SALTON SEA NATIONAL WILDLIFE REFUGE

AND

WATERFOWL DEVELOPMENT AREA

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NARRATIVE REPORT

MAY, JUNE, JULY, AUGUST

1957

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

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REFUGE PERSONNEL

Regular Personnel

EDWARD J. O'NEILL		Refuge Manager
JOSEPH L. CUDDY		Clerk-typist
HENRY STEER		Mechanic, Hvy. Duty
JOSE' BARROS		Tractor Operator
CARL W. FORD		Tractor Operator
ALFRED W. MC FARLAND		Tractor Operator
CLYDE W. STEWART		Tractor Operator
CHESLEY H. WILLIAMS		Tractor Operator
LEO E. COX		Oiler
JOHN BARROS		Irrigator
ROQUE BARROS		Irrigator
SYLVESTER BARROS	(Resigned 5-28-57)	Irrigator
MANUEL CARDONZO	(Resigned 5-28-57)	Irrigator
JULIO RIBERIO	(Resigned 5-31-57)	Irrigator

Temporary Personnel

LEO MATA	(Terminated 9-20-57)	Irrigator
TED WOOD	(Terminated 9-20-57)	Irrigator

NARRATIVE REPORT

I GENERAL CONDITIONS

A. Weather & Conditions

The weather throughout the period was perhaps a good average for the same period over the past ten years.

As usual high temperature and humid weather with threating thunder head clouds almost daily through July and August were common.

An unseasonal drop in temperature came on the wake of moderate west winds August 29. On the morning of August 30 the meroury read 60 degrees - the coolest reading since early May.

August in general was hotter than in 1956. The mean temperature was 90.3 degrees or .2 degree higher than one year ago.

Tabulated below is the weather data as compiled at the local U. S. Navy Auxiliary Air Station, Seeley, California:

MONTH	MAX.	MIN.	PRECIPITATION	DAYS OF 25MPH WINDS
May	104°	55°	T.	17
June	118°	61°	0	14
July	119°	74°	.01	4
August	111°	63°	.49	7
	Totals		0.50	42

B. Precipitation and Water Conditions

During August the Salton Sea level dropped .2 of a foot from the July level. At the close of the period the elevation was -234.6 feet below sea level. This figure is .15 of a foot less than the preceeding August figure.

C. Fires

No fires during period.

II WILDLIFE

A. Migratory Birds

1. Populations and Behavior

a. Ducks

No notable change over general conditions of previous years.

The drying down of refuge units during June apparently discouraged fulvous ducks and cinnamon teal from nesting in the fresh water units.

A few lesser scaup and ruddy ducks remained on Salton Sea throughout the summer period. A male bufflehead was observed at tract 9, Unit I, June 13.

Pintails, on fall migration, first arrived August 9 when 200 were observed at Unit II.

b. Geese

None present on refuge units.

c. Shorebirds, Gulls, Terns

No notable change in shorebirds.

Gull-billed terns (150 adults), nested on the small sandy islands south of AEC holdings along the west shore of Salton Sea. At the same time Caspians (40 adults) nested on the same island in June. Terns almost completely destroyed each others nests and eggs. Gull-bills renested and raised about 20 young. Caspians succeeded in raising 12 young.

Laughing gulls (4 adults) raised 3 young from one nest in late June.

d. Water and Marsh Birds

Cormorants, egrets, herons all nested as in previous years, however in greatly reduced numbers over last year.

An estimated population of 30 adult white pelicans laid a few eggs on the small sand island but incubation did not take place. No pelicans were reared this year.

Some 60 wood ibis were observed at the delta of Alamo River June 8. Several hundred were in the general vicinity of the refuge the remainder of the period, however the numbers observed were lowest in several years.

2. Disease

A number of sick and dead gulls and shorebirds observed as in previous years.

3. Banding

Bird banding become negligible due to lack of manpower for such work. A few egrets and cormorants were banded with the aid of Game Management Agent Jim Johnson in mid-June. Fifty (50) mourning doves, mostly nestlings, were banded.

Agent A. W. Elder and California Fish and Game personnel banded doves in the Imperial Valley area also.

4. Food and Cover

The necessity of drying down fresh water units, due to lack of funds with which to purchase water, caused the greater portion of wild millet and cattails planted on the refuge to die. This has been the poorest year of marsh crop production yet.

