SALTON SEA NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

MAY - AUGUST 1963

U. S. FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

CALIPATRIA, CALIFORNIA

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Department of the Interior

U. S. Fish and Wildlife Service

Bureau of Sport Fisheries and Wildlife

Calipatria, California

REFUGE PERSONNEL

* * * *

John H. Nowak	Refuge Manager
Robert R. Prather	Asst. Refuge Manager *
Jeanette Henson	Refuge Clerk **
Samuel E. Henson	Heavy Duty Mechanic
Clyde W. Stewart	Tractor Operator ***
Jose' Barros	Tractor Operator
Raymond Ybarra	Tractor Operator
Leo E. Cox	Irrigator
Michael J. Stewart	Irrigator
Lee L. Laizure	Irrigator

* Transferred to Sacramento Refuge August 5, 1963

** Part-time, eod August 5, 1963

*** Retired August 17, 1963

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SALTON SEA NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

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I. GENERAL

A. Weather Conditions

Tabulated below is the weather data for the period, secured from the Southwest Experimental Station located in Brawley, California. A Climatological Data Station really should be set up at the refuge as spot checks have indicated a considerable variance of temperatures throughout the Valley from day to day.

Month	Precipitation This Month	Precipitation Normal	Temperatures Maximum	Temperatures Minimum
May	0.00	.02	105	53
June	0.00	.00	111	a
July	0.00	.07	119	61
August	0.21	.40	118	68
Totals	0.21	.49	Extremes 119	53

Weather during the period could be considered about normal, We generally average about 120 days during the summer where the temperatures exceed the 100 degree mark. Humidity averaged about 30% from May until the middle of July when it made a rapid rise. From that point until the end of August 60-65% seemed to be about the norm. The last six weeks of the period could well be termed "soggy"! We might also call the summer weather in Imperial Valley the wettest-dry climate in the United States with only .21 inches of precipitation.

B. Habitat Condition8

1. Water

Most of the water damage of this spring was carried in the last report. High northwest winds continued during May and part of June and additional damage and flooding of refuge lands were experienced. Sea elevation on May 1, 1963 was -231.65. The elevation remained the same during May, drooped .15ft. in June, .05 in July and .05 in August for an August 31, 1963

elevation of -231.90. This represents a total drop of three inches for the period -- and July and August are the highest months of evaporation! When you consider no rainfall during the period, an evaporation factor of 7-9 feet per year, it can readily be seen that considerable waste water is Plowing into Salton Sea.

Under normal conditions the situation would look discouraging but several factors have now enters-i the picture to reverse the rising trend *and* the outlook is optimistic. Although the water suit between Arizona and California harp not been completely resolved, much of' the decision ok the U. S. Supreme Court has gone in favor of Arizona. All the ramifications of this water problem are much too extensive to outline in this report but regardless of the final decision, Southern California an4 the Imperial Valley will no longer have an unlimited supply at Colorado River water.

The Imperial Irrigation District has a very extensive an4 comprehensive water conservation plan dram up ready to put into immediate use. It has not been published, nor will it be, until a final decision has been handed down dealing with .9 million acre/feet of tributary flow, and a percentage allotment covering all parties in the event of a water shortage on the Colorado. These last two items are the final stage of the water suit.

Completion of the above suit may be just the start of another one within the State of California. Considerable talk is being heard of a coming legal battle between the Imperial Irrigation District and the Metropolitan Water District of Greater Los Angeles. The statement has been mentioned many times that in case of a severe water shortage the "MWD would buy up the entire Imperial *Valley*" to get the water rights!

Water shortages due to an increased allotment to Arizona are not expected for several years as it will take that State some time to complete ths huge Mesa Project and other minor ones. Of immediate importance is the present and projected water shortage existing in Lake Mead. To Quote the Bureau of Reclamation in a statement to the Imperial Irrigation District:

> "Precipitation and runoff from the Colorado River for 1963 have established a new 'next to the worst' record for the river....We are asking for a voluntary re-examination and re-evaluation of water requirements for the remainder of this calendar y-ear. We are asking that in the preparation of schedules of water requirements for calendar year 1964, you exercise the utmost frugality in proposed water use."

This 'latter situation will have immediate effect on the discharge of waste water into the sea. Unfortunately it is coming a bit fate to do the refuge much good this year and we do expect a rise next winter that will exceed the -231.65 of April 1963. All tract8 in Unit I are now well protected by sea dikes and some additional reinforcing will be done, this winter. Additional low-cost temporary dikes will also be constructed at Unit IT. All land in Unit B has already been inundated beyonduse until the Sea recedes. We will attempt to hold our present farm land from inundation this winter and then we believe the "worst will be over".

Sufficient fresh water was available throughout the entire *period* in the four impoundments at Unit I and Tract 4-5 in Unit II. Originally it was planned to dry up the bulrush impoundments in July after maturity to save water Costa. By July there was such heavy use of these tracts by nesting shorebirds and fulvous tree ducks that we felt it was desirable to maintain a low water level. We were also a bit apprehensive about drying up these tracts and then reflooding in September from a botulism potential standpoint.

All fresh water aupply is purchased *from* the Imperial Irrigation District and is used almost entirely for the maintenance of impounded areas under a marsh management plan. At present the water rate is $2.00 per acre foot but this rate is expected to be increased to either $2.50 or $3.00 a foot. This increase will also have some effect of course on cutting down the amount of waste water going to the Sea. The increase will be part of the Imperial Irrigation District's water conservation plan as the extra revenue will be used to start a concrete canal lining program on all of the District's secondary laterals.

Considerable water loss due to seepage and evapo-transpiration is being experienced on the mile long 258 Canal at Unit T. This matter was handled under separate correspondence.

2. Food and Cover

There is little utilization of the refuge by waterfowl during this period, therefore there is a great abundance of food available in our marsh impoundments. Duck and shorebird use of the impoundments was very heavy and the largest percentage of the refuge populations were to be found at all times in theee impoundments. By maintaining a constant fresh-water elevation all summer we find that our growth of submergent aquatic foods has increased tremendously. With the increase in submergents there has also been a great increase in various marine life that has attracted waterfowl, water an? marsh birds and shorebirds, Besides the bulrush and cattail the predominant aquatics are Bacopa eisenii, Echinodorus cordifolius, Sagittaria calycina, Cyperus esculentus, Ruppia maritima, and Chara Sp. The last three especially have thrived very well and being well utilized.

Both food and cover is excellent for doves, quail, and pheasants.

IX, WILDLIFE

A. Migratory Birds

1. Ducks

The period began with a slightly higher than usual population of about 2500 bir is. By mid-May the population took adip to the usual summer levels of 1,000 consisting mainly of ruddy ducks. Although low in population a large variety of ducks remained; mallard, pintail, green-wing and cinnamon teal, shoveler, redhead, scaup, goldeneye, ruddy duck and fulvous tree duck,

Broods of mallard, pintail, green-wing teal, cinnamon teal, redhead, Ruddy, and fulvous were observed. The first fulvous tree ducks arrived during the previous period and the population remained at two until the en4 of May when a slight buildup began, The peak population of 60 birds is lower than last year; however, it is strongly felt that the dense bulrush stands prevented an accurate census.

Our success in establishing a stand of bulrush in Tract 4 was beyond all expectations and even In this dense stand some broods were seen daily. Heavy use was also made by this duck in the inaccessible Trifolium-13 natural marsh (old tracts 9 and 10 which are, now flooded by fresh water from the New River) but a true census of this naturally secretive bird is about impossible in this type of habitat. Relatively few broods were observed herebut due also to the dense cover available.

Three blue-winged teal were seen on June 17 - a rare observation for that time of the year. On August 39th an unusual observation was made of a brood of four Class I green-wingedteal. On this same date a brood of ruddy ducks, still in the downy stage, were observed. We estimated the brood to be not more than P-3 days old,

2. Geese

Normally there is little to report under this section for this period; however, the daily presence of Canada geese and Black Brant is especially note-worthy.

On May 28, a pair of large Canada geese were seen and photographed In the New River Delta area. These birds were *flyers* and only observed this one time until the middle of the summer (we assume they are the same birds) when they moved into one of the bulrush tracts in Unit I. Since the end of July they have been observeddaily enjoying the Imperial Valley heat like a couple of natives and boss over 300 acres of lush alkali bulrush, There wae no evidence of any nesting.

