

SPOIL BANK AVIFAUNA IN THE INTERMEDIATE MARSHES OF SOUTHWESTERN LOUISIANA

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ABSTRACT

A study of the bird usage of spoil banks in the intermediate marshes of southwestern Louisiana was conducted from late February 1973 to mid-April 1974 along the Superior Canal spoil bank system within Rockefeller Wildlife Refuge, Cameron Parish, Louisiana. During the study period we recorded 75 bird species on the banks. In summer we found seven species nesting and 17 other species feeding and/or resting on the banks. In fall, winter, and spring 72 bird species were sighted and/or mist netted on the banks, including spring and fall migrants, and winter and permanent residents of southern Louisiana. The spoil banks' year-round dense cover and high ground were the probable reasons for the bank usage by a diverse group of birds.

The random and cumulative development of oil and gas fields and the construction of extensive navigation channels in Louisiana's 1.7 million hectares of coastal marshland have resulted in a widespread network of canals and spoil banks. By 1973 there were more than 489 square kilometers of canal systems and 264 square kilometers of spoil bank honeycombing the Louisiana coastline. The detrimental impacts of canal dredging on marshes have been well documented. They include (1) the direct and permanent alteration and loss of marsh habitat, (2) the reduction of marsh habitat quality, (3) the alteration of natural hydrologic patterns, (4) siltation and saltwater intrusion, (5) increased erosion rates, and (6) the destruction of archeological sites (McGinnis, et al. 1972, Gagliano 1973, Adkins and Bowman 1976).

There are some beneficial impacts of canal dredging and spoiling in Louisiana's marshes. One of the major benefits appears to be the spoil banks which have created a new habitat that provides high ground and dense cover for both marsh and upland wildlife. However, little definitive information on the usage by and the importance to wildlife of spoil banks is available. The purpose of our study was to provide some information on the bird usage of spoil banks located in the intermediate marshes of southwestern Louisiana.

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Plant scientific nomenclature is after Fenald (1950), Gleason (1968), Hitchcock (1950), Radford, et al. (1968), and Small (1933). Bird scientific nomenclature is after American Ornithologist's Union (1957) and American Ornithologist's Union Committee on Classification and Nomenclature (1973).

STUDY AREAS

The study area was confined to the section of the Superior Canal's spoil banks and adjacent intermediate marsh within the boundaries of Rockefeller Wildlife Refuge,

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Cameron Parish, Louisiana. Within the refuge, the Superior Canal is about 26 kilometers long and 30 meters wide with several spur canals branching from the main canal. North of the refuge, the canal crosses the eastern terminus of the Grand Chenier Ridge and Louisiana Highway 82, and then extends 16 kilometers to join Grand Lake. The southern extremity of Superior Canal is about five kilometers north of the Gulf of Mexico. There are many other canal systems on the refuge, including several which are connected to Superior Canal. Construction of the main section of the canal was completed by 1952 and the major spur canals between 1952 and 1956 (Mr. J. M. Motor, pers. comm., 1974, Superior Oil Company, Houston, Texas).

The width of the canal's spoil banks range from about 9 to 40 meters with elevations ranging from about 0.3 decimeters to 1.5 meters above mean marsh level. These banks form a portion of the levee system for three marsh impoundments (Lakes 8, 10, and 13) located at the northern end of the canal system. The vegetation of these banks is markedly different from the surrounding intermediate marsh. Groundselbush (*Baccharis halimifolia*), an evergreen wood shrub, and wiregrass (*Spartina patens*) are the dominant plants on the spoil banks, comprising 34.5 and 36.0 percent of the vegetative cover, respectively. Other common plants include *Eupatorium serotinum*, deer pea (*Vigna luteola*), and pink hibiscus (*Kosteletskya virginica*). Roseau cane (*Phragmites communis*) and hogcane (*Spartina cynosuroides*) are locally common species, even though they constitute only 4.4 and 0.4 percent of the cover, respectively. Other woody shrubs found on the banks are marsh elder (*Iva frutescens*), rattlebox (*Daubentonia texana*), and *Sesbania exaltata* which collectively comprise only 1.3 percent of the cover. Small trees, including tallow-tree (*Sapium sebiferum*), chinaberry (*Melia azedarach*), and black willow (*Salix nigra*) are scarce on the banks, each making up less than 0.05 percent of total cover (Spindler and Noble 1974).

The surrounding intermediate marsh, consisting of numerous potholes, bayous, and lakes, is a transition zone between the fresh marsh to the north and the brackish marsh to the south. This vegetation type is a major constituent of the southwestern Louisiana marshland, comprising almost 30 percent of total marsh acreage. The water salinity of the intermediate marsh type has a mean of 2.6 ppt (parts per thousand) with a range of 0.5 to 6.0 ppt. Wiregrass is the dominant plant of the intermediate marshes, with paspalum (*Paspalum vaginatum*), Walter's millet (*Echinochloa walteri*), bullwhip (*Scirpus californicus*), and roseau cane also prevalent. Groundselbush is practically absent in the intermediate marshes, making up only 0.3 percent of the composition. Rattlebox is even scarcer comprising only 0.08 percent of the composition. The trees and other shrubs found on the Superior Canal spoil banks are apparently absent in the surrounding marsh (Chabreck 1970).

