



SALTON SEA NATIONAL WILDLIFE REFUGE

AND

WATERFOWL DEVELOPMENT AREA

XXXXXXXXXXXXXXXXXXXX

NARRATIVE REPORT

JANUARY, FEBRUARY, MARCH, APRIL

XXXXXXXXXXXXXXXXXXXX

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

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COVER ..... GAMBEL'S QUAIL  
(Photo by Robert Watson)



# NARRATIVE REPORT

## I GENERAL CONDITIONS

### A. Weather & Conditions

The period will probably go down in history as the year of the big blowards, or some similar descriptive phrase to denote the fact that many a mile of wind passed through the area (no reflection on winter visitors intended). In short, we've never seen the like. One day one of the tractor operators reported it blow so hard in Tract C, Unit I that a female roadrunner laid the same egg three times before the wind subsided.

On January 12th and 25th hard sandy blows were witnessed. During February 13, 14, and 26th gusts up to 50 mph succeeded again in shifting a lot of real estate. In March there were 10 days in which gusts exceeding 40 mph were felt with the hardest blow recorded at 52 mph. Winds were so frequent in April it would perhaps be easier to state that there were a few calm days when tractor operations were not impaired on sandy tracts of land. Portions of Highway 99 were closed often when sand drifts impaired traffic.

March 29th strong, persistent winds checked the westward flow of water from the delta of the New River and silt deposits closed the outlet. Until an adequate channel in the delta was out elsewhere to the east, water backed up some two miles into Trifolium 13 Canal partially inundating Tracts 6, 7 and 8 of Unit I.

Several cloudy, overcast days were noted in February and March.

Earthquake tremors were felt January 13th and March 19th.

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

<u>MONTH</u>	<u>MAXIMUM</u>	<u>MINIMUM</u>	<u>PRECIPITATION</u>	<u>DAYS WINDS OVER 25 MPH</u>
January	83°	32°	0.86 IN.	2
February	93°	43°	----	4
March	90°	40°	0.61 "	12
April	104°	50°	----	12
		Total	<u>1.47 "</u>	

## B. Precipitation and Water Conditions

Light, gentle rains which were of little consequence caused shut-downs in operations due to wet fields and slick refuge access roads. An all-night drizzle on January 12th made for bad, maddy conditions and a "mud holiday" for school children. Snow flurries were reported early in the morning of the same day. The .18 inches of rain meant the first measurable precipitation on rain gauges in 10 months. The moisture caused short circuits on 8 power poles in the Valley. In the Laguna mountains ten inches of snow piled up. Last "snow storm" recorded in the floor of the Valley was December 12, 1932.

The Imperial Irrigation District and Geological Survey gauge reading of Salton Sea elevation showed the following for the period:

January 1	-235.11	March 1	-235.00
February 1	-235.30	April 1	-234.80

The Sea water is now 1.15 feet higher than one year ago. During the span of the last two weeks in January it raised three inches.

Latest word on claims against the Coachella Valley and Imperial Valley irrigation companies, for inundation of private beaches and lands, concerns decision by the Superior Court to holding up hearings until the present complaints are reworded.

Strong winds continue to rip out the old fresh water dikes west of Red Hill, Unit II. By mid-February water had advanced nearly half way around the south side of Red Hill. Irrigation water drainage from Tracts 15, 22 and 23 Unit II is now blocked.

In considering renewal of the Lea Act Lease (Unit II), the Imperial District was requested to reconsider the rental fee on some 360 acres. At Refuge Supervisor MacDonald's suggestion the matter was presented to the District. At this writing it has been agreed to strike out the rental cost of some 360 acres involved. The lands will still be controlled by the Service at no additional cost. This is only fair since the original farming potential no longer exists due to high water table complications.

The usual irrigation water stealing activities were noted during the period. Most conflict was with the Hubble outfit and the Sinclair Ranches near Unit II. In Tracts 18 and 19 Unit I the Carret outfit flooded portions of refuge roads and headlands so bad that tractor work was delayed several days. As usual we put up a bold front, admonished the sinners and made appropriate retreat.

Refuge land losses between the -230 contour and Salton Sea, due to rise in water level, disclosed the following for both Service and California Fish and Game Department Units:

<u>YEAR</u>	<u>SALTON SEA ELEVATIONS</u>	<u>UNIT I - ACRES</u>	<u>UNIT II - ACRES</u>	<u>ACRES LOST</u>
1952	-238.30 to -236.68	750.0	207.5	957.5
1953	-236.68 to -235.00	175.5	160.0	335.5
				<u>1293.0</u>

		<u>UNIT A - ACRES</u>	<u>UNIT B - ACRES</u>	
1952	-238.30 to -236.68	687.5	105.0	792.5
1953	-236.68 to -235.00	187.5	190.0	377.5
				<u>1170.0</u>

This does not verify the claim that federal lands are all higher and less susceptible to inundation than the State Units.

#### C. Fires

No fires occurred on the refuge during the period.

### IX WILDLIFE

#### A. Migratory Birds

##### 1. Population and Behavior

No outstanding change in the waterfowl picture was noted during the period.

The annual waterfowl inventory as conducted over the Imperial Valley, lower Colorado River to the delta and north from Yuma, Arizona to Blythe, California, including Palo Verde Valley, took place January 4th and 5th. William Anderson, Biologist, California Fish & Game, Jacinto Solis Corzo, Mexican Government Representative, Patrick Symons, pilot, California Fish & Game and the writer comprised the census party. This makes the third consecutive year that the same individuals, flying in the State's Cessna Plane No. 1357-D have covered the same area. Tabulated below are the numbers recorded during the 10 hours of flight:

<u>SPECIES</u>	<u>IMP. VALLEY &amp; S. SEA</u>	<u>COLORADO RIVER SOUTH</u>	<u>COLORADO RIVER NORTH</u>
Snow Goose	9,360	4,330	60
W.- Front't Goose	90	10	---
Canada Goose	760	170	560
Mallard	60	160	20
Gadwall	10	10	---
Am. Widgeon	71,000	80	250
G-W Teal	2,730	3,500	200
Cinn. Teal	10	---	---
Shoveller	7,780	990	410
Pintail	10,610	26,740	180
Redhead	10	---	---

<u>SPECIES</u>	<u>IMP. VALLEY &amp; S. SEA</u>	<u>COLORADO RIVER SOUTH</u>	<u>COLORADO RIVER NORTH</u>
Canvasback	3,770	---	40
L. Scaup	18,030	---	10
Golden-eye	60	---	---
Bufflehead	450	---	---
Buddy	9,350	110	450
Merganser	10	20	10
W-W Sooty	10	---	---
Geese	29,050	620	16,510

## 2. Geese and Swans

The disappearing act by 50% of the regular flock of Canada Geese which moved out the previous period, after constant boundary-hunter bombardment, night disturbance and managed hunting on Unit II refuge plots, was solved in part by the report that some 1,000 Canadas had moved into the Moses, California area. Following the close of the season some returned, however at no time did we regain the former population. By February 18th the flock had peaked at 1,500 compared with 2,100 a year ago. As pointed out in the previous report, and substantiated by Form NR-1, Canada goose figures dropped abruptly at the beginning of the second hunting season and remained low until after the January 10th closing date. Peak population compared with the same period of last year was down 700 geese.

Observations at Tract 7-14, Unit II where geese fed daily on the alfalfa crop, disclosed a number of birds wearing leg bands. Out of a 260-bird flock 31 banded geese were counted the first week of December. At the close of the period 67 returns on banded geese killed on the refuge had been received. Most of these were picked up by State Fish & Game Department men during the managed hunt of refuge Unit II.

Banding stations that had tagged the geese killed included the following known places:

<u>NUMBER OF CANADA GOOSE RETURNS</u>	<u>BANDING STATION</u>
10	Blackfoot Reservoir, Idaho
30	Neponsit Reservoir, Utah
2	Bear River Refuge, Utah
1	Dingee Swamp, Idaho
1	North Lake Refuge, Idaho
1	Pablo Reservoir, Montana
1	Outler Reservoir, Utah
2	Ogden Bay Refuge, Utah
9	Pathfinder Reservoir, Wyoming
8	Alcega, Wyoming
2	Cypress Lake, Saskatchewan, Canada

Some migration from this vicinity was apparent in late February. The species dwindled in numbers until mid-March when only 90 were observed. In pathetic fallacy the usual number of cripples were left behind by the flock, grounded and probably destined to succumb to earth-bound predators or starvation. Total known kill for the season was arrived at by summarizing shooting ground data, dead birds found on food plots and reliable kill reports from hunters and wardens. It can be stated that at least 497 were killed on and near the refuge units and probably 200 were taken by unknown hunters on the desert, farm fields, etc.

