

EAGLE INVESTIGATIONS WITHIN THE JAMES RIVER CONCENTRATION AREA



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Report to: Charles City County, Virginia / U.S. Fish & Wildlife Service / 1994

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BACKGROUND

The James River through eastern Virginia is known to support the largest summer concentration of Bald Eagles on the east coast. During any mid-summer day it is not unusual for over 100 eagles to be observed by boat along one seven mile stretch of river (just east of Hopewell). Recent evidence suggests that the James River site holds regional significance for the Bald Eagle and that many of the individuals observed here come from outside Virginia. We suspect that post-nesting birds from both the north and south are attracted to this communal roost area to forage. Although just over 140 birds represents the highest single day count, there are likely several hundred eagles that utilize the area during the course of a given summer. This contention is supported by 1) observations of fledgling birds in April and May (young at this latitude do not fledge until much later), 2) dramatic shifts (between shoreline surveys) in the ratio of adult to immature birds throughout the summer season, and 3) color markers observed on birds from Florida, South Carolina, Tennessee, Massachusetts, New York, Pennsylvania, and New Jersey.

In recognition of its regional significance for eagles, the U.S. Fish & Wildlife Service, with the initial assistance of the Nature Conservancy, purchased one 3,537 acre parcel in 1991 that contains several known roost sites. This tract constitutes the nation's 468th National Wildlife Refuge and is situated on the south shore of the James River east of Powell Creek. In early 1993, Charles City County constructed a pier on the north shore of the river at Wilcox Wharf (situated near the mouth of Queens Creek and opposite Flowerdew Hundred). The pier was intended to open public access to the waterway for recreational fishing.

In response to concerns that the pier structure and its users might negatively impact summering eagles, Charles City County in conjunction with the U.S. Fish & Wildlife Service commissioned a cursory investigation of shoreline use by Bald Eagles relative to the Wilcox Wharf site and a designated control. The objectives of the study were: 1) to compare Bald Eagle use of the two study areas in 1993 with those observed in an earlier study conducted before construction of the pier, and 2) to monitor eagle activity within the immediate area surrounding Wilcox Wharf and the control. This brief report gives a summary of the relevant findings.

SELECTION OF CONTROL SITE

During the summer of 1990 Ken Clark (at the time a graduate student at William & Mary) conducted an investigation of shoreline use within the James River Bald Eagle concentration area. Clark marked off the shoreline in 0.5 km intervals and conducted 23 shoreline surveys to map patterns of shoreline use. A summary of this data shows relative use of all areas of the shoreline prior to the construction of the pier at Wilcox Wharf. This data was used to select a control (segment of the shoreline that had comparable use to Wilcox Wharf prior to pier construction).

Several sections of the shoreline showed similar patterns of eagle use in 1990. Westover plantation was chosen as the control site because: 1) it was very similar in use to the Wilcox Wharf site, 2) the shoreline has remained the same since 1990, 3) has one of very few existing piers on the north side of the river, and 4) has good access for observers.

METHODS

Shoreline Surveys

Shoreline surveys were conducted over the same route used by Clark in 1990 (as established by M. A. Byrd in the early 1980's). Birds were counted while piloting a motorboat parallel to the shoreline and approximately 100 m offshore. Eagles observed along the shoreline or flushed were mapped on a copy of a USGS 7.5 min topographic quadrangle. Due to navigational problems along the shoreline, all surveys were conducted at high tide. Ten such surveys were conducted between 16 June and 9 September 1993.

Pier Observations

Observations of eagles at both Wilcox Wharf and Westover Plantation were made from the end of each respective pier. All Bald Eagles detected (whether perched on shoreline, soaring, or in foraging flights) within approximately 800 m of the pier were mapped on copies of 7.5 min topographic quadrangles. Eagle locations were not plotted continuously but were plotted during 1 min periods spaced 10 min apart. At the end of each 1 min survey period, a count of the number of people present on the pier was made and recorded. Observation periods were run continuously for 2 hrs at a time. Two-hr time blocks were conducted in time slots referred to as "early" and "late". Early time periods began as early as visibility allowed. It was not possible to establish a regular starting time because of the often foggy or cloudy conditions in the study area. Eagles seem to move out to the river as soon as visibility conditions allow. Starting times for early periods were generally between 5:30 and 6:00 AM. Starting times for late periods were generally around 8:00 AM.

