SANTA ANA NATIONAL WILDLIFE REFUGE

NARRATIVE REPORT

1965

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF SPORT FISHERIES AND WILDLIFE

SAN BENITO, TEXAS

INDEX

Santa Ana National Wildlife Refuge
Narrative Report
1965

REFUGE PERSONNEL

Richard J. Hitch	Refuge Manager
Keith S. Hansen	Asst. Refuge Manager
Raymond J. Fleetwood	Asst. Refuge Manager (Resident Mgr.)
George A. Unland	Foreman II
Melvin F. Bradeen	Operator-General
Elsie S. Robertson	Clerk-Stenographer

TEMPORARY EMPLOYEE

Cruz R. Martinez	Laborer

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I. GENERAL

A. Weather Conditions.

	Precipitation		Temperatures		Average Temperatures	
	This Period	Normal	Max.	Min.	Maximum	Minimum
Jan.	.06	1.43	90	31	77.0	50.67
Feb.	.91	1.18	92	28	72.4	50.10
Mar.	.31	1.11	95	30	77.6	53.80
Apr.	.32	1.59	105	55	94.9	66.40
May	5.64	3.09	96	58	90.0	72.35
June	.21	3.05	102	69	95.4	74.00
July	.31	1.97	103	69	99.6	73.50
Aug.	1.82	2.45	101	67	97.0	73.00
Sept.	2.84	5.13	105	62	96.7	71.80
Oct.	4.73	2.91	93	47	91.0	60.90
Nov.	4.29	1.55	89	52	81.0	64.20
Dec.	3.40	2.16	82	40	73.0	54.00
Total	24.84	27.62	Extremes:		105° Maximum;	28° Minimum

The lowest temperature for the year was 28 degrees February 25 and February was the coldest month of the year. Temperatures rose in March and on April 11, 105 degrees was recorded. In June, the temperature reached 100 or more on two days. July was hotter than last year as the thermometer read 100 or more on 19 days. August was cooler than last year as there were only eight days, August 20 - 27, when the thermometer read 100 or more degrees. September was hotter than last year as there were 14 days that the temperature was from 100 to 105 degrees. Generally, the fall months have been mild with the lowest temperature being 40 degrees recorded December 19 and 25. There has not been any freezing weather; not even a frost, consequently the herbaceous vegetation is luxuriant and green at the end of the year.

There was a deficit of 2.78 inches of precipitation from the normal of 27.62 inches with every quarter showing a deficiency except the last one which had 3.51 inches in excess of a normal of 11.75 inches. The last quarter had more rain than the entire year of 1964. During the last eight years, only 1960 had normal precipitation.

B. Habitat Conditions.

1. Water. East Lake was dry the entire year with the exception of a small area along the north side that was flooded when the irrigation district dumped excess water into the lake. This dried up within

four weeks. Optimum water levels and conditions were maintained in West and North Lakes by using both deep well pumps. West Lake was allowed to dry up in July so that the cattails could be cut and sprayed. Pumping to fill West Lake started the forepart of November and the water level was satisfactory at the end of the year. A patch of vegetation containing sedges, wild millet, and smartweed in the middle of the lake was not mowed. The barrow ditch along the North boundary and levee was dry to the last quarter when low places filled with water. Water levels in the lakes have fluctuated thus exposing mud flats that attracted shore birds and soon became covered with dwarf spikerush, an important duck food. There has been a fairly good flow of water in the Rio Grande during the year and once the river was almost half bank full. Free pumping of water from the river was authorized four or five times during the year.

2. Food and Cover. Generally the water and marsh areas have had ample food and cover for all the species that have utilized this habitat. West Lake had too dense stands of cattails last winter so they were cut and sprayed during the fall. Patches of cattails were maintained in North Lake so that broods of Black-bellied Tree Ducks would stay and rear young on the lake. A disadvantage of these cattails is that they serve as hiding places for bobcats during the nesting and wintering seasons.

Perhaps the most utilized foods in the water areas are dwarf spikerush, fennelleaf, pondweed, southern naid, and wild millet; also, large spike spikesedge. On drier soils around the lakes are patches of salt marsh bulrush, stout smartweed, bearded sprangletop and bundleflower, Desmanthus Virgatus(l) Willd. Var.depressus(H.B.K.) Turner. Also, longtom and other grasses are around the lakes and on the dikes.

Upland herbaceous vegetation did not look good most of the year due to the lack of moisture. It was almost nonexistent during July and August. With the precipitation in the fall months, the picture changed. Seed germinated, herbaceous plants and grasses sprang up and the entire refuge, with the exception of the lakes, became one dense jungle-like area. This condition prevailed to the end of the year as there was not a single frost this season.

Native berries on trees and shrubs were scarce from January until spring so Chachalacas had to find other sources of food. Tons of unmarketable cabbage from adjacent farms were hauled and placed along the North-South and East-West roads for the birds. They could clean up a pickup load of cabbage in a week. In midsummer food must have been available as Chachalacas did not come to grain put out for them. In July and August they started to eat grain thrown out for them. After the rains of September and October; also November, the birds slackened their feeding at the stations but were coming back in large numbers at the end of the year. There was a good crop of berries on the following plants: anaqua, brasil, granjeno, snake-eyes, chapatillo, hackberry, orient vine, pepper vine, ivy treebine, bloodberry, chillipiquin, wolfberry, desert yaupon, barbados cherry, mistletoe and chinaberry. There was a good crop of mesquite beans

and tunas of the Texas Prickly Pear. The crop of coma berries was poor and the persimmon crop was a failure. Ash and cedar elm produced good seed crops and the tender succulent fruits were eaten by the Chachalacas. Sunflowers in moist sites produced some seed. Texas and brown-top millet produced seed after the early fall rains, as did other grasses. Seeds were eaten by doves and sparrows.

Throughout the woodlands cedar elm, hackberry and ash tree saplings, and old trees continued to die until fall. In places it looked as though a disease was killing the elm trees.

II. WILDLIFE

A. Migratory Birds. Three Canada Geese observed flying over the refuge January 22 is the only record for the forepart of the year. In the fall, the first Canada Geese, a flock of 20, were seen flying over the refuge October 7. A small flock of eight was observed the next day. The total number of geese recorded this fall was 318 and 170 of these were observed in December. Not a single goose was seen on the ground.

We had 180,330 duck use days for the year compared to 228,267 use days in 1964; a decrease of approximately twenty-one percent. The peak was 3,083 in 1964 and 1,960 in 1965. Small numbers of seven species were present the first half of May. They did not linger on the refuge as they did last year. The only species seen, with the exception of the tree duck, was one Gadwall seen on June 8.

The fall migration of ducks started with the arrival of three Blue-winged Teal August 13. Only five had been observed by the end of the month. The Pintail and Green-winged Teal appeared in September. Gadwall, Shoveler, American Widgeon, Ruddy, Ring-necked, Redhead, and Cinnamon Teal appeared in November.

Peak numbers of Green-winged and Blue-winged Teal, Gadwall, and American Widgeon were lower than those in 1964. Pintail, Cinnamon Teal, Ring-necked and Ruddy Ducks had higher peaks than those of 1964. All the ducks were confined to North Lake until December when West Lake was filled. The ducks then utilized both lakes. As in past years, the principal foods for the ducks has been southern naid and dwarf spikerush.

The Black-bellied Tree Ducks arrived April 12, 18 days later than last year. The peak for 1965 was 37 adults compared to 105 in 1964. The first nests, three in number, were found May 19 and contained from one to six eggs. Of 21 nests found on the refuge this year, 16 were in nesting boxes constructed of lumber. In each case, the entrance hole was two feet or more above the nest. There was not a single nest found in nesting boxes made from hollow trees and hung horizontally. In the latter, the entrance hole was only a few inches above the bottom of the box. The last of a full compliment of 11 eggs was laid September 1 and the eggs

hatched September 28. Not a single duckling survived to the flight stage. One nesting box had three nests and others contained two nests. Twenty-four eggs was the most found in a single nest. Several eggs do not hatch unless they are taken from the box immediately after the hen vacates the nest and placed under bantams or in an incubator. The manager placed abandoned incubated eggs under another foster mother whose eggs would hatch about the same time. Other eggs were placed under a bantam that hatched many of the eggs. Even light bulbs were used to hatch two clutches of eggs. Perhaps this is why the percentage of eggs hatched is so high. In the wild, these eggs would have been lost. Guess it would have been better to let the eggs alone as only three out of 18 young hatched by the bantam and lights lived to the flight stage.

The nesting tabulation shows that 67.5% of the eggs hatched compared to 51.5% in 1964. Predation accounted for a loss of 10% of the eggs, all of which occurred in nests located in tree cavities. Not a single case of predation was observed in the 35 nesting boxes. At least a dozen eggs were broken by the toenails of the ducks usually when the nest contained from one to six eggs.

Even though there were 35 nesting boxes for the tree ducks, pairs of birds still have the inclination to nest in tree cavities as evinced by the five nests found in dead trees. Sheet metal was tacked around two trees that contained nests. One of the trees had two successful nests in the same cavity and was located when adult birds perched in the tree. The other nest was found on a hunch that there might be a nest in the tree as it contained a nest last year. Undoubtedly a more systematic search and investigation of dead trees with cavities would have resulted in the discovery of other nests.

