
 BRANT USE OF YAQUINA ESTUARY, LINCOLN COUNTY, OREGON IN THE SPRING OF 1976

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ABSTRACT.--Black Brant (*Branta bernicla nigricans*) distribution was monitored and eelgrass beds (*Zostera marina*) were mapped during the spring migration of 1976. Brant used eelgrass areas significantly, and human disturbance and tide height were important factors influencing Brant distribution and activity.

A. EDITOR'S NOTE by Range Bayer

David J. Wetzel did this study as a senior thesis project for the Department of Fisheries and Wildlife, Oregon State University. He sent me a copy of the report after it was finished in 1976, and a revised version in April 1981 along with a note, which said "I certainly have no objections to you using my data on Brant if you cite me for it." In 1981, he wrote that he had spent 3.5 years in the Peace Corps in a National Park in Cameroon in Africa; he had married, and they had a baby girl.

I have unsuccessfully tried to contact him about this project since 1981. Because his report has not been published, even though it has some important information about Brant, I have taken the liberty of heavily editing his two versions into a single version and publishing it here. I have attempted to not alter his findings or conclusions.

Accordingly, he has not had a chance to revise or comment on this draft. Because he was so willing to share his results, I hope he would approve of this paper.

Please note that his study occurred during spring migration; Brant distribution and abundance during winter are quite different (Bayer 1996a).

The heavily edited version is given below.

B. INTRODUCTION

This is a report on differential use of areas within Yaquina Bay, Oregon by Black Brant (*Branta bernicla nigricans*).

Yaquina Bay is a 1,140 hectare estuary on the Oregon central coast bordering the town of Newport (Fig. 1). The Bay is used year-around by sport and commercial vessels, with peak periods of use occurring in summer and on weekends.

C. STUDY AREAS AND METHODS

Approx. Center of Site: 44 37' N, 124 01' W
 Oregon Natural Heritage Program Hexagon: 27,176
 Location: portions of Township 11S, Range 11W
 Area Studied: ?
 Habitat(s) Studied: Estuary
 Elevation: intertidal
 Minimum Distance to Coastline: 0 mi (0 km).

C-1. STUDY GRID AND TIDAL DATUM

A Grid was constructed by dividing an outline map of the Bay into squares, each of which were 305 m on a side (Fig. 2).

Tidal heights in feet are relative to Mean Lower Low Water (MLLW) (0.0 ft); tide heights were measured at the Oregon State University (OSU) Marine Science Center (Fig. 1).

C-2. STUDY DURATION DURING SPRING MIGRATION

Over 90 hours of Brant observations were made during 14 days in February-April 1976 (Table 1). 7 X 35 field glasses and a 9-30X spotting scope aided in viewing Brant.

C-3. BRANT CENSUSES DURING SPRING MIGRATION

Besides censuses during March-April 1976 visits to study Brant activity (see next section), there were also four days with censuses in February 1976 (Table 1).

Numerous repetitions of Brant counts showed that a precision of roughly one bird for every ten in a group was average throughout the study. Constant movement of birds and occasional periods of poor visibility due to weather and long distances between an observer and Brant probably accounted for the majority of the variation in estimates of group size.

C-4. MEASURING BRANT ACTIVITY DURING SPRING MIGRATION

Observations of Brant activity were made on 9.5 days during weekends in March and April of 1976; the dates are given in Table 1. At each Brant sighting, the time, size of the flock and the locality were recorded on the Grid (Fig. 2). At first, a staff compass and cloth tape were used in triangulating distances trigonometrically from observation points to the Brant until workers obtained enough skill to identify Grid squares visually by using landmarks opposite the observation points.

I drove from one observation point to the next around the Bay, noting Brant until the entire Bay was examined. This process was repeated continually throughout the day. If Brant were seen in the same Grid square upon the return of the workers, the Brants' presence in the area throughout the non-observation period was assumed. If different numbers of Brant were found upon the worker's return, the average of the number first seen and those seen upon the observer's return was assigned to the area for that time interval. If Brant moved from one area to another within view of the same observation point or in the same general region of the Bay during the observer's absence, time for that group was divided equally between the two areas involved.

