INTERMOUNTAIN WEST
JOINT VENTURE

INTERMOUNTAIN INSIGHTS
Inspiring Conservation Action Through Science

WORKING SCIENCE FOR WORKING LANDSCAPES

Valuing Private Land and Seasonal Water Availability in Wetland Conservation Efforts

Photo: USFWS
Migrating Northern Pintails - Lower Klamath NWR

Underneath the notoriously tangled web of the West's water rights and water delivery infrastructure, the availability of water depends on natural cycles that are increasingly harder to predict. Habitat provided by this limited resource – and the agriculture it supports – are left vulnerable by a boom-and-bust cycle. Growing uncertainty around the reliability of water supplies increases the need to consider collaborative public-private approaches to water and land management in the West.

In the past, many wildlife refuges in the Intermountain West were managed without full knowledge and understanding of surrounding landscapes. This is, in part, a direct result of limited understanding of the importance of private wetlands. In the Southern Oregon and Northeastern California (SONEC) region, this knowledge gap is readily apparent. SONEC is one of the most important landscapes in the Pacific Flyway for waterfowl, shorebirds, and waterbirds. Wetland and riparian systems in the region play a key role in sustaining migratory bird populations and also support world-class big game populations, fisheries, and rural agricultural economies. The area includes numerous state and federally managed wildlife refuges such as Lower Klamath National Wildlife Refuge (U.S. Fish and Wildlife Service), Summer Lake Wildlife Area (Oregon Department of Fish and Wildlife), Warner Wetlands (Bureau of Land Management), and Ash Creek Wildlife Area (California Department of Fish and Wildlife).

> "Private wetland habitats in SONEC provide vital stopover habitat that supports 94 species of migratory birds and millions of individual birds annually."

The privately-owned wet meadows used for forage production on working ranches that surround the refuges make up the majority of seasonally flooded habitats in SONEC. These land uses overlay riparian floodplains and once-naturally occurring wetlands. Many landowners use traditional flood irrigation practices that provide optimal seasonal flooded habitat for migratory waterfowl during spring migration. Together with public land refuges, private wetland habitats in SONEC provide vital stopover habitat that supports 94 species of migratory birds and millions of individual birds annually as they migrate between northern breeding and southern wintering grounds.

Cumulatively, private working lands in SONEC may support a greater proportion of migratory birds than the refuges. However, poor documentation of the private land habitat provided by seasonal flood irrigation has left an information gap that, if filled, could better align land and water management practices with migratory bird habitat conservation goals.

