



Climate Action Plan

October 2024

Prepared by



verdis
GROUP
climate action that counts



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Board of Park Commissioners

Andrea Smith, President

Aaron Pointer, Clerk

Rosie Ayala

Matt Mauer

Tim Reid

Executive Staff

Shon Sylvia, Executive Director

Jennifer Bowman, Executive & Board Administrative Assistant

Mark Knowlden, Interim Director of Parks and Recreation

Hollie Rogge, Deputy Director of Community & Neighborhood Parks

Joe Brady, Deputy Director of Regional Parks & Attractions

Alan Varsik, Director of Zoological & Environmental Education

Rick Dietz, Deputy Director of Northwest Trek Wildlife Park

Sarah Oliver, Deputy Director of Point Defiance Zoo & Aquarium

Debbie Russell, Director of Business Administration & Planning

Tania Wink, Chief of Finance & Administration

Sandra Eliason, Chief of Marketing & Communications

Marty Stump, Chief of Planning & Asset Management

Norinda Rosario Yancey, Equity Officer

Hunter T. George, Policy & Government Relations Officer

Project Manager

Erich Sachs, Asset Management & Sustainability Manager

Metro Parks Tacoma Staff

Fred Ramey, ZEED Asset and Facilities Services Manager

Alisa O'Hanlon Regala, Strategic Planning Manager

Ross Wilton, Horticulture Services Manager

Mike Yaden, Community & Neighborhood Parks Manager

Nikki Dzialowy, Facilities Manager (NW Trek)

Scott Clarke, Facilities Manager (PDZA)

Nancy Johnson, Marketing & Communications Manager

Claire Keller-Scholz, Planning & Asset Administrator

Abigail Vizcarra Perez, Equity Outreach Program Coordinator

Doug Sawyer, Building and Facility Services Manager

Roger Stanton, Capital Programs Manager

Kristi Evans, Capital Programs Manager

Abdo Abdelrasoul, GIS Supervisor

Amy Johnson, Data Analytics Supervisor

Julie Wilfong, Procurement & Contracts Supervisor

Marci Kriebel, Capital Financing & Contracts Supervisor

Jenna Richardson, HR (& Risk) Manager

Amber Udelhoven, Risk & Safety Programs Manager

Doug Immerman, PDZA Maintenance Lead

Josh Azinger, Community & Neighborhood Parks Supervisor

Mark McDonough, Urban Forester

Bryon Jones, (PDZA) Horticulture/Arborist Leader

Michele Cardinaux, Facility Supervisor

Jesse Schossow, Finance & Budget Supervisor

Delia Flores, Community Outreach & Engagement Supervisor

Jorge Villamil, Equity Outreach & Engagement Coordinator

Emma Hamilton, Digital Media Coordinator



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Ashley Jonas, Associate, Data Specialist

Molly Coghlan, Associate, Engagement Specialist

Letter from the Park Board

Executive Summary

Guiding Focus Areas

This plan will guide Metro Parks Tacoma (MPT) in efforts to mitigate and adapt to climate change, and build resilience within the organization and the community. This plan, created through a participatory planning process, contains goals, strategies, and actions that fall within four primary focus areas:

Organizational Sustainability

Sustainability and climate resilience are deeply ingrained within Metro Parks Tacoma, where organizational governance, including policies, procedures, staffing, and fiscal prioritization, support MPT's sustainability and climate goals.

Community Resilience

Staff and external community are engaged in sustainability and climate action through education, professional development, incentives, and emotional support.

Resilient Built Environment

Metro Parks Tacoma's built environment is adaptive to the projected climate impacts for the Tacoma region, including extreme heat, heavy rain, rising sea level, landslides, and wildfire.

Resilient Living Systems

Land and animal management practices are sustainable, build local and regional resilience to projected climate impacts, and leverage nature-inspired strategies that support a climate-positive Metro Parks Tacoma.

