Attachment 18
Economics Discipline Report

CAPITOL LAKE – DESCHUTES ESTUARY

Long-Term Management Project Environmental Impact Statement

Economics Discipline Report

Prepared for:

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This document and the methodology upon which the analysis was conducted has been reviewed by an independent third-party expert or experts. Third party reviews can be used in an EIS process to ensure technical analyses are conducted using industry-recognized best practices and include a reasonable level of analysis to allow for the comparison of alternatives, consistent with the requirements of the State Environmental Policy Act (SEPA). Third party review is not required under SEPA but is considered an opportunity to provide independent review of the technical analyses conducted by the EIS project team that is also made up of members with expertise in the disciplines that are being studied.

Enterprise Services wishes to acknowledge the efforts of the following third-party experts that reviewed this document: Lisa McDonald, Senior Associate, Abt Associates and
Ken Cousins, Research Principal and Ecological Economist, Earth Economics

Executive Summary

This *Economics Discipline Report* describes the potential impacts of the Capitol Lake – Deschutes Estuary Long-Term Management Project on economic activity, benefits, and costs in the study areas for the project. The Capitol Lake – Deschutes Estuary includes the 260-acre Capitol Lake Basin, located on the Washington State Capitol Campus, in Olympia, Washington. Long-term management strategies and actions are needed to address issues in the Capitol Lake – Deschutes Estuary project area. An Environmental Impact Statement (EIS) is being prepared to document the potential environmental impacts of various alternatives and determine how these alternatives meet the long-term objectives identified for the watershed. This report was originally prepared to support the project's Draft EIS, and has been revised for the Final EIS. Revisions provide additional information and update and expand analyses and findings. Notable substantive revisions in the Economics Discipline Report are as follows:

- Updated construction and maintenance dredging cost estimates to reflect project design changes, updated cost assumptions, and to present all cost estimates in 2022 dollars. Economic impact modeling updated to incorporate revised cost estimates.
- Updated data about current economic conditions to reflect economic recovery from the COVID-19 pandemic and associated recession.
- Incorporated additional details about the Olympia Yacht Club (OYC) and private marina operations, and the economic importance of recreational boating in Washington.
- Revised discussion about water quality ecosystem service benefits related to LOTT Clean Water Alliance (LOTT) to include potential impacts under the draft Total Maximum Daily Load (TMDL) for Budd Inlet, which the Washington Department of Ecology (Ecology) released in June 2022.
- Updated discussion about temporary disruption to recreational use and value and potential disruption to downtown businesses during construction, reflecting revised assumptions about the 5th Avenue Bridge under the Estuary and Hybrid Alternatives that would avoid a long-term construction closure of this corridor.
- Expanded analysis to identify potential impacts to downstream economic activity if maintenance dredging does not occur as planned, such as in the event that funding is not provided, or funding is delayed or lapses and results in delays or lapses to maintenance dredging.

- Incorporated details about Funding and Governance Work Group (FGWG) progress towards a long-term funding and governance agreement and expanded on distributional impacts of potential project funding arrangements based on preliminary outcomes of the FGWG process.
- Updated analysis throughout to reflect updated project design assumptions and related impact findings from other disciplines (e.g., Land Use, Shorelines, and Recreation; Public Services and Utilities; Water Quality; Navigation; Transportation; etc.).

Economic impacts are assessed based on the potential of action alternatives to result in changes in economic activity or economic value in the region. This assessment evaluates economic impacts related to four primary categories: downstream economic activity, downtown development, demand for and value of recreation, and demand for and value of ecosystem services. The analysis examines these impacts for the No Action Alternative, as well as three Build Alternatives (Managed Lake, Estuary, and Hybrid).

Under the No Action Alternative, the limited actions to control invasive aquatic plants and other ongoing projects adjacent to the Capital Lake Basin would continue but a long-term management project would not be implemented. In the absence of a long-term management project, it is unlikely that Enterprise Services would be able to procure funding and approvals to manage sediment, manage or enhance water quality and related habitat and ecological functions, or enhance community use. Current conditions would continue, and in some cases would worsen over the long term. Over the long term, lack of a lake management program could contribute to reduced amenity-related value of the Capital Lake Basin and potentially lead to a less robust investment climate in downtown Olympia. It could also lead to forgone opportunities to capitalize on restored recreation activity, and lost recreation-related value to residents and visitors to the region.

Impacts of the Build Alternatives on Downstream Economic Activity

The project could begin construction as soon as 2027, pending funding, and be completed within four to eight years, depending on the alternative. Capital expenditures on building new infrastructure, dredging sediment, and other in-water work could support regional economic activity (jobs and income) through the purchase of goods and services and labor in the study area. All action alternatives would also require ongoing spending for maintenance dredging. Table E.1 summarizes the planning-level cost estimates for upfront construction and long-term maintenance dredging costs.

Table E.1 Planning-Level Cost Estimates by Alternative, 2022 Dollars

Action Alternative	Design, Permitting, & Construction Costs[1] ($M)	Maintenance Dredging Costs[2] ($M)	Total Quantified Costs[3] ($M)
No Action	$0	$11–$19[4]	$11–$19
Managed Lake	$76–$136	$141–$254[5]	$217–$390
Estuary	$137–$247	$29–$52[6]	$166–$299[7]
Hybrid	$178–$320	$43–$78[6]	$221–$398[8]

Notes: Refer to Chapter 7 for additional detail regarding the planning-level cost estimates.

[1] Potential additional costs associated with permit conditions for project construction have not been estimated at this time because they cannot be predicted with certainty. The planning-level cost estimates do not include potential costs associated with compensatory mitigation to offset potential temporary or permanent impacts to wetlands, fish, or other ecological functions. This could be required if the regulatory agencies do not consider the project benefits to outweigh the potential impacts (if the project is not considered "self-mitigating").

[2] These are estimated for a period of 30 years following construction completion. Costs for the adaptive management plans, habitat enhancement plans, and other operations and maintenance activities would be estimated during design and permitting once those requirements are better understood. Those long-term management costs are not included herein. The maintenance dredging cost estimates represent the largest long-term maintenance cost and help to differentiate the project alternatives.

[3] Reflects the sum of the first two columns, representing the total quantified costs for design, permitting and construction and maintenance dredging costs over a 30-year period following construction. See Table 7.1.1 in Chapter 7 for summary notes on additional unquantified costs not associated with construction or maintenance dredging by alternative (discussed qualitatively throughout this Discipline Report).

[4] This represents the estimated non-project costs associated with dredging-impacted areas of West Bay based on sedimentation rates and patterns modeled for the No Action Alternative, to maintain minimum depths for navigation and to meet the requirements of DNR leases with the private marinas. These costs assume that the Port of Olympia has remediated known contaminated sediment in West Bay and authorized depths have been reestablished in navigational areas during that effort. That dredging of contaminated accumulated sediment is not associated with this project, and those costs are not included in the assumed $11 to $19M that would be spent by other entities over 30 years for maintenance dredging. The planned Port of Olympia-led dredging of contaminated sediments is also expected to enable the future dredged material under the No Action Alternative to be disposed of in-water. Funding to dredge the volume of sediment consistent with the No Action Alternative would be the responsibility of the Port of Olympia, private marinas, and the USACE (USACE funding is subject to congressional approval).

[5] Under the Managed Lake Alternative, project-related dredging would occur within the North Basin. That sediment is expected to be disposed of upland. This total cost reflects the assumed upland disposal, with truck transport. Rail transport could reduce costs from what is shown here, and feasibility of rail transport would be evaluated prior to maintenance dredging. It is possible for a small portion of the dredged material to be beneficially reused within the Capitol Lake Basin, if needed to replenish the habitat areas in the Middle Basin. In-water disposal, which is often a lower cost option compared to upland disposal, is currently prohibited due to the presence of the invasive New Zealand mudsnail. If environmental conditions or environmental regulations change in a way that would allow in-water disposal of the dredged sediment, the costs would be reduced to approximately $56 to $100M. Separately, non-project dredging paid for by separate entities would still be required in West Bay, consistent with the dredging costs that are estimated for the No Action Alternative.

[6] These costs reflect the additional maintenance dredging costs beyond dredging costs that would be incurred under the No Action Alternative ($11 to $19M over 30 years) to avoid significant impacts to navigation, and to maintain a working waterfront and recreational boating in West Bay. As described in note 4 above, funding to dredge the volume of sediment consistent with the No Action Alternative would be the responsibility of the Port of Olympia, private marinas, and the USACE. Approximately 37% of the estimated costs for maintenance dredging would be to remove accumulated sediment from the FNC and Turning Basin, and that is the responsibility of the USACE. Therefore, it is assumed that 37% of these total maintenance dredging costs would be paid by USACE; these funds are subject to congressional approval. The

additional/increased dredging requirements resulting from the Estuary Alternative would be jointly funded by members of the Funding and Governance Work Group, through 2050, and USACE.

[7] Maintenance dredging costs over 30 years for the Estuary Alternative would increase to $157M to $283M if dredged material was determined not suitable for in-water disposal. However, based on findings in this EIS, the sediment is expected to be suitable for in-water disposal.

[8] Maintenance dredging costs over 30 years for the Hybrid Alternative would increase to $242 to $436M if dredged material was determined not suitable for in-water disposal. However, based on findings in this EIS, the sediment is expected to be suitable for in-water disposal.

Much of the construction spending under all action alternatives would purchase goods and services from outside the region given the greater presence of in-water construction companies and equipment further north. Spending at the local level is not directly proportional to total costs and varies by alternative depending on how construction activities are implemented. Local expenditures are about $36 million for the Managed Lake Alternative over a five-year period, $67 million over a six-year period for the Estuary Alternative, and $96 million over a seven-year period for the Hybrid Alternative. The majority of local spending under all alternatives would go to transportation services, and smaller amounts to construction services, machinery rental, landscape and horticultural services, and architectural and engineering services.

Long-term operation of the project would involve maintenance dredging under all build alternatives. Under the Estuary and Hybrid Alternatives, maintenance dredging would increase certainty that downstream economic activity at the Port, the private marinas, and the Olympia Yacht Club (OYC) would continue into the future.

If funding for maintenance dredging cannot be secured for any reason, sediment would accumulate in West Bay and reduce access to marina moorage—especially for deeper draft boats—and would reduce accessibility of the Port's vessel berths and passage through the federal navigation channel for some ships during low tide. If maintenance dredging does not occur at all over the 30 year project time horizon after construction, 50 percent of the existing slips at the OYC and 25 percent of the slips at the private marinas would become inaccessible. If this occurs, it could substantially impact the revenue generation potential of these businesses and organizations and potentially reduce the overall economic contribution of recreational boating to the region's economic activity. More limited navigation, especially for fully loaded ships, could reduce the demand for the Port's marine terminal, reducing overall revenue to the Port of Olympia. However, the Port vessel berths would likely remain functional, with impacts primarily to operations at the southern vessel berth.

As described in more detail below, funding is expected to be provided for maintenance dredging of increased sediment under the Estuary Alternative through an agreement executed by the Funding and Governance Work Group (FGWG). Additional analysis has been included in this document in case funding lapses; however, that is not the standing assumption.

The Managed Lake Alternative would produce the most direct spending on maintenance dredging but has the lowest sediment volume removed over 30 years: the higher cost is due to a higher per-unit

disposal cost for upland disposal, which is assumed because of the invasive New Zealand mudsnail that will persist in Capitol Lake[1]. The Estuary Alternative would produce the least direct spending on maintenance dredging. The Hybrid Alternative has the highest maintenance dredge volume with higher direct spending than the Estuary Alternative, and lower direct spending than the Managed Lake Alternative. As with construction costs, most of the operational costs would be spent on goods and services acquired from outside the region. Thus, this spending would not meaningfully change aggregate spending levels or economic activities within the study region under any alternative. However, the spending could produce **beneficial impacts**[2] to those individuals, businesses, industries that are contracted to work on the project. While maintenance dredging would sustain the economic benefits and impacts associated with a working waterfront in downtown Olympia, it would also produce opportunity costs when local governments use resources for this project instead of other regional priorities. The extent and magnitude of these opportunity costs would depend on what other activities the funding entities would have spent the money on if this project does not happen.

Project Funding Update

The FGWG as part of the Capitol Lake–Deschutes Estuary Long Term Management Project has developed recommendations related to project funding responsibilities . Through the FGWG process, the FGWG members recommended that the state of Washington take responsibility for funding construction costs for any alternative. This reflects a guiding principle of the FGWG process that "those who contribute to the problem should participate in funding or paying for the solution," and an acknowledgement that the State constructed the 5th Avenue Dam and has had the responsibility to maintain it over its lifetime—deconstruction/decommissioning is part of that responsibility. Enterprise Services is exploring potential funding strategies, which will likely include a combination of state and federal grants and appropriations of taxpayer dollars.

As documented in the Draft EIS, the FGWG members recommended the following division of responsibility for funding of long-term maintenance under each of the alternatives.

- Estuary Alternative: shared funding and governance for long-term maintenance
- Managed Lake Alternative: state responsibility for long-term maintenance
- Hybrid Alternative: unknown

[1] In response to comments received on the Draft EIS, cost estimates for in-water disposal of dredged sediment have also been developed for the Managed Lake Alternative. However, environmental conditions and environmental regulations currently prohibit in-water disposal of dredged material under the Managed Lake Alternative given the persistence of the New Zealand mudsnails. Consequently, in-water disposal is not the assumed approach for maintenance dredging under the Managed Lake Alternative. The in-water disposal costs have been prepared in case environmental regulations change in the future or environmental conditions change as a result of new management practices.

[2] The use of the term "beneficial" in this context is not intended to represent these impacts as economic benefits (positive changes in economic welfare). Instead, they represent changes in economic activity that arise through transfers of monetary resources—for each transaction, someone pays, and someone receives so there is no net change (cost or benefit) in economic welfare.

Since release of the Draft EIS, the FGWG members have developed a preliminary agreement for funding and governance related to maintenance of the Estuary Alternative, documented in a non-binding Memorandum of Understanding (MOU) among its members that is intended to lead to a binding Interlocal Agreement (ILA). The FGWG will continue to negotiate details of long-term funding and governance. Chapter 7 of the EIS documents the interim outcomes and decisions.

FGWG members agree in principle under the MOU that local jurisdictions, the state, the federal government, and private marinas would share financial responsibility related to ongoing dredging and other operations costs under the Estuary Alternative, including funding for maintenance dredging of the increased sediment deposition that would occur under the Estuary Alternative. The OYC and the private marinas would provide funding sufficient to cover the cost of dredging that would be required under the No Action Alternative.

These long-term financial arrangements have important economic implications but will remain somewhat uncertain until FGWG members finalize a binding ILA and Enterprise Services secures funding to construct the project.

Impacts of the Build Alternatives on Development in Downtown Olympia

More than 450 local businesses and 1,900 residents are currently located in the downtown Olympia study area. Impacts on development in downtown Olympia arising from construction activities are unlikely to differ based on the alternative selected, and temporary disruption from construction is unlikely to have a meaningful effect on the market for downtown development.

Across all action alternatives, resolving current management uncertainties in the Capitol Lake Basin will increase certainty that the area will continue to serve as a productive amenity with benefits for current and future development in downtown Olympia, compared to the No Action Alternative. There is no clear signal from the research conducted for this impact assessment that implementing any alternative, including the Estuary and Hybrid Alternatives, would reduce demand for residential or commercial development in downtown Olympia. The City of Olympia's plans for the redevelopment of downtown are long-range, and investment in residential and commercial development is expected to increase in intensity (more units per year) over the next decade.

Implementation of the Estuary Alternative represents the most visual and environmental change to the downtown area. This change has the potential to create uncertainty, at least initially, among investors, developers, and residents in downtown Olympia. As designs are further developed and project elements associated with a well-planned, thoughtfully designed, and functional estuary design are further proven, with sufficient funding and governance to address long-term issues arising from implementation, this alternative is unlikely to produce a negative impact on downtown development compared to the other alternatives. The Hybrid Alternative is likely to have a similar effect, though with less upfront risk because it retains the familiar feature of the reflecting pool. The Managed Lake Alternative would represent the least amount of visual change compared to current conditions and is unlikely to increase uncertainty among potential investors about future conditions. Thus, all action

alternatives are likely to produce benefits for downtown development assuming they are implemented in a way that is well-planned, thoughtfully designed, and accessible.

Impacts of the Build Alternatives on Demand and Value of Recreation

Construction of all action alternatives would temporarily disrupt recreation activity, and potentially reduce the quality of recreational experiences, particularly in the parts of the project area that currently experience the highest levels of use, around the North Basin and at Marathon Park. Temporary closure of the loop trail around the North Basin would disrupt existing patterns of recreational use. In the Managed Lake Alternative, intermittent closures could occur during the 6-month construction period, imposing a temporary cost on users. In the Estuary and Hybrid Alternatives, construction of the new 5th Avenue Bridge would take place before dam removal, with the loop trail fully accessible throughout construction except for an approximately 1-month period when the new bridge is being connected to the existing trail. Marathon Park would be closed to public use under all Alternatives for the duration of the 4- to 8-year construction period. These effects would result in **adverse impacts** stemming from lost recreation value. Mitigation actions may reduce disruption and restore connectivity along trails via detours and temporary structures, but impacts from staging dredging activities at Marathon Park would be unavoidable.

Construction activity inherently is disruptive to some people and interesting to others (and potentially both disruptive and interesting to some people). It is possible that construction activity may serve as a draw or enhance the experience and value some users obtain from recreating in the Capitol Lake Basin during the construction period, producing a **beneficial effect** that could potentially offset some of the adverse impact, which is discussed in relation to its effects on recreation.

All alternatives would produce **beneficial effects** to recreation compared to the No Action Alternative by improving trails (e.g., adding boardwalks), increasing the diversity of vegetation and habitat areas, and restoring water-based recreation. Some people may experience losses in value if their preferred environmental setting, e.g., managed vs. unmanaged or natural, is not implemented. These losses are likely to be felt more strongly by people in favor of a Managed Lake, should the Estuary Alternative be selected due to the status quo bias and the endowment effect (discussed in Section 4.3). They are also likely to diminish over time as people adjust to new conditions. The overall economic value associated with recreation in the Hybrid Alternative could be higher than the Managed Lake and Estuary Alternatives, since it shares both predominant features. Data are unavailable to confirm this outcome, however.

Restored access within the Capitol Lake Basin for water-related recreation would expand the types of amenities offered to downtown residents and visitors, a **beneficial effect** of all alternatives. Water access in the Capitol Lake Basin has been restricted since 2009. Despite being surrounded by water, direct opportunities for interaction are limited, making new ones more valuable. Other than the public and private marinas in downtown, there are no non-motorized boat access points or beaches in the immediate vicinity of downtown Olympia to facilitate the full range of non-motorized water-based recreation experiences that people enjoy in the region. Therefore, restoring access would open new avenues for enjoying different types of water-based recreation in a central location. While the types of

boating available would differ between alternatives and the duration of boating access would be shorter under the Estuary and Hybrid Alternatives due to tidal influence, the marginal differences in value are likely to be minor compared with the large increase arising from restoration. By restoring access to water-based recreational use and enhancing vegetation throughout the Capitol Lake Basin, the value of the amenities it provides to people would increase. These amenities benefit both downtown development economic value as well as the value of recreational experiences. All recreation enhancements are likely to increase in value over time as the downtown residential market continues to grow.

The distributional implications of choosing one alternative over another are potentially important, especially from a social justice perspective. Status quo bias may favor the Managed Lake Alterative. Status quo bias tends to ignore or diminish the benefits of a change in policy or ignore or diminish the costs of maintaining the status quo. To the extent that the Managed Lake Alternative would sustain a managed environment for recreation and preclude expansion of a more natural recreational setting, it would produce both **beneficial and adverse impacts** for future recreational users, depending on individual preference. Tribal populations would disproportionately experience adverse impacts, raising **social justice concerns** discussed in more detail with respect to ecosystem services below.

Impacts of the Build Alternatives on the Value of Ecosystem Services

Construction of all action alternatives would **temporarily affect** the value of ecosystem services generated in the project area, as water quality, habitat provision, and visual aesthetic values are disrupted. Construction would result in a long-term change in habitat quality and distribution, with a greater diversity of habitat types, including tideflats and estuarine wetlands under the Estuary and Hybrid Alternatives compared to the Managed Lake Alternative, which would have primarily freshwater wetlands and deep freshwater habitat types.

Differences among the action alternatives during operation arise from changes in habitat that result in in ecosystem services related to water quality regulation, habitat provision, flood regulation, visual aesthetics and cultural, heritage, spiritual, and educational services. The differences manifest in terms of costs/avoided costs for ratepayers and distributional and equity concerns arising from changes in habitat provision, visual aesthetics, and cultural services, especially for tribal populations.

The Managed Lake Alternative would be similar to the No Action Alternative in terms of water quality and accompanying regulatory compliance impacts. As the Washington Department of Ecology (Ecology) moves toward finalization of its TMDL for the Deschutes River/Capitol Lake/Budd Inlet, it may modify allocations for major dischargers, which could result in more stringent permit requirements for the LOTT Clean Water Alliance (LOTT) and other dischargers. The issue of discharge allocations is complicated, and there will always be some uncertainty as to how Ecology would regulate dischargers in the future. However, if LOTT and other dischargers were required to undertake additional measures as a result of Enterprise Services not meeting its waste load allocations, which would be equivalent to a natural estuary condition, the most stringent targets would occur under the No Action and Managed Lake Alternatives.

Ecology modeling suggests that the Estuary and Hybrid Alternatives would improve dissolved oxygen conditions in Budd Inlet. This may result in Ecology assigning less stringent discharge reduction requirements for LOTT and stormwater dischargers, likely resulting in reduced, deferred, or avoided regulatory compliance costs compared to the No Action and Managed Lake Alternatives. This would be a **beneficial effect** for utilities and their ratepayers, compared to the No Action Alternative.

Habitat provision has **beneficial effects** in all action alternatives due to the increased diversity of habitat and additional habitat features, in addition to the water quality improvements that would also benefit many native species. The overall economic value associated with habitat provision is **likely to be highest** in the Estuary and Hybrid Alternatives by increasing habitat diversity more than the Managed Lake Alternative, and providing better habitat quality for species of commercial, recreational, and cultural value, such as salmon. These effects would **specifically benefit tribes**, which disproportionately rely on salmon for subsistence, commercial, and cultural value, compared to the general population. Not all species experience benefits in the Estuary and Hybrid Alternatives. Some freshwater fish and freshwater vegetation communities would not be able to survive in the saltwater-dominant Estuary and Hybrid Alternatives, resulting in **adverse effects** for people who derive value from these ecosystems.

The Estuary and Hybrid Alternatives would **enhance cultural values** for populations that hold preferences for restoration of naturally-functioning ecosystems, including tribes. Restoration would enhance opportunities for local tribes to exercise culturally-important traditions. The No Action and Managed Lake Alternatives would **preserve values** for some people who hold a preference for maintaining recent historical conditions. All action alternatives would maintain educational use value of Capitol Lake – Deschutes Estuary, but the Estuary and Hybrid Alternatives would substantially expand opportunities for research and discovery, with potential **beneficial applications** to increase the success and cost effectiveness of future restoration projects.

There are distributional and social justice implications associated with maintaining the status quo conditions of a freshwater lake ecosystem under the No Action and Managed Lake Alternatives. The status quo conditions perpetuate historic inequities, particularly for tribal populations that have experienced ongoing **adverse effects** from changes to the ecosystem since settlement of the region occurred. Improvements to culturally and economically important species and habitat functions in the Estuary and Hybrid Alternatives, particularly from removal of the 5th Avenue dam, have the potential to result in **substantial beneficial effects** for tribes.

The Estuary and Hybrid Alternatives reduce the risk of riverine flood impacts in Capitol Lake – Deschutes Estuary, through improved flood regulation capacity in these events. This would produce a **beneficial effect** by slightly lowering flood risk and associated disruption and damage to property and infrastructure, compared to the No Action and Managed Lake Alternatives.

Changes in the value of visual aesthetics would **depend on individual preferences** between the distinct visual amenities of the different alternatives. Some people may prefer the status quo visual conditions, while others may prefer the estuarine environment (for more information see the *Visual Resources Discipline Report*).

There are differences in greenhouse gas emissions and carbon sequestration potential between the alternatives. The Managed Lake Alternative would reduce greenhouse gas emissions slightly compared to a No Action Alternative but overall, the freshwater system does not provide much opportunity for reducing, capturing, or storing greenhouse gas emissions. The Estuary and Hybrid Alternatives would provide **more opportunity for carbon sequestration and less methane emissions** than the Managed Lake Alternative, with the Estuary providing slightly more storage capacity than the Hybrid Alternative. **Both the Estuary and Hybrid Alternatives are better aligned with local climate adaptation goals than the Managed Lake Alternative.**

Construction and operation impacts of the No Action and Build Alternatives are summarized in the following tables.

Table E.2 No Action Alternative - Summary of Findings

	Summary of Findings for No Action Alternative
Downstream Economic Activity (e.g., economic activity surrounding Budd Inlet, downstream of the project area)	**No discernable economic effect** on jobs, labor income, or economic output. **Adverse Impact –** Increased risk and potential cost from disruptions to economic activity in downtown Olympia and areas downstream during high-flow flood events. Costs related to disrupted economic activity could also materialize from increased frequency and magnitude of flooding. Increased flooding could increase maintenance costs associated with aging infrastructure, potentially increasing costs to taxpayers and utility ratepayers.
Downtown Development	**Minor Adverse Impact –** The political impacts of not acting could result in potential deferred or displaced investment decisions for some developers, arising from uncertainty around future conditions of the Capitol Lake Basin. Larger market and economic trends are likely to be more influential in shaping the future of downtown development in Olympia.
Demand for and Value of Recreation	**Adverse Impact –** People who want to access the water by boat from downtown Olympia would continue to access the water elsewhere, potentially at higher cost or lower value of the experience. Recreational value for trail, path, and park use would be impacted by temporary closures potentially resulting from flooding in future sea level rise scenarios. Repeat flood events could result in disinvestment in recreation infrastructure and reduced access or quality of recreation in the long run.

	Summary of Findings for No Action Alternative
Demand for and Value of Ecosystem Services	**Adverse Impact –** High likelihood that TMDL allocations shift additional nutrient reduction responsibilities to wastewater and stormwater dischargers. LOTT would almost certainly need to invest in additional treatment capacity, with increased costs for ratepayers. Potential small increased risk and cost of flooding associated with diminished flood regulation capacity for Deschutes River flows. **Substantial Adverse Impact –** Sustained equity and social justice issues related to ongoing diminished ecosystem services that produce commercial, subsistence, cultural, heritage, spiritual, and educational value for tribal populations.

Table E.3 Managed Lake Alternative - Summary of Findings

		Summary of Findings for Managed Lake Alternative
Construction	Construction: Downstream Economic Activity	**Minor Beneficial Effect–**Temporary short-run increases in jobs, labor income, and economic output would occur in the study region from construction spending. State-led responsibility for securing funding, likely from a combination of state and federal grants and appropriations of taxpayer dollars supporting economic activity in the region that may not otherwise occur.
	Construction: Downtown Development	**No Impact–**Construction activities are unlikely to affect current or future development in downtown Olympia. Business disruptions from traffic circulation changes and closures would be intermittent and limited in duration and impact.
	Construction: Demand for and Value of Recreation	**Minor Adverse Impact–**The Managed Lake Alternative would intermittently close or disturb use of recreational trails over a 6-month period and require closure of Marathon Park for the duration of construction. Economic value reductions from loss of access and temporary nuisances would be similar to the other action alternatives. **Minor Beneficial Effect–**Some people may derive value from observing construction activities, which may partially offset losses associated with construction disturbance.
	Construction: Demand for and Value of Ecosystem Services	**Minor Adverse Impact –** The Managed Lake Alternative would temporarily disrupt ecosystem functions and values associated with water quality regulation, habitat provision, visual aesthetics, and cultural, heritage, spiritual, and education. The effects would be temporary and shorter duration compared to Estuary and Hybrid Alternatives.

		Summary of Findings for Managed Lake Alternative
Operation	Operation: Downstream Economic Activity	**Minor Beneficial Effect–**Recurring maintenance dredging in the North Basin would support economic activity in the study region. State-led responsibility for operation means dredging funding would likely come from appropriations of taxpayer dollars supporting economic activity in the region that may not otherwise occur. **No Effect–**Ongoing dredging is expected to maintain navigability downstream, preserving the value of marina and Port activities. A lapse in dredging is unlikely to affect marina and Port activities during the 30-year operation window.
	Operation: Downtown Development	**Minor Beneficial Effect –** Impacts on downtown development arising from operations are likely to be positive under all action alternatives, as long as they are implemented in a way that is well-planned, thoughtfully designed, and accessible. Uncertainty is lowest under the Managed Lake Alternative, because it is closest to current conditions. Overall, other economic factors are likely to have more influence on market conditions for development in downtown Olympia than changes in the Capitol Lake Basin.
	Operation: Demand for and Value of Recreation	**Beneficial Effect –** Enhancements to trails, habitat areas, and restored water-based recreation would increase the value of recreation in the Capitol Lake Basin. Economic opportunities may arise to capture some increased value as revenue through new business ventures. The aesthetic impacts to the recreational experience for visitors will vary based on individual preferences. People who prefer the status quo will likely prefer the Managed Lake relative to the other action alternatives. The Managed Lake Alternative offers boating opportunities that are more consistent and more easily accessible compared to the Estuary and Hybrid Alternatives.

		Summary of Findings for Managed Lake Alternative
Operation (continued)	Operation: Demand for and Value of Ecosystem Services	**Beneficial Impact –** Improvements in habitat provision for certain species, visual aesthetics, and cultural, heritage, spiritual, and education value arising from enhanced habitat islands. Expanded recreation infrastructure and restored in-water use. **Adverse Impact –** As with the No Action Alternative, high likelihood that new TMDL allocations shift additional nutrient reduction responsibilities to wastewater and stormwater dischargers. LOTT would almost certainly need to invest in treatment capacity, with increased costs for ratepayers. Potential small increased risk and cost associated with diminished flood regulation capacity for Deschutes River flows.
	Operation: Equity and Distributional Impacts	**Disproportionate Adverse Impact to Tribal Populations –** The cultural value for tribes of the Managed Lake Alternative would be similar to conditions within the No Action Alternative. Tribal values would continue to be adversely impacted by the continued loss of connection to the natural environment and anthropogenic harm to the balance and functions from natural ecosystems. The lack of access to water resources, presence of the 5th Avenue dam, and impacts to species and natural functions has created costs in the form of reduced value to tribes, and would continue to do so in the Managed Lake Alternative. An equitable consideration of cultural value under the No Action Alternative would need to consider the past inequities associated with management of the Capitol Lake Basin. Many, if not all, cultural services for tribes are defined by place, tradition, and continuity of use and practice; no alternative resource could provide a sufficient substitute for the resources in question.

Table E.4 Estuary Alternative - Summary of Findings

		Summary of Findings for Estuary Alternative
Construction	Construction: Downstream Economic Activity	**Minor Beneficial Effect–**Temporary short-run increases in jobs, labor income, and economic output would occur in the study region from construction spending, the local share of which is similar in this alternative compared to the other alternatives. State-led responsibility for securing funding, likely from a combination of state and federal grants, appropriations of taxpayer dollars, and funds from other private and non-profit granting programs. Funds would support economic activity in the region that may not otherwise occur.
	Construction: Downtown Development	**No Impact–**Construction activities are unlikely to affect current or future development in downtown Olympia. Business disruptions from traffic circulation changes and closures would be intermittent and limited in duration and impact.
	Construction: Demand for and Value of Recreation	**Minor Adverse Impact–**The Estuary Alternative would disrupt the loop trail during the connection of the new 5th Avenue Bridge for about a month and require closure of Marathon Park for the duration of construction. Economic value reductions from loss of access and temporary nuisances would be similar to the other action alternatives. **Minor Beneficial Effect–**Some people may derive value from observing construction activities, which may partially offset losses associated with construction disturbance.
	Construction: Demand for and Value of Ecosystem Services	**Minor Adverse Impact –** The Estuary Alternative would temporarily disrupt ecosystem functions and values associated with water quality regulation, habitat provision, visual aesthetics, and cultural, heritage, spiritual, and education. The effects would be temporary and shorter duration compared the Hybrid Alternative.
Operation	Operation: Downstream Economic Activity	**Minor Beneficial Effect–** Recurring maintenance dredging in West Bay would support economic activity in the region. A mix of local, state, federal, and private funding sources would likely support dredging; federal and state dollars may support economic activity that would not otherwise materialize in the region. **No Effect–**Ongoing dredging is expected to maintain navigability downstream, preserving the value of marina and Port activities. A lapse in dredging could limit moorage accessibility and Port navigability, reducing revenues to businesses and organizations and potentially reducing regional economic activity related to boating and trade.

		Summary of Findings for Estuary Alternative
Operation (continued)	Operation: Downtown Development	**Minor Beneficial Effect–**Impacts on downtown development arising from operations are likely to be positive under all action alternatives, as long as they are implemented in a way that is well-planned, thoughtfully designed, and accessible. Uncertainty associated with environmental conditions and implementation risks may materialize but is likely to resolve once construction begins. Overall, other economic factors are likely to have more influence on market conditions for development in downtown Olympia than changes in the Capitol Lake Basin.
	Operation: Demand for and Value of Recreation	**Beneficial Effect –** Enhancements to trails, habitat areas, and restored water-based recreation would increase the value of recreation in the Capitol Lake Basin. Economic opportunities may arise to capture some increased value as revenue through new business ventures. The aesthetic impacts to the recreational experience for visitors will vary based on the individual's preferences. The more dramatic visual change in the Estuary Alternative could result in a reduction of value for some recreational users. However, other recreational users who prefer a more natural environment setting may experience an increased value. Relative to the Managed Lake Alternative, this alternative offers potentially more challenging and dynamic boating conditions, which may have higher value for some boaters, but likely appeal to a more limited population.

		Summary of Findings for Estuary Alternative
Operation (continued)	Operation: Demand for and Value of Ecosystem Services	**Beneficial Effect –** Improvements in habitat provision, visual aesthetics, and cultural value arising from enhanced habitat islands and habitat provision for native and commercially important species including salmonids, expanded recreation infrastructure, and restored in-water use. Potential avoided, delayed, or deferred regulatory compliance costs for LOTT and its ratepayers compared to the No Action and Managed Lake Alternatives resulting from improved water quality in Budd Inlet. Potential reduced risk and avoided cost of flooding from improved ecosystem flood regulation capacity compared to the No Action and Managed Lake Alternatives. Increased educational value arising from opportunities for research and observation of ecosystem restoration, with potential application to improve success and reduce costs of future Puget Sound estuary restoration projects. **Substantial Beneficial Effect–**Enhanced economic, cultural heritage, spiritual, and educational value associated with ecosystem restoration for tribal populations, addressing equity and social justice impacts of existing conditions. **Adverse Impact –** Potential loss in habitat provision for freshwater species, visual aesthetic, and cultural, heritage, spiritual, and educational value for people who hold a preference for freshwater ecosystems and the reflecting pool.
	Operation: Equity and Distributional Impacts	**Beneficial Effect to Tribal Populations –** Tribal populations likely would disproportionately experience the beneficial effects of restoration of the Capitol Lake Basin to an estuarine system. This distributional consideration has social justice dimensions since tribes have been historically disadvantaged, not just from management of Capitol Lake over the last 70 years, but since settlement of the region occurred. The 5th Avenue Dam has disrupted the interconnectedness of nature and resulted in water quality changes that have harmed species, specifically salmon, as well as plants and other animals, that tribes are dependent on for economic, subsistence, and cultural purposes.

Table E.5 Hybrid Alternative - Summary of Findings

		Summary of Findings for Hybrid Alternative
Construction	Construction: Downstream Economic Activity	**Minor Beneficial Effect–**Temporary short-run increases in jobs, labor income, and economic output would occur in the study region from construction spending, the local share of which is similar to the other alternatives. Depending on funding source, funds would support economic activity in the region that may not otherwise occur.
	Construction: Downtown Development	**No Impact–**Construction activities are unlikely to affect current or future development in downtown Olympia. Business disruptions from traffic circulation changes and closures would be intermittent and limited in duration and impact.
	Construction: Demand for and Value of Recreation	**Minor Adverse Impact–** The Hybrid Alternative would disrupt the loop trail during the connection of the new 5th Avenue Bridge for about a month and close Marathon Park for the duration of construction. This could induce people to temporarily substitute to other sites, at higher travel cost and lower value. **Minor Beneficial Effect–**Some people may derive value from observing construction activities, which may partially offset losses associated with construction disturbance.
	Construction: Demand for and Value of Ecosystem Services	**Minor Adverse Impact –** The Hybrid Alternative would temporarily disrupt ecosystem functions and values associated with water quality regulation, habitat provision, visual aesthetics, and cultural, heritage, spiritual, and education. The effects would be the longest compared to the other action alternatives.
Operation	Operation: Downstream Economic Activity	**Minor Beneficial Effect–** Recurring maintenance dredging in West Bay would support jobs, labor income, and economic output in the study region. A mix of local, state, and federal funding sources would likely support dredging; federal and state dollars may not otherwise support economic activity in the region. **No Effect–**Ongoing dredging is expected to maintain navigability downstream, preserving the value of marina and Port activities. A lapse in dredging could limit moorage accessibility and Port navigability, reducing revenues to businesses and organizations and potentially reducing regional economic activity related to boating and trade.

		Summary of Findings for Hybrid Alternative
Operation (continued)	Operation: Downtown Development	**Minor Beneficial Effect–**Impacts on downtown development arising from operations are likely to be positive under all action alternatives, as long as they are implemented in a way that is well-planned, thoughtfully designed, and accessible. Uncertainty associated with environmental conditions and implementation risks may materialize but is likely to resolve once construction begins. Overall, other economic factors are likely to have more influence on market conditions for development in downtown Olympia than changes in the Capitol Lake Basin.
	Operation: Demand for and Value of Recreation	**Beneficial Effect –** Enhancements to trails, habitat areas, and restored water-based recreation would increase the value of recreation in the Capitol Lake Basin. Economic opportunities may arise to capture some increased value as revenue through new business ventures. The aesthetic impacts to the recreational experience for visitors will vary based on the individual's preferences. The barrier wall would provide an additional pathway for pedestrians and bicyclists, which would provide a new perspective on the Basin compared to other paths in the study area. This may serve to attract new visitors to the area and potentially generate somewhat higher levels of economic value compared to both the Estuary Alternative and Managed Lake Alternatives.

		Summary of Findings for Hybrid Alternative
Operation (continued)	Operation: Demand for and Value of Ecosystem Services	**Beneficial Effect –** Improvements in habitat provision, visual aesthetics, and cultural, heritage, spiritual, and education value arising from enhanced habitat islands and habitat provision for native and commercially important species including salmonids, expanded recreation infrastructure, and restored in-water use. Potential avoided or delayed regulatory compliance costs for LOTT and its ratepayers compared to the No Action and Managed Lake Alternatives—but higher risk than the Estuary Alternative due to uncertainty from the hybrid reflecting pool—resulting from improved water quality in Budd Inlet. Potential reduced risk and avoided cost of flooding from improved ecosystem flood regulation capacity compared to the No Action and Managed Lake Alternatives. Increased educational value arising from opportunities for research and observation of ecosystem restoration, with potential application to improve success and reduce costs of future Puget Sound estuary restoration projects. **Substantial Beneficial Effect–**Enhanced commercial, subsistence, cultural, heritage, spiritual, and education value associated with ecosystem restoration for tribal populations, addressing equity and social justice impacts of existing conditions. **Minor Adverse Impact –** Potential loss in aesthetic value associated with the discontinuity of the reflecting pool wall, especially for those experiencing the estuary environment at water-level. Diminished cultural, heritage, spiritual, and educational value for people who hold a preference for one outcome over another, compared to their preferred outcome.
	Operation: Equity and Distributional Impacts	**Beneficial Effect to Tribal Populations –** Tribal populations likely would disproportionately experience the beneficial effects of restoration of the Capitol Lake Basin to an estuarine system. This distributional consideration has social justice dimensions since tribes have been historically disadvantaged, not just from management of Capitol Lake over the last 70 years, but since settlement of the region occurred. The 5th Avenue Dam has disrupted the interconnectedness of nature and resulted in water quality changes that have harmed species, specifically salmon, as well as plants and other animals, that tribes are dependent on for economic, subsistence, and cultural purposes.

The impacts on economic resources from the action alternatives would likely be largely positive and not require avoidance, minimization, and mitigation measures beyond those described in other Discipline Reports.

There is potential for the Estuary and Hybrid Alternatives in particular to increase levels of uncertainty in future conditions compared to the Managed Lake Alternative, because it is a dramatic change from current conditions. Transitioning from a managed lake to an estuary, if implemented without sufficient attention to appearance, could result in minor adverse impacts in the market for development in downtown Olympia. This risk can be minimized by the following:

1) Recognizing the importance of incorporating aesthetically pleasing and functional elements into project design and effectively implementing them, with input and feedback from local residents and developers.
2) Pursuing adequate funding to fully implement all project elements successfully and timely, with a priority on those elements that engage people in the environment and provide access to the water. Enterprise Services is leading the effort to secure funding for upfront construction, with funds likely to come from a combination state and federal grants, appropriations of taxpayer dollars, and funds from other private and non-profit granting programs.
3) Developing a plan for functional governance, funding, and adaptive management to quickly and productively address potential issues that may arise that compromise the amenity value of the resource. As noted throughout, the FGWG process has resulted in a Memorandum of Understanding that details progress FGWG members have made toward assigning long-term management responsibilities and allocating funding for maintenance dredging among its members. FGWG members intend for this non-binding document to serve as a bridging document toward a binding Interlocal Agreement. This agreement is specific to the Estuary Alternative.

Additionally, ongoing evaluation of public preferences related to perceived and real potential changes in amenity value will help ensure future design and implementation plans maximize economic outcomes. Ongoing consideration to how the distribution of benefits and costs aligns across different populations and groups of people is also warranted as the project develops, to highlight potential equity and social justice concerns.

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Appendices

Appendix A Key Informant Interview Questions

Appendix B Recreation Technical Appendix

List of Acronyms and Abbreviations

Acronyms/ Abbreviations	Definition
CBO	Congressional Budget Office
COVID	Coronavirus-19
DEIS	Draft Environmental Impact Statement
DO	Dissolved Oxygen
ECOLOGY	Department of Ecology
EIS	Environmental Impact Statement
ENTERPRISE SERVICES	Washington State Department of Enterprise Services

Acronyms/ Abbreviations	Definition
ESRI	Environmental Systems Research Institute
EPA	Environmental Protection Agency
FGWG	Funding and Governance Work Group
FPO	Federal Poverty Level
IGRA	Indian Gaming Regulatory Act
IPCC	Intergovernmental Panel on Climate Change
JBLM	Joint Base Lewis-McChord
LOTT	Lacy, Olympia, Tumwater, Thurston County (LOTT) Clean Water Alliance
M&N	Moffat & Nichol
MHI	Median Household Income
NEPA	National Environmental Protection Act
OFM	Office of Financial Management
PSF	Per square foot
SEPA	State Environmental Policy Act
USDA	United States Department of Agriculture
WSDOT	Washington State Department of Transportation
Yacht Club	Olympia Yacht Club

1.0 Introduction and Project Description

1.1 PROJECT DESCRIPTION

The Capitol Lake – Deschutes Estuary includes the 260-acre Capitol Lake Basin, located on the Washington State Capitol Campus, in Olympia, Washington. The waterbody has long been a valued community amenity. Capitol Lake was formed in 1951 following construction of a dam and provided an important recreational resource. Historically, the Deschutes Estuary was used by local tribes for subsistence and ceremonial purposes. Today, the expansive waterbody is closed to active public use. There are a number of environmental issues including the presence of invasive species, exceedances of water quality standards, and inadequate sediment management.

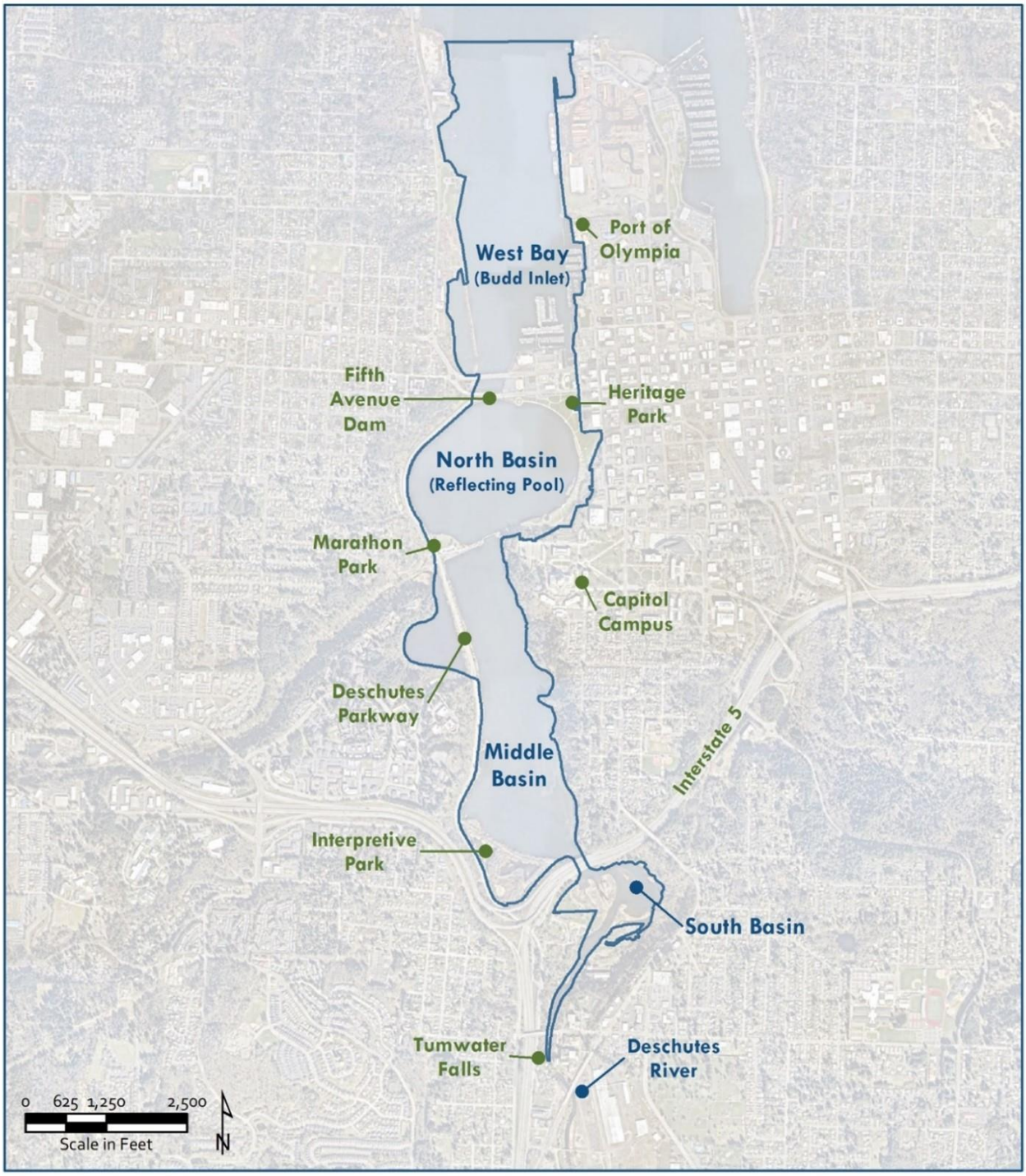
The Washington State Department of Enterprise Services (Enterprise Services) is responsible for the stewardship, preservation, operation, and maintenance of the Capitol Lake Basin. The 260-acre Capitol Lake Basin is maintained by Enterprise Services under long-term lease agreement from the Washington Department of Natural Resources.

