U.S.
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

SALTON SEA NATIONAL
WILDLIFE REFUGE
PUBLIC HUNTING ADMINISTERED BY
CALIFORNIA
DEPARTMENT OF FISH AND GAME


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SALTON SEA NATIONAL WILDLIFE REFUGE

WATERFOWL DEVELOPMENT AREA

NARRATIVE REPORT

[redacted], OCTOBER, NOVEMBER, DECEMBER

1954

UNITED STATES DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE
BRAWLEY, CALIFORNIA

CONTENTS

REFUGE PERSONNEL

Regular Personnel

EDWARD J. O'NEILL	Refuge Manager
ROBERT C. WATSON	Refuge Manager, Asst.
FRANK L. BEALS	Clerk-typist
CLYDE W. STEWART	Foreman, Farm Operations
MICHAEL J. KARI	Mechanic
JOSE BARROS	Tractor Operator
LEO E. COX	Tractor Operator
W. CARL FORD	Tractor Operator
CHESLEY H. WILLIAMS	Tractor Operator
PAUL E. WILLIAMS	Tractor Operator
ALFRED W. McFARLAND	Tractor Operator
JOHN BARROS	Irrigator
SYLVESTER BARROS	Irrigator
MANUEL CARDONZO	Irrigator
MELVIN FORD	Irrigator
JULIO RIBEIRO	Irrigator

Temporary Personnel

None during period.

NARRATIVE REPORT

I GENERAL CONDITIONS

A. Weather Conditions

The powerful electric storm reported for the last day of the previous period brought winds which ripped through Imperial Valley knocking out power lines and tearing roofs from buildings and causing numerous flash floods. The entire Valley north of Imperial was without power about 15 minutes when lightning struck a circuit breaker. Six distribution line poles were burned down in the Brawley-Westmorland area and the El Centro-Calipatria-Coachella lines were out all night and most of the next day.

Older citizens called the lightning display "the worst in ten years".

Power poles were snapped off at ground level on Highway 111 north of Niland when strong winds struck. At the Wister Agricultural Inspection Station the inspector opened the office front door and the tin roof blew off.

Resultant rainfall in Brawley was only .37 of an inch while Palm Springs reported flash runoff and a heavy, 40 minute rain with all the "fireworks".

Throughout September the mean-average temperature was 87° (.6 higher than the average for last year) and 2.5° higher than any year since 1914 ---- a period of 40 years). On September 23rd the temperature was just 101° even. At the same time in the Service plane at 2,000 feet elevation, where pictures were being taken, we noted the temperature stood at 72°. (Hmmm ---- could be the early fall ducks travel too high and when they finally drop in at Salton they find themselves not crazy about the place.—Just too overcome and sluggish to get up and move on until cool October weather - and hunters, arrive).

Again the afternoon of September 26th strong winds came depositing cool, coastal air into the Valley and, of course, depositing a bit of sand and dust too. The long-awaited break in the summer heat was not sudden or outstanding. In fact after a few days, daytime temperatures were back up there again. Several days later old Sol gave way to gusts of light south to southwesterly winds which brought more cool nights and further gentle decline in the mercury.

The fore-part of October saw days of high temperatures again. The week of the 20th ---- after which we can say this was truly the ideal place for both man and beast to winter ---- there was a decided dip in temperature. Coolers were turned off and the heating fixtures looked into.

We noted haying operations near Holtville as late as October 26th.

November was a beautiful month. Old man weather outdid himself in the opinion of lettuce farmers though when the crop suddenly started to head out and even develop seed stocks. November 21st, as an example, was 22° higher than last year (88° as compared with 68° one year ago; 55° was the low reading compared with 36° one year ago). Balmy temperatures favored Valley crop pests too. Agricultural men reported that crickets and cutworms were creating a problem in some flax fields before the crop was mature enough for first irrigation. When the water was applied swarms of gulls, ibis and lesser shorebirds of many species moved in and did their bit toward control.

On November 12th local citizens were jarred from a sound sleep by a strong earthquake which reportedly rocked the center of Baja California, 60 miles south of the Mexican border. No damage reported. Center of the quake area was in a remote, non-populated, mountainous area.

First frost of the season occured in mid-December with very little consequence noted even to the more tender flower gardens and vegetables. Late in December however, stinging frosts killed alfalfa growths right and left and eliminated about 20 per cent of the winter tomato crop. Ice, one-half inch thick, covered quiet refuge ponds and water containers.

B. Water and Precipitation

On September 18th fog blanketed the area for a short period. On October 13th again another layer of fog, described as "several hundred feet thick", hampered air operations throughout the Valley, caused power outages and even radio silence. Meterologists reported the layer originated in the Gulf of California and drifted north into this area.

Tabulated below is the weather data compiled by the El Centro Naval Air Station, Seely, California.

MONTH	MAXIMUM	MINIMUM	PRECIPITATION	WINDS OVER 25 MPH (DAYS)
September	109°	57°	----	9
October	102°	48°	----	6
November	91°	46°	----	5
December	76°	29°	----	0

The high winds and rain of early September are blamed for 50 per cent loss in the date crop in Coachella Valley amounting to some $500,000 according to Riverside County agriculturists. After being rain-soaked the dates swelled and burst open causing deterioration.

A sprinkle of rain fell on December 9th but not sufficient to produce a measurable amount.

C. Fires

No fires occured on the refuge during the period.

II WILDLIFE

A. Migratory Birds

1. Population and Behavior

Waterfowl populations at the beginning of the period for Salton Sea Refuge compared favorably with the populations in 1953 with few exceptions. Due to the unusually late arrival of Pintails this year (last week in August), there was considerable speculation that the Pintail population for the period would be well under that of the previous year, however this was not the case. Early in September Pintails, as well as Green-winged Teal, Cinnamon Teal, and Shovelers, moved into the area in sufficient numbers to bring the population up slightly higher than that of 1953.

It was the general consensus of opinion by the nimrods that poor hunter success during the first half of the hunting season was due to lack of waterfowl. The census figures do not bear this out. In all likelihood the 107 degree F. "bluebird" weather on opening day, and in subsequent weeks, was a prime contributing factor to lack of hunter success.

Through the months of October, November, and December the waterfowl population approached and at times exceeded the 1953 population. Moreover it was distinctly more stable than the Refuge population of 1953. In considering the population of the entire Imperial Valley we do find marked fluctuations in certain species, notably Pintails and Green-winged Teal, which undoubtedly were influenced by the use and misuse of baiting areas in the Valley.

Although populations on Salton Sea Refuge were not materially changed from the previous year, the annual inventory of waterfowl for Imperial, Palo Verde, and Mexicali Valleys and the Colorado River revealed a population decrease of over 39,000 birds ---- a continuation of the downward trend for the third consecutive year. A tabulation of populations for these areas for the past three years follows:

COMPARISON OF WINTER INVENTORY TABULATIONS

SPECIES OBSERVED	1952-53	1953-54	1954-55
Ducks			
Mallards	10	240	270
Gadwall		20	31
Am. Widgeon	75,230	71,330	62,550
Green-winged Teal	1,030	5,980	2,255
Shoveler	21,290	9,180	3,805
Pintail	16,440	37,530	19,645
Redhead	90	10	120
Canvasback	1,810	3,810	2,520
Scaup	29,600	18,040	8,030
Cinnamon Teal		10	100
Goldeneye	10	60	
Bufflehead	260	450	160
Ruddy Duck	17,680	9,910	8,940
Merganser		40	300
Surf Scoter		10	
Unidentified	22,050	4,260	12,410
Geese			
Snow Geese	20,830	13,750	12,134
Canada Goose	4,150	1,490	1,625
White-F. Goose	100	100	
Swans			
Whistling Swan			16
TOTAL DUCKS	185,500	160,880	121,140
TOTAL GEESE	25,080	15,340	13,759
TOTAL SWANS			16
TOTAL COOTS	49,210	36,180	21,855

The Canada and White-fronted Goose population increased rapidly as the period progressed and peak populations were slightly above those of 1953. Until the opening of the second half of the hunting season, on December 6th, the geese utilized refuge lands almost exclusively and were seen in large compact flocks. After the second half of the season opened, however, Canada Geese were seen resting on Salton Sea in flocks of 100 to 200 birds. In contrast, the Snow Geese remained concentrated on refuge lands in spite of a severe food shortage in Unit I late in the period.

2. Geese and Swans

The first appreciable number of geese were seen on September 27th when 30 White-fronted Geese were noted on Tract 8 Unit I (8 Canada Geese were seen on Salton Sea on September 22nd). The White-fronted geese population made spectacular gains during October and November and declined after the opening of the second season just as rapidly. From the 30 White-fronted Geese seen on September 27th the number of birds increased to an estimated 1,000 on November 15th and to 1,800 on December 3rd. By December 16th, ten days after the hunting season opened, their numbers had dropped to an estimated 850 birds and remained relatively stable the rest of the period. On the refuge feeding areas the White-fronted Geese mixed readily with Canadas but normally stayed on fringe areas where Snow Geese were feeding.

As mentioned earlier, 8 Canada Geese were seen on Salton Sea on September 22nd. This was approximately three weeks earlier than the first arrivals a year ago. Throughout October and early November approximately 300 Canada Geese were using the refuge and the peak population occurred during mid-December with an estimated 1,150 birds on hand. This fell far short of the late November peak of 2,470 birds in 1953.

The opening of the second half of the hunting season appeared to affect the Canada Goose population far less than it did the White-fronted Geese as far as numbers are concerned. Immediately after the hunting season opened the numbers of White-fronted Geese declined to less than half their former population whereas the Canada Geese actually reached their peak at that time. Their behavior was markedly changed however and they spent a large portion of the daylight hours on open water in Salton Sea.

Snow Geese made their first appearance early in October when 50 were seen in Tract 8 Unit I and in Section 13 on October 11th. By November 5th an estimated 3,000 were using refuge feeding areas. Their numbers increased to 4,600 on December 3rd and at the close of the period the Snow Goose population had passed the 10,000 mark --- the peak for the period. The population peak for this period was approximately the same as the peak in 1953.

Several Ross' Geese were noted throughout December and in contrast to previous years none were checked in hunters bags at State-controlled hunting areas or on refuge boundary roads. We captured a wounded Ross' Goose early in December and it was placed in the enclosure at Unit I. On December 7th, when recovery of the bird seemed assured, it was banded and released.

Cackling Geese were present in small numbers during the last half of the period. Cacklers were first seen on November 5th when 2 were located in the green barley field at Unit I. The population peak occurred in late November and early December with approximately 20 birds present. Four Cackling Geese were killed on Unit II of Salton Sea Refuge during the last half of the hunting season. Regretably the kill seemed out of proportion with the population.

One Blue Goose was seen feeding with the Snow Geese in Unit II on December 19th. It was sighted occasionally throughout the remainder of the period and apparently came through the hunting season unscathed.

3. Ducks

The first appreciable numbers of American Widgeon were seen during the aerial census of September 22nd when 85 were noted near New River delta. The Widgeon population increased rapidly after mid-October as determined by the following aerial census data:

AERIAL CENSUS DATA FOR AMERICAN WIDGEON

	Salton Sea Refuge	Imperial Valley
September 22	------	85
October 22	250	2,050
November 19	5,500	12,400
December	15,000	32,000

Although no aerial census of the refuge was made from December 16th to the close of the period, ground census figures indicate the Widgeon population was steadily increasing during the period and through this interval.

The majority of Widgeon using refuge lands were found on inundated Tamarix areas bordering the Sea and on the old freshwater pond on Unit I. Many were also noted on Tract 8 Unit I after the Snow Geese had cleared the area of cattails. During the aerial census of December 16th an estimated 6,000 Widgeon were located on a baited leach field southeast of Brawley, California. Widgeon concentrations on Salton Sea were found in the vicinity of the Alamo River delta and approximately one mile offshore from Wister, California.

No decided differences were noted in the populations of Cinnamon Teal, Gadwalls, Mallards, and Redheads

The most outstanding feature of the Pintail population on the refuge was its stability. The period opened and closed with an estimated 3,100 and 4,100 Pintails present respectively. A peak concentration of 6,900 birds occurred on November 5th as compared to a peak of 10,000 birds on October 29th in 1953. Preferred habitat on the Refuge for Pintails was the leach field in Unit I although a few were seen feeding with Snow Geese in the fields containing Sudan Grass and Red-top Cane.