Tacoma's Changing Climate

Climate change is a global issue that not only threatens the health and safety of our planet, but has significant consequences for our local community. Greenhouse gas emissions released by the burning of fossil fuels trap heat in the atmosphere, causing a blanket-like effect that increases global average temperatures and causes more extreme weather events. Specific impacts of climate change vary by geographic region, and vulnerability of an organization or community depends on a variety of factors.

Recognizing the impacts of global and local climate change, the City of Tacoma has long been engaged in climate action, including the development of its first Climate Action Plan in 2008, and the passing of Resolution No. 40509 in 2019, declaring a climate emergency in Tacoma. In developing its Climate Action Plan and Climate Adaptation Strategy, the City of Tacoma engaged in a process that identified climate hazards and associated risks.

Through review of multiple climate risk assessments and models, it is likely that Metro Parks Tacoma will have to navigate climate impacts that can largely be categorized as follows:

Temperature Alterations

- Extreme Heat
- Extreme Cold

Precipitation Variability

- Severe Storms
- Flooding
- Drought and Fires

Sea Level Rise

Reducing Emissions

Verdis Group measured annual emissions data for 2019, consistent with the baseline established for the Zoological and Environmental Education Department (ZEED) in previously-contracted GHG work. Metro Parks Tacoma produced 9,700 MtCO₂e in 2019 across all scopes included in the analysis (see Figure

1). Select Scope 3 categories included purchasing, capital goods, employee commute, business travel, waste, and wastewater. The primary source of emissions in 2019 is from operating expenses (24%) followed by employee commute (20%).

