Assignment #4: Leadership Briefing Paper Addressing the Ecological Issues and Invasive Species of Capitol Lake

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Introduction

Capitol Lake, an artificial reservoir formed by damming the Deschutes River in Olympia, Washington, is facing severe environmental challenges. Its stagnant, shallow, and nutrient-rich waters have created ideal conditions for invasive species to thrive, leading to the disruption of native ecosystems and a decline in overall water quality. These ongoing issues, if left unaddressed, will continue to degrade the lake's ecological health and limit its recreational and aesthetic value, highlighting the urgent need for sustainable restoration efforts.

The Impact of Invasive Species

Over time, Capitol Lake has become a hotspot for invasive species that outcompete native plants and animals, further destabilizing the ecosystem. Among the most problematic species are New Zealand Mudsnails and Eurasian Watermilfoil. New Zealand Mudsnails *(Potamopyrgus antipodarum)* pose a serious threat to the lake's ecosystem. They consume algae and detritus that are vital to native aquatic insects, which serve as a primary food source for juvenile salmon. However, New Zealand Mudsnails provide no nutritional value to fish, as they pass through digestive systems unharmed. Since their discovery in 2009, the lake has been indefinitely closed to all public use to prevent their spread. Eurasian Watermilfoil *(Myriophyllum spicatum)*, another highly invasive species, was first detected in Capitol Lake in 2001. This aquatic plant forms dense mats that choke out native vegetation, hinder recreational activities, and alter habitat conditions. Despite these efforts, invasive species continue to thrive in Capitol Lake, underscoring the need for a long-term solution.

Challenges Posed by Capitol Lake's Artificial Environment

The artificial conditions of Capitol Lake exacerbate existing water quality issues, making it an unsuitable environment for native species. Several key challenges have emerged as a result of its impounded nature. One of the most significant problems is nutrient overload and oxygen depletion. During the summer months, nitrogen and phosphorus accumulate in the stagnant waters, fueling algal blooms. This process depletes oxygen levels, which are critical for aquatic life, further contributing to the decline of native fish populations. Additionally, sediment accumulation has become a costly and persistent issue. The Deschutes River naturally carries sediment downstream, but because the lake is dammed, sediment settles within Capitol Lake instead of dispersing into Budd Inlet. This results in the gradual filling of the lake, necessitating expensive and recurring dredging operations to maintain depth and water flow. These water quality issues have also led to restricted public use of the lake. Due to concerns over invasive species and pollution, recreational activities such as boating, kayaking, and fishing have been limited, diminishing the lake's value as a public resource.

The Case for Estuary Restoration

Restoring the Deschutes River estuary by removing the dam offers a long-term solution to Capitol Lake's environmental problems. While complete ecological restoration may not be possible due to urban development and altered landscapes, reintroducing tidal flow would provide significant benefits to the region's natural systems. One of the most immediate benefits of estuary restoration would be improved water quality. Estuaries naturally flush sediment and help regulate nutrient buildup, leading to clearer water and higher oxygen levels. This would create a healthier environment for native species and reduce the frequency of harmful algal blooms. Restoring the estuary would also help reduce the presence of invasive species. Many of the species thriving in Capitol Lake, including the New Zealand Mudsnail, are better suited to

freshwater environments. By reintroducing saltwater from Budd Inlet, the habitat would become less hospitable to these invaders while favoring native species that rely on estuarine conditions. Furthermore, the restoration of the estuary would support native wildlife, particularly Chinook and Coho salmon. These species depend on estuarine environments as part of their life cycle, and improved habitat conditions would contribute to their recovery. Additionally, healthier estuarine conditions could encourage the return of other depleted species, including shellfish.

Concerns

Despite the clear environmental benefits, some stakeholders have expressed concerns about the proposed restoration of the Deschutes River estuary. One of the primary concerns is the potential aesthetic changes associated with converting Capitol Lake back into an estuary. Critics worry that the transformation will alter the scenic landscape near the State Capitol, leading to potential changes in water levels, increased vegetation, and odors associated with tidal flats. These factors could affect the visual appeal of the area, particularly for visitors and government officials. Another concern is sediment management. Some stakeholders fear that increased sediment flow from the Deschutes River could impact nearby marinas and waterfront businesses. However, estuaries naturally disperse sediment over time, reducing the need for costly dredging operations compared to the current impounded lake system. Additionally, economic considerations have been raised. While dredging Capitol Lake is a costly and temporary solution, estuary restoration also comes with significant upfront expenses.

Engaging the Public and Stakeholders

To ensure a successful transition from an impounded lake to an estuary, it is crucial to engage the public, particularly the boating community and the Port of Olympia. Public

awareness campaigns should be implemented to educate residents on the impact of invasive species and the benefits of estuary restoration. By increasing public understanding, community members may be more likely to support restoration efforts and take action to prevent the spread of invasive species. Additionally, boater cleaning stations should be introduced at marinas and ports to prevent the spread of invasive species. While this solution is not a substitute for full restoration, it can serve as an immediate measure to limit further ecological damage. However, these stations should be part of a broader restoration effort rather than a standalone solution. Finally, collaborative management plans should be developed in partnership with environmental agencies, local governments, and the boating community. By working together, stakeholders can create sustainable strategies that balance ecological restoration with recreational and economic interests.

Conclusion

Capitol Lake's current condition is unsustainable due to the spread of invasive species, declining water quality, and excessive sediment buildup. While dredging provides a temporary and costly solution, it does not address the underlying environmental problems. Restoring the Deschutes River estuary offers a long-term, science-based solution that would improve water quality, reduce invasive species populations, and support native wildlife. By engaging key stakeholders, including the boating community and the Port of Olympia, and implementing proactive management strategies, the transition to an estuary can be both environmentally and economically sustainable. Immediate action is necessary to ensure that Capitol Lake and the broader Puget Sound ecosystem remains a thriving and healthy environment for future generations.

Sources

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