Stability of population was not a virtue of the Pintails utilizing other than Service-controlled lands. In the September-December period of 1953, as well as previous years, the numbers of Pintails using privately-owned leach areas were affected generally by hunting pressure. This year, with the advent of the baited area, utilization of private leach land was sharply curtailed during the hunting season. Baiting was successful in attracting the birds before and between the hunting seasons but it was not sufficient inducement to hold the birds in numbers during the season. Contrary to expectations the Pintails did not move into Refuge areas when flushed from leach fields but apparently left the Valley entirely. Tabulated comparisons of leach area and utilization by Pintails in 1953 and 1954 are as follows:

ESTIMATED ACRES BEING FLOODED AND LEACHED IN IMPERIAL VALLEY SHOWING USE BY PINTAILS

1953

MONTH	*ACRES FLOODED OLD	NEW	TOTAL	PINTAILS OBSERVED	TOTAL PINTAILS IN VALLEY
August 26	2,740	340	3,080	3,895	7,000
September 24	890	160	1,050	4,770	13,500
October 21	580	360	940	2,010	6,900
November 18	-----	---	1,100	1,850	11,420
December 9	-----	---	1,840	1,550	5,950

1954

August 24	1,360	1,284	2,644	-----	5,850
September 22	790	944	1,734	8,440	15,580
October 22	505	990	1,495	760	6,750
November 19	760	995	1,755	6,700	9,650
December 16	900	480	1,380	1,100	9,900

(Hunting season dates: October 9 thru November 13 and December 6 thru January 10)

*(Old and New areas determined by lack of or degree of vegetation established)

The October-November survey was more complete and illustrates the average leach area* to be about 70 acres in size with about 6 ducks per acre during October and about 9 per acre during November. There was a total of 120 water areas scattered over the Valley and during the two months we noted that at least 14 of the areas were being actively baited for hunting purposes.

The Imperial Irrigation District has announced that after January 1 there will be no free water delivered to land owners. This may put a definite crimp in the business of setting up hunting areas for some. It may further reduce the total puddler duck habitat too since it is an expensive operation and can be more efficiently done with a cover crop such as rice. Winter leaching will mean no crop production on the land until the following winter.

A total of 3,978 Pintails were banded during the period and the resulting data reveals a slightly improved adult-immature ratio over last year. The ratio this year was 48:52 as compared to 59:41 in 1953. This is the second consecutive year that immature female Pintails failed to make up a substantial portion of the Salton Sea population. (See the following pages for flock composition and banding data).

Green-winged Teal was again the most common species found in hunters bags at Salton Sea. Of the 7,078 ducks killed on State-controlled shooting areas 2,271 were Green-winged Teal. Heavy kills were also made in the vicinity of New and Alamo River deltas, especially during the first half of the season. During the second half the Widgeon was the most common bird from this area. The refuge population of Green-winged Teal at the start of the period was550 birds a nd had a peak population of 4,300 on December 3.

The peak concentration of Shovelers this year exceeded that of 1953 slightly. A peak of 3,450 birds was reached on November 19. One of the favorite areas for the Shoveler on the Refuge was the leach area in Unit I as it was being cleared of cattails by the Snow Geese. The hunting toll of this bird was quite heavy with 1,536 taken on State-controlled areas during the season.

Three Ring-necked Ducks were seen on October 22.

An estimated 50 Fulvous Tree Ducks were seen during the aerial census of November 19. On November 21 an adult was taken in the banding trap at the outlet of Number 1 drain.

At the close of the period an estimated 6,500 Scaup, 4,500 Canvasbacks, 1,200 American Goldeneye, and 450 Buffleheads were on Salton Sea. An unusually large number of female Goldeneye were taken by hunters the last half of the season.

A Blue-winged Teal was killed on State-controlled hunting areas this period.

*(Several of these areas are gun clubs, flooded during open hunting season.)

ADULT:IMMATURE AND MALE:FEMALE RATIOS OF

PINTAILS BANDED AT SALTON SEA REFUGE, 1948-54, INCL.

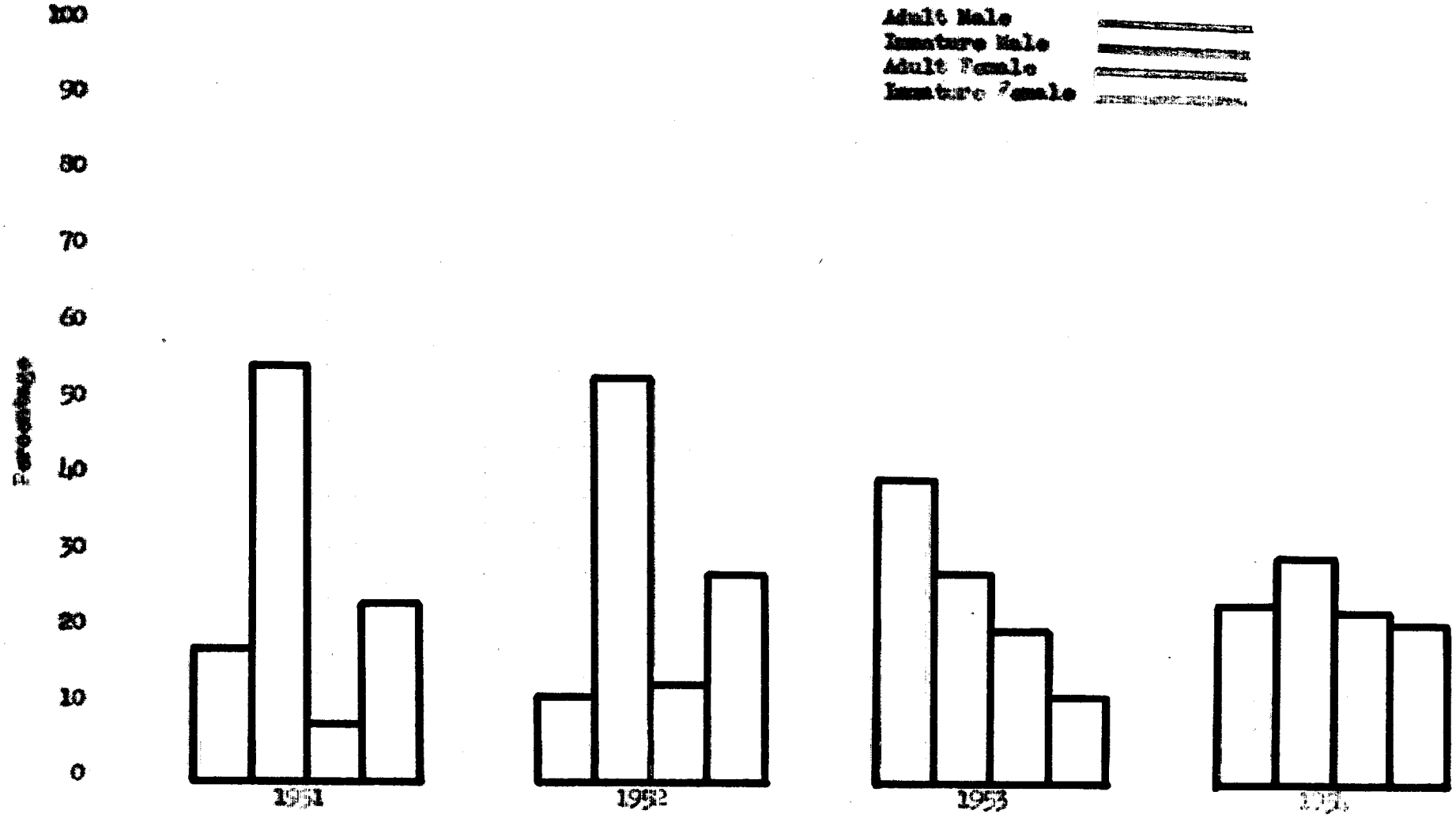
AUGUST THRU DECEMBER

YEAR	MALE	FEMALE	TOTAL	RATIO	AM	IM	AF	IF	TOTAL A.	TOTAL I	TOTAL	
1948-49	3	13	16	18:82								
1949-50	150	272	422	36:64	37	69	95	97	130	166	296	44:56
1950-51	107	245	352	30:70	0	5	0	28	0	33	33	0:100
1951-52	4,278	2,519	6,797	62:38	523	1,764	222	762	745	2,526	3,271	23:77
1952-53	3,222	2,017	5,239	62:38	313	1,636	230	897	543	2,533	3,076	18:82
1953-54**	4,619	1,992	6,611	70:30	2,579	1,812	1,111	732	3,690	2,544	6,234	59:41
1954-55#	3,795	3,035	6,830	56:44	1,001	1,197	900	878	1,903	2,075	3,978	48:52
TOTALS	16,107	10,096	26,206	61:39	4,456	6477	2,556	3394	7,011	9,877	16,888	42:58

* Years run from July 1 to June 30

** 1953-54 figures to December 31, 1953 only

\# 1954-55 figures to December 31, 1954 only



Distribution of age and sex of pintails banded at Dalton Gen during fall banding for years 1951-54, inclusive.

SUMMARY OF BIRDS BANDED AT SALTON SEA REFUGE, 1947-54 INCL.

Species	1948	1949	1950	1951	1952	1953	1954	Total
Gull-billed Tern		100	4					104
Caspian Tern		15	2					17
White Pelican		164	199	100	200		34	697
Mallard		50			4	13	11	78
Gadwall						1	2	3
Widgeon		25	23	6	267	2,013	3,393	5,727
Green-winged Teal	407	2	271	142	1,956	1,656	1,601	6,035
Blue-winged Teal					2			2
Cinnamon Teal	42			70	404	98	60	674
Shoveler				2	77	6		85
Pintail	199	553	234	3,458	6,805	9,811	6,830	27,906
Redhead					57	66	80	203
Canvasback					11	2	2	15
Bufflehead							1	1
Lesser Scaup					5	7	2	14
Ring-necked Duck						1		1
Ruddy Duck			1		9	25	94	129
Fulvous Tree Duck		2	14	148	33	12	4	213
Mallard-Pintail Hybrid					1			1
Lesser Snow Goose						12	12	24
Ross' Goose						1	1	2
White-fronted Goose						1		1
Canada Goose				3	1		2	6
White-faced Glossy Ibis						2		2
Common Egret						6	109	115
Great Blue Heron						2	25	27
Snowy Egret					1	2	27	30
Black-crowned Night Heron						5	3	8
Sora		1	1	2				4
Florida Gallinule		2	5			1	2	10

(Continued on next page)

SUMMARY OF BIRDS BANDED AT SALTON SEA REFUGE, 1947-54 INCL. (Cont'd)

Species	1948	1949	1950	1951	1952	1953	1954	Total
Coot	8	121	236	58	101	537	359	1,420
Northern Phalarope						8		8
Wilson's Phalarope						2		2
Long-billed Dowitcher						4		4
Stilt Sandpiper						1		1
Mourning Dove		2	2		9	332	28	380
Burrowing Owl						1		1
Roadrunner						2		2
Yellow-headed Blackbird		14				3		17
Red-winged Blackbird		9				49		58
Western Meadowlark						5		5
Loggerhead Shrike						2		2
TOTALS	656	1,060	999	3,989	9,943	14,689	13,581	14,367*

*Includes 16 Pintails banded in 1947 (only birds banded that year).

4. Water, Marsh, and Wading Birds

The largest concentration of White Pelicans seen during the period was an estimated 1,150 on October 1. The birds methodically followed the southwest shoreline of Salton Sea to the refuge, milled about as if to land, then moved directly out to Sea. Another concentration of about 800 was seen on November 26 in the vicinity of the New River delta.

Dead White Pelicans,(15-20), were found along the dikes bounding refuge Unit I. Although it was impossible to definitely determine cause of death it is believed they were unwittingly shot as game species.

Two Brown Pelicans were seen on September 10 on the open water of Salton Sea directly northwest of headquarters.

Sandhill Cranes were seen on the refuge throughout the period - the largest flock was seen on November 7.

An estimated 900 Farallon Cormorants were seen during the aerial census of December 16. Most of the birds were near the mouth of the San Felipe River.

Wood Ibis remained in the area until mid-October. The peak population of this bird was 490 on September 10. The last Wood Ibis of the season was able to tear himself away from Salton Sea shortly after October 17.

White-faced Glossy Ibis were seen every month of the period. Often, on newly irrigated land. The peak population for the period was reported by Refuge Clerk Frank Beals on December 30 when 2,500 of the birds were seen. A number of White-faced Glossy Ibis were shot as usual during the hunting season.

5. Shorebirds, Gulls, and Terns

Black-necked Stilt numbers dropped sharply in mid-October to an estimated 20 birds. Approximately 1,260 Stilts were on the refuge at the begining of the period. Through November and December only an occasional Black-necked Stilt was seen.

On November 5 an estimated 4,000 Long-billed Curlews were observed flying from the Alamo River delta area, presumably in search of freshly irrigated fields.