The total time the Brant spent in each square was then estimated and multiplied by the number of Brant in the flock, giving rise to a "Brant-hours" value for each square. The Brant distribution map (Fig. 2) is the result of the compiled Brant-hours for the study period; there was a total of 4,487.3 Brant-hours.

Note that Brant-hours were combined for all tide stages and for whether Brant were foraging or not.

C-5. EELGRASS MAPPING

An 18 ft (5.5 m) dory, powered by an outboard engine, was used in Brant observations as well as in mapping vegetative eelgrass (*Zostera marina*) distribution for Fig. 1. This map was constructed from visual estimates of the extent of eelgrass beds in the Bay as they became exposed during the -1.6 and -1.7 ft low tides on 17 and 18 April 1976 measured at the OSU Marine Science Center.

The eelgrass shown on Wetzel's map is that of the persistent eelgrass beds that are mostly below MLLW at Yaquina Estuary (Bayer 1979, 1996b).

The eelgrass distribution shown in Fig. 1 is similar to the distribution found by Gaumer et al. (1974:30) in 1971. Wetzel's Fig. 1 in his 1976 draft was a photocopy of an unpublished ODFW eelgrass survey map in 1973-1974 that gave eelgrass distribution as "sparse," "moderate," or "dense," so the ODFW apparently also has unpublished maps of eelgrass distribution.

Unfortunately, Wetzel's eelgrass maps that he sent Bayer are not accurately transferable to his Grid system because his eelgrass maps did not show his Grid and they were at a different scale from his maps showing the Grid. But Figs. 1 and 2 can be roughly used for visually comparing Brant presence with eelgrass distribution, although they are not to the same scale.

D. RESULTS AND DISCUSSION

D-1. INFLUENCE OF TIDE HEIGHT ON BRANT ACTIVITY & PARASITISM OF COOTS

Tide height seems to affect the movement of Brant about Yaquina Bay. When tide height was +5 ft or more, Brant usually were found scattered widely about the open water areas of the coves in Yaquina Bay. Feeding activity was usually quite light during these periods, with birds swimming about casually, picking up bits of eelgrass that floated by.

It was during high water periods that Brant were observed associating with American Coots (*Fulica americana*). Upon two separate occasions, Brant were seen actually harassing coots as they surfaced with bits of food taken during dives. This harassment often ended in the coot dropping its food, and the Brant taking it off the water surface. As many as five to seven examples of this particular form of "parasitism" were seen in five minute intervals of observation. Brant paid little or no attention to coots during low tides.

When the tide height dropped below +5 ft, Brant would commonly congregate along shorelines to feed upon either eelgrass or the small bits of food that were deposited on the bottom before it was exposed. Feeding activities usually increased to their maximum during low water periods.

D-2. BRANT ASSOCIATION WITH EELGRASS DURING SPRING MIGRATION

The relationship between Brant and eelgrass distribution was determined by comparing total Brant-hours spent in squares containing at least 10% tideland and some eelgrass beds, with total Brant-hours spent in squares containing at least 10% tideland but no eelgrass beds. A chi-square test indicated that Brant use of squares with eelgrass was significantly greater than expected (chi-square=14.6, df=1, P less than 0.05).

Brant fed on eelgrass during low tide when use of shorelines by humans was relatively low. During high tide or when there was extensive human use of the Bay, Brant usually were in deep water or at the Refuge (square E4 in Fig. 2).

D-3. INFLUENCE OF HUMAN DISTURBANCE ON BRANT ACTIVITY

Human activities are the main determinant of how long Brant use eelgrass areas within Yaquina Bay. Unless disturbed by man's activities in and around the Estuary, Brant tend to center their activities around areas offering vegetative eelgrass stands. This was demonstrated many times during the study.

Groups of Brant were commonly found in the early morning hours (when there were low human activity levels), feeding vigorously on eelgrass as the beds were either exposed or the water level was at a point where eelgrass was easily available. As the day progressed and more and more people began congregating around the shorelines, Brant were forced from their feeding places and moved generally to less suitable habitats.

That Brant would indeed stay and feed as long as possible on eelgrass stands was demonstrated during observations made on April 19 when the entire population of Brant within the Bay (81 birds) fed on one eelgrass bed. The Brant began feeding at the earliest time possible, when the tide was still over +5 ft and continued through the +0.8 ft mark, at which time we left to return to Corvallis. No human activity was seen in the

vicinity of the Brant during the 2.5 hr of observations, and the Brant fed intensively during this period with no sign of either slowing their feeding rate or preparing to leave.

