

State of California

Department of Fish and Game

San Francisco Bay Region

Salt Marsh Song Sparrow Survey, 1974 ^{1/}

by

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ABSTRACT

A survey of three endemic, non-migratory races of the Song Sparrow (Melospiza melodia) was conducted in the San Francisco Bay region during 1974. The purposes were to determine density in breeding habitat, range and status of each race. The Alameda Song Sparrow (M. m. pusillula) of San Francisco Bay has shown the greatest decrease in range and density. The Samuel's Song Sparrow (M. m. samuelis) of San Pablo Bay has also shown a decrease in range and density. The Suisun Song Sparrow (M. m. maxillaris) of Suisun Bay has decreased in some areas but still occupies a large portion of its original range. Declines reported are due to loss of habitat due to urbanization. Density of nesting pairs was determined for several situations representative of the current habitat being utilized by each race. These densities ranged from 2.4 pairs per acre in an urbanized area to 16.6 pairs per acre in an undisturbed salt marsh.

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RECOMMENDATIONS

Information obtained during this survey prompted the following recommendations for the conservation and management of the three endemic, non-migratory races of song sparrows in the San Francisco Bay region:

1. A complete sequence of aerial photographs be taken of all fresh, brackish and salt marshes at low tide from the correct altitude to enable preparation of detailed vegetation maps of the region. This would enable accurate determination of ranges and densities of song sparrows.
2. Emphasize conservation and enhancement of native habitat in the San Francisco Bay region.
3. Continue delineation and evaluation of marshes in the San Francisco Bay region periodically to inventory habitat available to endemic species.
4. Incorporate studies and management of song sparrows in the programs of the San Francisco Bay National Wildlife Refuge.
5. Subject areas of now dry marshland to daily tidal flow to increase available habitat.
6. Restore a fresh water bayward interface wherever possible to promote and increase brackish habitat.
7. Continue evaluation and survey of San Pablo and San Francisco Bay populations to determine if these populations are threatened with extinction.

INTRODUCTION

The Song Sparrow (Melospiza melodia) is a familiar inhabitant of moist plant communities where it is found in dense, highly territorial, populations (Rico 1937). Four races breed in the San Francisco Bay region. The Marin Song Sparrow (M. m. gouldii) is an inhabitant of upland freshwater plant communities. The Alameda Song Sparrow (M. m. pusillulu) is the endemic race of San Francisco Bay. The Samuel's Song Sparrow (M. m. samuelis) is the endemic race of San Pablo Bay. The Suisun Song Sparrow (M. m. maxillaris) is the endemic race of Suisun Bay (Grinnel 1909, Marshall 1948, Gill 1971).

The three endemic, salt marsh races are non-migratory and breed in areas along the edge of bays and streams where tidal flow affects the vegetation (Johnston 1956). Historically the bays were surrounded by vast marshes which graduated from salt marsh to brackish marsh to riparian growth along freshwater streams (Marshall 1948). The three races have suffered a loss of habitat and have disappeared from part of their former range. Song sparrows are limited to isolated groups of individuals in much of the remainder of their range (Gill, Mewaldt, Cogswell pers. comm.).

The ecology and taxonomy of the three endemic races have been studied by Marshall (1948) and Johnston (1956). The populations of song sparrows in the San Francisco Bay region have been altered by man's urbanization of marsh habitat since the studies of Johnston. This alteration and lack of current information has created the need for a survey of the affect of the alteration on density and range of these possibly threatened races of song sparrows.

SCOPE AND PURPOSE

This survey was conducted to determine the density in breeding habitat, range and status of each race of song sparrow breeding in the bay marches of the San Francisco Bay region. Also involved in the eight-month survey is a search for the factors which affect the densities and ranges of each race. This survey will continue until September 1975.

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METHODS

This survey was conducted between February and October of 1974 and will continue until September of 1975. Whenever possible the fieldwork coincided with the period of high-tide for that particular day. Observations were made with Bushnell 7X binoculars and a 15X spotting scope. United States Geological Survey topographical maps and aerial photographs were used to calculate acreage and distance.

Maps, knowledgeable people and literature were consulted to locate suitable habitat and delineate ranges for each race. An aerial survey was made to locate additional areas of use by song sparrows. An attempt was made to visit all areas of suitable habitat in the San Francisco Bay region.

