SALTON SEA NATIONAL WILDLIFE REFUGE

AND

WATERFOWL DEVELOPMENT AREAS

NARRATIVE REPORT

JANUARY - APRIL, 1952

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BRAWLEY, CALIFORNIA

ELEPHANT TREES

Within 15 parched, desert, air line miles of refuge headquarters can be found a sizeable "grove" of Elephant Trees, Bursera microphylla (Gray), belonging to the Torchwood family, which yields the frankincense of biblical fame.

These strange animated trees exist on dry, rocky banks of washes and among huge boulders strewn over the landscape by alluvial fans. They are most common on east slopes between Fish and Corrizo Creek along the west edge of the desert.

The peculiar name is derived from swollen tapering branches, smooth skin-like bark and general overall characteristics which at first suggest an elephant. Tips of dark reddish-brown limbs yield blood-red sap when broken or injured. The yellowish cambium layer of the main trunk, which truly resembles animal skin more than tree bark, also "bleeds" profusely when injured.

June blossoms are inconspicuous and followed by a small berry which matures about October.

Across the border and well into Mexico, these trees are abundant and attain large sizes. Natives use them for firewood mainly.

(Photo by Lloyd R. Ramelli)

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Refuge Manager, Salton Sea National Wildlife Refuge, Brawley, Calif.

DATE: October 20, 1952

FROM : Refuge Manager, San Benito, Texas

SUBJECT: Narrative Report - Salton Sea Refuge

Enjoyed reading about the old area.

Many of the large basic problems are still there apparently, such as the steadily rising Salton Sea, the silt problem at the delta of the rivers and the crop damage, some more exaggerated, some lessened.

I appreciate Mr. MacDonald's courtesy and interest in asking that you send a copy of your narrative report to me and thanks for sending it.

Luther C. Goldman

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UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BRAWLEY, CALIFORNIA

C O N T E N T S

REFUGE PERSONNEL

Regular Personnel

Edward J. O'Neill	Refuge Manager
Clyde W. Stewart	Foreman-Farm Operations
Herbert Lamansky	Clerk (Typing)
Will T. Wesley	Maintenance Man
Jose Barros	Maintenance Man
Earl M. Barker	Mechanic
Alfred W. McFarland	Tractor Operator
Melvin Ford	Tractor Operator
Carl W. Ford	Tractor Operator
Chesley H. Williams	Tractor Operator
James W. Hamilton	Dragline Operator

Temporary Personnel

John Barros	Irrigator
Sylvester Barros	Irrigator
Eldon L. Kissee	Irrigator
William L. Lynch	Irrigator
Manuel Cardonzo	Irrigator
Adrian E. McDoniel	Irrigator
Leo E. Cox	Tractor Operator
Paul E. Williams	Tractor Operator

N A R R A T I V E R E P O R T

I GENERAL CONDITIONS

A. Weather Conditions

To say the least, weather throughout the period was most pleasant. Temperatures at times dropped down but each day saw warm, sunny, conditions agreeable to both man and beast. There was only one bad windy day during the period.

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

MONTH	MAXIMUM	MINIMUM	PRECIPITATION	DAYS WINDS OVER 25 MPH
January	76	31	.22	0
February	82	39	.07	0
March	89	43	.16	1
April	95	44	.22	0
		Total	.67	

B. Precipitation and Water Conditions

Precipitation during the period was light inasmuch as none of the storms were heavy and were well spaced apart. Commercial crop harvest was apparently hindered but little and the moisture received benefited the sandy access roads at Unit I. As indicated in the previous report, Salton Sea is undergoing a steady, noticeable, rise. The elevation came up considerably during cool weather - or, as one individual put it, "The shoreline is certainly going down, Yep, it will soon be down to highway 99!"

On March 28th, it was divulged that damage claims totaling $220,000 had been filed with the Imperial Irrigation District and the Coachella County Water District, by owners of property on the Salton Sea shores. It was contended that the sea's rise of approximately two feet since 1950 is due in part to waste water entering from the two districts.

The owners of the Desert Beach resort, 10 miles southeast of Mecca, Ralvert and Company of San Bernardino and former Senator Ralph E. Swing, land owner, alleged that considerable property had been flooded and abandoned.

A complaint by the Desert Beach resort, charged against both Districts, stated that . . . "You and each of you, have continued to cause water to flow, waste, drain, seep and be placed in the Salton Sea to such an extent that the level thereof has been caused to rise . . ." further . . . (this has) "caused complete discontinuance of claimants business, including, but without limitation, the restaurant, cocktail lounge, boating and motel business . . ." In addition to demands for damages the resort corporation asked that the Districts "desist" from activities that are causing the "gradual rising of the level of the sea . . ."

The $3,000,000 Sandy Beach, Atomic Energy Base along the west shores of the sea is also involved. Waterfront docks have been submerged. An unestimated amount of damage has already been done to the airfield runways, piers and beach installations. One of the larger islands, from which nesting birds were forced in late June of 1949 (1), as the Atomic Energy Commission erected an instrument-housing structure, was completely obliterated by high water and infrequent ripping winds. The Sandia Corporation of AEC drove piles to protect the dune island but much of the structure succumbed to winds and came to final rest along the east shores of the sea.

The carbon-dioxide gas wells along the south shore west of Niland were flooded. Some 16 wells of Cardox Western, Inc., dry ice manufacturing concern, went under. Only 4 of the company's 20 wells are above water at this writing. From the air can be seen a ring or earthen dike around each well to protect it.

The old Morton Salt works near Frink, 12 miles northwest of Niland, is now completely under water. One would have to wade to his neck to reach the abandoned administration building.

Mullet Island is once more truly an island! The county road leading to the improvements and concession-dance hall is under water. Nearby, the popular mud-pots area covering several acres, and long a tourist attraction, is partly under water.

An Imperial Irrigation District spokesman commented recently, "We anticipate from our engineering studies now being assembled that the rise may continue at an approximate rate of 15 inches a year and that the sea may reach a contour of around -220 feet below sea level over a period of years."

Estimates indicate the annual flow of Imperial Irrigation District water into the sea now amounts to about 1,450,000 acre-feet and the District's irreducable minimum amounts to around 215,000 acre-feet annually. The balance of the sea's inflow comes from agricultural underground tiles and irrigation waste in the Valley. Mexico's

(1) May - August narrative, page 9.

Irrigation waste, seepage, the Coachella District spillage, springs, natural inflow and unpredictable seasonal storms. The problem appears about as complicated as can be. Every local inhabitant is affected. Two counties (Riverside and Imperial), are involved, two public agencies (the Coachella and Imperial Irrigation Districts), are involved and there is even an international involvement with Mexico. Mexico has been given the right to spill a certain amount of waste water each year into the Salton Sea through the international Mexican Water Treaty of 1944. Everyone who farms wastes some water. When all small streams are combined it requires not one but two sizable rivers to accomodate the flow.

The All-American Canal, with water from the Colorado River, carries upwards of one ton of dissolved salts per acre foot of water (2). More porous, leveled land allows for elimination of these salts through water penetration and natural drainage. In producing an alfalfa crop which might require about 6 acre-feet of water per acre, per year, a total of about 6 tons of salt might accumulate on each irrigated acre. About one-third of these salts are very detrimental to plant growth and must be eliminated. To combat and balance the salts, more than 3,000 miles of highly beneficial underground drainage tile have been laid in the Valley. This year for the first time, an equivalent amount of salt is being drained from the land in proportion to the amount being carried in from the Colorado River's drainage basin. These same tile lines add substantially to the water which reaches the sea. They provide a shortcut back to the surface, a shortcut for waters that would otherwise be subjected to the ground table or gradual capillary rise to the surface. These tile systems are a must and will no doubt continue to increase for many years to come.