In 2016, as part of Phase 1 of long-term planning, a group of stakeholders representing a broad range of interests, in collaboration with the state, identified shared goals for long-term management and agreed an Environmental Impact Statement (EIS) was needed to evaluate a range of alternatives and identify a preferred alternative. In 2018, the state began the EIS process. The Draft EIS was published on June 30, 2021, and evaluated four alternatives: a Managed Lake, Estuary, Hybrid, and a No Action Alternative.

The long-term management alternatives are evaluated against the shared project goals of improving water quality, managing sediment accumulation and future deposition, improving ecological functions, and enhancing community use of the resource. Refer to Figure 1.1 for the project area for long-term management.

Within the Final EIS, Enterprise Services has identified the Estuary Alternative as the preferred environmentally and economically sustainable long-term management alternative for the Capitol Lake – Deschutes Estuary. The EIS process has maintained engagement with the existing Work Groups, which include the local governments, resource agencies, and tribes. It also provides for expanded engagement opportunities for the public, such as a community sounding board.

Figure 1.1. Project Area



1.2 SUMMARY OF PROJECT ALTERNATIVES

1.2.1 Managed Lake Alternative

The Managed Lake Alternative would retain the 5th Avenue Dam and Bridge in its existing configuration. The 5th Avenue Dam would be overhauled to significantly extend the serviceable life of the structure. The reflecting pool within the North Basin would be maintained, and active recreational use would be restored in this area. Sediment would be managed through initial construction dredging and recurring maintenance dredging in the North Basin only. Sediment from construction dredging would be used to create habitat areas in the Middle Basin to support improved ecological function, habitat complexity, and diversity. Sediment would continue to accumulate and over time would promote a transition to freshwater wetlands in the South and Middle Basins. Boardwalks, a dock, and a boat launch would be constructed for community use.

This project would also construct a new, approximately 14-foot-wide bike and pedestrian bridge south of the existing 5th Avenue Bridge to provide a dedicated recreational trail connection.

Adaptive management would be needed to maintain water quality, improve ecological functions, and manage invasive species.

1.2.2 Estuary Alternative

Under the Estuary Alternative, the existing 5th Avenue Dam and Bridge would be removed, and an approximately 500-footwide (150-meter-wide) opening would be established in its place. This would reintroduce tidal hydrology to the Capitol Lake Basin, returning the area to estuarine conditions where saltwater from Budd Inlet would mix with freshwater from the Deschutes River. Sediment would be managed through initial construction dredging in the Capitol Lake Basin and recurring maintenance dredging within West Bay. Dredged materials from construction dredging would be used to create habitat areas in the Middle and North Basins to promote ecological diversity, though tideflats would be the predominant habitat type. Boardwalks, a dock, and a boat launch would be constructed for community use. This alternative also includes stabilization along the entire length of Deschutes Parkway to avoid undercutting or destabilization from the tidal flow. Existing utilities and other infrastructure would be upgraded and/or protected from reintroduced tidal hydrology and saltwater conditions.

The Estuary Alternative has been updated in the Final EIS to include a new 5th Avenue Bridge that would be constructed south of the existing 5th Avenue Dam and Bridge. The new bridge would include a vehicle lane, bike lane, and sidewalk in each direction, with the sidewalk on the south side providing a dedicated recreational trail connection. This bridge would be constructed and connected to the transportation system before the existing 5th Avenue Dam and Bridge are removed.

Adaptive management plans would be developed to improve ecological functions and manage invasive species during the design and permitting process.

1.2.3 Hybrid Alternative

Under the Hybrid Alternative, the existing 5th Avenue Dam and Bridge would be removed, and an approximately 500-footwide (150-meter-wide) opening would be established in its place. Tidal hydrology would be reintroduced to the western portion of the North Basin and to the Middle and South Basins. Within the North Basin, a curved and approximately 2,600-foot-long (790-meter-long) barrier wall with a walkway would be constructed to create an approximately 45-acre reflecting pool adjacent to Heritage Park. The reflecting pool of the Hybrid Alternative has been updated in the Final EIS to be groundwater-fed, rather than saltwater. Construction and maintenance of this smaller reflecting pool, in addition to restored estuarine conditions in part of the Capitol Lake Basin, gives this alternative its classification as a hybrid.

Sediment would be managed through initial construction dredging in the Capitol Lake Basin and recurring maintenance dredging within West Bay. In the Middle and North Basins, constructed habitat areas would promote ecological diversity, though tideflats would be the predominant habitat type. Boardwalks, a dock, and a boat launch would be constructed for community use. This alternative also includes stabilization along the entire length of Deschutes Parkway to avoid scour or destabilization. Existing utilities and other infrastructure would be upgraded and/or protected from reintroduced tidal hydrology and saltwater conditions.

The Hybrid Alternative would also construct a new 5th Avenue Bridge, as described for the Estuary Alternative, prior to removing the existing 5th Avenue Dam and Bridge.

Adaptive management plans would be needed to improve ecological functions, manage invasive species, and maintain water quality in the freshwater reflecting pool.

1.2.4 No Action Alternative

The No Action Alternative represents the most likely future expected in the absence of implementing a long-term management project. The No Action Alternative would persist if funding is not acquired to implement the Preferred Alternative. A No Action Alternative is a required element in a SEPA EIS and provides a baseline against which the impacts of the action alternatives (Managed Lake, Estuary, Hybrid) can be evaluated and compared.

The No Action Alternative would retain the 5th Avenue Dam in its current configuration, with limited repair and maintenance activities, consistent with the scope and scale of those that have received funding and environmental approvals over the past 30 years. In the last 30 years, the repair and maintenance activities have been limited to emergency or high-priority actions, which occur sporadically as a result of need and funding appropriations.

Although Enterprise Services would not implement a long-term management project, current management activities and ongoing projects in the Capitol Lake Basin would continue. Enterprise Services would continue to implement limited nuisance and invasive species management strategies.

In the absence of a long-term management project, it is unlikely that Enterprise Services would be able to procure funding and approvals to manage sediment, improve water quality, improve ecological functions, or enhance community use. The No Action Alternative does not achieve the project goals.

1.3 CONSTRUCTION METHODS FOR THE ACTION ALTERNATIVES

This impact analysis relies on the construction method and anticipated duration for the action alternatives, which are described in detail in Chapter 2 of the EIS.

2.0 Regulatory Context

2.1 RESOURCE DESCRIPTION

This report describes the economic context that is relevant to evaluating the potential impact of each action alternative, and the economic effects that are likely to arise with construction and implementation. The action alternatives would produce economic effects in two ways:

1. By changing the supply of or demand for goods and services that people care about relative to the No Action Alternative, and
2. By changing spending levels associated with construction and management activities, potentially resulting in changes in employment and income (economic activity) compared to the no-action alternative.

Changes in economic value and economic activity are evaluated across specific topics, raised by the public and stakeholders during Phase 1 of the Capitol Lake/Lower Deschutes Watershed Long-Term Management Planning effort and during EIS scoping. These topics are grouped into four categories, which organize the economic analysis:

3. Potential impacts to **economic activity**, including **downstream** of the project;
4. Potential impacts to **development in downtown Olympia**;
5. Potential impacts to the **demand for and value of recreation** directly and indirectly related to Capitol Lake; and
6. Potential impacts to the **demand for and value of ecosystem services** within, adjacent to, and downstream of the project.

2.2 RELEVANT LAWS, PLANS, AND POLICIES

SEPA does not require economic analysis of a proposed action (Department of Ecology 1998 and Terry 1992). As such, the statutes and regulations governing SEPA do not provide specific guidance for what an economic analysis should include or what approach it should take to analyzing economic effects. In funding the EIS effort, however, the Washington State Legislature and project stakeholders indicated

that an economic analysis would be a critical component of the documentation of effects, and should be conducted with a broad perspective to support the decision-making process

> *The appropriation in this section is subject to the following conditions and limitations: The department shall develop an environmental impact statement to consider alternatives for Capitol Lake. The alternatives considered must include, at a minimum, a lake option, an estuary option, and a hybrid option. The environmental impact statement will also consider sediment transport and locations within lower Budd Inlet. The department must work with affected stakeholders to develop mitigation plans.* ***The environmental impact statement must also consider an expanded area around Capitol Lake and Budd Inlet including the Port of Olympia for the economic analysis.*** *The environmental impact statement must consider the use of equal funding from nonstate entities including, but not limited to, local governments, special purpose districts, tribes, and not-for-profit organizations.* (Washington Legislature 2018)

Similar to economic analysis, SEPA does not require consideration of Environmental Justice (EJ) in the EIS process. This analysis does not include a formal EJ analysis consistent with federal guidance under Executive Order 12898 as required for NEPA. Consistent with the professional standards for economic analysis discussed in detail in Section 3.0, this analysis addresses the distributional effects across populations, and would support the preparation of a complete EJ analysis under NEPA, should this be required at a later date.

3.0 Methodology

In the absence of relevant laws, plans, and policies governing economic resources, as detailed in Section 2.0, the methodology followed for this analysis is consistent with professional standards of economic analysis, in the context of environmental impact review. It reflects federal guidance for using economic analysis in regulatory decision making (U.S. EPA 2010), water resource planning (Council on Environmental Quality 2013), and NEPA socioeconomic analysis.[3]

Guidance for NEPA and precedent under SEPA both stipulate that in conducting economic impact review, a benefit-cost analysis is not required. Any discussion of economic impacts arising from a proposed action should include consideration of unquantified environmental impacts, values, and amenities. Monetary impacts should not be weighed against environmental impacts when there are important qualitative considerations (Council on Environmental Quality 2005). Moreover, the level of analysis of economic effects should be commensurate with the potential magnitude of those effects, and qualitative analysis is appropriate given the data typically available for a project at the planning/environmental review stage.

This approach underlies the methodologies used in this economic analysis. The structure and methodology for the economic analysis was reviewed and approved through a third-party peer review process (ECONorthwest 2019).

The assessment of impacts related to each of the four topical areas in the economic analysis requires different methodological considerations, in terms of geographic extent, data sources, analytical approach for assessing impacts. These are described in sequence within each subheading below.

[3] At this time there is no federal funding or federal action requiring federal review of the project under NEPA or any other federal statute. Should the project progress, however, NEPA review would be required as part of the federal permitting process. Anticipating this, the project team is preparing the SEPA EIS to support future NEPA analysis where possible and appropriate.

3.1 SELECTION OF THE STUDY AREA

In economic analysis, the study area should be defined to fully capture potential impacts in the relevant markets and/or populations that the action alternatives would potentially affect, either directly or indirectly during construction and operation of the project. Each of the four topical areas of analysis impact different economic resources, which have different geographic scopes. Therefore, the study area for the economic analysis is tailored to each of the four topical areas of analysis. In each case, these study areas are larger than the project area shown in Figure 1.1.

3.1.1 Study Area for Impacts to Downstream Economic Activity

The study area for impacts to downstream economic activity is the relevant market within which public and private entities operating downstream of the project area interact. The specific entities that the action alternatives would impact are those adjacent to Budd Inlet, shown in Figure 3.1. Although the impact of the action alternatives is unlikely to directly affect entities outside of Budd Inlet, any effect on jobs, labor, income, and gross regional product may manifest in the broader regional economy, which encompasses Thurston County. This two-part study area definition addresses the project requirement (Washington Legislature 2018, ESSB 6095) to consider an expanded area around Budd Inlet, including the Port of Olympia, for the economic analysis.

Figure 3.1 Areas North of 5th Avenue Dam Considered in the Downstream Economic Activity Analysis

Source: ECONorthwest

3.1.2 Study Area for Impacts to Development in Downtown Olympia

The study area for impacts to development in downtown Olympia is the relevant market defining downtown development in the City of Olympia. The Downtown Olympia Community Renewal Area Boundary (Figure 3.2) is the product of a recent community process to address blight, remove barriers to redevelopment, and initiate development partnerships with the Port in downtown Olympia (ECONorthwest 2013). Capitol Lake is listed as a potential amenity in the feasibility study for the Community Renewal Area which thus supports the use of this boundary to investigate the potential impacts of changes in the amenity on downtown development.

Figure 3.2 Downtown Olympia Community Renewal Area Boundary

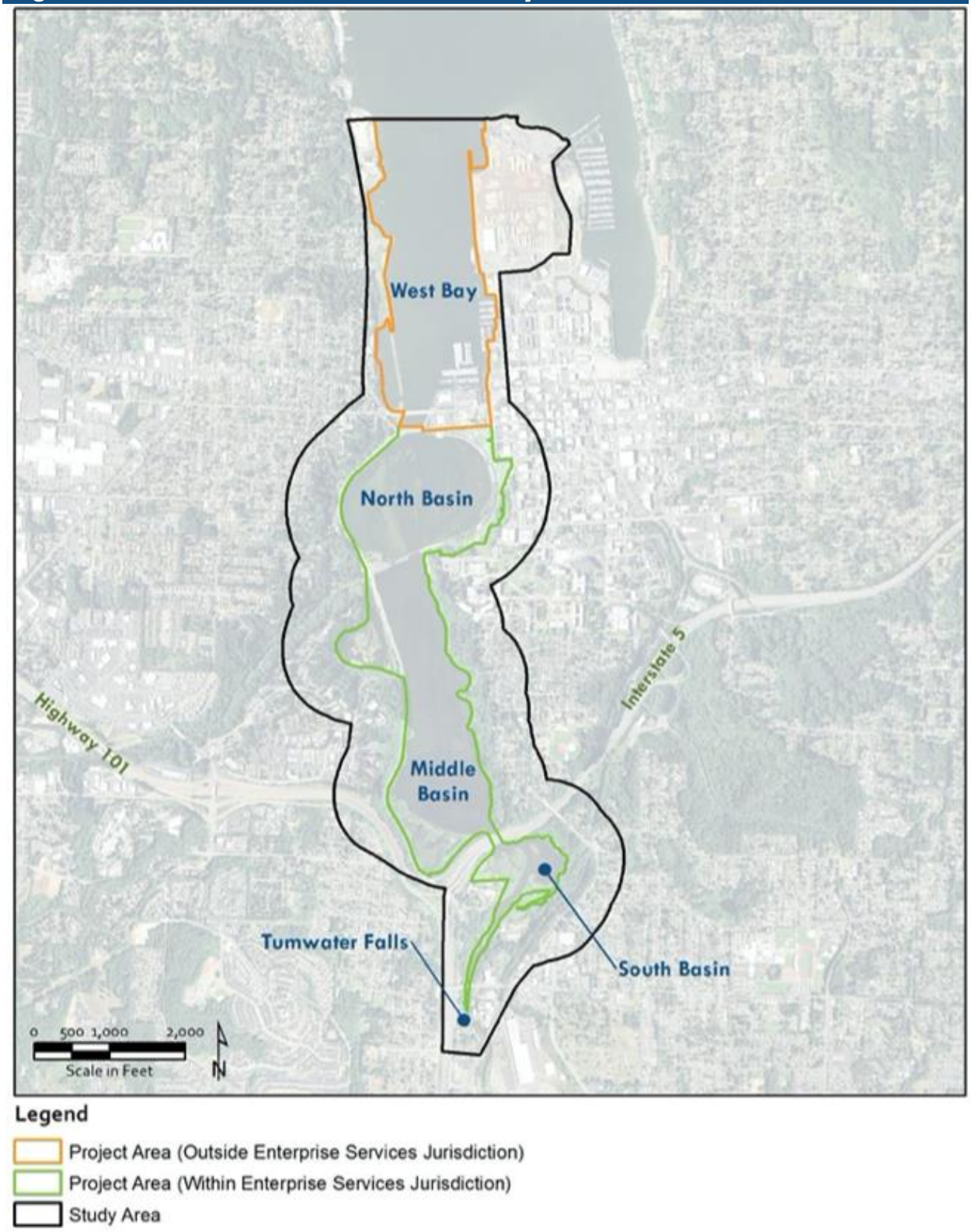
Source: ECONorthwest 2013

3.1.3 Study Area for Impacts to Recreation Demand and Value

There are two relevant study areas for evaluating the impacts to recreation demand and value. The primary, larger study area for impacts to recreation demand and value is Thurston County, an area that captures the majority of the population that generates demand for recreation in the Capitol Lake Basin and includes potential substitute recreation resources. Thurston County contains county, state, and federal recreation resources upstream from the Basin, downstream in Budd Inlet, and along the Puget Sound shoreline to the east and west of Olympia. Many of these resources would not be directly impacted by any of the action alternatives. However, recreational users could substitute to these sites if quality or quantity of their first-choice resource within the immediate study area is impacted.

The supply of recreation resources that could be directly impacted by the action alternatives is assessed in the *Land Use, Shorelines, and Recreation Discipline Report (ESA, 2020c)*. The economic analysis of impacts to recreation demand and value relies on this assessment as an input, and therefore adopts the same geography immediately around Capitol Lake as the immediate study area (Figure 3.3). This area encompasses Capitol Lake and extends from Budd inlet in the north to Tumwater Falls in the south.

Figure 3.3 Recreation Area Boundary



3.1.4 Study Area for Impacts to the Value of Ecosystem Services

The relevant study area for evaluating the impacts to ecosystem services varies by ecosystem service. In each case, it reflects both the area in which changes in the supply of a particular ecosystem service occurs (generally the study area as defined for each biophysical resource), and the area—often much broader—where demand for the ecosystem service occurs (typically associated with the locations of the populations that derive value from the ecosystem service). This analysis focuses on six types of ecosystem services, shown in Table 3.1, that could be affected by changes within Capitol Lake – Deschutes Estuary (i.e., the area that includes the Capitol Lake Basin and West Bay of Budd Inlet) (Section 3.2.4 below provides a definition of ecosystem services and more detailed discussion of their identification and classification, which supports this list).

Table 3.1 Description of Ecosystem Service Study Areas

Ecosystem Service	Supply	Demand
Water Quality Regulation	Capitol Lake Basin and West Bay of Budd Inlet	Populations that use the Capitol Lake Basin and West Bay for recreation; Populations in jurisdictions that discharge to these water bodies (e.g., LOTT)
Flood Regulation	Areas adjacent to the project area (Figure 1.1)	Populations that use the area adjacent to the project area, and in jurisdictions that intersect with the project area.
Habitat Provision	Capitol Lake Basin and West Bay of Budd Inlet (including affected extent of Percival Creek)	Populations that derive commercial, recreational, subsistence, and cultural/spiritual value from affected species and habitat, centered primarily in Western Washington, and to a diminishing extent within the Pacific Northwest, the U.S., and the world. This specifically includes tribes as noted in section 4.4.6.1.
Climate Regulation	Capitol Lake Basin and West Bay of Budd Inlet	Global
Visual Aesthetics	Capitol Lake Basin and West Bay of Budd Inlet	Populations that use the Capitol Lake Basin and West Bay for recreation; Populations living within view of the project area.
Cultural, Heritage, Spiritual, and Education	Capitol Lake Basin and West Bay of Budd Inlet	Populations that currently or historically have connected with the resources in the Capitol Lake Basin, directly or indirectly, centered primarily in Western Washington and statewide.

3.2 DATA SOURCES AND COLLECTION

Description of existing and future conditions and assessment of impacts relied on publicly available data, data generated in past assessments of Capitol Lake—Deschutes Estuary long-term management planning, proprietary data from data service providers, and data generated from interviews and email correspondence with key informants. Most data presented reflect pre-COVID conditions. At the time of this analysis, significant uncertainty exists about future economic and market conditions. These uncertainties are noted throughout this report and will be revisited prior to release of the FEIS.

3.2.1 Data Sources for Impacts to Downstream Economic Activity

3.2.1.1 Description of the Affected Environment

Data to describe current and expected future conditions in the study area and comparison regions were derived from the U.S. Census Bureau, U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and Washington State Office of Financial Management. Data describing current operations at the Port were collected from publicly available documents, which were verified and expanded upon through key-informant interview correspondence with Port management. Data describing business employment and income for the key firms downstream of the project were obtained from Business Analyst, a proprietary data service provided by ESRI. These data were verified, to the extent possible, using publicly available information from firm websites and other publicly available documentation.

3.2.1.2 Inputs to the Economic Model Quantifying Impacts

Moffatt & Nichol (M&N) provided the planning-level cost estimates for construction of the action alternatives, which served as an input for the economic modeling. The estimates provided by M&N were disaggregated by commodity and cost breakout by component (labor, equipment, etc.). Because both time and geography are important in the context of input-output modeling, the data were further disaggregated by spending by commodity that would occur within the study region. Additionally, the construction spending is averaged over the number of project years to derive an annualized estimate of economic contribution per year over the lifecycle of the project in each alternative.

3.2.2 Data Sources for Impacts to Development in Downtown Olympia

3.2.2.1 Description of the Affected Environment

Data to describe current and expected future conditions in the study area and comparison regions were derived from the U.S. Census Bureau, U.S. Bureau of Economic Analysis, and CoStar, a subscription-based proprietary data source that reports near-real time real estate market analytics. In addition to these data sources, previous reports from the City of Olympia describing the relationship between Capitol Lake and current trends in downtown development (City of Olympia 2015 and 2017) informed the analysis.

3.2.2.2 Key-Informant Interviews

The methodology guiding the Economic Analysis for the SEPA EIS, which underwent third-party peer review in August of 2019 to ensure that industry-recognized best practices were used, identified key-informant interviews as an important data source for documenting potential impacts to downtown development of the action alternatives. The methodology specified that Enterprise Services project leadership would review both potential interviewees and interview questions, prior to initiating the interviews.

Key-Informant Interview Structure

The interview process adhered to standard qualitative research techniques. To control for bias, a standardized interview script was used across all interviews to avoid capturing different perspectives of the same questions. A verification process occurred following each interview in to ensure, where possible and appropriate, that information obtained through the key-informant process was consistent with alternative sources of information, including market data and peer-reviewed literature.

Interviews were conducted with two categories of key-informants: 1) planners and economic development officials (to capture the public sector perspective) and 2) private developers and real estate experts (to capture the private sector perspective). Representatives in first category were identified for contact based on their positions in local planning and economic development roles. ECONorthwest and Enterprise Services staff both contributed to identifying this list. Private developers were identified from a database of developers active in the Olympia area, from trade publications, and from local websites of development projects in the area. For the private developers and real estate experts, there was concern that those with active projects may not want to participate or may be biased towards a specific perspective. To account for this, the potential interviewee list included two real estate professionals from outside of the region (identified through their leadership roles in the planning community in the Pacific Northwest) to provide independent verification of responses, based on professional experience with development trends in urban markets throughout the Pacific Northwest.

Interviews were conducted via telephone, with two ECONorthwest staff and one Enterprise Services staff present. Enterprise Services staff provided a project introduction and were available to answer project-related questions. ECONorthwest staff provided technical background and guided the interview through pre-selected questions, probing as needed to clarify responses. ECONorthwest staff also took detailed notes for each interview, for later review and verification. Expectations were established with each interviewee that the interview would be approximately 30 minutes long, with a 45-minute time slot schedule to allow for flexibility. Actual interview times ranged from 25 minutes to 1 hour.

Contact Process and Response Rates

In all, 15 potential interviewees were identified for initial contact, based on the process described above: eight planners and economic development officials, and seven private developers and real estate experts. Potential interviewees were contacted via email by Enterprise Services, and ECONorthwest staff followed up to schedule a 45-minute telephone conversation. Ten interviews were

scheduled and completed based on this initial correspondence. Enterprise Services sent a second follow-up email to those who had not yet responded, which resulted in two additional completed interviews for a total of 12 interviews completed. Eighty percent of potential interviewees identified ultimately completed an interview (12/15).

ECONorthwest identified eight planners and economic development officials, and completed seven interviews, which translates to 90 percent ultimately completing interviews (7/8).

ECONorthwest identified seven private developers and real estate experts, and completed five interviews, which translates to 70 percent ultimately completing interviews (5/7). Of the initial list, five interviewees were actively involved in the Olympia market and two were from outside the region. Both interviewees from outside the region and one from inside of the region responded to the first inquiry. A second email yielded two additional local developers who were willing to participate in the interview process.

The interview questions, developed for the public and private sectors, are included in Appendix A. The identity of interviewees included on the initial contact list and list of completed interviews is confidential, to protect the integrity of the interview process.

3.2.3 Data Sources for Impacts to Recreation Demand and Value

3.2.3.1 Description of the Affected Environment

Data to describe current and expected future conditions associated with recreation demand and value in the study area and comparison regions were derived from primary and secondary sources. These are described below. Appendix B provides a more detailed methodology for each technique used to estimate recreation use in the study area.

Description and Quantification of Demand

The analysis describes overall levels and trends in demand for recreation in the study area and in Washington state using data from public reports and studies completed for recreation planning purposes in Washington. This information includes data and information from Washington State Recreation and Conservation Plan from the Washington Office of Recreation and Conservation, Thurston County Parks, City of Olympia Parks and Recreation, City of Lacey Parks and Recreation, City of Tumwater Parks and Recreation, as well as Washington Department of Transportation counts of bicyclist and pedestrians as a part of the WSDOT Washington State Bicycle and Pedestrian Documentation Project.

Data quantifying demand for recreation in the study area were not available from existing sources, so the recreation demand analysis methodology called for new data collection via a park user survey and other observational and statistical methods. These primary data collection efforts were supported by interviews of managers familiar with recreation and visitor use in the study area, including on the Capitol Campus and in Tumwater.

Park User Survey

The park user survey was an in-person, on-site survey designed by the EIS Project Team and conducted by Enterprise Services staff in summer 2019. Enterprise Services staff intercepted visitors at the parks adjacent to Capitol Lake and had them fill out paper surveys. Surveys were conducted during higher-usage periods on weekdays and weekends in the summer of 2019. Enterprise Services collected survey data from parks adjacent to Capitol Lake as well as its general vicinity on thirteen days from July to September 2019, including one weekend during Capital Lakefair. There were 330 respondents, 75 percent of whose responses were collected in Heritage Park. Responses were also collected in Interpretive Center, Marathon Park, Tumwater Historical Park, and the general vicinity of Capitol Lake.

The survey asked people questions about how frequently they use the park, how many people they usually come with, and what they use the park for. Most sections of the survey were multiple choice, with open-ended responses for the number of people with whom the respondent attended the park. Survey questions included questions about the respondent's plans for the day as well as their general habits. While attention was given to survey question design, the survey design was not intended to capture a representative sample of respondents or collect data in a way that could be statistically extrapolated to population-level estimates. Instead, it provides a set of descriptive results to questions that can be organized in a systematic way, by certain user characteristics. The survey instrument is provided in Appendix B.

Enterprise Services Event Database

Enterprise Services requires event sponsors to apply for a permit for events on the Washington State Capitol Campus and the surrounding parks if they predict an attendance of more than 75 people. The permit application asks sponsors for the date, type, and expected attendance of their event. From this information ECONorthwest staff determined the frequency of use for different parts of Capitol Campus for officially-permitted events. The Capitol Campus Activities and Events database contains information for each area of Capitol Campus (i.e. Tivoli Fountain, the Sunken Garden, and campus park quadrants) as well as nearby Marathon, Sylvester, and Heritage Parks, but it does not contain information for non-permitted events such as protests or spontaneous gatherings.

STRAVA Global Heatmap and WSDOT Pedestrian and Bicycle Use Counts

The global heatmaps provided online via Strava present the aggregate user data of the recreation-tracking app of the same name. Strava is one of the most popular apps linked with wearable recreation trackers. It is used by individuals and groups, such as running clubs. Its database of recreational use is international in scale and the company sells subscriptions to its data for recreation planning and other purposes. Obtaining raw data from Strava was out of the scope and budget of this project, but heatmaps were used in conjunction with use counts from the WSDOT Washington State Bicycle and Pedestrian Documentation Project to provide very rough estimates of magnitude of average annual pedestrian and bicycle use in the study area.

Capitol Campus Security Video Footage

Security camera video footage at Heritage Park was used to generate rough estimates of monthly visitor park use. Data were collected intermittently between September 2019 and September 2020. However, COVID-19 disrupted typical use patterns following March 2020. Due to this and other technical challenges, estimates presented are based on footage collected in August and September 2020.

Informational Interviews

The project team conducted informational interviews and data queries with staff of the City of Olympia and the City of Tumwater, to determine what information might be available to help describe or quantify use of the recreational facilities in and adjacent to the study area. The team also interviewed Tomy Mollas, then the Department of Enterprise Services Visitor Services Manager, who provided the team with descriptions and characterization of use at Washington State Capitol Campus, particularly related to changes in use patterns associated with COVID-19.

Description of Economic Value and Economic Activity Associated with Recreation

In this context, economic value, also known as consumer surplus, refers to the value that a person is willing to pay for engaging in a recreation activity beyond what they pay for the experience in fees, food, lodging, travel costs, time costs, etc. Economic activity is what people spend to engage in the recreation activity. That spending then stimulates additional economic activity as it flows to local suppliers and their employees. Economic activity is not a "benefit" because it does not consider social welfare effects. It is a measure of how dollars are spent in the local economy.

Peer-reviewed literature and other research publications provided information about the economic value of recreation and economic activity associated with recreation use in the Pacific Northwest and elsewhere. This literature included information on the value of recreational use and on how changes in the quality of recreation amenities and the availability of recreation opportunities affect demand for recreation in similar contexts. The value of recreation use by relevant activity, including both consumer surplus from U.S. Forest Service survey data contained within the Recreation Use Values Database (Rosenberger 2020) and spending patterns for local and non-local visitors, was derived from economic literature (ECONorthwest 2019, Mojica et al. 2020, Jostad et al. 2017). The project team also consulted peer-reviewed literature related to how changes in the quality of recreation amenities and availability of recreation opportunities affect demand for recreation in similar contexts.

3.2.4 Data Sources for Impacts to the Value of Ecosystem Services

Data to describe current and expected future conditions associated with ecosystem services were derived primarily from the Discipline Reports for other resource areas and publicly available literature. The following sources served as inputs to the description of the affected environment:

- Information from other resource discipline reports prepared for the project to describe the change in the supply or quality of ecosystem services.

- Information describing specific demands for each ecosystem service come from the project record and peer-reviewed literature.
- Peer-reviewed literature related to the value of ecosystem services, including the social cost of carbon, value of incremental changes in fish and wildlife populations and their habitat, and others.

3.3 ANALYSIS OF IMPACTS

The assessment of changes in economic values and economic activity in the study area is based on the available data sources described above. To the extent possible, the assessment will provide quantitative results. Where quantitative data are unavailable, the direction, magnitude, timing, and duration of the impacts are identified and described qualitatively.

The descriptions related to the distribution of impacts (i.e., who would bear the costs of the action) are based on work of the FGWG to develop a funding strategy and governance plan for the Capitol Lake–Deschutes Estuary Long Term Management Project. Progress made toward a binding ILA is outlined in a non-binding MOU that all FGWG members have signed; provided as Attachment 23 to the Final EIS. The FGWG will continue to negotiate details of long-term funding and governance for the Estuary Alternative and Chapter 7 of the EIS documents the existing outcomes and decisions. The economic analysis reflects the distributional effects of funding and governance provisions as they are currently articulated in the FGWG's MOU.

3.3.1 Methods for Assessing Impacts to Downstream Economic Activity

Navigation-dependent entities (e.g., the Port of Olympia and private marinas) north of the 5th Avenue Dam in Budd Inlet (downstream of the project) are sensitive to sedimentation impacts. Sedimentation, if not properly addressed, could obstruct navigation and result in a reduced capacity to operate in West Bay. To avoid this impact, all action alternatives include maintenance dredging of impacted areas to maintain navigability in West Bay. The analysis assesses impacts in two dimensions: changes in economic values (costs and benefits[4]) and changes in economic impacts (jobs and incomes). The primary effect in both cases would arise from potential changes in dredging costs and other potential costs imposed by the action alternatives.

- **Economic Value.** Managing sediment is a common cost of doing business for water-dependent businesses (e.g., ports and marinas). Changes in physical and natural infrastructure that change sedimentation patterns may increase or decrease the cost of management, resulting in benefits or costs to affected entities. Costs materialize as businesses direct spending to sediment management and away from other opportunities. These costs could materialize through direct payments for private dredging activities, or increased taxes or fees paid as part of a cost-sharing agreement to address dredging on a

[4] While this analysis describes changes in economic value in terms of costs and benefits in this and subsequent analyses, it is not a benefit-cost analysis, which is a specific tool that captures and standardizes flows of benefits and costs across time and facilitates comprehensive comparison of alternatives.

public or community basis. Other project elements may also impose costs on public and private entities, directly (e.g., by requiring investments in capital or management expenses to respond to project-related changes), or through temporary disruptions in access, or changes in the supply (quality or quantity) of goods and services people enjoy. These benefits and costs are components of economic value which measure the change in social welfare in the study area.

- **Economic Impacts.** When costs increase or business activities change in response to changes in sediment management patterns or other project-related costs, spending patterns are likely to change as well. These spending pattern changes result in changes in the level of jobs and income in an economic region. These are evaluated using the Input-Output Modeling tool IMPLAN. Economic impacts are not benefits or costs because they only measure levels of spending, not changes in social welfare.

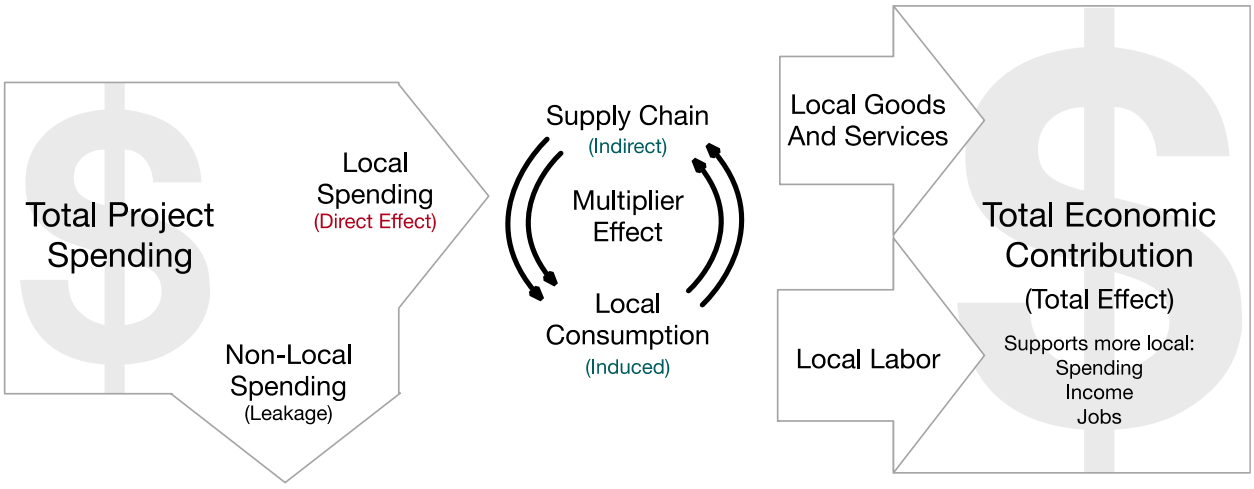
3.3.1.1 Input-Output Modeling

To calculate the economic contribution of the alternatives, ECONorthwest used the 2018 version of IMPLAN, an input-output model that calculates the change in jobs, labor income, and economic output that may arise from changes in spending related to constructing the infrastructure required to support the action alternatives, along with any new dredging that may occur.

Economic contribution studies use specific terminology to identify different types of economic effects that can be modeled using input-output tools. More specifically, the IMPLAN model provides estimates of the effects of the expenditures on income and employment that follow from direct, indirect, and induced expenditures (See Figure 3.4).

- **Direct effects** are the output, jobs, and income associated with the immediate effects of final demand changes. These are typically described as the "inputs" to the model.
- **Indirect effects** are production changes in backward-linked industries caused by the changing input needs of directly affected industries. Suppliers to the directly involved industry will also purchase additional goods and services; spending leads to additional rounds of indirect effects. Because they represent interactions among businesses, these indirect effects are often referred to as supply-chain effects.
- **Induced effects** are the changes in regional household spending patterns caused by changes in household income. The direct and indirect increases in employment and income enhance the overall purchasing power in the economy, thereby inducing further spending by households. Employees in these industries, for example, will use their income to purchase groceries or take their children to the doctor. These induced effects are often referred to as consumption-driven effects.

Figure 3.4 Economic Effects Arising from Spending to Generate Total Economic Contribution



Source: ECONorthwest

Taken together, these combined economic effects (i.e., direct, indirect, and induced) describe the total contribution to the economy in the study region based on changes in spending levels. These effects are measured in terms of output, income, and jobs, which are defined as:

- **Output** represents the value of all goods and services produced from an event, and it is the broadest measure of economic activity.
- **Labor Income** consists of employee compensation and proprietor income, and it is a subset of output. This includes workers' wages and salaries, as well as other benefits such as health, disability, and life insurance, retirement payments, and non-cash compensation.
- **Jobs** are measured in terms of full-year equivalents (FYE). One FYE job equals work over twelve months in an industry (this is the same definition used by the federal government's Bureau of Labor Statistics).

Economic Contributions vs. Economic Impacts

Economic contributions are an upper bound estimate of all the economic activity that can be associated with an industry or event in a region's economy. These types of analysis do not measure the net difference in the amount of activity in the economy because of the change in spending, nor do they account for substitution effects resulting from changes in demand. Economic impacts are a related but separate analysis which accounts for the net change in economic activity from an industry or event in a region's economy

ECONorthwest modeled the economic contributions in Thurston County of the Capitol Lake–Deschutes Estuary management alternatives. This definition presents some challenges because although much of the investment would occur locally, many firms contracted to construct the project would likely come from outside of the study region. Despite this limitation, using a similar region for the economic area to

define changes in supply chain and consumption spending helps ensure that the results of the analysis are comparable across sections.

Limitations of Input-Output Models

Input-output models are static models that measure inputs and outputs of an economy at a point in time. With this information and the balanced accounting structure of an input-output model, an analyst can: 1) describe an economy in a single time-period, 2) introduce a change to the economy, and then 3) evaluate the economy after it has accommodated that change.

This type of "partial equilibrium" analysis permits comparison of the economy in two separate states but does not describe how the economy moves from one equilibrium to the next. In partial equilibrium analysis, the researcher assumes that all other relationships in the economy remain the same (other than the initial changes in spending levels).

Contrary to dynamic models, static models assume that there are no changes in wage rates, input prices, and property values. In addition, underlying economic relationships in input- output models are assumed to remain constant; there are no changes in the productivity of labor and capital, and no changes in population migration or business location patterns.

3.3.2 Methods for Assessing Impacts to Development in Downtown Olympia

Stakeholders involved with various phases of long-term management planning for the Capitol Lake – Deschutes Estuary have expressed interest in understanding if changes in the characteristics of the waterbody could potentially influence commercial or residential development opportunities in downtown Olympia. Environmental and aesthetic amenities are among the factors that may affect demand for economic expansion and development. Changes in demand can affect the price and value of both current and future development opportunities. As a result, the action alternatives could increase, decrease, or have no effect on the value of downtown development. Two analytical strategies were pursued to help answer this question and identify potential impacts on development in downtown Olympia: a literature review, and a key-informant interview process, described in more detail above in Section 3.2.2.2.

The assessment of impacts to downtown development is qualitative, focusing on identifying the mechanism, direction, magnitude, timing and distribution of the effects by alternative. Using data from CoStar and previous studies of downtown Olympia, a baseline description of the No Action Alternative that includes expected future trends in markets for development without the project was assembled. Most of these data reflect pre-COVID conditions, or conditions present during the first quarter of 2020. The short-term effects of COVID and other events of 2020 are not fully reflected in data available as of the publication, and the long-term effects are still unknown. All relevant data will be revisited prior to publication of the DEIS to address the unusually dynamic and uncertain economic conditions currently present. The qualitative analysis of the action alternatives relies on conclusions drawn from literature and key-informant interviews to describe the likely effect each alternative would have on the expected trends in downtown development compared to the No Action Alternative.

3.3.2.1 Literature Review Methodology

A literature review was conducted to identify key findings in government publications and peer-reviewed literature relevant to assessing impacts of the action alternatives on the market for downtown development in Olympia. It focused on several key questions:

> *What does the literature say about the relationship between environmental amenities and residential development (influencing demand and price)? Do different types of environmental amenities or differences in quality of the amenity have different effects?*
>
> *What does the literature say about the relationship between environmental amenities and commercial development (influencing demand and price)? Do different types of environmental amenities or differences in quality of the amenity have different effects?*
>
> *How has access to estuarine environments in urban areas been designed, and does design have implications for public use, the value of the amenity, or the value of adjacent development?*

The literature review questions were designed to help clarify and validate the opinions and experiences of the interviewees with empirical evidence, where possible.

3.3.2.2 Key-Informant Interview Methodology

The data collection process was completed at the conclusion of the final interview. ECONorthwest staff then reviewed interview notes, compiled key themes from the interviews, and discussed findings internally among the staff who participated in the interviews. Conclusions were drawn based on consensus of the interviewers. One interview was conducted with an official in Tumwater, to verify the assumption of the original methodology that development impacts arising from action alternatives would be concentrated in downtown Olympia and would be unlikely to affect the market for development in Tumwater. This assumption was firmly supported by the results of that interview. This confirmational finding is reflected in the definition of the study area reported above.

3.3.3 Methods for Assessing Impacts to Recreation Demand and Value

Restoring active community use of the waterbody is a project goal. Water-based recreation opportunities are currently prohibited but are among the historic and potentially desired future conditions. Significant investment has occurred in parks and trails surrounding Capitol Lake that are enjoyed by both the local population and tourists. Assessing the economic dimensions of changes in recreational use involves describing the current and expected future demand and supply of recreation, both in the immediate study area, and in the larger study area of Thurston County where people who may use Capitol Lake spend their leisure time. The *Land Use, Shorelines, and Recreation Discipline Report* (ESA 2020c) addresses the action alternatives' effects on the supply of recreation in the study area, including temporary and permanent changes in the parks, trails, and access to primary water-related uses. This report expands on this analysis by describing the demand for these recreation facilities and the associated economic value to users and recreation-related spending in the region.

The assessment of impacts to recreational demand and value is primarily qualitative although quantitative data were developed to describe existing levels of demand for recreation. This information provides a general level of magnitude of demand and value for recreation associated with the Capitol Lake Basin, where none has existed prior to this study. However, the research team determined that these data were not precise enough to serve as the basis for providing quantitative analysis of impacts to future demand and value resulting from the alternatives. Instead, impacts are described qualitatively, focusing on identifying the mechanism, direction, magnitude, timing, duration, and distribution of the impact by alternative, rather than quantifying a specific monetary value of changes in use.

This analysis addresses how changes in the supply of recreation opportunities may affect overall demand and value, and how changes in supply may change the distribution of recreation activity within the study area.

3.3.4 Methods for Assessing Impacts to the Value of Ecosystem Services

Ecosystem services are generally categorized as provisioning, regulating, cultural, and supporting services. See Table 3.2 for examples of the types of ecosystem services that can be provided by lakes, rivers, and estuaries.

Table 3.2. Ecosystem Services from Lakes, Rivers, and Estuaries

Provisioning Services	Regulating Services	Cultural Services
The "products" obtained from ecosystems	Benefits obtained from the regulation of ecosystem processes	Nonmaterial benefits obtained from ecosystems
Food Habitat Fresh Water	Flood Regulation Climate Regulation Water Purification	Recreational Visual Aesthetic Spiritual Heritage Educational
Supporting Services		
Services necessary for the production of all other ecosystem services		
Nutrient Cycling Biodiversity Soil Formation		

Source: Created by ECONorthwest based on Millennium Ecosystem Assessment (2006).

This analysis focuses on six types of ecosystem services that could be affected by changes within the Capitol Lake Basin. A seventh ecosystem service, Recreation, is covered in its own section.

- Water quality regulation,
- Flood regulation,
- Habitat provision,

- Climate regulation,
- Visual aesthetics, and
- Cultural, heritage, spiritual, and education.

In some cases, the value of ecosystem services can be quantified in monetary terms. For example, estimates of the value of rivers and lakes in Puget Sound includes values for water supply, habitat, aesthetic and recreational values in the range of $117 to $33,080 per acre per year (Batker et al. 2008, 2022 dollars). The same study found the value of estuaries in Puget Sound ranged from $28 to $4,300 per acre per year (Batker et al. 2008, converted to 2022 dollars). Estimates of the monetary value of ecosystem services can be obtained using multiple types of methods. Estimates generally rely on either revealed preferences (i.e. observations of behavior in a marketplace) or stated preferences (i.e., information obtained from survey responses). However, it is not always appropriate to monetize ecosystem service values. For example, traditional monetary measures of economic importance are generally inappropriate to describe the value of cultural, spiritual, or heritage values. There may also be insufficient information available to proceed with monetization techniques.

The analysis employed in this report is primarily qualitative—i.e., it does not monetize the changes in ecosystem services affected by project actions. This result is primarily because of the lack of specific quantitative biophysical estimates of the changes in ecosystem services. For example, it is unknown exactly how many of each species would be impacted by changes in habitat conditions, or exactly how visitation would change due to changes in lake aesthetics. Instead, this analysis characterizes, to the extent data allow, the direction of change, magnitude of change, timing and duration of change, and the populations affected by the change.

