

1990 CANADA GOOSE PRODUCTION STUDY

FISH SPRINGS NATIONAL WILDLIFE REFUGE

OCTOBER 1990

PREPARED BY _____

REVIEWED BY _____

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OBJECTIVES:

1. Determine the reproductive success of the breeding population including average clutch and brood size, total hatched, total fledged.
2. Evaluate the breeding goose population in relation to 1989 production, population growth, nest site selection and drawdown response.

PROCEDURES:

The study was scaled down in intensity in 1990 due to an extended off-refuge personnel schedule from late April to late May. This curtailed intensive post-hatching observations of brood activity, such as foraging and loafing areas, dispersals, and brood specific mortality. Nest site rehabilitation was conducted in February and is listed in Appendix 3.

Two pair counts were conducted from April 1 to April 20. Incidental observations between counts allowed verification of territory and nest site locations. Only those pairs or lone males which displayed a specific site fidelity were tallied as nesting pairs. Groups of geese that broke into pairs when flushed were treated as flocked birds. Pairs which did not show any strong territoriality were considered to be non-nesting, first or second year subadults. These pairs were not used to calculate nesting data.

As pairs began nesting, locatable nests were checked at least once to determine clutch size. Nests with less than 5 eggs were rechecked to verify the final clutch size. The initial nest check was made approximately 2 weeks after individual females were observed incubating. This allowed sufficient time for a full clutch to be completed, thus eliminating the need for rechecking as well as limiting disturbance. Nests were checked by foot, canoe, and airboat depending on the nesting location. Nest observations were made from vehicles, using a spotting scope, to note nest activity. When broods were observed in a particular area, nearby nests were observed for incubating activity. This allowed pinpointing of the hatched nest, which was then checked to verify the number of eggs hatched. Hatching started several days prior to the ARM's scheduled off-refuge leave, thus most nests had to be checked several weeks after hatching. This is not believed to have affected hatching data accuracy.

Brood counts were started after the first brood was observed on April 18. A running tally of brood size and location was kept by Refuge Personnel throughout most of the brood period. Complete brood counts were conducted at approximately 2 week intervals

between April 21 and July 3.

RESULTS:

Pair counts were conducted on April 2 and April 18. There was 25 and 24 indicated nesting pairs, respectively, tallied on the 2 counts. The respective total goose populations on these counts were 84 and 71. The total population rose to about 150 birds by May 8, as moulting birds started to arrive.

Nineteen (19) pairs of geese were considered to be breeders. Other pairs observed on pair counts could not be pinned down at the later date to suggest nesting activity. It is believed that all nesting territories were located. Of the 19 apparent nesting pairs, 14 nests were located. Twelve of these located nests were on artificial islands or platforms. Appendix 1 summarizes nest site locations and nest data. Of the 5 unlocated nests, 2 were believed to have hatched due to continued presence of pairs and or broods in the vicinity. The other 3 "nests" were considered to be failed due to the absence of pair activity and broods in the vicinity. Since observations were less intensive during the post-hatching period, the fate of the unfound nests is somewhat speculative, though brood counts and other pair information seems to support the conclusions.

Twelve (12) of the 19 nests hatched (success = 63%). Two of the known nests (H1 & H15) were destroyed by predators (at least one by ravens). Another nest (H5) was believed abandoned prior to being destroyed by ravens. P10 was rechecked in late May with all eggs still intact. They appeared to be infertile. Observations of this female indicate that she was steadfastly incubating, thus abandonment prior to embryo development does not seem likely.

The average clutch size of known nests was 5.9 (high-8, low-4). Sixty-seven percent (67%) of the total number of eggs hatched (55 of 82), while 97% of the eggs of successful nests hatched (55 of 57). The average brood size hatched from successful nests was 5.5. Artificial structures and islands again provided most of the nesting sites. Appendix 2 summarizes overall nesting data, in regard to nest site selection.

