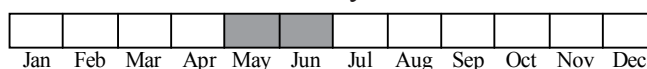


Best Survey Period



Status: State threatened

Global and state rank: G5/S2

Family: Ardeidae – Herons, Egrets, and Bitterns

Total range: Five subspecies of least bittern are found throughout much of North, Central, and South America (Gibbs et al. 1992). In North America, this species is primarily restricted to the eastern U.S., ranging from the Great Plains states eastward to the Atlantic Coast and north to the Great Lakes region and the New England states (Evers 1994). Western populations are concentrated in low-lying areas of the Central Valley and Modoc Plateau of California, the Klamath and Malheur basins of Oregon, and along the Colorado River in southwest Arizona and southeast California (Gibbs et al. 1992). U.S. populations are migratory and overwinter along the Atlantic coastal plain and U.S. Gulf Coast south through Mexico and the Caribbean islands into northern South America (Gibbs et al. 1992, Evers 1994). The northern limit of overwintering least bitterns is considerably farther south than that of the hardier American bittern (*Botaurus lentiginosus*) (Gibbs et al. 1992).

State distribution: Barrows (1912) listed the least bittern as “an abundant bird in all suitable places in the

state.” Wood (1951) identified the species as a summer resident and common in southern tiers of counties and Cheboygan County, but rare and local in the Upper Peninsula. Least bittern was later described by Payne (1983) as an uncommon transient and summer resident, with nesting confirmed in 27 counties. Michigan Breeding Bird Atlas (Atlas) surveys conducted in the 1980s confirmed breeding in 20 survey blocks in 17 counties (Adams 1991). All of these observations occurred in the Lower Peninsula, with the number of blocks and counties with confirmed breeding nearly split between the northern (9 blocks in 8 counties) and southern (11 blocks in 9 counties) Lower Peninsula (Adams 1991). Researchers confirmed nesting at several sites on Saginaw Bay and observed possible breeding in Munuscong Bay wetlands (Chippewa County) during avian studies conducted in the mid-1990’s (Whitt and Prince 1998, Monfils and Prince 2003). Evers (1994) noted that least bittern has declined dramatically in all of its former strongholds in Michigan. The figure above indicates the counties with confirmed breeding during Atlas surveys or known occurrences from the Michigan Natural Features Inventory database at the time of writing.

Recognition: Least bitterns average 11 – 14 inches (28 – 36 cm) in length and have a wingspan of 16 – 18 inches (41 – 46 cm) (Evers 1994). Gibbs et al. (1992)



noted that the **crown, back, and tail** are a **vivid greenish black**, while the neck, sides, and underparts are brown and white. Diagnostic characters include **chestnut wings with contrasting pale patches and white lines bordering the scapular feathers** (Gibbs et al. 1992, Evers 1994). Sexes are similar in size but have **dimorphic plumage**, with the **crown and back of the female being purple-chestnut** compared to **black in the male** (Gibbs et al. 1992). The female also has a darkly streaked neck. Gibbs et al. (1992) described juveniles as similar to females, but having a paler and browner crown and heavier streaking in the neck and breast. In the rare dark color morph known as Cory's Bittern, the pale areas of the typical plumage are chestnut colored (Gibbs et al. 1992). Least bitterns can be confused with green herons (*Butorides virescens*); however, according to Gibbs et al. (1992) the green heron is easily separated by its larger size and dark wings and scapular feathers. Because of the secretive nature and dense cover used by this species, it is often easier to identify by its **low dovelike call**. Males give a fast series of **three to five "coo" notes**, reminiscent of the black-billed cuckoo (*Coccyzus erythrophthalmus*). Females have been reported to respond with ticking calls, and the species will utter various cackles and "tut-tut-tut" calls when agitated or alarmed (Gibbs et al. 1992, Evers 1994). Similar to the much larger American bittern, this species will assume a frozen position with its bill pointed upward, feathers compressed, and eyes directed forward when threatened (Gibbs et al. 1992).

Best survey time: Surveys are most successful when conducted during the early breeding season prior to incubation, which generally occurs from early to mid May through the end of June. Whitt and Prince (1998) suggested that the most effective method to determine presence and breeding status for this species is to search emergent breeding habitat for nests and adults between mid-June and late July. As with many secretive marsh bird species, broadcasting conspecific calls can increase the effectiveness of surveys (Lor and Malecki 2002, Gibbs and Melvin 1993, 1997). In New York, least bitterns were most responsive to call-response surveys conducted between mid May and mid June (Swift et al. 1988). Bogner and Baldassarre (2002) found that responsiveness was higher near nest initiation when compared to incubation and hatching stages. Least bitterns can be heard during the early

morning and evening hours; however, Swift et al. (1988) indicated that responsiveness to call-response surveys may be higher in the morning. The species is usually silent during midday and afternoon (Gibbs et al. 1992).