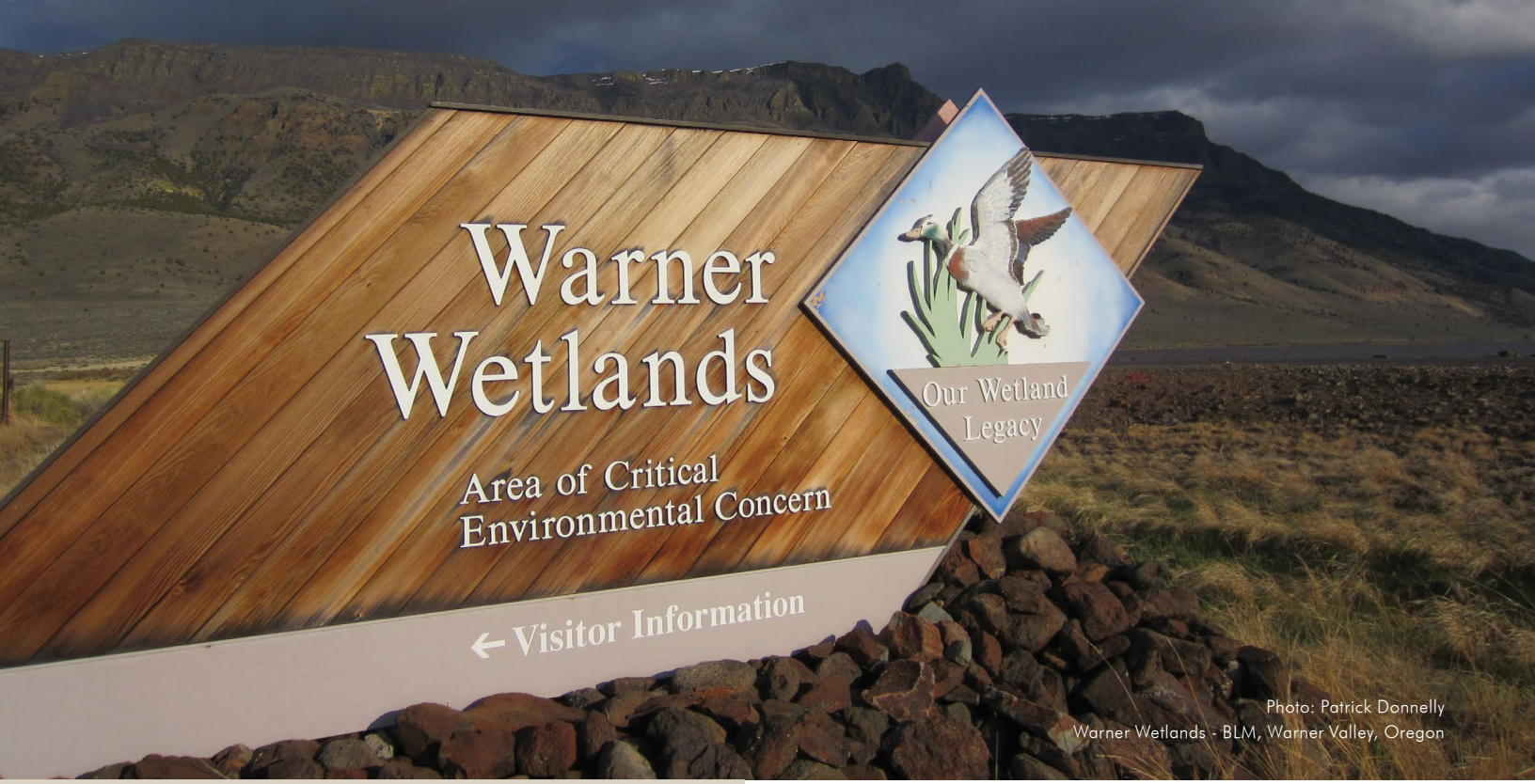


Photo: Patrick Donnelly
Warner Wetlands - BLM, Warner Valley, Oregon

> Demonstrating meaningful biological outcomes provides transparency, builds trust among partners, and lowers the overall cost of private lands conservation. It is a win for working lands and wildlife."
>
> **– Ron Alvarado**
> State Conservationist for the Natural Resources Conservation Service (NRCS) in Oregon.

Researchers from the Intermountain West Joint Venture (IWJV), University of Montana, U.S. Fish & Wildlife Service (USFWS) Migratory Bird Program, and Oregon State University used satellite imagery from 1984 to 2016 to map bi-monthly distributions of seasonally flooded wetlands on both public and private lands. The researchers then used more than 30 years of aerial surveys collected by the USFWS to estimate the timing of SONEC waterfowl migration for seven different species of dabbling ducks. By combining duck surveys with bi-monthly flooding maps, a new landscape perspective emerged. For the first time, wetland flooding that supports waterfowl migration on public refuges and surrounding private lands was comprehensively identified.

"Demonstrating meaningful biological outcomes provides transparency, builds trust among partners, and lowers the overall cost of private lands conservation," said Ron Alvarado, State Conservationist for the Natural Resources Conservation Service (NRCS) in Oregon. "It is a win for working lands and wildlife."

TIMING IS EVERYTHING

When dealing with a resource as limited as water in an arid environment, land managers must be strategic to maximize conservation benefits. Private lands biologists and managers must hit a moving target by prioritizing wetlands that flood within a narrow migration window in order for conservation outcomes to hit their mark. As different wetlands flood at different times, it can be difficult to identify the flooded habitat that aligns with the timing of peak waterbird migration.

