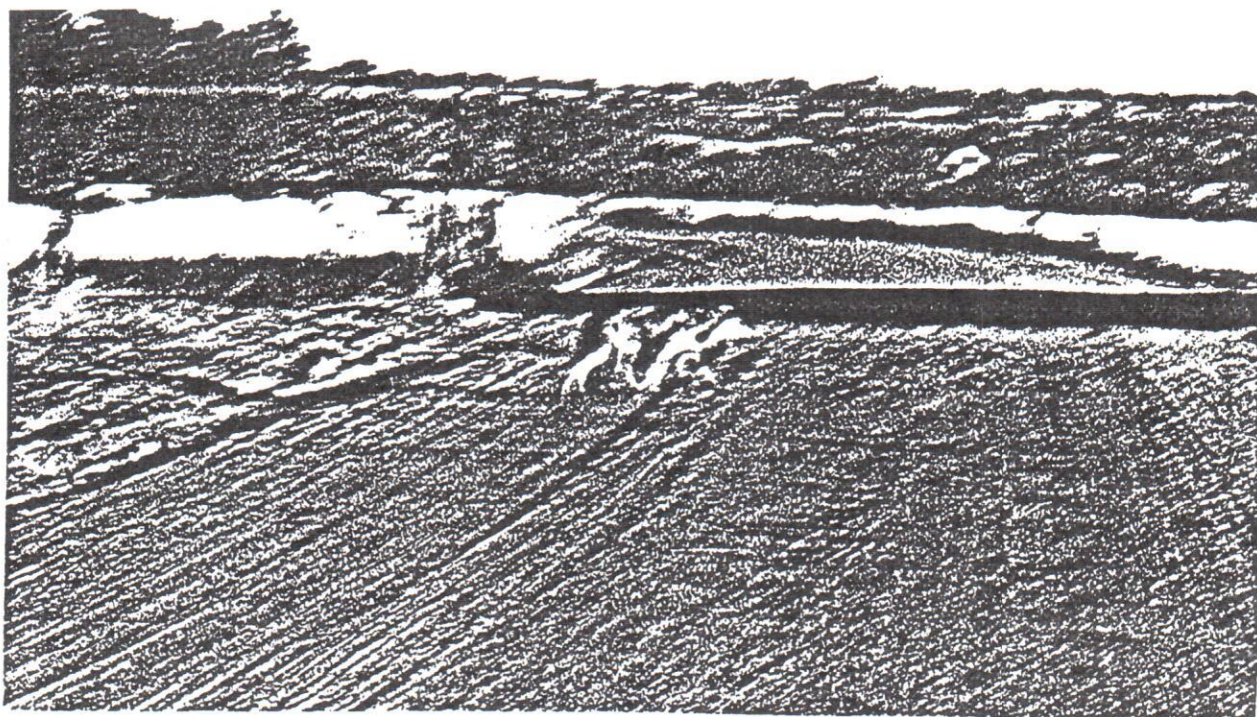


RECENT FIELD INVESTIGATIONS OF THE MEXICAN WOLF
IN NORTHERN MEXICO AND SOUTHEASTERN ARIZONA

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Southern Arizona, May 1, 1991

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DISTRIBUCION ACTUAL DEL LOBO MEXICANO
(Canis lupus baileyi)*

By

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INTRODUCTION

It is not new to say that the management and protection of predators is difficult. The complexity is based on the fact that social, political, and principally economic interests are in opposition to the scientific aspects. Justly, and in accordance with that mentioned by Knowlton (1972), one must know the biological aspects of the specie of interest in order to create an adequate management plan for it. There is no doubt that the management plan must be fitted inside a political and social context in each case.

ANTECEDENTS

In Mexico, around 1920, attempts were made to control populations of the Mexican wolf (Canis lupus baileyi). Although Roy McBride will speak to us later on this subject, it could be said that it was the last stage of this control program which seriously decimated wolf populations, thus placing this subspecie in danger of extinction. This stage consisted of putting poison, principally strychnine and 1080, in their dens, thus destroying the new generations of wolves. It was not until 1972 that the government of Mexico, along with that of the United States, and with the support of the IUCN, began to concern themselves with the danger of disappearance in which this subspecie finds itself. At this moment, an agreement is signed between both countries for the recovery and protection of the Mexican wolf. Within this framework, the study performed by McBride (1980) has given us the guidelines to follow in order to try to locate the zones in which there are presently records of wolves.

FIELD STUDY

From October to December of 1985, and starting from that information provided by McBride (1980), in addition to that supplied principally by ranchers, agronomists, and forestry engineers, the states of Chihuahua, Durango, and Sonora were travelled over. Through some information which it has been possible to obtain, it is possible that wolves still exist in the state of Zacatecas. Due to the shortness of time available during the performance of this study, no sweeps were made in this state. In accordance with McBride's (1980) information, Chihuahua, Durango, and Sonora are the states which are most likely to have recent records of wolves. The dates from 1980 to the present were considered as recent information.

FIELD SURVEYS

Sweeps were made in the mountains of Chihuahua, Durango, and Sonora obtaining information among the cowboys, ranchers, forest rangers, and authorities in the different regions. Although at that time field observations were not attempted, some records of wolves based on tracks and animals seen and/or heard were obtained.

RESULTS

Consistent with this information, and as it is shown on Map 1, it can be said that the present distribution of the Mexican wolf is the following:

Sonora

1. In the Sierra de Santa Cruz, in the north of the state, near the border town of Heroica Nogales. This zone includes the municipalities of Nogales and Santa Cruz.
2. In the central portion of the state, in the areas adjacent to the state of Chihuahua at the altitude of Huachineras and Mesa de Tres Rios. The municipalities included in this zone are: Bacerac, Huachinera, Bacadehuachi, and Nacori Chico.

Chihuahua

3. To the northwest of the state is the extension of zone 2. It is situated in the mountainous regions of Tres Rios and Pacheco, and includes the municipality of Casas Grandes.
4. To the northwest and center of the state. In this

zone are found the Sierras de las Tunas and del Nido. This area includes the Cumbres de Majalca National Park. The municipalities which comprise this zone are: Galena, Buenaventura, Namiquipa, Riva Palacio, and Chihuahua.

5. The southern portion of Chihuahua, in the municipality of Satevo. The information from this zone has not been corroborated.

6. To the southwest of the state, in the area included among Creel, Guachochic, La Cieneguita, San Carlos, and El Cebollin; in the mountain ranges close to Rio Verde. This zone includes one part of the Barranca del Cobre. The municipalities included are: Uruachic, Maguarichic, Guazapares, Urique, Morelos, Batopilas, Guachochi, and Guadalupe y Calvo.

Durango

7. To the northwest of the state of Durango, and continuing in a descending direction from zone 6, a recent report was obtained in Rio de Los Lobos to the north of el Valle de Topia. Wolf tracks were observed in this zone. This area includes the municipalities of: Tepehuanes, Topia, Canelas, and Santiago Papasquiario.

8. To the center of Durango. This zone contains the Sierras de la Candela, La Purisima, and de Canatlan. In the Sierras de la Candela and La Purisima were found fresh tracks of an adult wolf. It was mentioned in the "Bajio de Leon" that in January of 1984, a wolf was seen to the south of these mountain ranges. The information obtained in the Sierra de Canatlan was contradictory from the present existence of the wolf to its total extermination more than twenty years ago. Canatlan is the municipality which contains these mountain ranges.

9. To the southwest of the state of Durango, in the municipality of Pueblo Nuevo, in the zone of El Salto. In spite of the fact that the inhabitants of the zone do not know of the present existence of wolves in the area, we heard wolf howls and saw tracks in that region.

10. To the southeast of the state, on the Las Margaritas Ranch, neighboring the Temascal. This ranch is bounded on one side by La Reserva de la Biosfera de Michilia, and on the other by the tepehuana zone. This region is included inside the municipality of Mezquital.

Zacatecas

11. As previously mentioned, this state was not travelled

over. Nevertheless, information was received that wolves still exist in the area of Juchipila.

Except in zone 1, in the Sierra de Santa Cruz, Sonora, the information obtained was of solitary individuals (wolves). The zones in which information on wolves was obtained are found at altitudes between 1000 and 2000 meters above sea level. Regarding the vegetation of these zones, it consisted predominantly of forest groves of oak, oak-pine, and pine-oak. Zones 1, 4, and 5 are ranching zones where pastures predominate.

It is important to point out that due to the pressures which this specie has been the object of in Mexico, it is difficult to try to mark these zones in accordance to a theoretical area of country or territory. Therefore, although certainly the area presented is very different from the area in which the wolves really live presently in Mexico, it is an attempt to fix possible zones with wolves in our country. In this work, basically what was done, was according to the sites where reports of wolves were found, a tentative area was marked, covering thus the majority of the nearby sites within itself. Afterward, the sites which remained enclosed in this area were marked. This was done primarily because we suppose that this will facilitate the continuation of the location and control of the populations of wolves, and it will also serve to evaluate the changes of the distribution of the wolf in Mexico.

FINDINGS

If we observe Map 1, it is seen that:

- Zone 1 does not appear in the distribution of the wolf presented in 1980.
- Zone 2 is located a little more to the north with respect to that presented in 1980.
- Zone 3 was reduced by nearly 50% from that presented in 1980.
- Zone 4 grew by 50% towards the east. This area includes the municipality of Chihuahua, where wolves had not been reported in 1980.
- Zone 5, which is not shown on the map, is absent in the information presented in 1980.
- Zone 6, which in 1980 had been presented as two isolated zones, has merged as one in the records found now in the municipality of Guadalupe y Calvo, Chihuahua. As can be seen, this zone extends towards the southeast, penetrating the state of Durango, and thus forming zone 7.

