State of California
THE RESOURCES AGENCY
Department of Fish and Game

CALIFORNIA BLACK RAIL

BREEDING SEASON SURVEY IN CENTRAL CALIFORNIA

1977[1/]

by

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ABSTRACT

A survey to locate breeding populations of California black rails (Laterallus jamaicensis coturniculus) in the San Francisco Bay Area, Morro Bay and Los Banos Wildlife Management Area was conducted from March through July 1977. Thirty-two calling black rails were located at sampling stations in tidal marshes bordering San Pablo Bay and its tributaries, the Suisun marshes and the Delta of the Sacramento-San Joaquin River system; seven were heard calling in marshes bordering Morro Bay; and one was heard in Olema Marsh, Marin County. Ninety-five percent of the black rails were in marshes dominated by Salicornia virginica or Scirpus spp. No black rails were found in San Francisco Bay south of the Richmond-San Rafael Bridge or at Los Banos Wildlife Management Area. Breeding black rails seem confined to high marsh habitat at the upper limit of tidal flooding.

1/ Nongame Wildlife Investigations, Endangered Wildlife Program, E-1-1, Study IV, Job 1.3 (August 1977).

RECOMMENDATIONS

As a result of a spring and summer survey for California black rails in the San Francisco Bay Region and elsewhere in central California, the Department recommends that:

1. Further censusing be conducted in marshes in the San Francisco Bay Region in order to further define the range of the black rail and the remaining suitable habitat available to this species.

2. More intensive field work, including perhaps trapping and banding, be carried out in marshes harboring populations of black rails in an attempt to better understand the life history and habitat requirements of this species, as well as determine population densities in different marsh types.

3. Federal- and state-owned marshes that contain, or may contain, breeding black rails be managed in a manner that will conserve those qualities that make such marshes attractive to black rails.

4. Regional, county and city agencies and private individuals owning marshlands harboring black rails be made aware of the presents of the birds and be encouraged to aid in their preservation.

5. Preservation and restoration of marshlands be encouraged and influenced by the findings of this and any subsequent studies of black rails.

6. The California black rail be retained on the California Fish and Game Commission list of Rare Animals.

INTRODUCTION

The California black rail (Laterallus jamaicensis coturniculus) is classified "Rare" by the California Fish and Game Commission, but this secretive, little-known bird's true status in the state has always been difficult to assess. Most recently, Wilbur (1974) and Gill (1977) discussed the status of black rails and both concluded that records of singing birds in the spring and of immatures in late summer indicated the presence of breeding, or at least summering, individuals in the San Francisco Bay Area (see Appendix A for a review of historical records for northern California). Since 1974, Department of Fish and Game and interagency study teams have surveyed a number of sites in northern California to determine the breeding season status of black rails (Jurek 1975 and 1976). Black rails were located in spring and summer in Solano, Napa and San Joaquin counties (Jurek 1976 and DFG files). These findings prompted this study. Its purpose was to clarify the status of this species in northern and central California and to identify its habitat requirements. The study began March 25, 1977, and concluded July 14, 1977. It compliments studies in progress of black rail distribution in southern California by U. S. Fish and Wildlife Service (Endangered Wildlife Research, Ojai) and Bureau of Land Management (Riverside District Office).

METHODS

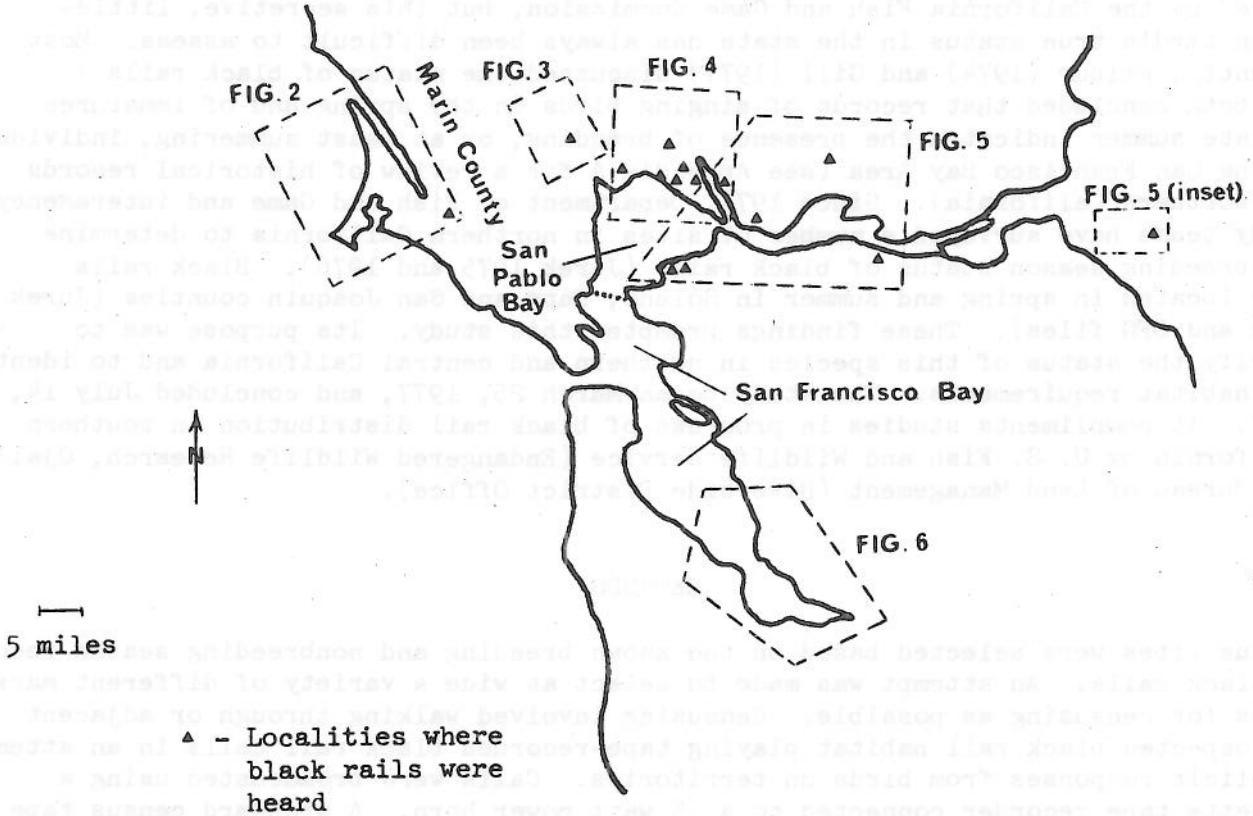
Census sites were selected based on the known breeding and nonbreeding season records of black rails. An attempt was made to select as wide a variety of different marsh types for censusing as possible. Censusing involved walking through or adjacent to suspected black rail habitat playing tape-recorded black rail calls in an attempt to elicit responses from birds on territories. Calls were broadcasted using a cassette tape recorder connected to a 15 watt power horn. A standard census tape, with alternating "grr" and "kic-kic-kerr" call sequences (see Results for a discussion of black rail vocalizations) separated by one minute pauses, was most frequently used, particularly during the first visit to a site. Information recorded for each site censused included: date; time; weather; habitat description; number and kind of responses; sightings of other species of special concern, including the salt marsh yellowthroat (Geothlypis trichas sinuosa); and other relevant data. The locations of vocalizing rails were plotted on photocopies of USGS topographic maps. A number of visits to representative Bay Area marshes were made during peak high tide periods in late May and June to view the effects of these tides on the habitat.

