2001

Effects of Management Practices on Grassland Birds: Marbled Godwit

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EFFECTS OF MANAGEMENT PRACTICES ON GRASSLAND BIRDS:

MARBLED GODWIT

Grasslands Ecosystem Initiative
Northern Prairie Wildlife Research Center
U.S. Geological Survey
Jamestown, North Dakota 58401
This report is one in a series of literature syntheses on North American grassland birds. The need for these reports was identified by the Prairie Pothole Joint Venture (PPJV), a part of the North American Waterfowl Management Plan. The PPJV recently adopted a new goal, to stabilize or increase populations of declining grassland- and wetland-associated wildlife species in the Prairie Pothole Region. To further that objective, it is essential to understand the habitat needs of birds other than waterfowl, and how management practices affect their habitats. The focus of these reports is on management of breeding habitat, particularly in the northern Great Plains.

Suggested citation:


Species for which syntheses are available or are in preparation:

- American Bittern  
- Mountain Plover  
- Marbled Godwit  
- Long-billed Curlew  
- Willet  
- Wilson’s Phalarope  
- Upland Sandpiper  
- Greater Prairie-Chicken  
- Lesser Prairie-Chicken  
- Northern Harrier  
- Swainson’s Hawk  
- Ferruginous Hawk  
- Short-eared Owl  
- Burrowing Owl  
- Horned Lark  
- Sedge Wren  
- Loggerhead Shrike  
- Sprague’s Pipit  

- Grasshopper Sparrow  
- Baird’s Sparrow  
- Henslow’s Sparrow  
- Le Conte’s Sparrow  
- Nelson’s Sharp-tailed Sparrow  
- Vesper Sparrow  
- Savannah Sparrow  
- Lark Sparrow  
- Field Sparrow  
- Clay-colored Sparrow  
- Chestnut-collared Longspur  
- McCown’s Longspur  
- Dickcissel  
- Lark Bunting  
- Bobolink  
- Eastern Meadowlark  
- Western Meadowlark  
- Brown-headed Cowbird
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MARBLED GODWIT

Jill A. Dechant, Marriah L. Sondreal, Douglas H. Johnson, Lawrence D. Igl, Christopher M. Goldade, Melvin P. Nenneman, and Betty R. Euliss

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Major Funding: Prairie Pothole Joint Venture, U.S. Fish and Wildlife Service
U.S. Geological Survey

Funding also provided by: U.S. Forest Service

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February 1998
(revised January 2001)
Information on the habitat requirements and effects of habitat management on grassland birds were summarized from information in more than 4,000 published and unpublished papers. A range map is provided to indicate the relative densities of the species in North America, based on Breeding Bird Survey (BBS) data. Although birds frequently are observed outside the breeding range indicated, the maps are intended to show areas where managers might concentrate their attention. It may be ineffectual to manage habitat at a site for a species that rarely occurs in an area. The species account begins with a brief capsule statement, which provides the fundamental components or keys to management for the species. A section on breeding range outlines the current breeding distribution of the species in North America, including areas that could not be mapped using BBS data. The suitable habitat section describes the breeding habitat and occasionally microhabitat characteristics of the species, especially those habitats that occur in the Great Plains. Details on habitat and microhabitat requirements often provide clues to how a species will respond to a particular management practice. A table near the end of the account complements the section on suitable habitat, and lists the specific habitat characteristics for the species by individual studies. A special section on prey habitat is included for those predatory species that have more specific prey requirements. The area requirements section provides details on territory and home range sizes, minimum area requirements, and the effects of patch size, edges, and other landscape and habitat features on abundance and productivity. It may be futile to manage a small block of suitable habitat for a species that has minimum area requirements that are larger than the area being managed. The Brown-headed Cowbird (Molothrus ater) is an obligate brood parasite of many grassland birds. The section on cowbird brood parasitism summarizes rates of cowbird parasitism, host responses to parasitism, and factors that influence parasitism, such as nest concealment and host density. The impact of management depends, in part, upon a species’ nesting phenology and biology. The section on breeding-season phenology and site fidelity includes details on spring arrival and fall departure for migratory populations in the Great Plains, peak breeding periods, the tendency to renest after nest failure or success, and the propensity to return to a previous breeding site. The duration and timing of breeding varies among regions and years. Species’ response to management summarizes the current knowledge and major findings in the literature on the effects of different management practices on the species. The section on management recommendations complements the previous section and summarizes specific recommendations for habitat management provided in the literature. If management recommendations differ in different portions of the species’ breeding range, recommendations are given separately by region. The literature cited contains references to published and unpublished literature on the management effects and habitat requirements of the species. This section is not meant to be a complete bibliography; a searchable, annotated bibliography of published and unpublished papers dealing with habitat needs of grassland birds and their responses to habitat management is posted at the Web site mentioned below.

