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DISTRIBUTION AND STATUS OF GREATER SANDHILL CRANES IN NEVADA

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Abstract: Nesting habitat of the Lower Colorado River Valley Population (LCRVP) of greater sandhill cranes (*Grus canadensis tabida*) was censused in northeastern Nevada from 1983 through 1986. Ninety-two nesting pairs and 594 cranes were located. Eighty-two percent were observed in central Elko County. Cranes were marked from 2 summer range locations and from the Lund, Nevada traditional spring migration stopover with patagial streamers. Cranes marked on summer range wintered on the lower Colorado River, in the Imperial Valley near Brawley, California and on the Gila River in southwestern Arizona. Cranes marked at the stopover were observed on summer range in Elko County and lower Colorado River winter range. Two cranes marked at the stopover were also observed on Rocky Mountain Population (RMP) fall staging and wintering areas indicating a portion of cranes using the stopover are members of the RMP. Spring stopover counts are not a valid measure of LCRVP trend because an unknown number of cranes from at least 1 other population also use the stopover, peak periods of use vary from year to year and peak numbers using the stopover can fluctuate drastically between years. The only method currently used to monitor the size and trend of the entire LCRVP are censuses conducted on winter range. The LCRVP probably numbers between 1800 and 2000 birds. If significant numbers of cranes from adjacent populations also winter with the LCRVP, winter range counts would be rendered invalid.

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Most of the Lower Colorado River Valley Population (LCRVP) of greater sandhill cranes nest in northeastern Nevada (Fig. 1). A segment of the population may also nest in extreme northwestern Utah, south-central Idaho and Malheur County, Oregon (Brown 1983).

Only limited investigations have been conducted to determine the distribution and status of cranes summering in Nevada. Drewein et. al. (1976) captured and color-marked 6 juvenile cranes from 2 Elko County, Nevada locations in the early 1970's, and subsequent observations indicated they wintered along the lower Colorado River near Poston, La Paz County, Arizona and made use of a spring migration stopover at Lund, White Pine County, Nevada before migrating to summer range. Small numbers of cranes wintering 11 km southeast of Brawley, Imperial County, California and along the Gila River between Buckeye and Gila Bend, Maricopa County, Arizona were also suspected to be members of the LCRVP (Bron 1983).

LCRVP population estimates and trends have been based on counts conducted by the Nevada Department of Wildlife (NDOW) at the Lund spring migration stopover, fall age ratios obtained by NDOW and upon intermittent counts of cranes on winter range by various individuals and agencies.

In 1983 NDOW launched a study through its nongame wildlife program to determine the distri-

bution and numbers of cranes summering in Nevada, further identify LCRVP winter ranges and review the validity of surveys traditionally conducted by NDOW to monitor the population.

METHODS

Most suitable nesting habitat in northeastern Nevada was surveyed with a helicopter in spring 1983 and with fixed wing aircraft in spring 1984 through 1986 (Fig. 2). NDOW observation records were used to estimate the number of cranes using locations not aerielly surveyed. Breeding pairs were identified by the presence of nests or young.

Forty-nine cranes were captured and color-marked with patagial streamers: 23 from 2 summer range locations in Ruby and Lamoille valleys, Elko County in fall 1984 and 1985, and 26 from the Lund spring stopover in 1985 and 1986 (Fig. 3). Different colored markers and marker codes were used to identify trap locations and individual cranes.

Aerial and ground surveys to locate marked cranes were conducted on Nevada summer range in spring 1985 and 1986, at the Lund spring stopover in February and March 1985 through 1987, and on suspected wintering areas in January 1986. Observations of marked cranes were also solicited from agencies and individuals responsible for crane management throughout the western United

States.

Population counts were conducted at the Lund spring stopover from 1976 to 1987, and in spring 1985 and 1987 simultaneous counts were conducted by NDOW at the stopover and on wintering areas by the Arizona Department of Game and Fish, California Department of Fish and Game and the U.S. Fish and Wildlife Service.

Surveys were conducted by NDOW in fall 1977 through 1983 to determine percent young in the population as an expression of annual post-fledging recruitment to the LCRVP.

RESULTS AND DISCUSSION

Nevada Distribution

Ninety-two nesting pairs and 594 cranes were located in northeastern Nevada (Table 1). Eighty-two percent of all cranes were observed in central Elko County along the Humboldt River, the upper North Fork of the Humboldt River drainages, and in Independence, Ruby, Lamoille, Huntington and Starr valleys. The southernmost observation of cranes was made in Lake Valley, Lincoln County, and the westernmost in Squaw Valley near Midas, Nevada in western Elko County (Fig. 2).