Mortality of the ducklings was very high even though some of the nesting boxes were located over water. Almost every brood that was under observation lost from one to four of the ducklings within five days after leaving the nest. These losses continued through the downy stage and up to the time that flight was attained. Two broods that had ten or more ducklings when they left boxes had only two each to survive to the flight stage. Some of the losses can be attributed to the disposition of the parents in caring for the broods. When disturbed, parents were seen to leave the nest and the young and fly to another part of the lake. Consequently the young became scattered and a number probably died from exposure. There was considerable pondweed, southern naid and slimes in the water and it is possible that a number of very young ducklings became entangled in this moss and were unable to extract themselves. In one instance, the parents left the refuge and one of their young three weeks before the young bird was able to fly and leave the refuge.

Single birds and small flocks of Fulvous Tree Ducks appeared on the refuge after April 28 where they stayed a few days and then departed. The largest flock of 24 adults was seen on the refuge August 24 - 30. None were recorded in October; a single bird noted in November and the year closed with ten being recorded on December 10.

TABULATION OF BLACK-BELLIED TREE DUCK NESTING DATA
SANTA ANA REFUGE 1965

Nesting Box Number / Tree Number	1	2	3	4	5	3	3	5	10	12	12	23	24	24	24	27	27	29	35	35	35	Totals
Hatched		10*	8		9	2		11	13		13	10		10	11		12	17	2	15	11	154
Predation (Racoon)	10*			12*																		22
Left After Hatch No Development					4	1	2	2				1			1		5	2	1	2		21
Dead Embryoes						1		1							2		3	1	1			9
Abandoned Eggs			5																			5
Mashed or Broken					1				1	2	2	1	3			1		1	2	2	1	18
Total Eggs	10	10	13	12	14	4	2	14	14	2	15	12	3	10	14	1	20	21	6	19	12	228

* Number Estimated

It was stated in the last report that the wood duck was a regular visitor to the refuge every month of the year. This did not hold true for 1965 as there were only three records and they were for November 27 when two males and one female were seen and December 3 when one male was seen. Three were seen on December 21.

The rare Masked Duck appeared on Santa Ana for the third consecutive year and was present for approximately two weeks. Two females were observed on North Lake August 31. On September 1, two individuals were observed, probably the same birds. A single bird, a female, was recorded September 5 and the last observation, a female, was seen September 11.

There were 49,102 Coot use days for the refuge in 1965. Compared to 55,279 use days in 1964, this is a decrease of 11.2%. The peak numbers for 1964 and 1965 were 608 and 630, respectively. This species nested this year on the refuge for the first time during the past seven years. All the nesting occurred on North Lake and approximately 35 young were produced. A number of nests were destroyed by predators.

Only one Jacana was observed on the refuge and it appeared on North Lake July 6. It was seen July 7, 9, and 16 the last record.

Water and marsh birds continue to be erratic and scarce. No Louisiana Heron, White Ibis, or Snowy Egrets were recorded during the year. Only five Cormorants were recorded during the year; two on October 29, and three on November 30. Only 29 White-faced Ibis were seen; four on March 12, twenty-four April 1, and one April 25. A single flock of 200 Wood Ibis flying over the refuge were observed on April 27. The American Egret was recorded four months of the year and probably represented twelve individuals.

The Yellow-crowned Night Heron got into the scene by the appearance of two individuals on North Lake the latter part of August and September. The Black-crowned Night Heron representing 12 individuals were seen five months of the year. When there was water in East Lake, as many as 195 individuals were present. Of all the water birds the great Blue Heron is the only species that was observed regularly but in small numbers. It was not recorded in January but there are records for the other months. Three individuals is the peak for the species. A few years ago, from 10 to 50 individuals could be counted on the refuge.

The Little Blue and Green Heron were regularly seen during March, April and May and again in August and September. The Anhinga was seen in six months of the year with the peak number being 30 on March 30. The American Bittern, four individuals, were seen during the year. Its cousin, the Least Bittern, appeared on the refuge July 5 and at least two pairs nested. One pair brought off three young from five eggs. This is the first known nesting during the past seven years. Gulls and terns were represented by Franklin's, peak number 150 on April 26 and Black Tern, peak 16 on September 2.

The only White Pelicans seen were a flock of 400 flying over on April 13.

Pied-billed, and Least Grebes were present every month of the year and both species nested and produced several young. The Eared Grebe returned November 19 and with a peak of seven is more common than in past winters. Both the Common and Purple Gallinule were on the refuge the latter during the summer months only. The Common Gallinule nested and several young were raised. The Sora is to be found in patches of cattails and bulrushes in and around both lakes but is more easily detected by their squealing than by sight. Individuals were flushed from dense grass when East Lake was mowed in December.

During the year almost all of the shorebirds that are likely to be found on Santa Ana were observed including the Black-necked Stilt, Greater and Lesser Yellowlegs, Dowitcher, Upland Plover (good flight over refuge) Long-billed Curlew, Spotted, Solitary, Pectoral (one or two birds) Least, Stilt Sandpipers, Killdeer, and Phalarope (200 on April 30). A few spotted Sandpipers remained in the area during the summer. The Solitary, Upland Plover, and Lesser Yellowlegs returned from their breeding grounds in July.

The Red-billed Pigeon was not present on the refuge during January but returned about two weeks earlier than last year (March 3). A bird was heard cooing in a tree at Headquarters on February 9. Two birds were observed the following day. Seven individuals were seen on March 23. The peak number for the year was eight on September 5. The first nest was found in a big ebony tree in the front yard on April 24. A well-feathered squab was in the nest on May 24. A second nest was built in the tree and a squab fell to the ground. It was put back in the nest. A day later the squab was found dead beneath the nest; it probably starved as the parents had left the area after the squab fell from the nest. Four other nests were found but the fate of each nest is not known. The last fall record was October 13, three days later than last year.

As usual, the first White-winged Doves arrived in April; April 10 to be exact. Four were seen April 12 and on April 14, 45 birds were present. From this date there was a gradual buildup until the middle of May when almost all the residents had arrived. Ted Clark, Biologist, Texas Department of Parks and Wildlife, made a census of white-wing doves on the refuge June 2. He came up with an average of 9.92 pairs per acre on 1,600 acres for a total of 15,872 pairs, or 31,744 breeding birds. More nests were found this summer than any year during the past seven years.

More nests were found this summer than any year during the past seven years as stated above and a quarter mile of the Oriole trail had 35 nests along it in July and other trails had similar nesting densities. Many eggs and young were destroyed by predators and strong winds but in spite of this mortality the refuge had the highest production in seven years. From the middle of August to the middle of September,

the woods appeared to be saturated with white-wings, conservatively estimated at 55,000 birds. The majority of the birds had left the refuge by the end of September. A flock of 50 birds were noted on October 19 and on October 21, two birds were seen, the last record for the fall.

The wintering population of Mourning Doves on the refuge is not great and most of the birds are found along the river, East and West boundaries. Migrants arrived in March and there were thousands on the refuge in April and May. Many nests were found and predation was heavy and many eggs and young were destroyed. More young were produced than in any of the last seven years. Thousands of birds were on the refuge in September but by October the majority had left. There appears to be a larger wintering population this year as 103 individuals were seen on November 12. A nest containing two eggs was found on the Dicliptera Trail on November 29. A nest containing two almost grown young was found between December 20 and 25. Cooing has been continuous throughout the fall and winter, and this seems unusual.

The Ground Dove population remains about the same as last year. From one to twenty individuals can be seen on a day of field work on the refuge. Two or three nests containing eggs were found in November.

A few Inca Doves were noted at headquarters, along the levee and along the East and West Boundaries. The population of this species is not as high as that of the ground dove.

There is not much to say about the White-fronted Dove except that we still have them on the refuge. The first cooing of the spring was heard February 7. A bird banded April 14, 1959 was re-trapped September 25, 1965. As it was an adult when banded, the bird was over seven years old.

B. Upland Game Birds. At least half a dozen coveys of Bobwhite Quail were observed during the year, and this is indicative of a successful nesting season. Coveys have been observed around East Lake and along the East and West Boundaries.

Most Chachalacas had completed the nesting cycle by September so there was a cessation of hollering. However, some hollering was heard every month of the year with April, May, June and July being the dominant months. Hollering was recorded for 189 days of the year. The first nest was found May 25 and the eggs had hatched so the eggs were laid about April 1. The first chick seen was on June 1 when a four-day old individual was seen in the yard at headquarters.

Chachalaca nests were found in 19 species of plants. As usual, five species of trees; namely, cedar elm, anaqua, huisache, ebony, and hackberry contained 145, or 64%, of the nests. The same species from January 1, 1959, to December 1965 have contained 508 nests, or 65.7% of the 773 nests discovered. By including coma, granjeno and persimmon

in the list making eight species we find that they contained 185 nests, or 81.8%, of the nests discovered in 1965. The favorite species for nesting sites was cedar elm with 46 nests in 1965 and 32 in 1964. Anaqua which was in fifth place (22 nests) in 1964, jumped to second place (42 nests) in 1965. Huisache was in third place both years. Hackberry which was in fourth place (24 nests) in 1964 dropped to sixth place (14 nests) in 1965. Ebony which was in second place (29 nests) in 1964 dropped to fourth place (21 nests) in 1965. Nine nests were found in vines; namely, Orient Vine Cocculus diversifolius; Virgin's Bower Clematis drummondii; and a species of climbing milkweed Sarcostemma Cynanchoides.

