1. Project title: The Prothonotary Project

2. Project description:

The Prothonotary Warbler nests in the wooded swamps and bottomland forests of eastern North America and is one of only two North American warbler species that nests in tree cavities. Because of its specific habitat requirements, the population distribution is highly localized and in 2016 it was designated as a "Species of Continental Concern" by Partners in Flight due to its dramatic 42% population decline during the past 40 years. The specific reason for the warbler's decline is unclear and because it is a Neotropical migrant, it faces threats on the breeding grounds, at stopover sites during migration, and on the wintering grounds in the tropics. The entirety of the population breeds in North America and potential factors limiting its population here include loss of floodplain forest habitat, increased nest predation, and reduced productivity due to parasitism by the Brown-headed Cowbird. Cowbirds typically avoid parasitizing cavity-nesting birds, however, the Prothonotary Warbler is a frequent host and cowbirds may use "mafia tactics" to force it to rear cowbird young. Prothonotary Warblers migrate from Central and northern South America to breed, therefore factors such as habitat loss or increased predation along their migratory stopover sites may negatively affect the population. Finally, Prothonotary Warblers may face challenges at their wintering sites in the tropics, where they occupy mangrove forests that are also being rapidly depleted.

3. Project goals:

I initiated the Prothonotary Project at Carp Lake and Nahant Marsh in Davenport, Iowa in 2016 to examine the causes of the decline of this charismatic bird and to provide nesting sites to help increase its productivity. It began as a pilot project with 80 nest boxes. More than 90% of the

boxes were occupied and I quickly realized that the Quad Cities area has ideal habitat for this species. My plan is to establish a study site conducive for long term study of the Prothonotary Warbler with a focus on its breeding and migratory biology. The goals of the Prothonotary Project in 2017 and beyond are to:

1. **Provide critical nesting sites** by erecting nestboxes for Prothonotary Warblers along a 10 mile stretch of the Mississippi River floodplain in Scott County, Iowa. Because Prothonotary Warblers readily use nest boxes, we can provide them with boxes to help conserve the population and this will also allow us to study their breeding biology.

2. To study warbler **breeding behavior**, including interactions with brood parasitic cowbirds that lay eggs in the nests of these warblers and may engage in mafia tactics to force them to accept parasitism.

3. To attach monitors and **use radio-telemetry to track** warblers during fall/spring migration and during the nonbreeding season in Central and South America. To date, only a single Prothonotary Warbler migration event has been tracked. With the rapid advancement of radio transmitter technology, this is becoming the latest tool to monitor declining migratory bird populations. We will also be joining the Prothonotary Warbler Working Group established by Louisiana Audubon. This is a partnership between research groups in six states whose goal is to monitor and develop plans to help conserve Prothonotary Warbler populations.

Therefore, our main priority is to create nesting habitat for this rapidly declining species and then to determine whether the population declines are a result of factors during in the breeding season, migration, or on the wintering grounds in tropical America.

Funds were used for construction of nest boxes, color bands, and geolocators.

4. Project impact:

1. Provide critical nest sites. We erected 175 nestboxes. In addition to our site at Carp Lake/Nahant Marsh (n=50), we located a major site at Princeton Wildlife Management Area (n = 115 boxes). We also teamed up with TPC Deere Run and established boxes (n=10) along the Rock River on the golf course property.

2. Study warbler breeding behavior. 98% of boxes were occupied; 82% had Prothonotary Warblers. *However, 84% of these boxes were usurped by House Wrens*. Wrens destroyed warbler eggs and nestlings and were the greatest cause of nest failure in the warblers. 6% of boxes were occupied by Tree Swallows. The 2nd greatest cause of nest failure was flooding. There were three floods during the 2017 season and the event around Memorial Day weekend was particularly impactful. Some boxes were also destroyed by the floods and falling trees associated with the floods. These preliminary data suggest House Wrens are the most significant cause of nest failure in Prothonotary Warblers. Nest predation by mammals/snakes was almost non-existent, and while some nests were parasitized by cowbirds, the negative effects are much less because warblers raise both cowbirds and their own young when parasitized. The wren is not sympatric with the warbler in much of its range in the south, so this is a unique issue in the northern portion of the range.

3. Track warbler migration. Geolocators have been purchased and will be deployed in 2018. Funds were not received in time to purchase the geolocators in 2017 because there is a ~4 month lag time. Additionally, PIT tags will be attached to cowbirds and data loggers will be mounted on warbler boxes to determine whether cowbirds revisit nests they've parasitized to engage in mafia activity.