Snow Goose populations and conditions as reported previously were similar throughout the early days of the period. The population compared well with figures for one year ago. There may have been a slight increase in the wintering flocks, at any rate there was not a decrease in the species judging from the local tally. Northward migration was delayed perhaps two to three weeks this year. Following the end of the hunting season the birds remained in a close, large flock ranging freely from refuge food plots to the delta of both the Red and Alamo Rivers.

A number of cripples were again retrieved and banded in accordance with previous practice. Misjudged high shots crippled a large number of birds at Unit II. One individual reported numerous emaciated-looking geese on the Sea. In reworking food plots, on aerial census flights, etc we recorded an additional 27 dead birds. With more reports from hunters and observers we placed the known seasonal Snow Goose kill at 1060.

One of the Blue Geese seen the previous period was observed on Unit II January 15th.

On January 14th 9 Cackling Geese were observed with Canadas in Unit II.

### 3. Ducks

Pintails remained low in numbers throughout the period. Hunting pressure had definite effect on the species. During the winter inventory flights they were found loafing along the muddy delta of the Colorado River. At the start of the period only 2,000 were present. Some 2,600 seen March 12th represents the peak figure for the period. It is interesting to note that within two days after the close of the regular waterfowl hunting season an estimated 4,000 pintails moved back into the Valley presumably from below the International Boundary.

The American Widgeon population followed closely the pattern of one year ago peaking in early January at about 38,000. Decline in numbers due to migration was rapid after mid-March. Only 100 individuals were here the last of April.

Two Fulvous Tree Ducks showed up on January 29th. The species was not recorded again until April 9th when 6 were here. Some 20 individuals were here the last of April.

The Shoveler continues to share the bulk of the hunting pressure with the Green-winged Teal. The species peaked in population late in February.

On January 6th a hybrid Pintail-Widgeon was shot by Mr. Dan Cunningham on the Calipatria Land Company (Gum Club). The specimen was the full size of a pintail showing mostly that species characteristics. The bill was short, favoring the widgeon, with sides blue as in the male pintail. The upper mandible had fine black ridges. The head was large, shaped like a widgeon's. Feathers on the top of the head were light-brown. Feet were very small, proportionately. Long tail feathers were present and general body color showed pintail characteristics. The wing speculum was a greenish gloss suggesting characteristics of both parents. Disposition of the specimen is unknown.

The Green-winged Teal apparently wintered favorably. There was no evidence of status changes in this vicinity. One male bird, lacking lobes on either foot, was captured in one of the State's duck traps during the period.

Ten White-winged Scoters were observed on Salton Sea near Bombay Beach during the winter inventory.

The tabulations below cover bird-banding during the period:

<u>SPECIES</u>	<u>JAN.</u>	<u>FEB.</u>	<u>MARCH</u>	<u>APRIL</u>	<u>TOTALS</u>
Gr.-W Teal	24	1185	814	44	2067
Pintail	487	1143	1119	57	2806
Gim. Teal	---	19	17	5	41
Gadwall	---	1	1	---	2
Ar. Widgeon	1140	1222	43	190	3195
Redhead	---	---	1	46	47
Canvasback	---	---	---	2	2
Ruddy Duck	---	1	1	36	38
Coot	---	79	20	44	143
L. Scaup	---	1	1	---	2
L. Snow Goose	3	---	---	---	3
Canada Goose	1	---	---	---	1
Hared Grebe	---	---	---	45	45
Mourning Dove	---	---	3	9	12
Totals	1955	3056	2690	478	8179

The following is a summary of important band recoveries received during the period:

BAND RECOVERIES - 1953 & 1954

	Pelican Bay			Crescent Beach			Goat			Green Island			Pigeon Bluffs			Petaluma			Petaluma			Redwood			Shoreline					
	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L			
ARIZONA	1	4	5													1	7	8												
CALIFORNIA	18	34	52	1	1		3	26	47	73	1	1	1	70	176	2	1	3	2	1	3	2	1	3	1	1	2			
IDAHO		1	1																											
KENTUCKY																														
LOUISIANA																2	3	5												
NEVADA	1	1	2							1		1				2		2										1	1	
NEW MEXICO																			1	1										
NORTH DAKOTA																			1	1										
OREGON		1	1																											
TEXAS		1	1													3	15	18												
UTAH		8	8							2	3	5				8	10	18												
WASHINGTON		1	1													1		1												
CANADA																1	3	4												
MEXICO		1	1							1	1					5	27	32												
SOUTH AMERICA																			1	1										
Totals	23	49	72	1	1	1	3	29	51	80	1	1	1	93	215	2	1	3	2	1	3	2	1	3	1	1	2			

#### 4. Diseases

On March 9th and 10th Messrs. Rossen and Foss, representing the California Fish and Game Department and Drs. Quortrup and Dunsinger, representing the San Diego County Veterinary Department collected blood samples for further tests in their search for possible Newcastle disease among ducks or the incidence of similar virus which might implicate wild ducks as possible carriers of poultry diseases. The birds were obtained incidental to live trapping operations then in progress.

Waterfowl tested for disease were of the following species and numbers:

<u>SPECIES</u>	<u>NUMBER</u>
Pintail, male	161
Pintail, female	91
Total .....	255
Am. Widgeon, male	56
Am. Widgeon, female	15
Total .....	71
Green-winged Teal, male	11
Green-winged Teal, female	1
Total .....	12
Am. Coot	5
Grand Total .....	<u>343</u>

Of the 343 banded birds that were tested only one male pintail was found carrying a titer for Newcastle disease. All others were negative for the disease. One female pintail and one male widgeon carried a high titer for *Arizona paracolon*. All tests for paratyphoid, *Salmonella pullorum*, and fowl typhoid were negative.

It would appear from the samples of birds taken that there need be no concern at this time among the raisers of domestic fowl.

The operations, under Pittman-Robertson Project 35R, were much more orderly this year and approached the desired conduct expected on the refuge units. Gentian purple was used to dye all birds handled to prevent duplication. Out of 343 birds sampled 19 died immediately. Many swam away, dove and were never seen again. Some made very short flights of escape only to collapse and die. It might be advisable in the future to perhaps pen up such birds for a few hours to keep them quiet until they can recover from the shock. Conservatively, we estimated the mortality

to be about 20%. A slight increase over Mr. Rosen's 1% when requesting permission to do the work on the refuge.

Again a few shorebirds, egrets and Hared Grebes were noted sick during the period. The presence of disease among the birds was apparently not serious if actually present.

5. Shorebirds, Gulls, and Terns

Laughing Gulls - Only 5 adults present.

Gull-billed Terns - Four nesting attempts but none successful due to restricted habitat and water rise; estimated population of 200 present.

6. Marsh and Water Birds

No change in status since previous report.

Approximately 100 nests of Common Egrets were located near New River delta.

Great Blue Herons started nesting in March also.

A single Common Loon was noted on Salton Sea April 22nd.

7. Food and Cover

Natural food and cover conditions unchanged since previous report.

It is interesting to note that for the third season during bright moonlight nights the heavy hunting and harassment pressures actually resulted in poorer hunting success. Snow Geese particularly rosted by day out on the Salton Sea and by night they fed contentedly on all refuge food plots. The State Fish and Game Department kill records pretty well substantiate this.

When the Cinnamon Teal arrived in greater numbers in the spring they fed almost exclusively in the drains and lower ends of canals where Southern Maid produced considerable early growth.

#### B. Upland Game Birds

No change in status noted.

#### C. Other Birds

Mourning Doves started calling the 9th of February. Despite the previous few days of cold winds and cloudy weather cooing was common on the 11th. After that date there were signs of definite population increases and we concluded that some semblance of a migrational movement was taking place. First nest of the season was found in mid-March.

Million Flycatchers were seen several times on the refuge from February 3rd on until early March.

The spectacular groups of Blackbirds still are conspicuously absent in these parts. Refuge Manager (Asst.) Kridler observed one flock of male Yellow-headed Blackbirds near Drawley on March 30th. The flock contained about 4,000 individuals. During April small flocks of both Redwings and Yellowheads were seen often.