Height of the nests ranged from 43 inches to 30¾ feet with the average height of 214 nests being 10.9 feet. Records show that 143, or 63.2%, were old nests of birds; chiefly, Green Jay, Mockingbird, Long-billed Thrasher, and Chachalaca which had been remodeled by the addition of nesting material. At least five nests did not have any nesting material as the eggs had been laid on the bark between crotches of trees or on top of snags. Two nests were used twice this year and several used by pairs last year were used this year. One nest has been used three consecutive years. Three nests were found in depressions at the top end of snags. One of these was used as a nesting site in 1963. The species had one of the most successful nesting seasons ever recorded on the refuge as evinced by the discovery of 226 nests containing 535 eggs, of which 223 (41.6%) hatched. Three hundred and two eggs or 56.4%, were destroyed by predators while ten (2%) failed to hatch due to desertion, eggs falling from nests, or other reasons. While 223 young are known to have come from 79 successful nests under observation, 69 other young not associated with any of the nests under observation, were seen. The known young produced was 292 individuals.

A nest containing two eggs and was being incubated August 30, was found destroyed September 1, the last nest of the season. When Chachalacas cannot obtain their natural foods in the brush, the birds will venture out and eat tender Bermuda grass on the roads along the boundary fences. If grass is not available, they will fly into adjacent fields and eat kale, lettuce and cabbage from rows nearest the refuge.

C. Big Game Animals. No big game animals are on the refuge but Feral Hogs might be placed in this category. During the year two shoats were trapped and donated to the Sunny Glen Home at San Benito. The population increased this summer by the farrowing of five pigs. At the end of the year, the hog population consisted of a sow, boar and three shoats. It is hoped that the animals can be shot or trapped this year.

D. Fur Animals, Predators and Other Mammals. Coyote: There has not been a decrease in the number of coyotes on the refuge this year. In fact, there may have been an increase as Dan McGrew, a "birder", was surrounded by a pack of 20 individuals on the Owl Trail during November. The animals ran around him, yelping and threatening to

Too many or too much tequila
Hey

come closer, had it not been for a stick that he picked up. Mr. Cruz Martinez, Laborer, reported that three coyotes followed the mower around when the vegetation was cut in East Lake and caught rodents as they were driven from cover.

Raccoon. The population on the refuge is higher than it should be. Tracks and trails are everywhere around the lakes. Trails were made past the new service building to the grain bin where they made holes in the rusted out floor to obtain milo. Coon trees can be located by looking at the base for paths and peeled bark from the trunk.

The Opossum population has not recovered from the drastic reduction of three years ago. Less than half a dozen animals were observed during the period.

The Bobcat population may have increased as individuals are seen more frequently, especially around the roads and dikes. Individuals hide in Cattails along the dikes awaiting the appearance of Coots and ducks. A bobcat and two kittens were seen in December crossing the entrance road at the structure between North and East Lake.

The Skunk is more frequently seen than the Opossum. A skunk and five young were observed crossing the entrance road last spring.

Beaver still inhabit the river as willow cuttings are found along the North bank. The animals have homes in the banks.

The Bridled Weasel is seen infrequently during the year. In May, one was seen chasing a Plains Pack Rat up and down fallen limbs; the rat out maneuvered the weasel and escaped.

The Rabbit population has remained about the same as last year. A dozen or more can be seen along the refuge roads before dusk. At least two pairs have been at Headquarters for several years. One young rabbit was rescued from a large indigo snake which had started to swallow it.

The Armadillo has not increased to any extent. A few animals have been observed around burrows in the woods. None were seen foraging around headquarters as they did in 1962.

Pack and Cotton Rats were present in normal numbers. Pack rats stayed in the woodlands while the cotton rats sought the open areas with dense stands of grass.

Not a single Flying Bat was seen during the year but the skeleton of one was found on the foundation of the service building in July.

E. Hawks and Owls. The spring migration of hawks began March 17 with the appearance of 20 Broad-winged Hawks ; with a peak of 1,500 March 25 and lasting until May 6. During this period, 8,847 individuals passed

over the refuge and many of the birds spent a night on the refuge. There were 16,803 recorded last year. As usual, most of the flight came from a northwesterly direction.

Five days after the broad-winged hawk migration began, the first Swainson's Hawks arrived with a peak of 115 on April 1. The migration of this species was over by May 5, though a single bird was recorded May 20. During this period 382 Swainson's Hawks were recorded, compared to 924 last year. The first Mississippi Kites were observed March 30 with the peak being 115 on April 15, and the last record was on May 19. During the migration 206 individuals were observed. This is 66 less than last year.

The fall migration of hawks was the most spectacular one that the resident manager has witnessed during his seven year tenure on Santa Ana. Flights began September 26 with the arrival of three flocks of Broad-winged Hawks consisting of 1,100 individuals. Other flocks followed September 27, 28, 29 and 30. The largest flock of 5,000 arrived September 29. During this period it was estimated that 11,600 Broad-wings passed over the refuge and, as usual, a majority of the birds spent at least one night on the refuge. A straggling flock of 15 Broad-wings were observed October 22 and was the last record for the year.

Less than half a dozen Swainson's Hawks were recorded during the fall migration. The Red-shouldered, Red-tailed, Cooper's, Sharp-shinned, Marsh and Sparrow Hawk returned as single individuals at the usual time. The number of immature Gray Hawks on the refuge reached their peak on September 14 with three individuals seen. The species was not seen after October.

The White-tailed Kite did not nest on the refuge this year and there were less than half a dozen records for the year. At least two pairs of birds have taken up winter residence on the refuge at Big Bend and near the Chinaberry Parking Area. It was reported that a pair nested near Mission, Texas.

Only one Caracara was observed during the year, March 10. The Osprey was recorded March 29. The Duck Hawk was recorded four times during the year. The rare Zone-tailed Hawk, an immature bird was observed perched in a tepehuaje tree at Headquarters on September 2.

The Screech Owl is common on the refuge throughout the year and are frequently seen in the nesting boxes. The Barn Owl is present throughout the year but is more common during the winter months. No nests were found this year. The Barred Owl found on the refuge on December 11 by Mr. Dan McGrew is an addition to the owl family on the refuge. For the third consecutive year the little Elf Owl returned to the refuge and nested. On July 29 an adult and two young were seen in brush near the West Boundary. On August 10 and 23 an adult and one young were seen in dense brush near the

Buzzard's Roost and the distance between the two sites is so great that we feel certain that the records are for two pairs. The Great Horned Owl appears to have increased its numbers on the refuge or the birds are moving around more. Last spring and fall a pair of birds came to Headquarters, perched in trees in the front yard and hooted.

F. Fish. Since the last narrative report there has been a remarkable increase in fry of Minnows in North Lake. The population is high enough to support a number of water birds but few have turned up to utilize the fry. West Lake, with the exception of the southmost pool, was dry and considerable time will be required for it to be stocked by natural means.

G. Other Birds. On December 11, Mr. Dan McGrew observed a Barred Owl perched in a tree along the trail between the Wetback Trail and the soil pit on the East-West Road. This is the first record for the refuge and one of the few records for the Rio Grande Delta.

On November 29, Mr. McGrew observed a Cassins' Sparrow in brush at the Shrub Garden, the first record for the refuge.

On October 29, Mr. Charles A. Westcott, Barrington, Illinois, saw a pair of Lark Buntings on open ground at the old cemetery. This is the first record for the refuge. It is rather strange that the species has not appeared on the refuge earlier as the species is fairly common in winter less than 75 miles West and North of the refuge.

Another addition to the refuge bird list is the Prairie Warbler. A bird in brilliant plumage was observed by the resident manager on August 8.

A pair of Buff-bellied Hummingbirds were feeding around the flowers of Turks Cap at Headquarters during November and December.

Lichtenstein's Oriole continues to increase in numbers as evinced by the number of nests found, 19, on the refuge. This is 12 nests less than the 31 found last year but this year's number represents a more accurate count of pairs. Several of last year's nests represented second and third nesting attempts by pairs. Family groups of three to five individuals were observed so young were produced. Most of the nests were in areas where previous nestings had been recorded but a few nests were in new areas.

No nests of the Black-headed Oriole were found and it is more difficult to observe this species than Lichtenstein's.

The spring migration of Warblers was earlier (April 25) than last year and was marked by the absence of the Golden-winged Warbler. This species has been common during previous migrations. Nothing spectacular about the fall flight of warblers except that a few species arrived early and others late. The Waterthrush was seen in greater numbers than usual.

H. Reptiles. No poisonous snakes were recorded on the refuge this year but the nonpoisonous species were seen frequently and in numbers comparable to those of past years.

On two occasions Indigo Snakes were caught in the act of devouring young white-winged doves. In one case the young dove was on the ground while in the other, the snake had climbed up to the dove nest and was tyring to swallow a young bird. The snake released the bird but it did not survive.

The secretive Texas Blind Snake Leptotyphlops dulcis duleis was discovered under debris at Headquarters on November 19. It was not over four inches long so it must have been a young one.

Whip, Ribbon and Bullsnakes were other species observed during the year.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development. A 20' x 40' metal service building with a concrete floor was constructed 100 feet west of the office. This building was completed August 23. This building has overhead doors and is being used for the storage of tools and vehicles.

An up to date bird blind was constructed of hollow and solar blocks between the big pump and the trail to North Lake. It has a concrete floor, plastic roof and six openings for the projection of lens. Two other metal lawn buildings were purchased and openings made for cameras and bird observation. One was placed on a concrete slab at the little pump at West Lake.