Song sparrows are distributed linearly along tidal sloughs where singing males were counted as the author walked. Several counts were made in each area. Methods of Johnston (1956) were used to calculate density in breeding habitat. Ranges described by Marshall (1948) and Johnston (1956) were re-examined and compared with 1974 results.

RESULTS

Density in Breeding Habitat

Song sparrows breed in areas along the edge of bays and streams where tidal flow affects the vegetation. Variation in density was observed in three forms: 1) variation due to differences in types of breeding habitat, 2) variation due to different complexities of marsh vegetation, and 3) variation due to alteration of marsh habitat by man's urbanization. Distance and density per acre were derived for various habitats (Table 1).

TABLE 1

Variation in breeding density

Type of Breeding Habitat	Race	Distance Between Pairs	Density (Pairs/Acre)
Salt marsh	<u>pusillula</u>	30-60	16.6-8.3
	<u>samuelis</u>	45-75	11.1-6.7
Brackish marsh	<u>maxillaris</u>	45-80	11.1-6.3
	<u>samuelis</u>	50-7.5	10.0-6.7
Salt marsh (altered)	<u>pusillula</u>	60-120	8.3-4.0
Brackish marsh (altered)	<u>maxillaris</u>	60-130	8.3-3.7
	<u>samuelis</u>	70-130	8.7-3.7
Salt marsh (altered)	<u>samuelis</u>	90-110	5.3-4.3
Urbanized fringe	<u>pusillula</u>	100-200	4.8-2.4

Variation due to differences in types of breeding habitat is attributed to differences in types of vegetation. Salicornia-Grindelia associations within the salt marsh community contain maximum densities of song sparrows with 16.6 to 8.3 pairs per acre. Brackish marsh associations of Scirpus are found to contain a lesser density with 11.1 to 6.3 pairs per acre.

Variation due to different complexities of marsh vegetation cause the observed ranges in distance between pairs. Density within salt marsh populations range from 16.6 to 6.7 pairs per acre due to variation in number of sloughs per acre or height of marsh vegetation. Brackish marshes contain populations ranging from 11.1 to 6.7 pairs per acre depending on the width and height of brackish vegetation.

Limited alteration causes reduced densities. This is attributed to diking or filling of portions of the marshes but not reduction to fringe. Reduction in the number of sloughs per acre or narrowed vegetation results. Altered salt marsh areas contain densities ranging from 8.3 to 4.0 pairs per acre. Altered brackish marshes contain 8.3 to 3.7 pairs per acre.

Complete alteration of marsh habitat by man involves landfilling, salt pond construction and diking and dredging of sloughs. These cause long, narrow fringe vegetation which contain only 4.8 to 2.4 pairs per acre.

Populations vary each year but may be compared over a period of several years if marshes are not altered (Johnston 1956). Comparison of densities calculated in 1974 with those of Johnston (1956) and Gill (1971) show comparable populations in areas where vegetation has not been altered (Table 2).

TABLE 2

Comparison of densities of 1974 with Johnston (1951-1955) and Gill (1971)

Salt Marsh Habitat

<u>Race</u>	<u>Location</u>	Census <u>Length</u> (yards)	<u>Size</u> (acres)	<u>Number</u> <u>Pairs</u>	<u>Density</u> (pairs/acre)	<u>Author</u>
<u>pusillula</u>	Mud Slough	666	1.4	11	7.9	Gill
"	"	833	1.7	7	4.0	Gill
"	"	700	1.4	13	8.1	Walton
<u>pusillula</u>	Mowry Slgh.	733	1.4	13	8.7	Gill
"	"	825	1.7	16	9.4	Walton
<u>pusillula</u>	Triangle M.	1000	2.0	20	10.0	Gill
"	"	900	1.8	18	10.0	Walton
<u>samuelis</u>	San Pablo	1020	2.1	22	10.5	Johnston
"	"	1191	2.5	24	9.7	Johnston
"	"	800	1.6	17	10.4	Johnston
"	"	1493	3.0	25	8.2	Johnston
"	"	700	1.4	8	8.0	Walton
"	"	800	1.6	10	7.6	Walton

