Preservation Foundation
of the Lake County Forest Preserves

DATE: November 10, 2021

MEMO TO: Nels Leutwiler, Chair
Preservation Foundation Board

FROM: Jim Anderson
Director of Natural Resources

RECOMMENDATION: Recommend approval of a $36,000 grant from unrestricted funds to support Forest Amphibian Conservation in the Southern Des Plaines River Oak Woodland Restoration Project area.

FINANCIAL DATA: The requested funds will be paid in equal installments of $12,000 in 2022, 2023, and 2024 and will be matched by $47,283.20.

As of September 30, 2021, the Foundation's total of unrestricted funding was $271,883. Grants payable from unrestricted funds through September 2023 total $165,156.

BACKGROUND: Amphibians are the most endangered vertebrate group with population declines over the last three decades resulting in the extinction of over 150 species worldwide (Olsen et al. 2013). While many of the rapid declines and extinctions have occurred in the tropics, temperate zone amphibians have also been hard-hit.

In Illinois, historic habitat loss and fragmentation, coupled with shifts in habitat suitability due to hydrologic alteration, invasive species introduction (Sacerdote and King 2014), and presence of amphibian disease, have contributed to the loss of historically common species such as the cricket frog (*Acris crepitans*) from the northern third of the state, pickerel frogs (*Lithobates palustris*) from many groundwater-fed wetlands, and wood frogs from the forested ephemeral ponds of northeastern Illinois counties (Sacerdote 2009). In the last decade, studies have documented the increasing role of climate change and the accompanying drought and flood extremes in amphibian population declines (Olsen et al. 2013 Walls et al. 2013a, Cayuela et al. 2016, Muths et al. 2017).

The natural communities located in the Southern Des Plaines Oak Woodland Restoration Project area include critical habitat for amphibian species. Within these Oak Ecosystems there exists Northern Flatwoods (vernal pools) which provide breeding habitat for the species mentioned above. The surrounding upland habitat is also critical habitat for summer foraging and overwintering.

From 2007-2010, Lake County Forest Preserve District (the District) partnered with Dr. Allison Sacerdote-Velat (now with Chicago Academy of Sciences) to reintroduce wood frogs, an Illinois Species in Greatest Conservation Need, to MacArthur Woods Forest Preserve following extensive hydrologic restoration and removal of invasive buckthorn in the site. Using egg mass

translocation, multiple cohorts of eggs were transferred to MacArthur Woods over several years. By 2014, a breeding population with approximately 60 females was established in the site.

In 2016, Dr. Sacerdote-Velat found just over 200 egg masses in the site, indicating a robust population of at least 200 breeding female wood frogs. Initially making use of a single forested ephemeral pond, the population subsequently expanded and wood frogs were documented breeding in six additional MacArthur Woods ponds in the site in the last three years.

The reintroduced wood frog population in MacArthur Woods represents the only population of the species in the county and is the only site with confirmed recent records of the species across over 100 sites in nine northeastern Illinois counties. Single, isolated populations of a species are more vulnerable to unpredictable changes in environmental conditions, such as severe droughts and floods, outbreaks of disease, competition, and predation pressures. To secure populations of rare species, establishment of additional populations through further reintroduction efforts helps hedge against the effects of extreme environmental conditions and other drivers of decline.

In 2017, Dr. Sacerdote-Velat partnered with the District to assess feasibility of expanding wood frog egg mass translocation to three additional restored preserves near MacArthur Woods; Ryerson Woods Conservation Area, Grainger Woods, and Elm Road Woods. In 2018, initial translocations occurred in Ryerson Woods and Elm Road Woods. In 2019, the second cohort of eggs was translocated to Ryerson Woods and Elm Road Woods, and an initial cohort was translocated to Grainger Woods. In 2020 and 2021, additional cohorts of eggs were translocated to Ryerson, Grainger, and Elm Road Woods.

In 2021, Lake County experienced a sustained and severe drought resulting in the second driest annual conditions in the past 127 years (NOAA). The reintroduced wood frog population at MacArthur Woods experienced total reproductive failure with all ponds in the site drying during the last week of May and first week of June. The drought conditions and impacts were similar across all study sites.

To ensure the persistence of reintroduced wood frogs in Lake County, we propose to carry out additional translocations of wood frog egg masses into Elm Road Woods, Grainger Woods, and Ryerson Woods, and survey these sites for evidence of establishment. Additionally, the severity of the 2021 drought resulted in total reproductive failure for blue-spotted and tiger salamanders across breeding sites in the southeastern portion of the county. We propose to assess the occupancy, abundance and recruitment success of blue-spotted salamanders, tiger salamanders, and other ephemeral pool-obligate amphibians including spring peepers and chorus frogs in a total of six study sites for which we have pre-drought populations data; Old School Forest Preserve, MacArthur Woods, Grainger Woods, Wright Woods, Elm Road Woods, and Ryerson Woods. This study will improve our understanding of regional amphibian resilience to severe drought, help identify sites and species with greater vulnerability, and identify management goals and conservation approaches to protect sensitive amphibian species.