The grain bin and oil shack were moved back so that they would not be conspicuous and the front of the service building and road leading to it were graveled.

Approximately one fourth mile of the East-West road was surfaced with sand and approximately the same distance of the North-South road was treated in the same manner.

Vegetation in all the lakes was kept under control by periodic mowing and cutting with handtools. East Lake received three mowings and West Lake's pool two had three mowings and pool three had two mowings to control cattails. Vegetation along roads, on dikes and along the boundary fences were mowed periodically.

Tripods were constructed to support 100 feet of pipe through which water flows from the little pump into West Lake. This eliminates water loss in the two sumps that were used in past years.

Nesting boxes were repaired and new nesting materials placed in them prior to the nesting season. Roads were maintained by the removal of fallen trees, limbs, dragging and trimming of brush. Sand was

dumped in low places where mud holes were likely to form. Brush and vines were cut along the fencing on the East and West Boundaries. Trails were maintained by trimming brush, removal of fallen trees and limbs and periodic mowing with the Gravely Mower. Plant labels and directional markers were restenciled and attached to posts.

A number of mulberry trees were set at headquarters and West Lake. Approximately two acres of land at Big Bend were spot planted with huisache seed but the seed did not germinate as dry weather followed the planting.

Leaves and limbs were raked from the roof of the residence and vines removed from the south end.

A dozen refuge and penalty signs were put up along the North Boundary, prior to the white-winged dove hunting season.

D. Control of Vegetation. The dry bed of East Lake was mowed three times during the year to prevent the area from being filled with Black Mimosa Mimosa pejia and longtom grass Paspalum lividum. The tractor-drawn mower was used for the East Lake job; also for the mowing of cattails in West and North Lakes. The same equipment was used to control vegetation along roads, fences, and dikes. The Gravely Mower was used to cut vegetation on the foot trails and the grass at Headquarters and at the West Lake pump.

F. Fires. No fires occurred on the refuge this period although there was a serious fire hazard in July and August. The fall rains changed these conditions and luxuriant vegetation began growing over the area. This vegetation was still green and growing at the end of the year.

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Progress Report. During the year additional data on the Chachalaca were obtained and recorded. The data included much on the nesting of this species. It was found that a majority of nesting birds use the old nest of its own kind or those of other birds. Frequently a nest may be used twice during the season, probably by different pairs. A small percentage of pairs lay four instead of the complement of two and three eggs. From the observation of two nests with three and four young, respectively, the young reached the ground by jumping. In 1964 Chachalacas were heard hollering 203 times during 143 days. This year they were heard 209 times during 189 days which is about one half of the days of a year. Last year the Chachalacas hollered 264½ hours. This year, they hollered 255 hours. The birds holler every month of the year but the peak is reached in May, June and July.

Little field work on collection of plants was done this year. Among the few specimen collected was one Achyranthes aspera L new to the

flora of Texas. This species was collected on Santa Ana. Another species from Santa Ana that was identified from the fruiting structure by the staff of the Gray Herbarium, Harvard University, proved to be Oenothera trilobata Nutt., Stemless evening primrose.

The manuscript on the plants of Santa Ana was revised and additional species added to it. The manuscript on the Hooked-billed Kite is still in the hands of the editor of "THE AUK" and has not been approved for publication. The manuscript, "Probable Green Violet-Ear Hummingbird, Colibrithalassinus, in Cameron County, Texas," was published in the Southwestern Naturalist, Vol. 10, No. 4, Page 312, November 15, 1965.

B. Plantings.

1. Aquatic and Marsh Plants. Wild Millet was sown around the margins of North and West Lakes. The bulrush Scirpus Americanus Var. Longispicata was set on the Northeast side of a dike across North Lake in 1963. This has spread across the dike. It is an excellent cover plant and a good barrier against wave action.

2. Trees and Shrubs. Approximately two and one-half acres of mostly sodded land in Big Bend were spot planted to huisache and ebony during March 1965. The grass was scalped off and then holes were made and seed was dropped into the holes and covered. About two acres on the east side of East Lake were seeded to huisache and ebony by broadcasting the seed, then dragging the area with an iron drag. The dry weather prevented the seed from germinating. Approximately 75 seed spots of ebony were made along the road from T junction to the little pump at West Lake.

The Xylosa seedlings planted at Headquarters have grown but several of those set around West Lake died.

The President Kennedy Ebony planted at Headquarters shortly after the assassination of President Kennedy has reached a height of 18 inches.

VI. PUBLIC RELATIONS

A. Recreational Uses. Boy and Girl Scout Troops, Boys Clubs, Garden Clubs, Church Groups, School Classes, Biology Classes (approximately 1,022 individuals) from nearby cities used the refuge for hikes and nature studies this year. The Tip O' Texas Girl Scout Council had a day camp at West Lake the first week of June. Approximately 120 girls and 30 adult leaders participated in the event.

Visitors last year rolled up a new total of 11,994 and this is an increase of 14% over last year. They came from 43 states including Alaska and the District of Columbia. Foreign countries represented were Canada, (4 Provinces), Mexico, Scotland, England, India, Argentina, Germany, Austria, and South Kenya, Africa.

B. Refuge Visitors. Among the visitors of distinction that registered were: Sir Robert Elkins, Edinburg, Scotland; John D. Hartman, Dept.

of Vegetable Crops, Cornell, University, Ithaca, N. Y.; Jim Reeves, Texas Parks and Wildlife; W. B. Kiel, Jr. Biologist, King Ranch, Kingsville, Texas; E. G. Adams, formerly BSF & W, Custer, South Dakota; Dr. William T. Penfound, Botany Dept., Oklahoma University, Norman, Okla.; Ira Gabrielson, Wildlife Management Institute, Washington, D. C.; Bruce Paige, Everglades Natl. Park, Fla.; Anore' Blanchard, Houston, Texas; Dick Russell, Bryce Canyon Natl. Park, Utah; Roy O. Kendall, San Antonio, Texas; Dr. Clarence Cottam, Director, Welder Wildlife Foundation, Sinton, Texas; Merrill S. Sweet, Biology Dept., Texas A. & M. College Station, Texas; Dr. J. N. Knull, Prof. Emeritus, Ohio State Univ., Columbus, Ohio; Henry J. Stevenson, Biology Dept. Fla. State College, Tallahassee, Fla.; and Bruce Hayward, Southwestern State College, Silver City, N. M.

Official visitors:

John S. Gottschalk, FWS, Washington, D. C.
John C. Gatlin, FWS, Albuquerque, N. M.
Marcus C. Nelson, FWS, " " "
Elroy R. Lumb, FWS, Washington, D. C.
Wm. E. Ackerknecht, FWS, Washington, D. C.
Jim Lankford, FWS, Atlanta, Ga.
James Blavers, Mammal Control Agent, Uvalde, Texas
Larry Glover, GMA, Corpus Christi, Texas
Bruce Stollburg, FWS, Washington, D. C.
Bill J. Van Tries, Biologist, FWS, Victoria, Texas
M. G. Sheldon, FWS, Albuquerque, N. M.
John V. Dennis,FS, Alexandria, La.
Robert L. Rumsey, USFS, Alexandria, La.
E. G. Campos, Biologist, US Public Health Service, Brownsville, Texas
H. H. Trevino, Biologist, " " " " " "

C. Refuge Participation. The resident manager participated in the Valley Spring Species Count and laid the ground work for the Christmas Bird Count on Santa Ana. He made a personal bird count at Big Bend National Park. He assisted Bird Clubs and individuals with the spotting of certain species of birds.

F. Safety. The resident Manager attended monthly safety meetings at San Benito and led the discussions in two of the meetings. Laborer Cruz R. Martinez attended these meetings and became more familiar with safety regulations and practices. The publication "Family Safety" and other literature was distributed at these meetings. A continuous effort was made to warn and advise Mr. Martinez about assignments that required extra safety precautions.

VII. OTHER ITEMS

A. Items of Interest. Mr. Cruz R. Martinez, Laborer, was terminated on March 6, 1965, but was re-employed in July and he was on duty the rest of the year.

The St. Augustine grass at Headquarters started dying with the approach

of fall; the cause is unknown. Mr. Sleith of the Weslaco Experiment Station is of the opinion that the organism causing the destruction has never been described and reported as an enemy of this grass. If it is a virus, spraying will not do any good. The only recourse is to keep the grass irrigated and as much alive as possible until spring when the agent is less destructive.

The entire report was written by Raymond J. Fleetwood, Assistant Refuge Manager, edited by Refuge Manager Hitch, and typed by Mrs. Elsie S. Robertson, Clerk-Stenographer.

Submitted by:

Richard J. Hitch

January 31, 1966

Richard J. Hitch
Refuge Manager

Reviewed by:

William T. Krummes
Associate Regional Director
2/15/66

SANTA ANA NATIONAL WILDLIFE REFUGE
Christmas Count - December 21, 1965

All points within a 15-mile diameter circle, center approx. 2 miles south of Pharr where highway #281 crosses the floodway, as in previous years includes Krenmueller Lake, Donna Settling Basin, Hidalgo Settling Basin, floodway levees, refuge, Alamo Sewage Plant, El Gato and cities; citrus groves 2%, cities 3%, floodway levees and adjacent fields 5%; native brush 80%, ponds and marshes 15%. 6:00 a.m. to 6:00 p.m., clear all day, Temp. 45° to 74°, wind SE 2 - 12 m.p.h.; 13 observers in 7 parties. Total party hours 58, on foot 34, by car 24; total party miles 312, on foot 31, by car 281.