Numerous Northern Phalaropes were observed during the aerial census of September 22. Little, if any, of the shoreline area was devoid of these birds. A conservative estimate of 60,000 was made.

Several Baird's Sandpipers were noted on September 27.

Black-bellied Plover (20) were seen in Unit II on November 11.

Unit II also supported a small population of Mountain Plover the last half of December.

An immature Franklin's Gull and 4 Western Gulls were recorded in mid-November.

6. Disease

No known disease during the period.

7. Food and Cover Conditions

Natural food conditions underwent little apparent change if any.

Cattail growths at the delta of New and Alamo Rivers were greatly reduced this year due to minor changes which took place in the flow of water over both deltas. From a due west course flow over the delta flats, New River became silt obstructed and broke out along the east side creating a new delta. This occured too late for good cattail growths which could be used by the Snow and White-fronted Geese.

The Alamo River too broke out and formed a new delta area further upstream where practically no cattail growths have showed up.

At Wister drain, north of Mullet Island, cattails made practically no new growths and the area is badly choked with residual vegetation.

On the refuge cattail acreage was much reduced over previous years.

Several leach fields over the Valley developed from fair to good growths of Wild Millet which attracted Pintails, Green-winged Teal and Fulvous Tree Ducks early in the fall (September-October). There is always an unknown amount of seed from previous crops which lie under water in leach areas. They no doubt provide a fair amount of duck food. The tabulations on page 8 show the amount of acreage under leach during the period and use by waterfowl.

B. Upland Game Birds

Quail

The long season (November/to December 31), on Gambel's quail made the none too plentiful species rather scarce in areas adjacent to the refuge.

As late as September 29th a brood of quail consisting of 2 chicks about 2 weeks old was observed on the refuge.

Pheasants

The refuge population of ring-necks was lower this last year. The State's program of stocking was again in full force and pen-raised birds became common along country roads as the season opening date approached. (Hunting season from November 20th to 29th).

Mourning Doves

The Fish and Game Department announced excellent prospects with populations highest in years but we can't agree. It is difficult to enumerate the species in comparing abundance with populations of past years when they were hunting in October only. The season ran from September 1 through September 20th and again October 14 through October 30th. There were two noon opening days. Hunters were required to turn in the outer right wing of each dove to the State's Sacramento office for research.

Celebrities such as Andy Devine, Charles Skouras, Roy Rogers, Chill Wills, Gary Cooper, Clark Gable and Frankie Laine were among the thousands of hunters who flocked into the Valley for doves.

In mid-October the population of doves had apparently moved out of this area. They started to gather in "winter groups" the last of October and remained thus in flocks of 8 to as many as 40 birds.

White-winged Doves

This species appears to be decreasing in numbers. The Brawley News carried an article relating that the town Mayor, Pat Williams, obtained a limit of White-winged doves opening day and was out to maintain that record on the second day. It helped to popularize the feat and many have asked where they can find the species.

C. Predaceous Birds

A few records of duck hawks and sharp-shinned hawks only.

D. Other Birds.

Yellow Warblers first showed up about September 20th. On that date Red-shafted Flickers were also first noted. By mid-October the species was "common".

A lone Ferrugenous Rough-leg hawk was seen September 25th.

White-crowned Sparrows were first noted in mid-October along with the first notable population of Audubon Warblers.

A flock of several hundred Cowbirds was noted among sheep on the Elmore Ranch October 29th.

In the mid-afternoon of October 30th a group of 27 Swainson's Hawks were seen several miles south of Calipatria, California circling and drifting in a southwesterly direction.

Two Belted Kingfishers showed up October 31st. That same day flocks of House Finches were observed along Unit II fence rows where they remained several days.

At headquarters two Pink-sided Juncos were noted on October 31st.

On November 9th two Oregon Juncos were observed with the House Finches at Unit II. They remained through the period.

Pipits showed up about November 10th which was the first day they were noted.

Mountain Plover showed up the latter part of December in the smooth, barren Tract 15 Unit II.

E. Fur Animals, Predators, Etc.

A lone coyote was seen at Rock Hill, Unit II a few days before the last half of the waterfowl season.

Irrigator Sylvester Barros relates how a bobcat came up to his car and walked around a standing shovel and lighted lantern only a few feet away one dark night while he sat in his car eating lunch.

Raccoon signs are the lowest in the history of the present refuge set up.

F. Fish

The death of introduced marine fish species, as reported previously, continued to persist throughout the period. From the air four distinct wind rows of dead fish could be seen and followed from Wister drain on the southeast shore of Salton Sea to the Salton Sea Beach on the west.

Ten sample strips covered in October revealed about 136 fish every 10 feet of shoreline or 71,808 fish per mile ----- around 3,000,000 fish along the 40-odd miles of shoreline where they were thickest. The remaining shoreline (40 miles), contained only about one-fourth as many per mile.

Since 1948 California State Fish and Game has experimented with and introduced into Salton Sea some 19 species of fish.

At present Fish & Game is undertaking a three year study under Dr. Boyd Walker of the University of California, Los Angeles. Corbina is the main species concern now. When conditions are good they attain four to six pounds size. Todays problems include salinity increases due to irrigation water and evaporation, and the pollution of water around New and Alamo Rivers where the fish would spawn. There is a possibility the amonia level could be raised or oxygen content lowered dangerously.

One of the expressed attractions around the new State Salton Sea Beach at Mecca has been the possibility that marine fish might provide a real attraction to the public.

Mullet runs were noted again this year starting about mid-October, however very few actually entered either New or Alamo Rivers. Sports fishing for the species was practically nil this year due to the lack of spawning activities at the river deltas proper. From the air schools of several hundred could be seen out in deeper waters.

The State's Ramer Lake which now covers about 200 acres was planted in September to white catfish, 2,000 Golden Shiner minnows, 4,000 fathead minnows and 225 Sacramento Perch. The department is quite confident the carniverous perch from Sacramento River will survive and furnish at least fair sportsfishing.

III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Developments

1. Cultivated Crops During Period

The year-round agricultural program remained active throughout the period. As indicated under Hunting, the volunteering of dry barley crops and the program of maintaining green feed has been greatly impeded this year due to hunting activities. Operations were shifted as much as available equipment would allow to further the leveling job at Tract C Unit I.

Some of the green barley acreage was seeded to uncleaned Henschen variety. Reduction in acreage of all crops, due to imundation of land by the Salton Sea, has resulted in greater use or pressure per acre. After continuous use over a four to six month period the green barley makes very poor recovery for seed production. It has been demonstrated to be more equitable to fertilize and replant the seed crop in late winter after the birds start to move north or at least spread out.

Winter growth was perhaps the poorest in years due to cold weather, frost and cloudy, wet conditions. There is not much hope that the refuge feed will adequately satisfy the geese considering the hundreds of adjacent areas available after the season closes.

To say the least all crops were utilized well. Owing to the span of the hunting season and club baiting, pintails did not utilize refuge seed crops as consistently and well as in previous years.

The sudangrass-cane crop produced good growth and yield was utilized by both ducks and geese. This year it was not possible to "save" the crop until after hunting season. Snow and White-fronted geese, desperate for food, actually cut down the smaller-stemmed plants and broke off the tall cane to obtain grain heads. These fields were the favorite of scores of White-crowned sparrows and blackbirds most of the winter period. It is estimated that at least 200,000 pounds of grain was the yield.

UNIT I

Acres under lease	3,000
Acres under fallow	490
Acres planted to crops	760
Acres producing crops	750
Acres under sump, river, backwaters, etc	1560
Acres being leached	190

Crops and Acres Available On Productive Lands

	Green	Mature (seed)
Mariout barley	340	80
Hemschen barley	80	
Cattails and Wild Millet	100	
Sudangrass-Red-top Cane		150 = (750)

UNIT II

Acres under lease	1,454
Acres under fallow	30
Acres planted to crop	1,080
Acres producing crop	1,000
Acres under sump, river, backwater etc	344
Acres being leached	NONE

Crops and Acres Available On Productive Lands

	Green	Mature (seed)
Mariout barley	170	680
Hemschen barley	100	
Sudangrass-Red-Top Cane		50 =(1,000)

HANNSCHEN

In considering future utilization of refuge crops it might be well to evaluate the increasing amount of detrimental pressure by boundary hunters. It would appear that waterfowl cannot be expected to tolerate much more before seeking refuge elsewhere. For example, hunters can and do hunt on all sides or completely around both refuge units (as well as on Unit II). Roughly 20 per cent of Unit I is one mile wide from boundary to boundary or boundary to waters edge. The remaining 60 per cent of the area varies from less than 500 yards wide at one point to an average width of about one-half mile. Hunters constantly shoot, camp, park automobiles and walk along the entire boundary both fronting along the Sea and private property. Vehicles move freely over 11 miles of boundary roads, and over 6 1/2 miles of roads which pass through the refuge units. State shooting grounds completely open to hunting border 4 miles. Private hunting clubs "project" into the area along 5 1/2 miles of the jagged boundary line. There is a tell-tale, tall, ungrazed fringe of refuge crops along every feed plot which illustrates the condition to anyone remotely interested in the welfare of the wild fowl which spend more than 50 per cent of their existence on these wintering grounds.

In an endeavor to hold back some of the hunting fraternity which insisted on touring through the very center of Unit II during the first half of the season, we obtained permission from the Imperial Irrigation District and then blocked off the road which passes north from subheadquarters. For three weeks visitors were content to park at the locked gate and watch the feeding birds.

Things went too well ---- on October 17th State Game Wardens Reynolds and Greenwald demanded an explanation since they claimed the obstruction hampered their patrol of the refuge. Sorry ---- no keys for the general public they were informed but we did offer to link our lock through theirs same as Imperial Irrigation District's if they cared. A few days later we received a visit from the County Road Supervisor who explained that though the road hadn't been maintained for years and did not extend for more than one-half mile beyond the gate, "sportsmen's interests" working through the District Attorney were demanding justice and the gate would have to go. The Imperial Irrigation District was willing to back us up on the basis that the road was under their -230 contour jurisdiction but we declined, doubting that anyone else gives a hoot.

In Tract 2 and B of Unit I contours were removed and the area prepared for a barley crop.

Tract 9 of Unit I was also leveled and prepared for a winter crop of barley.

Leveling work in Tract C was continued as indicated under Hunting.

All other fields or plots were cropped and worked as indicated on the attached progress maps.

The usual tasks of painting and general maintenance work were continued.

Graveling of the headquarters area is being undertaken at this writing.

B. Receipt of Seed and Stock

During the period Widgeon Grass (Ruppia), was shipped in from the Aransas Refuge, Austwell, Texas. The Boy Scouts of America in that area collected the shipment as part of their conservation good turn. These transplants were set out in fresh water estuaries along the west and south shore of Salton Sea.

From Luther Goldman, former Salton Sea Refuge number 1 man, now at Brownsville, Texas we received a shipment of Shoalgrass root stock (Halodule) which likewise was set out in marked areas along the shore of Salton Sea.

Refuge Clerk Beals brought in more Salicornia and Eel Grass (Zostera) from Mission and San Diego Bays, California.

The Salicornia was transplanted along the moist shoreline of the Sea in lateral strips projecting from the waters edge back inland to dry soil. All plants died same as in the previous period.

The Eel Grass was set out in similar situations as the Widgeon Grass and Shoal Grass and although all leaves have turned black and deteriorated, it will be some time before they should be given up.

IV ECONOMIC USE OF THE REFUGE

A. Grazing and Haying

No activities

V PUBLIC RELATIONS

A. Recreational Uses

As the refuge hunting activities increased the esthetic values decreased. Photographers, amature naturalists, even the bird watchers were as scarce as duck's teeth after the first shotgun spoke of the open season.

The casual visitor this year has been leaving with a rather unimpressed look on his face compared with pre-refuge-hunting days. Unit I is as barren as a Canadian dance hall on Sunday. The birds, pressured into using the closed unit have killed the crops from over-utilization and it appears as though no attempt is being made to accommodate them. Unit II, still green looking, appears as though we did a fine job for the hunters only.

