

1989 DECK PRODUCTION STUDY

FISH SPRINGS NATIONAL WILDLIFE REFUGE

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1989 DUCK PRODUCTION

Fish Springs NWR initiated its first nest-dragging operations in 1989. The Mayfield Exposure Method was adapted to the collected data to determine nest success. The MEM was used in conjunction with pair counts and brood data to determine overall production. Many pitfalls were encountered along the way, but much was learned from these problems and the collected data. The traditional nest-dragging and data extrapolation encountered in the prairie states appears invalid at Fish Springs and many modifications are needed to adapt this system into a worthwhile refuge program.

Methods:

Two 4-wheel drive ATV's were used to drag a single 100' long, 5/16" chain through the nesting habitat. The airboat or wading was used to check emergent sloughs, islands, and other areas inaccessible by ATV's. These areas were either dragged with a rope or the beat-out method was used in emergents. Searching began on May 2 and ended June 13, due to a shortage of manpower and other scheduling conflicts.

Survey areas were generally a hit or miss deal since we did not know what we would encounter in each area. The variable habitat and high interspersion of water dictates that most dragging areas are small and often difficult to drag. Most of the larger areas are primarily drier uplands with sparse vegetation and therefore not good nesting habitat. The 1989 plots (map 1) were surveyed twice when possible. Some areas proved so poor and difficult to survey that they were not redone and will probably be dropped in 1990.

While dragging, one person was generally designated as the spotter and the other person identified the flushed hen and searched for the nest. When the nest was located, eggs were counted then several were candled using short lengths of radiator-type hose to determine age. Nests were then flagged from 3-10' before the nest was encountered parallel to the direction of travel. The distance of flag placement varied depending on the surrounding habitat characteristics, etc. Field data sheets were then filled out with the appropriate data. Attempts were made to relocate nests at 7-10 day intervals to determine nest fate. Unfortunately, this time period was often lengthened because re-checking quickly became an all day ordeal, and scheduling conflicts and the lack of manpower did not allow an excess of time for re-checking.

Only rudimentary vegetation data was collected this year. Since plot analysis is a time-consuming proposition, particularly with the varied habitat of this refuge, it was felt that staff time

was better spent trying to locate an adequate number of nests. The lack of useful refuge aerial photos made plot sizes and subsequent extrapolations difficult to determine.

Nesting success was determined by the Mayfield Exposure Method, the Shortcut Method, and through Apparent Success. Peak pair counts (Table 1) were multiplied by the nesting success to determine the number of successful nests. This was then multiplied by the average Class IIC and III brood size to determine production. The brood sizes were determined on a species basis if adequate data existed (subjective determination) or through the average size of either a dabbling or diver grouping. Though this may be somewhat unconventional, it was felt to be the most accurate considering the data at hand.

Coot nests were located primarily as incidental observations and during the beat-outs and slough searches. The number of nests found became overwhelming and rechecking was impossible. The inability to accurately age nests by candling, excluded coots from the Mayfield techniques. The fact the hens will leave nests with a partially hatched clutch, then return later for the rest can cause confusion as to whether a nest was abandoned, failed, etc. We did not have time to continually monitor coot nests.

### Results:

There was approximately 400 acres surveyed. This is considered a very rough estimate and was obtained from generalized refuge maps. If adequate aerial photos existed, this could have been more accurately determined. About 75 man-hours were spent nest-dragging, with an additional 40 man-hours spent hand-dragging or using the beat-out method.

A total of 60 duck nests were located and followed to a conclusion. Of these, 46 met requirements for use in the Mayfield formula: 29 by nest-dragging, 9 by hand-dragging or beat-out, 8 by incidental location. The latter were included since nesting success became our only goal from this data and no habitat extrapolations were to be done.