On June 7, a single Canada goose, obviously cripple3 and barely capable of flight was seen adjacent to Tract 8-13. No further observations were made on this bird, until September ? when it was seen feeding on bulrush in Tract 4-5, unit II.

The con stant presence of Sack Brant throughout the entire period bears recording. First observations of brant were made during the previous period with the peak being 5. (In April 120 ware seen on the north end of the Sea.) However, 2, 3, and 4 brant have been observed almost daily in Tracts 1A, 3, and 4, Unit I. These birds were capable of flight and appeared perfectly healthy.

The tract th%y most favored ha3 been planted to alkali bulrush and they were observed feeding on bulrush sprouts as well as Ruppia and Chara in Tract 3. Temperatures ranged from 119 to 120 degrees during their stay, quite different from what they would have encountered had they completed their normal migration.

3. Other Waterbirds

Coots were present throughout the entire period but the population appeared to be down somewhat from last year, Very few broods hsve been observed. Populations began to build up a bit toward the en3 of August. Common Gallinules were seen quit% frequently and more often heard whenever we were in the New River Delta or Trifolium-13 areas.

Considerable more time was spent on water and shorebirds this summer than has been in the immediate past. It was by no means enough time hut enough to know that a great deal more work can and should be don% on these species here at Salton Sea. The area supported tremendous populations of these birds back in the 50's with a drastic decline until *recently.* It is our feeling this year that the birds may be starting to re-utilize the refuge.

We all too often seem to let our conservation minds narrow down to the duck and the goose alone, completely Ignoring these other species. They are not game birds but for shear beauty of flight there is nothing equal to that of a flock of Ibis or Egrets or the sight of thousands of Avocet, stilts, curlew orgodwits feeding on the shoreline.

We don't normally think in terms of "Shorebird Use Days" as we do waterfowl but if this method were applied to the use of these birds at Salton Sea Refuge it would exceed 3,000,000 for the May-August period alone. Until recently little has been contributed toward th% management of this species. With the conversion of refuge land from crop to marsh-type impoundments, greater and greater population8 are using the refuge rather than the sea front, both for nesting and feeding.

Whit% pelicans have been observed throughout the period with a peak population of 150 present at the start of the period. It is felt that the population fluctuates frequently. As a general rule these birds frequent the New River Delta area but thissummer flocks have been using the flooded buffer-zones adjacent to our sea dikes. Animmature brown pelican was seen on June 20 an? during the week of August 4, several sightings were made of Brown's in Unit I. No color-marked pelicans have been observed.

5. Doves

The nesting population of mourning doves remains high. In 1962 the California Department of Fish and Game estimates that the breeding population was up 21% over 1961. In our opinion it is up another 25% again this year, We find nests an4 young doves throughout the entire period. The white-winged doves began building up the last week of May and were present in good numbers the remain&r of the period. Surprisingly, not a single sight record of either the Mexican ground dove or the Inca dove has been made this period; but, their numbers are always low.

B. Upland Game Birds

During the early part of the summer we felt that She Gambel's quail reproduction had not been as high as would be expected and relatively few broods had been observed. Then starting in August it seemed that there were quail all over the refuge. We are unable to explain this -- certainly not a "cold, wet spring". A brood of day-old quail were seen at Tract 7-4 on August 29.

Pheasants are more or less a rare sight in this area, although we generally have one or two hanging around the Unit II headquarters. Actually there have been no observations of pheasants during tha period. They have little chance of survival in the Valley what with heavy aerial spraying, monthly cutting of the alfalfa fields, lack of cereal grains, etc.

C. Big Game Animals

None present,

3. Fur Animals, Predators, Rodents, an3 other Mammals

Muskrats are very common in the irrigation canals and along the New River. In our narrative of one year ago we made the statement...."It is suspected that with an increase in freshwater impoundments for bulrush and natural marsh development that the muskrat population will increase considerably end present a management problem." They did! During the period a total of 54 muskrats were *removed* from Tracts 1A and 4 in Unit I. For awhile they *were* knocking out dikes in the impoundments Paster than we could repair them. It appears that- we now have the population under control.

Coyotes, bobcats, and kit foxes are known to be present, and actual sightings are rare, A bobcat has been seen twice in the headquarters area. Raccoon are fairly numerous and tracks can always be seen in the mud along the sea front, irrigation ditches, and freshwater impoundments. The skunk population seems to be about double of that last year *and road kills* are much more numerous.

The cottontail populations have remained static over the past year but black-tailed jackrabbits have appeared to increase. We have been looking for a natural die-off of rabbits *for* the past several years, but they remain healthy and hardy.

E. Hawks, Eagles, and Owls

We seem to have less of these species during the &y-August period than anything else. An osprey was observed in late June, one Harsh hawk was seen; and, at the very end of the period two sparrow hawks were seen in the palms at head-= quarters. Burrowing owls of course are very common in the Valley. Normal habitat for these owls is along the steep banked, large, irrigation drains. This year we have noted an influx of owls that are now using the dikes in our bulrush impoundments.

F. Other Birds

Little in the way of unusual sightings was made on small birds during the spring or summer, An Olive Warbler was sighted at Unit II on May 3, and this will be a new one for the Refuge Bird Checklist. .A Lazuli bunting was sighted *on* May 3, and a Blue grosbeak on July 14. A pair of Cactus wrens were very obliging In building a nest and bringing aff a brood in a Palo Verde tree just, outside the new office. Nesting Verdin's and various hummingbirds *were* quite *common* this year using the trees and shrubs around the Manager's residence.

G. Fish

Corvina fishing continues to be excellent and is even improving with bigger fish being caught each year, While out on the Sea in July, on shorebird census, we noted schools of *large* mullet jumping out of the water. Mullet will not take to hook and line. de have heard cases of mullet jumping and landing in a boat and several times they came very close to landing in the Government boat. Some of the Colorado fresh-water fish come down through the All-American Canal to the Sea, but cannot survive In pure sea water.

The future of the marine life In the Salton Sea is doubtful. At one time It, was estimated that conditions would remain optimum for about 20 years. This estimate was base-l on the probability of the Sea continuing to rise. It appears now that the trend is to be reversed and if it does, the salinity factor will rise very rapidly, disrupting the marine food chain.

H. Reptiles and Amphibians

We doubt if the rattlesnake populations have been reduced any, but sightings and "reductions" have *been* less this period. Several have been killed around the irrigation structures and one small sidewinder was killed while crawling through the fence into the Manager's residence yard. The higher temperatures of this summer are a factor in numbers observed. Our problems arise when we start pre-soaking irrigation ditches in September and October.

Eed racers end bull snakes are abundant but observations *are* limited this time of the year.

I. Disease

There is certainly evidence of disease existing. Whether it is pollution, botulism, pesticides, or a combination, we are not sure. During the early part of the period we had a considerable die-off of sandpipers. It ended as repidly as it started.

It is characteristic of many of the shorebirds to utilize commercial fields for feeding on insects. Leached and irrigated fields normally draw many avocets, stilts, curlews, godwits, and ibis. The irrigated alfalfa fields are especially attractive and these are the fields that are continually receiving heavy applications of pesticides. If pesticides are a source of mortality, sterility, etc. then the drawing power and increased use of our impoundments by shorebirds has an even greater value.

We were on the lookout for sick pelicans but none *were* observed. On August 21, four dead white pelicans were seen, but there has been none since, Unfortunately, none of tha four were in a position to be easily collected.

Pollution deposits *in* shallow water and receded areas is quite severe and most of the shore-line on the south end of the Sea at this time of the year is covered with a heavy blue-green algae. The Sea at this time of the year also has a pretty rank "sewage disposal plant" odor!

3. Relocation of Headquarters

In the early part of 1962, through the cooperation of the local Sail Conservation Service, an extensive salinity sampling was made on most of the existing refuge farm land. This soil survey indicated that any further attempts to produce cereal crops on the major portion of the Unit I lands would no longer be possible. Partially because of this we began a program of converting Unit I land to marsh-type impoundments. On completion of this conversion it would leave 75% of our farming operations in Unit If.

