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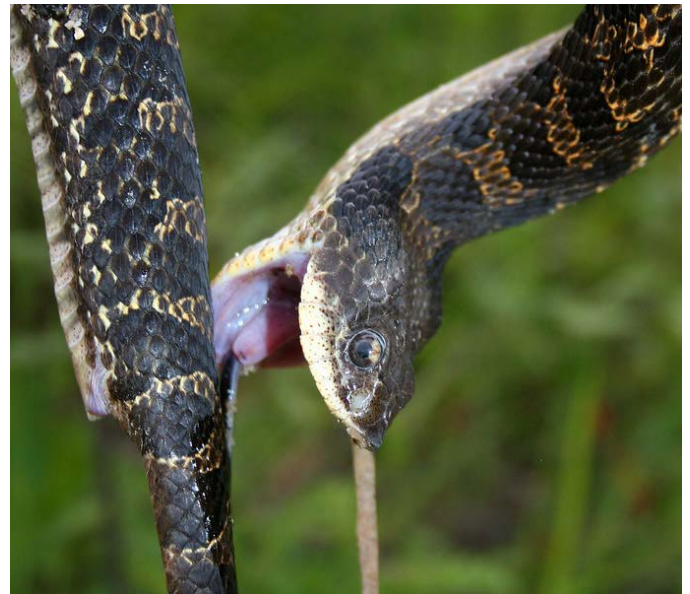
**Eastern Hog-nosed Snake
Heterodon platirhinos
Latreille 1801**

State Status: **Special Concern**
Federal Status: **None**

SPECIES DESCRIPTION: The Eastern Hog-nosed Snake (*Heterodon platirhinos*) is a thick-bodied, moderately large snake with a broad head and upturned snout. Most specimens are well patterned with a light background color of yellow, gray, or olive and a regular series of large, rectangular, dark spots down the middle of the back that alternate with dark spots on either side, but the species can be yellowish. Hog-nosed snakes also display partial or complete melanism, appearing slate-colored (rather than jet black). The scales are keeled and the underside of the tail is typically lighter than the rest of the belly. Adults range from approximately 51 to 102 cm (20 to 40 inches) in total length. Mating has been documented in September on Cape Cod (Buchanan et al. 2016), and females typically deposit 15 to 25 eggs in sandy soil or mulch in June or July. Eggs hatch in August and September. Behaviorally, this species is easy to distinguish from all other native snakes because of its elaborate “bluff” anti-predator behavior: it hisses loudly, flares or flattens its neck, and inflates its body substantially when threatened (looking a bit like a cobra). If further harassed, some specimens will thrash and roll on their backs, eject their stomach contents, and “play dead.”



Adult Eastern Hog-nosed Snake from Cape Cod, Barnstable County, Massachusetts, showing upturned nose. Photo: Scott Buchanan



If captured, Hog-nosed Snakes will sometimes feign death, gape their mouth, and eject their stomach contents or salivate. An adult from Franklin County, Massachusetts is pictured. Photo: Mike Jones / MassWildlife

EVOLUTION AND TAXONOMY: *Heterodon platirhinos* is a relatively ancient (Miocene) lineage within the widespread family Dipsadidae, subfamily Heterodontinae (formerly Colubridae). There are three recognized, living species within *Heterodon*—*H. platirhinos* (Eastern Hog-nosed Snake), *H. simus* (Southern Hog-nosed Snake), and *H. nasicus* (Western Hog-nosed Snake). The hog-nosed snakes are now estimated to have diverged from its closest living relative in Massachusetts, the Worm Snake (genus *Carphophis*), between 27.6 and 38.9 million years ago (Pook et al. 2009; Chen et al. 2014; Zheng and Wiens 2016).

DISTRIBUTION AND ABUNDANCE: Eastern Hog-nosed Snakes are known from Franklin, Hampshire, Hampden, Worcester, Middlesex, Norfolk, Bristol, Plymouth, and Barnstable Counties below 300 m elevation.

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Hog-nosed snakes have not been recorded from any offshore islands in Massachusetts (i.e., Dukes or Nantucket Counties). Lazell (1976) suggested that Hog-nosed Snakes are absent from the outlying islands in Massachusetts and Rhode Island because they are poor dispersers across seawater and they arrived in New England after the major islands were isolated from the mainland by postglacial sea level rise. However, the species appears to be relatively salt-tolerant and has even been observed in the surf and ocean at Cape Cod as well as at Assateague Island, Maryland (R. Cook, NPS, pers. comm.). There are also no records from Essex County, although the species is well-documented in portions of the Nashua River watershed in Middlesex County (Michener and Lazell 1989) and adjacent New Hampshire.

