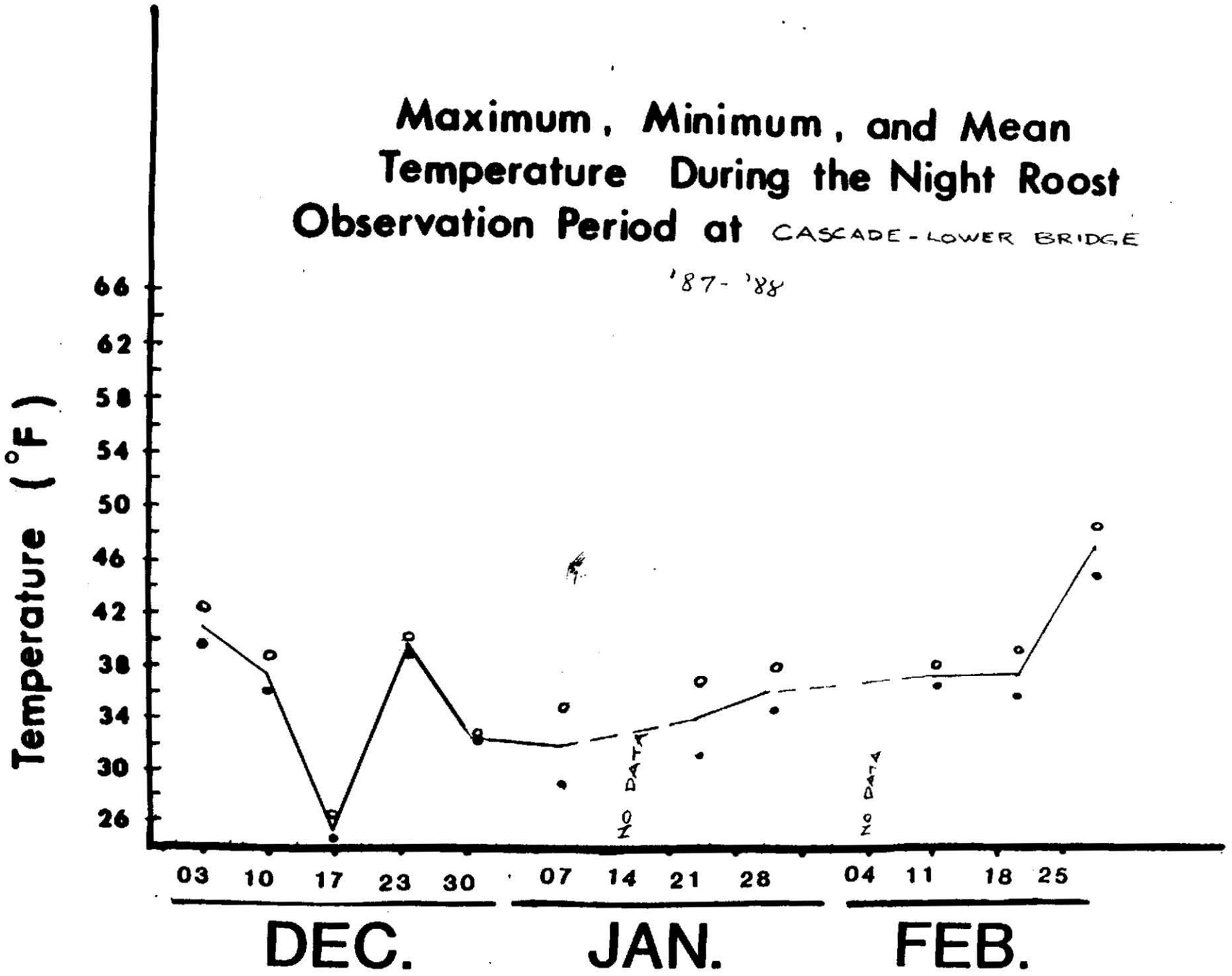
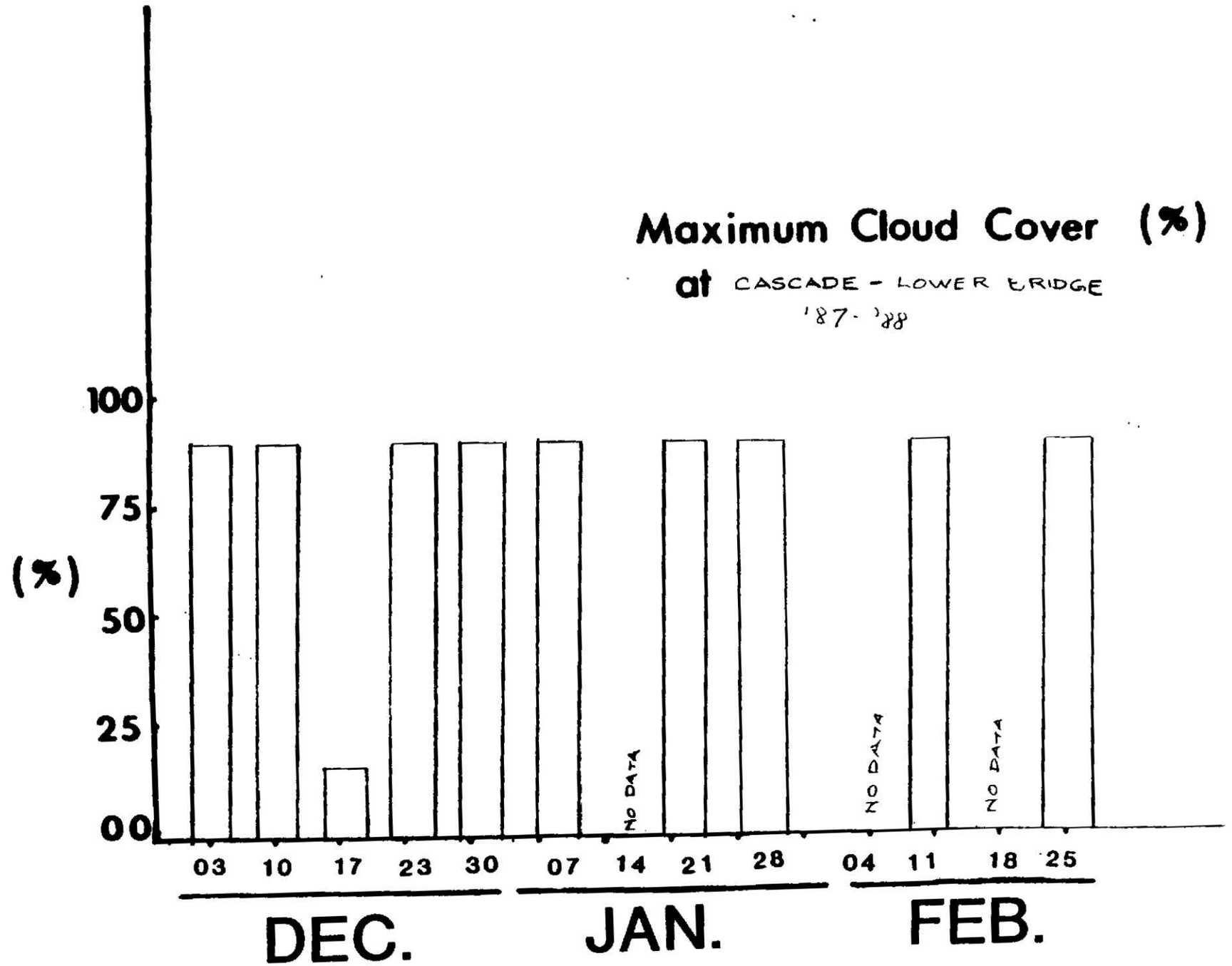
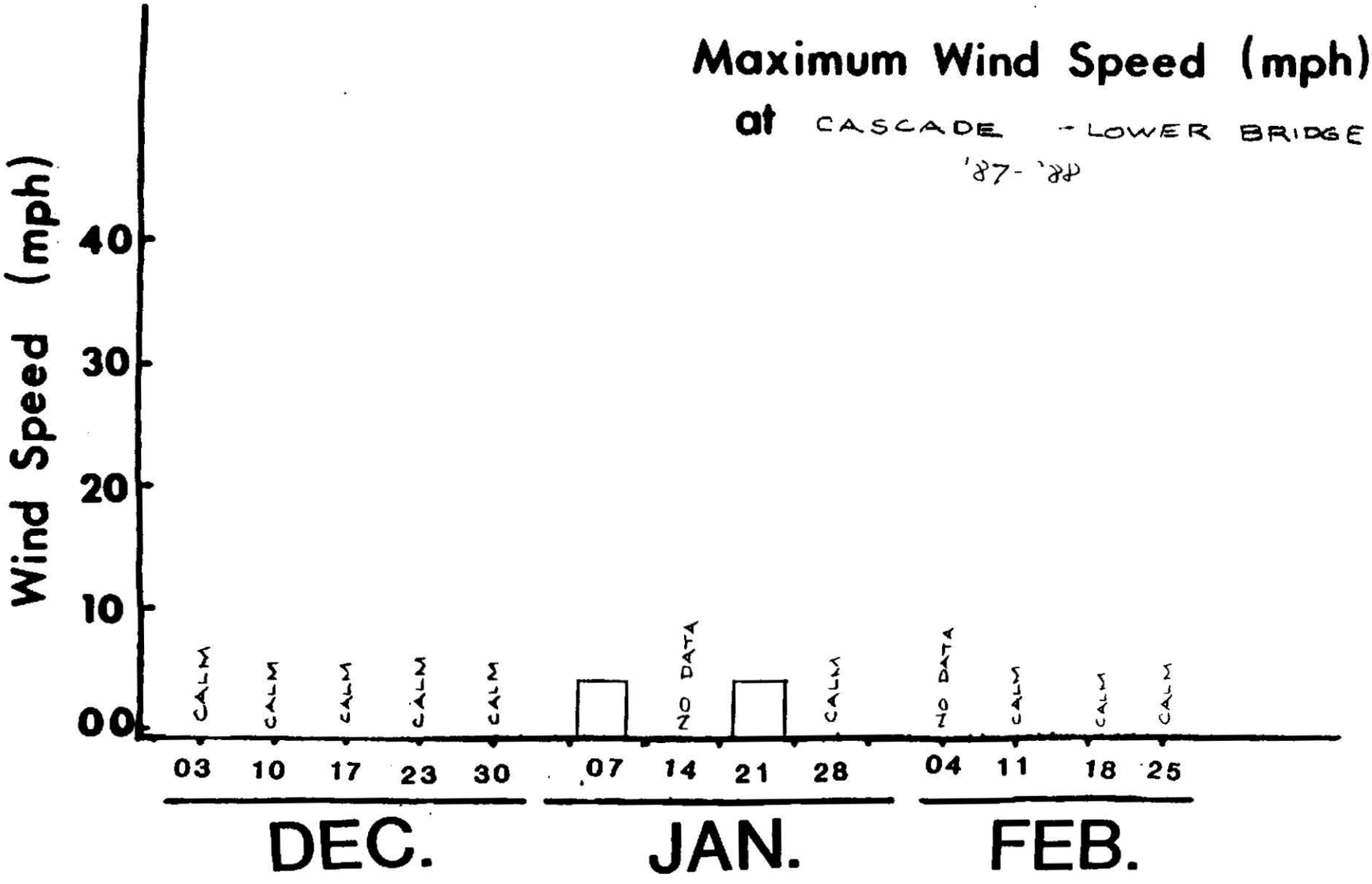
29
05
12
19
26
Dec.
Jan.
Feb.


Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at CASCADE-LOWER BRIDGE
'87-'88
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
03 10 17 23 30
07 14 21 28
04 11 18 25
DEC.
JAN.
FEB.


Maximum Cloud Cover (%)
at CASCADE - LOWER BRIDGE
'87-'88
100
75
50
25
00
(%)
03
10
17
23
30
07
14
21
28
04
11
18
25
NO DATA
NO DATA
DEC.
JAN.
FEB.


Maximum Wind Speed (mph)
at CASCADE - LOWER BRIDGE
'87-'88
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
CALM
CALM
NO DATA
CALM
NO DATA
CALM
CALM
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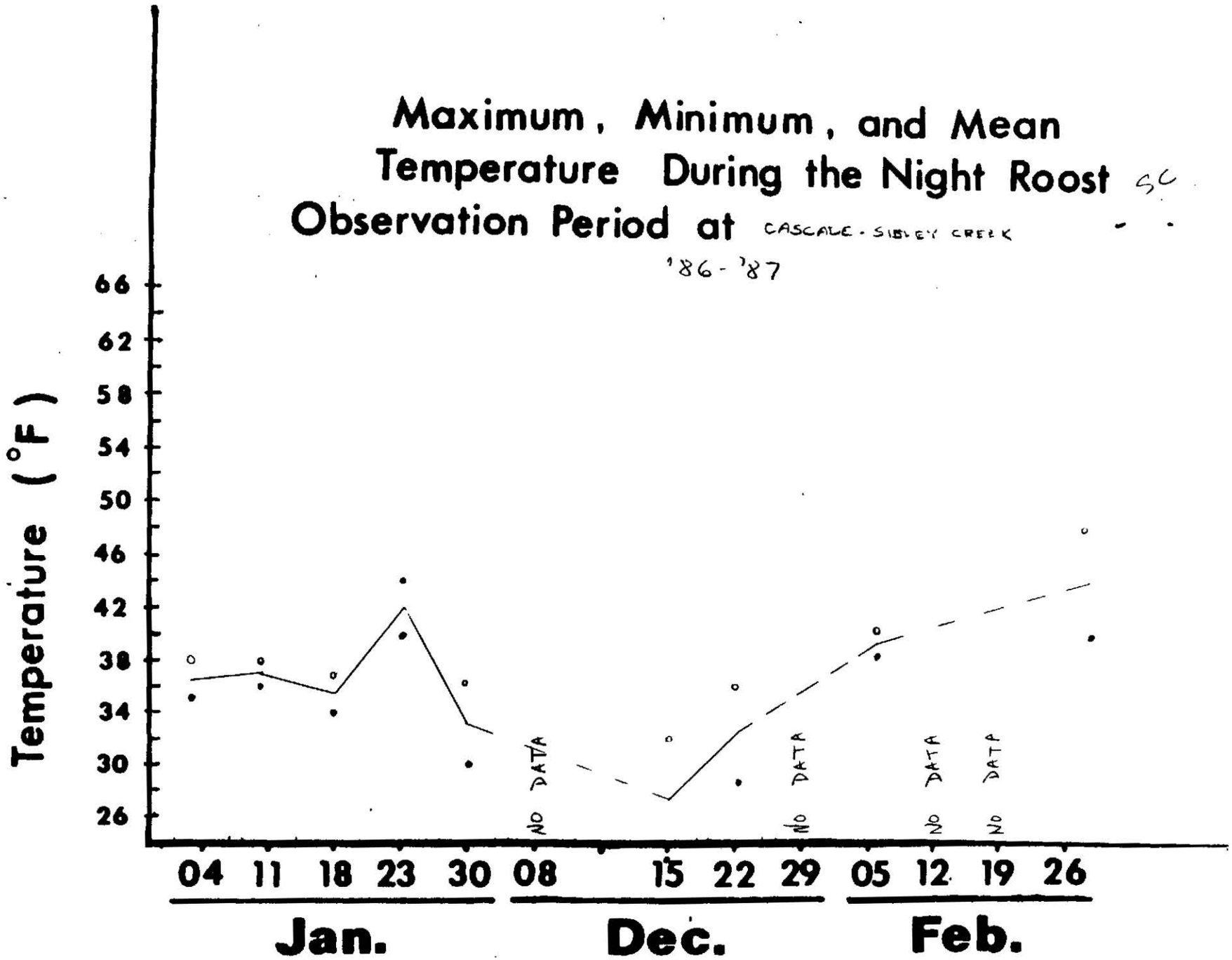
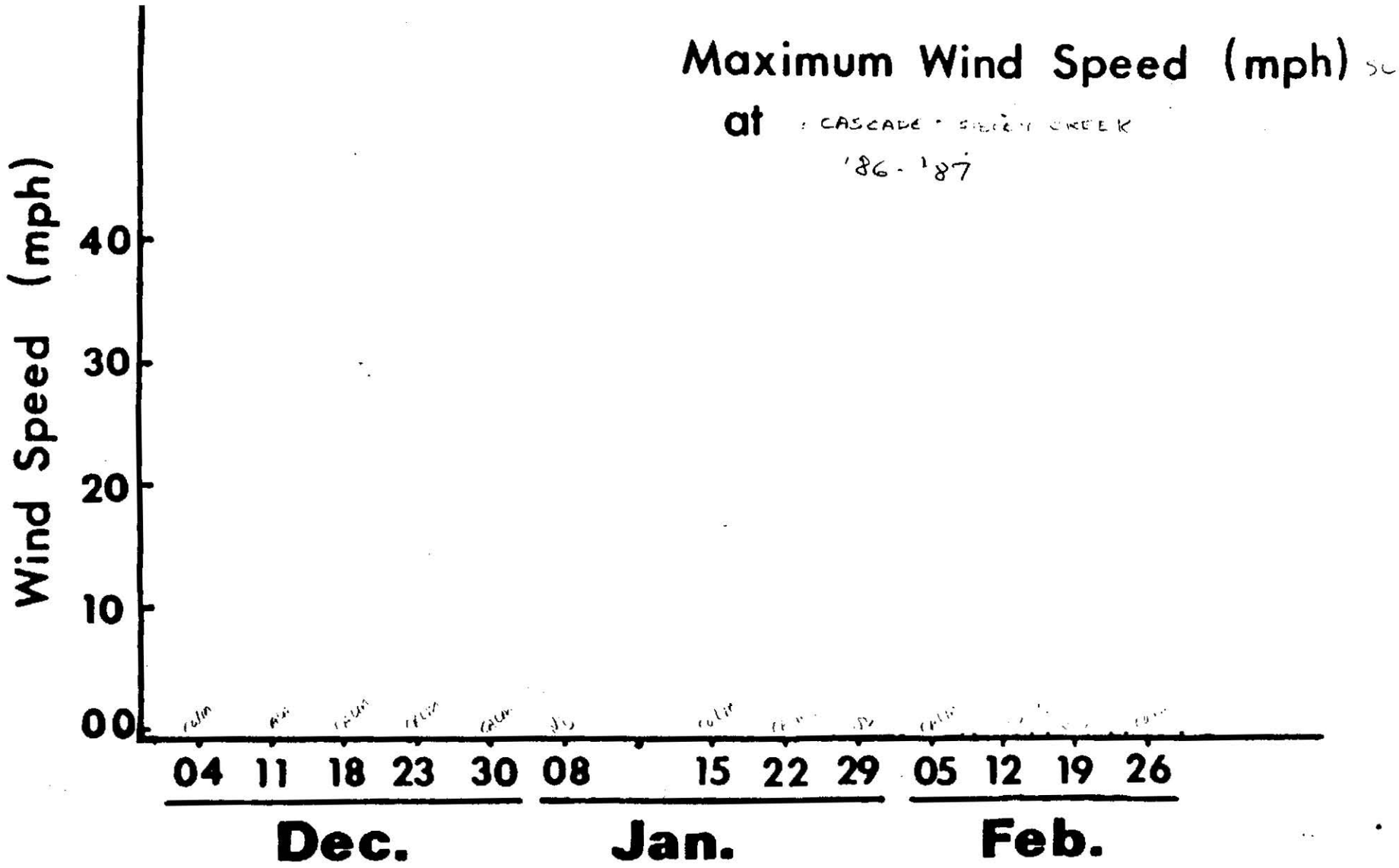
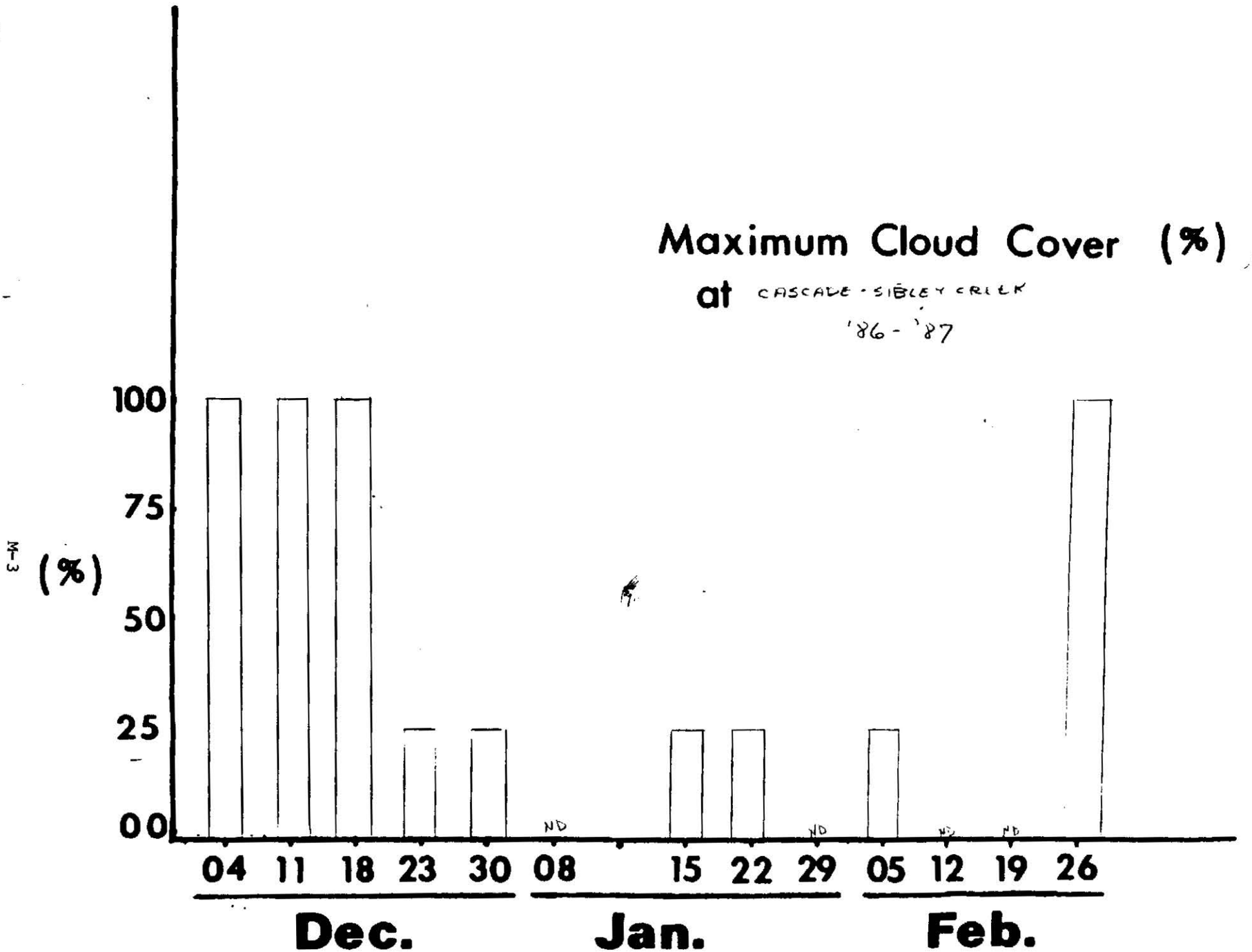
11
18
25
DEC.
JAN.
FEB.

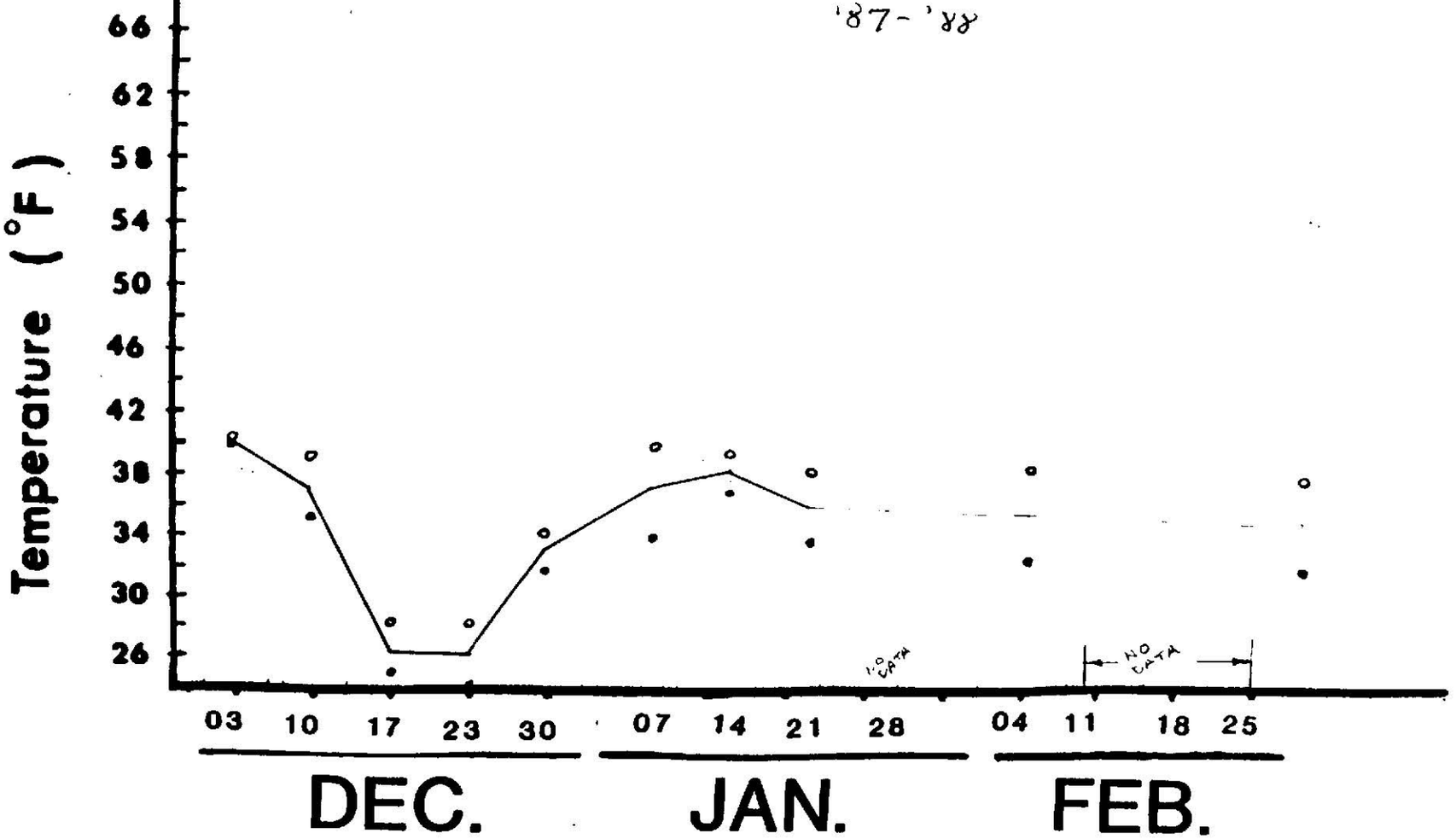

Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at CASCADE - SIBLEY CREEK SC
'86 - '87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

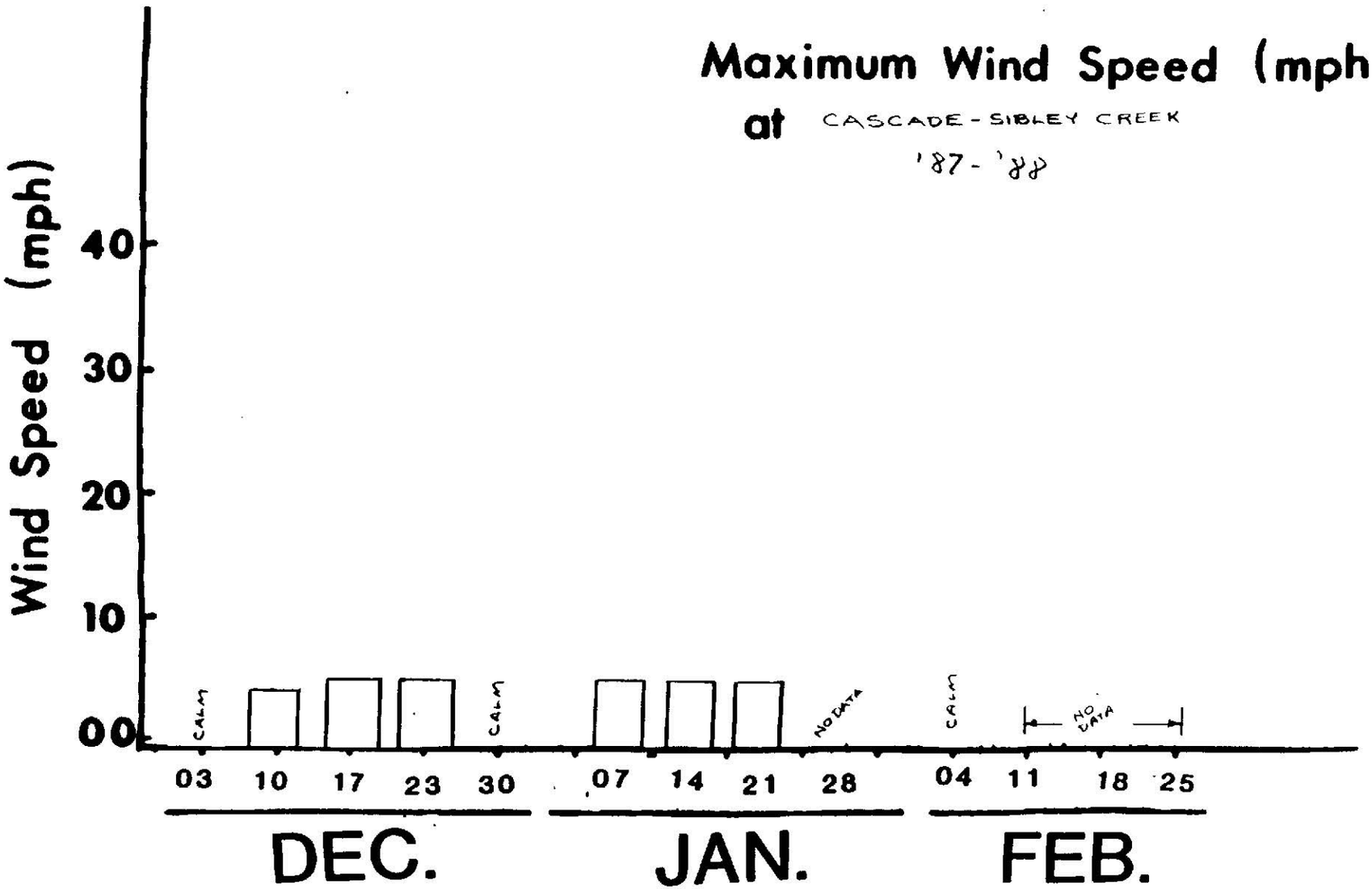
M-1

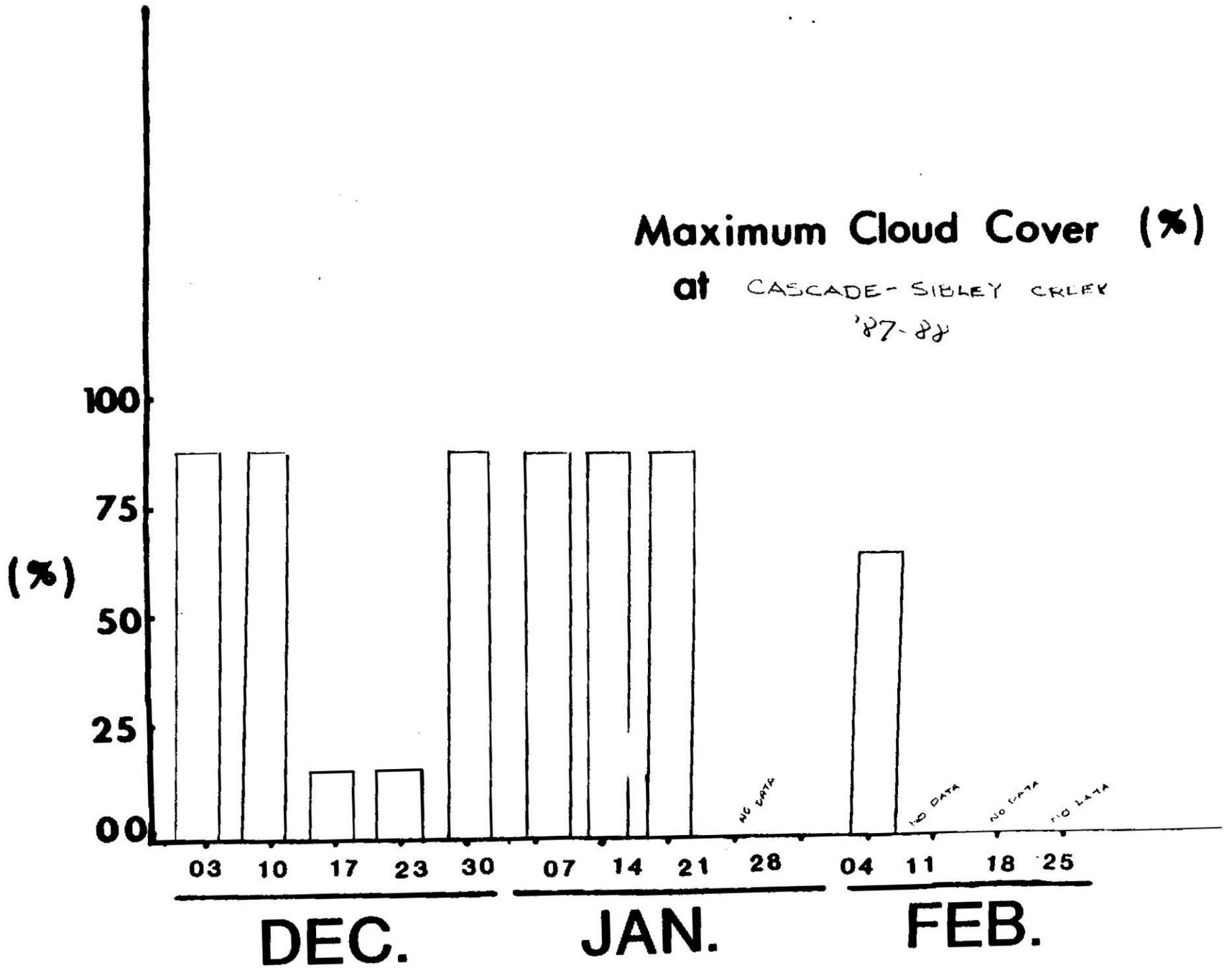

Maximum Wind Speed (mph)
at : CASCADE - SILVER CREEK
'86 - '87
Wind Speed (mph)
40
30
20
10
00
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Cloud Cover (%)
at CASCADE - SIBLEY CREEK
'86 - '87
100
75
50
25
00
(%)
MT3
ND
ND
ND
ND
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

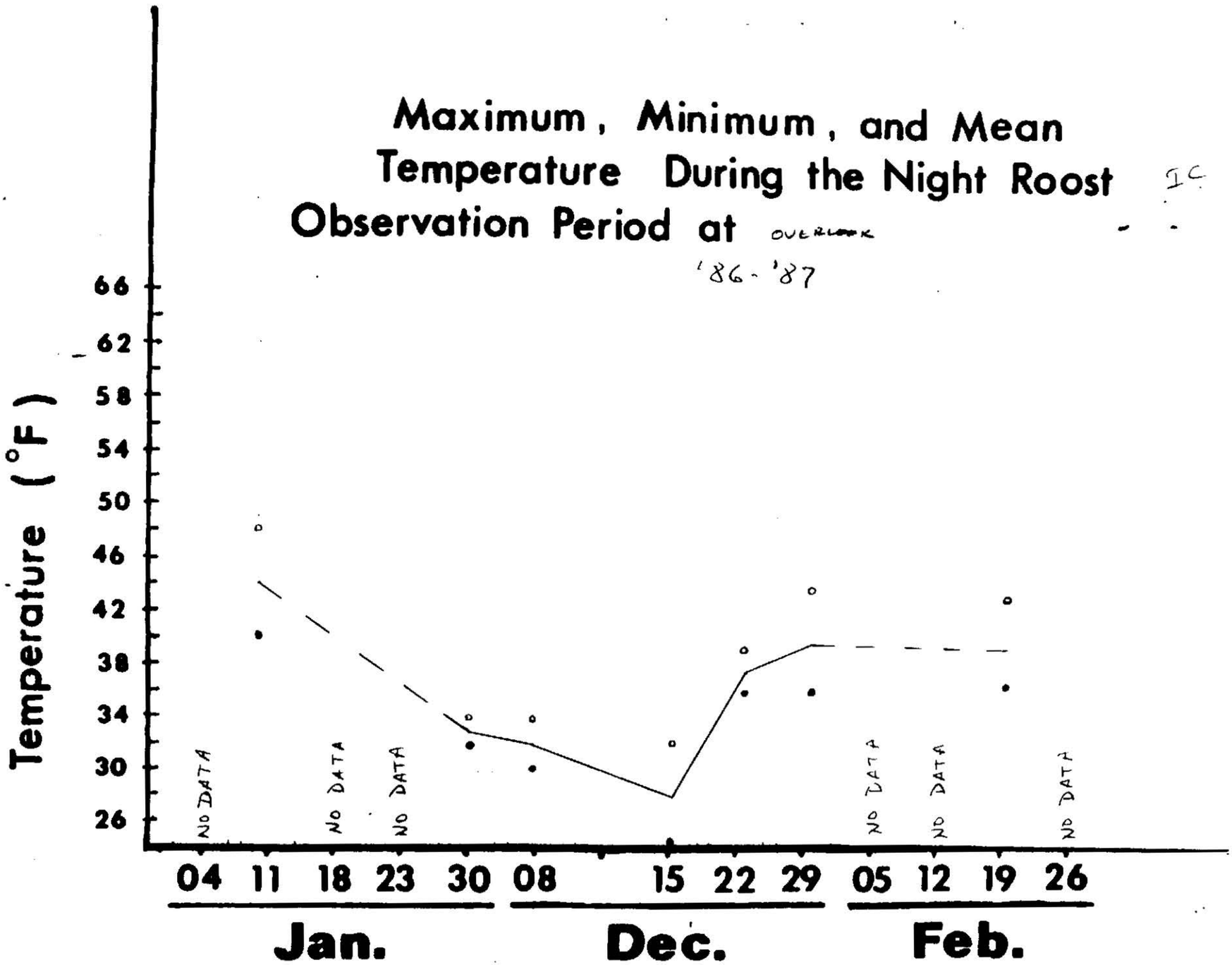
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at CASCADE - SIBLEY CREEK '87-'88

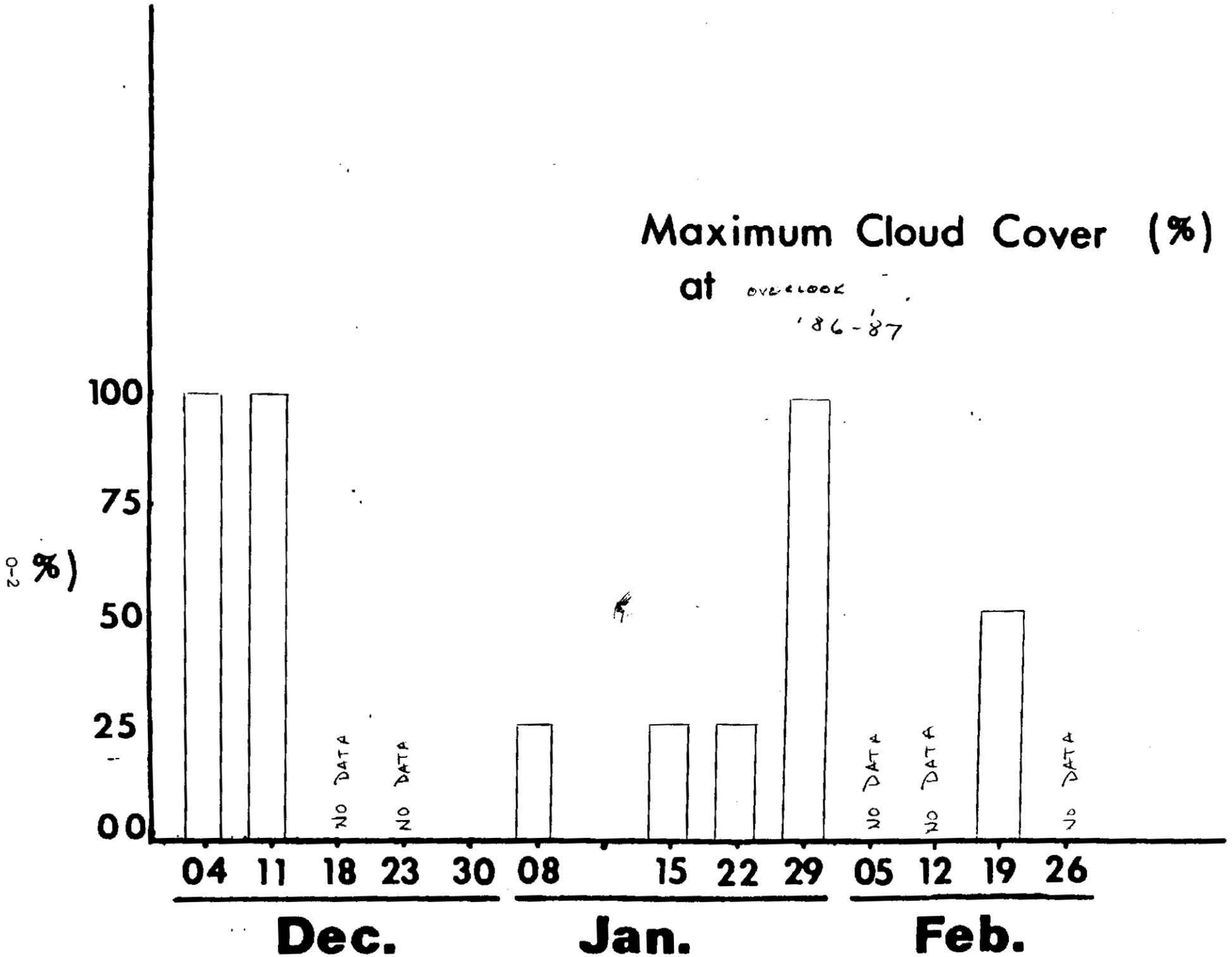



Maximum Wind Speed (mph)
at CASCADE - SIBLEY CREEK
'87 - '88
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
NO DATA
CALM
NO DATA
03 10 17 23 30
07 14 21 28
04 11 18 25
DEC.
JAN.
FEB.