3.4 SIGNIFICANCE CRITERIA

For this SEPA EIS, the project team is establishing clearly defined sets of criteria to assess the significance of potential adverse impacts, for those disciplines where it makes sense. The economic methodology (ECONorthwest 2019) introduced potential impact indicators to identify how action alternatives would produce impacts. It did not, however, identify specific criteria to determine whether an impact is significant.

Creating rigorous, logical significance criteria for economic impact analysis is challenging. Changes in economic values and patterns of spending rarely have unambiguous consequences that are clearly significant or not. The challenges are manifold, particularly when attempting to synthesize findings that are both quantitative and quantitative in nature or are primarily qualitative. Moreover, the assessment of significance must often be prefaced by the question of "from the perspective of whom?" Almost every economic impact would produce some winners—those who are better off than without the change—and some losers—those who are worse off than without the change.

For this reason, bright-line significance criteria are not used to describe potential impacts. Instead, the economic analysis offers a more contextual assessment of economic impacts. It describes how changes in management of the Capitol-Lake–Deschutes Estuary system will interact with the economy, across

multiple dimensions. The analysis is still grounded in a rigorous methodology and results are presented systematically. For each category of impact, the analysis addresses five factors: the direction of change (positive, negative, or neutral), the magnitude of change (to the extent it can be quantified or described qualitatively), the timing of the change (today or in the future), the duration of the change (temporary or permanent) and the distribution of the change across relevant populations.

4.0 Affected Environment

4.1 DOWNSTREAM ECONOMIC ACTIVITY

This section characterizes the current and expected future conditions related to population and the economy in Thurston County, Olympia, and Tumwater. It also describes the economic development patterns and economic activity located north of the 5th Avenue Dam, including historical, current, and expected future trends at the Port of Olympia. Data were compiled for the DEIS in 2020 and 2021 and reflect conditions present during the height of the COVID-19 pandemic and economic recession. Updates for the FEIS note general trends during the latter half of 2021 and first half of 2022 but do not comprehensively update the data. These updates provide context about the economic recovery, but future conditions remain uncertain as the response to the pandemic evolves and concerns about inflation grow. These evolving trends do not change the ability of this analysis to differentiate impacts and benefits across the alternatives.

4.1.1 Overview of the Regional Population and Economy

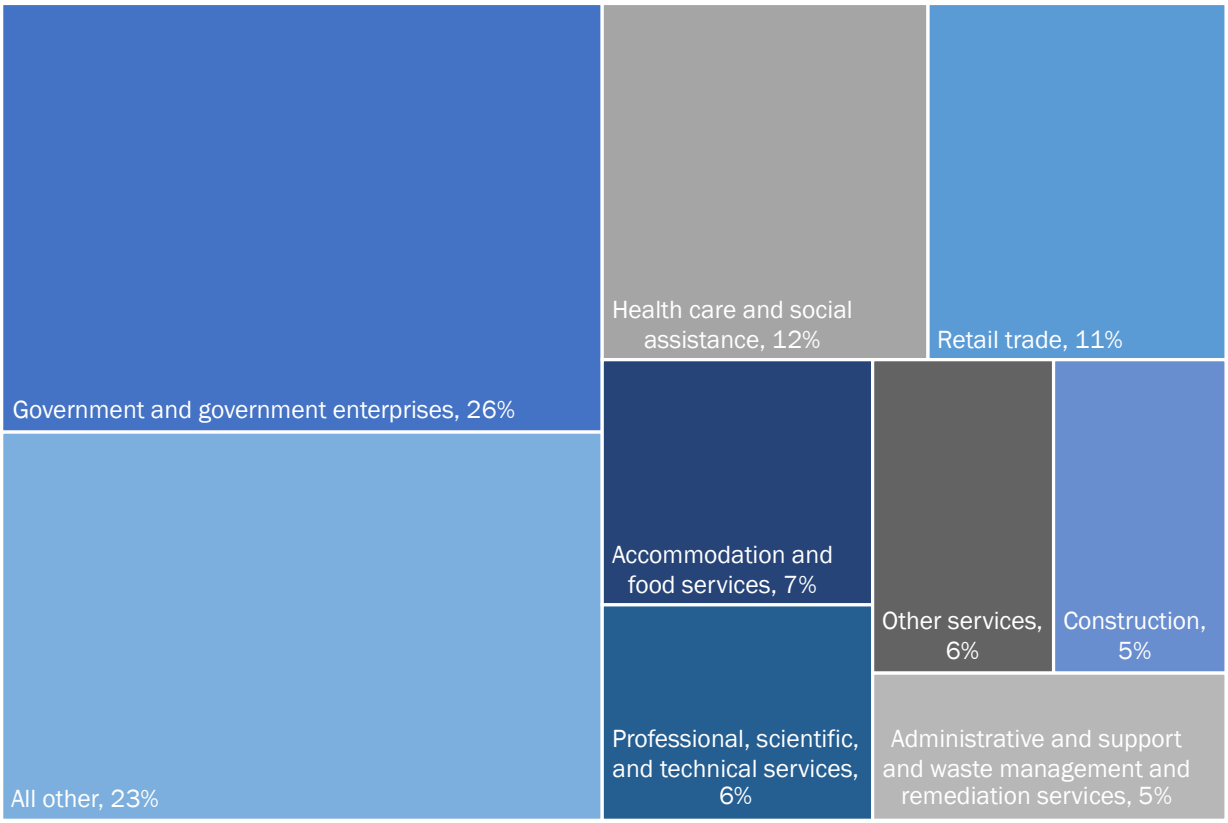
Throughout much of the 20th century, Thurston County's natural resources played an important role in the local economy. Sandstone and coal mining and lumber were the major industries through the 1920s; however, once Olympia was established as the capitol of Washington in 1927, employment in the government sector grew, eventually outpacing lumber industry employment in the 1950s (Vleming 2020). Decades later, the area's accommodation and food services and arts, entertainment, and recreation sectors grew with the passage of the Indian Gaming Regulatory Act (IGRA) under the Reagan administration. This legislation led to a gaming presence in the county (Washington State Gambling Commission 2020). In 1995, the Chehalis Tribe opened Lucky Eagle Casino followed by the Red Wind Casino opened by the Nisqually Tribe in 1997 (500 Nations 2020a and 2020b). Tribal casinos hold two positions in Thurston County's top five employers. Today, government at the local, state, and federal levels continues to be the county's largest source of employment.

In 2018, 154,519 people were employed (part time and full time) in Thurston County with the majority of employees (39,855) working in the government sector (U.S. Bureau of Economic Analysis 2018). The county's five largest private employers that year were Providence St. Peter Hospital (2,849 employees),

Safeway (1,024 employees), Walmart (1,002 employees), Nisqually Red Wind Casino (760 employees), and Lucky Eagle Casino (688 employees) (Thurston Regional Planning Council 2020a).

Figure 4.1 shows the major sectors and their share of employment in Thurston County. Aside from government, employment is heavily concentrated in health care and social assistance, retail, and accommodation and food services. "All other" includes any sector making up less than five percent of employment in Thurston County.

Figure 4.1 Employment by Sector in Thurston County



Source: ECONorthwest, with data from U.S. Bureau of Economic Analysis 2018

Note: "All other" sectors include: real estate and rental and leasing (4%); finance and insurance (3%); manufacturing (3%); transportation and warehousing (3%); arts, entertainment, and recreation (2%); educational services (2%); wholesale trade (2%); farm (1%); forestry, fishing, and related activities (1%); information (1%); management of companies and enterprises (1%); mining, quarrying, and oil and gas extraction (<1%); and utilities (<1%).

Population, Household, and Employment Forecasts

As part of the broader rapid population growth in the Puget Sound and existing residents seeking access to affordable housing, Thurston County's population increased by 9 percent between 2010 and 2018 (U.S. Census Bureau 2010b and 2018c). Much of that growth occurred in Lacey, which is adjacent to nearby military installations. Within the study region, Tumwater has seen the largest rate of growth (30 percent) as housing remains relatively affordable and the state of Washington recently opened new campuses to accommodate the state's public-sector workforce.

Table 4.1 Current Population and Population Change Between 2010 and 2018

Geographic Area	2010	2018	Percentage Change
Thurston County	252,264	274,684	9%
Olympia	46,478	50,836	9%
Tumwater	17,371	22,500	30%

Source: U.S. Census Bureau 2010b and 2018d

Looking ahead, the Washington State Office of Financial Management (OFM) estimates that Thurston County will continue to see population growth, increasing by 26 percent between 2020 and 2040, with an average annual growth rate of 1 percent (Washington Office of Financial Management 2017).

As it grows, Thurston County is becoming more ethnically and racially diverse (Thurston Regional Planning Council 2020b). A quarter of Thurston County residents identify as non-White followed by 23 percent of Olympia residents and 18 percent of residents in Tumwater (U.S. Census Bureau 2018a). Those who identified as either Hispanic/Latino or Asian alone made up the largest share of non-White residents in the study area (Table 4.2). Native American/Alaska Native populations comprised about 1 percent of the population in the study area.

Table 4.2 Race and Ethnicity, 2014-2018

Geographic Area	White Alone	Black or African American Alone	Asian Alone	Native American or Alaska Native Alone[1]	All Other Races Alone	Hispanic or Latino
Thurston County	75%	3%	6%	1%	6%	9%
Olympia	77%	3%	7%	1%	4%	8%
Tumwater	82%	2%	4%	< 1%	5%	7%

Source: U.S. Census Bureau, "Hispanic or Latino Origin by Race, 2018 5-Year Estimates," Table B03002, Accessed July 9, 2020. https://data.census.gov/cedsci/

Note: [1] Labeled in the Census as "American Indian or Alaska Native Alone"

Median household income (MHI) is calculated as the midpoint between the incomes for all households within the defined area. Tumwater and Thurston County have a higher MHI than Olympia, but the gap has narrowed in recent years. As Table 4.3 shows, adjusted for inflation, MHI in both Tumwater and Thurston County has decreased since 2010, while Olympia's MHI has increased by three percent over the last decade (U.S. Census Bureau 2010a and 2018b).

Table 4.3 Real Median Household Income (2018 Inflation-Adjusted Dollars)

Geographic Area	2010	2018	Percentage Change
Thurston County	$70,165	$69,592	-1%
Olympia	$56,958	$58,606	3%
Tumwater	$69,768	$65,167	-7%

Source: U.S. Census Bureau 2010a and 2018b

The federal poverty level (FPL) is an economic tool that is used to determine the eligibility status of individuals and families based on their income for certain government-subsidized benefits and programs. Consistent with its lower MHI, Olympia also has the highest share of residents living 50, 125, 150, and 200 percent of FPL, compared with Thurston County and Tumwater (Table 4.4).

Table 4.4 Poverty Status, 2014-2018

Geographic Area	50% of FPL	125% of FPL	150% of FPL	200% of FPL
Thurston County	5%	11%	16%	23%
Olympia	7%	21%	25%	33%
Tumwater	4%	13%	18%	24%

Source: U.S. Census Bureau 2018c

Employment Forecast by Industry

From 2010 to 2018, employment across all sectors in Thurston County grew by 20 percent (Table 4.5). The greatest increases were in transportation and warehousing (60 percent), administrative and support and waste management and remediation services (43 percent), information (41 percent), construction (41 percent), and mining, quarrying, and oil extraction (36 percent). The only sector to exhibit job losses over this time period was wholesale trade (-2 percent).

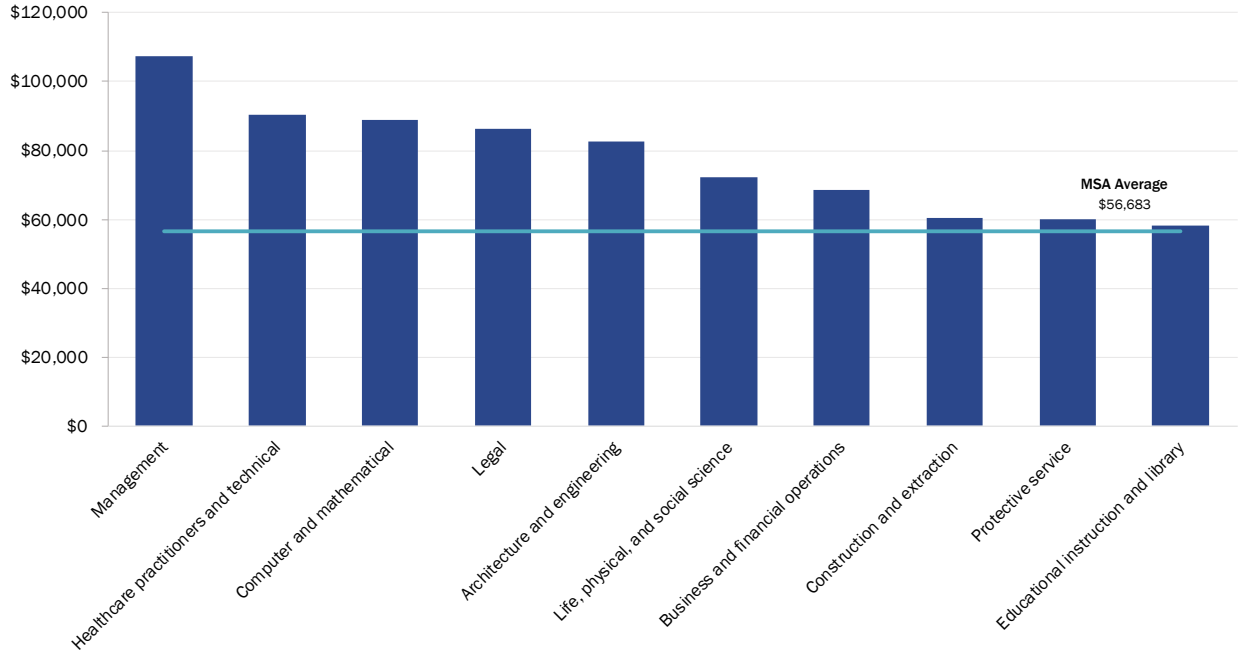
Table 4.5 Total Employment and Employment Trends, 2010 to 2018

Geographic Area	2010	2018	Percentage Change	Average Annual Growth Rate
Thurston County	128,661	154,519	20%	2%

Source: U.S. Bureau of Economic Analysis, "Regional Data GDP and Personal Income CAEMP25N Total Full-Time and Part-Time Employment by NAICS Industry (Number of Jobs), Thurston County," Accessed July 16, 2020. https://www.bea.gov/index.php/data

In 2019, Thurston County's average annual wage was $56,683. The industry with the highest average annual wage was management ($107,460) followed by healthcare practitioners and technical ($90,304), computer and mathematical ($88,844), legal ($86,339), and architecture and engineering ($82,666) (U.S. Bureau of Labor Statistics 2019 and U.S. Office of Personnel Management 2020).

Figure 4.2 Average Occupational Wage by Top 10 Occupational Groups, Olympia-Tumwater MSA



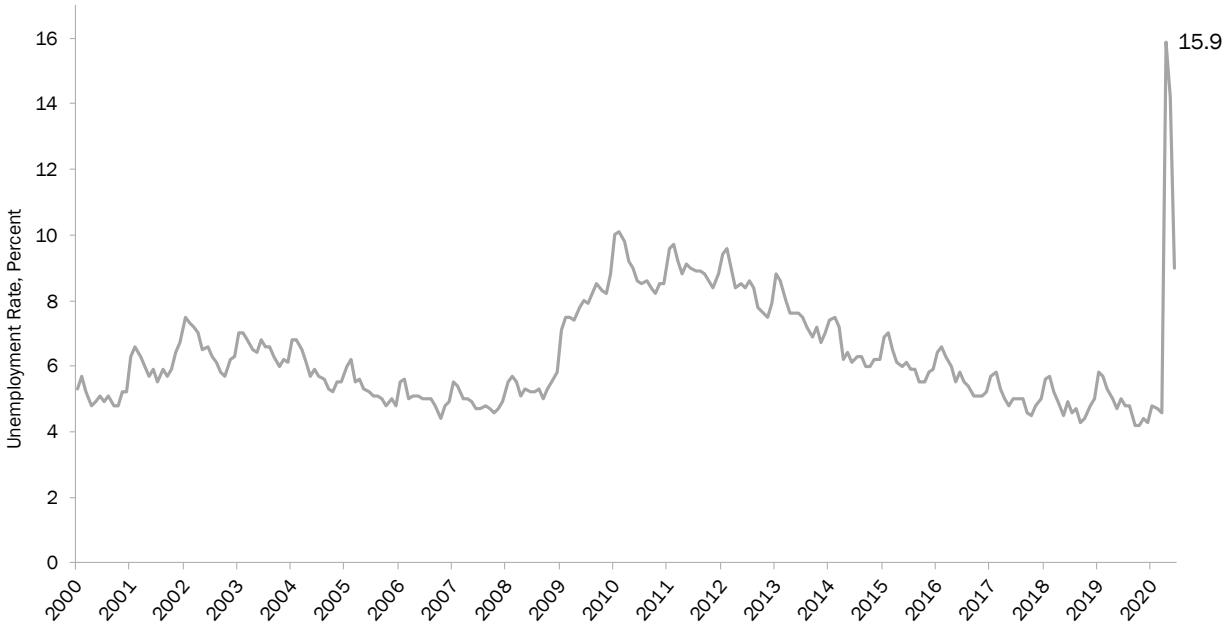
Source: ECONorthwest, with data from U.S. Bureau of Labor Statistics 2019

Note: Average occupational wage for the Olympia-Tumwater MSA ($56,683) is depicted as a teal line. The average wage was calculated by using the hourly wage estimated by the Bureau of Labor Statistics by the number of hours worked by the Washington State Office of Personnel Management for the most recent calendar year.

Unemployment in the study region tends to follow the statewide trend, but experiences less dramatic swings, largely due to a robust workforce in healthcare and public administration. Throughout 2019, the annual average unemployment rate for Olympia was 4.6 percent and 4.9 percent in Thurston County. Since 2012, the average annual unemployment rate in Thurston County has exceeded the statewide average. It is only in recent years (since 2016) that Olympia's average annual unemployment rate is greater than Washington's.

The COVID-19 pandemic has had a dramatic effect on the region's local labor force, impacting businesses and employees across almost all sectors. The shock to the national and regional labor force was well outside historical averages (Figure 4.3). By July 2022 employment fully recovered and is above pre-pandemic levels; Olympia's unemployment rate is at 4.4 percent, below pre-pandemic levels (U.S. Bureau of Labor Statistics 2022, Washington Economic and Revenue Forecast Council 2022).

Figure 4.3 Unemployment, Olympia-Tumwater MSA, 2000 to May 2020

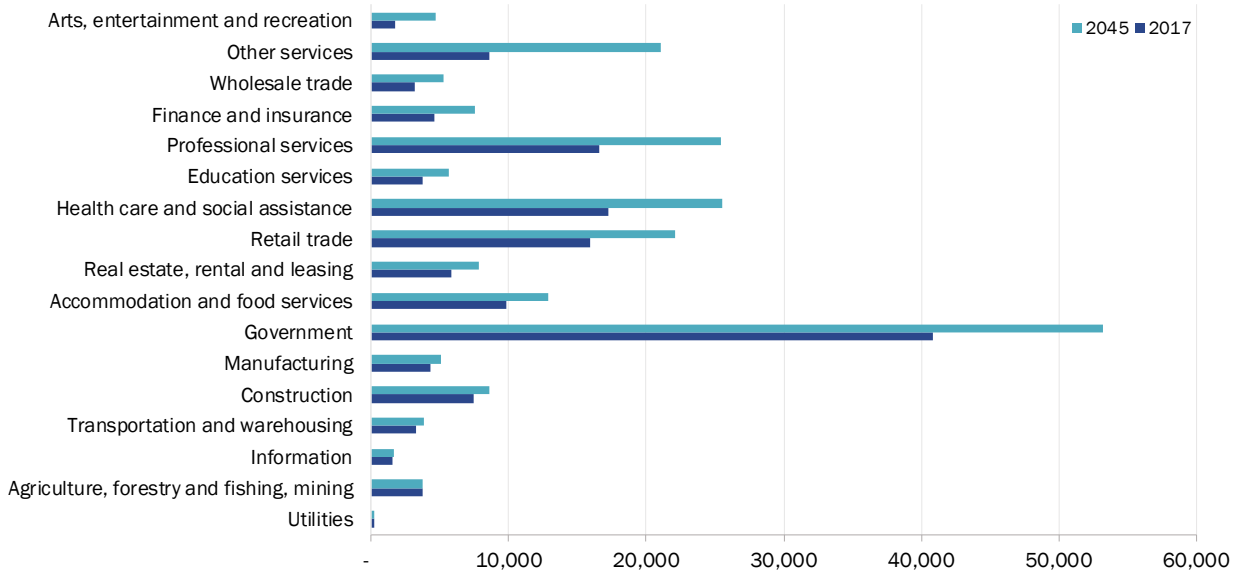


Source: ECONorthwest, with data from U.S. Bureau of Labor Statistics 2020

Note for Final Revision: As of May 2022 the seasonally-adjusted unemployment rate for the Olympia-Tumwater, WA MSA was 4.4%

The employment forecast for Thurston County through 2045 suggests that government will remain the largest employment sector, followed by healthcare and social assistance, professional services, and retail trade. This is largely consistent with the sector's importance today. The sector expected to grow the most between 2017 and 2045 is arts, entertainment, and recreation, which may more than double, although it remains a small proportion of county employment despite the growth. "Other services," which is a catch-all category that covers a wide range of service businesses, including machinery repairing, religious activities, dry-cleaning and laundry, personal care services, and pet care, is also expected to grow substantially, likely in part driven by expected steady growth in residential populations and household income (Thurston Regional Planning Council 2019).

Figure 4.4 Employment Forecast for Thurston County, 2017 to 2045



Source: ECONorthwest, with data from Thurston Regional Planning Council 2019

Note: Industries ordered by expected growth rate

4.1.2 Economic Activity North of the 5th Avenue Dam

Established nearly 100 years ago, the Port of Olympia has been an economic development resource for the surrounding local economy (Port of Olympia 2019). The primary source of the Port's funding is derived from operational revenues (e.g., cargo handling, leases). The Port also receives financial support through a $6.2 million tax levy (or $55-$60 annually per household). In addition to the Port of Olympia, economic development adjacent to West Bay of Budd Inlet (show in Figure 3.1) includes:

- **NorthPoint**, an area of restaurants and views of Puget Sound;
- **The Market District**, retail and commercial establishments, the centerpiece of which is the popular year-round Olympia Farmer's Market;
- **Private Marinas**, a group of three privately-owned marinas (Martin Marina, One Tree Island Marina, and Fiddlehead Marina) adjacent to Percival Landing Park;
- **The Olympia Yacht Club**, a private organization offering moorage opportunities to members, sailing education programs in partnership with Olympia Parks, Arts and Recreation, and other activities;
- **West Bay Tidelands**, the western shoreline of West Bay, which is undeveloped and has been the subject of habitat restoration and recreational planning efforts over the past several years.

Port of Olympia

In 2014, the Port of Olympia's marine terminal, marina, general aviation activity, and real estate tenants supported $106.1 million in direct wages and 2,400 jobs with an average salary of $44,204. Approximately 89 percent of the direct jobs were held by Thurston County residents. In addition to this, the Port was responsible for 1,168 induced jobs and $90.3 million in purchases of local supplies and services from firms providing direct services to the Port. Individuals directly employed by the Port generated $90.6 million in induced wages and local expenditures while local businesses generated $287.7 million in revenue. During this same year, the Port was responsible for $22.2 million in state and local tax revenue (Martin Associates 2014).

Marine Terminal

The Port of Olympia has a 66-acre marine terminal that contains a cargo facility for breakbulk, bulk, and roll-on / roll-off ("ro-ro") goods, a U.S. Customs bonded warehouse, rail service from Union Pacific and BNSF with an on-dock rail loop, three deep water berths, and other industry-related resources (e.g., truck scales, a heavy-left mobile harbor crane) (Port of Olympia 2017a).

The Port of Olympia is a niche and bulk port specializing in the management of irregularly shaped or sensitive cargo. The Port's exports are heavily concentrated in timber and raw wood products that are shipped to China, Japan, and South Korea as well as livestock to Vietnam. Because of its breakbulk storage layout and proximity to several tree farms, the Port has a comparative advantage in handling timber products, which serve as its chief export. In 2017, timber exports from the Port of Olympia provided 171 longshore jobs per ship (Port of Olympia 2017b; One job is equivalent to an 8-hour longshore day).

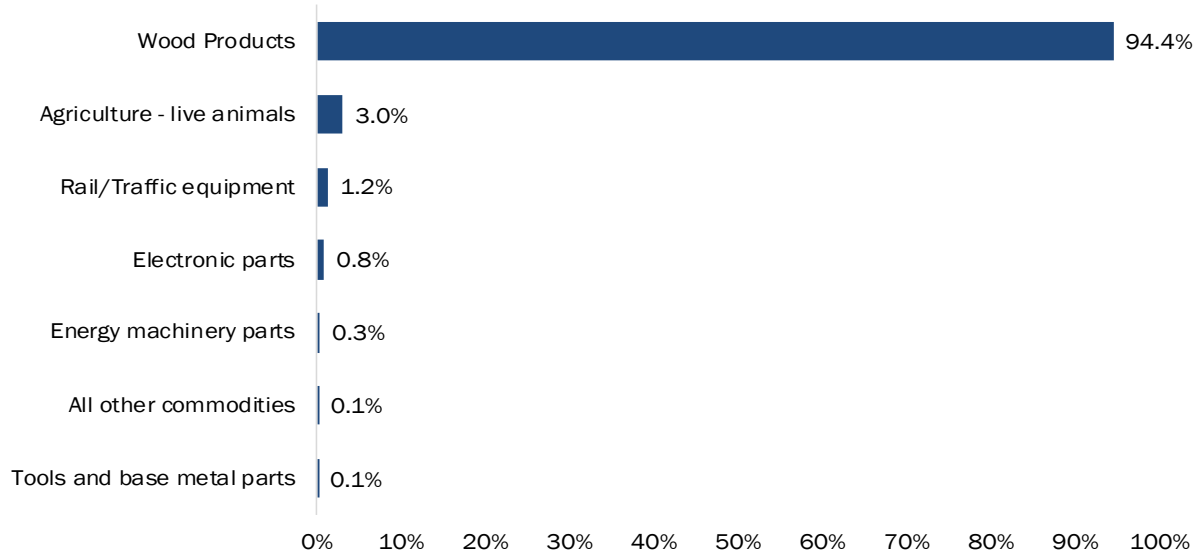
Despite the industry's important role in both the regional and state economies, timber has recently been subjected to political volatility stemming from the nation's trade conflict with China. In 2019, hardwood exports to China—the world's largest purchaser of wood—fell, triggering layoffs and closures of lumber mills (Campbell 2019; Olick 2019). Recently, Chinese log exports have decreased and are not expected to recover quickly as construction is largely driven by government expenditures to support demand (Perkowski 2020).

Behind timber, cattle are the second-largest export from the Port of Olympia. Beginning in 2015, the Port began shipping cattle transported from California, Washington, and Idaho to Vietnam under the supervision of the United States Department of Agriculture (USDA) (Port of Olympia 2017b). The arrangement was made in an effort to diversify the Port's cargo and help Vietnam address childhood malnutrition through its "glass of milk per child per day" program (American Shipper Staff 2017). The Port's past experience in handling complex shipping arrangements and sensitive cargo gives it a comparative advantage in managing the many steps involved in shipping cattle (e.g., veterinary inspections, feed transportation, safety measures to prevent manure from contaminating local waterways). In 2017, cattle exports provided 64 longshore jobs per ship (Port of Olympia 2017b).

The Port is also responsible for handling military cargo imports and exports because of its economies of scale of longshore labor and proximity to Joint Base Lewis-McChord (JBLM). The Port works with military logistics personnel to ensure the safe handling of sensitive cargo, which provided 535 longshore jobs per ship in 2017 (Port of Olympia 2017b).

In addition to military equipment, the Port of Olympia imports gold ore from Europe, heavy-lift cargo from Asia, windmill blades from Brazil, ceramic proppant from China,[5] organic grain from Turkey, and automobiles from Asia and other manufacturing plants in the United States. Following military cargo, gold ore provides the largest number of longshore jobs per ship (472) (Port of Olympia 2017b).

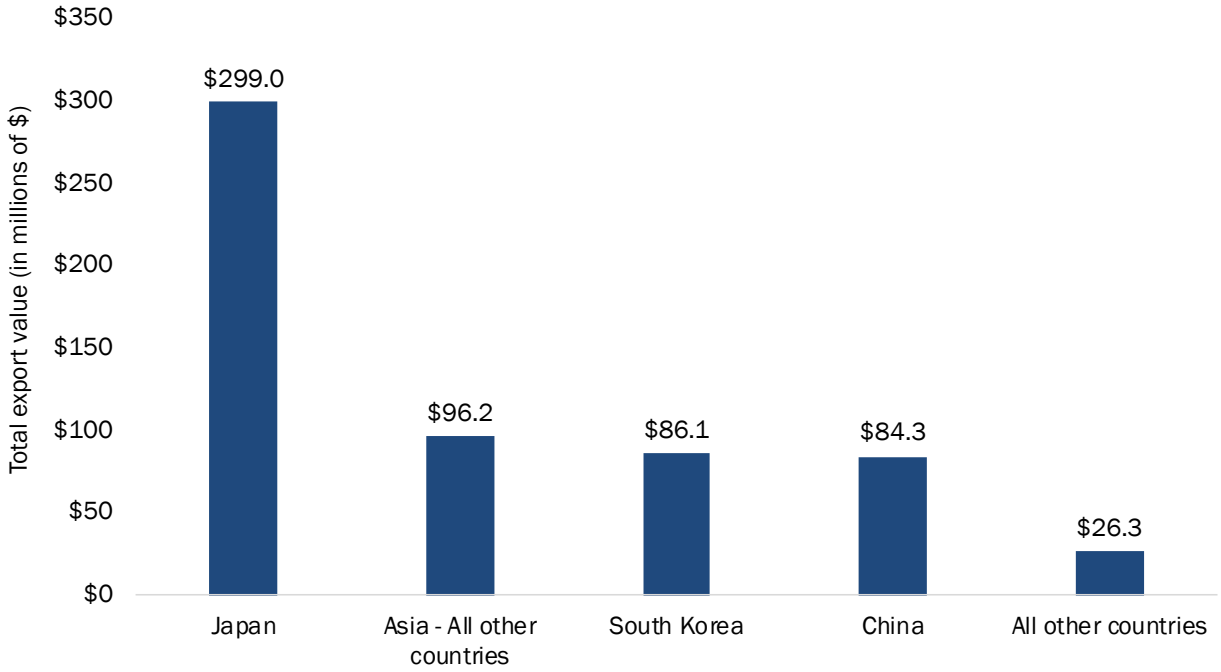
Figure 4.5 Distribution of Export Commodities for the Port of Olympia (Export Value, All Directions)



Source: ECONorthwest, with data from U.S. Census Bureau 2019

[5] Ceramic proppant is a solid material used in hydraulic fracturing.

Figure 4.6 Top Export Countries for the Port of Olympia



Source: ECONorthwest, with data from U.S. Census Bureau 2019

NorthPoint

NorthPoint is located on the northernmost edge of the Port peninsula and features views of the Olympic Mountains and the Budd Inlet (Port of Olympia 2020a). Formerly an industrial site, the Port of Olympia and Ecology restored the area in 2006 (Port of Olympia 2017a). NorthPoint offers dining at Anthony's Hearthfire Grill, one of the waterfront locations of Anthony's Restaurants, a locally owned and operated chain throughout the Pacific Northwest (Anthony's Restaurant Group 2020).

Market District

The Market District was established as a transition point from the marine terminal to downtown Olympia. Consisting of 17 acres of development, the area hosts a variety of commercial and retail businesses including a wholesale coffee roaster and fine dining restaurants and offers public access to the waterfront. The Port Plaza is the Market District's outdoor events space available for both public and private gatherings. Additionally, the district hosts the second-largest farmers market in the state (Port of Olympia 2020b, 2020c).

Private Marinas

Three privately-owned marinas are located adjacent to Percival Landing Park, which spans the east shore of West Bay from the Port of Olympia's marine terminals to Heritage Park. They operate under long-term leases with the Department of Natural Resources (DNR).

- **Martin Marina** was developed in 1979 and acquired by current ownership in 2021 for $1.875M (Thurston County Assessor 2022). It provides leased moorage at 85 slips, with 8 permitted

liveaboard occupancy. Data provided by the marina but not independently verified suggests its owners spend about $225,000 per year on payroll, its government lease, taxes, insurance, and purchasing services and supplies. Its owners anticipate investing $1.2M in improvements over the next 10 years for piling and dock replacements, bank armoring, and maintenance dredging.

- **Fiddlehead Marina** was redeveloped in its current location in 1981; its current owners purchased it in 2020 for $1.9M (Thurston County Assessor 2022). It provides leased moorage at 80 slips, with 16 permitted liveaboard occupancy. Data provided by the marina but not independently verified suggests its owners spend about $350,000 per year on payroll, its government lease, taxes, insurance, and purchasing services and supplies. Its owners anticipate investing $1.5M in improvements over the next 10 years for piling and dock replacements, bank armoring, and maintenance dredging.
- **One Tree Island Marina,** the smallest of the three private marinas, provides 50 slips and spends at least $50,000 on payroll, its government lease, taxes, insurance, and purchasing services and supplies.

The next closest marina outside of West Bay is the Port-operated Swantown Marina in East Bay. At 650 leased slips and 70 guest slips, it is one of the largest marinas in Puget Sound. It serves as a regional center for boating services including repair, maintenance, and storage. It is the nearest fuel facility to the marinas in West Bay (Port of Olympia 2020d). Demand for permanent moorage at Swantown is strong and the marina maintains a waitlist. Demand is highest for slips over 50 feet, with a waitlist of between 5 and 8 years. The waitlist for smaller slips (30 feet and shorter) is about 6 months.

Swantown maintains temporary guest moorage (short term and day use) for vessels up to 200 feet at Port Plaza in West Bay, just south of the Port of Olympia. Temporary moorage is also available at Percival Landing, which the City of Olympia maintains under a DNR lease.

Recreational boaters who lease slips at the private marinas have their own economic footprint in the region and the state. In addition to generating revenue for the marinas through moorage payments, they spend money on boating equipment, fuel, and boat maintenance. According to the National Marine Manufacturer's Association, recreational boating in Washington in 2018 supported 1,232 jobs and 63 businesses in Washington's 10th Congressional District, which includes Olympia (National Marine Manufacturer's Association 2019).

Olympia Yacht Club

Established at its current location in 1904,[6] the Olympia Yacht Club (Yacht Club) is the oldest yacht club in Washington (Olympia Yacht Club 2020a). It provides 238 moorage slips for its members, with 13 permitted liveaboard occupancy. OYC amenities are accessible by membership and in 2021 had 480 adult members and 6 junior members. In addition to moorage access, the club offers a sailing education program along with private lessons and hosts a variety of social events (Olympia Yacht Club 2020b). Approximately one third of marina visitors come with organized yacht club bookings at about 20 visits

[6] The OYC was incorporated in 1904. From 1904 to 1915 OYC was known as the Boat and Rowing Club of Olympia.

per year (Wilkins, Broman, and Bucove 2018). Data provided by OYC but not independently verified suggests it currently employs 4 full-time staff and 17 part-time staff and spends about $1M per year on payroll, its government lease, taxes, insurance, and purchasing services and supplies.

OYC provides exclusive benefits to its members, but also offers opportunities for the larger community. The Sailing Education Program offered through Olympia Parks, Arts, and Recreation reaches several hundred community members each year and supports youth race teams. It engages with specific communities through various events each year and provides grants to non-profit organizations in Olympia.

West Bay Tidelands

In 2016, the Port, the City of Olympia, and the Squaxin Tribe evaluated environmental restoration opportunities for the West Bay tidelands with a focus on water quality strategies and habitat restoration (Coast & Harbor Engineering 2016). Additionally, the assessment identifies potential development opportunities for recreation in the lagoon located south of the park as well as at West Bay Park. The objective of the restoration is to improve the ecological functioning of West Bay by connecting restoration sites that promote natural coastal processes while the recreational opportunities would support public use of the shoreline. Ongoing restoration and recreation development activities have the potential to generate employment opportunities and enhance recreational use and spending in the local area.

4.2 DOWNTOWN DEVELOPMENT

This section characterizes the existing conditions within the downtown-development study area and describes the factors that could be impacted by the construction and operation of the long-term management alternatives. Specifically, this section looks at the current and expected trends that could affect the demand for and supply of residential and commercial real estate in downtown Olympia over the next 30 years, and how those trends might be impacted by the management alternatives. Data were compiled for the Draft EIS in 2020 and 2021 and reflect conditions present during the height of the COVID-19 pandemic and economic recession. Updates for the Final EIS note general trends during the latter half of 2021 and first half of 2022 but do not comprehensively update the data. These updates provide context about the economic recovery, but future conditions remain uncertain as the response to the pandemic evolves and concerns about inflation grow.

The downtown Olympia study area covers about 0.5 square miles in Thurston County. The area sits east of the northernmost portion of Capitol Lake and extends north into the Budd Inlet on a peninsula. More than 450 local businesses and 1,900 residents are located here (City of Olympia 2020). Its main attractions include waterfront activities, a farmer's market near the waterfront, various dining and retail options between the State Capitol Building and the farmer's market, a children's museum, multiple theaters, and a Creative District that supports artists and cultural venues. Future development is supported by City planning efforts, including the 2017 Downtown Strategy that aims to absorb 25 percent, or about 5,000 residents, of Olympia's population growth over the next 20 years (City of Olympia 2017). The City plans for a walkable, family-friendly neighborhood with a mix of urban housing

options. In recent years (as of 2017), more than $180 million of public and private money has been invested into development and redevelopment in downtown Olympia.

The following subsections discuss factors that are relevant for measuring impacts to development in the downtown area. These factors are all directly related to the supply of and demand for development, and therefore drive key development decisions and the financial feasibility of new construction.

Overall, the existing buildings in downtown Olympia have low vacancies and their rents have been rising since 2013. The factors that drive these trends are largely unrelated to the management of Capitol Lake. In the multifamily residential market, younger workers and retired or nearly retired populations create new residential demand as they seek an alternative to more costly cities along the I-5 corridor. Residential and commercial growth are intrinsically tied. People will consider the level and types of current retail activities in downtown Olympia before moving there. Population growth and additional housing projects will, in turn, increase the demand for supporting retail activities like grocery stores, restaurants, and gas stations. The presence of more local residents in a walkable neighborhood will also generate more foot traffic for other types of retail stores. New residents can also make up part of the workforce that will attract new office tenants. If the population in downtown Olympia grows as planned, there will be a greater demand for commercial spaces. But, to attract new residents, sufficient levels and types of supporting retail activities must accompany the new apartments. Because of Olympia's tourism and recreation-based economy, retail tenants rely on not only local shoppers and workers but also visitors who come because of local attractions.

Growth in downtown Olympia is also driven by its amenities and attractions. In addition to retail, new residents will look for quality-of-life factors, such as availability of open spaces, recreational access, environmental amenities, public safety, access to public transportation or highways, access to high-speed internet, and cost of living, including rent. Attractions in downtown Olympia are not limited to the Capitol Lake. They include waterfront activities and boating; views of the Puget Sound, the State Capitol Building, and Mount Rainier; a farmer's market; a children's museum; and various performance and cultural venues.

Economic disruptions caused by recent protests, challenges with homelessness, and the COVID-19 pandemic have had negative impacts on some retail activities downtown. If conditions persist, it may lead to structural changes in economic and market conditions. It is too early to project whether and how these structural changes in the downtown development market might materialize. Market signals in 2022 indicate a recovering retail market in downtown Olympia, but early signs of a deteriorating market for office space. Economic conditions impacting these markets remain uncertain and will continue to evolve.

4.2.1 Trends in Residential Development

Demand for and the supply of high-density, residential development is increasing in downtown Olympia. This demand is largely driven by regional population growth, both in Thurston County and north and south along the I-5 corridor. The City is planning for more than 5,000 residents to move to downtown Olympia over the next 20 years, more than tripling the current number of residents and housing units. Only 4 percent of Olympia's residents currently live in downtown Olympia, but the plan would increase that to 10 percent. For downtown Olympia to attract this share of regional growth, it

must maintain and enhance its amenities and provide retail and other services that residents will want nearby. New developments are likely to be located within walking distance to downtown amenities, such as Percival Landing, Heritage Park, and the waterfront along the East Bay of Budd Inlet. To accommodate the planned residential growth, there are likely to be more three-story multifamily buildings and mixed-use buildings reaching six or seven stories.

Historically, much of the residential development has been subsidized affordable housing or other lower rent residential development (Property Counselors 2016). While new construction does not follow this trend, the current rent and income levels reflect the presence of rent-restricted units. Rent-restricted and publicly subsidized units are likely to remain affordable over time, creating an opportunity for a mixed-income urban residential market.

4.2.1.1 Rent and Vacancy

As in most urban downtown environments, multifamily units (apartments and condominiums) dominate the housing market in downtown Olympia. The multifamily housing market in downtown Olympia had reached a new high by the end of 2019. Vacancy rates and average rents shown in Table 4.6 reflect pre-pandemic and early pandemic data. The COVID-19 pandemic temporarily upended the multifamily market and caused vacancies to rise (to 7.4% in Downtown Olympia, 4.6% in the City of Olympia, and 5.9% in Thurston County). However, the return of demand for housing in Olympia and insufficient supply have resulted in declining vacancy rates (2.6% in Downtown Olympia, 2.5% in the City of Olympia, and 3.2% in Thurston County in 2022). Meanwhile, rents have accelerated since the beginning of 2020 to an all-time high ($1,456 in downtown, $1,503 in city, $1,562 in county).

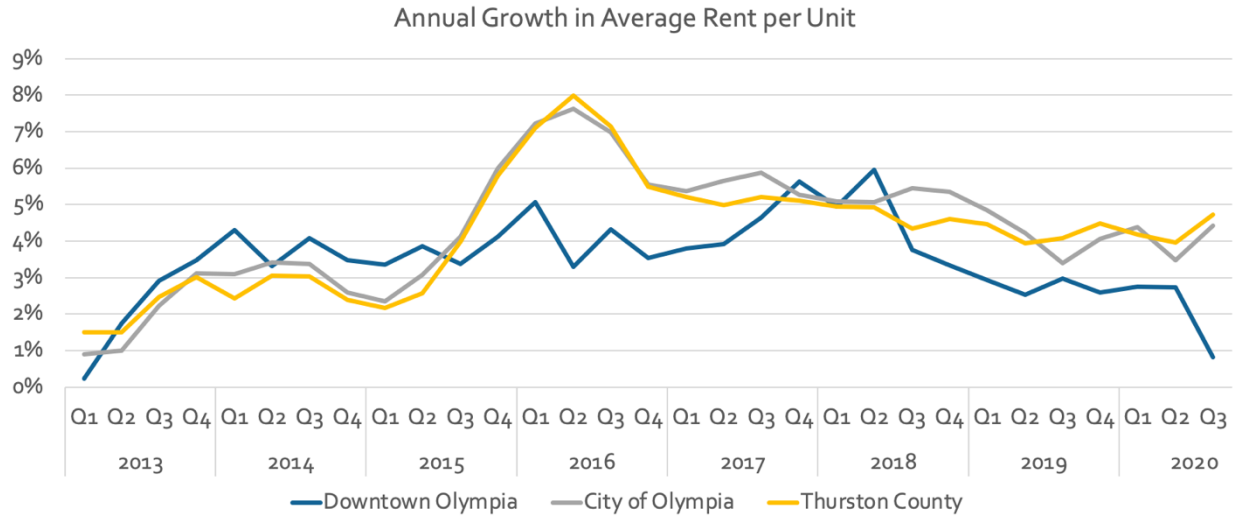
Table 4.6 Multifamily Rent and Vacancy in Downtown Olympia and Comparison Areas

		Multifamily	
		2019 Q4	2020 Q3
Downtown Olympia	Average Rent per Unit	$1,113	$1,116
	Average Rent PSF	$1.79	$1.79
	Average Vacancy	4.5%	10.9%*
City of Olympia	Average Rent per Unit	$1,228	$1,273
	Average Rent PSF	$1.47	$1.52
	Average Vacancy	3.6%	4.0%
Thurston County	Average Rent per Unit	$1,260	$1,309
	Average Rent PSF	$1.49	$1.55
	Average Vacancy	3.9%	4.8%

Note: * Multifamily vacancy in downtown Olympia was 5.0% before 140 new units became available.
Source: CoStar

For comparison, vacancies in the City of Olympia and Thurston County have followed a similar pattern. They have fallen since 2013 but rose slightly in recent months. Rents, on the other hand, have continued to grow in recent months, increasing the gap in rent per unit compared to downtown Olympia. Additionally, the growth in rent per unit has been higher in the two comparison areas. Annual rent growth in the City of Olympia and Thurston County peaked at about 8 percent in 2016 and stayed above 5 percent through 2017, whereas the annual rent growth in downtown Olympia never exceeded 6 percent (see Figure 4.7).

Figure 4.7 Multifamily Rent per Unit Annual Growth



Source: ECONorthwest, with data from CoStar

A key difference between the multifamily market in downtown Olympia and its two comparison areas is unit size. On average, multifamily unit size in downtown Olympia is about 680 square feet (sf), which is the size of a small one-bedroom apartment. In the two comparison areas, the average unit size is about 850 sf, reflecting not only larger unit sizes but also the presence of more three-bedroom units. Due to this size difference, the average rent per unit in downtown Olympia is 12 to 15 percent lower than in the City of Olympia and Thurston County. But, the average rent per square foot (psf) is about 15 percent to 18 percent higher in downtown Olympia. Moreover, the average rents in downtown Olympia likely mask the difference between new units with relatively high rents and affordable units with subsidized rents.

The smaller unit sizes in downtown Olympia reflect the preference among smaller households to live in urban, mixed-use neighborhoods. Developers identified most residents in the downtown area as either young, working professionals or seniors looking for a simplified lifestyle with access to urban amenities within walking distance.

4.2.1.2 Construction and Leasing Activities

The City has focused on attracting private development to downtown Olympia, leading to a considerable amount of newly constructed residential units in recent years. Over 220 units were

delivered in 2016, 90 more units were delivered in 2018 and 2019, and more than 200 units were under construction in the beginning of 2020. Moreover, the *Downtown Strategy* records 9 residential projects that are underway or were recently completed. They include an affordable housing project and are mostly mixed-use properties. As of 2019, 3 other mixed-use developments were under consideration. The City expects its planning effort will result in 2,500 to 3,500 new residences over the next twenty years (City of Olympia 2017).