The first brood was observed on April 18, 2 weeks earlier than in 1989. The first brood hatched from Harrison Unit (H2). Four additional broods hatched within 2 days, with brood counts suggesting that all broods hatched by the first week of May. Assuming that at least 5 goslings each hatched from the 2 undetected nests, 65 goslings in 12 broods left the nest. Brood data was tallied on 22 days between April 18 and July 3.

Seven brood counts tallied 9 or more broods, with one count finding 12 broods. This high count seems to support earlier conclusions on the fate of the undetected nests. Because individual broods were not tracked, a general lumping of broods

up to 4 weeks old exhibited a brood size of 4.1 birds, or a 25% mortality. By mid June, the high count of 12 broods showed 33 still surviving, for an average brood size of 2.8, or a 49% mortality. A later brood count produced 11 broods with 31 young. At this point, the assumption was made that no new losses were likely to occur, thus setting total production at 33 fledged goslings.

Refuge personnel banded 18 goslings from June 12 to July 10, bringing the total number of goslings banded since 1989 to 33 of the estimated 55 fledged. In addition, a breeding pair from Avocet Unit was recaptured with one of its young (banded local male) from 1989. Appendix 4 summarizes breeding goose and local banding data for 1989 & 1990.

DISCUSSION:

The 1990 Canada Goose production at Fish Springs was similar in many respects to 1989, i.e., no positive growth. The total number of breeding pairs increased by one, however, successful nests remained at 12. Average clutch size remained about the same, but due to one additional predated nest, the number of hatched eggs declined slightly. Appendix 2 summarizes nesting data for 1989 and 1990.

The most notable difference between the two years, was an increase in the survival rate of the goslings (51% in 1990 versus 30% in 1989). Production was estimated at 33 fledged goslings in 1990 versus the 22 in 1989. Because intensive brood observations were not possible during the critical period in late April and May, the reasons for this increase are unknown. The breeding goose population represents a small sample size therefore allowing minor changes in survival of 1 or 2 broods to be magnified in the final tally. One possibility for the increased survival may stem from the marsh drawdowns this year.

Though this years production is an encouragement over the previous two poor years, production is still well below the pre-hunting season levels prior to 1987. Because the breeding population is unchanged from 1989, true population growth will not be realized until the number of breeding pairs increases. Assuming that the subadult population declined simultaneously with the breeding population, significant recruitment into the breeding population will probably not occur until at least 1992.

Marsh Drawdowns

The 2 drawdown units this year were Harrison and Egret. In 1989, these units accounted for 7 of the 18 nests, while this year they accounted for 5 of the 19 nests. These units were used extensively by broods in 1989, especially those that preferred to forage outside of the dikes. This was expected to have contributed to the excessive mortality last year. Because of the lowered water levels in 1990, there was little brood use after

early May. However, the broods that were observed showed an increased mortality. Brood counts revealed that the last observed brood in Harrison was on May 6, with an apparent loss of 6 of the 13 goslings hatched from 2 nests. Three broods were observed on Egret Unit around the third week of May along the east side. Two of the broods had only 3 goslings between them, while the other brood was uncountable because of heavy cover. Brood use stopped after this period because of reduced water levels.

Drainage problems in these 2 units contributed to higher than expected water levels (for a drawdown) during this time period and may have indirectly led to increased mortality due to enhanced coyote access. Conversely, the lower water level in Harrison Unit may have caused the abandonment of nest H5. This platform was left far from water during the incubation period, as water levels receded. There was no known human intrusion to this platform, prior to its suspicion as being abandoned. However, a pair of geese were often observed in the vicinity, though incubation appeared to be terminated. The decrease in nesting attempts on Egret and Harrison was probably a result of the receding water.

The 2 drawdown units from 1989, Shoveler and Pintail, exhibited a slight increase in pair use though only 1 additional nest was suspected of hatching. Most notable was the increased brood use of the main Pintail impoundment, where 4 broods were regularly observed. This unit was also used extensively by non-breeding geese and other waterfowl, thus "protection en masse" probably helped reduce predation. The open views afforded by Pintail Unit would seem to enhance survival, in its own right. The myriad of sloughs throughout Shoveler Unit makes observations here extremely difficult. Little brood use was observed in Shoveler Unit. Both of these units were burned in 1989, and invertebrate sampling showed a marked increase in invertebrates, compared to other units.