Maximum Cloud Cover (%)
at CASCADE-SIBLEY CREEK
'87-88
100
75
50
25
00
(%)
03 10 17 23 30 07 14 21 28 04 11 18 25
NO DATA
NO DATA
NO DATA
NO DATA
DEC.
JAN.
FEB.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at OVERLOOK '86-'87

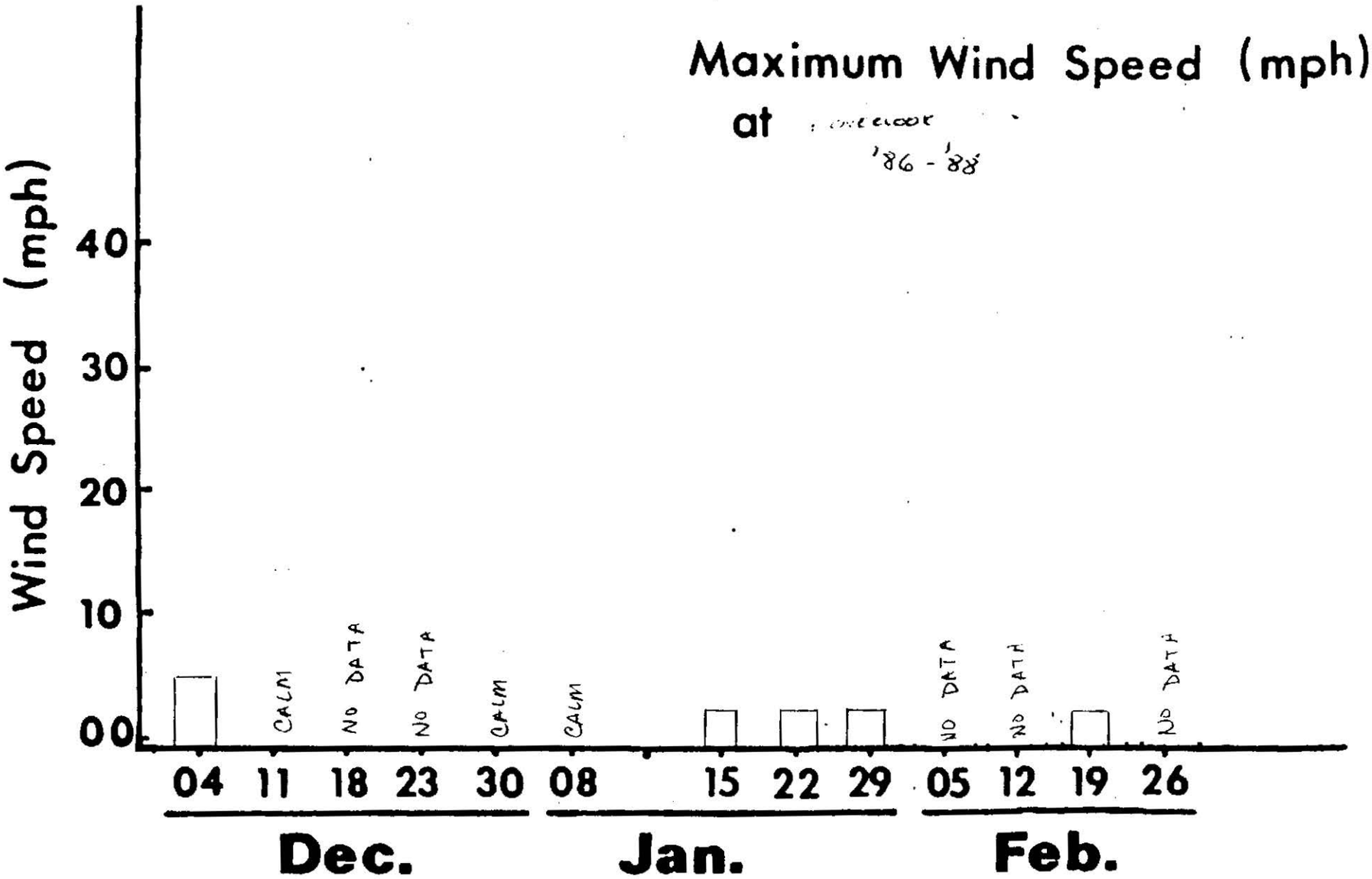


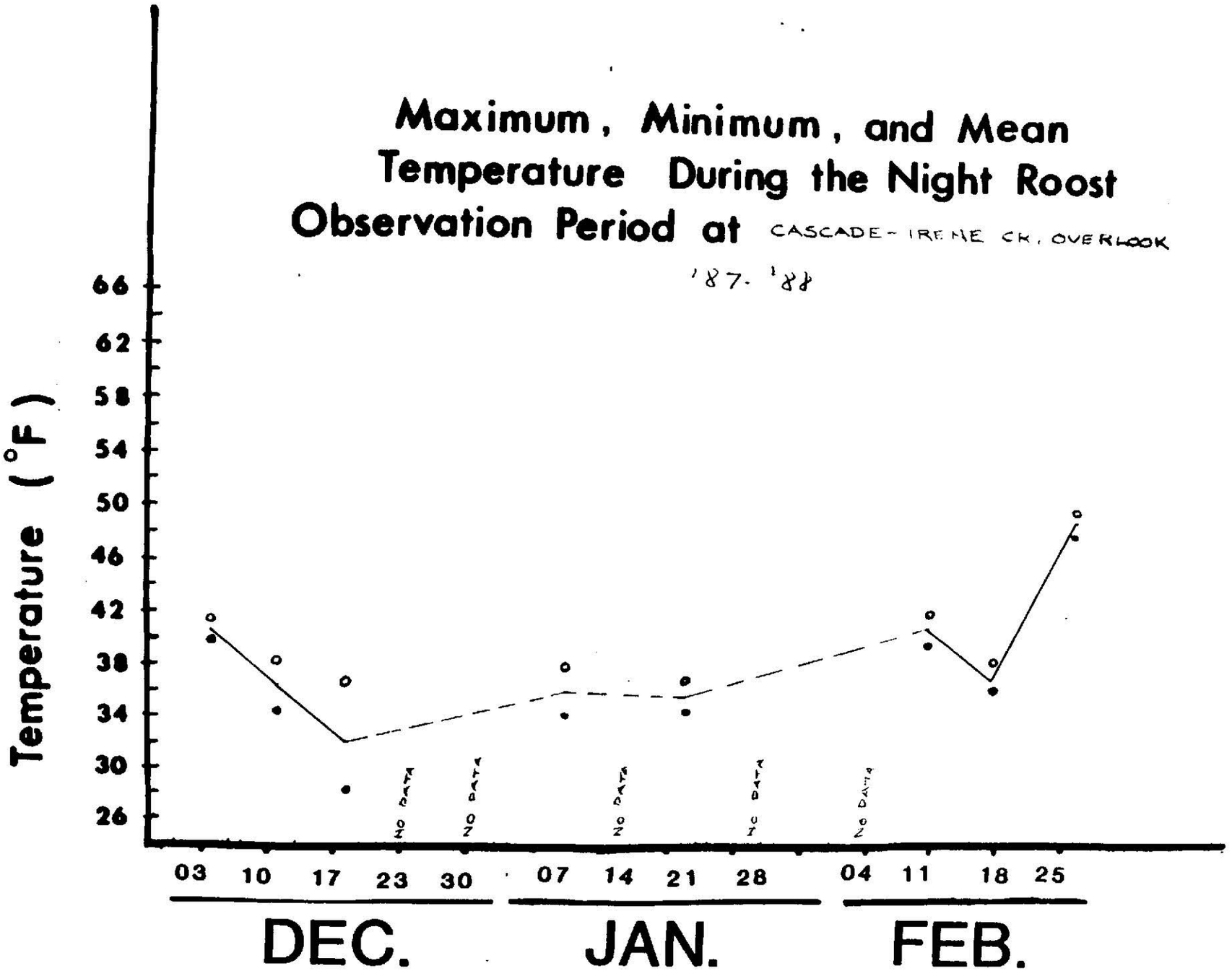

Maximum Cloud Cover (%)
at OVERLOOK
'86-87
100
75
50
25
00
%)
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum Wind Speed (mph)

at [illegible]

'86 - '88

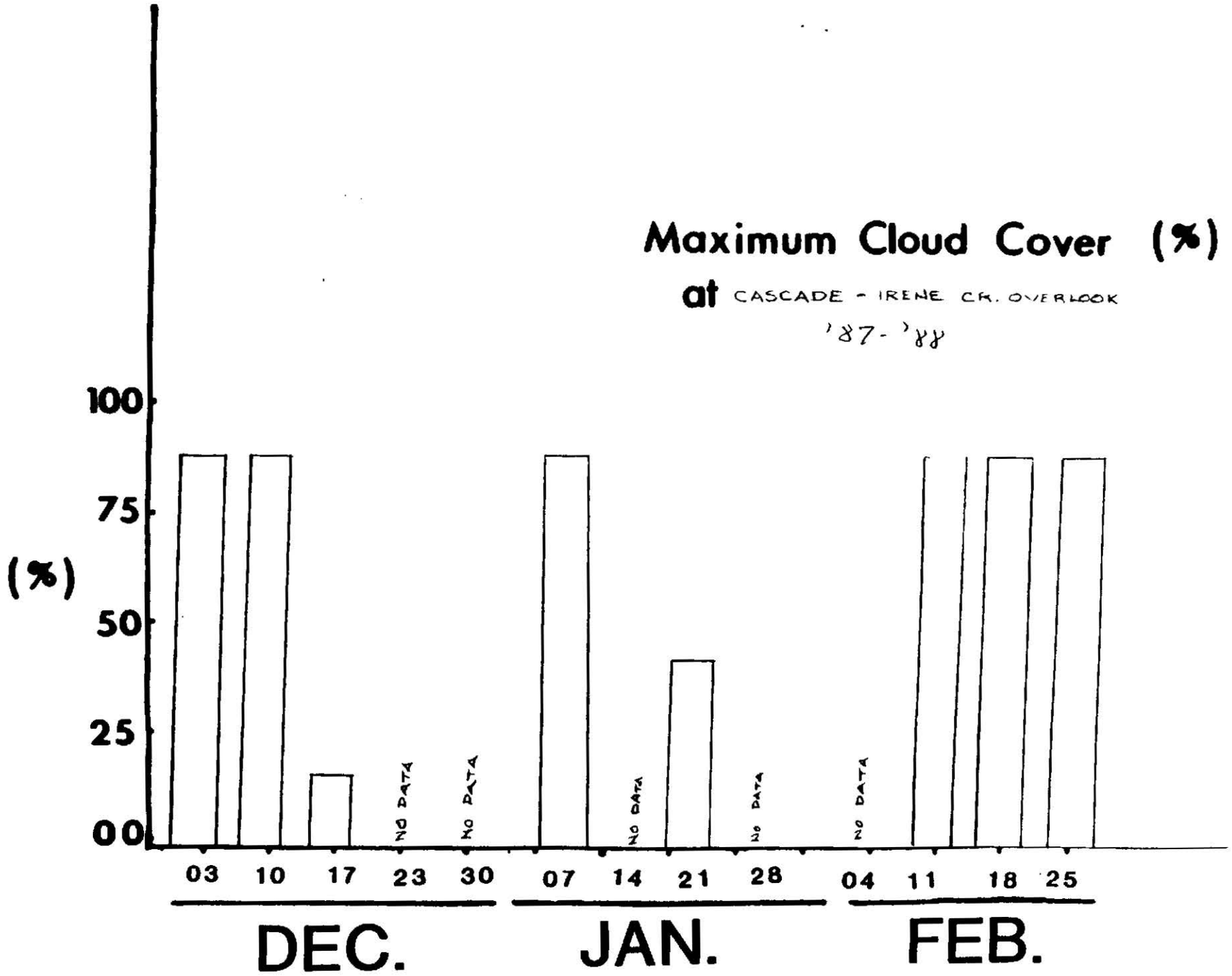



Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at CASCADE - IRENE CK. OVERLOOK
'87-'88
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Maximum Cloud Cover (%)

at CASCADE - IRENE CR. OVERLOOK

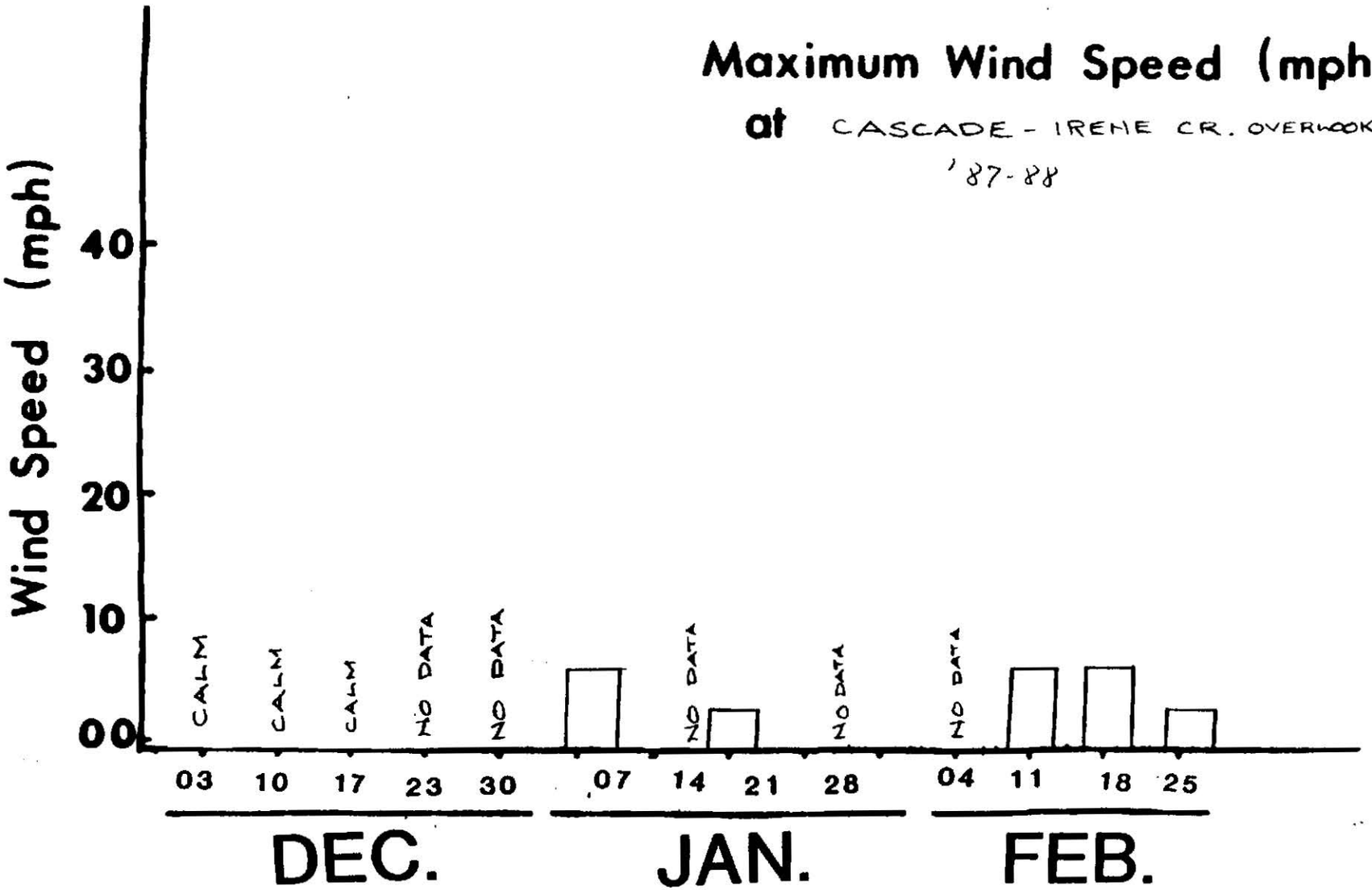
'88 - '87

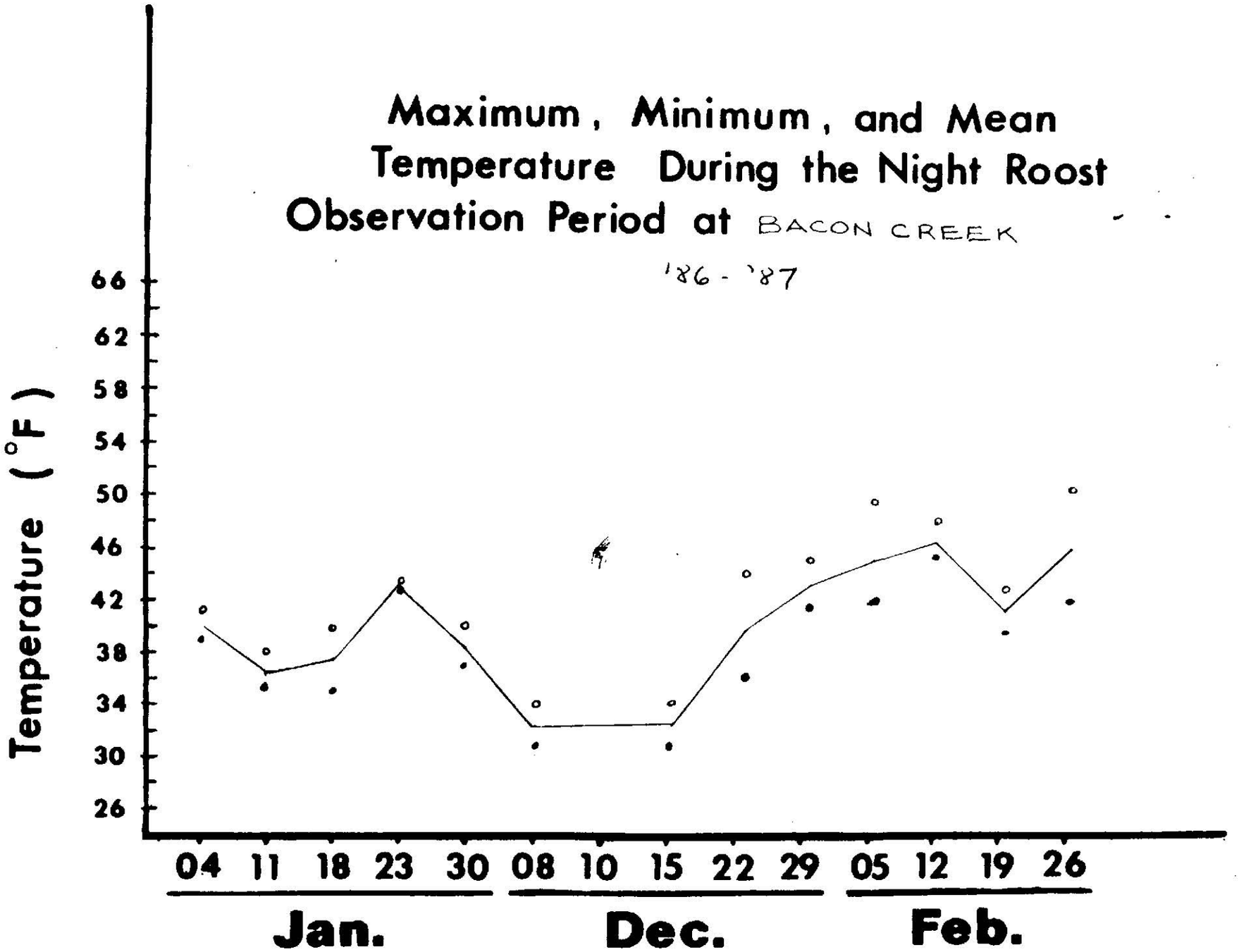


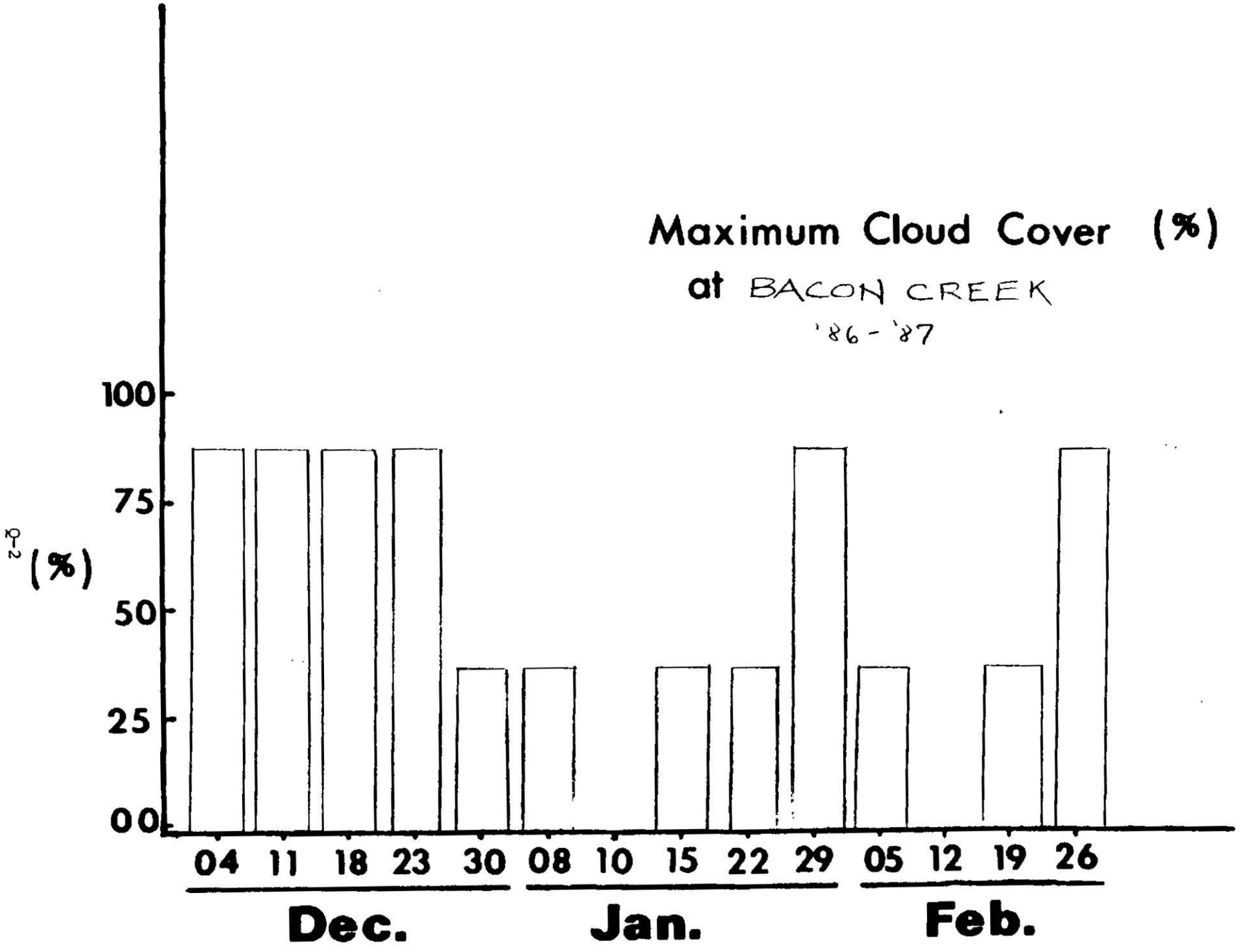
Maximum Wind Speed (mph)

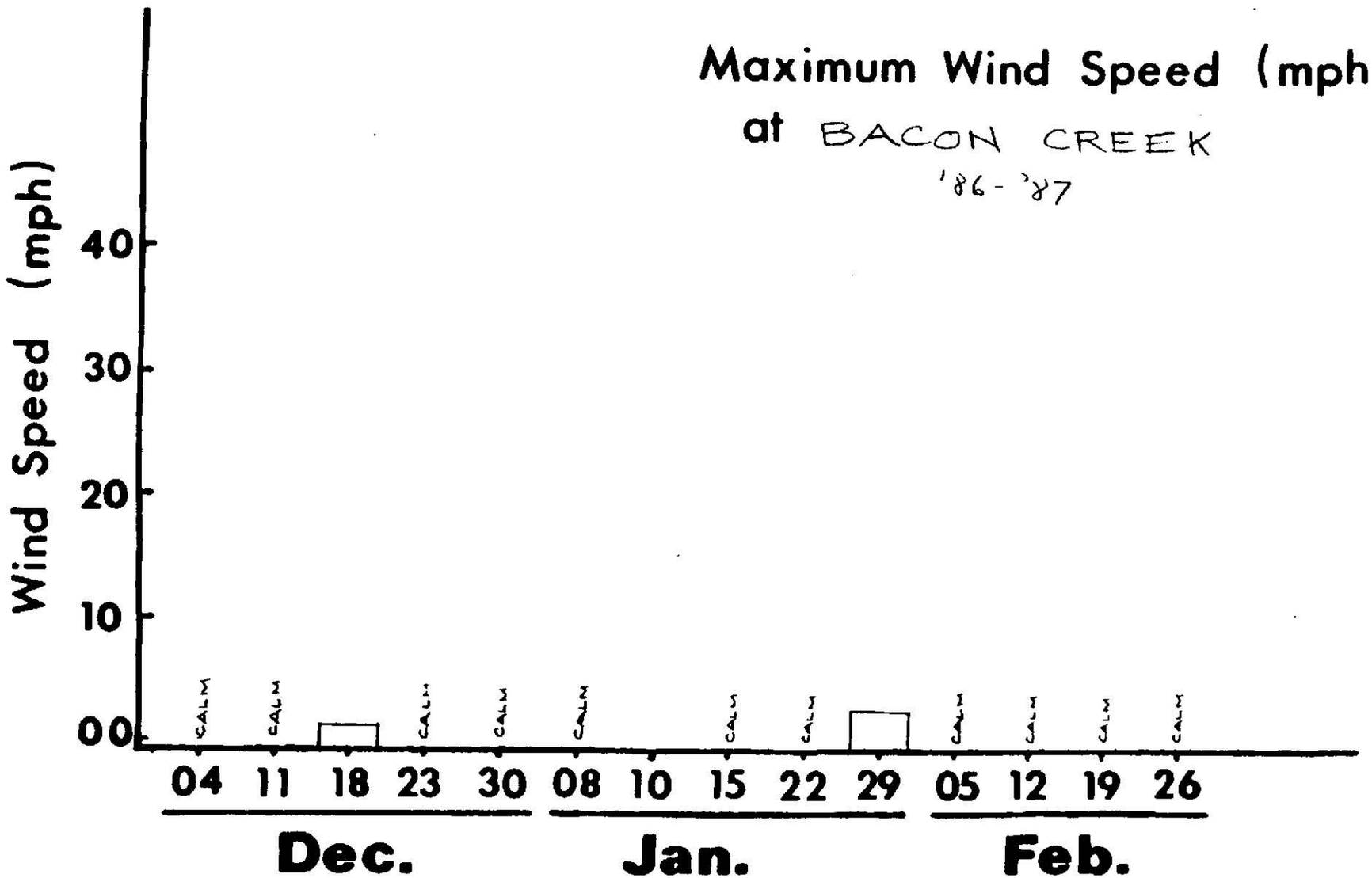
at CASCADE - IRENE CR. OVERLOOK

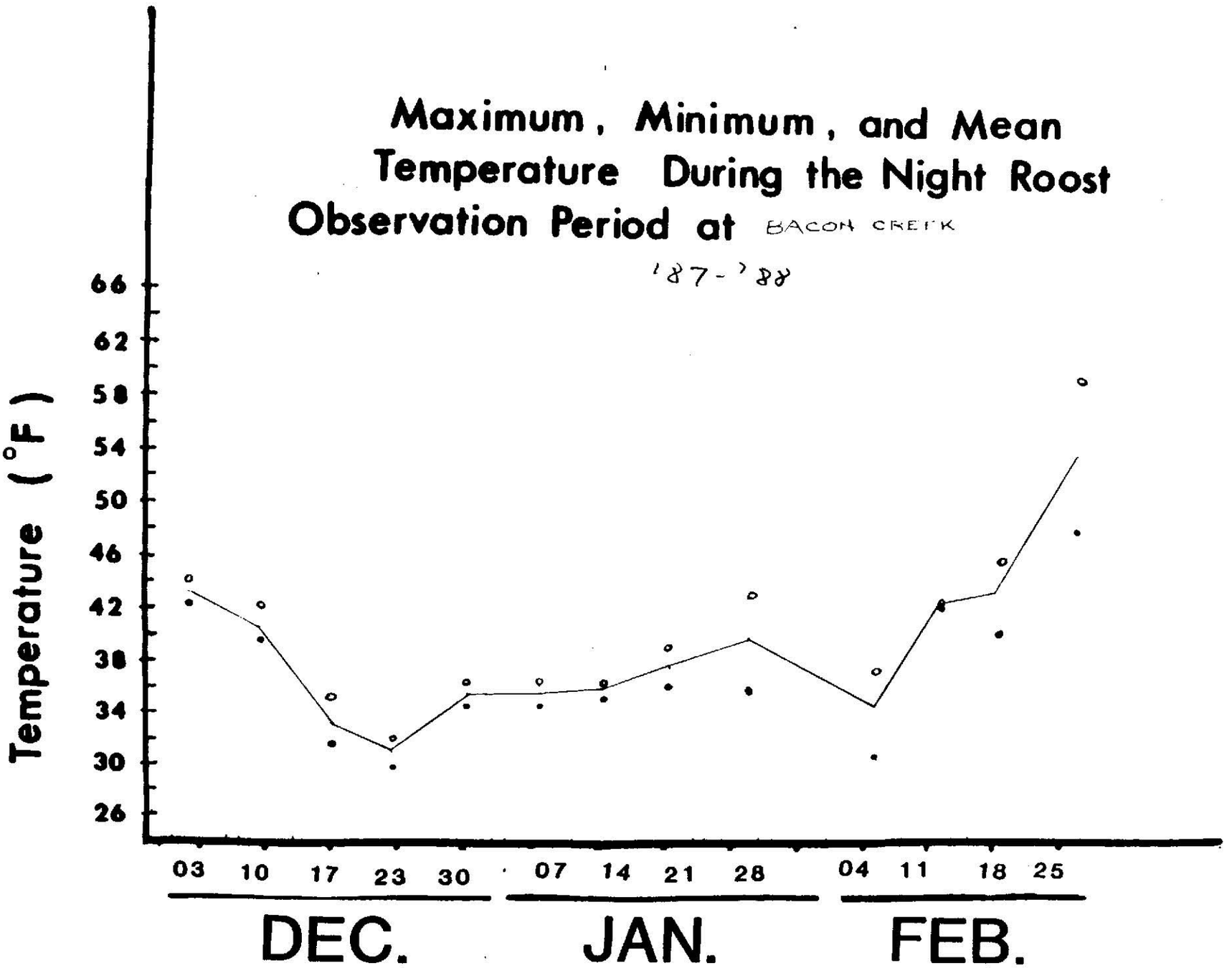
'87-88

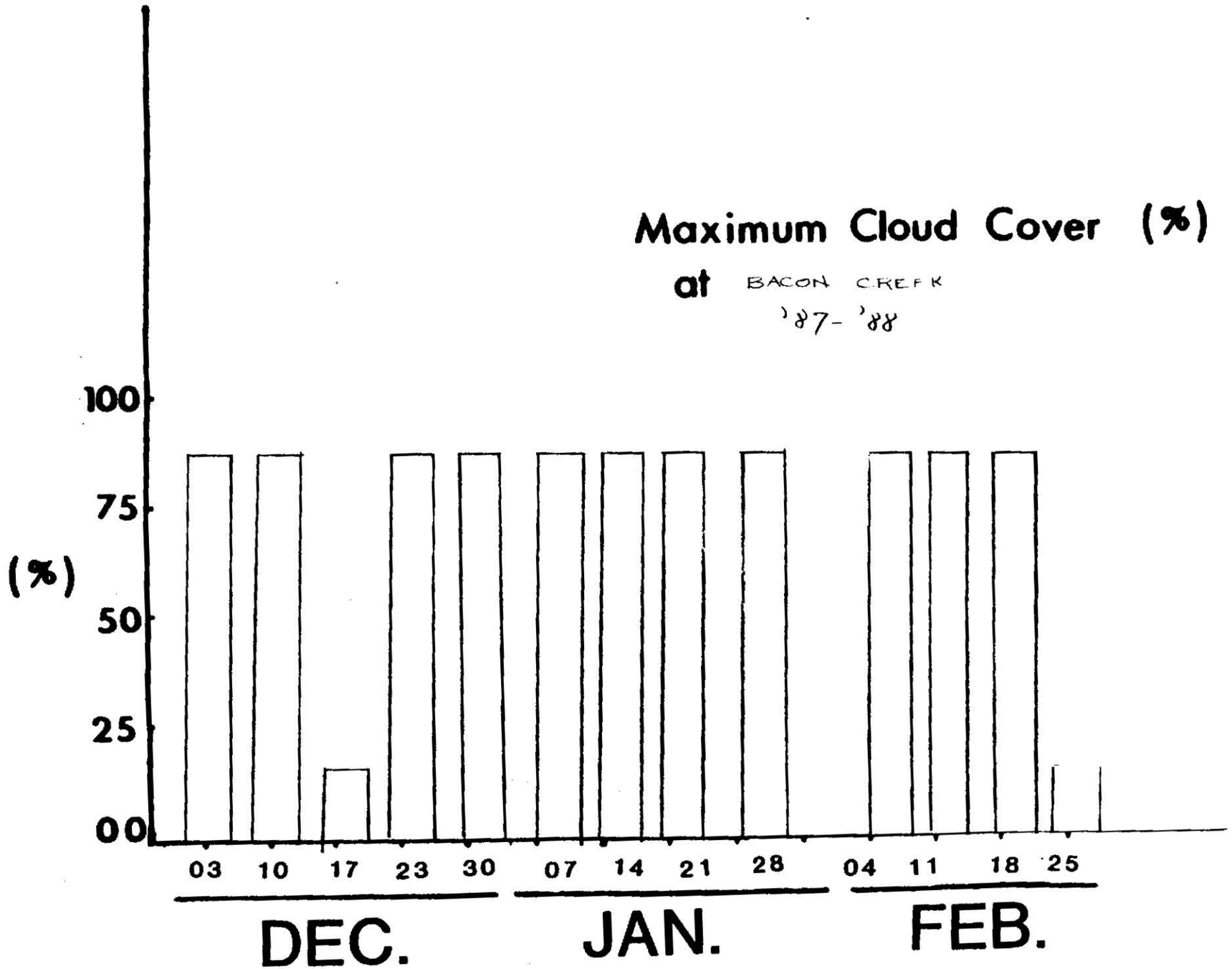



Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at BACON CREEK
'86 - '87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

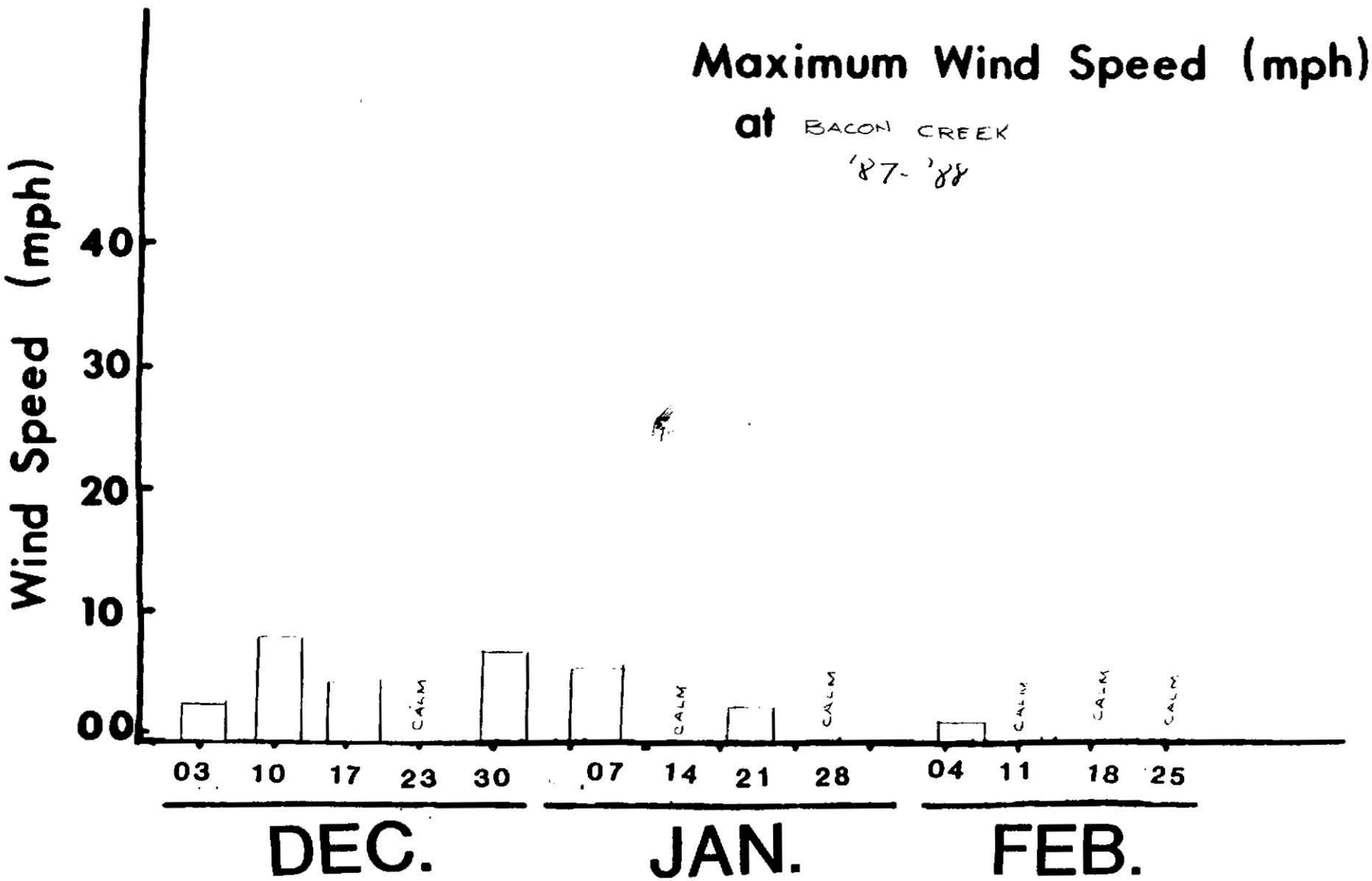

Maximum Cloud Cover (%)
at BACON CREEK
'86 - '87
100
75
50
25
00
(%)
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Wind Speed (mph)
at BACON CREEK
'86-'87
Wind Speed (mph)
40
30
20
10
00
CALM
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at BACON CREEK
'87-'88
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

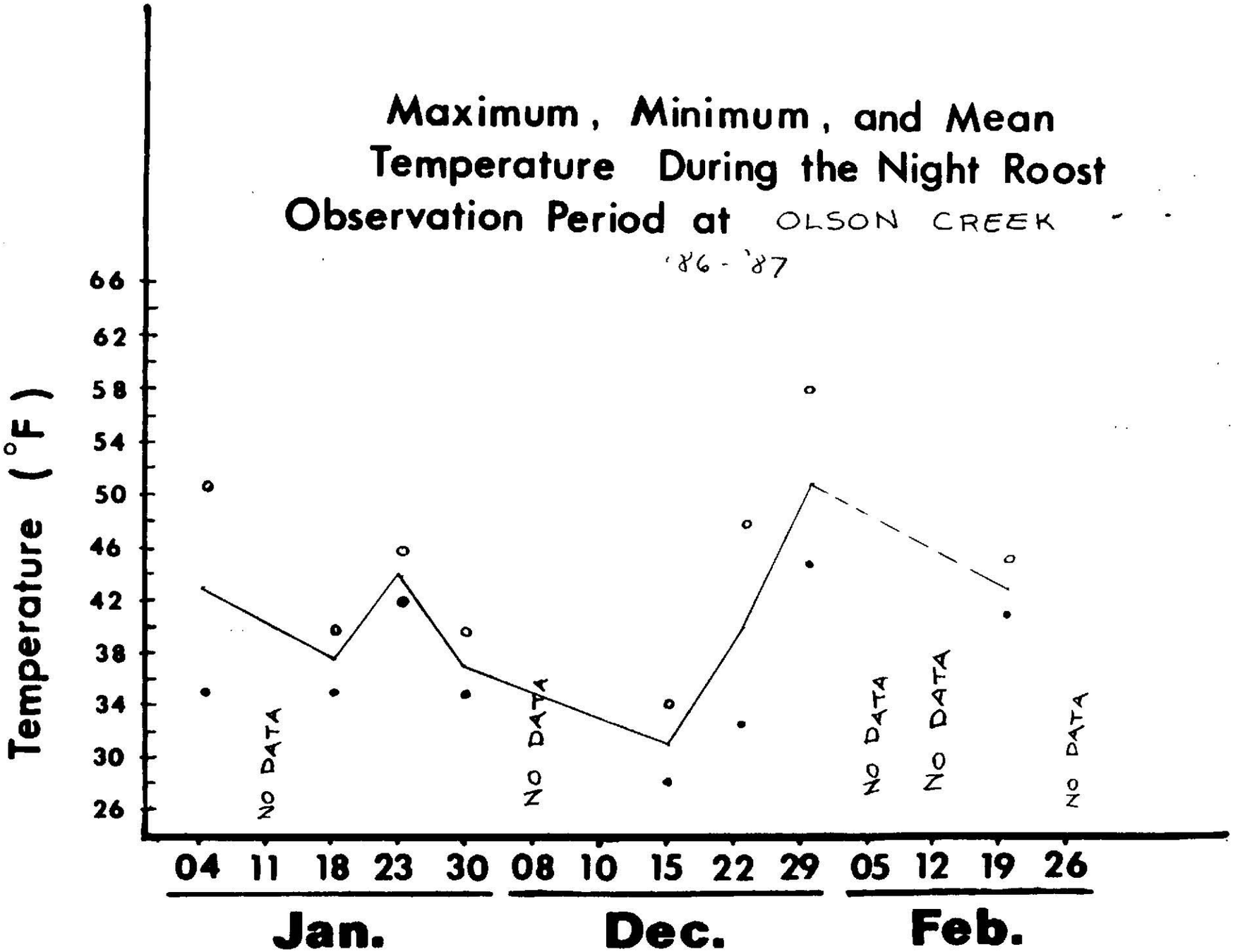

Maximum Cloud Cover (%)
at BACON CREEK
'87-'88
100
75
50
25
00
(%)
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC. JAN. FEB.

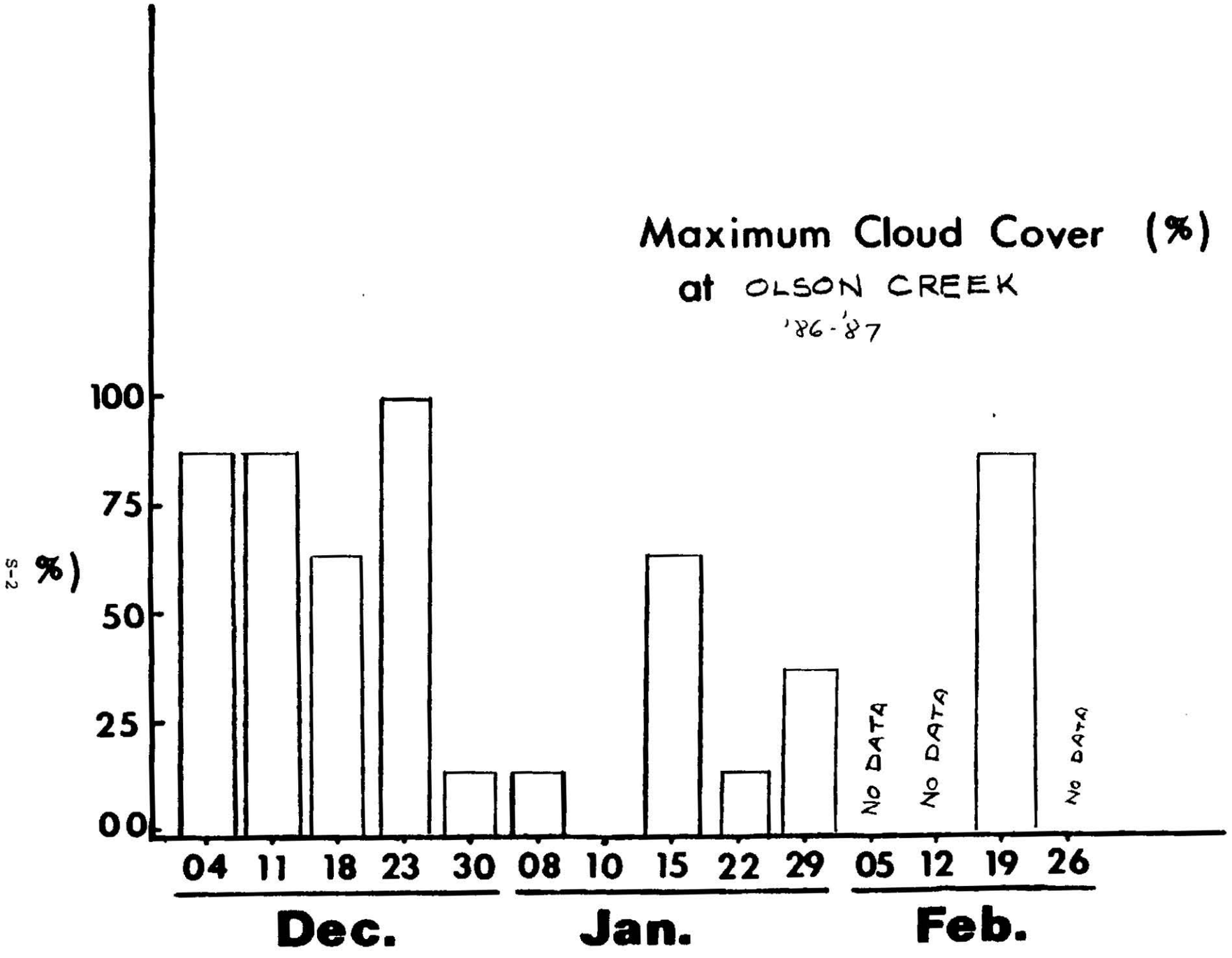
R-2

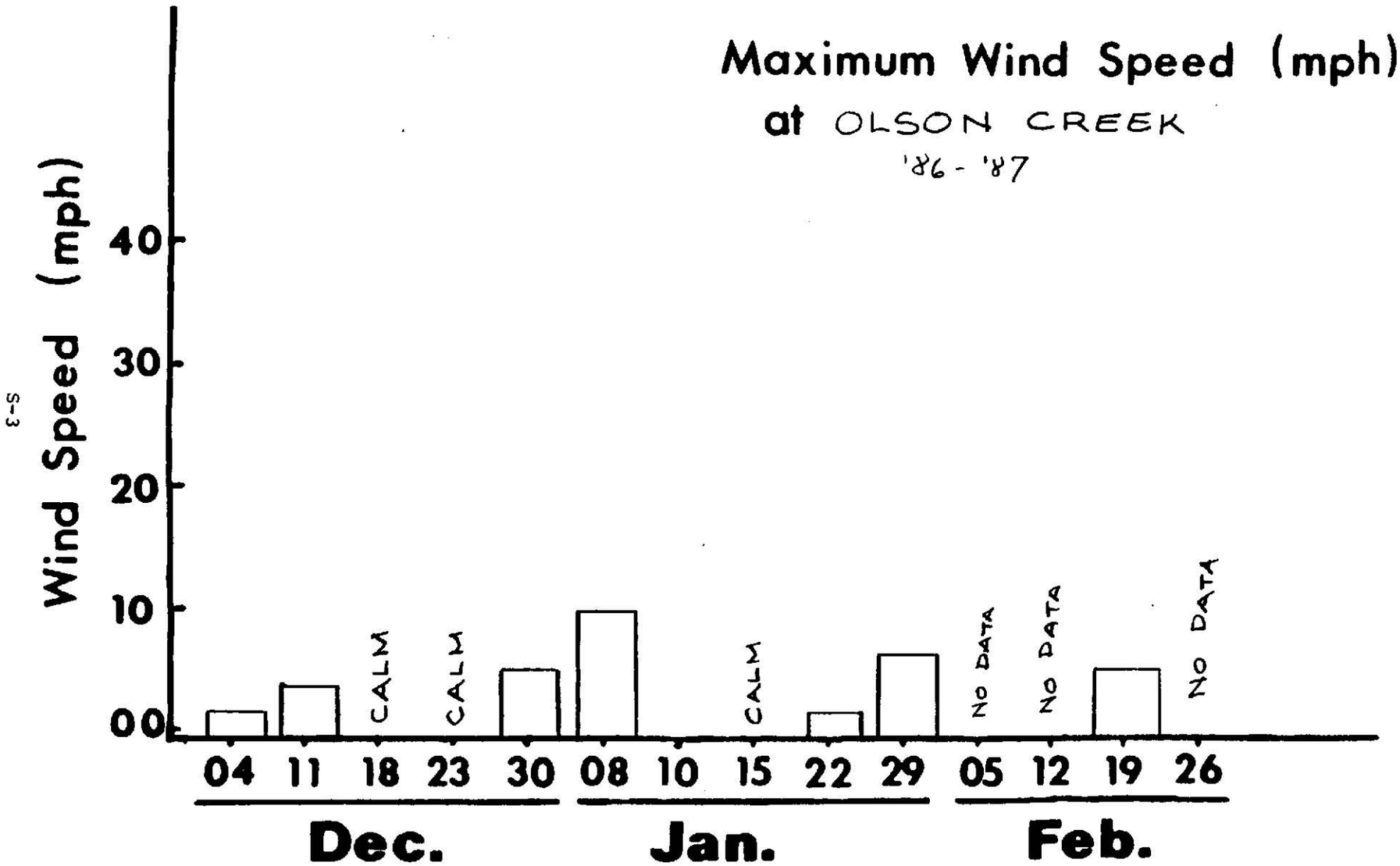

Maximum Wind Speed (mph)
at BACON CREEK
'87-'88
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
CALM
CALM
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at OLSON CREEK

'86 - '87

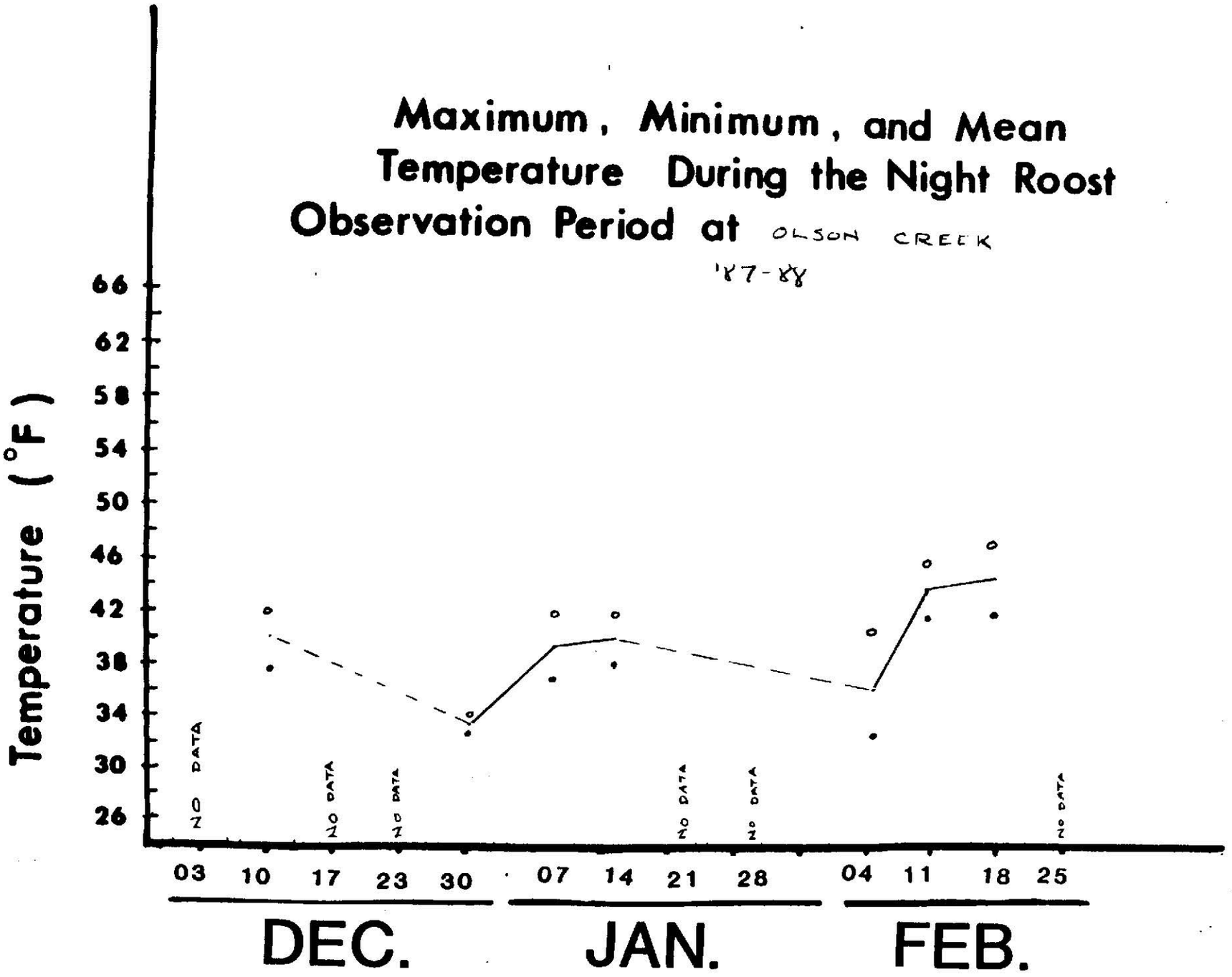


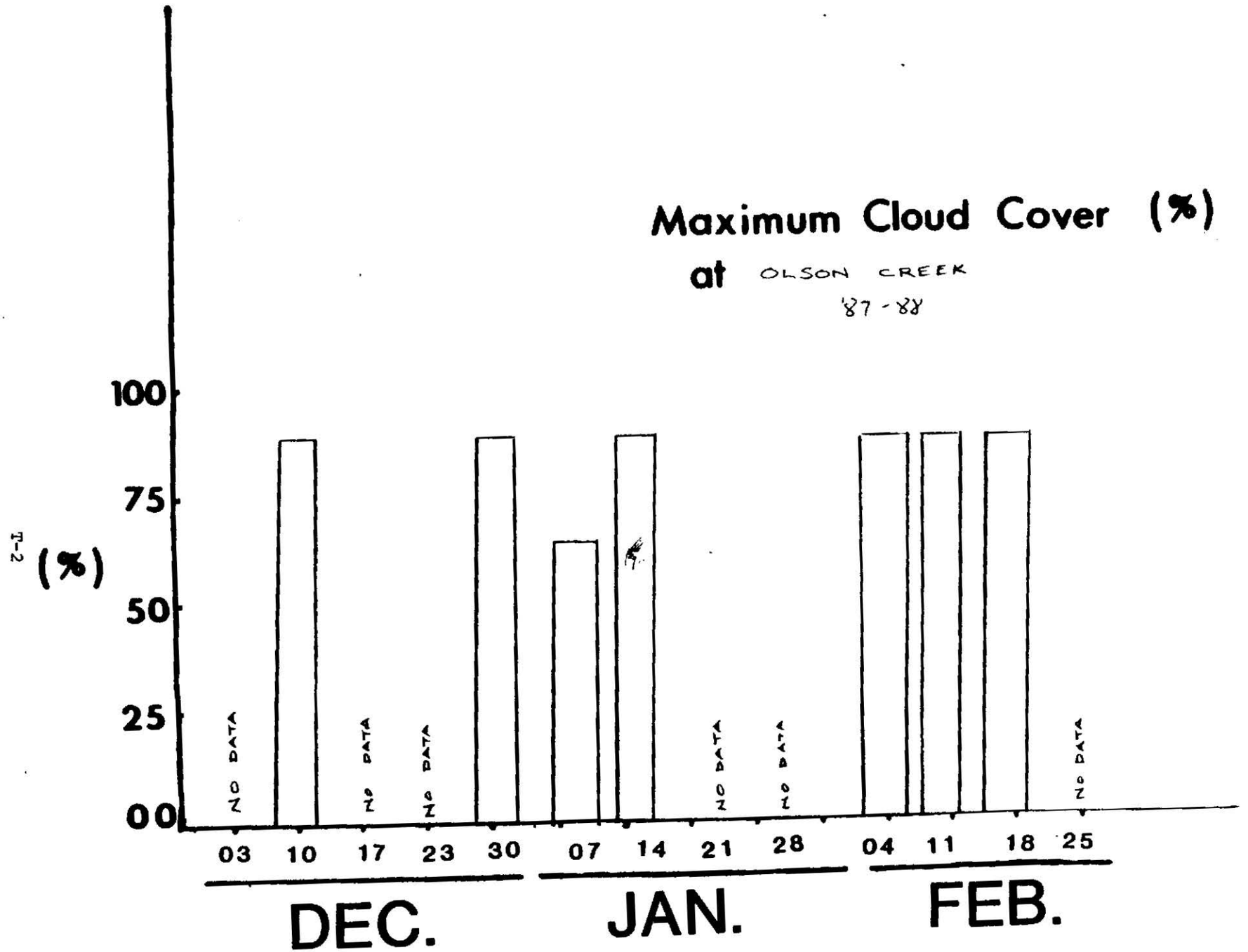

Maximum Cloud Cover (%)
at OLSON CREEK
'86-'87
100
75
50
25
00
%)
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.
NO DATA
NO DATA
NO DATA