Nearly 30 years ago all public lands below the -220 foot contour were withdrawn from entry by Presidential order. All of the claimants involved in the present District suits probably acquired their lands below the -220 contour from private ownership's dating back in instances to the Railroad Land Grant Act of 1866. In 1938 the Imperial Irrigation District purchased about 199,000 acres of land from the railroad and approximately 25,000 acres from private ownership, all below the -230 foot contour. This was part of the ultimate water reserve area which comprises the refuge units. Lands above the possible sea plane were exchanged for those in danger. The District now owns all but about 4,000 acres of such lands along the sea below the -230 foot level in Imperial County. To the north, in Riverside County, Indian lands and some private holdings still lie adjacent to and within the danger zone of the salty water. These people will undoubtedly continue to resist the idea of abandonment.

(2) Analysis of Colorado River water at Yuma, Arizona, U. S. Geological Survey, 1948.

An old newspaper, the Escondido Times, dated sometime in 1892 quoted the Banning Herald newspaper thus: "Reports from Salton* say that there have been heavy rains on the desert and the lake has risen about a foot. The rise is caused solely by rains and serves to indicate how rapidly the lake will fill up now that the ground is thoroughly saturated by water. The Colorado River has risen five feet, but as yet no water is flowing into Salton from the river. When the Colorado does get high, the Salton lake will be ten times greater in extent than last year. All doubt as to the lake becoming permanent is fast disappearing - (Banning Herald)."

In the memory of man a lake existed in the same basin occupied by Salton Sea as late as 1891. That was the last natural diversion or switch from the river channel. About 14 years later the basin was revived from super-aridity to the present lake. In time the water receded to -250 ft., in 1925. Since 1936 there has been a progressive rise in Salton Sea. It is a direct reflection of agricultural expansion and water use. One rainstorm in 1939 raised the level one and one-half feet in 48 hours. Each summer evaporation lowers the level some but in recent years it has not offset the inflow. About an 8 inch rise has been gained each successive year.

George B. Holbrook (3), in his studies, compiled an interesting Area and Capacity Table which is tabulated here in part:

AREA AND CAPACITY TABLE

(SALTON SEA)

Feet above Sea Level	Area in Acres	Capacity in Acre-feet
-248	175,000	2,919,000
-246	183,000	3,277,000
-244	191,000	3,651,000
-242	199,000	4,041,000
-240	206,000	4,446,000
-230	234,000	6,646,000
-220	261,000	9,121,000
-210	289,000	11,871,000
-200	316,000	14,896,000

The whole water level stabilization, notwithstanding probable rains, is dependent upon the surface acres available for evaporation. Local average evaporation is about 6 feet per year. No one knows what variations take place over the deep waters out in the sea.

*A Southern Pacific station long submerged by rising waters.
(3) "Report on Probable Future Stages of Salton Sea", U.S.G.S. 1927

Holbrook estimates that 500,000 acre-feet would be the maximum amount of storm water that might ever enter the sea in a wet year. The annual operational spillage or waste was estimated then to be about 1,387,000 acre-feet on the basis of 1.5 acre-feet wasted per acre irrigated. This was based on the assumption that 925,000 acres would be irrigated. He concluded that the area of real safety lied above the -220 contour. Today tile flow and waste are somewhat higher than in Holbrook's time.

We are deeply concerned with the present and predicted stages of the sea as it concerns the refuge area. In the north portion of Unit I high water and wind almost lashed out a portion of the outer levee in March, and perhaps before the windy season is over the sea will force it's way into Tract 29.

The State Fish and Game Department has abandoned about half of their leased lands near Pumice Hill. Early in March high winds obstructing the Alamo River delta forced backwaters up the deeper drains into the State's Hazard area and into our Tracts 9 of Unit I and 23 of Unit II. No clearance exists between the water and the bridge which crosses Alamo River along Vail 3 Canal at this writing. The levee to the west is all that prevents Red Hill from becoming an island, as it was back in 1914.

While the District engineers predict that 10 years will see all of our installations under water, we cannot help but feel that refuge operations are a must. Some food can always be provided for the birds.

Long before the waters of Salton Sea reach -220 elevation there will no doubt be many suits and rumors of suits from indignant farmers and land owners. Private and railroad lands against the -230 contour will lose their high value and perhaps become available for refuge use. Drains will back and cover tile outlets, contrary to District soil improvement policies. At a fast rate damages will run into millions of dollars. It may even become practical to pump water into some desert basin in critical periods. It may be necessary to restrict all waste ditch outlets to perhaps 6 inch pipes to cut down on individual irrigation waste, or require individuals to order water several days in advance so that only required amounts would be diverted from the Colorado River.

The solution to the rise in the sea calls for the type remedy which hurts most. Under existing conditions it would require dealing with the "little drops" of water. It's a problem for the farmer who could better control his excess or waste water. Like one individual we know of who irrigates cotton every day of the week

except Saturday and Sunday. By holding the order continuously he can irrigate all of his land as required. In order not to break up the schedule or cancel an order, he dumps the water into Salton Sea two days each week.

The big waters now flowing from the river will in time be taken care of through expansion of the present irrigation district.

C. Fires

No fires occurred on the refuge area during the period.

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II WILDLIFE

A. Migratory Birds

1. Populations and Behavior

Populations of geese continued to hold up with the highest numbers of Canada geese in the history of the area. Total waterfowl population figures sagged a bit though over previous climbing January averages. For the first time, the gradual increases did not occur. This is mainly attributable to the almost complete absence of pintails in this area during January.

YEAR	AVG. NO. DUCKS - WEEKLY SURVEYS (JANUARY)
1948	22,734
1949	25,510
1950	36,364
1951	46,549
1952	44,463

2. Geese

The population shown the previous period steadily gained until by January 26th there were 2,200 Canadas, 360 White-fronted and 6,740 Lesser Snow geese here. A single Cackling goose and 1 Ross' goose were seen several times during the period.

During mid-February populations showed definite drops. By February 23rd there were only 860 Canadas, 200 White-fronts and 3,300 Lesser Snows here. The last of April saw a mere 5 Canada geese, 1 White-fronted goose and 13 Lesser Snows present.

Canada geese were highest ever in the history of the Valley. Severe cold weather of more northern climes was no doubt involved to a great extent. More reports came in from "wintering" ranchers and well-to-do northerners that the ducks and geese were swept right through the states of Montana and Oregon by the first blast of cold weather. Based on the stories of the cold weather up north, one of the local farmers swears he saw a bunch of "Key" birds. They had abandoned weather vanes and moved to this country to spend the winter.

The two freak partial albino Canada geese reported the previous period, continued to enjoy the southern sunshine. The white bodied bird departed in February and the white-necked individual stayed until mid-March.

Snow geese are almost back in the same status of three years ago. At that time conditions of the nesting grounds seems to have shrunk the wintering population to a mere nucleus of the previous flock. This year we have seen good percentages of immature, rusty, birds among flocks observed closely. A number of spot counts brought estimate figures which ranged from 11 to 31 percent young birds in some flocks.

Our notes on all geese killed or reliably reported killed, adjacent to the refuge tallied out thus:

Canada geese killed	178
Lesser Canada geese killed	3
Lesser Snow geese killed	402
White-fronted geese killed	41
	624

3. Ducks

Pintails never regained the population status of the previous period. (They seemed to have inside information this year on just when the annual census would take place). By mid-February the total duck population had shown declines to an estimated 23,800. At that time there was some 12,000 Baldpates, 500 Pintails, 3,800 Green-winged Teal, 600 Cinnamon Teal, 4,000 Shovellers, 20 Redheads, 10 Canvas-backs, 100 Lesser Scaup, 2,300 Ruddy ducks and about 450 Coots.

Populations in mid-March showed a total of 13,300 ducks here with Baldpates down to 2,300, Pintails 200, Green-winged Teal 2,000, Cinnamon Teal 4,000, Bufflehead 10, Coots 600 and a few Scaup, Redheads and Canvasbacks. A couple of Golden-eye ducks could be found on the place every time counts were made. They've never been numerous in the past and we regard them as somewhat of a rarity here at Salton Sea.