- Zones 7 and 8, which were united in 1980, are now separated, since in the Sierra de Canatlan (Zone 8), the information was contradictory.
- Zone 9 was seen to be reduced by 50%, consisting now of only the municipality of Pueblo Nuevo.
- The records of Zone 10 had not been presented previously.

CONCLUSIONS

One important aspect which must be noted to adequately interpret this information is that although it appeared that the area of wolf presence in some zones has increased, the records obtained are of solitary individuals, save in Zone 1. If we consider the wolf's range of movement, some of the reports could address one same individual. The fact that records of packs are no longer found, makes more difficult the job of recovery of this subspecies. This not only indicates to us that it will be difficult to find them, but it is most serious as well that there is little probability that they will encounter other wolves, almost annulling their reproduction in the wild state. Based on these results, we see that the pack, which is the basic social structure of this species, no longer exists in the wild state in the Mexican wolf. Neither can it be thought to be a question of periferic individuals, in as much as there should exist a sufficiently high population of wolves for this to be the case.

Finally, in order to locate wolf populations, and considering their diet, it would be advantageous to conduct joint studies to evaluate populations of herbivores of both medium and large size. Initially, it would be advisable to invest more effort in zones 3, 4, 6, and 7. It should be pointed out that parts of zones 4, 6, and 7 are found in or near protected areas, as are: El Parque Nacional Cumbres de Majalca, Chihuahua (zone 4), La Barranca del Cobre, Chihuahua (zone 6), and the Puerto de los Angeles, Durango (zone 7). La Reserva de la Biosfera de la Michilia, which is found in zone 10, is an area with little probability of finding wolves in the wild state. Nonetheless, because of the status of this area, it would be interesting to consider this zone as a possible refuge for the Mexican wolf. Inclusive in the framework of the protection of this subspecies, there are at the present time five wolves in captivity.

An important aspect which could be observed during the realization of this work was that in the rural environment there exists a great interest in the protection of wild fauna and flora. Additionally, land owners exist that are interested in cooperating in the recovery and protection of the Mexican wolf. This social aspect, which is very seldom taken into account, is important to evaluate if we intend to complete the

recovery of this subspecie.

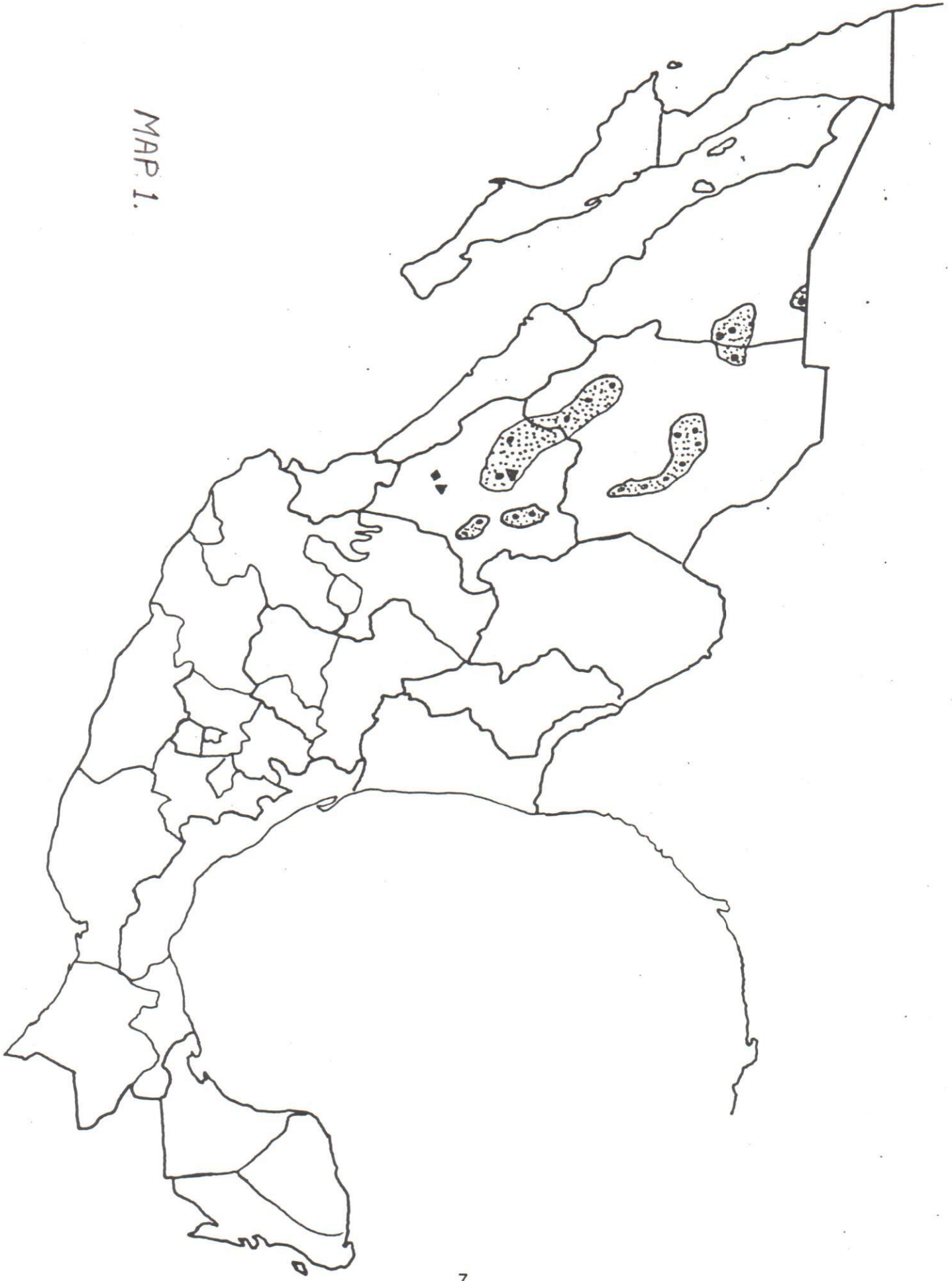
Although we have these arguments in our hands, we believe that the last word on the recovery and protection of the Mexican wolf is in the hands of the respective authorities. One of the most important decisions to make now is to determine an adequate area, taking into account above all the social and official support which can be counted on, since otherwise, the scientific and moral support on which we can depend will not be enough.

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MAP 1.



A CURRENT FIELD INVESTIGATION OF THE RECENT PRESENCE
OF THE MEXICAN GREY WOLF (Canis lupus baileyi)
IN SOUTHEASTERN ARIZONA

BY

Dennis Parker

1987

1. INTRODUCTION

This investigation of Mexican wolf presence along the international boundary separating southeastern Arizona from northeastern Sonora, may be one of the last efforts of this nature possible. This is due to the imminent extinction with which the Mexican wolf is faced in the absence of any substantive effort to address the causes of its endangerment. Should this situation remain unchanged, the Mexican wolf will soon join the growing list of organisms that have perished by the hand of man.

1.1 Antecedents

Documentable records for the Mexican grey wolf (Canis lupus baileyi) in Arizona go back to 1892 and the securing of a female specimen (later referred to this subspecies) from the Santa Rita Mountains in the southeastern portion of the present-day state (Holzner 1892). In New Mexico, the first documentable specimens of this subspecies are also from 1892 (Mearns 1907), and were collected from the San Luis Mountains in the southwestern portion of that state. Prior to 1926, Mexican wolves were unknown to the north of the border mountain ranges of southeastern Arizona and southwestern New Mexico (Gish 1977), but with the final removal of the Mogollon Mountain wolf (Canis lupus mogollonensis) from its range in the sub-mogollon and mogollon country of Arizona and New Mexico, Mexican wolves extended their range northward (Map 1). Although Mexican grey wolves were encountered as far north as the San Francisco Mountains in Arizona (Map 3), documentable breeding records are limited to the border mountain ranges of southeastern Arizona, and in New Mexico, are limited to the border mountain ranges of the southwestern corner (Map 1). There are three documentable records of the Mexican wolf in west Texas (Scudday 1977); the first in 1944, and the last two in 1970. There are, however, no documentable breeding records for the Mexican wolf in Texas. The last documentable breeding record for the Mexican wolf in Arizona

is from 1942, when a litter of pups was whelped on the west side of the Huachuca Mountains (Gish 1977). The last documentable breeding record for New Mexico occurred in or around 1937 (Nunley 1977), when a litter of pups was whelped to the south of Animas Peak in the Animas Mountains.

The introduction of the predacide 1080 (sodium monofluoroacetate) to the American Southwest in 1948, and its introduction to wolf range in Mexico in 1950, marked the beginning of the end for all but isolated populations of Mexican grey wolves and Mexican grizzly bears alike. Although transient Mexican wolf occurrence in Arizona continued until at least 1963 (Gish, pers. comm. 1985), and in New Mexico until 1970 (Nunley 1977), overall population numbers in Mexico were declining at an accelerated rate. During the fall of 1977 and early 1978, survey of wild Mexican wolf population status was conducted by McBride (1980) (Map 4). McBride estimated that, in 1978, no more than fifty pairs of Mexican wolves existed in the wild in Mexico (McBride 1980). In 1972, 1080 use was illegalized in the United States, and by 1986, had also been illegalized in Mexico as a means of predator control (Carrera 1986, Simposio Sobre Lobo Mexicano).