Brackish Marsh Habitat

<u>samuelis</u>	Napa River	1650	3.4	28	8.2	Johnston
"	"	1200	2.5	14	5.6	Walton
<u>maxillaris</u>	Cordelia S.	3000	6.1	42	6.9	Johnston.
"	"	1200	2.5	16	6.4	Walton
<u>maxillaris</u>	Southampton	1800	3.7	30	8.1	Johnston
"	"	800	1.6	13	8.1	Walton
<u>maxillaris</u>	Pittsburg	800	1.6	12	7.5	Johnston
"	"	400	0.8	5	6.2	Walton

Range

The Alemeda Song Sparrow (M. m. pusillula) ranged from Stege, Emeryville and San Leandro Bay, where only a few individuals were found, south to Coyote Creek and west to Belmont Slough. Much of the population inhabited fringe vegetation although a few concentrations occurred at Bair Island, Greco Island, Palo Alto Baylands, Mewry Slough, Dumbarton Point and Alemeda Creek (Figure 1).

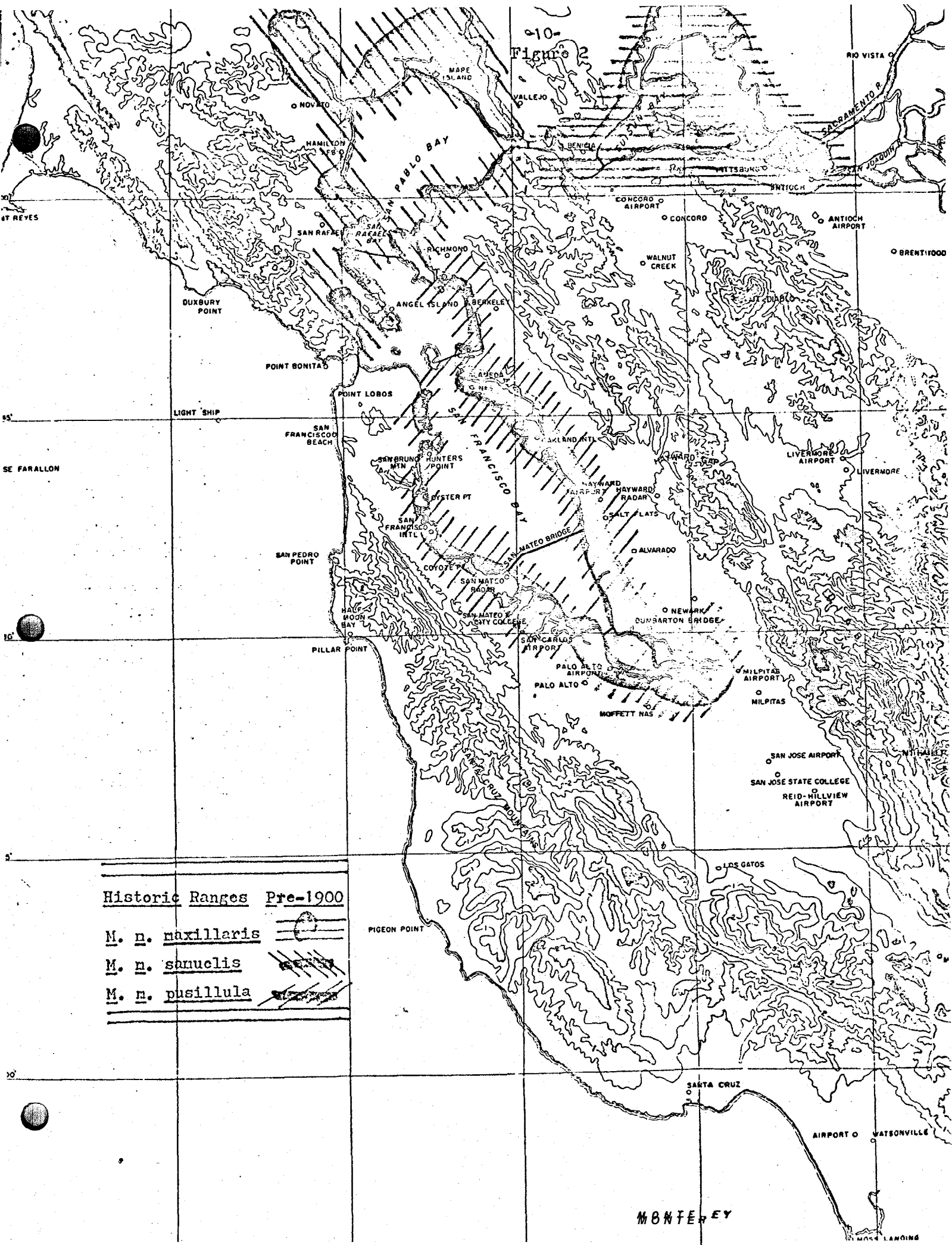
The Samuel's Song Sparrow (M. m. samuelis) ranged from Mill Valley, Corte Madera, Richmond and Pinole in the south, where only a few individuals were found, to large populations at Gallinas Creek, northern San Pablo Bayshore, and extensive marshes of the Napa, Sonoma and Petaluma Rivers (Figure 1).