By late April our waterfowl population figures came out in about as many digits as the weather man's temperature tabulations. We boasted of 5 Mallards, 10 Gadwalls, 150 Baldpates, 20 Pintails, 200 Green-winged Teal, 400 Cinnamons and 200 Shovellers. Canvasbacks, Scaup, Ruddy ducks and Coots varied but little from the former trends for this time of year. A single male Ring-necked duck appeared on the fresh water area of Tract 11, Unit I, on April 24th.

A few Blue-winged Teal were taken again in our duck traps during March. Now and then during that month we saw several small groups.

Messrs. Wm. Anderson and E. G. Hunt of the State Department of Fish and Game, while live trapping ducks on Unit I in mid-February, observed a lone ~~Wood duck~~ Fulvous Duck fly overhead within very close range.

Banding operations on Unit I by the State were discontinued in mid-February. State personnel working full time tagged some 9,000 ducks during September, January and the first half of February. It was necessary for the men to stop operation and assist on the hunting grounds during the season. We consider this an outstanding live trapping job. Traps used are an adaptation of the Ohio pheasant trap. All barley for baiting purposes was supplied from the Tule Lake refuge grain shipment in storage at headquarters. It became impossible to obtain cheap feed barley and the State was allowed to draw from the refuge supply for on-the-refuge banding.

Refuge banding operations were continued on a smaller scale due to lack of time and qualified help. By April, 700 ducks and geese had been trapped, tagged and released. Two of the State traps were used also during March to capture all possible Cinnamon and Green-winged Teal. Thirteen species appeared on the tally sheets when the spring trapping season was over.

The probability of our early fall flights of ducks returning north as suggested in earlier reports is proving to be true. Of 3,400 pintails banded at this refuge in late August and September by both State of California and refuge personnel, 42 returned or made subsequent flights into central and northern California, Oregon, Washington and Utah. Although agricultural crops and cropping conditions may not be the sole factor involved, it is interesting to note that during August when the lands in Imperial Valley are being flooded they are the number-one duck habitat in spite of refuge crops. Flax seed, cantalope seed, barley seed, wheat seed, etc., are most available to the puddlers then. As the season progresses food becomes scarcer and the population dwindles.

To date 140 reports have come in from the 3,400 Pintails banded during September. Reports received tally out as follows:

MIGRATIONAL FLIGHTS OF BANDED PINTAILS:	NUMBER
North from Salton Sea	42
South from Salton Sea	21
East from Salton Sea	16
Locally (at Salton Sea)	61

One Pintail banded September 27th was taken on November 27th at Ancon, Canal Zone, Republic of Panama. Another banded September 23rd, was killed in December at Choluteca, Honduras, Central America. A third, banded September 17th, was picked up at Chinondega, Nicaragua, Central America. In November, a September banded Pintail was taken at Gray's Harbor County, Washington.

The annual waterfowl census-inventory as conducted on January 7th and 8th was extended to Baja, California, Mexico, this year. The State's 4-place Cessna 170 plane was employed for the job. Messrs. Jacinto Solis Corzo, Chief Delegate of Forest and Game, Baja, California, William Anderson, California Fish and Game, Patrick Symons, pilot, California Fish and Game and the writer made up the group of observers.

Areas along the Colorado River from Blythe, California, through the river delta in Mexico and the entire Imperial and Palo Verde Valleys were covered. Total flying time was slightly less than 10 hours. About 550 miles of travel was accomplished. Average actual altitude over the river areas was 200 feet. Average air speed was 80 miles per hour.

A total of 119,508 birds were estimated and recorded during the flights. Of the total, 15,201 were geese.

On the trip into Mexico two magnificent specimens of Bald Eagles were observed, numbers of Mergansers were scattered along the river almost to the very mouth. In Mexico we found ducks scarce. Snow geese and Pintails were the main species recorded. At the delta it was low tide, ducks were along the main stream or sand bars. Geese (predominantly Snows), were mainly in the lush, tidal grasslands.

Senor Solis pointed out to us how the Rio Hardy river had cut a channel through the old delta beds and moved back inland since the days of muddy waters and high silt.

Laguna Salada which formerly became flooded during periods of high river water is now and has been dry for some years. This was once a major resort for our flocks of wintering ducks. Today it is bone dry.

4. Shorebirds, Gulls and Terns

A few Ring-billed and Glaucous-winged gulls spent the entire winter period here as in past years. 4 California gulls were here February 13th. Black-bellied Plover, 300 and 400 in a flock remained into early February and then disappeared on the urgent flight back north. Weeks later, April 26th to be exact, 26 turned up where the drain from Tract 28, Unit I, runs into the sea.

Mountain Plover, the last of a large group which wintered here, were present to the extent of 4 on February 2nd.

A few Black-necked Stilts and Avocets managed to stick it out and remain all winter - a bit on the unusual side.

The Glossy Ibis, scarce in the previous period, showed up in late February when several hundreds came to the Valley.

The special Snipe investigation conducted here on January 26th left us with the feeling that we had been sent on an old-fashioned snipe hunt. After many an hour a'field we still had nothing more than the empty sack, not one snipe did we see!

5. Marsh and Water Birds

The flock of Sandhill Cranes seen during the previous period may have moved out of the area or perhaps split up. On February 13th 5 individuals visited Unit I. The group, apparently a family, remained until March 3rd. Again on March 14th, near Mullet Island, 14 cranes were observed in a barley field.

6. Food and Cover

This subject was covered in the previous report and there has been little change in conditions save for the fact that much of the new alfalfa crops were killed from constant grazing and trampling by the population of birds which depended upon the refuge for home and food. There was an upswing in alfalfa losses by night feeding ducks in private fields. Last years losses to alfalfa were about 2,800 acres according to the data obtained from growers.

In the Niland area we obtained stomachs from ducks which had ingested a number of small rounded clams. Search disclosed that

sandy canals in that area are teeming with the small clams. Dr. Joshua L. Bailey, Jr. of the San Diego County Museum and Professor Carl Hubbs of Scripps Institution of Oceanography tentatively identified the species as Corbicula or Sphaerium and intend to study them further. One irrigation company employee reports that several years ago a Filipino brought in a bucket full from the Sacramento country.

B. Upland Game Birds

No known change in status since the previous period.

C. Other Birds

Western Bluebirds by the hundreds continued through the winter months to proclaim the country surrounding Salton Sea as the finest roosting, singing, feeding place this side of the chilly northern belt we've heard so much about this winter. By March 19th only 1 individual could be found. The cool weather was over by then as farmers were baling the second cutting of hay by this time.

An unusual record was obtained when an Eastern Flycatcher came here in late January.

American Red Starts were here again this season.

D. Fur Animals, Predators, etc.

No known change since the previous period.

E. Fish

The take of mullet on Salton Sea by commercial fishermen provides practically nothing to write about. It can be summed up thus - - very light catch.

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III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Developments

1. Cultivated Crops

Unit I:

Acres under lease	4600
Acres under fallow	2550
Acres cropped	870
Acres producing successful crop coverage	550
Acres under sump, river, etc.	1200

In early March drainage of the fresh water impoundment areas was started. By the last of April they were about one-half dried up for cultivation and replanting. Only the upper portions of Tract 11 and Tracts 28-30 were drained to allow for a good growth of cattails, horned pondweed and widgeon grass.

Tract 7 produced the best crop of barley ever. We estimate that about 15 sacks per acre could be combined from the 160 acre tract.

Dragline operations were continued as 2 miles of service ditch with holes for boxes and 3⅛ miles of drain ditches were constructed.

Tracts 5 and 6 were reworked after it became apparent that geese had killed more than 85 per cent of the crop by over use.