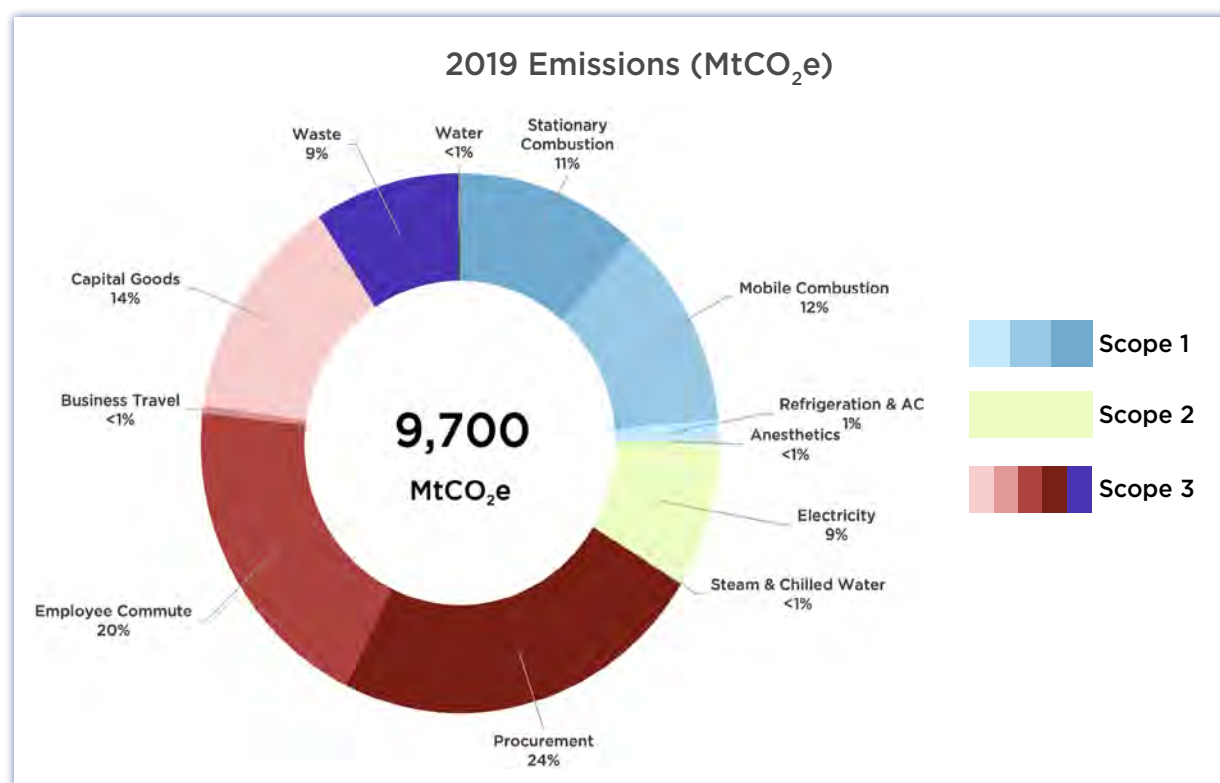


Figure 1. Metro Parks Tacoma's baseline GHG emissions by Scope, 2019

EXECUTIVE SUMMARY

The following diagram (Figure 2) provides an overview of MPT's pathway to net-zero emissions. This analysis resulted in a plan outlining when and to what extent MPT should implement each strategy for reducing emissions in order to reach its goal.

MPT can have the greatest impact on emissions reduction by investing in renewable energy credits and the electrification of buildings and vehicles. By addressing emission categories as outlined, MPT aims to achieve net-zero emissions by 2050.