Nesting success was relatively poor:

Apparent Success = 33% (15 of 46 nests)  
Mayfield Exposure Method = .0906 or 9%  
Shortcut Method = .14875 or 15%

Brood counts (Table 2) show overall brood survival at 48%.

|          | Avg. Class IIC-III size / Avg. Clutch Size = Brood Survival |   |      |   |     |
|----------|-------------------------------------------------------------|---|------|---|-----|
| Dabblers | 5.53                                                        | / | 9.40 | = | .59 |
| Divers   | 3.51                                                        | / | 9.33 | = | .38 |
| Overall  | 4.52                                                        | / | 9.37 | = | .48 |

The average Class IIC/III size for divers may be low. Many of the older broods were observed independent of adults (especially ruddy ducks) and thus counts may have tallied broods that had partially broken up, causing an overestimate of brood numbers.

Coot production was determined through brood counts and pair counts. There were 142 broods of "late class" coots tallied with an average of 2.04 young/brood. Two pair counts were averaged to attain an estimate of 339 pairs, which translates to 678 young fledged. This is probably a conservative estimate. Since both sexes in coots look similar and nesting hens appear to leave nests frequently, pair count data is suspect. Coot production techniques need to be refined.

Table 3 shows the production estimates by species. Table 4 shows the production estimates since 1982.

#### Discussion:

Typical prairie style nest-dragging and subsequent Mayfield calculations and extrapolations do not hold true at Fish Springs. The varied and interspersed habitat types limits the size of plots and makes refuge-wide extrapolations unrealistic, without a more complete and in-depth dragging program.

Although a lot was learned during the 1989 season, many problems arose. The primary problem is staffing. The refuge can not expect to adequately conduct this project without 4 or more people who can devote almost all their time to it. This is particularly true in the first couple of years, since plots need to be established and measured, vegetation and other habitat conditions need to be documented and measured. Water and vegetative characteristics vary from unit to unit and therefore duck use on each unit varies. A 3-acre plot of saltgrass on Harrison unit does not contain the same number of nests as a 3-acre plot on Avocet unit because other necessary conditions do not exist. To overcome this problem, a more detailed and extensive search needs to be conducted probably on a unit to unit basis. This reduces the amount of extrapolation but greatly increases the workload.

The amount of time needed to search any particular area is greatly increased on this refuge. A variety of drag hinderances occur in most areas. These include bomb-outs and nest island waste that have not been leveled, large clumps of alkali sacaton and other clump-type vegetation, large dirt mounds exposed during irregular burns (probably in peat deposits) and decadent emergent stands. An excessive amount of time is spent freeing the drag chain from these obstructions.

The high interspersion of water also increases the amount of time spent dragging. ATV's get bogged down in the mud, and canals and ditches need to be skirted. As water conditions change, the accessibility to some areas in the plot changes thus the same

route can not always be run each time. Unfortunately, if all the hinderances were avoided there would be nothing left to drag.

The high vegetative and water interspersation also causes a problem in calculating plot sizes. Rectangular plots do not exist because of the highly variable edge. Good aerial photographs would help enormously in much of this work but currently they do not exist.

Current staffing levels will be unable to accomplish much of the needed work, as evidenced by the shutdown of operations in early June.

The low nesting success introduced the need for evaluations of predator populations, impacts and control. Of the 21 destroyed nests, only 1 or 2 appeared to be caused by coyotes. The rest were victims of avian predation principally ravens. Very few gulls exist on the refuge at this time of the year and those present were rarely observed in the primary nesting areas. Most gulls frequented Gadwall unit, where duck nesting is limited. Coyotes were rarely observed until the latter parts of the season and there has been no evidence of skunks or raccoons on the refuge this year. Gopher snakes are a predator but their impact is unknown.