Project Approach

Dr. Sacerdote-Velat (Curator of Herpetology) and a field technician will work in partnership with the District to accomplish the following objectives:

1. Conduct demographic surveys of the amphibian communities in MacArthur Woods, Old School, Grainger Woods, Wright Woods, Elm Road Woods, and Ryerson Woods to assess impacts of the 2021 drought. Automated frog call recorders will be used in all study sites to collect call intensity data, document breeding effort by male frogs, and record changes in call phenology across seasons.
2. Conduct population sampling and egg mass surveys of wood frogs in MacArthur Woods to assess effects of the 2021 drought on reintroduced wood frog persistence and population composition.
3. Carry out additional annual translocations of no more than 10 % of egg masses from MacArthur Woods to Elm Road Woods, Grainger Woods, and Ryerson Woods to secure the reintroduction efforts impacted by the 2021 drought, and establish wood frog populations in three additional sites.
4. Use pond enclosures to examine changes in fitness metrics such as hatching rates, metamorphosis rates, and body size at metamorphosis across sites and ponds to improve our understanding of the population level and physiological effects of changing climate conditions on regional ephemeral pool-breeding amphibians.

Deliverables:

The Curator of Herpetology will provide the District with an assessment of the impact of the 2021 drought on abundance, occupancy, and recruitment of reintroduced wood frogs, blue-spotted salamanders, spring peepers, boreal chorus frogs, and tiger salamanders. The research team will compare pre-drought and post-drought survival rates and fitness metrics to improve understanding of the community-level and physiological effects of severe drought on sensitive ephemeral pond-obligate species. Egg mass counts will track the reproductive output of the MacArthur Woods wood frog population through time, and egg mass surveys and call recordings will be used to assess success of wood frog translocation efforts in three additional sites.

Annual reports will be provided to the District detailing the results of sampling efforts, translocation progress, and any management recommendations that may improve conditions for ephemeral pond-dependent amphibians. Results of this study will be presented at professional wildlife management and conservation conferences including the Midwest Fish and Wildlife Conference and Midwest Partners in Amphibian and Reptile Conservation. Manuscripts resulting from this project will be submitted for peer-reviewed publication.

Budget:

Year 1-2022			
Personnel	**Item**	**Breakdown**	**Totals**
	Field Technician	380 hours at $15.38/hour + FICA(0.0765)	$ 6,300.00
	Curator of Herpetology	6% of time: project management, data analysis	$ 4,600.00
Mileage	Project Mileage	1000 at 0.56 per mile	$ 560.00
Supplies	Waders, gloves, decontamination supplies, enclosure materials		$ 540.00
Subtotal			**$ 12,000.00**
Year 2-2023			
Personnel	**Item**	**Breakdown**	**Totals**
	Field Technician	380 hours at $15.76/hour + FICA (0.0756)	$ 6,500.00
	Curator of Herpetology	5.5% of time: project management, data analysis	$ 4,400.00
Mileage	Project Mileage	1000 at 0.56 per mile	$ 560.00
Supplies	Waders, gloves, decontamination supplies, enclosure materials		$ 540.00
Subtotal			**$ 12,000.00**
Year 3-2024			
Personnel	**Item**	**Breakdown**	**Totals**
	Field Technician	375 hours at $16.15/hour + FICA (0.0756)	$ 6,550.00
	Curator of Herpetology	5.5% of time: project management, data analysis	$ 4,400.00
Mileage	Project Mileage	1000 at 0.56 per mile	$ 560.00
Supplies	Waders, gloves, decontamination supplies, enclosure materials		$ 490.00
Subtotal			**$ 12,000.00**
Total Request From Lake County Preservation Foundation			**$ 36,000.00**

Chicago Academy of Sciences Project Support			
Personnel	**Item**	**Breakdown**	**Totals**
Year 1-2022	Curator of Herpetology	20% of time: data collection/analysis	$ 15,297.60
Year 2-2023	Curator of Herpetology	20% of time: data collection/analysis	$ 15,756.40
Year 3-2024	Curator of Herpetology	20% of time: data collection/analysis	$ 16,229.20
Total Provided by Chicago Academy of Sciences		20% of time: data collection/analysis	**$ 47,283.20**

Total Project Costs **$83,283**

REVIEW BY OTHERS: Executive Director, Director of Finance, Director of Administration, Chief Operations Officer, Preservation Foundation Executive Director.

PRESERVATION FOUNDATION BOARD:

Date: _____ ☐ Roll Call Vote: Ayes: ____ Nays: _____

☐ Voice Vote Majority Ayes; ___ Nays: _____