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Revised Original

JOB PROGRESS REPORT

State: California

Project Number: W-54-R-11 Project Title: Nongame Wildlife Investigations

Job Number: III-1.0 Job Title: California Raptor Survey

Period Covered: July 1, 1978 - June 30, 1979 Job Type: Survey and Inventory

SUMMARY:

In January and May 1979 forty-two routes totaling 3,420 miles were surveyed resulting in sightings of 3,826 raptors of 16 species. This represents an average of 112 raptor sightings per 100 miles, the lowest recorded since 1973 when 110 raptors per 100 miles were reported on a similar sized sample of raptor survey routes.

BACKGROUND:

Raptor surveys were initiated in December 1970. During the first surveys, a total of 54 routes were sampled 4 times per year to record the number of raptor species observed. Raptor routes were established in areas where raptors were known to concentrate during the winter and breeding season. The number of routes sampled was reduced to 42 in 1975 and these were run during January and May. In 1976 it was decided to run a 15 route sample each year and a 42 route sample every third year.

After a 15 route sample was run during 1977 it was recommended to discontinue the 15 route surveys and conduct a 42 route survey once every 4 years; in 1979 the first 42 route survey was conducted according to the latest recommendations.

OBJECTIVES:

The objectives are to determine the relative abundance and population trends of raptors wintering and breeding in California. The surveys are not intended to yield absolute population numbers, but rather to provide a comparative index of population trends in diurnal birds of prey.

PROCEDURES:

Department personnel are requested to run 42 raptor routes in January and May. Surveys are run between the first and fifteenth of each month along routes that were first established in December, 1970. The routes are 30 to 50 miles long and are traveled at speeds of 20 miles per hour or less whenever possible. Surveys begin at 1100 hours and are completed by 1500. All raptors sighted are recorded and weather conditions are noted at the beginning and end of each survey.

FINDINGS:

In the past, data on surveys often was incomplete thus reducing usefulness of

information gathered in meeting the objectives. However, during 1979, 41 of 42 routes were completed in January and 38 of 42 routes were run in December (Table 1) thereby resulting in a successful generation of data adequate to meet the objectives. The time period for running raptor routes was extended an additional 10-15 days each month to ensure that work conflicts and poor weather conditions would not result in unsurveyed routes.

A total of 1,712 miles were traveled in January and 1,702 miles were traveled in May yielding 2,409 and 1,417 raptor sightings respectively. This represents 135 raptors per 100 miles during winter and 89 per 100 miles during the breeding season (Table 2).

Raptor sightings were tabulated by region (Tables 3 and 4) and geographic area (Tables 5 and 6). Most frequently reported raptors were Red-tailed Hawk (31.4% of all sightings), Turkey Vulture (27.4%), American Kestrel (18.5%), Marsh Hawk (4.6%), Rough-legged Hawk (2.6%), Golden Eagle (2.2%), and White-tailed Kite (2.0%). The remaining nine species represented 11.3% of the sightings and 5.4% were unidentified. There were no reports of California Condor, Goshawk, or Peregrine Falcon.

The Sacramento Valley-Delta and North Coast routes produced the most winter raptor sightings per 100 miles (175.3 and 166.6 raptors per 100 miles respectively) with South Coast (135.5) and San Joaquin and Antelope Valleys (125.1) following. During the breeding season, North Coast (157.7) and Sacramento Valley-Delta (113.1) had the highest number of raptors per 100 miles.

#### ANALYSIS:

During the 1979 survey adequate information was gathered to meet the objectives; however, it is unknown what relevance these data have to those gathered on previous, sometimes incomplete surveys. An effort was made to ensure as complete coverage of the 42 routes each season as possible. In addition, it was stressed that two observers be present to survey each route. This appeared to be the case in over 80% of the surveys.

Since some trends appeared in 1979 that may warrant close monitoring over the next few years, it will be necessary to run full 42 route surveys each year until more complete information can be gathered on apparent declines of such species as White-tailed Kites and American Kestrels, particularly in the Sacramento and San Joaquin Valley areas. Most of the remaining soaring species populations appear to remain stable with some notable exceptions. Swainson's Hawks were virtually undetected, indicating an extremely small breeding population; Marsh Hawk populations may be declining in certain portions of their range in California; and the Accipiters and Red-shouldered Hawks remain largely undetected due to the unsuitability of the survey method used.