Negative impacts of the scheduled marsh drawdowns could include displacement of breeding pairs to unfamiliar or marginal territories, thus reducing productivity. The completion of drawdowns early in the nesting season is important to avoid having pairs nest on units that will be dry at hatching. This will reduce the gosling mortality that would be incurred by broods trekking across large open areas in search of water.

Nest Site Selection and Fidelity

Many similarities between 1989 and 1990, also occurred in respect to nest site selection and nesting outcome. Site fidelity is well documented in many species of birds, including geese, so it is no surprise that many of the same structures and territories were used in both years. Appendix 1 denotes "site fidelity" pairs; this fidelity is also the reasoning behind using some of the same nest #'s as in 1989, for natural island nesters. Eight

of the pairs used the same nest site as in 1989, with 4 more occupying the same territory (natural island but nest not located). With the addition of water to Pintail Unit this year, it is expected that last year's P5 moved to P10. Also it seems that 1989's I11 and I20 moved to I14 and I19, respectively. The pair on H5 this year is probably the same pair that used H6 last year, since this pair (H6) originally started on H5 prior to egg laying but then moved to H6. Between known nest sites and suspected movements, data shows that 16 of the 19 nesters utilized the same nest site or immediate territory as in 1989.

The affinity of the breeding goose population to utilize the same nests or territories each year underscores the importance of maintaining established nesting islands and platforms. Nesting platforms and islands are essential in reducing nest predation, as can be seen from Fish Springs data as well as many other published reports. The maintenance and subsequent use of artificial nesting structures will play an important role toward increasing the Refuge's Canada goose population.

Four of the nesting pairs that failed in 1990, also failed in 1989. Two of these (A10, C13) had territories that inferred nesting on natural islands. Nests have not been found of either pair, and "failure" has been a matter of assumption, not fact. H1 failed both years, once through apparent infertile eggs, the next by predation. This tends to suggest that this is a younger pair, possibly with its first nesting attempt in 1989. The same is expected of I15. In both 1989 and 1990, I15 was the last pair to initiate nesting, both nests were outside of the straw bales, and subsequently, both nests were destroyed by predators.

RECOMMENDATIONS:

The continuation of an intensive goose study is recommended until the breeding goose population rebounds. Though time consuming, the information collected is important to evaluate the progress of this population. A less intensive study can lead to many erroneous assumptions and thus skew the collected data. This year's study was less intensive due to time constrictions and a few discrepancies arose concerning the final assumptions (though none are considered serious enough to effect the conclusions). The collection of accurate data will benefit the Refuge both now and in the future, when hopefully, large nesting populations will confound the data collection process. This data will serve as a guideline to evaluate future production.

As recommended in 1989, prescribed burning and water control needs to be a major priority, in order to enhance the overall habitat. The completion of the Predator Control Plan also needs to be addressed in 1991, as predation is still the major block to gosling survival, and thus future recruitment.

Color marking of known breeders and locally raised geese is still a major need. All the breeding data loses its full value if the

wintering and migratory dynamics of the Refuge geese is not understood. Leg band returns will provide little useful information in the short term, as the current, small population will afford few returns. Color marking, either neck bands or wing markers, will provide immediate results as to movements around the Refuge. Fall and winter monitoring will also provide an accurate assessment of migratory activities. This data is crucial before any attempts are made to reopen the goose hunting season.

PRIORITIES:

1. Keep the goose hunting season closed indefinitely until the breeding population reaches 75 pairs and crucial migratory data is collected and analyzed.
2. Maintain a prescribed burn plan with emphasis on goose foraging sites.
3. Maintain current water level prescriptions and drawdown schedules and evaluate their effect on foraging sites.
4. Continue monitoring all aspects of the breeding population, particularly production and survival.
5. Continue banding local and breeding adult geese, including the initiation of color marking.
6. Monitor the coyote population and fulfill the Predator Control Plan quotas.
7. Maintain and enhance available goose nesting structures.

