Testing Efficacy of Remote Sensing to Measure Multiple Environmental Benefits of Water Level Management: A Case Study at Wilson Lake, Kansas

Background

Water level management (WLM) is an important management approach for many different benefits at reservoirs including threatened and endangered species (TES) management. Whooping Cranes (WHCR) are an endangered species that require shallow water depths (<18 inches), open spaces without nearby woody or tall vegetation, and a glide path free of obstructions for roost locations. Many USACE reservoirs within the Great Plains support stop-over habitat for WHCR along with numerous other waterbirds. WLM can greatly benefit these species by lowering pool levels at the appropriate time of year to increase habitat (e.g. mudflats). In addition to benefits to TES, WLM can benefit reservoirs by reducing shoreline erosion during fall and winter, as well as better control of invasive species with a eradication focus on phragmites at Wilson Lake.

Objectives

The goal of this project is to further aid the USACE mission by testing efficacy of remote sensing to measure multiple environmental benefits of an EWN action (WLM). Our primary objectives at Wilson Lake are to (1) use existing bathymetry data to establish exposed shoreline area at different water levels, and (2) establish camera arrays to detect seasonal presence of sensitive bird species, including WHCR. This information will directly assist development of an ESA Section 7(a)(1) conservation plan for WHCR, being drafted under the DOER TEST initiative. Our second objective is to explore, with partners, how to work with WLM to monitor and assess changes in shoreline erosion and spatial distribution of invasive species. This latter objective includes development of a sound scientific plan for evaluating effects of WLM on these two problematic issues widespread in the Great Plains.

Shorebirds stopping over at Kanopolis Lake, Kansas during spring migration.

Approach

The first task is to conduct hydrological analyses to determine how WLM should be implemented according to bathymetry data available for Wilson Lake. We will use results from this analysis to guide future WLM actions that target suitable stop-over habitat for WHCR and other migratory shorebirds. We will test advanced camera systems as a proof-of-concept for monitoring and documenting use of managed habitat by WHCR and other species of conservation concern. In addition to wildlife monitoring, we will test these camera systems for their ability to monitor long-term changes within the ecosystem with shoreline erosion and invasive species being the target of this investigation.

Outcomes

This project will provide improved knowledge for determining how WLM can be implemented for shoreline management (e.g., ecosystem restoration; wildlife management), while maintaining primary project objectives (e.g., Flood Risk Management). We will produce a Tech Report that presents the outcomes from the bathemetry, camera demonstration, shoreline erosion, and invasive plant species monitoring. We will demonstrate how this project serves as a proof-of-concept with advanced camera systems for monitoring wildlife in remote settings that can be applied to other EWN and USACE projects nationwide. We will also create online media for the EWN website using ArcGIS Storymap to visually present the outcomes of the projects. We plan to distribute information internally to USACE staff via an online webinar and to reach a broader audience through use of an EWN Podcast.

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