Harbor Heights is one of the newly opened residential buildings in downtown Olympia that caters to residents 55 years and up. Located on top of retail uses in 500 Columbia Place, the building offers luxury units with views of the marina and the bay and easy access to the local farmer's market. The rent for Harbor Height's one- and two-bedroom units range from $2,000 to $3,000. The Easterly (at 909 Eastside Street SE) is one of the new properties currently under construction. Its one-bedroom units will be available at $1,525 to $1,575 per unit, and its two-bedroom units will be available at $1,900 to $1,975 per unit. New one-bedroom units at 215 Columbia Street NW are in a mixed-use building and will rent at $1,400. Other newly constructed apartments on 5th Avenue have studios renting at about $1,050 to $1,250 a month.

These new developments illustrate a recent trend toward increased construction and leasing activities in downtown Olympia. The inventory of units in downtown Olympia grew by about 40 percent over the last five years, whereas the inventory of units in the City of Olympia and Thurston County grew by 19 percent and 17 percent, respectively, over the same time period. This is a reversal of the trend preceding the Great Recession. Between 2002 and 2007, the number of units grew by only 5 percent in downtown Olympia and 8 percent in the two comparison areas.

If the current trend continues, downtown Olympia is likely to gain about 100 units per year, on average. However, the City is planning for sustained and increasing growth, and developers seem to be responding, recognizing the area has been underdeveloped for some time and there is a lot of unmet market demand for residential units downtown. Based on current patterns in multifamily construction, many units are likely to be in mixed-use buildings with retail on the street level, highlighting downtown amenities, such as views of Puget Sound, nearby restaurants, and parks like Percival Landing. These buildings tend to have four or five stories of residential uses above ground floor retail and structured parking. Residential-only buildings are likely to be located near the mixed-use buildings or other retail uses and reach up to three floors.

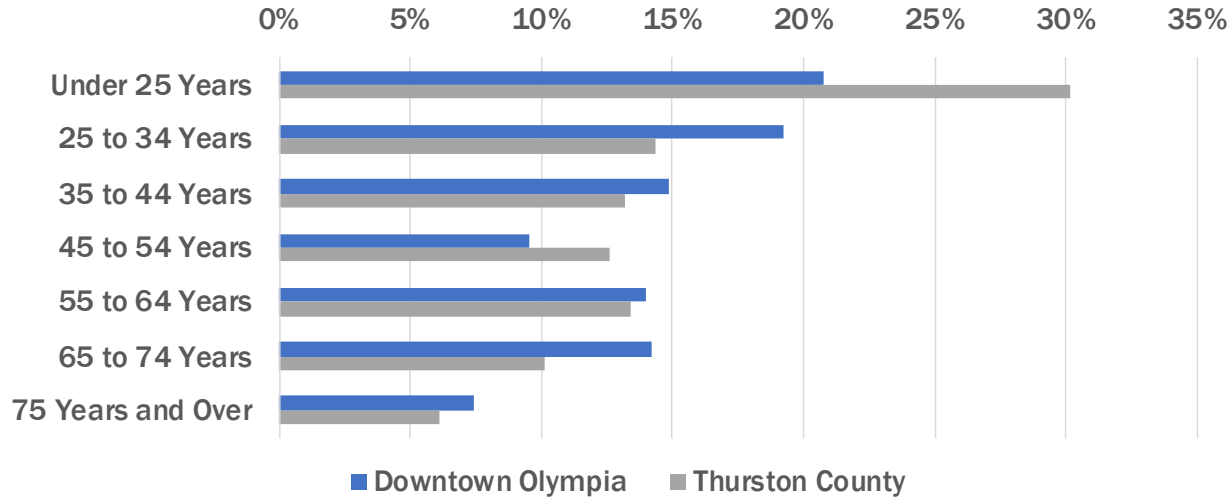
4.2.1.3 Population Growth and Household Income

Regional population growth will be the primary driver of growth in downtown Olympia. Thurston County is expected to gain over 76,000 new residents over the next 20 years, and 20,000 are expected to be located in Olympia. Given that the current population in the county is more than five times larger than the population in Olympia, population density in Olympia will grow much faster. As a result, there will be a considerable change in downtown Olympia and its adjacent residential neighborhood in South Capitol since only about 3,300 people currently live there and the population grew by only 4.3 percent over the past 8 years (U.S. Census Bureau, 2014-2018). For downtown Olympia to attract a

disproportionately large share of regional growth, it will need to maintain and enhance its amenities and enable new development.

The City plans encourage more of the City's growth in the downtown area. Developers, planners, and economic development professionals believe downtown Olympia offers a lower-cost alternative to larger, more expensive regional metropolitan areas like Seattle and Portland and cite the rise of remote work options as a potential factor for population growth. In addition, downtown Olympia is also more attractive to younger workers and retired or nearly retired population. The share of people between 25 and 34 years old and between 65 and 74 years old are much greater in downtown Olympia relative to Thurston County.

Figure 4.8 Population by Age in Downtown Olympia and Thurston County



Source: ECONorthwest, with data from U.S. Census Bureau, "Age and Sex, 2018 5-Year Estimates," Table S0101, Accessed October 9, 2020.

Households in downtown Olympia have varying levels of income. The median household income for younger households whose householders are between 25 and 44 years old is $53,100. The median household income for older households whose householders are older than 65 years is only $26,300. Moreover, half of residents in Olympia live within 150 percent of the federal poverty level (FPL) (U.S. Census Bureau, 2014-2018). (For a more complete population and income analysis, see Section 4.1.1).

Given the differences in incomes across various groups, residential growth in downtown Olympia is likely to be comprised of both new, market-rate properties and new affordable, low-income housing options. Planners and economic development professionals familiar with development in the downtown area discussed the need for housing options at all income levels, especially for lower-income families. These households are sensitive to displacement as more middle and higher-income housing units are built.

4.2.2 Trends in Commercial Development

Commercial development in downtown Olympia has experienced steady growth despite the increasing prevalence of visible homelessness and has the potential to continue increasing barring further business shutdowns associated with COVID-19 and protests near the State Capitol.

4.2.2.1 Rent and Vacancy

Similar to the multifamily residential market, retail and office markets in downtown Olympia became more competitive in the past six years. Retail rents (psf) steadily rose by 2 percent to 3 percent per year to $13.88 and retail vacancies have fallen to 0.7 percent in 2020 (see Table 4.7). Similarly, office rents have steadily risen by 2 percent to 5 percent per year to $19.57 and office vacancies have fallen to 1.9 percent in 2020. The growth persisted even as sheltered homelessness grew and more tents were pitched, which has generated pushback from the business community (Greenstone and James 2020).

Retail rents and vacancies reversed course during 2020 due to the impacts of COVID-19, but have recovered. Vacancies in Downtown Olympia peaked at 3.5% during 2020 and are back to about 1% in 2022. Rents are at an all-time high of $17.78. The office market was never materially impacted during the pandemic but started to show signs of deterioration: vacancies increased and rents decreased in July 2022. The retail market likely experienced a more immediate impact as office workers switched to remote work options and tourism dried up. The office market was slower to respond because office tenants tend to be more stable and many of the tenants in downtown Olympia are government sector, more directly tied to the Capitol. While more data is needed to confirm whether there is a definitive change in the market dynamics, the delayed response in the office market is not surprising because lease contracts last multiple years and vacancies by existing tenants would not have showed up immediately during the COVID-19 pandemic. In the long run, the future demand for retail and office space is also tied to Olympia's population growth.

Rents and vacancies in Olympia and Thurston County have followed a similar pattern. Rents have risen and vacancies have fallen since 2014, but the retail market has been negatively impacted by COVID-19. Retail rents fell and vacancies began to rise in 2020. In 2022 Vacancies are back down to about 2% and rents are at an all-time high ($21.32 for city, $22.75 for county). A key difference between downtown Olympia and the two comparison areas is that both rents and vacancies are lower in the downtown area. Lower vacancies suggest insufficient development activity. Office rents in downtown Olympia are only about 2 percent lower than in the comparison areas. Pre-pandemic, retail rents in the downtown area were 12 percent lower than in Olympia and 7 percent lower than in Thurston County, indicating that the retail market in downtown Olympia has been relatively weak despite the prevalence of mixed-use buildings with commercial activity on the ground floor.

Table 4.7 Commercial Rent and Vacancy in Downtown Olympia and Comparison Areas

		Retail		Office	
		Early 2020	Mid 2020	Early 2020	Mid 2020
Downtown Olympia	Average Rent PSF	$13.88	$13.10	$19.57	$19.61
	Average Vacancy	0.7%	1.6%	1.9%	1.9%
City of Olympia	Average Rent PSF	$15.97	$14.79	$20.10	$20.04
	Average Vacancy	2.6%	2.7%	1.9%	2.5%
Thurston County	Average Rent PSF	$14.55	$14.41	$19.83	$20.12
	Average Vacancy	2.6%	3.3%	2.6%	2.8%

4.2.2.2 Construction and Leasing Activities

Most of the recent commercial developments in downtown Olympia are redevelopments. The *Downtown Strategy* records 6 retail and office projects that are underway or were recently completed. They include an artisan market, a brewery café, other retail, and large office spaces. Other commercial projects in the area include a community care center, a transit center, and a family clinic.

Construction of new commercial properties in downtown Olympia are infrequent. About 41,700 sf of retail space were built in 2013 and 2014, contributing to a peak in leasing activity. The newest completion of retail space is in 500 Columbia Place, which is one of the largest mixed-use developments in the entire county in the past two years. Another 51,000 sf of retail space is under construction on 203 Columbia Street NW. New office buildings are even more sparse; only 13,500 sf were delivered in 2018 and none are under construction. Still, the City expects its planning effort will contribute to a 100 percent increase in sales and 650,000 sf of new commercial space over the next twenty years (City of Olympia 2017).

4.2.2.3 Consumer Base and Demand

The current retail environment is largely supported by workers, tourists, and visitors. Residential demand segments are growing as more downtown units are constructed and occupied and will become more important to supporting a downtown retail environment over time.

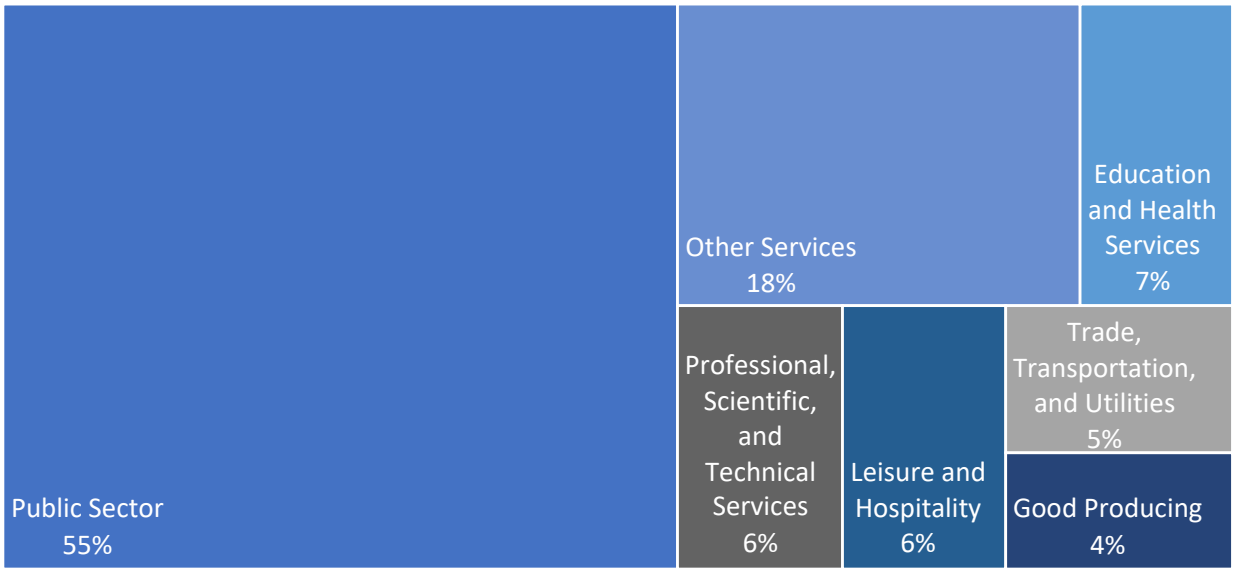
Most of the existing demand for retail uses in downtown Olympia is generated from visitors to the area's unique attractions. The State Capitol Building, Percival Landing Park, Heritage Park, the marinas on Budd Inlet, and a variety of theater and arts venues support retail uses in the area. Moreover, the Hands On Children's Museum is a top destination in the county. The museum attracts more than 300,000 visitors every year, a third of which are from outside Thurston County (Hobbs 2015). The Olympia-Lacey-Tumwater Visitor & Convention Bureau expected about 9,000 hotel visits in 2016. Estimates indicated 1.2 million tourists would spend over $300 million per year in Thurston County. (Dean Runyan & Associates 2017).

Despite being an employment center and a destination for tourists, new commercial development and retail growth in downtown Olympia is unlikely to take place independent of new residential development. Based on the City's plan for developing a walkable neighborhood that promotes local retail uses, retail tenants that do occupy new commercial spaces are more likely to include grocery stores, restaurants, bars, and fitness centers that rely on local customers.

4.2.2.4 Employment

Historically, the local economy was supported by Thurston County's natural resources such as sandstone, coal, and lumber. Budd Inlet was a hub of maritime commerce in the 20th century. Once Olympia was established as the capitol of Washington in 1927, the government sector became a major employer. Today, local and state governments are the largest sources of employment in downtown Olympia. There are about 10,000 employees who work in downtown, about half of whom work on the State Capitol Campus (City of Olympia 2017). (see Figure 4.9).

Figure 4.9 Employment in Downtown Olympia by Sector



Source: U.S. Census Bureau, 2017 Longitudinal Employer-Household Dynamics (LEHD)

As a result of the COVID-19 pandemic, the unemployment rate for Olympia rose to 14.9 percent. Similar to the rest of the country, workers in retail and tourism-related occupations experienced the largest impacts. About 75 percent of businesses in downtown Olympia are small businesses with fewer than 10 employees (City of Olympia 2017). Small businesses generally have less financial capital to fall back on during economic downturns. Combined with the fact that the supply of new office buildings is limited, the current office market in downtown Olympia appears to be saturated and office space growth is not likely to return unless market conditions change significantly. Still, the office market is not likely to suffer large losses because the government sector makes up a sizable portion of local employment and demand for office space.

4.2.3 Summary of Findings for Development in Downtown Olympia

Synthesizing findings from all three lines of inquiry (key-informant interviews, market assessment, and literature review) suggest several conclusions relevant to assessing the impact of the action alternatives on development in downtown Olympia:

- Demand for development in downtown Olympia is primarily being driven by regional population growth.
- A segment of the growing population is attracted to development similar to that currently being developed in downtown Olympia: primarily smaller households, which are most often made up of younger and older people.
- Retail demand is currently driven by visitors, workers, and tourists, as well as a growing base of downtown residents. Increasing residential demand will drive new retail growth, which in turn attracts more residential development.
- Downtown Olympia will successfully attract demand for residential development based on two factors: competitive rents compared to other locations, and the portfolio of amenities (including environmental amenities) the downtown area has to offer.
- The downtown area has many amenities that differentiate it from other areas. These include the waterfront facing both sides of Budd Inlet, the Capitol grounds, public attractions (museums and the farmer's market) and Percival Landing.
- In the case of Capitol Lake specifically, interviewees most frequently cited the surrounding walking trails as one of its most compelling features for downtown residents, followed by the views it provides. To the extent that these are maintained in future management alternatives, the influence of these features would continue to contribute to attracting residential demand to downtown.

Based on this set of conclusions, growth in downtown Olympia is driven in part by its amenities, including Capitol Lake. Current and potential new residents will assess quality-of-life factors in their decision to live downtown. Visitors will come for work or to visit the capitol grounds and will return based on the quality of their experience. Retailers, restaurant owners, and service providers will respond to demand from residents and visitors and locate and invest accordingly. However, the largest influence on new development continues to be overall regional demand for housing among demographic segments that are more likely to prefer high amenity, urban environments.

4.3 DEMAND FOR AND VALUE OF RECREATION

This section characterizes the existing conditions related to recreation demand and value within the regional study area of Thurston County, and within the project area. It describes levels of use (demand) for the types of recreation currently available or potentially available under future conditions with project implementation. It describes the trends in recreation demand in recent years, and how demand and value may change over the next 30 years, in response to changes in population, preferences, and environmental conditions.

This analysis builds on the description of recreation facilities in the study area, presented in the *Land Use, Shoreline, and Recreation Discipline Report* (ESA 2022c). That report describes the supply of recreation facilities that support recreation in the project area. Changes in both supply and demand are relevant to assessing the potential impacts of the alternatives on the economic value of recreation. Some of the data were collected for the DEIS in 2020 and 2021 and reflect conditions during the height of the COVID-19 pandemic. These data were not updated for the FEIS because the results are not needed to differentiate impacts among alternatives.

4.3.1 Recreation Demand in the Regional Study Area

Within the county there are federal, state, county, city, and privately-owned parks and natural areas. These areas provide recreation opportunities that are similar in one way or another to the recreation features offered by the resources within the study area. People who recreate within the study area may also visit these other areas or may choose to visit the study area instead of these other areas. Understanding the supply of similar types of recreation resources throughout the county is important because the total availability informs the value of resources within the study area that could be impacted by the project. Resources present within the study area that are relatively scarce within the region may produce a larger impact (in terms of economic value) if disrupted. Figure 4.10 provides an overview of the recreation areas in Thurston County. They are discussed in more detail below, grouped by parks, trails, and water-based recreation.

4.3.1.1 Park Use, Events, and Tourism

Available park recreation in Thurston County is widespread and diverse. There are three state parks: Tolmie State Park, Millersylvania State Park, and Hope Island Marine State Park. The state and federal governments administer several natural areas in Thurston County, among them Nisqually National Wildlife Refuge, Garfield Nature Trail Park, Capitol State Forest, and Woodard Bay Conservation Area. These areas host wildlife and nature viewing, picnic areas, hiking trails, and water-based recreation opportunities (Figure 4.10).

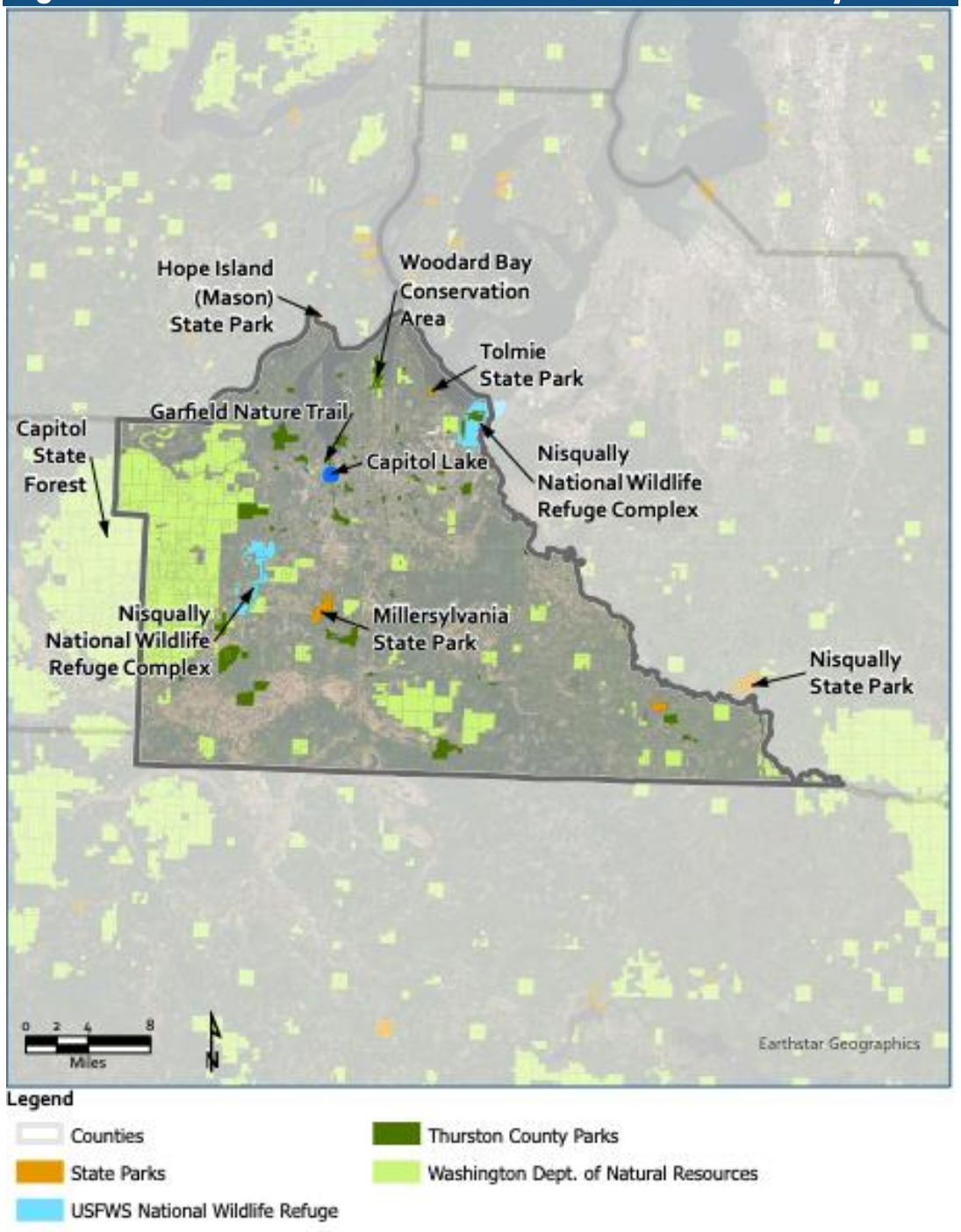
In addition to state and national agencies, there are many municipalities that own parks in Thurston County. The county itself owns 25 regional parks, totaling 2,800 acres of property (Thurston County 2020). Prominent parks include Burfoot, Frye Cove, and Kennydell. The City of Tumwater owns 12 parks, the Tumwater Valley Golf Course, and the future Deschutes Valley Trail which will complete construction December 2020 (City of Tumwater 2020). The City of Lacey has over 1,200 acres of parkland and open space, as well as four golf courses and an athletic complex (City of Lacey 2020). Finally, the City of Olympia has 37 community parks and over 1,340 acres of park land (City of Olympia 2020).

In the southwest Washington region, which includes Thurston County, almost 60 percent of residents indicated they attended an outdoor concert or event in 2017. It is the fourth-most popular form of outdoor recreation among users in the region. About half of all county residents also indicated they participated in an activity consistent with the types of activities the parks in the project area support: wildlife or nature viewing (51 percent), gathering or collecting things in a nature setting (52 percent) and visiting rivers or streams (69 percent) and visiting a beach or tidepools (65 percent) were all among

the top-ten recreation activities. Clearly, there is considerable demand among residents for the types of recreation facilitated by the parks in the Capitol Lake Basin (Jostad et al. 2017).

State parks and many federally managed areas were closed or had limited capacity due to the COVID-19 pandemic, and at the same time the parks surrounding Capitol Lake, which remained open, were used at much higher rates than usual, according to the Enterprise Services Visitor Services Manager. This suggests that county, state, and federal parks and open spaces may be substitutes for some uses of Capitol Lake's recreation sites—when one is not available, use shifts to the others.

Figure 4.10 Recreation Features in Thurston County



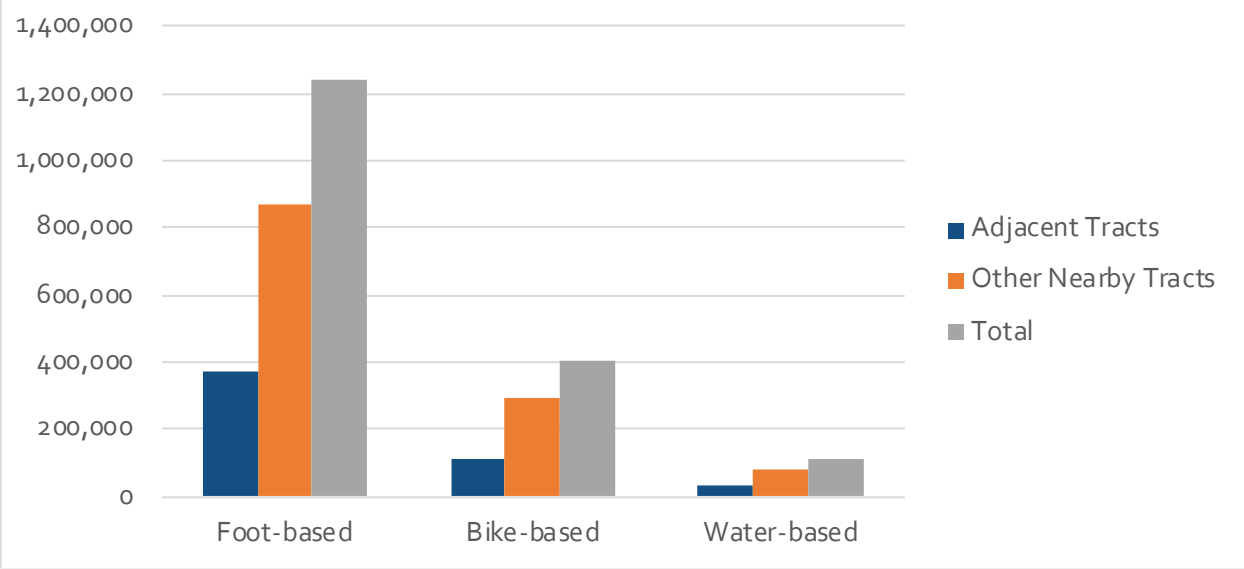
4.3.1.2 Trail and Path Use

In the southwest Washington region almost 90 percent of residents indicated they participated in trail-based recreation in 2017. It is the most popular form of outdoor recreation in the county (Jostad et al. 2017). Thurston County contains 47.5 miles of recreational trail corridors. In total, there are 177 miles of

trails, the majority of which are used for walking (ECONorthwest 2019). Trails are also frequently used for running, hiking, and biking, and to a lesser extent backpacking.

Based on a previous study of Washington trail use, Thurston County has 8.5 million trail-based user days, leading to an economic contribution of $104 million (ECONorthwest 2019). Analysis of the 2017 state of Washington Outdoor Recreation Survey reveals an estimated 368,628 annual trips to facilities similar to Capitol Lake by residents of the three closest census tracts[7] for foot-based activities such as walking, running, and picnicking. These are shown in Figure 4.11 in the blue columns. Annual trip counts were also estimated for the census tracts adjacent to the three bordering Capitol Lake, covering most of the City of Olympia and the northern portion of the City of Tumwater. Figure 4.11 shows these trips in the orange columns. The gray columns show the total annual trips by residents in both sets of tracts. In total, annual foot-based trips exceeded 1.2 million trips, there were about 400,000 bike-based trips, and about 100,000 water-based trips.

Figure 4.11 Estimated Annual Trips by Residents of Nearby Census Tracts



Source: ECONorthwest analysis of Washington Outdoor Recreation Survey data

4.3.1.3 Primary Water-Based Recreation

Thurston County borders the Puget Sound and contains a number of major watersheds. There are notably five freshwater lakes in nearby state parks. Budd Inlet in the immediate study area is a popular kayak location and Tugboat Annie's, located at West Bay Marina offers kayak rentals. Other access points for kayaking and canoeing include kayak rentals at Boston Harbor Marina on the northeast end

[7] These tracts are 101, 104, and 105.2, and cover the South Capitol, Wildwood, Governor Stevens, and South Westside neighborhoods of Olympia. Tract adjacent to these include 102, 103, 105.1, 106, 109, and 111, and cover the western portion of Olympia and northern Tumwater.

of Budd Inlet, Columbus Park at Black Lake in Olympia, Ward Lake in Olympia, and Long Lake in Lacey. Data describing use of these sites is not available. In 2017, the most recent year for which data were available, about 46 percent of Washington residents participated in freshwater water-based recreational activities and 27 percent participated in salt-water-based recreational activities (Jostad et al. 2017). Boating participation rates in Washington are higher than the state-level averages for the western region and are second only to Alaska in participation rates (U.S. Coast Guard 2012). Approximately 15 percent of Washington residents participated in fishing from a boat in 2017 (Jostad et al. 2017).

4.3.1.4 Regional Trends in Recreation Demand

Recreation trends in the region can be inferred using a 2016 US Forest Service study (White et al. 2016). Using 2008 as a base year, the study projects national participation projections per capita to 2030 for different recreational categories. The research also estimates future participation with and without climate change effects.

These projections predict an increase in participation rates for all recreation opportunities available in the study area in all alternatives. Water-related recreation opportunities are projected to have increases in per capita participation of 2.5 percent for motorized boating, 3.4 percent for swimming, and a decrease of 3.9 percent floating (canoeing, kayaking, and rafting). Floating decreases are attributable to reduced opportunities due to climate change (9 percent decline in total participation days). There will also be an increase in participation days for people visiting developed interpretive sites of 3.2 percent (such as nature centers, prehistoric sites, and historic sites) and engaging with developed sites of 0.7 percent (such as areas used for family gatherings and picnics). Per capita participation in fishing is projected to decline by 2.6 percent, largely attributable to the effects of climate change (a 5 percent decline in total user days).

Data from the WSDOT pedestrian and bicycle counts offer additional insight into trends in trail use over time in the region. While none of the locations were in the vicinity of Capitol Lake, the resulting trends can be used to understand how demand for biking and pedestrian recreational areas has been changing in the region. Between 2017 and 2019, pedestrian trips on regional pathways increased by about 20 percent per year. During the COVID-19 pandemic, rates of use increased substantially, indicating people's demand for outdoor recreation is at least temporarily surging. Whether this trend will persist after COVID-19 remains to be seen, although if permanent shifts towards more people working from home occur, it is possible that demand for outdoor recreation may experience faster growth due to shifting patterns of time use (away from commuting and towards different leisure activities).

While the participation rates have increased and are expected to continue to increase, this effect will be compounded by the rate of population growth in Thurston County. Projections of the total resident population for the Growth Management Act predict a 1.3 percent increase in the population of Thurston County from 2020 to 2040 (State of Washington Office of Financial Management 2018). Some of this regional population growth likely will concentrate in the immediate area of the Capitol Lake Basin, as residential development in downtown Olympia is projected to sustain dramatic growth (see discussion

in the previous section). As a result, there will be more people in the immediate area and the region, who would demand the types of recreation offered in the project area.

4.3.2 Recreation Demand in the Project Area

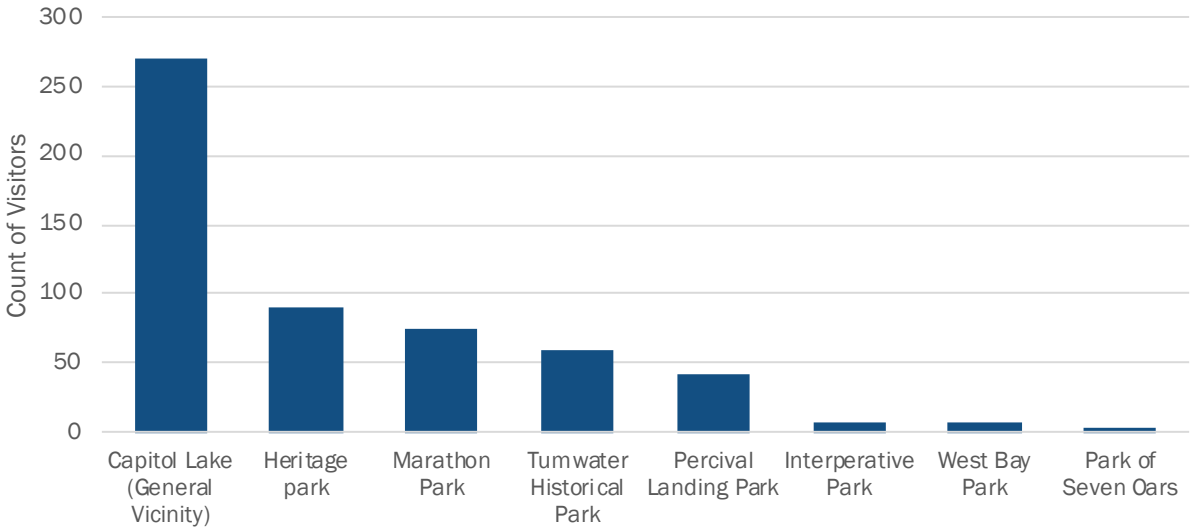
This section describes recreation resources within the immediate study area near Capitol Lake. Recreation in the project area can be grouped into three categories: 1) Park Use, Events, and Tourism; 2) Trail and Path Use; and 3) Primary Water-Based Recreation (e.g., boating and fishing). For each recreation resource within the immediate study area, estimates are provided to characterize the annual visitation and contextualize any seasonal variation in the visitation. Recreational use is popular among both local residents and tourists. Where possible, data are presented to identify the proportions of use by Olympia and Tumwater residents and non-residents to understand the distribution of local and non-local use.

4.3.2.1 Park Use, Events, and Tourism

Enterprise Services conducted a park user survey during the summer of 2019. Survey dates included high-attendance events, such as Capital Lakefair, as well as weekends and holidays. The survey did not employ a statistically rigorous sampling methodology, so the results represent a snapshot of the use patterns of the people who agreed to fill out the survey but cannot be extrapolated to infer larger visitation patterns. More detail about the park user survey methodology is included in Appendix B.

The park user survey results indicate that the most frequently visited individual parks in the project area were Heritage Park, Marathon Park, and Tumwater Historical Park. The smaller Interpretive Center, West Bay Park, and Park of Seven Oars were visited less frequently. This question was multiple choice and one-third of respondents said they were visiting more than one park that day (Figure 4.12).

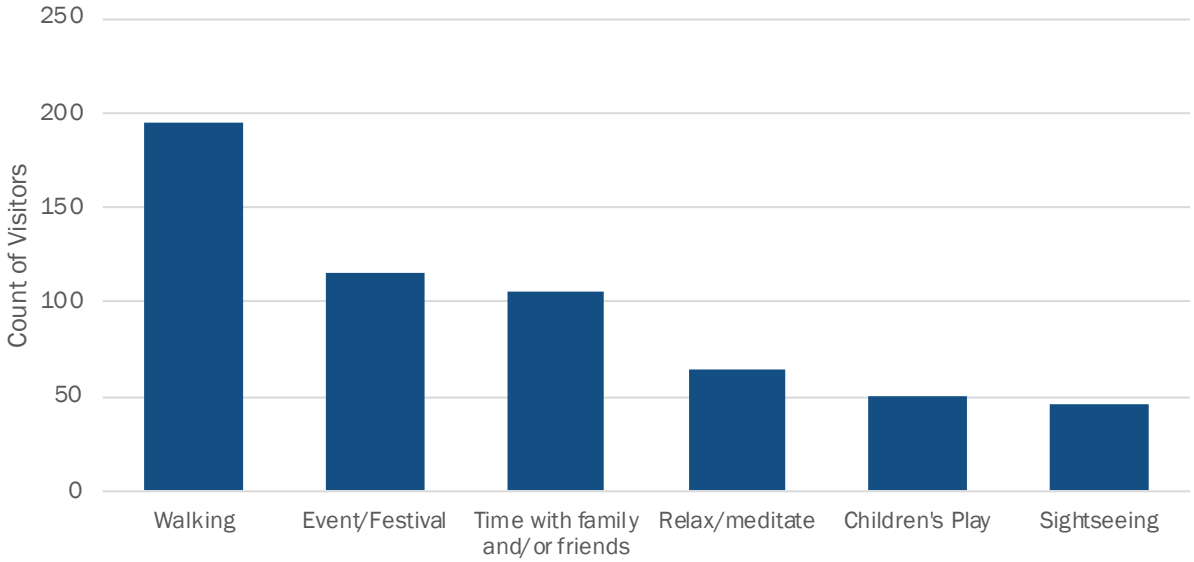
Figure 4.12 Parks Visited on Day of Survey



Source: ECONorthwest analysis of Enterprise Services survey of park visitors, 2019

What these users do at the park was the subject of another question in the survey. This question was multiple choice, so people were allowed to select multiple options. The most common activity respondents reported was walking Figure 4.13). Other common activities were attending one of the many events and festivals, spending time with family, and relaxing or meditating. Fewer than one-third of respondents came to the park alone, indicating that the park is used as a social gathering place. Less common reasons people visited included plant and wildlife viewing, playing sports, and volunteering or environmental stewardship. This characterizes Capitol Lake's parks as the site of leisure time or a place to congregate.

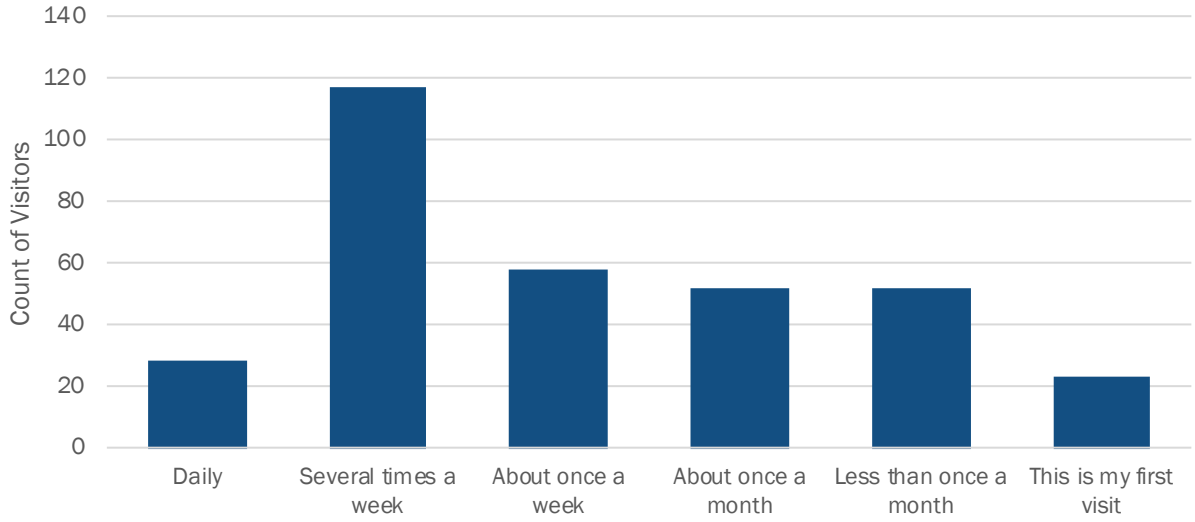
Figure 4.13 Activities Enjoyed on Day of Survey



Source: ECONorthwest analysis of Enterprise Services survey of park visitors, 2019

Respondents were also asked about the frequency that they used the park. Figure 4.14 shows that the majority said they use the park several times a week. A smaller amount uses the park daily or were there for their first visit. These responses represent the extremities of use. More often, respondents report either using the part once a week, once a month, or less than once a month. These results demonstrate two main groups of recreators; frequent users who use the park as part of their weekly routine, and infrequent users who visit the park occasionally.

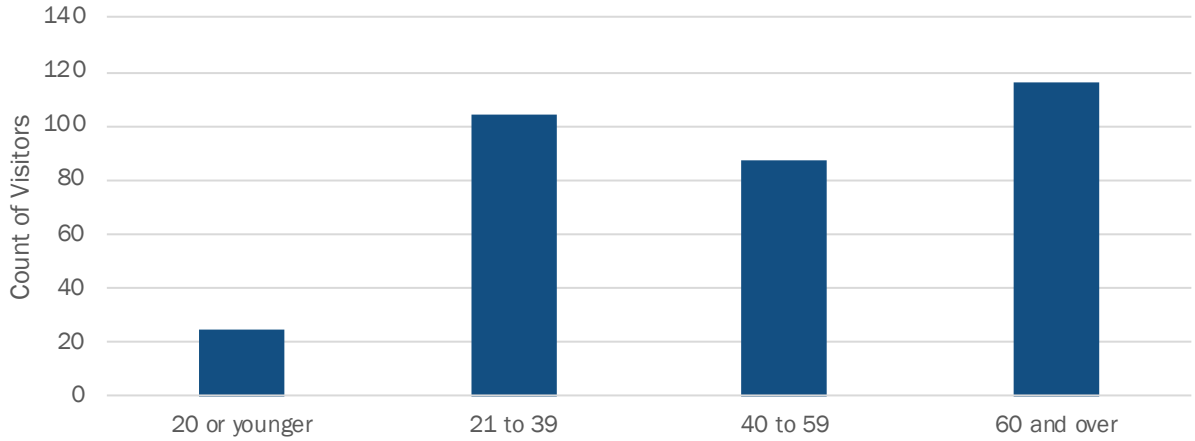
Figure 4.14 Frequency of Park Use by Survey Respondent



Source: ECONorthwest analysis of Enterprise Services survey of park visitors, 2019

The age of respondents was evenly distributed between three age groups. Figure 4.15 shows that the majority of respondents were 60 or over. Those aged 21 to 39 were next most representative, followed by those aged 40 to 59. A small number of respondents were 20 or younger, probably due to the unlikelihood that people of that age group were unaccompanied.

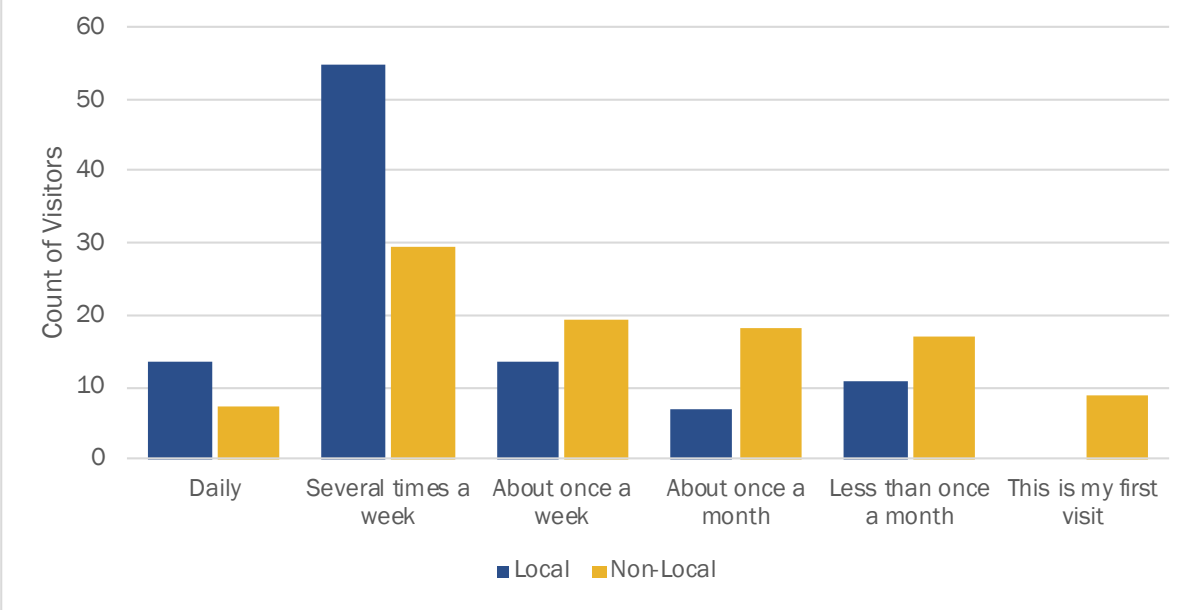
Figure 4.15 Age of Survey Respondent



Source: ECONorthwest analysis of Enterprise Services survey of park visitors, 2019

Finally, a mix of local and non-local visitors were at the park on the days of the survey. There are two ways of designating local and non-local visitors. In the survey, respondents were asked to report their zip code. Seventy-five percent of respondents visited Capitol Lake from a zip code outside of Capitol Lake (80501). These visitors are considered "non-local" for purposes of this report. "Local" visitors are those who live in zip code 80501, which includes Olympia and Tumwater. Respondents were also asked whether they had to travel greater than five miles to visit that day. The fraction of non-local visitors to local visitors was much higher on Capital Lakefair days than non-Lakefair days. This result suggests that large park events attract higher levels of non-local use. Figure 4.16 displays the percent of respondents who visit the study area for each frequency. A much higher percentage of people who come daily or several times a week were locals, while less frequent use was higher for non-local use. Daily non-local use may be due to people commuting to the Capitol Campus from outside the 98501 zip code. Of note is that Capitol Campus leads up to five public tours a day of the buildings and grounds. After the tour, these people have the option to explore the study area, thus attracting increased non-local use during these periods of the day.

Figure 4.16 Local and Non-Local Proportional Frequency of Use



Source: ECONorthwest analysis of Enterprise Services survey of park visitors, 2019

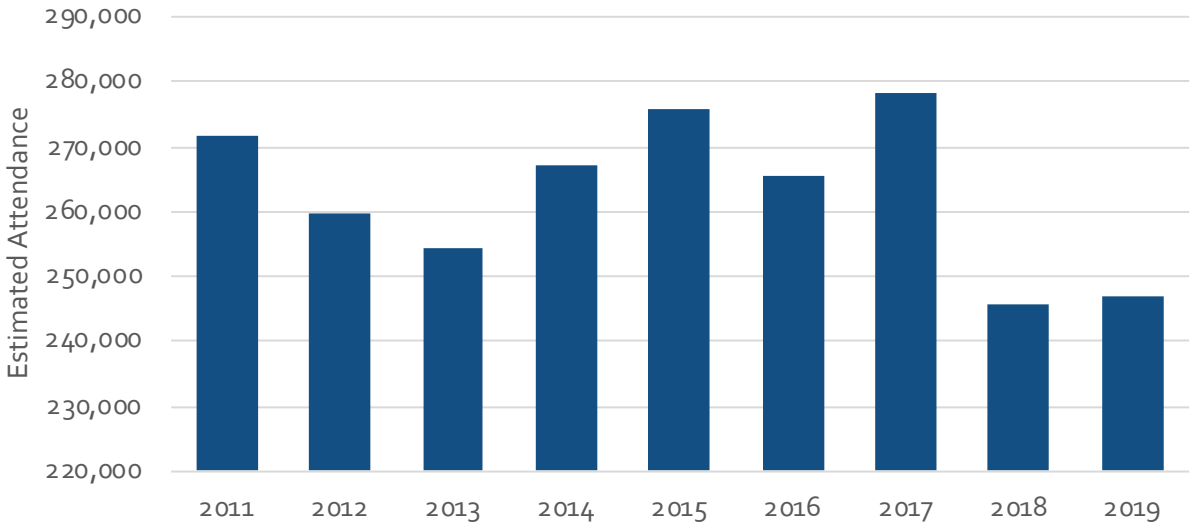
Note: A "local" resident is defined by having a zip code of 98501, which includes the City of Olympia and Tumwater. A "non-local" has a different zip code.