RESULTS

Distribution

A minimum of 32 black rails was heard in 14 localities in the northern San Francisco Bay Area and the Sacramento-San Joaquin River Delta (Table 1; Figures 1-5). Only one black rail was seen. Twenty-two (69 percent) of the birds found in this area were in marshes bordering San Pablo Bay or the river systems (Napa and Petaluma) that empty into San Pablo Bay from the north. No black rails were found in marshes bordering the Pacific Ocean (sites 37, 40 and 41) or in San Francisco Bay south of the Richmond-San Rafael Bridge (Figure 6). Two other areas in central California were surveyed for black rails. Seven black rails were heard in a census of Salicornia marshes bordering Morro Bay, San Luis Obispo County, on April 14 and 15 (Figure 7). Parts of Los Banos Wildlife Management Area, Merced County, were censused April 15, 16 and 17 with negative results. A more detailed analysis of black rail distribution is presented in Appendix A.

Figure 1. Locations where black rails were found in the San Francisco Bay Area and key to figures 2-7.



Habitat

Grinnell and Miller (1944) described the habitat preferred by black rails as "chiefly tidal salt marshes, where associated characteristically with heavy growths of pickleweed (Salicornia). But also occurs in brackish and fresh-water marshes." This description was confirmed by this study. Ninety-five percent (37 of 39 birds) of the black rails found were in marshes dominated by either Salicornia virginica or bulrush (Scirpus spp.), and 54 percent (7 of 13) of the birds in Scirpus-dominated marshes were in or near parts of the marsh where Salicornia virginica was present and fairly abundant. One bird was heard near Suisun City, Solano County, in an area where matted salt grass (Distichlis spicata) merged with a stand of cattails (Typha sp.) and Scirpus sp., and another bird was heard calling from a stand of Typha sp. in Olema Marsh, Marin County. Except for Olema Marsh, all marshes in which black rails were found are tidally influenced. Areas within these marshes where black rails were heard are near the upper limit of tidal flooding. A variety of marshes that are no longer under tidal influence were also checked (sites 16; 18; 19a, b and c; 20; 23; 31; 37 and 40), but no black rails responded at any of these sites. Censuses in marshes that are dominated by Scirpus spp. (sites 10, 19d, 21 and 36) or Salicornia virginica (sites 29, 20, 32, 33, 34a, 35, 38 and 39), but are frequently and/or extensively covered by high tides, also yielded negative results.

The salinity of marshes in which black rails were heard was not measured, but it no doubt varied considerably from very low (Olema Marsh, Marin County and White Slough, San Joaquin County) to rather high (San Pablo Bay marshes) levels. Salinity did not appear to be a factor effecting the distribution of black rails in the Bay area.

Calls

Wilbur (1974) summarized information on the calls of black rails. Vocalizations heard during this study included: 1) the song of this species, "kic-kic-kerr", and variations involving dropped or added "kics" (e.g., "kic-kic-kic-kerr"); 2) the "grr" call (a sequence of low, syncopated growling phrases), rattle-"grrs" (a "grr" sequence preceded by, ending in or including a rattle-like call) and rattles; 3) and single notes, sounding like "yip" or "kic" (like first part of song), occasionally given in a sequence ("kic-kic-kic-kic"). Except for occasional spontaneous songs, all calls were elicited by playing taped calls. The defensive nature of these calls, and the fact that they were usually used at close range (6-9 meters or 20-30 feet) indicated that they were probably expressions of territoriality.

Most (12 of 17) of the first responses to the standard census tape came within 30 minutes of the start of the census. Between April 4 and May 14, nine of 11 first responses were "grrs", and 10 of the first responses in this period came within 30 minutes of the starting time. Half (three of six) of the first responses between May 26 and July 5 were "kic-kic-kerrs", and required 30 minutes or more of census time to obtain.

Table 1

Sites censused for black rails in the San Francisco Bay Area, the Sacramento-San Joaquin River Delta, Merced County and Morro Bay. Location numbers (in parentheses) refer to location numbers mentioned in the text and figures.

Location	Marsh Type	Date	No. of Birds[1/]
Marin County			
(1) Kehoe Marsh	Scirpus, Juncus	4/5/77	-
		6/21/77	-
(2) Shield's Audubon Sanctuary, Inverness	Salicornia, Spartina	4/5/77	-
(3) Lower Olema Marsh	Typha, Scirpus, Salicornia, Distichlis	4/5/77	-
(4) Upper Olema Marsh	Typha, Juncus	4/5/77	1
		6/21/77	-
(5) Mouth of San Antonio Creek, south shore[2/]	Salicornia	5/4/77	4
Sonoma County			
(5) Mouth of San Antonio Creek, north shore	Salicornia	5/4/77	2
(6) Tolay Creek Marsh	Scirpus, Salicornia	4/4/77	2
		5/3/77	3
		5/26/77	-
Napa County			
(7) South Slough (part)	Scirpus, Salicornia	3/28/77	-
		4/27/77	-
(8) Napa Slough	Salicornia, Scirpus	5/2/77	1
(9) China Slough	Salicornia, Scirpus	5/2/77	-
(10) Fly Bay	Scirpus, Spartina	6/29/77	-
Solano County			
(7) South Slough (part)	Scirpus, Salicornia	3/28/77	-
		4/27/77	1
(11) Mouth of White Slough	Scirpus, Salicornia	3/28/77	1
		4/4/77	-
(12) North shore, San Pablo Bay	Salicornia	4/4/77	3
		4/27/77	2
		5/26/77	1
		6/29/77	3
(13) Mouth of South Slough	Scirpus, Salicornia	5/2/77	2-3
(14) Dutchman's Slough	Salicornia, Scirpus	4/27/77	-

1/ Unless otherwise noted, number estimates are based on call responses.

2/ One black rail was heard at Black Point on May 23, 1977, by Bob Stewart, Point Reyes Bird Observatory.