APPENDIX 1

1990 CANADA GOOSE NESTING SITES

NEST #	1989 SITE	UNIT	SITE TYPE	# OF EGGS	# HATCH	DATE HATCH
A9	X	AVOCET	NAT ISLE	6	6	4/20
A10	X	AVOCET	NAT ISLE	-	0	
A18	X	AVOCET	NAT ISLE	6	4	4/19
M11	X	MALLARD	NAT ISLE	-	0	
C13	X	CURLEW	NAT ISLE	-	0	
E12	X	EGRET	NAT ISLE	?	?	
D1		SHOVELER	NAT ISLE	?	?	
P10		PINTAIL	ARTIF ISL	6	0	
P21		PINTAIL	PLATFORM	7	7	
G1		GADWALL	PLATFORM	5	5	4/20
G2	X	GADWALL	PLATFORM	6	6	
I4	X	IBIS	ARTIF ISL	5	5	
I14		IBIS	ARTIF ISL	4	4	
I15	X	IBIS	ARTIF ISL	5	0	PREDAT
I19		IBIS	ARTIF ISL	5	5	4/20
H1	X	HARRISON	PLATFORM	7	0	RAVEN
H2	X	HARRISON	PLATFORM	8	8	4/18
H5		HARRISON	PLATFORM	7	0	ABANDN
H7	X	HARRISON	PLATFORM	5	5	
		TOTAL KNOWN		82	55	

* A10, M11, & C13 WERE ASSUMED FAILED BECAUSE OF DISAPPEARANCE OF PAIR OR ABSENCE OF BROODS FROM THEIR TERRITORY. THE PEAK COUNT OF 12 BROODS CORRESPONDS WITH THE TOTAL NUMBER OF KNOWN (10) SUCCESSFUL HATCHINGS + THE SUSPECTED (2) SUCCESSFUL HATCHINGS.

** A ? SIGNIFIES THE 2 PAIRS THAT WERE ASSUMED SUCCESSFUL, DUE TO SITE FIDELITY AND PRESENCE OF A BROOD IN THE VICINITY OF THEIR TERRITORY.

APPENDIX 2

1990 GOOSE PRODUCTION DATA SUMMARY

	PLATFORMS	ARTIFICIAL ISLANDS	NATURAL ISLANDS	TOTAL
# OF NESTS & (% OF TOTAL)	8 (42)	4 (21)	* 7 (37)	19
1989	6 (33)	5 (28)	7 (39)	18
# & (%) SUCCESSFUL	5 (63)	3 (75)	4 (57)	12 (63)
1989	4 (67)	4 (80)	4 (57)	12 (67)
# OF KNOWN EGGS (14 NESTS)	51	19	12	82
1989 (13 NESTS)	39	31	11	81
# EGGS HATCHED & (%)	31 (61)	14 (74)	10 (83)	55 (67)
1989	26 (67)	26 (84)	11 (100)	63 (78)
AVERAGE CLUTCH SIZE	6.4	4.8	6.0	5.9
1989	6.5	6.2	5.5	6.2
AVERAGE BROOD SIZE OF SUCCESSFUL NESTS	6.2	4.7	5.0	5.5
1989	6.5	6.5	5.5	6.3

* SEVEN (7) NESTS SUSPECTED DUE TO TERRITORIALITY (SOME SIMILAR TO 1989) AND PRESENCE OF BROODS. ONLY 2 NESTS CONFIRMED.