#### RECOMMENDATIONS:

1. Continue to run 42-route surveys to determine direction of population trends of White-tailed Kites, American Kestrels, Swainson's Hawks, and Marsh Hawks.
2. Subject all raptor survey data to computer and statistical analyses to determine validity of apparent population trends.

3. Develop alternate survey methods to determine population trends of Accipiters and Red-shouldered Hawks. Initiate first surveys in 1980.
4. Continue to maintain close communication with personnel designated to run raptor routes to ensure complete coverage. Use volunteers or make necessary adjustments to ensure that no survey route is neglected during each scheduled time period.

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Date: October 1, 1979

TABLE 1

## Raptor Survey Routes - 1979

<u>Route Name</u>	<u>County</u>	<u>Route No.</u>
<u>Region 1</u>		
Garberville-Bridgeville	Humboldt	R1-12-01*
Litchfield-Nevada Line	Lassen	R1-18-01
Warm Springs Valley	Modoc	R1-25-01
Redding-Platina	Shasta	R1-45-01
Lower Klamath-Butte Valley	Siskiyou	R1-47-01*
	Total -- 5 routes	
<u>Region 2</u>		
Sacramento River	Butte, Glenn & Tehama	R2-4-01*
Calaveras-Stanislaus	Calaveras & Stanislaus	R2-5-01
Colusa	Colusa	R2-6-01
Sierra Valley	Plumas & Sierra	R2-32-01*
White Rock	Sacramento	R2-34-01*
Bradford-Jersey Island	Sacramento	R2-34-02
Sutter-Natomas	Sutter	R2-51-01
North Yolo	Yolo	R2-57-01
	Total -- 8 routes	
<u>Region 3</u>		
Bodega Bay-Stafford Lake	Marin & Sonoma	R3-21-01
Coast Highway #1	Mendocino	R3-23-01
Longvale-Covelo	Mendocino	R3-23-02
King City-Santa Ana Valley	Monterey	R3-27-02
Napa-Lake Berryessa	Napa	R3-28-01
San Juan Valley	San Luis Obispo	R3-40-01*
Paso Robles-Laguna Lake	San Luis Obispo	R3-40-02*
Mt. Hamilton-Livermore	Santa Clara & Alameda	R3-43-01
Santa Cruz-Pescadero Marsh	Santa Cruz	R3-44-01
Grizzly Island	Solano	R3-48-01*
Laguna de Santa Rosa-Sulphur Creek	Sonoma	R3-49-01*
	Total -- 11 routes	
<u>Region 4</u>		
Los Banos Wildlife Unit	Fresno	R4-10-02*
Tehachapi Wildlife Unit	Kern	R4-15-01
Avernal Wildlife Unit	Kings-Kern	R4-16-01
Madera Wildlife Unit #1	Madera	R4-20-01
Turlock Wildlife Unit	Merced	R4-24-01
Ridgecrest Wildlife Unit	San Bernardino-Inyo	R4-36-01
Sequoia Wildlife Unit	Tulare	R4-54-01
	Total -- 7 routes	

TABLE 1 (Cont.)

<u>Route Name</u>	<u>County</u>	<u>Route No.</u>
<u>Region 5</u>		
Imperial Wildlife Area	Imperial	R5-13-03*
Pleasant Valley-Big Pine	Inyo	R5-14-01*
Palmdale-Gorman	Los Angeles	R5-19-01*
North Mono	Mono	R5-26-01
Lake Mathews	Riverside	R5-33-01
Palo Verde Valley	Riverside	R5-33-02*
San Jacinto Unit	Riverside	R5-33-03
Topock Gorge	San Bernardino	R5-36-02
New York-Providence Mt.	San Bernardino	R5-36-03
Camp Pendleton	San Diego	R5-37-01*
Orcutt-Vandenberg	Santa Barbara	R5-42-03

Total -- 11 routes

State Total -- 42 routes

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\* 15 Sample routes.