Location	Marsh Type	Date	No. of Birds
(15) Southampton Marsh (Benicia State Park)	Salicornia, Scirpus	3/25/77	3
		5/18/77 3/	2
		5/21/77 3/	2
		5/30/77 3/	3
		6/4/77 3/	1
		6/18/77 3/	1
		7/2/77 3/	3
(16) Cordelia (vicinity)	Salicornia	6/12/77	-
(17) Peytonia Slough Ecological Reserve	(a) Scirpus (mostly)	6/26/77	-
	(b) Mixed (Distichlis, Typha, Scirpus, Juncus Salicornia	7/5/77	1 4/
(18) Duck Slough	Distichlis, Scirpus, Juncus	7/5/77	-
(19) Joice Island (State Wildlife Area)	(a) Scirpus, Typha	5/16/77	-
	(b) Juncus, Salicornia	5/16/77	-
	(c) Salicornia	5/16/77	-
	(d) Scirpus	5/16/77	-
(20) Grizzly Island (State Wildlife Area)	(a) Scirpus, Juncus	4/21/77	-
	(b) Scirpus, Salicornia	4/21/77	-
	(c) Salicornia	4/21/77	-
San Joaquin County			
(21) Mandeville Point (County Park)	Scirpus, Typha	7/7/77	-
(22) White Slough, (headwaters)	Scirpus, Typha	4/1/77	-
		5/6/77	-
		5/29/77	3
		6/30/77	3
(23) Caldoni's Marsh	Scirpus, Juncus	4/1/77	-
		5/6/77	-
		5/29/77	-
Contra Costa County			
(24) Pinole	Salicornia	5/9/77	3
		5/14/77	3
		5/23/77	2
		6/28/77	2
		7/14/77	3
(25) Point Pinole (Regional Park)	Salicornia	6/16/77	1
(26) Martinez Marina	Salicornia, Scirpus	6/12/77	-
(27) Port Chicago (Naval Reservation)	Scirpus, Salicornia Juncus	6/11/77	-
(28) Mallard Island	Scirpus, Juncus, Distichlis, Typha	7/2/77	2-3 5/

3/ Censused by Mr. Frank Beyer.
4/ Immature black rail found dead in this vicinity on August 11, 1977 (DFG files).
5/ One black rail was accidentally flushed into view.

Location	Marsh Type	Date	No. of Birds
Alameda County			
(29) Dumbarton Point	Salicornia, Spartina	5/10/77	-
(30) Ideal Cement Marsh	Salicornia, Spartina	5/12/77	-
(31) Coyote Hills Regional Park	Scirpus, Typha, Salicornia	5/12/77	-
(32) Mowry Slough	Salicornia (mostly)	5/24/77	-
(33) Albrae Slough	Salicornia (mostly)	5/24/77	-
(34) San Leandro Bay	(a) Salicornia, Distichlis	6/14/77	-
Arrowhead Marsh	(b) Spartina, Salicornia	6/14/77	-
Santa Clara County			
(35) Palo Alto Baylands	Salicornia, Spartina	4/9/77	-
(36) Triangle Marsh	Scirpus, Salicornia	5/25/77	-
San Mateo County			
(37) Pescadero Marsh	Scirpus, Salicornia, Typha	4/8/77	-
		7/6/77	-
(38) Corkscrew Slough	Salicornia, Spartina	5/13/77	-
(39) Greco Island	Salicornia, Spartina	5/13/77	-
(40) San Gregorio	Salicornia, Scirpus, Distichlis	7/6/77	-
(41) Princeton	Salicornia, Typha, Scirpus, Juncus	7/6/77	-
Merced County			
Los Banos (Wildlife Management Area)	Scirpus, Typha, Juncus	4/15/77	-
		4/16/77	-
		4/17/77	-
San Luis Obispo County			
Morro Bay	Salicornia	4/14/77	2
		4/15/77	5

DISCUSSION

Post and Enders (1969) hypothesized that black rails find tidal marshes more attractive than diked marshes with similar vegetation possibly because of higher food resource levels in tidal marshes. Little is known about black rail food habits (Wilbur 1974), but they seem to feed on arthropods (Huey 1916). The variety and abundance of arthropods in a marsh are probably affected considerably by the quantity, quality and the nature of fluctuations in the level of water in the marsh. Black rails found in this study were often in the immediate vicinity of tidal sloughs, indicating a concentration of activity in this part of the marsh. This suggests that the intertidal zone is an important part of the habitat of this species.

The frequent association of black rails with pickleweed is possibly a reflection of their preference for high, infrequently flooded marshes, but the importance of pickleweed, and possibly salt grass, as sources of nesting materials and substrates remains to be examined.

The fact that black rails were not found in San Francisco Bay proper may reflect the lack of high marsh habitat around this bay. Many areas of salt marsh in south San Francisco Bay have subsided in the past quarter-century because of human removal of water from underground water supplies (Conradson 1966), and large tracts of low-lying salt marsh in this region abut abruptly against salt pond dikes and other man-made structures, instead of gradually merging into upland habitats as they formerly did. Nearly all the remaining salt marsh in the south bay is completely covered by peak high tides, and often extensively flooded by even moderately high tides (fide San Francisco Bay National Wildlife Refuge personnel and personal observations).

In a census of marshes along the lower Colorado River, Repking and Ohmart (1974) found black rail distribution patterns similar to that observed in this study. They found black rails in high (damp ground and shallow water) marshes with little annual and/or daily fluctuations in water levels, but not in low, deep-water marshes or marshes with considerable annual and/or daily fluctuations in water levels. Ingersoll (1909), Huey (1916) and Stephens (1919) found evidence of profound effects by high tides on black rail populations, and Grinnell and Miller (1944) felt that the "most important hazards to existence [of black rails] on salt marshes appear to be extra high tides". The presence or absence of suitable high marsh vegetation for nesting may be the most limiting factor in determining the distribution of breeding black rails.

This study was conducted during a period of severe drought in northern California. A major effect of the drought has been an increase in salinity levels throughout the Bay Area and the Sacramento-San Joaquin Delta. To determine what effect this may have had, or will have, on black rail distribution and population levels will require further monitoring of this species in the region.

Nesting has not yet been confirmed in this northern end of the subspecies' range (Wilbur 1974). No nests were found in this survey, although the effort to find nests was limited to only one brief search at a marsh in Pinole on June 14. However, at eight sites (sites 5, 6, 12, 13, 15, 22, 24 and 28), the presence of two or more calling birds during the census period highly suggests that these are breeding birds. The habitat preference observed in tidal marshes in this study is also consistent with known nesting distribution in other tidal areas. Furthermore, the extensive amount of territorial calling heard during this survey also is indicative of breeding.

While this survey found black rails in many marshes in the San Francisco Bay Area, most of the bay marshes that may have summer populations of black rails have yet to be censused. Much more survey work will be required to accurately estimate the sizes of black rail populations in the San Francisco Bay estuary (see Appendix A for future survey recommendations).

Analysis of data on responses obtained in this study indicates that April and May, and perhaps March, are the best months to attempt to elicit responses from territorial black rails. In this period, censusers could expect to obtain responses within an hour of the beginning of the census if black rails are present.