The Suisun Song Sparrow (M. m. maxillaris) ranged from Southhampton Bay in the west, throughout the marshes of Goodyear, Cordelia, Monezuma and Grizzly Sloughs in the north to the junction of the San Joaquin and Sacramento Rivers in the east. The southern portion of the population ranged from Avon east to Pittsburg and Antioch (Figure 1).

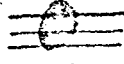
Historically the ranges of these three races approached the present geographical limits. The most notable restriction of range occurs in the San Francisco Bay population. Other areas contain far less acreage of breeding habitat than was encompassed in original ranges (Figure 2).

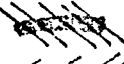
Song sparrows are found in specific portions of a marsh. They are not evenly distributed over entire salt or brackish marshes but are linearly distributed along the dendritic network of drainage sloughs. They breed at elevations slightly above mean high tide level for spring tides. In salt marshes this is most often in the Salicornia-Grindelia zone (Figure 3). In brackish marshes song sparrows breed in Scirpus zones (Figure 4). Areas which are constantly dry or flooded are avoided.

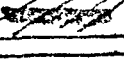
Figure 2



Historic Ranges Pre-1900

M. n. maxillaris 

M. n. sanuclis 

M. n. pusillula 

MONTREY

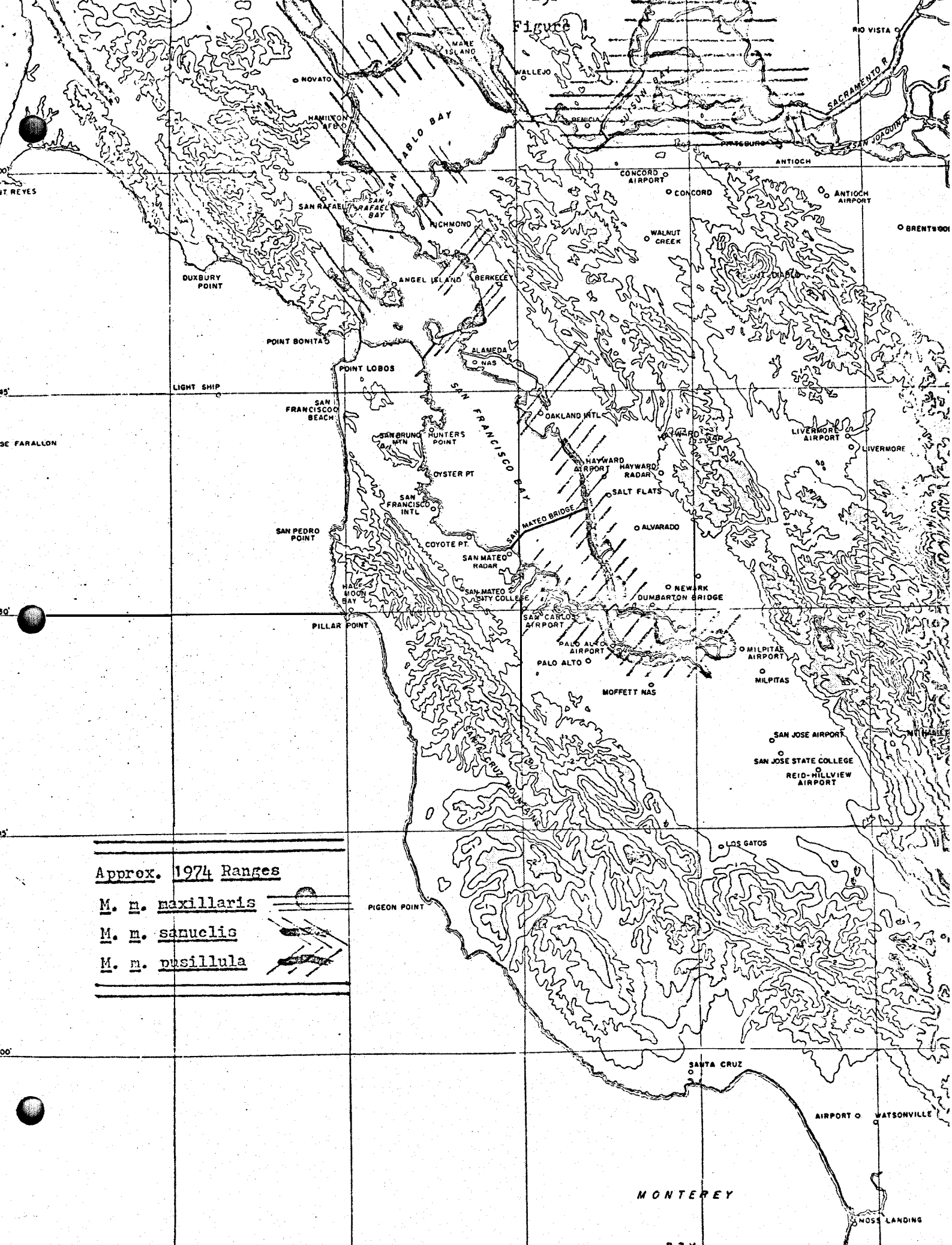
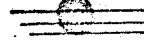




Figura 1

Approx. 1974 Ranges

- M. m. maxillaris 
- M. m. sanuelis 
- M. m. pusillula 

PIGEON POINT

MONTEREY

AIRPORT WATSONVILLE

MOSS LANDING

Status

The productivity and density were comparable to past figures established by Johnston (1956) and Gill (1971) in areas where habitat was not altered. There has been a great loss in numbers of total individuals due to loss of suitable habitat for breeding. Density has decreased in areas where habitat was altered.