Enterprise Services requires event sponsors to apply for a permit for events on the Washington State Capitol Campus and the surrounding parks if they predict an attendance of more than 75 people. The permit application asks sponsors for the date, type, and expected attendance of their event. This information provides insights into the frequency of use for different parts of Capitol Campus by official events. The data reported below describe events that occurred in Marathon, Sylvester, Heritage, and Centennial Parks as well as parts of Capitol Campus.[8]

Capitol Campus hosts an average of 88 permitted events per year of varying attendance during a typical year. As shown in Figure 4.17, the average yearly attendance to the park for permitted events is 260,000, a value that has been fairly consistent from year to year. Data collection began in June 2010 and is ongoing, though only complete years are shown. Actual attendance could be more or less, but because these estimates are largely consistent from year to year, it is probably a reasonable estimate. The types of events commonly applied for include runs, marches, festivals, and arts and music events. A given event has an average attendance of 2,500 people.

[8] Sylvester and Centennial Parks are upland from the Capitol Lake Basin on the interior part of the Capitol Campus. They are included because according to Capitol Campus event managers, participants to events held in these locations often spill over into the other Capitol Campus areas, including the parks adjacent to Capitol Lake. Thus, they potential are indicative of use throughout the Capitol Campus.

Figure 4.17 Total Permitted Event Attendance by Year, 2011-2019



Source: ECONorthwest analysis of Enterprise Services event registration database, 2011-2019

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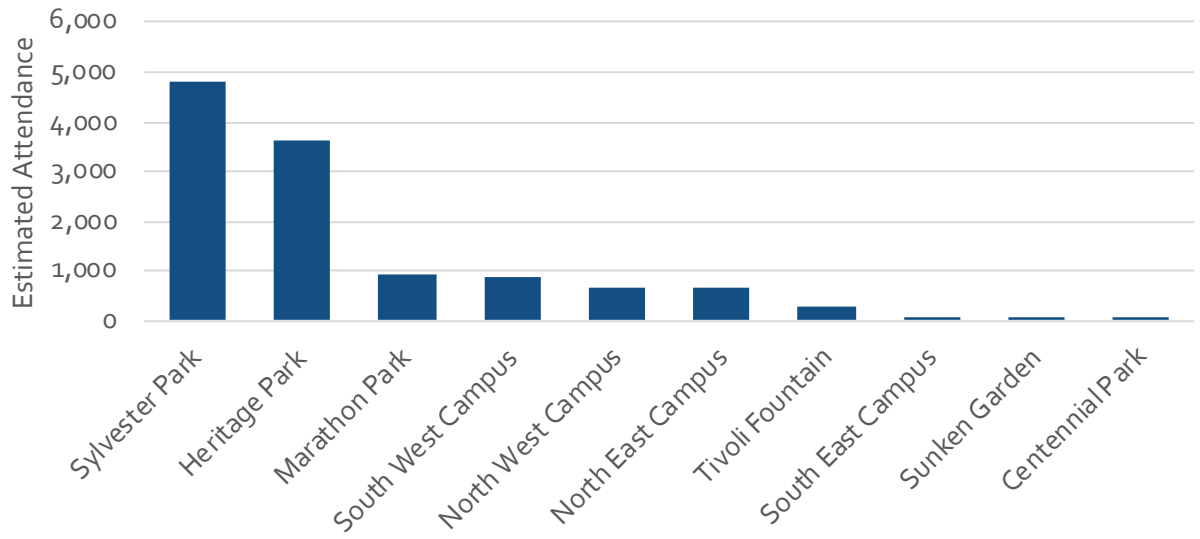
Reservations for 2020 and 2021 indicate decreased park attendance. In response to the COVID-19 pandemic, Enterprise Services stopped issuing permits in July 2020. In an informational interview, the Enterprise Services Visitor Services Manager noted that since COVID-19, there have been 65 non-permitted events on the Capitol Campus, with attendance drawing anywhere from ten to 2,000 people (not shown in figures). Attendance for events dropped in 2021 to about 17,600.

Qualitatively, the Visitor Services Manager observed that during the 2020 COVID-19 pandemic, while restrictions on travel and gatherings were in place throughout the state, several parking areas near Marathon and Heritage were the busiest he has ever seen. He notes the two to three weeks near the beginning of the COVID-19 shutdown were busiest. As substitute sites for recreation reopened, activity decreased. Additionally, Capitol Lake has been the site of many protests in 2020. These draw crowds, who often stay on campus after the protest to explore the grounds. Overall Capitol Lake's parks have seen increased attendance in 2020 based on qualitative assessments and Enterprise Services staff feedback, though quantitative data is unavailable at this time.

Attendance increased in 2022 to 213,743. This number remains lower than all previous years, aside from 2021. The increase in attendance from 2021 to 2022 is primarily attributable to the resumption of the week-long Capital Lakefair event that took place in Heritage Park and Marathon Park, pulling in approximately 200,000 people. This event did not take place in 2020 or 2021.

Figure 4.18 Average Annual Attendance at Permitted Events, by Area (2011-2019)



Source: ECONorthwest analysis of Enterprise Services event registration database, 2011-2019

Sylvester Park, above the Capitol Lake Basin, more central to downtown Olympia, is the most well-attended park with an average event attendance of 4,000 visitors, on average. The most well attended events held there are the annual Arts Walk, which brings in 15,000 visitors, and Pride, which brings in 10,000 to 15,000 visitors. Eventgoers there often also visit other parks on the Capitol grounds, including those in the project area, during their visit but may not be counted in official totals. Heritage Park is second-most used with an average event attendance of 3,700. This is a result of the annual Capital Lakefair summer festival, where attendance was estimated at 200,000 people. The festival is a weeklong event. Heritage Park also hosted the Women's March and annual 5k runs. Marathon Park is third most frequently used with an average event attendance of 929. It hosts marathons, charity walks, and 5k runs (Figure 4.18).

Most of the other areas are on Capitol Campus and have a smaller capacity and are generally used for government and private events. Private events include weddings and family barbecues, but some 5k runs and private company-sponsored events are also listed as private. Governmental events include recognition ceremonies and "Take Your Child to Work" days. These events bring in smaller groups of people but contribute to the number of events held on Capitol Campus.

Systematic Estimate of Heritage Park Use

Security camera footage captured recreational use of Heritage Park. Estimates of use were developed for the months of August and September 2020. For August 2020, the total estimated count of visitors was 41,893. For September 2020, the total estimated count was 32,721 visitors. These months likely represent peak or near-peak use throughout the year at Heritage Park, with the exception of attendance during the Capital Lakefair event, which occurs in July. These months also reflect use during the COVID-19 pandemic, when socialization in indoor places was discouraged and park-use surged

compared to previous patterns of use. As a result, they may overestimate the long-term average count of monthly visitors to Heritage Park.

4.3.2.2 Trail and Path Use

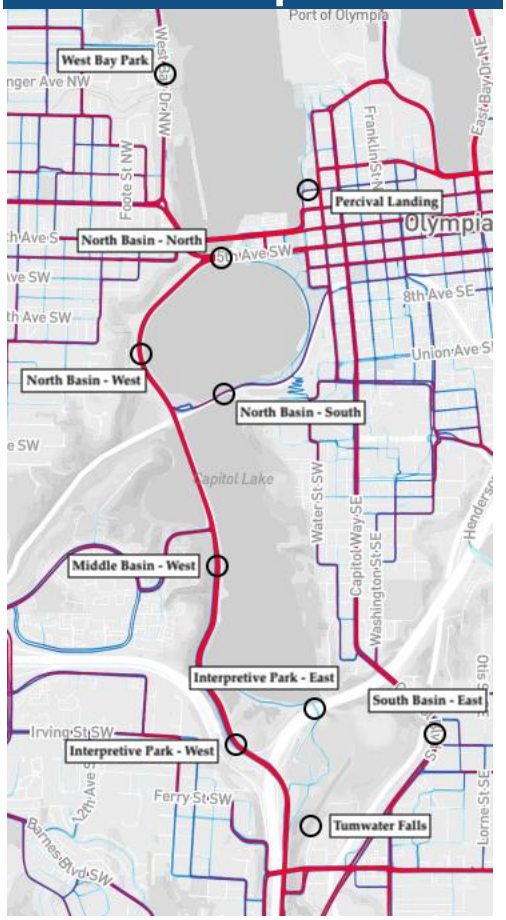
The parks in the immediate study area are connected by a series of trails. Major trails within the immediate area include the Heritage Park Trail and the Deschutes Parkway Trail (which circumnavigate the North and Middle Basins, respectively), the Garfield Ravine Trail, trails within Interpretive Center, and other shoreline trails.

Activities on these trails include walking, running, and biking. As mentioned above, the site is popular with runners and walkers likely due to the large number of trails. Additionally, a portion of the use is by commuters and people who use the trails and paths as connectors for their trip but are not using the resources for recreation. This is prevalent on Deschutes Parkway whose bicycle path has become a commuting route. The trails are accessible in multiple places by street as well as via the switchback connecting Capitol Campus to the North Basin.

Strava heatmaps were combined with WSDOT Washington State Bicycle and Pedestrian Documentation Project count data to estimate annual bicycle and pedestrian use of at different points around Capitol Lake. Strava's global recreation heat map collects trip data from a wide base of users. Combining the two sources created an estimate for the annual total number of visits for pedestrians and bicyclists for 2018. Count were estimated for ten points along the North, Middle, and South Basin as well as Tumwater Falls and West Bay Park (see Figures 4.19 and 4.20).

Figure 4.19 depicts the patterns of use for bicycle recreation revealed in the heat map. The highest level of use occurred in places with a redder, thicker, and more opaque line. The data reveals that Deschutes Parkway, 4th Avenue West, and Capitol Way South are regional through-ways and experience some of the highest levels of use captured by the Strava platform in the area. The North Basin loop is less popular for bicycle use. This confirms anecdotal evidence that some people use trails in the study area to commute.

Figure 4.19 Bicycle Use Heatmap

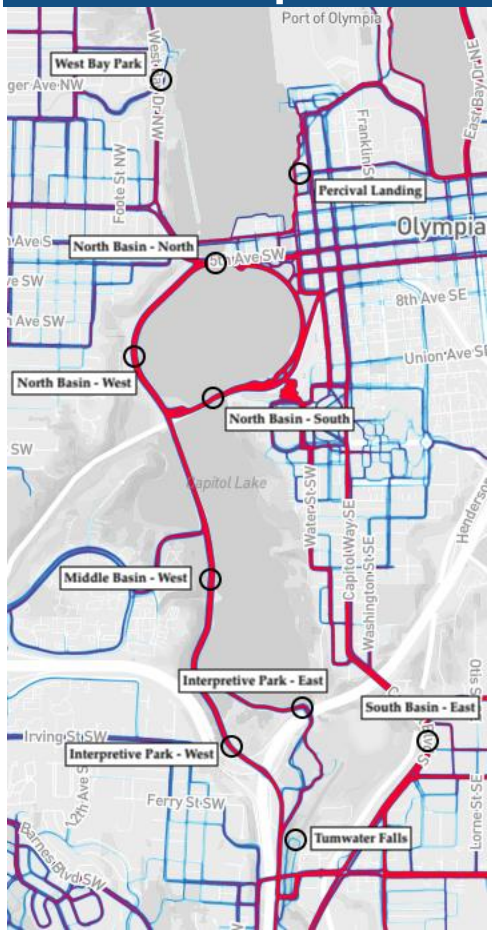


Source: STRAVA, augmented with observation points used in the analysis.

Note: The color red indicates the highest use in the heatmap, followed by purple, then blue as the lowest levels of use.

Figure 4.20 depicts the patterns of use for pedestrian recreation in the heat map. The intensity of use in Figure 4.20 cannot be compared with that of Figure 4.19. Strava weights its maps based on the location and type of use so intensity can only be used to compare use within a single map. Instead, each figure can be used to compare use between different key locations on the map. A comparison of points in Figure 4.20 reveals that the North Basin loop is a very popular route to walk and run, but Deschutes Parkway and Capitol Way S are almost equally popular.

Figure 4.20 Pedestrian Use Heatmap

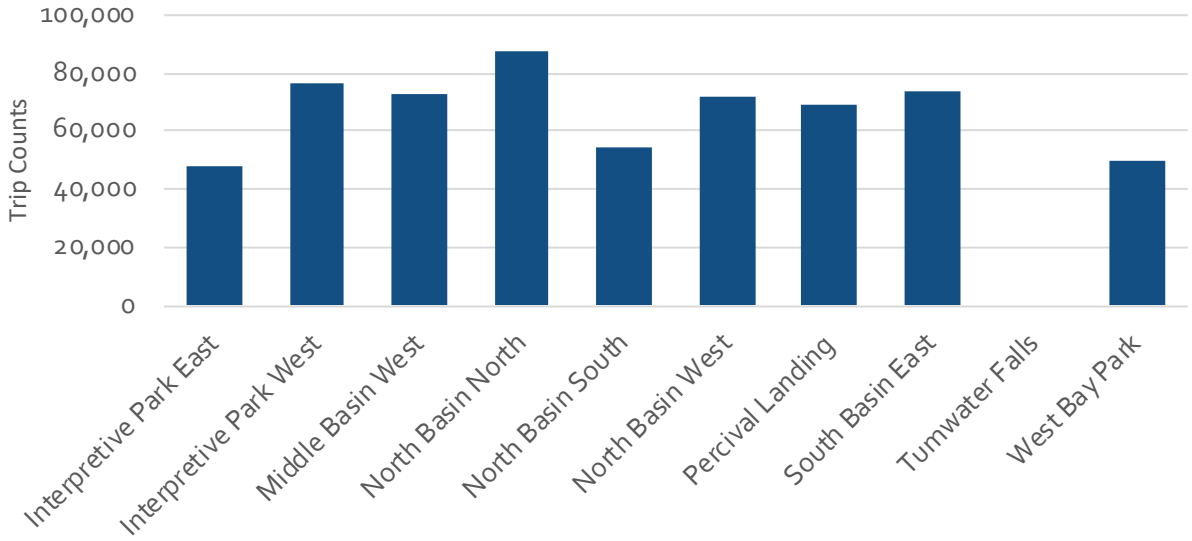


Source: STRAVA, augmented with observation points used in the analysis.

Note: The color red indicates the highest use in the heatmap, followed by purple, then blue as the lowest levels of use.

For bicyclists, the average yearly trip count across all locations was 67,000, not including the Tumwater Falls location which is not open to bicycles (Figure 4.21). There was a maximum of 88,000 trips at North Basin North and a minimum of 48,000 trips to Interpretive Center East (not including Tumwater Falls). The three most used locations were all along Deschutes Parkway.

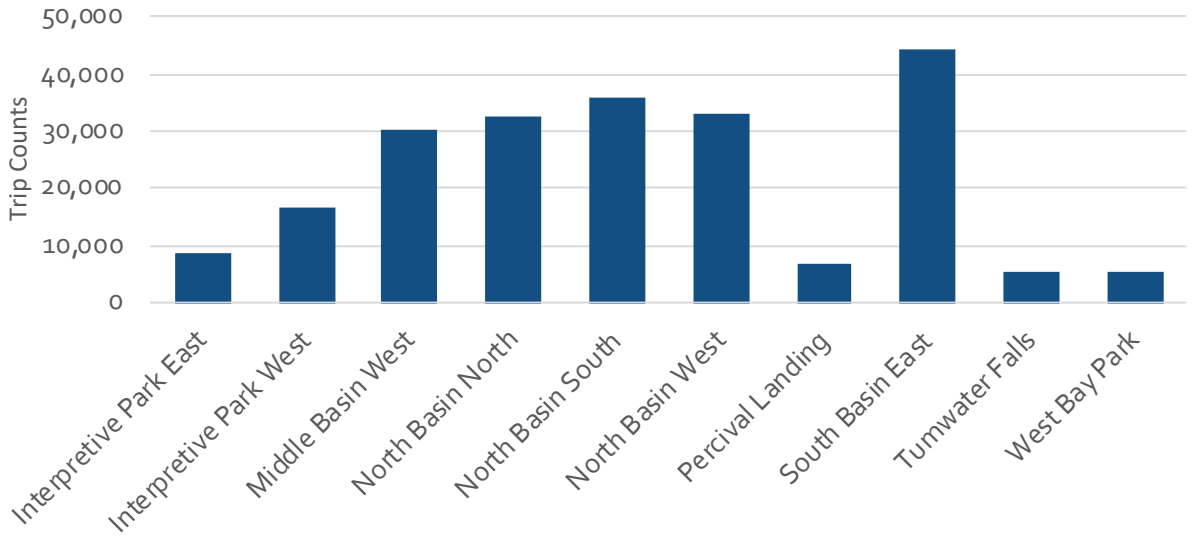
Figure 4.21 Total Estimated Annual Bicycle Count



Source: ECONorthwest analysis of STRAVA heatmaps and WSDOT Washington Stata Bicycle and Pedestrian Documentation Project data (2017-2019); Location names correspond to observation points shown in Figure 4.19

The average pedestrian trip count in 2018 across locations was 24,000. This is close to one-third of the average number of bicycle trips in the same year. The most frequented locations were "South Basin East" on Capitol Way S at 44,000 trips, followed by locations along the North Basin loop (Figure 4.22). Some locations showed much less use than expected, including Percival Landing and perhaps even points surrounding the North Basin, which anecdotally receive heavy use. The results do not imply that fewer people use these areas; the estimated count data is subject to selection bias. Since the counts were calculated based on Strava heatmaps, they are a reflection of use by people who use Strava's app and are actively tracking their activity. The results do not pick up all instances of use by all people and may be systematically underestimating use in areas where people are less likely to track activity. For example, this may be why bicycle use of Capitol Lake appears three times as popular as pedestrian use. People going for a lunchtime stroll or meeting up with friends are not as likely to record their exercise on Strava as cyclists out for a long ride or with a recurring commute.

Figure 4.22 Total Annual Pedestrian Count



Source: ECONorthwest analysis of STRAVA heatmaps and WSDOT Washington Stata Bicycle and Pedestrian Documentation Project data (2017-19); Location names correspond to observation points shown in Figure 4.20

Primary Water-Based Recreation

Capitol Lake is not currently open for any recreation directly on the water due to the presence of the invasive New Zealand mudsnail. Prior to its closure to recreation in 2009, the lake was used for non-motorized boating and fishing. Until 1985, the City of Olympia also operated a swimming area at the north end of the North Basin, when it was subsequently closed due to poor water quality. In the South Basin, Tumwater Falls Park hosts trails and interpretive historical signs around the three waterfalls. Informational interviews with the Enterprise Services Visitor Services Manager note that since the closure, there has been no water activity. However, there are occasionally people who inquire about boat launches or water access, indicating that there may be demand for water-based recreation.

To the north, there is active and ongoing water use through the yacht club and marina in Budd Inlet and Puget Sound. This further indicates that demand for water use in the area exists and use likely would occur if permitted. Data on regional recreation demand reported above confirm demand for motorized and non-motorized watercraft recreation and fishing exists but is currently being served by access in other locations.

4.3.3 Economic Importance of Recreation

4.3.3.1 Recreation Spending

Recreation has several economic dimensions of importance. Recreation generates local spending, on fees, equipment, food, and lodging for non-local visitors. These expenditures help support local economic activity. Recreation opportunities can also serve as an amenity that attracts new residents and firms and can lead to expansion of a local economy. The effects of spending and the resulting

changes in economic activity are not economic benefits or measures of economic value because they do not evaluate changes in social welfare.

While visiting Capitol Lake, visitors may spend money on transportation, lodging, food and drink, and/or retail shopping. Additionally, visitors may spend money on events such as running competitions or festivals. However, not all of this spending can be directly attributed to recreation at Capitol Lake. Visitors may have come to Olympia or Tumwater for a different primary reason and added a trip to Capitol Lake as part of their trip.

Estimating recreational spending in the Capitol Lake project area is difficult, due to the challenge in extracting recreation solely attributable to Capitol Lake rather than to the Capitol Building or the surrounding areas, as most visitors combine multiple destinations in their trips. As a result, there is insufficient information to estimate recreational spending directly related to the Capitol Lake Basin. However, general spending patterns for recreation activities at similar sites provides a baseline for the potential magnitude of per visit spending.

Mojica et al. (2020) published an analysis of outdoor recreation in Washington State to calculate visitor expenditure per trip for different types of land and recreation activities. Recreation associated with local city parks was estimated at $8 per participant per day, while local county parks estimated $13 in spending. Local event use generated $49 per participant per day. Motorized boating and sailing generated $94 per user per day, while non-motorized paddling sports generated $83 per user per day.

The National Park Service publishes an annual national park visitor spending effects report that estimates the economic contribution of visits to national parks, monuments, and historic sites. The 2019 report found that for a local day trip, the average spending per party was $38.00. For a non-local day trip, this value was $88.82 (Cullinane and Koontz 2020).

Another study reported average per day expenditure from out-of-town visitors to festival and spectator events in sixteen cities (Crompton and Park 2010). Events like Winterfest or the River Festival are similar to events that occur around the Capitol Lake Basin and were associated with spending of $12 to $35 per visitor.

Finally, motorized boaters in the area generate spending in the local economy, which researchers have measured. While no spending data are available specifically for the boaters who moor at the private marinas in West Bay, boaters visiting the Swantown Marina, a larger Port-owned marina facility located on the East Bay of Budd Inlet, spend an average of $180 per day, generating between $400,000 to $500,000 in annual revenue for Olympia's local economy (Wilkins, Broman, and Bucove 2018). Boaters spend money on equipment, fuel, maintenance, and repair of their boats. Boaters visiting the region from elsewhere also contribute to the local economy by spending on food, lodging, and other attractions (local boaters' spending on these items would likely materialize in the local economy without boating). According to the National Marine Manufacturer's Association, spending related to recreational boating in Washington in 2018 supported 1,232 jobs and 63 businesses in Washington's 10th Congressional District, which includes Olympia (National Marine Manufacturer's Association 2019).

4.3.3.2 Recreation Value

To those engaged in recreational pursuits, recreational opportunities increase overall wellbeing, which represents a type of economic value. Economic value is calculated as an individual's willingness to pay to participate in an activity minus the cost of participating in the activity. Table 4.8 summarizes results from research on the economic value of a selection of outdoor recreation activities in the Pacific Northwest. For example, the average economic value of nonmotorized boating is $116 (2018 dollars) per person per day. These values can be used to estimate the economic value associated with recreation participation.

Of note is that these values are for National Forest visits, which have both similarities and differences compared to the recreation sites in project area. Studies estimating the economic value of recreation trips in a more urban setting suggest the value per trip for urban trail use could be somewhat smaller: from $5 to $40, depending on the assumptions about how time is valued, how demand is measured, and other factors.

Table 4.8 Estimates of the average economic value of recreation per person per day by primary activity in the Pacific Northwest (2018-dollar values)

Recreation Activity	Economic Value Estimate
Nonmotorized Boating	$116
Biking	$92
Hiking	$90
Fishing	$76
Nature-Related	$64
Picnicking	$52

Source: Rosenberger et al. 2017

The value of a recreational experience is affected by the attributes of the environment where recreation takes place. How the character of the environment affects the quality and value of a recreational experience is a complex and nuanced topic. Environmental quality is important, but a primary driver of value only in areas where high levels of pollution clearly influence smell, water quality, and health risks. In these cases, studies have found that improvements in environmental quality do enhance the value of recreation (Doherty et al 2014). These findings are consistent with some of the feedback obtained in the Community Sounding Board meetings (described further in the *Land Use, Shorelines, and Recreation Discipline Report (*ESA 2020c)) where people questioned how the look and smell of the waterbody might change. In locations where environmental quality changes focus more on ecological function or indicators that are not easily perceived, the influence of improvement on economic value is less straightforward and typically only manifests in a small subset of users.

Empirical measurement of people's preferences toward certain types of aesthetic landscape qualities suggests less variation that one might expect; different observers often make similar aesthetic judgements (Williams 2007). For example, one study found that recreational users demonstrated preferences for more visually interesting sites, such as wide vistas and novel features, rather than ecologically interesting without visual value (Hammitt 1983). However, aesthetic quality is only one factor of the environmental setting that influences the value of individuals' recreation experience.

Other factors that drive recreational user preference of environmental character relate to the social, cultural, or symbolic meaning of a particular environment: people can perceive aesthetic changes similarly, but ascribe different values to them based on an individual's past experience, personal attachment to place, and understanding of the cultural contributions the setting provides (Williams 2007). These factors are difficult to quantify, but important drivers of how people interpret and translate changes in the environment into the value of their recreational experience.

In terms of economic value, there is often bias towards preserving the status quo. This phenomenon is referred to as the "endowment effect" and it is also related to loss aversion (Kahneman et al. 1991). It occurs when a person experiences a greater loss from giving up something, they already have than the amount they would pay to acquire it. More simply, people demonstrate a preference for the status quo and can be resistant to change, for various reasons including attachment to place and identity. Because of the endowment effect, all things equal, the value people place on maintaining the status quo is often or typically higher than the value people place on moving to a new state of the environment.

It is important to note that preferences are far from uniform and vary by individual. Some trends in recreation preferences have been observed in the literature, such as that the environment in which a person has lived influences their preferences for developed versus natural sites. A person who has spent most of their lives in urban areas is more likely to prefer highly developed parks and recreation spaces, while a person who has lived in suburban/rural areas is more likely to prefer natural settings (Schroeder 1983).

There is also a historical and social justice component to recreation participation and value. People of color generally visit parks at lower rates than white residents. Park landscapes and design features as well as historical inequities and cultural preferences may contribute to this phenomenon (Byrne and Wolch 2009). Across all populations, visitation to a recreation site is likely to be higher the more accessible the site is and the lower the "travel costs" (Brown and Mendelsohn 1984). For example, a site that is a close distance to a heavily populated area with ample parking will have higher visitation than a similar site in a less populated area.

4.3.4 Summary of Findings for the Demand and Value of Recreation

Synthesizing findings from the data presented above suggests several conclusions relevant to assessing changes in the demand for and value of recreation in Capitol Lake–Deschutes Estuary:

- Demand for the types of recreation provided by the Capitol Lake Basin is strong. Demand is likely to increase in the future with regional population growth, local population growth

supported by residential development in downtown Olympia, and increasing participation rates in outdoor recreation.

- The Capitol Lake Basin provides the types of recreation opportunities that Washington and Thurston County residents demand the most: urban trails and paths for walking and biking; exploring waterways, coastlines, and natural spaces; and participating in outdoor events.
- Annual use of the parks and facilities surrounding Capitol Lake during formal events likely exceeds 200,000 people. Monthly use of Heritage Park during peak season likely exceeds 30,000 people. Recorded pedestrian use of paths throughout the Capitol Lake Basin varies from 1,000s of trips in some parts of the North Basin to hundreds of thousands of trips in parts of the South Basin per year. The path circumnavigating Capitol Lake is most popularly used by pedestrians. Recorded bicycle use is more concentrated along Deschutes Parkway, with an average of over 60,000 trips per year. Recorded bicycle use is likely primarily reflecting trips for commuting. These estimates are based on incomplete data (i.e., the dataset only includes people who record their trips using the Strava App) with high levels of uncertainty but provide a very rough order-of-magnitude indication of current use levels.
- Geographic substitution of trail- and park-based recreation in the region likely occurs with some ease, and offsets direct losses of economic value when recreation closures occur.
- Demand for some activities not currently available in the Capitol Lake Basin, such as non-motorized boating, paddling, and fishing is present and growing. Availability of substitutes for paddling opportunities in the downtown area is limited and could be reduced in the future due to climate change. The nearest access for canoes and kayaks is in the northern part of Budd Inlet.
- Recreation activity is important economically in the region because visitors coming into the study area to participate in recreation activities spend money that would not likely otherwise occur. Spending ranges from $8 per participant per day for local park use to over $80 per day for non-motorized boat use.
- Recreation activity is also economically important because it is something people value. Enhancements to recreation enhance people's overall economic well-being, and may lead to more people moving to the region in part because they value recreation amenities. The economic value people obtain from participating in outdoor recreation opportunities ranges from $52 per person per day for picnicking to $116 per person per day for non-motorized boat use.
- The economic value people place on recreation experiences is influenced by the quality of the environmental setting where recreation takes place, and on their understanding of cultural and symbolic meaning attached to place. In the aggregate, people place higher values on visually interesting sites over ecologically interesting sites that are not visually diverse. Smell and appearance influence value in expected ways. Symbolic and cultural meaning is impossible to quantify but highly influential and varies from person to person.

- The alignment of preferences and economic value may bias towards maintaining status quo, for several reasons: people tend to value more highly what they know; and people who perceive they are giving something up that they care about may value the loss more highly than the value someone may place on gaining something new, a manifestation of the endowment effect.

Based on these conclusions, recreation in the Capitol Lake Basin is economically important. Changes in development patterns in downtown Olympia are likely to increase the value of close-in recreation opportunities in the future. Rising demand may also lead to more congestion of existing recreation sites, further increasing the value of expanded recreation opportunities. Recreation opportunities not currently available in the Capitol Lake Basin (boating) are associated with the highest per-user per-day values, both in terms of spending and changes in individual well-being. Recreation users are sensitive to the environmental setting in which recreation occurs, which is relevant to the understanding how the variation in project-related changes by alternative may affect the economic value of recreation in the area. Changes in the environment that affect recreation access and quality are likely to produce changes in economic value.

4.4 DEMAND FOR AND VALUE OF ECOSYSTEM SERVICES

This section characterizes the supply and demand for ecosystem services potentially impacted by the project alternatives. Each type of ecosystem services evaluated in this section is discussed individually. Where information is available, this section also discusses trends in these resources to inform how the value of these resources could change over time within the 30-year study timeframe.

Ecosystem services describe the capacity of the ecosystem to provide goods and services that people value. Increases in the ecosystem's ability to provide goods and services produce economic benefits, as they increase the value people derive from the ecosystem. Conversely, decreases in the ecosystem's ability to provide goods and services produce economic costs. These values may accrue as factors of production to industries and tribes (e.g.., commercial fishing), extractive and non-market recreational use values of the broader ecosystem (e.g., fishing or birdwatching), or non-use values related to the health and function of the ecosystem. Ecosystem goods and services typically are not traded in markets, so their value is inferred from non-market valuation techniques to assess changes in value.

Ecosystem services are largely determined by the type and quality of habitat available. The habitat types currently present in Capitol Lake Basin/Deschutes Estuary that the project alternatives could affect include submerged/open water, river channel, freshwater wetlands, mudflat, low marsh, high marsh, transitional, and upland habitat types. A summary of the availability of these habitats throughout Thurston County is shown in Table 4.9. Note that this table includes total acres for all habitat types but some of these areas do not have public access.

Table 4.9. Water Body Habitat Acreage in Thurston County

Habitat Design	Acres of Habitat Type in Thurston County
Bay/estuary	24,011
Lake/pond	6,015
Marsh	6,412
Reservoir	1,152
Stream/river	971
Total	38,561

Source: Washington Department of Natural Resources Hydrography - Water Bodies. Retrieved from https://geo.wa.gov/datasets/28a0f93c33454297b4a9d3faf3da552a_1?geometry=-122.305%2C47.471%2C-122.085%2C47.512

4.4.1 Water Quality Regulation

Water quality in Capitol Lake – Deschutes Estuary varies by location. Capitol Lake is rich in nutrients (i.e., eutrophic), which allow it to support plant growth. Budd Inlet contains a mixture of saline marine water from Puget Sound and freshwater from the outflows of the Deschutes River and Capitol Lake. More information about water quality is available in the *Water Quality Discipline Report* (Herrera Environmental Consultants, Inc. 2020).

Ecology has released a draft Total Maximum Daily Loads (TMDLs) for dissolved oxygen (DO) in Budd Inlet (Washington Department of Ecology 2022). There are currently established water quality standards in the Deschutes River and tributaries to Budd Inlet for fine sediment, bacteria, DO, pH, temperature, and total dissolved gas, and total phosphorus (U.S. EPA 2020, State of Washington 2012). Capitol Lake occasionally exceeds (i.e., does not comply with) the State standards for temperature, pH, DO, and total dissolved gas, and continually exceeds standards for total phosphorus. Elevated levels of phosphorus and nitrogen contribute to algae growth. More information about water quality is available within the *Water Quality Discipline Report* (Herrera Environmental Consultants, Inc. 2022).

DO is a particular focus for water quality within Capitol Lake – Deschutes Estuary because low DO concentrations have been a long-term problem in Budd Inlet, which is currently not meeting state DO water quality criteria. Low DO levels are harmful to fish and other aquatic species that require enough DO in the water to breathe, though low DO concentrations are typical of inlets in Southern Puget Sound.

Sediment is also of particular concern as a water quality issue within Capitol Lake – Deschutes Estuary. The 5th Avenue Dam holds back sediment that would normally flow into Budd Inlet and Puget Sound to build shorelines and send nutrients where they need to go to support the underwater ecosystem.

Water contamination has occurred in the past within Capitol Lake – Deschutes Estuary, including groundwater and soil contamination from the over 50 stormwater outfalls that discharge typical urban contaminants such as bacteria, metals, and petroleum products into Capitol Lake (Herrera Environmental Consultants, Inc. 2020). There was a spill of PCB contaminated transformer oil to the

Deschutes River in 2019. There have also been instances of accidental and/or overflow discharges of sewage and wastewater into Capitol Lake. In 2019, there were three sewage spills in Percival Creek (Herrera Environmental Consultants, Inc. 2022).

As an ecosystem service, water quality contributes to a variety of goods and services that people enjoy including human health from clean drinking water, recreation opportunities, and supporting aquatic ecosystems that humans depend on and value (Keeler et al., 2012; Batker et al 2008). There has not been a specific study related to the willingness to pay for water quality improvements within Capitol Lake – Deschutes Estuary. However, studies in similar locations can inform the types of ecosystem service values that may reasonably be expected from various water quality conditions. Studies from other locations have demonstrated that people value general improvements in water quality (Hite, Hudson, and Intarapapong 2002), as well as water quality that is specifically supportive of boating, fishing, and swimming (Carson and Mitchell 1993).

4.4.1.1 Wastewater and Stormwater Discharge

The regional wastewater utility, LOTT Clean Water Alliance (LOTT), which consists of the City of Lacey, City of Olympia, City of Tumwater, and Thurston County discharges its wastewater within the project area, and benefits from the ecosystem's capacity to regulate water quality. LOTT's Budd Inlet Wastewater Treatment Plant is located on the eastern shore of the West Bay (Budd Inlet). LOTT is considered a "point source" discharger because the effluent from their facility is discharged through an outfall. Facility discharge is regulated by Ecology – the effluent must meet discharge limits stipulated in the facility permit, to support water quality in Budd Inlet. Like LOTT, there are also other public and private entities that have permits for discharging into the study area for stormwater as well as sand and gravel. Effluent limits provided for the permitted discharges will change as a result of the TMDL for Budd Inlet, and the extent of the change would vary by alternative. These TMDLs take into consideration the current quality of receiving water bodies, which reflect the ecosystem's capacity to assimilate pollutants and maintain water quality. See the *Public Services and Utilities Discipline Report* (ESA 2022a) for more information about wastewater and stormwater discharge.

4.4.1.2 Other Water Quality Impacts

Water quality also impacts aquatic species and vegetation within Capitol Lake – Deschutes Estuary, influences available recreational opportunities, and can affect the aesthetic value by altering appearance. These aspects of water quality are discussed separately in the *Habitat Provision*, *Recreation Value,* and *Visual Amenity Value* sections, respectively.

4.4.2 Flood Regulation

The amount of water within Capitol Lake – Deschutes Estuary is affected by Deschutes River discharge, runoff from upstream sources, groundwater return, and storm surges. Tide gates within the 5th Avenue Dam are controlled to support flood management, with water released before a storm to provide additional flood carrying capacity. However, large storm events can cause flooding in Capitol Lake – Deschutes Estuary and cause floodwaters to spill over into adjacent upland areas. Increased flooding

can cause property damage, pose physical risks to people, impact the use of adjacent park space, and cause operational concerns for utility infrastructure. More information about the flood risk to utilities is available in the *Public Services and Utilities Discipline Report* (ESA 2022a).

Future flooding in Capitol Lake – Deschutes Estuary will be exacerbated by future sea level rise and increased storm intensity due to climate change. In recognition of the future risk, the City of Olympia, LOTT, and Port of Olympia recently completed a Sea Level Rise Response Plan (AECOM 2019). This plan provides strategies for minimizing and preventing flooding in downtown Olympia. Actions included as part of the strategies include installing valves and gates to prevent the backflow of floodwaters into the storm system (these efforts are underway), constructing a berm at Heritage Park, and raising vulnerable infrastructure at the Budd Inlet Wastewater Treatment Plant. All of these actions are occurring independently of this project, and this project is compatible with all strategies.

4.4.3 Habitat Provision

Capitol Lake – Deschutes Estuary provides habitat to a variety of plant and animal species, including both sensitive protected species as well as habitat for species that are important for commercial, recreational, and/or subsistence purposes. The *Fish and Wildlife Discipline Report* (ESA 2022b) details the known animal and plant species in the study area.

Sensitive fish species that could be affected by changes in the aquatic and riparian habitat conditions within Capitol Lake – Deschutes Estuary include Puget Sound Chinook salmon, Puget Sound steelhead, and Bull trout, which are all listed as threatened under the federal Endangered Species Act. Shellfish species, including Olympic oysters, also have habitat within the area. Sensitive wildlife species that could be affected by changes within Capitol Lake – Deschutes Estuary include the Southern Resident killer whale, listed as threatened under the Endangered Species Act. Although not listed at the state or federal level, multiple species of bats could also be affected by changes in Capitol Lake Basin/Deschutes Estuary. Sensitive plant species that could be affected by changes in the aquatic and riparian habitat conditions within Capitol Lake – Deschutes Estuary include the giant chain fern and tall agroseris.

Some of the species that could be affected by changes within Capitol Lake – Deschutes Estuary are valued for commercial, recreational, or subsistence reasons, such as salmon and shellfish. Tribal values of species have subsistence, recreation, and commercial value, as well as ceremonial and spiritual value which is discussed further in the *Cultural, Heritage, Spiritual, and Education section (4.4.6)* and the *Cultural Resources Discipline Report* (ESA and Northwest Vernacular 2022).

4.4.3.1 Commercial Value

Non-tribal commercial fisheries in Washington State generated $65.1 million in sales in 2006, including $41.1 million in shellfish and $9.4 million in salmon harvest values statewide (TCW Economics 2008). This economic activity supports local jobs and wages. Non-tribal commercial fisheries supported 3,524 jobs in 2006 and over $148 million in personal income in Washington (TCW Economics 2008).

The effects of spending and the resulting changes in economic activity are not economic benefits or measures of economic value because they do not evaluate changes in social welfare. However, they are a way that ecosystem service provisions, in this case habitat for commercial fish species and effects on their population levels, affect economic activity in Washington State.

Tribal commercial fisheries also contribute to economic activity in the state. In 2006, the commercial harvest value from tribal fisheries was $48.9 million (The Research Group 2008). Washington tribes have treaty rights to fisheries within the state terrestrial and coastal waters, which allocate approximately half of the annual allowable catch to tribes. Salmon fishery limits, both tribal and non-tribal, are governed by annual catch limits set through the annual North of Falcon process.

4.4.3.2 Recreational Value

Approximately 824,000 anglers engaged in recreational fishing and shellfish harvesting in 2006 (TCW Economics 2008). These anglers spent an estimated $904.8 million (2006 dollars) on fishing-related equipment and trip-related items, including food, lodging, transportation, and other trip expenses (TCW Economics 2008). Jobs and economic activity, known as economic impacts, differ from the economic value to the person engaging in the activity. For those anglers, the net economic value of their angling trip is measured by the willingness to pay for the trip less what was paid. Estimates of the net economic value of fishing in Washington is $137 per trip (Rosenberger et al 2017, converted to 2022 dollars).

4.4.3.3 Subsistence Value

Subsistence includes use of fish or other hunted, fished, or gathered goods for personal consumption or traditional/ceremonial purposes. Both tribal and non-tribal populations engage in subsistence use of resources in the Puget Sound region. Tribal populations rely on fishing and gathering of native resources found within the study area for both substance and ceremonial purposes (spiritual values associated with ceremonial and subsistence harvest are discussed separately in the *Cultural, Heritage, Spiritual, and Education Values section (4.4.6)*). Most of the fish consumed by tribes in the Puget Sound region are locally harvested. For example, about 68 percent of total fish consumed by the Squaxin Island tribal population are locally harvested, and about 80 percent of the anadromous fish consumed are locally harvested (Washington Department of Ecology 2013).

Relatively less is known of non-tribal subsistence use. Primary research from the Lower Duwamish Waterway suggest fishing and fish/shellfish consumption in urban areas is highest among older, lower-income and unemployed individuals, immigrant populations, and people of color. People who fish for personal consumption often share their catch with friends and family (Lenhart et al. 2013). Subsistence fishing differs from recreational fishing in that the primary goal of subsistence fishing is to procure food, rather than gain enjoyment, exercise, or relaxation from the activity. Recreational anglers may eat their catch, and people fishing for subsistence may enjoy the activity, but the primary purpose for each is different.

Tribal values of species include ceremonial and subsistence harvests for fish, shellfish, and plant species. Generally, these needs are met before any fishery catch is sold for commercial purposes, demonstrating its value to the tribal community. The cultural, heritage, spiritual, and educational values associated with ceremonial and subsistence harvest are discussed separately in the *Cultural, Heritage, Spiritual, and Education section (4.4.6)*.

4.4.3.4 Non-Use/Existence Value

In addition to use value associated with harvesting species there is also non-use value that reflects the value that people have for the existence of a species. These values are generally calculated through surveys that measure the willingness to pay for species conservation. For example, a survey found that households in Washington are willing to pay between $38 and $53 per month (2022 dollars) in increased utility bill costs for a 50 percent recovery of Puget Sound salmon (Layton, Brown, and Plummer 1999). A more recent study of Coho salmon in Oregon found willingness to pay for maintaining or recovering the species of between $74 to $220 per year per household (2022 dollars), or as $637 million per year (2022 dollars) for an extra 100,000 returning salmon for all Pacific Northwest households (Lewis et al. 2019). Salmon in Capitol Lake – Deschutes Estuary serve as the food source for orca populations within the Puget Sound. Among West Coast households, the willingness to pay for species recovery of the Southern Resident killer whale is approximately $124 per year (2022 dollars) (Wallmo and Lew 2016).

4.4.4 Climate Regulation

Another ecosystem service provided by the natural capital in Capitol Lake – Deschutes Estuary is the ability to regulate climate through sequestering greenhouse gases. Greenhouse gases in the Basin are primarily sequestered in the vegetation and soil in and around the water (IPCC 2013). In contrast to sequestration, greenhouse gases are released by decomposing organic matter, such as vegetation. These greenhouse gas releases can be especially prevalent in inundated areas behind dams (Deemer et al. 2016). More information about greenhouse gases sequestration and releases is available in the *Air Quality and Odor Discipline Report* (Ramboll US Corporation 2020).

One way to measure the economic value of greenhouse gas sequestration or the cost of emissions is through the social cost of carbon (IPCC 2016). The social cost of carbon is a measure of the damages associated with one metric ton of carbon-dioxide equivalent greenhouse gas emissions and includes damages from net agricultural productivity, human health, property damages, and others. The social cost of carbon for 2022 is $76 per metric ton (Interagency Working Group on Social Cost of Greenhouse Gases 2016).

There are no current estimates of the greenhouse gases being sequestered and released from the soil or riparian and littoral vegetation of Capitol Lake – Deschutes Estuary or how that value compares to carbon sequestration and releases from other sources. Riparian restoration of streams can sequester an additional 0.87 to 1.12 metric tons of carbon per hectare per year (0.35 to 0.45 metric tons per acre per year) (Matzek et al. 2020). In comparison, as of 2016 Thurston County's greenhouse gas inventory is equivalent to 2.96 million metric tons per year (Thurston Climate Action Team 2018).

The threats from climate change in Washington include sea level rise, increased flooding, reduced snowpack, droughts, increased fire risk, ocean acidification, and others. Sea level rise is especially relevant for Capitol Lake – Deschutes Estuary. Estimates from the Olympia Sea Level Rise Response Plan are that by 2100 sea level rise is most likely to be 36 inches but could be as high as 68 inches (AECOM 2019). Infrastructure that could be damaged by sea level rise includes the LOTT Budd Inlet Treatment Plant as well as roads, bridges, and buildings near Capitol Lake (Thurston Regional Planning Council 2018). A recent national inventory suggests that Washington will need to spend $23.9 billion by 2040 on construction of seawalls due to climate change (Thurston Regional Planning Council 2018).

Actions to reduce greenhouse gases and mitigate against climate change have occurred both at the state level in Washington as well as in Thurston County and Olympia. Statewide, the State Agency Climate Leadership Act (RCW 70.235.050 and 060) requires some state agencies to reduce their greenhouse gas emissions to established target levels. Locally, the Thurston Regional Planning Council (TRPC), Lacey, Olympia, Tumwater and Thurston County began work on a climate mitigation plan in 2018 with the goal of reducing greenhouse gas emissions to 85 percent below 2015 levels by 2050 (Thurston Regional Planning Council 2018). Although not monetized like the social cost of carbon, these actions demonstrate state and local value from greenhouse gas reductions.

4.4.5 Visual Aesthetics

There are two types of values associated with visual aesthetics in Capitol Lake – Deschutes Estuary – those accessible through public areas, such as parks, trails, and roads that are available to all, and those which are only available at private properties with restricted access. The *Visual Resources Discipline Report* (ESA 2020d) contains a full description of the different viewsheds in the North, Middle, and South basins.

4.4.5.1 Public Views

Public views include all those around Capitol Lake – Deschutes Estuary, such as the view of the Capitol dome from the reflecting pool in the North Basin, mountain views and views of downtown from the North Basin Overlook, the waterfront views throughout the trails on the shoreline, and secluded views of vegetation that provide an immersive experience in the South Basin. Although the exact value of these public visual amenities is unknown, it is likely that these visual amenities increase tourism, recreational use, and overall visitation to the area compared to lower visual amenity sites.

There are a variety of regulatory programs and policies that highlight the value of visual amenities within Capitol Lake – Deschutes Estuary. In particular, the Olympia Downtown Strategy (City of Olympia 2017) stipulates that most significant views shall not be affected by new development, including views of the Capitol dome, mountains, and water.