Public Uses	Visitor Days
a. Fishing use	NONE
b. Hunting use	1,164
c. Miscellaneous	200
Total.....	1,364

B. Refuge Visitors

1. Official Visitors

NAME	DATE	IDENTIFICATION	PURPOSE
Mr. Wm. Anderson	9/9 etc	Calif. Fish & Game	Waterfowl banding.
Mr. Ralph Wells	9/9 etc	Calif. Fish & Game	Waterfowl banding
Mr. Ray Glahn	9/12,22 10/21-23 11/18-20 12/15-18	Pilot-biologist, USFWS	Waterfowl census, photography, etc.
Mr. Leo Laythe	9/27	Regional Director USFWS	Lea Act Tour.
Mr. C. Lostetter	9/27	Berkeley, USFWS	"
Mr. A.W. Elder	9/27	Los Angeles, "	"
Mr. J. Kelley	9/27	El Centro , "	"
Mr. J. Reynolds	Numerous	Brawley, Cal. F & G	Law enforcement
Mr. Harry Hoshaw	11/27	Tule L. - Truck Driver	Haul D-7 Cat.
Mr. Bob Hart	11/28	Formerly Cal. F&G	Tour Refuge-contact
Mr. Chester Markley	11/29	Stillwater Mgt. Area	Haul D-7 Cat.
Mr. John Parish	12/1 etc	Cal. Fish & Game	Map & hunting
Mr. John Laughlin	12/4 etc	Cal. Fish & Game	Hunting
Mr. L. Rubke	12/4 etc	Cal. Fish & Game	Hunting, etc.

NAME	DATE	IDENTIFICATION	PURPOSE
Mr. Paul Quick	12/7	Regional Office USFWS	Tour and inspect club baiting.
Mr. E. Swift	12/7	Central Office USFWS	"
Mr. F. Koslik	12/7	Cal. Fish & Game	"
Mr. P. Schneider	12/7	Oregon " "	"
Mr. Roy Chalberg	12/8 etc	Moody Institute of Science	Photography
Mr. Teague	12/9	Trapper, USFWS	Visit
Mr. Ade Zajanc	12/12 etc	Sacramento "	Depredations

C. Refuge Participation

Mechanic Mike Kari on detail at Willapa Refuge, Washington for construction work since the previous period, returned in September.

A tour by the local Depredations-Lea ActLands Committee was conducted over the refuge Units September 27th. The same night a meeting, to determine whether or not the refuge Unit II should be hunted, was attended.

A water pollution meeting, held at Indio, California was attended December 10th.

D. Hunting

What was to have been an experimental hunt last year on the Lea Act lands, (Unit II), apparently was successful since the whole area, lock, stock and barrel was reopened this year.

Behind the decision to open the area was a tour on September 27th and a meeting the same night. Mr. John Jahnsen of the Fish a nd Game Department told those at the meeting he thought the area should be open because we had agreed to do so and the State had already announced to the public that it would be. Besides, applications were coming in from hunters.

Since the hunting was managed by the State Fish and Game Department we have asked Mr. Rubke to summarize the operations.

REPORT OF PUBLIC SHOOTING ON LEA ACT LANDS OF SALTON SEA NATIONAL WILDLIFE REFUGE 1954-55
(By L. Rubke and J. Parrish)

INTRODUCTION

Prior to the opening of the 1954-55 waterfowl season it was decided that the Lea Act Lands again be opened to public shooting. It was also decided that the majority of the geese would not be here during the first half of season, and that the lands should be opened only during the second half of season. The fact that much of the crop would not be ready substantiated the decision.

AREA OPEN TO HUNTING:

Essentially the same area as last year was open to hunting. This comprises the entire Unit II of the Salton Sea Refuge except that the 40 acre field where the refuge managers residence is located. Cooperation by the Fish and Wildlife Service accounted for the entire area being open to shooting each shoot day. Although some farming was being conducted this activity was stopped on the shoot days.

POSTING:

The outside perimeter of the area was posted with 12" x 18" - Department of Fish and Game Cooperative hunting signs which were tied over the existing Fish and Wildlife refuge signs. These signs indicated that hunting was allowed by written permission only and also acknowledged cooperation with the Fish and Wildlife Service. In addition the 40 acres of closed area was posted with similar red closed zone signs.

BLINDS:

No blinds were constructed by department personnel as in previous years. A plentiful supply of arrow-weed was piled at each parking area and the hunters were instructed to build their own blinds anywhere in the particular field to which they had been assigned. This method proved unsatisfactory in the fact that relatively poor dispersion was accomplished and in some cases blinds were built at unsafe distances apart.

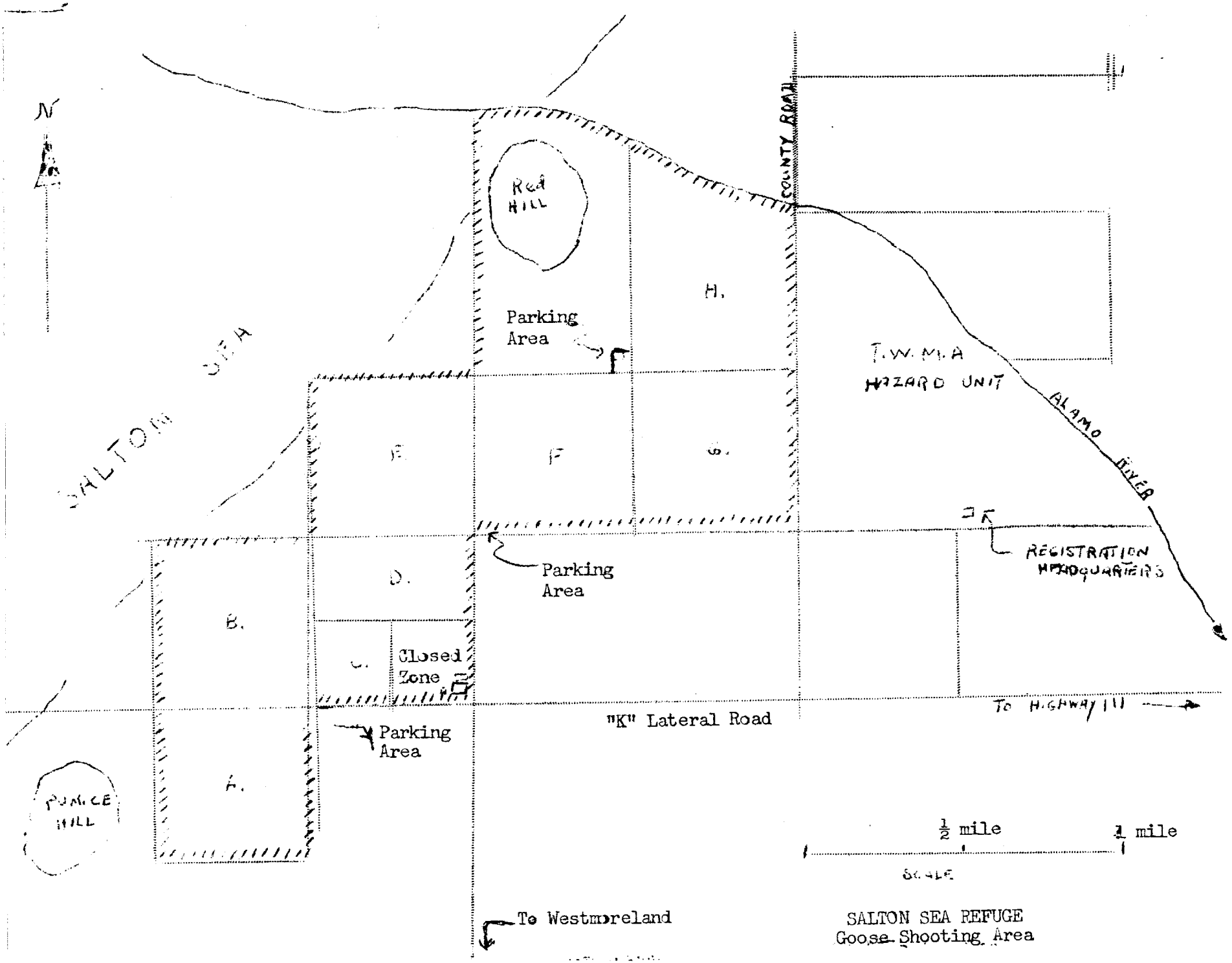
REGISTRATION OF HUNTERS:

All registration took place in the office at the Hazard Headquarters. Registration fee was $2.00 per hunter, juniors were free. At the time of registration the hunter was assigned to one of eight fields by lottery. Each permittee was then given a map and dispatched to one of the three parking lots located within the area. A Fish and Game employee stationed at the parking lot gave final instructions and directions and saw that the hunter got to his assigned field. The same employee remained on the area to patrol and check hunters as they came out.

RESULTS:

A total of 1,164 hunters utilized the Lea Act Lands during the second half of the waterfowl season and killed 19 ducks, 1,091 geese and 17 coots for a total of 1,127 waterfowl.

ARRESTS: During the 1954-55 waterfowl season 11 arrests were made for trespass on the Lea Act Lands.



SALTON SEA REFUGE
Goose Shooting Area

WATERFOWL HUNTING SEASON REPORT

SALTON SEA REFUGE UNIT II

Total acreage - 1,454
Acres open - 1,414

DATE	TOTAL HUNTERS	DUCKS KILLED	GEESE KILLED	COOTS KILLED	TOTAL KILL
Dec. 6	72	7	14		21
8	61	2	10		12
11	77	1	43		44
12	81	2	20	17	39
15	41	-	49		49
18	78	1	80		81
19	72	-	30		30
22	87	3	100		103
26	83	-	83		83
29	88	-	159		159
Jan. 2	93	-	181		181
5	91	-	118		118
8	92	1	99		100
9	89	2	18		20
10	57	-	57		57
TOTALS	1,164	19	1,091	17	1,127

COMPOSITION OF KILL (By Species)

Imperial Waterfowl Management Area, Finney-Ramer, Salton Sea Refuge

SPECIES	TOTAL KILL
Mallard	19
Gadwall	70
American Widgeon	700
Pintail	104
Green-winged Teal	2271
Shoveler Teal	412
Redhead	1536
Ringneck	23
Canvasback	24
Scaup	70
American Goldeneye	39
Bufflehead	33
Ruddy Duck	801
Unknown Diver Duck	27
Merganser Duck	8
Blue-winged Teal	1
Sub-total	7,978

SPECIES	TOTAL KILL
Canada Goose	240
White-fronted Goose	88
Cackling Goose	4
Lesser Snow Goose	867
Sub-total	1,199
Coots	301
Grand Total	8,578

END

Not that we can't stand to see our feathered friends shot out of the sky, but rather because we are genuinely interested in an advantageous program for them, we have summarized six points for whatever merit they might have:

(1) Depredations ..... The refuge goose kill doesnot seem to get at the real crux of the management problem ..... if there be one. It disperses birds from the only place they are wanted and provided for. Today almost every green field and leach area over the Valley has blinds, legalized baiting stations or "permanent" decoys out. The program looks from here to be a complete reversal of the cry to keep all the birds out of and away from agriculture. Geese are dispersed from the refuge through hunting on it, too close around the boundaries, airplane rallying, etc and encouraged through all legal means to reenter the valley croplands from which they were formerly driven. It has been demonstrated the past two years that refuge hunting has not effectively clipped the population of Snow Geese any better than hunting before the refuge was opened. Depredations complaints in the past have centered around the pintail and puddling damages or widgeon and alfalfa losses ..... Goose hunting on the refuge takes some geese and has little or no bearing on the real issue there.

(2) Cooperation With State -- Hunter Accomodations: ..... Since the origin of the program, the State has never been able to fill all local hunter accomodations or shooting space except on a couple of unusual holiday season instances. This year for instance, surplus blinds were advertised thus:

Date	Vacancies
10/16	110
10/14	198
10/20	259
12/11-12	178

(Total daily capacity of local shooting grounds .... 290 hunters)

The contention that without federal Unit II (Lea Act Lands), the hunting public cannot be given accomodations is bunk. The Finney-Ramer, open daily with accomodations for 120 shooters was utilized less than 50 per cent of capacity. The Poa was not managed but people hunted there at will. The Hazard accomodates 90 shooters; the Pumic 80. None of the new Wister area was considered for opening although 300 acres was producing

a new crop of green feed.

(3) Management Phase ..... It has been pointed out by some that the refuge has caused an increase in geese. Since it is so far from the breeding ground we doubt the claim ..... Not unlike other refuge areas it has created a home for desperate birds which have gradually moved in from surrounding areas and like so many fish in a new reservoir have probably reached a peak for this locality. The past two years, during which hunting was in full swing, the total population of geese showed lowered population over a wide, fixed area including several thousand miles of habitat.

