SALTON SEA NATIONAL WILDLIFE REFUGE
AND
WATERFOWL DEVELOP MENT AREA

Narrative Report

January, February, March, April, 1948

--- Regular Personnel ---

Edward J. O'Neill....Refuge Manager
James H. Hall.....Mgr. Waterfowl Control Area
Will T. Wesley.....Laborer
Clyde W. Stewart.....Tractor Operator
Alfred W. McFarland..Tractor Operator
Eulese S. Huffines...Laborer

--- Temporary Personnel ---

Joseph V. Collins....Laborer

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United States Department of The Interior
Fish And Wildlife Service
Brawley, California

I. GENERAL CONDITIONS

A. Weather Conditions.

By mid-January the dry, sunny weather conditions that have always attracted so many winter tourists to California, proved to be backfiring in the direction of a disasterous drought. Some coastal cities rationed water to sanitary and domestic use only.

The life-blood $650,000,000 agricultural industries faced extreme danger. Fire hazard areas in forests, created by the long dry spell, were padlocked and restricted; the normally green carpeted hills and valleys turned as brown as inmid-summer. Deer moved off the barren mountain slopes and foraged commonly in the beautiful foothill gardens and fields until feed in the form of baled hay was scattered in the hills from the air and by trucks.

The drought was first felt in Southern California and gradually crept up-state to the San Francisco bay area. Temperatures broke all January readings as citizens basked in the "lovely weather". The year 1947 was the driest since local weather bureau stations started their records some 70 years ago. During the Christmas week the mercury raised to 87 degrees in the Los Angeles area.

The Imperial Valley with its great system of irrigation and water supply, likewise felt natures winter moods. On January 28th balmy weather temperatures plummeted to freezing. Estimates placed frosts responsible for more than $500,000 damage to the vegetable crops. The entire valley felt shivering temperatures of the lowest degree readings since 1937. From southwest of El Centro came one temperature reading of 19.5 degrees.

The vast fields of hardy lettuce were not hurt by the freeze.

One of the city parks at Brawley under irrigation at the time, was

frozen solid. A long list of frozen automobile radiators, plumbing fixtures, etc accompanied the low readings.

In early February, California saw its first winter storms. Drenching southern coastal counties with generous precipitation worth millions of dollars. Rain, snow and even hail came to most areas promising to be a savior of many hundreds of thousands of acres of crops. Some snow even fell in the great Mojave desert to the north.

Save for cloudiness and a couple of sprinkles so negligable as to fail to even register on rain gauges, the storms never reached the Imperial Valley.

Tabulated below is the local weather recordings as compiled by the El Centro naval air station.

MONTH	TEMPERATURES MAXIMUM	TEMPERATURES MINIMUM	PRECIPITATION
January	84.1	25.0	0
February	86.0	29.0	Tr.
March	81.2	32.0	Tr.
April	100.1	45.6	0
		TOTAL.....	Tr.

January 19th marked the first windstorm of the period, when loose sand and dust swirled skyward before a 32 mile per hour wind and caused a near black-out of the sun. At about this time a report came to us from the local Naval Air base that at one of the bases in the Mojave where the snow fell, a flock of about 200 Canada geese landed on the runways and required flushing before two airplanes could be landed.

The month of February was marked with winds also, four blows, the worst of which occured on the 22nd day of the month. Weather observers blamed the high winds on a low pressure area centered over northern Arizona. The El Centro naval air station reported that the peak winds averaged 89 miles per hour, however over the valley an average velocity of 47 miles per hour ripped the frost caps from winter mellons, cantaloupes and other tender crops and damaged many a shade tree.

March saw but five bad dust storms which decended on the refuge farming area, cutting the visibility to a few feet and rendering tractor operations impossible.

During April, sand storms were common place. There was at least seven days during which wind velocities ranged from 30 to 48 miles per hour. A number of days of lesser wind velocities created disagreeable field working conditions.

B. Water Conditions.

Often during March and early April the New River backed up from its choked delta and topped the banks in Section 23 of the developement area.

On April 16 the Imperial Irrigation District effected the proposed cut in the west bank of the New River in tract 16 and sent the muddy waters swirling accross the north portion of Section 22. The water raised gradually until by the last of April all of tracts 11, 12, 13, 14 and 16 were under water. About one-half of tract 15 remained above water.