4.4.5.2 Private Views

There are some private views of the water features in Capitol Lake Basin/Deschutes Estuary from residential properties in the sloped area above Deschutes Parkway and from taller buildings in

downtown, particularly to the east and north of the lake (ESA 2020d). Direct views from most properties on the bluff to the west of the project area are largely obscured by trees, with unobscured views limited to a small set of private residential properties, and a few properties used for commercial purposes.

4.4.6 Cultural, Heritage, Spiritual, and Education

Cultural, heritage, spiritual, and education values are a component of cultural services that represent the non-material benefits that people obtain from ecosystems and environments. There are three primary components to these values associated with Capitol Lake Basin/Deschutes Estuary. The first is the tribal value associated with the environment and natural resources used for ceremonial and subsistence purposes by tribes since time immemorial. The second is the historical value of Capitol Lake as a component of the state Capitol Campus and the City of Olympia. The third is the potential for the ecosystem and ecosystem management activities to offer educational opportunities to the public, resource managers, and researchers.

The presence of archaeological resources and historic built environment resources is discussed further in the *Cultural Resources Discipline Report* (ESA and Northwest Vernacular 2020). An earlier report (AHBL Inc. and Ainsworth 2009) also evaluated the cultural and spiritual values of similar alternatives for Capitol Lake Basin.

4.4.6.1 Tribal Value

Historically, the Deschutes Estuary was used by local tribes for subsistence and ceremonial purposes. Capitol Lake – Deschutes Estuary is located within the traditional territory of the Southern Coast Salish cultural group (ESA and Northwest Vernacular 2020).

Native American communities experience value from Capitol Lake – Deschutes Estuary from a variety of sources. It provides a connection and balance to nature, a source of life, a place for education about history and ancestors, and a source of meditative tranquility (AHBL Inc. and Ainsworth 2009). Water-related ecosystems contribute to individual and group identity, sense of place, spirituality, and serve to link past and future generations.

In its prior natural state before construction of the dam, Deschutes estuary provided fish, shellfish, birds and eggs, medicinal plants, and materials (e.g., sweetgrass) for basket-weaving, as well as water and mud for spiritual cleansing rituals (AHBL Inc. and Ainsworth 2009). Because the ecosystem is no longer in its natural state these resources do not exist in the same way. Fish, shellfish, and birds have decreased both within Capitol Lake Basin/Deschutes Estuary and the broader territories. Invasive plant species have crowded out sweetgrass, which is no longer available in Capitol Lake – Deschutes Estuary. In addition to access restrictions for tribal members and the public, the interconnectedness of Capitol Lake with its environment was disrupted by construction of the 5th Avenue Dam (AHBL Inc. and Ainsworth 2009).

Tribal value also extends beyond Capitol Lake – Deschutes Estuary because actions within the basin can affect resources outside of it. For example, impacts to aquatic species, such as salmon, migrate outside the basin and provide value to tribes throughout the Pacific Northwest. Salmon populations also support species outside the basin, including the southern resident killer whale. Although unique locations carry distinct cultural importance, the value of natural resources to tribes is not confined to one region or tribal group.

Traditional monetary measures of economic importance are generally inappropriate to describe the value of cultural and tribal use of water resources. Monetization implies substitutability (i.e., that monetary compensation at some level can make whole the loss of the service, because equivalent services may be purchased) (Hirons, Comberti, and Dunford 2016). For example, archeological values, such as burial grounds and ceremonial sites, are non-renewable and have no substitutes. Given that many, if not all, cultural services for tribes are defined by place, tradition, and continuity of use and practice, no alternative resource could provide a sufficient substitute for the resources in question. Although they are not monetized, cultural values of tribes are of significant importance.

4.4.6.2 Historical Value

Capitol Lake – Deschutes Estuary is intertwined with the with the cultural history and pre-history of the site, and the political, aesthetic, and engineering history of the Capitol Campus, City of Olympia, and Washington, resulting in cultural and historic value for both residents and visitors. This historical value applies to archaeological and historic built resources. In particular, the Capitol Lake reflecting pool in the North Basin, created by construction of the 5th Avenue dam in 1951, serves as a reflecting pond for the domed Legislature Building and the Temple of Justice. It was a key component of the design visions of Wilder & White and the Olmsted Brothers. However, following issuance of the Draft EIS, the Washington Department of Archaeology and Historic Preservation (DAHP) issued a formal determination of eligibility and has determined that Capitol Lake is not eligible for listing in the National Register of Historic Properties.

The full list of archaeological and historic built resources present in Capitol Lake – Deschutes Estuary is identified in the *Cultural Resources Discipline Report* (ESA and Northwest Vernacular 2020).

The ecosystem service value provided by historical resources includes sense of place, civic pride, education and documentation of architectural and engineering techniques, art inspiration, and connection with the past. Historical values vary on the preferences of individual people. Like tribal values, historical value is not monetized because substitutability is generally not possible or appropriate. Although historical values do provide an ecosystem service, they can also be used to legitimize and entrench modes of decision-making that marginalize and undermine other cultural values, such as the cultural, heritage, spiritual, and educational values of minority groups (Hirons, Comberti, and Dunford 2016).

4.4.6.3 Educational Value

The central location of Capitol Lake – Deschutes Estuary, proximate to the state capitol grounds, makes it accessible to a wide range of people. School groups, tourists, and residents enjoy the area for a variety of purposes. Some of these involve developing and transmitting knowledge of the history, ecology, and importance of the human and natural environment in Capitol Lake – Deschutes Estuary. This produces value directly in people who value acquiring knowledge, and indirectly as the knowledge people acquire sparks curiosity and leads to further inquiry and learning.

Capitol Lake – Deschutes Estuary also produces value as an environmental research laboratory. Studies of the area's ecology add to scientific knowledge of the region's ecosystems, and how natural and human-influenced processes are affected by various management strategies. This research is ongoing and has the potential to evolve in different ways depending on future conditions. Knowledge developed in Capitol Lake – Deschutes Estuary may translate directly to monetary value to the extent that it leads to more efficient or effective management strategies that increase ecosystem values or reduce costs for regulatory and/or regulated entities in the basin.

5.0 Impacts and Mitigation Measures

5.1 OVERVIEW

This section describes the probable economic impacts from the No Action Alternative and the Build Alternatives (Managed Lake, Estuary, and Hybrid Alternatives). This section also identifies mitigation measures that could avoid, minimize, or reduce the identified impacts.

5.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the project would not be built. Potential impacts would be related to limited ongoing maintenance of the 5th Avenue Dam and ongoing sedimentation of the Capitol Lake – Deschutes Estuary, since no coordinated sediment management strategies would be implemented. Ongoing sediment management activities in West Bay would likely continue along historic trends. Each entity choosing to maintain navigational depth and/or comply with terms of their leases with the Department of Natural Resources related to minimum water depth would fund and implement dredging independently. The economic effects of continuing with status-quo, along each of the four dimensions explored in this analysis, are described below.

5.2.1 Effects on Downstream Economic Activity

Under the No Action Alternative, any economic activity supported by projected repair and maintenance would remain at or near existing funding levels. This alternative is not projected to have any discernable economic effect on jobs, economic output for Port activities north of the Dam, or in the downtown corridor adjacent to the site resulting from changes in government spending.

OYC and the private marinas in West Bay would experience nominally increased rates of sedimentation compared to past conditions as Capitol Lake's capacity to hold sediment declines and more sediment makes its way through the dam and deposits in the marina areas. They would continue to be responsible for maintenance dredging at their discretion to maintain slip accessibility and comply with current and future DNR lease provisions for maintaining minimum depths. To the extent OYC and the marinas increase spending on dredging, it would support more employment in this sector. Most of

those revenues would accrue to businesses in Tacoma, where several in-water construction companies are located, or other areas in the state of Washington. Therefore, economic effects in the study region would be limited.

Economic activity within and adjacent to the study area in downtown Olympia is subject to periodic disruption due to flooding. As sea level rise is likely to increase the frequency and magnitude of future flood events, this economic disruption would continue along, or increase compared to recent historical trends. During these storm events, the ability to manage flood waters within the Capitol Lake Basin rests solely on operations at the 5th Avenue Dam. As this infrastructure ages despite periodic repair and maintenance, the risk of failure of the 5th Avenue Dam or failure of operations at the 5th Avenue Dam increases. The risk of dam/tidegate failure would be highest during back-to-back flood events, which will occur with increasing frequency given future climate change projections. In this scenario, equipment malfunction or human error could result in extreme flooding or dam breach. The impacts of this type of failure have not been modeled, though disruption of economic activity consistent with or beyond current levels is anticipated.

5.2.2 Effects on Development in Downtown Olympia

This assessment of impacts is drawn from the findings of the key-informant interviews, the market assessment presented in Section 4.0, and the results of the literature review.

Prevailing trends in demand for residential and commercial development in downtown Olympia are strong and are expected to continue to be strong in the near future. Uncertainty related to COVID-19 and protests may persist and ultimately impact market conditions. However, no evidence currently suggests these factors will result in sustained disruptions in downtown development over the long run. The increasing visibility and impacts arising from concentrations of sheltered and unsheltered homeless populations in downtown Olympia is frequently cited as one of the biggest risks to livability and commercial vibrancy (a frequently cited concern among key-informant interviewees). Enterprise Services is working with community partners to address this ongoing and complex issue (personal communication with Tomy Mollas, Capitol Security and Visitor Services). However, management of water quality, recreation, and ecological conditions in the Capitol Lake Basin are unlikely to be an independent driver of homelessness trends or impacts.

Capitol Lake is currently seen as an amenity, among many other amenities that downtown Olympia has to offer (consensus among key-informant interviewees). Some amenities, such as views of Puget Sound, waterfront restaurants, and Percival Landing Park have a greater influence in marketing new residential developments for some current developers compared to Capitol Lake, but it is not currently viewed as a disamenity. Should aesthetic conditions in Capitol Lake deteriorate substantially in the No Action Alternative, as is expected to be the case with significant continued growth of aquatic plant populations and algae blooms, or access to its surrounding trail-based recreation amenities become disrupted, it could become more of a liability than an amenity. Should they materialize, these conditions could be much more likely to contribute to depressed development activity in the future.

The lack of environmental management in Capitol Lake does not appear to be adversely influencing development decisions in downtown Olympia at this time. Some property owners directly adjacent to Capitol Lake may be delaying potential redevelopment decisions given current uncertainty in long-term management of the resource (unconfirmed directly by affected property owners but mentioned several times during key-informant interviews as a possibility). To the extent that the No Action Alternative exacerbates this uncertainty indefinitely, it may limit some redevelopment opportunities downtown, in close proximity to Capitol Lake. This may have indirect effects on other development and redevelopment opportunities downtown, as redevelopment often catalyzes other development as long as market demand is sufficient to support it and redevelopment plans permit it.

The No Action alternative may also compound the perception present among developers and some planners in the region that inaction and stagnation in policy implementation and decision-making are prevailing conditions leading to underinvestment in downtown Olympia (a consistent view among both planners and economic development professionals, and private developers and real estate experts familiar with the area who were interviewed). Although recent investment activity suggests these factors are becoming less of an issue compared to the recent past, should this perception persist or grow, some investors may ultimately choose to invest elsewhere, slowing growth compared the goals the City has outlined for the downtown redevelopment area.

5.2.3 Effects on Demand for and Value of Recreation

Under the No Action Alternative, the current restrictions on water-dependent activities are expected to remain (see the *Land Use, Shoreline, and Recreation Discipline Report* (ESA 2020c)). This means that people who want to access the water by boat from downtown Olympia would have to access the water elsewhere, potentially at higher cost or lower value of the experience. As population growth in the region and in downtown Olympia increase demand for outdoor recreation opportunities, such as boating and fishing, existing water access points in Thurston County may grow increasingly congested, potentially reducing the quality and value of boating and other water-contact recreation experiences in the region.

Trail and park-based recreational opportunities and community events would continue much as they are at present (see the *Land Use, Shoreline, and Recreation Discipline Report* (ESA 2020c)). The supply of paths, trails, and parks that support recreation in the study area would stay the same, even as trends in population growth and user preferences are likely to increase the demand for recreation in the study area. This means the recreation resources likely would become more valuable over time, but also may be more vulnerable to congestion. Increased congestion could reduce the quality and value of recreation enjoyed within the study area for some people. Connectivity and circulation issues related to pedestrian and bicycle use of the 5th Avenue Dam would continue to adversely affect the value of path-based recreation for some people.

Temporary disruption in recreation access due to dam repair, or flooding, would affect the value of recreation consumed in the study area, by reducing the amount of time people can access the resource. Some people would recreate elsewhere during these disruptions and enjoy a potentially less valuable recreation experience relative to the Capitol Lake Basin; some people would not recreate, forgoing the

total value of their experience. In both cases, the value of recreation in the study area would decrease. The magnitude and duration of these impacts are likely to vary from year to year, and their timing is uncertain and largely subject to chance. Potential changes in aquatic vegetation over time may change the environmental setting for recreation in small ways but are unlikely to produce changes in the quality or value of the recreation experience for the majority of users.

5.2.4 Effects on Demand for and Value of Ecosystem Services

Under the No Action Alternative, the environmental resources in Capitol Lake – Deschutes Estuary would be managed consistent with minor management actions conducted currently and in the recent past (see Table 5.1 for the current habitat conditions that would continue in the No Action Alternative). The ecosystem's ability to produce goods and services related to water quality, flood regulation, habitat provision, climate regulation, visual aesthetics, and cultural, heritage, spiritual, and education would remain consistent with existing conditions, or diminish along current trends. The No Action Alternative would not result in any impacts to ecosystem services from construction because the project would not be built.

5.2.4.1 Water Quality Regulation

Water quality related to DO and algae could improve slightly under the No Action Alternative through the implementation of the Deschutes River TMDL. As described in the *Water Quality Discipline Report (Herrera Environmental Consultants, Inc. 2022)*, a discernable change in Budd Inlet for DO or algae is not expected. All other water quality considerations would be consistent with current conditions, which indicate relatively good water quality.

In June 2022, Ecology released the draft Budd Inlet Total Maximum Daily Load (TMDL) for Dissolved Oxygen with wasteload allocations for permitted sources of pollution. The TMDL sets pollution limits that are intended to help meet water quality standards in Budd Inlet. The TMDL states that Capitol Lake is the largest source of DO depletion to Budd Inlet and that this is due to both its production of algae and aquatic plants and the impact of the dam on circulation patterns. While the TMDL did not assign a wasteload allocation for Capitol Lake, it requires that if the lake basin is managed differently than the 'natural' estuary condition, it cannot cause water quality standards violations at any time or location in Budd Inlet, as determined though mechanistic modeling. Enterprise Service would not be able to meet these conditions under a No Action Alternative, so Ecology would need to enforce lower wasteload allocations on other permitted dischargers.

There are four wastewater treatment plants that discharge directly to Budd Inlet. Ecology has assigned TMDL allocations to each of these treatment plants in the draft TMDL. LOTT is the largest of these dischargers. LOTT's compliance strategy is a function of its treatment capacity, alternative discharge options (e.g., producing and selling reclaimed water), and nutrient loading in its wastewater (a function of population growth). In cooperation with Ecology, LOTT has been planning for future investments to meet this new TMDL as well as growth in wastewater treatment demand as the region's population increases. Under the No Action Alternative, where Capitol Lake would not be managed as a natural estuary condition, it is likely that Ecology would further reduce LOTT's wasteload allocation beyond

what is in the draft TMDL to make up for ongoing contributions from Capitol Lake. This creates a high likelihood that LOTT would have to invest in additional treatment sooner than it otherwise plans to, **increasing the costs** for LOTT's ratepayers beyond current expectations. If this happens, households may have to direct more income toward utility payments and have less income to spend in the local economy on other goods and services. It is likely that there would be additional costs for the other treatment plant dischargers as well.

5.2.4.2 Flood Regulation

Under the No Action Alternative, there would be continued and increased extreme river flooding, placing low lying infrastructure at continued and increased risk. The modeled extreme river flood event in the Capitol Lake Basin results in water surface elevations in the downtown area that exceed the flood-proofing elevations set in the Olympia Sea Level Response Plan. As a result, low-lying infrastructure could experience flood-related disruption and damage more frequently, resulting in increased costs to public and private utilities and property owners. This includes recreation infrastructure, which would disrupt recreation activity and potential result in lost value related to recreation, which is discussed in more detail above in 5.2.3 and in the *Land Use, Shorelines, and Recreation Discipline Report* (ESA 2022c). More information about flooding impacts is available in the *Public Services and Utilities Discipline Report* (ESA 2022a).

5.2.4.3 Habitat Provision

Under the No Action Alternative, the Capitol Lake Basin would remain a freshwater system. In the short-term, habitat within the Capitol Lake Basin would remain consistent with the current conditions, though submerged aquatic vegetation would increase in density. In the long-term, there would be a loss of open water habitat within Capitol Lake as sediment accumulation and aquatic plant growth continued without strategies for removal. In this scenario, Capitol Lake would transition into an emergent wetland, but this would be beyond the 30-year project time horizon.

These changes under the No Action Alternative would affect habitat quality and habitat use by some fish and aquatic species, but the species would persist. Shallow lake areas caused by increased sedimentation can increase the water temperature and decrease DO, negatively impacting salmonids. Sediment accumulation can also disconnect the river channel from adjacent wetlands, resulting in a simplified system with little habitat heterogeneity and impacting rearing habitat for species such as Coho salmon. Long-term increases in sedimentation within Budd Inlet, arising as suspended sediment passes through the 5th Avenue Dam with increasing significance over time, could also have detrimental impacts on invertebrates such as Olympia oyster. To the extent that these marine species are harvested commercially or recreationally it could reduce catch, which would have economic impacts to tribal and industrial commercial fishing and diminish the value of the experience for recreational anglers and harvesters. Subsistence value for tribes could also be reduced to the extent that population changes reduce the amount of catch and effort required. However, future habitat conditions in the No Action Alternative would likely not measurably affect fish available for harvest. To the extent that there are reductions in fish populations there would also be adverse impacts to tribal commercial and subsistence

fishing. The cultural, heritage, spiritual, and educational values associated with fish populations in the No Action Alternative are discussed in section 5.2.4.6.

The transition of the lake over-time to a vegetated wetland would substantially reduce the ability of the area to support bats. The Yuma and little brown myotis bats from the Woodard Bay colony feed on aquatic insects in Capitol Lake, so this loss of habitat could significantly impact the species.

People value the existence and health of species. Reductions in populations of any species are likely to result in welfare losses for people from a broad region who value the fish and wildlife supported by the Capitol Lake Basin ecosystem. As the No Action Alternative is likely to result in an ongoing downward trend in the diversity and habitat for species that people in the region value (e.g., salmonids, bats), the ecosystem is likely to produce lower values related to habitat provision over time. As human population in the region grows, human demands that encroach on wildlife s habitat is likely to increase o, further exacerbating current and expected future scarcities. More information about impacts to species is available in the *Fish and Wildlife Discipline Report* (ESA 2022b)

5.2.4.4 Climate Regulation

The Thurston Regional Planning Council (TRPC), a local intergovernmental board representing local governmental jurisdictions within Thurston County plus the Confederated Tribes of the Chehalis Reservation and the Nisqually Indian Tribe, has undertaken a multi-year effort to address climate change in the region, including Greenhouse Gas emissions. As part of their 2018 Thurston Climate Adaptation Plan, the TRPC established goals for climate adaptation, to help the area prepare for and adapt to climate change. This plan includes a dozen project goals, including goals to create vibrant centers, preserve environmentally sensitive lands, protect and improve water quality, maintain air quality standards, and move toward a carbon-neutral community. These goals are supported by nine guiding principles, which include the following with particular relevance to GHG emissions associated with the CLDE alternatives:

- Identify and leverage climate change adaptation strategies and actions with mitigation co-benefits, such as reducing, capturing, and storing greenhouse gas emissions;
- Consider the impacts of climate change adaptation policies on the region's economy, environment, and society; this includes all urban and rural communities, especially vulnerable residents, and the ecosystem benefits provided by natural systems.

The freshwater system of the No Action Alternative would likely have the highest greenhouse gas emissions of any alternative because freshwater wetlands within the system would emit methane, have reduced capacity to sequester (store) soil carbon, and have low potential for biomass storage. The No Action Alternative does not include mitigation strategies to improve adaptation to climate stresses and provides the lowest level of ecosystem benefits from natural systems. Thus, it is not consistent with these local climate change adaptation policies.

5.2.4.5 Visual Aesthetics

The No Action Alternative would not change any physical features and would be generally consistent with current plans and policies for visual resources. However, longer-term, there would be an increase in submerged aquatic vegetation and the lakebed would continue to become less deep over time. However, longer-term there would be increased floating algae in Capitol Lake. Because the lake is already affected by aquatic algae and aquatic plant populations, the impacts on visual quality of increased growth and proliferation of the species would have negligible impacts to the benefits people derive from the visual aesthetics of the ecosystem. More information about the impacts to visual resources is available in the *Visual Resources Discipline Report* (ESA 2020d).

5.2.4.6 Cultural, Heritage, Spiritual, and Education

The No Action Alternative has resulted in losses to tribes and people who value natural environments, not just from management of Capitol Lake over the last 70 years, but since European settlement of the region occurred. The No Action Alternative would sustain the loss of connection to the local natural environment that tribes have endured during this time. The lack of access to water resources, presence of the 5th Avenue dam, and adverse impacts to species and natural resources have reduced the ecosystem's ability to produce goods and services that tribes have used and valued since time immemorial.

Tribes have experienced long-term losses related to their sense of place, ceremonial and ancestral history, and physical and spiritual connection to the land and water. The No Action Alternative would continue to impose costs on a historically marginalized population. An equitable consideration of cultural, heritage, spiritual, and educational value under the No Action Alternative would need to consider the past inequities associated with management of the Capitol Lake Basin.

Under the No Action Alternative, the heritage value that some people place on the current configuration of the human and natural environment created by the 5th Avenue Dam and reflecting pool would be sustained. Lost heritage values associated with activities no longer allowed due to restrictions on in water uses would also persist. Archaeological and historical resources could be affected by sedimentation and flooding in the No Action Alternative. To the extent that these resources are impacted there would be an adverse effect on cultural, heritage, spiritual, and education values. More information about the impact to cultural resources is available in the *Cultural Resources Discipline Report* (ESA and Northwest Vernacular 2020).

To the extent that people (e.g., school children, tourists, researchers) use the Capitol Lake Basin for educational and research pursuits, the No Action Alternative would maintain the current opportunities for discovery and learning. Accordingly, these activities would continue to yield value under the No Action Alternative.

5.3 IMPACTS COMMON TO ALL BUILD ALTERNATIVES

5.3.1 Impacts from Construction

Construction activities that could contribute to economic effects include all activities that have a monetary cost associated with them. This cost manifests as spending on labor, equipment, and materials. Project costs are generally associated with actions that produce changes in the physical environment. To the extent that these changes lead to increases in goods and services that people value, benefits materialize. It is also possible that changes lead to temporary or permanent decreases in goods and services that people value, which would produce additional costs (either monetary or non-monetary) and potential adverse impacts.

Under this definition, all construction actions have the potential to produce effects on the economy:

- Initial dredging in the Capitol Lake Basin is a direct project cost and has the potential to minimize impacts to navigability in marinas and navigation channels downstream of the 5th Avenue Dam, or to reach a target depth to support water-based recreation.
- Habitat area establishment is a direct project cost and has the potential to enhance the quality and value of recreation activity and other human uses of the ecosystem.
- Construction of elevated boardwalks in the South and Middle Basins are direct project costs and would increase the quantity and quality of recreation opportunities.
- Construction of a dock and boat ramp are direct project costs and would increase the quantity and quality of recreation opportunities.
- Construction of the 5th Avenue non-vehicular bridge (Managed Lake Alternative) or of the bike paths and sidewalks on the new 5th Avenue bridge (Estuary and Hybrid Alternatives) are direct project costs and have the potential to increase the quality of recreation opportunities and enhance the amenities directly related to development in downtown Olympia.

The direct costs associated with construction are reported separately for each alternative below. The cost represents both the level of spending the alternative would generate during construction, and the amount of revenue that would need to be raised to implement the alternative. All costs are currently planning-level estimates, subject to change.

Through the FGWG process, the members recommended that the state of Washington take responsibility for funding construction for any alternative. This reflects a guiding principle of the FGWG process that "those who contribute to the problem should participate in funding or paying for the solution," and an acknowledgement that the 5th Avenue Dam and maintenance lapses within Capitol Lake since dam construction was complete, has resulted in the existing impaired conditions. Enterprise Services is exploring potential funding strategies, which will likely include a combination of state and federal grants and appropriations of taxpayer dollars. The FGWG process is described in more detail in Chapter 7 of the Final EIS.

Construction costs would result in impacts to those responsible for paying for the project. Depending on the final distribution of upfront cost responsibility, resources directed to this project could generate opportunity costs within the region if they are directed away from other priorities. Assuming the upfront costs come from state or federal funds that would not have been spent in the region without the project, the opportunity costs in the region would likely be smaller.

The following sections describe for each area of analysis the specific impacts of constructing the project for the elements common to all alternatives.

5.3.1.1 Effects on Downstream Economic Activity

The project could begin construction as early as 2025 or 2026 and be completed within four to eight years, depending on the alternative. Capital expenditures on building new infrastructure, dredging sediment, and other in-water work could support regional economic activity (jobs and income) through the purchase of goods and services and labor in the study area. Supporting economic activity is often perceived as a "beneficial effect,"[9] especially to those entities who receive jobs and income from project spending. As noted below, this "beneficial effect" is countered with an adverse "impact" resulting from shifting resources away from other priorities.[10] The economic contributions from construction projects are often temporary in nature and diminish as spending declines. However, expansionary projects that strengthen the capacity of a region to increase economic output more efficiently may have broader long-run benefits than what is typically measured in short-run economic impact analyses. These long-run benefits might materialize to the extent that any of the alternatives bolster long-term development opportunities in downtown Olympia or increase the region's supply of recreation opportunities leading to increases in business investment or increased quality of life for residents.

Conversely, project costs would be funded with revenue that could be pulled away from other regional priorities, resulting in opportunity costs, which could be interpreted as project impacts. In other words, money spent on this project potentially could have been used to generate the same or similar levels of jobs and incomes through different activities, which could potentially produce a different set of goods and services in the region. The extent or magnitude of these opportunity costs would depend on the source of the revenue used to fund the project (local or non-local), and what it would have been spent on but for the project. As described above, Enterprise Services is developing a funding strategy for construction which would more likely than not rely primarily on non-local (state and federal) resources, which would minimize opportunity costs in the region.

[9] The use of the term "beneficial" in this context is not intended to represent these impacts as economic benefits (positive changes in economic welfare). Instead, they represent changes in economic activity that arise through transfers of monetary resources—for each transaction, someone pays and someone receives so there is no net change (cost or benefit) in economic welfare.

[10] In economic analysis, analysis of jobs and income is not part of a benefit-cost analysis, so these terms "beneficial effect" and adverse "impact" are used loosely to align with the characterization of effects throughout the DEIS process. This analysis is not intended to provide a quantification of the "net effects" of investments in this project and their opportunity costs, but the concepts are discussed to facilitate understanding of the broad range of project effects.

Construction activity may disrupt current economic activity by increasing traffic delays as equipment is moved through the road system or material is imported or exported to and from the site, reducing access to the waterway, and may result in other negative externalities, such as increased noise for businesses and residences adjacent to the construction site. However, those effects are anticipated to last only through the duration of the construction phase. At this time, no specific issues have been identified from the construction project in any alternative that may require mitigation for nearby businesses or residences, beyond the implementation of a construction traffic management plan which is typical to projects if this size. The project is not expected to result in permanent adverse changes in access to nearby businesses or lead to disruptions in existing transportation networks. Any temporary disruptions during construction would be mitigated, as described in the *Transportation Discipline Report (Heffron 2022)*.

Overall, the action alternatives would support some economic activity in the City of Olympia and broader Thurston County by increasing demand for the construction industry, and other local supporting sectors, such as transportation and engineering services. The wages paid to workers in construction and supporting industries would increase consumption in the area. However, as this is not a net analysis, these results do not delineate between additional economic activity resulting from the project and activity that replaces or substitutes for activity that would have occurred otherwise. Additionally, the analysis does not account for the opportunity cost of spending the funds associated with the project on another public project. The size of the opportunity cost would depend on the source of construction funding (local vs. non-local) and what it would have been used on but for the project.

5.3.1.2 Effects on Development in Downtown Olympia

Construction activities would result in changes in the environment that have direct beneficial effects on the amenity value of the Capitol Lake Basin and its relationship to development in downtown Olympia. Construction activities that result in habitat improvements, elevated boardwalks, boat ramps, and the multimodal enhancements to 5th Avenue are common to all action alternatives and are essential to ensuring that the project would produce **beneficial effects** to development in downtown Olympia. Although these amenities are the direct result of construction activities, they produce a stream of benefits over the life of the project, and are discussed more directly as impacts from operation, below.

Temporary disruptions resulting from construction activities are likely to have a **minimal to no effect on** the patterns and trends in development in downtown Olympia, especially after proposed mitigation measures are implemented. Additionally, with the exception of equipment or material hauling on classified haul routes, construction would be confined to the Capitol Lake basin, and adjacent parks and roadways (Deschutes Parkway and 5th Avenue). Construction activities of all different types, durations, and magnitudes are common in downtown Olympia. Developers are unlikely to change long-term investment decisions and construction timelines based on temporary, short-term construction activities of the nature proposed and common to all action alternatives, even those that are expected to last for a prolonged period of time.

5.3.1.3 Effects on Demand for and Value of Recreation

Construction of all action alternatives would temporarily disrupt recreation activity, and potentially reduce the quality of recreational experiences, particularly in the parts of the project area that currently experience the highest levels of use, leading to **adverse impacts** related to lost recreation value. Mitigation actions may reduce disruption and restore connectivity along trails via detours and temporary structures, but impacts from staging dredging activities at Marathon Park would be unavoidable. Construction activity inherently is disruptive to some people and interesting to others (or perhaps both disruptive and interesting to some people). It is possible that construction activity may actually serve as a draw or enhance the experience and value some users obtain from recreating in the Capitol Lake Basin during the construction period, producing a **beneficial effect** that could potentially offset the adverse impact to recreation.

Construction on 5th Avenue, including dam repair or removal and construction of a new bridge or separate non-vehicular bridge would **temporarily disrupt** the continuity of the loop trail around Capitol Lake—one of the most heavily used trails in the downtown area (See discussion in Section 4.3 about use levels). This discontinuity likely would reduce demand for this trail and cause some people to temporarily substitute to other trails and paths at higher cost or lower value of the recreation experience. However, project adjustments made for the FEIS have reduced the level of disruption across all alternatives. Under the Estuary and Hybrid Alternatives, the previously forecasted closure was anticipated to be up to 4.5 years. Given the updated approach to constructing a new 5th Avenue Bridge, that long-term closure has been reduced to approximately one month. Closures for the Managed Lake Alternative would occur intermittently over a 6-month period, but the closures would be short. The impact on the value of recreation from either of these closure scenarios would be small, especially if timed for lower periods of recreation demand (e.g., during the winter months).

5.3.1.4 Effects on Demand for and Value of Ecosystem Services

Construction of the Build Alternatives would result in changes to habitat, as described in Table 5.1.

Table 5.1. Habitat Design Availability within Study Area for All Alternatives

Habitat Design[1,2]	Existing Conditions	Managed Lake Alternative	Estuary Alternative	Hybrid Alternative
Deepwater Habitat - Freshwater	240 acres	107 acres	-	48
Deepwater Habitat – Estuarine [1]	-	-	37 acres	27 acres
River Channel - Freshwater	25 acres	5 acres	5 acres	5 acres
Vegetated Freshwater Wetlands	51 acres	210 acres	7 acres	7 acres

Habitat Design[1,2]	Existing Conditions	Managed Lake Alternative	Estuary Alternative	Hybrid Alternative
Tideflat	-	-	151 acres	118 acres
Low Marsh – Estuarine	-	-	39 acres	37 acres
High Marsh – Estuarine	-	-	46 acres	45 acres
Vegetated Wetland Transitional[3]	-	-	31 acres	29 acres
Upland	19 acres	14 acres	21 acres	22 acres
Total	**336** acres	**336** acres	**338** acres	**338** acres

1 Not including the West Bay

2 Areas are estimated based on modeled future conditions and rounded to the nearest acre.

3 Transitional between freshwater and estuarine habitats.

Source: Created by Environmental Science Associates using definitions that generally follow the U.S. Fish and Wildlife Service (USFWS) Classification of Wetlands and Deepwater Habitats of the United States system (Cowardin et al. 1979)

Construction of all action alternatives would temporarily disrupt ecosystem services provided by the Capitol Lake Basin, producing costs for people who value them. The effects associated with construction are short-term in nature and facilitate long-term improvements in the ecosystem's ability to produce goods and services that people value. The long-term improvements materialize largely through changes in habitat quality and distribution, as described in Table 5.1.

There would be short-term impacts to water quality from construction activities, such as dredging, dredged material placement for constructing habitat areas, and dam construction (repair or removal). Dredging can increase turbidity and decrease DO levels, potentially resulting in exceeding water quality standards (see *Water Quality Discipline Report* (Herrera Environmental Consultants, Inc. 2020)). Because these water quality disruptions are temporary in nature, they are unlikely to result in increased costs to regulated entities or ratepayers.

Construction activities also have the potential to temporarily affect habitat as dredging and staging disturb existing habitat resources. Noise and activity in natural areas associated with the construction and enhancement of habitat and recreational infrastructure may lead to short-term losses in species presence and biological productivity, which some people may perceive as a temporary cost.

Construction activities would result in increased greenhouse gas emissions, but the emission levels would have a negligible effect on climate regulation (see *Air Quality and Odor Discipline Report* (Ramboll US Corporation 2020)). These construction and staging activities could also temporarily affect visual aesthetic values, particularly from public vantage points close to the resource. Viewsheds may be restricted by construction and staging machinery, or the character of the visual amenity could change

from the temporary introduction of construction and staging activities (see *Visual Resources Discipline Report* (ESA 2020d)). Again, some people may experience this disruption as a temporary cost.

To the extent that construction activities impact culturally valuable resources like historical or archaeological resources from excavation, compaction, and other activities there would also be impacts to cultural, heritage, spiritual, and educational values. If resources are permanently damaged, destroyed, or otherwise changed in character then there could be long-term effects to cultural, heritage, spiritual, and educational values (see *Cultural Resources Discipline Report* (ESA and Northwest Vernacular 2022)). These potential risks would be actively minimized, limiting the potential adverse impact on cultural, heritage, spiritual, and educational value. Construction itself could increase values associated with education, to the extent that it produces opportunities for study of how the ecosystem responds to disruption, intervention, and restoration.

5.4 MANAGED LAKE ALTERNATIVE

5.4.1 Impacts from Construction

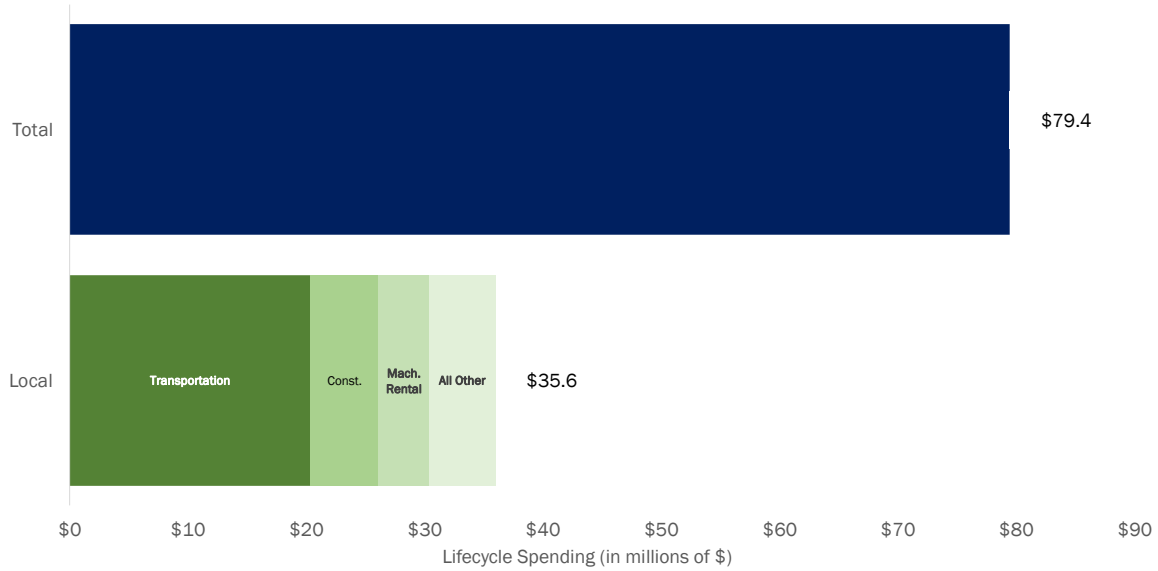
All construction impacts under the Managed Lake Alternative would generally be as described in Section 5.3, Impacts Common to all Build Alternatives. The initial planning-level cost for construction of the Managed Lake Alternative ranges from approximately $76 to $136 million in 2022 dollars, reflecting an accuracy of-25 and +35 percent, consistent with cost estimating at a 15-percent design stage. As design is further developed, costs can be predicted with more accuracy. As noted above, the source of these funds is still undetermined, but is likely to be comprised of a mix of public revenue from multiple sources.

5.4.1.1 Effects on Downstream Economic Activity

The total construction spending for the Managed Lake Alternative would happen over a five-year period. Approximately 45 percent of this spending would occur in or near the City of Olympia or nearby areas in Thurston County, supporting economic activity across the construction and transportation sectors. The remainder would be spent outside the region (i.e., Thurston County), in the state of Washington or outside the state.

Figure 5.1 shows the distribution of total project spending across industries. In total, the Managed Lake Alternative is expected to result in $36 million in new local spending. Of the local spending portion, the majority would likely be spent on transportation-related goods and services. Construction services and machinery rental are the next largest sectors that would receive spending. The remainder would go to industries such as landscape and horticultural services, architectural and engineering, hotels and motels, and waste management and remediation, among others.

Figure 5.1 Construction Spending by Industry for Managed Lake Alternative



Source: ECONorthwest, with data from Moffatt & Nichol 2022

Note: Total refers to construction spending in millions of dollars within the local region and outside the region, in the state of Washington and outside the state. This total represents the midpoint of total construction costs, excluding contingency. For this reason, it differs from preliminary cost estimates reported above.

Construction of the Managed Lake Alternative would occur over a 5-year period. To derive the economic contribution of the project, the average spending over the construction period of the project is used to derive an annualized estimate of supply chain and consumption impacts from local project spending. Using the average of $36 million over a 5-year period, the analysis assumes that $7.2 million in construction spending would occur in the study region, per year (Table 5.2). The labor income and number of direct jobs that directly support the project would ultimately depend on the final project design, but based on industry averages, the project would likely support $2.5 million in labor income and 44 jobs per year.

Table 5.2 Average Annual Economic Contribution from Construction for the Managed Lake Alternative

Effect	Direct ($M)	Indirect ($M)	Induced ($M)	Total ($M)
Output	$7.2	$1.4	$1.6	$10.2
Labor Income	$2.5	$0.6	$0.5	$3.6
Jobs	44	10	10	64

Source: ECONorthwest using IMPLAN

Using that initial change in local demand for construction labor and local goods and services, the project would likely support an average of $10.2 million in economic output, $3.6 million in labor

income, and 64 jobs per year over the 5-year period when the secondary supply chain and consumption effects from that spending are accounted for. Compared to the 2019 labor force, this alternative would affect 0.05 percent of existing employment in Thurston County.

5.4.1.2 Effects on Development in Downtown Olympia

Impacts on downtown development arising from construction activities are unlikely to differ based on the alternative selected.

5.4.1.3 Effects on Demand for and Value of Recreation

Temporary disruptions in environmental quality, resulting from increases in construction-related noise, dust, smell, or access could result in reductions in the economic value people enjoy from participation in recreation. In particular, construction-related disruption of the loop trail around Capitol Lake would occur during the six-month window of construction on the dam and bridge. This is likely to reduce the value of this trail for many users, who use it specifically for exercise because of its circular design. It is possible that many of these users would substitute to other trails for the limited closure durations, so the economic value of trail-based recreation in the study area would not be entirely lost during this period. While negative, the changes in economic value would likely be relatively minor and temporary. If proposed mitigation strategies are implemented as outlined in the *Land Use, Shorelines, and Recreation DR,* these economic losses may be diminished. They may also be partially offset by increases in value arising from people who are attracted to watching construction activity. In some cases, the same people who experience impacts from the project could also experience benefits from the visual appeal of construction. In other cases, construction activity could bring new recreation users to the area.

Construction of boardwalks and habitat enhancements in the Middle and South Basins would expand trail and path-based recreation and is a necessary step to achieving expanded economic benefits from these trails during operation. The economic importance of this restored recreational use is discussed in detail under Impacts from Operations.

Construction of the boat ramp in Marathon Park and dock at the Interpretive Center would facilitate restored water-based recreation in Capitol Lake and is essential to producing economic benefits throughout the duration of the project. The economic importance of this restored recreational use is discussed in detail under Impacts from operations. The activities involved in reconstruction of the dock itself would only produce impacts on demand or value of recreation to the extent that they produce temporary environmental disamenities as described above.

5.4.1.4 Effects on Demand for and Value of Ecosystem Services

Construction related impacts to ecosystem services under the Managed Lake Alternative would generally be as described in *Section 5.3.1.4, Impacts Common to all Build Alternatives (Construction)*. Under the Managed Lake Alternative, there would also be construction activities for the maintenance and repair of the 5th Avenue dam. These temporary activities could result in decreased ecosystem

service value associated with water quality, habitat, recreation value, and visual amenity value, but the changes in ecosystem services would be minor and temporary.

5.4.2 Impacts from Operation

Under the Managed Lake Alternative, long-term impacts on economic resources would arise from new, recurring costs associated with maintenance dredging, and changes in economic value resulting from the stream of goods and services that is produced (or lost) from construction activities.

Recurring maintenance dredging in the North Basin would occur during operation, at an approximately 20-year frequency. This would produce a new recurring cost, and new recurring spending on dredging activities. The estimate for maintenance dredging after the construction period ends is expected to be $141 to $254 million (reflecting an accuracy of -25 to +35 percent) over the 30-year period. This is the cost for upland disposal at a permitted facility, which is understood to be the most likely outcome based on what is known at this time. If environmental conditions or environmental regulations change from existing, and in-water disposal is allowable in the future,, costs could decrease to approximately $56 to $100 million. The cost represents both the level of spending the Managed Lake Alternative would generate during operation, and the amount of revenue that would need to be raised to implement the alternative.

5.4.2.1 Effects on Downstream Economic Activity

Based upon what is currently known about the expected distribution of spending to support the additional dredging and operations spending under this alternative, it is not anticipated that additional local spending would meaningfully change aggregate spending levels or other economic activities within the study region (i.e., Thurston County). Most of those revenues would accrue to businesses in Tacoma, where several in-water construction companies are located, or other areas in the state of Washington. Therefore, economic effects in the study region would be limited.

Maintenance dredging in the North Basin and operation of the restored 5th Avenue Dam would result in no change to navigation in Budd Inlet. This means that the marinas, yacht club, and Port of Olympia would not directly incur costs for dredging beyond those consistent with historic patterns, resulting from terms of their aquatic leases, or related to new investments. That sediment removal in West Bay would not be a project action; and, when conducted by others, it would ensure that each entity is able to maintain operations within the range of historic patterns and continue to generate economic value for the local and regional population and economy.

Changes in the value of ecosystem services associated with water quality regulation have the potential to manifest in the market and produce changes in economic activity. To the extent that the Managed Lake Alternative (like the No Action Alternative) increases the costs in the region to manage wastewater and stormwater, the region may have fewer financial resources available to direct to addressing other priorities. As the increased costs are passed on to ratepayers, households may have to direct more income toward utility payments and have less income to spend in the local economy on

other goods and services. These effects are expected to be similar to the No Action Alternative, but higher than under the Estuary or Hybrid Alternatives.

Through the FGWG process, the members recommended that the state of Washington take responsibility for funding operation of the Managed Lake Alternative. Enterprise Services would need to seek funding from the State Legislature, and implementation of future maintenance dredging and maintenance of other constructed assets and oversight activities would be contingent on receiving state-appropriated funding. As discussed for upfront construction costs, this financial responsibility could result in impacts in the region, arising from the opportunity costs of using resources for this project instead of other regional priorities. Maintenance dredging activities downstream of 5th Avenue Dam would remain the individual responsibility of OYC, the private marinas, the Port, and USACE within each respective jurisdiction. The FGWG recommendations related to project funding are described in more detail in Chapter 7 of the Final EIS.

5.4.2.2 Effects on Development in Downtown Olympia

Capitol Lake is one amenity among many in downtown Olympia. It is closely associated with the Capitol grounds and is emblematic of the recent cultural and civic backdrop of the city. As with any amenity, its effect on the market for development is related to its power to influence people's decisions to locate, visit, or work downtown. In the case of Capitol Lake specifically, interviewees most frequently cited the surrounding walking trails as one of its most compelling features for downtown residents, followed by the views it provides. The influence of these features would continue to attract residential demand to downtown.

Under the Managed Lake Alternative, restored access to Capitol Lake for water-related recreation would expand the types of amenities offered to downtown residents and visitors. Importantly, restoring this access would provide a type of opportunity that is relatively scarce in downtown Olympia, despite being surrounding by waterfront: easily accessible water access. Several interviewees noted that this could be an important addition to downtown, which would enhance its appeal to target market segments.

It is impossible to isolate and quantify the magnitude of the effect of the Managed Lake Alternative on development trends in downtown Olympia directly, relative to other factors. Compared to the No Action Alternative, the effect would **likely be positive**: by restoring access to water-based recreational use and enhancing ecological function throughout the Capitol Lake Basin, the value of the amenities it provides to people would increase. Given that the Managed Lake Alternative is expected to have minimal changes in its overall appearance, people would enjoy these amenities in a context that is already familiar and perceive them as a direct expansion of existing opportunities. The extent to which these changes would affect the market for downtown development independent of the other prevailing market trends described in Section 4.2 is uncertain.