Habitat: Range-wide this species uses a variety of freshwater and brackish marshes with dense, tall growths of aquatic or semiaquatic vegetation, especially cattail (*Typha* spp.), sedge (*Carex* spp.), bulrush (*Schoenoplectus* spp.), and arrow-head (*Sagittaria* spp.), interspersed with clumps of woody vegetation and open water (Gibbs et al. 1992). Weller (1961) found least bittern nests in the north-central states most often associated with marshes dominated by cattail and/or bulrush. When compared to the American bittern, the least bittern is more prevalent in deeper water marshes (Weller 1961, Weller and Spatcher 1965). In their study of Iowa marshes, Weller and Spatcher (1965) recorded the species in the greatest abundance during years when ratios of emergent vegetation to open water were approximately equal (the hemi-marsh stage), and the species was not observed in areas of dense vegetation until opened up by muskrats. Brown and Dinsmore (1986) found that least bitterns were observed more often on Iowa wetlands larger than 12 acres (5 ha), suggesting that the species may be area sensitive. While Bogner and Baldassarre (2002) observed a mean home range size of 9.7 ha (11.4 ha for females, 8.1 for males) in their study in western New York, they suggested that vegetation type and cover ratios are likely more important than marsh size to least bittern populations.

Biology: Spring arrival usually occurs in late April and early May in the southern Lower Peninsula and shortly thereafter in northern Michigan (Evers 1994). Males give their low calls frequently during the breeding season, presumably to advertise their presence to females, and are known to defend their territories (Gibbs et al. 1992, Weller 1961). Weller (1961) indicated that nests are almost always placed above standing water and are constructed primarily by the male. The nest consists of a platform located 0.15 to 0.75 m above the water in clumps of dense emergent vegetation (Adams 1991), and is formed by bending down live and dead stalks and adding short stems and sticks on top (Weller 1961). Usually a clutch of 4 – 5, and rarely up to 7, pale bluish to pale greenish eggs are laid at one day intervals (Baicich and Harrison 1997).





Photo by Brad Yocum

Least bittern young remain at the nest for about a week after hatching, where they are brooded by both parents.

Weller (1961) found that incubation begins with either the first or second egg and lasts for 17 – 20 days. While both sexes participate in incubation, Weller (1961) felt the female may incubate more than the male. Renesting and double brooding has been observed; however, Bogner and Baldassarre (2002) indicated that more information is needed to determine the proportion of birds that renest or have second broods. Young are semi-altricial and downy and are brooded by both parents until they leave the nest as early as the 6th day, but usually leave permanently by the 13th – 15th day (Gibbs et al. 1992, Nero 1950). The young are fed minnows and frog legs by regurgitation (Nero 1950, Weller 1961). Young are typically able to begin foraging on their own within 1 – 2 weeks after hatching; however, the parents may continue providing food for up to 30 days (Nero 1950, Palmer 1962). First flight is usually attained by about 25 days after hatching (Baicich and Harrison 1997), although Bogner and Baldassarre (2002) observed a mean age of 29 days at first flight (n = 4) in western New York. Adams (1991) stated that little is known about the timing of the southward migration in Michigan, but it probably begins in August and continues well into September. Gibbs et al. (1992) noted that least bitterns use only four of the 28 known feeding behaviors used by herons: standing in place, walking slowly, neck swaying, and wing-flicking. Foraging occurs almost exclusively in emergent

wetlands, most often at the edges of open water and emergent vegetation (Evers 1994). The least bittern's small size and compressed trunk allow it to easily move through dense emergent vegetation (Gibbs et al. 1992). Weller (1961) found that least bitterns stalk along branches or reeds when feeding, or by clinging to clumps of vegetation above the water level, aided by its short outer toes and long curved claws. Prey consists primarily of aquatic species, such as small fish, large insects, tadpoles and other amphibians, and crayfish, with small mammals and birds taken occasionally (Evers 1994). Foraging platforms of bent vegetation are frequently constructed at productive feeding sites, which are used during the late-incubation and brood-rearing periods (Weller 1961, Evers 1994).