Eared Grebe	58	Am. Coot	305
Least Grebe	9	Killdeer	29
Pied-billed Grebe	16	Common Snipe	2
Double-crested Cormorant	1	Long-billed Curlew	1
Anhinga	1	Spotted Sandpiper	2
Great Blue Heron	8	Solitary Sandpiper	5
Little Blue Heron	12	Greater Yellowlegs	9
Cattle Egret	10	Least Sandpiper	52
Snowy Egret	5	Long-billed Dowitcher	31
Am. Bittern	2	Stilt Sandpiper	3
Gadwall	120	Am. Avocet	1
Pintail	105	Black-necked Stilt	5
Green-winged Teal	425	Mourning Dove	1,549
Blue-winged Teal	105	Forster's Tern	13
Cinnamon Teal	50	Ground Dove	75
Am. Widgeon	80	Inca Dove	24
Shoveler	119	White-fronted Dove	25
Wood Duck	3	Roadrunner	8
Redhead	4	Barn Owl	5
Ring-necked Duck	119	Screech Owl	12
Canvasback	75	Great Horned Owl	3
Lesser Scaup	3	Pauraque	11
Ruddy Duck	7	Ruby-throated Hummingbird	3
Turkey Vulture	197	Buff-bellied Hummingbird	2
Black Vulture	15	Belted Kingfisher	1
White-tailed Kite	2	Yellow-shafted Flicker	5
Sharp-shinned Hawk	2	Golden-fronted Woodpecker	46
Cooper's Hawk	6	Yellow-bellied Sapsucker	5
Red-tailed Hawk	11	Ladder-backed Woodpecker	36
Red-shouldered Hawk	16	Tropical Kingbird	11
Harris' Hawk	24	Scissor-tailed Flycatcher	2
Marsh Hawk	18	Kiskadee Flycatcher	39
Pigeon Hawk	1	Eastern Phoebe	14
Sparrow Hawk	53	Say's Phoebe	3
Chachalaca	175	Vermilion Flycatcher	13
Bobwhite	23	Tree Swallow	3
Sora	9	Barn Swallow	1
Common Gallinule	31	Green Jay	94

White-necked Raven	178
Black-crested Titmouse	32
Verdin	9
Brown Creeper	1
House Wren	10
Winter Wren	1
Carolina Wren	3
Cactus Wren	21
Long-billed Marsh Wren	2
Mockingbird	75
Long-billed Thrasher	12
Curve-billed Thrasher	31
Robin	135
Hermit Thrush	2
Eastern Bluebird	19
Blue-gray Gnatcatcher	50
Ruby-crowned Kinglet	18
Water Pipit	109
Cedar Waxwing	22
Loggerhead Shrike	31
White-eyed Vireo	6
Starling	5
Solitary Vireo	4
Orange-crowned Warbler	4
Nashville Warbler	2
Myrtle Warbler	20
Audubon's Warbler	1
Pine Warbler	2
Yellowthroat	12
Yellow-breasted Chat	1
House Sparrow	392
Eastern Meadowlark	25
Western Meadowlark	40
Red-winged Blackbird	11,606
Black-headed Oriole	3
Lichtenstein's Oriole	7
Brewer's Blackbird	60
Boat-tailed Grackle	600
Brown-headed Cowbird	1,081
Bronzed Cowbird	63
Cardinal	23
Pyrrhuloxia	7
Am. Goldfinch	33
Olive Sparrow	1
Savannah Sparrow	19
Grasshopper Sparrow	8
Lark Sparrow	35
Black-throated Sparrow	11
Chipping Sparrow	15
Clay-colored Sparrow	2
Lincoln's Sparrow	39
Swamp Sparrow	2

Total Species: 128
Total Individuals: 19,258

Seen in area during count period, but not on count day:

Bufflehead, White-winged Dove, American Egret, Canada Goose, White-fronted Goose, Green Heron, Western Sandpiper, Cassin's Sparrow, Vesper Sparrow, Black-throated Gray Warbler, Black-throated Green Warbler

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

WATERFOWL

REFUGE Santa Ana MONTHS OF January TO April, 19 65

(1) Species	(2) Weeks of reporting period: 1/1-7 (1)	1/8-14 (2)	1/15-21 (3)	1/22-28 (4)	1/29-2/4 (5)	2/5-11 (6)	2/12-18 (7)	2/19-25 (8)	2/26/3/4 (9)	3/5-11 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										
Black										
Gadwall	135	155	140	131	98	107	114	100	112	126
Baldpate	25	20	10	15	6	6	5	7	3	3
Pintail	40	28	37	60	15	2	3	6	5	
Green-winged teal	325	450	405	415	540	380	390	260	225	160
Blue-winged teal	28	22	15	15	23	18	15	50	35	12
Cinnamon teal	30	18	53	42	35	35	30	42	28	37
Shoveler	38	15	14	13	40	36	26	17	41	14
Wood										
Redhead	1	1								
Ring-necked	1	3	2	4	3	2	13	8	16	17
Canvasback										
Scaup			10	26	12	28	31	20	5	9
Goldeneye										
Bufflehead										
Ruddy	1						1			
Other										
Coot	64	45	58	53	65	85	60	85	40	40

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

WATERFOWL
(Continuation Sheet)

REFUGE Santa Ana MONTHS OF January TO April , 19 65

(1) Species	(2) Weeks of reporting period 3/12-18 11	3/19-25 12	3/26-4/1 13	4/2-8 14	4/9-15 15	4/16-22 16	4/23-29 17	4/30 18	(3) Estimated waterfowl days use	(4) Production Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada											
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard											
Black											
Gadwall	75	85	83	81	35	63	50		11,830		
Baldpate	2	2	2	1	7	7	5		882		
Pintail	1				1	1			1,393		
Green-winged teal	135	65	45	15	6	8	2		26,782		
Blue-winged teal	35	35	45	35	38	32	41		3,458		
Cinnamon teal	28	28	31	33	15	4	2		3,437		
Shoveler	10	7	13	26	24	22	12		2,576		
Wood											
Redhead									14		
Ring-necked	14	3	3	2					631		
Canvasback											
Scaup	2	2	1		2	2			1,050		
Goldeneye											
Bufflehead											
Ruddy			1						21		
Other B.B.TreeDuck					5	37	12		378		
Fulvous Tree Duck							2		14		
Coot:	30	50	72	76	70	60	67		7,140		
					(over)						

	Total Days Use	Peak Number	Total Production
Swans	None		
Geese	None		
Ducks	52,454	772	None
Coots	7,140	85	None

SUMMARY

Principal feeding areas North and West Lake

Principal nesting areas N/A

Reported by Richard J. Hitch

Richard J. Hitch, Refuge Manager

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

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

WATERFOWL

REFUGE Santa Ana MONTHS OF May TO August, 1965

(1) Species	(2) Weeks of reporting period: 5/1-7 (1)	5/8-14 (2)	5/15-21 (3)	5/22-28 (4)	5/29-6/4 (5)	6/5-11 (6)	6/12-18 (7)	6/19-25 (8)	6/26-7/2 (9)	7/3-9 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada										
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										
Black										
Gadwall	30	20	6	6	1	1				
Baldpate	6	3	1							
Pintail	1									
Green-winged teal	1									
Blue-winged teal	20	24								
Cinnamon teal	2									
Shoveler	3									
Wood										
Redhead										
Ring-necked	1	1								
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
~~Other~~ Masked Duck										
Fulvous Tree Duck			2				2	2	5	9
B-B Tree Duck	4	7	7	4	4	6	12	22	31	49
Coot	38	25	16	12	8	8	8	8	14	13

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

WATERFOWL
(Continuation Sheet)

REFUGE Santa Ana MONTHS OF May TO August, 1965

(1) Species	(2) Weeks of reporting period 7/10-16 11	7/17-23 12	7/24-30 13	7/31-8/6 14	8/7-13 15	8-14/20 16	8/21-27 17	8/28-31 18	(3) Estimated waterfowl days use	(4) Production Broods seen	Estimated total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada											
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard									448		
Black									70		
Gadwall									14		
Baldpate								3	28		
Pintail					3	5	5	60	819		
Green-winged teal									14		
Blue-winged teal									21		
Cinnamon teal											
Shoveler											
Wood											
Redhead									14		
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other Masked Duck								2	14		
Fulvous Tree Duck	20	8	2	4	18	2	24	23	847		
B-B Tree Duck	49	81	27	21	14	17	38	30	2,961	11	126
Coot:	~~16~~	~~20~~	~~19~~	~~22~~	~~20~~	~~24~~	~~25~~	~~30~~	2,282	5	25

(over)

	Total Days Use	Peak Number	Total Production
Swans	0	0	0
Geese	0	0	0
Ducks	5,240	118	126
Coots	2,282	38	25