METHODS AND MATERIALS

Summer Study

Forty paired sample plots (20 spoil bank plots and 20 marsh plots) were randomly selected to determine the density and distribution of nesting birds, by species, on the Superior Canal spoil banks and in the adjacent intermediate marsh. Each sample plot was 61 meters long and the width of each marsh plot was equal to the adjacent bank plot's width measured at plot center. Nine of the marsh plots were not directly adjacent to the paired bank plot due to large ponds or bayous, but were located as close as possible. At approximately two week intervals, from late March through July, we recorded the location and condition of each nest found in the plots. We dragged a 15.2 meter rope across the marsh plots to improve the possibility of flushing a bird from its nest. Small cow bells and cans filled with small shells were attached to the rope to make noise and add weight.

We determined the nesting density per hectare to spoil bank and marsh for each bird species and calculated a 95 percent confidence interval for the mean nesting density. A paired t-test was used to determine significant differences between spoil bank and marsh nesting density by species. The spatial distribution of nesting species was analyzed by mapping the location of each nest in each plot, dividing the plot maps into four quadrats,

testing the frequency of quadrats containing the various number of nests against the Poisson distribution.

Fall, Winter, and Spring Study

To determine the bird usage of the spoil banks in the fall, winter, and spring, we conducted observations and a mist netting operation on the banks from 30 September 1973 through 13 April 1974. Two types of tethered, monofilament mist nets were employed. The first measured 2.1 meters high by 9.1 meters long and had a 0.4 decimeter mesh and the second was about 2.4 meters high by 12.2 meters long with a 0.4 decimeter mesh. After selecting a net site, we made an opening in the vegetation and placed the net perpendicular to the bank. The bottom edge of all nets touched the ground. We periodically checked all nets during the day and kept records of all birds captured by species.

RESULTS

Summer Usage

We recorded seven bird species nesting on the spoil banks. The red-winged blackbird (*Agelaius phoeniceus*) was the most abundant nesting bird on the Superior Canal spoil banks and in the intermediate marsh. Spoil bank nesting was considerably greater ($p < .01$) than marsh nesting for this species. Nesting density on the banks averaged 7 nests per hectare with a 95 percent confidence interval of 4 to 10 nests per hectare. Marsh nesting density averaged one nest per hectare with a 95 percent confidence interval of zero to one nest per hectare. Most redwing nests on the banks were in groundselbush, the most available plant to nesting birds. Other plants used to support redwing nests included roseau cane, pink hibiscus, marsh elder, wiregrass, hogcane, *Eupatorium serotinum*, and bulltongue (*Sagittaria* sp.). All redwing nests in the marsh were placed in wiregrass, the most available marsh plant to nesting birds. Nests were randomly distributed on the spoil banks and in the marsh.

The boat-tailed grackle (*Cassidix major*) had the second highest nesting density on the spoil banks. The average density on the banks was two nests per hectare with a 95 percent confidence interval of one to four nests per hectare. Although no nests were found in the marsh plots, boattails were observed nesting within stands of bullwhip and giant cutgrass (*Zizaniopsis miliacea*) located in a marsh pond and Lake 8, respectively. Based on the sample data, spoil bank nesting density was substantially greater ($p < .05$) than that for the marsh. Boattail nesting distribution on the banks was clumped. This was anticipated since this species usually nests in loose colonies (Bent 1965). The spoil bank colonies were, however, small, consisting normally of less than 20 nests. The largest colony observed along the banks consisted of 50 nests. Most of the boattail nests on the banks were in groundselbush. Other plants used to support nests included marsh elder and roseau cane.

The green heron (*Butorides virescens*) was a common nesting bird on the banks. Groundselbush was again the most frequently used plant to support nests. A few nests were found in black willow and rattlebox. Only one active nest and two incomplete nests were found in the bank plots. No nests were located in the marsh plots. The data showed no difference ($p > .05$) between bank and marsh nesting, but observations along the total bank system indicated that green heron nesting was considerable and probably the third highest among the bank nesting species. According to the sample data, the nesting density on the banks averaged one nest per hectare with a 95 percent confidence interval of zero to one nest per hectare. The nesting distribution for this and the remaining species was random.

The orchard oriole (*Icterus spurius*) and least bittern (*Ixobrychus exilis*) commonly nested on the banks. Both nested mainly in groundselbush. Other plants used by the orchard oriole included marsh elder. The least bittern utilized hogcane, marsh elder, and sawgrass (*Cladium jamaicense*) to a limited extent. No evidence of the orchard oriole nesting in the marsh proper was found, but this was expected since no preferred vegetation (shrubs or trees) was present. Based on the sample data, the oriole nesting density on the banks was considerably greater ($p < .05$) than that in the marsh. The estimated nesting density for this species was one nest per hectare with a 95 percent confidence interval of zero to one nest per hectare. We did find a few least bittern nests in

the marsh, and, based on the sample data, no significant difference ($p > .05$) in nesting existed between the two areas.

