Jordyn Jones | 12.8.25 | Prompt #1

In the four-part series *Draining Oregon*, a critical issue is brought to light; ground water in Oregon has been unsustainably utilized, through state mismanagement of permits, and excessive withdrawals for agriculture (House & Graves, 2016). Groundwater is defined as subterranean water, below the soil root zone (Christopherson et al., 2017). The high-desert areas within Eastern Oregon including, Harney Valley, Umatilla Basin, and Willow Creek Basin, are where these depletion issues are most acute; these regions encounter low annual precipitation and more heavily depend on consistent groundwater reserves (Christopherson et al., 2017; House & Graves, 2016). The state of Oregon has created a hydraulic imbalance within these basins; routinely over-permitting these areas. The permits given for Willow Creek Basin allow for pumping that exceeds area recharge by forty-nine billion gallons; while Harney Valley permits a shortfall of eleven billion gallons (House & Graves, 2016).

The over-pumping of these groundwater reserves has started to deplete aquifers, causing water levels to decline, and degradation of local ecosystems. This is visible in the wells East of the Cascades; with three fourths of them showing a decline in water levels up to hundreds of feet (House & Graves, 2016). While local springs necessary for sustaining populations of salmon and steelhead have diminished or in some cases, completely dried up. Oregon's Department of Water Resources monitoring and enforcement systems are outdated, incomplete, and often utilizing antiquated scientific research (House & Graves, 2016). This imperfect framework commonly relies on the honor system for reporting usage, with numerous wells being exempt from reporting altogether; further progress to research and regulate this has been impeded by insufficient funding and legislative factors (House & Graves, 2016).

The depletion of Oregon's groundwater has been hastened by the agriculture industry, worth 5.4 billion, and the effects of climate change, which has resulted in a declined rate of natural recharge (House & Graves, 2016). The agricultural sector in Oregon heavily relies on the use of underground water reserves; with over five thousand farms dependent on the use of well water, and nearly seventeen thousand irrigation wells have been authorized within the state. Increase in crops like alfalfa, have created an enhanced need for water, as they require more water for growth than other crops. Water scarcity is increased by climate issues, with Oregon experiencing droughts more frequently and of higher severity than previous decades; the lack of precipitation and increase irrigation demand has accelerated the depletion of Oregon's groundwater (House & Graves, 2016).

To understand Oregon's groundwater crisis, it is necessary to consider the ecological and hydraulic processes that explain why depletion has become so severe and how Oregon's systems are affected. Oregon's groundwater is primarily sustained by participation that comes from rain and snow,

that enters the hydraulic cycle by evapotranspiration, infiltration, and runoff (Christopherson et al., 2017; House & Graves, 2016). This precipitation is what recharges the aquifers; fluctuations in these levels affect the springs, streams, and wetlands of surrounding areas (Christopherson et al., 2017). In the arid environment of Eastern Oregon, where precipitation commonly totals 10 inches or below annually, there is little opportunity for recharge in the soil-water budget; which makes groundwater extremely crucial to this region's water supply (Christopherson et al., 2017; House & Graves, 2016). The majority of precipitation in Eastern Oregon is lost through evapotranspiration, unable to recharge aquifers; when combined with over-pumping, the recharge balance is disrupted and hinders the release of water to nearby streams, wetlands, and springs. Consequently, ecological impacts ensue, species experience habitat loss (Christopherson et al., 2017; House & Graves, 2016).

This issue is compounded by the uneven distribution of water supply in Oregon. Since Eastern Oregon receives lower precipitation than other areas within the state, this region relies more upon their groundwater, which is visible in the pumping permits authorized by the state for this region that exceed the natural recharge rates of the area (Christopherson et al., 2017; House & Graves, 2016). The Water Resources Department faces regulatory challenges, as policies in Oregon favor development over conservation, which allow permits to continue and overdrafts to persist, declining water tables even further. Climate changes in the area have resulted in higher temperatures, lower levels of snowpack, and more frequent droughts; this has increased the rates of evapotranspiration (Christopherson et al., 2017; House & Graves, 2016). The ecological issue surrounding groundwater in Oregon arises from human-driven over-use as well as climate changes within the region.

The two main stakeholders within the debate over Oregon's groundwater problems are environmental conservationists, and agricultural producers; these groups have different priorities that conflict and cause tension. Environmentalists are concerned with the future of water availability and the protection of important ecosystems that are affected by water over-use (House & Graves, 2016). The Freshwater Trust, and WaterWatch are two of the conservation groups that are attempting to obtain more rigorous state regulations for groundwater as without these, communities and ecosystems in Oregon alike could suffer from future aquifer collapse. The position of agricultural producers is quite different; this perspective is focused on the agricultural productivity in these regions, which is necessary to maintain economic stability (House & Graves, 2016). Expanded pumping rights are considered necessary by agricultural producers, as well as continuation of current pumping practices.

These two different perspectives create two significantly different potential ecological outcomes. Further support of current pumping or expanded pumping practices will generate economic stability for agricultural dependent regions; but will result in decline to the water table, and harmful impacts to the

local ecosystems (Christopherson et al., 2017; House & Graves, 2016). The measures that are focused on conservation of groundwater and ecosystems would restrict water access for agricultural needs, lessening the economic benefits to the communities; yet they would strengthen the ecosystems and assist in sustaining the hydrologic balance. The conflict between these stakeholders demonstrates the complexity of this issue, balancing the economic demands of a community with the environmental.

References

Christopherson, R. W., Cunha, S. F., Birkeland, G. H., & Thomsen, C. (2017). *Geosystems core*. Pearson.

House, K., & Graves, M. (2016). *Draining Oregon*. Oregonlive.com. https://www.oregonlive.com/environment/page/draining_oregon_day_1.html