In 1984, reports of wolf presence began to surface from former Mexican grey wolf breeding range along the Arizona-Sonora border. This area, known as the Canelo Hills wolf runway (Young and Goldman 1944), encompasses the Canelo Hills of Arizona, the Huachuca Mountains of Arizona-Sonora, the Patagonia Mountains of Arizona, the Cocospero (or Santa Cruz) Mountains of Sonora, and the San Rafael Valley of Arizona-Sonora. Due to the persistence of credible reports of wolf presence in this region, field survey efforts were undertaken in order to confirm the nature of these reports.
(Map 1)

1.2 Habitat and Vegetation Types

The habitat of this region consists of well vegetated mountain ranges and well developed grasslands from 4200' in elevation (Red Rock Canyon, Patagonia Mountains) to 9472' in elevation (Miller Peak, Huachuca Mountains). The grasslands of the San Rafael Valley are situated at about 5000' in elevation. This area falls under a bi-annual precipitation regime that is characterized by a predominate summer rainy season, and a winter precipitation season of lesser importance.

The predominate habitat type of the mountain country is Sierra Madrean Woodland, characterized by several species of drought-keyed and potentially deciduous live oaks (*Quercus* spp., including Arizona White Oak, Emory Oak, Mexican Blue Oak, Silverleaf Oak), Alligator Bark Juniper, Mexican Pinyon Pine, and Chihuahuan Pine, along with manzanita (*Arctostaphylos* sp.). At higher elevations, Apache Pine, Ponderosa Pine, Mexican White Pine, Douglas Fir, Arizona Madrone, and White Fir are present

as well. At the highest elevations, Quaking Aspen is also present (Huachucas).

The grassland of the San Rafael Valley is an extension of the grassland type typical of the tablelands of the northern Sierra Madre Occidental above 4500' in elevation, and is characterized by an abundance of gramma grass (Bouteloua) species.

2. GENERAL OBJECTIVES

2.1 To secure physical evidence of wolf presence through systematic field investigation as a means of confirming reports of wolf presence from the region given access to wolves by their use of the Canelo Hills wolf runway.

2.2 To notate all credible reports of wolf presence from southeastern Arizona, southwestern New Mexico, and northern Sonora.

2.3 To identify, through interview and literature search, the causes of Mexican wolf endangerment.

2.4 To formulate recommended actions by which the continued survival of wild Mexican wolves can be secured.

3. METHODS OF INVESTIGATION

Due to the considerable size of Mexican wolf home ranges, the great distances traveled by transient animals, and the mountainous nature of the Sierra Madre, the following three methods were chosen as means by which Mexican grey wolf presence in this area could be detected:

3.1 Surveys

The interviewing of ranchers, cowboys, and predator hunters (both active and retired) was undertaken in order to identify areas of past, recent, and present wolf activity, and to learn of the attitudes of these people toward the Mexican wolf. Thorough search of the available literature pertaining to the Mexican wolf was also initiated at this time. As a result of the interview process and literature search, field investigation was primarily confined to the region given access to wolves by their use of the Canelo Hills wolf runway, in Santa Cruz and Cochise Counties, Arizona. Reports of wolf presence from

northern Sonora and southwestern New Mexico are included for consideration with reports from southeastern Arizona. Consideration of wolf reports was limited to those reports from people who either live within the area from which a report originated (such as ranchers and cowboys), or by those people whose vocations enable them to spend considerable time in areas from which reports originated (such as Forest Service personnel, county road workers, and predator and game hunters). Recent reports of wolves were considered to be those from 1980 to the present.

3.2 Establishment of regular monitoring stations

Based on interviews with retired government (PARC) wolf trappers and credible reports of wolf presence, four likely sites of wolf passage along the Canelo Hills wolf runway were identified and regularly examined for physical sign of wolf presence, on a thrice weekly basis, from March of 1986 through June of 1987.

3.3 Establishment of photo-trapline

Three photo stations, baited with white-tailed deer (*Odocoileus virginianus couesi*), were also utilized as a possible means of obtaining physical evidence of wolf presence. Stations were located adjacent to three of the four sites referred to in 3.2, and were monitored on a thrice weekly basis, from June 21, 1986 through May 18, 1987. Stations were located at the following elevations: Station 1, 4800'; Station 2, 5300'; Station 3, 6300'. The method employed, was roughly modeled after that of Joslin (1977), and is basically a technique by which carnivores document their existence photographically.

4. RESULTS AND DISCUSSION

4.1 Mexican grey wolf presence in southeastern Arizona

Physical evidence of wolf presence was obtained on two occasions during the study period. Five unclassified canid scats were also collected from within the study area during this time period.

4.2 Surveys

Twenty-five reports of wolves, for the 1980 to June of 1987 time period, meet criteria for consideration. Of this total, nineteen fall within territory given access to by the

Canelo Hills wolf runway (18 from Arizona, 1 from Sonora); one from the Atascosa Mountains west of Nogales, Arizona; one from the Chiricahua Mountains and two from the Santa Rita Mountains of southeastern Arizona; one from the Animas Mountains of southwestern New Mexico; and one from the Pinito Mountains of northern Sonora (Map 3). Only two instances of possible wolf depredation on livestock were reported for this time period. A steer of approximately 700 lbs. was reported freshly killed and partially consumed on the T4 Ranch, west side of the Patagonia Mountains. It is reported that this animal was brought down by flank attack. Another steer carcass was reported by a predator hunter on the Lone Mountain Ranch, west side of the Huachuca Mountains. Although the carcass was old, evidence suggested death by predation. Long parallel scratches and large canid tracks, much more recent than the kill, were also reported to be present in the vicinity of the carcass. The predator hunter estimated the live weight of this steer as being approximately 600 lbs.

The largest group of wolves reported was that of five animals, on two occasions. A group of three and a group of four were also reported, on one occasion each, and twenty-one reports were of a solitary animal.

4.3 Monitoring stations

Physical evidence of wolf presence, in the form of photographs of a sign post and accompanying tracks, was obtained on April 24, 1986 from a station located at 6300' elevation, west side of the Huachuca Mountains. Confirmation of sign identity was provided by Mr. Dale D. Lee of Tucson, Arizona, and by Mr. Dan Miles Gish of Mesa, Arizona. On June 21, 1986, track of wolf was again found, measured, and photographed at this same site. Verification of track identity was provided by Mr. Dan Miles Gish of Mesa, Arizona.

4.4 Photo-trapline

No photographs of wolves were obtained by this method, which did not lend itself well, in the form used, to the photographing of extremely wary predators. It is thought that the obtrusive nature of the camera stations employed may have precluded the obtaining of satisfactory results. On one occasion, a large, solitary canid approached within fifty yards of station 3 on the forest trail leading to this set. The animal deviated from the trail at this point, took a semi-circular route around this station, and rejoined the same trail about fifty yards beyond the set. Nevertheless, photographs of the following animals were obtained: Station 1 - Coyote (Canis latrans), Turkey Vulture (Cathartes aura); Station 2 - Bobcat (Felis rufus); Station 3 - Grey Fox (Urocyon cinereoargenteus),

Ringtail (Bassariscus astutus), Coati (Nasua nasua), Opossum (Didelphis marsupialis), non-feral hunting dogs (Canis familiaris), and Turkey Vulture (Cathartes aura). Tracks of Puma (Felis concolor) were also observed on two occasions in the vicinity of Station 1. It is thought that with refinement, the photo-trapline may yet become a valuable technique for determining wolf presence in a given region.

4.5 Scats

Five unclassified scats were collected from within the study area. Of the five, three meet criteria established by Fritts and Weaver (1979) for differentiation of coyote and wolf scat based on dry diameter (Table 1).

Servin (pers. comm. 1987) states that in analyzing a large sample of coyote scats from the state of Durango, Mexico, on only one occasion did a coyote scat measure over 32mm. in fresh diameter. In comparing size of coyote scats to the size of scats obtained from the captive Mexican grey wolves at Michilia, Durango, Servin found that 32mm. of fresh diameter is useful criteria for separating scats of coyotes and Mexican grey wolves. Three of the five collected scats meet this criteria as well.

The possibility that feral dogs, or wolf-dog hybrids, could be responsible for scats of this size, cannot be overlooked. In his many years of wolf work in Mexico, McBride (pers. comm. 1986) encountered only one instance of wild wolf-dog hybridization. Apparently, the barriers separating coyotes and Mexican grey wolves are still in place as well (McBride 1980). While hybrid animals are of a more remote possibility, feral dogs have, in the past, been a problem in this area. Therefore, it is suggested that these scats be subjected to rigorous bio-chemical analysis as a possible means of addressing these possibilities, and of determining their origins with accuracy.

5. CONCLUSIONS

5.1 Concerning the presence of wolves from the territory given access to them by their regular use of the Canelo Hills wolf runway:

The results obtained in this study are evidence of the transient occurrence of wolves in this area, and are corroborative of the findings of wolf presence by Hernandez, Lafon, and Gallina (1985) from an area contiguous to this in northern Sonora. This occurrence is not thought to represent a breeding population, as sign of active, resident occupation was not found, but does suggest the persistence of a core area of reproductive success to the south in northeastern Sonora.

5.2 Attitudes of ranchers and cowboys interviewed towards the wolf.

The attitudes of both regarding the possibility of coexistence with wolves, is not positive. This attitude is based, in a few instances, on past economic loss due to depredations on livestock by wolves, stories of such passed down to many of these people, and a consensus that this situation would recur should wolves actively reoccupy this area. That these concerns are well founded, is affirmed by the biological record regarding livestock loss due to wolf depredation (Bailey 1931, Young and Goldman 1944, Gish 1977, Nunley 1977, McBride 1980). The possible severity of these depredations, and degree of economic hardship resulting from such, can be illustrated by the case of the infamous "Las Margaritas " wolf of Durango, Mexico. During an eleven month period, this lone Mexican wolf killed in excess of 110 yearling steers and heifers; 96 of which were killed on a single ranch during an eight month span (McBride 1980). The loss in monetary terms to this ranch could be conservatively estimated at \$14,000, U.S.