In view of the switch in operations, it was felt that the Unit II subheadquarters should be made the main headquarters. Since 1962, there has been an easy and gradual change to this new location. During 1962 most of the storage and all of the shop repairs have been handled at Unit II. In June of 1963, a contractor was located who would tackle the job of moving the office building from Unit I to II. A new foundation was poured, the building set and new asphalt tile laid. The building was completely redecorated on the interior, roof' reshingled, along with two coats of exterior paint and trim. The grounds have as yet to be landscaped and a parking area established.

This move has been very beneficial, increasing our efficiency along with a cost saving in excess of $4,000.00 a year. No power or telephone facilities were available at the old Unit I site but are available at Unit II.

3. Electric Power Distribution

With the increase-d use of the Unit II site our power factor increased proportionately, The original wiring and service entrance to the shop was seriously underrated as was the service entrance box at Quarters No. 7. The matter was discussed with the power company and they agreed to set several new distribution poles, upgrade the old 10 KVA transformer to a 25 KVA and move it to the center of the work area. The refuge staff took it from there, installing a new meter and main service entrance and retiring the shops and office for 110-220 current. The 70 amp, service entrance at the residence was replaced with a 30 circuit-200 amp. box. This latter Job was contracted,

4. Farm Land Rehabilitation

One TD-18 and 11 cy. yd. carryall scraper was kept in operation during most of the period on the land leveling project at Tract C, Unit I. This is our only *remaining* tract in Unit I that is capable of producing barley:;. In view of this, we feel justified in going ahead with a relatively extensive rehabilitation of Tract C.

Several things will be accomplished and corrected with this rehabilitation: (1) the 'low spots and resultant salt deposits will be eliminated, (2) irrigation costs will be reduced abng with a considerable saving and conservation of water, (3) the irregular fall of the field will be corrected, and (4) outcroppings of poor adobe soil can be covered with better types of soil from other parts of the field.

It has been a practice in the past at this refuge to annually chisel all crop lands. Chiselling is at a depth of around 18 inches. Starting this year we have begun a rotation plan of deep sub-soiling all crop lands to a depth of 30-36 inches, This is accomplished with a three-tooth hydraulic ripper pulled by a D7 Cat. Most of our soil is a hard, impervious adobe with deeper thin strata of sand. This sub-soiling is necessary to create a water path whereby the soluble salts can be drawn down into the lower ground water table. Short of expensive tiling, it is the only means of pulling the salt off the surface soils thereby allowing for better gsrmination of seed. The operation is slow and expensive, requiring the we of low gear on the engine, but worth it in increased production. Experimental work was tried on a small *tract* using this method last year with good results. Tracts 1, 3, and 6, Unit II received this treatment this summer. All other fields were chiselled in the usual manner.

5. Dike Construction

During the April-May wind storms and rise of the Salton Sea, the sea dikes at Tract 8-13 and 4-5, Unit II were washed out. There is some possibility of repairing the 8-13 dike, if the sea drops; but, at least 1/8th mile of the 4-5 dike was completely flattened. Repair of the original dike is out of the question, unless the Sea recedes a foot or more.

All dikes at Unit I held although the Tract 5 sea dike was only a foot thick by the time we were able to get a bulldozer into the area. As the buffer-zone behind the dike was fairly dry, the last border dike was reinforced an4 enlarged in case the repairs failed to hold next winter. The Tract 4 sea dike received no damage due to a temporary constraction dike ahead of it, but this temporary dike no longer exists, York was started in widening this like and reinforcing it using the dragline. This project will be completed next period.

The connecting dike and roadway between Tract 3 and 4 will also be reinforce4 this winter. The concrete foundation from the old office site was broken up and used for riprap at this spot.

6. Shop-Office Storeroom

To complete the transition of the move Prom Unit I to Unit II, it was necessary to establish a temporary office in one end of the repair shop. This was accomplished with a partition in the south 12 feet of the building. The room has now been converted into a parts and supply area. Shelving has been constructed along one wall and a tool board for carpenter, electrical and plumbing tools. Storage space in the office is very limited and this new room will help considerable in maintaining a neat and orderly office.

7. The remaining projects are relatively small and involve anywhere from 3to 15 man-days:

a. All vehicle equipment, pickups, stakes, dumps, and track-tractor, is now sporting newwhite tops on the cabs. It is amazing what a white top will do in cutting down the temperature within the cab of a truck. Temperature reduction will run be tween 12 and 15%. On a day when the air temperature it 120° and reflection temperature 156° these white top8 are appreciated. It seems we were about the last of the Government and State agencies in the south to do this.

b. Sign construction and rehabilitation was carried over from the previous period. 421 large refuge wooden signs have now been completed. Three additional redwood directional signs have been constructed and installed at Headquarters. Redwood signs were also contructed an4 installed designating each of the farm tracts and impoundments on the refuge.

c. One-half mile of input canal, feeding Tract 1A and 5 from the 258 main canal, was cleaned with the Hinson dragline. A great deal more dragline uork and canal cleaning need8 to be done. Lack of manpower and poor condition of the old, small 3/8 cu. yd. Hinson machine are part of the reasons this work has fallen behind schedule.

d. Control of salt cedar along the canals and on the borders of the impoundments is a constant problem. Chemical control is possible along the canals but not in the impoundments. During the period a portable one-man 10" brush saw was purchased. It may be part of the answer as one mm can now do the work of six. Some brush control work was completed in Unit 11.

e. On removal of the office building from Unit I, the brick fence and footings wre removed, the concrete foundation broken up and hauled off for ruprap, the grounds leveled and picked up. The 20 KW diesel generator was removed from the generator room and transferred to Sheldon Refuge. The old headquarters site needs additional cleanup and re-arrangement of storage space and these will be accomplished next tinter.

f. A minor amount of' road repairs were accomplished during the period. The County Highway Department was hauling gravel from our Red Hill area and they wre very cooperative in loading our dump truck whenever we were in a position to haul gravel. Some work was done on the sandy stretch along the 258 Canal along with regraveling part 04 the Unit II site and headquarters parking area.

g. Several man-days were used to brush out boundary signs, make replacements where needed, and to do some additional posting,

h. Five trips were made by Mechanic Henson to inspect or pick up equipment for other refuges. Two trips were made to San Diego, one to Long Beach, one to the Los Angeles area and one to Port Hueneme.

i. Many man-hours were devoted to the complete revision of Salton Sea's management plans. The Soil and Moisture, Land Use, Hunting and Census Plans have now all been submitted. A large part of the work was completed on the revision of the Water Management Plan. Final draft is being held up pending publication of' the Imperial Irrigation District's new Water Conservation Plan.

8. Equipment Repairs

The radiator was replaced on the 20 KW Continental generator just prior to transfer to Sheldon Refuge. All cables on the 11 dy. scraper were replaced, along with sheaves and tongue repairs. A new main clutch was installed in the TD-18? *and* rather extensive repairs to the rear power control unit, Two defective rollers were replaced on the TD-18?.

The Dodge pickup I-50810 was given a major engine overhaul, new shocks installed on Dodge pickup I-54017, and many man-hours were put into Dodge pickup I-54018 to keep it operating until. a replacement can be received this year.

To comply with the new ICC regulations, emergency trailer locking brakes were installed an our S-ton truck-tractor. Many modifications were necessary to accomplish this installation.

B. Plantings

1. Aquatic and Marsh Plants

All plantings during this period were confined to millet. On July 1?, 2250 lbs. of Japanese Millet was aerially seeded to Tract 5, Unit I. This is a 30 lb/acre rate, No engine work had Seen clone on the fieldother than construction of a secondary dike. Prior to seeding, the field had been pre-soaked to a mudflat stage. Considering the time of the year and high temperatures, the pre-soaking of seed was held to 36 hours, We believe now that 72 hours would have been better. Spring pm-soaking is generally 120 hours when temperatures are below 100 degrees,

In the past, millet has been either drilled or aerially seeded into water that has a depth of 1 to 4 inches. Success has been poor. This par we have started to irrigate millet like a cereal crop. The tract is flooded but the water is *remove.3* as rapidly as possible. The stand in Tract 5 is spotty but wherever germination did occur we have a good healthy plant. We believe the erratic stand is due to two things. (1) Lack of adequate water control an4 sufficient drainage. (2) Reduced pre-soaking time. In 1961 a large supply of millet seed was purchased, Good storage is a problem en4 germination tests indicate a fall-off on thisseed. We are now using it up as rapidly as possible.