Two 2-hr observation periods were conducted at both Wilcox Wharf and Westover Plantation each week. This includes one early and one late for each (the order of early/late and sites was randomly determined). Surveys were conducted between 16 June and 8 August, 1993. Sixteen 2-hr observations periods (8 early and 8 late) were conducted on each pier.

Data Summary and Analysis

Data collected during shoreline surveys was compiled by summing the number of eagles detected within shoreline segments determined by Clark (except that 5 successive segments used by Clark were combined to reduce the overall number). This resulted in 12 shoreline segments (see figure 1) that could be compared directly to Clark's data. In addition to this overview, sections containing Wilcox Wharf and Westover were compared directly to evaluate any changes since pier construction.

Data collected from piers was compiled over the field season to evaluate number of eagles surrounding piers, number of people on piers and the influence of time of day on these patterns.

RESULTS

Patterns of Shoreline Use

During 10 shoreline surveys conducted during 1993, 878 eagles were counted. In 1990, 1345 birds were detected during 23 surveys. This represents a 50% increase in the number of birds detected per survey between 1990 and 1993. However, it should be noted that the 1990 counts began earlier and extended later such that many surveys were done at times falling outside the seasonal peak.

In terms of the broad-scale distribution pattern of birds within the concentration area, there was very little change in relative use of shoreline segments between 1990 and 1993 (see figure 2). Only 3 of the 2.5 km shoreline segments showed any significant shift in usage. These three were Maycocks Point, Wilcox Wharf, and Bucklers Point. Maycocks Point showed a significant increase in relative use from 1990 to 1993 ($X^2 > 4$, $P < 0.05$) while Wilcox Wharf and Butlers Point showed a significant decrease in relative use ($X^2 > 4$, $P < 0.05$).

To evaluate changes at the Wilcox Wharf and Westover sites in closer detail, birds were summed within the smaller 0.5 km segments originally used by Clark. A comparison between 1990 and 1993 data at this scale shows that the relative use of the Wilcox Wharf site was very low in both years and did not decline appreciably between years (see figure 3). The Westover site also shows very low relative use in both years but a significant (nearly 3 fold) increase in relative use between 1990 and 1993.

Pier Observations

A total of 342 eagles were observed within 800 m of piers and 539 people were counted on piers during the 32, 2-hr surveys. Summing over all surveys there was no significant difference in the number of eagles observed within 800 m between Wilcox Wharf and Westover Plantation ($X^2 < 2$, $P > 0.05$). However, there were over 13 times more people observed using the pier at Wilcox Wharf compared to that at Westover (501 vs 38), ($X^2 > 390$, $P < 0.05$). In addition, there were differences in the daily timing of pier use between the two sites (see figure 4). There were more people early in the morning at Westover compared to later in the morning (however the difference was not significant).

Wilcox Wharf showed the opposite pattern with a significant increase in human use throughout the morning ($X^2 > 240$, $P < 0.05$).

Eagle activity around the pier sites was not constant throughout the morning but showed a significant morning bias for both Wilcox Wharf and Westover (see figure 5), ($X^2 > 7$, $P < 0.05$). However, the reduction in activity throughout the morning was much more pronounced at the Westover site.

Although the two sites did not differ in the overall number of eagles observed within 800 m, the spatial distribution of observations was strikingly different between the sites (see figure 6). Eagle density was significantly skewed to the shoreline around the Westover pier but was skewed out toward the middle of the river around the Wilcox Wharf pier. As a result, eagle density was significantly higher around the Westover pier (compared to the Wilcox Wharf pier) out to a distance of 200 m.

