



**Status:** State special concern

**Global and state ranks:** G4/S3S4

**Family:** Ardeidae – Herons, Egrets, and Bitterns

**Total Range:** The American bittern breeds from the mid – U.S. to northern Canada (AOU 1983). Its breeding range runs from British Columbia east to southern Quebec and Newfoundland. Breeding in the U.S. is discontinuous south of Pennsylvania, Ohio, Indiana, Illinois, Missouri, Kansas, Colorado, Utah, Nevada, and California (AOU 1983). Only local breeding is found in Wyoming and surrounding states (Findholt 1984) and in Texas, Louisiana, Florida, and Mexico (Hancock and Kushlan 1984). The winter range includes the west coast from southern British Columbia south through California, the southern U.S. to the east coast, south through Mexico and the Caribbean, and rarely to Central America (AOU 1983). Wintering concentrations occur along the southern Atlantic coast, Gulf Coast, and southern California (Root 1988).

**State Distribution:** Barrows (1912) commented that the American bittern was one of the most abundant of our waders, and the species was listed as a common summer resident by Wood (1951). Currently, the

American bittern breeds throughout the state but is more common in the Upper Peninsula (UP) and northern Lower Peninsula (LP) (Adams 1991). In recent years, breeding has been confirmed or suspected in 30 counties in the state (Adams 1991, Michigan Natural Features Inventory 2003). Michigan Breeding Bird Atlas (Atlas) records of American bitterns were widely scattered, but did reveal concentrations of observations in the northeastern LP and in Jackson, Barry, Van Buren, Oakland, and Tuscola Counties and near Saginaw Bay in the southern LP (Adams 1991). Intensive bird surveys at coastal wetland sites on Saginaw Bay upgraded American bittern breeding status to probable in one township and added a possible breeding record in a second township from what was observed during Atlas surveys (Whitt and Prince 1998). Distribution in the UP was generally more uniform with fewer birds recorded near the lakeshores and in some central counties (Adams 1991). Monfils and Prince (2003) confirmed nesting in coastal wetlands on Munuscong Bay (Chippewa County). Ewert (1999) identified several important bird sites for the American bittern: Houghton Lake marshes (Roscommon and Missaukee Cos.), Lower Manistee River wetlands (Manistee Co.), Seney National Wildlife Refuge (Schoolcraft Co.), Munuscong Bay wetlands, Lake Stella (Alger Co.), and Scott’s Marsh (Schoolcraft Co.). The figure above indicates counties with confirmed



breeding during Atlas surveys or known occurrences from the Michigan Natural Features Inventory database at the time of writing.

**Recognition:** This **brown, medium sized heron** is 23 – 33 inches (60 – 85 cm) in length with a **stout body and neck and relatively short legs** (Cramp and Simmons 1977, Hancock and Kushlan 1984). Gibbs et al. (1992) described adults as dark brown above, **heavily streaked brown and white below**, having a rusty crown and white throat, and possessing a **long, black patch extending from below the eye down the side of the neck**, which is a character unique among the herons. American bitterns are sometimes confused with immature black-crowned night-herons (*Nycticorax nycticorax*), which are darker brown, lack the contrast between the dark wingtips and paler coverts and body, and have no black neck patch (Gibbs et al. 1992). Males and females are similar, with the males slightly larger, and juveniles lack the black neck patches. Vernacular names such as “stake-driver” and “thunder-pumper” allude to the resounding call of the American bittern (Gibbs et al. 1992). Previous authors have best described the American bittern’s **low, resounding song** as a deep, gulping, pounding **“BLOONK-Adoork”**, which is repeated one to 10 times in succession (Gibbs et al. 1992, Sibley 2000). This species **assumes the “bittern” stance when alarmed** by larger animals: **bill pointed skyward, body stretched vertically, contour feathers compressed, and body swayed with the breeze** (Gibbs et al. 1992).

**Best survey time:** Because the American bittern is most often concealed in dense herbaceous wetlands, the best time to survey for this species is during the breeding season when it is more apt to call to mark its territory or advertise for a mate. Singing is most often crepuscular and nocturnal, but American bitterns can be heard throughout the day and night early in the breeding season (Gibbs et al. 1992). The best survey period is between their arrival on the breeding grounds and egg laying, which Gibbs et al. (1992) noted is the time when males are most territorial and actively solicit copulations from females. In Michigan, this period ranges from late April to early July depending on latitude. Conspecific call-response techniques have been used successfully to improve the effectiveness of surveys for American bitterns and other waterbirds (Lor and Malecki 2002, Gibbs and Melvin 1993, 1997).