A considerable amount of what appeared to be suitable crane nesting habitat was unoccupied. Most areas were aerially surveyed during unusually high water years, therefore some locations which appeared to constitute nesting habitat may be unsuitable during normal or low water years.

Marked Crane Observations

Ruby Valley marked cranes (6) were subsequently observed in fall 1985 through 1987 on summer range in Ruby and Lamoille valleys. Three of those were observed at the Lund spring stopover, and on winter range, 1 was observed on the Colorado River Indian Reservation near Poston, Arizona, 2 on the Cibola National Wildlife Refuge, La Paz County, Arizona and 3 along the Gila River near Gila Bend, Arizona (Fig. 3, Table 2).

Lamoille Valley marked cranes (17) were subsequently observed in Ruby and Lamoille valleys in 1985 and 1986, and in summer 1985, 1 individual was observed on the Mary's River, Elko County approximately 32 km northeast of the Lamoille Valley capture site. Eight Lamoille Valley cranes were observed at the Lund spring stopover, and on winter range, 1 was observed 11 km southeast of Brawley, California, 6 on the Cibola National Wild-

life Refuge and 5 along the Gila River (Fig. 3, Table 2).

Two of the 26 cranes marked at the Lund spring stopover were observed in spring 1985 in Ruby Valley and 1 was observed near North Fork, Elko County, Nevada in spring 1986. One Lund crane was observed in fall 1986 in Ruby Valley and 4 individuals were observed in Lamoille Valley. Six Lund cranes were observed at the stopover in years following capture. During fall migration, 1 Lund marked mortality was recovered from the Key-Pittman Wildlife Management Area near Hiko, Lincoln County, Nevada and 1 Lund crane was observed near Alamosa, Rio Grande County, Colorado (R. Drewein pers. comm.) on a fall staging area used greater sandhill cranes comprising the Rocky Mountain Population (RMP). Four Lund cranes were observed in January 1986 on the Colorado River Indian Reservation and the Cibola National Wildlife Refuge. Lund cranes were not observed at the Brawley and Gila River wintering areas. At least 2 Lund cranes wintered near Polvadera, Socorro County, New Mexico and on the Bosque del Apache National Wildlife Refuge, Socorro County, New Mexico (R. Drewein pers. comm.), both wintering grounds for the RMP (Fig. 3, Table 2).

Observations of color-marked cranes indicate most, if not all, cranes summering in Ruby and Lamoille valleys use the Lund spring stopover and winter along the Gila River, the lower Colorado River and the vicinity of Brawley.

Observations of Lund cranes on Colorado fall staging and New Mexico wintering areas indicate some portion of the cranes using the Lund stopover are members of the RMP. Some RMP cranes currently winter near Wilcox, Cochise County in southeastern Arizona (Drewein & Bizeau 1974). Although marked cranes were not observed at Wilcox, some cranes using the stopover may winter here as well, since the Wilcox wintering area is nearer Lund than wintering areas in New Mexico.

Some mixing of the LCRVP and RMP may also occur on summer range. In 1974 a juvenile crane marked on summer range in the Bear River Valley near Cokeville, Lincoln County, Wyoming was observed on the Mary's River north of Deeth, Elko County, Nevada (Drewein et. al. 1976).

Collectively, observations of marked cranes indicate LCRVP and RMP crane range probably overlap to some degree on the eastern fringe of the LCRVP's range. It is conceivable a similar exchange may occur between members of the Central Valley Population (CVP) and the LCRVP on

the western fringe of the LCRVP's range.

Population Estimates and Trend

The most exhaustive counts of wintering LCRVP cranes were conducted by Perkins & Brown (1981) during the winters of 1978-79 through 1980-81 (Table 3). Wintering populations ranged from 1601 in 1978-79 to 1807 in 1980-81. In January 1986, in this study, approximately 50 more cranes were observed at the Brawley and 80 more on the Gila River wintering grounds than in previous high counts for those areas.

Cranes traditionally arrive at the Lund spring stopover in early February and usually abandon in mid-March. The largest number of cranes observed at the stopover was 1459 in 1984. The results of simultaneous stopover and wintering ground counts were 1690 and 1736 cranes observed in 1985 and 1987, respectively. Peak numbers of cranes using the stopover can fluctuate drastically between years. In 1986, crane numbers declined from 1427 in 1985 to 340; possibly attributable to unseasonable mild weather on summer range in February and March 1986. Peak periods of use varied by as much as 2 weeks since counts were initiated in 1976.