This report has been downloaded from the Northern Prairie Wildlife Research Center World-Wide Web site, www.npwrc.usgs.gov/resource/literatr/grasbird/grasbird.htm. Please direct comments and suggestions to Douglas H. Johnson, Northern Prairie Wildlife Research Center, U.S. Geological Survey, 8711 37th Street SE, Jamestown, North Dakota 58401; telephone: 701-253-5539; fax: 701-253-5553; e-mail: Douglas_H_Johnson@usgs.gov.
MARBLED GODWIT
(Limosa fedoa)


Keys to management include providing large expanses of short, sparse to moderately vegetated landscapes that include native grasslands and wetland complexes. Wetland complexes contain a diversity of wetland classes and sizes, such as ephemeral, temporary, seasonal, semipermanent, and permanent wetlands, as well as intermittent streams. Marbled Godwits use wetlands of various salinities.

Breeding range:
Marbled Godwits breed from central Alberta through central Manitoba and along St. James Bay, south through Montana, North Dakota, eastcentral South Dakota, and northcentral Nebraska, and east to northcentral Minnesota (National Geographic Society 1987). (See figure for the relative densities of Marbled Godwits in the United States and southern Canada, based on Breeding Bird Survey data.)

Suitable habitat:
Breeding Marbled Godwits require large expanses of short, sparse to moderately vegetated uplands for nesting and foraging, and wetland complexes for foraging (Stewart 1975, Ryan 1982, Ryan et al. 1984, Kantrud and Higgins 1992). Marbled Godwit territories are characterized by a high percentage of grass cover, many wetlands, and high wetland diversity.

Marbled Godwits prefer native grass cover to tame vegetation (Stewart 1975, Ryan 1982, Ryan et al. 1984, Kantrud and Higgins 1992). Pastures, idle grasslands, and haylands are often used for nesting, and pastures that are idle during the nesting season may be particularly attractive (Higgins et al. 1979, Ryan et al. 1984, Kantrud and Higgins 1992). Although tilled lands usually are avoided (Weber 1978, Ryan et al. 1984), nests also have been reported in cropland, including cereal grains, flax, and stubble fields (Stewart 1975, Higgins et al. 1979, Kantrud and Higgins 1992). In the northern prairie and aspen parkland regions of Alberta, mean numbers of birds/site was nonstatistically compared among several habitat types (Prescott et al. 1995, Prescott 1997). In the prairie region, Marbled Godwits were most abundant in idle mixed-grass followed by sandhills, hayland, fallow cropland, and tame pasture (Prescott 1997). Sandhills were defined as mixed-grass containing sandy soils. Hayland was planted to grasses (species not specified) or alfalfa (*Medicago sativa*). In aspen parkland uplands, Marbled Godwits were most abundant on idle mixed-grass followed by continuously grazed mixed-grass (Prescott et al. 1995). They were not found in idle tame grassland, tame DNC, tame pasture, tame hayland mowed after 15 July (deferred), deferred mixed-grass pasture, idle parkland, continuously grazed parkland, native DNC, hayland, or cropland.