The plan of the irrigation company is to construct a river channel somewhere through tracts 19 and 24. Should this operation definitely be decided upon as a current year job it will forstall developements in the newly leased Section 14.

Of interest to watch was the remarkable adaptation of tamarix and arrow-weed (Pluchea s.), once the area was flooded. Within a week tamarix bushes had sprouted numerous aeration roots on the limbs just at the water surface. Arrow-weed required almost two weeks and roots sprouted around the main stems. Plants two-thirds submerged appear to be thriving.

As aforementioned the rainy season passed once more without sufficient precipitation to result in a runoff, and so the Salton Sea remains substantially as of the previous period. Elevation of the sea has been remarkably stable the past three years during which time very little precipitation has occured. (1946 elevation Salton Sea...-240.30 ft.; 1947.. .....-239.08 ft.; 1948....-239.95 ft.).

C. Fires.

There were no fires detrimental to property or wildlife witnessed on the area throughout the period.

II WILDLIFE.

A. Migratory Birds.

1. Populations And Behavior.

During the month of January and the forepart of February, population figures rose and declined for White-fronted and Canada geese, Pintails and Ruddy ducks. The Mallard, Gadwall and Cinnamon Teal population gradually decreased weekly, until mid-February when we were obtaining population estimates of conclusive evidence that they were by now on the move to more northern climes.

Mallards were a rare sight through latter January and February. The species as a whole was definitely absent from the picture. Verbal reports backed up our lack of records on the species. During March a few paired Mallards were seen but the highest"greenhead"counts for the area showed but about 20 present.

Gadwalls may have completely escaped observation or likely passed through during migration, there being very few records obtained for the species.

Baldpates using the area showed declines similar to others after the late February peak of 2030. The farmed developement area doesnot appear to have reached the stage of attraction for widgeon that the neighboring State Shooting Grounds and the Salton Sea proper holds and for this reason our records during the spring werenot representative of the picture for the species. For instance, after January the population figures decreased to a mere handfull of ducks, yet the preports coming in indicated there was "plenty" of baldpates present. At night during April and May southwesterly flights of baldpates were heard a number of times by refuge personnel out irrigating. This is the most discussed and cussed species of bird to enter the valley each year.due to its crop feeding habits.

Pintails attained a period population peak of 8,750 in mid-January after which they too gradually declined in numbers. At the last of the period an estimated 40 were here.

The Shoveller was perhaps consistently the most numerous common duck on the developement area. Flooded, rank growths of hemp (Sesbania), tamarix, cattails, shadscale (Atriplex) and bulrush consisting of approximately one-half of the presently leased lands attracts the "spoonies" to a remarkable degree. The species rose in population to an estimated 7,900 during late January. April 2nd saw an estimated 2,000 still here and at the end of the period some 800 were accounted for.

Redheads and Canvasbacks were rare sights both on the developement area marsh and in the hunters bag. Reports came in often of rafts of these birds on the sea proper but few were taken.

Lesser scaup observed during the previous period reappeared on the area in early April and a handfull remained through April.

Ruddy Ducks were never common, the peak count of mid-January indicating a mere 40 present. About 10 were here at the end of the period.

Fulvous Tree Ducks moved intothe general vicinity about April 1st. On the second of the month a group was heard by night irrigators. The first sight record was April 27 when five were seen on the area. These visitors from the south increased to an estimated 10 by the end of the period.

The Whistling Swan noted in the previous report period remained. On January 10 a sick swan was captured by Messrs Hall and Wesley of the refuge staff. A few days later we found it dead in Section 27. The remaining swan was seen weekly until as late as February 21. Two other swans which had been apparently killed by hunters were found cast under some brush in one of the parking areas.

The first banding operations started March 7 with a small Illinois River type trap in use. The project was undertaken mainly as an experiment to determine if the work could be carried out with numerous raccoon still on the area.

After 12 days of trapping we had banded 297 Green-winged Teal, 32 Cinnamon Teal and some coots. The largest catch was 72 birds. No damages or losses were encountered.

Mourning Doves started courtship flights and mating activities in earnest the last week of February. The first nests noted were found the first week of March in the Section 13 area where a number had been placed in barley. Of 9 nests observed during the period, 6 or two-thirds were located on the ground. Barley fields seem a preferred nesting cover with barley leaves used for nest construction. Never was a nest found either under construction or bearing eggs, in barley growth taller than 8 inches.