The south portion of Tract 4 was prepared, fertilized and seeded to alfalfa. The balance of the 160 acre tract was seeded to barley in January.

Tract 9 was surveyed for ditches to bi-pass the Reseda Gun Club to the east and leach the soils. A drainage ditch was constructed along Trifolium 13 to drain waste water from above and make more land available. About 3 weeks after it was completed strong winds choked the New River delta, backed the river up and a charge of water backed almost a mile up our new drain ditch.

Tracts 26 and 27 were planted to alfalfa in early February but winds following germination killed out about 50 percent of the crop. We chanced a light irrigation to salvage the remaining crop and dwarfed seedlings, sheltered in cracked soil, were mostly sealed in.

Unit II:

Acres under lease	2180
Acres under fallow	720
Acres cropped	540
Acres producing successful crop coverage	420
Acres under sump, river, etc.	900

The alfalfa acreages (180), were heavily utilized by geese and the new crop in Tract 9 was killed by overuse.

As the barley matured in Tract 4, Yellow-headed Blackbirds moved in and systematically cleaned up all of the earliest maturing heads of grain. This "milking" damage stopped after a few surrounding fields began to mature and birds thinned out. About 25 percent of the grain was taken however and visitors remarked that it looked as though our crop was killed by frost. Aside from the detrimental standpoint, the huge flock of highly colored birds perched on fences and trees attracted many a sight-seer to the area. They presented a beautiful sight and before they left, the roads along the field were littered with camera film cartons.

Tract 23 was leveled and together with Tracts 15 and 22 one large field of 200 acres is being prepared for fall seeding.

Tracts 7 and 14 were resurveyed and leveling started to combine the tracts and make one large field.

B. Receipts of Seed and Stock

From Sumner Lake refuge we received 1,000 pounds of Nodding Smartweed for experimental planting in each of the 3 permanent fresh-water units. If Smartweeds will survive and produce they may prove a great improvement over the Wild Millets which have failed to overcome "blasting" of the seed.

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IV ECONOMIC USE OF REFUGE

A. Grazing and Haying

Only one special use permit was issued during the period to cover grazing of refuge alfalfa crops after the waterfowl had departed from these parts. On April 18th Mr. Arnold Shields entered the refuge with 1,545 head of mature sheep which grazed continuously for 23 days.

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V PUBLIC RELATIONS

A. Recreational Uses

The weekly public tour which departed from headquarters each Sunday at 1:30 PM was continued until the 2nd week of February.

A number of visitors, as listed under that heading, came to observe waterfowl and tour the development areas.

1. Public Use — Visitor Days

a. Hunting Use	None
b. Fishing Use	102
c. Miscellaneous Use	563
Total	665

B. Refuge Visitors

NAME	DATE	IDENTIFICATION	PURPOSE
Wm. Anderson	1/7	Calif. F & G	Tour
Sr. Solis Corzo	1/7	Mexican Government	Tour
J. A. Reynolds	1/9	Calif. F & G	Game violations
H. Sargeant	1/11	R. O. Region I	Inspection tour
Pyle	1/20	Editors, Audubon Field Notes	Tour
O. Small	1/20		
G. Noel	1/20	Calif. F & G	Tour
R. Hanson	1/21-22	Pilot-Biologist	Aerial survey and
	2/18	Sacramento Refuge	photography
H. Preston	1/24-25	R. O. Region I	Office records, etc.
C. H. Lostetter	1/30-2/4	Depredation Biologist	Tour - report data
Wm. Wooten	2/18	Agent, Los Angeles	Patrol
D. Woodward	2/20	Geological Survey	Discuss elev. of sea
Wm. Taylor	2/21	Central Office	Tour & inspection
Wm. Krummes	2/21	Central Office	Tour & inspection
Regan	2/21	Central Office	Tour & inspection
F. Gillett	2/21	R. O. Region I	Tour & inspection
K. F. MacDonald	2/21	R. O. Region I	Tour & inspection
Wm. Ackernecht	2/21	Central Office	Tour & inspection
W. Baum	2/21	Central Office	Tour & inspection
B. McEachern	2/25-3/5	USF&W Merced	Clerical detail
J. C. Salyer	3/7-9	Central Office	Tour & inspection
J. M. Sheldon	3/10-11	Engr. I.I.D.	Insp. drainage Un. III
A. Shields	3/11	Livestock owner	Sheep grazing permit
16 members	3/29	San Diego Audubon	Photography, etc.
22 members	3/30	Orange Co. Audubon	Bird observations, etc.
85 students	4/6	L.A. City College	Bird observations, etc.
A. M. Day	4/17-18	Central Office	Depredations meet. & tour
J. C. Gatlin	4/17-18	R. O. Region II	Depredations meet. & tour
L. L. Laythe	4/17-18	R. O. Region I	Depredations meet. & tour
A. W. Elder	4/17-18	Game Agent, L.A.	Depredations meet. & tour
G. Ducret'	4/21-22	R. O. Region I	Survey & profile of New River
L. Eddens	4/24	Livestock owner	Grazing permit

C. Refuge Participation

Three meetings of the Lea Act Lands-Depredations group were held January 14th, February 7th and April 18th. As permanent "secretary" we continued to handle correspondence and minutes of each confab. The group this season extended their guidance to the entire refuge operations rather than the insignificant 1,200 acres of Lea Act lands. Before the season was over our refuge policies had been blasted like the spoonbill that made it through the east boundary firing line on opening day.

. . . . . .

On February 4th a gathering of chemists, plant pathologists and naturalists from across the country met at Seeley, California, to form the Sonoran Life Zone Society. The Society proposed to "study the biology, chemistry and economic uses of plants that grow under desert conditions, and the animals, insects, birds and micro-organisms that live in the environment of desert plants, and to make the knowledge gained from this study available to the public in literature to be published on three educational levels; for the amateur, for the student and for the scientist."

At the first organization meeting celebreties included Dr. Peter C. Duisberg, Arid Lands Committee of the American Association for the Advancement of Science, Dr. C. W. Botkin, Professor of Chemistry, New Mexico College of Agriculture and Mechanical Arts, Dr. Henry M. Burlage, Dean of College of Pharmacy, University of Texas, Dr. John R. Clapton, Professor of Chemistry, University of Colorado, Victor H. Scheffelmeyer, science editor, etc.

We participated by attending the first meeting and presenting a paper entitled, "Some Comments about the Biology of Salton Sea."

D. Violations

Violations dropped off to a negligible factor with the close of the waterfowl season (January 5th). Several apprehensions were made but no cases were filed in court during the period.

VI OTHER ITEMS

Up in Inglewood, California, one Mrs. Leola Cason, age 60, was faced with a $14,750 damage suit because she scattered bread crumbs in her yard for the birds.

Two neighbors, Mr. and Mrs. Jeff C. Earlywine, filed suit complaining that we "cannot hang out our washing any more because thousands of birds roost in our yards."

They asserted further, "rats, mice, other migratory animals, and thousands of seagulls, blackbirds and wild birds of every kind" attend the daily luncheons in the neighbor lady's garden and many take up residence in the area.

Payment is being asked for alleged damage to their house, yard, fence, and for "mental and physical anguish."

. . . . . .

Next to livestock, ducks compete with the winter alfalfa dehydration mills more than any other industry in this area. An indication of the present size of the business is borne out in the report that each year approximately 80,000 tons of alfalfa are dehydrated here. Ovens operate from September to May now. Meal is shipped to mixing centers at St. Louis, Kansas City, Chicago, etc, for laying mashes, chicken feed, calf meal and medicinal uses. There has been tremendous demands for export of alfalfa meal in late years.

. . . . . .

During the period the State wound up what they considered the most successful waterfowl hunting season in the history of the Hazard, Pumice and Unit A areas. Some 3,227 shooters used fee areas at $5 per man, two men per blind. State figures show around 9,300 birds were checked through the stations. This is about a 300% increase over last year. For the first time all blinds were filled on a couple of occasions. The State reportedly realized some $16,135 on their 550 acres of land owned and 1,465 acres leased for $1 per year from the District.