A pair of ravens were known to be nesting just off the refuge this year. Numerous sightings of these ravens carrying eggs to the nest area occurred. Many raven-depredated eggs were found along roads, and atop mounds and other elevated sites. Few ravens were observed on the refuge, other than the nesting pair. This indicates the potential devastation that can be caused by ravens. Studies in the U.S. and Canada are showing that corvids may be impacting duck populations to a greater extent than originally thought. On the refuge, ravens have been observed destroying nests within an hour after they had been located by dragging. On one occasion, 2 of 3 nests were destroyed immediately after they were located and while the drag crew was still within a few hundred yards. Whether the ravens are keying in on the nest flags or opportunistically observing the hens as they return to the nest is unknown. A raven was flushed from one of the above mentioned nests and as the destroyed nest was approached, the hen was seen nearby in the saltgrass. Five northern harrier nests were located by dragging this season. Of the 4 that were rechecked, 3 had been destroyed by ravens. Apparently ravens do not discriminate.

The problem of raven predation needs to be addressed prior to the 1990 season. Considering the extent of damage, ravens may need to be eliminated before and during the nesting season. Three of the 4 fledgling ravens were eliminated this year, but it was already too late. Nest flag placement or other methods of marking need to be looked at, to keep ravens from keying in on flags.

### Recommendations:

1. Extend the time frame of the search to include early nesting mallards and the late nesting gadwalls.
2. Expand the coverage to include both dabbling and diving duck habitat in all units.
3. Establish and document specific plot sites, including the search regime, and initiate the collection of baseline habitat data.
4. Incorporate plot sites into the prescribed burn plan as habitat conditions warrant and document fluctuations in burn site usage.
5. Revise nest marking techniques (flags versus alternatives) in both ground and overwater nesters. Standardize the acceptable techniques.
6. Monitor snake movements with snake fence and traps. Remove gopher snakes from the refuge.
7. Eradicate or harass ravens from the refuge prior to and during the nesting season, as needed.
8. Identify nesting areas particularly susceptible to coyote predation, such as islands and peninsulas, for incorporation into future predator exclusion practices.

### Needs:

1. Extra seasonal staff (both biological technicians and SCA volunteers) are essential for establishing and conducting a sound program.
2. Current refuge aerial photographs (with water levels at optimum) showing topography and vegetative types are needed for documenting plot sites and acreages. They are also needed to document changing habitat conditions.
3. Extra ATV and/or essential parts are needed for emergencies.

TABLE 1: Pair Count Data: # 1 = May 1-4, # 2 = May 31 - June 2

|            | <u>Peak<br/>Count</u> | <u>Low<br/>Count</u> | <u>% change<br/>from # 1</u> | <u>% of total<br/>dabbler/diver</u> | <u>% of total<br/>ducks</u> |
|------------|-----------------------|----------------------|------------------------------|-------------------------------------|-----------------------------|
| Mallard    | 124                   | 122                  | 1.6                          | 15.6                                | 9.4                         |
| Pintail    | 87                    | 80                   | 8.1                          | 11.0                                | 6.6                         |
| Shoveler   | 71                    | 65                   | -8.5                         | 8.9                                 | 5.4                         |
| Cinn Teal  | 231                   | 223                  | -3.5                         | 29.0                                | 17.5                        |
| Bl-wg Teal | 15                    | 14                   | 6.7                          | 1.9                                 | 1.1                         |
| Gadwall    | <u>266</u>            | 194                  | -27.1*                       | 33.5                                | 20.2                        |
| Total      | 794                   |                      |                              |                                     |                             |
| Redhead    | 388**                 | 339                  | -12.6                        | 74.2                                | 29.5                        |
| Ruddy      | 118                   | 83                   | -29.7***                     | 22.6                                | 9.0                         |
| Canvasback | <u>17</u>             | 12                   | 41.7***                      | 3.3                                 | 1.3                         |
| Total      | 523                   |                      |                              |                                     |                             |

\* - Count #1 (266) may be high, since gadwalls are later nesters the count may have picked up late migrants and/or there seemed to be a higher number of males present.

\*\* - Adjusted downward to account for the higher number of males.

\*\*\* - May reflect higher number of males in population.

Count #1 was the peak count for Shoveler, Gadwall and Ruddies.