Observations during weekdays would be necessary to see if humans affect Brant activity less than during the weekends of this study or if human activity is as great during the winter.

D-4. INTRAESTUARINE DISTRIBUTION OF BRANT DURING SPRING MIGRATION

DOCKS.--Brant were not seen at the Dock area north of the Breakwater (Fig. 1), which is not surprising because it was constantly inhabited by boats and people, to which Brant show an aversion.

REFUGE.--Brant spent 44% (1968.1) of the total 4,487.3 Brant-hours at the Refuge (square E4 in Fig. 2) and were often there during high tide. The Refuge was a flat area of approximately 28,000 sq m and was along a 100 m shoreline just west of the northwest corner of the Yaquina Bay Bridge. There were no eelgrass beds there (Fig. 1), and this area supported practically no plant life or shellfish, although there were small bits of sea lettuce (*Ulva* spp.) and occasional piece of eelgrass. No grit or zootic foodstuffs were found here.

The swift currents off this shoreline made fishing from it difficult and boating hazardous. This was the only location within the harbor where clam and shrimp digging, fishing-related activities, or presence of people for extended periods of time were never observed. Further, suitable cover for predators (such as dense shoreline vegetation) was not present.

Though Brant usually fed quite heavily at the Refuge, considerable amounts of Brant-hours were spent simply resting and preening after they hauled up on shore. It is believed that Brant resorted to the Refuge when all other areas were being used by humans.

ELSEWHERE WEST OF THE BRIDGE.--There was some eelgrass south of the Refuge and west of the Bridge (Fig. 1), but Brant were seldom seen there (Fig. 2).

EMBAYMENTS.--Other than the Refuge, the sites with the greatest Brant-hours were at Sallys Bend (square G15) and Idaho Flats (square F9) (Fig. 2). The embayments were also where eelgrass was concentrated, with Sallys Bend having the most eelgrass (Fig. 1; Gaumer et al. 1974:30) and more squares with high Brant usage than any other area (Fig. 2).

[Editor's note: It is unfortunate that Brant-hours for all tide heights were combined because if they were separated for when eelgrass either was or was not available, then the sites important for Brant foraging could be identified.]

KING SLOUGH AND UPPER ESTUARY.--At King Slough, Brant were seldom found only at the mouth; Brant were uncommon as far upstream as Yaquina (square N16) and were never observed as far upstream as River Bend (Fig. 2), although eelgrass could be found along the banks of the channel at least that far upstream (e.g., see Gaumer et al. 1974:30).

E. TABLE AND FIGURES

TABLE 1. Estimated abundance of Black Brant during Wetzel's spring 1976 census dates. Bayer estimated Brant numbers from Wetzel's graph of Brant numbers versus dates, so these estimates are probably within 10-15 Brant of the number Wetzel counted. For the only census that Wetzel gave in his text (81 Brant on April 19), the graphical estimate was 75 Brant.

N=number of Brant.

1976 Date	Estimated Brant (N)
2/2	28
2/7	160
2/8	1,509
2/14	142
3/27	85
3/28	222
4/3	307
4/4	245
4/10	170
4/11	156
4/17	99
4/18	104
4/19	75 (Wetzel's exact count was 81)
4/24	28

FIGURE 1. Wetzel's eelgrass distribution at Yaquina Bay during 17 and 18 April 1976. This graph was electronically scanned from his eelgrass distribution map that he sent Bayer in 1981; Bayer added many place names. Note that there was no Grid on this or his original eelgrass distribution map and that his eelgrass maps were not to the same scale as his Brant-hour figures, so a simple overlay or placing of his Grid on his eelgrass figures was not possible without error. Also see the discussion in section C-5. Wetzel did not give the scale for this map.