C. Collections and Receipts - none

D. Control of Vegetation

Vegetation control is confined primarily to the removal of phreatophytes on our many input irrigation canals. Water loss due to evapotranspiration is very great, running as high as 120 inches in this area. It is therefore important that our input canals be kept as free of vegetation as possible. Control was accomplished in canals leading to Tracts 1A and 5, Unit I, and 1, 2, 3,6, 7-14, and. 15-22, Unit XT.

E. Planned Burning

None other than along ditch banks, Irrigations and drainage canals.

F. Fires - none

IV. RESOURCE MANAGEMENT

No activities at this station under this section.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Banding

None during this period.

B. Depredations

None during this period.

C. Marsh Management

1, Bulrush Plantings

We are now in our second year of experiment with the production of bulrush. One thing has been definitely proven -- we can raise it on marginal land that will not produce anything else. The techniques of raising bulrush are now well established although we 30 not mean to imply that these methods cannot be improved on. We think they can.

Regardless of the high temperatures, use of the Sea is very high and fishermen, boaters, and water skiers are a common sight. Most of this activity is on the north end of the Sea with little use on our end unless the Corvina fishing is good around the New River Delta.

B. Refuge Visitors

After the middle of June we pretty much have the place to ourselves as will be borne out by the very short visitors list:

5/6 - B. Stollberg, BSFW, Washington Office, S&M operations
5/6 - E. Lumb, BSFW, Washington Office, S&M operations
5/6 - V. Ekedahl, BSFW, Portland Office, S&M operations

5/12 - G. McCaskie, San Diego State College, Review of bird records.
5/27 - W. Moholt, BSFW, GMA, San Diego, Depredation problems
5/27 - R. Freeman, BSFW, GMA, Merced, California, Depredation problems
5/27 - G. Gofer, BSFW, GMA, Bakersfield, California, Depredation problem

7/2 - R. Renoud, Chief Personnel Off., CAS, Portland Office, Inspection.
7/18 - R. carter, General Mgr., IID, Lands an3 water menagement.
7/18 - E. Howington, IID Board of Directors, Land withdrawal.

8/16 - A. W. Elder, BSFW, GMA, Pasadena, California, Dove enforcement
8/16 - W. Moholt, BSFW, GMA, San Diego, California, Dove enforcement
8/30 - R. Thompson, BSFW, Biologist, P&RC, Riverside, California, Courtesy call,

C. Refuge Participation

This is also the period when all local clubs and organizations fold up their tents not to begin operations or meetings until about the first of October, Little opportunity is available for any public relations work other than individual contacts or dally business contacks.

7/10 - Nowak & Prather attended a one-day Salinity and Drainage Conference sponsored jointly by the Imperial Irrigation District an.1 the Soil and Water Conservation Society. Nowak is a charter member of the latter organization.

7/16- Nowak attended a Water Conference sponsored by the Imperial Irrigation District which dealt with the problems arising out of the Arizona-California water suit and how it will effect the Imperial Valley and Salton Sea.

D. Hunting - none

E. Fishing

All fishing is limited to those areas adjacent to our sea boundary. There is no activity within the refuge.

F. SAFETY

Four SAFETY meetings were held during the period pluo two fire drills. To date all recommendations brought forth in the meetings for improving SAFETY have been completed. No Injuries have occured during the period.

The station was free from any lost time accidents during the period with 1278 days elapsing since the last lost-time accident,

VII. OTHER ITEMS

A. Items of Interest

1. Geo-thermal Drilling

Probably the biggest thing to hit the Imperial Valley since the big flood of 1905-7! Two firms already have producing wells; O'Neill, Ashman an3 Hillird, Inc., and Western Geo-Thermal Inc. and we now understand that Pacific Gas and Electric may get Into the act. O'Neill-Ashman-Hillird have the "inside tract" as they are tied in with the Imperial Irrigation District, who have control of the land along the fault line where moat of the thermal activities occur. They are elsewhere in the Valley but deeper drilling is required. Originally the drilling was for steam and power generating pur poses.

The main objection and problem was what to do with the effluent and brine that flowed out with the steam as the Pollution Board brought en injunction against depositing it in the drains or the Sea. The problem was rapidly salved when the engineers discovered this effluent was loaded with chemicals. The chemical value now seems to exceed the value of the steam. The O'Neill No. 3 well just adjacent to our Tract 15-22 is capable of producing 2080 tons of chemicals every 24 hours! The chief chemical is muriate of potassium but everything from fluoride to traces of gold and silver have been found. Each well is also capable of producing about 600,000 lbs. of steam every 24 hour period,

Plans are now being drawn up for the construction of a $10,000,000 chemical reduction plant within the next three years. Negotiations are now in progress for the withdrawl of 220 acres of land within the refuge by the Imperial Irrigation District. (All refuge land is leased from this agency and they have full mineral and geo-thermal rights.) The next two wells will go in at the Red Hill area and drilling is expected to start in February.

Strangely enough this is one case where drilling activities will benefit the refuge. The fault line runs along the shore of Salton Sea and it is now to the advantage of the Imperial Irrigation District to devise some means of dropping the Sea elevation. The chemical business might just become more lucrative than the water business!?

2. Imperial Valley and the refuge had it's share of earthquakes during the period. No damage to refuge facilities other than gutting some new cracks in the concrete patio of Quarters 7 an? the crew on edge. An intensity of 6 on the Richter Scale was the highest with another at 5½,4½ and after that we don't count 'em. These quakes occurred on May 22 at 11:37 p.m., 11:44 p.m., and on May 23 at 2:08 a.m., 8:45 a.m., 10:05 a.m., and 11:40 a.m. There were numerous other rolling earth tremors during this 24 hours period. Another light earthquake was recorded on June 11 at 8:26 a.m. of 30 second duration. Some of the tremors on May 23 were sustaining and of long duration.

3. Clyde W. Stewart, Tractor Operator, retired during the period. Due to a breakdown incommunications, Mr. Stewart sort of retired twice. First on July 5th and again on August 17. Mr. Stewart went on an extended trip July 6th only to return on August 8th to findthat he hadn't retired. It was necessary that he take 200 hours of annual leave, work one week, and then his retirement became official on August 17, 1963. Clyde was certainly senior man on the staff, having started work on this refuge in 1945. At the peak of operations in the 50's he was promoted to Farming Foreman. We know of no other man who could put up a border like Clyde could -- you couldn't draw a line any straighter or truer than one of Clyde's half mile long borders. His knowledge of farming this adobe soil was endless and we still find ourselves calling on Clyde for a bit of free advice. May your summers be cool and pleasant Clyde -- you put in 17 rugged hot ones.

4. Prather and Nowak spent one day working with State personnel out on the Sea checking the shoalgrass plots, This was a transplant from the coast of Texas and has not been too successful until this past year. Growth and spreading has been excellent and we hope next year to get a nursery crop started along our sea dikes.

5. On August 5 Robert Bather, Assistant Manager was transferred to the Sacramento Refuge to a like, but more responsible position. We wish Bob the best of success. His enthusiasmfor the refuge and our problem are missed. A replacement has not yet been assigned.

6, On August 5 Miss Jeanette Henson was employed as refuge clerk on a temporary full-time appointment. The appointment has since been converted to part-time career-conditional while Miss Henson continues her studies atImperial Valley College.

7. Michael J. Stewart, Irrigator, went on Leave Wfthout Pay for a two months period to enroll in the Western School of Heavy Equipment Operation, Stewart (age 31) had shown a good aptitude for equipment operation of all types, The refuge has benefited from this schooling asMike is very much at home on an engine and knows what he is doing. The school is certainly recommended for my young refuge employeed. We hope soon to have Mr. Stewart reclassified to Maintenanceman I.