TABLE 2

Raptor Survey, Statewide Summary of Birds  
per 100 Miles, 1971-1975

<u>Year</u>	<u>Month</u>	<u>Miles Traveled</u>	<u>Raptors Reported</u>	<u>Raptors per 100 Miles</u>
1971	Jan.	2,335.2	2,793	106.2
	May	<u>2,337.7</u>	<u>2,103</u>	<u>90.0</u>
Total		4,672.9	4,896	104.8
1972	Jan.	2,331.0	2,687	115.2
	May	<u>2,197.0</u>	<u>1,711</u>	<u>78.5</u>
Total		4,528.0	4,398	97.1
1973	Jan.	1,658.7	2,394	144.3
	May	<u>1,662.0</u>	<u>1,568</u>	<u>94.3</u>
Total		3,320.7	3,962	110.3
1975	Jan.	1,777.6	2,470	139.0
	May	<u>1,451.5</u>	<u>1,403</u>	<u>96.6</u>
Total		3,229.1	3,873	119.9
1979	Jan.	1,712.4	2,409	134.7
	May	<u>1,707.1</u>	<u>1,417</u>	<u>88.9</u>
Total		3,419.5	3,826	111.8

TABLE 3

Raptor Survey, Sightings Summarized by Region  
1979

REGION	NO. OF ROUTES	MONTH	MILES	TURKEY VULTURE	GOLDEN EAGLE	BALD EAGLE	OSPREY	RED-TAILED HAWK	SHOULDERED HAWK	SWAINSON'S HAWK	ROUGH-LEGGED HAWK	FERRUGINOUS HAWK	MARSH HAWK	COOPER'S HAWK	SHARP-SHINNED HAWK	WHITE-TAILED KITE	PRAIRIE FALCON	MERLIN	AMERICAN KESTREL	UNIDENT.	TOTAL
1	5	Jan.	200.8	5	18	7	--	95	--	--	53	--	13	1	1	1	4	--	34	42	273
	5	May	200.4	75	9	--	--	45	--	--	--	--	13	--	1	--	1	--	18	16	178
	Total		401.2	80	27	7	--	140	--	--	53	--	26	1	2	1	5	--	52	58	451
2	8	Jan.	324.4	98	1	2	--	175	--	--	18	--	33	2	1	20	2	--	82	34	468
	6	May	279.6	142	1	--	--	60	--	--	--	--	5	--	--	1	--	--	41	3	253
	Total		604.0	240	2	2	--	235	--	--	18	--	38	2	1	21	2	--	123	37	721
3	11	Jan.	470.4	187	20	1	--	275	16	--	8	5	27	4	4	20	3	--	229	24	825
	10	May	459.0	372	5	--	5	112	6	--	--	--	15	1	--	3	1	--	36	5	561
	Total		929.4	559	25	1	5	387	22	--	8	5	42	5	4	23	4	--	265	29	1,386
4	6	Jan.	297.3	12	19	4	--	168	--	--	6	--	36	2	--	12	--	--	135	27	421
	7	May	336.6	95	4	--	--	81	--	--	--	--	8	1	--	1	--	--	29	9	228
	Total		633.9	107	23	4	--	249	--	--	6	--	44	3	--	13	--	--	164	36	649
5	11	Jan.	419.5	36	3	12	--	124	6	--	16	2	22	7	1	15	2	--	145	37	428
	10	May	431.5	26	6	--	--	68	6	2	--	--	5	1	--	5	1	--	59	11	190
	Total		851.0	62	9	12	--	192	12	2	16	2	27	8	1	20	3	--	204	48	618
All Regions	41	Jan.	1,712.4	338	61	26	--	837	22	--	101	--	131	16	7	68	11	2	625	164	2,409
	38	May	1,707.1	710	25	--	5	366	12	2	--	7	46	3	1	10	3	--	183	44	1,417
	Grand Total		3,419.5	1,048	86	26	5	1,203	34	2	101	7	177	19	8	78	14	2	808	208	3,826
Percent of Total		Jan.		14.0	2.5	1.1	*	34.7	0.9	*	4.1	*	5.4	0.7	0.3	2.8	0.5	*	25.9	6.8	
		May		50.1	1.8	*	0.4	25.8	0.8	0.1	*	0.5	3.2	0.2	*	0.7	0.2	*	12.9	3.1	
		Grand		27.4	2.2	0.7	0.1	31.4	0.9	*	2.6	0.2	4.6	0.5	0.2	2.0	0.4	*	18.5	5.4	