Black-bellied Plover were present again this season; so being seen February 6th.

A lone Robin was observed February 10th. The species is still unpredictable as a winter resident.

A single Ferruginous Roughleg hawk was recorded February 11th. The species is uncommon as a visitor or winter resident.

On February 20th a large flock of Turkey Vultures were congregated at Unit I presumably in a migrational influx. They remained only a few hours.

For the second time we have an uncertain "record" of which we believe was a Long-tailed Jaeger. The observation was made without glasses under unfavorable conditions.

A single Harris's Hawk showed up March 9th, remained one day and was not seen again during the period.

By March 11th there was a nest of young Shrikes in the date palms at headquarters.

A rather unusual sight was the occurrence of three Goldfinches along the Barth drain west of Unit I. On March 15th we observed the Lawrence, Green-backed and Common all in the same grove of trees.

Bullock's Orioles were here March 25th along with Western Kinglets and Black-throated Gray Warblers.

Night Hawks showed up April 2nd.

D. Fur Animals, Predators, Etc.

No notable change over same report period last year.

E. Fish

No notable change over same report period last year.

F. Waterfowl Depredations

Now geese tried desperately many times to enter their Unit II food plots during State-conducted shooting days. For five years this had been their happy "No Hunting" grounds. For that long the populace of farmers had been herding them into that area. With the decision handed down hunters were spotted in blinds over the green food plots from sunup till mid-afternoon three days each week. As related in the last report, the geese this year did range over a wide area causing damage complaints by previously unheard from irate farmers whose damages and losses were not entirely imaginary.

Some 1,300 acres of alfalfa losses (by ducks) had been reported by the first part of January mostly in the Calipatria-West-Westmorland area. An estimated 40 acres of rice was lost several miles east of Brawley as reported by County Supervisor Neil Field. Canada and White-fronted geese were blamed for loss of nearly 100 acres of alfalfa. Mr. George Battire of Westmorland expressing the sentiment of a lot of farmers said at one of the meetings; "I've never had geese in my fields before like this year. They come in every day." Mr. Battire's 400 acres of alfalfa is located within a few miles of the refuge. It would appear that his statement substantiates the fact that; (1) the refuge had been contributing to the protection of crops, (2) hunting the refuge added to the problem of crop depredations, (3) hunting in itself is nothing more than political ointment on an old wound. Undoubtedly the practice will result in some (off the refuge) change in feeding habits just as the establishment of the refuge areas once attracted them from other locations of harassment.

Special Depredation Order No. 50, permitting unlimited 24-hour Widgeon shooting over agricultural lands was well received by everyone but law enforcement men. Being effective January 11th "until further notice" it meant to some a continuation of the previous 65-day season which ended January 10th. Local California Fish and Game men operated a control information "bureau" at the Brawley Chamber of Commerce during the season. At first the center was operated until midnight week days and around-the-clock on week ends. It soon became evident that the hours of from 1:00 PM to 9:00 PM were sufficient.

During the season, which ended March 22nd, 3,258 calls, contacts and letters were reported. As the season progressed the interest fell off steadily. The great majority of calls and inquiries were made by out of town migrants. Only eleven (11) farmers contacted the information center for hunter assistance despite news articles and radio balleyhoo by Baxter Loveland. (It was found that some 30 farmers were troubled by ducks throughout the period). The two main shotgun shell dealers in Brawley reported a very low number of shells sold during the special season.

A total of 1,400 birds were recorded as having been either checked, reported or resored. In summing up the seasons activities Mr. Larry Rubke stated, "It would be a safe estimate that not over 4,000 Baldpates were killed ....."

Following the regular hunting season the goose population showed considerable reluctance to settle down and return to the refuge "schedule". The presence of blinds, though no longer in use, still caused the geese to seek other areas or to shy from the preferred feeding sites. Following later removal of all blinds by State men the geese eventually did settle down and the population became more fixed. Even the family groups could be spotted at times.

Neighboring farmer H.H. Hubbel, adjacent to Unit II became very much disturbed when small groups of snow geese insisted on flying over his lush fields of barley. Numerous times we were able to drive the species off without damages before more than 20 or 30 had alighted in his fields. (It was rather yammerous, incidentally, refuge personnel out flushing and herding geese from neighboring areas with no more equipment than bare hands. Farmers merely go to the State and borrow Service guns and flares with no questions asked. It is a fact, so help us, since the days and policies of Mr. E.E. Horn there has persisted a rather jealous, "hands off" attitude toward refuge use of pyrotechnics. It has been impossible, and apparently undesirable, for the refuge branch of the Service to cooperate with neighboring farmers on a similar basis that the State of California Management Areas do.) Mr. Hubbel, equipped with flares shot into the refuge several times to "flush the geese away from my barley crop". On one occasion State Warden Reynolds watched Hubbel shoot into and boost several hundred geese out of Tract 7-11, Unit II and warned him. Finally in desperation we appealed to the guy to let well enough alone as long as the birds were not actually on his property. After several more shots into the refuge he gave up and the geese did settle down in the refuge fields; our neighbor did harvest one beautiful grain crop and we did have to replant the adjacent refuge fields because of over-utilization. Why, oh why do folks overlook this significant function of the refuge?

## ~~THE~~ REFUGE DEVELOPMENT AND MAINTENANCE

### A. Physical Development

1. Cultivated Crops During Period

UNIT I

The farming of refuge tracts as reported last period was continued.

Only Tract 28 (80 acres) survived the severe close cropping and paddling by geese during the early winter hunting and harassment activities in Unit II.

At the close of the period Tracts 1, 11, and 8 (320 acres) were being prepared for leaching. Good Cattail-Wild Millet production is desired here.

Tract 6 was surveyed, contoured, and leveling operations started.

UNIT II

Tracts 8, 15 and 22 (300 acres) were replanted late in the season to provide mature barley grain for early fall-winter use next year.

Tracts 4 and 5 which were mowed the previous period in hopes of holding the crops back until after spring migration of the Snow Geese turned out to be a failure. The crop when first cut stooled remarkably but the combination of low soil nutrients (nitrates) and over-mature stalks resulted in a very dwarfed growth which lacked sufficient promise to warrant further irrigation. After we had given up hopes the Snow Geese moved in and stripped the tract of all tender, maturing grain heads.

Tract 3 (80 acres) which was headed out by February was completely gleaned of grain heads by Snow and Canada Geese.

Tracts 1 and 2 (160 acres) survived well and matured a fair crop of barley grain for fall use.

The Alfalfa crop in Tract 7-11 (160 acres) survived poorly due to previous frosts and close cropping by geese after the hunting blinds had been removed. The crop was clipped along the east edge and several tons hauled to Unit I for use by the California Fish and Game Department in Widgeon trapping (live) operations.

2. Other Developments

The usual ditch cleaning by hand and dragline was continued. Head ditches and drains at Tract 6 Unit I were constructed by dragline as well as one-half mile of service canal through the Union Pacific Lands Company property Sec. 35, T. 12 S., R. 12 E.

Dragline operations were shut down the last of March and in April the P&H machine was transferred to Sacramento Refuge.

A shower-wash room was added to the Unit I residence facilities

At Unit II restroom facilities were constructed in the Shop building. A metal canopy was also constructed to shade the house-trailer at Unit II.

In mid-January aeriaks were erected and the refuge communications radios at Unit I and II were put in operation.

#### IV ECONOMIC USE OF THE REFUGE

##### A. Grazing and Haying

No activities under this heading.

#### V PUBLIC RELATIONS

##### A. Recreational Uses

There are no recreational facilities on the refuge.

On January 31st Mr. Beals and the writer conducted a tour of 60 members of the Southern California Sierra Club.

Visitors and groups too numerous to mention here toured the refuge throughout the period.