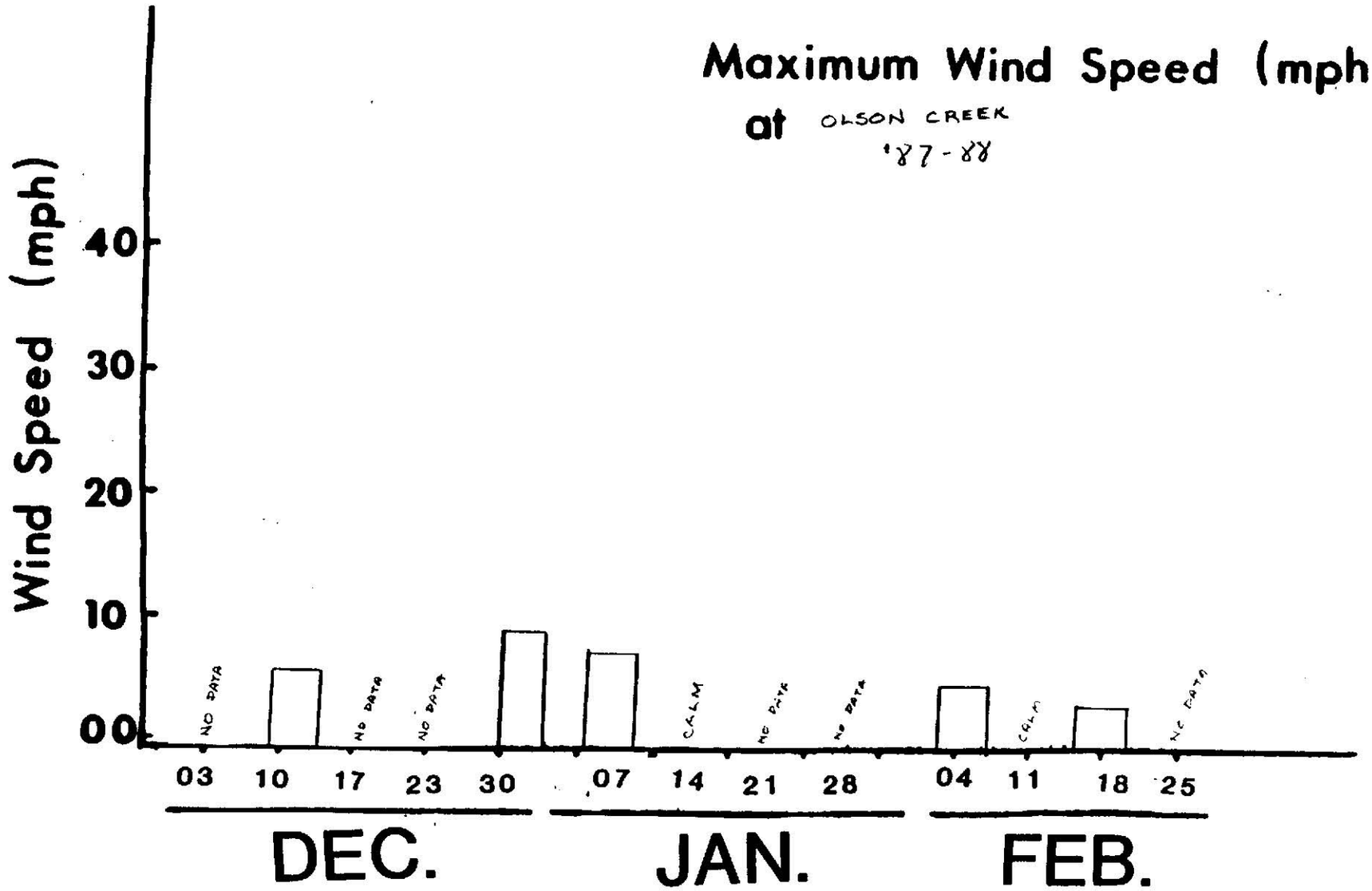

Maximum Wind Speed (mph)
at OLSON CREEK
'86 - '87
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at OLSON CREEK

'87-88

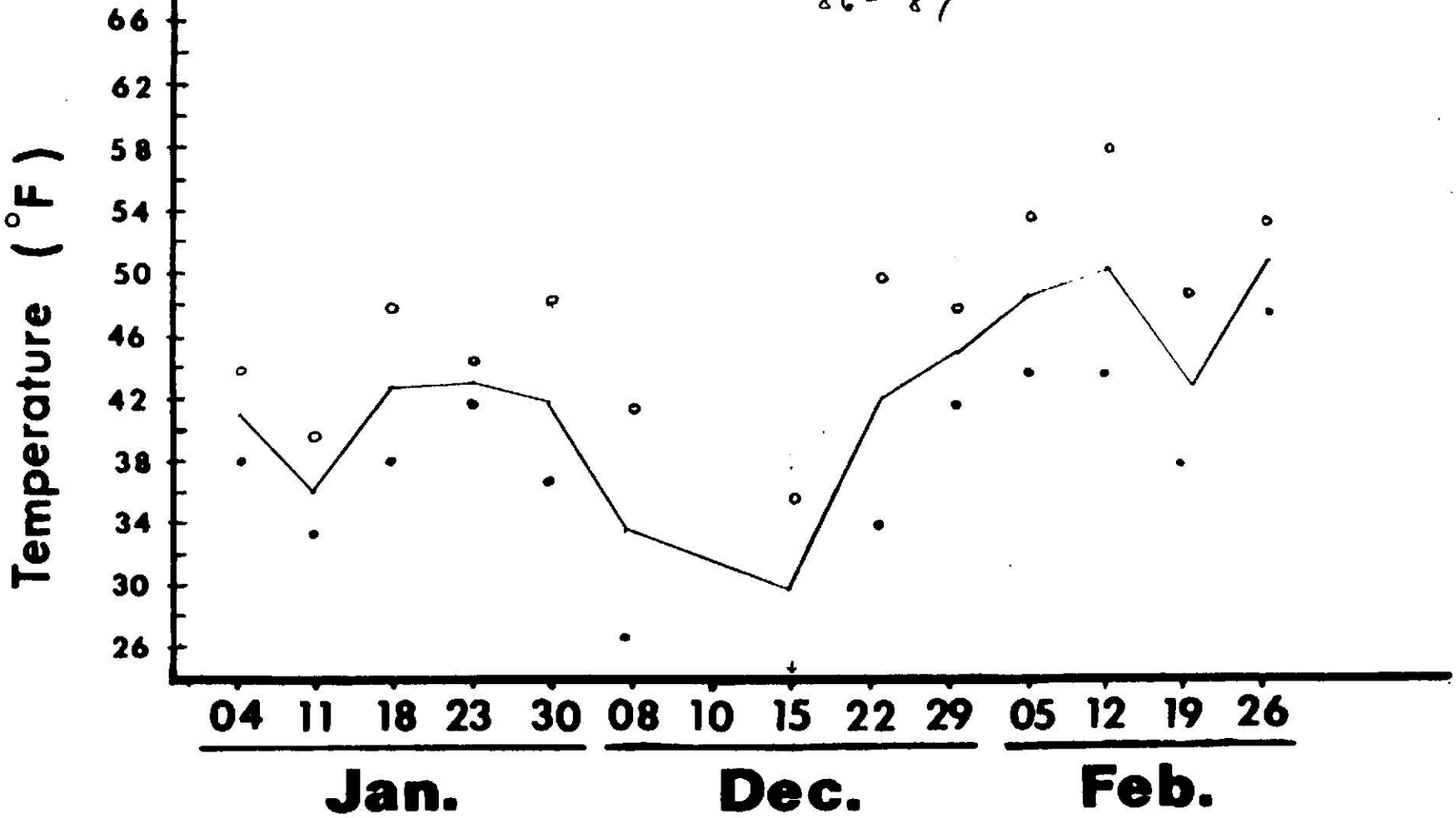


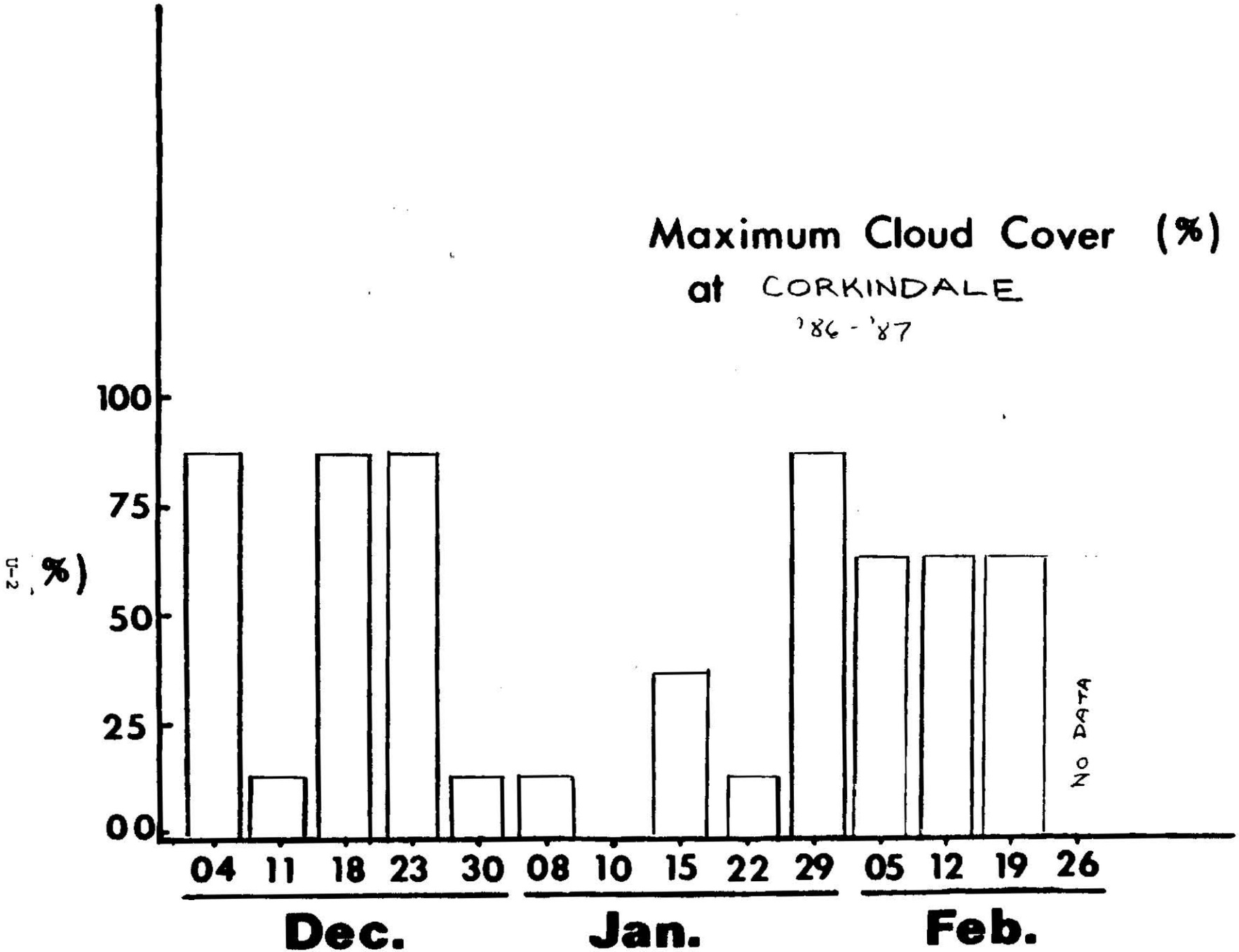

Maximum Cloud Cover (%)
at OLSON CREEK
'87 - '88
100
75
50
25
00
(%)
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

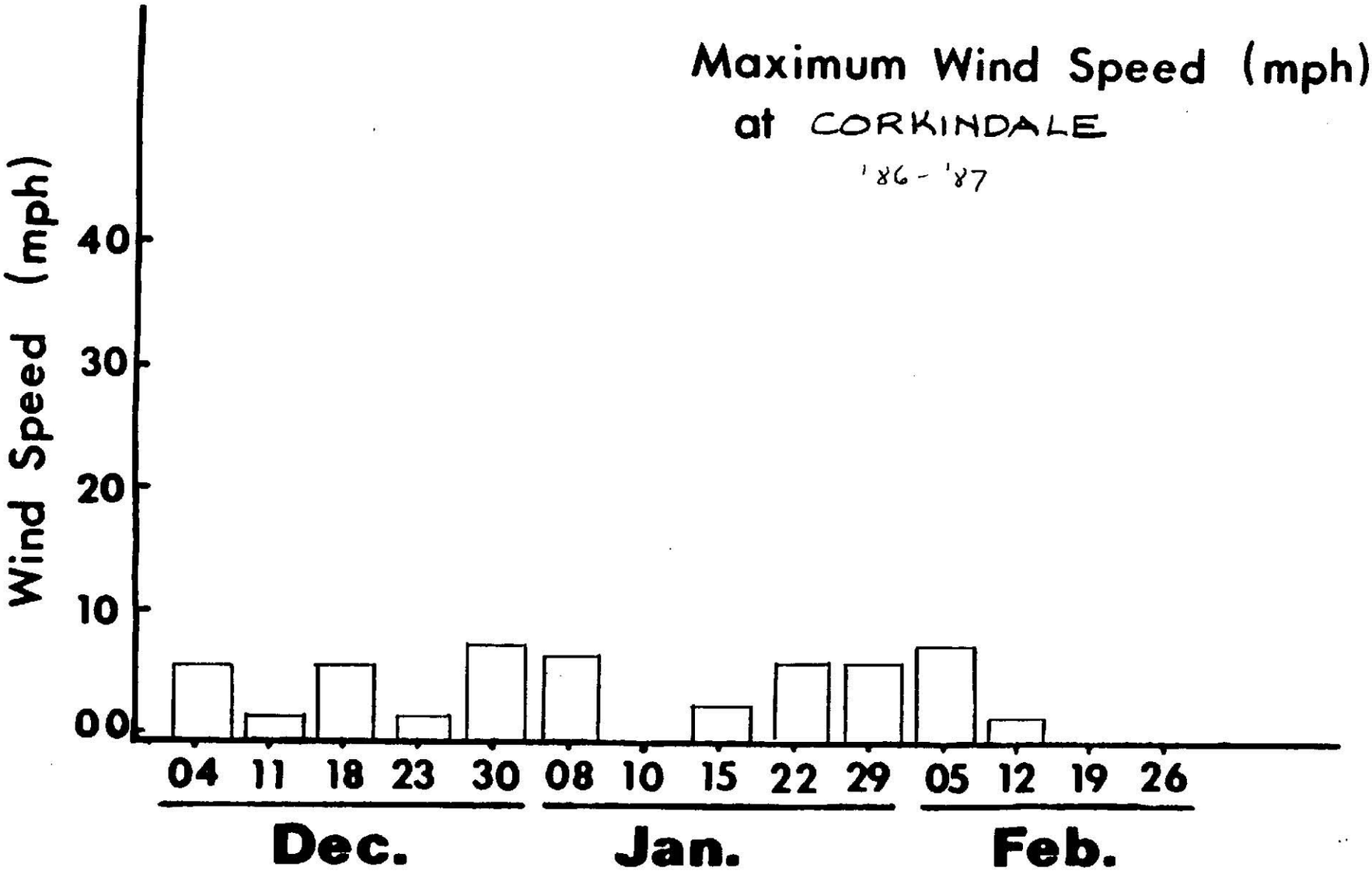

Maximum Wind Speed (mph)
at OLSON CREEK
'87-88
Wind Speed (mph)
40
30
20
10
00
NO DATA
NO DATA
NO DATA
CALM
NO DATA
NO DATA
CALM
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at CORKINDALE

'86 - '87

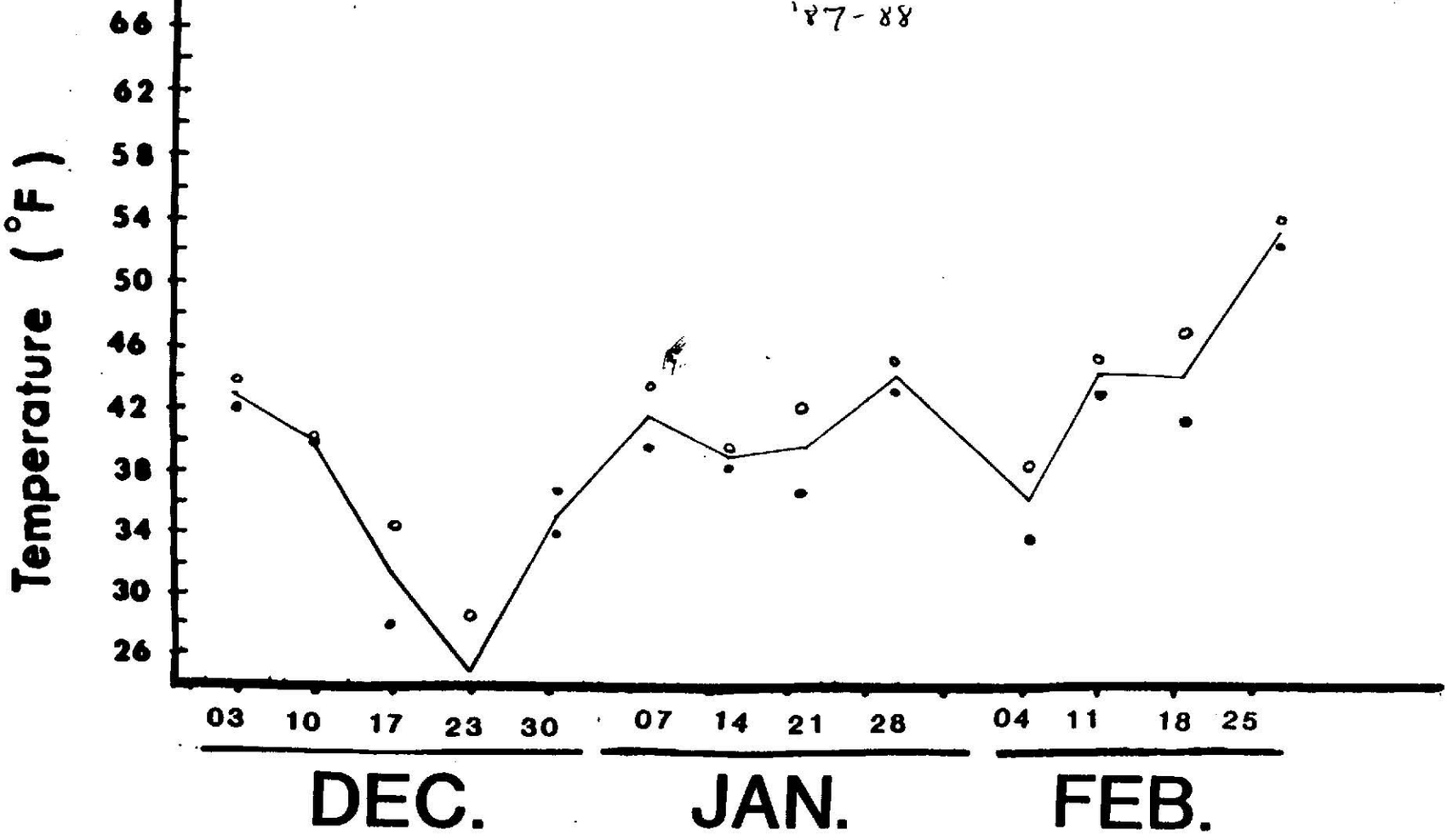



Maximum Cloud Cover (%)
at CORKINDALE
'86 - '87
100
75
50
25
00
%)
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.
NO DATA

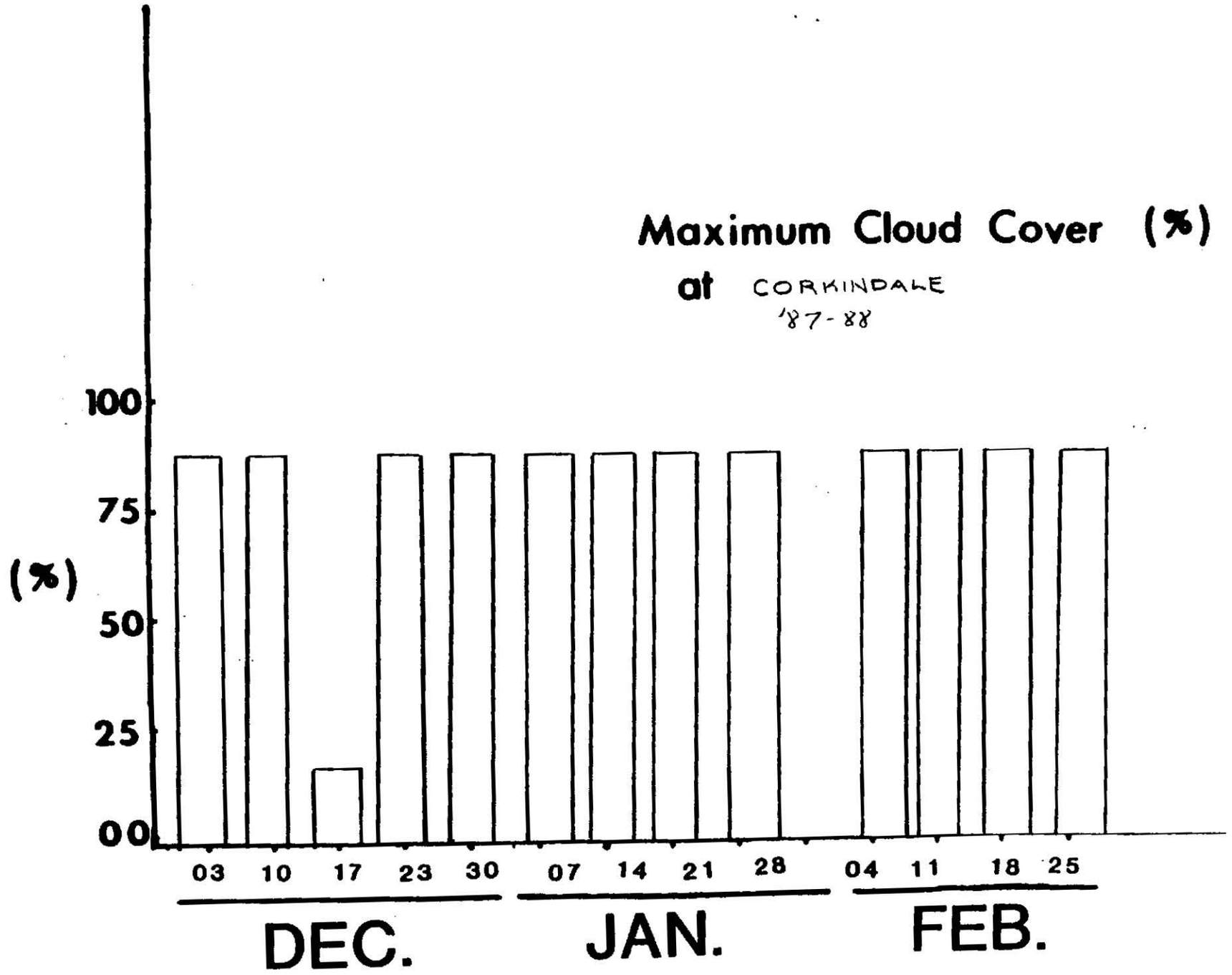

Maximum Wind Speed (mph)
at CORKINDALE
'86 - '87
Wind Speed (mph)
40
30
20
10
00
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

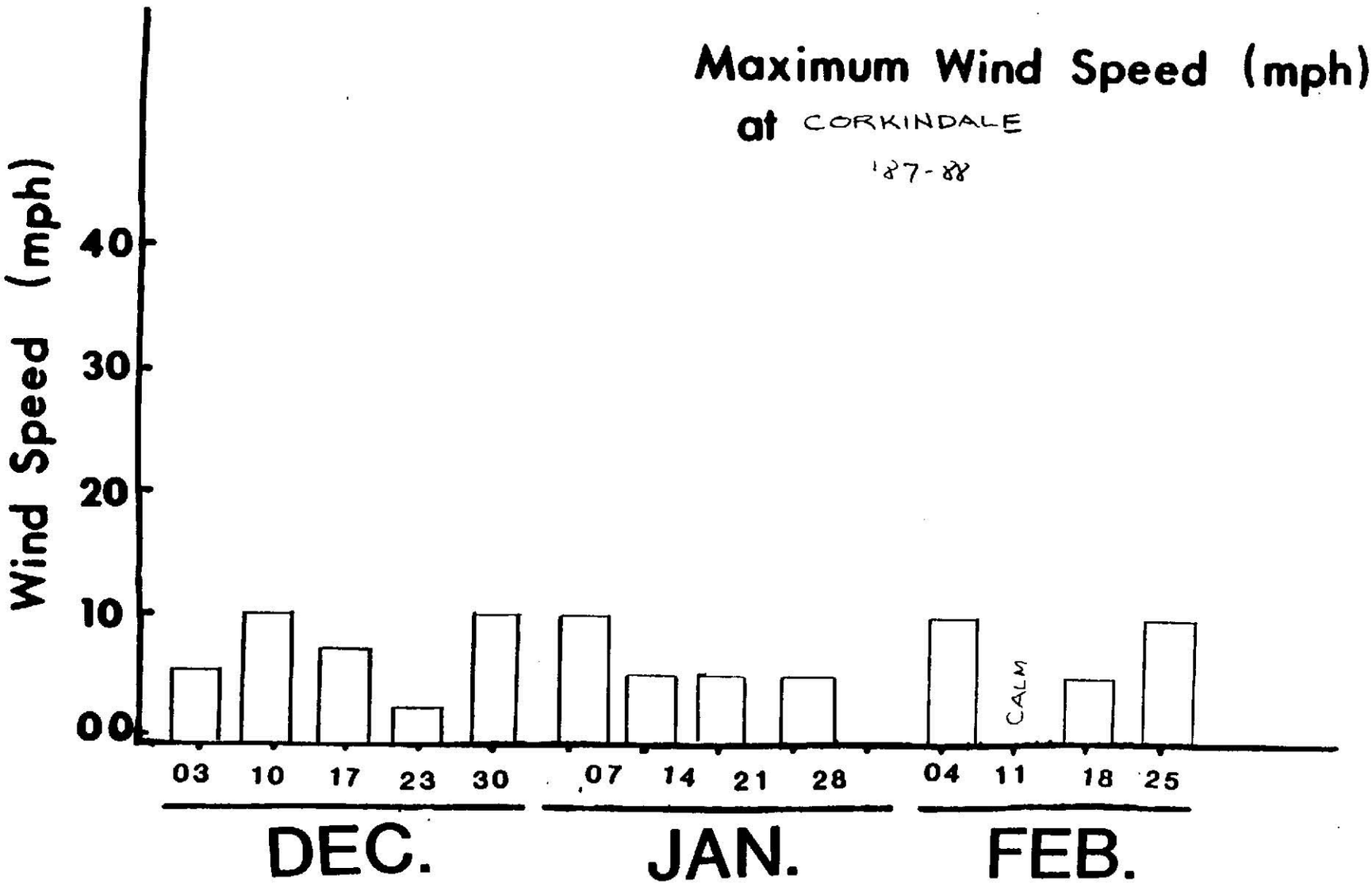
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at CORKINDALE

'87-88



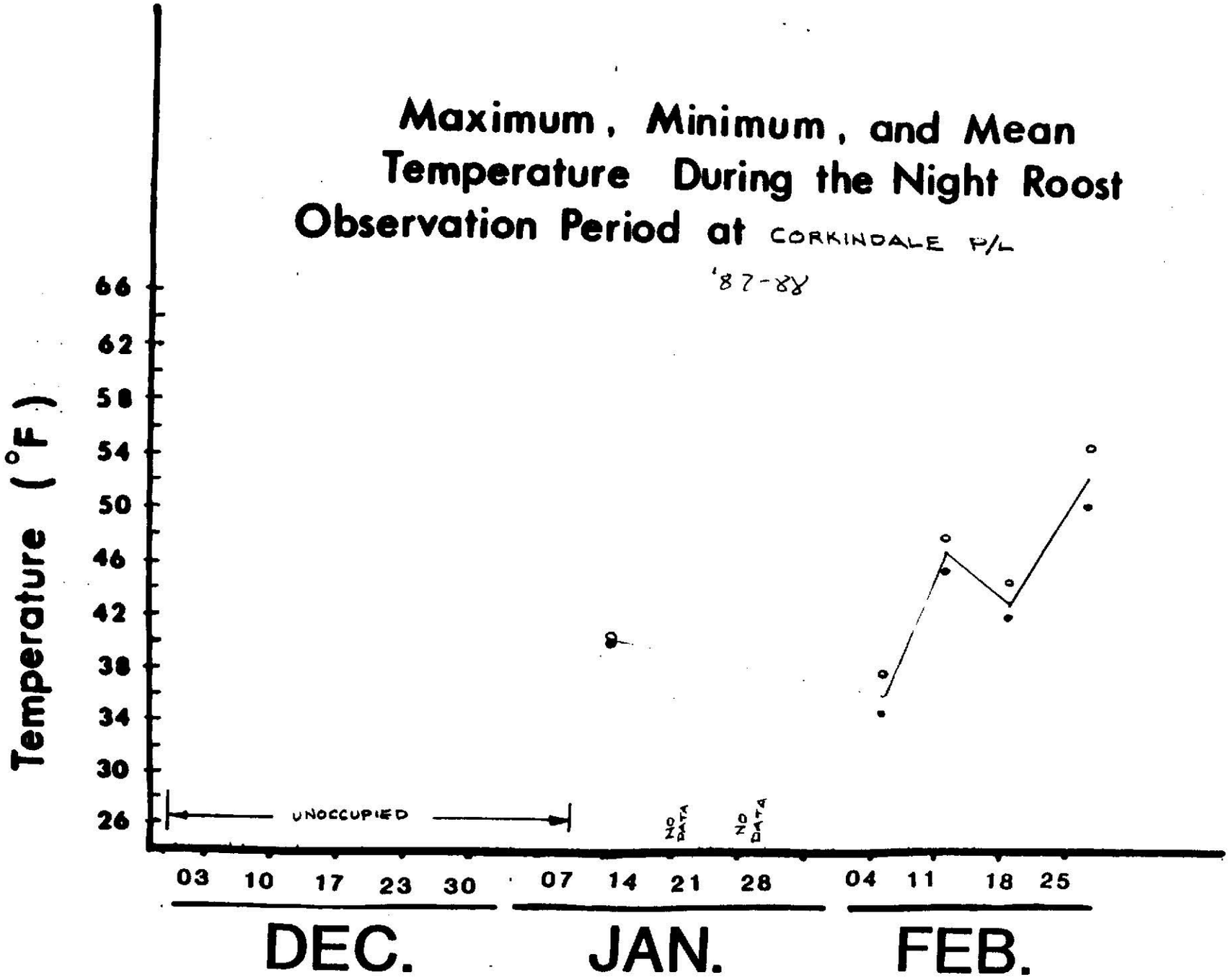
V-1


Maximum Cloud Cover (%)
at CORKINDALE
'87-88
100
75
50
25
00
(%)
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC. JAN. FEB.

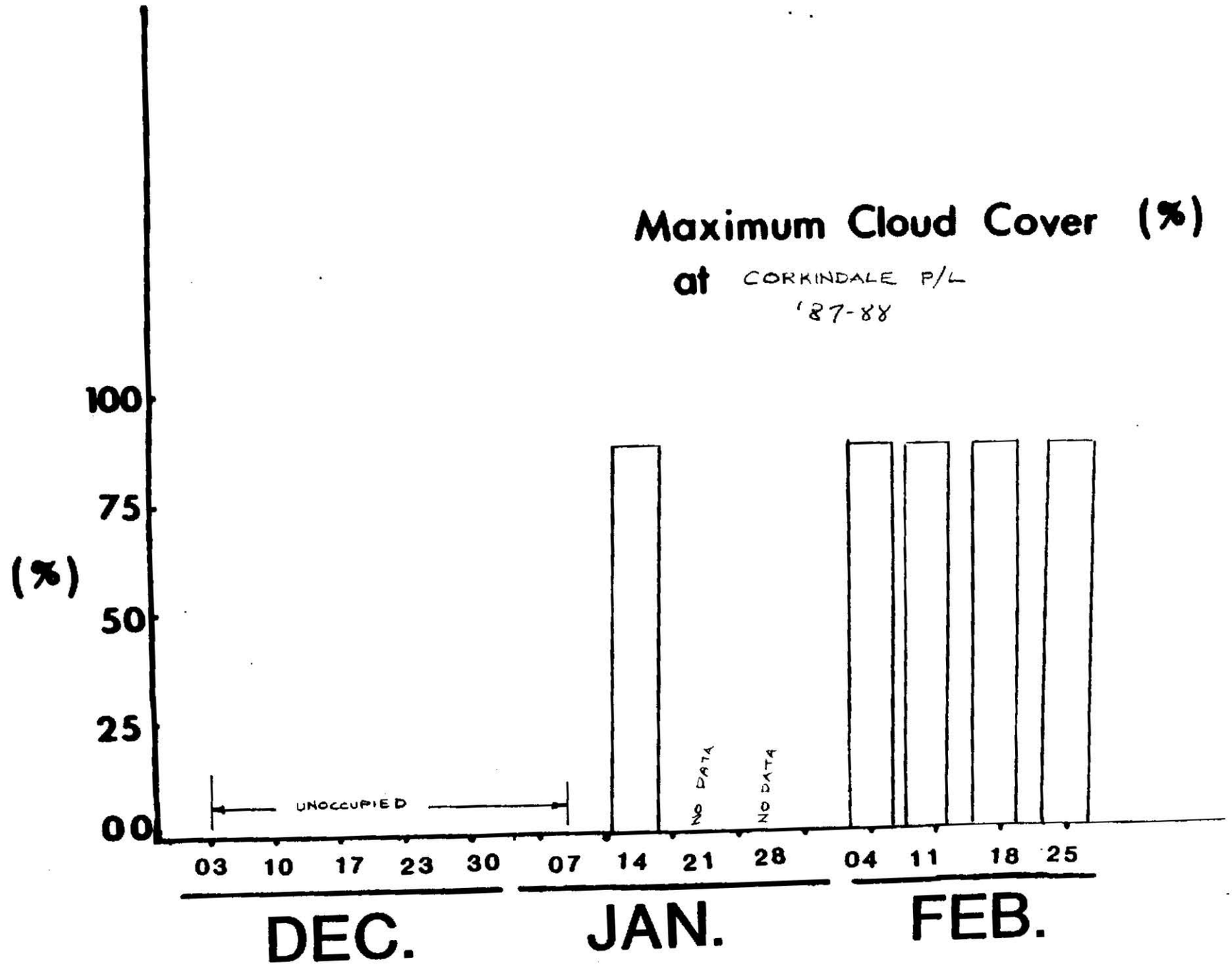

Maximum Wind Speed (mph)
at CORKINDALE
'87-88
Wind Speed (mph)
40
30
20
10
00
CALM
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at CORKINDALE P/L

'87-88



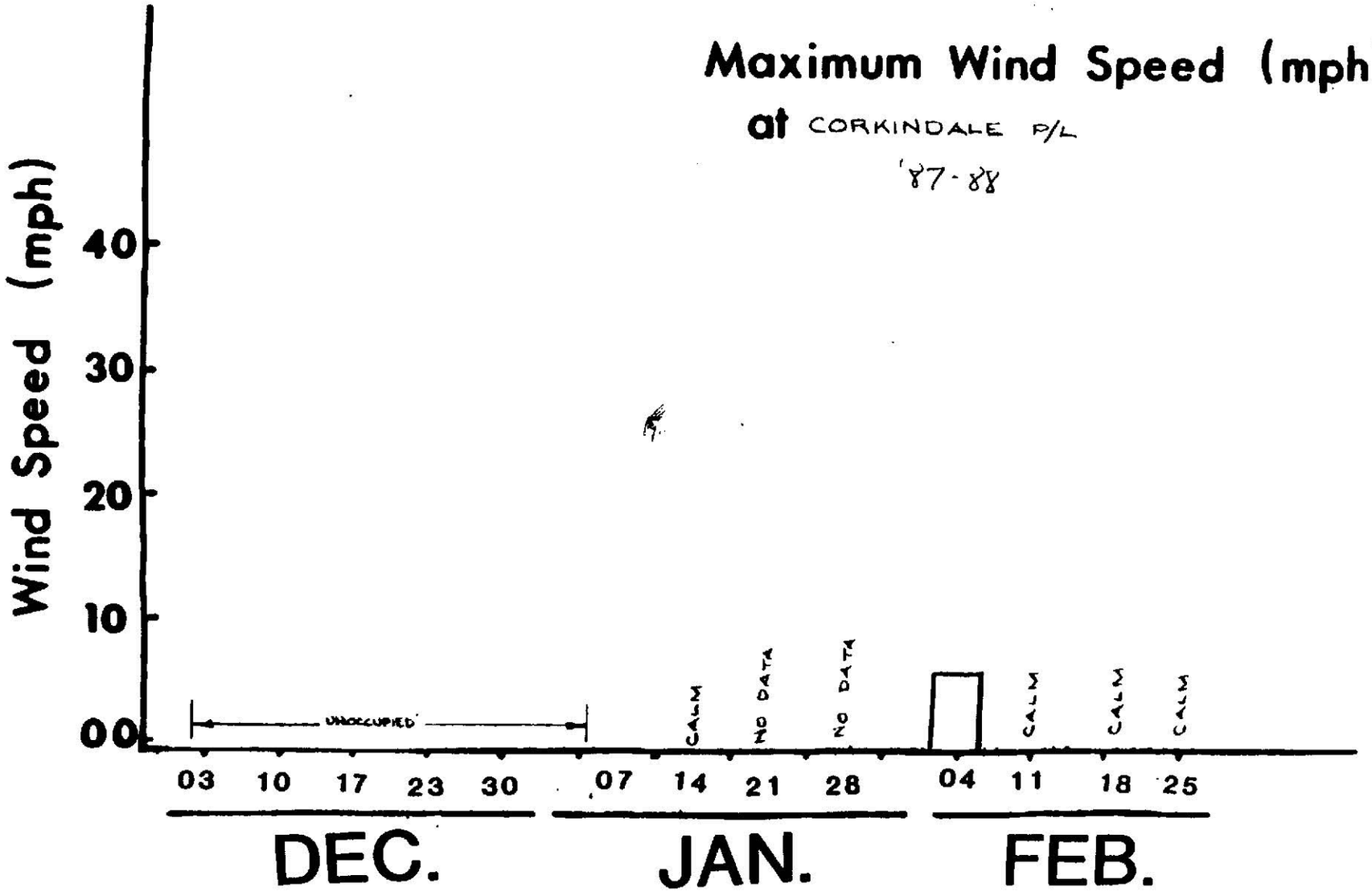
W-1


Maximum Cloud Cover (%)
at CORKINDALE P/L
'87-88
100
75
(%)
50
25
00
UNOCCUPIED
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

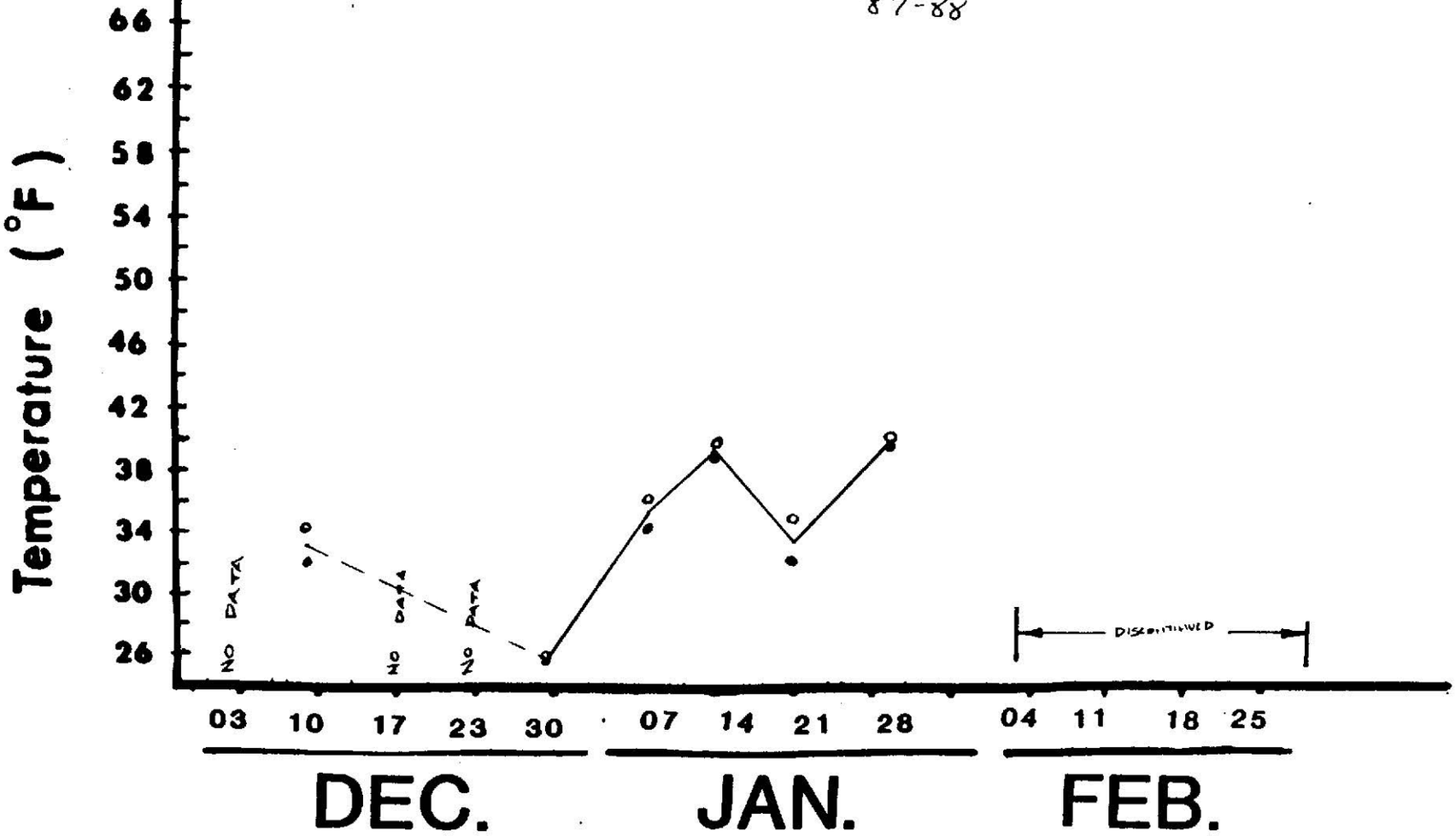
Maximum Wind Speed (mph)