CONCLUSIONS

This study confirms the existence of a summering, and probably breeding, population of California black rails in the San Francisco Bay Region. Also, the study has provided some insight into the habitat requirements of this species. It suggests that tidal or riparian marshes in which the annual and daily cycles of water flow are not subject to extreme fluctuations are suitable for breeding, but that diked marshes usually are not. It also confirms the preference of black rails for high marsh habitat at the upper limits of flood tides.

Effective management programs to preserve suitable nesting habitat for black rails must depend on a better understanding of the interrelationships between this species and other elements, living and nonliving, of the marsh community.

ACKNOWLEDGMENTS

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My special thanks to anyone I may have failed to mention but who helped in anyway.

LITERATURE CITED

Conradson, D. R. 1966. Exploring our baylands. The Palo Alto Chamber of Commerce, Palo Alto. 60 pp.

Gill, R. Jr. 1977. Breeding avifauna of the South San Francisco Bay estuary. Western Birds, 8:1-12.

Grinnell, J. G., and M. W. Wythe. 1927. Directory to the bird-life of the San Francisco Bay Region. Pac. Coast Avif. No. 18.

Grinnell, J. G., and A. H. Miller. 1944. Distribution of the birds of California. Pac. Coast Avif. No. 27.

Huey, L. M. 1916. The Farallon rail of San Diego County. Condor 18:58-62.

Ingersoll, A. M. 1909. The only known breeding ground of Creciscus coturniculus. Condor 11:123-127.

Jurek, R. M. 1975. California black rail survey. Proj. No. W-54-R-7, Job I-1.3. Job Progress Report. California Department of Fish and Game, Nongame Wildlife Investigations. 2 pp.

Jurek, R. M. 1976. California black rail survey. Proj. No. W-54-R-8, Job I-1.3. Job Progress Report. California Department of Fish and Game, Nongame Wildlife Investigations. 3 pp.

Post, W., and F. Enders. 1969. Reappearance of the black rail on Long Island. Kingbird 19:189-191.

Repking, C. F., and R. D. Ohmart. 1974. Density and distribution of the black rail (Laterallus jamaicensis) along the lower Colorado River...U.S. Fish and Wildlife Service, Contract No. 7625-15-18, Completion Report (February 22, 1974). 13 pp.

Stephens, F. 1919. Random notes. Condor 21:123-124.

Wilbur, S. R. 1974. The literature of the California black rail. U.S. Fish and Wildlife Service, Spec. Sci. Report---Wildlife No. 179. Washington, D. C. 17 pp.

Figure 2. Point Reyes Peninsula, Marin County records of black rails. Numbers in parentheses refer to location numbers in Table 1.

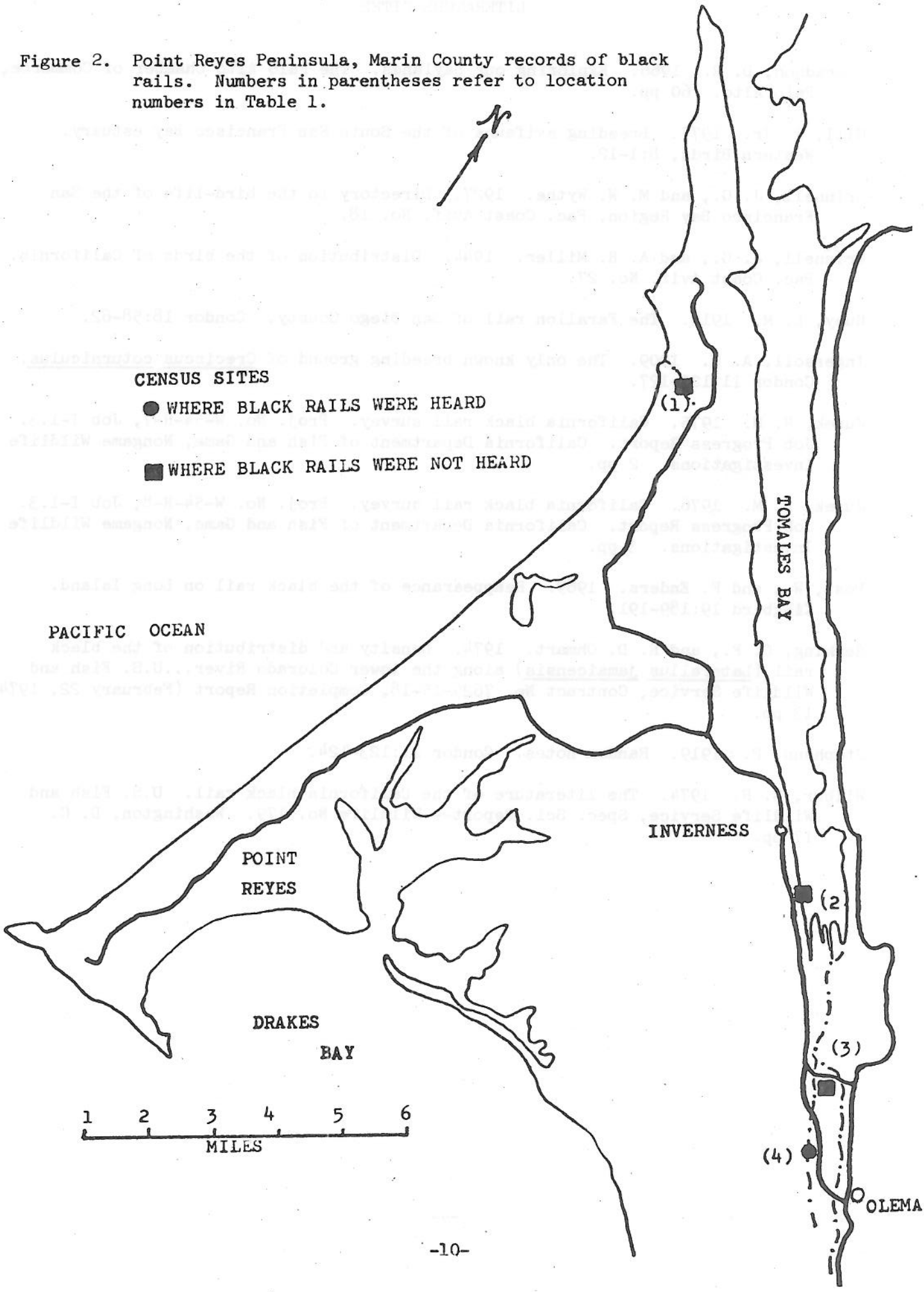


Figure 3. Petaluma Marsh black rail records. Numbers in parentheses refer to location numbers in Table 1.