Between 1800 and 2000 cranes probably comprise the LCRVP. Current understanding of the LCRVP suggests conducting counts on LCRVP winter range is the most reasonable strategy for monitoring the population. Stopover counts are not reliable indicators of population size because peak numbers and peak periods of crane use can vary between years and an unknown number of cranes using the stopover are members of the RMP.

Fall Age Ratios

Percent young in the population ranged from a low of 2.2 in fall 1977 to a high of 14.8 in fall 1979 averaging 6.9% over the 7 year period. In 1984 NDOW abandoned the use of age ratios as a determinant of recruitment due to an inability to classify an adequate number of cranes per the sampling formula of Czaplewski et. al. (1983) (NDOW, on average, was classifying less than 41% of the required sample of cranes) and because the application of age ratios in a population with several sub-adult cohorts indistinguishable from adults does not, in itself, reflect the reproductive success of breeding pairs or the upward or downward trend of a population (Caughley 1974).

Management

In Nevada cranes are not hunted and management activities have been limited to delineating and monitoring the population. Most Nevada crane nesting habitat is located on private lands, and currently NDOW is working with The Nature Conservancy to acquire a portion of Franklin Lake, a major nesting area, in Ruby Valley.*

Loss of winter roosting habitat on the lower Colorado River is a major concern. In 1981, Cibola National Wildlife Refuge initiated construction of an 8.1 ha roost site and plantings of cereal crops for forage (Brown 1983). In recent years, 700 to 1200 cranes have annually wintered at Cibola, but depredations of crops on private lands adjacent to the refuge have developed (W. Martin, Refuge Manager, pers. comm.). In 1987 the Pacific Flyway Council recommended that the U.S. Fish and Wildlife Service purchase croplands in the vicinity of Cibola to alleviate depredation problems and secure foraging habitat for the population. These acquisitions are proceeding (W. Martin pers. comm.).

CONCLUSIONS

Results of summer and winter range inventories suggest the LCRVP is currently stable or increasing. The disparity between the number of cranes observed summering in Nevada and the number of cranes on identified winter range may be attributable to 2 factors: a large number of LCRVP cranes may summer in Idaho and/or significant numbers of cranes from adjacent populations may use LCRVP winter range. If a significant number of cranes from other populations share LCRVP winter range, identification of LCRVP cranes as a distinct population based solely on winter range distribution becomes questionable and winter range counts would be invalidated as a method for monitoring the population. Since winter censuses are the only method currently available to monitor the LCRVP, managers responsible for the population need to investigate and determine the degree of mixing between populations on winter range. If significant overlap between populations on winter range does occur, alternate methods of monitoring will need to be explored, developed, and implemented.

Although only the most cursory nesting habitat investigations have been conducted, it appears a considerable amount of habitat is unoccupied.

*Acquired in spring 1988.

Until the habitat elements which must be present for cranes to successfully nest in Nevada are known, it is not possible to determine how much nesting habitat is actually available. Factors limiting reproductive success in the LCRVP have not been investigated, although specific causes of significant nesting failure and pre fledging mortality have been identified in the adjacent CVP (U.S. Fish & Wildlife Service 1978). NDOW will attempt to answer these questions in the future and will continue to work with the LCRVP flyway subcommittee to monitor the population, identify management concerns and develop management strategies to ensure the population's well-being.

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Table 1. Number of known breeding pairs and largest numbers of cranes observed prior to fall staging by location in Northeastern Nevada, 1983-86

LOCATION	BREEDING PAIRS ^a	LARGEST No. OBSERVED ^b
Elko County		
Humboldt River	1	27
Mary's River	2	19
Upper North Fork Drainage	12	63
South Fork Owyhee River	1	6
Susie Creek	1	2
Salmon Falls Creek	1	13
Horse Creek	1	2
Thousands Spring Creek	0	10
Penrod Creek	1	2
Goose Creek	1	2
Bruneau River	1	2
Yankee Bill Creek	1	2
Independence Valley	14	110
Ruby Valley	25	182
Huntington Valley	7	37
Lamoille Valley	4	59
Starr Valley	6	12
Squaw Valley	0	2
Metropolis	2	4
White Pine County		
Steptoe Valley	6	17
North Spring Valley	0	8
South Spring Valley	1	2
Newark Valley	3	13
Lincoln County		
Lake Valley	1	2
Total	92	594

^a Based upon presence of nests or young.
^b Excluding young.