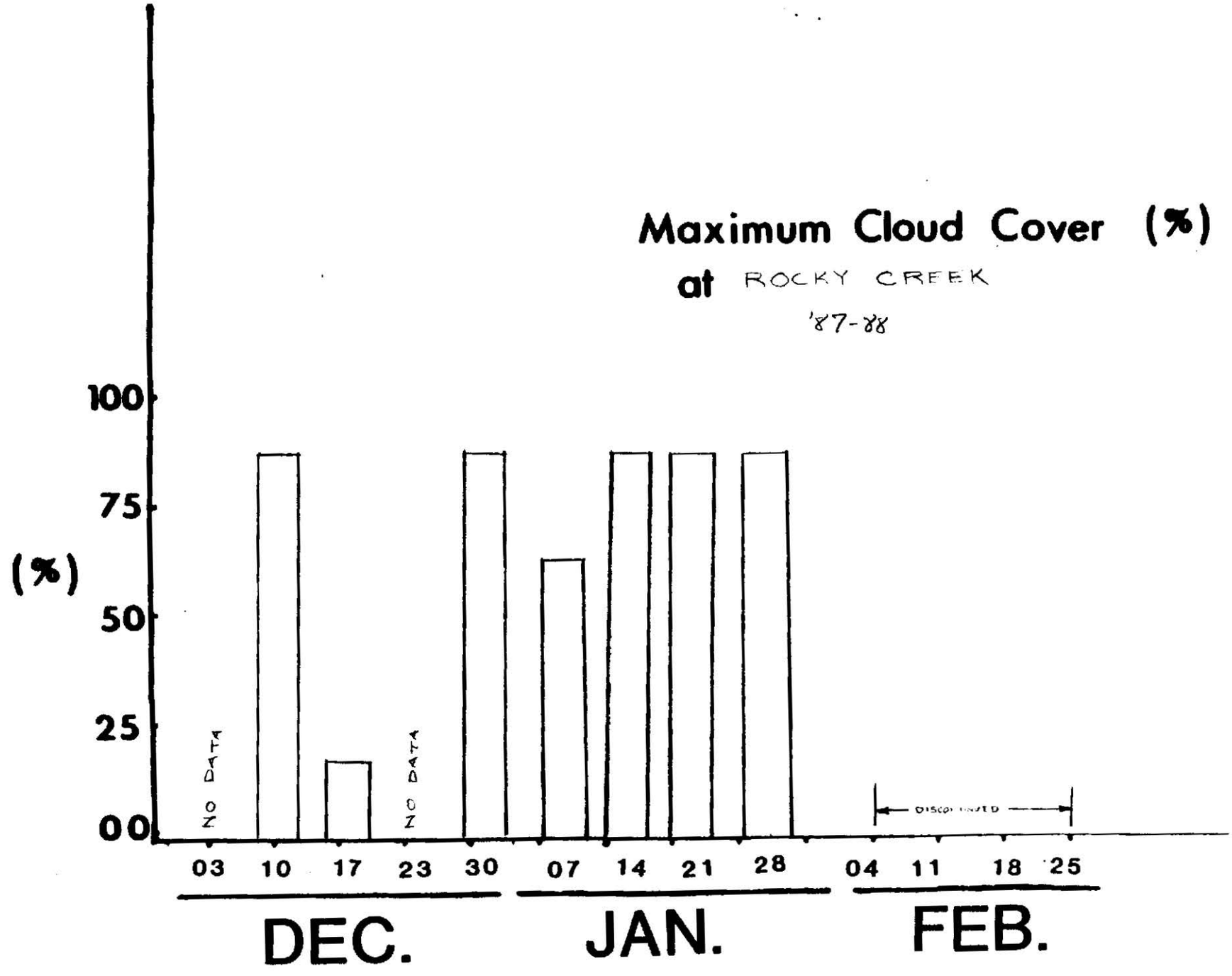
at CORKINDALE P/L

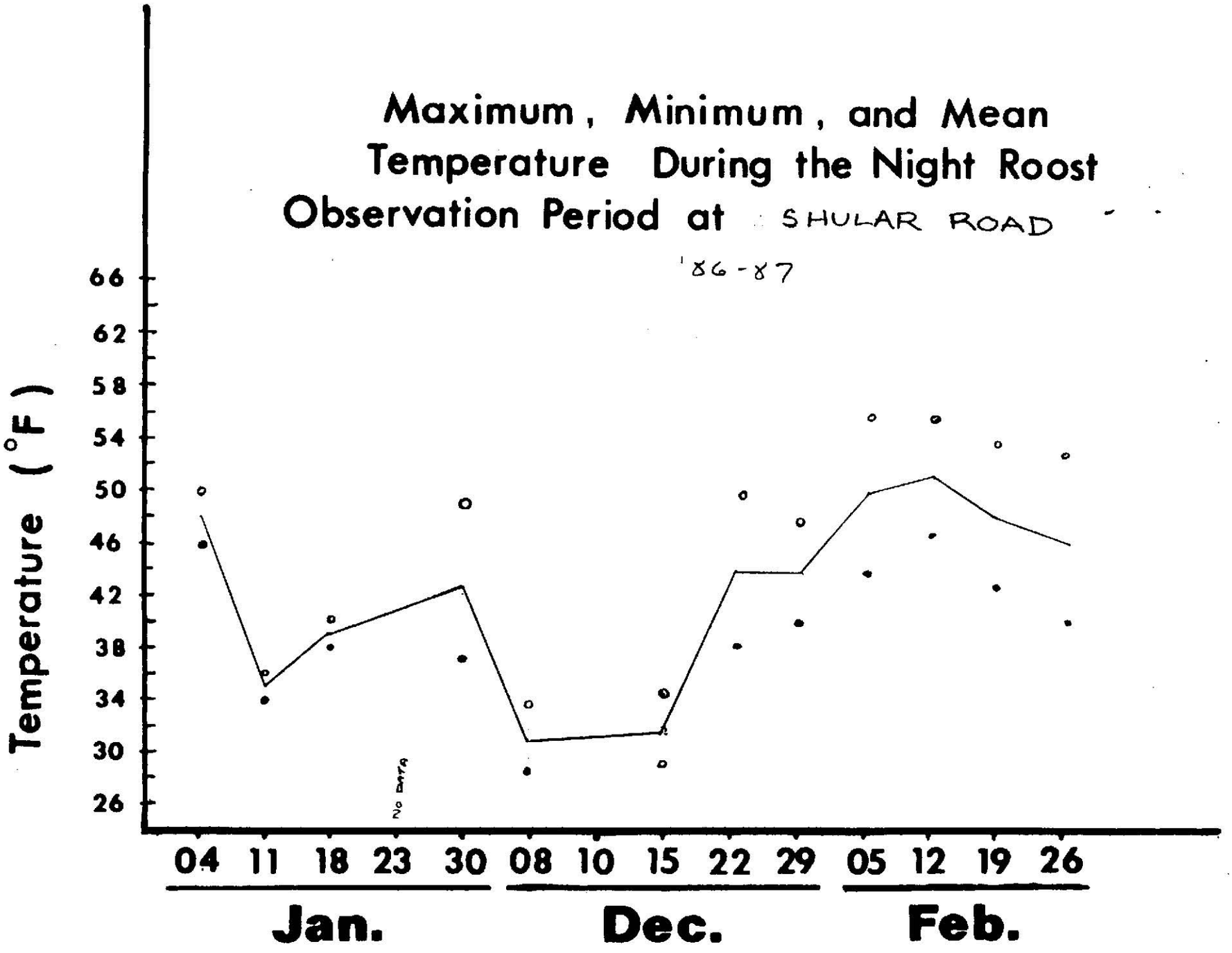
'87-88

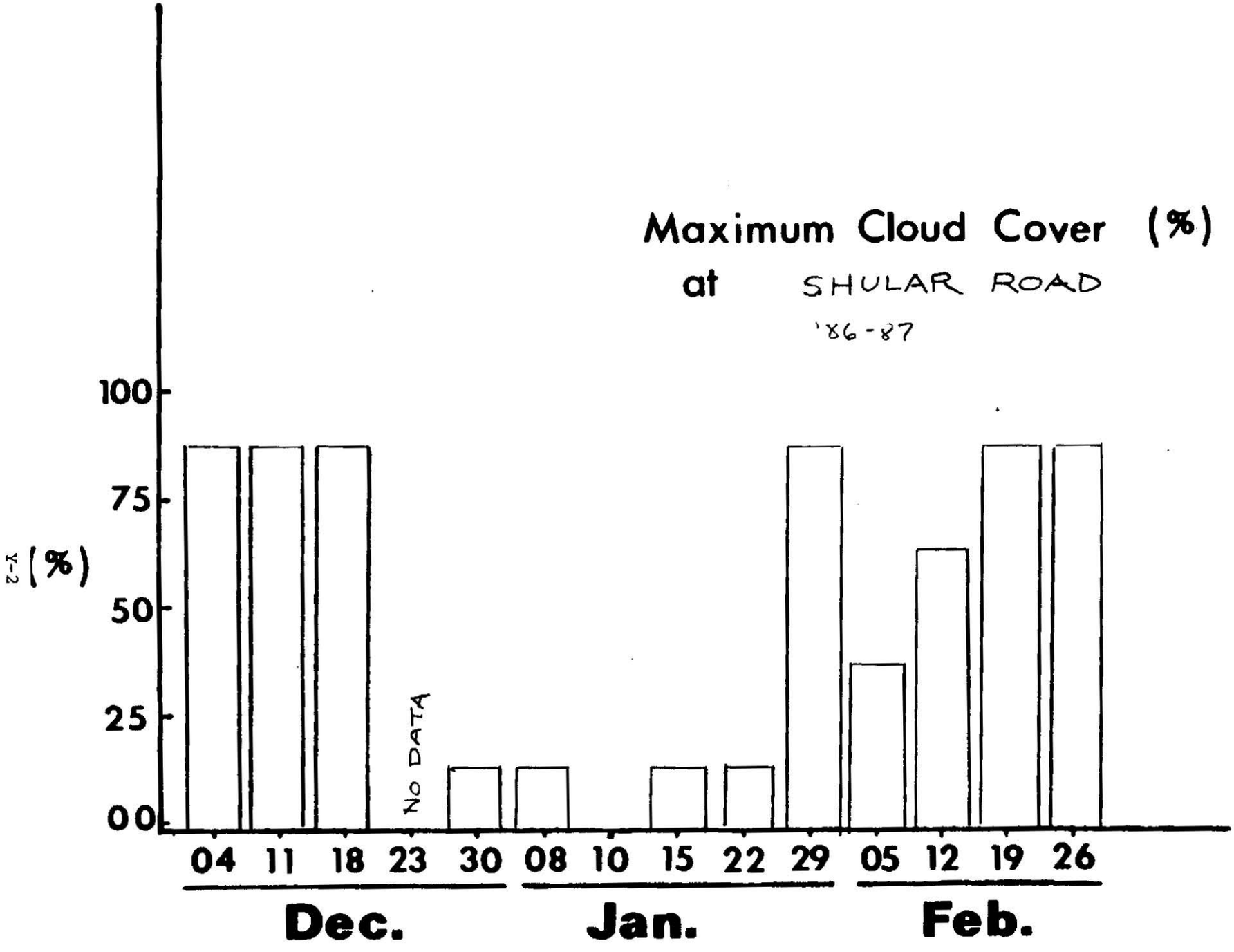


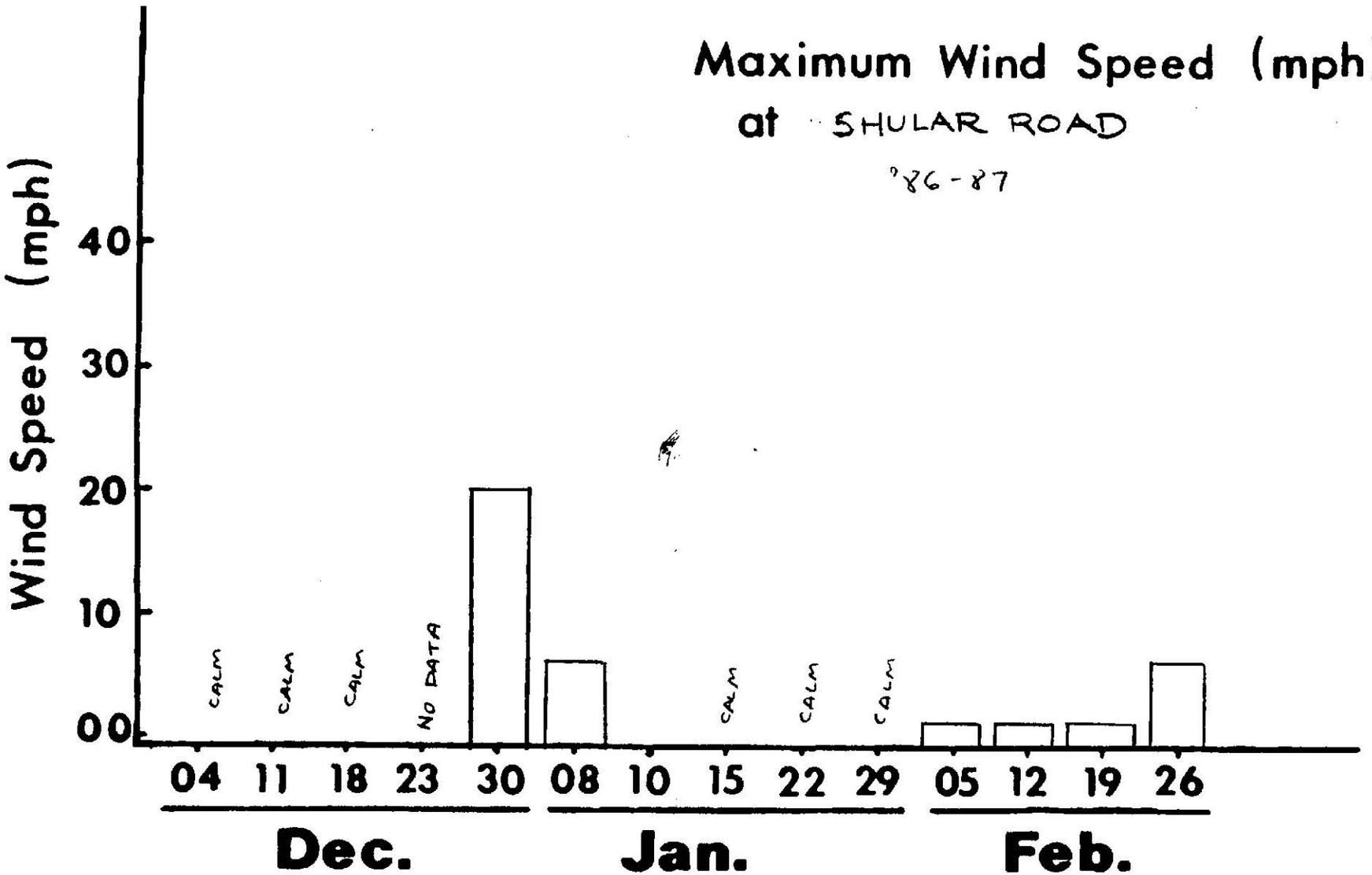
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at ROCKY CREEK '87-88

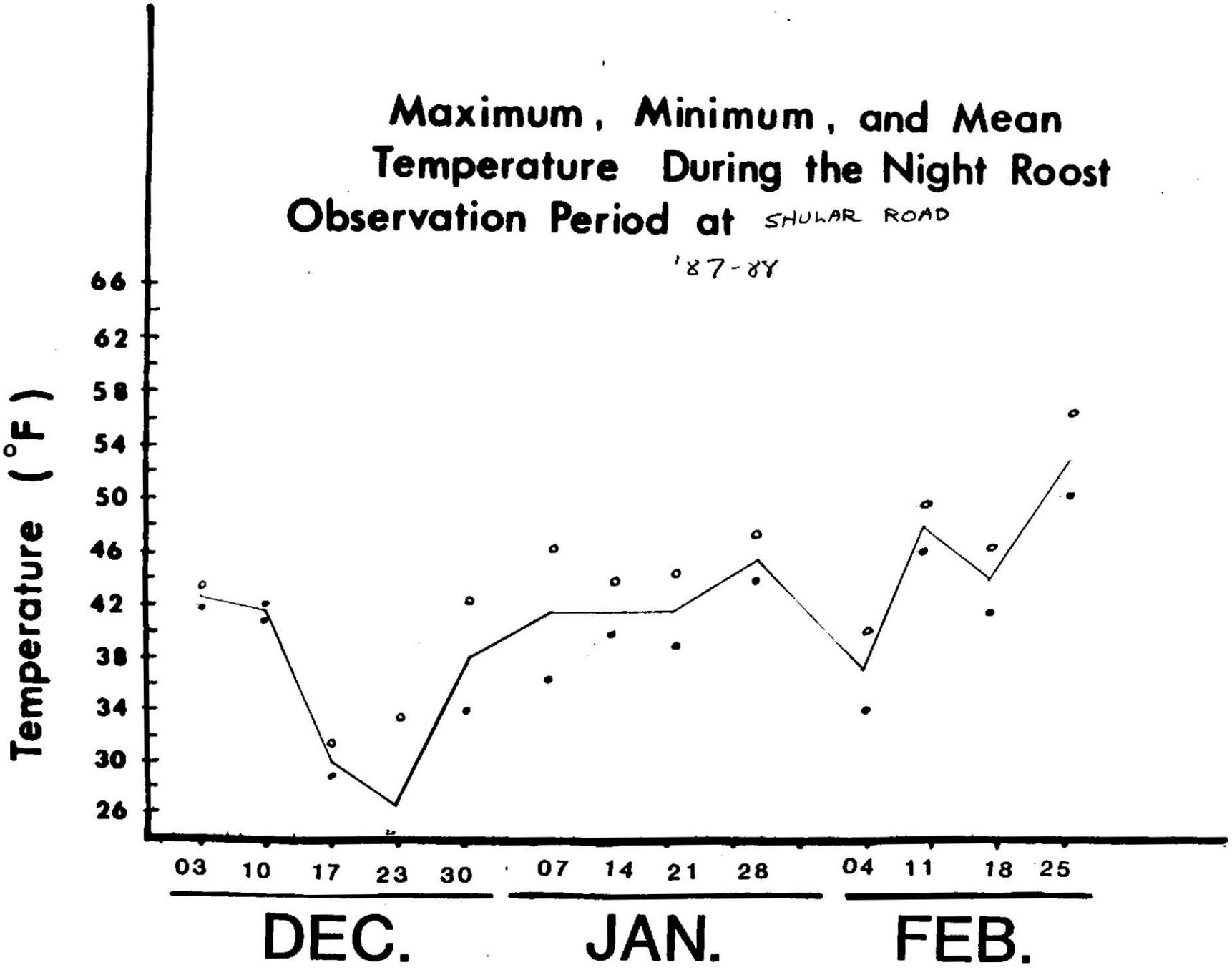


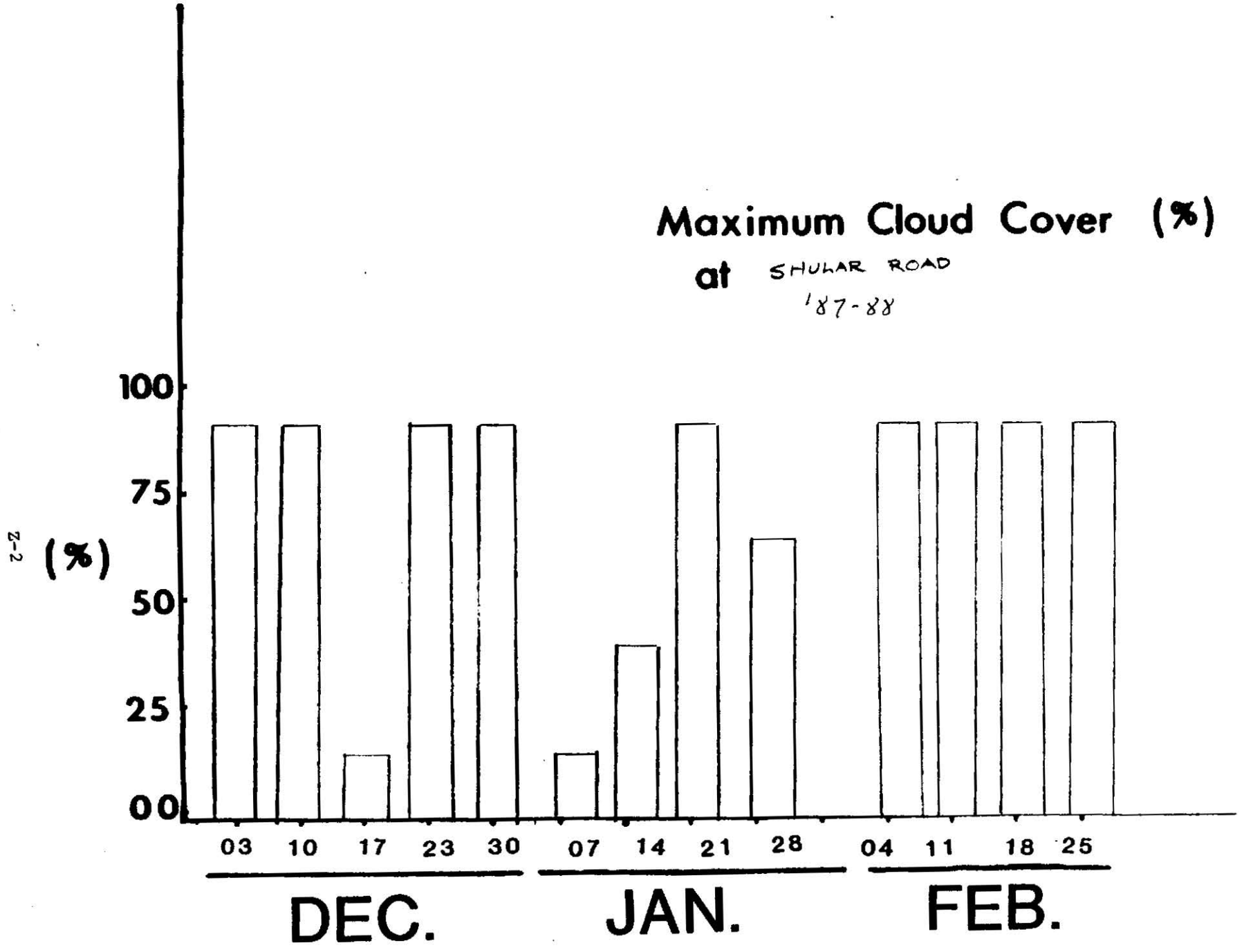

Maximum Cloud Cover (%)
at ROCKY CREEK
'87-88
100
75
50
25
00
(%)
NO DATA
NO DATA
DISCONTINUED
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

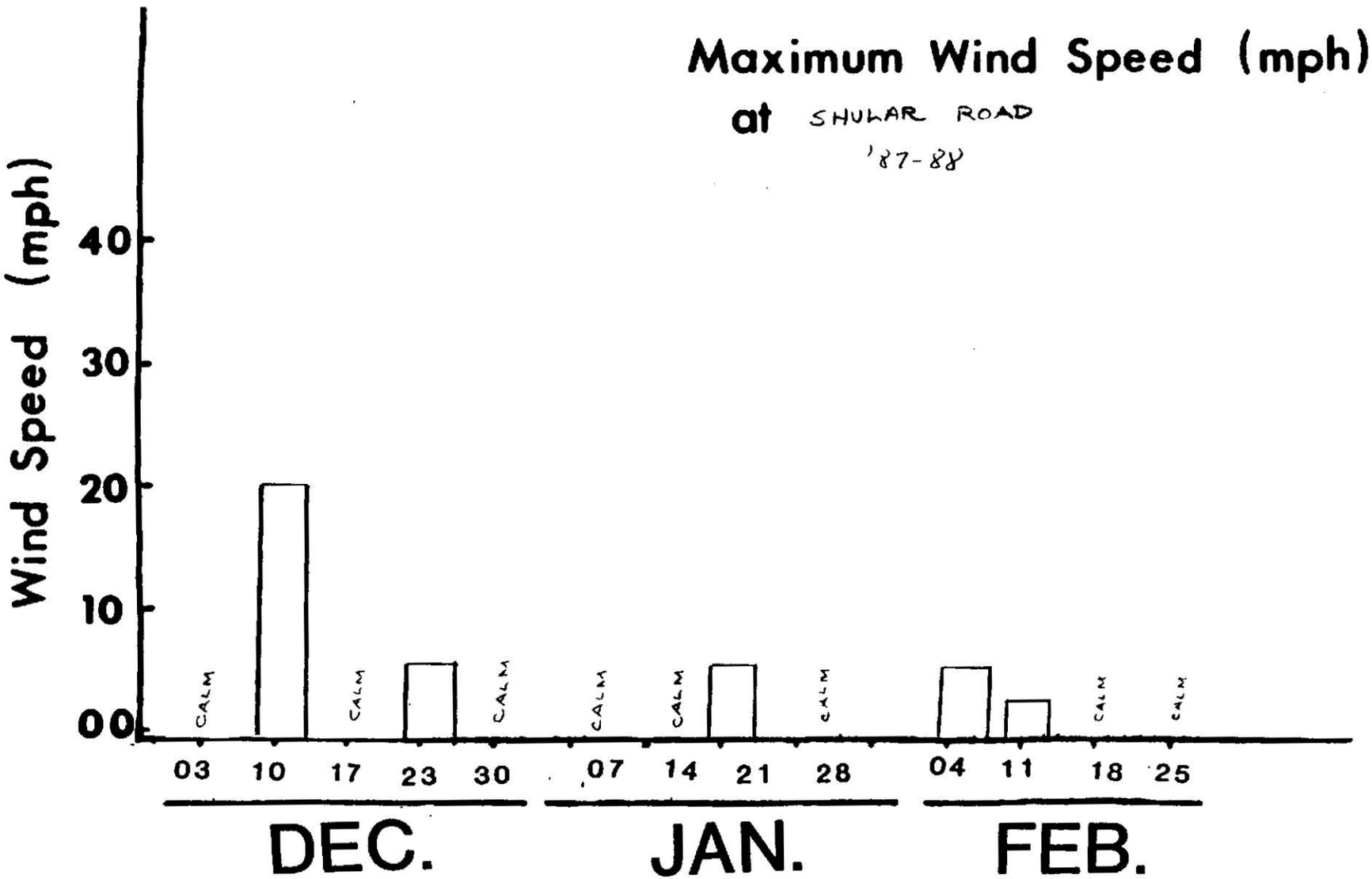

Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at SHULAR ROAD
'86-87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
No Data
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

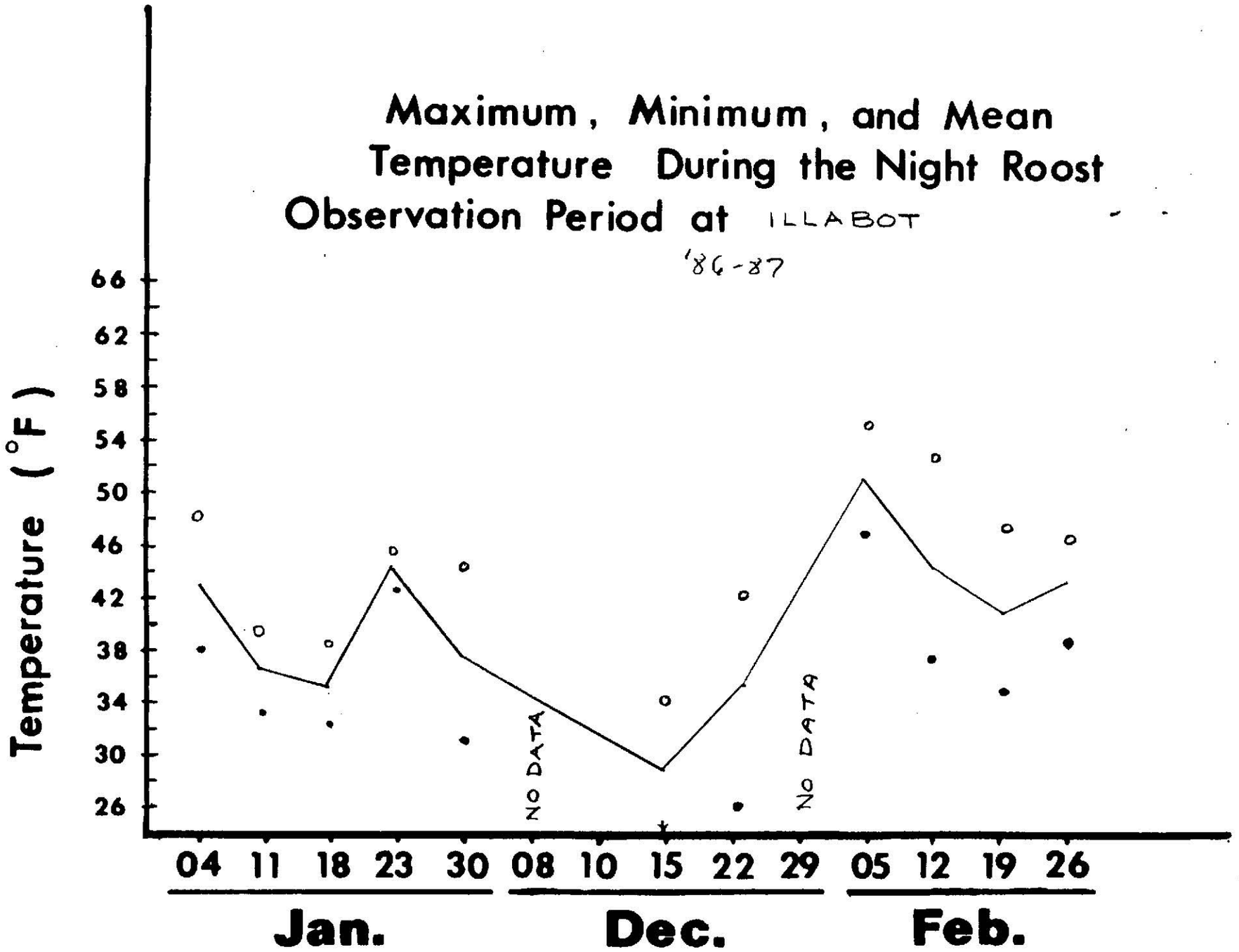

Maximum Cloud Cover (%)
at SHULAR ROAD
'86-87
100
75
50
25
00
Y-2 (%)
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

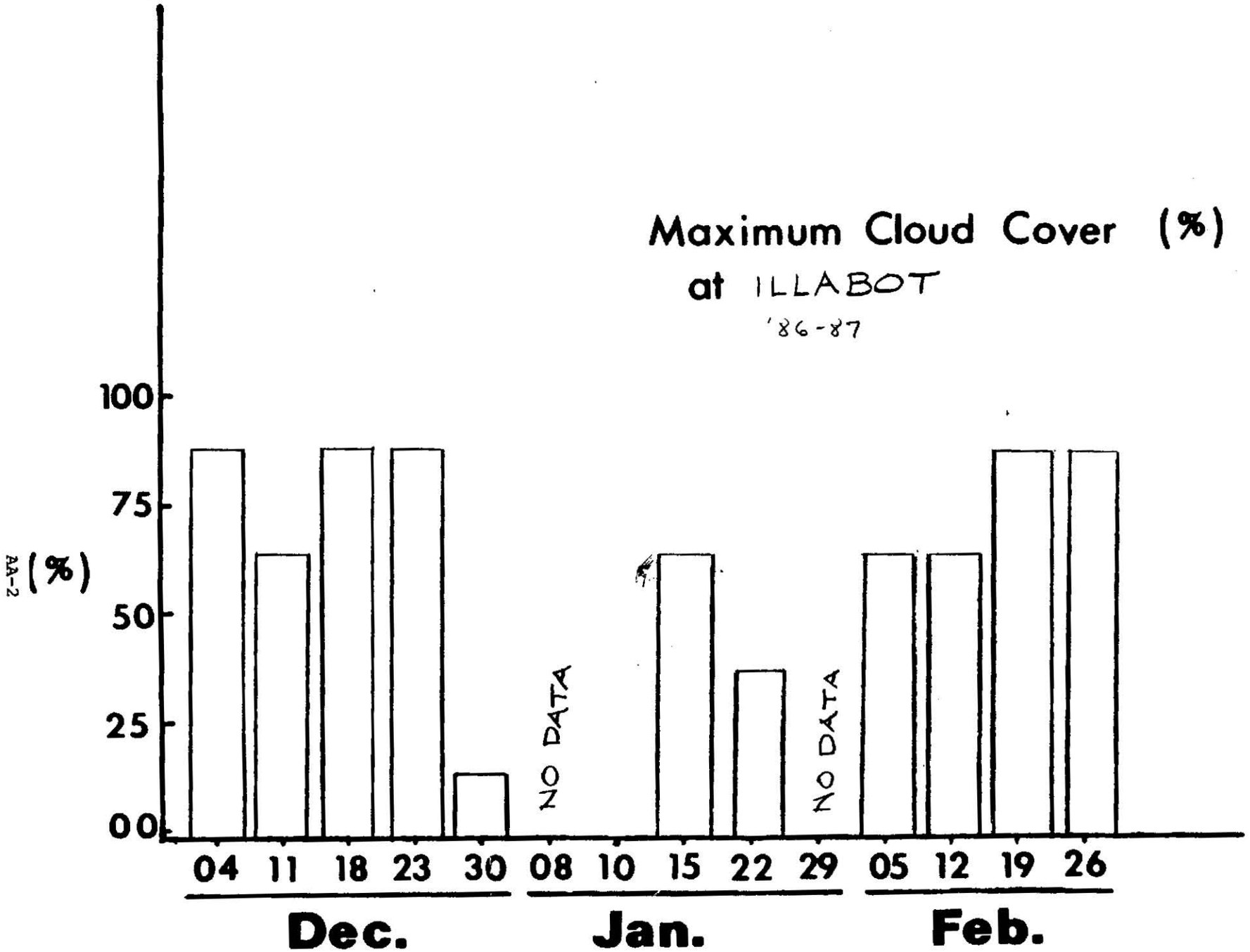

Maximum Wind Speed (mph)
at SHULAR ROAD
'86-87
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
NO DATA
CALM
CALM
CALM
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

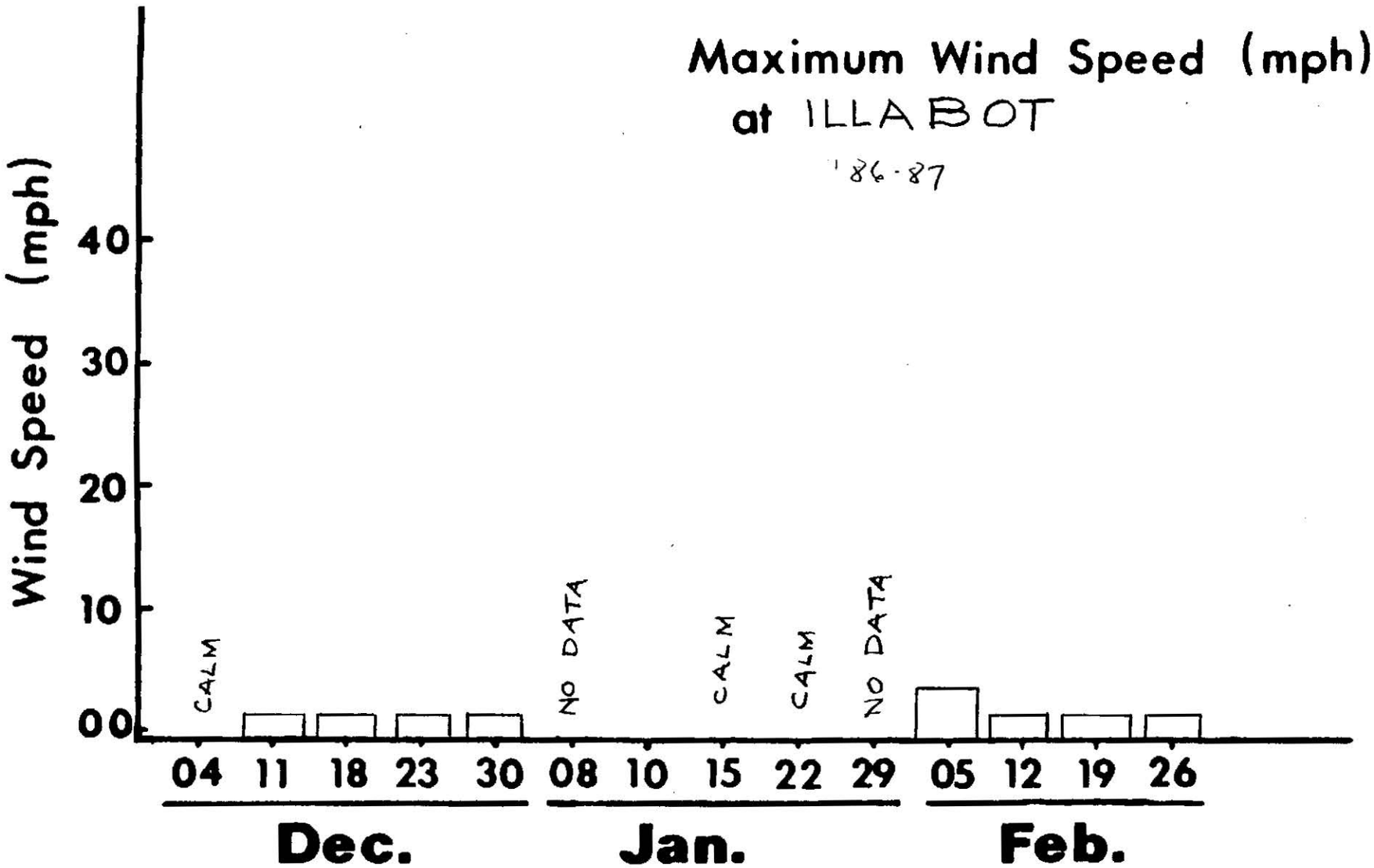

Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at SHULAR ROAD
'87-88
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
03 10 17 23 30
07 14 21 28
04 11 18 25
DEC.
JAN.
FEB.

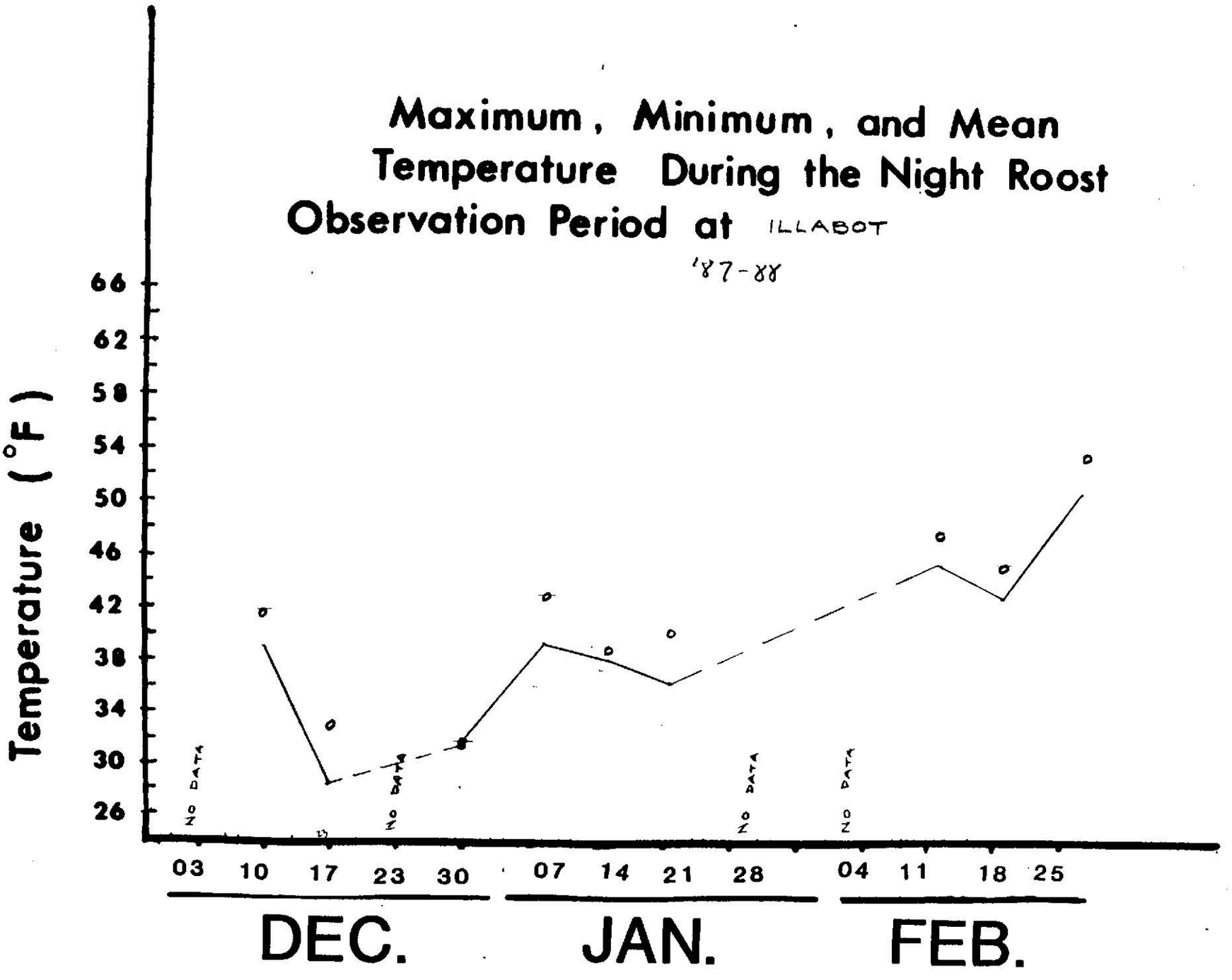

Maximum Cloud Cover (%)
at SHULAR ROAD
'87-88
100
75
50
25
00
(%)
03 10 17 23 30
07 14 21 28
04 11 18 25
DEC.
JAN.
FEB.

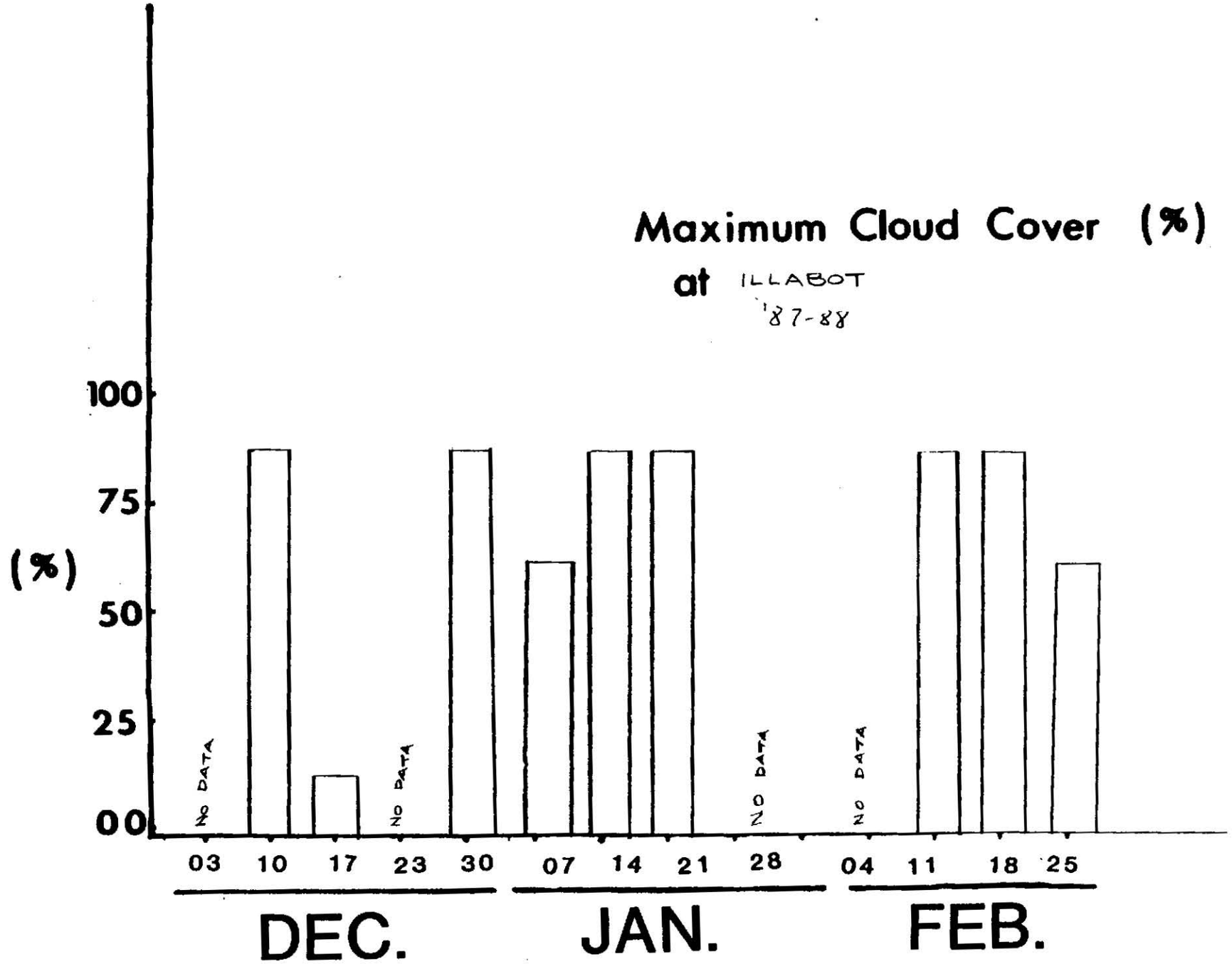

Maximum Wind Speed (mph)
at SHULAR ROAD
'87-88
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
CALM
CALM
CALM
CALM
CALM
CALM
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.


Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at ILLABOT
'86-87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

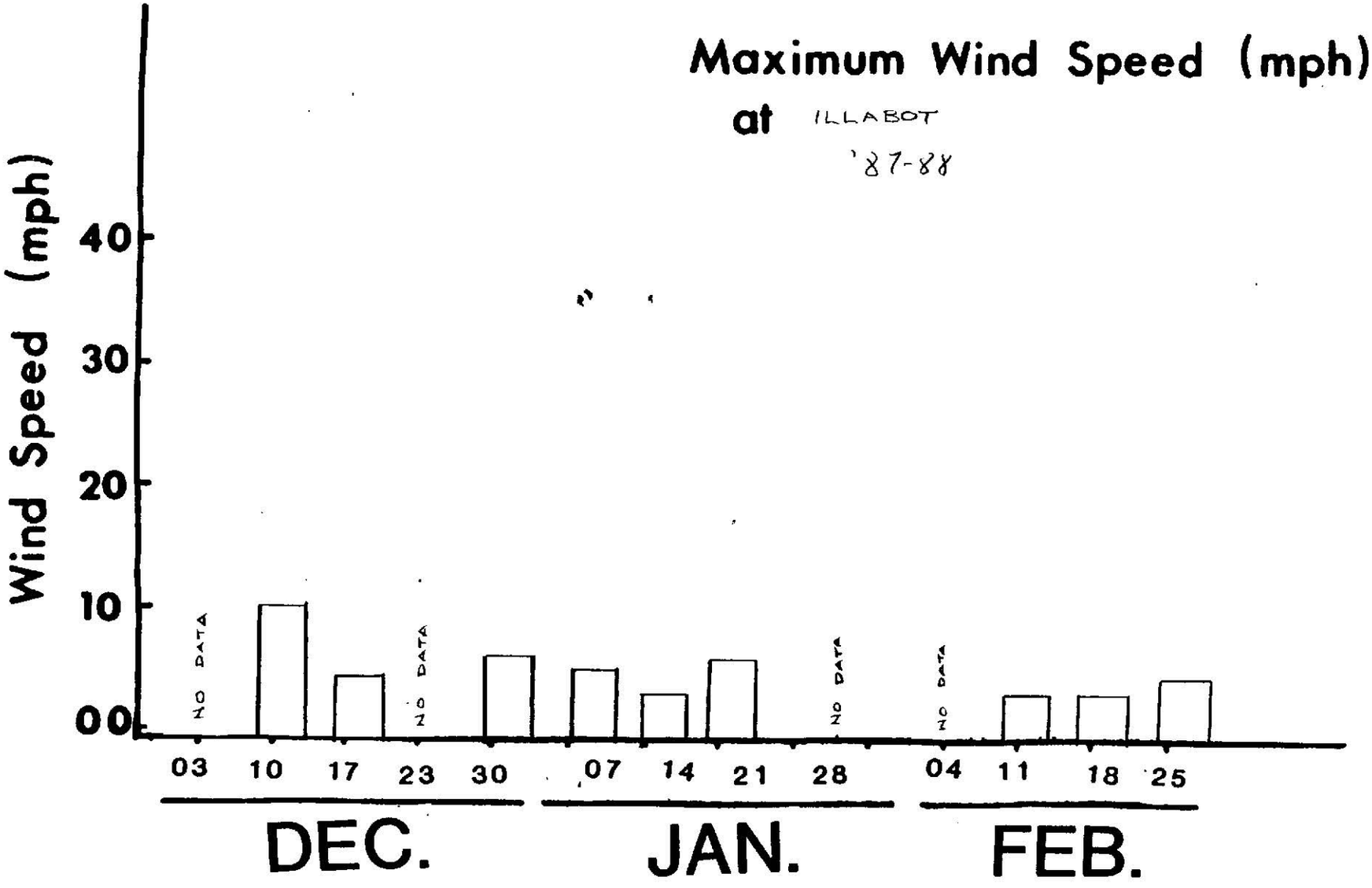

Maximum Cloud Cover (%)
at ILLABOT
'86-87
100
75
50
25
00
(%)
AA-2
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

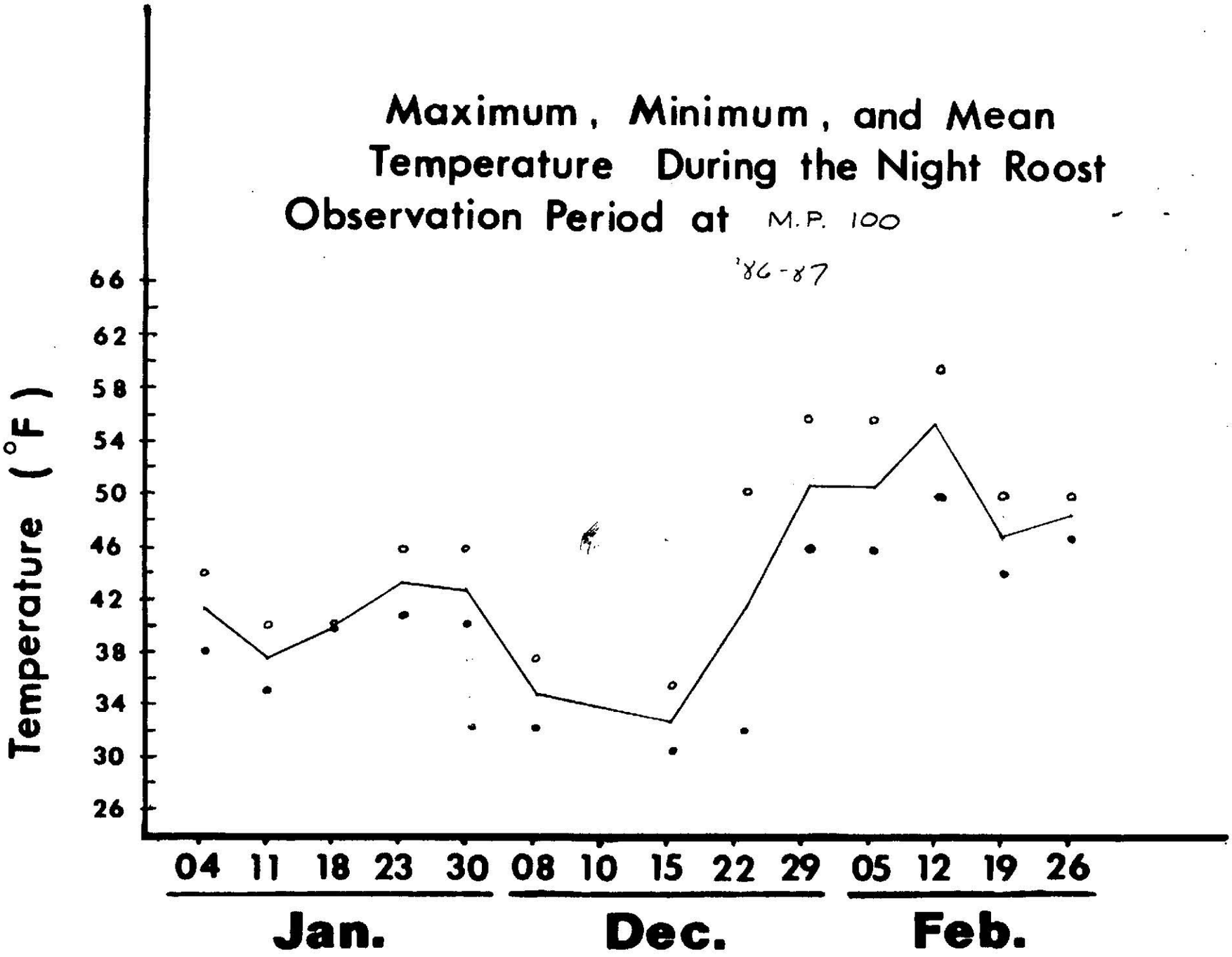

Maximum Wind Speed (mph)
at ILLABOT
'86-87
Wind Speed (mph)
40
30
20
10
00
CALM
NO DATA
CALM
CALM
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at ILLABOT
'87-88
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

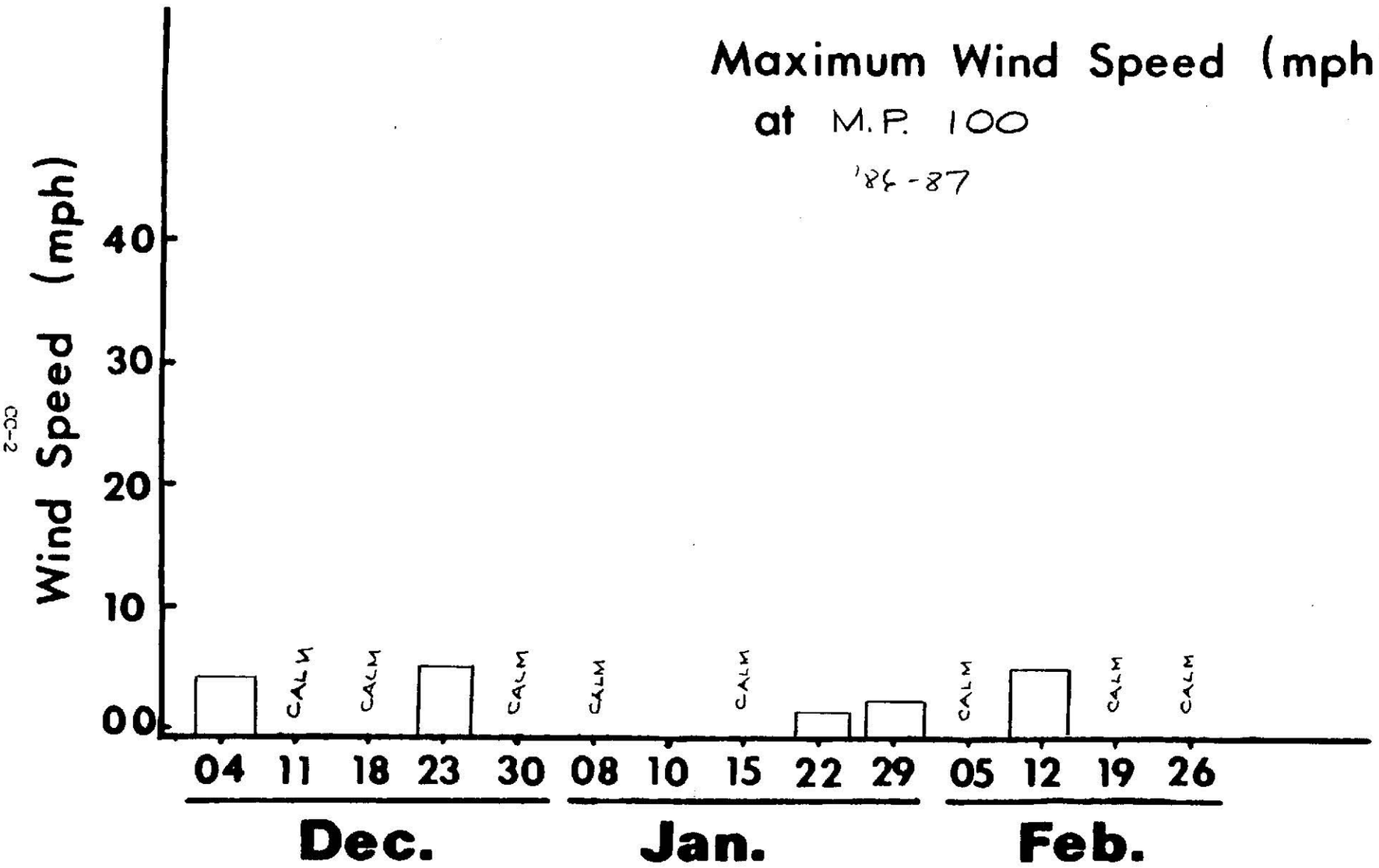

Maximum Cloud Cover (%)
at ILLABOT
'87-88
100
75
50
25
00
(%)
NO DATA
NO DATA
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

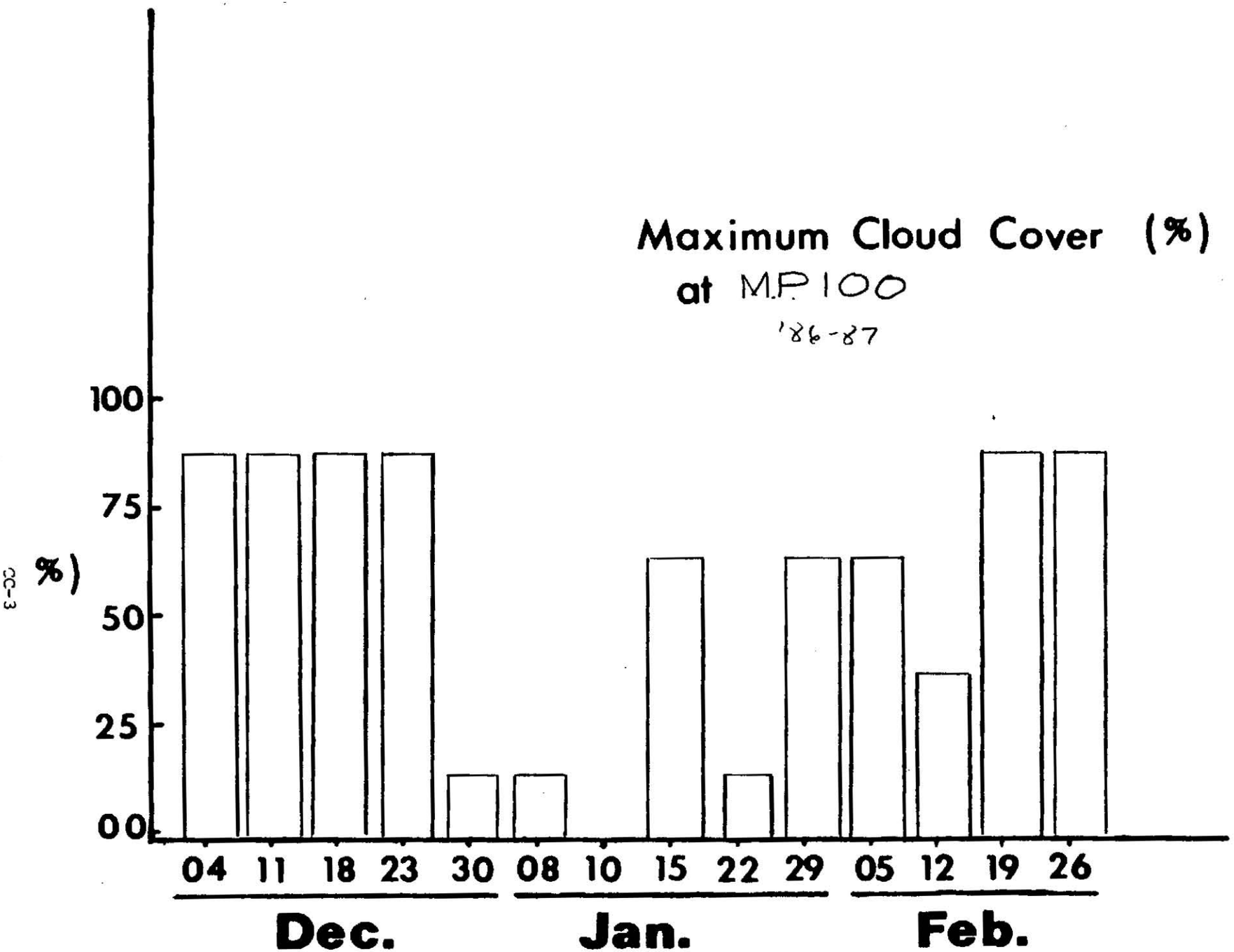
BB-2


Maximum Wind Speed (mph)
at ILLABOT
'87-88
Wind Speed (mph)
40
30
20
10
00
NO DATA
NO DATA
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.


Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at M.P. 100
'86-87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

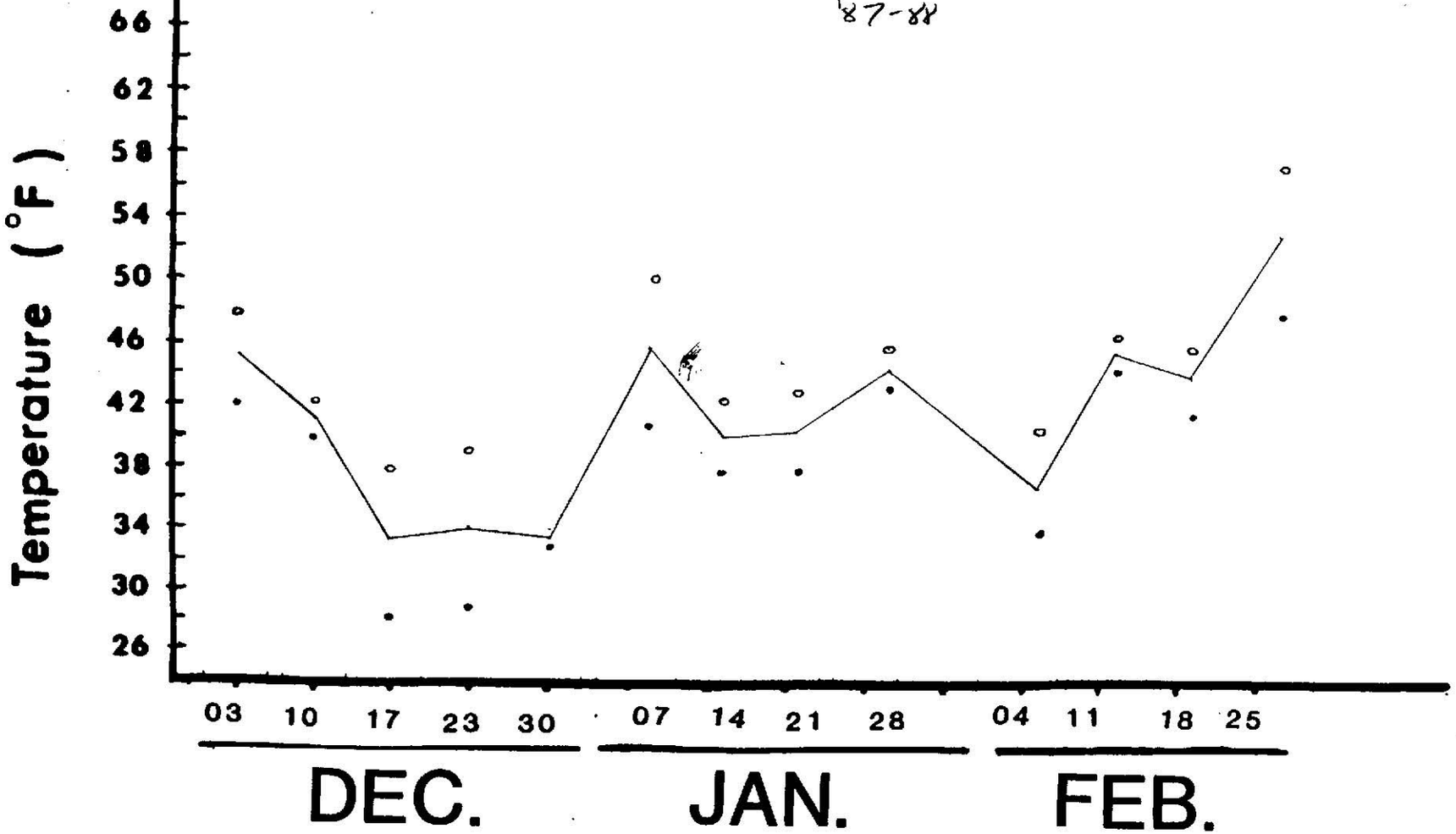
CC-1


Maximum Wind Speed (mph)
at M.P. 100
'86-87
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
CALM
CALM
CALM
CALM
CALM
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Cloud Cover (%)
at M.P 100
'86-87
100
75
50
25
00
%)
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at M.P. 100

'87-88

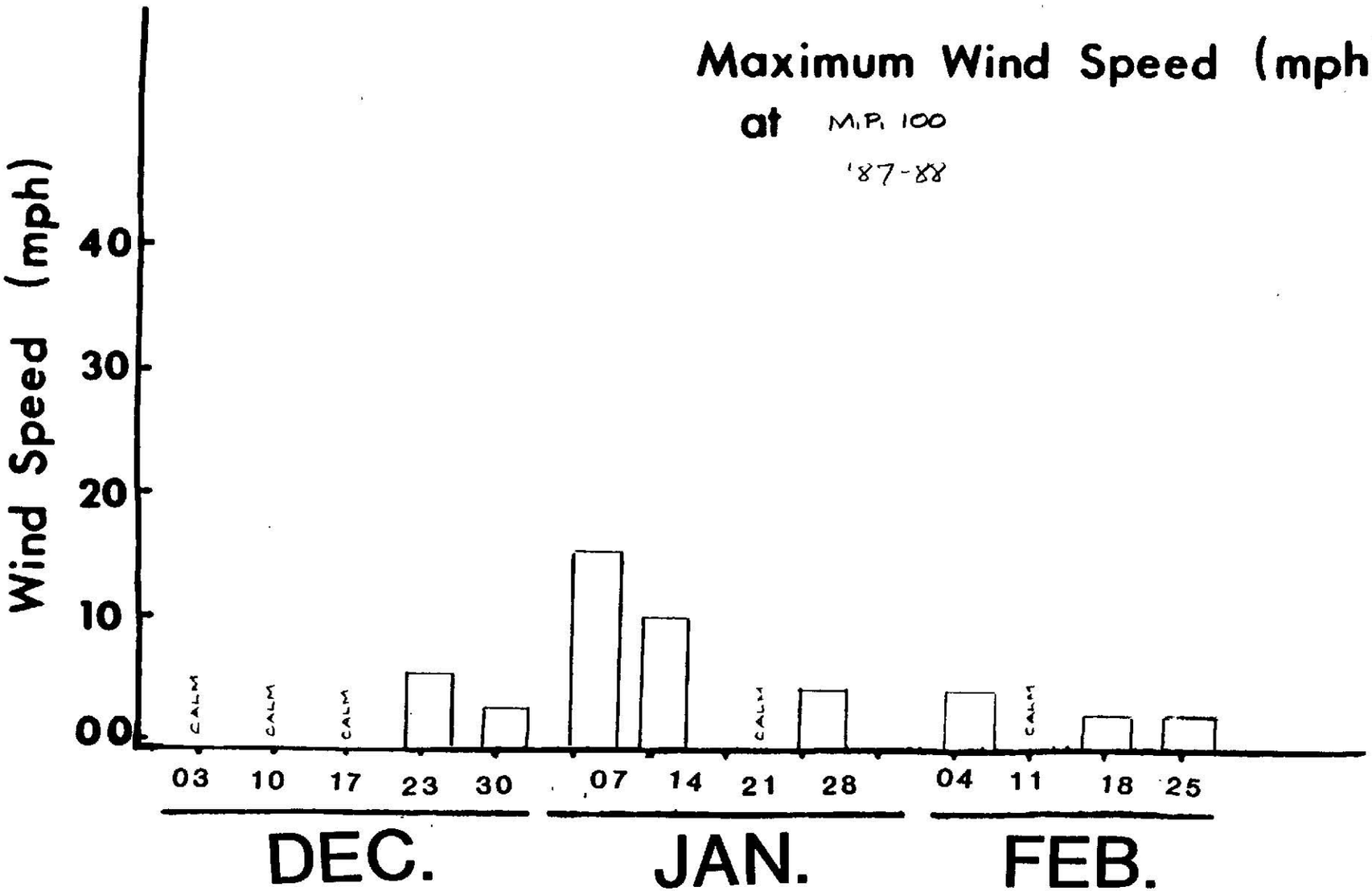


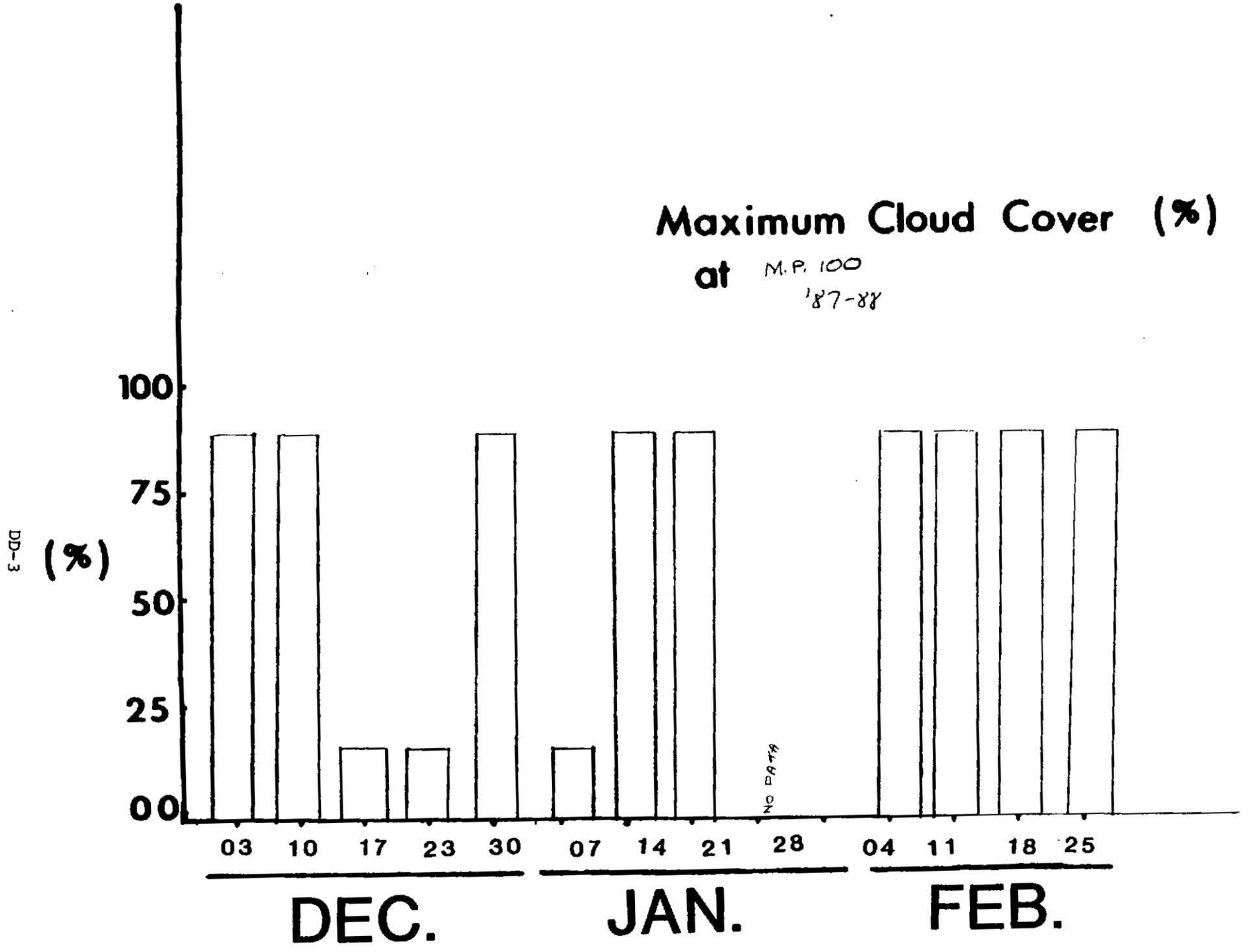
DD-1

Maximum Wind Speed (mph)

at M.P. 100

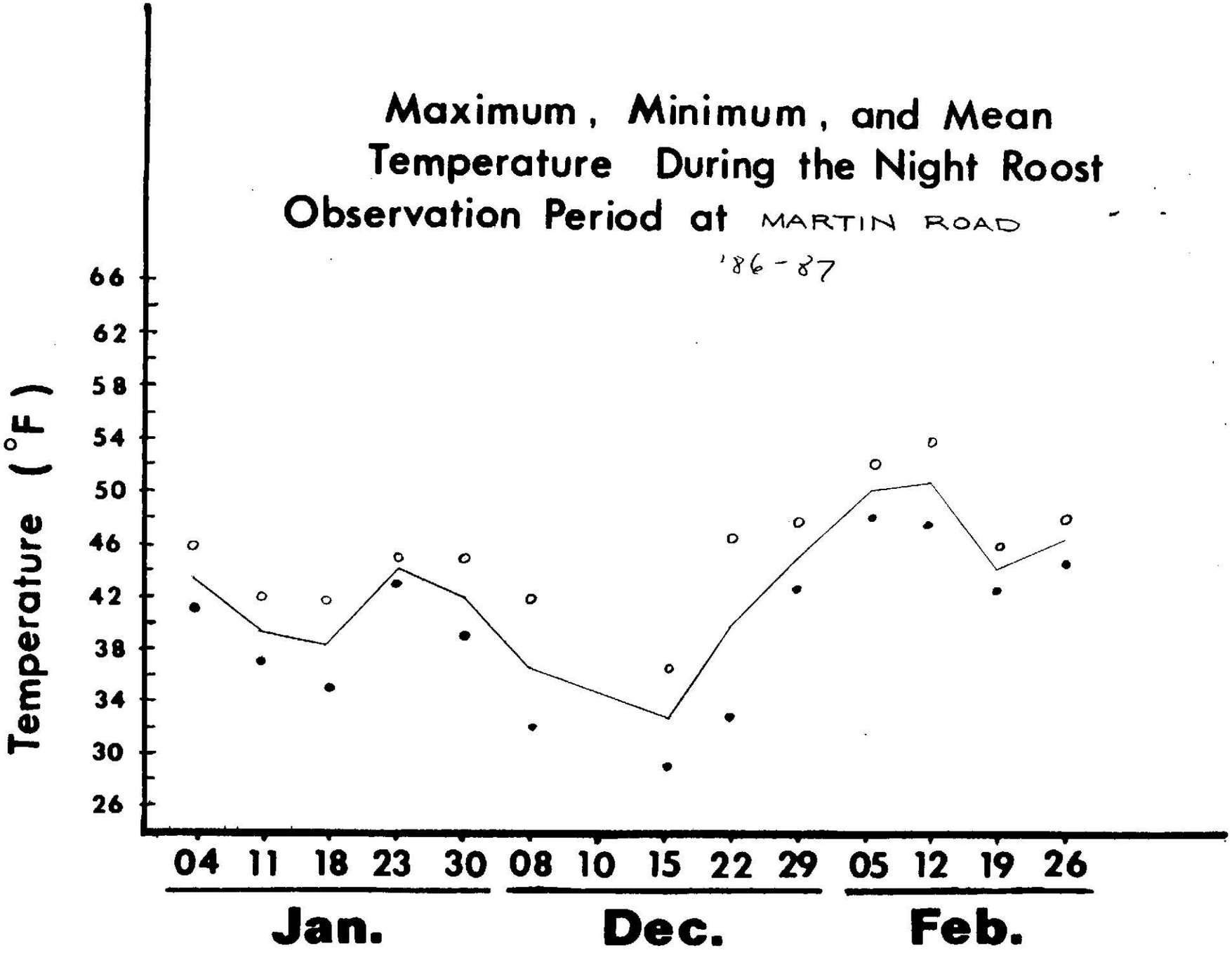
'87-88

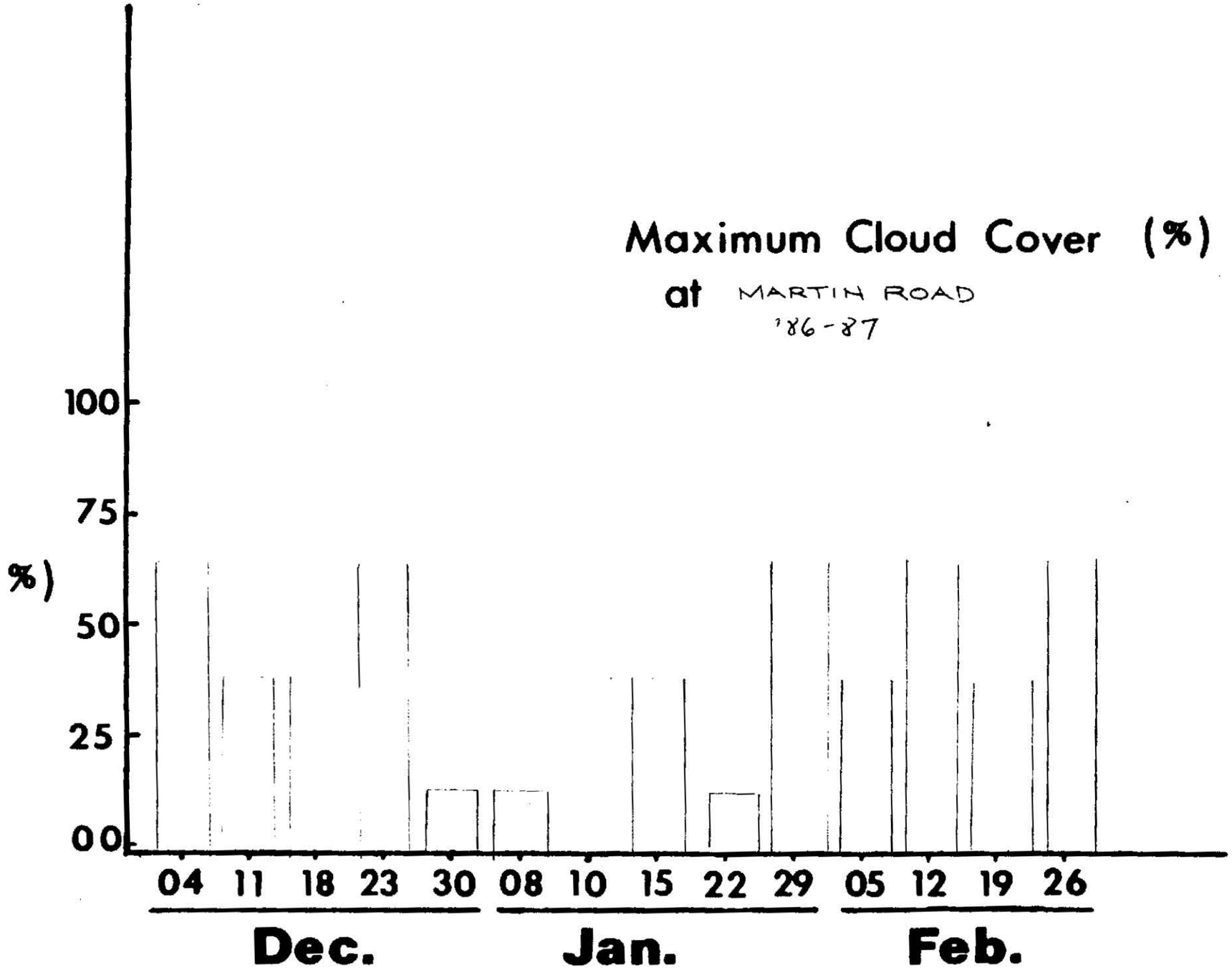


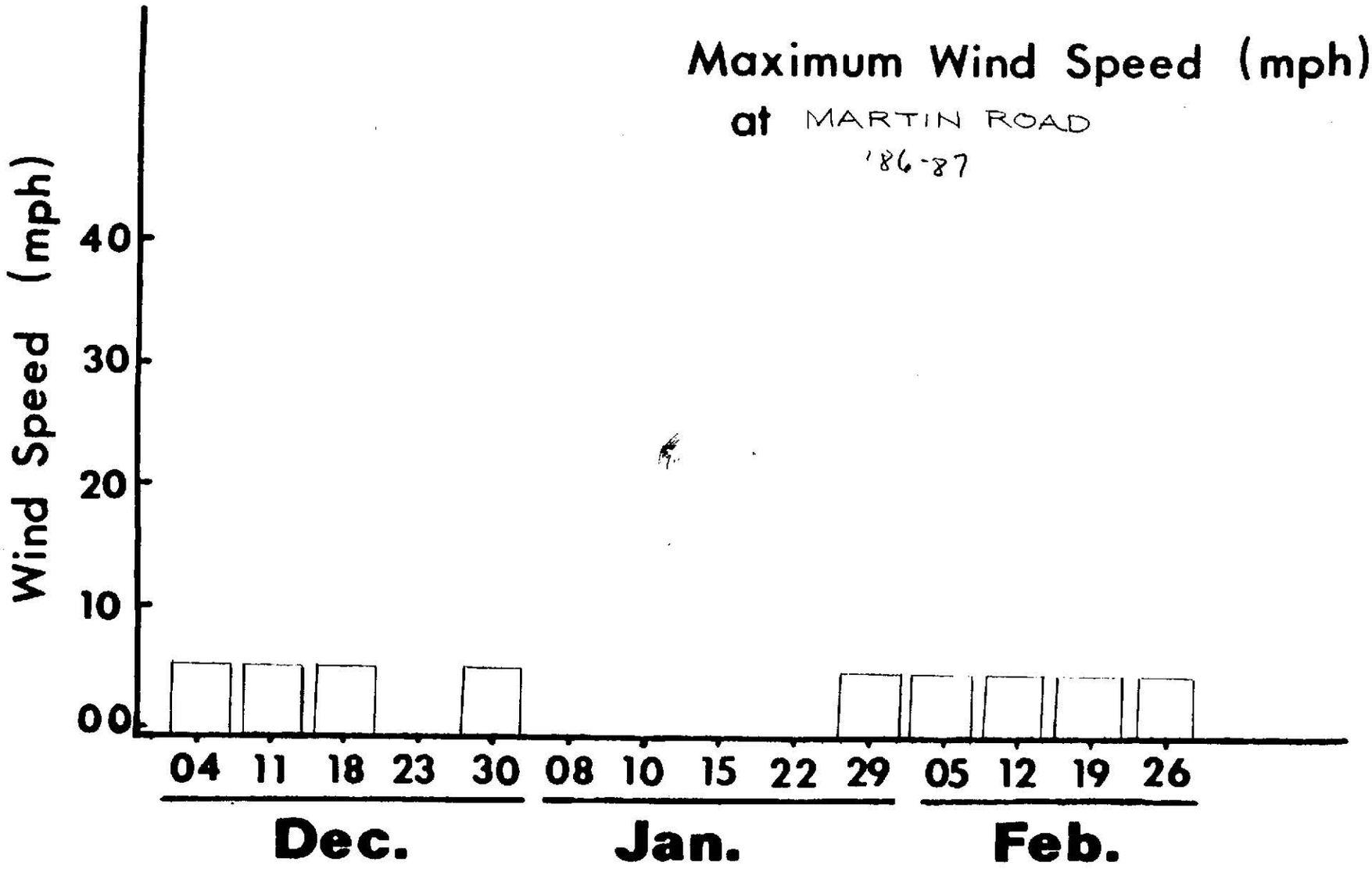

Maximum Cloud Cover (%)
at M.P. 100
'87-88
100
75
50
25
00
(%)
03 10 17 23 30 07 14 21 28 04 11 18 25
NO DATA
DEC.
JAN.
FEB.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at MARTIN ROAD

'86-87

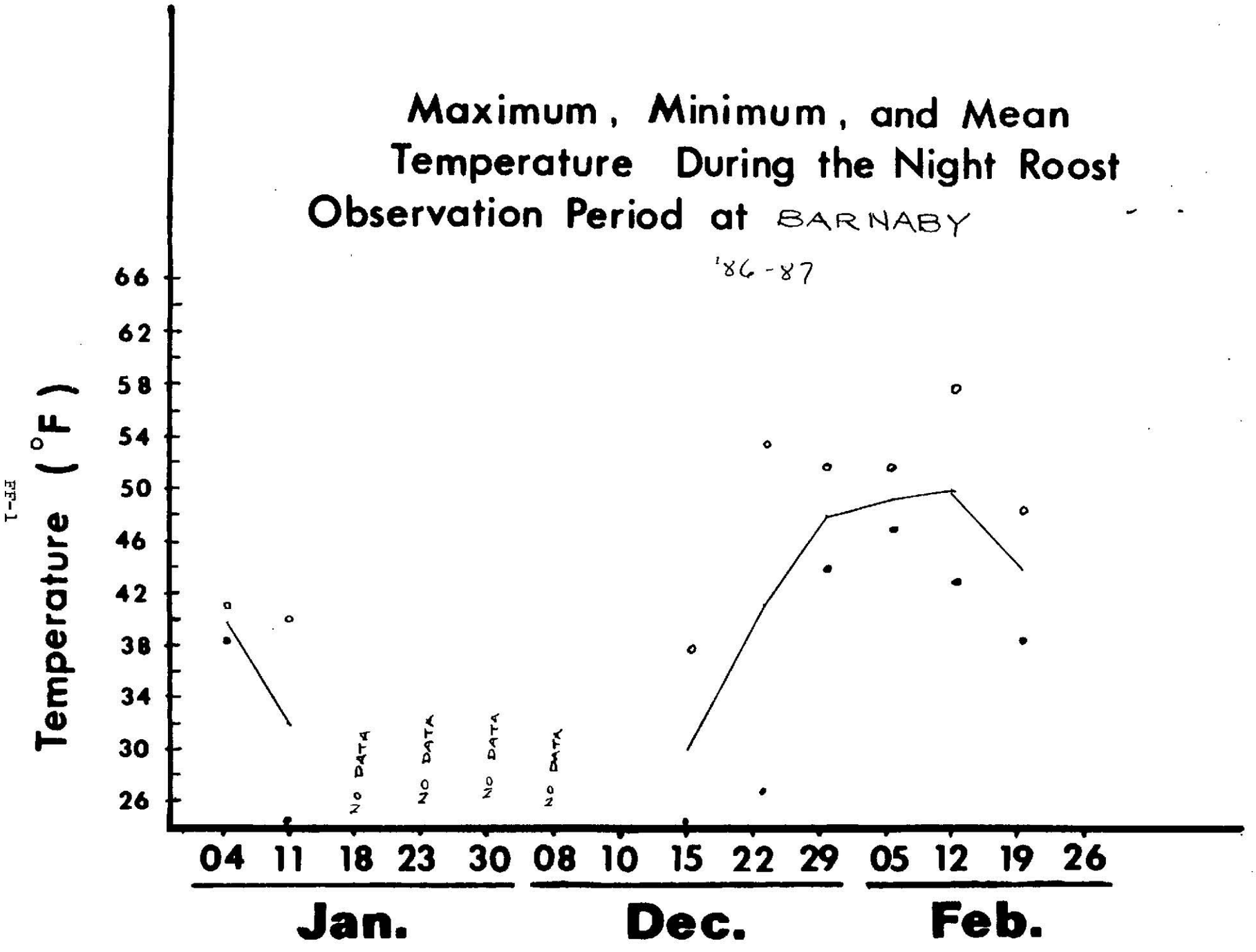



Maximum Cloud Cover (%)
at MARTIN ROAD
'86-87
100
75
%)
50
25
00
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

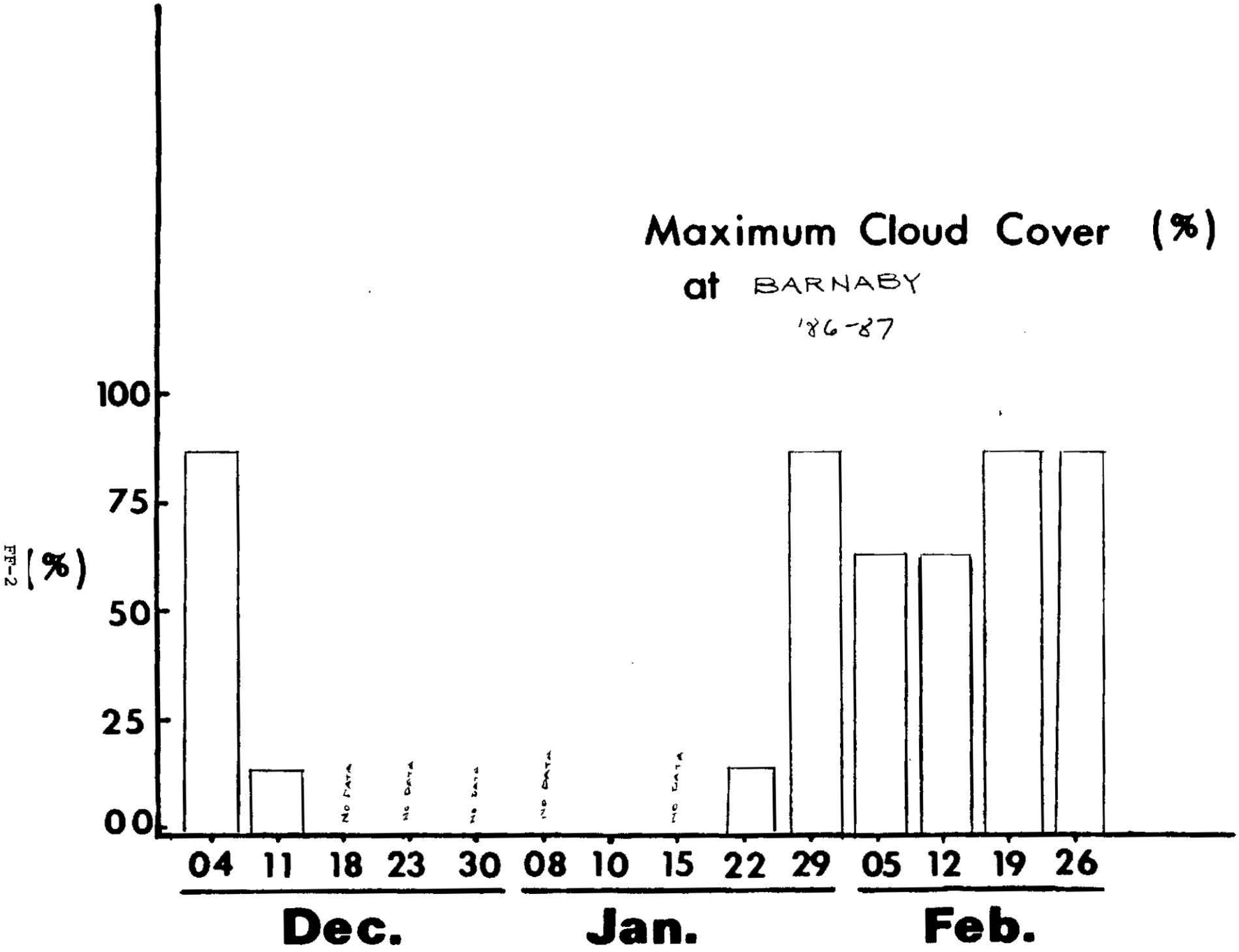

Maximum Wind Speed (mph)
at MARTIN ROAD
'86-87
Wind Speed (mph)
40
30
20
10
00
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

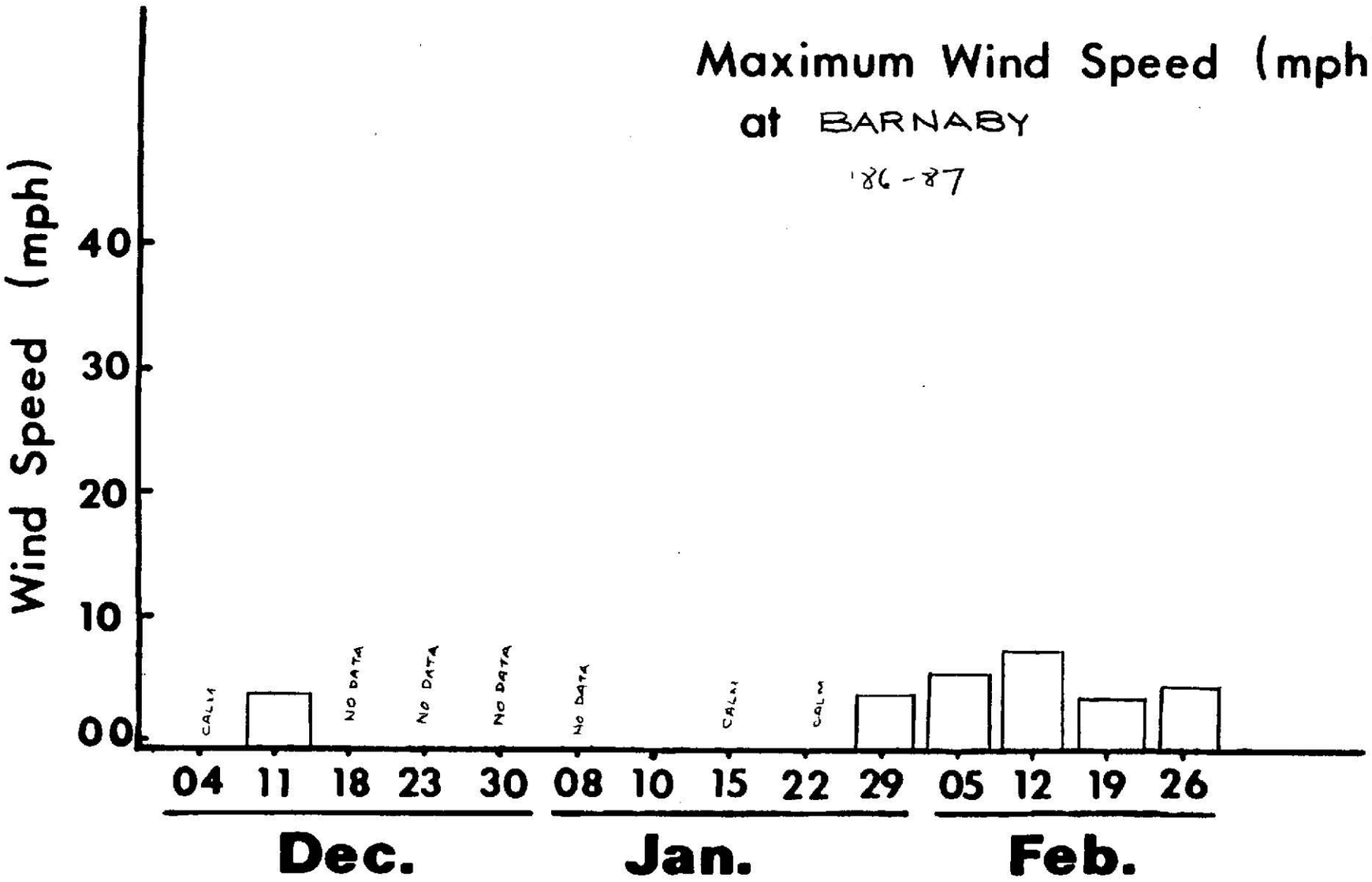
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at BARNABY

'86-87



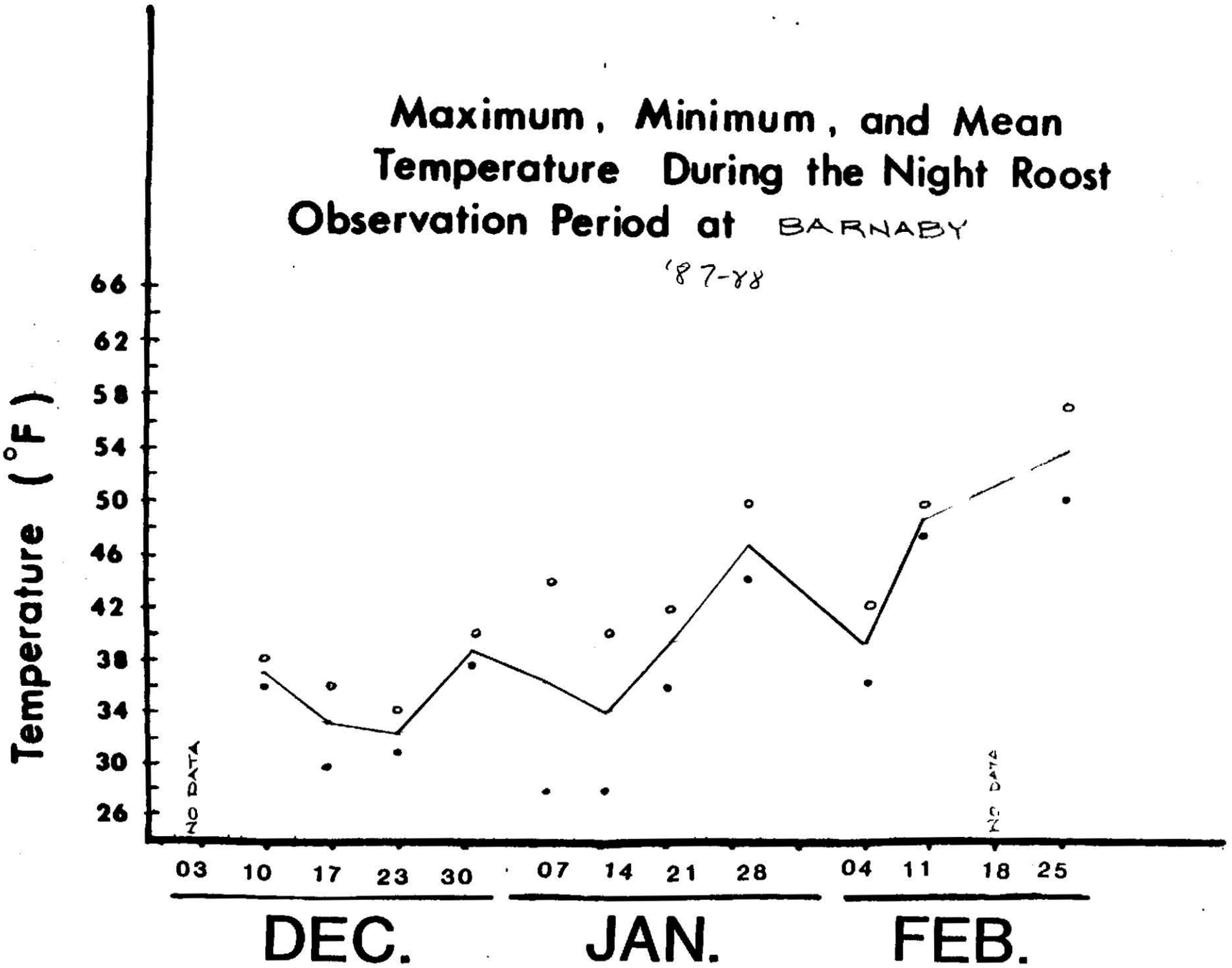
FE-1

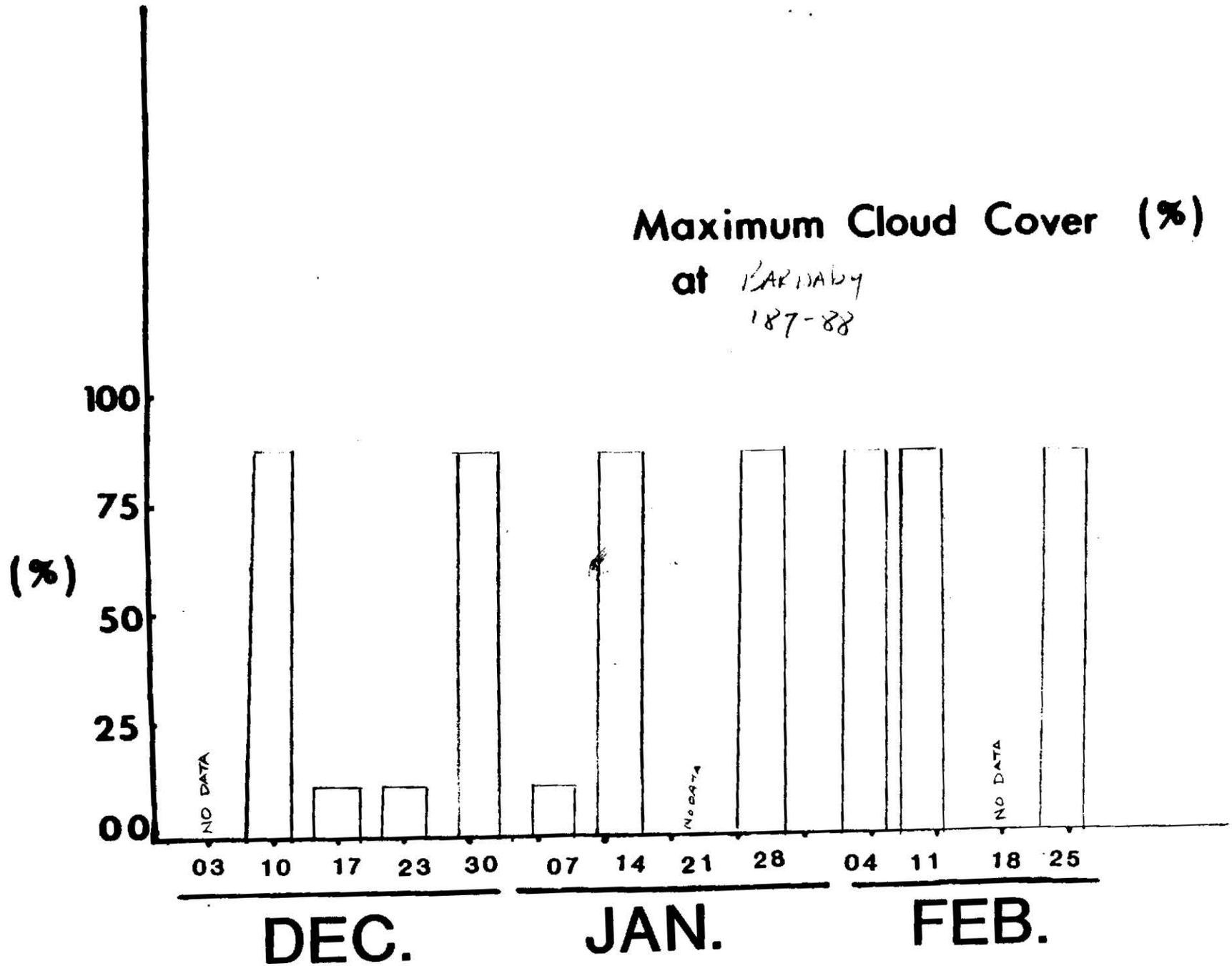

Maximum Cloud Cover (%)
at BARNABY
'86-87
100
75
50
25
00
(%)
FE-2
No Data
No Data
No Data
No Data
No Data
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Wind Speed (mph)
at BARNABY
'86-87
Wind Speed (mph)
40
30
20
10
00
CALM
NO DATA
NO DATA
NO DATA
NO DATA
CALM
CALM
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