5.3 Causes of Mexican wolf endangerment

Two major causes have been identified that lead, directly, to diminished Mexican grey wolf populations:

1. Wolf depredations on livestock
2. Habitat destruction/natural resource development

Conflict with man, in the form of wolf depredation on livestock, is the greatest causative factor leading to Mexican wolf endangerment. Although habitat destruction is of major and growing concern, vast tracts of suitable habitat yet remain within the historic breeding range of the Mexican wolf.

5.4 Recommendations for securing the continued existence of the Mexican grey wolf

In the course of this study, it has become apparent that Mexican wolf endangerment is not nearly so much a biological or technical matter as it is a socio-economic and cultural vexation. It is imperative, then, that recovery be approached from this perspective. With this in mind, the following recommendations are suggested as plausible means to securing the continued survival of the Mexican grey wolf:

1. The immediate creation of an independent and international compensatory vehicle that competently, equitably, and promptly provides restitution for economic losses attributable to Mexican wolf depredations on livestock.
2. The undertaking of concerted field survey efforts to determine existing numbers and distribution of wild Mexican

grey wolves, with special emphasis on identifying and securing remaining core areas of reproductive success.

3. The maintenance of captive populations in small groups and in seminatural settings, within known Mexican wolf breeding range. Should field surveys of wild population status deem it possible and/or prudent, the securing of additional wild Mexican wolves for inclusion within captive populations would be both desirable and necessary in order to broaden the restricted nature of genetic base common to all captive lines.

4. The establishment of protected preserves in Mexico for the Mexican wolf and its native prey base (Coues' white-tailed deer, wild Turkey, and smaller mammals), where livestock raising presents a limited potential for conflict, and where habitat and spatial requirements are met.

5. The development of an educational campaign that is consistent with the habits and natural history of the Mexican grey wolf.