Conservation/Management: Analysis of North American Breeding Bird Survey data did not reveal significant population trends for the least bittern; however, these and other large-scale surveys are known to not adequately survey secretive marsh birds (Adams 1991, Gibbs et al. 1992). While listed as abundant to common in Michigan through the late 1950s (Barrows 1912, Wood 1951, Zimmerman and Van Tyne 1959), Adams et al. (1981) indicated least bitterns apparently declined in the state between the late 1950s and early 1980s. Habitat destruction and degradation are likely the most important threats facing this species. Dahl (2000) estimates that less than half of the original wetlands estimated to be present in the conterminous U.S. at the time of European settlement remain today. An estimated 50% of Michigan's original wetlands have been destroyed overall since European settlement, including about 70% of the State's coastal wetlands (Cwikel 1998). Many of our remaining wetlands have been severely degraded from their original condition by sedimentation, eutrophication, and chemical contamination. Gibbs et al. (1992) noted that changes in water quality could adversely affect the least bittern's prey base and increase the potential impacts from a nematode parasite (*Eustrongilides* spp.), which can devastate wading bird populations. Acid precipitation could be a potential threat due to possible effects to their food supply; however, the emergent wetlands used by this species tend to be circumneutral in pH and may provide chemical buffering against acidification (Gibbs et al. 1992). Invasive species such as purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*) have degraded many wetlands and have the



potential to impact the availability of suitable nesting habitat. Alterations to the hydrology of wetlands, such as drainage or channelization, can reduce breeding success by drying or flooding potential nest sites (Evers 1994). Collisions with motor vehicles, barbed-wire fences, transmission lines, and airboats can be a significant mortality factor due to least bitterns flying low to the ground (various sources cf. Gibbs et al. 1992). Although least bitterns are generally less vulnerable to land predators because they tend to nest over water and away from shore, there are many potential predators of young and eggs, including American crows (*Corvus brachyrhynchos*), raptors, blackbirds, blue jays (*Cyanocitta cristata*), snakes, turtles, mink (*Mustela vison*), and raccoons (*Procyon lotor*) (Bent 1926, Weller 1961, Bogner and Baldassarre 2002). Bogner and Baldassarre (2002) suspected marsh wrens (*Cistothorus palustris*) of predated least bittern eggs.

The protection, management, and improvement of large shallow wetlands with robust growth of emergent vegetation is seen as the most urgent conservation need of this species (Gibbs et al. 1992, Evers 1994). Several authors have indicated that marshes with a 50:50 ratio of open water to emergent vegetation, often termed hemi-marshes, attract the highest densities and diversities of wetland birds (Weller and Spatcher 1965, Kaminski and Prince 1984, Gibbs et al. 1991). Managing wetlands for the hemimarsch stage would improve conditions for least bittern and other wetland birds. Gibbs et al. (1992) suggested that wetlands also be protected from chemical contamination, siltation, eutrophication, and other forms of pollution. Best management practices, such as filter strips, no-till farming, and conservation tillage, are valuable tools in protecting wetlands from pollution. Initiatives that encourage wetland restoration and protection on private and public lands have been effective at conserving habitat for this and other wetland-dependent birds. Federal programs funded by the Farm Bill, such as the Wetlands Reserve Program and Conservation Reserve Program, and the North American Wetlands Conservation Act are good examples of efforts that have had positive benefits for an array of wetland species.

Research needs: Although call-response surveys are useful assessing the status and trends of this and other

waterbird species in North America (Hands et al. 1989, Adams 1991, Gibbs et al. 1992), no large-scale monitoring programs have been implemented. Such a monitoring program is needed to track the populations of this and other secretive wetland bird species, and would allow agencies and organizations to work more effectively for their conservation. More study of least bittern breeding biology is needed, including investigations of movements, causes, and rates of juvenile and adult mortality, causes of nest failure, re-nesting, juvenile dispersal patterns, mating systems and philopatry, and diet (Gibbs et al. 1992). Gibbs et al. (1992) also suggested examining the species' habitat associations in the nesting, migration, and overwintering periods. Major habitats used as least bittern migration stopovers and for overwintering need to be identified, and techniques for wetland enhancement and restoration need to be developed (Gibbs et al. 1992). Other topics that should be explored include determining the factors that regulate populations, investigating the effects of chemical contamination, identifying the effects of disease and parasites, and determining the impacts of weather on populations (Gibbs et al. 1992, Hands et al. 1989).

Related abstracts: American bittern, Forster's tern, yellow-headed blackbird, Great Lakes marsh.

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