Geese Population Summaries (From Winter Inventories)

YEAR	SPECIES	REFUGE ONLY	ENTIRE AREA*
1950	Snow Goose	4,050	Unknown
	White-fronted Goose	610	"
	Canada Goose	850	"
	Pintail		14,660
1951	Snow Goose	5,080	8,800
	White-fronted Goose	560	560
	Canada Goose	2,470	3,620
	Pintail		14,230
1952	Snow Goose	11,100	20,830
	White-fronted Goose	100	100
	Canada Goose	2,340	4,150
	Pintail		6,440
1953	Snow Goose	6,000	13,750
	White-fronted Goose	100	100
	Canada Goose	1,150	1,490
	Pintail		37,530
1954	Snow Goose	8,970	12,134
	White-fronted Goose	0	0
	Canada Goose	930	1,625
	Pintail		19,645

*(Colorado River, Imperial Valley, etc)

In providing food crops the hunting program has hindered the refuge production program, resulted in a waste of effort and food and encouraged the birds to seek a home elsewhere. In past years it has been the practice to renovate dry barley fields just as soon as the seed crop was consumed. From December 6th to January 10th, 192 tractor hours were lost this year because hunters occupied the fields which should have been completely worked and flooded. At no time was the sale of refuge hunting permits reduced in accordance to crop lands worked up making it impossible to flood or irrigate anything. Hunters blinds were plowed around and the poor misguided souls continued to draw tabs for the bare fields until the last day. In the mean time there was nothing to do but lay off employees affected by the Wednesday, Saturday and Sunday hunting.

Waste resulted when pressured birds were literally stacked in at Unit I and the crops, which normally continue to produce throughout the winter months, were devoured and killed by over-use. Feed became such a problem to snow geese that they circled Unit II pitifully on shoot days for 3 to 7 hours waiting to come down. The nocturnal feeding habits mentioned in past reports was more pronounced this season than ever before. Like the widgeon, snow geese might in time become somewhat adapted to man's schedule.

Hunting pressure around the boundary is going up each year by leaps and bounds. There is approximately 15 times as many hunters along the refuge boundary today as occupy the State's shooting grounds. Little accurate data is obtained on the actual kill by these shooters who hunt every day of the week. In 1952 they killed a known 854 geese along the boundary plus 111 on Fish and Game areas. This winter a known 809 were taken along the boundary in addition to 1,199 reported by the State Fish and Game.

Local people are dictating the program yet less than 10 per cent of them are using the blinds. Having the refuge occupied by out-of-town hunters makes for better shooting on posted, exclusive lands surrounding the refuge.

The more federal acreage thrown open, the less pressure by hunters on the Fish and Game program which has steadily reduced its efforts since the first opening of refuge lands three years ago.

(4) Inadequacy of Waterfowl Accomodations ..... Since 1952 approximately 2,000 acres of land has been lopped off the refuge units due to rise in Salton Sea and the established policy of retracting the boundary lines along the Sea-front to allow a shoreline corridor for hunters. Back in 1952 when it was considered inadvisable to hunt the refuge there was more land, crops and geese. The State then was producing food on the shooting grounds up to that stage. In 1952 Lloyd Scouler in a 17th North American Wildlife Conference report shows 1,000 acres of tillable acreage on local state areas. Here is how the two organizations compare:

YEAR	F&WLS ACRES	SUPLEMENTARY FEED	CAL. F&G ACRES	SUPPLEMENTARY FEED
1950	2,370	900 bushels	1,333	0
1951	2,500	484 "	815	0
1952	2,555	50 "	600	18 bu. *
1953	1,810	215 "	80	0
1954	1,500	84 "	100 **	0

* (Furnished by the U.S.Fish and Wildlife Service)
** (Approximately 300 acres newly seeded barley-ryegrass on new Wister tract .... negligable use reported during the period.)

Inadequacy of refuge foods has been covered previously. The logic that hunting Unit II, which contains 1,080 acres of feed as opposed to 760 acres of Unit I, will save the feed until January and February when it is needed to protect agricultural fields does not provide any feed

during the time the food plots are usurped by the hunters. Furthermore, 760 acres of the mediocre crops produced on refuge Unit I can't possibly suffice considering that there was some 520,352 pintail use days and 41,184 goose use days or roughly half-a-million bird days of utilization over the 72 day season. WHAT did the birds do ? ..... They robbed the farmers crops as in pre-refuge years and fed on Unit II at night when it was illegal to hunt.

(5) Public Reaction ..... The opening of Unit I has been set by some as a goal for future gains. Law enforcement problems are multiplying each year. It is quite difficult to maintain a refuge four days a week after its been hunted three days.

One prominent bird enthusiast had this to say, "We bird lovers don't have enough bankers in our organization to balance the thinking".

Some hunters actually are of the opinion that the Salton Sea POPULATION is too great to manage. They agree too much habitat is hunted but they love the idea.

Visitors and visitor days reached a new low. Hunters along the boundary make it very hard for such people. The writer, in accompaniment with another person in an official vehicle, was actually jeered loud and long by boundary hunters for spoiling their chances to obtain a limit of geese feeding in the fields.

The unnatural rafting of birds on restricted space leaves the impression that there is one terriffic population at Salton Sea.

New depredations has caused some to think the refuge idea is a joke. One farmer reported 160 acres grased by geese during the hunting season.

(6) Legal Aspects ..... The Code of Federal Regulations, Chapter I, Subchapter C, Part 31, Section 31.313 provides for Lea Act Lands hunting when ..... "substantial part of the crops on lands in the locality of the refuge susceptible to wildlife depredation has been harvested, or that the period of susceptibility to wildlife depredation on such crops has passed, or that the potentiality of wildlife depredations to crops on such lands is a negligible factor ....."

Salton Sea cannot be compared well with Sacramento or Merced where rice is perhaps the main concern. From the time the birds arrive here until they leave, the possibilities of depredations is on the increase. No harvest or reduction in susceptibility takes place until after the birds leave in the spring. In mid-winter when temperatures are lowest, damage complaints are highest.

None of the Pittman-Robertson financed state shooting grounds, adjacent to federal units, are kept closed. All state holdings and slightly less than half of the total federal holdings was hunted, amounting to something like 10,000 acres open and 3,000 closed.

Future Considerations ..... Why not maintain an adequate habitat acreage, state or federal, to accomodate the birds during the hunting season?

Why not a free, managed hunt by the Service, rather than the State, as at Tule Lake, Bear River, etc ?

Why not have a closed season on dark geese until the nucleus population becomes more established?

.....

E. Publicity

Salton Sea received NOTORIETY in three known publications including Condor, American Rod and Gun, and Sports Afield magazines.

F. Violations

The number of violations increased this year. Among the problems are; airplane rallying, retrieving within the refuge by boundary shooters, late shooting, hunting on the refuge, indiscriminate killing of non-game species and a score of lesser complaints.

There was no less than 10 instances of very serious airplane flushing or herding of birds at both refuge units. Rumor has it that some of the boundary shooters actually hired some of the flushing done. Tally of the milder instances of flushing by airplane was given up weeks ago after the count exceeded 20-odd separate instances excluding the military.

The retrieving of cripples and dead birds dropped within the refuge boundary by boundary shooters became a major problem. Allowing the public to enter (with or without firearms), reached the stage where the purpose of the refuge (waterfowl habitat----we think!), was completely defeated and living space actually jeapordized. Allowance of refuge entrance has definitely encouraged shooting of birds along both the units long before they fly over the boundary, use of crippling firearms and ammunition, and hopelessly high shots. Several individuals were found deep within the refuge "just looking around for cripples". Some didn't even have hunting licenses, others obviously were "stirring" the birds to benefit the "boundary benders" fraternity along toilet tissue lane.

Finally, in desperation we called a halt to the "friendly courtesy" extended by our predecessor and put a complete stop to entrance of the refuge via the boundary lines by anyone for any purpose. Just like the signs say! There was no serious complaint of our action. It was accepted readily and, believe it or not, people actually respect the refuge more and seem slightly interested in what we are trying to do. Other violations definitely fell off too.

One morning while patroling in personal car the writer had it put to him this way by a boundary hunter, "I give a dam what they do at Tule or Sacramento ----- you'd better stay out of this refuge". Meanwhile, birds in good condition were gathered along the boundary and turned over to the Pioneers Memorial Hospital, Brawley.

Some 30-odd refuge boundary cases, made early in the season will be reported in the next refuge narrative.

Several miles east of the refuge on the John Elmore place live decoys (snow and canada geese), were penned up in a 160 acre barley field. The birds never did decoy in to make for a hunting violation until the field was being irrigated then a Mexican was employed to flush geese out of the wet field. Just before Christmas the decoys disappeared from the pen. Rumor has it that someone in Westmorland served roast goose a few days later.

VI APPLIED RESEARCH

The project of taking water temperatures on Salton Sea was continued throughout the period.

VII OTHER ITEMS

On September 22nd Messrs Bob Jefferson, Imperial Valley Sportsmans Association and Baxter Loveland, Imperial Valley Farm Bureau were interviewed on the local radio program, Rod And Gun Club Of The Air. The interviewer asked several leading questions and both men supplied the answers. Loveland explained how they had requested a special season on Widgeon to prevent alfalfa damages following the regular hunting season. It was stated that of all the methods tried, open hunting was the best answer thus far. Asked if Widgeon were worth the time and effort Loveland was quick to answer "Yes", but also had to admit he had never killed or eaten one.....

Again on September 29th at 12:30 PM Loveland appeared on a political campaign radio program with Senator John Phillips. Phillips commended Loveland for being the instigator of all the depredations work in Imperial Valley. Loveland agreed with the Senator that he, Phillips, had done considerable work in obtaining pyrotechnics with which to fight the ducks, etc. It was also agreed that Phillips was instrumental in passing the Lea Act..... "I believe some people refer to the widgeon as 'Baxter's chickens' don't they, Baxter?" asked Phillips.

While on the subject of our friend Baxter we note in a news item headed "Thirty Years Ago ..... Baxter Loveland of Brawley was elected one of the directors of the Southern California Purebred Livestock Association at an annual meeting. Each director is representative of a community particularily noted for a distinctive breed of stock. Mr. Loveland will however, represent the Duroc Jersey hogs." (This was before

the widgeon came into being. Today our same Mr. Loveland is author of a book on alfalfa raising entitled, "Gone With The Widgeon").

..... o .....

At Bakersfield, California on October 20th a petition was filed with the Kern Board of Supervisors asking for a halt to the widespread poisoning of the coyote. Petitioners pointed out that by destroying the animal life was made easy for the thriving rabbits which now threaten certain crops.

..... o .....

There's been much a'do this year in regard to swimmers crossing the Salton Sea. We're told that Helen Burns, resort owner on the southwest shore has done most of the promoting. On November 28th Tom Parks, professional swimmer from Long Beach, California set a new worlds record (4 hours, 32 minutes), for the 12 mile crossing. Previously, Amy Highland and a companion, Daisy Murchie crossed on November 14th in 14 hours. To date five individuals have crossed the briny drink and tip-toed out amongst the barnicals over on the sunset side.

..... o .....

In the October issue of Southwest Rancher Bob Jefferson comments thus on the dove season ..... "Dove season opened with a bang on September 1st with quite a turnout of local and coastal hunters bagging the limit without too much trouble. The first half of the dove season ended on September 20th, and, much to everybody's surprise, we will have another dove season from October 12 to October 31, both dates inclusive. I have attempted to find out just what prompted the Fish and Wildlife Service to offer a split season, but, to this date, have been unable to get an answer. Some politician probably got too hot while shooting doves last September and wanted a later season when it was cooler. This is the only reason I can think of, for I think you will agree with me, to wit, that we have always enjoyed wonderful dove hunting in the Imperial Valley, and I hope we shall continue to have, but a split season with two opening days is certainly not good conservation....."

..... o .....

A tentative agreement on a stationary boundary line between Arizona and California has been reached by a staff of engineers from both States.

Pending formal approval by the Arizona-California members of the boundary commission, then by the legislatures of both states and

Congress, the new boundary will follow the present channel of the stream except in three instances, one of which will give Arizona about 2,000 acres of farm land near Yuma.

It would seem that one of the main factors to bring about the agreement has been the numerous squatters farming river bottom lands without paying taxes in either state.

..... o .....

Oysters, which formerly inhabited Imperial Valley when it was part of the Gulf of California, brought joy to week-end geologists from Los Angeles in November when a fossilized oyster bearing a pearl was found in ancient beds in Travertine Rock at the north end of Salton Sea. This represents the second local pearl-bearing mussel find and is considered by authorities to be "most unusual and rare".

..... o .....

At Buckeye, Arizona a project was set up in November which will undertake the desalting of brackish water by ion exchange at a point six miles east of Buckeye, Arizona.

Ionics, Incorporated of Cambridge, Mississippi will conduct the tests for eight months for the Saline Water Conversion Office of the U.S. Department of the Interior under an $98,000 contract.