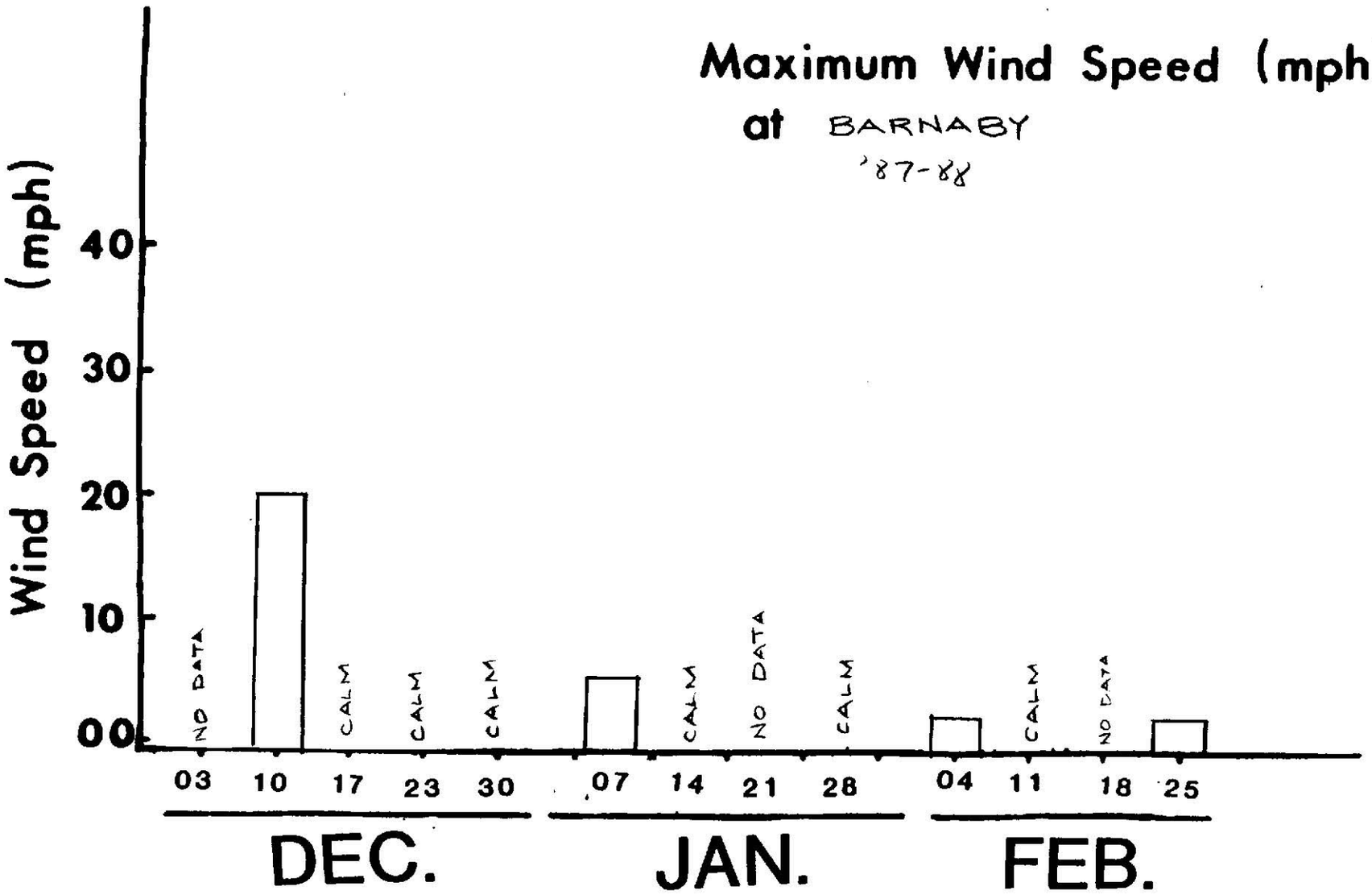
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at BARNABY

'87-88



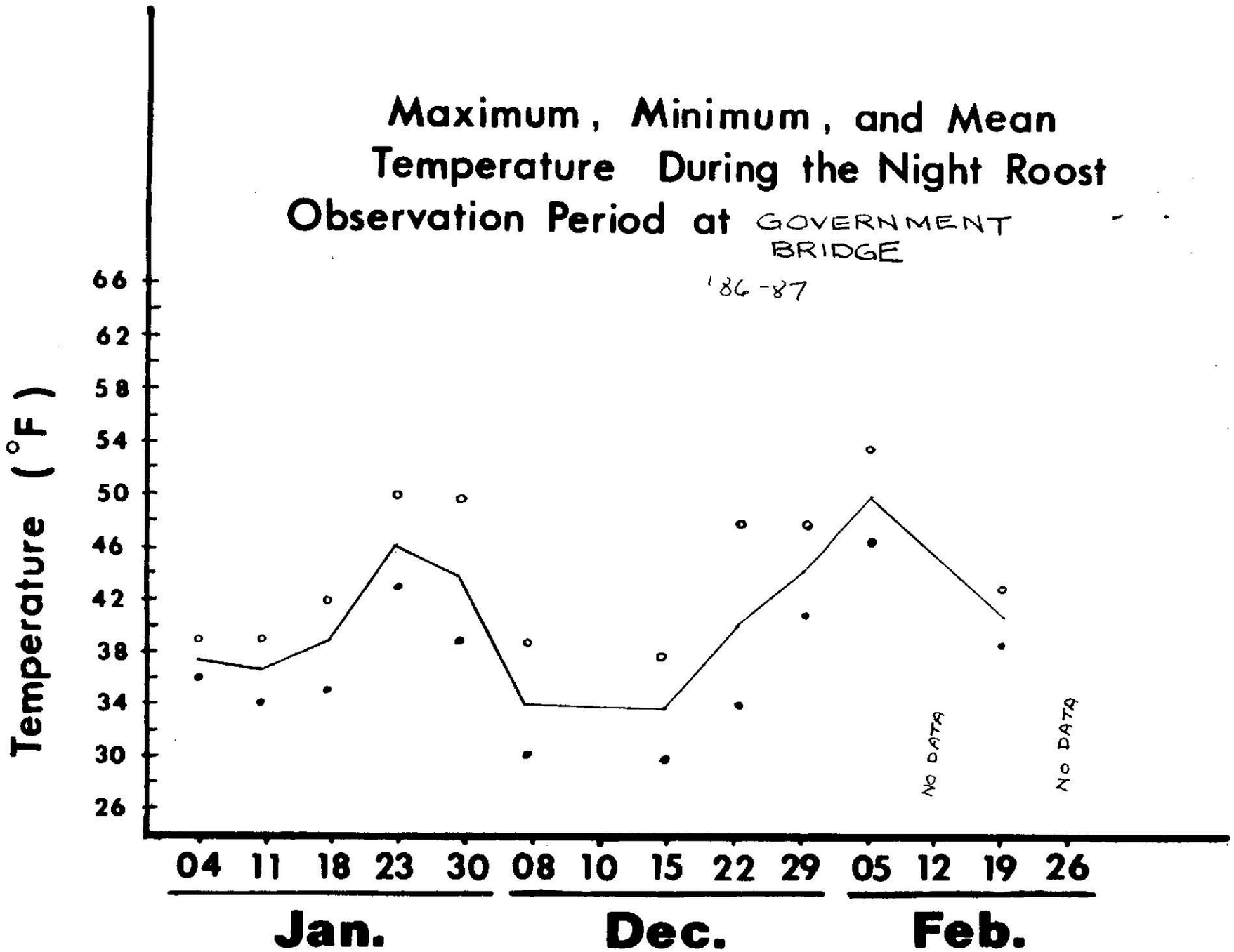

Maximum Cloud Cover (%)
at BARNABY
187-88
100
75
(%)
50
25
00
NO DATA
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

GG-2

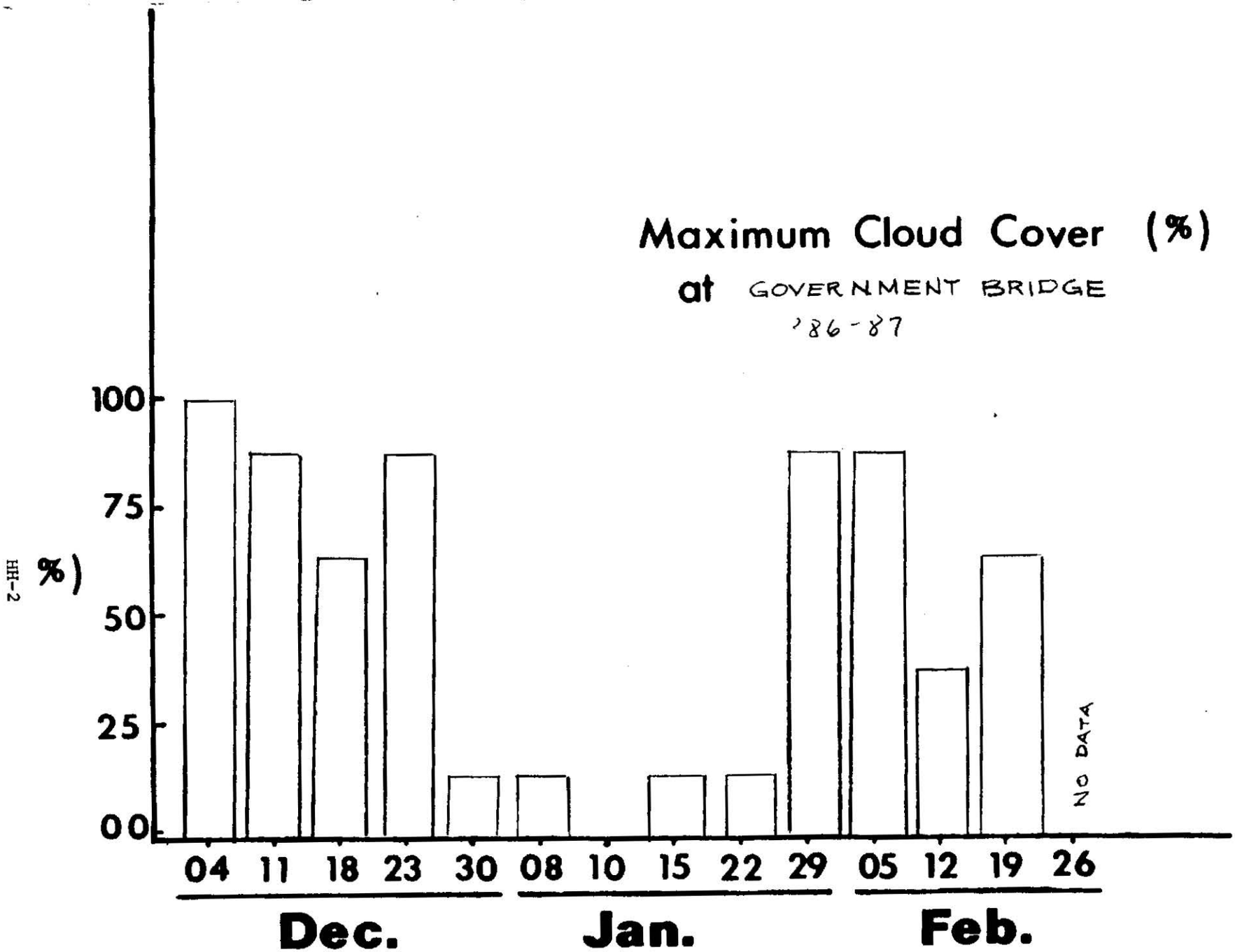

Maximum Wind Speed (mph)
at BARNABY
'87-88
Wind Speed (mph)
40
30
20
10
00
NO DATA
CALM
CALM
CALM
CALM
NO DATA
CALM
CALM
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

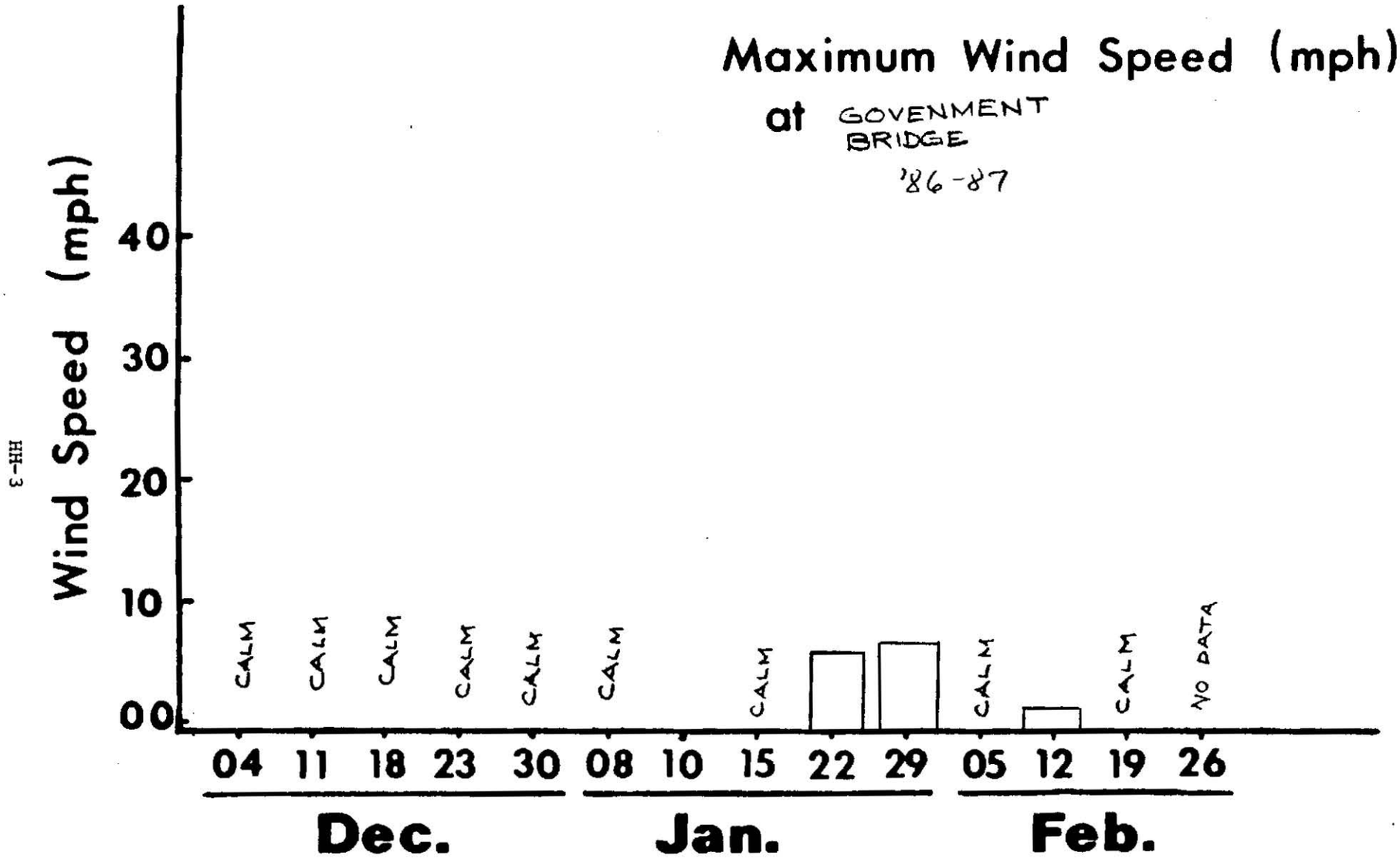
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at GOVERNMENT BRIDGE

'86-87

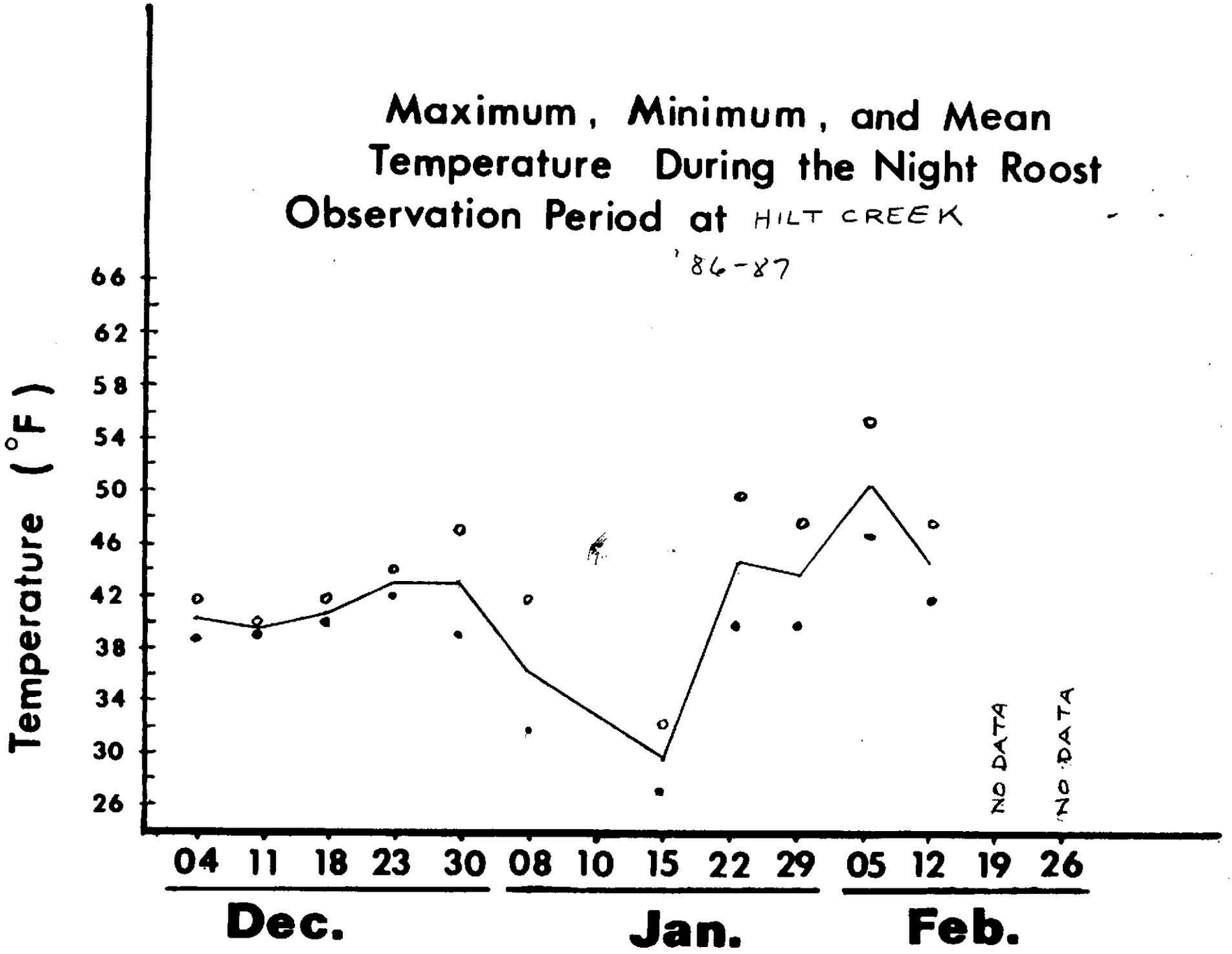


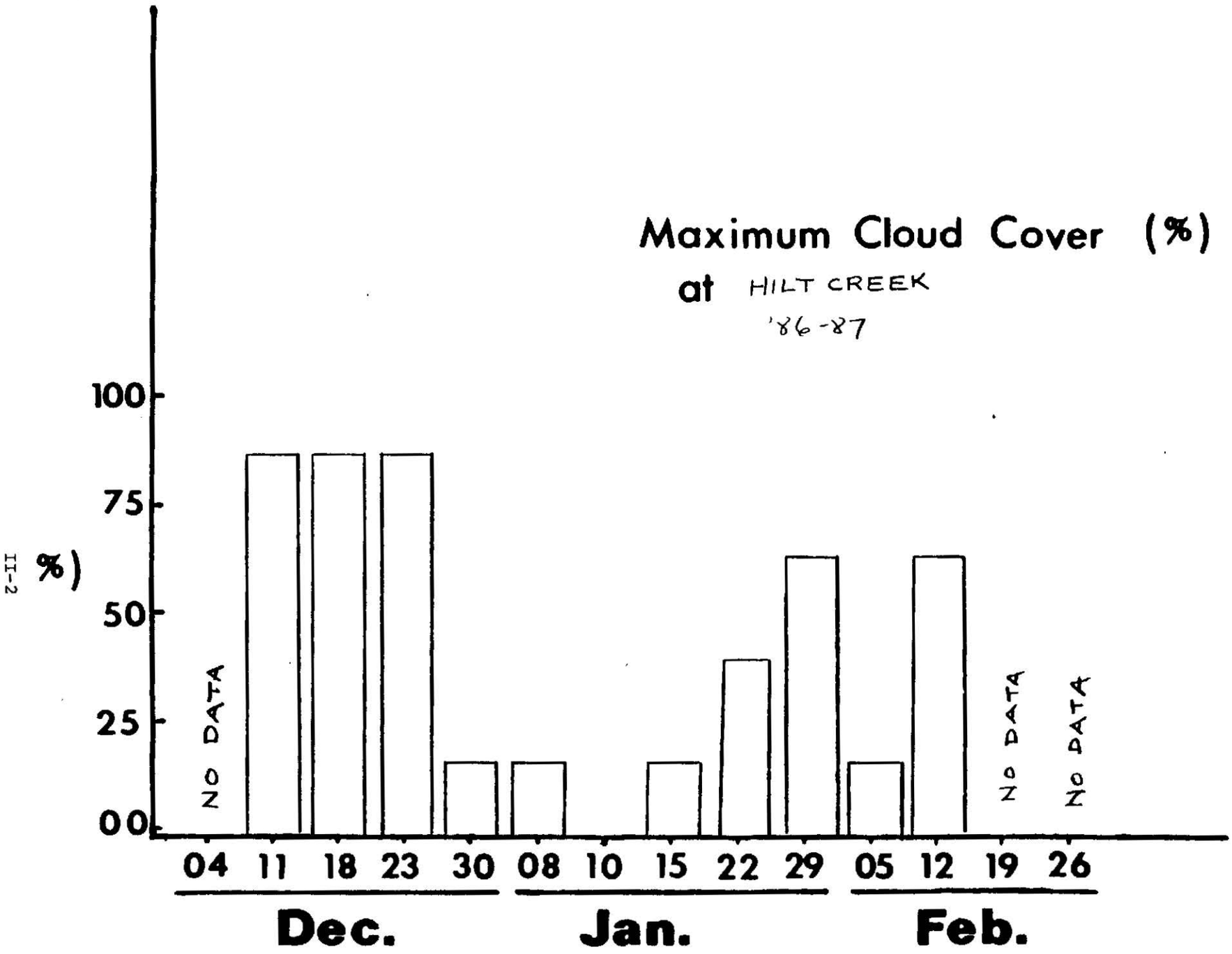
HH-1

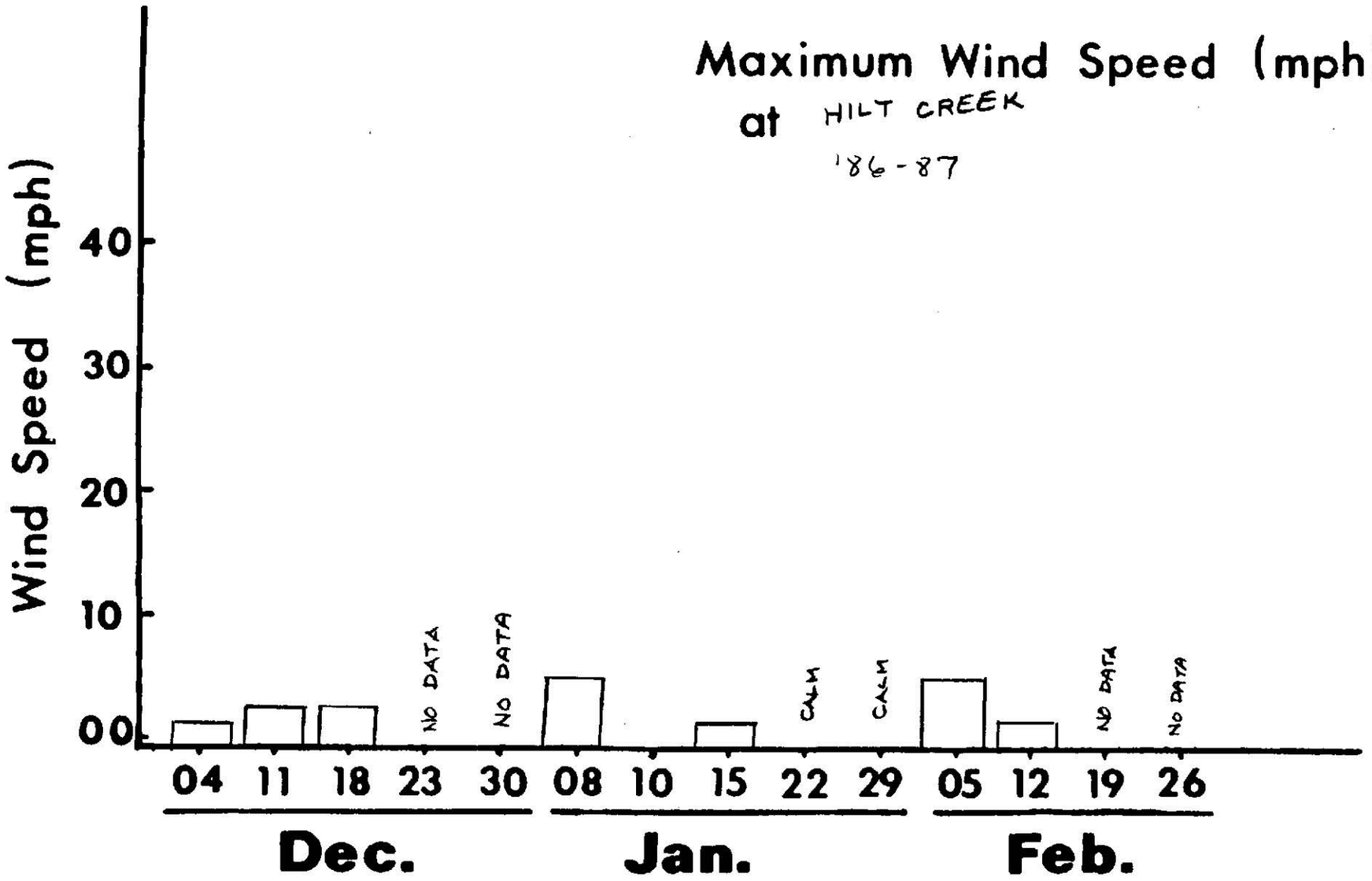

Maximum Cloud Cover (%)
at GOVERNMENT BRIDGE
'86-87
100
75
50
25
00
%)
HH-2
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.
NO DATA


Maximum Wind Speed (mph)
at GOVENMENT BRIDGE
'86-87
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
CALM
CALM
CALM
CALM
CALM
CALM
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

HH-3

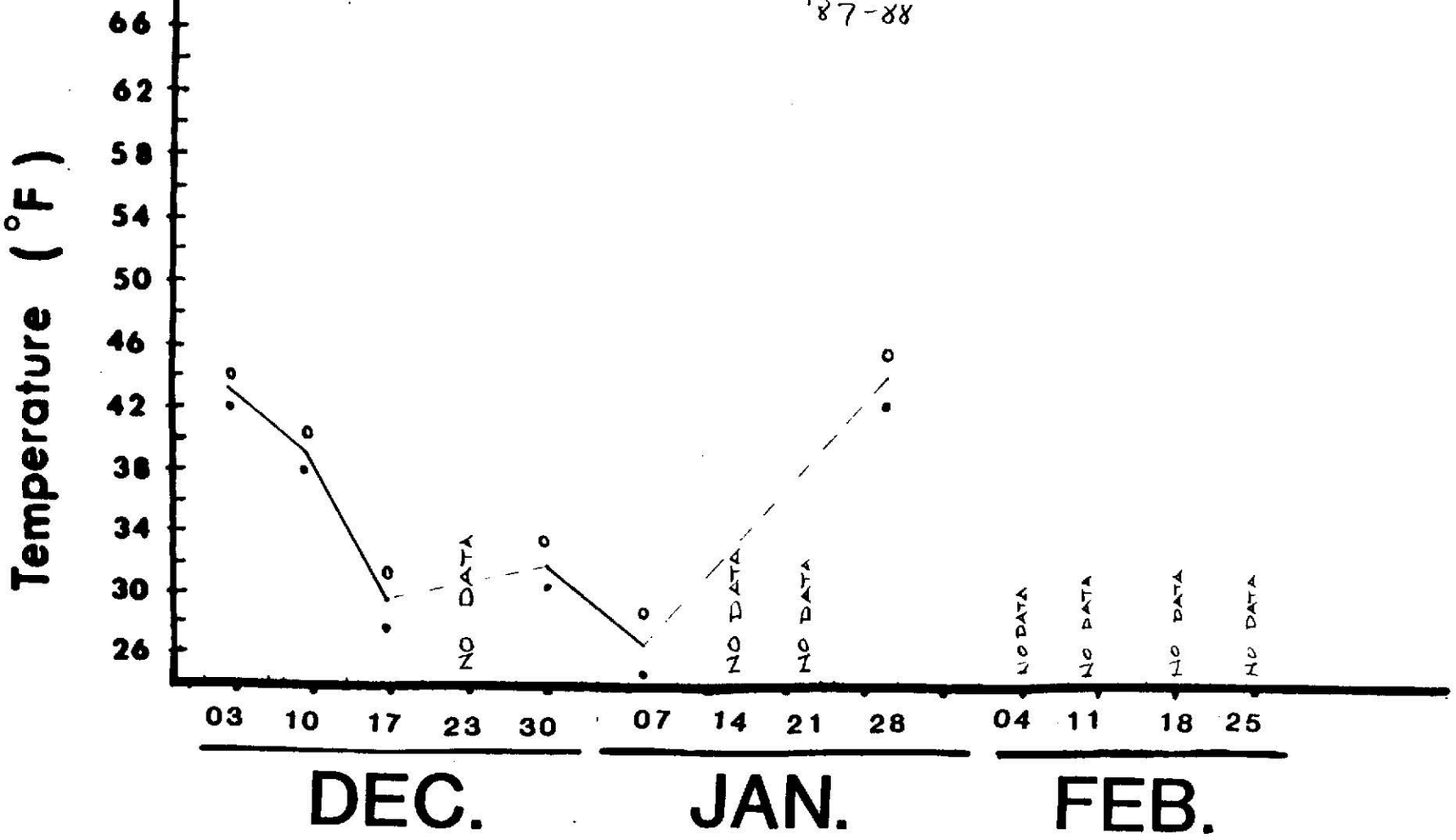

Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at HILT CREEK
'86-87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Cloud Cover (%)
at HILT CREEK
'86-87
100
75
50
25
00
%)
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

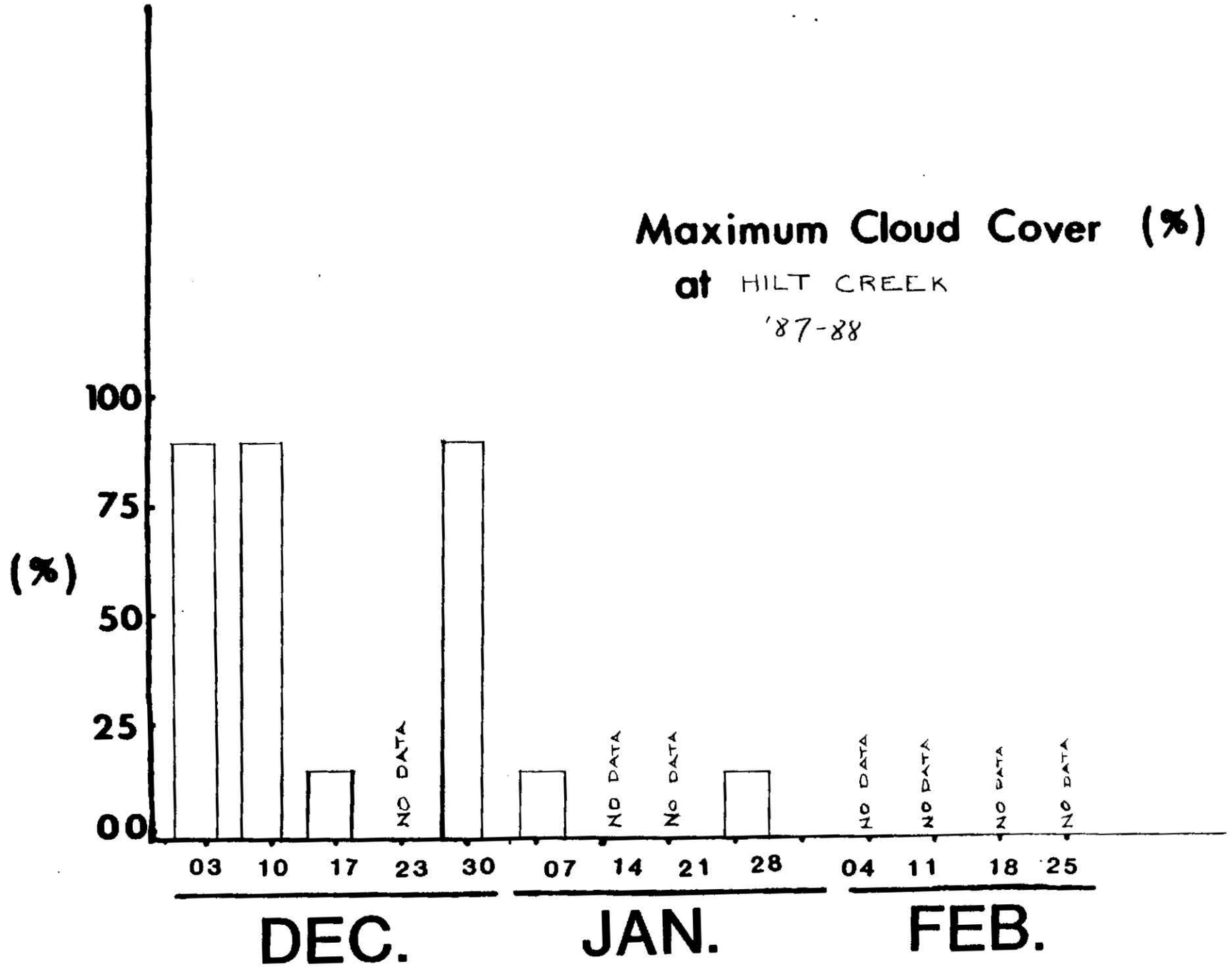

Maximum Wind Speed (mph)
at HILT CREEK
'86-87
Wind Speed (mph)
40
30
20
10
00
NO DATA
NO DATA
CALM
CALM
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at HILT CREEK

'87-88



J2-1

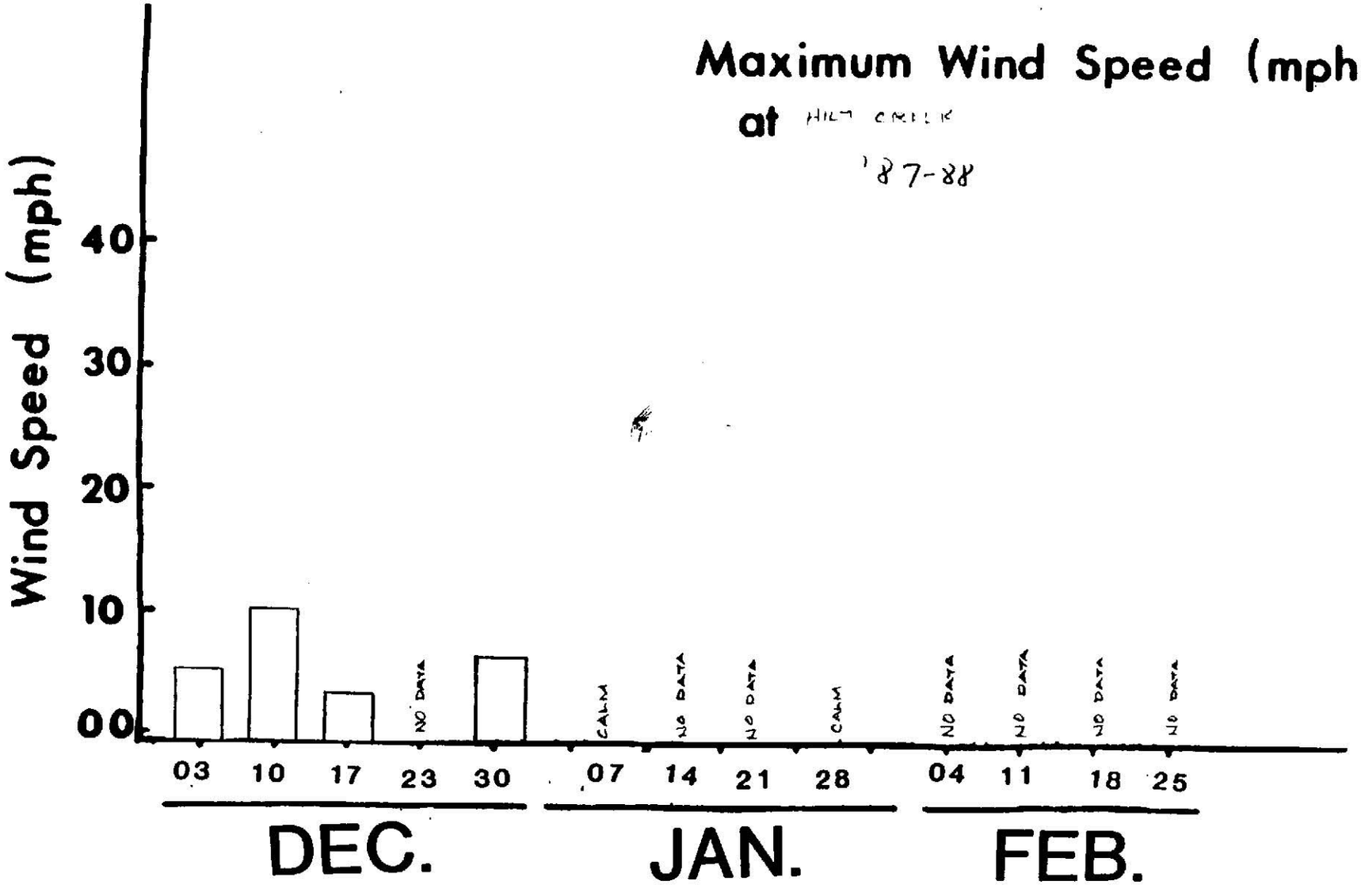

Maximum Cloud Cover (%)
at HILT CREEK
'87-88
100
75
(%)
50
25
00
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

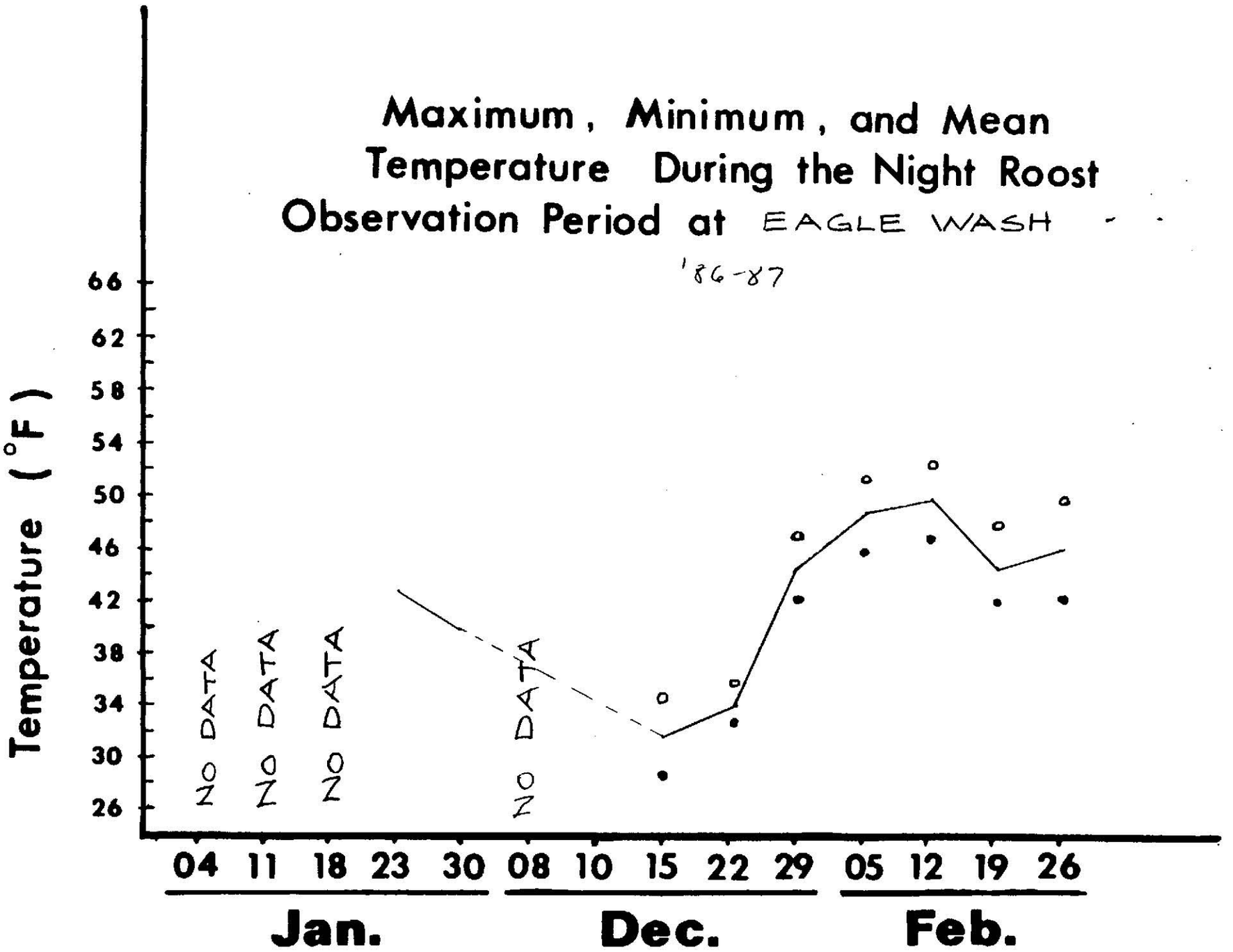
JJ-2

Maximum Wind Speed (mph)

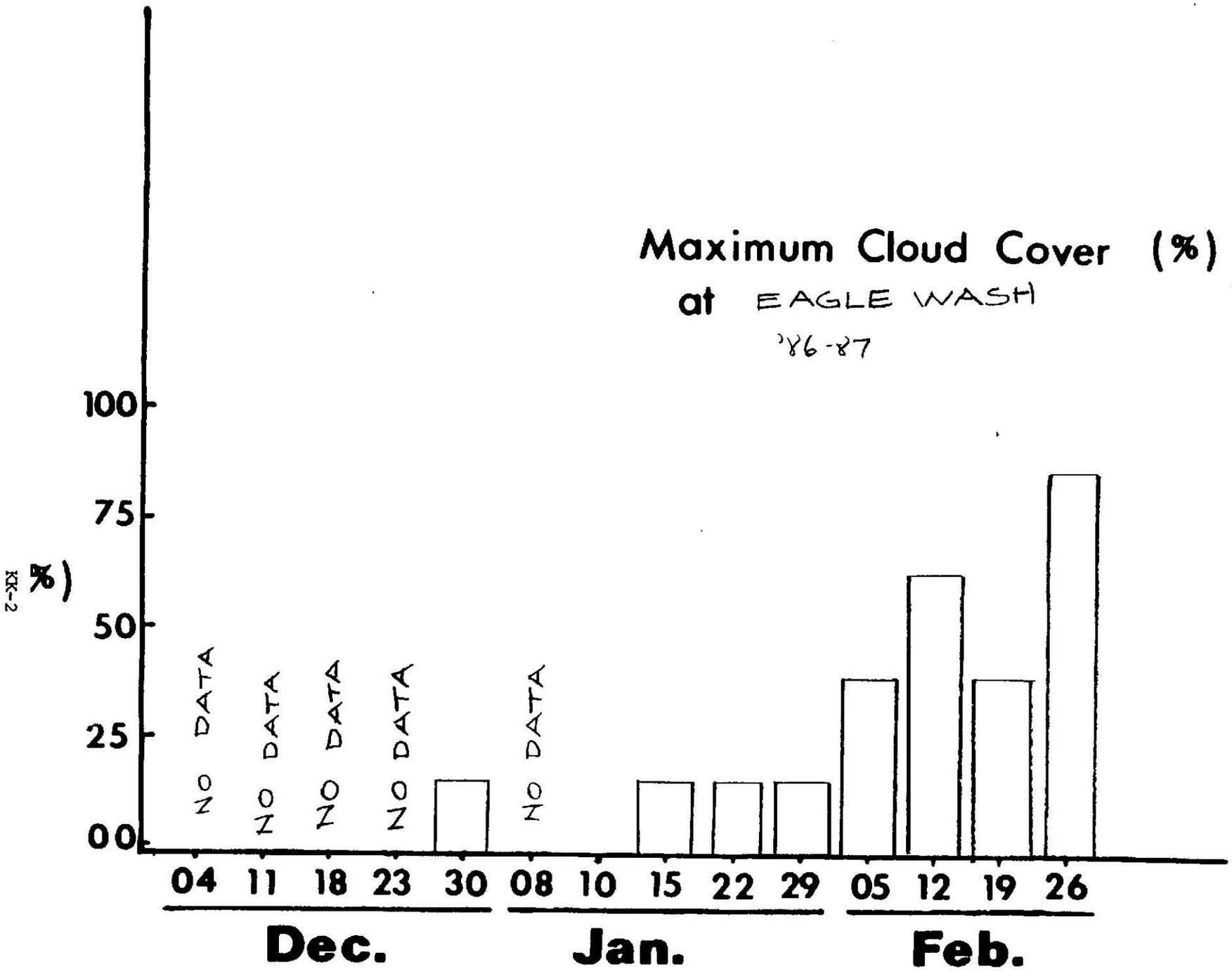
at HILL CREEK

'87-88




Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at EAGLE WASH
'86-87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
NO DATA
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Jan.
Dec.
Feb.