CONCLUSIONS

1. A comparison of shoreline use between 1990 and 1993 shows a reduction in use between Queens Creek and Herring Creek and an increase in use of the Maycocks Point area.
2. A comparison of shoreline use between 1990 and 1993 (using 0.5 km segments used by Clark) for Wilcox Wharf specifically shows no significant change. This same comparison for Westover shows a significant 3-fold increase.
3. Significantly more people used the Wilcox Wharf pier compared to the Westover pier.

4. Both Wilcox Wharf and Westover piers showed significant time of day patterns in human use. Human use was higher in the early morning at Westover but increased throughout the morning at Wilcox Wharf.

5. Significantly more eagles were observed early in the morning compared to late for both Wilcox Wharf and Westover piers.

6. Eagle activity within 800 m was not significantly different between Wilcox Wharf and Westover piers.

7. The spatial distribution of eagles within 800 m was significantly different between Wilcox Wharf and Westover. Eagles were skewed toward the shoreline at Westover and toward the middle of the river at Wilcox Wharf.

8. The density of eagles was significantly higher within 200 m of the Westover pier compared to the Wilcox Wharf pier.

NOTE

It should be noted that only the shoreline use comparisons are valid for assessing the influence of the Wilcox Wharf pier on eagle use within the concentration area. This is true because this is the only background information available for before the pier was constructed. Although the remaining data show some valid descriptive patterns (e.g. eagle density is higher within 200 m of Westover) we have no idea how birds were distributed around the sites prior to pier construction thus can not comment on any change in distribution.