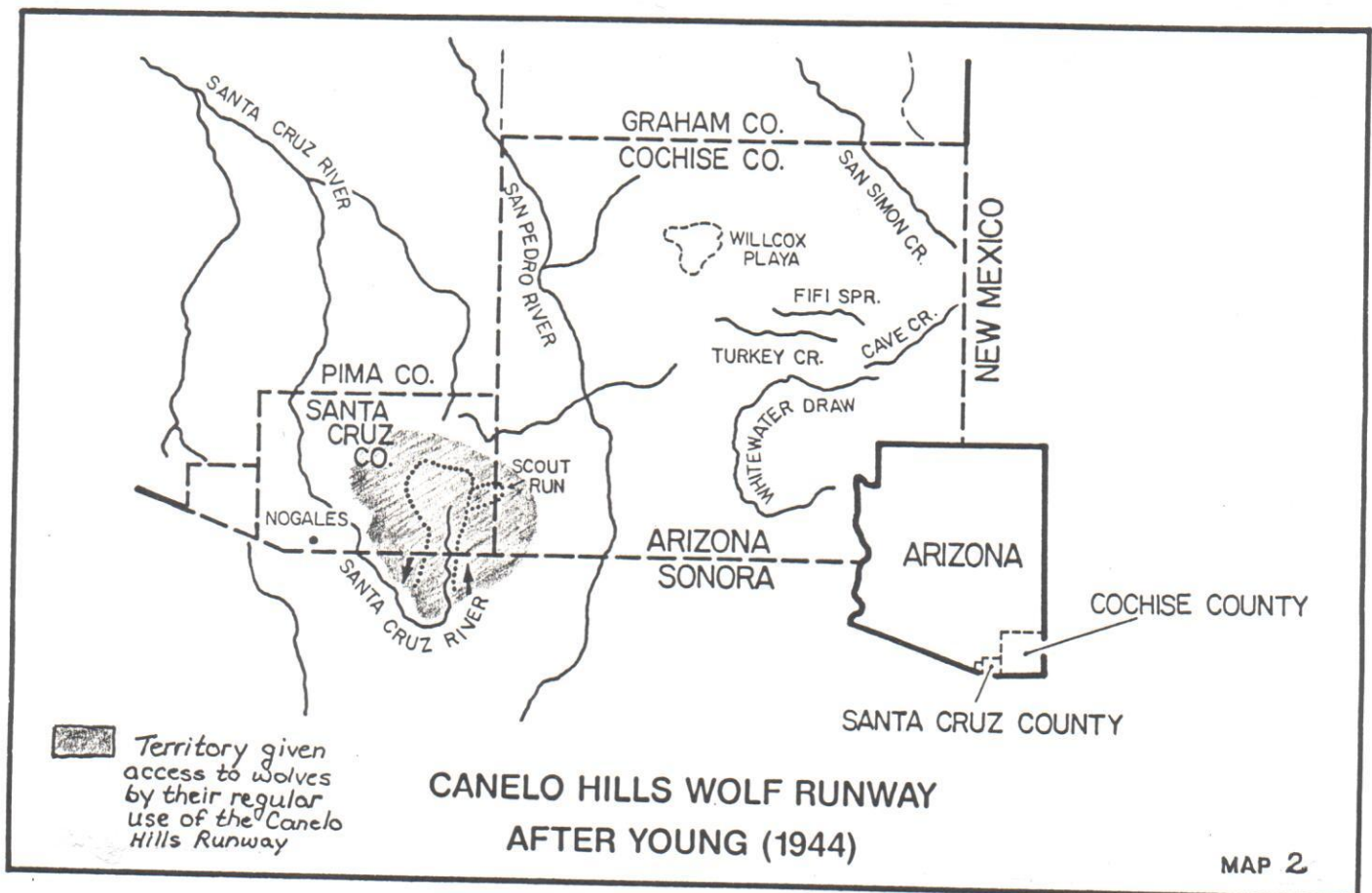
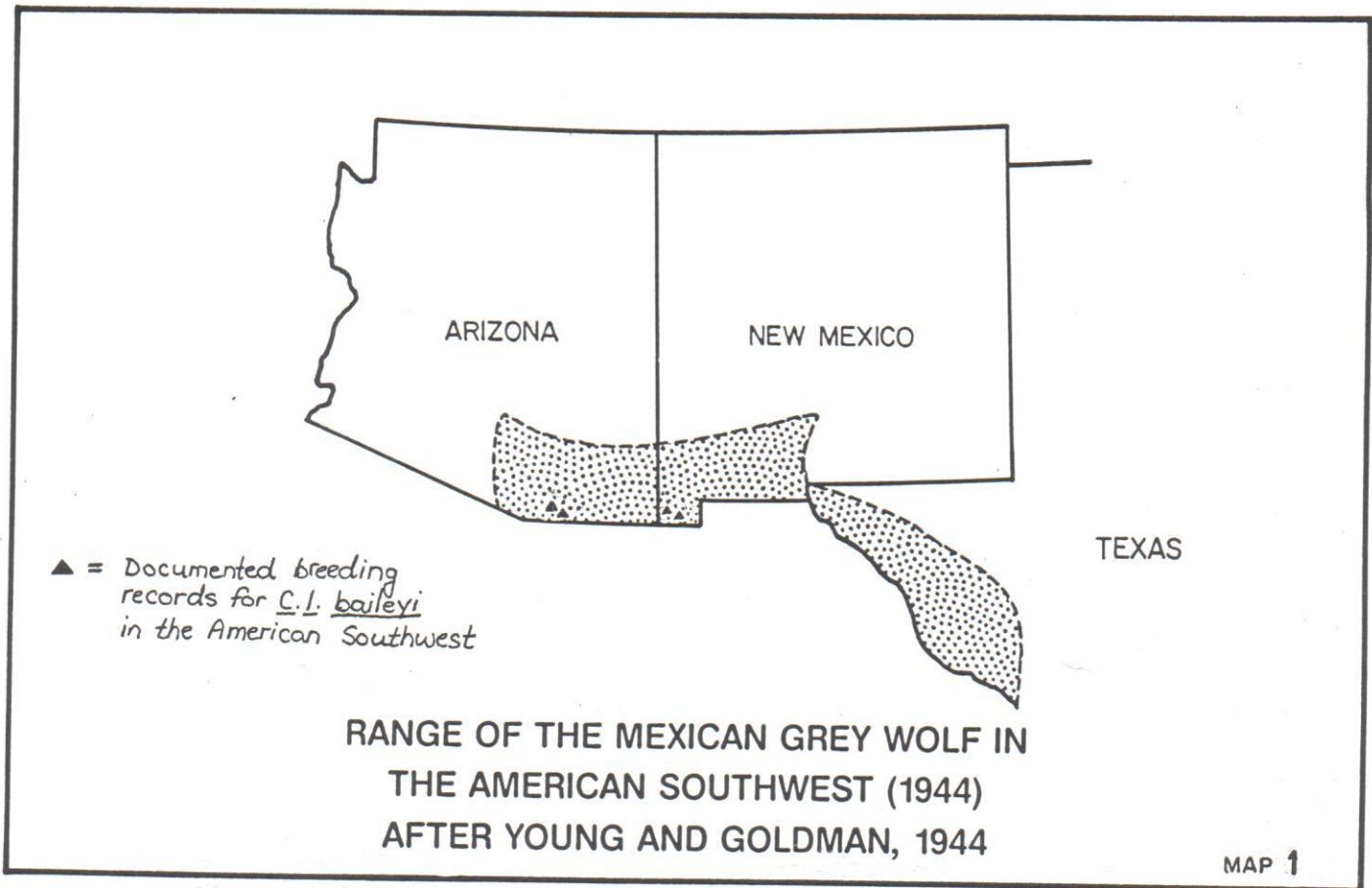
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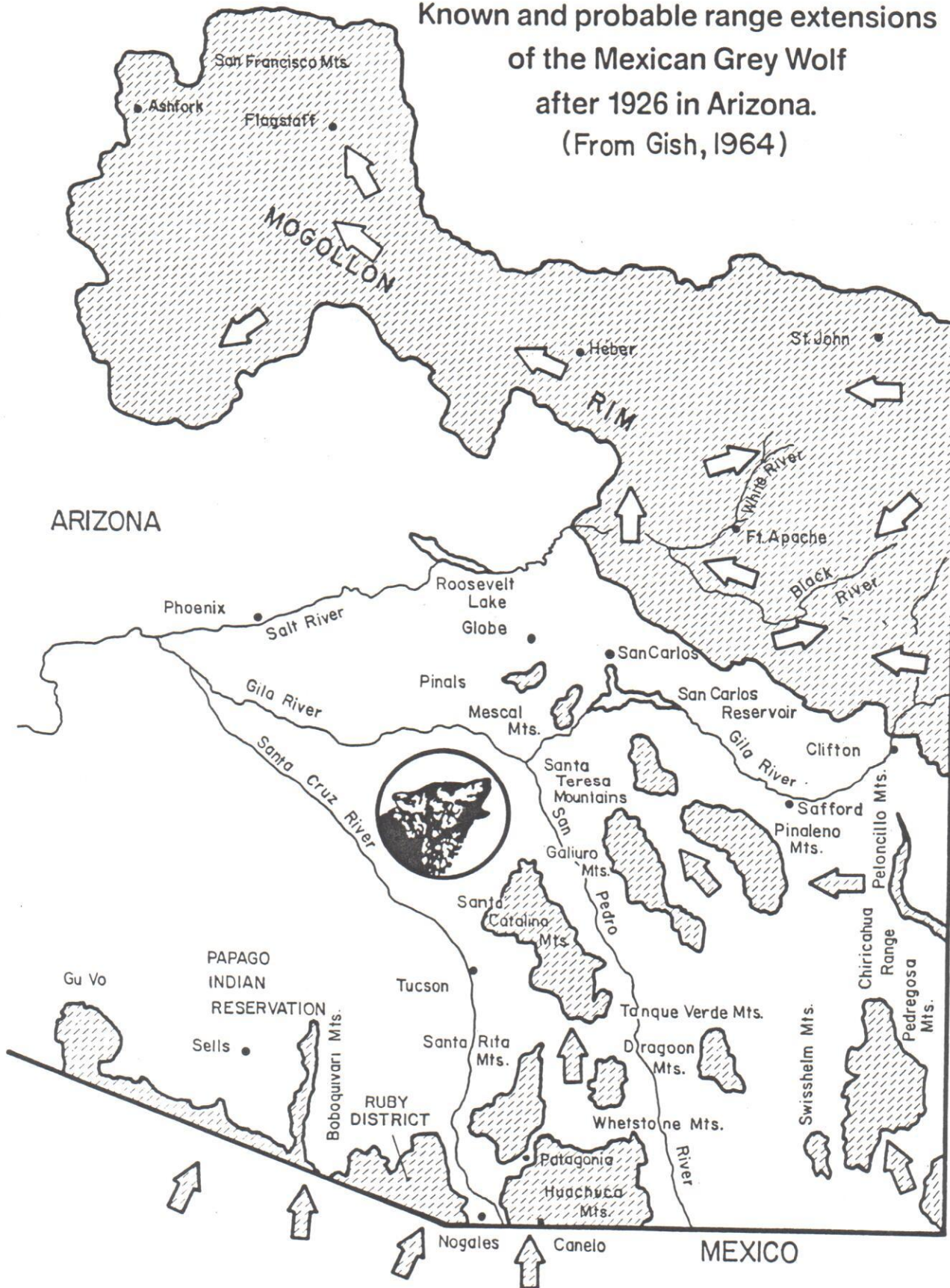
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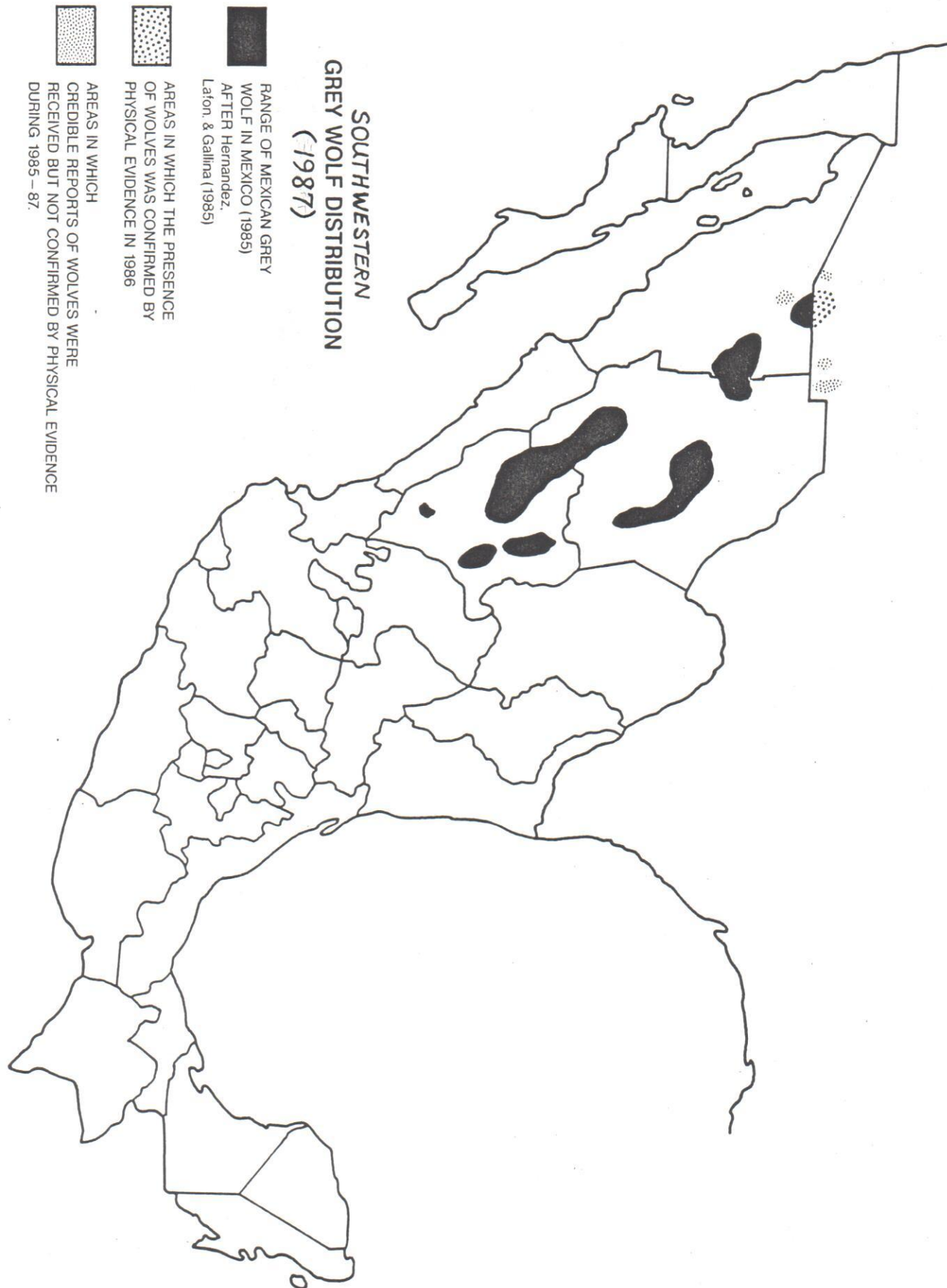
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Known and probable range extensions
of the Mexican Grey Wolf
after 1926 in Arizona.
(From Gish, 1964)







MAP 5

TABLE 1

TABLE OF SCAT DIAMETERS			
DATE - LOCATION	DIAM.- FRESH	DIAM.- DRY	PROBABILITY OF WOLF AS COMPARED TO COYOTE (according to Fritts and Weaver, 1979)
1. Aug. 23, 1986, San Rafael Valley	33mm.	32mm.	90%+
2. Sept. 2, 1986, Canelo Hills	30mm.	N/A	not identifiable to species on basis of diameter alone
3. Sept. 23, 1986, San Rafael Valley	33mm.	32mm.	90%+
4. Sept. 28, 1986, San Rafael Valley	34mm.	33mm.	90%+
5. Aug. 24, 1987, Huachuca Mountains	31mm.	—	—