Table 2. Minimum number of different marked cranes observed by location in Nevada from 1984 to 1987.

LOCATION OBSERVED	TRAP LOCATION	MINIMUM NO. of MARKED INDIVIDUALS
Spring Stopover		
Lund, NV	Ruby Valley	3
	Lamoille Valley	8
	Lund, NV	6
Summer Range		
Ruby Valley, NV	Ruby Valley	2
	Lamoille Valley	3
	Lund, NV	3
Lamoille, NV	Ruby Valley	1
	Lamoille Valley	5
	Lund, NV	4
Mary's River, NV	Lamoille Valley	1
North Fork, NV	Lund, NV	1
Fall Migration		
Alamosa, CO	Lund, NV	1
Key Pittman WMA, NV	Lund, NV	1
Winter Range		
Brawley, CA	Lamoille Valley	1
Colorado River IR	Ruby Valley	1
	Lund, NV	1
Cibola NWR, AZ	Ruby Valley	2
	Lamoille Valley	6
	Lund, NV	3
Gila River, AZ	Ruby Valley	3
	Lamoille Valley	5
Polvadera, NM	Lund, NV	2 ^a
Bosque del Apache NWR, NM	Lund, NV	2 ^a

^aAt least 1 of these cranes wintered in both areas in successive years.

Table 3. Selected winter observations of LCRVP cranes in Nevada from wintering locations currently used by the populations.

LOCATION	NUMBER OF CRANES	WINTER OF:	SOURCE
California			
SE of Brawley	60	1951-52	Salton Sea NWR Narrative Report (Brown 1983)
	49	1970-71	C.D. Littlefield (Brown 1983)
	205	1980-81	Perkins & Brown (1981)
	283	1985-86	NDOW
Arizona			
Colorado River IR	210	1960-61	L.D. Hatch (Brown 1983)
	800	1970	C.D. Littlefield, W.H. Mullins (Brown 1983)
	1349	1979-80	Perkins & Brown (1981)
	416	1985-86	NDOW
Cibola NWR	61	1966-67	Cibola NWR Narrative Report (Brown 1983)
	120	1975-76	Cibola NWR Narrative Report (Brown 1983)
	258	1978-79	Perkins & Brown (1981)
	759	1983-84	Cibola NWR
	481	1985-86	NDOW
Gila River (between Buckeye and Gila Bend)	85	1949-50	V.H. Householder (Brown 1983)
	18	1955-56	V.H. Householder (Brown 1983)
	50	1970	C.D. Littlefield (Brown 1983)
	79	1980-81	Perkins & Brown (1981)
	155	1985-86	NDOW