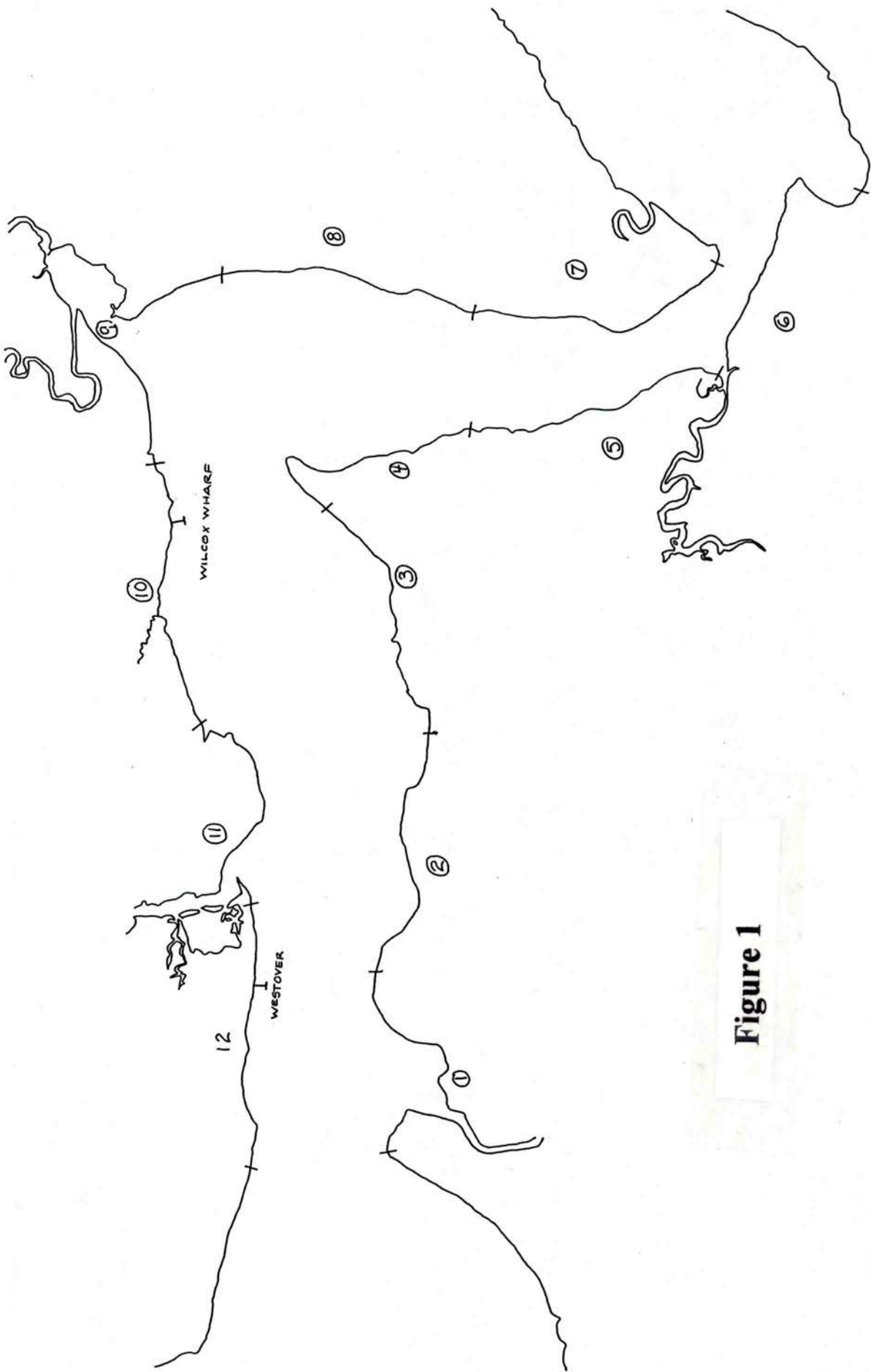


Figure 1

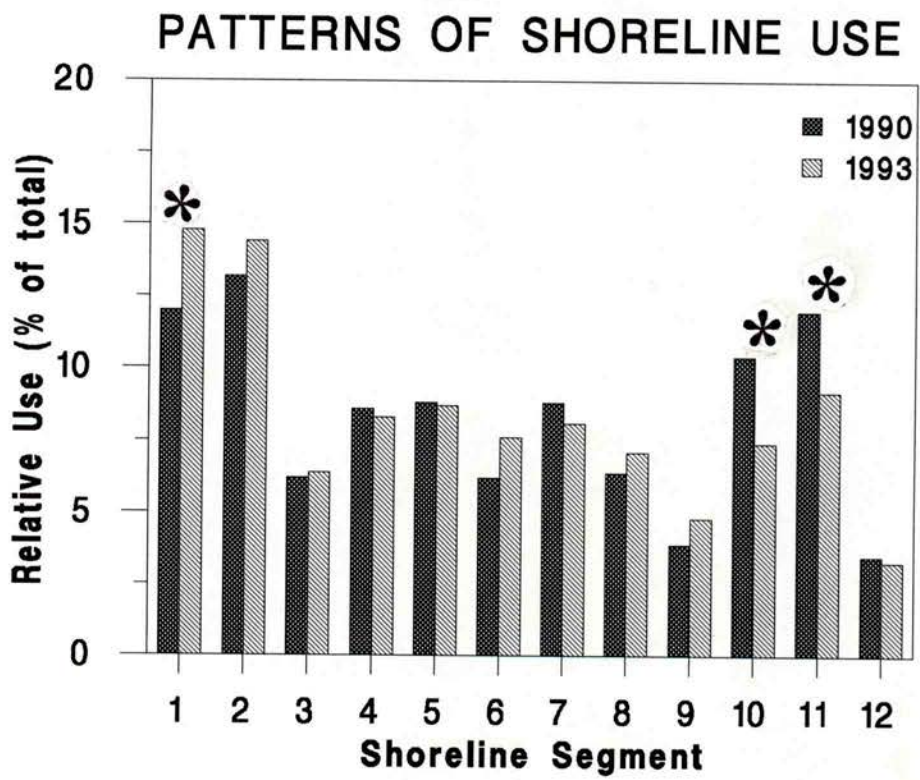