##### B. Refuge Visitors

<u>Name</u>	<u>Date</u>	<u>Identification</u>	<u>Purpose</u>
Wm. Anderson	1/16 & numerous.	Cal. Fish & Game, Biologist.	Waterfowl banding.
Ben Handley	1/26, 27	U.S.F&W, R.O.	Inspection.
Ade Zajano	1/27, 2/5, 2/9	U.S.F&W, Biologist	Contacts
A.W. Elder	1/11, 1/27, 2/9, 3/7	U.S.F&W, Agent	Contacts
G. Lostetter	2/9	U.S.F&W, Biologist	Contacts
Ray Glahn	2/16, 17, 18, 3/7, 4/21, 22	U.S.F&W, Pilot	Aerial census
Dr. E.R. Quortrup	3/9, 10	San Diego County Veterinarian	Research
Merton Rosen	3/9, 10	Cal. F&Game	Research
Mr. Foce	3/9, 10	Cal. F&Game	Research
Dr. Dunsinger	3/9, 10	San Diego County	Research

B. Refuge Visitors (Continued)

<u>Name</u>	<u>Date</u>	<u>Identification</u>	<u>Purpose</u>
John Bauhman	3/9	U.S. F&W, Bear River Refuge	Visit & tour.
Fred Kroller	3/9	U.S. F&W, Agent	Contacts.
John Parrish	1/5	Cal. Fish & Game	Contact.
Ross Hanson	1/17	U.S. F&W, Pilot	Tour.
F.A. Everest	3/6	Moody Institute	Photography.
Roy Chalberg	3/6	Moody Institute	Photography.
Wendell Miller	3/4	Cal. F&G, Biologist	Contact.
Frank Kozlick	3/4	Cal. F&G, Biologist	Contact/
Ed. Beaty	3/14	Farmer, Calipatria, Calif.	Re lands.
Mr. Hubble	3/15	Farmer, " "	Re ducks.
Chas. Vonderahe	3/21	Farmer, Brawley, Cal.	Re duck clubs.
H.F. MacDonald	3/17, 20	U.S. F&W, R.O.	Inspection.
Mr. Hazeltine	3/24	U.S. F&W, R.O.	Wet lands study.
R. Imler	3/24	U.S. F&W, R.O.	Wet lands study.
Bob Reynolds	4/30	I.I.D., Imperial, Calif.	Re drainage.
O.J. Wilson	4/27	I.I.D., Imperial, Calif.	Re drainage.

C. Refuge Participation

On March 18th a meeting was held by the California Fish and Game and Service personnel concerned with management policies of Valley refuges and shooting grounds. The following were in attendance:

Ben Glading, State F&G	Lee Laythe, U.S. F&W
John Janssen, " "	Kenneth MacDonald, U.S. F&W
Everett Horn " "	Edward J. O'Neill, U.S. F&W
Willard Greenwald " "	Eugene Kridler, U.S. F&W
Harvey Russo " "	Clinton Lostetter, U.S. F&W

### C. Refuge Participation (Continued)

Larry Rubke, State F&G

A.W. Elder, U.S.F&W

John Parrish, " "

Ward Gilliland, State F&G

John Laughlin, " "

James, Reynolds, " "

At the meeting the type of blinds, fees, and shooting grounds regulations were discussed as well as hunter success during the past season, food for widgeon, etc. It was pointed out by the Service that acquisition of expensive land was not permissible. Mr. Horn in reply commented that we should not spend large sums trying to feed the widgeon, "why not shoot to bring down the population?"

On January 4th refuge personnel including Messrs Kridler, Beals and the writer attended a depredations meeting at Brawley, California where the Service was lambasted and raked over the coals for lack of farmer-hunter consideration, mismanagement, shortage of pyrotechnics, etc.

Again on January 10th a similar meeting was attended in Brawley, California at which time it was announced that a depredations order had been declared extending the season on Widgeon for an indefinite period of time. All grievances and shortcomings pointed out during the previous meeting were reviewed for the benefit of Regional Office men in attendance.

On February 1st Messrs Kridler, Beals and the writer took over the Brawley Chamber of Commerce hunter-farmer information center. The station was operated an average of 16 hours per day while the State men took advantage of accumulated leave, etc.

Mr. Kridler attended Justice of Peace Court at Westmorland, Calif. on February 5th to assist State Warden Reynolds in presentation of refuge violations.

A special Ross's Goose survey was conducted during February and early March in cooperation with Messrs Dave Marshal and Ray Erickson who were conducting investigations in Sacramento Valley.

During February a Snow Goose specimen was loaned, from the refuge holding pen, to the State Fish & Game for use in a County-financed wild-life display. Two weeks after the fair was over an attempt to recover the specimen disclosed that the goose had been killed.

### D. Hunting

The following chart is an outline of all duck hunting clubs in Imperial Valley.

TIPERILL VALLEY DUCK CLUBS

<u>NAME</u>	<u>LOCATION</u>	<u>PRESIDENT, SECRETARY OR COUNCILMAN</u>	<u>NO. MEMBERS</u>	<u>ACRES PLANTED</u>	<u>TOTAL ACRES</u>	<u>NO. OF HELMS</u>
Westmorland Investment Co.	Trifolium 13 Canal, Gate 299	Frank Lytle, Owner Westmorland, Calif.	10	70	80	7 Ducks
San Fernando Investment Co.	Trifolium 12 Canal, Gate 237	Burt Hammond, 129 Remora Ave., Long Beach, California	5	100	120	7 Ducks
S & K	1 1/2 miles N.E. of Hedese Station (Hwy. 99)	Vincent Zankle, Zankle Fish Market, San Pedro, Calif.	6	30	280	8 Ducks
Alamo Duck Club (Formerly Del Rio)	2 miles S.E. of Calipatria, Calif.	Ray Olsen, 83098 Hwy. 10 99, Indio, Calif. E.F. Allen, Calipatria, Calif.	10	50	60	5
Barthard & Elmore	12 miles S.E. Brewsley, California	John E. Elmore, and Al Barthard, 791 E Street, Brewsley, Cal.	2	800	400	10 Ducks
Not considered a Club	Flax Canal, Gate 12, 10 M. West of Imperial, California	John R. Hunter, 1266 Sandwood, 12 Centero, California	1	15	15	1 Temporary
United Bond & Own Club	N Imperial Soc. 2 1/2, Tills 1033M	Raymond H. Henry, 619 S. Hill St., Los Angeles, Calif.	5	7	80	5 Ducks
Roseda Development Co.	Trifolium 12 Gate 238	H.H. Dackles, 6101 Wilbur Ave., Roseda, Calif.	5	40	40	0
Calipatria Land Co. (Formerly Greenwood)	5 1/2 M. S.E. Calipatria, California	H.P. Brown (Main Agency), 400 N. Duquesne Blvd., Indio, Calif. H.H. Dackles, 6101 Wilbur Ave., Rosedale, Calif. Juan Bernardino, Calif.	9	40	180	6

(18)

Imperial Valley Duck Clubs (Continued)

- (1) Number farmed for cash crop incidental to club activities..... 5
- (2) Number farmed for club activities (2 acres Sudan grass) ..... 1
- (3) Total acres crops raised on clubs ..... 119
- (4) Number of clubs which fed ducks during past season ..... 5
- \* (5) Number of clubs which favor feeding before & after season in the future 5
- (6) ~~Each~~ Amount of feed (sacks per shoot day) put out on club in past season ... 11
- (7) Average number of days per week hunted on clubs ..... 2.5
- (8) Number of clubs which maintain permanent water ..... None
- \* To prevent deprecations.

Two new areas are proposed for hunting next year. Both are adjacent to Unit II of the refuge and owners Charles Vonderahe and Hubble plan to open 80 acres each.

E. Violations

Violation of state and federal laws and regulations persisted throughout the regular hunting season which ended January 10th. The individuals listed below were all apprehended for hunting on the refuge units.

<u>VIOLATOR</u>	<u>ADDRESS</u>	<u>CHARGE</u>
Mr. Julius Christian	969 Ford Street, Corona, Calif.	Hunting on Refuge
Mr. Roland V. Cook	720 W. Grand Blvd, Corona, Calif.	" " "
Mr. H.J. Dreher	3112 Silva St., Long Beach "	" " "

Outline of Case Results of Previous Apprehensions

<u>NAME</u>	<u>ADDRESS</u>	<u>FINE</u>
Eugene William Haden	Brawley, California	\$25.00
R. C. Horton	Holtville, California	25.00
William Harrington	Phoenix, Arizona	35.00
Donald W. Terry	Fontana, California	25.00

## Outline of Case Results of Previous Apprehensions (Continued)

<u>NAME</u>	<u>ADDRESS</u>	<u>FINE</u>
Clarence Leon Green	Brawley, California	\$35.00
Guy Junior Collins	El Centro, California	35.00
Walter Max Beach	Brawley, California	25.00
James Richard Cobb	Westmorland, California	----- letter of
Larry Paul Miller	Westmorland, California	----- " " "

A total of 8 Snow Geese, 1 White-fronted Goose and 4 Widgeon were turned over to the Pioneers Memorial Hospital, Brawley, California. Other game confiscated was deposited in the California Fish & Game Department freezer locker at Brawley, California.