The effect on the market for downtown development could potentially begin to manifest as soon as a decision on a Preferred Alternative is announced. This action would signal to developers increased certainty surrounding the future of the Capitol Lake Basin, and any developers delaying investment

decisions based on this uncertainty (assuming this is occurring, which is speculative and unconfirmed) could move forward. The duration of the effect on downtown development is long-term in nature. The City of Olympia's downtown strategy has a 20-year planning horizon and anticipates significant growth in redevelopment and new development over that period. Changes in the management of Capitol Lake at any time over this period and beyond could have positive or negative consequences for development decisions. Implementing the Managed Lake Alternative would provide more certainty about the future than the No Action Alternative, which would potentially have a positive and enduring effect on downtown development.

The effects on downtown development of implementing the Managed Lake Alternative are unlikely to place disproportionate burdens on marginalized populations. Although it could have some beneficial effects in supporting development and redevelopment in downtown Olympia by enhancing amenities and reducing uncertainty around future conditions, the primary drivers of development decisions will be other factors, such as regional population growth, economic conditions, population demographics, the policy and regulatory environment, and the comparative advantages of other markets in the region. These factors, much more than the direct effects of the Managed Lake Alternative, will govern the changes in the supply, demand, and price of housing and commercial real estate in downtown Olympia, and related equity outcomes.

5.4.2.3 Effects on Demand for and Value of Recreation

The Managed Lake Alternative would retain the existing setting and identity of the Capitol Lake Basin, with relatively minor changes in appearance resulting from enhanced habitat areas. For many people, this would maintain aesthetic elements they perceive as adding value to their recreational experience. For other people, this would have a neutral or negative effect on their experience of recreation in the Basin. The presence of status quo bias and the endowment effect (discussed in Section 4.3) imply that people who value the current landscape features are strongly attached to maintaining them and experience more loss moving to a different state of the world than the benefits they would perceive if they were advocating for the lake as a new feature. It is plausible, though uncertain because no empirical research has been conducted to measure the effect locally, that status quo bias explains, at least in part, the long history of inaction with respect to Capitol Lake management.

This effect is theoretically grounded and suggests maintaining Capitol Lake would preserve its contribution to the value of people's recreational experience. However, the distributional implications of maintaining the status quo are important, especially from a social justice perspective. Status quo bias tends to ignore or diminish the benefits of a change in policy or ignore or diminish the costs of maintaining the status quo. To the extent that the Managed Lake Alternative would sustain a managed environment for recreation and preclude expansion of a more natural or wild recreational setting, **it would produce both beneficial and adverse impacts for future recreational users**, depending on individual preference. Tribal populations would disproportionately experience the adverse impacts, raising social justice issues discussed in more detail with respect to ecosystem services.

Park and Event-Based Recreation

Maintaining Capitol Lake in the Managed Lake Alternative would keep the current setting abutting the parks, where events are often held. As discussed above, this would retain the current value people place on participating in events and visiting parks adjacent to the lake. Reintroducing water-based recreation on the lake has the potential to enhance and expand the offerings of events, by incorporating both shore-based and on-water activities, such as fishing or boat races. Relatively predictable conditions associated with a lake would make it easy to implement these types of activities, like Capital Lakefair, compared to tidal conditions under the Estuary and Hybrid Alternatives.

Trail and Path-Based Recreation

The addition of boardwalks and habitat improvements in the Middle and South Basins would increase the economic value associated with trail use, by offering new routes and enhanced diversity of experiences. Similarly, the addition of the pedestrian bridge in the North Basin would improve the connectivity of the project area with parts of downtown Olympia, lowering potential barriers to use and reducing real or perceived costs related to safety concerns compared to the No Action Alternative.

Water-Based Recreation

Construction of the boat ramp in Marathon Park and dock at the Interpretive Center would facilitate restored water-based recreation in Capitol Lake. Restoring this use has the potential to substantially increase the economic value of recreation supported in the project area. Restoring boating in Capitol Lake also has the potential to enhance the value of other recreation uses; peoples' presence on the lake surface in a variety of non-motorized boats and watercraft would add interest to the environment and provide a focal point for park and trail users. As noted in the *Land Use, Shorelines, and Recreation Discipline Report* (ESA 2020c), restored boating may also expand the offerings of park-based events, consistent with recent historical uses. From an economic perspective, this could increase the spending levels of users who participate in these events, and likely would increase the value people obtain from participating in and observing these events.

Restoration of fishing opportunities, both from shore and from boats, would likely increase the economic value of recreation in the Capitol Lake Basin. Although demand for recreational fishing is trending down overall, it is likely that the proximity of Capitol Lake to where people live would cause some people to substitute trips from locations further away, increasing the value they enjoy from a fishing trip. The extent to which this geographic shift in demand occurs would depend on the types of species available, success rates, and general quality of the angling experience. It may be an ideal low-cost location to introduce people, particularly children, to fishing, potentially expanding demand for fishing in the local area somewhat.

Under the Managed Lake Alternative, formal swimming facilities are not proposed, but may be explored under a future action, as discussed in the *Land Use, Shorelines, and Recreation Discipline Report* (ESA 2020c). Therefore, the economic value associated with potential future swimming use is not included here. However, improvements in environmental conditions, compared to the No Action Alternative,

makes it more likely that swimming could be added at a later date, generating what economists call *option value* for some people who would like to see swimming restored. Option value refers to the possibility that someone might be able to consume a good or have an experience in the future, even if they have no plans to do so today.

For all categories of restored in-water recreation, the Managed Lake Alternative would produce **beneficial effects** and would persist from the conclusion of construction activities throughout the life of the project. Beneficiaries would include all users of park facilities, current and future business owners in the City of Olympia, and local and state governments, which may collect increased revenues from increases in spending. Residents of downtown Olympia could enjoy higher levels of benefits compared to other users due to their very close proximity to the restored access.

No access would exist for motorized boats, which would mean there would be no change in demand for or value of recreation associated with motorized boating. Because the Managed Lake Alternative also would not likely affect the navigability of downstream marinas, the value of recreational boating in Budd Inlet would also not change (see discussion above related to downstream economic impacts).

5.4.2.4 Effects on Demand for and Value of Ecosystem Services

The Managed Lake Alternative would retain many of the ecosystem services associated with the No Action Alternative and create only minor changes in the type and magnitude of ecosystem services provided by the Capitol Lake Basin.

Water Quality Regulation

The Managed Lake Alternative includes an adaptive management approach that would be implemented to ensure that performance goals are maintained for water quality, aquatic plant, algae, invasive species, and habitat. There would be no change to water quality in Budd Inlet under the Managed Lake Alternative. Budd Inlet would continue to exceed DO standards each summer in the lower water column.

In June 2022, Ecology released the draft Budd Inlet Total Maximum Daily Load (TMDL) for Dissolved Oxygen with wasteload allocations for permitted sources of pollution. The TMDL sets pollution limits that are intended to help meet water quality standards in Budd Inlet. The TMDL states that Capitol Lake is the largest source of DO depletion to Budd Inlet and that this is due to both its production of algae and aquatic plants and the impact of the dam on circulation patterns. While the TMDL did not assign a wasteload allocation for Capitol Lake, it requires that if the lake basin is managed differently than the 'natural' estuary condition, it cannot cause water quality standards violations at any time or location in Budd Inlet, as determined though mechanistic modeling. It is unlikely Enterprise Service would be able to meet these discharge conditions, so Ecology would need to enforce lower wasteload allocations on other permitted dischargers.

There are four wastewater treatment plants that discharge directly to Budd Inlet. Ecology has assigned TMDL allocations to each of these treatment plants in the draft TMDL. LOTT is the largest of these

dischargers. As a discharger to Budd Inlet, Ecology established a TMLD allocation for LOTT in the draft TMDL. LOTT's compliance strategy is a function of its treatment capacity, alternative discharge options (e.g., producing and selling reclaimed water), and nutrient loading in its wastewater (a function of population growth). In cooperation with Ecology, LOTT has been planning for future investments to meet this new TMDL as well as growth in wastewater treatment demand as the region's population increases. Similar to the No Action Alternative, under the Managed Lake Alternative, it is likely that Ecology would further reduce LOTT's wasteload allocation beyond what is in the draft TMDL to make up for ongoing contributions from Capitol Lake. This creates a high likelihood that LOTT would have to invest in additional treatment sooner than it otherwise plans to, **increasing the costs** for LOTT's ratepayers beyond current expectations. If this happens, households may have to direct more income toward utility payments and have less income to spend in the local economy on other goods and services. It is likely that there would be additional costs for the other treatment plant dischargers as well. Operational impacts associated with recurring maintenance dredging to maintain target depths are common to all action alternatives. Recurring dredging would be required in the North Basin under the Managed Lake Alternative. Dredging can increase turbidity and decrease DO levels, temporarily reducing water quality in minor ways that may reduce the value people derive from the ecosystem.

Flood Regulation

Consistent with the No Action Alternative, overland flooding from Capitol Lake Basin for the extreme river flood event under the Managed Lake Alternative could result in water surface elevations in the downtown area that exceed the flood-proofing elevations set in the Olympia Sea Level Response Plan. As a result, utilities and property owners could incur costs related to flood disruption and damage during extreme river flood events under the Managed Lake Alternative. Accordingly, the Managed Lake Alternative does not improve the ecosystem's ability to attenuate river-related flood events, likely resulting in a similar level of cost arising from disruptions and damage to property as under the No Action Alternative. Mitigation options discussed in the *Land Use, Shorelines, and Recreation Discipline Report* could reduce these costs.

Habitat Provision

In the Managed Lake Alternative there would continue to be "Deepwater Habitat - Freshwater", "River Channel – Freshwater", and "Upland" habitat types, but the acres for these habitat types would be reduced while "Vegetated Freshwater Wetlands" habitat would increase from 51 to 210 acres compared to Existing Conditions (see Table 5.1 for a comparison of habitat availability under each alternative). The Managed Lake Alternative would improve the diversity and quality of habitat relative to the No Action Alternative, producing benefits for people who value the habitats and species found within the Capitol Lake Basin. Fish and wildlife distribution and use patterns would be similar to existing conditions, as the Basin would remain a freshwater system. Greater habitat complexity associated with a shift over time toward wetland habitat in the Middle and South Basins and the construction of habitat islands, combined with new recreation infrastructure that would bring people closer to habitats, are likely to increase the value people derive from habitat and species in the Managed Lake Alternative. As a freshwater system, habitat would support fish species popular with recreational anglers and potentially some local populations who fish for subsistence purposes. These people would be able to fish from the

shore and the lake as water access is restored under the Managed Lake Alternative. Habitat changes would not favor improvements to salmonid populations and other saltwater and estuarine-dependent species that are important to tribal populations. The cultural, heritage, spiritual, and educational values associated with fish populations in the Managed Lake Alternative are discussed later in this section.

Climate Regulation

The Managed Lake Alternative would result in slightly lower greenhouse gas emissions than the No Action Alternative, but provides minimal co-benefits for reducing, capturing, or storing greenhouse gas emissions in the freshwater system. This alternative results in the lowest construction and operation-related GHG emissions, but does not provide long term flexibility for climate change adaptation. It is less consistent with local climate change adaptation policies than the Estuary and Hybrid Alternatives.

Visual Aesthetics

Of all the action alternatives, the Managed Lake Alternative would retain the existing appearance of Capitol Lake, resulting in the least change to visual aesthetic value compared to current conditions and the No Action Alternative. Although conditions would be similar, there would be changes to the Middle Basin where habitat islands would obstruct views across the basin from Deschutes Parkway locations. The new recreational features that are common to all action alternatives, such as the 5th Avenue pedestrian bridge, would also alter the visual appearance and potentially obstruct views, but also create new viewing areas. Visual aesthetic value could increase because the new recreation features would provide new and potentially different visual experiences, but it could also reduce visual amenity value if the new structure block or alter existing viewpoints that people value. Overall, the impact on visual aesthetic value is likely to be neutral to positive for most people using the parks and recreational features in the area. The impact would almost certainly be neutral for people deriving value from more distant views, from both public and private vantage points.

Cultural, Heritage, Spiritual, and Education

The cultural value for tribes of the Managed Lake Alternative would be similar to conditions within the No Action Alternative. Tribal values would continue to be adversely impacted by the continued loss of connection to the natural environment and anthropogenic harm to the balance and functions from natural ecosystems. The lack of access to water resources, presence of the 5th Avenue dam, and impacts to species and natural functions has created costs in the form of reduced value to tribes and would continue to do so in the Managed Lake Alternative. As this alternative continues to impose costs on a historically marginalized population, an equitable consideration of cultural, heritage, spiritual, and educational value under the Managed Lake Alternative would need to consider the past inequities associated with management of the Capitol Lake Basin.

Because the Managed Lake Alternative is the most similar to current conditions and the No Action Alternative, it would preserve the value people derive from maintaining the Capitol Lake reflecting pool. By restoring in-water uses, it would allow people to resume historically allowable uses of the lake, enhancing their connection to the recent past and augmenting the cultural value they derive from the resource.

To the extent that people (e.g., school children, tourists, researchers) use the Capitol Lake Basin for educational and research pursuits, these activities would continue to yield value under the Managed Lake Alternative.

5.5 ESTUARY ALTERNATIVE

5.5.1 Impacts from Construction

In addition to the construction actions discussed above for all alternatives, the Estuary Alternative would require additional construction spending and would generate additional changes in the physical environment from these actions:

- Initial dredging of the North and Middle Basins is a direct project cost and likely would reduce impacts to navigation in Budd Inlet.
- Stormwater outfall replacement is a direct project cost and would maintain functionality and extend the lifespan of utility infrastructure following the removal of the 5th Avenue Dam.
- Coating the Arc of Statehood (the wall that separates the North Basin from Heritage Park) is a direct project cost.
- 5th Avenue Dam and 5th Avenue Bridge removal is a direct project cost. This action is required to reintroduce tidal flow to the Capitol Lake Basin and is a precursor to generating the stream of benefits associated with human use of the restored estuary.
- Construction of a new 5th Avenue Vehicle Bridge and realignment and slope stabilization of Deschutes Parkway is a direct project cost and is required to maintain transportation patterns and access between downtown Olympia and points south and west.
- Construction of a new hand-carried boat ramp at Marathon Park is a direct project cost and would facilitate recreational access via human-powered watercraft to the North and Middle Basins and Budd Inlet, increasing the quantity and quality of recreation opportunities.

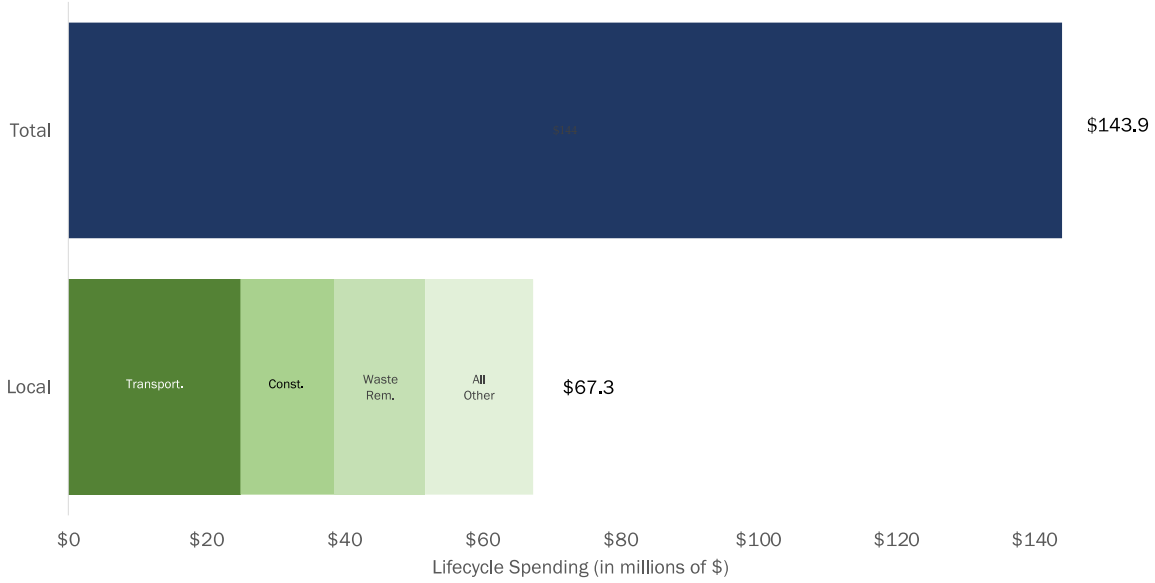
The initial planning-level cost for construction of the Estuary Alternative is in the range of approximately $137 to $247 million in 2022 dollars, with an accuracy of +35 and -25 percent, consistent with cost estimating at a 15-percent design stage. As design is further developed, costs can be predicted with more accuracy. As noted above, the source of these funds is still undetermined, but is likely to be comprised of a mix of public revenue from multiple sources.

5.5.1.1 Effects on Downstream Economic Activity

The total construction spending for the Estuary Alternative would be spent over a seven to eight-year period. Approximately 47 percent of construction spending would occur in or near the City of Olympia or nearby areas in Thurston County, supporting economic activity across the construction and transportation sectors. Figure 5.2 displays the distribution of total project spending across industries. In total, the Estuary Alternative is expected to result in almost $67 million in new local spending. Of the local spending portion, the majority would likely be spent on transportation-related goods and services.

Construction services and machinery rental are the next largest sectors that would receive spending. The remainder would go to industries such as landscape and horticultural services, architectural and engineering, hotels and motels, and waste management and remediation, among others.

Figure 5.2 Total Construction Spending by Industry for the Estuary Alternative



Source: ECONorthwest, with data from Moffatt & Nichol 2022

Note: Total refers to construction spending in millions of dollars within the local region and outside the region, in the state of Washington and outside the state. This total represents the midpoint of total construction costs, excluding contingency. For this reason, it differs from preliminary cost estimates reported above.

Based on the $67 million in local spending that would occur over a seven-year period, approximately $9.6 million in construction spending would likely occur in the study region, per year (Table 5.3). Using industry averages for a project of this type and size and distribution spending, the local spending would support $3.6 million in labor income and 58 jobs each year. After accounting for the indirect and induced effects associated with the local project spending, a total of $13.6 million in economic output, $5.0 million in labor income, and 85 jobs would be supported per year over the project's lifecycle. This amounts to 0.03 percent of the existing labor force in Thurston County.

Table 5.3 Average Annual Economic Contribution from Construction for the Estuary Alternative

Effect	Direct ($M)	Indirect ($M)	Induced ($M)	Total ($M)
Output	$9.6	$1.8	$2.2	$13.6
Labor Income	$3.6	$0.7	$0.7	$5.0
Jobs	58	12	14	85

Source: ECONorthwest using IMPLAN

5.5.1.2 Effects on Development in Downtown Olympia

Impacts on downtown development arising from construction activities are unlikely to differ based on the alternative selected. Changes to the design and construction of the new 5th Avenue Bridge incorporated into the FEIS, which maintain traffic circulation patterns through downtown during construction will minimize disruption to existing downtown businesses.

5.5.1.3 Effects on Demand for and Value of Recreation

Temporary disruptions in environmental quality, resulting from increases in construction-related noise, dust, smell, or access could result in reductions in the economic value people enjoy from participation in recreation. Connection of the new 5th Avenue bridge to the adjacent roadways will cause closures of up to one month throughout construction, rather than the initially assumed design that would cause a long-term closure of up to approximately 4.5 years. Temporary closure of the trail may temporarily reduce the value of the trail around Capitol Lake for many users, especially those who use it specifically for exercise because of its circular design. If trail disruptions are mitigated as proposed in the *Land Use, Shorelines, and Recreation DR*, these economic losses may be diminished somewhat.

Construction of boardwalks and habitat islands in the Middle and South Basins would expand trail and path-based recreation and is a necessary step to achieving expanded economic benefits from these trails during operation. The economic importance of this restored recreational use is discussed in detail under Impacts from Operations.

Construction of the boat ramp in Marathon Park and dock at the Interpretive Center would facilitate restored primary water-based recreation in Capitol Lake and is essential to producing economic benefits throughout the life of the project. The economic importance of this restored recreational use is discussed in detail under Impacts from Operations. The activities involved in reconstructing the dock itself would only produce impacts on demand or value of recreation to the extent that they produce temporary environmental disamenities as described above.

5.5.1.4 Effects on Demand for and Value of Ecosystem Services

Construction related impacts to ecosystem services under the Estuary Alternative would generally be as described in *Section 5.3.1.4, Impacts Common to all Build Alternatives (Construction)*. As part of construction of the Estuary Alternative the 5th Avenue Dam would be removed. Dam removal would result in an initial release of sediment and nutrients which would have temporary adverse impacts on water quality within Budd Inlet. These water quality impacts and associated value would be expected to normalize after sediments settle or are flushed out of the system, which may take several days to a few weeks. Because of the short-term nature, no ecosystem service values would be meaningfully impacted by water quality changes during the construction period for the Estuary Alternative.

The Estuary Alternative has a longer construction period than the Managed Lake Alternative due to construction of a new 5th Avenue Bridge, Deschutes Parkway realignment, 5th Avenue dam demolition, slope stabilization, and other activities. These construction activities would therefore result in larger

reductions in value associated with disruption to habitat provision and visual aesthetic resources compared to the Managed Lake Alternatives. Because of the short-term nature, cultural, heritage, spiritual, and educational values would not likely be meaningfully impacted by construction activities.

5.5.2 Impacts from Operation

Long-term impacts on economic resources would be associated with changes in economic value resulting from the goods and services that are produced (or lost) from construction activities.

Recurring maintenance dredging in areas of impact in West Bay would also occur during operation to avoid or minimize impacts to navigation. This would produce a new recurring cost, and new recurring spending on dredging activities. The estimate for maintenance dredging after the construction period ends is expected to range from $40 to $71 million[11] in 2022 dollars (reflecting an accuracy of -25 to +35 percent) over a 30-year period, assuming the dredged material is placed in open water rather than at an upland facility. While open water disposal is assumed, costs could increase to $214 to $385 million in 2022 dollars if the sediment is determined not suitable for in-water disposal and upland disposal at a permitted facility is needed.

5.5.2.1 Effects on Downstream Economic Activity

Based upon what is currently known about the expected distribution of spending to support the additional dredging and operations spending under this alternative, it is not anticipated that additional local spending would meaningfully change aggregate spending levels or other economic activities within the study region. Most of those revenues would accrue to businesses in Tacoma, where many in-water construction contractors are located, or other areas in the state of Washington.

Maintenance dredging in West Bay is proposed to avoid or minimize significant impacts to navigation in Budd Inlet. Maintenance dredging would allow downstream economic activity at the Port, the private marinas, and the OYC would continue into the future. If funding for maintenance dredging does not materialize or if it does not occur for any reason, sediment would continue to accumulate in West Bay, reducing access to marina moorage—especially for deeper draft boats—and reducing accessibility of the Port's vessel berths and passage through the federal navigation channel for some ships during low tide. If maintenance dredging did not occur at all over the 30 year project time horizon after construction, 50 percent of the existing slips at the OYC and 25 percent of the slips at the private marinas would become inaccessible. If this occurs, it could substantially impact the revenue generation potential of these businesses and organizations and potentially reduce the overall economic contribution of recreational boating to the region's economic activity. More limited navigation, especially for fully loaded ships, could reduce the demand for the Port's marine terminal, reducing overall revenue to the Port of Olympia. However, the Port vessel berths would likely remain functional, with impacts primarily to operations at the southern vessel berth. **Failure to implement maintenance**

[11] This represents the total cost of maintenance dredging over 30 years under the Estuary Alternative, including dredging the equivalent amount of sediment associated with the No Action Alternative and the additional dredging that would be required under the Estuary Alternative.

dredging would likely result in a loss of value and loss of economic activity to the region associated with impacts to the Port and businesses downstream of the 5th Avenue Dam.

FGWG members have developed an MOU to outline their agreement in principle that local jurisdictions, the state, and the federal government would share financial responsibility related to dredging that would occur under the terms of the agreement and other operations costs under the Estuary Alternative. The OYC and the private marinas would incur the same maintenance dredge costs under all alternatives, consistent with dredging that would be required under the No Action Alternative to avoid significant impacts from sediment accumulation. Progress towards a binding ILA for shared project governance and funding is documented in the FGWG MOU and described in more detail in Chapter 7 of the FEIS.

Funding and completing maintenance dredging would protect navigability in West Bay, which is needed to sustain the economic benefits and impacts associated with a working waterfront in downtown Olympia. It would also produce opportunity costs when local governments use resources for this project instead of other regional priorities. The extent and magnitude of these opportunity costs would depend on what the funders would have spent the money on if the project didn't happen. These long-term financial arrangements have important economic implications but will remain somewhat uncertain until FGWG members finalize a binding Interlocal Agreement and Enterprise Services secures funding to construct the project.

Improvements to habitat for salmonid and shellfish populations under the Estuary Alternative are likely to have a positive impact on the value of tribal and non-tribal commercial fisheries, which support employment in the region. The effect has not been quantified, so cannot be translated into a monetary or other economic measure. Based on what is known of the underlying biological effects, any change in fish habitat productivity and related change in fish populations available for commercial catch is likely to be small compared to the current productivity and associated value of commercial fisheries. However, given regional scarcity of salmonids and catch restrictions for commercial fishing, any increase would likely be valuable even if it would not support discernable changes in economic activity.

5.5.2.2 Effects on Development in Downtown Olympia

This assessment of impacts is drawn from the findings of the key-informant interviews, the market assessment presented in Section 4.2, and the results of the literature review.

Capitol Lake is one amenity among many in downtown Olympia. It is closely associated with the Capitol grounds and is emblematic of the recent cultural and civic backdrop of the city. Transforming this area into an estuary is likely to, at least initially, produce uncertainty in the minds of some members of the public and potential developers—especially those skeptical of this direction. However, in its transformation, the Estuary Alternative would expand the types of experiences people can have in downtown Olympia, which—so long as it is not perceived as incongruent or noxious—is likely to be complementary to existing upward trends in demand for housing and commercial real estate. This perception is key, however. The Estuary Alternative is inherently associated with more uncertainty because it requires change, and development markets have the potential to react negatively to

uncertainty, especially in combination with other sources of uncertainty. The duration of this uncertainty is likely only to last through the decision process, and potentially into construction—once implementation is complete and a long-term management structure is in place, the project would either prove itself successful or not, in either case developers' uncertainty resolves.

It is impossible to isolate and quantify the magnitude of the effect of the Estuary Alternative on development trends in downtown Olympia directly, relative to other factors. Developers and planning professionals interviewed in the scope of this analysis consistently identified that careful attention to implementation of the Estuary Alternative is critical to how people experience it and ultimately how it affects individual decision-making and overall market trends. A well-executed project that produces an accessible public open space, restores human interaction with and access to water resources, and expands the range of experiences people can have in downtown Olympia is unlikely to produce a negative effect in the market for development. It is, in fact, **likely to yield benefits** over the No Action Alternative.

A higher risk of adverse impacts would occur with a project implementation plan that omits features that invite people to interact with the resource, or that result in a visually or otherwise unattractive feature. However, the design of the Estuary Alternative, includes boardwalks, enhanced water-related recreation access, and establishment of diverse shoreline ecology that provide a broader range of experiences. All of these features are consistent with the types of amenities interviewees pointed to as adding value to the downtown area. Timing is key: implementing the Estuary Alternative in phases, with the possibility of delaying features, such as boardwalks, that have the most influence over how people experience the resource, would potentially reduce the value of the project as an amenity to downtown development. This would increase the risk of neutral or negative impacts on downtown development over time. Project phasing is not proposed at this time, though construction of the Estuary Alternative would progress in phases, given the range of construction activities.

Another factor that could increase the risk of adverse impacts is uncertainty surrounding resources available to execute an implementation plan effectively over the long run. As the Estuary Alternative would transform the existing Capitol Lake amenity, the ability of governments to manage that transformation and any unintended consequences that could arise and produce negative experiences downtown may reduce public or investor confidence and have ripple effects on downtown development plans.

A few interviewees, and many members of the public in past and current discourse around the project, have expressed a distinct preference against the Estuary Alternative. Some interviewees, and many members of the public have expressed a distinct preference for it. There is no clear signal from the research conducted for this impact assessment that implementing the Estuary Alternative would reduce demand for residential or commercial development in downtown Olympia. The City of Olympia's plans for the redevelopment of downtown are long-range, and investment in residential and commercial development is expected to increase in intensity (more units per year) over the next decade. As new developments are brought online following a decision on a Preferred Alternative, the market is likely to adjust; potential residents and retailers who hold a preference for a more natural

environmental condition are likely to find the Estuary Alternative increases their desire and willingness to pay to locate in downtown Olympia. For some people who express a preference against the Estuary Alternative, an efficient, well-planned, and thoughtfully designed implementation may change their mind or have a more limited impact on their overall well-being than they initially expected. The majority of interviewees were optimistic that once change occurs under the Estuary Alternative—assuming it is implemented with well-designed features that draw people to experience the new environment (e.g., boardwalks, docks that facilitate in-water recreation, etc.)— the market for development in downtown Olympia would adjust.

Any potential effects on the market for downtown development could potentially begin to manifest as soon as a decision on a Preferred Alternative is announced. This action would signal to developers—in a best-case scenario—increased certainty surrounding the future of the Capitol Lake Basin. Any developers delaying investment decisions based on this uncertainty (assuming this is occurring, which is speculative and unconfirmed) could move forward. The duration of the effect on downtown development is long-term in nature. The City of Olympia's downtown strategy has a 20-year planning horizon and anticipates significant growth in redevelopment and new development over the period. Changes in the management of Capitol Lake at any time over this period and beyond could have positive or negative consequences for development decisions. Implementing the Estuary Alternative, with assurances about its design and long-term implementation strategy, would provide more certainty about the future than the No Action Alternative, which would potentially have a positive and enduring effect on downtown development.

The effects on downtown development of implementing the Estuary Alternative are unlikely to place disproportionate burdens on marginalized populations. Although it could have some positive effects in supporting development and redevelopment in downtown Olympia by enhancing amenities and reducing uncertainty around future conditions, the primary drivers of development decisions will be other factors, such as regional population growth, economic conditions, population demographics, the policy and regulatory environment, and the comparative advantages of other markets in the region. These factors, much more than the direct effects of the Estuary Alternative, will govern the changes in the supply, demand, and price of housing and commercial real estate in downtown Olympia, and related equity outcomes.

5.5.2.3 Effects on Demand for and Value of Recreation

Removal of the 5th Avenue Dam would restore estuary conditions in the project area. This would produce major changes in appearance of the North and Middle Basins and would produce more gradual environmental changes throughout the South Basin over time. For many people, this dramatic change would reduce their enjoyment of the parks surrounding the Basin, for the reasons outlined for the Managed Lake Alternative, related to status-quo bias. It is unclear how many locals and visitors would go elsewhere to recreate, potentially at higher travel cost and lower level of enjoyment compared to the Managed Lake Alternative or No Action Alternative, resulting in an **adverse impact**. Some evidence from the literature suggests the initial loss in economic value associated with perceived negative

environmental changes may taper over time, as people adjust to the change, form new attachments to place, and discover new ways of deriving recreation-related value.

For other people, restoring estuarine conditions would increase the value of their recreation experience, by creating new recreation opportunities (e.g., tidal zone exploration), more diverse ecological experiences, and more preferential cultural and symbolic associations with a more natural setting. As with the Managed Lake Alternative, the distributional implications of implementing the Estuary Alternative are important, especially from a social justice perspective. Status quo bias tends to ignore or diminish the benefits of a change in policy or ignore or diminish the costs of maintaining the status quo. To the extent that the Estuary Alternative would create a more natural or wild recreational setting than is currently present, **it would produce both beneficial and adverse impacts for future recreational users**, depending on individual preference. Tribal populations would disproportionately experience the benefits of restoration to an estuarine system, producing social justice benefits discussed in more detail with respect to ecosystem services.

Park and Event-Based Recreation

The Estuary Alternative would not affect the range of uses currently enjoyed at the parks adjacent to the North Basin. As discussed above, people who have a preference for the current lake setting may experience diminished value in participating in or holding events at the park. But other people with preferences for a more natural system, or who are indifferent to setting, would not experience a loss in value and may enjoy more value from these recreation facilities. Established events associated with Capitol Lake (e.g., Capital Lakefair) may incur costs—both monetary and non-monetary—needed to realign or reimagine a future under the Estuary Alternative. While all upland facilities will remain to support these events, the cultural and symbolic orientation toward the lake may influence how quickly and efficiently organizers are able to adapt to new conditions. Long-term, demand for public celebrations and events will likely ensure that people continue to use the facilities in Heritage Park to create social value.

There is likely to be a smaller window of time where water-based activities can occur in conjunction with park-based events given the tidal fluctuation that would be restored. However, as long as coordination occurs, the increased value would still materialize, but may be less than the Managed Lake Alternative.

Trail and Path-Based Recreation

The addition of boardwalks and habitat improvements in the Middle and South Basins would increase the economic value associated with trail use, by offering new routes and enhanced diversity of experiences. Similarly, the addition of dedicated bike and pedestrian facilities on the new 5th Avenue bridge would improve the connectivity of the project area with parts of downtown Olympia, lowering potential barriers to use and reducing real or perceived costs related to safety concerns compared to the No Action Alternative.

Water-Based Recreation

Removing the 5th Avenue Dam and constructing a boat ramp in Marathon Park and Interpretive Center would facilitate restored water-based recreation in Capitol Lake—Deschutes Estuary. Boating conditions would be substantially more dynamic and diverse in the Estuary Alternative than the Managed Lake Alternative. Tidal conditions would mean that areas outside of the main channel would not be navigable at all times, though given the tidal elevations, water depth throughout the North Basin would be sufficient to support human-propelled watercraft approximately half of the time. Higher tides that would allow for this recreation in the North Basin occur more frequently during daylight hours in the winter; whereas, low tide conditions occur more frequently during daylight hours in the summer during peak boating season. Accessibility to the water from the boat launch sites would also vary depending on tidal levels. Connectivity with Budd Inlet would be restored allowing boats (non-motorized and motorized) to move in and out of the estuary during higher tidal elevations.

Restoring boating use has the potential to substantially increase the economic value of recreation supported in the project area compared to the No Action Alternative. The user experience would be substantially different under the Estuary Alternative than the Managed Lake Alternative, but it is not clear that it would have a lower economic value. The amount of time the Capitol Lake—Deschutes Estuary would be navigable to most boats would be shorter, implying a reduced quantity of this type of recreation. However, it is possible that people would time their trips to account for this, and tidal influence would not reduce the overall use of the area. Dynamic and more natural conditions could increase the value of the experience for some boaters and reduce it for others. Among recreation users, the Estuary Alternative would produce some benefits and some adverse impacts relative to the Managed Lake, but the net effect is not readily discernible.

As with the Managed Lake Alternative, people's presence in a variety of non-motorized boats and watercraft would add interest to the environment and provide a focal point for park and trail users, though the effect may be less prominent because the environmental setting is overall more dynamic. As noted in the *Land Use, Shorelines, and Recreation Discipline Report* (ESA 2020c), tidal conditions may reduce the feasibility of organized boating events in the Estuary Alternative. To the extent events happen, spending in the local area would likely increase, as would the economic value people obtain from participating in and observing these events.

Similar to the Managed Lake Alternative, restoration of fishing opportunities, both from shore and from boats, would likely increase the economic value of recreation in the Capitol Lake—Deschutes Estuary. Although demand for recreational fishing is trending down overall, it is likely that the proximity of Capitol Lake—Deschutes Estuary to where people live would cause some people to substitute trips from locations further away, increasing the value they enjoy from a fishing trip. The extent to which this geographic shift in demand occurs would depend on the types of species available, success rates, and general quality of the angling experience. It may be an ideal low-cost location to introduce people, particularly children, to fishing, potentially expanding demand for fishing in the local area somewhat.

Compared to the Managed Lake Alternative, conditions under the Estuary Alternative would likely be less desirable for supporting potential future swimming use (which is not proposed here for reasons discussed in the *Land Use, Shorelines, and Recreation Discipline Report* (ESA 2020c)). This would potentially limit the option value associated with this opportunity and have a limited economic benefit.

For all categories of restored in-water recreation, the Estuary Alternative would produce positive (beneficial) impacts and would persist from the conclusion of construction activities throughout the life of the project. Beneficiaries would include all users of park facilities, current and future business owners in the City of Olympia, and local and state governments, which may collect increased revenues from increases in spending. Residents of downtown Olympia could enjoy higher levels of benefits compared to other users due to their very close proximity to the restored access.

5.5.2.4 Effects on Demand for and Value of Ecosystem Services

The Estuary Alternative would alter the appearance and functions of the Capitol Lake Basin ecosystem by restoring tidal exchange. This would substantially change the availability, distribution, and value of goods and services produced by the Capitol Lake Basin ecosystem.

Water Quality Regulation

Water quality regulation would be substantially changed in the Estuary Alternative compared to the No Action or Managed Lake Alternatives. Water quality within the North Basin and Middle Basin would transition from a freshwater lake to a saltwater estuarine environment subject to tidal exchange. This change would alter the plant and animal species able to live in the area. The impacts to plant and animal species are discussed in the Habitat Provision Section below.

As an estuary, the North and Middle Basins would no longer be subject to the current water quality standards designed for freshwater. Instead, marine water quality standards would apply. In Budd Inlet, DO may nominally increase, potentially improving conditions for fish species. In the North and Middle Basin DO levels would decrease but represent low DO concentrations typical of estuary ecosystems. Under an Estuary Alternative, Ecology modeling predicts that water quality would improve in Budd Inlet, though some discrete violations of DO may still occur in summer months.

In June 2022, Ecology released the draft Budd Inlet Total Maximum Daily Load (TMDL) for Dissolved Oxygen with wasteload allocations for permitted sources of pollution. The TMDL sets pollution limits that are intended to help meet water quality standards in Budd Inlet. The TMDL assumes that the Capitol Lake basin is managed as a 'natural' estuary and sets wasteload allocations for dischargers accordingly. As a discharger to Budd Inlet, Ecology established a TMLD allocation to LOTT. LOTT's compliance strategy is a function of its treatment capacity, alternative discharge options (e.g., producing and selling reclaimed water), and nutrient loading in its wastewater (a function of population growth). In cooperation with Ecology, LOTT has been planning for future investments to meet this new TMDL as well as growth in wastewater treatment demand as the region's population increases.

Under the Estuary Alternative, while it is still possible that Ecology will further regulate LOTT's allocation in response to future conditions in Budd Inlet, there is a lower probability compared to the No Action or Managed Lake Alternatives that LOTT would face increased costs in the future beyond what it is currently planning for. If Ecology does establish a more stringent allocation in the future, LOTT would have more time to plan for it. Regulatory changes that occur further in the future could reduce LOTT's compliance costs in several ways: the market could shift for different nutrient management strategies (e.g. reclaimed water) to be economically feasible; future developments in technology could be less expensive per unit of nutrient removal than they are today; and at a minimum, delays could allow more time for LOTT to save for future investments. While Ecology's regulatory requirements may still create costs for LOTT's ratepayers beyond current expectations under the Estuary Alternative, the chance is smaller, which represents a quantifiable benefit in terms of avoided cost to LOTT and its ratepayers.

Operations-related impacts associated with recurring maintenance dredging to maintain target depths are common to all action alternatives. Recurring dredging would occur in the impacted areas of West Bay under the Estuary Alternative. Dredging can increase turbidity and decrease DO levels, potentially resulting in exceeding water quality standards, however these impacts would be temporary and would not likely result in costs to regulated entities (see *Water Quality Discipline Report* (Herrera Environmental Consultants, Inc. 2020)).

Flood Regulation

Under the Estuary Alternative, water levels within the Capitol Lake Basin would no longer be controlled by the 5th Avenue dam/tide gate and would rise and fall with the tides. Maximum water levels for the Estuary and Hybrid Alternatives would be slightly lower than that of the No Action and Managed Lake Alternatives (see *Public Services Utilities Discipline Report* (ESA 2020a)), increasing the ecosystem's ability to regulate floodwaters flowing downstream from the Deschutes River. Thus, the risk and associated cost of flooding from riverine flood events is likely lower under the Estuary Alternative than the No Action or Managed Lake Alternatives.

Habitat Provision

In the Estuary Alternative there would no longer be the 240 acres of "Deepwater Habitat – Freshwater" as a habitat type exist in the Existing Conditions. These acres would be redistributed to the other habitat types, primarily "Tideflat" habitat which would increase from zero to 151 acres (see Table 5.1 for a comparison of habitat availability under each alternative). The transition from a freshwater to an estuarine ecosystem throughout much of the Capitol Lake Basin would fundamentally change the type of habitat available and thus, the presence and distribution of species. Freshwater plants would be replaced by saltwater tolerant plants. The loss of freshwater habitat may generate costs for some people. As the transition to estuarine ecosystem communities is completed, the loss some people experience would be offset by gains in value from the new habitat, especially habitat that supports continued persistence of threatened species. This process will take time, and the perceived impact will vary from person to person. Overall, the transition would eradicate aquatic invasive plant species that are intolerant to saltwater (e.g., Eurasian watermilfoil, curly pondweed, and purple loosestrife) and reintroduce native, saltwater-tolerant species. People who hold a preference for native ecosystems

would likely value the native habitat more highly than the current habitat, and would perceive a net benefit in habitat provision.

Objective measurements of habitat productivity between ecosystem states over time have not been estimated, so it is impossible to conclude the value of the ecosystem's habitat under an estuarine ecosystem is higher value than under the Managed Lake Alternative. However more highly-valued species (in terms of commercial, recreational, and non-use value), such as salmon and shellfish, would benefit from a shift to estuarine conditions. The North Basin's extensive shallow water habitat under the Estuary Alternative would provide preferred rearing habitat for juvenile salmon, and dam removal would be beneficial for migratory fish. Some freshwater fish species would be adversely impacted by the loss of the freshwater environment in the North Basin, but many of these freshwater fish are non-native species that prey on native species like salmon. Eradicating them likely would further improve salmon populations. To the extent that increases in fish populations increase the productivity of commercial, recreational, or subsistence harvests in the project area and beyond, there would be an increase in the value of habitat provision. There would also be beneficial impacts to tribal commercial and subsistence fishing, which could expand into the estuary and experience enhancement in Puget Sound downstream of the project area. The cultural, heritage, spiritual, and educational values associated with fish populations in the Estuary Alternative are discussed later in this section. Existence values associated with species (e.g., salmon) that proliferate under estuarine conditions would also increase.

In addition to the loss of freshwater fish populations that some people value for angling, adverse impacts from the Estuary Alternative are primarily associated with habitat for Yuma and little brown bats. These bats prey on insects from freshwater environments. The bat colonies that feed near Capitol Lake appear to prefer this habitat more than other nearby freshwater lakes, suggesting a dependence on the ecosystem. To the extent that these bat species are harmed, or populations are reduced, the existence values for these bat species would decrease resulting in a loss of value associated with the Estuary Alternative.

The improvements to habitat provisioning from the creation of habitat islands, wetlands, and infrastructure would create greater habitat complexity and increase human interaction with habitat resources within the Capitol Lake Basin. The beneficial effects from these actions would be similar to those described for the Managed Lake Alternative.

Climate Regulation

The Estuary Alternative will create increased salinity in the former lake basin, which would result in less methane being released compared to the No Action or Managed Lake alternatives. Vegetated marshes in the Estuary Alternative would also sequester more soil carbon through the biomass and in the soil than would be expected in open water habitats. Compared to the No Action and Managed Lake Alternatives, this alternative is more closely aligned with local climate change adaptation policies because it offers the highest ability to capture and sequester carbon over the long term, and it creates ecosystem benefits through increased diversity of habitat.

Visual Aesthetics

The Estuary Alternative would produce major changes in appearance of the North and Middle Basins and would produce more gradual environmental changes throughout the South Basin over time. Water levels would fluctuate based on the tides, with all three basins filling and emptying twice per day. Visual changes also include different vegetation types, a defined river channel, exposed mudflats, new habitat islands, and secondary channels between islands. Views from Heritage Park would not be blocked in the Estuary Alternative like they could be in the managed Lake Alternative because the habitat islands in the estuary cannot support trees. Like recreation values, the effect on visual amenities would depend on the preferences of the visitors and viewers. People who prefer the estuarine environment would experience beneficial effects from these changes, while people who prefer the freshwater lake environment would experience adverse effects.

The environmental changes in the Capitol Lake Basin could also lead to changes in the quality or characteristics of views enjoyed by private property owners in the area. At high tide these distant views would be similar to the No Action and Managed Lake Alternative. At low tide, exposed mudflats would dominate the view.

No private property owners are expected to lose any physical view, only the characteristics of the view would change, depending on tidal stage. In theory, changes in the character of the visual amenities could result in changes to property values or personal aesthetic values. The value this category captures is distinct from the potential changes in business activity, lease rates, or other pecuniary (financial) impacts measured within the analysis of impacts to downtown development, even though some of those impacts could be driven by changes in the quality of the view. Depending on viewer preferences this could be an adverse or beneficial effect, as described above. Any initial adverse effect is likely to diminish with time as people adjust to the new aesthetic conditions (which would be consistent with the surrounding views of Puget Sound).

Cultural, Heritage, Spiritual, and Education

Tribal populations likely would disproportionately experience the beneficial effects of restoration of the Capitol Lake Basin to an estuarine system. This distributional consideration has social justice dimensions since tribes have been historically disadvantaged, not just from management of Capitol Lake over the last 70 years, but since European settlement of the region occurred. The 5th Avenue Dam has disrupted the interconnectedness of nature and resulted in water quality changes that have harmed species, specifically salmon and shellfish as well as plants and other animals, that tribes are dependent on for ceremonial and subsistence purposes. Accordingly, removal of the dam and conversion back to an estuary environment would have beneficial effects for cultural, heritage, spiritual, and educational value for tribes. It would also benefit tribal commercial fisheries to the extent that there are increases in fish catch, discussed above in the *Habitat Provision* section. It also has educational value for tribal populations as estuary restoration could present opportunities for intergenerational transfer of traditional knowledge, and for developing more effective restoration management techniques that could benefit future tribal-led ecosystem restoration projects.

Although improvements would occur to native species in the Capitol Lake Basin, the Estuary Alternative would not fully restore salmon, shellfish, or other tribally valuable species to pre-disturbance levels, so tribal values would continue to be adversely affected by the anthropogenic effects found throughout the Puget Sound region. Tribal values could also continue to be adversely affected in the Estuary Alternative from reoccurring maintenance dredging that has the potential to disturb archeological resources.

People who value the recent history and civic pride associated with the Capitol Lake Basin would experience loss from the Estuary Alternative through diminished cultural values through the loss of the historic reflecting pool. Organizations and events like Capital Lakefair that are directly associated with the lake may face monetary and non-monetary effects in re-orienting and re-visioning their activities around an estuary. Some may not continue operations, which could represent a loss of social capital that would take resources (human energy, time, other forms of capital) to replace. Like tribal values, people who value environmental restoration at a spiritual level would benefit from the return of estuary functionality. In some cases, these people could be the same people who value recent history and civic pride, and thus experience both adverse and beneficial effects from the Estuary Alternative.