\* - Less than 0.1 Percent of Total

TABLE 4

## Raptor Survey, Birds Per 100 Miles

REGION	NO. OF ROUTES	MONTH	MILES	TURKEY VULTURE	GOLDEN EAGLE	BALD EAGLE	OSPREY	RED-TAILED HAWK	RED-SHOULDERED HAWK	SWAINSON'S HAWK	ROUGH-LEGGED HAWK	FERRUGINOUS HAWK	MARSH HAWK	COOPER'S HAWK	SHARP-SHINNED HAWK	WHITE-TAILED KITE	PRAIRIE FALCON	MERLIN	AMERICAN KESTREL	UNIDENT.	TOTAL
1	5	Jan.	200.8	2.5	9.0	3.5	--	47.3	--	--	26.4	--	6.5	0.5	0.5	0.5	2.0	--	16.9	20.9	136.0
	5	May	200.4	37.4	4.5	--	--	22.5	--	--	--	--	6.5	--	0.5	--	0.5	--	9.0	8.0	88.0
		Total	401.2	19.9	6.7	1.7	--	34.9	--	--	13.2	--	6.5	0.2	0.5	0.2	1.2	--	13.0	14.5	112.4
2	8	Jan.	324.4	30.2	0.3	0.6	--	53.9	--	--	5.5	--	9.6	0.6	0.3	6.2	0.6	--	25.3	10.5	144.3
	6	May	279.6	50.8	0.4	--	--	21.5	--	--	--	--	1.8	--	--	0.4	--	--	14.7	1.1	90.5
		Total	604.0	39.7	0.3	0.3	--	36.9	--	--	3.0	--	6.0	0.3	0.2	3.5	0.3	--	20.4	6.1	119.4
3	11	Jan.	470.4	39.8	4.3	0.2	--	58.5	3.4	--	1.7	1.1	5.7	0.9	0.9	4.3	0.6	0.4	48.7	5.1	175.4
	10	May	459.0	81.0	1.1	--	1.1	23.3	1.3	--	--	--	3.3	0.2	--	0.7	0.2	--	7.8	1.1	123.3
		Total	929.4	60.1	2.7	0.1	0.5	41.1	2.4	--	0.9	0.5	4.5	0.5	0.4	2.5	0.4	0.2	28.5	3.1	149.7
4	6	Jan.	297.3	4.0	6.4	1.3	--	56.5	--	--	2.0	--	12.1	0.8	--	4.0	--	--	45.4	9.1	141.6
	7	May	336.6	28.2	1.2	--	--	24.1	--	--	--	--	2.4	0.3	--	0.3	--	--	8.6	2.7	67.7
		Total	633.9	16.9	3.6	0.6	--	39.3	--	--	0.9	--	6.9	0.5	--	2.1	--	--	25.9	5.7	102.4
5	11	Jan.	419.5	8.6	0.7	2.9	--	29.6	1.4	--	3.8	0.5	5.2	1.7	0.2	3.6	0.5	--	34.6	8.8	102.0
	10	May	431.5	6.0	1.4	--	--	15.8	1.4	0.5	--	--	1.2	0.2	--	1.2	0.2	--	13.7	2.5	44.0
		Total	851.0	7.3	1.1	1.4	--	22.6	1.4	0.2	1.9	0.2	3.2	0.9	0.1	2.4	0.4	--	24.0	5.6	72.6
All Regions	41	Jan.	1,712.4	19.7	3.6	1.5	--	48.9	1.3	--	5.9	--	7.5	0.9	0.4*	4.0	0.6	0.1	36.5	9.6	134.7
	38	May	1,707.1	41.6	1.5	--	0.3	21.1	0.7	0.4	--	0.4	2.7	0.2	0.1	0.6	0.2	--	10.7	2.6	88.9
		Grand Total	3,419.5	30.6	2.5	0.8	0.1	35.0	1.0	0.2	3.0	0.2	5.1	0.6	0.2	2.3	0.4	0.1	20.7	6.1	111.8