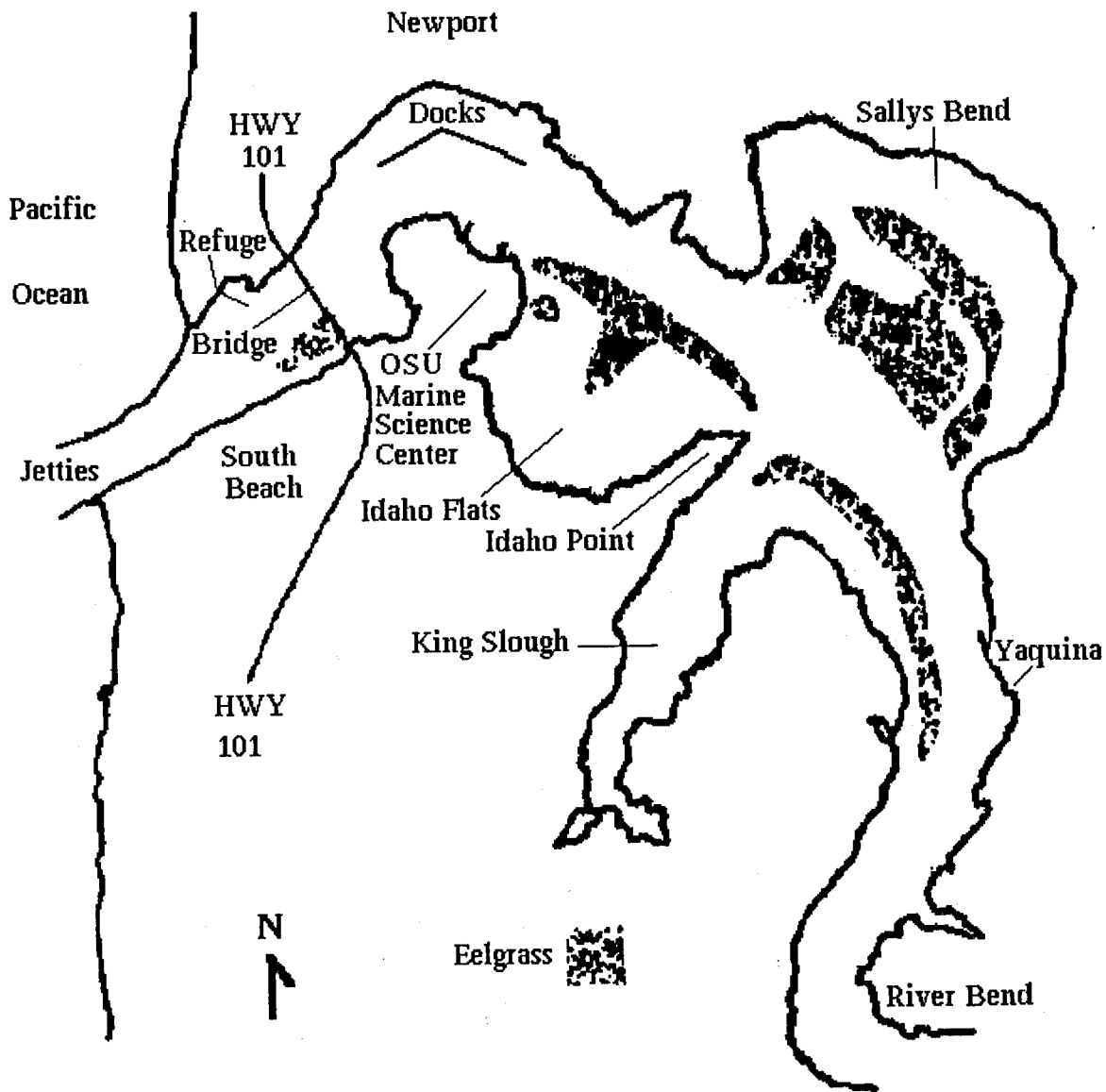
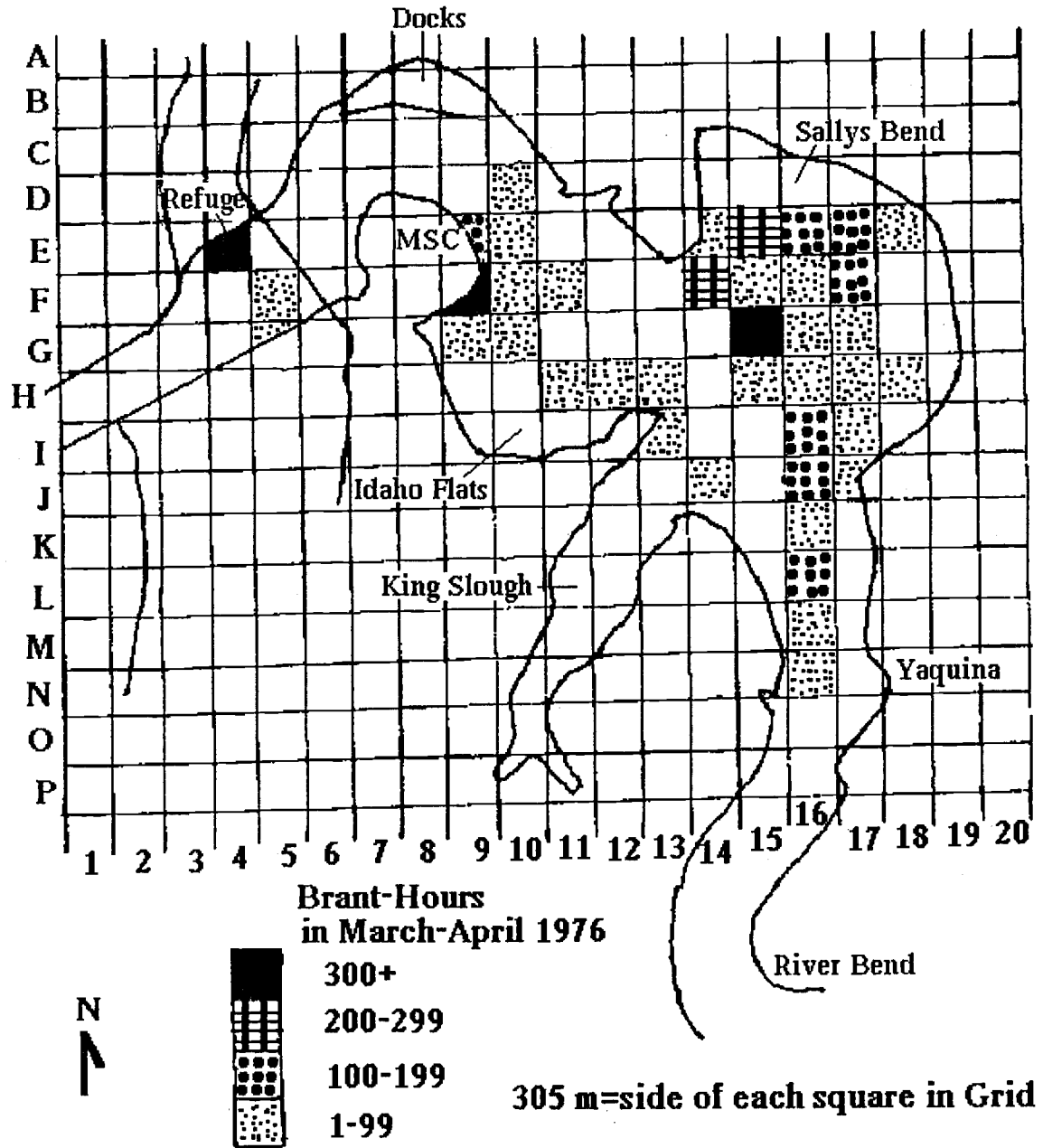


FIGURE 2. Wetzel's total Brant-hours and Study Grid at Yaquina Bay during 9.5 days in March and April 1976. His Grid was composed of squares 305 m on a side. This figure shows the Grid in his 1976 paper with an overlay of the Brant-hours per square given in his updated 1981 draft. The Grid was not square in Wetzel's original figures, so this figure is also not square. MSC=OSU Marine Science Center.



F. ACKNOWLEDGEMENTS

I thank Robert E. Olson, Range Bayer, Richard S. Caldwell, and Clay Creech of the OSU Marine Science Center and Tom Gaumer of the Oregon Department of Fish and Wildlife for their cooperation in the execution of this study.

[Editor's Note: Wetzel uses "observers" and "workers" many times in his first draft but does not give names of people who may have helped him with his observations or eelgrass mapping.]

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