Modeling to Improve Wetlands Management

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Overview

We developed three models to inform water and vegetation management at the Bear River Migratory Bird Refuge, Utah. The first model processes and classifies satellite images (Landsat) and estimates vegetation cover as well as the extent of flooding in wetland units over ten year period. The second model simulates the spread of invasive *Phragmites australis* as a function of water level changes and the reproduction mechanism (seed or rhizomes). The third systems model embeds results from the first and second models (Fig.1) and recommends vegetation control actions and water allocations among wetland units that will improve wetland habitat. Model results yield several important insights and recommendations to better manage water and vegetation at the Refuge.

Insights and Recommendations

1. Remote sensed Landsat images can help monitor vegetation and flooded areas in wetlands. These images are released every 16 days and freely available at glovis.usgs.gov/.

2. To reduce invasive vegetation spread, manage water levels according to the biological state of vegetation.

3. Detect invasive vegetation early, respond rapidly, and eradicate small patches completely rather than partially control larger patches.

4. Two-fold potential to improve wetland performance as measured by the performance metric of suitable habitat area for priority bird species.

5. More dynamically adjust water levels in wetland units. Install and use an automatic system to control gates/weirs or assign more personnel to adjust gates.

6. Protect the Refuge's water right to prevent drastic decline in wetland performance.

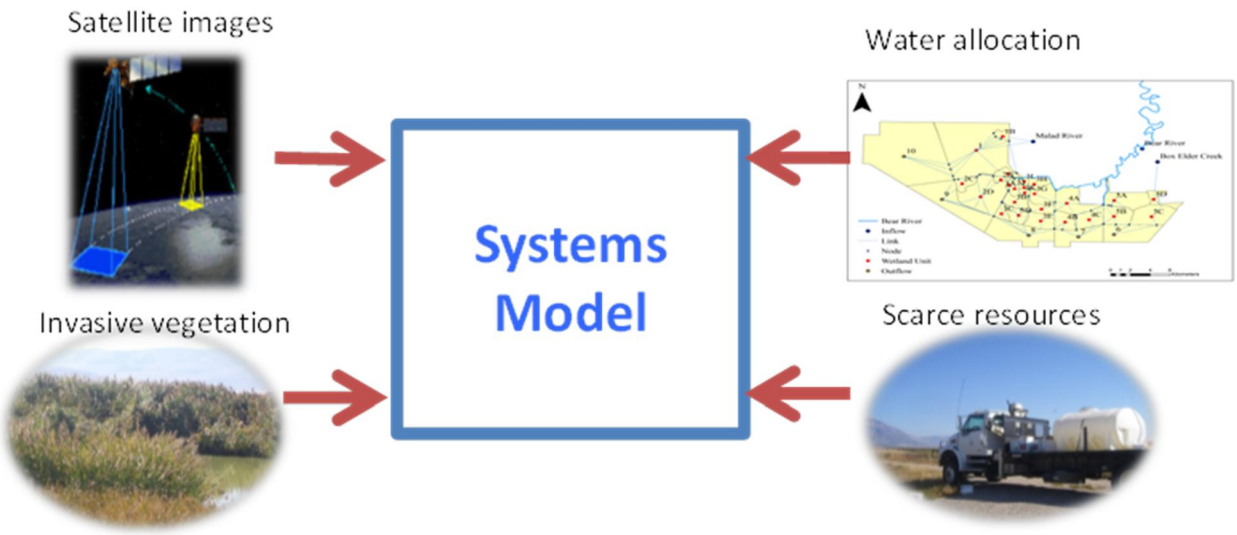

Fig.1. A systems model connects hydrological and ecological data to identify the efficient water allocation and vegetation management actions to improve wetland performance as measured by the suitable habitat area for priority bird species.