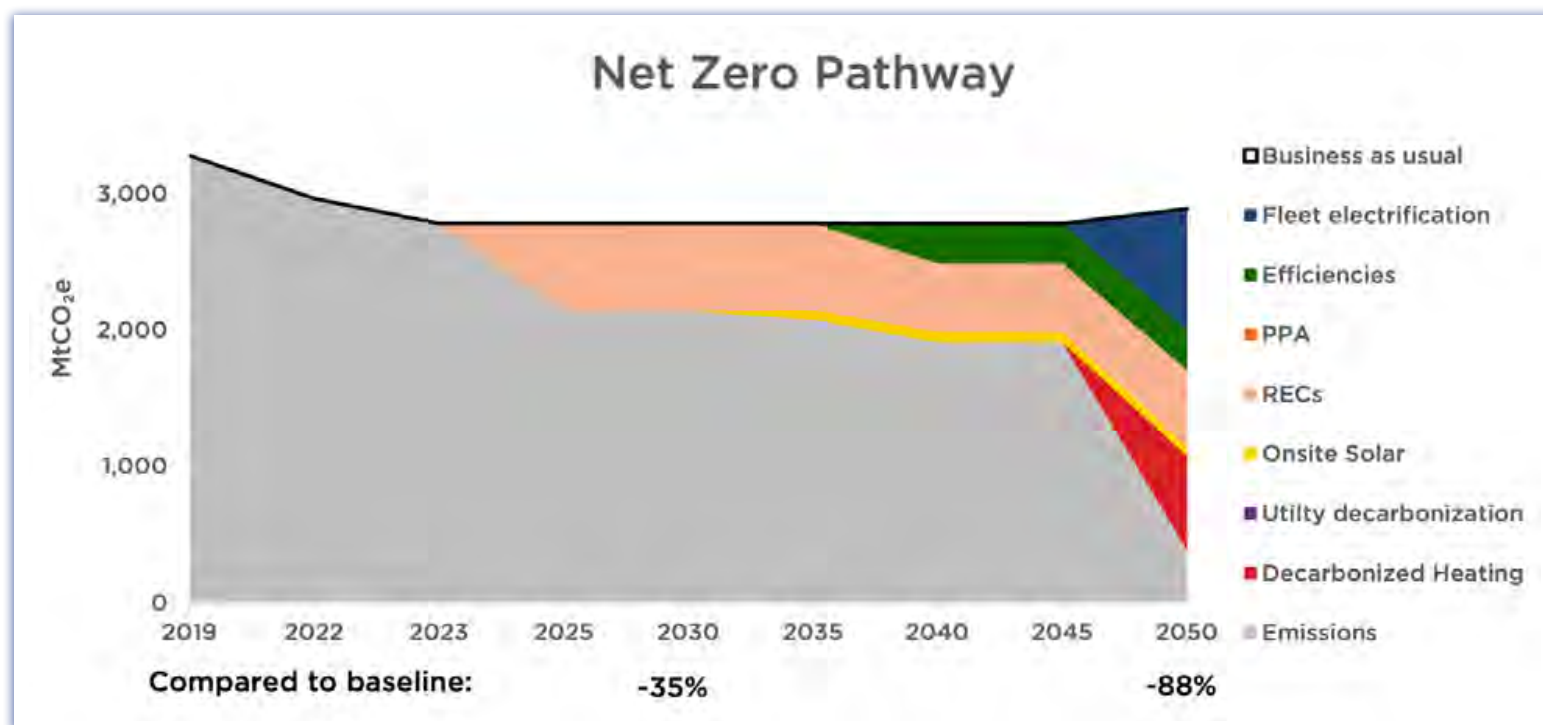


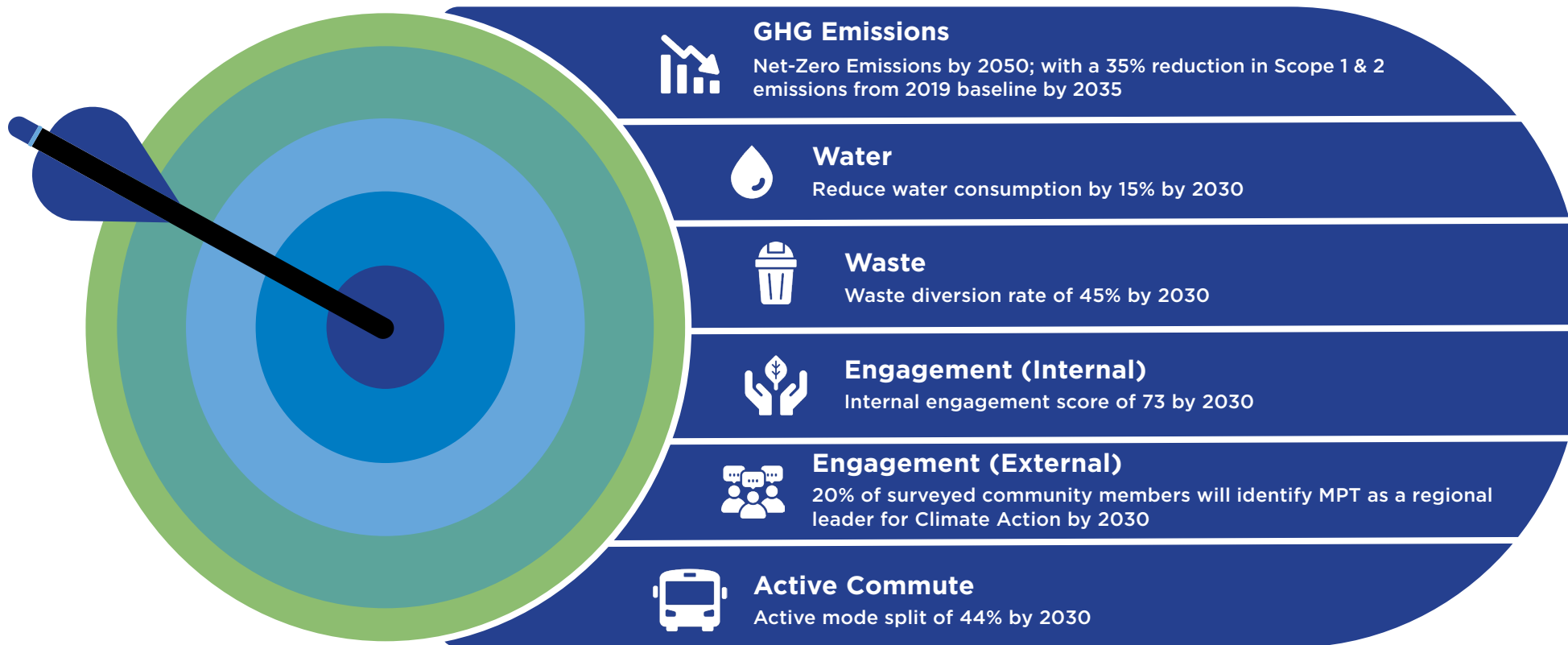
Figure 2. Metro Parks Tacoma's pathway to net-zero emissions

Looking Forward

Goals

Metro Parks Tacoma established the following sustainability and climate action goals through collaborative and evidence-based discussions. MPT leadership reviewed baseline data, peer benchmarking, and subject matter expert input for each of the categories.

