To: Interior Secretary Deb Haaland (Example Recipient)
From: Henri Neblina, Policy Analyst at Heinz Policy Institute (Placeholder Institution)
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Subject: Klamath Basin Restoration

Wetland Restoration for a Better Basin

Executive Summary

The Klamath River Basin (KRB) is experiencing extreme drought. Consequently, the Bureau of Reclamation is stopping water deliveries to protect Native peoples' rights and endangered species. Farmers are now struggling to irrigate their crops, and tensions are high amongst water rights holders. To alleviate tensions between the Native Klamath Tribes and the Basin's farmers, the Bureau of Reclamation should initiate a wetlands conversion program. Restoring wetlands on farms benefits farmers, the environment, and the Klamath Tribes.

Conditions in the Klamath River Basin

The Western United States is experiencing the worst drought in at least 1,200 years (Harvey, 2022). Climate change is putting immense stress on the region's water systems, and government has been slow to adapt. The drought is expected to worsen over the coming decades (Udall & Overpeck, 2017), and while policymakers wait to take substantial action, Westerners have borne the brunt of its effects.

Klamath River Basin (KRB) inflows hit a historic low in 2021 (Stern & Sheikh, 2022). This puts stakeholders at economic risk and the environment in danger of ecological collapse. With 80% of the Pacific Flyway's migratory waterfowl stopping to rest and reproduce in the KRB (U.S. Fish & Wildlife), productive ecological functions may be greatly diminished or cease entirely. Nutrient flows are interrupted because important wetlands are drying up and can no longer sustain bird life (McDuie et al., 2019). Beyond the raw ecological harm, reduced river flow also endangers the cultural practices of Native peoples, which are guaranteed protections by federal law (Native American Rights Fund, 2020). Swift, concrete steps must be taken to ensure local, state, and federal government do not run afowl of these protections.

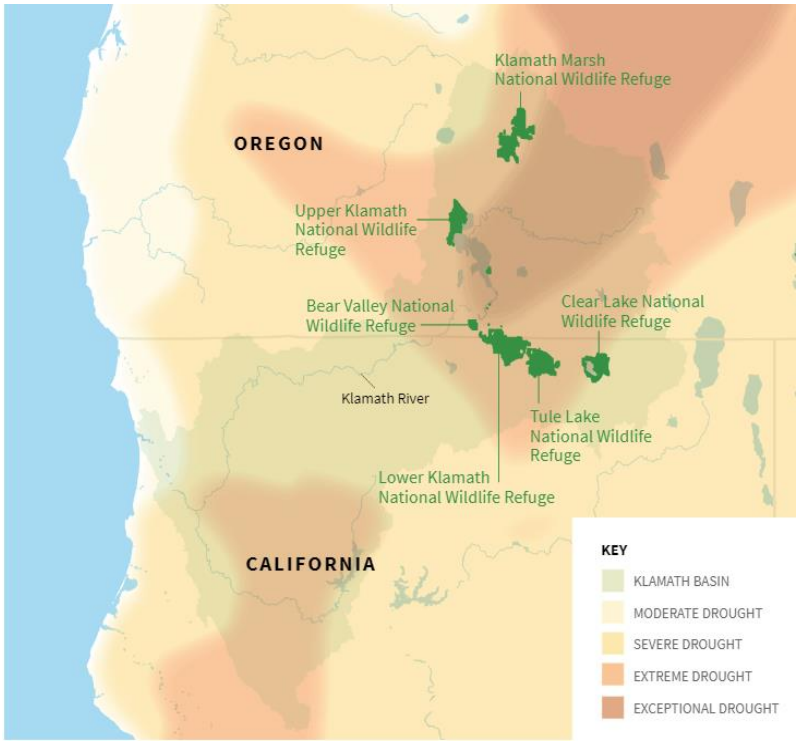

Figure 1: Map of drought conditions in the Klamath River Basin. *Credit: Trail, 2022*

The KRB has been managed with human development as the paramount consideration. Over the course of the 20th century, the Klamath Project—a network of dams, reservoirs, and canals—has drained nearly 95% of the region's once plentiful wetlands to irrigate farmland and make room for cattle grazing (Trail, 2022). As a result, the Basin's natural and economic systems have grown sensitive to shocks in water supply. To alleviate this, the Bureau of Reclamation should take actions to restore KRB wetlands in a way that benefits both the environment and the economy.

Birds Benefit the Basin

Migratory waterfowl, in conjunction with non-migratory birds, provide substantial economic benefits. Thogmartin et al. (2023) used the Prairie Pothole Region along the Mississippi and Central Flyways to investigate the effect of wetland loss on economic activity. They found that draining wetlands can decrease economic activity by as much as $489 million annually. Moreover, they claim that these losses are unlikely to be offset by an increase in agricultural economic output. Their estimate considers losses from only two sources: recreational hunting and birdwatching. Given that essential ecological functions of migratory birds are not considered in the study, the figure of $489 million is a highly conservative estimate. It is very likely that birds and the wetlands they inhabit provide similarly large benefits in the KRB.

Similarly, Revolo- Fernández (2015) used the city of Xochimilco, Mexico as a case study to estimate the economic loss associated with urban wetland loss. He found that, while national birdwatchers are willing to pay a lower price, $79 per year, to watch migratory birds from North America, international viewers are willing to pay almost four times that at $296 dollars annually. This puts the annual losses for wetland degradation between $2,836 and $3,999 per hectare. This is equivalent to $734,524 to $1,035,741 per square mile. Again, this study focuses on a willing-to-pay model of economic activity without considering ecological functions of migratory birds and wetlands in general, meaning that these values are highly conservative estimates.