A pilot plant will treat 1,500 to 2,000 gallons of water per hour. Water which carries 4,500 ppm soluble salts. Water is passed through plastic membranes which are electrically positive and negative. Water as brackish as 4,633 ppm costs $20.00 per acre foot to process ..... We wonder if perhaps some such a project couldn't be set up at Salton Sea Refuge permanently (tsk, tsk).

..... o .....

Near Kaiser's Flying Eagle Railroad in the Chocolate Mountains a bighorn sheep was found dying October 9th by O.L.Riddle and Bill Dawson of Mecca, California. It seems the animal had been hit in the hind quarter by shotgun pellets.

..... o .....

Jack Curnow, writing for the Los Angeles Times (October 19th), under "Fish'N'Game" poses a question ..... "While in the capitol, we asked a question which often comes our way ..... Why is the California waterfowl hunting season opened so early when it's almost bound to be warm weather with only light flights migrating from the north?

We got various answers, ranging from politics to crop depredations, to save the waterfowl from slaughter ..... We also got conflicting answers from various persons who are supposed to know the score .....

"As an example, one so-called authority told us that pressure from farmers causes the early opening dates. They want to save their crops from depredations by migrating birds and figure the hunters keep the fowl moving. Well, maybe so .

"But the Merced waterfowl shooting area, which originally was scheduled to open for shooting on November 3, has been ordered to remain closed until December 6 when the second half of split season begins .... Reason given for keeping the refuge closed is danger of crop depredation to nearby farms.

"It is pointed out that waterfowl which otherwise would feed on farm crops now stay on refuges and waterfowl management areas, thus saving crops which are ready for harvesting.

"So you have two directly opposite lines of reasoning: (1) an early hunting season keeps the waterfowl moving and reduces crop damage potential and (2) a closed refuge will draw waterfowl away from crops which otherwise would be damaged if hunters kept waterfowl on the move."

..... o .....

In early October it was announced that thousands of acres of land along the Colorado River in Imperial County would be set aside as a "Wilderness Area" for hunting and fishing. It seems that sportsmen were dissatisfied with the prospects of proposed 20,510 acre Picacho park being set aside as a recreational area. A controversy arose between the State Beaches and Parks and Fish and Game which stopped all land acquisition by the first agency. Taylor Lake, main bone of contention was considered by Newton B. Drury "of minor importance as a waterfowl area" according to the U.S.Department of the Interior, Fish and Wildlife Service, Regional Director in a communication with him. Later it was decided to let Fish and Game have the lake.E.E.Powell, planning and acquisition supervisor objected that, "for the department of Fish and Game to administer a small area inside a large state park would provide a great many problems for both agencies." Horns were relocked for more struggles but in November both agencies finally came out in agreement and some 5,100 acres of the park were carved out to leave a 200-acre area around Taylor Lake Lagoon for state hunting purposes.

..... o .....

The Desert Protective Council held its annual meeting in the Joshua Tree National Monument December 5th.

The Council is a non-profit organization whos purpose is to "safeguard for wise and reverent use by this and succeeding generations those desert areas that are of unique scenic, scientific, historical and recreational value."

..... o .....

In December the state Fish and Game announced an allotment of $11,000 more for levee work on the Ramer Lake public fishing area south of Calipatria, California.

..... o .....

The first known hunting accident of the season involved Richard Primeaux of Pasadena, California who slipped down a muddy bank at the edge of Brawley. Mud jammed into the bore of the gun and when fired later it blew the barrel off. The dove hunters left forearm was treated for wounds...

A 72 year old hunter from Riverside, California shot another hunter in the face November 13th while hunting on the State's Hazard area. The victim, Mernard M. Henricks of Los Angeles, California had 13 pellets removed from his shoulder, neck and face .....

Red Gillian on November 22nd was seriously injured near Ocotillo, California. Experimenting with an old-fashioned rolling block 7mm Remington rifle Gillian got his when the shell exploded as the chamber was being closed. A large lever on the side of the block jabbed into his hand and the cartridge case, which exploded, added fragments to the wounded hand and caused numerous facial cuts and powder burns .....

Frank Domingues, twenty years old and from El Centro, California accidently shot himself through the left foot in December when his .22 discharged. The bullet entered the top of his foot and broke two bones....

Near subheadquarters a youth caught two pellets in the nose from a pheasant hunters shotgun in November.....

At least two deaths occured from over-exertion by hunters on Salton Sea.

..... o .....

In State-released newspaper articles the Salton Sea Refuge was referred to as the "State's Waterfowl Management Area" in at least 8 different instances.

..... o .....

In the credit department mention should be made of the radio operator at Unit II who answered hunters questions via the front door and telephone while the chores of housekeeping went merily on. A total of 401 radio calls, 251 telephone calls and slightly less than 100 door inquiries were handled during the period.

.....o.....

Members of the Westmorland gun club, which juts out into Unit I, accused Watson and Glahn of deliberately trying to herd all of the birds out of their area with the Service plane during the December refuge inventory. So serious was the claim, we received three 'phone calls! Tsk tsk. (Of course no mention was made of the private planes which many times herded the birds out of the refuge and over the clubs).

.....o.....

Respectfully submitted,

[redacted]ard J. O'Neill
Refuge Manager

Note: Credit is due.....to Mr. Watson who wrote the section on Waterfowl, Marsh and Shore Birds; to Messrs Larry Rubke and John Parrish of California Fish and Game who rwote the section on Lea Act Hunting; and to Mr. Beals who did the editing and typing.

Approved: _____

_____

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Salton Sea MONTHS OF Sept. TO Dec., 1954

(1) Species	(2) Weeks of reporting period 11	12	13	14	15	16	17	18	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated total
Swans:											
Whistling		AERIAL SURVEY				AERIAL SURVEY					
Trumpeter											
Geese:											
Canada	300	250	300	950	1100	1150	1000	900	46,056		
Cackling	10	20	20	20	10		2	1	995		
Brant	1000	1000	1500	1800	1000	850	920	1100	86,608		
White-fronted	3000	3500	3800	4600	5000	6000	8900	10,900	360, 267		
Snow											
Blue							1	1	14		
Other											
Ducks:											
Mallard	30	50	300	250			90	30	6,510		
Black											
Gadwall	40	30	30	40	150	250	10	10	4,403		
Baldpate	4300	5500	6800	8700	11,500	15,000	11,000	15,500	577,955		
Pintail	4500	2950	2500	4000	5000	8300	4900	4100	620,010		
Green-winged teal	2000	2500	3200	4300	2500	1150	2300	3750	324,100		
Blue-winged teal											
Cinnamon teal	450	100	140	120	50	30	50	20	97,300		
Shoveler	1100	8500	1400	2400	1800	1400	2000	2400	172,580		
Wood											
Redhead	70	30	90	150	150	190	170	150	9,380		
Ring-necked											
Canvasback	20	10	40	500	300	250	400	550	15,148		
Scaup	350	1350	250	300	500	1200	800	600	42,000		
Goldeneye					50	300	130	150	4,410		
Bufflehead			20	70	125	150	250	80	4,865		
Ruddy	1200	750	2800	3000	2500	500	900	700	136,970		
Other											
Pelican T.D.	20	10	30	10					5,040		
Coot:	5100	11,425	9000	6700	4000	2100	5000	5500	970,325		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	469,620	12,502	
Ducks	1,029,241	28,600	
Coots	570,325	11,425	

SUMMARY

Principal feeding areas

Refuge food plots.

Principal nesting areas

Reported by

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C. 37944
1953

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Salton Sea MONTHS OF Sept. TO Dec., 19 52

(1) Species	(2) Weeks of reporting period 1	2	3	4 (9/30)	5	6	7	8	9	10
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada						25	50	125	150	300
Cackling										2
Brant										
White-fronted					34	450	500	600	600	1000
Snow				1		50	200	300	730	3000
Blue										
Other										
Ducks:										
Mallard							10		10	200
Black										
Gadwall	10	6					3			50
Baldpate				85	40	220	400	250	820	2400
Pintail	2000	3100	3500	15,380	4700	3900	4200	2700	3600	8500
Green-winged teal	400	590	1800	3450	2200	3300	3900	2400	2100	4000
Blue-winged teal										
Cinnamon teal	250	340	1350	3600	1500	1650	1900	1200	800	750
Shoveler	180	250	1130	2370	1150	1050	1250	1200	1500	1200
Wood										
Redhead	10	10	20	30	60	20	60	10	50	190
Ring-necked										
Canvasback				10		4				
Scaup									150	500
Goldeneye										
Bufflehead										
Ruddy	150	130	410	1580	640	600	800	200	1200	1500
Other										
Fulvous T.D.	60	90	130	140	80	70	40	40		
Coot:	800	550	3100	6000	3500	3000	5000	5300	4800	4800

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Salton Sea Months of Sept. to Dec. 1954

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
White Ibis	Previous period		800	Sept.	1	Oct.				
Glossy Ibis	"	"	2900	Dec.						
Common Egret	"	"								
Snowy Egret	"	"								
S.C.N. Heron	"	"	800	Oct.						
Gr.B. Heron	"	"	80	Oct.						
Gallinule	"	"								
Western Grebe	"	"								
White Pelican	"	"	1350	Oct.						
Eared Grebe	"	"	14,500	Dec.						
Brown Pelican	"	"	2	Sept.						
Cormorant	"	"	900	Dec.						
Sandhill Crane	19	Nov.	19	Nov.	3	Dec.				
II. Shorebirds, Gulls and Terns:										
Lesser Yellowlegs	previous period		120	Nov.						
Gr. "	"	"	6	Nov.						
Godwit	"	"	180	Oct.						
Willet	"	"	190	Oct.						
L.B.Curlew	"	"	4000	Nov.						
Black-bellied Plover	"	"								
Am. Avocet	"	"	9800	Sept.						
Black-necked stilt	"	"		Sept.						
Stilt Sandpiper	"	"	4	Nov.						
Northern Phalarope	"	"	60,000	Sept.						
Wilson's "	"	"								
Black Tern	"	"								
Forester's Tern	"	"								

(over)

(1)	(2)		(3)		(4)	(5)		(6)
III. Doves and Pigeons:								
Mourning dove	Previous period		2500	Sept.				
White-winged dove	"	"	90	"				
IV. Predaceous Birds:								
Golden eagle								
Duck hawk	Previous period							
Horned owl	"	"						
Magpie								
Raven								
Crow								

Reported by.....

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INT.-DUP. SEC., WASH., D.C.

59317

3-1757
Form NR-7
(April 1946)

PLANTINGS
(Marsh - Aquatic - Upland)

Refuge Salton Sea Year 1934

Species	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount & Nature of Propagules	Date of Planting	Survival	Cause of Loss	Remarks
Eelgrass	Salton Sea shoreline		30 yds.(sc)	1½ sacks of entire plants	Sept.	unknown		
Shoalgrass	"		40 yds. "	3 bushels entire plants	Oct.	"		
Widgeongrass	" "		20 " "	2 bushels entire plants	Oct.	"		

TOTAL ACREAGE PLANTED:

Marsh and aquatic sq. yds.
Hedgerows, cover patches
Food strips, food patches
Forest plantings

3-1758
Form NR-8
(April 1946)

CULTIVATED CROPS

Refuge Salton Sea Year 1954

Permittee (If farmed by refuge personnel, so indicate)	Permit No.	Unit or Location	Crops Grown	Avg. Yield per Acre	Permittee's Share		Government's Share or Return				Compensatory Services, or Cash Revenue
							Harvested		Unharvested		
					Acres	Bu. Harvested	Acres	Bu.	Acres	Bu.	
Refuge personnel			Harvout barley						340		
		UNIT I									
			Hannchen barley						60		
			Wild Millet						100		
			Sudangrass-Sudan top cane						150		
		UNIT II									
			Harvout barley						170		
			Hanchan barley						100		
			Sudangrass-Sudan top cane						10 50		

Summary of Crops Grown:	Crop	Acreage	Permittee's Share		Government's Share				Total Revenue
			Acres	Bushels	Harvested Acres	Harvested Bu.	Unharvested Acres	Unharvested Bu.	$
	[illegible]	[illegible]							
	Millet	100							
	Sudan-cane	200							

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS

Cultivated Crops Report Form NR-8 should be prepared on a calendar-year basis for all crops harvested or utilized during the calendar year and submitted with the December 31 refuge report.

Permittee - List each permittee separately. If lands of the refuge are farmed by refuge personnel or hired labor, this should be indicated in the Permittee column.

Permit No. - List the number of the Special Use Permit issued to the individual.

Use or Location - The Unit No. or name specified in the Economic Use Plan should be listed in this column.

Crops Grown - A separate line of the form should be used for each crop grown by each permittee or by refuge personnel. This is important, since if each crop grown by each operator is not specifically enumerated, the report will be of no value for statistical purposes.

