

## AVIAN USE – PHASE I

### BACKGROUND

The Utah Department of Environmental Quality, Division of Water Quality (DWQ), the Willard Spur Steering Committee (SC), and the Willard Spur Science Panel (SP) have been working throughout 2011 to develop a research program to answer the question: *What water quality standards are fully protective of the beneficial uses of Willard Spur as they relate to the proposed publically owned treatment works (POTW) discharge?* These groups have worked throughout 2011 to prepare and execute a baseline sampling plan and discuss and define research objectives for subsequent years. The baseline sampling plan, sampling operating procedures (SOPs), meeting summaries, and proposed research plan can be found at the project website, [www.willardspur.utah.gov](http://www.willardspur.utah.gov). The proposed research program includes three different research areas to be phased over a three year period (see Proposed Research Plan document dated October 27, 2011). This study is to be completed as a first phase of Research Area No. 1.

### SCOPE OF WORK

#### TASK 1 – LITERATURE REVIEW

The objective of the literature review is to provide an overview of significant literature published on the use of Willard Spur by birds. The focus of this review is to address the following questions:

***Note that the overall objective is to look at the impact nutrients is or may have on bird's beneficial use of Willard Spur, see what we'd like to get out of the final report below***

1. What does the literature describe in terms of avian species/numbers, existing models, and understanding of bird foraging and reproductive use of Willard Spur? What are the data gaps in the literature?
2. What factors might affect bird abundance in wetlands habitats similar to Willard Spur, e.g., water level, season, food availability, vegetation?
3. What food items might birds depend upon in a wetlands habitat similar to Willard Spur? Are the birds opportunistic or specific in what they are looking for? What is the energy value of important food items for key bird guilds?
4. What does the literature reveal about the impact of nutrients upon bird populations similar to what might be found in a wetlands habitat like Willard Spur?

The literature review should be completed using typical methods of chain-of-citation and electronic database searches and consultation with leading researchers. The Principal Investigator (PI) will use the Zotero interface ([www.zotero.org](http://www.zotero.org)) to collect, organize, cite and share the identified literature. Electronic or hard copies of the original documents will be provided to DWQ. Annotations will be captured as notes within Zotero to describe how each piece of literature addresses the questions above.

***Field work is possible but not envisioned to be part of this scope of work.***

#### DELIVERABLES

1. An electronic or hard copy of the original documents included in the literature review

#### TASK 2 – EVALUATION

The objective of this task is to utilize bird count data available from the Utah Division of Wildlife Resources, US Fish & Wildlife Service, and others to evaluate if and why bird numbers and use has changed over time. Datasets should be discussed in terms of possible factors that may have influenced observed changes (see question No. 2 in Task 1). At a minimum, hydrology should be discussed in terms of the annual flow hydrograph at the USGS gage station at Bear River @ Corinne (obtained from USGS website), outflows from Willard Bay (obtained from US Bureau of Reclamation website), and the available satellite imagery (to be provided by DWQ).

*Note we will be working on summarizing available hydrology information as part of Research Area No. 2*

Methods used, observations, and identified data gaps will be documented in Task 3.

#### **DELIVERABLES**

1. Available datasets
2. GIS mapping if used to perform evaluation

#### **TASK 3 – REPORT**

The objective of this task is to document the findings of this study and make recommendations for further research for the consideration of the Science Panel, Steering Committee, and DWQ.

A report will be prepared that includes a summary of methods, an annotated bibliography from Zotero, key observations and conclusions, identification of data gaps, and recommendations for follow-up research. Recommendations for follow-up research should be prioritized and work to understand/confirm the existing use of Willard Spur by birds, how increased nutrients could affect this beneficial use, identify possible indicators of adverse nutrient impacts upon bird use, and the role of birds in the food web of Willard Spur. See also questions identified in the Proposed Research Plan for Willard Spur, dated October 27, 2011. A draft report will be submitted to DWQ for review by DWQ and the SP. Comments will be discussed with the PI and incorporated by the PI into the final document.

#### **DELIVERABLES**

1. Presentation of draft results and recommendations at a Science Panel meeting
2. Draft and final report (pdf and three hard copies)

#### **SCHEDULE**

Draft report should be submitted by June 30, 2012. Final report by September 30, 2012.