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TABLE 2: Brood Count Data: #1- June 22, #2- July 19, #3- Aug 23

|            | <u>Count 1</u> |              | <u>Count 2</u> |              | <u>Count 3</u> |              | <u>All Counts</u> |              |
|------------|----------------|--------------|----------------|--------------|----------------|--------------|-------------------|--------------|
|            | <u>#</u>       | <u>%</u>     | <u>#</u>       | <u>%</u>     | <u>#</u>       | <u>%</u>     | <u>#</u>          | <u>%</u>     |
|            | <u>broods</u>  | <u>total</u> | <u>broods</u>  | <u>total</u> | <u>broods</u>  | <u>total</u> | <u>broods</u>     | <u>total</u> |
| Mallard    | 8              | 17           | 3              | 5            |                |              | 11                | 9.7          |
| Pintail    | 2              | 4            |                |              |                |              | 2                 | 1.8          |
| Shoveler   | 1              | 2            | 2              | 3            |                |              | 3                 | 2.7          |
| All Teal   | 7              | 15           | 6              | 10           |                |              | 13                | 11.5         |
| Gadwall    | 3              | 6            | 17             | 29           | 4              | 67           | 24                | 21.2         |
| Redhead    | 12             | 25           | 16             | 27           | 2              | 33           | 30                | 26.6         |
| Ruddy      | 12             | 25           | 14             | 24           |                |              | 26                | 23.0         |
| Canvasback | <u>3</u>       | <u>6</u>     | <u>1</u>       | <u>2</u>     | <u>—</u>       |              | <u>4</u>          | <u>3.5</u>   |
| Totals     | 48             |              | 59             |              | 6              |              | 113               |              |

Counts #2 and #3 did not include any Class III birds.

TABLE 3: PRODUCTION BY SPECIES

|            | # Pairs | # Successful | Avg Class IIC-III<br>X Brood size | = | # Young |
|------------|---------|--------------|-----------------------------------|---|---------|
| Mallard    | 124     | 11.2         | 5.25                              |   | 59      |
| Pintail    | 87      | 7.8          | 5.53                              |   | 43      |
| Shoveler   | 71      | 6.4          | 5.53                              |   | 35      |
| Cinn Teal  | 231     | 20.8         | 5.53                              |   | 115     |
| Bl-wg Teal | 15      | 1.4          | 5.53                              |   | 8       |
| Gadwall    | 266     | 23.9         | 6.12                              |   | 146     |
| Redhead    | 388     | 34.9         | 4.37                              |   | 153     |
| Ruddy      | 118     | 10.6         | 2.30                              |   | 24      |
| Canvasback | 17      | 1.5          | 3.00                              |   | 5       |
| Total      |         |              |                                   |   | 588     |

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Table 4: Waterfowl Production at Fish Springs NWR 1982-1989

|            | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|------------|------|------|------|------|------|------|------|------|
| Mallard    | 356  | 800  | 570  | 400  | 350  | 400  | 70   | 59   |
| Pintail    | 429  | 300  | 300  | 520  | 310  | 300  | 370  | 43   |
| Shoveler   | 239  | 190  | 130  | 50   | 380  | 200  | 20   | 35   |
| All Teal   | 90   | 70   | 420  | 450  | 280  | 40   | 120  | 123  |
| Gadwall    | 620  | 600  | 320  | 230  | 270  | 300  | 110  | 146  |
| Redhead    | 845  | 770  | 350  | 80   | 700  | 1400 | 350  | 153  |
| Ruddy      | 55   | 120  | 40   | 40   | 150  | 300  | 40   | 25   |
| Canvasback | 10   | 60   | 40   | 80   | 290  | 250  | 50   | 5    |
| Subtotal   | 2589 | 2910 | 2170 | 1850 | 2730 | 3550 | 1130 | 588  |
| Canada     |      |      |      |      |      |      |      |      |
| Goose      | 55   | 140  | 130  | 80   | 90   | 70   | 75   | 22   |
| American   |      |      |      |      |      |      |      |      |
| Coot       | 2000 | 120  | 260  | 390  | 500  | 700  | 300  | 678  |

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MAP 1. 1989 NEST-DRAGGING UNITS