Salient comments and discussions at local depredations committee meetings included the following:

January 14th; The State men and sportsmen called for a late hunting season to eliminate depredations by Baldpates . . . One farmer thought that sportsmen couldn't kill enough Baldpates at night to save 10 acres of alfalfa - - - Lights were discussed and a new 120 volt, 60 cycle, 200 watt unit demonstrated by Otto K. Olson Co., Los Angeles - - - A motion was passed that Tule Lake homesteading should be stopped before it destroys the refuge and forces more alfalfa-eating ducks south - - - A proposal was made that the U. S. Fish and Wildlife Service install a duck light on telephone poles every mile or so apart in the north end to protect everyones crops.

February 7th; Sportsmen backed the State for purchase of 560 acres just south of Federal Unit II. One voting farmer came back with "Okay, provided it was farmed - not hunted!" - - - Mr. Rubke, State refuge manager, reported that 900 acres of their units would be lost this winter due to the rise of Salton Sea - - - A motion was passed that the U. S. Fish and Wildlife Service should contact scientists all over the world for plants which will grow here and produce more duck food - - - The flares have diminished in supply from 19,000 units in 1947 to 4,000 at present - - - Insurance for alfalfa crops was brought up and commented on.

April 18th; Mr. Al Day told the group they would probably have duck troubles as long as there are ducks - - - Mr. Ben Glading, State Fish and Game, called upon the Service to meet it's obligations and open up the refuge to hunting - - - Mr. Day blasted the State's baiting proposals stating that California's plan to feed 1 pound of grain per acre per day would feed about 4 adult Mallards each day - - - Duck seasons were discussed pro and con.

. . . . . .

On March 12th the California Senate approved two resolutions asking that the State be given authority to set it's own duck hunting seasons.

Senator George Hatfield (R-Newman) authored the 2 measures because the U. S. Fish and Wildlife Service does not take into consideration climate, topography or the size of California

Senator Ben Hulse (R-El Centro) said he's seen $100,000 damage done to crops in a single night in Imperial County because the seasons were ill-timed!

Two bad hunting accidents occured. One man was shot in the back of the head when his companion lost his balance, fell back and discharged an automatic shotgun. The second incident occured along the refuge boundary when a hunter shot his own hand off while pulling a shotgun through the fence.

Respectfully submitted,

Edward J. O'Neill
Refuge Manager

APPROVED:

_____

_____

_____

WATERFOWL

Refuge Salton Sea Wildlife Refuge Months of January to April 19 52

(1) Species		(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Young Produced		(6) Total
	Common Name	Number	Date	Number	Date	Number	Date	Broods Seen	Estimated Total	Estimated for Period
I.	Swans:									
	Whistling swan									
II.	Geese:									
	Canada goose	previous	period	2000	1/26					2500
	Cackling goose	previous	period	1		1	2/2			10
	Brant									
	White-fronted goose	previous	period	360	1/26					400
	Snow goose	previous	period	6710	1/26					10000
	Blue goose									
	Ross' goose	previous	period	1	1/26	1	2/2			10
III.	Ducks:									
	Mallard	Previous	period	60	1/26					100
	Black duck									
	Gadwall	previous	period	220	3/8					1000
	Baldpate	previous	period	40000	1/26					50000
	Pintail	previous	period	3605	1/5					6000
	Green-winged teal	previous	period	3300	2/23					5000
	Blue-winged teal	previous	period	10	3/8	1	3/22			10
	Cinnamon teal	previous	period	4000	3/15					6000
	Shoveller	previous	period	4360	3/9					7000
	Wood duck									
	Redhead	previous	period	160	1/5					200
	Ring-necked duck	previous	period	1	4/20	1	4/20			10
	Canvas-back	previous	period	300	1/12					500
	Scaup	previous	period	200	1/5					1000
	Golden-eye	2	1/5	12	1/12	1	4/12			10
	Buffle-head	previous	period	8	3/29					10
	Ruddy duck	previous	period	2300	2/24					4000
IV.	Coot:	previous	period	1300	1/5					3000

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese_____

Ducks_____

Coots_____

Total waterfowl usage during period 96,760

Peak waterfowl numbers 69,632

Areas used by concentrations_____

Principal nesting areas this season_____

Reported by_____

INSTRUCTIONS

(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) First Seen: The first refuge record for the species during the season concerned in the reporting period, and the number seen. This column does not apply to resident species.

(3) Peak Concentration: 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 in the reporting period.

(5) Young Produced: 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.

(6) Total: Estimated total number of the species using the refuge during the period. This figure may or may not be more than that used for peak concentrations, depending upon the nature of the migrational movement.

Note: Only columns applicable to the reporting period should be used. It is desirable that the Summaries receive careful attention since these data are necessarily based on an analysis of the rest of the form.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Salton Sea National Wildlife Refuge Year ending April 30, 1952

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5) Total Population
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
There are no small mammals of economic importance on this refuge.														

* List removals by Predator Animal Hunter

REMARKS:

Reported by _____

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge ~~Salton Sea National Wildlife Refuge~~ Months of ~~January~~ to ~~April~~, 194~~1~~ 52

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Pheasants									**1,000**	**Heavy plantings by State this season**

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

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

MIGRATORY BIRDS
(other than waterfowl)

Refuge Salton Sea Wildlife Refuge Months of January to April 1952

(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:										
Black-crowned nt. Heron	previous	period	21	3/16						
Great Blue Heron	previous	period	14	3/16						
Glossy Ibis	previous	period	2000	2/24						
American Egret	previous	period	1150	4/12						
Brewster's Egret	previous	period	300	4/12						
Sandhill Crane	previous	period	14	3/14						
II. Shorebirds, Gulls and Terns:										
Gull-billed Terns	14	3/29								
Long-billed Curlew	previous	period	4000	4/5						
Hudsonian Curlew	previous	period	2	3/21						
Black-necked Stilt	previous	period	1500	4/26						
Western Willet	previous	period	10	4/12						
American Avocet	previous	period	200	3/8						
Lesser Yellowlegs	previous	period	120	3/20						
Ring-billed Gulls	previous	period	2500	period						
Dowitcher	previous	period	3000	4/8						
Least Sandpiper	previous	period	2400	4/8						
Western Sandpiper	previous	period	3000	4/8						
Wilson Snipe	1	2/2	1							
Bonaparte's Gull	6	5/18								
Laughing Gull	6	5/2								
Black-bellied Plover	400	3/8			26	4/26				

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove					
White-winged dove					
IV. Predaceous Birds:					
Golden eagle					
Duck hawk					
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)

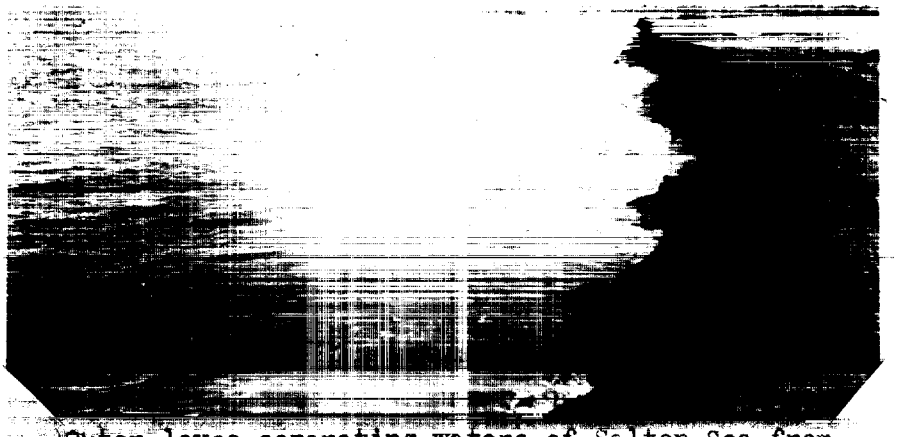
(2) First Seen: The first refuge record for the species for the season concerned.