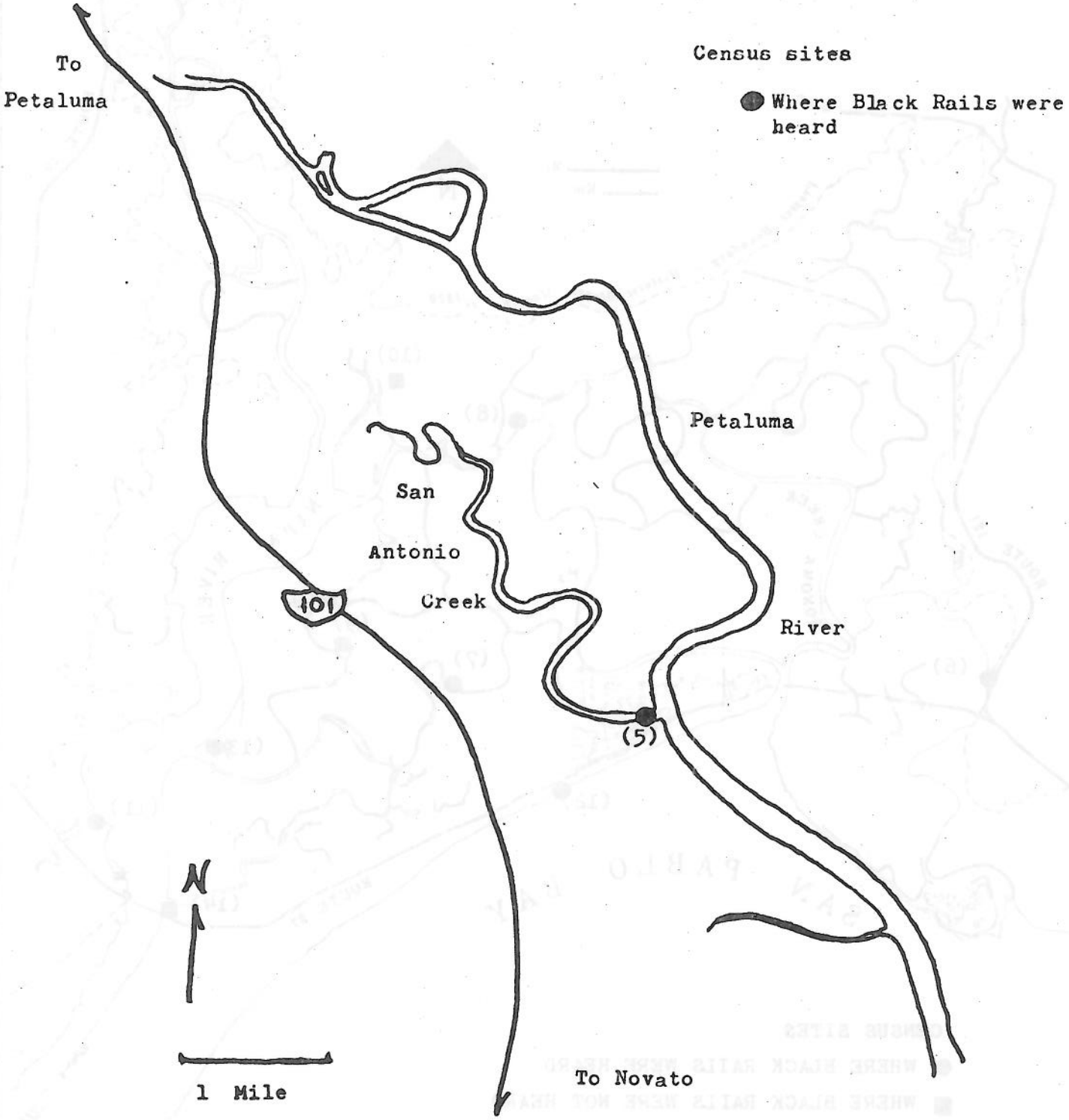


Figure 4. Napa Marsh records of black rails. Numbers in parentheses refer to location numbers in Table 1.