Average Yield per Acre - It is important that the average yield per acre of each crop grown by each operator should be shown.

Permittee's Share - Only the number of acres harvested or utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. It is requested that all crops harvested be reduced to bushels wherever possible, or, as in the case with the harvesting of seed such as that of sweet clover, alfalfa, bromegrass, etc., the total harvested crop in pounds may be shown. Timothy, alfalfa, or other hay harvested by the permittee should be shown on Form NR-10 and should not be shown in the Permittee's Share column.

Government's Share or Return - Harvested - Show the number of bushels harvested for the Government and the acreage from which this share is harvested, both for grain raised by refuge personnel and by permittees. Unharvested - show the exact number of acres of crops allowed to remain unharvested as food and cover for wildlife. An estimate of the number of bushels of grain that is available for the wildlife in such unharvested crops should be shown in the Bushels column.

Compensatory Services, or Cash Revenue - Show other services received by the Government in cooperative farming activities, the number of acres of food strips planted for wildlife, the amount of wildlife crops not otherwise reported that are planted by cooperators for the Service, or the cultivation of wildlife plantations. If the permit is on a fee basis indicate the total cash revenue received by the Service.

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge Salton Sea Months of September through December, 1954

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Mariout barley	0	1,400	1,400		1,400	165		0	X		
Feed barley	600	---	600			200		400		X	

(8) Indicate shipping or collection points

(9) Grain is stored at refuge storage sheds.

(10) Remarks

*See instructions on back.

16—61482-1

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

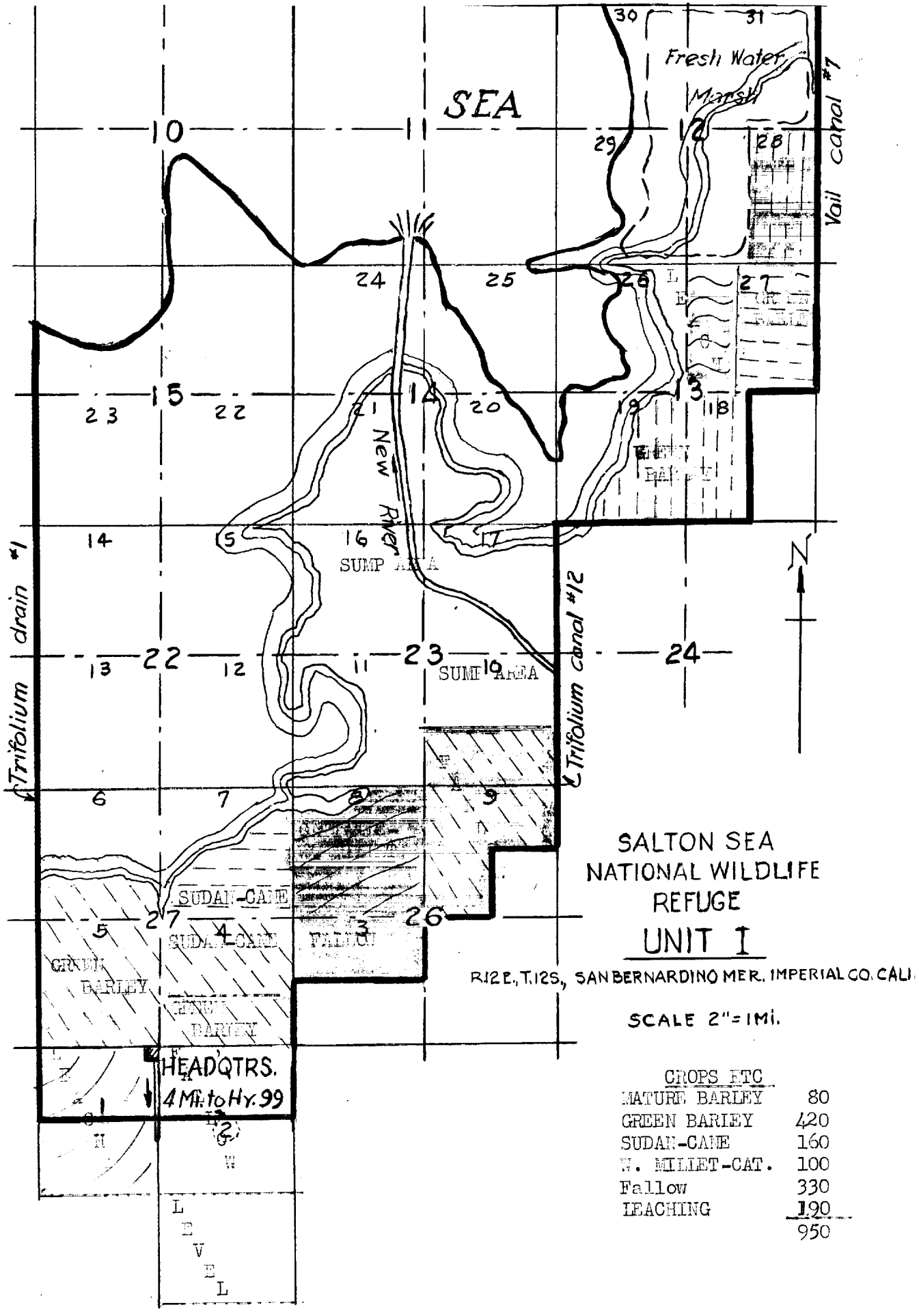
(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

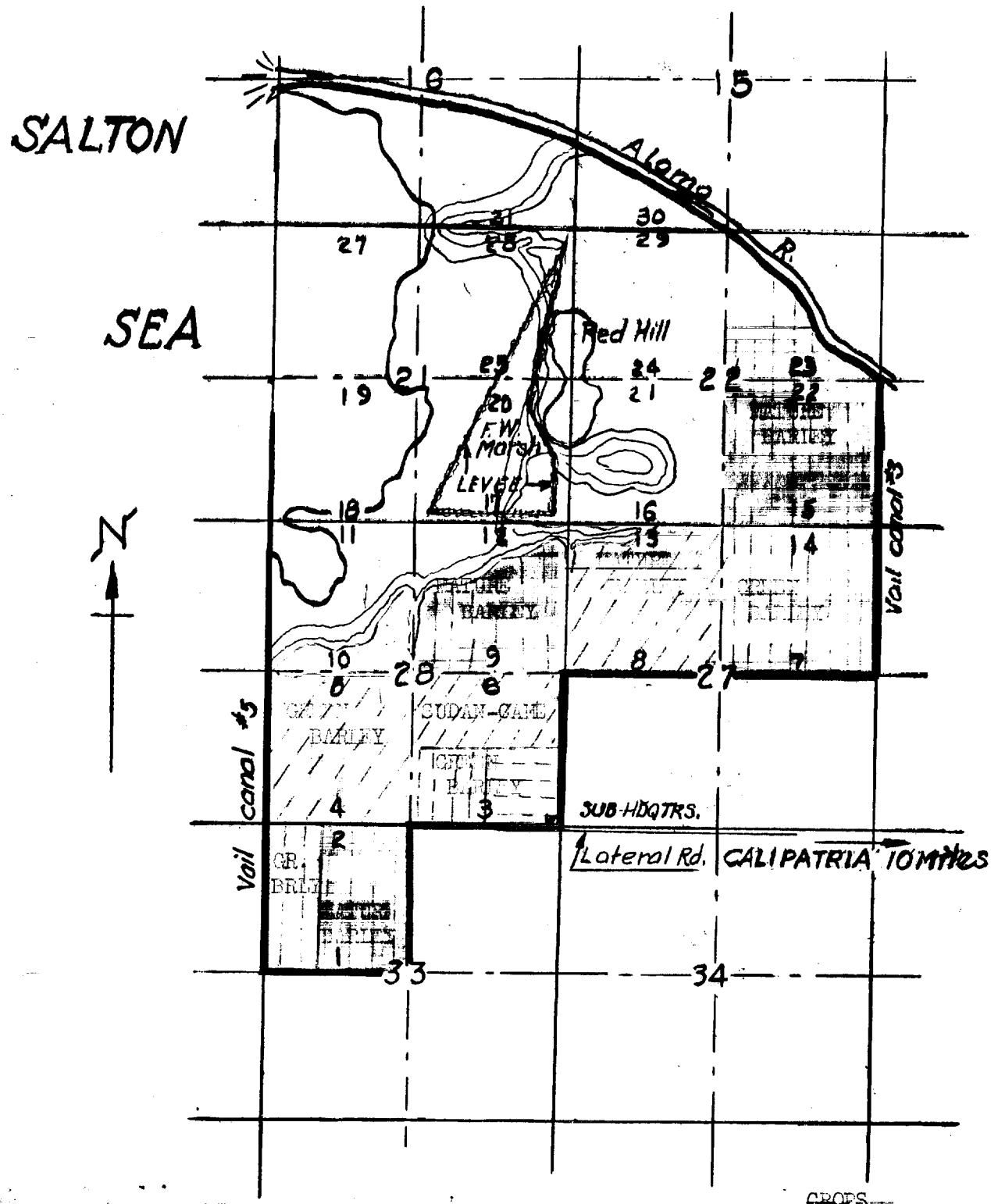
(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

16—61482-1 U. S. GOVERNMENT PRINTING OFFICE



CROPS ETC	
MATURE BARLEY	80
GREEN BARLEY	420
SUDAN-CANE	160
M. MILLET-CAT.	100
Fallow	330
LEACHING	190
	950



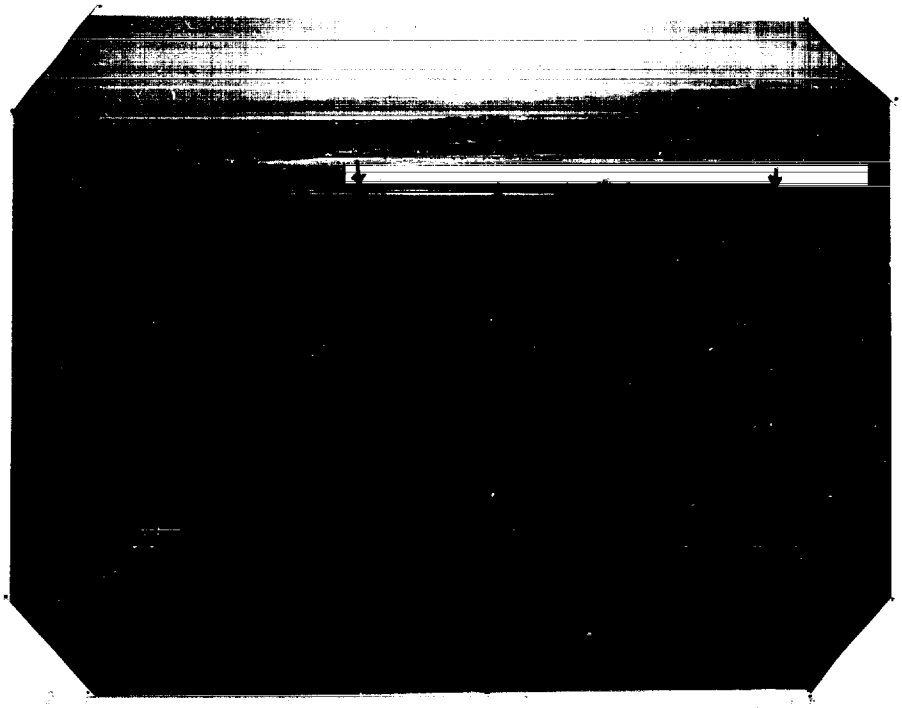
CROPS	
Mature Barley	580
Green Barley	420
Sudangrass-cane	80
	1080

SALTON SEA NATIONAL WILDLIFE REFUGE

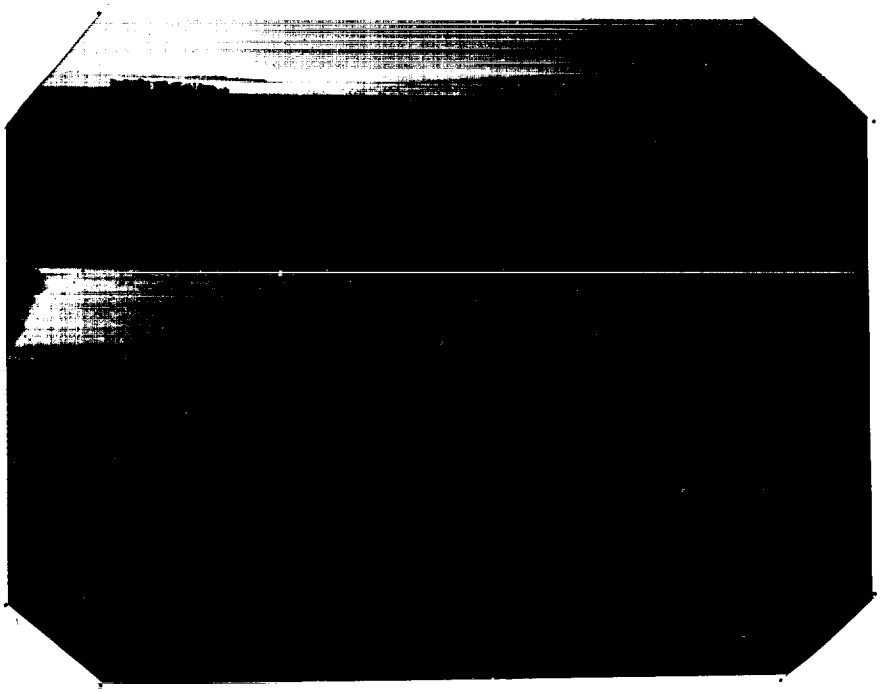
UNIT II

SCALE 2"=1 MI.