The Alameda Song Sparrow (M. m. pusillula) has been affected by urbanization throughout its range. The salinity of this area has gradually increased due to diversion of freshwater streams. Only limited areas of brackish marsh remain. Salt marshes have been largely filled or converted to salt ponds. Few remaining areas of complex salt marsh exist. Management of remaining salt marsh by the San Francisco Bay National Wildlife Refuge is needed to insure future habitat for this race.

The Samuel's Song Sparrow (M. m. samuelis) has been affected by urbanization in the southern portion of its range. In this area the vulnerable salt marshes have been filled and much of the remaining vegetation occurs in long strips along dikes. Small remnant populations in these areas rely on upland vegetation. In the northern portion of the range in the extensive Petaluma, Napa and Sonoma River marshes song sparrows inhabit brackish vegetation and maintain high concentrations. Much of this area is managed by duck clubs and the San Pablo Bay National Wildlife Refuge. This management creates a system of sloughs which the sparrows occupy. Two large salt marsh complexes, Gallinas Creek and the northern San Pablo-Mare Island bayshore, contain dense concentrations. Proper management and conservation of native habitat must occur to maintain remaining populations.

The Suisun Song Sparrow (M. m. maxillaris) has been affected by urbanization in the southern portion of its range. The population in this area is reduced to isolated groups of individuals in the remaining marshes. In the northern portion of its range there are large areas of suitable habitat remaining which are currently managed as duck clubs or game refuges. This management occasionally eliminates sparrow habitat in some areas where large Salicornia or Scirpus marshes are allowed to dry or are diked off and flooded. The large network of sloughs in these areas is subjected to daily tidal flow and provides habitat for the sparrows. Unless there is a great change in land use in this area, there appears to be substantial area of habitat for future use by song sparrows.

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