According to the study, 60-70 percent of seasonally flooded wetlands in SONEC occur on private lands during spring migration (February-April). This confirms that while wildlife refuges provide important wetland habitat, surrounding private lands are essential in supporting migrating waterfowl during spring. However, the relationship between migration chronology and the timing of flooding in spring is an important factor in habitat conservation. For example, early spring migrants like Northern pintails (a species that is currently well below North American Waterfowl Management Plan objectives) require flooded habitat earlier in spring than other species of birds that pass through SONEC. Researchers discovered that only half the wetlands in the landscape had water when early migrants arrived. This new information made it possible to determine that conservation outcomes could be improved by nearly 40 percent if private lands biologists could better identify when wetland flooding aligned with the timing of early spring migrants to ensure those private land practices continue.

Likewise, the study's results shed important light on a looming habitat bottleneck during fall migration. As a result of drying over the summer months and increasing water scarcity, only 20 percent of SONEC's wetlands are flooded during fall migration (September-November). This pattern points to a future in which fall migration habitat could be severely limited due to changes in snowpack, timing of runoff, and inadequate water supplies for wildlife refuges. This emerging trend could have population-level effects on Pacific Flyway waterfowl and shorebirds. Offsetting potential impacts to

waterbird populations will require novel conservation strategies that consider wetland network sustainability in a new era of limited water resources. Wetland managers and other conservation professionals will need to devise innovative conservation approaches to sustain adequate wetland habitat during the fall.

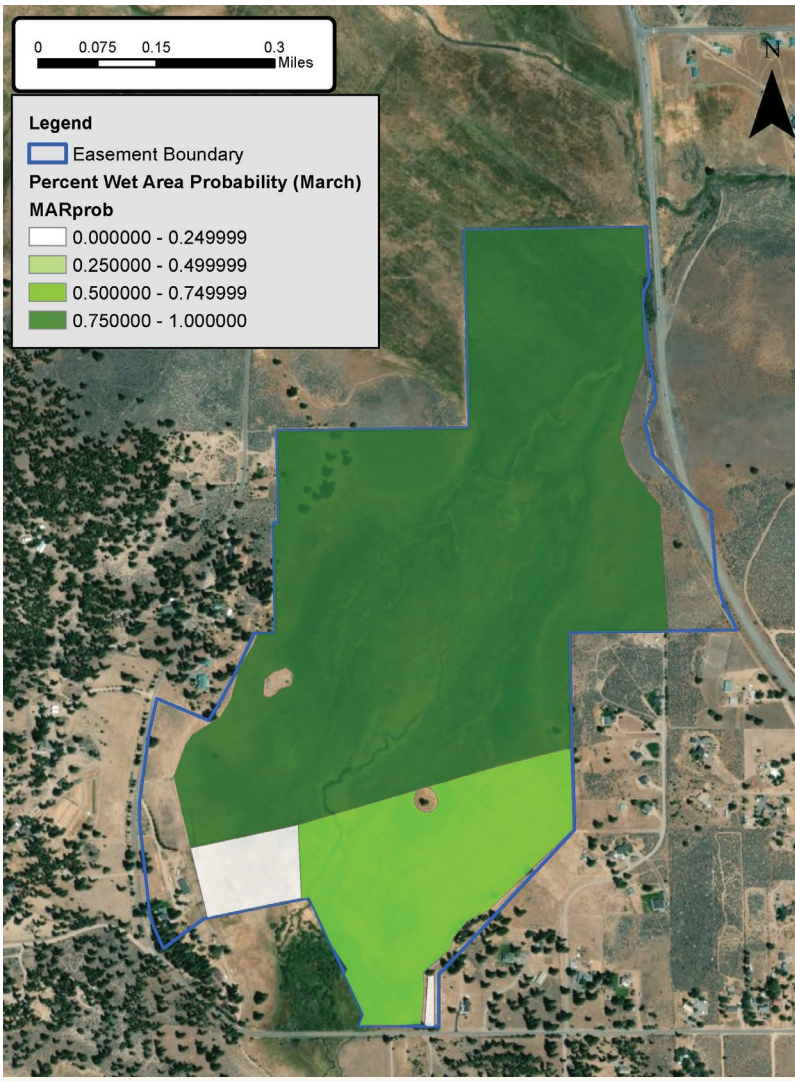
Since 2014, the NRCS, IWJV, Ducks Unlimited, and Harney County Soil and Water Conservation District have collaborated on a conservation program to enhance privately owned wetland habitats in SONEC. The projects, funded with Farm Bill programs including Environmental Quality Incentives Program (EQIP), Agricultural Conservation Easement Program - Agricultural Land Easements (ACEP-ALE), and Regional Conservation Partnership Program (RCPP), are intended to improve flood-irrigation systems to enhance forage production for livestock and conserve irrigation flooding and habitat for waterfowl. By identifying land units with high potential for wetland habitat value during critical spring migration periods, properties can be prioritized for habitat improvement projects or protection through these programs. And on publicly managed wildlife refuges, a higher emphasis on sustaining summer breeding and fall migration habitat could help fill wetland habitat needs created by seasonal drying on private lands.