Figure 2

SITE-SPECIFIC USE

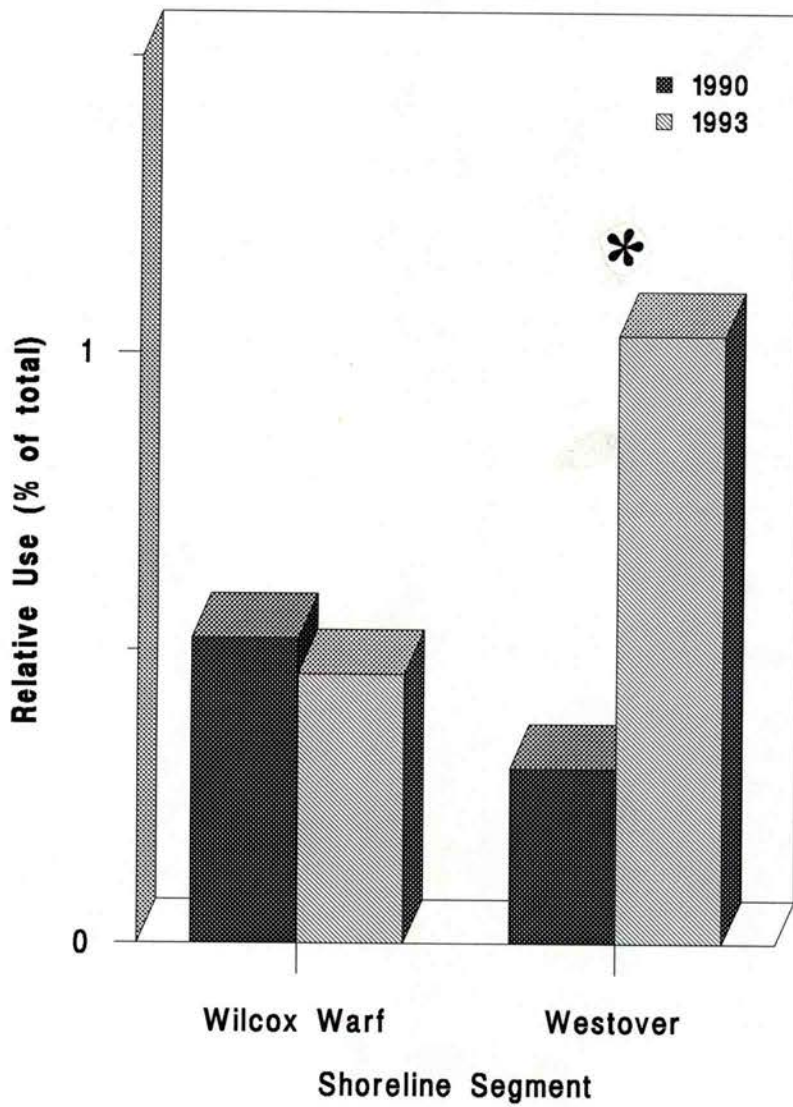


Figure 3

HUMAN USE OF PIERS