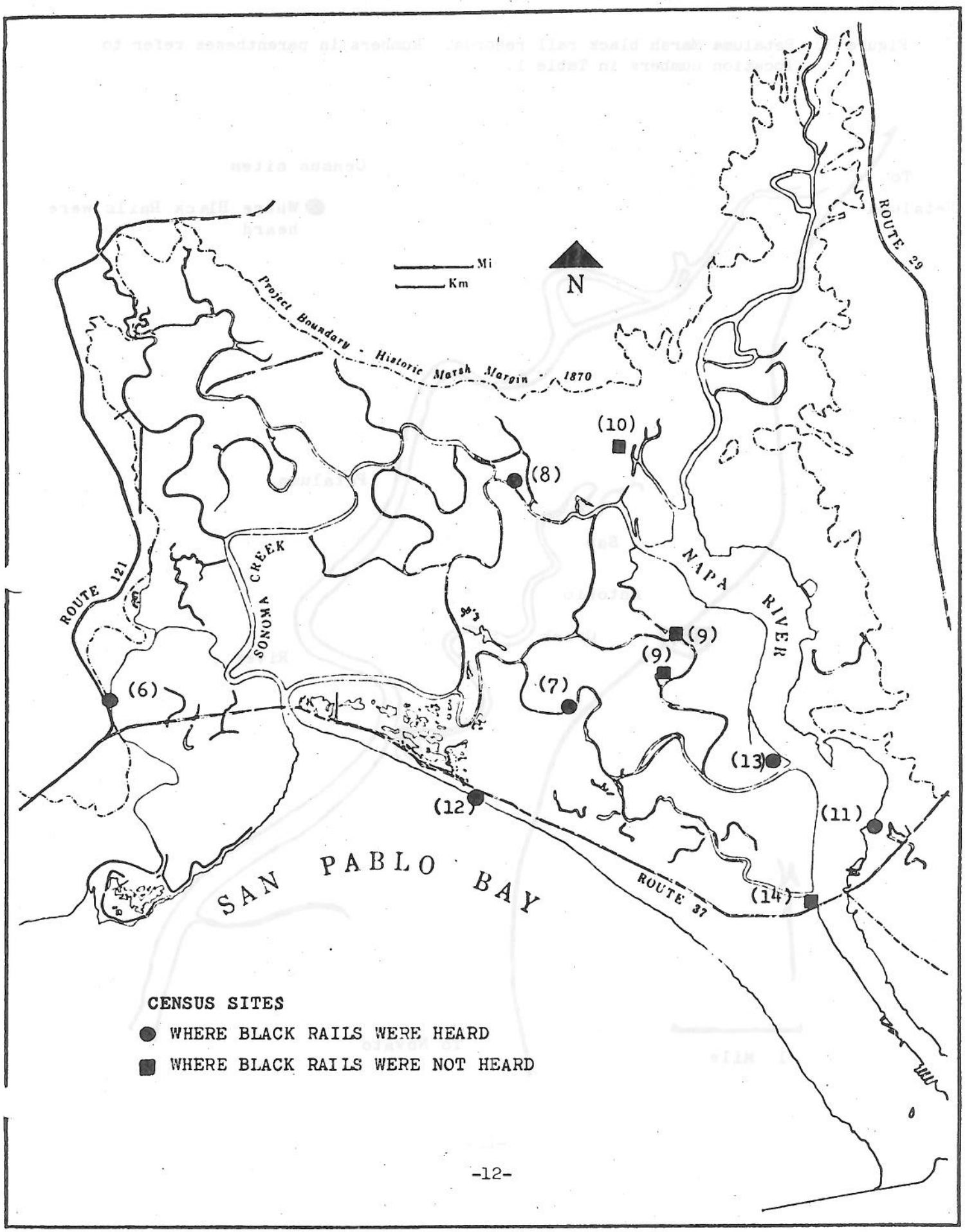
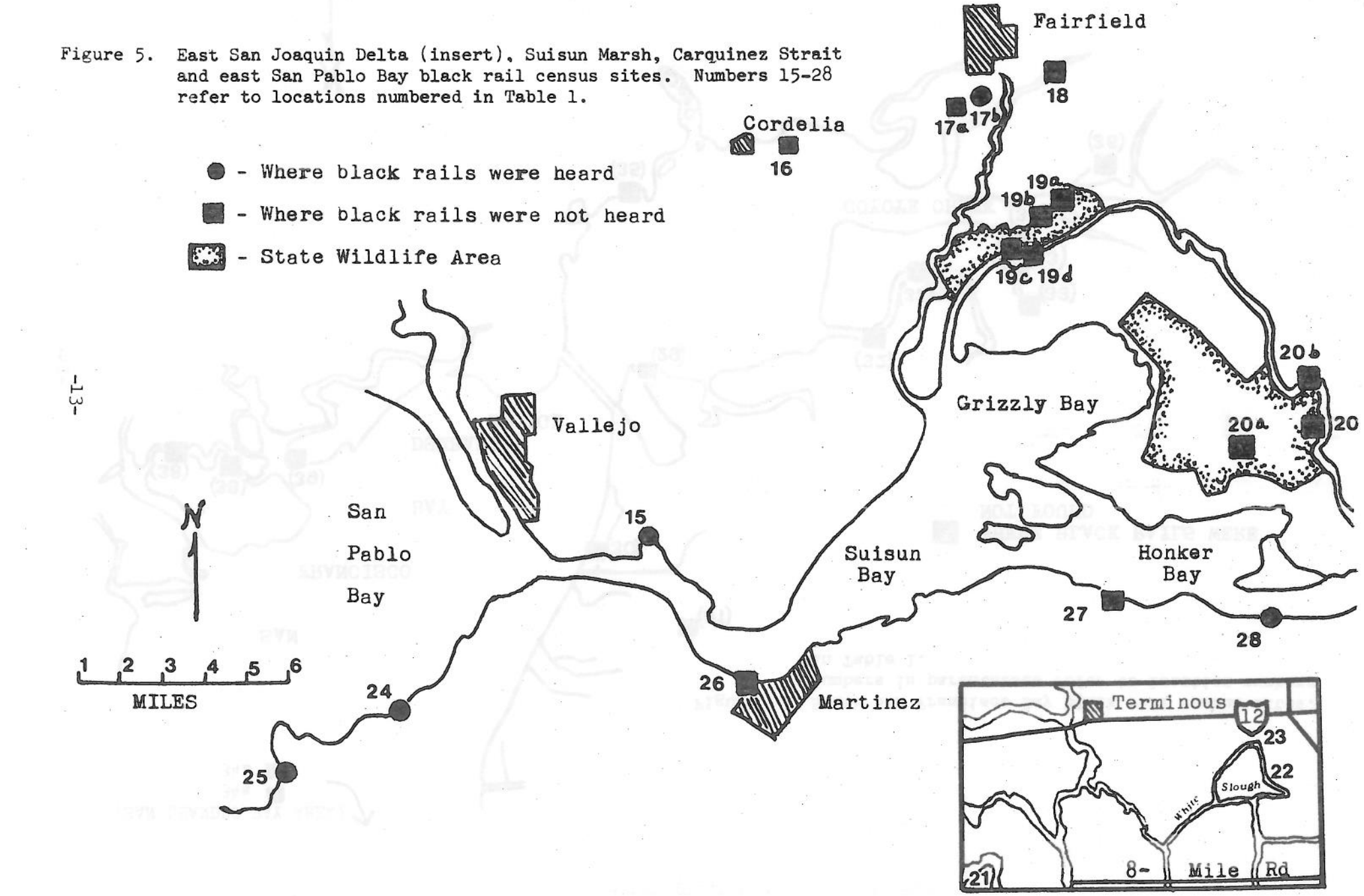


Figure 5. East San Joaquin Delta (insert), Suisun Marsh, Carquinez Strait and east San Pablo Bay black rail census sites. Numbers 15-28 refer to locations numbered in Table 1.