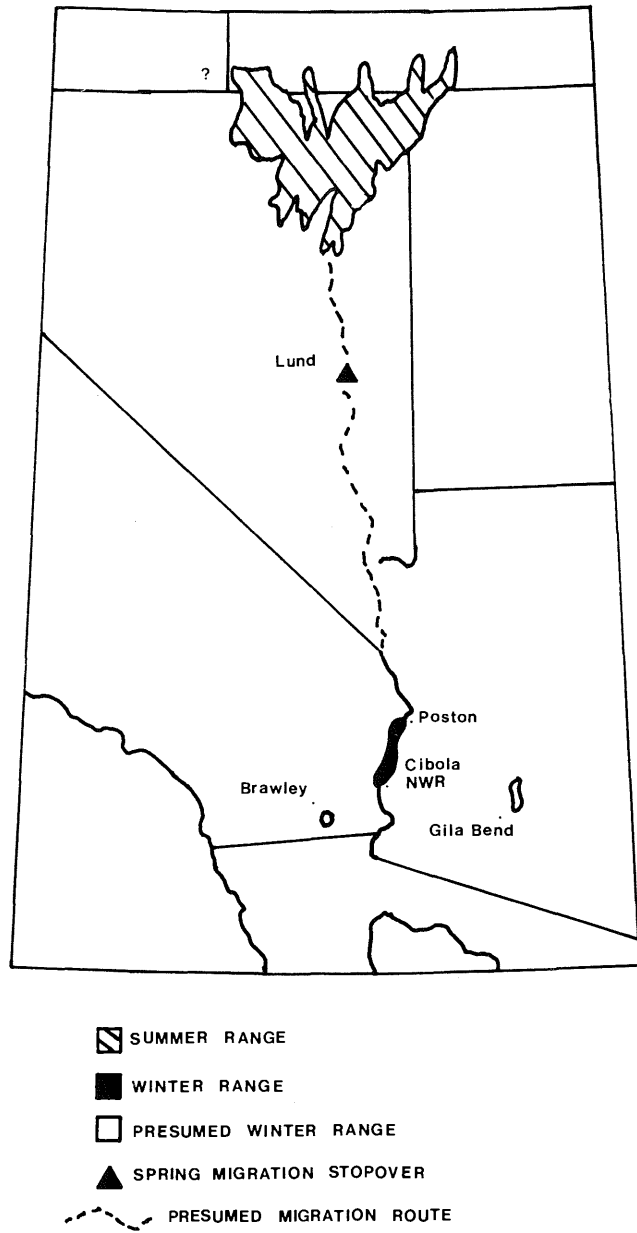


Figure 1: LCRVP distribution as identified in the 1983 LCRVP flyway management plan (modified from Brown 1983).

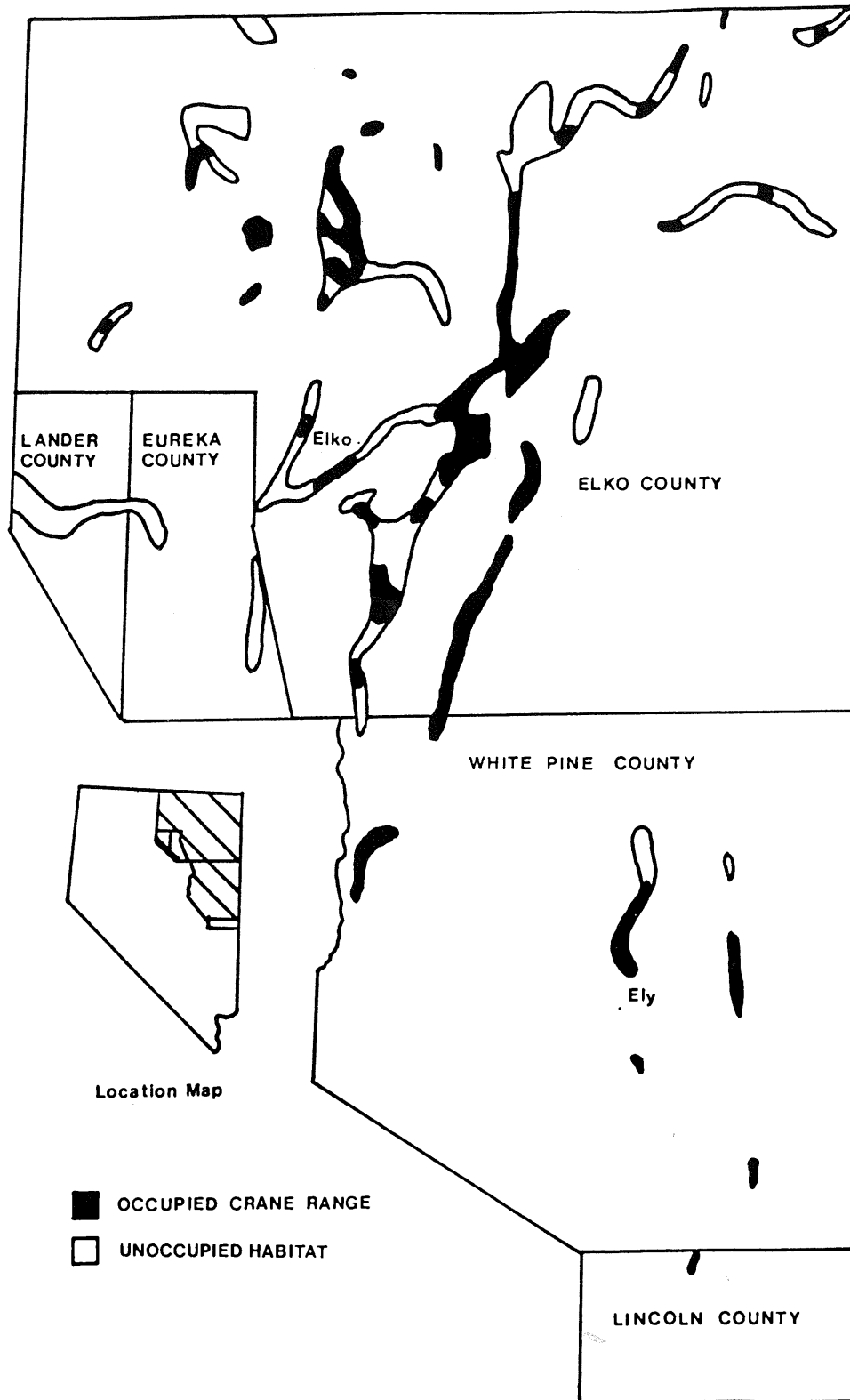


Figure 2. Occupied and unoccupied crane habitat in northeastern Nevada.