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

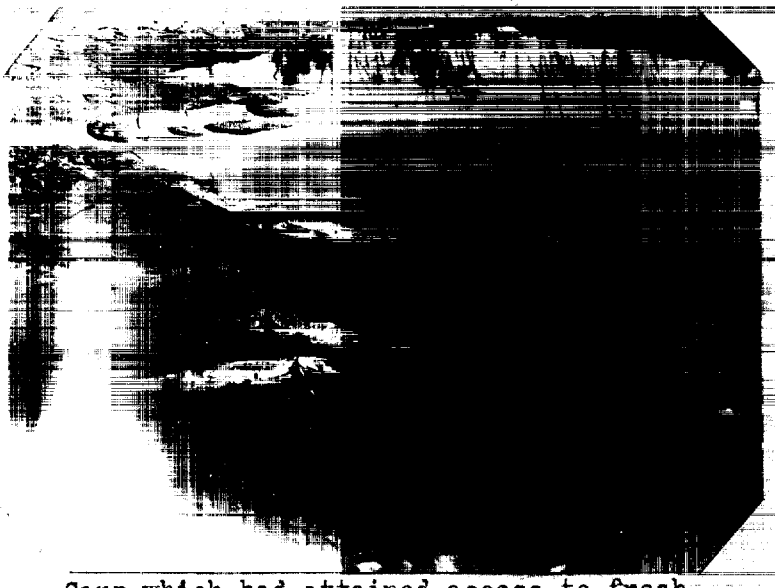
(4) Last Seen: The last refuge record for the species during the season concerned.

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

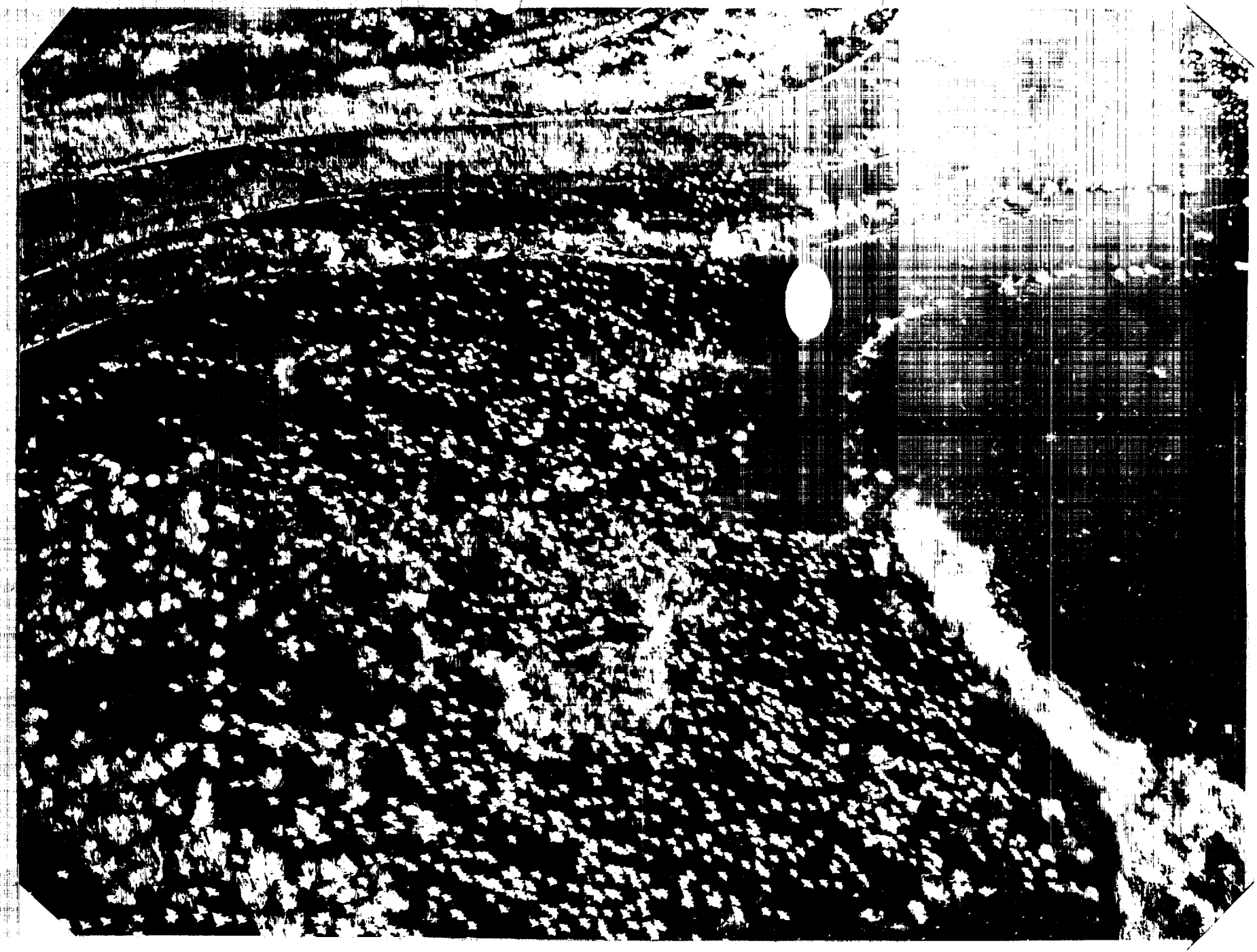
(6) Total: Estimated total number of the species using the refuge during the period concerned.



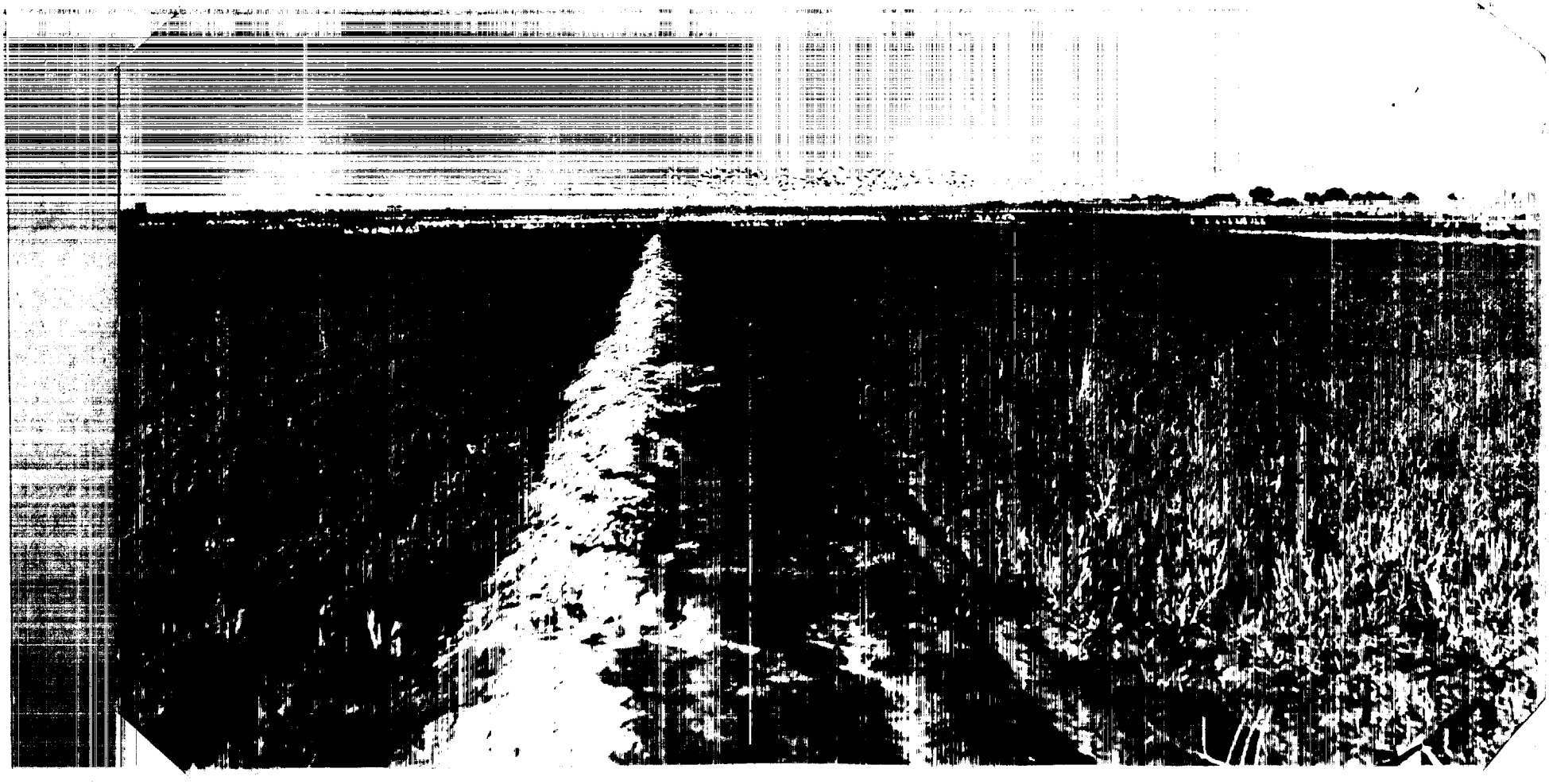
Outer levee separating waters of Salton Sea from fresh water impoundments. Days of highest winds splashed sea water over the levee. March, 1952. Tracts 29-30, Unit I.