SUMMARY

Principal feeding areas West and North Lakes

Principal nesting areas West and North Lakes

Reported by Richard J. Hitch

Richard J. Hitch, Refuge Manager

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

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

WATERFOWL

REFUGE Santa Ana MONTHS OF September TO December 31, 19 65

(1) Species	(2) Weeks of reporting period: 9/3 (1)	9/10 (2)	9/17 (3)	9/24 (4)	10/1 (5)	10/8 (6)	10/15 (7)	10/22 (8)	10/29 (9)	11/5 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada						28*		39*	1*	
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard										
Black										
Gadwall							25	51	100	95
Baldpate							2	1	5	3
Pintail			3				3	4	7	30
Green-winged teal	3	6			1	40	250	275	825	850
Blue-winged teal	60	62	100	105	150	250	850	880	250	85
Cinnamon teal					2	6	12	5	5	5
Shoveler			1			1	4	3	5	2
Wood										
Redhead										
Ring-necked						1	8	27	53	91
Canvasback										
Scaup										
~~Goldeneye~~ BB Tree Duck	30	12	27	9	11	12	9	10	4	2
Bufflehead										
Ruddy								1	1	1
Other Masked Duck	2	1								
Fulvous Tree Duck	23	7	2							
Coot:	30	32	30	28	35	205	380	425	618	630

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

WATERFOWL
(Continuation Sheet)

REFUGE Santa Ana MONTHS OF September TO December 31, 1965

(1) Species	(2) Weeks of reporting period: 11/12 (11)	11/19 (12)	11/26 (13)	12/3 (14)	12/10 (15)	12/17 (16)	12/21 (17)	12/31 (18)	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimate total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada			42*		47*				156*		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard											
Black											
Gadwall	153	195	225	215	150	200	120	50	11,053		
Baldpate	3	5	6	18	26	27	80	12	1,326		
Pintail	100	182	315	800	659	250	105	50	18,956		
Green-winged teal	700	800	810	550	450	500	425	350	47,845		
Blue-winged teal	50	30	25	20	38	30	105	45	21,945		
Cinnamon teal	6	7	15	18	15	4	50	25	1,225		
Shoveler	8	2	2	5	30	31	119	106	2,233		
Wood			2	1			3		42		
Redhead		1	1	8	6	7	4	3	210		
Ring-necked	75	285	335	310	285	350	115	320	15,785		
Canvasback	2	4	1	1	4	1	4		119		
Scaup Lesser				8	5	12			175		
~~Goldeneye~~ BBTreeDuck	1								889		
Bufflehead			2	1	2			1	42		
Ruddy	3	7	3	5	6	8	7	25	469		
~~Other~~ Masked Duck									21		
Fulvous Tree Duck		1			10				301		
Coot:	475	550	450	470	410	387	305	200	39,680		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	None		
Geese	156	47	NONE
Ducks	122,636	1,960	NONE
Coots	39,680	630	5

*Seen Flying Over Refuge

SUMMARY

Principal feeding areas North and West Lakes

Principal nesting areas North and West Lakes

Reported by Richard J. Hitch

Richard J. Hitch, Refuge Manager

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).

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Santa Ana Months of January to April 1965

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Eared Grebe	1	1/8	2	2/19	1	2/26				42
Least Grebe	Present		15	2/26	Still Present					672
Pied-billed Grebe	Present		6	2/6-26	"	"				392
White Pelican*	400	4/13	400	4/13	400	4/13				400
Anhinga	5	3/9	30	3/30	Still Present					42
Great Blue Heron	Present		2	3/29	"	"				14
Little Blue Heron	1	3/28	12	4/30	"	"				14
Green Heron	1	3/27	3	3/23	"	"				14
B-C Night Heron	Present		1	3/22	"	"				7
Cattle Egret*	3	3/27	3	3/27	"	"				3
Common Egret	Present		8	4/26	"	"				7
American Bittern	Present		1	3/1&28	1	4/9				14
Wood Ibis*	200	4/27	200	4/27	200	4/27				200
White-faced Ibis*	4	3/12	24	4/1	1	4/25				28
Sandhill Crane*	1	2/23	1	2/23	1	2/23				1
Sora	Present		8	3/12	Still Present					273
~~II. Shorebirds, Gulls and Terns~~										
Purple Gallinule	1	4/21	1	4/21	Still Present					14
Common Gallinule	Present		40	4/28	"	"				1554
Franklin's Gull*	80	4/22	150	4/26	"	"				230
Black Skimmer	2	4/9	2	4/9	2	4/9				2
II. Shorebirds, Gulls and Terns										
Killdeer	Present		2	4/28	Still Present					14
Common Snipe	Present		2	2/6	1	3/12				7
Long-billed Curlew*	1	2/27	2	4/1	Still Present					14
Upland Plover*	17	3/31	17	3/31	2	4/29				20
Spotted Sandpiper	Present		1	4/26	Still Present					7
Solitary Sandpiper			3	4/26	"	"				77
Greater Yellowlegs			6	4/2	"	"				301
Lesser Yellowlegs	2	3/12	30	4/23	"	"				545
Pectoral Sandpiper	1	3/12	1	3/12	1	3/12				7

(over)

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

Reported by_____

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

(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 migration record for the species for the reporting period.

(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.

(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 species days use (average population X no. days present) of refuge during the reporting period.

Interior—Duplicating Section, Washington, D. C.

26014

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Santa Ana Months of January to April 1965

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
~~I. Water-and-Marsh-Birds~~:										
II. Shorebirds, Gulls and Terns:										
Least Sandpiper					Still Present					126
Long-billed Dowitcher			10	3/12	"	"				182
Stilt Sandpiper	20	4/26	55	4/27	"	"				385
Semipalmated Sandpiper	12	3/10	12	3/10	"	"				84
Black-necked Stilt	Present		4	4/2	"	"				140
Wilson's Phalarope	7	4/25	200	4/30	"	"				1400
III. Doves and Pigeons:										
Mourning Dove	Present		76	4/16	"	"				1848
White-winged Dove	1	4/10	150	4/29	"	"				1582
Ground Dove	Present		16	2/23	"	"				630
Inca Dove	Present		1	4/11	"	"				
White-fronted Dove	Present		12	4/30	"	"				721
Red-billed Pigeon	1	2/9	7	4/15	"	"				245
~~II. Shorebirds, Gulls and Terns:~~										
IV. Predaceous Birds										
Turkey Vulture	Present		300	1/21	"	"				4921
Black Vulture	Present		13	3/2	"	"				182
White-tailed Kite	1	2/1	1	3/9	"	"				28
Mississippi Kite	3	3/30	115	4/15	2	4/28				1340
Sharp-shinned Hawk	Present		1	4/29	1	4/30				7
Cooper's Hawk	Present		1	4/30	1	4/30				14
Red-tailed Hawk	Present		12	4/22	12	4/22				154
Red-shouldered Hawk	Present		4	3/6	1	3/11				175
Broad-winged Hawk	20	3/17	1500	3/25	Still Present					50,806
Swainson's Hawk	12	3/22	115	4/1	"	"				2,415
Gray Hawk	Present		2	3/24	"	"				14
Harris' Hawk	Present		3	4/1	"	"				105
Marsh Hawk	Present		5	1/29	"	"				56

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove					
White-winged dove					
See front of form.					
IV. Predaceous Birds:					
Golden eagle					
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow					
Osprey*	1 3/29	1 3/29	1 4/16		2
Caracara*	1 3/10	1 3/10	1 3/10		1
Sparrow Hawk	Present	2 2/1	Still Present		63
Barn Owl	Present	2 1/2	" "		49
Screech Owl	Present	5 4/22	" "		105
Great Horned Owl	Present	2 1/1	" "		63
Belted King Fisher	1 4/5	1 5/5 & 23	" "		14
Raven	Present	300 1/27	2 3/8		3,263

Reported by Richard J. Hitch

Richard J. Hitch, Refuge Manager

*These passed or flew over refuge.

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

(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 migration record for the species for the reporting period.

(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.

(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 species days use (average population X no. days present) of refuge during the reporting period.

Interior—Duplicating Section, Washington, D. C. 26014

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Santa Ana Months of May to August 1965

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Least Grebe	Present		6	7-9	Still	Present		2	9	273
Pied-billed Grebe	Present		10	8-29	Still	Present		2	10	315
Anhinga	Present		20	5-5	2	6-2				154
Great Blue Heron	Present		2	6-2	Still	Present				49
Green Heron	1	8-8	2	8-19	Still	Present				49
Little Blue Heron	Present		2	5-5	Still	Present				98
Common Egret	Present		1	5-4	Still	Present				14
B-C Night Heron	No Record This Period									
Y-C Night Heron	1	8-17	1	8-17/20	Still	Present				14
Least Bittern	1	7-7	5	8-28	Still	Present		2	3	119
Sora Rail	1	8-31	1	8-31	Still	Present				7
Purple Gallinule	Present		6	7-23	Still	Present		2	6	196
Common Gallinule	Present		57	8-29	Still	Present		10	28	434
Jacana	1	7-6	1	7-6/9	1	7-9				7
II. Shorebirds, Gulls and Terns:										
Killdeer	Present		2	5-5	Still	Present				14
Long-billed Curlew	1	8-2	1	8/2	Still	Present				14
Upland Plover	1	7-29	12	8-11	Still	Present				399
Spotted Sandpiper	Present		1	5-3	Still	Present				7
Solitary Sandpiper	2	8-13	6	8-26	Still	Present				126
Lesser Yellowlegs	1	7-27	1	8-19/27	Still	Present				28
Greater Yellowlegs	Present		1	5-12	1	5-12				7
L-B Dowitcher	Present		6	5-3	2	5-5				42
Stilt Sandpiper	Present		40	5-3	1	5-15				294
Wilson's Phalarope	Present		100	5-3	18	5-15				1,015
B-N Stilt	Present		5	5-10	5	5-10				35
Franklin's Gull	Present		31	5-19	17	5-20				336
Common Tern	1	8-14	1	8-14	Still	Present				7
Black Tern	8	8-9	15	8-26	Still	Present				231