TABLE 5

Raptor Survey, Sightings Summarized by Geographical Area  
1979

AREA	NO. OF ROUTES	MONTH	MILES	TURKEY VULTURE	GOLDEN EAGLE	BALD EAGLE	OSPREY	RED-TAILED HAWK	RED-SHOULDERED HAWK	SWAINSON'S HAWK	ROUGH-LEGGED HAWK	FERRUGINOUS HAWK	MARSH HAWK	COOPER'S HAWK	SHARP-SHINNED HAWK	WHITE-TAILED KITE	PRAIRIE FALCON	MERLIN	AMERICAN KESTREL	UNIDENT.	TOTAL
North Coast	6	Jan.	296.6	165	17	--	--	139	16	--	4	3	4	3	2	3	2	1	121	14	494
		May	293.6	351	5	5	59	6	22	--	--	4	3	--	1	3	--	1	29	3	463
Total			590.2	516	22	--	5	198	22	--	4	3	4	4	5	3	3	1	150	17	957
Cascade	2	Jan.	87.5	4	14	7	--	35	--	--	3	--	2	1	--	1	1	--	6	5	79
		May	87.6	34	7	--	28	--	63	--	--	3	--	10	1	--	--	1	7	13	7
Total			175.1	38	21	7	--	63	--	--	3	--	12	1	--	1	2	--	13	12	173
South Coast	9	Jan.	415.9	34	6	10	--	224	6	--	2	2	9	5	2	16	3	1	219	24	563
		May	325.9	67	3	--	99	--	323	5	2	--	2	1	1	--	5	1	44	8	237
Total			741.8	101	9	10	--	323	11	2	2	11	6	2	2	21	4	1	263	32	800
Sac. Valley & Delta	6	Jan.	214.5	98	1	1	--	88	--	--	4	--	48	--	1	35	2	--	71	27	376
		May	200.7	128	1	--	49	--	137	--	--	4	--	20	--	2	--	--	24	3	227
Total			415.2	226	2	1	--	137	--	--	4	--	68	--	1	37	2	--	95	30	603
San Joaquin & Antelope Valleys	7	Jan.	331.7	12	19	4	--	168	--	--	9	--	37	3	--	9	--	--	126	28	415
		May	379.3	107	4	--	99	--	267	--	--	9	--	6	1	--	1	--	34	11	263
Total			711.0	119	23	4	--	267	--	--	9	--	43	4	--	10	--	--	160	39	678
Great Basin	5	Jan.	232.0	--	1	3	--	79	--	--	79	--	15	3	1	--	3	--	12	52	248
		May	242.6	15	2	--	27	--	106	1	--	79	--	8	--	--	--	--	43	11	107
Total			474.6	15	3	3	--	106	1	--	79	--	23	3	1	--	3	--	55	63	355
Colorado River & Desert	4	Jan.	139.8	25	3	1	--	17	--	--	--	2	14	1	--	--	--	--	41	9	113
		May	149.0	8	3	--	5	--	22	--	--	--	2	14	1	--	--	--	2	--	18
Total			388.8	33	6	1	--	22	--	--	--	2	14	1	--	--	--	--	43	9	131