The eastern kingbird (*Tyrannus tyrannus*) nested uncommonly on the banks. All nests were located in groundselbush at the canal edge. No nesting was recorded in the bank and marsh plots. One mottled duck (*Anas fulvigula*) nest, containing egg shells, was found in wiregrass on a spoil bank that served as the levee for a sludge pond during the summer of 1973. Another mottled duck nest was found with six eggs in another area of the same spoil bank levee in April of 1974. Two orchard oriole nests and one redwing nest on the banks contained eggs of the parasitic brown-headed cowbird (*Molothrus ater*).

During the summer, we sighted 17 other bird species on the spoil banks, seven of which may possibly have nested due to the abundance of their preferred nesting habitat (dense, shrubby vegetation). The seven species were the yellow-billed cuckoo (*Coccyzus americanus*), mockingbird (*Mimus polyglottos*), brown thrasher (*Toxostoma rufum*), loggerhead shrike (*Lanius ludovicianus*), common yellowthroat (*Geothlypis trichas*), cardinal (*Cardinalis cardinalis*) and rufous-sided towhee (*Pipilo erythrophthalmus*).

The clapper rail (*Rallus longirostris*) nested in the adjacent intermediate marsh to a limited extent. Although no evidence was found, we suspected the mottle duck and seaside sparrow (*Ammospiza maritima*) of nesting in the adjacent intermediate marsh because both were commonly seen during the summer.

Winter Usage

We recorded 33 bird species on the spoil banks during winter (November to mid-February). Based on observations and the mist net results along the bank system, the most common bird species using the banks during this season were the yellow-rumped warbler (*Dendroica coronata*), red-winged blackbird, swamp sparrow (*Melospiza georgiana*), common yellowthroat, and the belted kingfisher (*Megaceryle alcyon*).

Spring Usage

Fifty-six bird species were recorded on the spoil banks during spring (mid-February to mid-April). According to observations and mist netting results, the yellow-rumped warbler, red-winged blackbird, swamp sparrow, cardinal, boat-tailed grackle, common yellowthroat, and green heron were common birds on the banks during this season. Fifteen bird species, believed to be transient migrants, were recorded on the banks during the spring, including the white-eyed vireo (*Vireo griseus*), black-and-white warbler (*Mniotilta varia*), scarlet tanager (*Piranga olivacea*), ruby-throated hummingbird (*Archilochus colubris*), and bobolink (*Dolichonyx oryzivorus*).

Fall Usage

There were 23 bird species recorded on the spoil banks during late fall (late September through October). Common birds during this period included the red-winged blackbird, swamp sparrow, common yellowthroat, and belted kingfisher. We recorded a few fall transient migrants (seven species) on the banks, indicating that fall transients do use spoil banks during their migration southward. The extent of usage by spring and fall migrants should be investigated further.

Total Study Period

During the 14-month period, we recorded 75 bird species, representing 9 orders and 25 families, on the spoil banks. The number of transient species using spoil banks is undoubtedly greater than recorded since observations and mist netting were conducted during only part of the fall and spring migration periods.

DISCUSSION

Management Implications

At present there are no wildlife management practices conducted on spoil banks, but we suspect that interest along this line will develop in the near future for these reasons. Spoil bank habitat in Louisiana is widespread and comprises about 26,429 hectares. Based on several studies and observations, spoil banks appear to be valuable to many marsh and

terrestrial animals, including furbearers (Chabreck 1967), game mammals (Gould 1974, Self, et al. 1974), and birds. Finally, the management of spoil banks should be more practical and effective than that of the marsh since the manipulation and control of banks and their vegetation would appear to be easier.

We believe the year-round, dense cover on the Superior Canal spoil banks to be the major reason for the highly diverse birdlife on the banks. Thus, one of the major management practices on banks in the intermediate marshes and probably other marsh types would be the maintenance or development of dense shrub and cane stands. However, the creation of small openings in the dense stands would be beneficial since this would release many good to excellent herbaceous food plants for birds and other animals. Mechanical methods should be used to create the openings since observations have indicated that fire sets back plant succession from groundselbush to wiregrass, an undesirable situation (Spindler and Noble 1974). The periodic addition of spoil to the banks will be an important and necessary practice to overcome the natural subsidence of the banks. Another desirable practice would be the introduction or encouragement of plant species which are or would be used by marsh and upland birds as food, cover and/or nesting sites, but are scarce or absent on the banks and/or in the marsh.

CONCLUSIONS

Mineral exploitation and the construction of navigational systems has resulted in more than 26,429 hectares of spoil bank traversing the Louisiana coastal marshland. Our study has shown that spoil banks in the intermediate marshes of southwestern Louisiana are used by at least 75 bird species. Our observations indicate that the primary probable causes for the extensive use of these banks by a diverse avifauna is their year-round dense cover and high ground.

Management of spoil banks for birds and other wildlife seems very possible in the future, but additional studies are needed to ascertain the fauna of spoil banks in the swamps and other marsh types in Louisiana if this man-made habitat is to be managed effectively.

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