Water And Marsh Birds.

Four Sandhill Cranes put in an appearance January 30th. They were extremely wary and kept a good distance between all interested humans and themselves. At the time they chose a small group of Snow geese for companions and fed in the Section 27 rice fields. The duration of this small group's stay was never known. On March 23 Mr. Wesley of the refuge staff discovered some 30 individuals in the flat open area near Mullet Island to the north.

2. Food And Cover.

In an attempt to produce a crop of barley which would mature and remain standing until the birds arrived the following fall season, late planting was undertaken in tract 15, Section 22, tract 8 of Section 26 and in the Section 13 area.

When the barley crop in tract 15 reached about three inch height (February 13), Snow geese and a lesser number of ducks moved in rendering some 90 acres of the crop completely utilized and looking much the worse for wear and tear. Much to the surprise of everyone concerned the geese soon moved out of the country and with the abundant ground moisture at the time the field again turned green and developed the most productive crop yet. At the end of the period growth had attained two feet and the grain heads were filling up. The barley crop in Section 13 and tract 8 likewise made good gains, however due to delay of almost one month and the poor soil moisture conditions prevailing the crops there required much more irrigation water and didnot produce as heavily as did the seed which was planted in January.

On April 16th the Imperial Irrigation District effected the channel cut that had been proposed for several years. Muddy water from the New River found its way across the north portion of Section 22 and upon reaching the much higher, intended outlet to Salton Sea, the waters became quiet and for several days rose and backed over the Service developement area until fully two sections of land were under water. The bumper crop of barley in plot 15, as above mentioned, was completely lost when high winds later whipped waves over the crop and matted it down. The remainder of the crop was taken by blackbirds and summering Fulvous Tree Ducks. It was amusing to spot carp moving through one and two feet of water where only a few days ago the sandy soil was dry and parched as a part of the unfriendly desert which forever"battles" for its claim of the Imperial Valley floor.

Early in January the task of drying the units intended for summer planting was started. In drying the areas a correlation between the amount of shallow water on the area and the duck population was made during January and February to determine the degree to which the area might lose it's attractiveness for ducks. Below is the progress made in drying certain areas and the effects upon the waterfowl population.

DEGREE OF DRAINAGE AND EVAPORATION (all areas flooded)

Date	Sec 26;80-acres	Sec 23;200-acres	Sec 27;320acres	Total Water-fowl Population	
	BULRUSH	SESBANIA	RICE	DUCKS	GEESE
1/10	------	--------	-------	12,000	5,170
1/17	40%	20%	25%	14,410	4,110
2/8	60%	30%	75%	7,760	6,610
2/29	85%	50%	90%	5,310	40
3/5	--	(No est. made....last stage of evaporation)		6,480	20

The above observations coupled with the population figures and trends for the local state areas led to the conclusion that the waterfowl population was little affected by the gradual drying of the units. Most species showed declines after mid-December due presumably to migrational shifting from the area.

The gradual drying of the area did appear to make the area more attractive to the shorebirds.

Often during the latter half of January the Show geese were missed in area population counts and surveys. Seed collectors gathering Sesbania seed along the shores of the Salton Sea and the local individuals who frequently flew the area discovered that the geese were using a secluded area far to the north where bulrush was established in fair abundance.

On February 12 a Green-winged Teal stomach obtained from the marsh west of the developement area was found to be amazingly full of cattail seeds which were dispersing from the plant stems at the time.

In a large number of the superficially examined Snow geese droppings it was noted that tender growths of Bermuda grass occured commonly.

It is gratifying to note the degree and amounts of different natural foods growing in the area, scarce though they are, are used by all species of ducks. A number of stomachs were collected during hunting season and sent to Patuxent labratories for analizing. Bulrush (Scirpus paludosis), Widgeon grass (Ruppia m.), and Cattail (Typha l.) all occured commonly in the duck stomachs from which reports were received.

3. Diseases.

No diseases in evidence during the period.

4. Shorebirds, Gulls And Terns.

Most shorebirds present during the previous period remained at first but as the winter sojourn advanced it became evident that they were gradually finding their way northward. Generally speaking, peak populations occured during January. At this time Killdeer, Long-billed Curlews, Spotted and Western Sandpipers, Yellowlegs, Dowitchers and Wilson's Snipe were common on the area.