HABITAT DESCRIPTION: Within its range in New England, *H. platirhinos* may be found naturally in both forested and nonforested habitats (Michener and Lazell 1989; LaGory et al. 2009; NHFG 2015; Mirick et al. 2016). One commonality amongst northeastern studies of habitat selection in *H. platirhinos* is a preference for edge habitat, or the ecotone between, or mosaics of, upland forests dominated by Pitch Pine, White Pine, oaks, blueberries, huckleberries, and/or herbaceous/graminoid communities. Extant New England populations of *H. platirhinos* are often associated with Pitch Pine-Scrub Oak (*Pinus rigida-Quercus ilicifolia*) associations, ericaceous (heath) scrub, and other forested and nonforested habitats of glacial lake deltas, glacial outwash plains, and eroded glacial sediments reorganized by longshore drift. *Heterodon platirhinos* is often associated with sandplain communities on deep sand outwash and coastal dunes (Lagory et al. 2009; Buchanan et al. 2012; Vanek and Wasko 2017). *Heterodon platirhinos* is often found in association with sandy or sandy-loam soil (Seburn 2009). Hog-nosed Snakes have been reported to prefer areas with surface debris or rock cover within close proximity to both ponds and shrubs, lower canopy closure, greater solar radiative emissivity, and higher surface temperatures (Goulet et al. 2015; Buchanan et al. 2016). *Heterodon platirhinos* is a dietary specialist (Cooper and Secor 2007; NHFG 2015; Mirick et al. 2016), primarily feeding on toads and other amphibians, and the availability of an adequate amphibian prey base may be a limiting factor for populations of *H. platirhinos*. Wetlands are often a prominent habitat feature for *H. platirhinos* because they support populations of amphibian prey species, especially toads. There is at least one Worcester County site where the species historically shared a rock pile hibernaculum with a large population of North American Racers (*Coluber constrictor*) (Buelow 2007). Elsewhere in Massachusetts, the species is known to

hibernate in forested and scrub habitats, sometimes near woody debris.



Pitch Pine (Pinus rigida)-dominated habitat of the Eastern Hog-nosed Snake in Barnstable County (top) and Franklin County (bottom). Photos: Mike Jones / MassWildlife

THREATS: Combining data across studies, it appears that *H. platirhinos* has relatively low annual survivorship rates augmented by higher fecundity and more young produced annually compared to larger snakes (Platt 1969). *Heterodon platirhinos* appears to be susceptible to declines caused by habitat fragmentation and succession. The ultimate cause of decline is likely habitat loss, with adults lost to roadkill and depredation by small carnivores. The loss of essential, early-successional nesting habitats may be particularly detrimental to some populations, as it has been shown that some individuals exhibit nest-site fidelity (Buchanan et al. 2013; Vanek et al. 2014), and some population declines are likely related to the declines in reproductive success associated with increasing closed-canopy habitats due to succession. On Cape Cod, *H. platirhinos* are still killed by homeowners who think they are venomous and may be surprised by the snake's startling anti-predator displays (R.

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Cook, NPS, pers. comm.). Dispersal capability is probably poor, given an aversion to crossing paved roads (Robson and Blouin-Demers 2013), high nest site fidelity (Vanek et al. 2014), and potential for roadkill and incidental killing. Some of the most extensive populations known occur on federally-managed land of the Cape Cod National Seashore. Because of the high level of automobile, bicycle, and pedestrian traffic within known areas of occurrence, the species should be closely monitored on Cape Cod in order to inform management actions to minimize adult mortality.

The major threats to this species — and most medium-to-large snakes in general — are ever increasing habitat loss and road mortality. For this species, habitat loss may include the loss of wetland/lowland habitats it does not require directly, but which are important for the reproduction of its prey species. Further, some populations may have been negatively influenced by a declining prey base (primarily toads). There have undoubtedly been losses of hibernacula to development. Some populations may also have been reduced by over-collection, and certainly many individuals are killed by people needlessly frightened by their extraordinary bluff behavior. It is likely that the unnaturally high density populations of small- to mid-size “human commensal” carnivores, such as raccoon, skunk and fox, associated with human development, are also a threat to this snake. Studies are required to determine more about the abundance, distribution, and core habitat requirements of the species.

MANAGEMENT RECOMMENDATIONS: More than any other snake species in Massachusetts, *Heterodon platirhinos* is associated with sandplain communities on deep sand outwash and coastal dunes (Lagory et al. 2009; Buchanan et al. 2012; Vanek and Wasko 2017), and may benefit from strategic management of these areas where they occur. Current habitat management activities on several major protected areas—including vegetation management, forestry, and prescribed fire—appear to be consistent with Eastern Hog-nosed Snake conservation (Akresh et al. 2017). In particular, pine barrens restoration by MassWildlife in Franklin County (Hawthorne 2017) is likely to benefit *H. platirhinos*. Restoration of Pitch Pine-Scrub Oak communities with prescribed fire and forestry will likely improve habitat quality for the species at other locations. However, as noted by New Hampshire Fish and Game (2015), habitat management activities need further evaluation to confirm that they result in more stabilize populations. While Akresh et al. (2017) provide compelling information that *H. platirhinos* respond favorably to habitat management in Massachusetts, the species’ long-term



Dark or black phase of the Eastern Hog-nosed Snake, Franklin County, Massachusetts. Photo: Mike Jones / MassWildlife



Adult Eastern Hog-nosed Snake from Cape Cod, Barnstable County, Massachusetts. Photo: Scott Buchanan

response to common practices in pine barrens communities is needed to further refine habitat management goals. Road mortality hotspots must be identified, mapped, and mitigated. Long-term quantitative monitoring should be implemented.

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