TABLE 6

Raptor Survey, Birds per 100 Miles, Summarized by Geographical Area  
1979

AREA	NO. OF ROUTES	MONTH	MILES	TURKEY		GOLDEN EAGLE		BALD EAGLE		OSPREY		RED-TAILED HAWK		RED-SHOULDERED HAWK		SWAINSON'S HAWK		ROUGH-LEGGED HAWK		FERRUGINOUS HAWK		MARSH HAWK		COOPER'S HAWK		SHARP-SHINNED HAWK		WHITE-TAILED KITE		PRAIRIE FALCON		MERLIN		AMERICAN KESTRAL		UNIDENT.		TOTAL
				VULTURE	EAGLE	EAGLE	EAGLE	OSPREY	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	HAWK	
North Coast	6	Jan.	296.6	55.6	5.7	--	46.9	5.4	--	1.3	1.0	1.3	1.0	1.0	1.0	0.7	1.0	0.7	0.3	0.7	1.0	0.7	1.0	1.0	1.0	1.0	0.7	1.0	0.7	0.3	0.3	40.8	4.7	166.6				
		May	293.6	119.6	1.7	--	20.1	2.0	--	--	--	--	0.3	0.3	0.3	0.3	0.8	0.8	0.3	--	--	--	--	--	9.9	1.0	1.0	0.3	--	--	9.9	1.0	157.7					
Total			590.2	87.4	3.7	--	33.5	3.7	--	0.7	0.5	0.7	0.8	0.8	0.8	0.8	0.8	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	25.4	2.9	162.1						
Cascade	2	Jan.	87.5	4.6	16.0	8.0	40.0	--	--	3.4	--	2.3	1.1	1.1	1.1	1.1	1.1	1.1	--	1.1	1.1	1.1	1.1	1.1	1.1	1.1	--	--	6.9	5.7	90.3							
		May	87.6	38.8	8.0	--	32.0	--	--	--	--	--	11.4	--	--	--	0.6	0.6	0.6	--	--	--	--	--	8.0	8.0	1.1	--	--	7.4	8.0	107.3						
Total			175.1	21.7	12.0	4.0	36.0	--	--	1.7	--	6.9	0.6	0.6	0.6	0.6	0.6	0.6	--	0.6	0.6	0.6	0.6	0.6	0.6	0.6	--	--	7.4	6.9	98.8							
South Coast	6	Jan.	415.9	8.2	1.4	2.4	53.9	1.4	--	0.5	0.5	2.2	1.2	1.2	1.2	0.5	0.5	0.3	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	52.7	5.8	135.5						
		May	325.9	20.6	0.9	--	30.4	1.5	0.6	0.3	0.3	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	13.5	2.5	72.7					
Total			741.8	13.6	1.2	1.3	84.3	1.5	0.3	0.3	1.5	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	35.5	4.3	107.8						
Sac. Valley & Delta	6	Jan.	214.5	45.7	0.5	0.5	41.0	--	--	2.0	--	22.3	--	--	--	0.5	16.3	1.0	--	--	--	--	--	--	--	--	--	--	--	33.1	12.6	175.3						
		May	200.7	63.8	0.5	--	24.4	--	--	--	--	10.0	--	--	--	--	0.2	1.0	--	--	--	--	--	--	--	--	--	--	--	12.0	1.5	113.1						
Total			415.2	54.4	0.5	0.2	33.0	--	--	1.0	--	16.4	--	--	--	0.2	3.1	0.5	--	--	--	--	--	--	--	--	--	--	22.9	0.7	145.2							
San Joaquin & Antelope Valleys	7	Jan.	331.7	3.6	5.7	1.2	50.6	--	--	2.7	--	11.2	0.9	0.9	0.9	--	2.7	--	--	--	--	--	--	--	--	--	--	--	--	38.0	8.4	125.1						
		May	379.3	28.2	1.1	--	26.1	--	--	--	--	1.6	0.3	0.3	0.3	0.3	--	0.3	--	--	--	--	--	--	--	--	--	--	--	9.0	2.9	69.3						
Total			711.0	16.7	3.2	0.6	37.6	--	--	1.3	--	6.0	0.6	0.6	0.6	--	1.4	--	--	--	--	--	--	--	--	--	--	--	22.5	5.5	95.4							
Great Basin	5	Jan.	232.0	--	0.4	1.3	34.1	--	--	34.1	--	6.5	1.3	1.3	1.3	0.4	--	--	--	--	--	--	--	--	--	--	--	--	5.2	22.4	106.9							
		May	242.6	6.2	0.6	--	11.1	0.4	--	--	--	3.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.7	4.5	44.1							
Total			474.6	3.2	0.6	0.6	22.3	0.2	--	16.6	--	4.8	0.6	0.6	0.6	0.2	--	--	--	--	--	--	--	--	--	--	--	--	11.6	13.3	74.8							
Colorado River & Desert	4	Jan.	139.8	17.9	2.1	0.7	12.2	--	--	--	1.4	10.0	0.7	0.7	0.7	--	--	--	--	--	--	--	--	--	--	--	--	--	29.3	6.4	80.8							
		May	149.0	5.4	2.0	--	3.4	--	--	--	--	--	3.6	0.3	0.3	0.3	--	--	--	--	--	--	--	--	--	--	--	--	1.3	1.3	12.1							
Total			388.8	8.5	1.5	0.3	5.7	--	--	--	0.5	3.6	0.3	0.3	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	11.1	2.3	33.7							