8. Nowak and Henson (Mechanic) had the opportunity to complete a 20hour wildlifelawenforcement course sponsored by the California Department of Fish and Game. This course is mandatory for their Deputy Game Wardens. The course was an excellent one and we often think something of this type should be mandatory for our own refuge personnel who have enforcement authority,

9. Ever have trouble remembering how much water in an acre/foot? Here's a non-technical translation -- one acre-foot of water will make 77,000,000 ice cubes!

B. credits

With the absence of an assistant refuge manager the entire preperation of this report fell to the lot of the Refuge Manager. Some of the earlier census data and notes of Mr. Prather were used. Typing of course by Miss Henson.

C. Photographs

A number of photographs are included in this report related to our operations an3 problems. Picturecreiits are as indicated. The 4x5's were taken with the Government Speed Graphic; other sizes and color by personal equipment. All film la the property of the Service.

SIGNATURE PAGE

Submitted by:

John H. Nowak
(Signature)

John H. Nowak

Refuge Manager
(Title)

Date: September 25, 1963

Approved, Regional Office:

Date: _____

_____
(Signature)

_____
(Title)

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

WATERFOWL

REFUGE Salton Sea Refuge MONTHS OF May TO Auguse, 1963

(1) Species	(2) Weeks of reporting period: 5/5-11 (1)	5/12-18 (2)	5/19-25 (3)	5/26-6/1 (4)	6/2-8 (5)	6/9-15 (6)	6/16-22 (7)	6/23-29 (8)	6/30-7/6 (9)	7/7-13 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada					1					
Cackling										
Brant	2	2	4	4	3	1	3	3	3	3
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	10	10	5	5	5	5	5	5	2	2
Black										
Gadwall			2							
Baldpate	75	15	5							
Pintail	50	10	10	20	50	50	50	55		
Green-winged teal	150	25	10	10	10	20	10	5		
Blue-winged teal						2	3			
Cinnamon teal	350	75	45	40	35	45	45	45	45	45
Shoveler	50	20	10	10	5	5	5	5	2	2
Wood										
Redhead	10	10	20	10	10	15	20	20	30	30
Ring-necked										
Canvasback										
Scaup	60	10	5		5	5	5	5		
Goldeneye	35	35	25	25	15	20	30	30	15	15
Bufflehead	20									
Ruddy	1,600	1,250	875	675	420	650	400	280	25	25
Other: Fulvous T.D.	2	2	2	6	12	32	32	32	50	50
Coot:	2,300	1,750	1,185	995	245	335	300	375	250	250

INT.-DUP., D.C.-53824-59

3 -1750a

Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Salton Sea Refuge MONTHS OF May TO August, 1963

(1) Species	(2) Weeks of reporting period: 7/14-20 (11)	7/21-27 (12)	7/28-8/3 (13)	8/4-10 (14)	8/11-17 (15)	8/18-25 (16)	8/26-9/1 (17)	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada			2	2	2	2	2		77		
Cackling											
Brant	3	3	2	2	2	2	3		315		
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard	2	2		2	2	4	4		490	2	22
Black											
Gadwall									14		
Baldpate									665		
Pintail							430		5,075	2	20
Green-winged teal							230		3,290	2	10
Blue-winged teal									35		
Cinnamon teal	45	45	15	15	15	20	210		7,945	5	60
Shoveler	2	2							826		
wood											
Redhead	30	30	30	30	30				2,275	3	30
Ring-necked											
Canvasback											
Scaup									665		
Goldeneye	15	15							1,925		
Bufflehead									140		
Ruddy	225	185	25	50	50	55	400		50,330	3	110
Other: Fulvous T. D	60	60	20	30	30	20	60		3,500	6	50
Coot:	50	50	100	100	100	100	500		62,895	4	50

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	392	6	
Ducks	77,175	2,412	292
Coots	62,895	2,300	50

SUMMARY

Principal feeding areas Bulrush impoundments Unit I and II, sea front and New River Delta area

Principal nesting areas Bulrush impoundments, old flooded (sea water) impoundments and sea front.

Reported by John H. Nowak, & Robert R. Prather

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

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

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

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

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

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

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

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

Interior Duplicating Section, Washington, D. C.
1953

INT.-DUP., D.C.

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAUOFSPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Salton Sea Refuge, For 12-month period ending August 31, 1963

Reported by John H. Nowak Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	Acreage		(3) Use-days	(4) Breeding Population	(5) Production
Unit I	Crops	160	Ducks	6,383,670	2040	
	Upland	755	Geese	441,810		
	Marsh	380	Swans			
	Water	1,115	Coots	530,850	200	34
	Total	2,410	Total	7,356,330	610	235
Unit II	crops	540	Ducks	2,127,889	130	67
	Upland	235	Geese	662,722		
	Marsh	155	Swans			
	Water	506	coots	265,435	75	12
	Total	1,436	Total	3,056,036	205	79
Unit B	Crops	30	Ducks	81,221	90	34
	Upland	150	Geese	4,57 4,576		
	Marsh	80	Swans			
	Water	C C140	t s	3,500	25	4
	Total	400	Total	89 377	115	38
Grand Total	Crops	730	Ducks	8,592,850	630	302
	Upland	1,140	Geese	1,109,108		
	Marsh"	615	swans			
	Water	1,761	coots	799,785	300	50
	Total	4,246	Total	10,501,743	930	352
	Crops		Ducks	* 535 acres under artifical marsh		
	Upland		Geese	Impoundment		
	Marsh		swans			
	Water		Coots	Original refuge acreage of 32,407		
	Total		Total	has been entirely inundated and		
	Crops		Ducks	is no longer under management		
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total	---		
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of this page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Units A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa Lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

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

MIGRATORY BIRDS
(other than waterfowl)

Refuge Salton Sea Refuge Months of May to August 1963

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Productio			(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	200	8/29	200	8/29				800
Pied-billed Grebe	"	"	30	7/26	20	"				100
White Pelican	"	"	150	5/1	55	"				200
Brown Pelican	1	6/20			2	"				2
Great Blue Heron	Previous	Period			10	"				15
Common Egret	"	"	30	7/26	15	"				150
Snowy Egret	"	"	70	"	14	"				200
American Bittern	"	"	5	"						5
Glossy Ibis	"	"			36	"				100
Wood Ibis	10	6/20			256	"				400
Common Gallinule	Previous	Period	20	7/26	10	"				20
II. Shorebirds, Gulls and Terns:										
Semi-palmated Plover	Previous	Period	10	7/26	10	7/26				20
Snowy Plover	"	"	10	"						20
Killdeer	"	"	12	"	10	8/29				30
American Golden Plover	1	8/29			1	"				5
Black bellied Plover	Previous	Period			3	7/26				5
Long-billed curlew	"	"	220	8/29						500
Western Willet	"	"	22	"						50
Greater Yellowlegs	"	"	20	"						50
Long-billed Dowitcher	"	"	1500	"						2500
Marbled Godwit	"	"	200	"						400
American Avocet	"	"	3000	"						8000
Black-necked Stilt	"	"	980	"						4000
Wilson's Phalarope	"	"	50	"						200
Northern Phalarope	200	8/29	400	"						1200

(See Page 2 for continuation of II)

(over)

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove	Resident		No estimate but very abundant					30,000
White-winged dove	"	"	25					100
Mexican ground dove	"	"	15					15
Inca Dove	"	"	2					5
IV. Predaceous Birds :								
Golden eagle								
Duck hawk								
Horned owl								
Magpie								
Raven								
Crow								
Sparrow Hawk	Previous Period		2	3/31				10
Turkey vulture	"	"	25	7/1	5	8/25		30
Burrowing Owl	Resident							1,000
Marsh Hawk	1	5/1						10

Reported by.....

INSTRUCTIONS

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

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

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

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

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

(6) Total: Estimated total [illegible] of the species using the [illegible] during the period concerned,

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

79858

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

MIGRATORY BIRDS
other than waterfowl)

Refuge..... Months of.....to.....195.....

(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:										
II. Shorebirds, Gulls and Terns:										
Sandpipers (various)	Previous	Period	6200	8/29						10,000
Common Snipe	"	"	10	"						50
Ring-billed Gull	"	"	150	7/26						300
Herring Gull	"	"	25	"						100
Bonaparte Gull	"	"	100	"						500
Franklin's Gull	"	"	2	"	2	8/29				10
Forster's Tern	"	"	40	"						150
Caspian Tern	"	"	75	"						200
Black Tern	"	"	100	"						300

(over)

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

Reporte by.....

