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OWL PREDATION ON FLORIDA BONNETED BATS (*Eumops floridanus*)

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When the Florida bonneted bat (*Eumops floridanus*) was listed as federally endangered in 2013, predation by owls and snakes was noted as a potential but uncertain threat to the species (USFWS 2013). At that time, the only record of predation on Florida bonneted bats was from Fakahatchee Strand Preserve State Park, Collier County, Florida, where in June 2000 park biologist Mike Owen found the skull of a Florida bonneted bat in a regurgitated pellet from an unknown species of owl (Timm and Genoways 2004). Here we report three additional lines of evidence demonstrating interaction between owls and these endangered bats. We describe the first direct observation of an owl killing a Florida bonneted bat, as well as observations of Barred Owls (*Strix varia*) attempting to take Florida bonneted bats and being attracted to the bats' calls.

On 23 April 2018, we captured eight Florida bonneted bats in mist nets in Fakahatchee Strand Preserve State Park with the objective of attaching radio transmitters and tracking them to their roosts. Transmitters were attached to males and to females that did not appear to be pregnant. Because this large and heavy molossid bat typically drops from its roost as it takes flight, we routinely release a captured individual by placing it onto a tree trunk and watching as it climbs to a suitable height (usually 3-6 m) before dropping into flight. In a four-year study in Charlotte County, we released Florida bonneted bats in this manner >1,000 times with no mortality. Seven of the eight bats released on trees on 23 April also climbed and flew away unharmed. The eighth bat was a female that was assessed as healthy, but it was pregnant and so was not fitted with a

radio transmitter. We released this bat onto the trunk of a cypress tree (*Taxodium* sp.) at 2217 EST and it climbed readily before stopping about 4 m up the tree. JAG stood approximately 2 m from the tree and watched the bat in the moonlight to confirm that it flew away. A few moments later a large owl flew in directly overhead and, without slowing or making a sound, snatched the bat off the tree trunk. As the owl flew away, the bat was visible in its talons. ECB was nearby and did not see the owl, but heard the bat make several loud, high-pitched vocalizations.

We could not identify the owl, seen so briefly in poor light, but we assumed it was a Barred Owl because it was large and we had heard many Barred Owls calling nearby that night. It did not appear to be as large as a Great Horned Owl (*Bubo virginianus*), and we had heard no calls of that species. Bats have seldom been reported as a prey item for Barred Owls (Livezey 2007), but Bergstrom and Smith (2017) observed a pair of Barred Owls that temporarily relied on southeastern myotis (*Myotis austroriparius*) as a primary food source.

Although we saw only one bat captured by an owl, other circumstantial observations suggest that Barred Owls prey upon Florida bonneted bats more often than previously known. In March 2016, LM was observing a cavity tree used by roosting Florida bonneted bats in the Florida Panther National Wildlife Refuge, in Collier County, when a Barred Owl flew in and perched in a tree near the bat roost. At dusk, the owl dove at the first Florida bonneted bat to emerge from the cavity roost, but it missed and LM saw no bats captured that night. Because the owl perched near the roost and pursued the first bat that emerged, we suspect it had visited the roost previously.

We have also frequently heard Barred Owls near roost trees at dusk and observed them flying over the trees as the bats were emerging. On several occasions, ECB and MAW have observed Barred Owls flying into and around mist nets set above an acoustic lure (electronic speaker) placed to attract Florida bonneted bats by broadcasting their social calls (Braun de Torrez et al. 2017). On one occasion, in May 2016, MAW saw a Barred Owl land and stare at the lure, then tilt its head back and forth before jumping toward it, being briefly caught in the net, and then flying off.

Our direct observation confirms that owls in flight can capture a Florida bonneted bat (in this case resting on a tree), and it corroborates the earlier indirect evidence of owl predation based on an owl pellet (Timm and Genoways 2004). Our supplementary observations of Barred Owl behavior near a roost and at an acoustic lure provide circumstantial evidence that owls may target Florida bonneted bats as prey and not simply encounter them by chance.

If more extensive study shows that owls regularly prey upon Florida bonneted bats, it will be important to determine how predation rates vary across south Florida and throughout the year. Florida bonneted bats roost in a variety of habitats, including urban areas (Belwood 1992), and predation rates likely vary among populations depending upon the density of predators, presence of predator perches near roosts, and availability of other prey. Because colonies of Florida bonneted bats are typically small and believed to consist usually of a dominant male plus a harem of females and their offspring (Ober et al. 2017), predation by Barred Owls could quickly deplete a colony. This would be especially likely if a pair of nesting owls with young to feed discovered a bat roost, as was observed with Barred Owls that killed at least 37 southeastern myotis in Georgia (Bergstrom and Smith 2017). Survival of individual Florida bonneted bats is estimated to be relatively low (Bailey et al. 2017), and investigating ways to minimize mortality factors, including predation, may be important for conservation of local populations across the species' range.

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