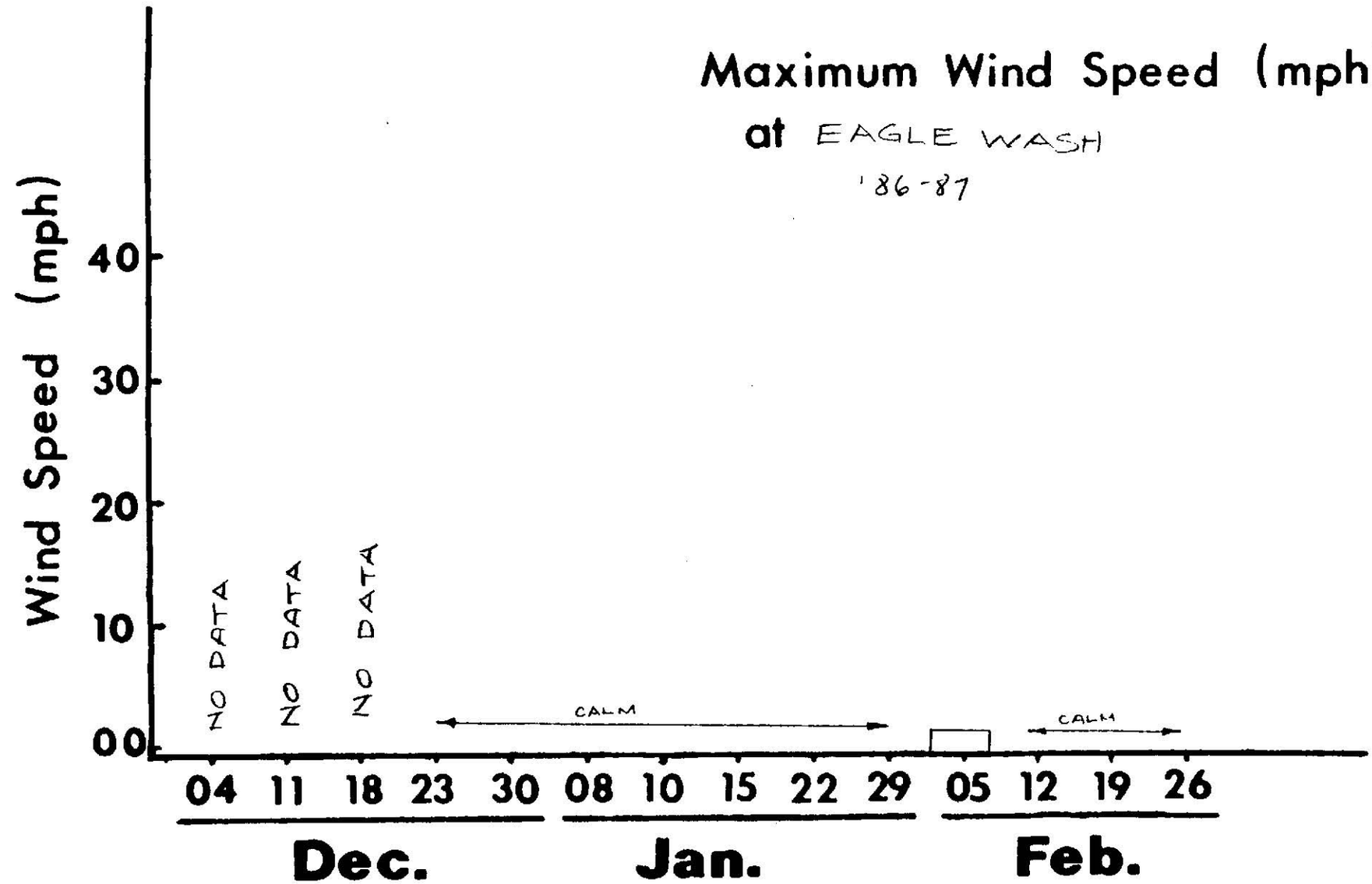
KK-1


Maximum Cloud Cover (%)
at EAGLE WASH
'86-87
100
75
50
25
00
%)
KK-2
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum Wind Speed (mph)

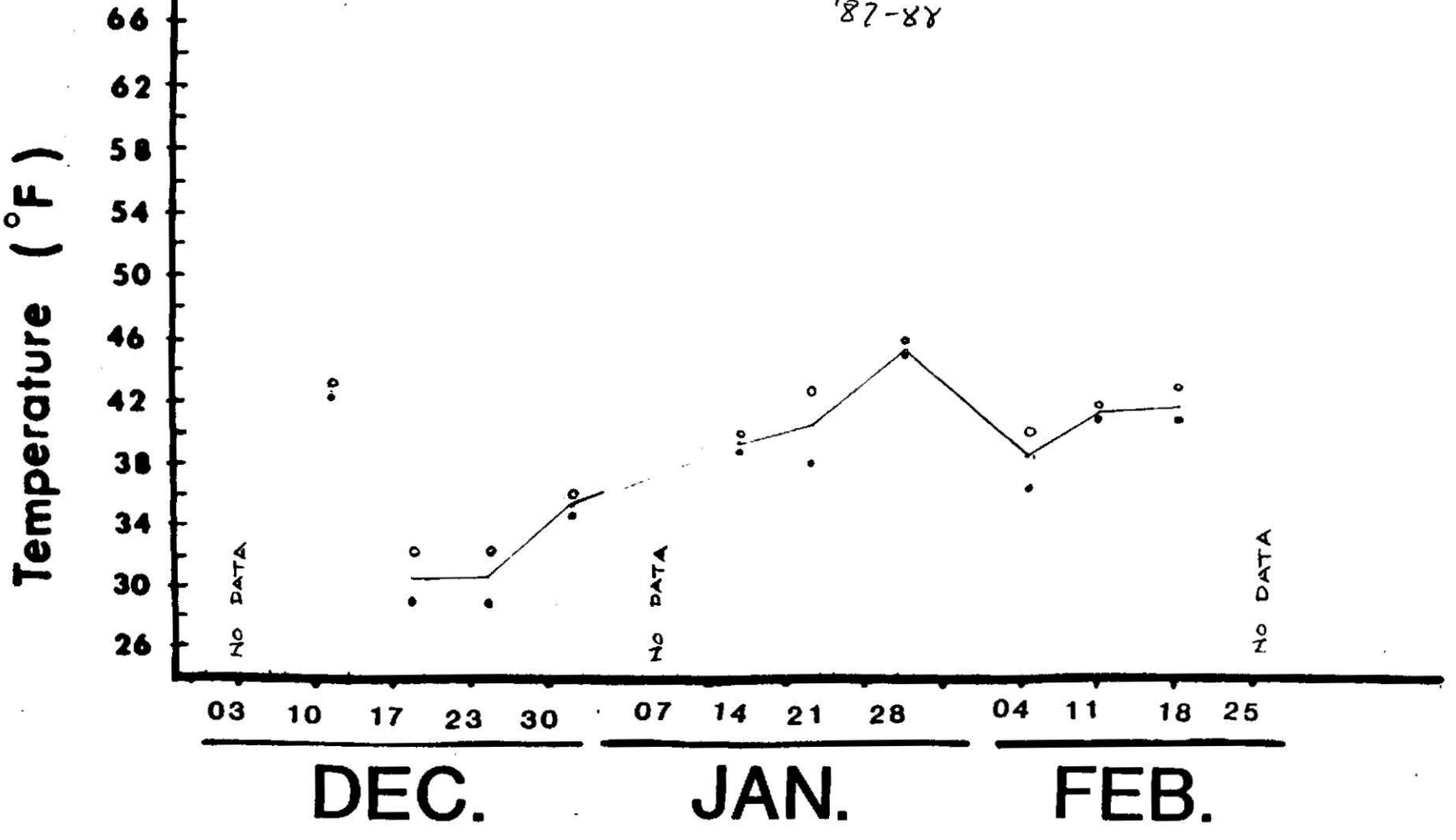
at EAGLE WASH

'86-87

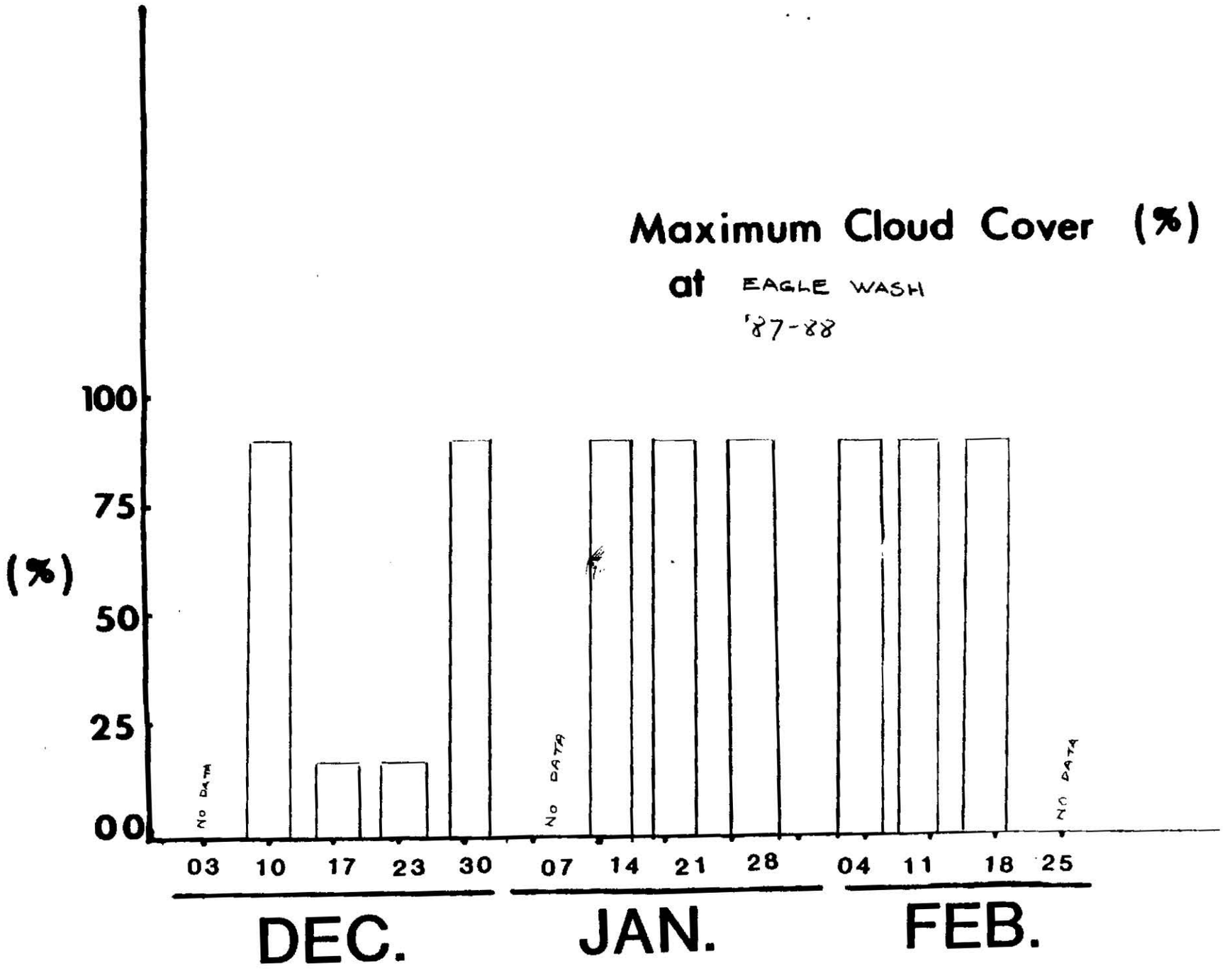


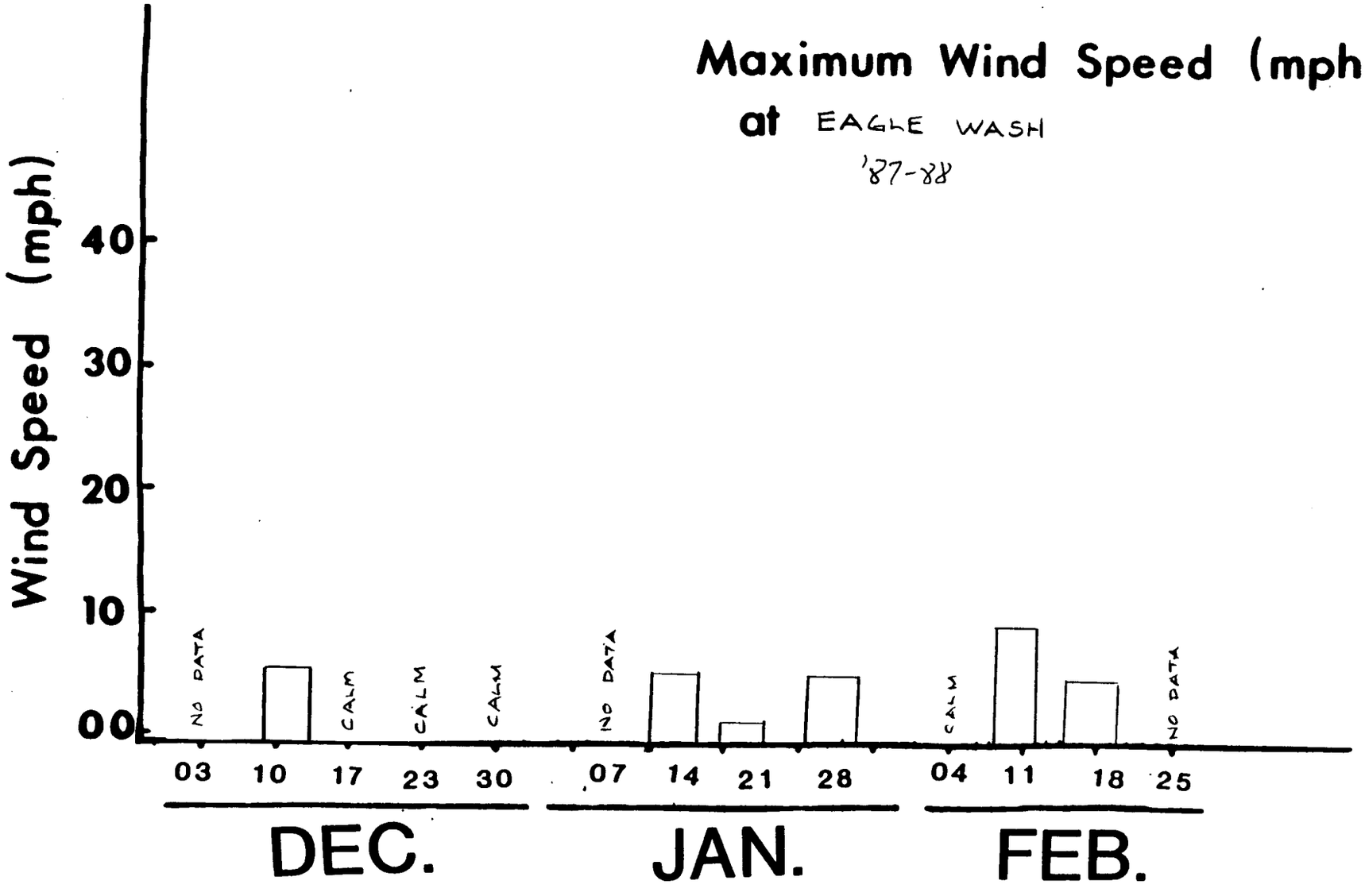
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at EAGLE WASH

'87-88



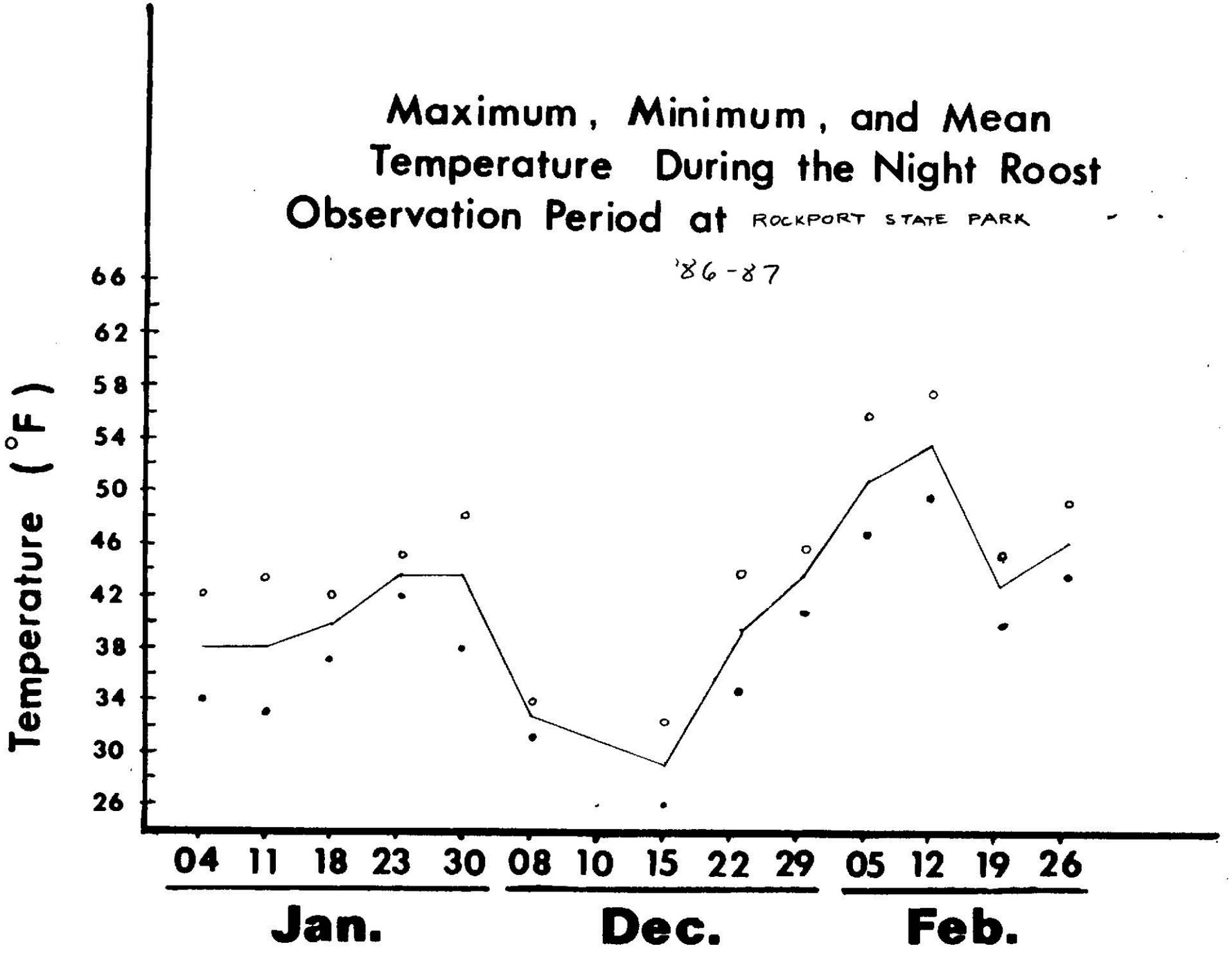
IL-1

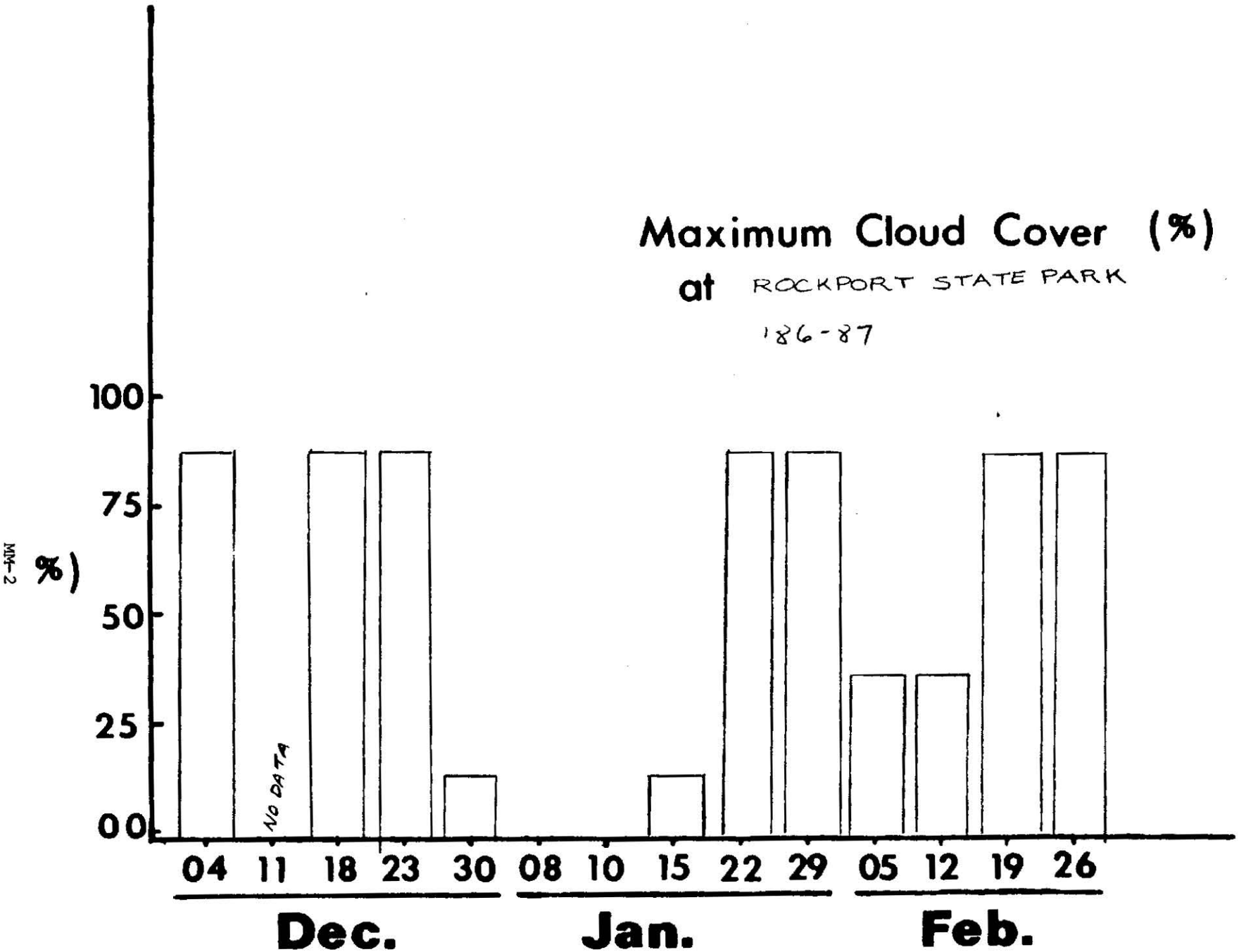

Maximum Cloud Cover (%)
at EAGLE WASH
'87-88
100
75
50
25
00
(%)
NO DATA
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.


Maximum Wind Speed (mph)
at EAGLE WASH
'87-'88
Wind Speed (mph)
40
30
20
10
00
NO DATA
CALM
CALM
CALM
NO DATA
CALM
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

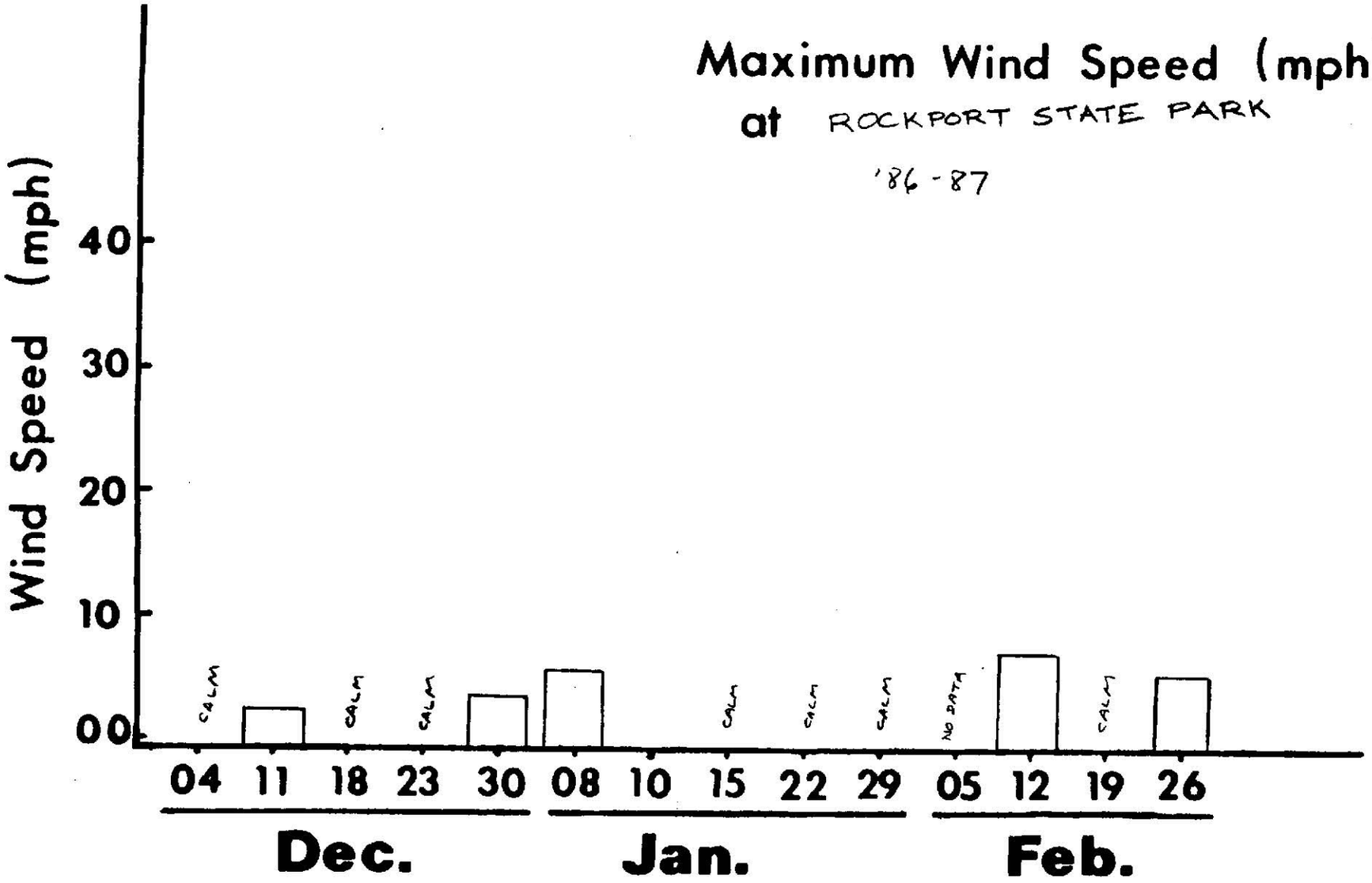
Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at ROCKPORT STATE PARK

'86-87



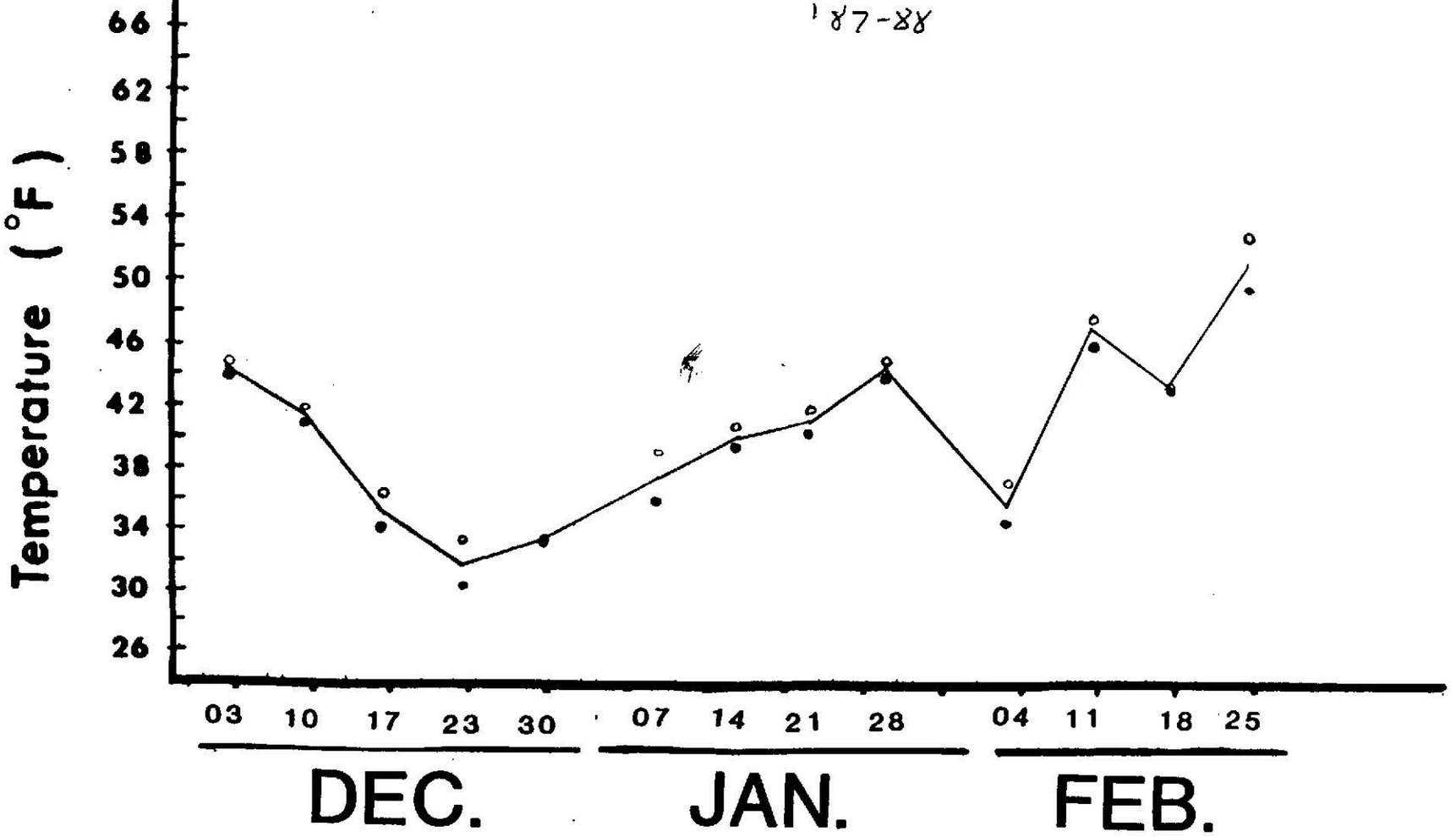

Maximum Cloud Cover (%)
at ROCKPORT STATE PARK
186-87
100
75
50
25
00
%)
MM-2
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum Wind Speed (mph)
at ROCKPORT STATE PARK
'86-87

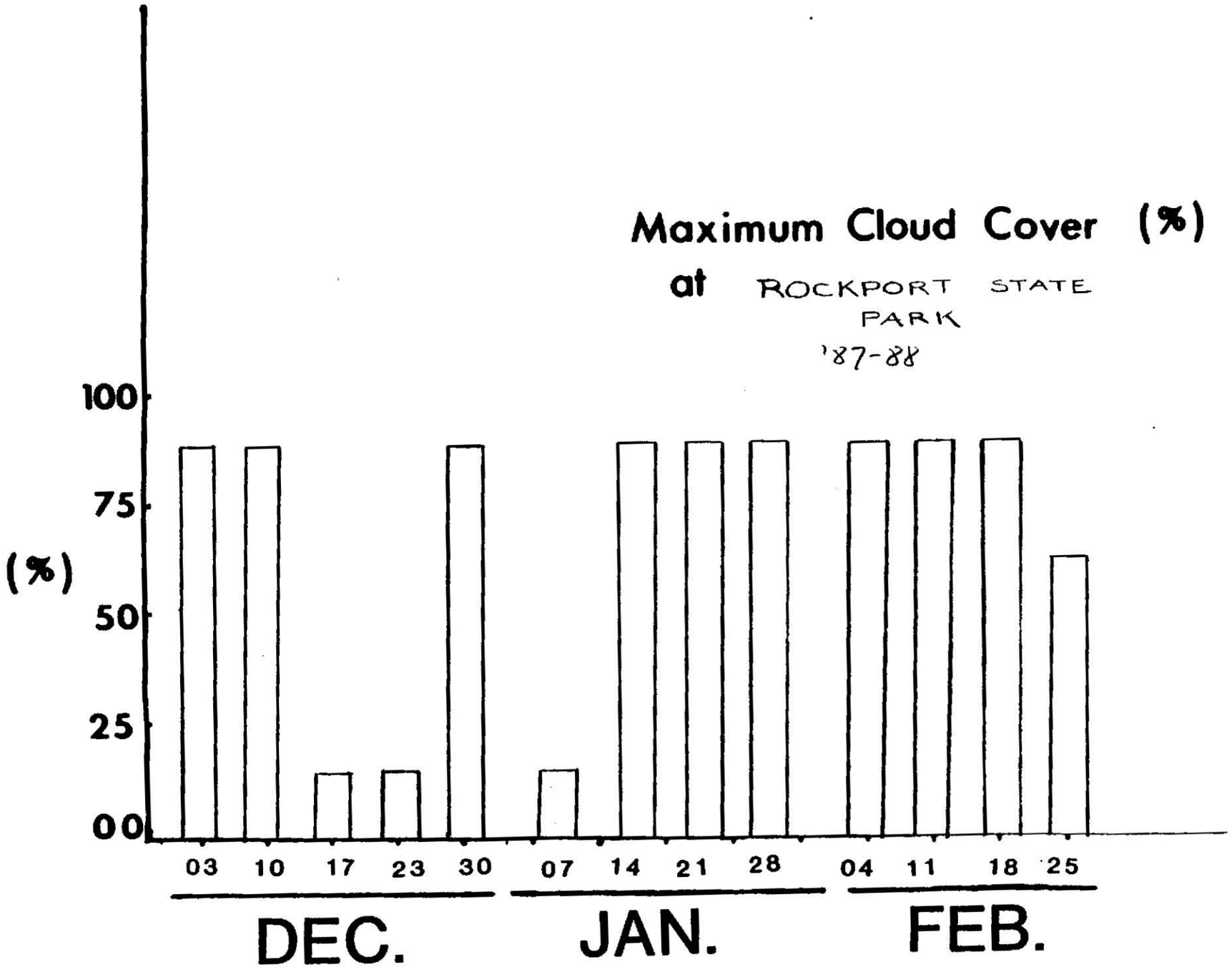


Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at ROCKPORT STATE PARK

'87-88



NN-1

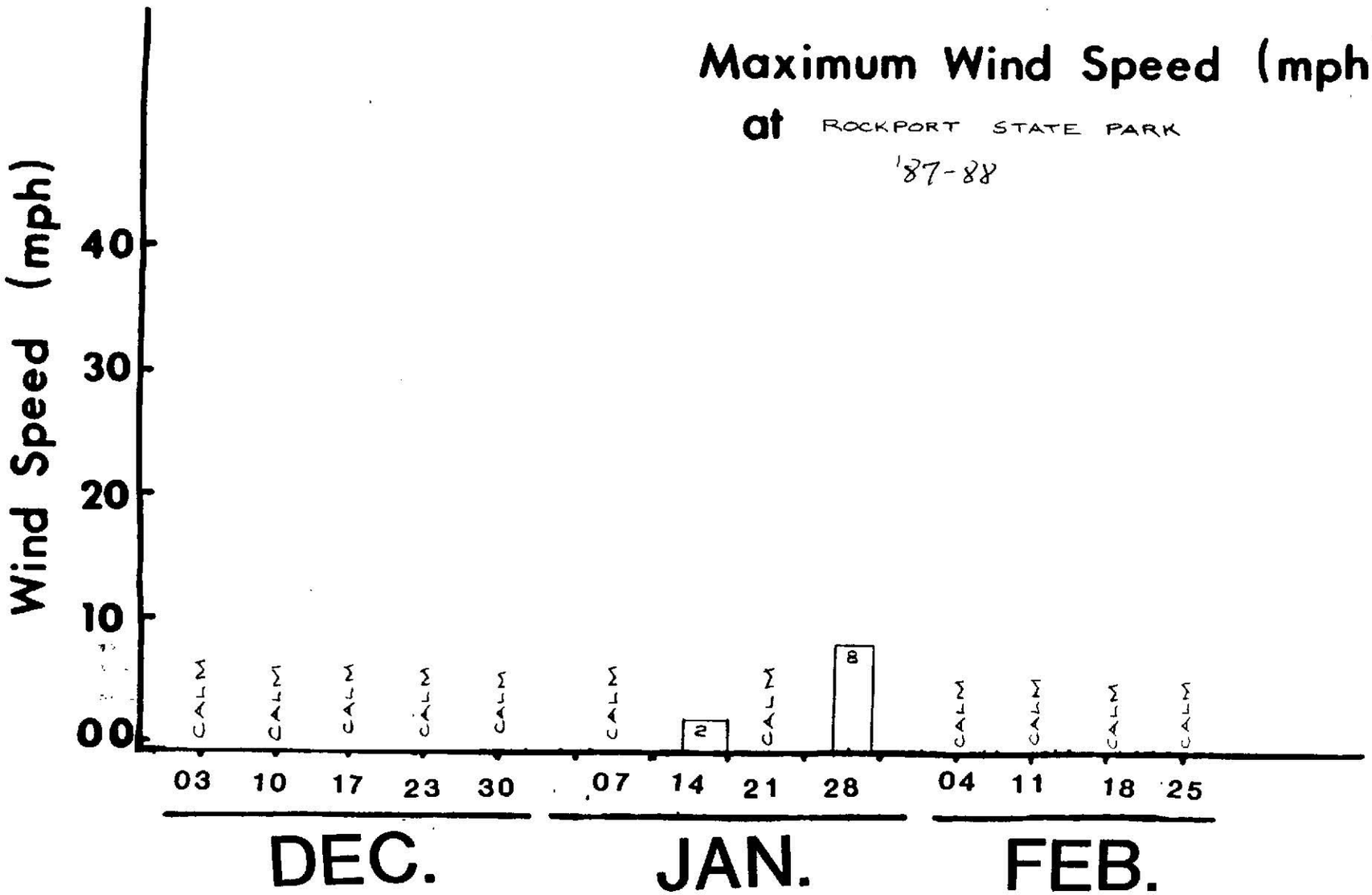

Maximum Cloud Cover (%)
at ROCKPORT STATE PARK
'87-88
100
75
50
25
00
(%)
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

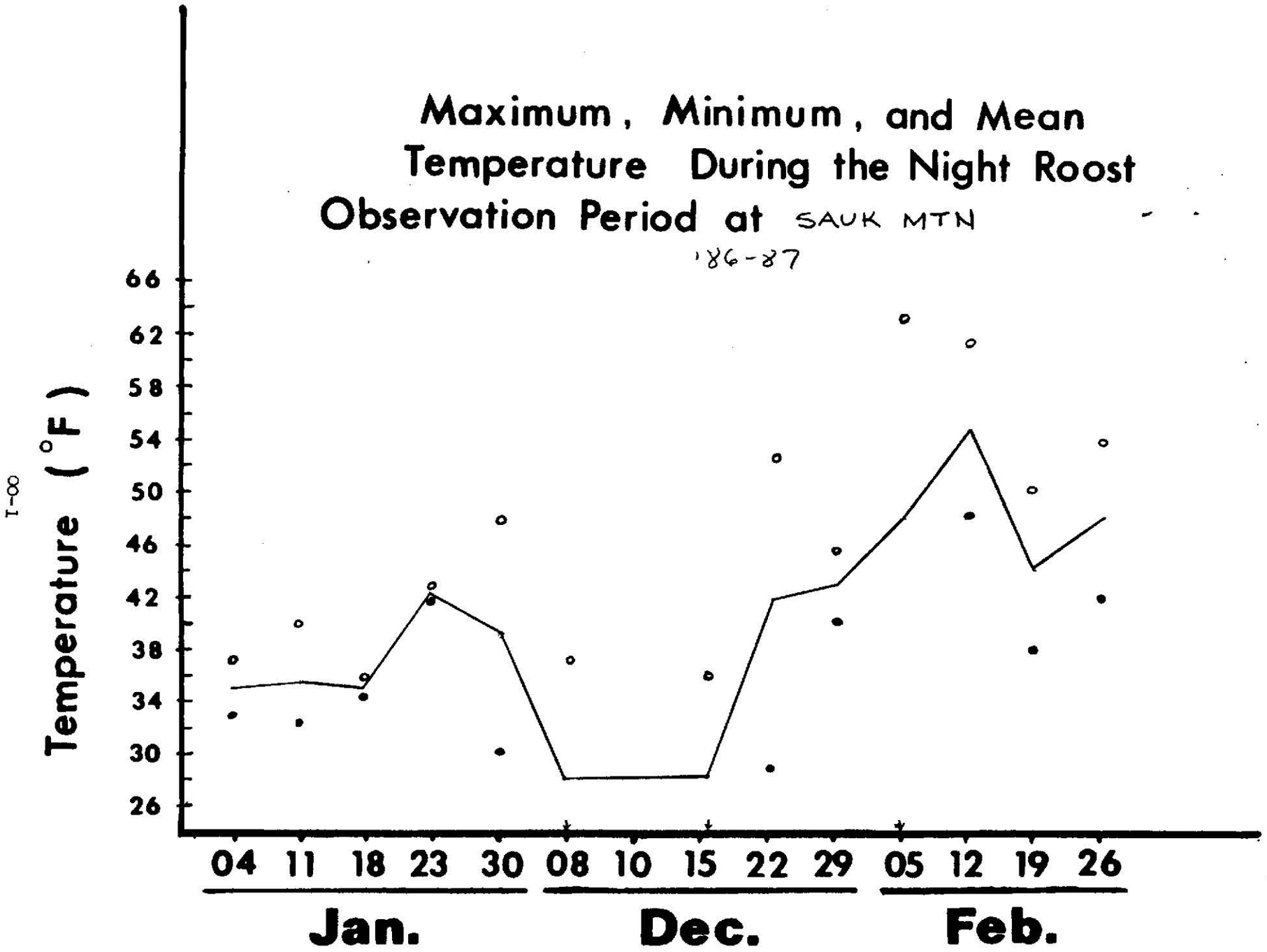
NN-2

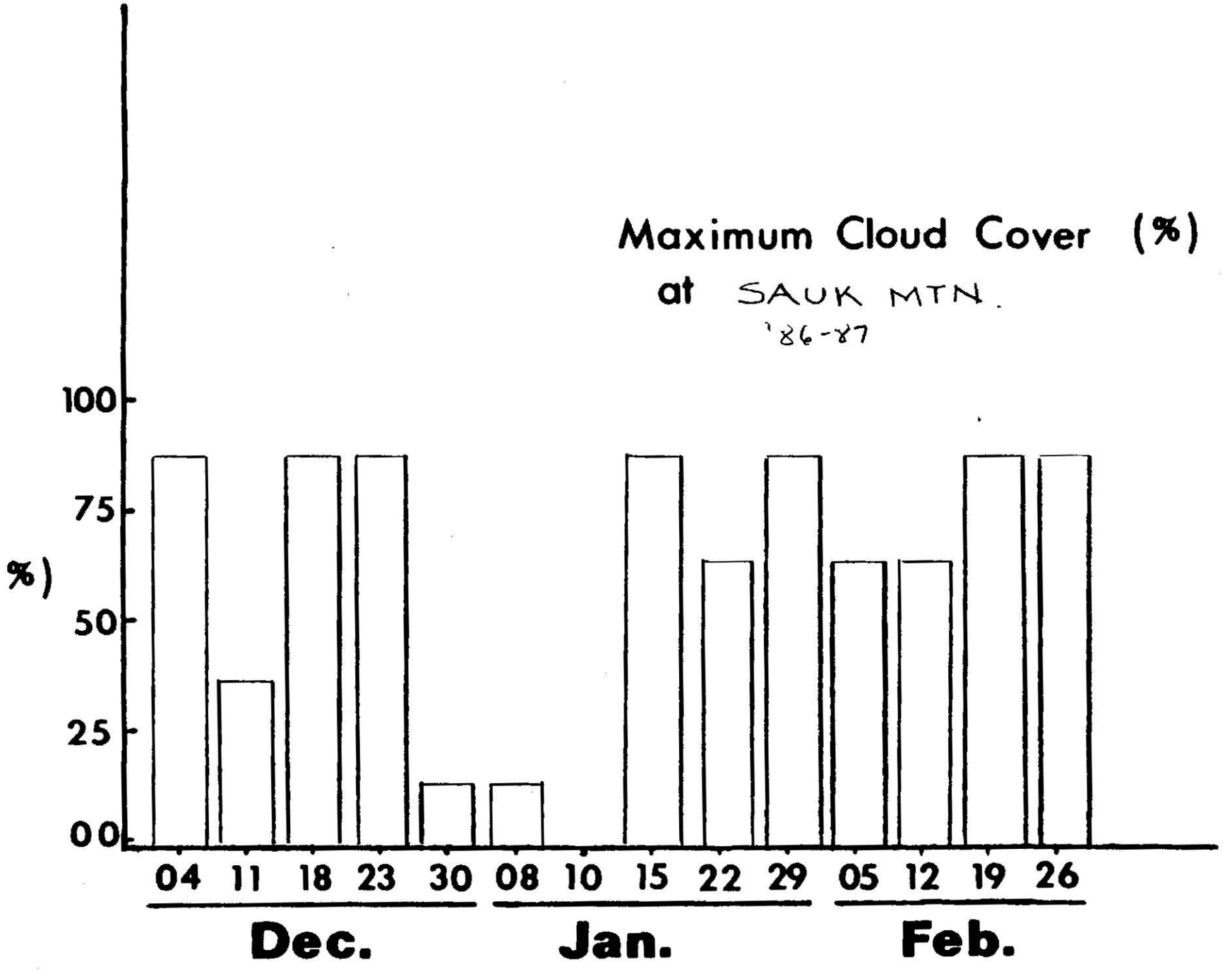
Maximum Wind Speed (mph)

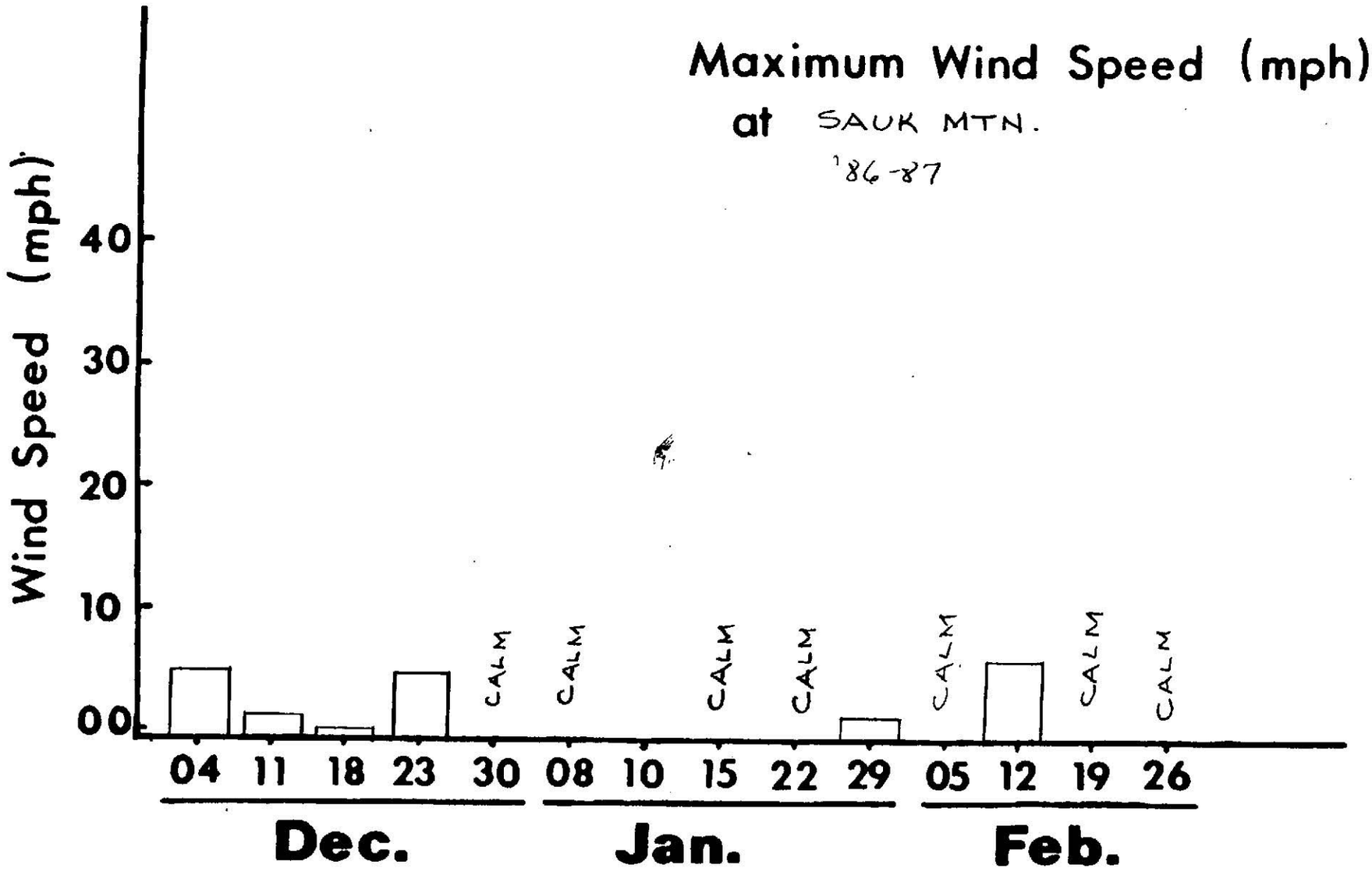
at ROCKPORT STATE PARK

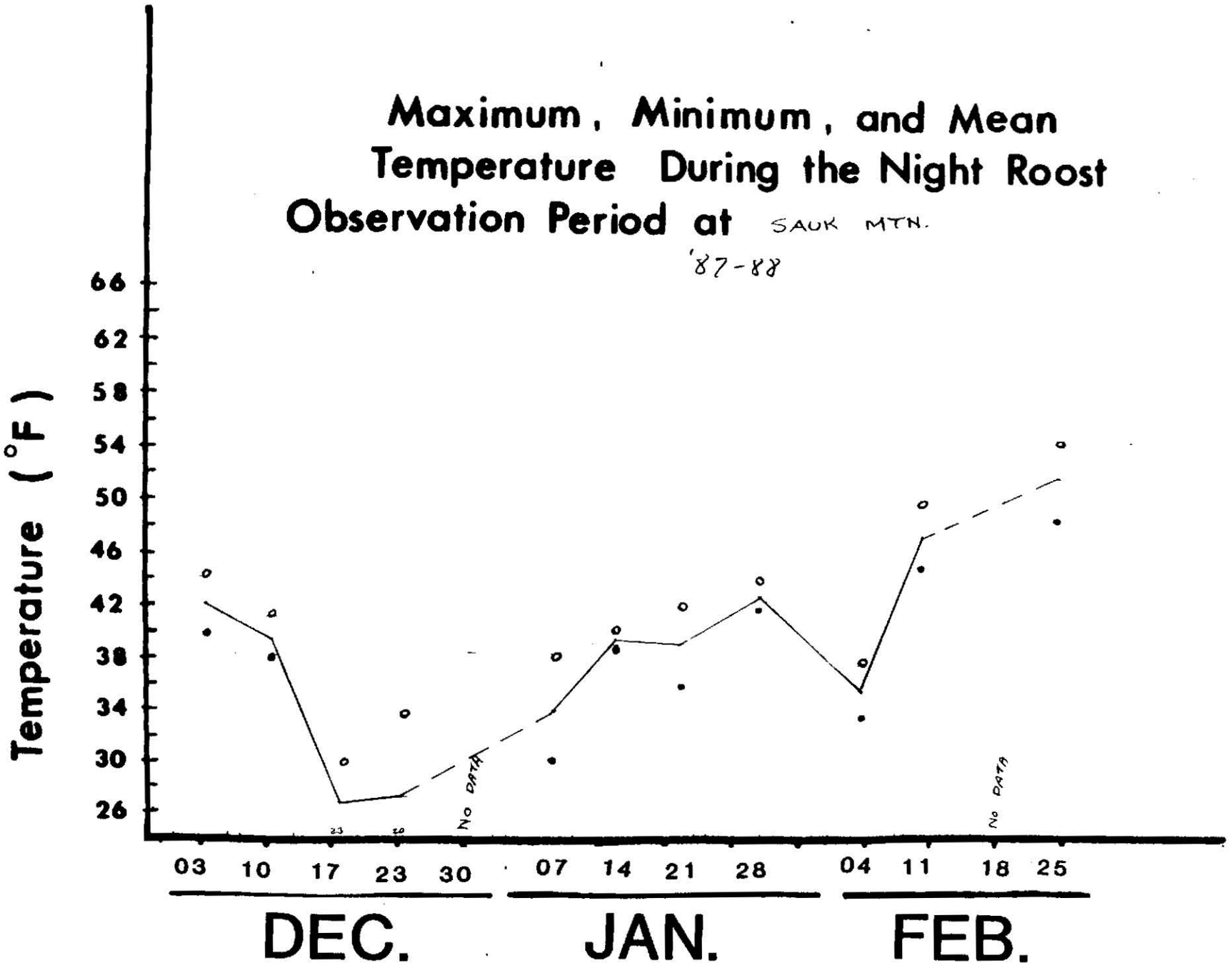
'87-88

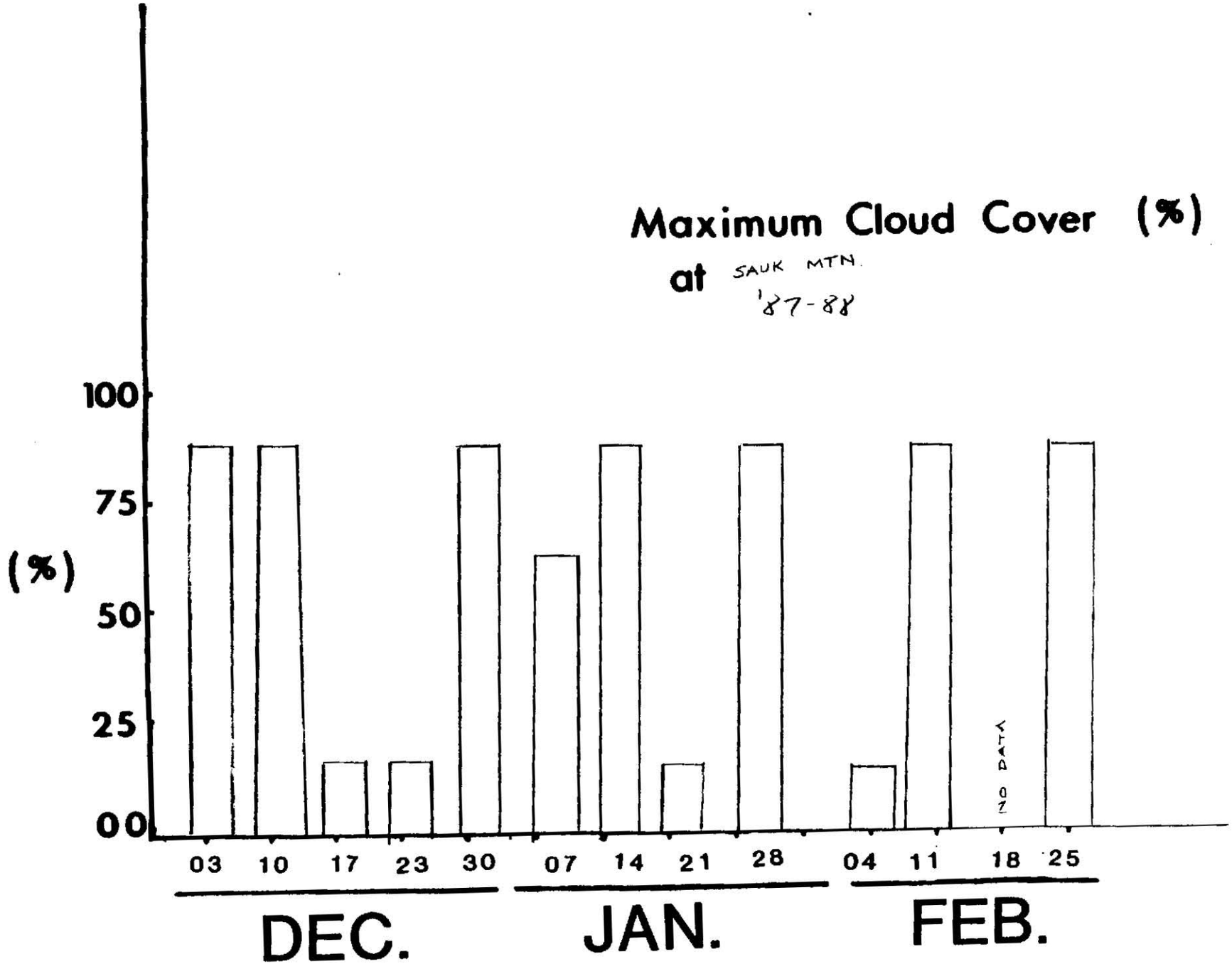



Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at SAUK MTN
'86-87
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Jan.
Dec.
Feb.