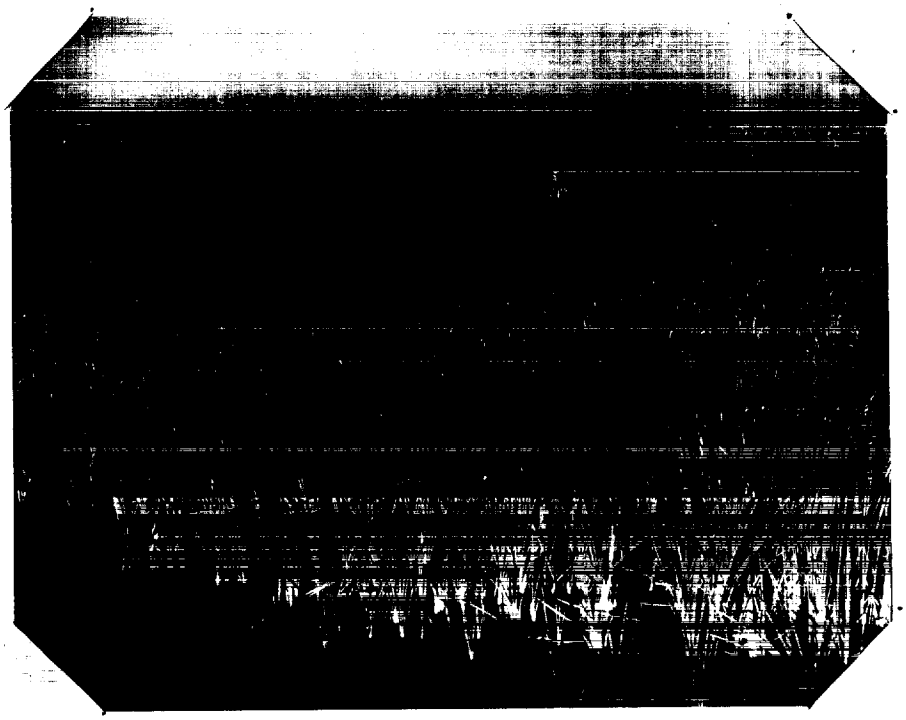
R.13 E., T. 11 S., SAN BERNARDINO MER. IMPERIAL CO. CALIF.



Aerial view of typical baiting concentrations on gun club. Arrows indicate blinds. (Nov. 1954).



Baiting concentration of ducks on Montgomery Club near Calipatria. Arrows indicate blinds.(Nov. 1954).

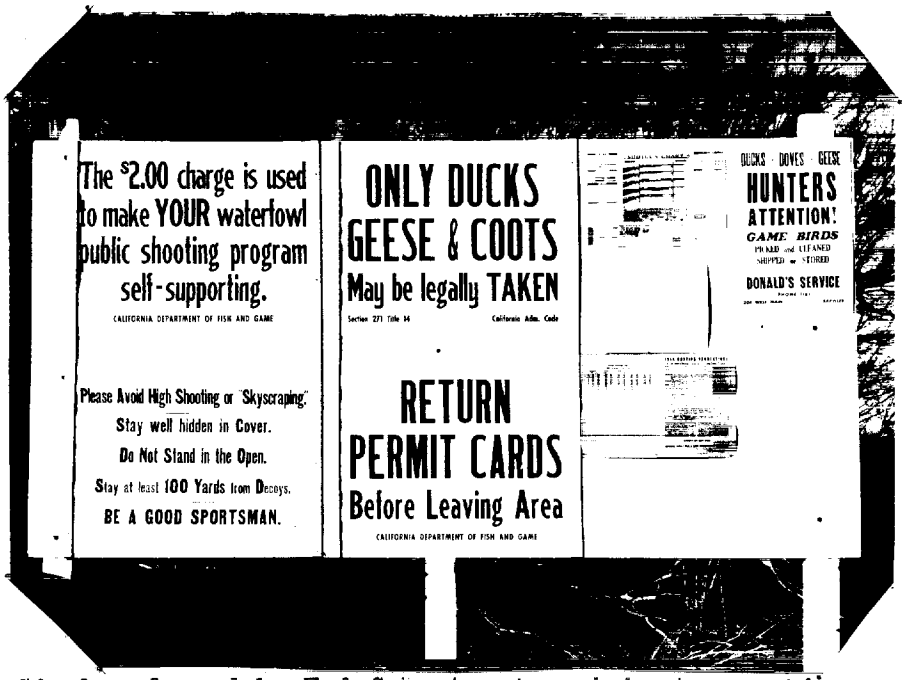


Green cattails produced on the refuge was the lowest acreage in recent years. (Sept. 1954).

Utilization was very complete by both ducks and geese. (Dec. 1954).

R. Watson and F. Beals transplanting Salicornia along sandy shoreline of Sea. (Sept. 1954).

Transplanting Eelgrass (Zostera), during the period in freshwater "estuaries" of Sea.



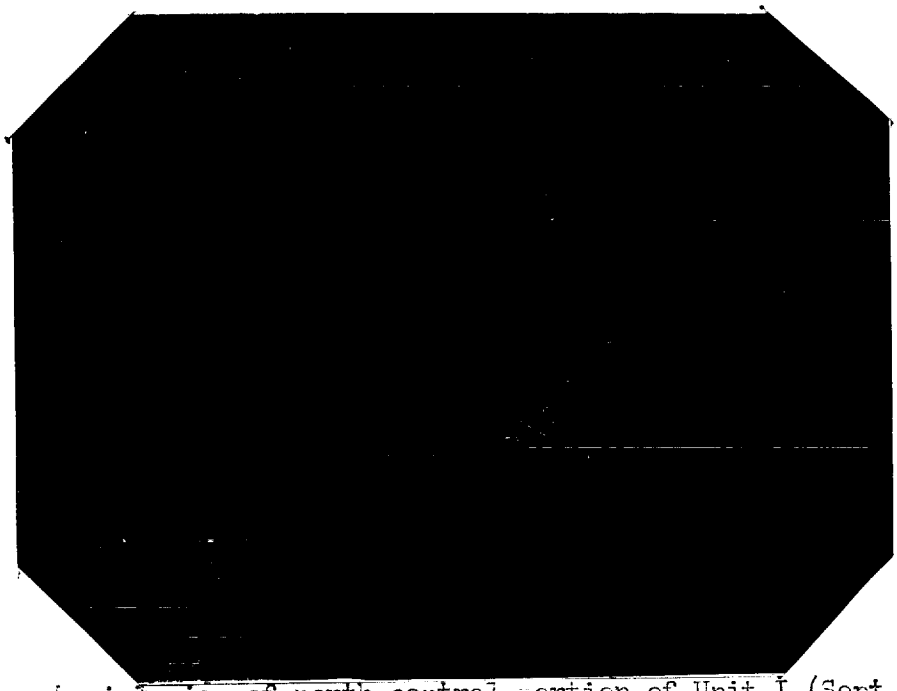
Signboard used by F & G Dept. at each hunter parking area. (Dec. 1954).

Irrigators installing and puddling concrete pipe water outlet. (Sept. 1954).

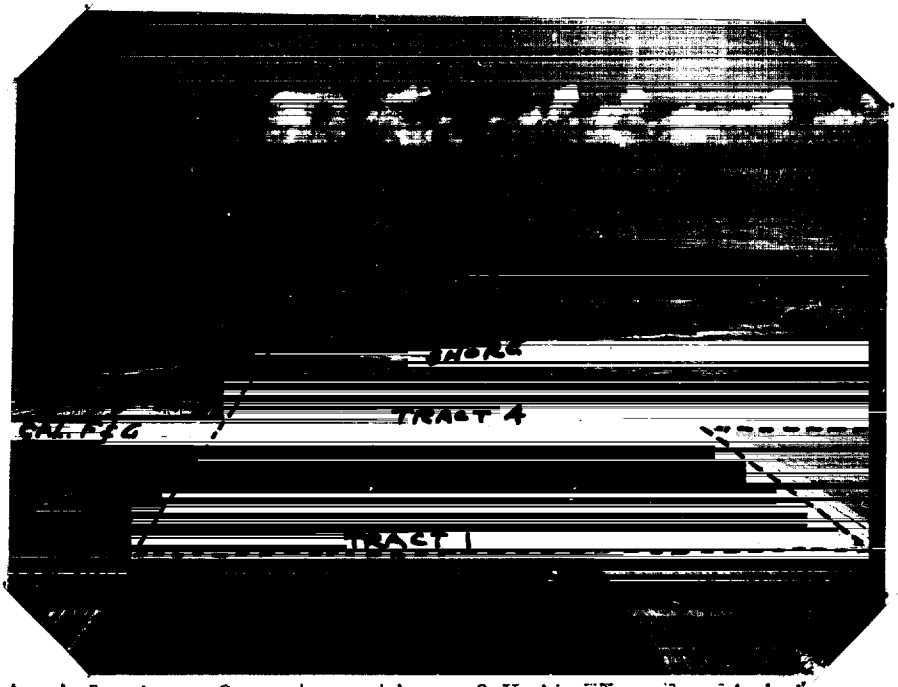
R. Watson displays one of millions of marine introduced fish lying dead in windrows along shore of Salton Sea.

Club-heads and knife-shaped bodies indicate starvation as well as suffocation. (Oct. 1954).

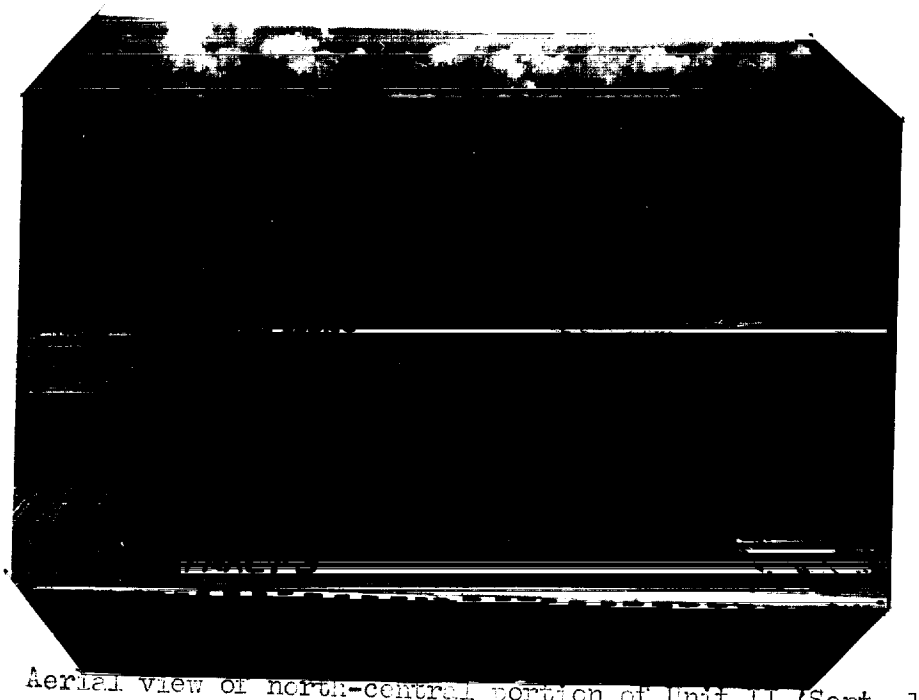
Aerial view of north portion of Unit I. (Sept.1954)



Aerial view of north-central portion of Unit I.(Sept.1954)



Aerial view of west portion of Unit II and adjoining state and private lands (Sept. 1954).



Aerial view of north-central portion of Unit II. (Sept. 1954).