## VI OTHER ITEMS

A. Items of Interest

Riverside County's new recreation beach, 10 miles southeast of Mecca on Highway 111 is now in the process of improvement.

The State Division of Beaches and Parks will spend some \$168,000 for the creation of a headquarters, bathhouses, sanitary facilities, roads and water supply on the 1552 acre site. About one mile of beach frontage is now included in the project and more frontage will be added as needed.

In addition to supplementary buildings there will be 20 or 25 camping ramadas. Camp water will be obtained from the All-American Canal. Consistent with the policy of Beaches and Parks all wildlife and vegetation are protected under State laws.

Meanwhile the citizens of Imperial Valley (County) want their share of things. The land planning and acquisition supervisors are favoring creation of a State Park on Salton Sea near Bombay Beach. Mullet Island was again mentioned as a prospective State Park where boat launching facilities could be developed. Since the Department of Fish and Game now owns lands nearby, and contemplates additional purchases, it was suggested that perhaps they could operate the facilities. The sand dunes in eastern Imperial County were also inspected as was the 20,000 acre park developments along the Colorado River where the Fish and Game Department is now negotiating for adjacent lands.

\* \* \* \* \*

A letter addressed simply "Salton Sea National Hunting Club, Brawley, California" was promptly delivered to the refuge mail box during the period. (There's no denying .....! By our fruits they shall know us).

\* \* \* \* \*

The Audubon Society Club of Southern California are selling (5¢) and distributing an automobile "Litter Bug" sticker which is reaching surprisingly wide distribution and adaptation in these parts. In one instance members went out and tidied a particularly debris-littered stretch of mountain road. They gleaned every bit of paper, broken glass, cans, etc over a quarter mile stretch and posted "Litter Bug" signs to draw attention to the before and after effects of the great American litter bug.

At the same time in Los Angeles the city printed and distributed 70,000 automobile cleanup decals showing Parkey, a cartoon kangaroo, armed with a cleanup stick and urging people to "keep your parks, roadsides and beaches clean."

\*\*\*\* \* \* \* \* \*

On April 11th the Cardox Western Company ceased dry ice manufacture as the waters of Salton Sea rose higher and higher around well casing heads. The company has moved to the coast where it has a 10-year contract with Shell Chemical Company for carbon dioxide from the Ventura County ammonium plant.

The local supply of CO<sub>2</sub> was developed when wells were drilled in the mud geyser area along the Salton Sea more than 15 years ago. It has been California's major supply of dry ice. Last year the 6973 tons of dry ice produced at Niland netted Imperial County some \$233,136.00.

Many wells are already submerged. Some are accessible only by boat and the material brought up with gas has coated and frozen many valves beyond economic repair.

\* \* \* \* \*

In the December, 1953 issue of Chrysler Owner's Magazine EVENTS writer Cy La Tour describes the State and Federal areas at Salton Sea as developed for the sportsmen. One misstatement says, "One of the best and largest of the shooting grounds (680 acres of land purchased by the U.S. Fish and Wildlife Service and under control of the California Fish and Game Department) is the Salton Sea Federal Waterfowl Management Area."

\* \* \* \* \*

A number of Chucker Partridges were shipped in from Idyllwild where they were trapped. The California Fish and Game Department pheasant farm south of Calipatria, California has received an 81 percent hatch from the eggs obtained. Chicks will probably be reared and used for brood stock at other game areas.

Sports writer Bill Freelick in the January 31 issue of the Los Angeles Examiner advised hunters..... "True, widgeon have 2 little holes in their bills and when they fly at full speed air going through these holes makes a whistling noise..... but that is only at full speed."

\* \* \* \* \*

We heard this about two local hunters out widgeon hunting one cold January morning: one had brought along a thermos jug full of hot coffee while the other chose a bottle of "Old Refuge Whippin' Post"

Both nimrods imbibed freely in their chosen beverages through the cool, wee hours. At length a lone widgeon calling in the distance appeared overhead. The coffee drinker raised his gun, took aim; boom, boom, ba-loogey-----nothing happened. The duck kept right on going. The second man casually pointed his gun in the general direction of <sup>the</sup> duck and brought it down with the first shot.

"That's sure pretty shootin'", said the first hunter. "'Sh nuttin' to it" shrugged the other. "When a big flock like that comes over, a man's bound to hit one."

\* \* \* \* \*

We were positively shocked one morning at the Fremont School in Calipatria, California to hear a singing class whooping it up to the tune of Stars and Stripes. The words were different; "Be kind to your web-footed friends for a duck might be your mother." At this point we were out of hearing to pick up the balance of the words but on second thought, could be those kids have got something!

\* \* \* \* \*

Respectfully submitted,

  
Edward J. O'Neill  
Refuge Manager

Note: Credit is due to Bob Watson for tabulating the banding returns data on page 8 and for assistance in editing. To Frank Beals for proof-reading and assistance in editing.

Approved: \_\_\_\_\_  
\_\_\_\_\_

3-1750

Form NR-1

(Rev. March 1953)

WATERFOWL

REFUGE

Swan Lake

MONTHS OF

TO

1954

(1) Species	(2) Weeks of reporting period									
	1	2	3	4	5	6	7	8	9	10
<u>Swans:</u>										
Whistling										
Trumpeter										
<u>Geese:</u>										
Canada	800	800	200	1075	1100	1000	1500	270	—	90
Cackling					9					
Brant										
White-fronted	9000	100	120	100	180	90	900	30	20	20
Snow		7600	8000	9000	9000	4000	9000	6000	—	400
Blue		1						1		
Other										
<u>Ducks:</u>										
Mallard		2	30		10	100				20
Black		20	1							
Gadwall		17,300	19,700	21,000	20,500	11,000	6000	10,700		1300
Baldpate	2000	500	1000	400	90	900	300	700		2650
Pintail	500	800	1000	1050	1100	1500	250	250		300
Green-winged teal										
Blue-winged teal	1500	1500	1200	2	1	2	25	10		100
Cinnamon teal				700	1100	1500	800	2550		1600
Shoveler										
Wood										
Redhead										
Ring-necked										
Canvasback				21	20	4	30	2		1
Scaup										
Goldeneye										
Bufflehead		100	300	250	430	450	200	300		900
Ruddy										
Other				2						
<u>Fowl:</u>										
Coot:	1000	1000	600	800	900	1200	1000	1000		3000

Int. Dup. Sec., Wash. D. C.

WATERFOWL  
(Continuation Sheet)

REFUGE Saltson Hon MONTHS OF January TO August, 1954

(1) Species	(2) Weeks of reporting period										(3) Estimated waterfowl days use	(4) Production Broods: Estimated : seen : total	
	11	12	13	14	15	16	17	18					
Swans:													
Whistling													
Trumpeter													
Geese:													
Canada	2		2										
Cackling													
Brant													
White-fronted													
Snow	500	1											
Blue													
Other													
Ducks:													
Mallard	100												
Black													
Gadwall													
Baldpate	9250	1000			150								
Pintail	150	200			100								
Green-winged teal	150	200			200								
Blue-winged teal	100	200			1200								
Cinnamon teal	450	650			1200								
Shoveler													
Wood													
Redhead	30				50								
Ring-necked					1								
Carvasback	1700	5			3								
Scaup	4				140								
Goldeneye					2								
Bufflehead					2								
Ruddy	200	1000			1000								
Other													
<b>Fulvous</b>													
Coot:	1000	500			2500								

(over)

	(5)	(6)	(7)
	Total Days Use	Peak Number	Total Production
Swans			
Geese	419,260	10,000	
Ducks	13,004,130	49,900	
Coots	912,800	2500	

SUMMARY

Principal feeding areas Divers-Salton Sea; puddles-  
 mostly in refuge units and agricultural leach fields;  
 wideon-agricultural alfalfa fields;

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).

UPLAND GAME BIRDS

Refuge ~~at~~ ~~State~~ ~~of~~ ~~Mississippi~~ to ~~April~~, 19~~46~~

(1) Species  Common Name	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'd.	Estimated Total		Hunting	For Re- stocking	For Research		
	No suitable change in status - most of former habitat being flooded by sea.									

Pertinent information not  
specifically requested.  
List introductions here.

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.