Maximum Cloud Cover (%)
at SAUK MTN.
'86-87
100
75
50
25
00
%)
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.


Maximum Wind Speed (mph)
at SAUK MTN.
'86-87
Wind Speed (mph)
40
30
20
10
00
CALM
CALM
CALM
CALM
CALM
CALM
CALM
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

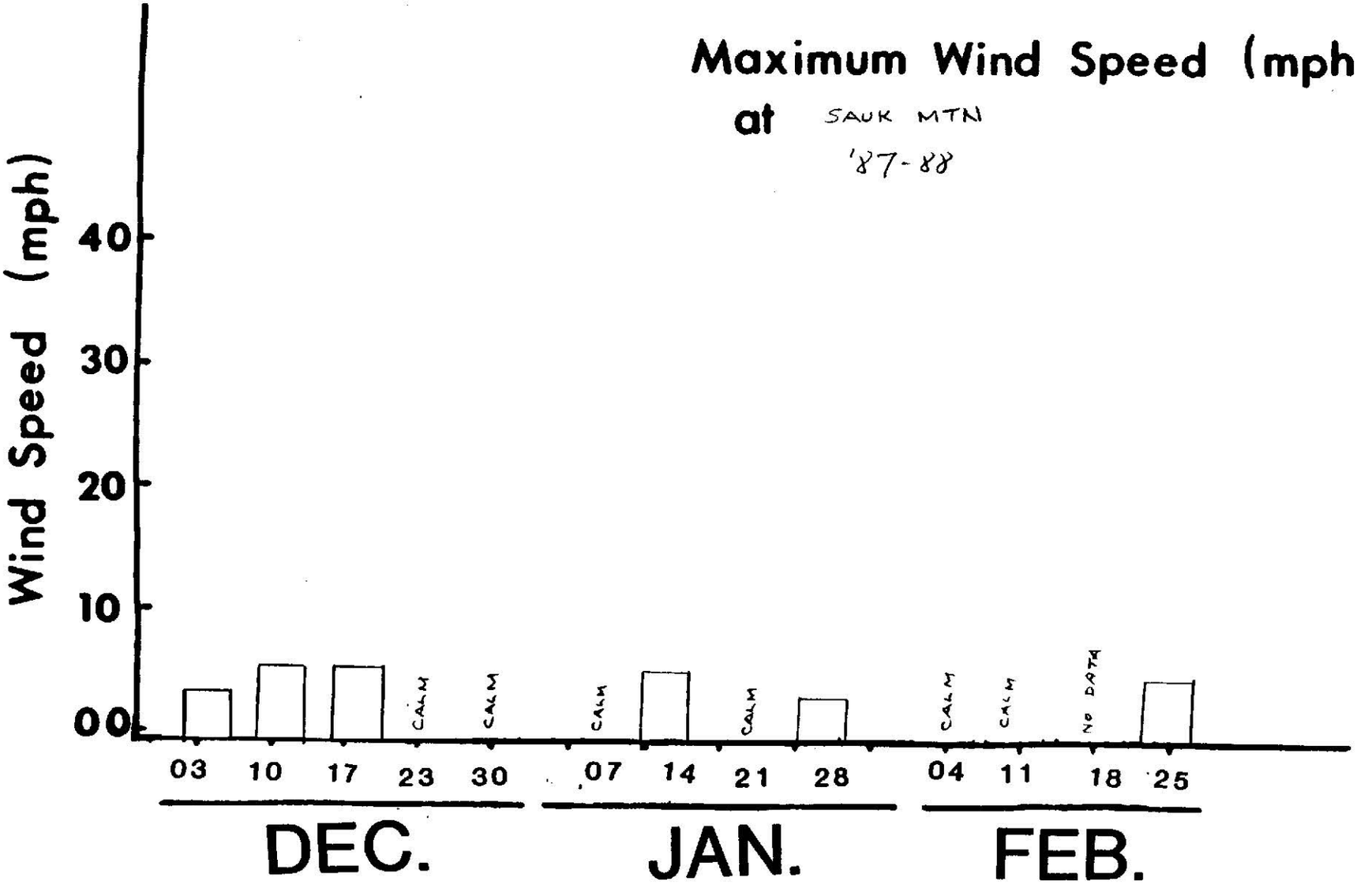

Maximum, Minimum, and Mean
Temperature During the Night Roost
Observation Period at SAUK MTN.
'87-88
Temperature (°F)
66
62
58
54
50
46
42
38
34
30
26
No DATA
No DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.


Maximum Cloud Cover (%)
at SAUK MTN.
'87-88
100
75
50
25
00
(%)
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

Maximum Wind Speed (mph)

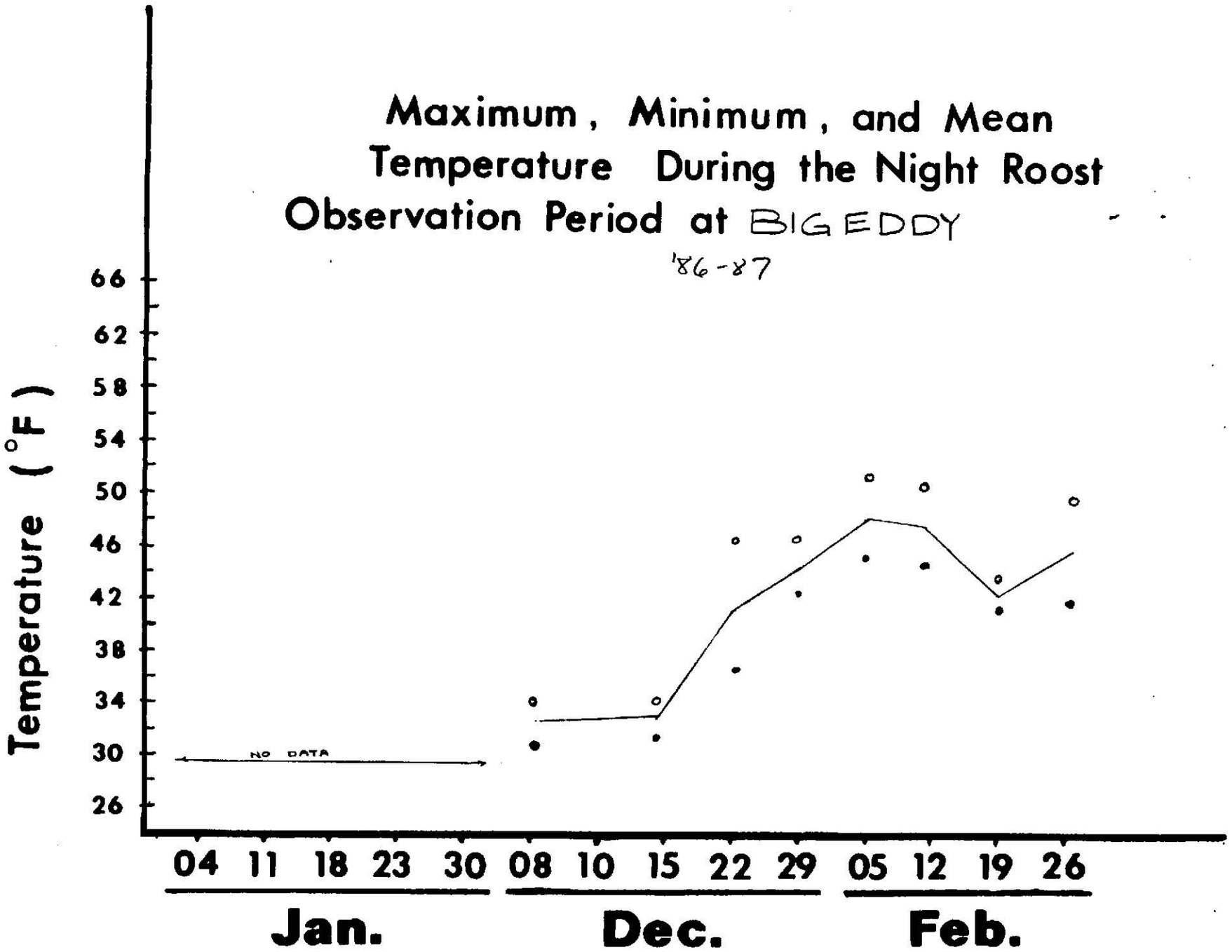
at SAUK MTN

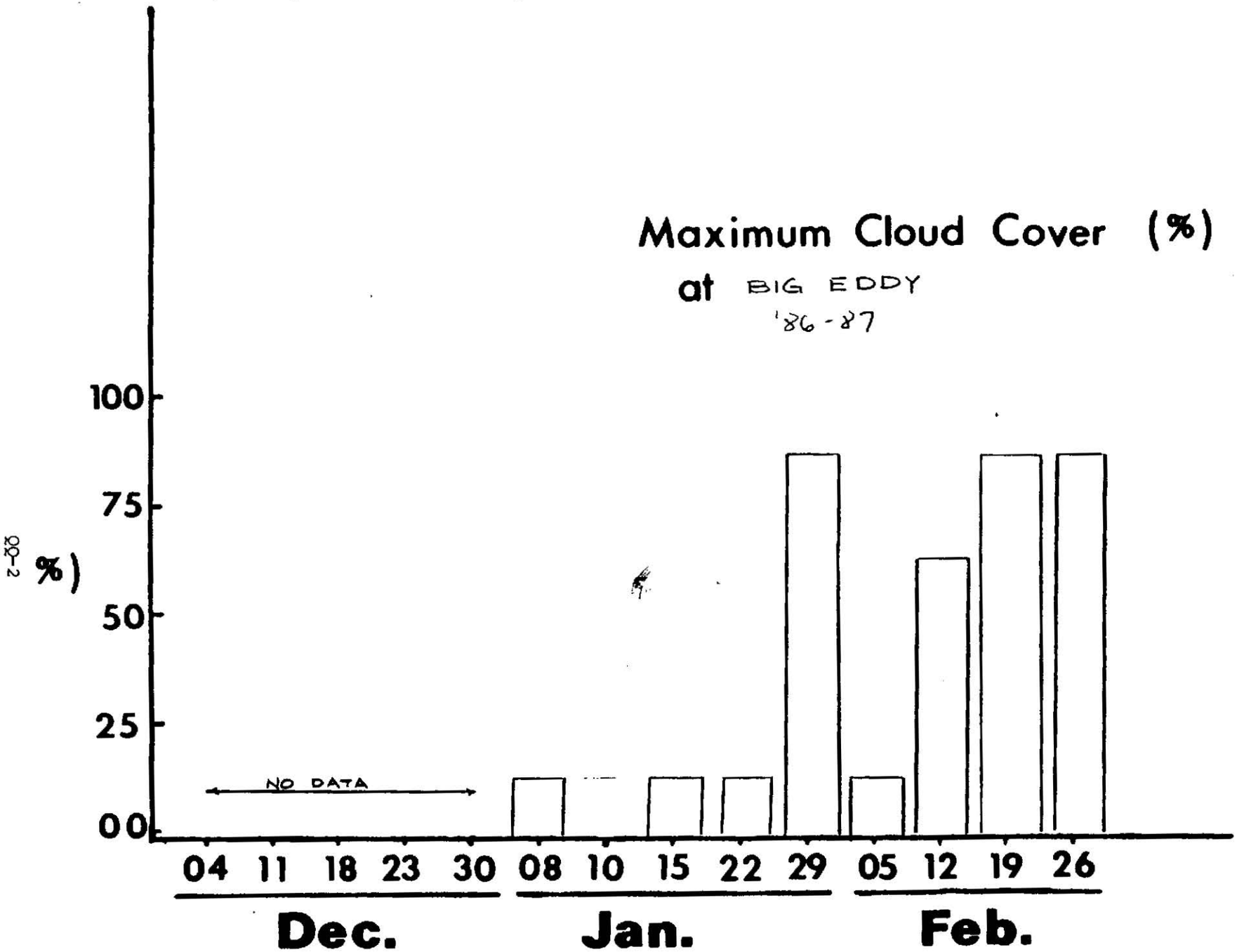
'87-88

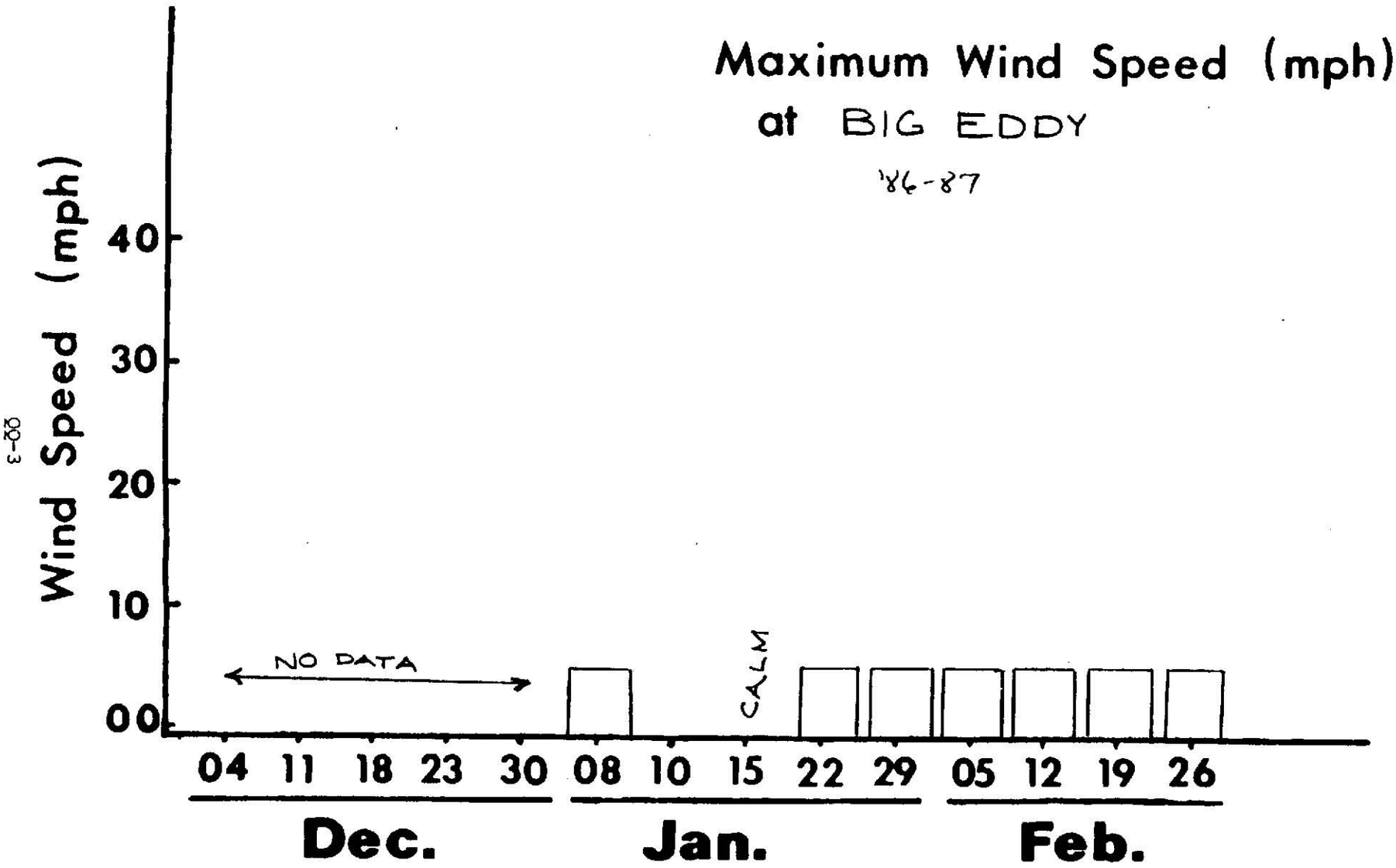


Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at BIG EDDY

'86-87

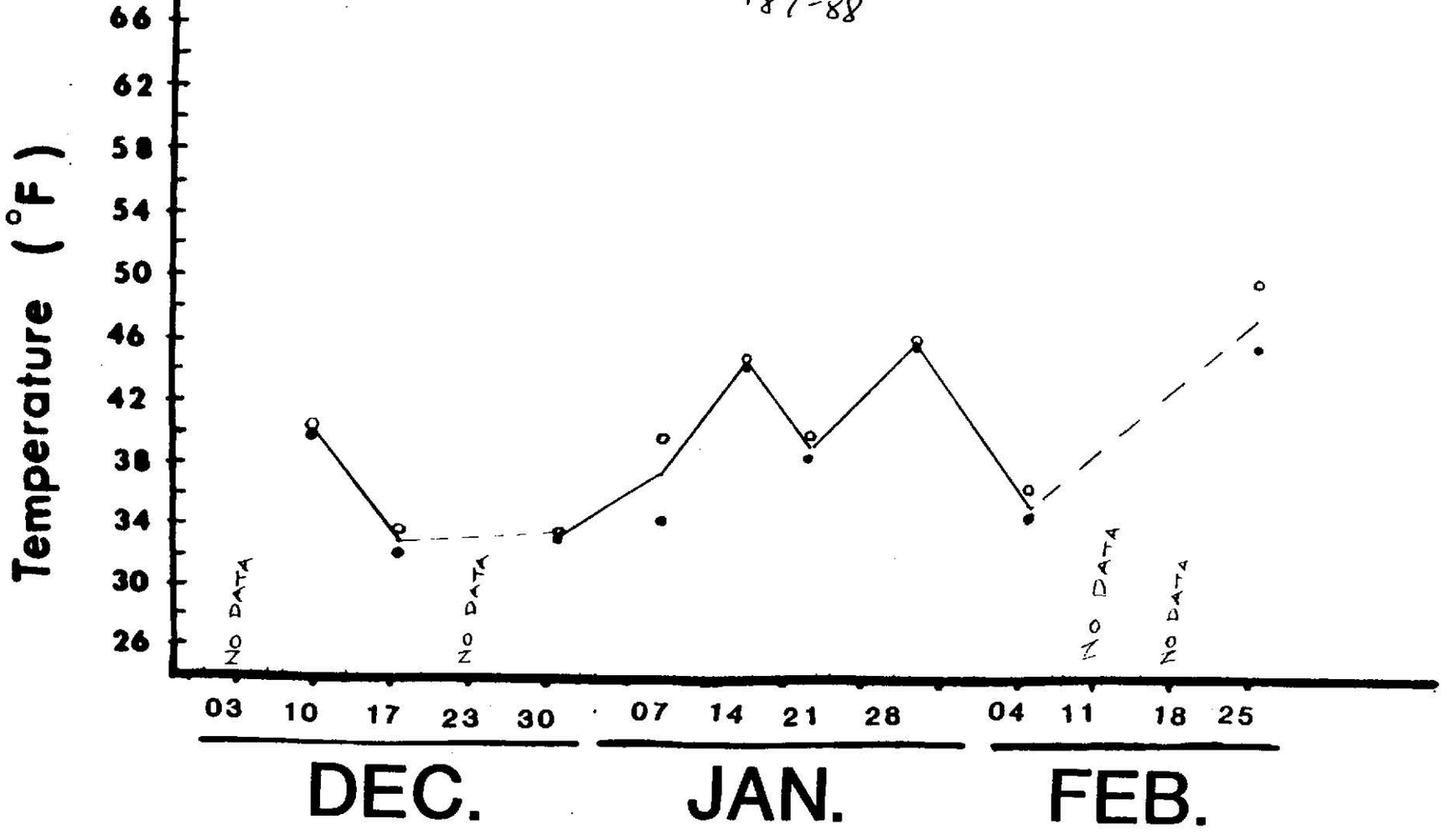



Maximum Cloud Cover (%)
at BIG EDDY
'86-87
100
75
50
25
00
%)
NO DATA
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

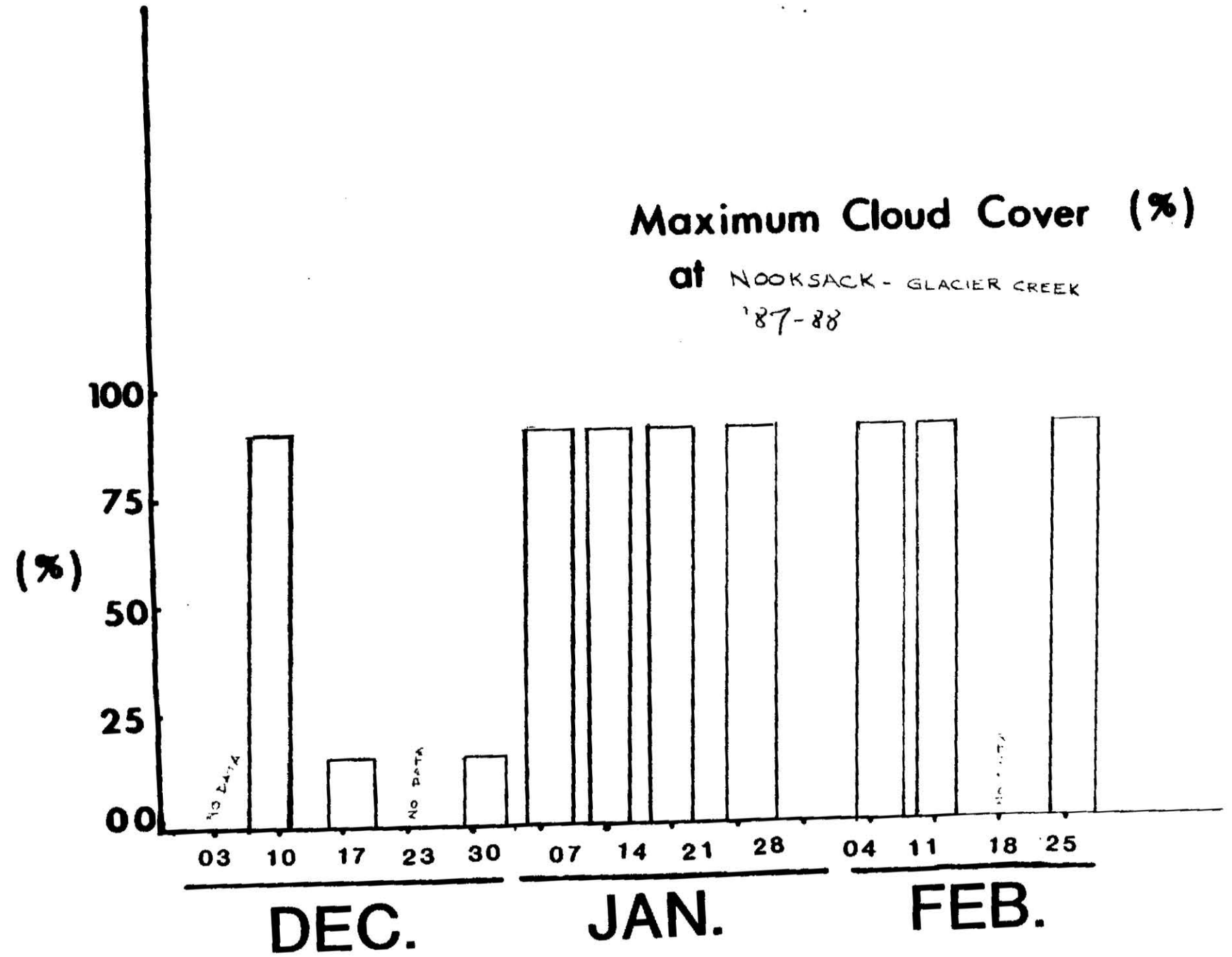

Maximum Wind Speed (mph)
at BIG EDDY
'86-87
Wind Speed (mph)
40
30
20
10
00
NO DATA
CALM
04 11 18 23 30 08 10 15 22 29 05 12 19 26
Dec.
Jan.
Feb.

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at NOOKSACK - GLACIER CREEK

'87-88



RR-1

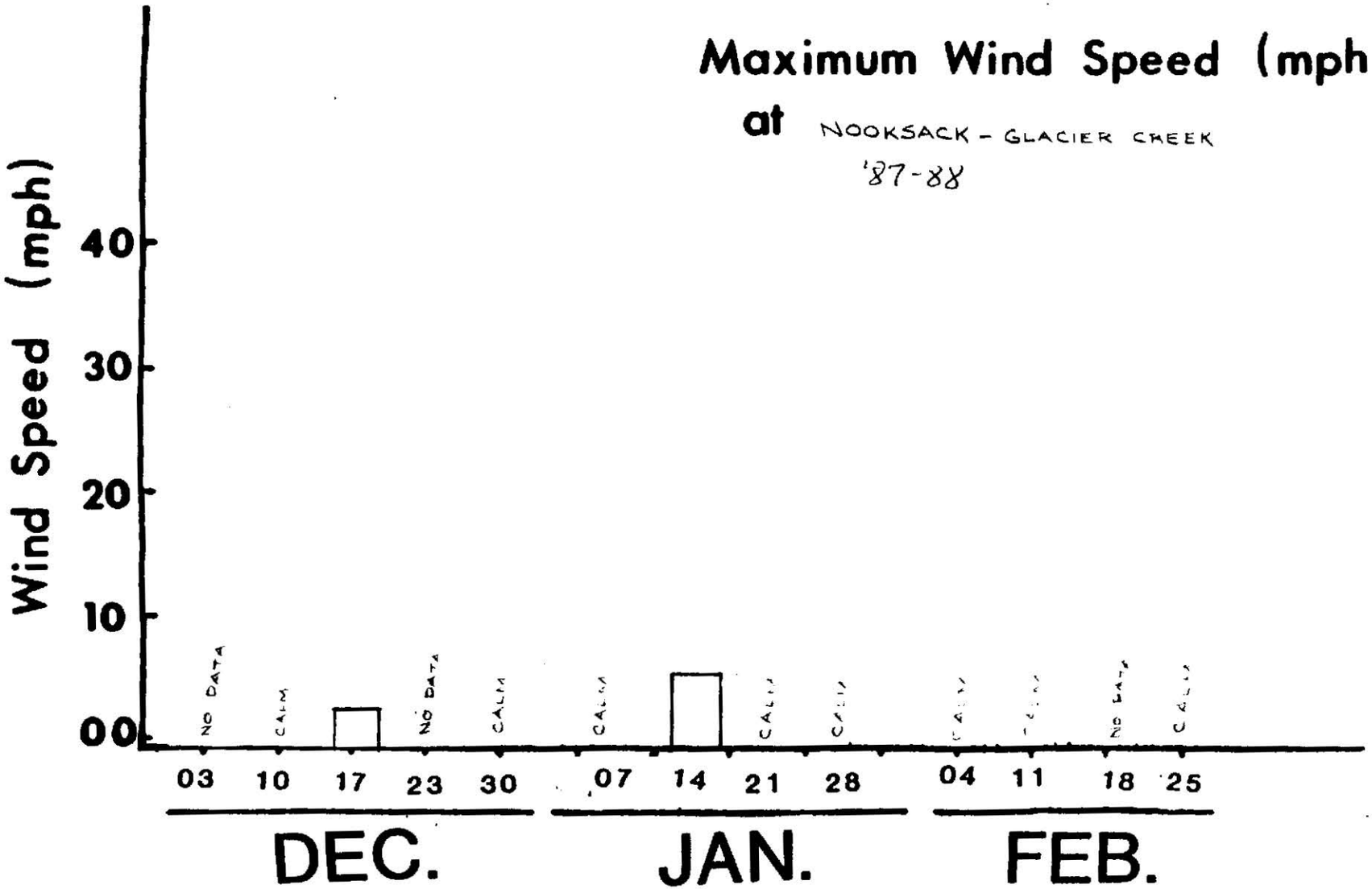

Maximum Cloud Cover (%)
at NOOKSACK - GLACIER CREEK
'87-88
100
75
(%)
50
25
00
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

RR-2

Maximum Wind Speed (mph)

at NOOKSACK - GLACIER CREEK

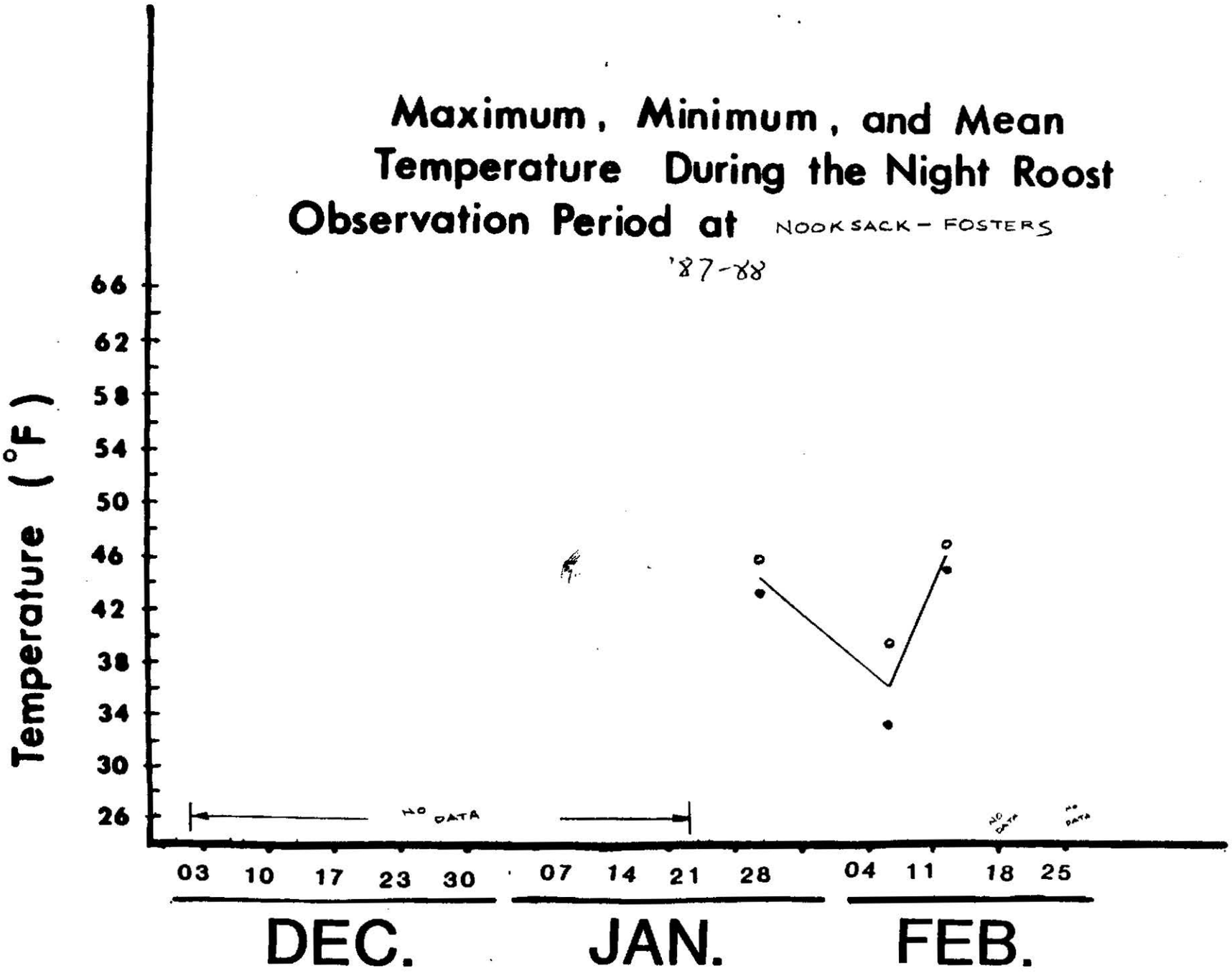
'87-88

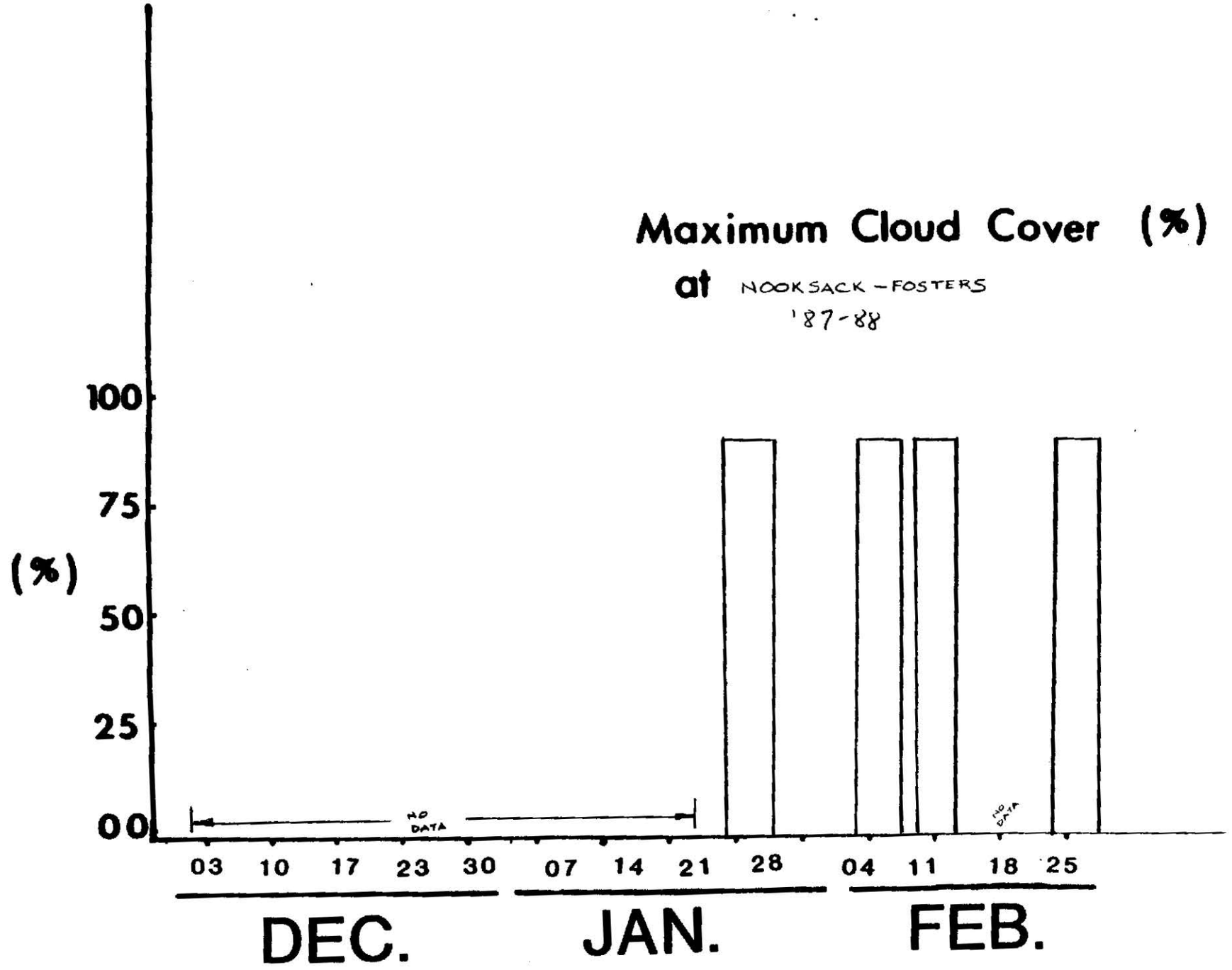


RR-3

Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at NOOKSACK – FOSTERS

'87-88



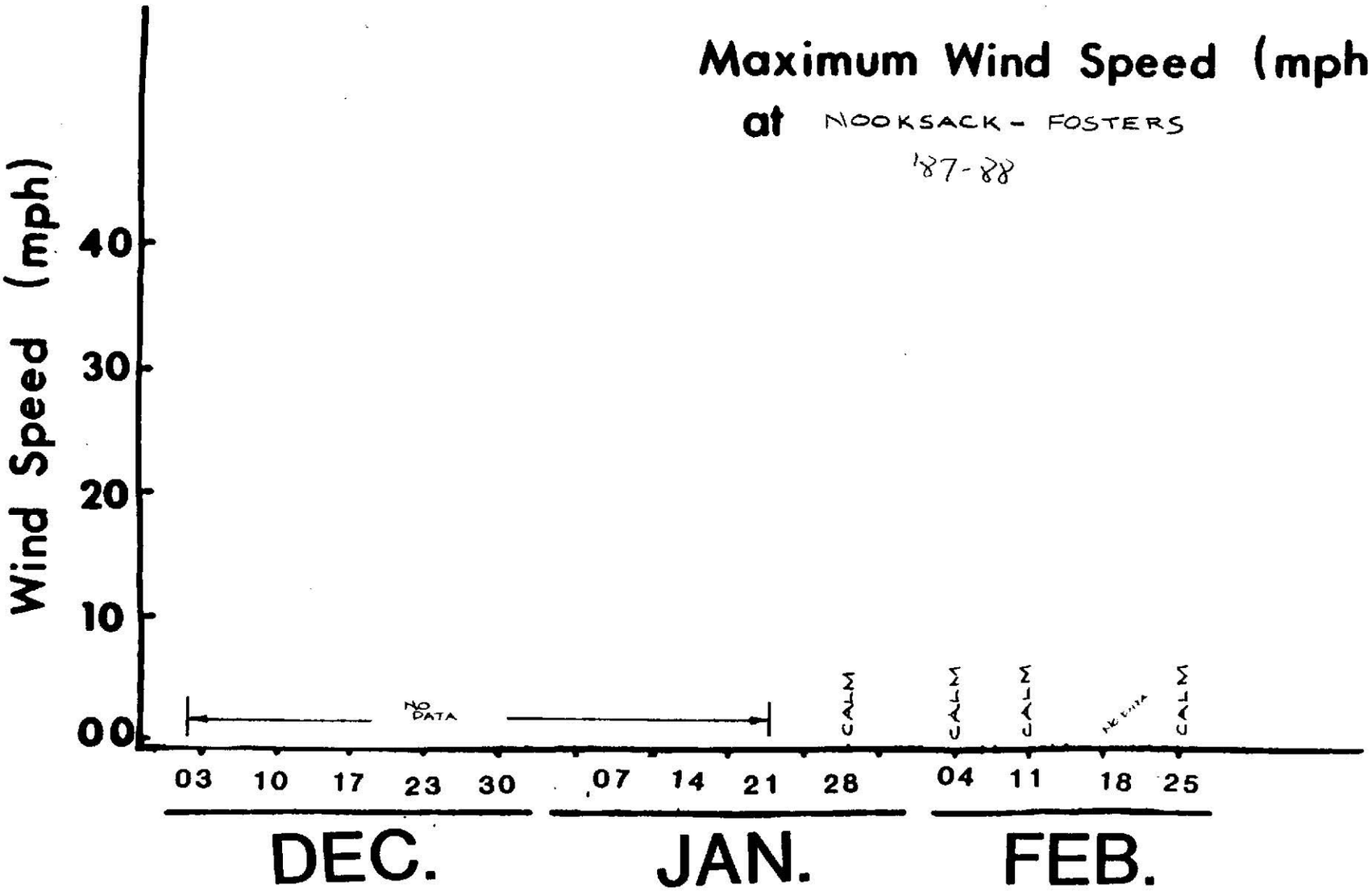

Maximum Cloud Cover (%)
at NOOKSACK - FOSTERS
'87-88
100
75
50
25
00
(%)
NO DATA
NO DATA
03 10 17 23 30 07 14 21 28 04 11 18 25
DEC.
JAN.
FEB.

SS-2

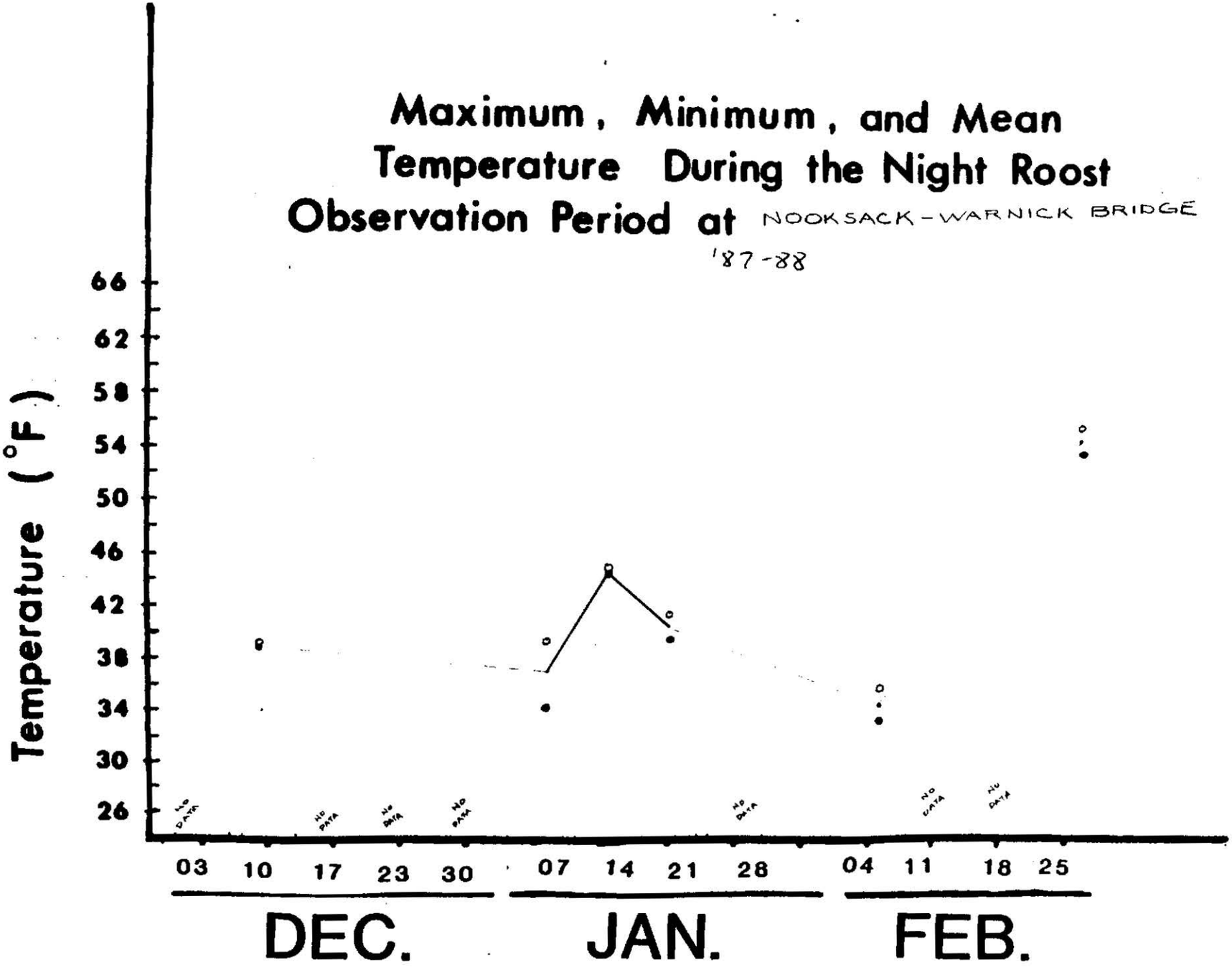
Maximum Wind Speed (mph)

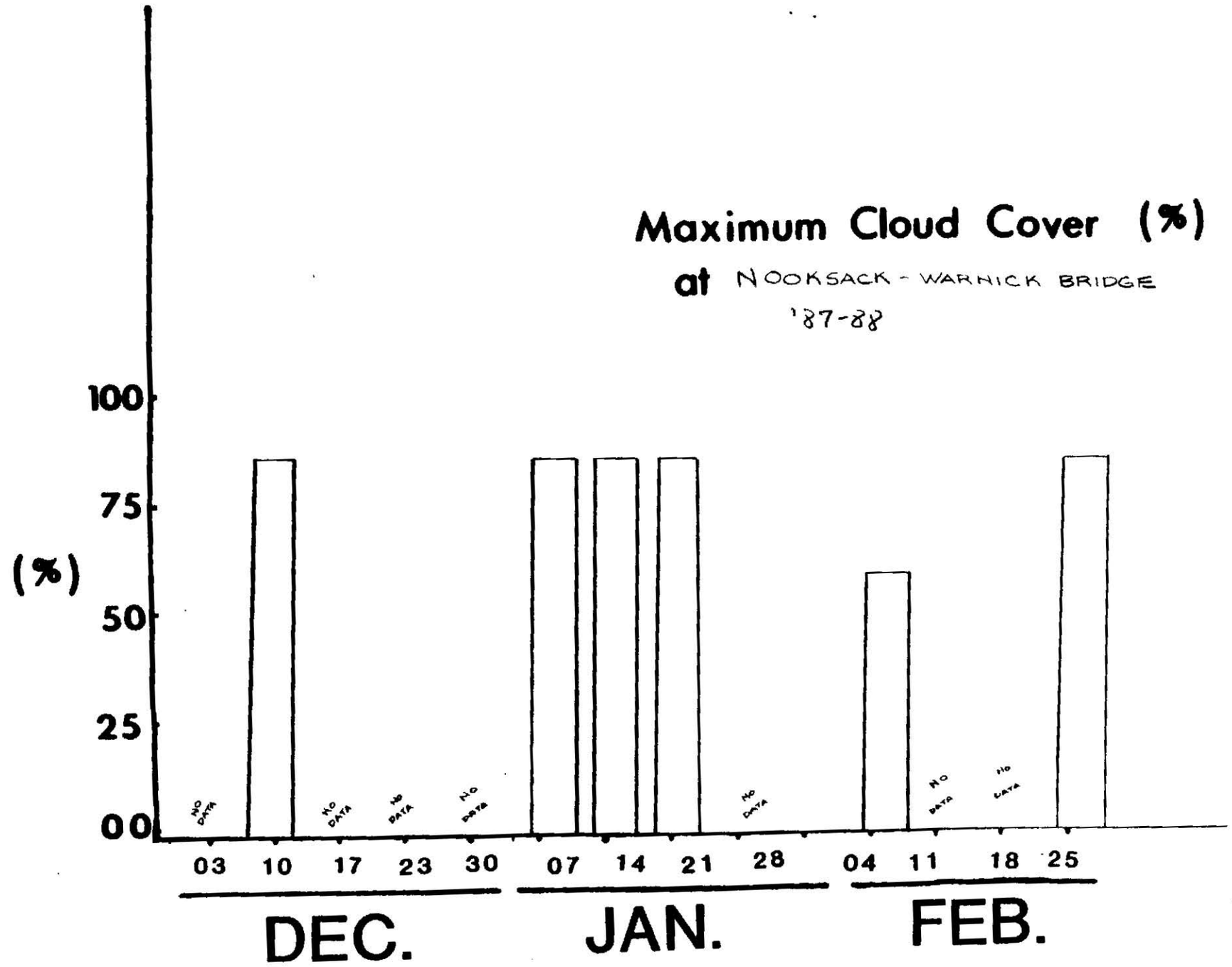
at NOOKSACK - FOSTERS

'87-88



Maximum, Minimum, and Mean Temperature During the Night Roost Observation Period at NOOKSACK-WARNICK BRIDGE '87-88




Maximum Cloud Cover (%)
at NOOKSACK - WARNICK BRIDGE
'87-88
100
75
50
25
00
(%)
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
NO DATA
03
10
17
23
30
07
14
21
28
04
11
18
25
DEC.
JAN.
FEB.

TT-2

Maximum Wind Speed (mph)

at NOOKSACK-WARNICK BRIDGE

'87-88