To the extent that people (e.g., school children, tourists, researchers) use the Capitol Lake Basin for educational and research pursuits, the Estuary Alternative could expand the opportunities for discovery and learning. As the ecosystem transitions from freshwater to salt water, the area could serve as an observatory for real-time experience of large-scale ecosystem transition—a relatively rare opportunity in the region. People who engage in these restoration projects as observers, volunteers, or through their employment would directly benefit; these benefits have the potential to be long-term, contributing value for generations. Research efforts could also yield knowledge that is transferrable to other, similar restoration projects. This transfer of knowledge would benefit a broader population and potentially improve the ecological success and reduce the cost of future projects throughout Puget Sound and beyond.

5.6 HYBRID ALTERNATIVE

5.6.1 Impacts from Construction

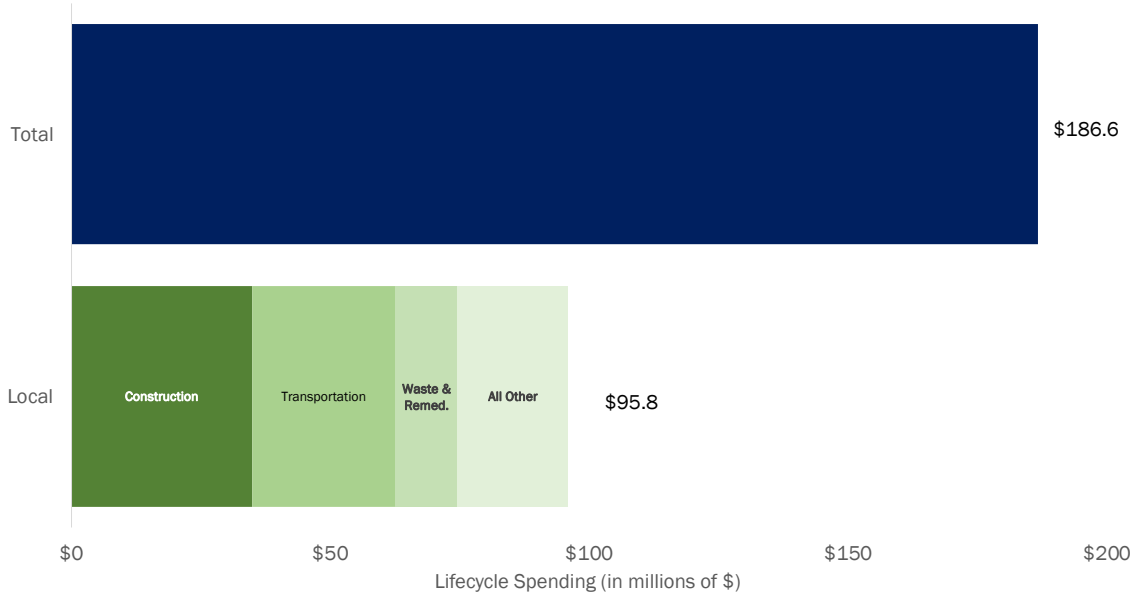
In addition to the construction actions discussed above for all alternatives and the Estuary Alternative, the Hybrid Alternative would require additional construction spending and would generate additional changes in the physical environment from construction of a barrier wall to create the reflecting pool.

The initial planning-level cost for construction of the Hybrid Alternative ranges from approximately $178 to $320 million in 2022 dollars, reflecting an accuracy of -25 and +35 percent, consistent with cost estimating at a 15-percent design stage. As design is further developed, costs can be predicted with more accuracy. As noted above, the source of these funds is still undetermined, but is likely to be comprised of a mix of public revenue from multiple sources.

5.6.1.1 Effects on Downstream Economic Activity

The total construction spending for the Hybrid Alternative—approximately $178 to $320 million—would be spent over a seven to eight-year period. Approximately 51 percent of construction spending would occur in or near the City of Olympia or nearby areas in Thurston County, supporting economic activity across the construction and transportation sectors. Figure 5.3 displays the distribution of total project spending across industries. In total, the Hybrid Alternative is expected to result in $96 million in new local spending. Of the local spending portion, the majority would likely be spent on transportation-related goods and services. Construction services and machinery rental are the next largest sectors that would receive spending. The remainder would go to industries such as landscape and horticultural services, architectural and engineering, hotels and motels, and waste management and remediation, among others.

Figure 5.3 Total Construction Spending by Industry for the Hybrid Alternative



Source: ECONorthwest, with data from Moffatt & Nichol (2022)

Note: Total refers to construction spending in millions of dollars within the local region and outside the region, in the state of Washington and outside the state. This total represents the midpoint of total construction costs, excluding contingency. For this reason, it differs from preliminary cost estimates reported above.

Based on the $96 million in local spending that would occur over a six-year period, $16 million in construction spending would occur in the study region, per year (Table 5.4). Using industry averages for a project of this type and size and distribution of project spending across industries, the local spending would support $5.8 million in labor income and 87 jobs each year. After accounting for the indirect and induced effects associated with the local project spending, a total of $21.6 million in economic output, $7.7 million in labor income, and 124 jobs would be supported per year over the project's lifecycle. This

amounts to 0.05 percent of the existing labor force that could be supported by this action alternative in Thurston County.

Table 5.4 Average Annual Economic Contribution from Construction for the Hybrid Alternative

Effect	Direct ($M)	Indirect ($M)	Induced ($M)	Total ($M)
Output	$16.0	$2.2	$3.4	$21.6
Labor Income	$5.8	$0.9	$1.1	$7.7
Jobs	87	15	22	124

Source: ECONorthwest using IMPLAN

5.6.1.2 Effects on Development in Downtown Olympia

Impacts on downtown development arising from construction activities are unlikely to differ based on the alternative selected. Changes to the design and construction of the new 5th Avenue Bridge incorporated into the FEIS, which maintain traffic circulation patterns through downtown during construction would help minimize disruption to existing downtown businesses.

5.6.1.3 Effects on Demand for and Value of Recreation

Construction of the Hybrid Alternative would have similar effects as described for the Estuary Alternative and Impacts Common to All Build Alternatives, except that the Hybrid Alternative would include construction of a barrier wall in the North Basin to create the reflecting pool and public walkway. This action would produce more temporary disruptions to the quality of recreation in the North Basin compared to the Estuary Alternative, producing higher economic costs over the 2 to 3 year construction period of this project element. The overall duration of construction-related impacts on recreation would persist for approximately seven years, which for some people would have a similar effect as a permanent disruption. The economic importance of the barrier wall to recreation demand and value is discussed in detail under Impacts from Operations.

5.6.1.4 Effects on Demand for and Value of Ecosystem Services

Construction impacts of the Hybrid Alternative on water quality would generally be as described for the Estuary Alternative in Section 5.5.1.4 with the addition of the increased construction activities associated with the construction of the barrier wall separating the estuary from a smaller reflecting pool. These additional activities would extend construction times, increasing the length of time that people could experience adverse impacts from construction and focus the additional impacts in the area where the barrier wall would be. Despite the cumulative increases to construction impacts in the Hybrid Alternative, the temporary and relatively minor effects during the construction period would not meaningfully impact ecosystem service values.

5.6.2 Impacts from Operation

Long-term impacts on economic resources would be similar to the Estuary Alternative, with one key addition. The construction of a reflecting pool would retain the permanent presence of water directly adjacent to Heritage Park, and the stream of goods and services it provides, including expanded recreation access compared to a No Action Alternative.

Like the Estuary Alternative, recurring maintenance dredging in areas of impact in West Bay, as well as within the reflecting pool would occur during operation. This would produce a new recurring cost, and new recurring spending on dredging activities. The estimate for dredging after the construction period ends is expected to range from $54 to $97 million (reflecting an accuracy of -25 to +35 percent) over a 30-year period, assuming the dredged material is placed in open water, rather than at an upland facility.[12] This cost represents both the level of spending the Hybrid Alternative would generate during operation, and the amount of revenue that would need to be raised to implement the alternative. While open water dredging is the assumed method of disposal, costs could increase to $300 to $539 million if the sediment is determined not suitable for in-water disposal and upland disposal at a permitted facility is needed.

5.6.2.1 Effects on Downstream Economic Activity

Based upon what is currently known about the expected distribution of spending to support the additional dredging and operations spending under the Hybrid Alternative, it is not anticipated that additional local spending would meaningfully change aggregate spending levels or other economic activities within the study region. Most of those revenues would accrue to businesses in Tacoma, where many of the in-water construction contractors are located, or other areas in the state of Washington, although dredging in West Bay may utilize services provided by the Port of Olympia for management and transportation of dredge spoils.

Maintenance dredging in West Bay would avoid or minimize impacts to navigation in Budd Inlet. This means that the OYC, private marinas, and Port would not directly incur costs for dredging beyond those consistent with historic patterns or related to new investments. Recurring sediment removal would ensure that each entity is able to maintain operations and continue to generate economic value for the local and regional population and economy. If dredging is not funded and implemented, impacts on economic activity would be similar to those described under the Estuary Alternative, but they could occur sooner because sediment deposition happens slightly more quickly under the Hybrid Alternative.

The FGWG members focused their negotiation of shared funding and responsibility on the Estuary Alternative after Enterprise Services selected it as the likely preferred alternative. It is unclear whether the FGWG work towards an MOU and an ILA would apply to the Hybrid Alternative, and additional process and negotiation would be required. Progress towards an ILA for shared project governance and

[12] This represents the total cost of maintenance dredging over 30 years under the Hybrid Alternative, including dredging the equivalent amount of sediment associated with the No Action Alternative and the additional dredging that would be required under the Hybrid Alternative.

funding under the Estuary Alternative is documented in the FGWG MOU and described in more detail in Chapter 7 of the FEIS.

Funding and completing maintenance dredging would protect navigability in West Bay, which is needed to sustain the economic benefits and impacts associated with a working waterfront in downtown Olympia. It would also produce opportunity costs when local governments use resources for this project instead of other regional priorities. The extent and magnitude of these opportunity costs would depend on what the funders would have spent the money on if the project didn't happen. These long-term financial arrangements have important economic implications but will remain somewhat uncertain until FGWG members finalize a binding Interlocal Agreement and Enterprise Services secures funding to construct the project.

Improvements to habitat for salmonid and shellfish populations under the Hybrid Alternative are likely to have a positive, though unmeasurable impact on the value of tribal and non-tribal commercial fisheries, similar to that described for the Estuary Alternative.

5.6.2.2 Effects on Development in Downtown Olympia

Compared to the Managed Lake Alternative and the Estuary Alternative, downtown development would likely respond to the Hybrid Alternative in similar ways—i.e., assuming the implementation of the Hybrid Alternative is well-planned and thoughtfully designed, and includes features that allow people to interact with the environment, it would function as an amenity and produce **beneficial effects** for downtown development. The factors driving market conditions are the same, and there is nothing unique to the Hybrid Alternative that would produce impacts different in kind to those identified for the other alternatives. The key findings common to both the Managed Lake and Estuary Alternatives are also key for the Hybrid Alternative: it must be implemented to enhance people's experience of the area and continue to provide at least the same level of amenity currently offered.

5.6.2.3 Effects on Demand for and Value of Recreation

The economic effects on recreation of the Hybrid Alternative would be the same as for the Estuary Alternative, with several notable differences:

- The barrier wall would provide an additional pathway for pedestrians and bicyclists, which is substantially different in character than other paths in the study area. This may serve to attract people who may not otherwise recreate in the area and potentially generate somewhat higher levels of economic value compared to both the Estuary Alternative and Managed Lake Alternatives.
- Construction of the barrier wall would create a reflecting pool in the North Basin, which would retain some of the visual character of Capitol Lake. It would also increase the diversity of recreation opportunities in the Capitol Lake–Deschutes Estuary, allowing for a wider range of boating, trail-based, and park-based experiences. It could also support future development of a swimming beach, which is not currently part of the project but was a valued use of the Lake in the past. This potentially translates to the Hybrid Alternative

meeting a higher amount of recreation demand and producing and overall higher economic value of recreation than either the Managed Lake or Estuary Alternatives.

The Hybrid Alternative attempts to meet two sets of demands simultaneously: it creates a reflecting pool to retain some of the aesthetic and architectural symbolism of Capitol Lake and restores some of the natural function of the estuary. It is unclear, however, whether the preferences of people favoring each outcome would be fully satisfied, leading to maximized economic value of recreation in both cases. It is possible the presence of tidal conditions and a smaller reflecting pool would reduce the economic value of recreation enjoyed by people with a preference for the Managed Lake Alternative, and that the presence of the barrier wall would reduce the economic value of recreation for people who prefer the integrity of a restored natural system. The overall economic value associated with recreation in the Hybrid Alternative could be higher than the Managed Lake and Estuary Alternatives, but it may not be. It is undoubtedly higher than under the No Action Alternative.

As with both the Managed Lake and Estuary Alternatives, the distributional consequences and equity implications of the changes related to recreation are likely as important to consider as the overall changes in economic value. These are discussed in more detail under ecosystem services.

5.6.2.4 Effects on Demand for and Value of Ecosystem Services

The Hybrid Alternative includes elements of the Estuary Alternative and Managed Lake Alternative, and has similar effects on ecosystem services values as the Estuary Alternative, but retains some of the values provided by the Managed Lake Alternative.

Water Quality Regulation

Water quality changes under the Hybrid Alternative would be similar to the Estuary Alternative with the exception of the new reflecting pool in the eastern portion of the North Basin. The reflecting pool would not fundamentally change but would likely reduce the benefits associated with water quality regulation as described for the Estuary Alternative. However, because it is not a 'natural estuary' condition, it is possible that Ecology may further regulate other point and non-point dischargers into Budd Inlet in order to meet water quality standards. Compared to the Estuary Alternative, this could increase the risk that LOTT would face a more stringent allocation and higher costs, but the risk would be lower than under the No Action or Managed Lake Alternative.

Flood Regulation

Improvements in flood regulation arising from removing the 5th Avenue dam/tidegate would be similar under the Hybrid Alternative as the Estuary Alternative. The new reflecting pool would not significantly change flood risk.

Habitat Provision

The changes in habitat availability in the Hybrid Alternative are similar to the Estuary Alternative as primarily a shift from "Deepwater Habitat-Freshwater" to all other habitat types (see Table 5.1 for a

comparison of habitat availability under each alternative). As in the Estuary Alternative, removal of the 5th Avenue Dam would provide access to an estuarine habitat where none currently exists in the North Basin. In the Hybrid Alternative, the barrier wall would impede fish movement within the full North Basin area. With a freshwater reflecting pool, fish would not be able to move from the estuary into the reflecting pool. To the extent that there are increases in fish populations there would also be beneficial impacts to tribal commercial and subsistence fishing, which could expand into the estuary and experience enhancement downstream in Puget Sound. The cultural, heritage, spiritual, and educational values associated with fish populations in the Hybrid Alternative are discussed later in this section. Overall, the difference between the Hybrid and Estuary Alternative are minimal and the ecosystem service of habitat provision would result in beneficial effects related to habitat provision for salmon and marine species, but adverse effects for freshwater species currently in the Capitol Lake Basin.

The impacts to habitat provisioning from habitat islands, wetlands, and infrastructure, to create greater habitat complexity within the Capitol Lake Basin would be as discussed for the Estuary and Managed Lake Alternatives.

Climate Regulation

The Hybrid Alternative would have slightly less net carbon sequestration when compared to the Estuary Alternative because of the decreased area of saline marsh in the North Basin. The Hybrid Alternative is expected to result in more carbon sequestration and less methane releases than the No Action and Managed Lake alternatives. It is generally consistent with local climate change adaptation policies to reduce and capture greenhouse gas emissions, and to provide some ecosystem benefits associated with new habitats in the former lake basin.

Visual Aesthetics

The impacts to visual aesthetic value in the Hybrid Alternative would be primarily influenced by how people perceive the barrier wall that creates the reflecting pool in the eastern portion of the North Basin. Compared to the Estuary Alternative, this feature creates a discontinuity in the landscape that may be displeasing to some people. However, it also provides a new vantage point to experience the visual aesthetics of the North Basin and surrounding areas. Views from ground or water level to the east would be blocked with an incongruous structure. This may substantially diminish the value some people derive from the visual aesthetics of the Hybrid Alternative.

Cultural, Heritage, Spiritual, and Education

As with both the Managed Lake and Estuary Alternatives, the distribution of changes to cultural, heritage, spiritual, and educational value have equity and social justice implications because of the different types of groups that would experience effects. As discussed for the Estuary Alternative, tribes and other people who value environmental connectivity, natural functions, and benefits to particular species are likely to experience an increase in cultural, heritage, spiritual, and educational value from the restored estuary environment. It would also benefit tribal commercial fisheries to the extent that there are increases in fish catch, discussed above in the *Habitat Provision* section. People who prefer the

recent historic character of Capitol Lake and have civic pride for the reflecting pool may experience a loss in cultural, heritage, spiritual, and educational value as a result of the change to an estuary.

The Hybrid Alternative is designed with these differences in values in mind. The new reflecting pool would retain some of the visual amenity value associated with the current reflecting pool, providing additional value to people who prefer characteristics of the Managed Lake Alternative compared to the Estuary Alternative, while also creating the estuarine environment. It may also retain heritage value associated with the current reflecting pool. People would likely experience a decrease in value relative to their most-preferred alternative but an increase in value relative to their least-preferred alternative. Neither group would be fully satisfied.

The compromise inherent in this alternative might suggest it is the most equal or fair because both perspectives stand to gain and lose, but it is not necessarily the most equitable because it only partially addresses underlying inequalities. Because the freshwater lake has been the status quo for the last 70 years, the people who value it have been experiencing benefits. The heritage value associated with the current configuration likely would increase with time as more people develop a stronger connection to this version of history and sense of place. In contrast, most people alive today have not experienced the estuary environment in this location and may have a weaker attachment to the vision. However, people who have personal, cultural, or familial connection to the environment that existed before Capitol Lake have experienced years of loss arising from the change. This is particularly and uniquely true of the tribes who have endured this, and additional losses related to their sense of place, ceremonial and ancestral history, and physical and spiritual connection to the land and water. An equitable consideration of cultural, heritage, spiritual, and educational value would need to consider the past inequities associated with management of the Capitol Lake Basin, and how retaining the reflecting pool influences those values.

5.7 SUMMARY OF IMPACTS AND BENEFICIAL EFFECTS

5.7.1 Effects on Downstream Economic Activity

All alternatives would require upfront construction spending and ongoing spending for maintenance dredging. Table 5.5 summarizes these costs. These costs would translate into some spending at the local level, ranging from about $36 million for the Managed Lake Alternative over a five-year period, to $96 million for the Hybrid Alternative over a six-year period, with the majority of all local shares going to transportation services across all alternatives.

Table 5.5 Planning-Level Cost Estimates by Alternative, 2022 Dollars

Action Alternative	Design, Permitting, & Construction Costs[1] ($M)	Maintenance Dredging Costs[2] ($M)	Total Quantified Costs[3] ($M)
No Action	$0	$11–$19[4]	$11–$19
Managed Lake	$76–$136	$141–$254[5]	$217–$390
Estuary	$137–$247	$29–$52[6]	$166–$299[7]
Hybrid	$178–$320	$43–$78[6]	$221–$398[8]

Notes: Refer to Chapter 7 for additional detail regarding the planning-level cost estimates.

[1] Potential additional costs associated with permit conditions for project construction have not been estimated at this time because they cannot be predicted with certainty. The planning-level cost estimates do not include potential costs associated with compensatory mitigation to offset potential temporary or permanent impacts to wetlands, fish, or other ecological functions. This could be required if the regulatory agencies do not consider the project benefits to outweigh the potential impacts (if the project is not considered "self-mitigating").

[2] These are estimated for a period of 30 years following construction completion. Costs for the adaptive management plans, habitat enhancement plans, and other operations and maintenance activities would be estimated during design and permitting once those requirements are better understood. Those long-term management costs are not included herein. The maintenance dredging cost estimates represent the largest long-term maintenance cost and help to differentiate the project alternatives.

[3] Reflects the sum of the first two columns, representing the total quantified costs for design, permitting and construction and maintenance dredging costs over a 30-year period following construction. See Table 7.1.1 in Chapter 7 for summary notes on additional unquantified costs not associated with construction or maintenance dredging by alternative (discussed qualitatively throughout this Discipline Report).

[4] This represents the estimated non-project costs associated with dredging-impacted areas of West Bay based on sedimentation rates and patterns modeled for the No Action Alternative, to maintain minimum depths for navigation and to meet the requirements of DNR leases with the private marinas. These costs assume that the Port of Olympia has remediated known contaminated sediment in West Bay and authorized depths have been reestablished in navigational areas during that effort. That dredging of contaminated accumulated sediment is not associated with this project, and those costs are not included in the assumed $11 to $19M that would be spent by other entities over 30 years for maintenance dredging. The planned Port of Olympia-led dredging of contaminated sediments is also expected to enable the future dredged material under the No Action Alternative to be disposed of in-water. Funding to dredge the volume of sediment consistent with the No Action Alternative would be the responsibility of the Port of Olympia, private marinas, and the USACE (USACE funding is subject to congressional approval).

[5] Under the Managed Lake Alternative, project-related dredging would occur within the North Basin. That sediment is expected to be disposed of upland. This total cost reflects the assumed upland disposal, with truck transport. Rail transport could reduce costs from what is shown here, and feasibility of rail transport would be evaluated prior to maintenance dredging. It is possible for a small portion of the dredged material to be beneficially reused within the Capitol Lake Basin, if needed to replenish the habitat areas in the Middle Basin. In-water disposal, which is often a lower cost option compared to upland disposal, is currently prohibited due to the presence of the invasive New Zealand mudsnail. If environmental

conditions or environmental regulations change in a way that would allow in-water disposal of the dredged sediment, the costs would be reduced to approximately $56 to $100M. Separately, non-project dredging paid for by separate entities would still be required in West Bay, consistent with the dredging costs that are estimated for the No Action Alternative.

[6] These costs reflect the additional maintenance dredging costs beyond dredging costs that would be incurred under the No Action Alternative ($11 to $19M over 30 years) to avoid significant impacts to navigation, and to maintain a working waterfront and recreational boating in West Bay. As described in note 4 above, funding to dredge the volume of sediment consistent with the No Action Alternative would be the responsibility of the Port of Olympia, private marinas, and the USACE. Approximately 37% of the estimated costs for maintenance dredging would be to remove accumulated sediment from the FNC and Turning Basin, and that is the responsibility of the USACE. Therefore, it is assumed that 37% of these total maintenance dredging costs would be paid by USACE; these funds are subject to congressional approval. The additional/increased dredging requirements resulting from the Estuary Alternative would be jointly funded by members of the Funding and Governance Work Group, through 2050, and USACE.

[7] Maintenance dredging costs over 30 years for the Estuary Alternative would increase to $157M to $283M if dredged material was determined not suitable for in-water disposal. However, based on findings in this EIS, the sediment is expected to be suitable for in-water disposal.

[8] Maintenance dredging costs over 30 years for the Hybrid Alternative would increase to $242 to $436M if dredged material was determined not suitable for in-water disposal. However, based on findings in this EIS, the sediment is expected to be suitable for in-water disposal.

Through the FGWG process, the members recommended that Enterprise Service take responsibility for funding construction costs for any alternative. Enterprise Services is exploring potential funding strategies, which will likely include a combination of state and federal grants and appropriations of taxpayer dollars. The FGWG process is described in more detail in Chapter 7 of the Final EIS. Depending on the source of funding (state vs. federal) and what the money might have been used on but for the project (opportunity cost), the **impact to the region** would vary. The spending could produce **beneficial impacts** to those individuals, businesses, industries that are contracted to work on the project

For the Estuary and Hybrid Alternatives, maintenance dredging in West Bay would avoid or minimize impacts to navigation in Budd Inlet. This activity would ensure that the OYC, private marinas, and the Port are able to maintain operations and to generate economic value for the local and regional population and economy through a working waterfront in downtown Olympia. The FGWG agrees in principle that funding for maintenance dredging should be shared among local, state, and federal entities. The OYC, private marinas, and the Port would fund dredging at levels that would need to occur under all alternatives, including the No Action Alternative.

5.7.2 Effects on Development in Downtown Olympia

Across all action alternatives, resolving current management uncertainties in the Capitol Lake Basin would likely increase certainty that the area will continue to serve as a productive amenity with benefits for current and future development in downtown Olympia, compared to the No Action Alternative. Moreover, amenity-related benefits would likely increase under all Action Alternatives with the restoration of water-based recreational and improvement of habitat quality. There is no clear signal from the research conducted for this impact assessment that implementing any alternative, including

the Estuary and Hybrid Alternatives, would reduce demand for residential or commercial development in downtown Olympia. The City of Olympia's plans for the redevelopment of downtown are long-range, and investment in residential and commercial development is expected to increase in intensity (more units per year) over the next decade.

Implementation of the Estuary Alternative represents the most visual and environmental change to the downtown area. This change has the potential to create uncertainty, at least initially, among investors, developers, and residents in downtown Olympia. As designs are further developed and project elements associated with a well-planned, thoughtfully designed, and functional estuary design are further proven, with sufficient funding and governance to address long-term issues arising from implementation, this alternative is unlikely to produce a negative impact on downtown development compared to the other alternatives. The Hybrid Alternative is likely to have a similar effect, though with less upfront risk because it retains the familiar feature of the reflecting pool. The Managed Lake Alternative would represent the least amount of visual change compared to current conditions and is unlikely to increase uncertainty among potential investors about future conditions. **Thus, all action alternatives are likely to produce benefits for downtown development assuming they are implemented in a way that is well-planned, thoughtfully designed, and accessible.**

5.7.3 Effects on Demand for and Value of Recreation

Construction of all action alternatives would **temporarily disrupt** recreation activity, and potentially reduce the quality of recreational experiences, particularly in the parts of the project area that currently experience the highest levels of use, around the North Basin. In all alternatives, recreational trail closures would be short and minor, imposing minimal costs on users. Closures of other recreational features like Marathon Park would span the duration of construction, but substitute resources in the area are likely to offset losses in economic value of recreation.

Construction activity inherently is disruptive to some people and interesting to others (or perhaps both disruptive and interesting to some people). It is possible that construction activity may actually serve as a draw or enhance the experience and value some users obtain from recreating in the Capitol Lake Basin during the construction period, producing a **beneficial effect** that could potentially offset the adverse impact to recreation.

All alternatives would produce **beneficial effects** to recreation compared to the No Action Alternative by improving trails (e.g., adding boardwalks), increasing the diversity of vegetation and habitat areas, and restoring water-based recreation. Some people may experience **losses in value** if their preferred environmental setting, e.g., managed vs. unmanaged or wild, is not implemented. These losses are likely to be felt more strongly by people in favor of a managed lake, should the Estuary Alternative be selected due to the status quo bias and the endowment effect (discussed in Section 4.3). They are also likely to diminish over time as people adjust to new conditions. The overall economic value associated with recreation in the Hybrid Alternative could be higher than the Managed Lake and Estuary Alternatives, since it shares both predominant features, but it may not be. For all alternatives, restoring water-based recreation has the potential to produce **substantial economic benefits**, by creating new recreation opportunities in the heart of downtown Olympia. Despite being surrounded by water, direct

opportunities for interaction are surprisingly limited, making new ones more valuable. While the types of boating would differ between alternatives, the marginal differences in value are likely to be minor compared with the large increase arising from restoration. All recreation enhancements are likely to increase in value over time as the downtown residential market continues to grow.

The distributional implications of maintaining the status quo are important, especially from a social justice perspective. Status quo bias tends to ignore or diminish the benefits of a change in policy or ignore or diminish the costs of maintaining the status quo. To the extent that the Managed Lake Alternative would sustain a managed environment for recreation and preclude expansion of a more natural or wild recreational setting, **it would produce both beneficial and adverse impacts for future recreational users**, depending on individual preference. Tribal populations would disproportionately experience the adverse impacts, raising social justice concerns discussed in more detail with respect to ecosystem services.

5.7.4 Effects on Ecosystem Services

Construction of all action alternatives would **temporarily affect** the value of ecosystem services generated in the project area, as water quality, habitat provision, and visual aesthetic values are disrupted.

Differences among the action alternatives during operation arise from changes in ecosystem services related to water quality regulation, habitat provision, flood regulation, visual aesthetics and cultural services. The differences manifest in terms of costs/avoided costs for ratepayers and distributional and equity concerns arising from changes in habitat provision, visual aesthetics, and cultural services, especially for tribal populations.

Under the No Action and Managed Lake Alternatives, TMDL allocations **would likely increase** regulatory compliance costs for LOTT and other discharges to West Bay, resulting in an adverse impact to these entities and ultimately, to the ratepayers. The TMDL allocation and associated cost implications to LOTT and ratepayers are **not expected to be as significant** under the Estuary and Hybrid Alternatives given the natural estuary conditions that would be restored in the project area.

Habitat provision has **beneficial effects** in all action alternatives due to the increased diversity of habitat and additional habitat features, in addition to the water quality improvements that would also benefit many native species. The overall economic value associated with habitat provision is **likely to be highest** in the Estuary and Hybrid Alternatives that improve habitat quality for species of commercial, recreational, and cultural value, such as salmon. These effects would **specifically benefit tribes**, which disproportionately rely on salmon for subsistence, commercial, and cultural value, compared to the general population. Not all species experience benefits in the Estuary and Hybrid Alternatives. Some freshwater fish and freshwater vegetation communities would not be able to survive in the saltwater-dominant Estuary and Hybrid Alternatives, resulting in **adverse effects** for people who derive value from these ecosystems. Enterprise Services is evaluating the concept of a freshwater reflecting pool under the Hybrid Alternative; in this scenario, some freshwater fish and associated waterfowl may persist within the project area.

The Estuary and Hybrid Alternatives would **enhance cultural, heritage, and spiritual values** for populations that hold preferences for restoration of naturally-functioning ecosystems, including tribes. Restoration would enhance opportunities for local tribes to exercise culturally-important traditions. The No Action and Managed Lake Alternatives would **preserve values** for some people who hold a preference for maintaining recent historical conditions, as would the Hybrid Alternative to the extent that it retains the reflecting pool feature. All action alternatives would maintain educational use value of Capitol Lake – Deschutes Estuary, but the Estuary and Hybrid Alternatives would substantially expand opportunities for research and discovery, with potential **beneficial applications** to increase the success and cost effectiveness of future restoration projects.

There are distributional and social justice implications associated with maintaining the status quo conditions of a freshwater lake ecosystem under the No Action and Managed Lake Alternatives. The status quo conditions perpetuate historic inequities, particularly for tribal populations that have experienced ongoing **adverse effects** from changes to the ecosystem since settlement of the region occurred. Improvements to culturally and economically important species and habitat functions in the Estuary and Hybrid Alternatives, particularly from removal of the 5th Avenue dam, have the potential to result in **substantial beneficial effects** for tribes.

The Estuary and Hybrid Alternatives reduce the risk of riverine flood impacts in Capitol Lake – Deschutes Estuary, through improved flood regulation capacity. This would produce a **beneficial effect** by slightly lowering flood risk and associated disruption and damage to property and infrastructure, compared to the No Action and Managed Lake Alternatives. Removal of the 5th Avenue Dam would **reduce the risk** of flooding arising from mechanical or operational failure, providing a **beneficial effect** of all Action Alternatives compared to the No Action Alternative.

Changes in the value of visual aesthetics would **depend on individual preferences** between the distinct visual amenities of the different alternatives. Some people may prefer the status quo visual conditions, while others may prefer the estuarine environment (for more information see the *Visual Resources Discipline Report*).

There are differences in greenhouse gas emissions and carbon sequestration potential between the alternatives. The Managed Lake Alternative would reduce greenhouse gas emissions slightly compared to a No Action Alternative, but overall the freshwater system does not provide much opportunity for reducing, capturing, or storing greenhouse gas emissions. The Estuary and Hybrid Alternatives would provide more opportunity for carbon sequestration and less methane emissions than the Managed Lake Alternative, with the Estuary providing slightly more storage capacity than the Hybrid Alternative. Both the Estuary and Hybrid Alternatives are better aligned with local climate adaptation goals than the Managed Lake Alternative.

5.8 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The impacts on economic resources from the action alternatives would likely be largely positive and not require avoidance, minimization, and mitigation measures beyond those described in other Discipline Reports.

There is potential for the Estuary and Hybrid Alternatives in particular to increase levels of uncertainty in future conditions compared to the Managed Lake Alternative, because it is a dramatic change from current conditions. Transitioning from the current managed lake to an estuary, if implemented without sufficient attention to appearance, could result in minor adverse impacts in the market for development in downtown Olympia. This risk can be minimized by

1) Recognizing the importance of incorporating aesthetically pleasing and functional elements into project design and effectively implementing them, with input and feedback from local residents and developers.
2) Ensuring adequate funding is available to fully implement all project elements successfully and timely, with a priority on those elements that engage people in the environment and provide access to the water. Enterprise Services, in cooperation with the FGWG, is exploring the options for funding upfront construction.
3) Ensuring a long-term plan for functional governance, funding, and adaptive management is in place to quickly and productively address potential issues that may arise that compromise the amenity value of the resource. As noted throughout, the FGWG process is underway to create a plan for future stable funding and governance.

Additionally, ongoing evaluation of public preferences related to perceived and real potential changes in amenity value will help ensure future design and implementation plans maximize economic outcomes. Ongoing consideration to how the distribution of benefits and costs aligns across different populations and groups of people is also warranted as the project develops, to highlight potential equity and social justice concerns.

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6.2 LIST OF PERSONAL COMMUNICATIONS AND INTERVIEWEES

Chuck Denney, Director, Tumwater Parks and Recreation

Len Faucher, Marine Terminal Director, Port of Olympia

Tomy Mollas, Capitol Security and Visitor Services, Department of Enterprise Services

Key-informant interviewees included in the data collection effort to identify impacts on downtown development were provided anonymity to protect the integrity of the research process. A description of the characteristics of interviewees and numbers of interviews conducted is included in Section 3.0.

Appendix A. Key-Informant Interview Questions

INTERVIEW QUESTIONS FOR PRIVATE DEVELOPERS AND REAL ESTATE EXPERTS

Can you share your role with us and how long you have been in downtown Olympia?

If the respondent is not an Olympia developer:

What's your role related to development, and are you familiar with development in the Olympia area?

Do you have any current or future projects that you think would be affected by changes to the management of the Capitol Lake Basin?

What do you believe to be the major forces and trends driving development activity in the downtown area of Olympia?

What do you expect the major trends affecting development in downtown Olympia will be over the next five to ten years?

Do the environmental management challenges (i.e., water quality, restricted in-water recreation, and uncertainty about future conditions) associated with existing conditions in the Capitol Lake Basin impact development or redevelopment decisions? If so, in what ways?

How important are environmental amenities compared to other factors in driving demand for and value of development?

Do different types of environmental amenities have different impacts on demand for and value of development?

Are there specific types of development that are more or less influenced by environmental amenities? How does geographic proximity affect value?

Do you believe restoration and ongoing management of the Capitol Lake Basin would impact development patterns and trends in downtown Olympia?

INTERVIEW QUESTIONS FOR PLANNERS AND ECONOMIC DEVELOPMENT PROFESSIONALS

Can you share your role with us and how long you have been in downtown Olympia?

Have you been directly or indirectly engaged with Capitol Lake – Deschutes Estuary planning or management activities in the past?

What do you believe to be the major forces and trends driving development activity in the downtown area of Olympia?

What do you expect the major trends affecting development in downtown Olympia will be over the next five to ten years?

The Olympia Downtown Strategy was adopted in 2017. What are the current challenges and opportunities surrounding downtown development and the area's economic growth?

Do the environmental management challenges (i.e., water quality, restricted in-water recreation, and uncertainty about future conditions) associated with existing conditions in the Capitol Lake Basin impact development or redevelopment decisions? If so, in what ways?

How important are environmental amenities compared to other factors in driving demand for and value of development?

Do different types of environmental amenities have different impacts on demand for and value of development?

Are there specific types of development that are more or less influenced by environmental amenities? How does geographic proximity affect value?

If active use of the Capitol Lake Basin were restored, would there be any changes in city policy regarding permitted/allowable uses in the shoreline jurisdiction, changes in zoning, or changes in city policy that would provide additional or different opportunities given the restoration of this resource?

Are there any topics we haven't covered that you think are relevant to our analysis?

Appendix B. Recreation Technical Appendix

Capitol Campus Security Video Footage

Enterprise Services collected security camera footage showing a section of the Capitol Lake trail in Heritage Park. The footage consisted of 31 hour-long segments from August 2020 to September 2020. The dates and times of footage were randomly selected ahead of time to ensure a wide distribution of weekdays, weekends, and mornings, evenings, and nights were captured. For each hour of video, the total number of unique recreators who entered the frame was recorded. Bicyclists and pedestrians were not separately recorded.

This raw data was then used to calculate a mean population per hour for weekends and weekdays in the months of August and September. This mean population was then scaled up by the number of weekdays and weekends in a month to create a total estimated monthly attendance and standard deviation for each month.

Strava Global Heatmaps and WSDOT Manual and Permanent Counts

This analysis used two sets of raw information and data: permanent and manual count data from WSDOT and visual maps from Strava's Global Heatmap. Note that the Strava Global Heatmaps were maps with color gradients, not underlying data, as the data costs were beyond the budget available for this project.

The permanent count data was collected by automatic trackers located on trails. They collected data on pedestrian and bicycle counts in fifteen- and sixty-minute intervals. Some counters had incomplete data due to malfunctions or counters being taken offline. The permanent count data was filtered to retain counts from 2017 to 2019 (2019 data was only available for permanent counts) in Thurston County and the six nearest counties. Locations that had fewer than 75 percent of the complete number of observations expected for a year of continuous data were excluded from the analysis. Data was then scaled so that each observation represented an average hourly count. This was subsequently scaled up to calculate an annual count for each location.

The manual count data was collected by volunteers on three consecutive days in September of every year. Volunteers would be assigned to a specific location in Washington and complete two shifts, a morning shift from 5-7am and an afternoon shift from 4-6pm. For each time frame, they recorded the number of pedestrians and the number of bicyclists who passed by. This data was cleaned similarly to the permanent count data, but with the exception of how annual counts were calculated. Because manual data was only collected in September, annual counts were estimated by regressing the permanent annual count on permanent average hourly counts and then predicting on the manual average hourly counts. The permanent and manual data was then merged.

The Strava Global Heatmap provided visual maps that allowed us to compare the frequency of use of different locations. Locations with more use were both darker red and had a thicker and more opaque line. Less popular locations had a blue hue and were thinner and more transparent. For each location listed in the manual and permanent count data, a correlating screenshot was taken on the heat map for biking and for pedestrian use. In addition, screenshots were taken for the ten locations on Capitol Lake that are of interest as key transportation nodes. All of these screenshots were then ranked from most used to least used and merged with the permanent and manual counts.

For each of these locations ECONorthwest staff found the five nearest other locations in the dataset as well as its corresponding ranking and distance away from the original location. This was done to alleviate concerns about any inconsistency in the way Strava might present its heat maps. Finally, a measure was created of location rank divided by location distance for each of the five nearest locations for a given location.

This dataset now had annual counts, and distance and ranking for the five nearest locations. For bicycling, ECONorthwest staff regressed the annual counts on the location ranking and the five nearest locations, calculated as rank divided by distance. This was then used to predict annual counts on the Capitol Lake locations, for which there are not annual counts.

For the pedestrian predictions, the annual counts for the manual data were not reliable, so only the permanent count data was used. The same process was carried through to get predicted annual counts for pedestrians in Capitol Lake.

Capitol Lake–Deschutes Estuary Park User Survey

The park user survey was an in-person, on-site survey designed by the EIS Project Team and conducted by Enterprise Services staff during the summer of 2019. Park visitors were intercepted and completed paper-based "clipboard surveys" at the parks adjacent to Capitol Lake. Surveys were conducted by the project team during higher usage periods on weekdays and weekends in the summer of 2019, including one large festival event (Capital Lakefair). Survey data were collected on the dates of July 8, 13, 16, 19, 20, and 24; August 1, 8, 14, 22, 24, and 28; and September 6, 12, 16, and 24. The surveys were administered to a "sample of convenience," (i.e., a group of people easy to contact who agreed to fill out the survey) and do not reflect a statistically scientific sampling methodology. Thus, the data collected are anecdotal and cannot be used to extrapolate overall visitation or use patterns.

The raw data were cleaned and then used to create the charts used in the report. The nonlocal results were created by filtering results by zip code. A copy of the survey instrument is reproduced at the end of this appendix.

Enterprise Services Events Calendar

The Washington State Department of Enterprise Services (Enterprise Services) requires event sponsors to apply for a permit for events on the Washington State Capitol Campus and the surrounding parks if they predict an attendance of more than 75 people. The permit application asks sponsors for the date, type, and expected attendance of their event. The frequency of use for different parts of Capitol Campus by official events can be determined from this information. The Capitol Campus Activities and Events database contains information for each area of Capitol Campus (i.e. Tivoli Fountain, the Sunken Garden, and campus park quadrants as well as nearby Marathon, Sylvester, and Heritage Parks.

This raw data was cleaned and then used to create the charts used in the report. The estimated attendance reported was often a range, in which case the mean of the range was used.

State of Washington Outdoor Recreation Survey

The Washington Outdoor Recreation Survey is a valuable data source that has respondents from many different demographics and locations across Washington. What results is a detailed cross-section of outdoor recreation practices in Washington. However, there are potential biases with this data. The survey asks respondents about their practices over a long period (1 year). This makes respondents susceptible to a "telescoping" effect where they perceive distant events as more recent than they were (Tourangeau et al. 2018). As a result, respondents may tend to answer questions about a yearlong period while actually only thinking about their habits from the last few months.

The EIS Project Team determined which activities listed in the recreation survey could currently feasibly occur at Capitol Lake. These activities were then grouped into subcategories (walking, running, trending activities, nature-based activities, and leisure activities, biking, freshwater activities, saltwater activities, and fishing) and then broader categories of "foot-based", "bike-based", and "water-based". For each of the broader categories, the frequency of use was summed and top coded such that no activity was recorded as done more than 3 times a day on every day of the year. This was done to remove potentially inaccurate data.

For each location type a dummy variable was recorded at the subcategory level. This raw data was summed to determine use at different locations at the category level.

With frequency of use as well as location of use for foot-, bike-, and water-based activities now available, missing observations were then imputed. Finally, two regressions were run. The first was a logit regression of the "local facility" dummy on demographic characteristics. This predicted the probability that a given person would make a trip to a place similar to Capitol Lake. The second regression was a Poisson regression of the annual frequency of use on the location dummies and

demographic characteristics. This allowed us to determine that if it was likely that one made a trip, how many of those trips would occur in a year.

This regression's results were then applied to demographic data pulled from the US Census. Demographics were recorded at the census tract level for the nine tracts closest to Capitol Lake. The results of the logit and Poisson regressions allowed us to calculate the expected number of trips from local visitors (i.e. those from these census tracts) to locations similar to Capitol Lake. As mentioned in the report, this allows us to estimate demand for substitutes in the region.

Trail Use from ECONorthwest Washington Trails Report

Estimates were reported using the results of a prior ECONorthwest study of Washington trails entitled "Economic, Environmental, and Social Benefits of Recreation Trails in Washington State". Technical details can be found in Appendix A.

References

Tourangeau, Roger, Eric English, Kenneth E. McConnell, David Chapman, Ismael Flores Cervantes, Eric Horsch, Norman Meade, Adam Domanski, and Michael Welsh. "The Gulf recreation study: Assessing lost recreational trips from the 2010 Gulf Oil Spill." Journal of Survey Statistics and Methodology 5, no. 3 (2017): 281-309.

Capitol Lake–Deschutes Estuary Park User Survey Instrument

Park User Survey

1. **What park or parks are you visiting today? Mark all that apply.**

- ☐ Capitol Lake Park
- ☐ Heritage Park
- ☐ Interpretive Park
- ☐ Marathon Park
- ☐ Park of the Seven Oars
- ☐ Percival Landing Park
- ☐ Tumwater Historical Park
- ☐ West Bay Park

2. **What is your age?**

- ☐ 20 or younger
- ☐ 40 to 59
- ☐ 21 to 39
- ☐ 60 and over

3. **How far did you travel to get to the park?**

- ☐ 0 to 1 mile
- ☐ more than 5 miles
- ☐ 1 to 5 miles

4. **How long do you plan to be at the park today?**

- ☐ Less than 15 minutes
- ☐ 2 to 4 hours
- ☐ 15 to 60 minutes
- ☐ More than 4 hours
- ☐ 1 to 2 hours

5. **How often do you use this park?**

- ☐ Daily
- ☐ About once a month
- ☐ Several times a week
- ☐ Less than once a month
- ☐ About once a week
- ☐ This is my first visit

6. **How many people did you come to this park with today?**

- ☐ Alone
- ☐ With ____ other people

7. **In general, do you come to this park alone or with others?**

- ☐ Alone
- ☐ With others

8. **If you brought children today, how many children in the following age groups did you bring?**

- ☐ 0 to 5 years _____
- ☐ 15 to 18 years _____
- ☐ 5 to 14 years _____

9. Why do you visit this park today? (Check all that apply.)

- ☐ Walk Dog
- ☐ Walking
- ☐ Running
- ☐ Children's Play
- ☐ Cycling
- ☐ Time with family and/or friends
- ☐ Visiting nearby businesses
- ☐ Plant or wildlife viewing
- ☐ Play sports
- ☐ Relax/meditate
- ☐ Sightseeing
- ☐ Skating/skateboarding
- ☐ Event / Festival
- ☐ Volunteer/Environmental stewardship activity
- ☐ Education
- ☐ Visiting State Capitol Campus

10. Do you visit this park as part of your exercise or health and fitness routine?

- ☐ Often
- ☐ Sometimes
- ☐ Never

11. If the following activities were available on this waterbody in the future, how often would you be likely to participate in them?

Activity	Daily	Several times a week	About once a week	About once a month	Less than once a month	Never
Swimming (in season)						
Boating (kayaking, sailing, SUP)						
Fishing						
Recreational shellfish gathering						

12. What is your zip code or postal code? _____

Email: _____

If you would like to be notified of planning related to this park, including the results of this survey, please provide us with an email address so that we may contact you.

END OF SURVEY

[SURVEY STAFF COMPLETES THIS SECTION FOR EACH SURVEY]

Location _____ Time _____ Date _____