Early flights of pintails quickly cleaned up the wild millet which blackbirds had not taken and then moved out into the Valley leach areas and into the State's Wister area.

B. Upland Game Birds

No notable change in status.

C. Other Birds

No notable change in status.

D. Animals

No notable change in status.

E. Fish

No notable change in status.

III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

1. Cultivated Crops

Unit I

The crops produced are as outlined below:

	Planted	Produced
Mature Barley (Mariout)	280	200

Cultivated Crops - Unit I (cont'd)

	Planted	Produced
Wild Millet & Cattails	870	150
TOTALS	1150	350

Unit II

Mature Barley (Mariout)	40	40
Wild Millet & Cattails	230	100
TOTALS	270	140

Unit A

Wild Millet & Cattails	200	20

Unit B

No lease at present.

2. Improvements and Developments

No building maintenance work was done this year due to lack of funds and manpower.

The bridge crossing over trifolium No. 1 drain for access to east Unit "A" was completed by refuge personnel in July.

Some 200 acres of east Unit "A" were grubbed of heavy growth, contoured and seeded. This is a new addition to the refuge in so far as productive acreage is concerned. Due to wet flooded conditions the work was greatly impaired until it was possible to clean out the lower end of the Trifolium storm drain to eliviate flooding of refuge lands.

Some 260 acres of contours were removed and the lands plowed at Unit II. Tracts 1 and 2, Unit II were contoured and seeded to cattails and wild millet.

At Unit I, 750 acres of land was contoured and additional acreage reworked and planted to wild millet and cattails.

The flooded north portion of Tract C, Unit I was completely lost when the upper contour broke in June. Serious washing and wet conditions prevented reentering the area the balance of the period.

IV ECONOMIC USES

No activities.

V. PUBLIC RELATIONS

A. Recreational Uses

No outstanding change in previous activities.

B. Refuge Visitors

Name	Date	Identification	Purpose
Mr. Jim Johnson	5/13-6/19	GMA, El Centro, Calif.	Contact
Dr. Gerald Brody	7/8	AmArbor, Michigan	Bird Obs.
Mr. R.E. Woodard	7/8	Tucson, Arisona	Bird Obs.
Messrs. Salazar, Bailey, Miller & Wills	7/17	Dept. of Agric., Imperial County	Khapra Beetle Inspection
Mr. A.W. Elder	8/28	GMA, Los Angeles, Cal.	Contact
Mr. Maxwell Ruleson	8/29	Dept. of Agric., Imperial County	Khapra Beetle Inspection

C. Refuge Participation

No activities.

D. Violations

Court proceeding of apprehensions made by refuge personnel and not reported in the previous narrative are listed below:

Name	Violation	Date	Amount
Robert Davis Long Beach, Calif.	Poss. of protected birds	10/26/56	$ 75.00
Arlie Walling Los Angeles, Calif.	Trespass on refuge	10/20/56	$ 35.00
Roy Halloway Los Angeles, Calif.	Trespass on refuge	11/10/56	$ 35.00
Roland L. Young Lemon Grove, Calif.	Trespass on refuge	11/24/56	$ 35.00
Richard Patterson Los Angeles, Calif.	Trespass on refuge	11/10/56	$ 35.00
George Adams Beaumont, Calif.	Trespass on refuge	11/21/56	$ 25.00

VI APPLIED RESEARCH

No research activities.

VII OTHER ITEMS

On July 9 three young men, Leonad Jost, Dick Allen, and Tommy Fritz of Banning, California related a story of being lost and helpless for one day and two nights on Salton Sea.

The trio put in at Helen's place at Salton Sea Beach for a weekend outing and water skiing. The boat motor failed and they drifted helplessly in the calm waters. The second day, by using skiis for paddles, the men came ashore about 5 miles south of their starting point. They suffered from severe sunburn, dehydration and hunger.

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Fresh water clams (May-Aug. 1954 report) have increased to the point that the Imperial Irrigation District believes they will soon prove a real nuisance.

The claim is that the small shells clog irrigation pipes, filters, meters and valves. Water systems where pumps are used have received damage.

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Imperial Irrigation District has developed a new muskrat control technique on main canals. Wooden boxes, containing barley treated with pivol poison, float on the water for rats to enter and feed.