Wetlands Benefit Farmers

Some farmers in the KRB have opted for less orthodox solutions to manage pollution, water scarcity, and ecosystem degradation. In 2021, Lakeside Farms eliminated 70 acres of agricultural land and replaced it with restored wetlands. Since then, dormant seeds of marsh plants have reestablished themselves, and migratory birds have returned to the wetlands as a place of refuge (Canon, 2023). Now, the farm—which used to leach five times the legal amount of phosphorus—no longer struggles with pollutant runoff. Instead, the wetlands soak it up and prevent from traveling throughout the Basin (Canon, 2023).

Wetlands have been shown to benefit agriculture in other areas as well. A study investigating the effects of constructed wetlands on wineries found that they reduce over "90% of organic pollutants and solids in winery wastewater", reduce "up to 90% of environmental impact associated with winery waste water," and reduce the costs of winery waste water up to 60 times (Flores et al., 2023)

Analysis & Recommendations

Given the immense benefits of wetland restoration, the Bureau of Reclamation should use the KRB as a case study to investigate how watershed restoration can be used to avert the worst effects of drought.

The federal government has already disbursed funds for drought relief. Although some of these funds finance ecological restoration projects, tens of millions of dollars were spent just to reduce water demand (Stern & Sheikh, 2022). Instead, the Bureau of Reclamation should pursue a pilot program that grants federal aid conditional on wetland restoration on KRB farmland.

This pilot program should administer additional drought relief aid to KRB farmers according to the percentage of farmland converted to wetlands. Aid should be no less than $105 annually per acre. This would make the restoration pilot program more attractive to farmers compared to competing programs, such as the Central Oregon Water Bank (Kohn, 2022). The transfers should increase in value up to 15% farmland conversion until dropping to zero dollars at 20% conversion. Figure 2 illustrates the benefits curve of the pilot program.

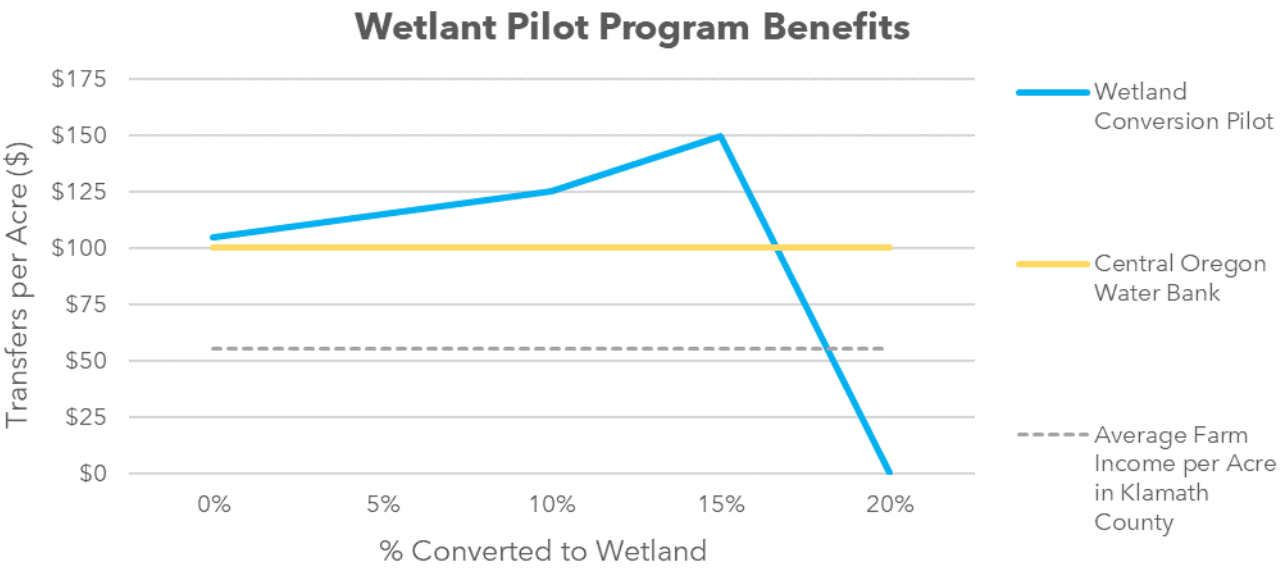

Figure 2: Graph of cash transfers to farmers in the KRB compared to the minimum viable amount per acre. *Data Source: National Agricultural Statistics Service, 2019; and Kohn, 2022.*

This wetland restoration pilot would also complement the Bureau of Reclamation's recent investments in the region's Native American tribes (U.S. Department of the Interior, 2022). The Klamath Tribes have fought to maintain their cultural fishing practices for centuries (Robbins, n.d.), and their water rights have been challenged by landowners since settlers first arrived in the Basin. Although the courts, including the Supreme Court in 2020, have consistently

reiterated that the Tribes hold the most senior water rights (Native American Rights Fund, 2020), they are still pressured by landowners and irrigators (Dillemuth, 2021). Converting farmland to wetland will reduce irrigation demand in the long-term, giving the Klamath Tribes' riparian lifestyle a protective buffer. Given the Bureau's interest in empowering Native peoples, the Secretary should consider the pilot program on the basis of equity in addition to economic benefit.

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