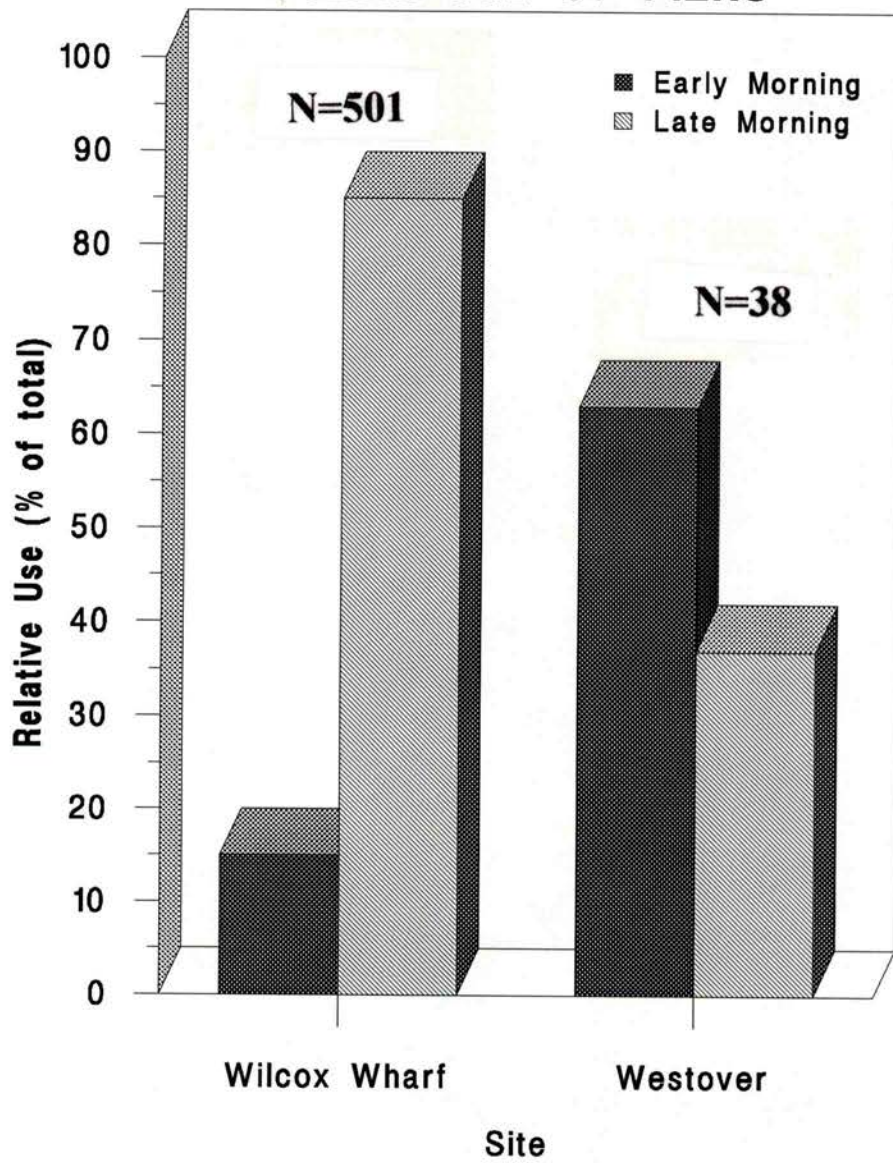


Figure 4

EAGLE ACTIVITY

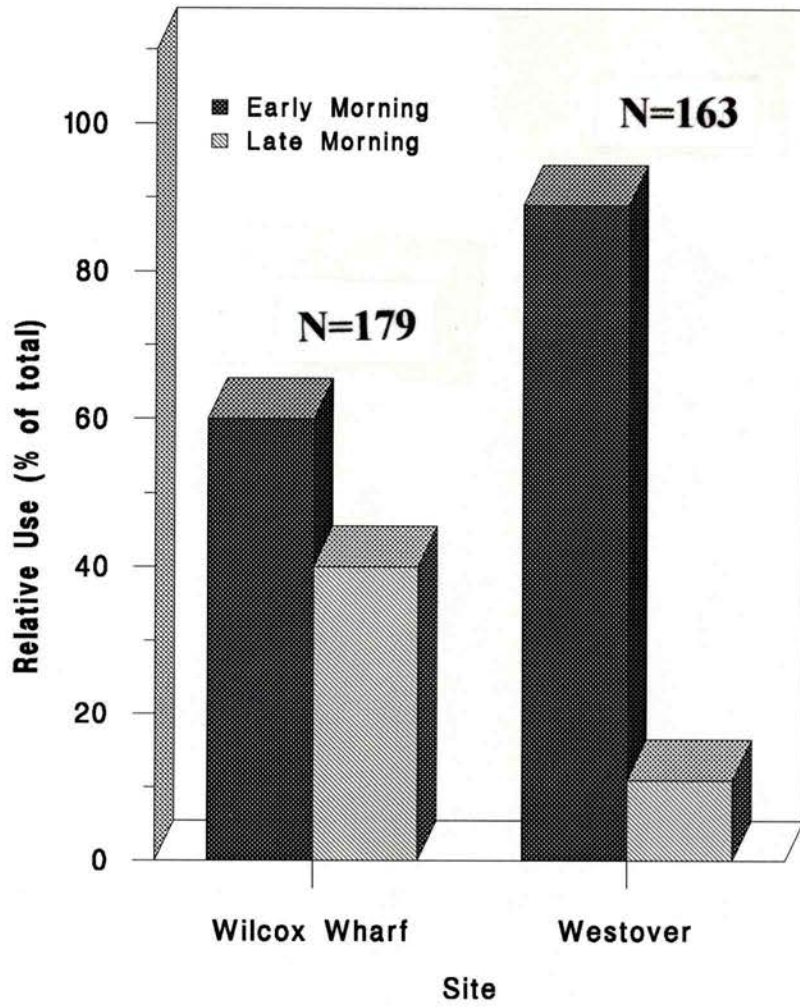