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On August 23 Police Chief Lon Garner and another officer at Brawley shot 19 cormorants on the city water ponds. From all reports the cormorants would not cotton to being driven off but rather dove and eluded all persuers for a couple of hours. After putting on a fine demonstration for the towns people the five survivors of the original 24 birds took to the air and escaped.

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Word reached us early in August that Mullet Island and some 80 acres adjacent to it were leased by I.I.D. to Mr. W.C. Reeder, South Pasadena for development of a tourist attraction.

The 80 acres of land will front on the Mullet Island road where the State Fish and Game Department proposes to construct a causeway. The lease runs to 1961 with a 20-year option for renewal.

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The Brawley Chamber of Commerce reports having made a survey of the value of the dove hunting seasons to Imperial County. The C of C estimates $ 643,000 net income from the dove season activities alone. An estimated 3,000 hunters at $ 30 per day for the first 3 days totaled $ 270,000 according to the press report. The balance of the season allowed $ 30 for 300 hunters per day totaling 8,000 who spent $ 240,000 in 27 days.

Local hunters spend about $ 75,000 based on an estimated $ 5 per day per each of 15,000 hunters. Shotgun shells and guns cost local hunters about $ 25,000. Outsiders spend about $ 3 each for gas.

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A news release by California Fish and Game Department requesting cooperation of hunters in submitting bands from doves indicated the State had banded 2,000 nestling doves this summer.

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Imperial Valley newspapers estimated 12,000 dove hunters came to the Valley on opening day. Success by hunters was reported excellent. Three hunters were shot by other nimrods and treated at local hospitals. The Bonanza Airlines shipped 5,500 pounds of doves by air the first four days of season. Birds were shipped as far as Texas, Colorado and Wyoming.

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The Imperial Irrigation District on September 1st reported the total salt brought into Imperial Valley through the All American canal amounted to 1,992,573 tons during the first six months of 1957. The total salt discharge, from January 1 to June 30, into Salton Sea was 2,001,463 tons as checked at the outlets of Alamo and New Rivers. The difference of 8,890 tons discharged represents a gain in salt removal through tile lines, leaching, and drainage.

Due to low run-off into the Colorado River this year the salt content of water in the All American Canal was 455,366 tons greater than in 1956.

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Respectfully submitted,

Edward J. O'Neill
Refuge Manager

Approved:_____

_____

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

WATERFOWL

REFUGE Salton Sea MONTHS OF May TO August, 1957

(1) Species	(2) Weeks of reporting period									
	5/3 1	5/10 2	5/17 3	5/24 4	5/31 5	6/7 6	6/14 7	6/21 8	6/28 9	7/5 10
Swans:										
Whistling										
Trumpeter										
Geese:				X	X	X		X		X
Canada				O	O	O		O		O
Cackling										
Brant				C	C	C		C		C
White-fronted	1			X	X	X	1	X		X
Snow				X	X	X		X		X
Blue				S	S	S		S		S
Other				U	U	U		U		U
Ducks:				S	S	S		S		S
Mallard		8								
Black										
Gadwall										
Baldpate		10								
Pintail	4	10					10			
Green-winged teal		10								
Blue-winged teal										
Cinnamon teal	30	200					150		50	
Shoveler	200	50								
Wood										
Redhead							4		2	
Ring-necked										
Canvasback										
Scaup			20				10		3	
Goldeneye										
Bufflehead							1			
Ruddy	2000						350		500	
Other Fulvous Tree Duck	20	10					70		40	
Am. Merganser			1							
Coot:	1000	800					170		20	

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

3-7150a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE Salton Sea MONTHS OF May TO August, 19 57

(1) Species	(2) Weeks of reporting period: 7/12 (11)	7/19 (12)	7/26 (13)	8/2 (14)	8/9 (15)	8/16 (16)	8/23 (17)	8/30	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling						Aerial					
Trumpeter						Census					
Geese:		NO		NO			NO				
Canada				C							
Cackling		C		E			C				
Brant		E		N			E				
White-fronted		N		S			N		14		
Snow		S		U			S				
Blue		U		S			U				
Other		S					S				
Ducks:											
Mallard									14		
Black											
Gadwall											
Baldpate						10		10	210		
Pintail					200	4600		4280	63,728		
Green-winged teal					20	30		1260	9,240		
Blue-winged teal											
Cinnamon teal	30		150		200	1110		150	11,480		
Shoveler						250		420	6,440		
Wood											
Redhead	2								56		
Ring-necked											
Canvasback											
Scaup	10								301		
Goldeneye											
Bufflehead											
Ruddy									7		
Other Fulvous Tree	300		250		300	1240		200	45,930		
Duck	10		50		60	167		40	3,269		
Am. Merganser									7		
Coot:	60		100		100	200		130	18,060		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	0	0	
Geese	14	1	
Ducks	158,792	7,407	
Coots	18,060	1,000	