It is surprising how readily most birds in the area will flock to flooded or irrigated lands. On March 3rd the city park in Brawley, California was irrigated by flooding. The next morning it supported a surprising population of Dowitchers, Yellowlegs, Killdeers and "peep" sandpipers. Despite the nearness of traffic and interruptions by school children the birds remained throughout the day.

California and Ring-billed gulls visited the area in mid-January.

B. Upland Game Birds.

1. Population And Behavior.

In late April Valley Quail started pairing. Lack of time prevented close observation of this species.

Pheasants were scarce and hard to find after the winter concentrations broke up. No nests were found on the area during the period.

2. Food And Cover.

Food and cover remained as of the previous period. Much barley digging by pheasants took place during February in the Section 22 area.

C. Big Game Animals.

No big game animals on the area.

D. Fur Animals, Predators, Rodents And Other Mammals.

Except for the escaped pigs using the general area (December 1947 report, p.5), very little change occured in the mammal population.

Hunters using a war surplus weasel carrier, Filipino trappers and interested individuals, took a notable toll and the herd was all but eliminated if the tracks before and after are a reliable index to the numbers.

Bobcats appear to range widely over the refuge area preying on rabbits cottontails and lesser rodents. During the latter part of February 'coon hunters with their dogs captured and killed a large individual. On the morning of March 16 Messrs Wesley and Huffines of the refuge staff flushed a mature "cat" in Section 26 of the refuge area. For some unknown reason the animals tracks and signs became increasingly scarce as the period drew to a close.

Numerous cottontails were found in the dense cattail growths adjacent to the refuge. Observations during April disclosed that they were feeding almost entirely on dry cattail heads. Thousands of the downed heads were gnawed clean or partly so. Placed between wet blotters some of the viable seeds in the droppings germinated in 5 days.

B. Fish.

After the New River was diverted the refuge waters increased substanttially in carp which at first preferred to concentrate in the flooded barley fields.

III. REFUGE DEVELOPEMENT AND MAINTENANCE.

A. Physical Developement.

Construction of three miles of new irrigation ditch, one-half mile of dirt road and preparation and planting of approximately 400 acres of barley and alfalfa for next winters use marked the main developements of the period.

Farming operations required continuous operation of the engines to the extent of 126 hours of rotary scraper work building borders, 52 hours of grain drilling, 16 hours of broadcast seeder work, 80 hours of buldozing 62 hours of grading ditches, etc, 152 hours of bedder and offset disoing, 64 hours of land floating and 176 hours of land planing.

B. Cultivated Crops.

Leveling of the contour borders of Section 27 where the rice crop was raised presented a real problem due to the high water table and slow rate of drying of the units. It is planned to raise some 250 acres of Milo Maize in this area to supply feed for crop damaging blackbirds and ducks.

During April all men were put on the irrigation work and the water was handled around the clock to get the barley and alfalfa crops started and well on the way.

C. Collections.

During the period some bulrush seeds were collected and planted in the flooded Section 22 area as was nearly a ton of bulrushes (Scirpus a.), Scirpus paludosis and S. acutus). The results of the planting were at first gratifying, many of the americanus plantings appeared in two weeks. The native seeds of paludosis likewise germinated. Shortly thereafter the New River waters were "dumped" upon the area and most plantings inundated. The real damage came however when high winds whipped over the area and uprooted most of the tender stock of newly sprouted bulrush plants. Successive hard blows during the latter part of the period rendered the planted area

D. Receipts of Seed And Stock.

Seed for the plantings on the area were received from refuges in Montana and North Carolina.

IV. PUBLIC RELATIONS

A. Recreational Uses.

No recreational facilities exist on the area. Only 42 visitors toured or visited the refuge during the period. Most of these visitors comprised the Orange County Ornithological Audobon Society Club members who spent February 21st observing the bird life on and around the developement area.

On March 10th two Service films, Porcupine and Birds of Woody Island were shown to some 60 members of the San Gorgonio Pass sportsman's club at Banning, California.