Climate Action Goals



Priority Strategies

Using inputs from the entirety of the planning process, Metro Parks Tacoma established four groupings of Priority Strategies:

Organizational Sustainability

- Develop a Climate Action Plan (CAP) team
- Conduct a district-wide utility audit
- Incorporate Sustainability Scoring criteria into organizational decision making processes
- Implement Net Zero Pathway (NZP)

Community Resilience

- Define and communicate decision making, roles, and responsibilities to staff
- Activate district-wide Green Team in 2025-26 biennium
- Create a community Climate Action Plan stakeholder group
- Establish and refine MPT and partner collaborative priorities

Resilient Built Environment

- Develop and implement agency design standards
- Complete a comprehensive inventory of assets and climate risks
- Update Emergency Management Plan with climate disruptions scenarios
- Implement utility redundancy infrastructure

Resilient Living Systems

- Identify and prioritize budget needs
- Align living collections guidelines with project local climate conditions
- Implement nature-based solutions (NbS) for coastal resilience
- Update wildfire mitigation plans

Introduction

Climate change is a global issue that not only threatens the health and safety of our planet, but has significant consequences for our local community.

Greenhouse gas emissions released by the burning of fossil fuels trap heat in the atmosphere, causing a blanket-like effect that increases global average temperatures and causes more extreme weather events. Acknowledging the urgency of this issue, MPT undertook a collaborative strategic planning process during 2023/24 to create this plan and set the organization on a path toward reduced environmental impact and greater climate resilience.



Structure of the Plan

Climate Action Plans (CAPs) are frequently structured around three categories of action: mitigation, adaptation, and resilience. Mitigation refers to strategies that reduce an organization's impact on the environment, while adaptation and resilience include actions to prepare the organization for the impacts of climate change. The focus areas that emerged from the planning process (**Organizational Sustainability, Community Resilience, Resilient Built Environment, and Resilient Living Systems**) fell within these three high-level categories.

This plan is structured to reinforce the importance of mitigation, adaptation, and resilience, while showcasing the alignment with MPT's focus areas. Broad strategies are listed within each focus area's section along with key action steps; detailed plans, timelines, leadership, and budget considerations for each strategy for the next three years are housed in a separate tracking spreadsheet. The tracking sheet will be used as a living document for ongoing project management and progress updates.

Integration with Existing Plans

As an engaged partner within the region, Metro Parks Tacoma sought not only to align with their own System and Strategic Plan, but also with sustainability and climate action targets and goals of other local government agencies. The following table identifies overlaps that MPT reviewed for consideration during the climate action planning process.

Table 1. Regional sustainability and climate action goals that informed this planning effort.

	City of Tacoma ¹	Pierce County ²	ZEED ³	MPT's Prior Planning ⁴	MPT CAP Goals
Waste	Decrease per-capita waste generation by 14%	N/A	Increase waste diversion rate to 15%.	Reduce the amount of waste sent to landfill and increase the availability of recycling for park visitors.	Waste diversion rate of 45% by 2030
Water	Reduce per-person water use during summer months.	N/A	Reduce water consumption by 30%	Reduce overall water use by 9% district-wide.	Reduce water consumption by 15% by 2030

¹ [City of Tacoma 2030 Climate Action Plan](#)

² [Sustainability 2030: Pierce County's Greenhouse Gas Reduction Plan](#)

³ [ZEED Strategic Plan 2022-2027](#)

⁴ [Sustainability & Conservation, Metro Parks Tacoma](#)