SUMMARY

Principal feeding areas Rivers - Salton Sea, Dabbling - Refuge units and agriculture leach fields, Widgeon - agricultural alfalfa fields.

Principal nesting areas Salton Sea.

Reported by Edward J. O'Neill, 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. 37944
1953

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

MIGRATORY BIRDS
(other than waterfowl)

Refuge Salton Sea Months of May to August 1957

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Pied-billed Grebe	Previous period									
Eared Grebe	"	"								
Western Grebe	"	"								
White Pelican	"	"								
Brown Pelican	14	8/15								
Cormorants	Previous period									
Common Egret	"	"								
Snowy Egret	"	"								
Black-crowned Night Heron	"	"								
Great Blue Heron	"	"								
Green Heron	"	"								
Glossy Ibis	"	"								
Wood Ibis	1	5/19								
Florida Gallinule	Previous period									
II. Shorebirds, Gulls and Terns:										
American Avocet	Previous period									
Black-necked Stilt	"	"								
Least & Western Sandpiper	"	"								
Dowitcher	"	"								
Caspian Tern	"	"								
Black Tern	"	"								
Gull-billed Tern	"	"								
Ring-billed Gull	"	"								
Laughing Gull	"	"								
L-B Curlew	"	"								
Hudsonian Curlew	"	"								
Marbled Godwit	"	"								
Killdeer	"	"								
Northern Phalarope	200	8/15								

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove	Previous period				
White-winged dove					
IV. Predaceous Birds:					
Golden eagle	No record.				
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow					

Reported by Edward J. O'Neill

INSTRUCTIONS

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

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

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

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

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

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

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Salton Sea Months of May to August, 19 57

(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.
	NO CHANGE IN STATUS.									

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.

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge Salton Sea Months of May through August, 1957

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Seed Barley	0	400	400					400	X		
Feed Barley	20	0	20					20		X	
Sudangrass	20	0	20			10	10	10		X	
Wild Millet	40	0	40		40		40	0			
Oats	600	0	600					600		X	

(8) Indicate shipping or collection points Unit I and II storage buildings.

(9) Grain is stored at Unit I and II storage buildings.

(10) Remarks

*See instructions on back.

16—61482-1

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

16—61482-1 U. S. GOVERNMENT PRINTING OFFICE

3-1750
Form NR-1B
(December 1956)

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Salton Sea — For 12-month period ending August 31, 1957

Reported by Edward J. O'Neill — Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage		(3) Use-days	(4) Breeding Population	(5) Production
Unit I	Crops	500 *	Ducks	3,030,050		
	Upland	400	Geese	419,026		
	Marsh	260	Swans	98		
	Water	1310	Coots	340,300		
	Total	2560	Total	3,789,474		
Unit II	Crops	600 *	Ducks	2,237,557		
	Upland	300	Geese	312,477		
	Marsh	340	Swans	-		
	Water	347	Coots	47,050		
	Total	1687	Total	2,597,084		
Unit A	Crops	92 *	Ducks	58,092		
	Upland	460	Geese	154,202		
	Marsh	200	Swans	-		
	Water	100	Coots	82,980		
	Total	752	Total	297,274		
Unit B (No Development)	Crops		Ducks			
	Upland	378	Geese			
	Marsh		Swans			
	Water		Coots			
	Total	378	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			

* Grain crops are renovated & irrigated to provide volunteer green forage crops.

(over)

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 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.

INSTRUCTIONS

(1) Area or Unit: A geographical unit that, 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. Estimated acreage of each unit should be indicated.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland consists of 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 the water category includes all other water areas inundated most or all of the growing season and extends from the deeper edge of the marsh zone to strictly open-water areas, 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 each type should be kept as accurate as possible through reference to available maps supplemented by periodic field observations and should agree with unit acreage.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven.

(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.
1956