In North Dakota, Marbled Godwits were associated with silty range, thin upland range, and shallow-to-gravel range sites (Messmer 1990, Sedivec 1994). Silty range and thin upland range sites were characterized by thin topsoil, loamy soil, 1-25% slope, grassy cover, low shrub cover, and moderate to high litter cover. Maximum vegetation height ranged from 50 to 70 cm and average litter depth ranged from 3.8 to 9.1 cm. Shallow-to-gravel range sites were characterized by sparse cover and reduced litter.

Within wetland habitats, Marbled Godwits avoided dense emergent vegetation, preferring shallow water areas with short, sparse to moderately dense shoreline vegetation (Ryan 1982, Ryan et al. 1984, Eldridge 1992). Suitable wetlands ranged in salinity from fresh to highly saline, and varied widely in size and permanence (Stewart and Kantrud 1965, Stewart 1975, Ryan et al. 1984, Eldridge 1992, Prescott et al. 1995). Semipermanent wetlands were used most often, but ephemeral, alkali, and temporary ponds were preferred relative to their availability (Ryan et al. 1984). Kantrud and Stewart (1984) observed 57% of breeding Marbled Godwits using seasonal wetlands, but their density was highest on temporary wetlands. Shifts in wetland use occurred seasonally and during climatic extremes, as breeding Marbled Godwits used less-permanent wetlands early in the breeding season and moved to semipermanent and alkali wetlands later in summer or during drought (Ryan et al. 1984, Gratto-Trevor 2000). In North Dakota, Marbled Godwits nested in wet and dry areas of wet meadow, upland areas of short (<30 cm) grass, and idle mixed-grass hayland; they fed in dry uplands, wet and dry areas of wet meadow, roadside ditches, and open water (Nowicki 1973). In southern Alberta, average distance between nest sites and water was 239 m in managed wetlands and 258 m in natural wetlands (Gratto-Trevor 2000). In Saskatchewan, Marbled Godwits nested in wetland margins and uplands with denser, taller, and more homogeneous vegetation than random sites (Colwell and Oring 1990). A table near the end of the account lists the specific habitat characteristics for Marbled Godwits by study.
Area requirements:

Territories are large, and include both feeding and nesting areas. Areas must be large enough to provide both upland habitat and a diverse range of wetland types (Ryan et al. 1984, Colwell and Oring 1988a, Kantrud and Stewart 1984). In North Dakota, mean territory size was 90 ha (Ryan et al. 1984). Marbled Godwits may be area sensitive, rarely occurring on blocks of contiguous grassland <100 ha in the northern Great Plains (D. H. Johnson, unpublished data).

Brown-headed Cowbird brood parasitism:

No known records of brood parasitism by Brown-headed Cowbirds (Molothrus ater) exist.

Breeding-season phenology and site fidelity:

The breeding season extends from mid-April through late July (Maher 1973, Stewart 1975, Kantrud and Higgins 1992, Sedivec 1994, Gratto-Trevor 2000). The earliest reported nest with eggs was 17 April (Stewart 1975), with most nests initiated during mid- to late May (Maher 1973, Kantrud and Higgins 1992, Sedivec 1994). Kantrud and Higgins (1992) report a late hatching date of 27 June, and Stewart (1975) observed a dependent brood 18 July. One brood is produced per season (Gratto-Trevor 2000). Although Higgins et al. (1979) reported that Marbled Godwit pairs appeared to make only one nesting attempt per breeding season, Ryan et al. (1981) and Gratto-Trevor (2000) reported that renesting occurred after failure of the initial nest. Marbled Godwits begin flocking in mid- to late July (Maher 1973), and most flocks depart by late August (Ryan et al. 1984). In Saskatchewan and Alberta, Marbled Godwits exhibited breeding-site fidelity (Colwell and Oring 1988b, Gratto-Trevor 2000).