Carp which had attained access to fresh water impoundments through District canals died as units were dried up during April. Some specimens had attained surprising size during the 10 month period.

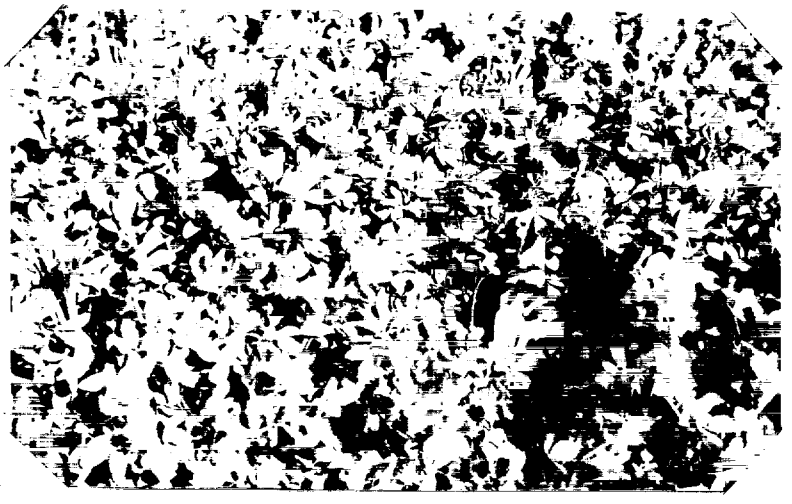


Aerial photo of Snow Geese, Tract 11, Unit I.



Wintering Snow Geese east of refuge Tract 27, Unit I. The alfalfa crops on refuge plots became badly overgrazed through 4 months of constant use. Birds turned to farm crops after the hunting season . . . .
February 1952.

BEFORE

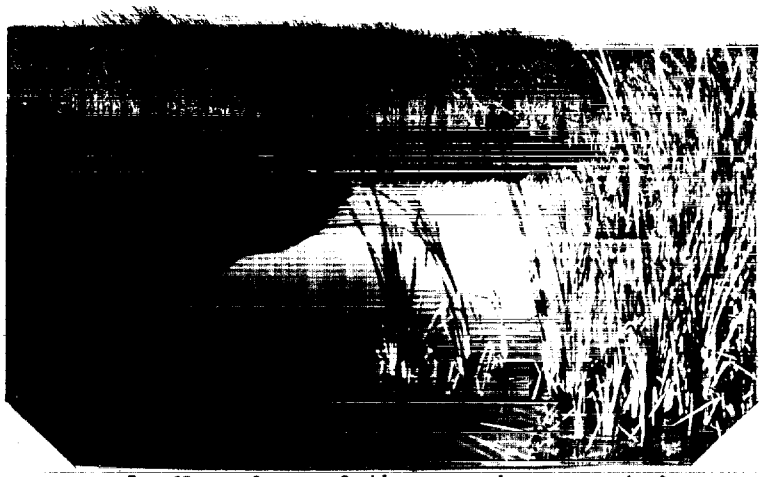


India variety alfalfa stand of 10/10 density on marked sample plot in Tract 18, Unit I. . . . October, 1951.

AFTER

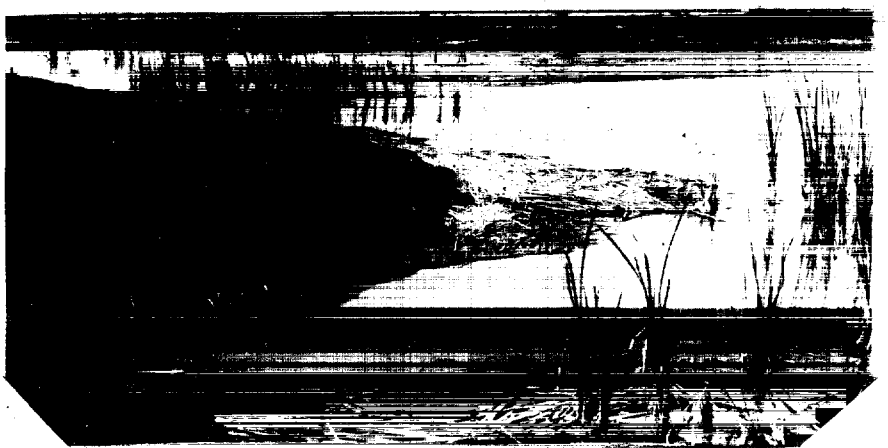
Same plot as above. Geese kept alfalfa clumps gleaned to the ground. Use before, during, after irrigation and in cold spells killed all new growths. . . . March, 1952.

BEFORE



By early November of the previous period, new cattail growths in the fresh water areas had attained heights of several feet. As refuge crops dwindled Snow and White-fronted geese utilized the "crop".

Tract 28, Unit I, November 1951.



AFTER

Throughout the winter months cattails proved a real item of food. When the warm days of April failed to revive the growths it was discovered that 90% of the cattails were dead.

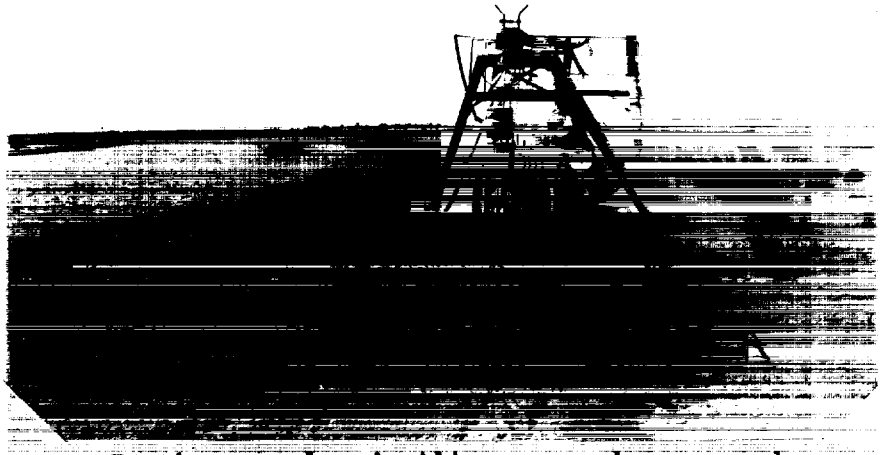
Tract 28, Unit I, March 1952.