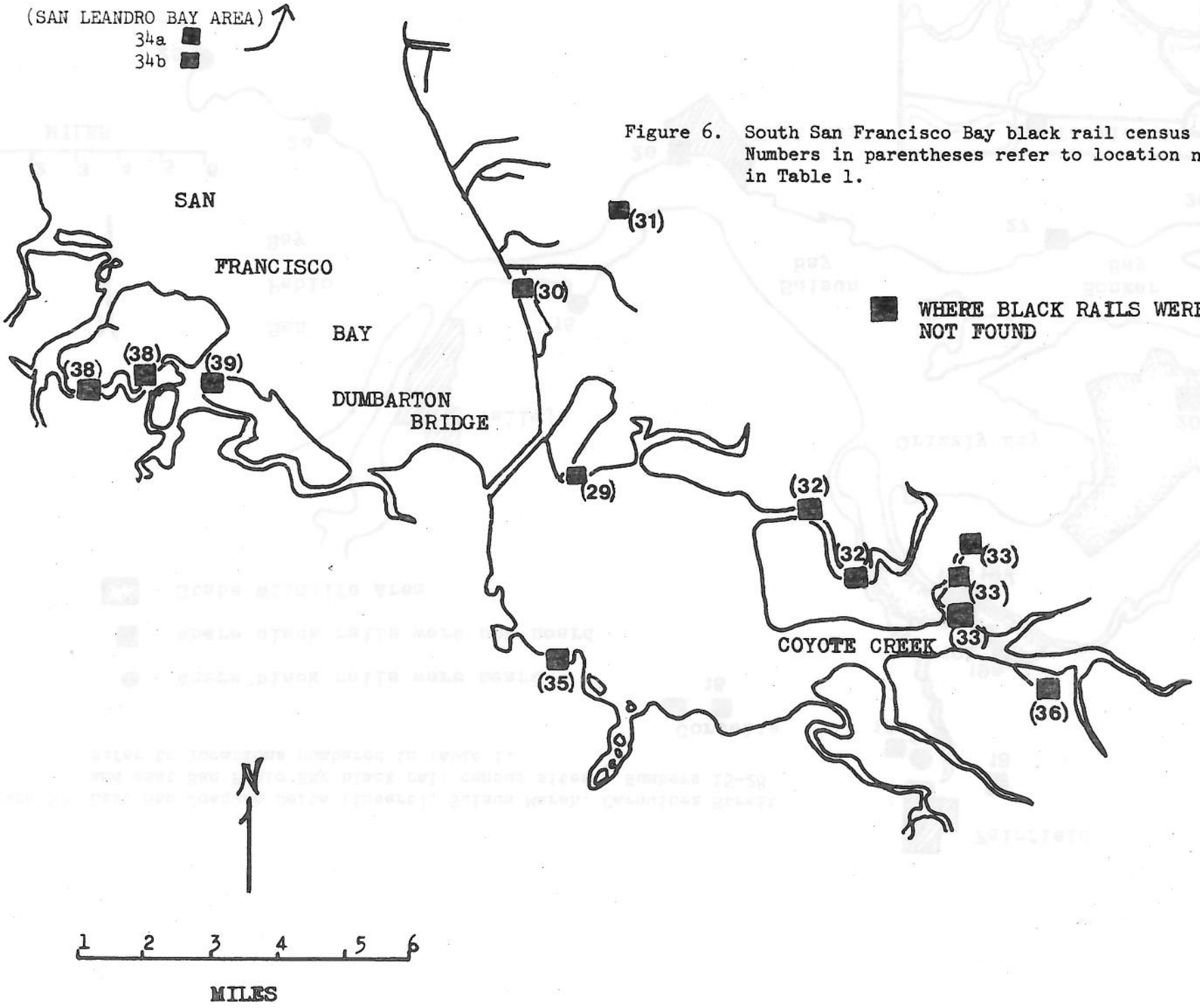


Figure 6. South San Francisco Bay black rail census sites. Numbers in parentheses refer to location numbers in Table 1.

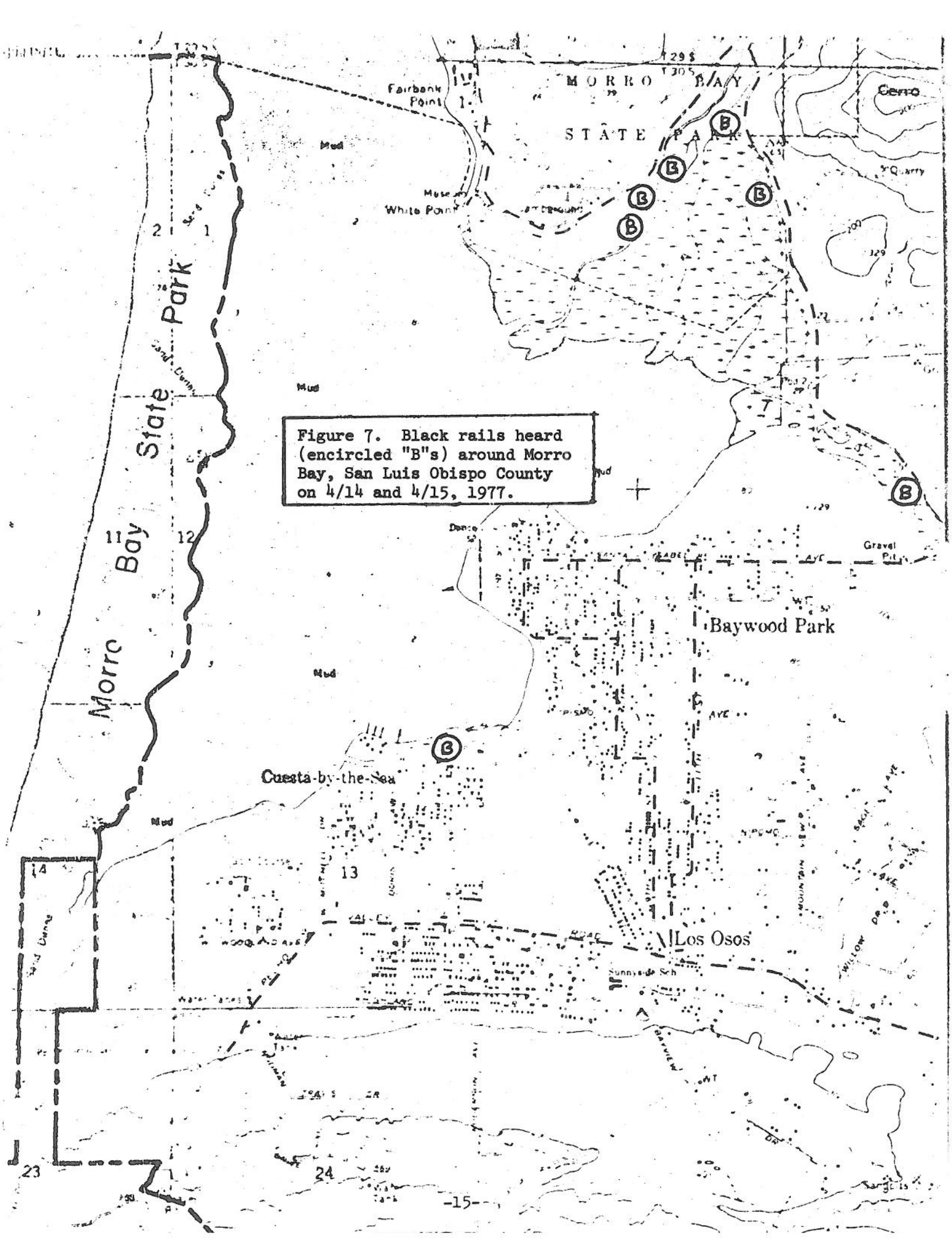


Figure 7. Black rails heard (encircled "B"s) around Morro Bay, San Luis Obispo County on 4/14 and 4/15, 1977.

APPENDIX A

REVIEW OF THE DISTRIBUTION OF BLACK RAILS IN NORTHERN AND CENTRAL CALIFORNIA.

This review is based on information from the following sources: Wilbur (1974); specimens in the Museum of Vertebrate Zoology (MVZ), Berkeley, and the California Academy of Sciences (CAS), San Francisco; the files of the Middle Pacific Coast regional editor of American Birds (AB); and information obtained in Department of Fish and Game studies and compiled in the Department's California black rail files in Sacramento (DFG).

TOMALES BAY AND WESTERN MARIN COUNTY

Specimens of black rails were frequently collected during high flood tides in the fall and winter (September-February) in salt marshes on the edge of Tomales Bay near Marshall and Point Reyes Station, Marin County, from 1897 to at least 1940 (Wilbur 1974; MVZ and CAS). In the period between 1965 and 1967, at least one pair inhabitated a small brackish marsh along the bay near Inverness, Marin County, and probably bred (Gerald Brady, pers. comm.), but they have not been seen there since. One bird was observed in pickleweed near the head of the bay during a flood tide on February 5, 1974 (DFG). Salt marshes around Tomales Bay, not checked in this study, may yet harbor nesting black rails and should be surveyed in the future.