SMALL MAMMALS

Refuge ~~Malheur~~ ~~Nev~~ Year ending April 30, ~~1944~~

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs				(5) Total Popula tion	
	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control *	For He- stocking	For He- search	Share Trapping	Share Trapping	Total Refuges Furs Shipped	Furs Donated		Furs Destroyed
Bobcat Badger Cottontail Hare													
<p>* List removals by Predator Animal Hunter</p> <p>Remarks: <b>Fur harvest of all but cottontails nearly all completed by riding Malheur Res.</b></p>													

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 headings 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, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unfitness 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.

# REFUGE GRAIN REPORT

Refuge Salinas Sea, California Months of January through April, 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	
Thurston Barley	---											
Thurston	425			425	425		300				125	
USA MILLET	10			10		10						
India Alfalfa	4			4			4			4		
Italian Ryegrass	4			4								

(8) Indicate shipping or collection points

(9) Grain is stored at

(10) Remarks

**Large quantities of silage**

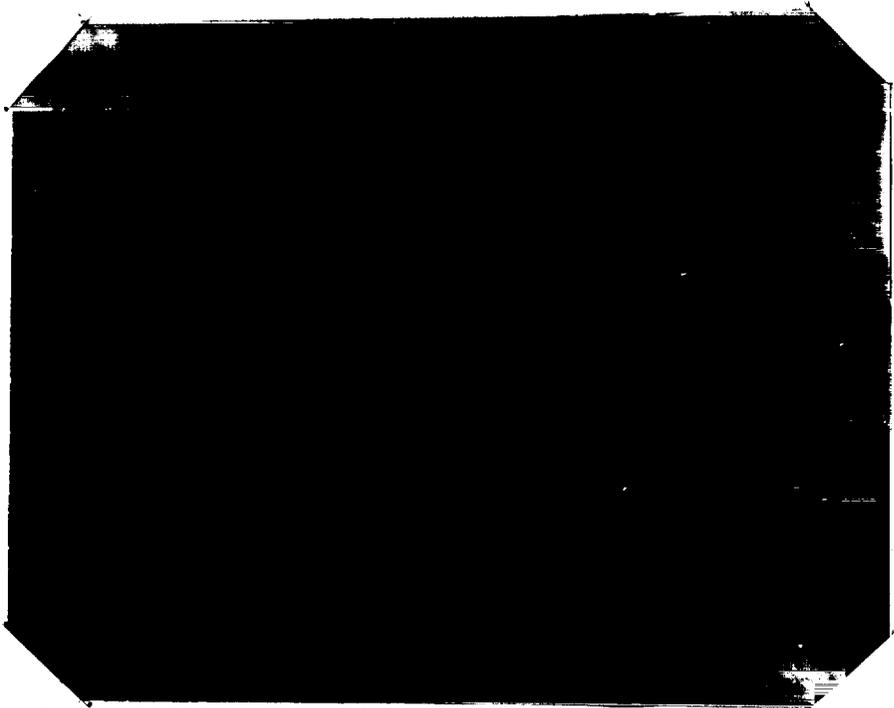
\*See instructions on back.

## REFUGEE 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.
- (2) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.
- (3) A total of columns 2 and 3.
- (4) Column 4 less column 5.
- (5) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.
- (6) Nearest railroad station for shipping and receiving.
- (7) Where stored on refuge: "Headquarters granary," etc.
- (8) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

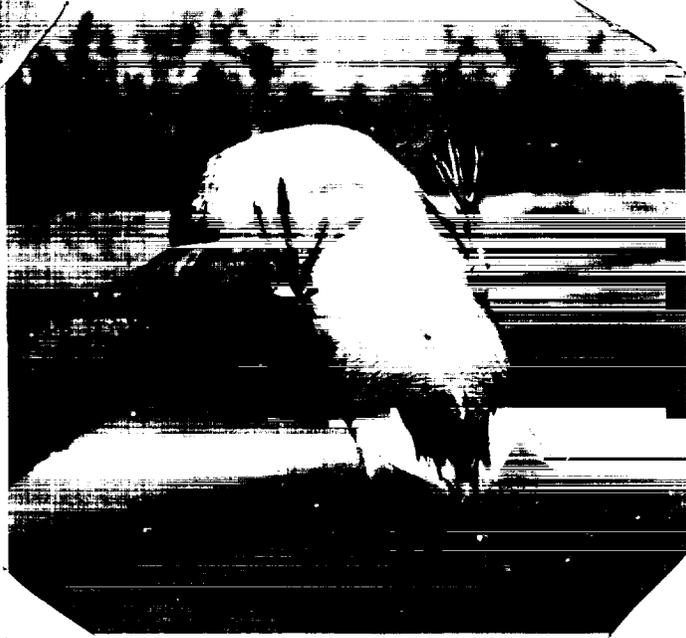


Floodwaters at Tract II Unit I caused by strong winds which blocked New River delta, backed waste water up Tri-folium 13 canal into refuge. (March, 1954)



Cinnamon Teal specimens taken in live trap. Bird at right shows partial white crescent in front of eye and lighter forewing, characteristic of Blue-winged Teal.

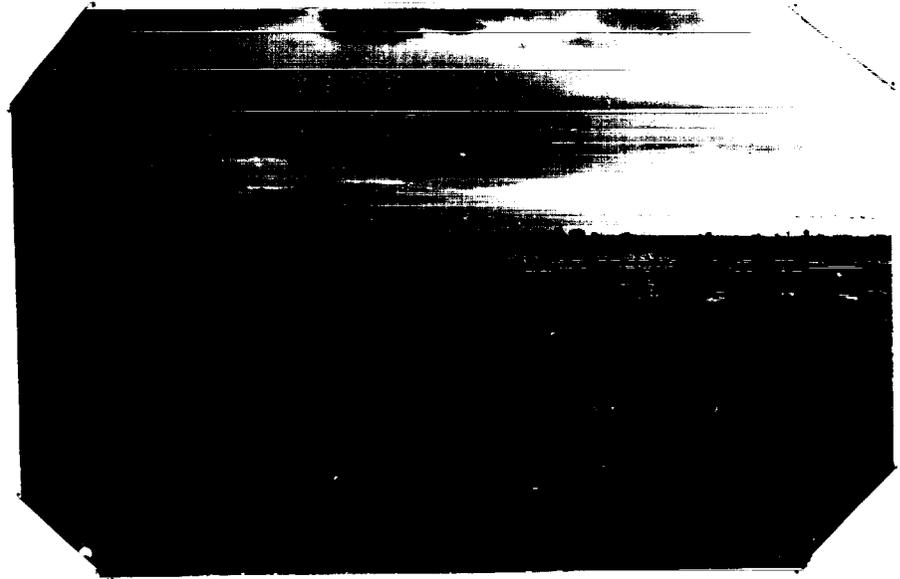
(Photo by Wm. Anderson, Cal F&G)



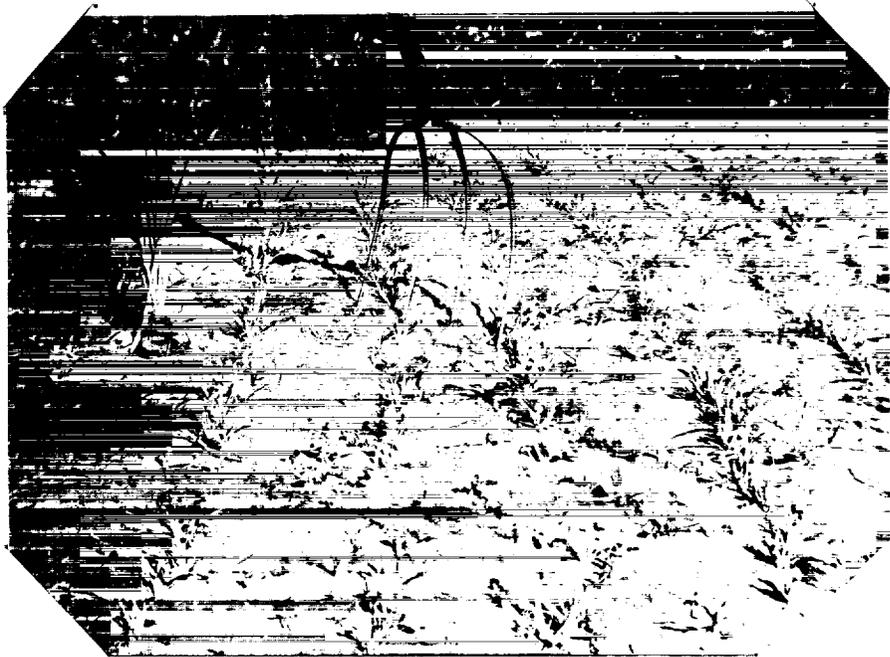
Male Green-winged Teal taken in live trap.  
Feet had no webs between toes. (Photo by R.  
Wilber, Cal. F&G). March, 1954.