Green cattails wern't the only item on this winters waterfowl menu . . . . Canada, White-fronts and Snow geese gleaned the dry soils of Tracts 15-22, Unit II, and consumed the plowed up rock-hard basal portion of young, dry cattails scattered over the fields.

Charting route of January 7, 8th, waterfowl census. (L-R) Sr. Solis Corzo, Wm. Anderson, Patrick Symons, Ed O'Neill.

Foreman C. Stewart and mechanic E. Barker rigged up temporary ripper teeth on the D-4 'dozer which made a clean sweep of matted Tamarix on old contours . . . .

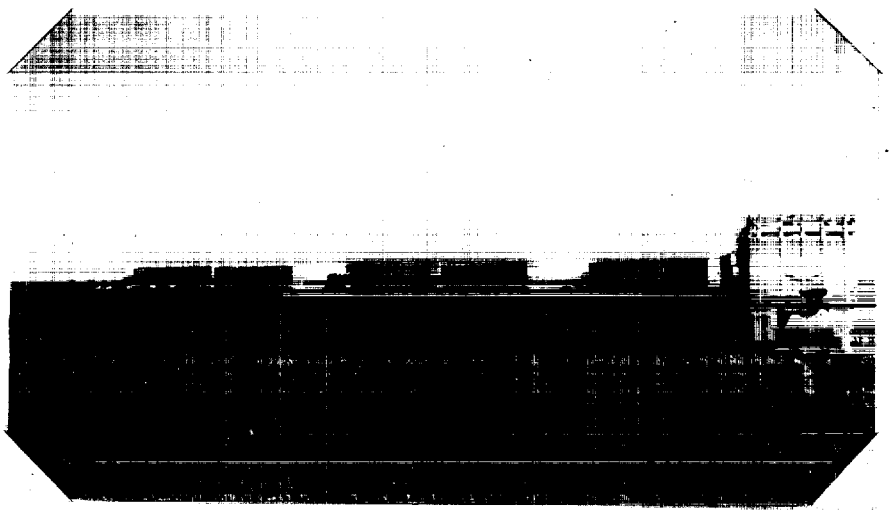
Operator W. Wesley, April, 1952



Brush removal and piling was made easy and saved many a man-day . . . .

Operator W. Wesley, April, 1952

A number of crippled ducks and geese were placed in the new enclosure at headquarters for display. January, 1952.

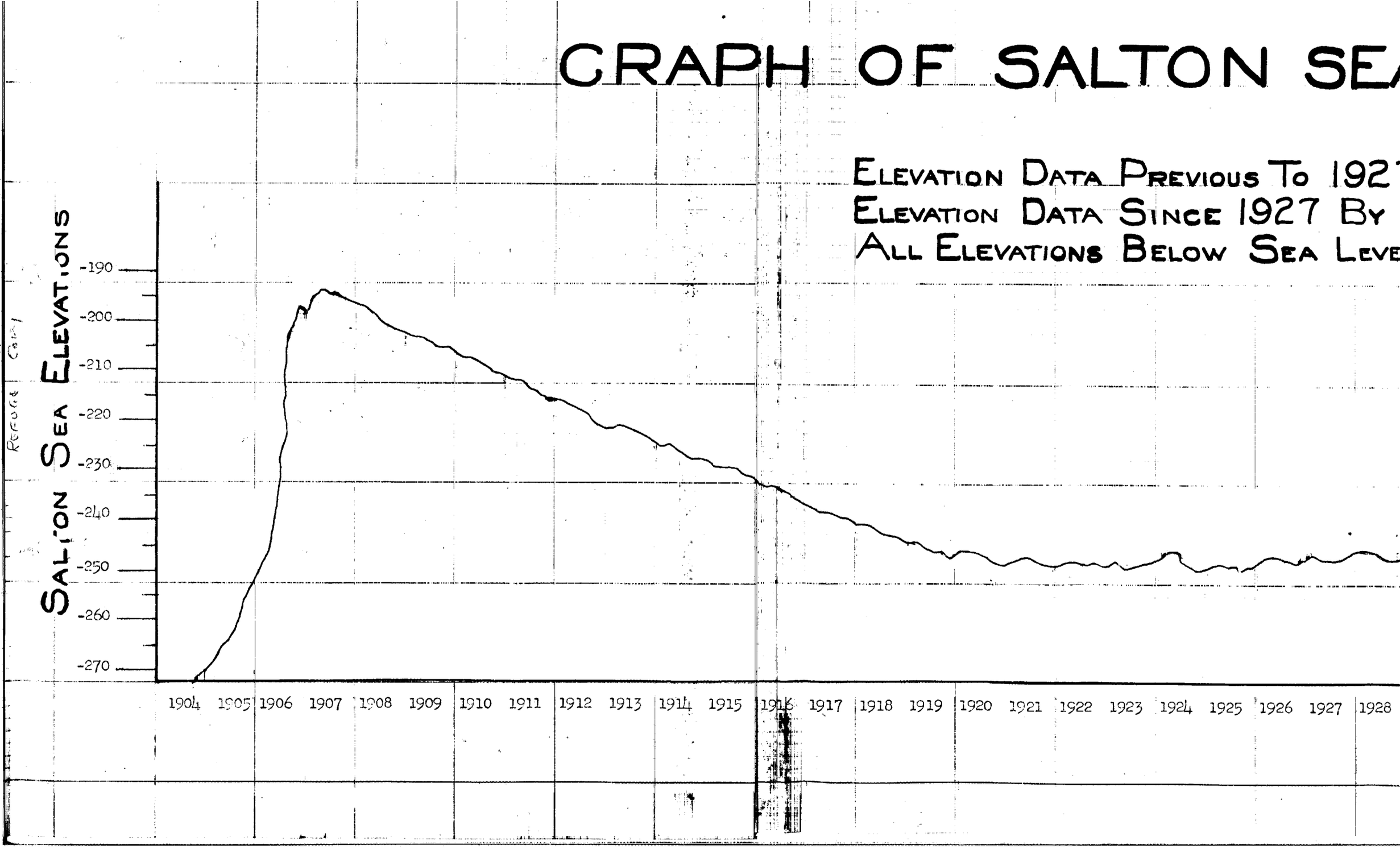


1,545 head of sheep entered Tract 3, Unit II, on April 18th to utilize alfalfa until a seed crop could be started. Here truckers unload first of 6 truck-trailer units . . . . April, 1952.

FALL BANDING RETURNS
25 PINTAILS TAGGED AT SALTON SEA IN SEPTEMBER

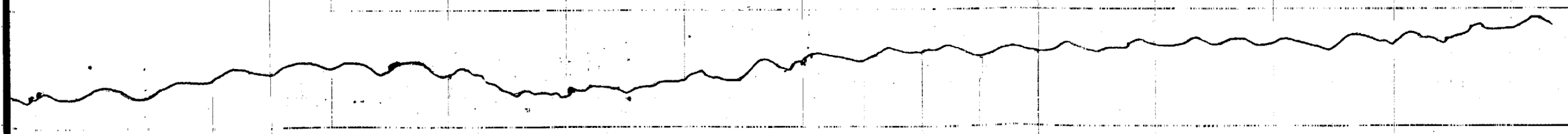
CRAPH OF SALTON SEA

ELEVATION DATA PREVIOUS TO 192
ELEVATION DATA SINCE 1927 BY
ALL ELEVATIONS BELOW SEA LEVE



SEA GAUGE READINGS

To 1927 By U.S.C.S. & S.P.R.R.
27 By I.I.D.
EA LEVEL



6 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952