Huschle et al. (2002) evaluated a variety of techniques for capturing adult American bitterns, and found mirror traps to be the most efficient method for trapping males and mist nets to be a versatile means of capturing both males and females.

**Habitat:** American bitterns most often breed in shallow wetlands dominated by tall emergent vegetation, including cattail (*Typha* spp.) marshes, wet meadows, bogs, and shrubby marshes, and occasionally hayfields (Adams 1991). In Maine, American bitterns were observed to use all wetland sizes, but were more abundant on larger wetlands, and preferred impounded and beaver-created wetlands to those of glacial origin (Gibbs et al. 1992). Brown and Dinsmore (1986) only found the species on wetlands > 10 ha, indicating that American bittern may be a wetland area-dependent species. In a study of wet meadows along the northern Lake Huron shoreline, Riffle et al. (2001) found the American bittern to be area-sensitive, with abundance positively related to wet meadow area. When compared to the sympatric least bittern (*Ixobrychus exilis*), the American bittern uses a wider variety of wetland types, less densely vegetated sites, shallower water depths, and exclusively freshwater habitats (Gibbs et al. 1992).

During spring and fall migration, Reid (1989) observed the species using wetlands dominated by river bulrush (*Schoenoplectus fluviatilis*), burreed (*Sparganium eurycarpum*), cattail, and water smartweed (*Polygonum coccineum*) in Missouri. American bitterns winter in areas where temperatures stay above freezing and waters remain open, especially in coastal regions where oceans moderate the climate (Root 1988). Gibbs et al. (1992) noted that although a wider range is used, wintering habitat is similar to breeding habitat. Managed wetlands, such as impoundments at wildlife refuges, are also important to American bitterns (Root 1988). This species will occasionally use brackish coastal marshes (Hancock and Kushlan 1984), and sometimes forage in large numbers in terrestrial habitats such as dry grasslands (Gibbs et al. 1992).

**Biology:** American bitterns return to southern Michigan during the first two weeks of April and rarely in late March (Wood 1951, Kelley 1978, Walkinshaw 1978), and by late April and early May occur throughout the state (Adams 1991). Adams (1991)



stated that nests are placed on elevated platforms constructed of emergent vegetation, such as cattails, sedges (*Carex* spp.), and grasses (Poaceae), above shallow water or sometimes on land in tall grass. Nests are placed singly, however, males may be polygamous, with several females nesting within a single territory (Baicich and Harrison 1997). Egg dates ranged from May 6 (Wood 1951) to July 11 (Pettingill 1974) and clutch size ranged from 2 to 7, but is typically 3 to 5 (Gibbs et al. 1992). Baicich and Harrison (1997) described the eggs as unmarked and plain buffy brown to deep olive-buff. Incubation is done by the female alone, beginning with the first egg and lasting 24 – 29 days. Although renesting by American bitterns has been suspected, Azure et al. (2000) recently documented renesting for the first time. The young hatch over several days, differ in size, and are semi-altricial with yellowish-olive down at hatching (Baicich and Harrison 1997). Brood rearing and feeding is apparently done by the female alone, and chicks are given partially digested, regurgitated food (Gibbs et al. 1992). Gibbs et al. (1992) stated that the young leave the nest after one to two weeks, but remain near the nest to receive supplemental feedings until two to four weeks of age. Age at fledging is unknown, but occurs at 50 to 55 days in the similar Eurasian bittern (*Botaurus stellaris*) (Gibbs et al. 1992). Little information is available on departure dates, but fall migration is thought to begin in September and continue well into October (Wood 1951, Kelley 1978, Adams 1979). This bittern is a solitary feeder that is most active during dim light and relies on stealth to capture its prey (Gibbs et al. 1992). Kushlan (1978) noted that only four of the recognized heron feeding behaviors are used by this species: standing in place, neck swaying, walking slowly, and walking quickly. Analysis of American bittern specimens collected throughout North America revealed an array of food items, including insects (23%), fish (21%), crayfish (19%), frogs and salamanders (21%), small mammals (10%), and snakes (5%) (Cottam and Uhler 1945).

