

MACROINVERTEBRATES

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. 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 macroinvertebrates. The focus of this review is to address the following questions:

1. What does the literature describe in terms of expected macroinvertebrate taxa and how they and their density/biomass might change by key habitats, season, and water quality in wetlands similar to Willard Spur?
2. What factors might affect macroinvertebrate abundance in wetlands habitat similar to Willard Spur, e.g., water level, season, food availability, vegetation?
3. What habitat characteristics might macroinvertebrates depend upon in a wetlands habitat similar to Willard Spur?
4. What does the literature reveal about the impact of nutrients upon macroinvertebrate taxa/biomass 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) 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 summarize the use of Willard Spur by macroinvertebrates as observed in samples collected by DWQ from Willard Spur in 2011. Answer the following question using 2011 sample results previously submitted to DWQ:

1. How did macroinvertebrate taxa and density/biomass vary by location, habitat type and quality, season, and water level and water quality, i.e., salinity, nutrient concentrations, in Willard Spur?

Indices already submitted to DWQ should be compared to results from other GSL wetlands. Methods used, observations, and identified data gaps will be documented in Task 3.

DELIVERABLES

1. Available datasets

TASK 3 – REPORT

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

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 macroinvertebrates, how increased nutrients could affect this beneficial use, identify possible indicators of adverse nutrient impacts upon macroinvertebrates, and the role of macroinvertebrates 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.