FIGURE 1 Cochise Co., Arizona, L 4 1-8", April, 1986



FIGURE 2 Cochise Co., Arizona, W 3 3-4", April, 1986



FIGURE 3 Cochise Co., Arizona, L 4 1-2", June, 1986

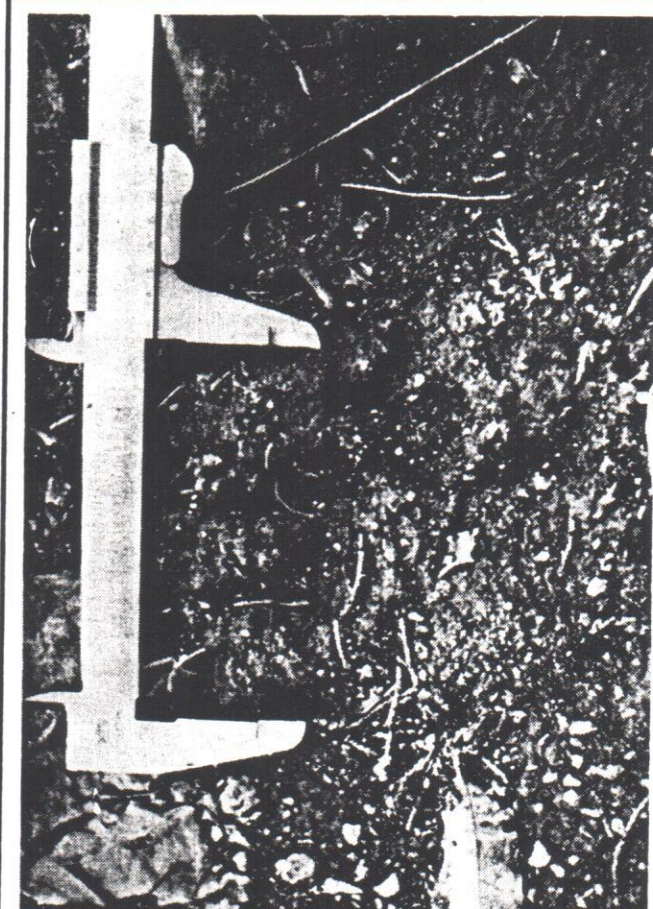


FIGURE 4 Cochise Co., Arizona, W 3 7-8", June, 1986

ESTUDIO PARA LA RECUPERACION DEL LOBO MEXICANO

Canis lupus baileyi EN EL ESTADO DE DURANGO

II ETAPA, 1987

BY

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1. INTRODUCTION

This present study on the existence of the Mexican wolf in the state of Durango, may be one of the last attempts to recover these so controversial carnivores of Mexican wild fauna, now that at this date, their presence in the forests of the Sierra Madre Occidental of Durango is almost a legend, were it not for some few examples which are believed to still exist in some inaccessible regions of the State.

1.1 Antecedents

In the state of Durango, the abundance of the Mexican wolf (Canis lupus baileyi) was considered high until the end of the 1970s, being distributed the length of the whole Sierra Madre Occidental which crosses the state in the west, and in some of the mountain ranges which derive from this one, such as the Sierra del Carmen, Coneto, and Promontorio (Baker, 1959).

However, with the use of traps, food poisoned with strychnine and 1080, a rapid fall of the existing populations began; this being a much greater cause than the effect which the felling of trees in the forest and the intense use of the land have had, although this last factor is not disregarded in the damage produced on the populations of wild flora and fauna of the state of Durango (Baker, 1959, Villa, 1960).

For these reasons and because of the results of the distribution which McBride made known in his work on the Mexican wolf (1980), because of the last census carried out by the Instituto de Ecologia (Hernandez et al. 1984), and also because of the reports received in the Delegacion SEDUE of the State of Durango of attacks on cattle by wolves in the Sierra del Promontorio, San Francisco and Coneto, Durango, this present work developed in this area of the state.

1.2 Geographic Situation of the Sierra del Promontorio

The Sierra del Promontorio is located to the north of the city of Durango, bordering the Laguna de Santiaguillo in the municipality of Canatlan on the north. These mountains are also known as San Francisco and Coneto, as well as Promontorio, although these three form part of one same mountainous system which runs from the NW to the SE. This begins to the east of the town of Tepehuanes between the 25 30 and 24 70 parallel of latitude north and the 104 60 and 105 20 of meridian longitude east. Apparently it is a mountain range isolated towards its limits in the south by an extensive plain which returns to the laguna de Santiaguillo, and isolated towards its north-eastern boundaries by drier plains with semiarid shrubs that borders the Chihuahuan desert (map 1).

1.3 Climate and Types of Vegetation

The climate which pertains to the Sierra del Promontorio is moderately subhumid, displaying a marked seasonality with regard to the period of rainfall which predominates from the month of June to the month of October, and the dry period, which presents itself from November until May. The maximum precipitation usually presents itself during September or October, and the month of least precipitation is April. The average annual temperature is 16 C.

The mountainous system presents an average elevation of 2400 msnm. (N=72), with altitudes that go from 3000 to 1900 m. In this manner, the different types of vegetation that are present at different altitudinal zones are the following: the forests of oak (*Quercus* spp.) in the lowest zones between 1900 and 2000 m.; the forests of oak-pine (*Quercus* spp. and *Pinus* spp.) with secondary vegetation of manzanita (*Arctostaphylos* sp.) and madrono (*Arbutus* sp.), are found between 2100 and 2300 m.; the forests of pine-oak, also with secondary vegetation, extends from 2300 to 2500 m.; and lastly, the pine forest is generally found in the highest parts of the mountain range above 2500 m. and up to 3000 m. Small thickets of Mexican sacred fir are also found in the most humid sites.

2. GENERAL OBJECTIVES

2.1 To select viable areas for the reintroduction of the Mexican wolf, as well as the proposal for the establishment of a Reserve for the Protection of the Mexican wolf in the State of Durango.

2.2 Formulation and preparation of documentation, cartography, and recommendations for the recovery of the Mexican wolf in the state of Durango.

3. METHODS

There exists a series of recommended techniques to detect the presence of carnivores, and in particular, pertaining to wolves (Mech, 1970, Pulliainen, 1980, Fuller, 1982, Harrington and Mech, 1982). Nevertheless, for the conditions presented in the mountainous systems of Mexico, there are still no techniques or proven methods to effect censuses of wolves, for which reason the following three methods were chosen to record their presence.

3.1 Surveys

One of the primary fountains of information is one in which country people, ranchers and other inhabitants of the region were interviewed, as they were in the Sierra del Promontorio and the area of San Francisco. The people were questioned regarding the existence of wolves in the area, the presence of tracks, scratches, and excrement of wolves that they may have observed in their travels. They were also questioned about the loss of cattle they and their neighbors had during the years 1985 and 1986. Other questions related to the habits of the wolves, zones of howling, active and old lairs (thickets where wolves make their lairs), zones where trails or evidence of these carnivores are frequently found, as well as the size of the group or if it was a solitary wolf. Over how much time and in which areas they had tracked them in the mountain range, and if they came down from the plains to the zone most inhabited by ranches and common lands were questions asked, as well as questions about the mating season, the birthing season, the rearing and the size of the litters, their habits or patterns of hunting for domestic cattle or their preference for wild prey, the places where they prefer to hunt, and their routes of crossing. Lastly, they were asked about their personal opinion regarding the wolves in the area and if they agreed that these animals of the wild fauna should be protected.

3.2 Transects of olfactory stations (stops, seasons, places)

This technique is based on the chemical communication (olfactory) which is present in wolves (Linharth and Knowlton, 1975, Peters and Mech, 1975) and is intimately related to the possession of a territory, which is actively marked with the urine of these carnivores.

An olfactory station consists of a circle a meter in diameter on fine sand in whose center is located the bait. In our case we used a mixture of sardines, hog fat, chicken viscera and remains of pork, all crushed until it formed a more or less compact mass (Servin, 1985). Twenty olfactory stations, a kilometer apart, were placed on the length of the transect, from

the fixed level of 2800m. to some 2km. to the NE of the town of Rancho Nuevo to 3.5km. to the N of the Promontorio mine above 2600m. Approximately 115g. of the bait mix was placed at each of the stations.

Considering that the stations are functional in a radius of 1.5km., since the transect was 20km., thus the area sampled by means of the olfactory stations was 60 square kilometers.

3.3 Transects of auditory stimuli

This census method has been used to learn of the presence, the size, and domestic boundary of the packs. It is a technique with certain, imminently good potential for working in difficult conditions (Fuller, 1982, Harrington and Mech, 1982), as in the mountainous systems of the Sierra Madre Occidental and in our case in the Sierra del Promontorio, Durango.

The length of the roads that go from one ranch to another were worked and some stations were made in runs on foot, the majority of these were carried out in double traction vehicles. A tape recorder and conventional tapes were used where the howls of the group of Mexican wolves which the Instituto de Ecologia maintains in the Reserva de la Biosfera de la Michilia in the same state of Durango were previously taped. The recordings were made during the period of reproduction and birth (February-April). Later tests of stimulus and response were performed with this recording, obtaining an 80% response to the recording with the same captive wolves to the first stimuli, and after three successive stimuli they no longer answered.

The censuses with howls were carried out during the months of July and August, since that is the period in which the greatest percentage of response is shown, from 65% to 80% in the places where this technique has developed (Harrington and Mech, 1982).

Each station was spaced 3 km. apart, and the recording which consisted of three parts was placed there. The first, with a duration of 54 seconds, interpolates sharp howls with long, grave ones, and leaving 20 seconds of silence. In the second part, with a duration of 24 seconds, grave and long howls are presented along with a silence of 20 seconds. Lastly, howls consistent with a chorus of grave, uniform, and long sounds, of 54 seconds duration, form the third part. After the completion of the third part, a silence of 90 seconds is observed. If in that interval of time responses are not heard, the station is closed and the next one gone to, since the responses, if there are any, are begun almost immediately after the end of the stimuli. It has been found that the average time of responses is 30 seconds (N=262), less than 9% responded between 30 to 60 seconds after the test, and only 1.5% took more than 90 seconds to respond (Harrington and Mech, 1982).