1. Refuge Visitors (official).

NAME	DATE	TIME SPENT	PURPOSE OF VISIT
C.Lostetter Game Mgt.Div. Berkeley,Cal.	1/8,2/12, 2/17 & 26	1½ days	Waterfowl Pop. est & tour
Mr.R.P.Boone R.O.-Portland,Ore.	1/21,3/10,25	½ day	Gen. observations & visit
John Laughlin State F & G Riverside, Cal.	1/21	½ hr	" " "
A.F.Halloran Refuges, Yuma, Ariz.	1/22	3 hrs.	" " " Tour area with State warden
J. Reynolds State F & G Brawley, Cal.	1/22	"	" " " Mr. Halloran

NAME	DATE	TIME SPENT	PURPOSE OF VISIT
Messrs L. Rameli & Leek Malheur Ref., Oregon	1/23	1 day	Load & transfer WAA property to Oregon.
R.O.Gustafson & E. Regan C.O., Washington,D.C.	1/23	½ day	Equipment inspection
W. Anderson R.O., Portland, Ore.	2/22	½ day	Inspection tour.
E.E.Horn Game Mgt. Div. Berkeley, Cal.	2/25,26	1 hour	General tour of area.
J.S. Hunter State F & G San Francisco,Cal.	3/11	1 hour	" " " "
A.A.Reimer Lands, C.O. Wash.,D.C.	3/15	½ "	" " Insp. land for acq.
Laurence Rubke State Refuges Calipatria, Cal.	3/15	½ hour	Visit & contact.
Messrs O.J.Wilson & J. Dermody, I.I.District, El Centro, Cal.	3/20	2 hours	Gen. Inspection tour of area.
P.T.Quick, R.O.-Portland	3/25	½ hour	" Tour
Wm. Riter P&R Control, Sacramento, Cal.	3/25	½ hour	" "
V. Ekedahl Sacramento Ref., Willows, Cal.	3/31	1 day	WAA property transfer
N.B.Morgan Imperial Ref. Yuma, Ariz.	4/27	½ day	Tractor Transfer

C.R.Lang Refuges, Yuma, Ariz.	4/27	½ day	Transfer of tractor

C. Violations.

The five hunters apprehended during the previous period were sent to State court at the local Game Management Agent's discretion. Two men were fined $50 for possession of waterfowl and Three were fined $25 each for trespassing with guns on the refuge area.

XXXXXXXXXXXXXX

Date: September 10, 1948

Report by: Edward V. O'Neill
Refuge Manager

Approved:

