Determining Nest Numbers in the Franklin Gull Colony on Sand Lake National Wildlife Refuge 1997

Introduction

Since 1994, Sand Lake National Wildlife Refuge has been home to a large nesting colony of Franklin's gulls. High water levels in the refuge pools during this time have provided ideal nesting conditions for these birds. Nest numbers within the colony have varied from 155,325 nests in 1994, 127,140 nests in 1995, 86,385 nests in 1996, and 90,179 nests in 1997. During this time, we have experimented with different methods of determining and documenting nest numbers. Dave Gilbert, Region 6 RAM, greatly assisted in this effort by piloting the flights for the aerial photography and by providing both equipment and guidance in the use of infra-red, 35 mm, and video aerial photography techniques. This report will summarize the different methods used and the results of this year's technique.

Methods

From 1994 - 1996, nest numbers were determined by mapping out the colony on a 4 inch per mile aerial photo to determine the size of the colony. After the birds began incubation, we checked different areas of the colony to determine nest densities. The colony was then subdivided into areas of different nest densities, and these figures were used to calculate the total number of nests in the colony. This method has worked for us, but we would like to refine it to better document nest numbers.

We experimented with infrared photography during 1995 through 1997, but the results were disappointing. During 1995, we attempted to photograph the entire colony with aerial photographs using infrared film. We tried to fly overlapping transects over the colony at an altitude of approximately 1000 feet. We had problems with gaps in the coverage, in addition to being unable to identify individual nests from the prints.

Again in 1996, we attempted to aerially photograph the entire colony with infrared film, trying to refine our technique for staying on line in the transects, and timing for releasing the shutter on the camera. We put out two markers (100 feet apart) in the colony, to help determine the scale of the photos. But the results were similar to 1995. We also used the 4 square mile video equipment to take a black and white video of the entire refuge at approximately 8000 feet above the ground. We flew in north and south transects, covering 1 mile at a time. I thought if this technique worked, we could possibly use it to more accurately determine the size of the colony each year.

During the 1997 nesting season, instead of trying to cover the entire colony with infrared photography, we set out 3 sets of markers, and flew several low-flight transects over the colony. The markers were placed on the edges of three different areas of the colony. They were 100 feet apart. In each transect through the colony, we attempted to get one frame with the two markers, to set the scale. We flew at an altitude of approximately 600 feet above ground and set the camera lens at 70 mm. We flew the transects first using infrared film, and again using Kodak Elite II slide film. We later flew the transects again using the black and white video camera. In addition, we shot black and white video (using 4-square mile equipment) at 8000 feet, to document the size of the colony.

Results of 1997 Estimation Technique

The infrared photos were not usable. There may have been a problem with the film or the developing, but we could not identify individual nests from those photos.

The slides were good enough that individual nests could be identified on most of the slides. The markers in each transect provided a scale to use to determine nest density for some of the photos in each transect (Figure 1). The density per 10,000 square feet was determined, and then converted to nests/acre. The average density for each transect was used to determine total nests.

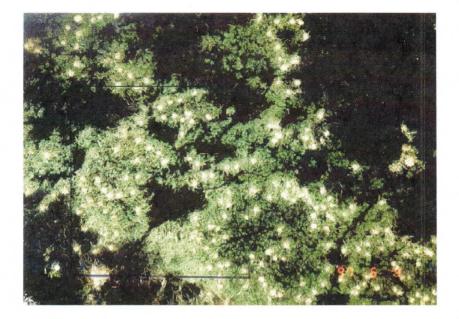


Figure 1. Photo #14, Transect #1, with 63 nests/10,000 square feet.

The size of the colony was determined by the black and white aerial video taken on the same day. The video of the colony area was transferred to a computer image. From this image, the scale was determined from a known distance, and the colony was mapped on it. The mapping was done from notes taken earlier in the nesting season, while checking the colony by boat.

We were unable to identify individual nests from the black and white video taken of the transects at an altitude of 600 feet. The nests were passing by too quickly at that altitude to get a clear picture. An increase in altitude would also decrease the visibility of the nests.

The number of nests in the Franklin's gull colony nesting on Sand Lake NWR in 1997 was determined as follows:

West Colony Area

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Area - 86 acres

Average nests/acre - 244

Total nests - 244 nests/acre X 86 acres = 20,984 nests

East Colony Area

Area - 276 acres

Average nests/acre - 222

Total nests - 222 nests/acre X 276 acres = 61,272 nests

North Colony Area

Area - 57 acres

Average nests/acre - 139

Total nests - 139 nests/acre X 57 acres = 7,923 nests

90,179 Total Nests

Discussion & Recommendations

The original intent of using the infrared aerial photos was to get a total nest count of the Franklin gull colony on Sand Lake NWR. I've determined that this is not feasible with our equipment, time, and money constraints.

Although the actual methodology used to determine this year's nest numbers is similar to the last three years, the aerial photographs and the video help to document the nest density and colony size from year to year. The yearly videos will also document changes in emergent vegetation patterns in this important area of the Sand Lake marsh.

Although the emergent vegetation in the colony area continues to thin out, nest density increased this year. Some birds also nested north of State Highway 10 this year. This accounted for the increase in nest numbers from 1996.

I recommend continuing the photo transects over future Franklin gull colonies, along with video of the entire refuge. If available, color video capability may be a better alternative to the black and white. We will continue to try to improve on these methods.



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