Species’ response to management:

Marbled Godwit densities were highest during the first 2 yr after a burn in North Dakota grasslands (Johnson 1997). Ryan et al. (1984) suggested that fall burning or haying could provide nesting habitat the following spring, and the denser, taller regrowth (15-60 cm) could provide suitable habitat for broods. Haylands are readily used by breeding Marbled Godwits (Ryan et al. 1984, Kantrud and Higgins 1992).

Grazing can be used in both upland and wetland habitats to maintain the short, moderately dense vegetation preferred by Marbled Godwits (Ryan et al. 1984). Grazed or recently grazed uplands are often more attractive to breeding Marbled Godwits than are other land-use types (Ryan et al. 1984, Renken and Dinsmore 1987, Kantrud and Higgins 1992, Sedivec 1994). In Saskatchewan, no significant difference in abundance was found between lightly grazed mixed-grass and lightly grazed stands of crested wheatgrass (Agropyron cristatum) (Sutter and Brigham 1998). In North Dakota, density of Marbled Godwits was not significantly different among several rotational grazing systems and idle pastures (Messmer 1990). The rotational systems were season-long pasture, short-duration (involves a system of pastures rotated through a grazing schedule of about 1 wk grazed and 1 mo ungrazed, repeated throughout the season), and twice-over rotation (involves grazing a number of pastures twice per season, with about a 2-mo rest between grazing).
Management Recommendations:

Maintain a diverse complex of wetlands (Kantrud and Stewart 1984, Ryan et al. 1984, Colwell and Oring 1988a). Marbled Godwits used wetlands of widely varying types and salinities, and may need to utilize larger, more-permanent wetlands during droughts or late in summer (Ryan et al. 1984). Maintain shallow-water ponds with little or no emergent vegetation for pre- and post-breeding flocks and shallow-water ponds with margins of emergent vegetation for broods (Gratto-Trevor 2000).

Protected habitats should be extensive enough (>1 km$^2$) to provide both upland habitat and a diverse range of wetland types (Stewart 1975, Colwell and Oring 1988a, Kantrud and Higgins 1992, Gratto-Trevor 2000). Territories averaged 90 ha in North Dakota (Ryan et al. 1984), but Marbled Godwits may require larger (>100 ha) blocks of contiguous grassland habitat (D. H. Johnson, unpublished data).

Protect wetlands from drainage (Ryan et al. 1984).

Restore drained wetlands (Berkey et al. 1993, Johnson 1996).


Burning, mowing, and grazing can be used to provide areas of shorter, sparser vegetation (Ryan et al. 1984, Eldridge 1992, Berkey et al. 1993).

Fall burning or mowing of upland sites and wetland edges can produce suitable cover for the following spring (Ryan et al. 1984). Moderate to dense regrowth in burned areas may be too dense for nesting, but can provide the denser, taller cover used by broods (Ryan et al. 1984).

Marbled Godwits prefer previously grazed areas that are idle during the current breeding season (Kantrud and Higgins 1992). If grazing is used, choose rotational grazing over season-long grazing (Sedivec 1994). When implementing a rotational grazing system, avoid grazing until late May or late June (Sedivec 1994, Gratto-Trevor 2000); when using season-long grazing, delay grazing until mid-June (Sedivec 1994). Berkey et al. (1993) suggested that short-term grazing (2-4 wk in May) may be beneficial to Marbled Godwits in North Dakota.