Elsewhere in western Marin County, black rails have been collected or observed at Kehoe Marsh on Point Reyes and in Olema Marsh between October and February. Black rails have been heard in Olema Marsh in April and May of recent years, and it is possible that they breed at this location (AB and DFG). A specimen of black rail from Elk Valley, Marin County, March 13, 1945 (MVZ), is probably a migrant or a nonbreeding wanderer.

PETALUMA MARSHES

No records from these marshes existed prior to this study. The six birds found at the mouth of San Antonio Creek, Marin and Sonoma counties, indicate a potentially large, unknown population in these marshes, and further surveying is strongly recommended.

SAN PABLO BAY

Prior to the 1970's, there seem to have been no records of black rails for marshes around this bay. One was seen at Pinole, Contra Costa County, November 19, 1975; five were seen at the mouth of Gallinas Creek, Marin County, December 11, 1973 and one was seen there on January 7, 1974; and one was seen and heard at Midshipman's Point, Tubbs Is., Sonoma County on February 14 and 26, 1977 (DFG).

Black rails were found along the northeast shoreline of San Pablo Bay, Solano County, and at Pinole and Point Pinole, Contra Costa County, during this study. Further survey work in the fairly extensive marshes around the bay seems warranted, as much of it appears to be suitable for black rails.

NAPA MARSHES

There appear to be no records for black rails in these marshes prior to 1976; two responses to taped calls were obtained by Department of Fish and Game employees near Fagan Slough, Napa County, on July 14 that year. In this study, black rails were found at five localities in the Napa marshes (Tolay Creek, Sonoma County; Napa Slough, Napa County; two spots along South Slough, Solano County; and the mouth of White Slough, Solano County, and further surveying for black rails in this area seems warranted.

SOUTHAMPTON MARSH (BENICIA STATE PARK)

Two were observed in this marsh on April 2, 1958, and in the early 1970's this marsh was "discovered" as a good place to observe black rails during high winter tides: a number of records for December through February (AB and DFG). One was heard in the marsh on May 22, 1975 (AB), and single calling birds were heard June 2 and 26, 1976 (DFG files). During frequent censusing of this marsh in summer 1977, Mr. Frank Beyer heard as many as three birds at once, and he estimated four pairs inhabitated this marsh. A black rail, probably a migrant, was found dead in Benicia, Solano County, July 18, 1941 (Wilbur 1974).

SAN FRANCISCO BAY

A good number of fall and winter (October through February) specimens of black rail were collected in a variety of San Francisco Bay localities (Alameda, Bay Farm Island and Newark, Alameda County; Alviso and Palo Alto, Santa Clara County; and Redwood City, San Mateo County) between 1892 and 1913 (Wilbur 1974; CAS and MVZ). Sight records in the years since then for the southern part of the bay have been in approximately the same areas in the same months. There are two specimens for Palo Alto on May 24, 1930 (CAS); one was seen along Belmont Slough, San Mateo County, in August 1972 (Barry Sauppe, pers. comm.); and one was seen August 7, 1958, at Dumbarton Point, Alameda County (AB). Black rails were not found in the south bay in this study, and it seems unlikely that the species nests in this region because of the lack of suitable habitat (high marsh). There are two specimens from north San Francisco Bay, both in Marin County; one found dead near Manzanita, August 11, 1929 (MVZ), and one from Kentfield, February 8, 1932 (CAS). While high marsh habitat in this part of Marin County has been greatly reduced since the time of these records, remaining salt marsh in this area is probably worth surveying in the future.

A number of records exist of black rails found away from tidal marshes in the San Francisco Bay Region. Most of them are for late summer or fall and indicate a tendency for individuals of this species to wander after the breeding season. Other than records already mentioned above, these records are as follows:

Location	County	Number of Black Rails	Date	Source
S.E. Farallon Is.	San Francisco	1	November 7, 1903	MVZ
S.E. Farallon Is.	San Francisco	1	June 1905	CAS
S.E. Farallon Is.	San Francisco	1	December 1909	MVZ
Merced Lake	San Francisco	1	September 20, 1931	Wilbur 1974
Merced Lake	San Francisco	1	October 16, 1932	Wilbur 1974
Merced Lake	San Francisco	1	October 16, 1937	Wilbur 1974
San Francisco	San Francisco	1	February 14, 1942	MVZ
Golden Gate Park	San Francisco	1	April 2, 1945	Wilbur 1974
San Francisco	San Francisco	1	August 8, 1945	CAS
Berkeley	Alameda	1	August 23, 1922	Wilbur 1974
Near Niles and Centerville	Alameda	1	September 21, 1949	MVZ

SUISUN MARSHES AND NORTHERN CONTRA COSTA COUNTY

Specimens of black rail were collected in the Suisun Marshes September 11, 1913; October 19, 1910; and January 15, 1911 (MVZ). Individuals were seen on December 13, 1975, and December 29, 1976, near Cutoff Slough, Solano County, and on December 28, 1974 near Suisun Slough, Solano County (DFG). There is an old winter record for Martinez, Contra Costa County (Grinnell and Wythe 1927), and recent (1975 and 1976) winter sightings near Port Chicago, Contra Costa County (DFG). During this survey, black rails were found near Suisun City, Solano County (1 bird[1/]), and on Mallard Island, Contra Costa County (two or three birds). Much of the Suisun Marsh is diked, and apparently unsuitable for nesting black rails, but tidal marshes still left in this area should be checked further for this species.

SACRAMENTO-SAN JOAQUIN RIVER DELTA

There is a late 19th century record for Stockton; one rail was found dead near there on August 26, 1959 (Wilbur 1974). Fish and Game personnel first discovered black rails calling, in response to taped calls, at White Slough Marsh, San Joaquin County, in the summer of 1974, and they have been heard in this marsh every year since. While such habitat is now fairly rare there, black rails should be looked for elsewhere in the delta where high tidal marsh occurs.

CENTRAL VALLEY

One record exists for the Central Valley; one was found dead at Gray Lodge Wildlife Management Area, Butte County, in March 1962. This was most likely a vagrant. Department surveys for black rail at Sacramento National Wildlife Refuge, Glenn County, at Gray Lodge, and at Los Banos Wildlife Area, Merced County, have all yielded negative results in recent years.

MONTEREY BAY

Black rails have been collected twice at Santa Cruz, Santa Cruz County: July 19, 1930, and August 25, 1941 (MVZ), and one was found dead there in September 1903 (Wilbur 1974). These records probably pertain to post-breeding wanderers or fall migrants. Marshes along Elkhorn Slough, Monterey County, should be checked in the future for breeding black rails.

MORRO BAY

A black rail was collected in Morro Bay on April 22, 1961, one was found dead there on December 18, 1972, and one was seen there November 30, 1968 (DFG). Seven black rails were heard in marshes around Morro Bay during this study, and the evidence points to a resident population of this species at Morro Bay.

1/ See footnote "4/" on Table 1.