INSTRUCTIONS

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

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

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

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

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

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

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

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Salton Sea Refuge Months of May August, 1963

(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.
Gambel's quail	ditch banks, road sides and abandoned farmlands, principally Atriplex and Tamer K	0.40	37	550	unknown	none	none	none	1400	Day-old brood of 4 seen on August 29th.
Ring-necked pheasant	desert-type upland ditch banks, etc.	80	none		25M:75F	none	none	none	10	Lack of cereal crop is main limiting factor, Reproduction in the general area is probably limited due to heavy use of pesticides on commercial fields,

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.

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

Photo Transect No. 1 (R48-2)

Tract No. 1-A Time 0900 Date 8/8/63

Camera 4x5 Speed Graphic Lens 270 mm.

Shutter speed 1/400 Aperture f.22

Film Tri-X Film speed (ASA) 400

Elevation of Camera bed of pickup Compass direction NE

Weather conditions Hi haze - hot and humid

Comments Density of stand and excellent seed crop is apparent. This part of tract was aerial seeded April 1962, and is second year stand. Area was almost entirely utilized in fall and winter of 1962.

R48-2 Nowak

Photo Transect No. 2

Tract No. 1-A Time 0910 Date 8/8/63

Camera same as above Lens same

Shutter speed same Aperture same

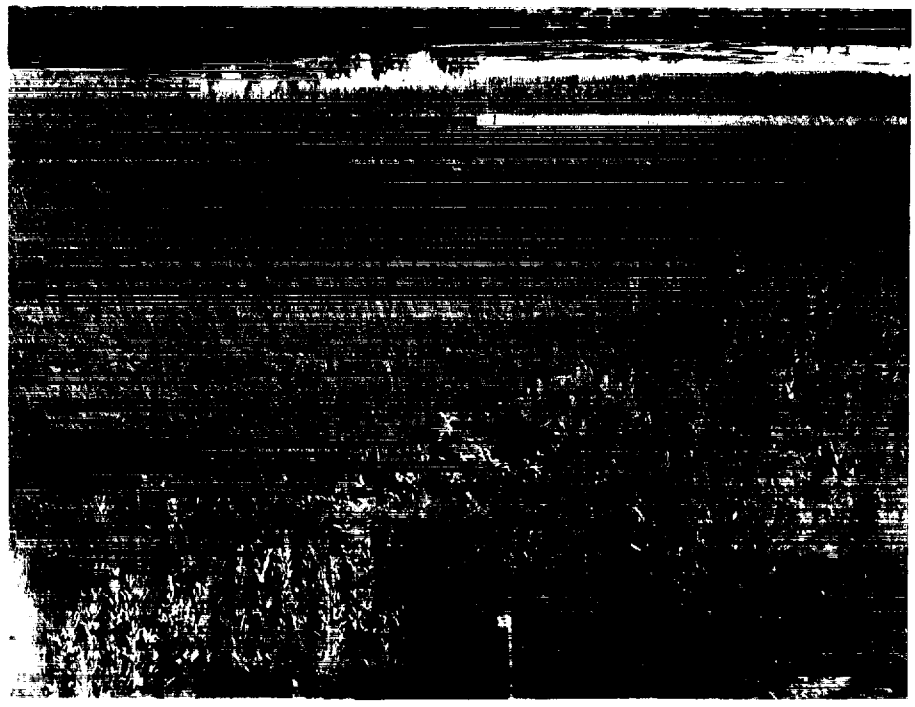
Film same Film speed (ASA) same

Elevation of Camera same Compass direction NW

Weather conditions Same as above

Comments Planting data same as above. This area was very heavily utilized in fall of 1962. Some encroachment of cattail is present but this will probably be utilized by snow geese in the fall of 1963.

R48-3 Nowak



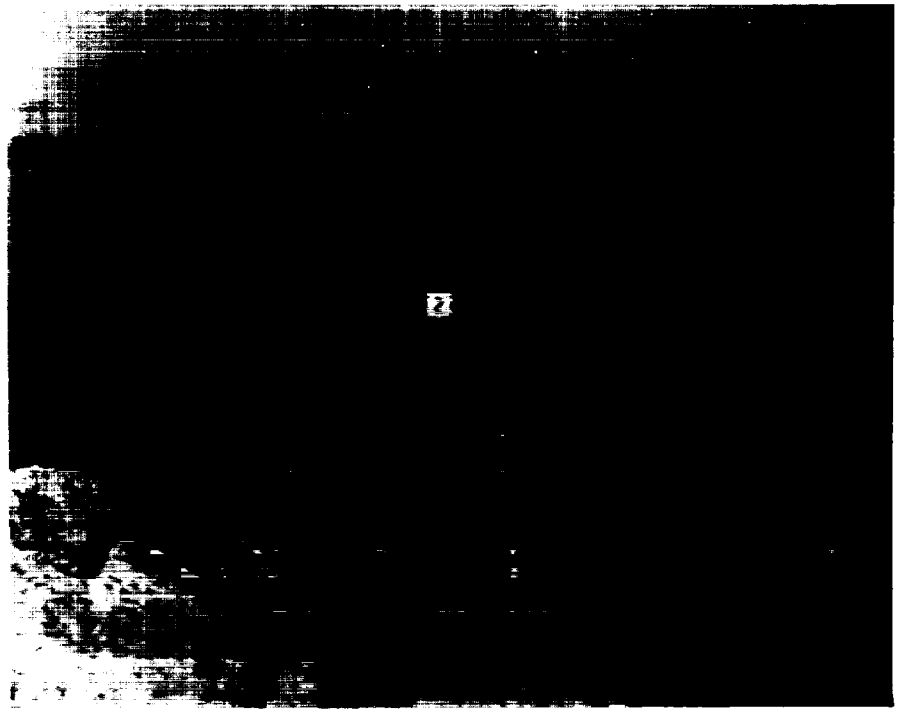


Photo Transect No. 3

Tract No. 1A(n(, Unit I Time 0920 Date 8/8/63

Camera 4x5 Speed Graphic Lens 270 mm.

Shutter speed 1/400 Aperture F.16

Film Tri-X Film speed (ASA) 400

Elevation of Camera bed of pickup Compass direction W

Weather conditions hi haze - hot and humid

Comments North ½ of Tract 1A aerial seed 3/11/63. Growth was slow until end of July. By end of August, stand was quite luxuriant. Submergents quite well established in deep ends.

R48-4 Nowak

Photo Transect No. 6

Tract No. 4-5, Unit II Time 1115 Date 8/8/63

Camera Same as above Lens same

Shutter speed same Aperture f.32

Film same Film speed (ASA) same

Elevation of Camera same Compass direction WSW

Weather conditions same

Comments Aerial seed to mudflat stage 3/8/63. High water and storms in April-May flooded tract with sea water and by end of May this tract was abandoned and flow of fresh water was removed. Two weeks later some sprouting was evident and water was put back on the field. An excellent stand has since developed.

