Joint grant submission with Dr Olofske and WWA

Overview:

This proposal describes a strategic partnership developed around effective wetland restoration for the combined goals of parasite and waterfowl conservation. Parasites have been considered a threat to conservation, but broadening perspectives and evaluation of scientific evidence has now identified the key role of parasites in general, and flatworms (trematodes) specifically, in ecosystems as essential components of biodiversity. Importantly, parasites are threatened through the loss of their hosts and by environmental change. Alternatively, waterfowl have received substantial conservation action and are flagship species for wetlands, however, there are scientific knowledge gaps between ecological theory and restoration practice, monitoring, and assessment. This proposal addresses a series of integrated research questions focused on evaluating the ecological processes supporting diverse and abundant trematode and waterfowl communities. Based on extensive fieldwork from the landscape to local level, our team of restoration practitioners, ecologists, taxonomists, and parasitologists will develop criteria for evaluating species and habitats in support of ecosystem conservation goals. The implementation plan will include site selection, design and monitoring of new restorations focused on the interrelated success of functional wetlands, diverse parasite populations and abundant waterfowl while developing parasites as conservation tools with their ability to serve as biological indicators of host and habitat connections.

Intellectual Merit:

This proposal describes how extensive wetland fieldwork encompassing environmental assessment and species interactions, coupled with specimen-based integrative taxonomy of trematodes can establish evidence-based conservation criteria for trematodes and their associated habitats. In order to prioritize species for conservation action there first needs to be criteria for assessing threat level and risk of extinction. Our project will provide scientifically based criteria for the regional level to rigorously evaluate the status and threats to trematode parasites in diverse wetland ecosystems. Our approach will also provide a quality assessment protocol for wetlands that can be used to support waterfowl populations and other wetland wildlife. Our project will also characterize species using the data and the criteria to designate species and habitats of conservation concern and prioritize further action. The outcomes of this process include designating trematodes as regional conservation targets and simultaneously testing trematodes as biological indicators to be used as conservation tools for prioritizing and assessing wetland restorations. The outcome of this conservation planning process will be dissemination habitat restoration and management plans applicable state-wide.

Broader Impacts:

The conservation action plan will take the next step by incorporating data from our research and our evidence-based conservation criteria, wetland quality assessment and bioindicator information to implement new restoration projects that benefit waterfowl, trematodes, and wetland ecosystems. We will prioritize and design new wetland restorations through a comprehensive approach that addresses water quality and species interactions. We will then monitor and evaluate these restorations through the development of efficient, rapid assessments focused on ecosystem function. Through regular assessment we will be able to test the effectiveness of our plan, refine our approach and goals, and identify further research needs. Additional broader impacts involve course-based undergraduate research, the development of parasite conservation teaching modules, and public outreach through waterfowl focused organizations, natural history museum events and nature education activities at state wildlife areas.