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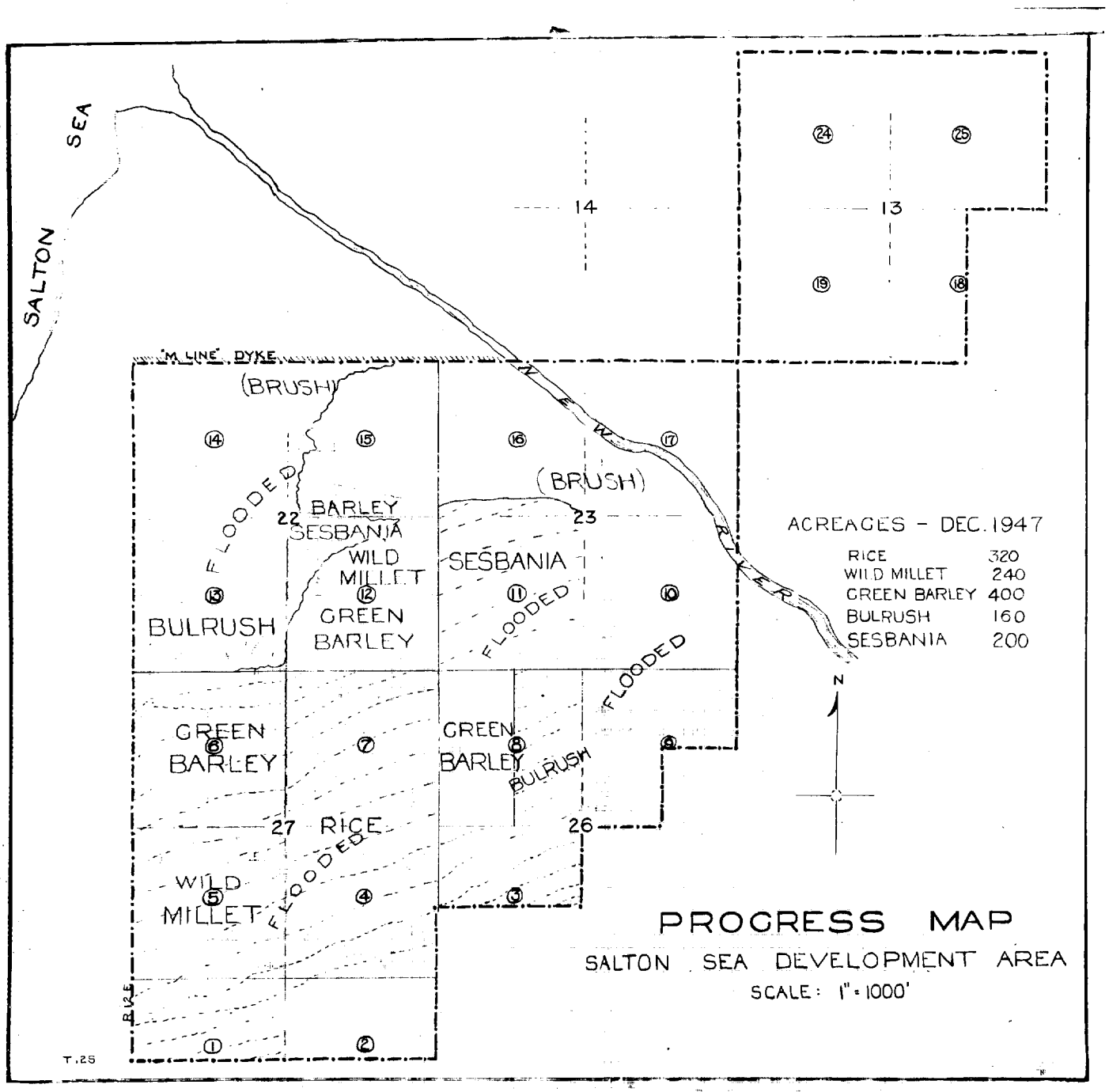
_____

1945



The above map shows the tract outlay and the waterfowl food developements on the area as of December, 1947.

WATERFOWL

Refuge Salton Sea Refuge & Dev. Area Months of January to April 1948

(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	Prev. period				1	2/22			4
II. Geese:									
Canada goose	"	"	55	2/8	1	2/29			130
Cackling goose	"	"	2		1	2/21			2
Brant									
White-fronted goose	"	"	197	1/30	20	3/5			200
Snow goose	"	"	7000	1/30	40	2/22			8000
Blue goose									
III. Ducks:									
Mallard	"	"	30	1/9	10	4/30			100
Black duck									
Gadwall	"	"	10	1/9	10	1/9			10
Baldpate	"	"	2030	1/30	10	4/30			4500
Pintail	"	"	8650	1/17	40	4/30			10,000
Green-winged teal	"	"	2980	1/30	20	4/16			5,000
Blue-winged teal									
Cinnamon teal	"	"	340	1/30	500	4/30			1,000
Shoveller	"	"	7960	1/30	800	4/30			11,000
Wood duck									
Redhead	50	3/19	50		6	4/30			50
Ring-necked duck									
Canvas-back									
Scaup	"	"	12	4/16	10	4/30			20
Golden-eye									
Buffle-head									
Ruddy duck	"	"	40	1/17	10	4/16			80
IV. Coot:	"	"	2870	1/30	300	4/30			4000
									44096

3-1750
(July 1946)

(over)

Form NR-1

SUMMARIES

Total Production:

Geese _____

Ducks _____

Coots _____

Total waterfowl usage during period 45,000

Peak waterfowl numbers 31,000

Areas used by concentrations Dev. Area & Salton Sea

Principal nesting areas this season _____

Reported by Edward J. O'Neill
Refuge Manager

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.

