

## **Final Project Executive Summary**

### ***Recovering *Boltonia decurrens* The Illinois River Valley: A Landowner's Guidebook***

**Reported by Annaliese Schweitzer for the degree of Master of Science (M.S.) in Environmental Science, Oregon State University**

**Graduate Advisor: Brad Barnhart**

**Graduate Committee: Stacy Rosenberg, Kai Henifin**

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This project developed a comprehensive, user-friendly moist-soil vegetation management handbook tailored to private landowners in the Illinois River Valley (IRV), with the goal of advancing the recovery of *Boltonia decurrens* while simultaneously supporting high-quality waterfowl habitat. The IRV is a highly modified floodplain system where hydrologic alteration, invasive species, and shifting land-use patterns have degraded native moist-soil vegetation communities. Because only a small fraction of Illinois' land is publicly owned, the long-term recovery of *B. decurrens* depends heavily on conservation actions implemented on private lands, particularly duck clubs with deep generational stewardship traditions.

This project integrates ecological science, social science theory, and collaborative conservation principles to create a practical, visually engaging guidebook that empowers landowners to adopt adaptive management strategies. The central

question guiding this work is: How can private landowners in the IRV implement adaptive moist-soil management practices that enhance waterfowl habitat while supporting the recovery of the federally threatened *Boltonia decurrens*?

The Illinois River Valley is a dynamic floodplain ecosystem historically shaped by seasonal flood pulses that created diverse wetland habitats. Over more than a century, levees, channelization, agricultural expansion, and water-control infrastructure have altered natural hydrology, reducing flood variability and increasing sedimentation. These changes have diminished habitat quality for both migratory waterfowl and *Boltonia decurrens*, a floodplain plant species federally listed as threatened.

*Boltonia decurrens* depends on early spring flooding followed by wet growing seasons to disperse seeds and establish new populations. Modeling studies show that late flooding, drought, and reduced hydrologic variability suppress recruitment and shift the species toward less resilient life-history strategies. Because only ~3% of Illinois land is publicly owned, recovery efforts must focus on private lands where habitat conditions can be directly influenced by landowner decisions.



Figure 3. *Boltonia decurrens* seed, Schweitzer 2025

The IRV is also a critical migratory corridor for waterfowl species such as Blue-winged Teal, Gadwall, Mallard, and Wood Duck. These species rely on native moist-soil vegetation, including smartweed, barnyard grass, and sedges, for high-energy forage. However, many landowners have shifted toward short-term management solutions such as herbicides and Japanese millet plantings, which attract waterfowl but degrade long-term habitat resilience and native plant diversity.

This project addressed four primary objectives:

1. Assess ecological and hydrologic challenges affecting moist-soil habitat productivity and *B. decurrens* persistence in the IRV.
2. Identify management strategies that promote native moist-soil vegetation and align with waterfowl and threatened-species conservation goals.

3. Develop a visually engaging, accessible guidebook tailored to the motivations, knowledge levels, and decision-making contexts of private landowners.
4. Integrate social science frameworks to strengthen communication, trust, and adoption of conservation practices.

These objectives reflect the dual ecological and social dimensions of conservation in the IRV, where landowner engagement is essential for achieving landscape-scale outcomes.

Moist-soil vegetation management is a cornerstone of waterfowl habitat conservation. Native moist-soil plants produce nutrient-rich seeds that support migratory birds, while also contributing to floodplain biodiversity. Effective management requires intentional disturbance, water-level manipulation, and vegetation control—practices that can also benefit *Boltonia decurrens* when implemented strategically.

Key ecological insights include:

- Hydrologic timing is critical for *B. decurrens* germination and population growth.
- Native seedbanks remain viable but require disturbance and seasonal drawdowns to regenerate.
- Invasive species and non-native plantings reduce habitat quality and suppress native vegetation.

- Moist-soil management practices such as delayed flooding, controlled drawdowns, and woody vegetation removal can enhance habitat suitability for both waterfowl and *B. decurrens*.

These ecological principles form the scientific foundation of the guidebook. Because conservation success on private lands depends on voluntary participation, the project incorporated two social science frameworks:

Social Norm Theory and Co-orientation Theory.

- Social Norm Theory explains how landowner behavior is influenced by perceptions of peer expectations and accepted practices. Duck clubs in the IRV have strong cultural traditions, and management decisions are often shaped by shared experiences, hunting outcomes, and informal knowledge exchange.
- Co-orientation Theory focuses on how accurately stakeholders understand one another's values, goals, and constraints. This is essential for aligning agency objectives, such as threatened species recovery, with landowner priorities like waterfowl attraction and cost-effective management.

These frameworks informed the guidebook's structure, tone, and communication strategies, ensuring that technical guidance resonates with landowner motivations and reduces perceived risk.

The U.S. Fish and Wildlife Service's Partners for Fish and Wildlife (PFW) Program plays a central role in advancing conservation on private lands. PFW biologists work directly with landowners to design, implement, and monitor habitat projects, while also coordinating with state agencies, NGOs, and academic partners.

This project aligns with PFW's mission by:

- Providing landowners with clear, actionable guidance rooted in ecological science.
- Strengthening trust and communication between landowners and conservation partners.
- Supporting federal recovery goals for *Boltonia decurrens*.
- Enhancing waterfowl habitat quality across the IRV.

The guidebook serves as a practical tool that bridges scientific knowledge with on-the-ground decision-making.

The guidebook was designed to be visually engaging, accessible, and adaptable to diverse landowner needs. It includes:

- Step-by-step moist-soil management strategies.
- Seasonal timelines for drawdowns, disturbance, and vegetation control.
- Identification guides for native and invasive species.
- Hydrologic management recommendations tailored to altered floodplain systems.
- Case examples from duck clubs and conservation partners.
- Social science-informed communication elements that emphasize shared goals.

The guidebook's design reflects the realities of managing wetlands in a highly modified river system, where hydrologic unpredictability and site-specific constraints require flexible, adaptive approaches.

The project demonstrates that:

- Private landowners are essential partners in the recovery of *Boltonia decurrens*.
- Adaptive moist-soil management can simultaneously support waterfowl habitat and threatened-species conservation.
- Social science frameworks improve communication, trust, and adoption of conservation practices.
- Collaborative conservation strengthens ecological outcomes and fosters long-term stewardship.

These findings highlight the importance of integrating ecological and social dimensions in conservation planning.

This project provides a scalable model for integrating threatened-species recovery with working-lands management. By centering private landowners as conservation partners and providing them with accessible, science-based tools, the guidebook enhances the resilience of floodplain ecosystems in the Illinois River Valley.

The work demonstrates that combining ecological science, social science, and collaborative conservation can produce durable, landscape-scale outcomes that benefit biodiversity, waterfowl populations, and the cultural heritage of stewardship in the IRV.

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