To further close this gap between science and habitat delivery, the IWJV and NRCS worked to put wetland data in the hands of local practitioners. The resulting Wetland Dynamics decision support tool (DST) allows biologists and planners to identify and work with landowners whose wetland management practices best align with waterbird migration. Conservation partners used the DST as a ranking factor to select conservation easements for funding under an RCPP awarded for conservation in SONEC. Because the DST provides a more accurate account of wetland acres available during spring migration, partners could compare the wetland habitat value between properties. The resulting conservation easement secured on the Elysian Creek Ranch in northeastern California showcases the DST at work. *(See Figure 1.)*

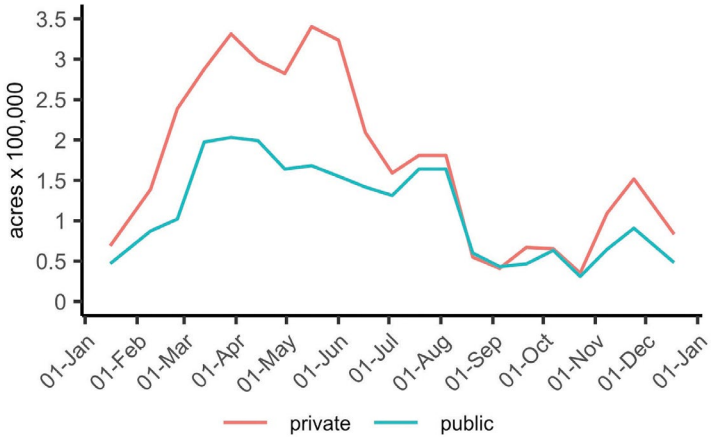
Moving forward, increased conservation efficiencies are anticipated to significantly reduce the long-term costs associated with pursuing wetland habitat goals. Investing in projects like conservation easements and flood irrigation infrastructure improvements on parcels of land that most effectively provide habitat during seasonal gaps is a more efficient way to provide year-round benefits for migratory waterfowl. In turn, this ensures scant conservation budgets can be stretched as far as possible.

This improved understanding of surface water dynamics in SONEC is also critical to providing wildlife refuges with the flexibility to manage public wetlands in ways that leverage the benefits of surrounding private lands. By linking the timing and length of migration with irrigation history, managers can more effectively maximize conservation efforts and share science-based communications about the importance of flood irrigated lands for wildlife habitat. John Vradenburg, the Senior Biologist for the Klamath Basin National Wildlife Refuge Complex, said this amounts to better water use on the refuges.

"Understanding the importance of water use on private lands in this landscape during spring migration is allowing the refuge to reconfigure limited water allocations that close gaps in fall wetland availability, creating a collaborative effort without altering the private lands agricultural practices" he said.



Elysian Creek Ranch in California overlaid with the DST. The ranch secured a conservation easement based on the wetland habitat value shown by the tool.



This graph shows the acres of flooded public and private wetlands in SONEC. Reprinted from Donnelly et al. 2019.

Photo: USFWS
Migrating Waterfowl, Lower Klamath NWR

SOURCE

Donnelly, J.P., Naugle, D.E., Collins, D.P., Dugger, B.D., Allred, B.W., Tack, J.D., Dreitz, V.J. 2019. Synchronizing conservation to seasonal wetland hydrology and waterbird migration in semi-arid landscapes. Ecosphere. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2758