R48-11 Nowak

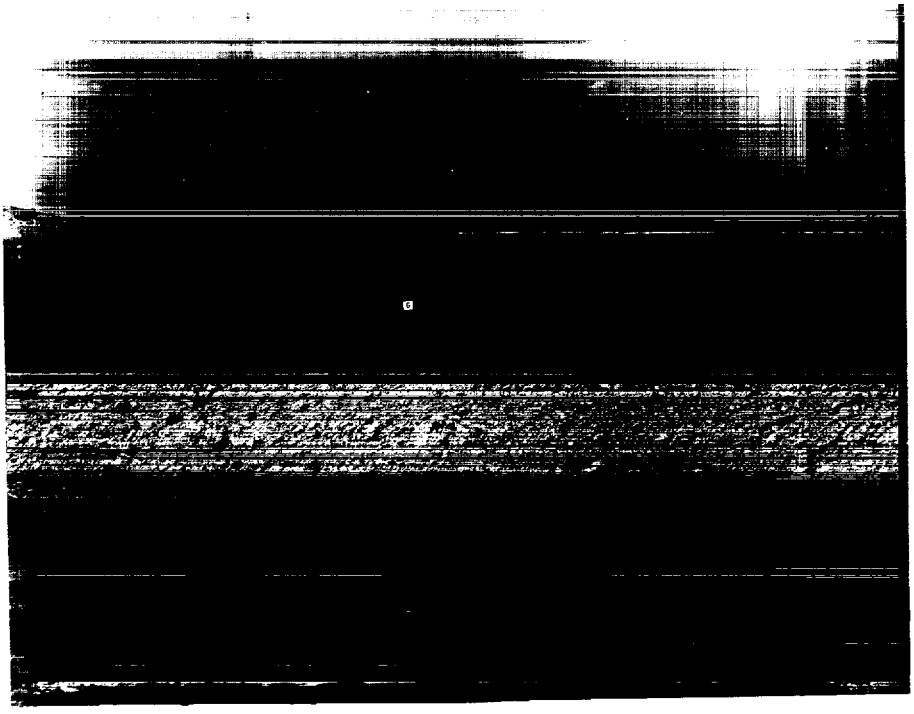


Photo Transect No. 4

Tract No. 4, Unit I Time 1020 Date 6/4/63

Camera 4x5 Speed Graphic Lens 270 mm.

Shutter speed 1/400 Aperture f.32

Film Tri-X Film speed (ASA) 400

Elevation of Camera 4 ft. Compass direction W

Weather conditions 90°, 50% humidity, clear w/hi haze

Comments Aerially seeded to bulrush on 3/20/63. Field had been corrigated as an experiement to aid in water control. It will be noted that growth is relatively slow over first three months. Some areas to the right do not even show any growth.

R42-5 Nowak

Photo Transect No. 4

Tract No. 4, Unit I Time 0930 Date 8/3/63

Camera same as above Lens same

Shutter speed same Aperture f.16

Film same Film speed (ASA) same

Elevation of Camera bed of pickup Compass direction W

Weather conditions hi haze - hot and humid (116°, 62% humidity)

Comments Two photos have been used to show growth and development between June and August. Success on this tract has been phenomenal and we feel it is due primarily to excellent water level regulation. The 130 acre tract is almost a solid stand of bulrush and seed production tremendous. Enough openwater areas have Seen left for waterfowl to light in.

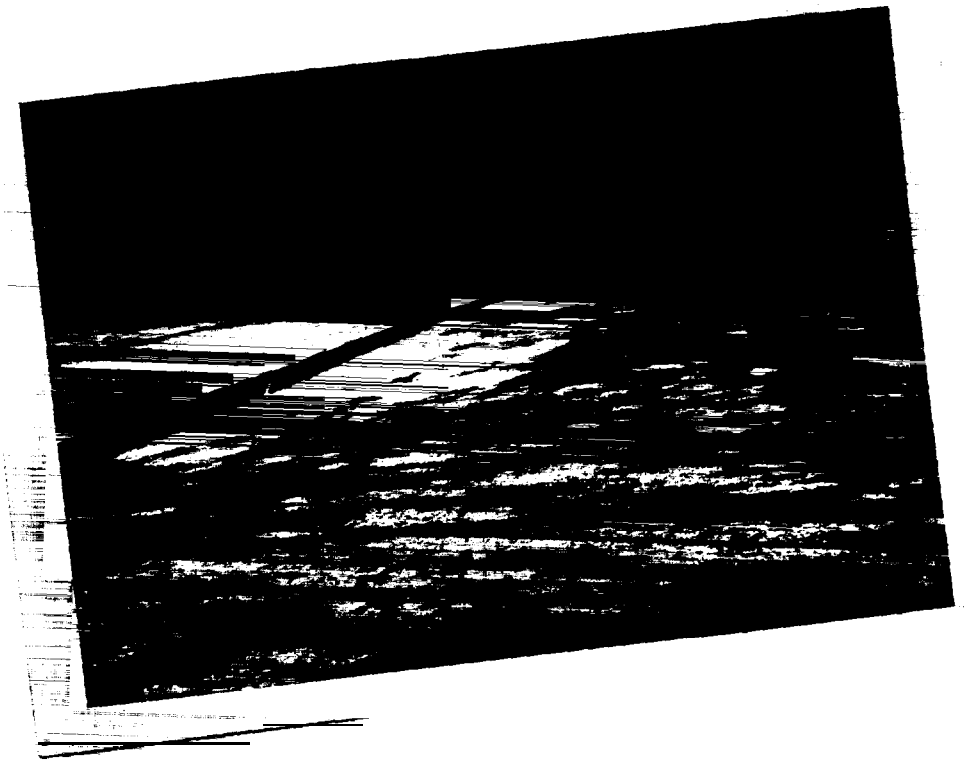
R48-6 Nowak

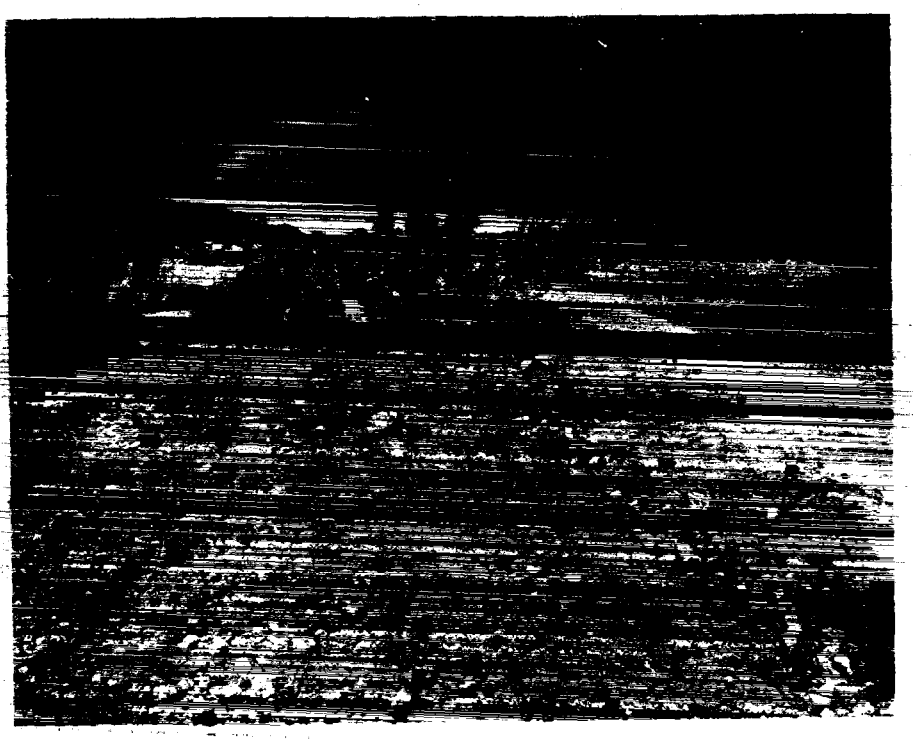
Salt deposits left in Tract B-1, Unit B. This tract was not flooded by direct Sea rise but by flooding as a result of high northwest winds. The Sea on the refuge end will rise as high as 15-20 inches during a storm. Now even for bulrush this land would require extensive rehibilitation.

R45-6 June 1963 Nowak

Temporary repairs made in the main sea dike at Tract 5, Unit I. By June the north end of this tract was a foot below the elevation of the Sea. The dike was holding but one more high wind storm would have flooded 80 acres of prime land. This dike has since beencompletely reinforced.