Figure 5

EAGLE DISTRIBUTION AROUND PIERS

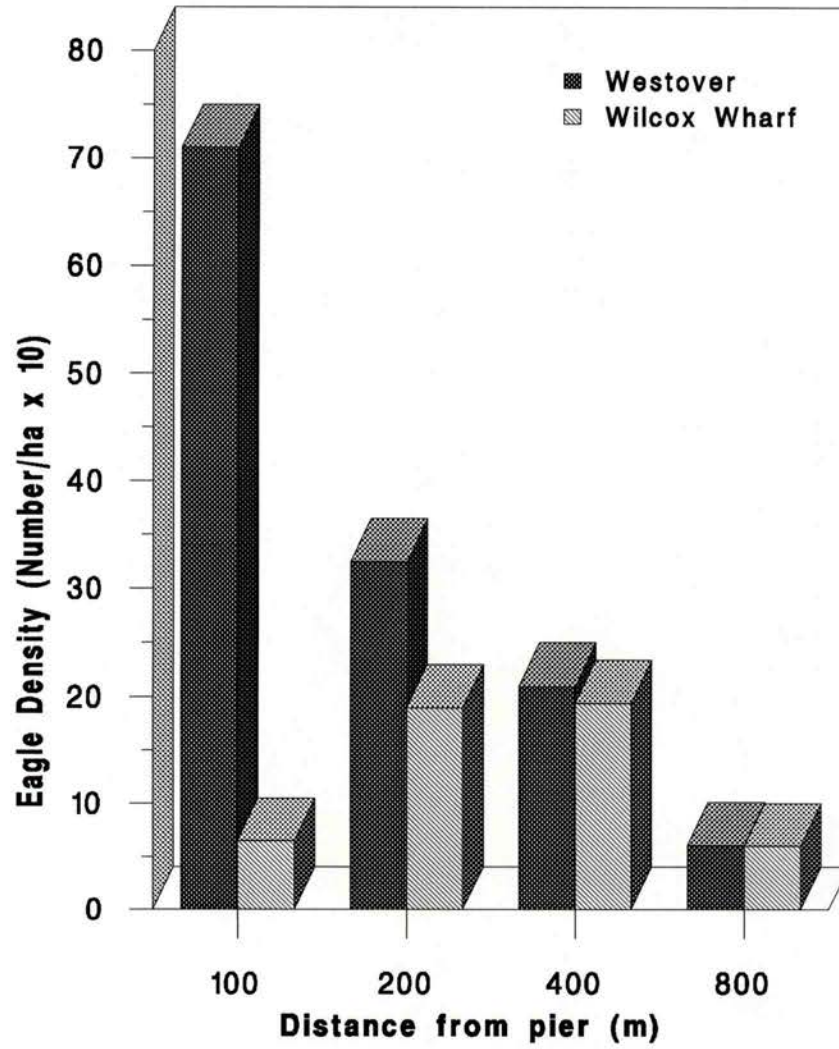


Figure 6