1990 GOOSE NESTING STRUCTURE REHABILITATION
FEBRUARY 23-28, 1990

UNIT STRUCTURE #	TYPE		STRAW RECEIVED	
	ISLAND	PLATFORM	BED	BALES
IBIS I1	X		X	
I2	X		X	
I3	X		X	1
I4	X		X	3
I5	X		X	1
I6	X		X	1
I7	X		X	3
I8	X		X	3
I9	X		X	2
I10	X		X	2
I11	X		X	
I12	X		X	4
I13	X		X	3
I14	X		X	4
I15	X		X	3
I16	X		X	3
I17	X		X	
I18	X		X	3
I19	X		X	3
I20	X		X	1
MALLARD				
M1	X	NATURAL	X	3
M2	X	NATURAL	X	3
M3	X	NATURAL	X	3
PINTAIL				
P1	X			
P2	X			
P3	X		X	
P4			X	
P5			X	
P6	X		X	
P7	PLATFORM RUINED - DISPOSED			
P8			X	1
P9	X		X	3
P10	X		X	3
P11	X		X	3
P12	X		X	3
P13	X		X	3
P14	X		X	3
P15	X	W/	X BARREL	3
P16			X BARREL	
P17			X BARREL	
P18			X BARREL	
P19			X BARREL	

UNIT STRUCTURE #	TYPE		STRAW RECEIVED	
	ISLAND	PLATFORM	BED	BALES
PINTAIL				
P20	ISLAND DESTROYED			
P21 (SLOUGH)		X	X	4
P22 (SLOUGH)		X	X	4
EGRET				
E1		X BARREL	X	
E2		X BARREL	X	
CURLEW				
C1		X BARREL	X	
C2		X BARREL	X	
HARRISON				
H1		X	X	
H2		X	X	
H3		X	X	
H4		X	X	
H5		X	X	
H6		X	X	
H7		X	X	
H8		X	X	
H9	X		X	3
H10		X BARREL	X	
H11	X		X	1
H12 (PENINSULA)		X BARREL	X	
GADWALL				
G1 (SLOUGH)		X	X	
G2		X	X	
G3		X BARREL	X	
G4 (SLOUGH)	X	NATURAL	X	3
AVOCET				
A1 (E SLOUGH)		X BARREL	X	
A2 (E SLOUGH)	X	NATURAL	X	3
A3 (MAIN POOL)	X	NATURAL	X	3
A4 (MAIN POOL)	X	NATURAL	X	3
A5 (MAIN POOL)	X	NATURAL	X	3
A6 (MAIN POOL)		X BARREL	X	
A7 (INNER)		X BARREL	X	
A8 (INNER)	X	NATURAL	X	3

CANADA GOOSE BANDING DATA

LOCALS AND KNOWN BREEDERS BANDED IN 1989 & 1990

Band Number	Age	Sex	Year	Unit
688-59910	Local	Male	1989	Avocet
688-59911	Local	Male	1989	Avocet
688-59912	F1 Breeder	Male	1989	Avocet
748-36633	F1 Breeder	Female	Recap	Avocet
688-59916	Local	Male	1989	
688-59917	Local	Female	1989	
688-59918	F1 Local	Male	1989	Avocet
688-59919	Local	Male	1989	
688-59920	Local	Female	1989	
688-59921	Local	Male	1989	
688-59922	Local	Female	1989	
688-59923	Local	Female	1989	
688-59924	Local	Male	1989	
688-59925	Local	Male	1989	Egret
688-59926	Local	Male	1989	Egret
688-59927	Local	Female	1989	Egret
688-59928	Local	Male	1989	Egret
688-59929	Breeder	Female	1989	Gadwall
688-59930	Breeder	Male	1989	Gadwall
688-59933	Local	Female	1990	Pintail
688-59937	Local	Male	1990	Pintail
688-59939	Local	Male	1990	Pintail
688-59940	Local	Female	1990	Pintail
688-59941	Local	Female	1990	Pintail
688-59942	Local	Female	1990	Pintail
688-59943	Local	Male	1990	Pintail
688-59951	Local	Male	1990	Avocet
688-59952	Local	Female	1990	Avocet
688-59953	Local	Male	1990	Avocet
688-59954	Local	Female	1990	Gadwall
688-59956	Local	Female	1990	Gadwall
688-59959	Local	Male	1990	Gadwall
688-59960	Local	Female	1990	Gadwall
688-59961	Local	Female	1990	Gadwall
688-59962	Local	Female	1990	Gadwall
688-59963	Local	Male	1990	Gadwall
688-59964	Local	Female	1990	Gadwall

F(#) - KNOWN FAMILY GROUP

*** - 36 goose bands remain for banding (9/90)