R42-1 June 1963 Nowak



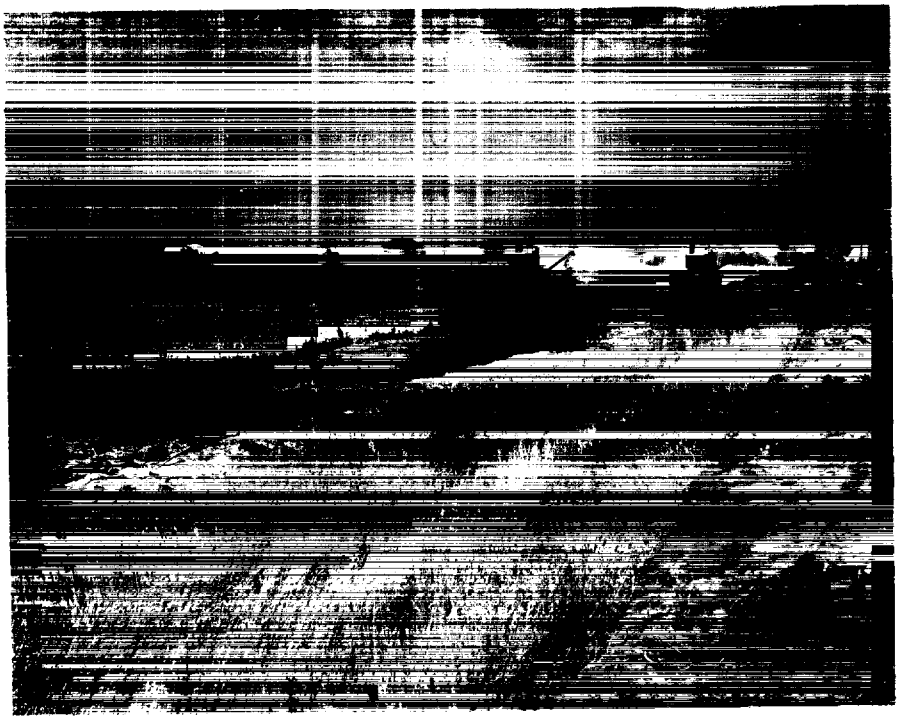


A rare sight at Salton Sea Refuge -- custom combining of "surplus" barley at Tract 3, Unit II.

R43-4 June 1963 Nowak

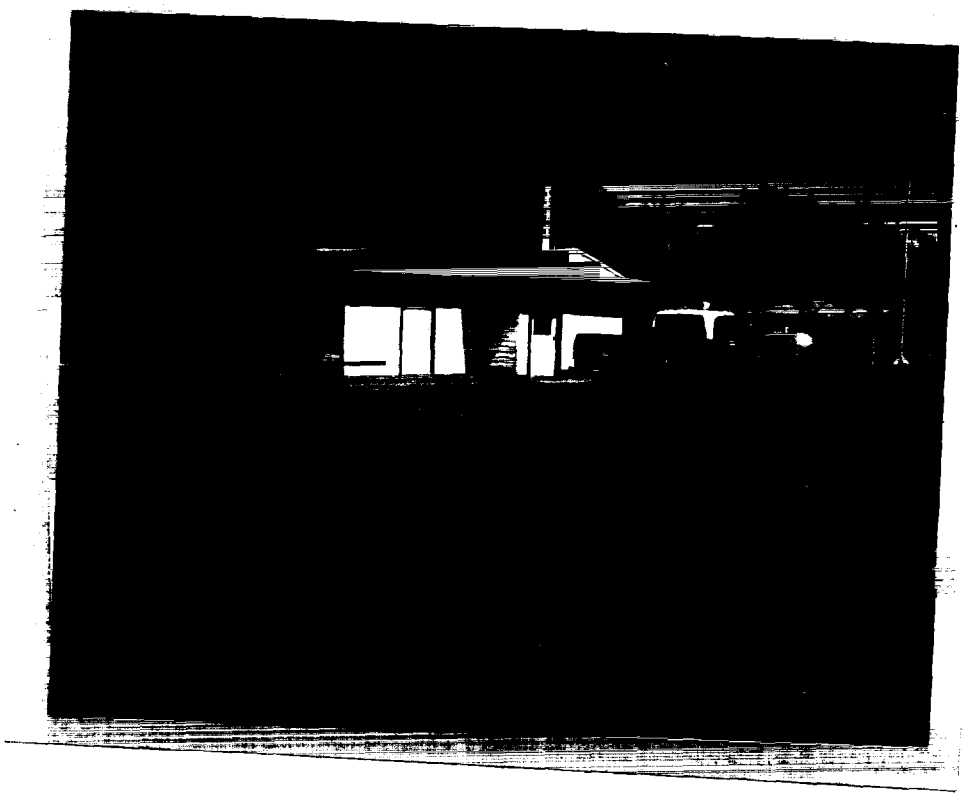
View showing extent of cut necessary to m-level Tract C, Unit I. This 160 acre tract was done with a single TD-18 and 11yd. scraper. A slow way of getting a job done but this is the only tract left in Unit I capable of raising barley,

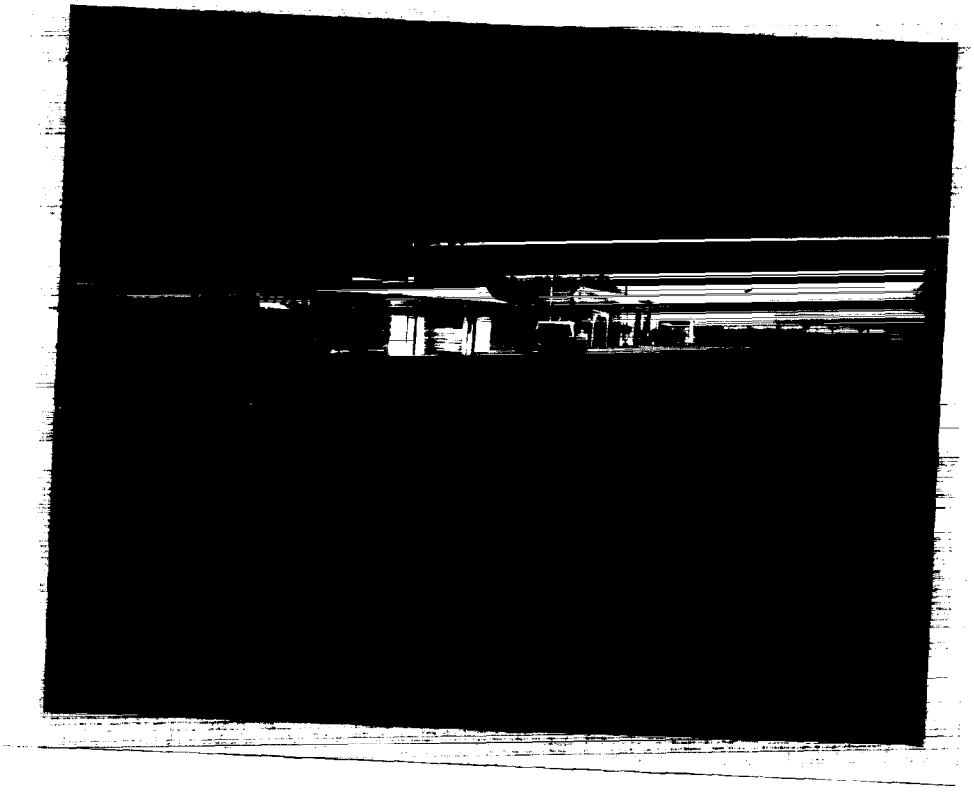
R48-10 August 1963 Nowak



Unit I office building which ha6 now been relocated at the Unit II headquarters. Lower photo indicates position of office In relation to other buildings. The bull-ding has been reshingled and part of the exterior painting has been completed. The ground6 have au yet to be landscaped and a parking area established.

R47-10 and 12 August 1963 Nowak





About all that's left of the Trifolium 13 access road and parking area. 'The "little edifice" remains standing but is now on an island. The Sea has dropped so little this summer, the area may have to be closed off and abandoned,

R44-10 June 1963 Nowak

"The Texan" on retirement day. Clyde W. Stewart, Tractor Operator, who retired on August 17, 1963, after 17 years of rough and rugged service, all at Salton Sea Refuge. Clyde just about pioneered the area and has always been a mainstay in the farming operations. At the peak of operations he held the position of Farming Foreman, He had been associated with farming in the Imperial Valley for over 40 years. We still find ourselves relying on Clyde for unofficial help and advise.

R46-3 August 1963 Nowak

"YOUNG BLACK-NECKED STILTS"

Prather: Exakta camera, Kodachrome II, 400 mm. lens.

June 1963

"SNOWY EGRET"

Henson: Exakta camera, Kodachrome X, 400 mm. lens

July 1963