**Conservation/Management:** Although North American Breeding Bird Survey (BBS) data should be viewed with caution, they can be useful in elucidating trends in bird populations. Recent analyses of BBS data indicate significant ( $P < 0.01$ ) declines in American bittern observations of 14.3 and 5.7 percent/year in the Great Lakes Plain (includes southern Michigan) and

Great Lakes Transition (includes northern Lower Michigan) physiographic regions, respectively (Sauer et al. 2003). Adams (1991) noted that the results of Atlas surveys confirmed that American bittern had declined in the State, especially in the southern Lower Peninsula. Habitat loss is cited most often as the likely cause of American bittern declines. Dahl (2000) estimated that less than half of the original wetlands present in the conterminous U.S. at the time of European settlement remain today. Approximately 50% of Michigan's original wetlands have been destroyed since European settlement, which includes about 70% of the State's coastal wetlands (Cwikiel 1998). Many of our remaining wetlands have been severely degraded from their original condition. Gibbs et al. (1992) noted that eutrophication, siltation, chemical contamination, and human disturbance can reduce habitat quality by impacting the prey base. The spread of exotic and nuisance species, such as purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), and common reed (*Phragmites australis*), has also degraded wetlands used by this species, but the overall impact of these changes has not been evaluated. Acid precipitation has been listed as a potential threat to American bitterns due to their dependence on wetlands vulnerable to acidification, the importance of amphibians to their diet, and the large proportion of their breeding range that receives acid rain; however, the emergent wetlands used by this species tend to be circumneutral in pH and chemically buffered against strong shifts in acidity (Gibbs et al. 1992). Although the effects of contamination on American bitterns are largely unknown, Gibbs et al. (1992) believe that agricultural chemicals could have significant indirect effects on the species by entering wetlands through runoff. Should prey items that are vulnerable to pesticides, such as aquatic insects, crayfish, and amphibians, be impacted by contamination, American bittern populations could in turn suffer (Gibbs et al. 1992).

Gibbs et al. (1992) stated that preservation of freshwater wetlands, especially large shallow wetlands with dense growth of robust emergent vegetation, is the most urgent management need for this species. Programs that provide funds for wetland restoration and protection on private and public lands can effectively conserve habitat for this species and need to continue. Such initiatives include Farm Bill programs like the



Wetlands Reserve Program and Conservation Reserve Program, and the North American Waterfowl Management Plan, which uses funding appropriated through the North American Wetlands Conservation Act. Existing wetlands also need to be protected from chemical contamination, siltation, eutrophication, and other forms of pollution that could harm the birds or their prey (Gibbs et al. 1992). Encouraging best management practices, such as filter strips, no-till farming, and conservation tillage, in surrounding watersheds would help protect priority habitats from pollution. Gibbs et al. (1992) also noted that concentrations of nesting and wintering birds on protected and managed wetlands, such as state and federal wildlife areas and refuges, indicate the need to develop and implement management plans that benefit American bitterns.

**Research needs:** Previous authors have noted that much about the basic biology and ecology of this species remains unknown (Gibbs et al. 1992, Hands et al. 1989). Although survey methodologies have been developed to monitor populations of American bittern and other waterbirds (Lor and Malecki 2002, Gibbs and Melvin 1993, 1997), no large scale surveys or monitoring programs have been implemented. Such surveys are needed to assess the status and trends of this species in North America. Gibbs et al. (1992) indicated that detailed studies of American bittern breeding biology have been lacking, including investigations of diet, home range, habitat requirements, mating systems, ability to reneest, sources and rates of mortality in adults, juveniles, nestlings, and eggs, and juvenile dispersal patterns and philopatry. Little work has been done during the migration and wintering periods of this species' life cycle. Research is needed to identify migration routes, major stopover and wintering sites, food habits, and habitat needs (Gibbs et al. 1992, Hands et al. 1989). Several authors have highlighted the need to develop effective strategies for wetland and associated upland management that will conserve habitat for this species during breeding, migration, and wintering (Gibbs et al. 1992, Adams 1991, Hands et al. 1989). A variety of other topics should be explored, including the examination of factors that regulate populations, impact of weather on populations, and the effects of chemical contamination (Gibbs et al. 1992, Adams 1991, Hands et al. 1989).

**Related abstracts:** least bittern, king rail, black tern, Great Lakes marsh.

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