Coot specimen taken in live trap which showed partial  
albino pigmentation on sides of head. March, 1954.



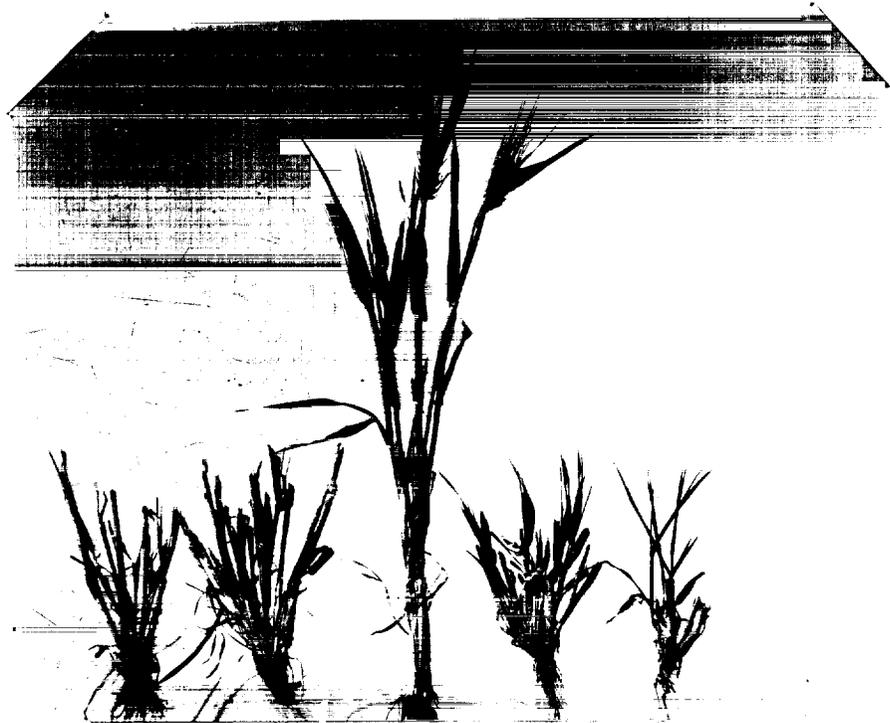
Snow and Canada Geese utilizing green barley crop after irrigation. Hunting Unit II resulted in "stacking" of birds on closed Unit I until crops were overutilized. December, 1953.



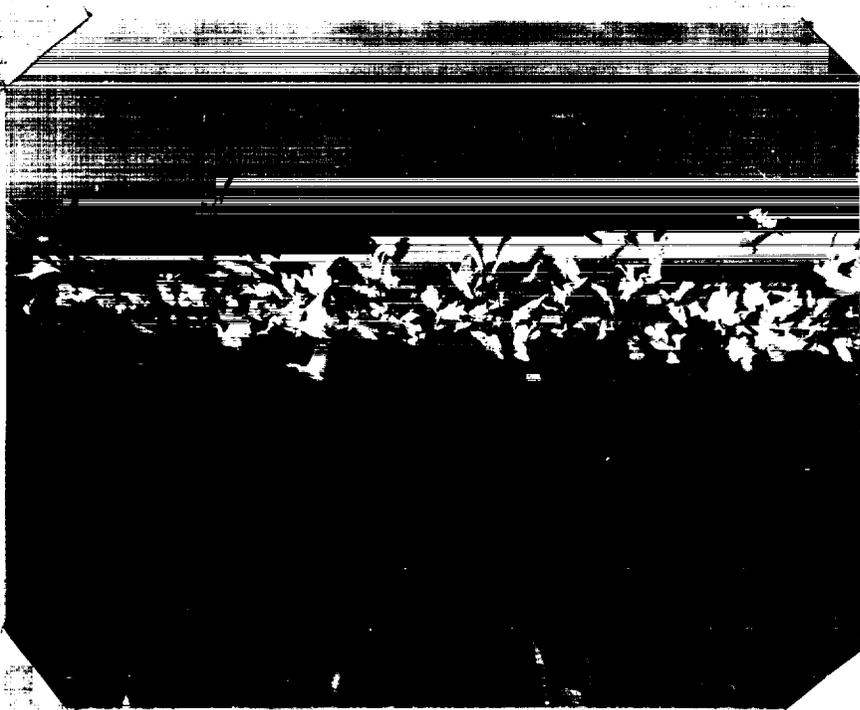
Close up of barley as cropped and killed by geese on Unit I. Clump at left compares growth of ungrazed crop at Unit II. Tract 18, Unit I, January, 1954.



Mowing operations at Tract 4, Unit II. Unutilized barley approached maturity too soon due to lack of use while hunters occupied refuge field. Approximately 60 tons of green feed went to waste in this field alone. Cutting to delay maturity was too late on most of crop. January, 1954.



Barley plants from above field. Two plants at left show development of numerous stems which produced poor grain heads (taken by geese). Two plants at right show early, stunted regrowth and die-back of cut stems. Plant in center shows normal growth, ungrazed. February, 1954.



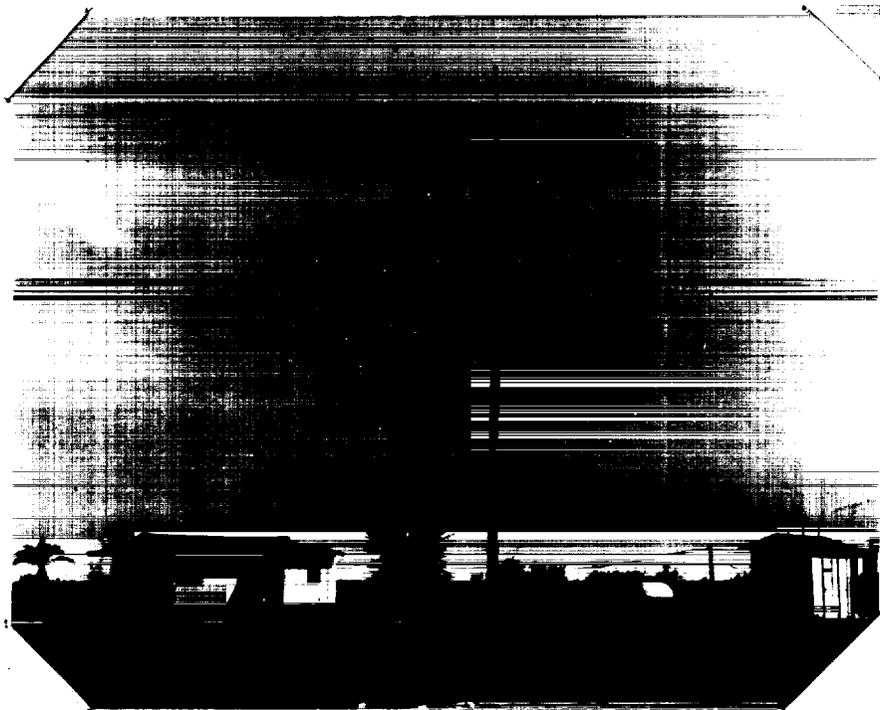
Snow geese often utilize heads only from early maturing barley crops. More acreage, at later stages is needed to allow for maturity of best crops. Tract 3, Unit II. 2/54