Protect upland habitat from tilling (Ryan et al. 1984). Encourage no-tillage and minimum-tillage practices on cropland (Kantrud and Higgins 1992).
Table. Marbled Godwit habitat characteristics.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Location(s)</th>
<th>Habitat(s) Studied*</th>
<th>Species-specific Habitat Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colwell and Oring 1990</td>
<td>Saskatchewan</td>
<td>Mixed-grass/tame pasture, wetland, wet-meadow pasture</td>
<td>Nested in wetland margins and uplands with denser, taller, and more homogeneous vegetation than random sites</td>
</tr>
<tr>
<td>Gratto-Trevor 2000</td>
<td>Alberta</td>
<td>Shortgrass pasture, wetland</td>
<td>Average distance between nest sites and water was 239 m in managed wetlands and 258 m in natural wetlands</td>
</tr>
<tr>
<td>Higgins et al. 1979</td>
<td>North Dakota</td>
<td>Burned mixed-grass, cropland, idle mixed-grass, idle tame, mixed-grass pasture</td>
<td>Nested in short (usually &lt;15 cm) grassy cover; nested in cultivated fields, tame grassland, native pasture, burned native grassland, and idle native grasslands; hatching success was similar between cultivated and native grassland nests</td>
</tr>
<tr>
<td>Johnson 1997</td>
<td>North Dakota</td>
<td>Burned mixed-grass, burned tame, idle mixed-grass</td>
<td>Occurred at highest densities during the first 2 yr after burning</td>
</tr>
<tr>
<td>Kantrud and Higgins 1992</td>
<td>Manitoba, Montana, North Dakota, South Dakota</td>
<td>Burned mixed-grass, cropland, hayland, idle mixed-grass, idle tame, mixed-grass pasture</td>
<td>Nested in native grassland, were most common in pastures idle during current growing season; nest sites were characterized by short to intermediate vegetation height and density; used areas with &lt;40% dead vegetation; avoided areas with 100% visual obstruction &gt;10 cm and areas with &gt;35 cm effective cover height (average maximum height of leaf canopy); average effective cover height at nests was 17 cm</td>
</tr>
<tr>
<td>Kantrud and Stewart 1984</td>
<td>North Dakota</td>
<td>Wetland complex</td>
<td>Breeding distribution among wetland classes was 57% seasonal, 37% semipermanent, 3% temporary, and 3% alkali; density (pairs/km²) was highest on temporary wetlands, followed by seasonal wetlands and fens</td>
</tr>
<tr>
<td>Messmer 1990</td>
<td>North Dakota</td>
<td>Idle mixed-grass/tame,</td>
<td>No significant difference in density between grazing</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Habitat Descriptions</td>
<td>Observations</td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>Nowicki 1973</td>
<td>North Dakota</td>
<td>Cropland, idle mixed-grass hayland, idle mixed-grass pasture, shrubland, tame pasture</td>
<td>Nested in wet and dry areas of wet meadow, upland areas of short (&lt;30 cm) grasses, and idle mixed-grass hayland; foraged in dry grasslands, wet and dry areas of wet meadows, in roadside ditches, and in open water</td>
</tr>
<tr>
<td>Prescott 1997</td>
<td>Alberta</td>
<td>Cropland, hayland, mixed-grass pasture, shrubland, tame pasture, woodland</td>
<td>Were most abundant in mixed-grass pasture followed by cropland, hayland, and tame pasture</td>
</tr>
<tr>
<td>Prescott et al. 1995</td>
<td>Alberta</td>
<td>Cropland; dense nesting cover (DNC; idle seeded-native, idle tame), idle mixed-grass, idle parkland, idle tame, mixed-grass pasture, parkland pasture, tame hayland, tame pasture, wetland, woodland</td>
<td>In wetlands, were most abundant in large saline wetlands and were also found in large fresh, small saline, and medium fresh wetlands; in uplands, were most abundant in idle native grassland and continuously grazed native grassland</td>
</tr>
<tr>
<td>Renken 1983, Renken and Dinsmore 1987</td>
<td>North Dakota</td>
<td>DNC (idle tame), idle mixed-grass, mixed-grass pasture</td>
<td>Preferred grazed habitats; territories were located in areas with less vegetative cover and sparser, shorter vegetation than unused areas; mean vegetation values for used areas were</td>
</tr>
<tr>
<td>Reference</td>
<td>Location</td>
<td>Habitat</td>
<td>Description</td>
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</tr>
<tr>
<td>Ryan 1982, Ryan et al. 1984</td>
<td>North Dakota</td>
<td>Cropland, idle tame, mixed-grass hayland, mixed-grass pasture, tame hayland, tame pasture, wetland complex</td>
<td>Preferred uplands with short (&lt;15 cm for nesting pairs, 15-60 cm for pairs with broods), sparse to moderately dense native grasses; avoided tilled land; used pasture, grassland and hayfield habitats; used a variety of wetland types characterized by short, sparse to moderately dense shoreline vegetation; used semipermanent ponds most frequently but select ephemeral, alkali and temporary ponds if available; used alkali and semipermanent wetlands more often in dry years; mean territory size was 90 ha; territories contained more wetlands and wetland classes than randomly selected areas</td>
</tr>
<tr>
<td>Sedivec 1994</td>
<td>North Dakota</td>
<td>Idle mixed-grass, mixed-grass pasture</td>
<td>Nested in dry upland; were more common in grazed areas than ungrazed areas; nested in sparse vegetation with low height density (&lt;6 cm); native rangeland should not be grazed until late-May to early June when implementing rotational grazing, and season-long grazing should be delayed until mid-June</td>
</tr>
<tr>
<td>Stewart 1975</td>
<td>North Dakota</td>
<td>Cropland, idle mixed-grass, idle shortgrass, mixed-grass hayland, shortgrass hayland, tame hayland, wetland complex</td>
<td>Nested in native prairie, cropland, and hayland; used a variety of wetland types that varied in salinity from fresh to highly saline</td>
</tr>
<tr>
<td>Stewart and Kantrud 1965</td>
<td>North Dakota</td>
<td>Wetland</td>
<td>Highest densities were found on seasonal wetlands with closed stands of emergent cover or with clumps of emergent cover interspersed with open water; on semipermanent wetlands with closed stands of emergent cover, with clumps of emergent cover interspersed with open water, or with</td>
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</table>
peripheral bands of emergent cover encircling expanses of open water; and on intermittent saline lakes