Work at the stations commenced at 20:00 hours, usually after the sun set, trying always to work during twilight and

darkness. Performing work at the stations without rain and with little wind was always attempted. If rain or strong wind appeared, the sampling was suspended until atmospheric conditions improved, because these parameters alter the potential for listening to possible responses.

A total of 34 stations, each 3 kms. apart, were utilized covering 102 kms. along the length of the borders of the mountain range and over the mountainous system. If it is considered that the responses can be heard in an optimal range of 3.5 kms. circumference with this sampling technique, a total of 714 square kilometers were covered.

4. RESULTS AND DISCUSSION

4.1 Present and historical distribution of the Mexican wolf in the state of Durango.

On Map 2, the original distribution of the wolf in the Republic of Mexico can be observed (Hall, 1981), where it appears that the wolf was distributed throughout the state. The distributions according to Leopold (1977) and McBride (1980), appear respectively on Maps 3 and 4. Lastly, on Map 5, the present distribution of the Mexican wolf given by the Instituto De Ecología in the first stage of this study can be observed (Hernandez, 1985).

With respect to the relative abundance of the wolf in Mexico and in the state of Durango, there is no data regarding this parameter of the population, since the best techniques to determine relative abundances in major predators with extensive displacements are relatively recent (Linharth, 1975).

For the state of Durango, the last report given of the presence of wolf is in the following locations:

- Rio de Lobos, to the north of Valle de Topia.
- Sierra de la Candela y la Purisima.
- Sierra de Canatlan, San Francisco y Promontorio.
- El Salto, Municipio de Pueblo Nuevo, Durango.
- Municipalities of Suchil and Mezquital, area contiguous to La Reserva de la Biosfera de la Michilia.

4.2 Surveys

The surveys were not directed to people at random; attempts were made to choose those persons who were connected to ranching or hunting in the area. 80% of affirmative responses (N=10) to the existence of the wolf in that area was obtained. These persons were asked about the habits of these animals to know the degree of knowledge, and to corroborate or not the information that they contributed. In this way, the knowledge that these persons have of the biology and behaviour of the wolf

could be estimated, since they know the wolves' reproductive and birthing periods, their preferences for traveling usually on paths which the cattle follow to pasture grounds and water-holes, their feeding preferences for domestic animals, their hunting habits and consumption of prey, knowledge of tracks, excrement, scratches, resting places, dens, size and composition of the group. Regarding the size of the group, this was always small, no more than six animals.

The most common methods to trap or kill the wolves in this zone were:

- a) Hunting with rifles and scopes when the wolves were found in passing, or calling them by means of howls.
- b) The search for dens in order to kill the adults, although the pups are left alive.
- c) That which is known as "enyerbarlos," and which consists of using a dead animal (burro or cow) to which is added strychnine or 1080, which was obtained from the ranchers union.
- d) Using steel traps, this being the method least used.

All of these methods to kill wolves in this zone, and in many other places in Mexico, have been the causes of the rapid diminution and disappearance of the wolf from over 90% of his original distribution in Mexico. Nevertheless, it is known of some animals that have not fallen easily to these methods of deception. Such is the case of the she-wolf "Las Margaritas," that McBride cites (1980), that took eleven months to trap and kill. Perhaps it is this type of wolf that is still left in some places of the Sierra Madre Occidental, since man has acted as a factor of artificial selection, eliminating the least astute animals with traps, and leaving only those animals most distrustful of man and his activities, and elusive, to reproduce. It could also be thought that man has eliminated those animals with certain alimentary habits, with preferences for domestic cattle which are said to be easier to hunt. But all of this depends on the capacity of the species to change rapidly and in a few generations to the pressures of selection that man is putting on them.

Lastly, in the information obtained through interviews, it was learned that cowboys of the Ejido de Campana found fresh wolf tracks in May of 1986, and in those days, in the same zone (Canada de Pavileros), a cow and her calf were lost through an attack by a wolf. Equally, on the Rancho el Salitre, we were informed that at the end of May, 1986, in the same Canada de Pavileros, there was a loss of three cows through wolf attacks. Nevertheless, by July, no more wolves had been seen or heard, nor more cattle lost, in this zone of Promontorio. It is near the Canada de Pavileros where a waterhole is found that is maintained throughout the year, and it is said that

the wolves frequent that zone during the driest months (April and May).

4.3 Transects of olfactory stations

Even though no wolf was attracted to, or reached any olfactory station, it can be said that the results obtained were satisfactory, since it is known that the coyote (Canis latrans) and the wolf are antagonistic (Fuller and Keith, 1981), and the coyote alone was located very near the Ejido Encinal at an altitude of approximately 1900 m. It is very significant that of twenty olfactory stations, only one was visited by coyote, since it is held that in lines of ten stations the coyotes come to visit three stations in very similar zones of the Reserva de la Biosfera de la Michilia (Servin, unpub. data).

Another aspect which could have had an influence in the lack of visits by wolf to the stations, is the use of previously sifted soil in the entire transect, and which was not from the site in which it was placed, since it is said that the wolf is an animal very distrustful of entering stations with sand which is not from that place (Carrera, pers. comm.).

The transects of olfactory lines were visited by the following carnivores: Cacomistle (Bassariscus astutus), badger (Taxidea taxus), gray fox (Urocyon cinereoargenteus), bobcat (Felis rufus), coyote (Canis latrans), and puma (Felis concolor). It is necessary to mention that the bait which was used is not selective for wolf. Accordingly, carnivores in general were attracted.

Another type of information which we were able to obtain from this technique, is the diversity of carnivores which were found in the mountain range. This group is still well represented, and it can be thought that a good availability of prey exists in such a way that the system can support predators as large and specialized as the puma (Felis concolor). It is feasible that a sufficient capacity of prey to maintain a pair of adult wolves exists, even though this conclusion is uncertain since it is necessary to know the density of prey (white-tailed deer, peccary, wild turkey, and small mammals) which could be used by the wolves.

4.4 Transects of auditory stimuli

Responses (5.8%) were obtained at only two stations, as much for the sampling of the month of July as for August. This data does not concur with the results obtained by Harrington and Mech (1982), even though their recommendations were followed. It was hoped that in July and August, we would have an index of responses much higher than that found; however, there were only responses which seemed to be from a solitary animal, even though the second response was a typical wolf howl. This hap-

pened August 13 at 21:30 hours, 8 km. to the NW of the Rancho los Sauces (Map 6), the response being heard following the third part of the recording after a 35 second wait.

The other response heard, was July 16 at 20:46 hours, 12 km. from the town of El Encinal on the road to the mina de Promontorio (Map 6). This response was heard 22 seconds after the end of the third part of the recording. The site was a gorge in the pine-oak forest which borders the Cerro del Promontorio. The response was heard on only one occasion and was very far away.

It seems that the technique used, gave good results since Harrington and Mech (1982) note that with this technique, adult wolves and pups respond more than adult solitary wolves. Moreover, Harrington and Mech (1982) found that this method is almost useless in detecting solitary wolves. Because of the preceding, it can be supposed that the animal which responded forms part of an adult pair. Notwithstanding, we do not have data to affirm whether they are adults at a reproductive age or not.

4.5 Total area examined

The total area sampled in the Sierra del Promontorio was 778 square kilometers, divided in the following manner: 64 square kms. were of olfactory stations and 714 square kms. of auditory stimuli through howls.

The difference between areas sampled with each technique is evident. It was very difficult to continue carrying out the first technique (olfactory stations) because there is only one road for double traction vehicles, which is the one which connects the old and abandoned mines of Promontorio with the common lands of Encinal and la Campana, and all other routes in this mountain range are horse trails. The other technique utilized, covered a larger area and was relatively easy to perform. It was decided to implement this technique more because of the reach it has, and because of the conditions present in the rugose and rolling heights of Promontorio.

5. CONCLUSIONS

5.1 Concerning the presence of wolves in the Sierra del Promontorio, Durango.

The results obtained in the present study are evidence of the presence of wolves in this zone; nevertheless, due to the fact that the wolf is usually elusive, is found in very low densities, travels extensive areas and gathers only in pairs or small packs, the methods of proof become extremely difficult, and large extensions must be covered to know how many animals still live in that zone. Based on the answers given by the ranchers of the zone and our results, it can be said that in

this zone exist a pair of wolves, even though we cannot know if they are at a reproductive age.

The methods of census used in the present study were those most accessible and adequate for the conditions of the Sierra del Promontorio, this being the first occasion on which we used them to detect the presence of the Mexican wolf.

5.2 Attitudes of the campesinos and ranchers of the area

The opinions and attitudes which these people have about the wolf are not positive, which was to be expected in the ranchers and some hunters. Nevertheless, the fact that the wolves no longer exist in great numbers, and that they no longer cause the loss of too many of their cattle, has considerably diminished the trapping and control of these animals. In this way, it is now a rare occasion in which these people place poisoned bait for the wolves, or actively hunt them. Another characteristic which can have an influence in the area so that the wolves can exist, is that this area is not used to raise cattle on a grand scale, even though some people lead their cattle to higher ground in the sierra to pasture during the dry time. When they gather the cattle to lead them down, and they do not find all of their animals, they give that some cattle are lost due to depredation by puma or wolf.

5.3 Prospects for the Sierra del Promontorio as a Reserve for the Mexican wolf

One of the objectives of this study is the selection of areas susceptible to the reintroduction of wolves, as well as to propose an area so that it will constitute a protected area for wolves.