(over)

(1)	(2)		(3)		(4)		(5) Nests	Young	(6)
Red-[illegible]led Pigeon	Present		21	8-26	Still Pre[illegible]		6	3	322
III. Doves and Pigeons:									
Mourning dove	"		38680	8-1 to31	"	"	300	12,800	2,940,000
White-winged dove	"		47244	8-1/31	"	"	500	15,500	3,024,000
Ground Dove	"		8	5/19	"	"			252
Inca Dove	"		2	7/1	"	"			49
White-fronted Dove	"		13	5/10	"	"			281
IV. Predaceous Birds:									
~~Golden eagle~~Turkey Vult.	"		15	8/15	"	"			392
~~Duck hawk~~ Black Vulture	"		2	8/15	"	"			77
~~Horned owl~~Wh.Tailed ~~Kite~~	"		1	5/15	1	5/15			7
~~Magpie~~ Miss. Kite	"		2	5/19	2	5/19			14
~~Raven~~ Broad Wg.Hawk	Still Present		306	5/5	2	5/20			354
~~Crow~~ Swainson's Hawk	"	"	5	5/5	1	5/20			49
Harris' Hawk	"	"	3	8/24	Still	Present	1	2	77
Gray Hawk	1	7/3	1	8-23/27	"	"			21
Sharp-Sh. Hawk	Present		1	5/3					7
Barn Owl	"		1	7/14	"	"			7
Screech Owl	"		6	8/16	"	"			161
Elf Owl	3	7/29	3	7/29	"	"	2	3	49
White-necked Raven	1	7/26	60	7/10	"	"			707

Reported by Richard J. Hitch

Richard J. Hitch, Refuge Manager

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

(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 migration record for the species for the reporting period.

(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.

(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 species days use (average population X no. days present) of refuge during the reporting period.

Interior—Duplicating Section, Washington, D. C. 26014

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Santa Ana Months of September to December 31 1965

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Grebe, Eared	1	11-19	6	12-21	Still Present					182
Grebe, Least	Present		9	9-21	Still Present					539
Grebe, Pied-billed	Present		18	9-17	Still Present					1,176
Cormorant	3	11-20	3	11-20	3	11-20				35
Anhinga	Present		16	9-29	16	9-29				126
Heron, Great Blue	Present		3	9-1	Still Present					91
Heron, Green	Present		12	9-14	Still Present					336
Heron, Little Blue	Present		3	9-17	3	9-17				42
Egret, Common	Present		1	9-1	1	9-1				7
Black-Cr.Night Heron	1	9-2	4	9-7	Still Present					126
Yellow-Cr.Night Heron	Present		2	9-7	1	9-22				49
Bittern, Least	Present		5	9-26	1	11-5				133
Bittern, American	1	9-26	1	9-26	Still Present					21
Sora	Present		6	12-21	Still Present					485
II. Shorebirds, Gulls and Terns: Killdeer	Present		9	11-24	Still Present					322
Common Snipe	1	10-13	1	12-3	Still Present					36
Long-billed Curlew	Present		9	9-2	Still Present					98
Upland Plover	Present		6	9-2	1	9-26				84
Spotted Sandpiper	Present		3	12-9	Still Present					49
Solitary Sandpiper	Present		3	10-6	Still Present					189
Yellowlegs, Greater	4	10-6	13	11-19	Still Present					357
Yellowlegs, Lesser	Present		10	10-8	Still Present					245
Least Sandpiper	2	9-5	44	11-24	Still Present					234
Long-billed Dowitcher	2	10-14	15	11-24	Still Present					189
Stilt Sandpiper	8	10-6	19	10-8	Still Present					161
Black-necked Stilt	2	9-26	4	10-6	Still Present					42
Black Tern	Present		16	9-2	4	9-25				161
Forster's Tern	1	10-6	1	10-6	1	10-6				7

(over)

(1)	(2)		(3)		(4)		(5)	(6)
Red-bil[illegible] Pigeon	Present		8	9-5	1	[illegible]3		168
III. Doves and Pigeons:								
Mourning dove	Present		135	9-14	Still Present			11,760
White-winged dove	Present		1,150	9-17	2	10-21		2,691
Ground Dove	Present		20	11-12	Still Present			1,148
Inca Dove	Present		2	Several Dates	Still Present			133
White-fr. Dove	Present		14	11-12	Still Present			735
IV. Predaceous Birds:								
~~Golden-eagle~~ Turkey Vul.	Present		200	12-31	Still Present			1,288
Duck hawk	1	10-17	1	10/17-22	Still Present			21
Horned owl, Great	Present		2	Sev. Dates	Still Present			126
~~Magpie~~ Black Vulture	Present		35	11-5	Still Present			553
Raven	Present		450	12-2	Still Present			8,610
~~Crow~~ White-Tailed Kite	1	11-5	2	12-3	Still Present			49
Sharp-Sh. Hawk	1	10-7	2	12-21	Still Present			70
Cooper's Hawk	1	10-7	3	12-21	Still Present			77
Red-tailed Hawk	1	11-25	4	12-21	Still Present			56
Red-Shouldered Hawk	2	10-6	8	12-21	Still Present			189
Broad-Winged Hawk	1	9-4	11,600	9-26/10-1	15	10-22		81,200
Swainson's Hawk	1	9-4	2	9-14	1	10-8		42
Zone-tailed Hawk	1	9-2	1	9-2	1	9-7		1
Gray Hawk	Present		3	9-14	Still Present			42
Harris' Hawk	Present		18	12-21	Still Present			469
Marsh Hawk	1	9-28	7	12-21	Still Present			142
Peregrine Falcon	Present		1	Several Dates	Still Present			21
Sparrow Hawk	1	9-20	12	12-21	Still Present			126
Barn Owl	Present		8	11-23	Still Present			61
Screech Owl	Present		8	12-21	Still Present			245
Barred Owl	1	12-11	1	12-11	Still Present			126

Reported by: [illegible]

INSTRUCTIONS (See Sec. 7532, Wildlife Refuges Field Manual)

(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)

Reported by: Richard J. Hitch
Richard J. Hitch, Refuge Manager

(2) First Seen: The first migration record for the species for the reporting period.

(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.

(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 species days use (average population X no. days present) of refuge during the reporting period.

Interior—Duplicating Section, Washington, D. C. 26014

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OS SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Santa Ana For 12-month period ending August 31, 1965

Reported by Richard J. Hitch Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	Acreage		(3) Use-days	(4) Breeding Population	(5) Production
Area 1	Crops	0	Ducks	118,470	16	89*
	Upland	1269	Geese	0	0	0
	Marsh	1	Swans	0	0	0
	Water	10	Coots	22,419	12	25*
	Total	1280	Total	140,889		
Area 2	Crops	0	Ducks	107,990	6	37*
	Upland	686	Geese	0		
	Marsh	4	Swans	0		
	Water	10	Coots	20,138		
	Total	700	Total	128,128		
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

*Hatched had not reached flight stage at end of quarter.

(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 one 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 Unit: 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

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Santa Ana Months of January to April, 1965

(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.
Chachalaca	1780 Acres Thick brushy wood, land-ebony, mesquite huisache, elm, ash, hackberry and willow	1.2	-	-		0	0	0	1585	No nests found this period.
Bob-white	396 Acres Open brush and grassy areas along west boundary, east boundary levee and Rio Grande River	4.6	0	0		0	0	0	85	Nest with eggs found in March; destroyed later.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES:	Use correct common name.
(2) DENSITY:	Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.
(3) YOUNG PRODUCED:	Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.
(4) SEX RATIO:	This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.
(5) REMOVALS:	Indicate total number in each category removed during the report period.
(6) TOTAL:	Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.
(7) REMARKS:	Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

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

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Santa Ana Months of May Thru ~~to~~ August, 19 65

(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.
Bob-white	396 - total acreage. Open brush and grassy areas along west boundary; east boundary levee and Rio Grande River.	3.8	2	17		0	0	0	102	
Chachalaca	1780 total acreage. thick brushy wood, land-ebony, mesquite, huisache, elm, ash, hackberry, and willow.	1.0	107	286*		0	0	0	1871	225 nests found. Seventy-eight were successful (34%) and 217 young produced from these nests. *Includes the young from 78 nests under observation plus 69 young observed and not associated with nests under observation.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

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

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

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

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

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

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

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

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Santa Ana Months of September to December, 1965

(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.
Bobwhite Quail	396 Acres - Open Brush and grassy areas along west boundary, Rio Grande River and east boundary	3.9	0	0	-	0	0	0	100	There were at least 1
Chachalaca	1780 Acres - Thick brushy woodland - ebony, mesquite, huisache, elm, ash, hackberry, willow	1.0	0	0	-	0	0	0	1,860	There were at least 150 feeding at stations along road toWEst Lake.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

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

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

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

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

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

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

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

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Santa Ana Year ending April 30, 1965