2330

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

MIGRATORY BIRDS
(other than waterfowl)

Refuge Salton Sea Refuge Months of January to April 194 8

(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:										
Eared Grebe	Previous period		12	3/9	2	4/30				30
Western "	"	"	2		1	3/16				10
Pied Billed Grebe	"	"	4		4	4/30				20
White Pelican	"	"	31	3/10	24	4/30				50
Double-Cr. Cormorant	"	"	200	4/10	30	4/30				320
Gr-blue Heron	"	"	8	3/26	4	4/30				10
Glossy Ibis	"	"	128	4/10	50	4/30				500
Am. Egret	"	"	60	4/10	20	4/30				150
Brewster's Egret	"	"	50	1/30	8	4/30				220
Am. Bittern	"	"	4		4	4/30				10
II. Shorebirds, Gulls and Terns:										
Wilson's Snipe	"	"	4	1/17	3	2/29				10
Long-billed Curlew	"	"	30	1/30	2	2/8				50
Willet	1	1/30	12	3/21	1	4/30				20
Gr. Yellowlegs	Prev. Period		130	2/14	25	2/29				200
Lesser "	"	"	200	1/30	6	2/29				400
Baird's Sandpiper	"	"	10	1/28						10
Dowitcher	"	"	3000	2/29	30	3/12				3500
Western Sandpiper	"	"	6	1/30	130	2/29				200
Am. Avocet	"	"	22	1/29	8	2/8				50
Wilson's Phalarope										
Black-necked Stilt	"	"	2	1/17	1	2/8				10

(over)

(1)	(2)	(3)		(4)		(5)	(6)
III. Doves and Pigeons:							
Mourning dove	Pervious period	550	1/29	---	---	unknown	2000
White-winged dove							
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl							
Magpie							
Raven							
Crow							

Reported by Edward J. O'Neill

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.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Salton Sea Refuge & Dev. Area Months of January to April, 1948

(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.
Pheasant	Tamarix, Atriplex, Strombocarpa, etc.		NONE		UNKNOWN				50	Most of pheasants planted last year have disappeared.
Valley Quail	• • •		•		•				30	

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.

Form NR-4

SMALL MAMMALS

Refuge Salton Sea Refuge & Development Area April 30, 1948

(1) Species	(2) Density		(3) Removals					(4) Disposition of Fur							(5)
								Share Trapping							
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control	For Re-stocking	For Research	Permit Number	Trappers' Share	Refuge Share	Total Refuge Furs Shipped	Refuge Income	Furs Donated	Furs Destroyed	Total Popula-tion
Coyote			(Reports of fur by State)												10
Bobcat				NONE											15
Skunk				"											20
Raccoon			(Large number killed by hunters & dogs surrounding areas)												150
Desert Fox															5
Jack Rabbit															30
Cottontail															70
Muskrat															200

REMARKS:

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. "List of North American Recent Mammals" by G. S. Miller, Jr., a very good reference, is now out of print, although a revision is scheduled for publication in the near future.)

(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, 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. Also show any removals not falling under heading listed.

(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 and the total income to the refuge by species, including share-trapped furs and furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimness 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.

Form No. 3-1570 Date September 10, 1948

QUARTERLY GRAIN REPORT

Station Salton Sea Ref.& Dev. Area, Calif. Period January - April, 1948

This report should cover all grain received, or disposed, of during the quarterly periods ending January 31, April 30, July 31, and October 30. Reports in duplicate, clipped to, but not bound as a part of, the quarterly narrative report, should reach the Regional Office by the 10th of the month following the close of the period covered by the report. The Regional Director, after approval, will forward the original to Washington.

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 lbs, Corn (ear)--70 lbs, Wheat--60 lbs, Barley--50 lbs, Rye--55 lbs, Oats --30 lbs, and Mixed--50 lbs. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.6 bushels. Report all grain received during period from all sources, such as transfer, share cropping, or harvest from feed patches.

Variety	On Hand Beginning of Period	Received During Period	Grain Disposed of: Transferred	Grain Disposed of: Seeded	Grain Disposed of: Fed	Grain Disposed of: Total	On Hand End of Period	Proposed Use: Seed	Proposed Use: Feed	Proposed Use: Surplus
Corn										
Wheat										
Barley	6580 bu [illegible]	------	------	2400	90	2490	1600	1600	---	----
Rye										
Oats										
Mixed										
Watergrass	1000 lbs						1000 lbs	X		
Sesbania	28 bu						28bu	X		

1. Indicate shipping or collection points Westmorland, California

2. Grain is stored at Property of Mr. James N. Hall, Westmorland, California.

3. Remarks

Approved By:

Regional Director

Submitted by: Edward J. O'Neill
Refuge Manager

Signature and Title