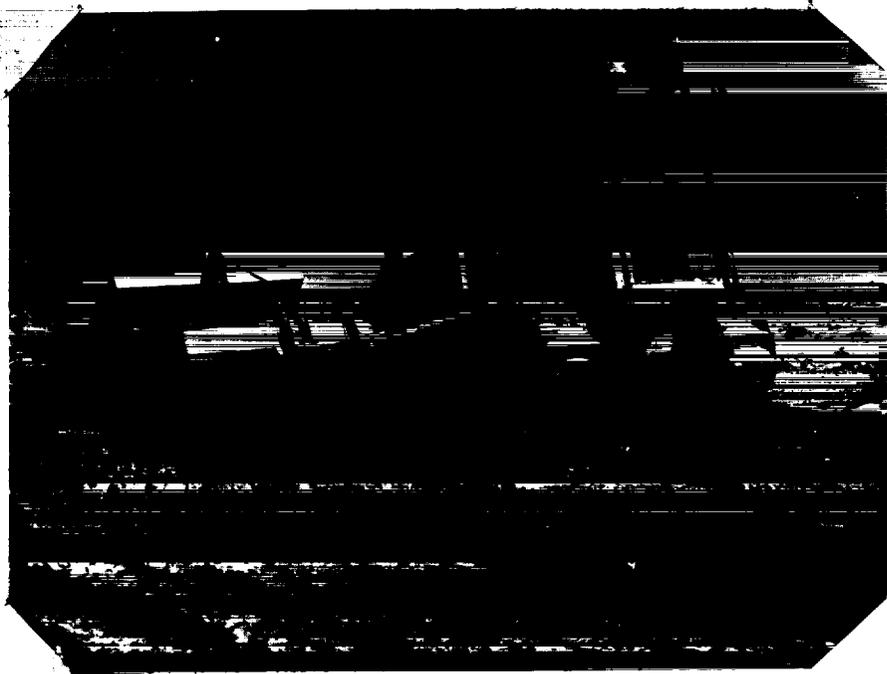
Barley plant specimens from above field. Plant at right illustrates how heads in "milk" stage are taken. Solution calls for delay of maturity through use or additional acreage in later stage of growth. February, '54.



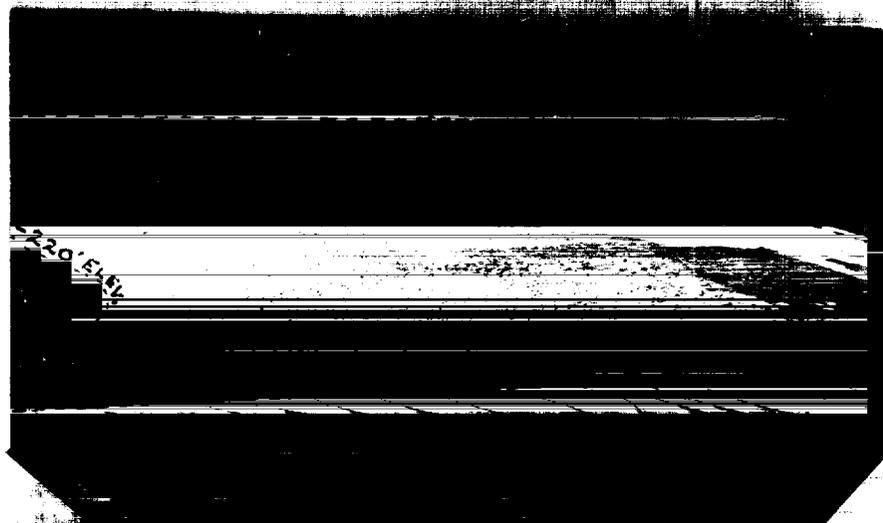
Operator C. Williams harvesting winter alfalfa for use in live-trapping widgeons on cooperative work with Cal F & G . During refuge hunting crop went unharvested by birds, rank growth was badly frosted, considerable loss resulted. December, 1953.



Headquarters area showing newly erected radio antenna.  
(Photo by Frank Beals)



Operator Carl Ford filling deep gullies with D-7 Cat.  
and 8-yd. Carryall. Tract C Unit I. February, 1954



Air view of Tract C Unit I looking East. Note frontage  
of refuge land by private fields of alfalfa, etc. Land is  
mostly above future sea level.

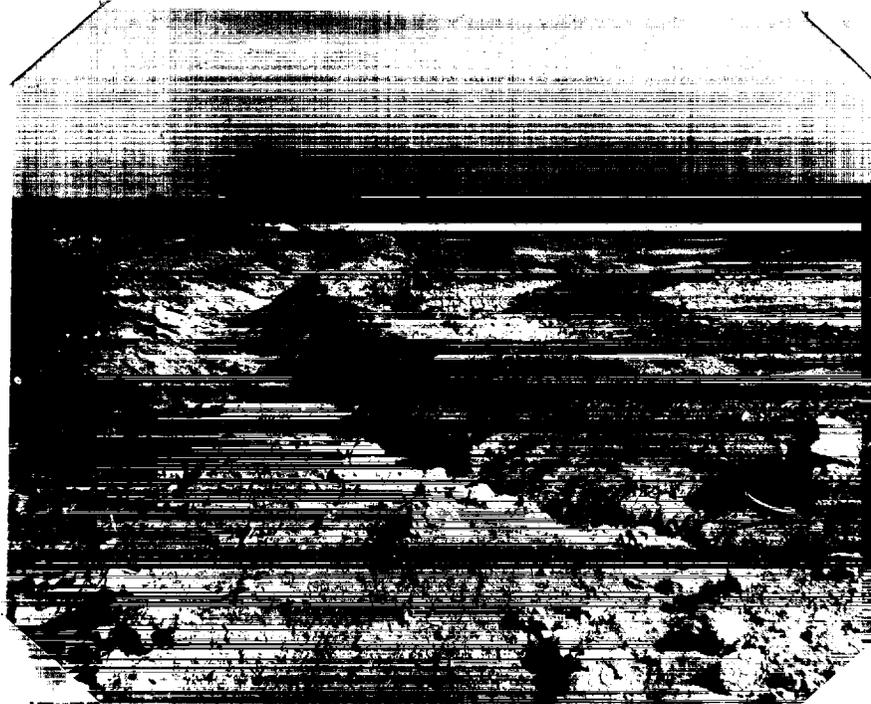
The P.&H. Dragline was shut down and temporarily assigned to Sacramento Refuge. Operator Jim Hamilton shown preparing unit for transfer. (Photo by Frank Beals).



Operator Jose Barros shown in first stage of leveling Tract C Unit I w/D-6 Cat. and 14-foot drag scraper. Feb. 1954. (Photo by Frank Beals)



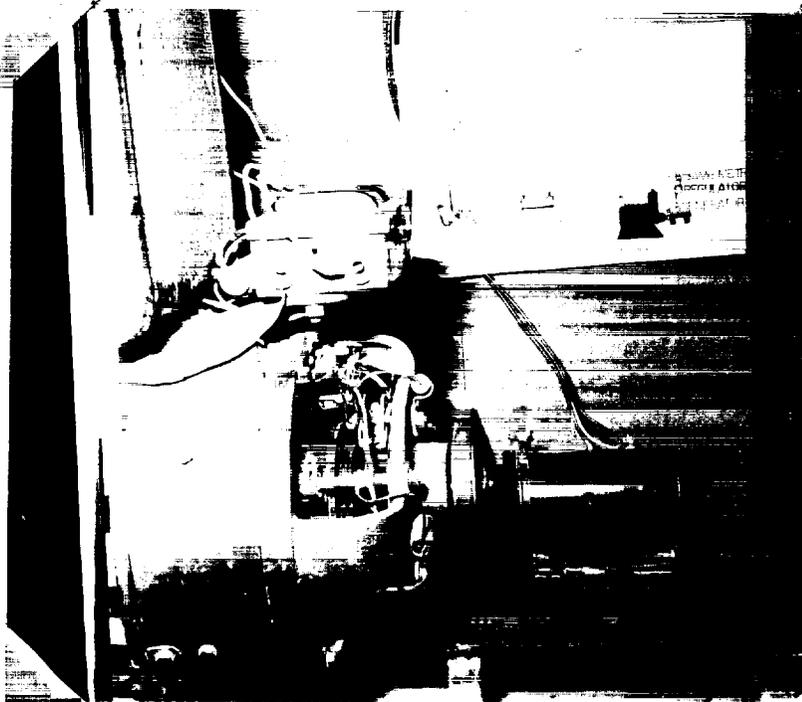
BEFORE: Athel trees along west boundary Unit II. Site of proposed head ditches Tract 4.



AFTER: Same as above after trimming and construction of head ditch.



Messrs Beals and Kridler at headquarters station (KNC-600) showing automotive type communications radio which links Unit I and II. March, 1954.



Kohler generator at headquarters. Illustration shows operation of automotive generator, regulator and ammeter to keep DC storage batteries charged for radio communications. Unit II radio operates on commercial AC power. (Suggestion by Willingham Radio; work done by mechanic Michael Kari).