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5) Total Population
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Died Fur Harvest	Predator Control*	For Re-stocking	For Research	Share Trapping Permit Number	Trappers' Share	Refuge Share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	
Armadillo	1,700	85		2										20
Beaver	200	25												8
Bat, Free-tailed	900	900		1										1
Bobcat	1,500	150												10
Coyote	1,700	85												20
Cottontailed Rabbit	1,500	6.4												230
Cotton Rat	500	2												1,000
Harvest Mouse	1,500	10												150
Jaguarundi	1,500	750												2
Mexican Ground Squirrel	1,700	12.1												140
Ocelot	1,700	1,700												1
Opossum	1,700	56.6												30
Plains Wood Rat	1,500	.5		5										3,000
Pygmy Mouse	1,500	15												100
Raccoon	1,700	24.2												70
Rice Rat	500	1.1												350
Skunk	1,500	75												20
Weasel	1,500	150												10
White-footed Mouse	1,500	.5												2,000
Coati-Mundi	1,700	1,700												1

*List removals by Predator Animal Hunter

REMARKS:

Reported by Richard J. Hitch
Richard J. Hitch, Refuge Manager

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 unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

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

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

NR-6

Bureau of Sport Fisheries and Wildlife

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge Santa Ana

Calendar Year 1965

1. Visits

a. Hunting None b. Fishing None c. Miscellaneous 11,994 d. TOTAL VISITS 11,994

1a. Hunting (on refuge lands) None

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl			
Upland Game			
Big Game			
Other			

Number of permanent blinds None

Man-days of bow hunting included above None

Estimated man-days of hunting on lands adjacent to refuge None

1b. Fishing (area open to fishing on refuge lands) None

TYPE OF AREA	ACRES	MILES
Ponds or Lakes		
Streams and Shores		

1c. Miscellaneous Visits

Recreation 11,803 Official 191

Economic Use 0 Industrial 330

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	ON REFUGE NO. OF GROUPS	ON REFUGE NUMBER IN GROUPS	OFF REFUGE NO. OF GROUPS	OFF REFUGE NUMBER IN GROUPS
Sportsmen Clubs				
Bird and Garden Clubs	2	30		
Schools	16	502		
Service Clubs				
Youth Groups	15	400		
Professional-Scientific	4	12		
Religious Groups	5	90		
State or Federal Govt.				
Other Xmas Bird Count	1	10		

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	0	Radio Presentations	0
Newspapers (P.R.'s sent to)	0	Exhibits	0
TV Presentations	0	Est. Exhibit Viewers	0

3-1756

(Rev. 4/63)

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and weekend samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

3-1979 (NR-[illegible])
(9/63)

Bureau of Sport Fish[illegible]s and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge: Santa Ana

Proposal Number: 1-65

Reporting Year: 1965

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10/25-26	Cattail	Pool 5 of West Lake	3	Dalpon (Radapon) 2,2-Dichloro-propionic Acid	45 lbs.	15 lbs/ac.	Water 37 Gals per Ac.	Portable Sprayer & Back Pack Pumps

10. Summary of results (continue on reverse side, if necessary) The cattails that were treated was new growth ranging from an inch to three feet in height, which had come out after the plot was mowed and the dead cattails burned in September. There were no flowers or fruiting heads. In general, the kill was poor, but in small spots where the plants were throughly saturated, there was a kill of 98%. Over the entire plot the kill was about 30%. The plants must be throughly wetted to do the job. The leaves do not turn brown and curl as they do when 2,4-D is used. Instead the chemical kills the roots, then the stem and leaves die. Total cost of the spraying operation was $109.57, or $36.52 per acre.

35500

Small opening behind present office building is cleared and leveled for construction of storage building.

Foundation for storage building completed.

Metal, four stall equipment storage building completed.

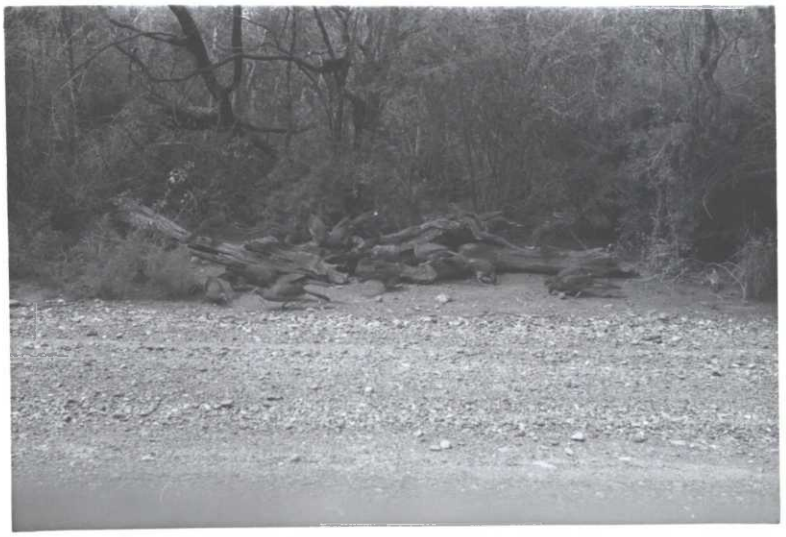
Bill Ackernecht, Jim Lankford, Marcus C. Nelson and
E. R. Lumb while on an inspection tour of refuge area.

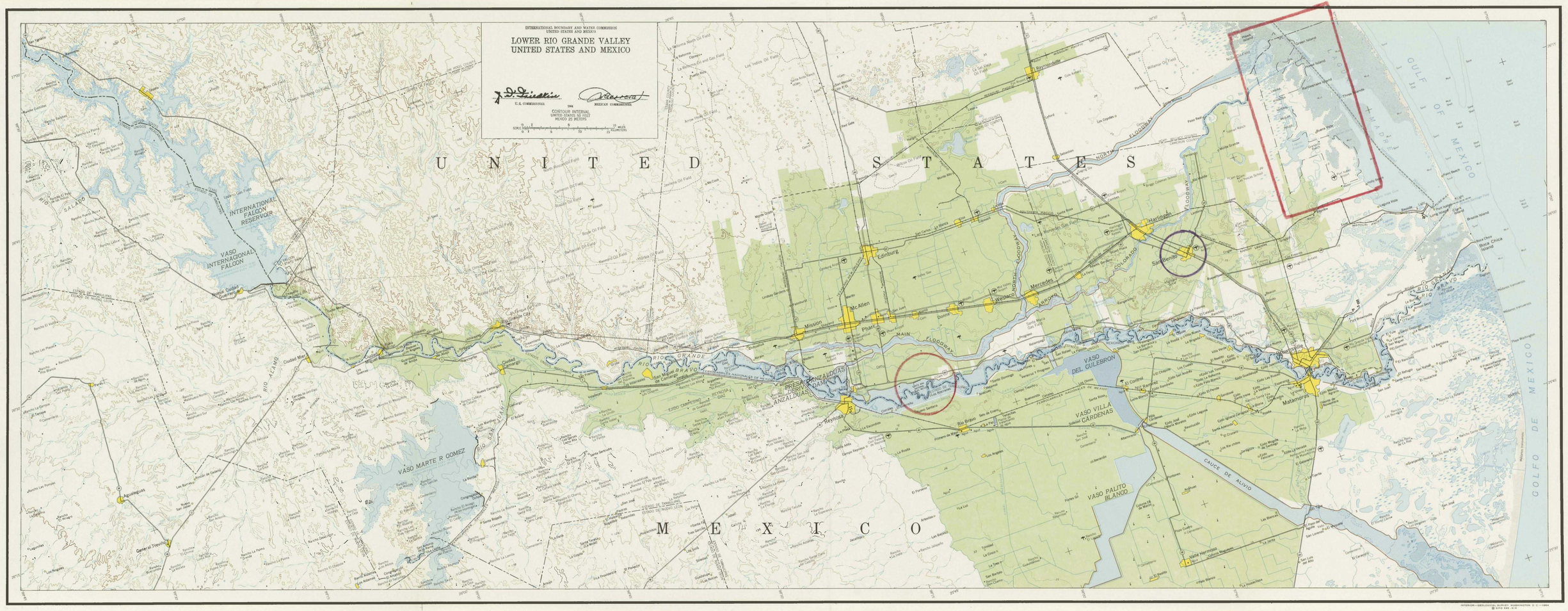
Metal storage building modified for use as a bird blind.

Bird blind of concrete block and fiber glass roof located near the Big Pump.

Chachalacas and Green Jays feeding in front of new bird blind near the Big Pump.

SEP · 65




INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
LOWER RIO GRANDE VALLEY
UNITED STATES AND MEXICO
U.S. COMMISSIONER
1944
MEXICAN COMMISSIONER
CONTOUR INTERVAL
UNITED STATES 50 FEET
MEXICO 25 METERS
U N I T E D S T A T E S
M E X I C O
INTERNATIONAL FALCON RESERVOIR
VASO INTERNACIONAL FALCON
VASO MARTE R GOMEZ
VASO DEL GULEBRON
VASO VILLA CARDENAS
VASO PALITO BLANCO
CAUCE DE ALUVIO
RIO GRANDE
RIO BRAVO
RIO ALAMO
RIO SAN JUAN
SALADO
MAIN FLOODWAY
NORTH FLOODWAY
COLORADO
PRESA DR. ANZALDUAS
GULF OF MEXICO
GOLFO DE MEXICO
Mission
McAllen
Pharr
Edinburg
Weslaco
Mercedes
Harlingen
San Benito
Brownsville
Matamoros
Reynosa
Ciudad Miguel Alemán
Ciudad Camargo
Agualeguas
General Treviño
Valle Hermoso
Boca Chica Island
Brazos Island
Rattlesnake Island
Green Island