<table>
<thead>
<tr>
<th>Study</th>
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<th>Habitat Description</th>
<th>Presence Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sutter and Brigham 1998</td>
<td>Saskatchewan</td>
<td>Mixed-grass pasture, tame pasture</td>
<td>No significant difference in abundance was found between lightly grazed mixed-grass and lightly grazed stands of crested wheatgrass (<em>Agropyron cristatum</em>)</td>
</tr>
<tr>
<td>Weber 1978, Weber et al. 1982</td>
<td>South Dakota</td>
<td>Cropland, idle mixed-grass, idle shortgrass, idle tallgrass, mixed-grass pasture, shortgrass pasture, tallgrass pasture, tame hayland, wetland, woodland</td>
<td>Presence was positively associated with wetlands containing dense stands of emergent vegetation, with open water or bare soil covering &lt;5% of the wetland, and with adjacent uplands of alfalfa (<em>Medicago sativa</em>)/hayland; presence was negatively associated with wetlands with adjacent tilled fields; were observed on temporary, seasonal, and semipermanent wetlands, on intermittent streams, stock ponds, dugouts, and tilled wetlands, but none were seen on permanent streams</td>
</tr>
</tbody>
</table>

*In an effort to standardize terminology among studies, various descriptors were used to denote the management or type of habitat. “Idle” used as a modifier (e.g., idle tallgrass) denotes undisturbed or unmanaged (e.g., not burned, mowed, or grazed) areas. “Idle” by itself denotes unmanaged areas in which the plant species were not mentioned. Examples of “idle” habitats include weedy or fallow areas (e.g., oldfields), fencerows, grassed waterways, terraces, ditches, and road rights-of-way. “Tame” denotes introduced plant species (e.g., smooth brome [*Bromus inermis]*) that are not native to North American prairies. “Hayland” refers to any habitat that was mowed, regardless of whether the resulting cut vegetation was removed. “Burned” includes habitats that were burned intentionally or accidentally or those burned by natural forces (e.g., lightning). In situations where there are two or more descriptors (e.g., idle tame hayland), the first descriptor modifies the following descriptors. For example, idle tame hayland is habitat that is usually mowed annually but happened to be undisturbed during the year of the study.
LITERATURE CITED