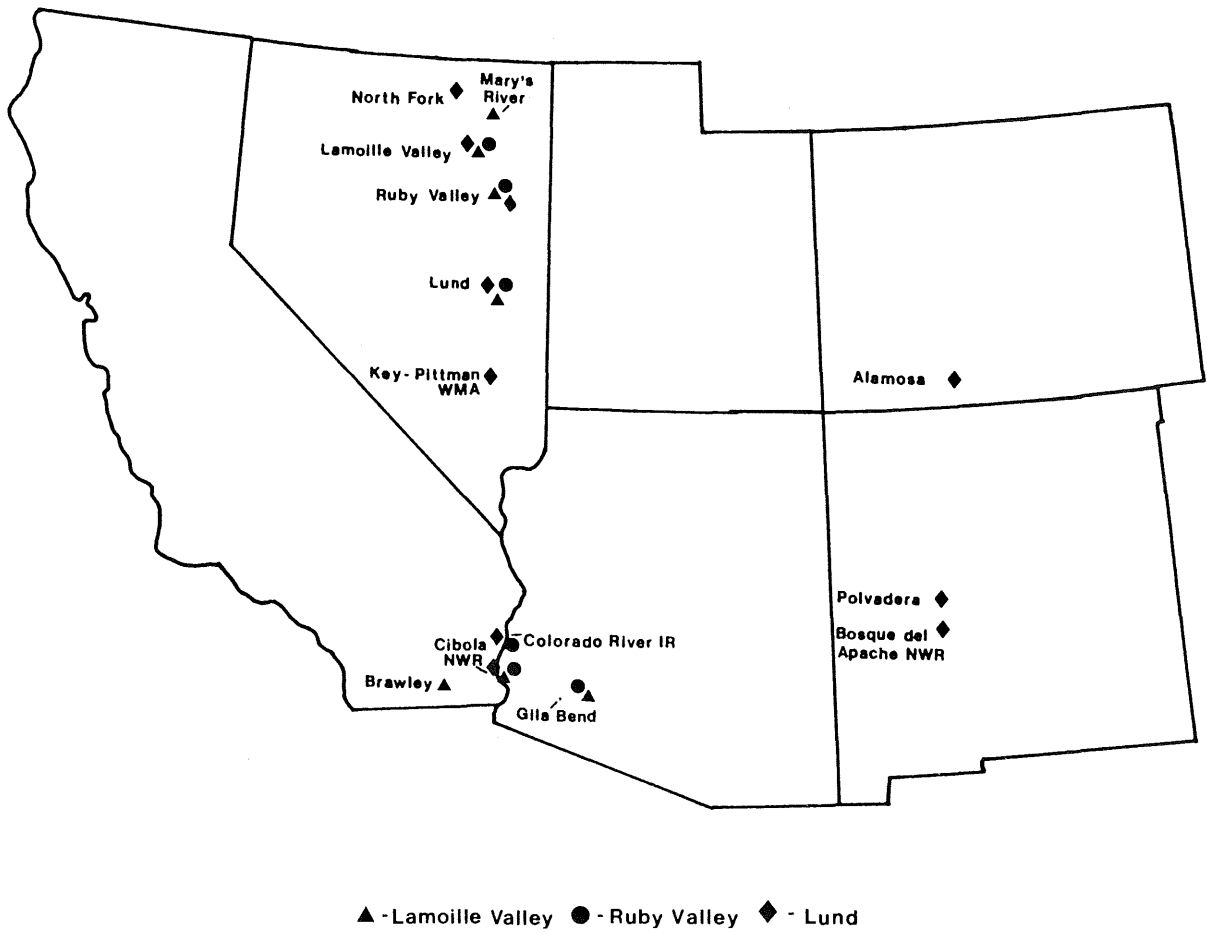


Figure 3. Observations of cranes marked from Lamoille Valley, Ruby Valley and the Lund Spring Stopover.