The Sierra del Promontorio brings together a series of characteristics which we believe are good to protect not only the Mexican wolf, but also would be a reserve of the common genetic and biotic property of the populations of the wild flora and fauna of the state of Durango. This is a relatively isolated area with difficult access, and which does not enter into the plans for forestry, agricultural, and ranching development of the state government. On the other hand, it was found that this area is well represented in regards to species of herbivores and predators as well as by an interesting diversity of plant and forest species. Immediately afterwards, the principal characteristics which the area presents, and which can be made use of to establish an ecological reserve, are explained.

5.3.1 Natural barriers

The boundaries of the protected areas can fall into two categories: natural and artificial. Of course it is competent

or more advantageous to maintain a zone isolated by natural barriers. This brings as a consequence that the fluxes of migration and emigration keep the populations in dynamic balance, thus giving the most stability to the ecosystem. The Sierra del Promontorio is a naturally isolated area, as it is surrounded on the south by an extensive plain which is principally used for agriculture, while to the northeast it is encompassed by drier plains of semi-arid shrubs.

5.3.2 Legal Limits and biotic limits

The legal boundaries of a protected zone, and those borders established by the higher authorities of a country or state, can change as a result of legal or legislative action.

The biotic boundaries are hypothetical borders necessary to maintain the existence of ecological processes within a protected area. In practice, the biotic limits are given by the complete watershed of a protected area, and is the area necessary to maintain a minimum viable population of terrestrial species with large areas of contour which are found within the legal limits (Newmark, 1985).

The act of proposing an area for a reserve and to protect some animal or plant specie, implies a contest between that which could be proposed as a protected area, and that which will be accepted to be protected by the legal authorities of the country, which is to say between the legal limits and the biotic limits. It is in this area where the action on the part of SEDUE and its departments of legislation of protected areas will take the major interest, if SEDUE really wants to do something to save the Mexican wolf from its now imminent extinction.

5.3.3 Ideal area for a Reserve for the Mexican wolf

Much has been written regarding the area of habitation which the wolves in Alaska, Canada, and Minnesota have, giving measurements of their territory (Murie, 1954, Mech, 1970, Fuller, 1982). However, no study on the Mexican wolf exists; their areas of habitation and displacement being unknown. For this study, the areas in the bibliography were considered, obtaining an average of 785.6 square kilometers ($DE=1163.75$ kms., $N=19$, $Range=57.9-8045$ square kms.). Another characteristic is that the largest areas have been found in Alaska and the smaller areas are more towards the south in Minnesota (Mech, 1970); by which, it is feasible that the areas will be smaller in Mexico.

The area measured in the Sierra del Promontorio starting from the cartography of DETENAL, using the map of ground use and vegetation (scale: 1-1000000), has a surface area of 1394.86 square kms., having its major axis of 74 kms. and its minor axis of 24 kms. This is half the size of the area of habitation for the wolves reported from Alaska and Minnesota. It must also be taken into consideration that the measurements were

taken from a cartography, by which knowing the rugged relief of the zone with certainty, the actual area is much greater.

Another important characteristic of the area, is that it does not enter the boundaries of lumber exploitation of the state, nor is it used as an intensive cattle raising zone or as an agricultural zone, its traditional activity being mineral extraction.

The fact of attempting to protect a predator, as is the Mexican wolf, does not end there. This would be the final phase and the product of a good policy of conservation in the direction of biotic resources, which include the flora and fauna; since it is known that there exists an intimate relationship between each and every one of the elements which form an ecosystem. This intent to protect one predator would not work if measures for the protection of the species which serve as prey for these animals are not designed ahead. It is necessary to create an ecological reserve which conserves the richness of the flora and fauna of the state of Durango as well as the genetic, biological, and cultural common property. With respect to the latter, it should be remembered that the wolf and the oak are the symbols represented on the shield of the state of Durango.

5.3.4 Legal measures

Without doubt, the task of proposing an area for an ecological reserve is an arduous and constant one. It is in this field where SEDUE has more obligation, without forgetting that it is necessary to join forces with universities, research institutions, international societies for the protection of nature and wildlife, as well as individuals who are interested in this work.

These efforts should increase even more when the species to protect are in danger of extinction, and form part of the natural and cultural inheritance of a nation; without forgetting that in nature, predators are an important part of the dynamics of natural life, and this might be the last opportunity to save the Mexican wolf (Canis lupus baileyi) from its disappearance in Mexico.

5.3.5 Situation of the possession of the land in the Sierra del Promontorio-San Francisco

The list of names of the farms, public lands and properties, has been obtained for the area proposed for the Reserve of the Mexican wolf in the Sierra del Promontorio-San Francisco.

6. RECOMMENDATIONS

1. An area of 1394 square kilometers in the Sierra del Promontorio is proposed for the reintroduction and protection of the Mexican wolf, as well as to extend the protection to the wild

flora and fauna.

2. To maintain wolves in captivity in small groups, like the one which exists in the Reserva de la Biosfera de la Michilia, in order to implement a program of reproduction and preparation for possible liberations in the Promontorio zone.
3. To undertake a broadcast campaign about the basic biological aspects of this predator.
4. To implement research studies with other universities and research institutions, national and international societies, state and federal governments.

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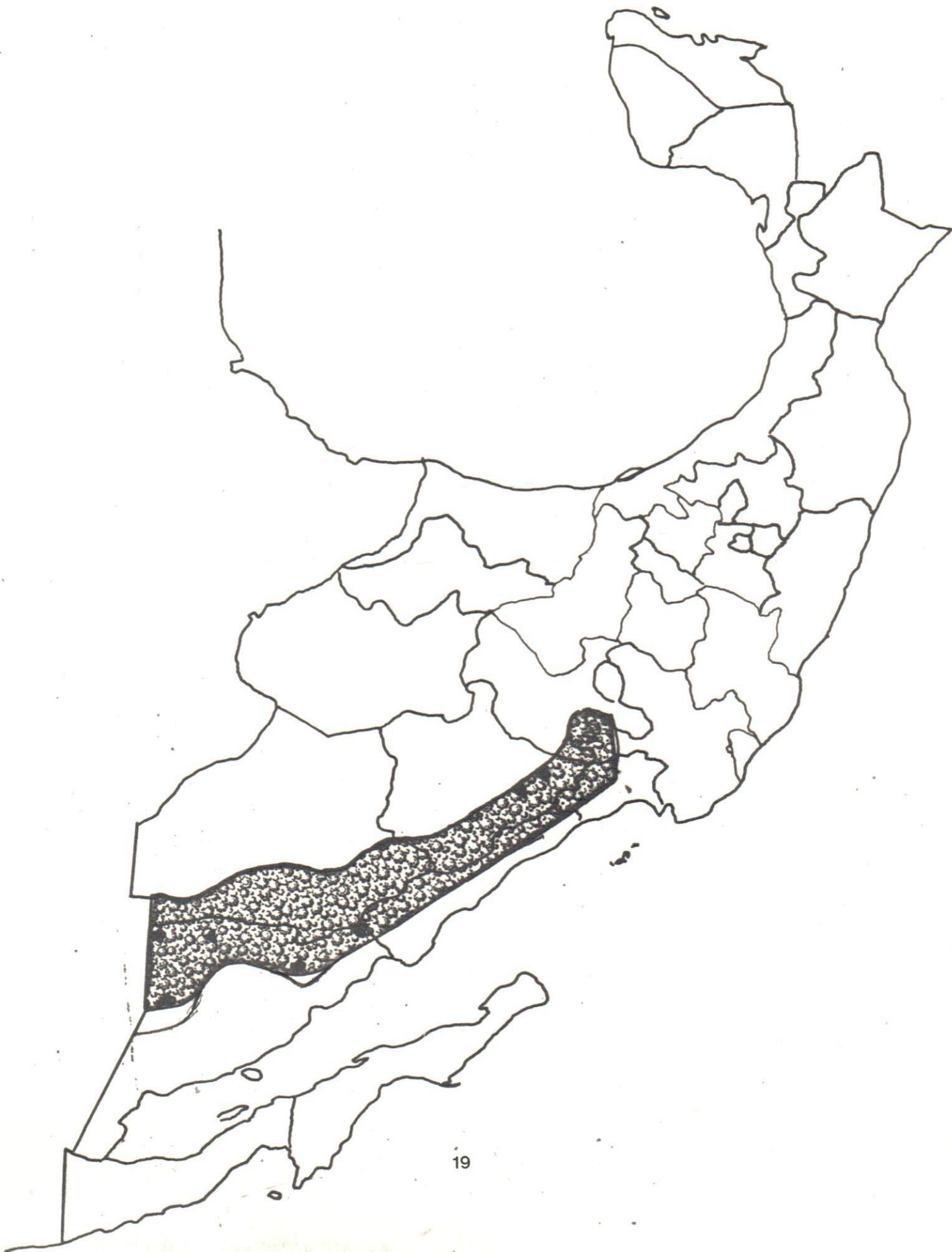
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Mapa 1.- Localización de la Sierra del Promontorio-San Francisco, Municipio de Canatlán, Coneto de Comonfort, Rodeo, El Oro, Santiago Papasquiaro y San Juan del Río, Estado de Durango.

Mapa 2.- Distribución Original del Lobo Mexicano (*Canis lupus baileyi*) en México (tomado de Hall 1981).



Mapa 3.- Distribución del Lobo Mexicano en México (tomado de Leopold 1959).



Mapa 4.- Distribución del Lobo Mexicano en México (tomado de McBride 1980)



Mapa 5.- Distribución actual del Lobo Mexicano en México según los resultados obtenidos durante la primera etapa de este estudio (Hernández et al. 1985)