Table 1. Continued

	City of Tacoma ¹	Pierce County ²	ZEED ³	MPT's Prior Planning ⁴	MPT CAP Goals
Emissions	Net Zero Emissions by 2050	45% reduction of all emissions, both operational & community-wide, from a 2020 baseline by 2030.	40% Scope 1 and Scope 2 emissions reduction from 2019 baseline by 2030 and Net Zero Emissions by 2050. ⁵	N/A	GHG Emissions - Net Zero Emissions by 2050; with a 35% reduction in Scope 1 & 2 emissions from 2019 baseline by 2035 Active Commute - Active mode split of 44% by 2030
Engagement and Awareness	Ensure all climate action related engagement efforts are inclusive of the communities most impacted by the climate crisis.	N/A	N/A	N/A	Engagement (Internal) - Engagement score of 73 by 2030 Engagement (External) - 20% of surveyed community members will identify MPT as a regional leader for Climate Action by 2030

Additionally, as an admired Parks and Recreation organization, with multiple zoological facilities, Metro Parks Tacoma maintains accreditation through both the National Recreation and Park Association's (NRPA) Commission for Accreditation of Park and Recreation Agencies (CAPRA), and the Association of Zoos and Aquariums (AZA). The intentional development and implementation of this plan applies toward meeting CAPRA (2024) Accreditation Standard 3.6 (Sustainability and Climate Resiliency Plan) and AZA (2024) Accreditation Standard 3.2 (Conservation Programs).

This Climate Action Plan serves to support a sustainable future through collaborative planning with a variety of MPT partners and establishing a roadmap for reducing emissions, building resilience, and engaging the community and peers in developing resources and sharing knowledge.

⁵ Appendix D, ZEED's Net Zero Pathway Report



Building on Strengths and Successes

Before engaging with Verdis Group to create the Climate Action Plan, Metro Parks Tacoma had already taken steps to mitigate its environmental impact and establish itself as a regional partner and leader in sustainability and climate action.

- Water conservation through projects like rainwater capture at Stewart Heights
- Invasive species management, for example, the Himalayan blackberry no longer dominates as it once did
- Animal conservation and habitat restoration, such as the artificial reef beside Dune Peninsula and the work ZEED is doing to protect endangered species
- Prioritization of coastal resiliency with the redevelopment of Owen Beach
- Conversion to electric trams at Northwest Trek
- Community engagement in sustainability initiatives, such as volunteer beach clean ups and newsletters sent out to the public
- Launched a new Enterprise Asset Management Software, Cartegraph, to track and manage the lifecycle of assets
- Completed water utility system study at Point Defiance Park

Process



Discovery/Project Kickoff

The Discovery phase encompassed a variety of data-gathering activities to set the stage for the planning process, including peer research, sustainability engagement survey, community engagement survey, climate impacts, baselines for likely metrics, interviews, and a greenhouse gas (GHG) inventory.

During the Discovery phase, a Climate Action Plan (CAP) Task Force was created. Members were identified based on their expertise within a range of topic areas relevant to the plan.

Climate Vulnerability Assessment

A climate vulnerability assessment (CVA) was conducted to ascertain the ways in which climate impacts have already affected the MPT, the kinds of climate hazards and consequences the MPT may experience in the future, and MPT's level of readiness to navigate through climate-related disruptions.

Strategic Planning Process

The Task Force participated in five workshops throughout the project, which reflect the Technology of Participation (ToP) Strategic Planning process. ToP provides foundational methods for the facilitation of complex planning processes that encourages diverse perspectives to work collaboratively toward consensus around a desired outcome. This participatory decision-making framework lays the groundwork for a successful plan by incorporating voices from across the organization. People participate in what they help create, so ensuring MPT's interested parties were involved in the creation of the plan will be instrumental to its success.

Visioning

First, Task Force members were asked to brainstorm and organize ideas around the question:

What would a more sustainable and climate resilient Metro Parks Tacoma be like in 10 years?

Barriers and Consequences

Task Force members participated in an exercise to identify obstacles that would stand in the way of achieving the vision they developed in the first workshop. Identification of climate-related consequences also occurred as part of climate vulnerability assessment and barrier identification.

Strategic Directions

The Task Force ideated strategies that would help overcome the identified barriers, as well as climate consequences, and move MPT toward realizing its vision.

Focused Implementation

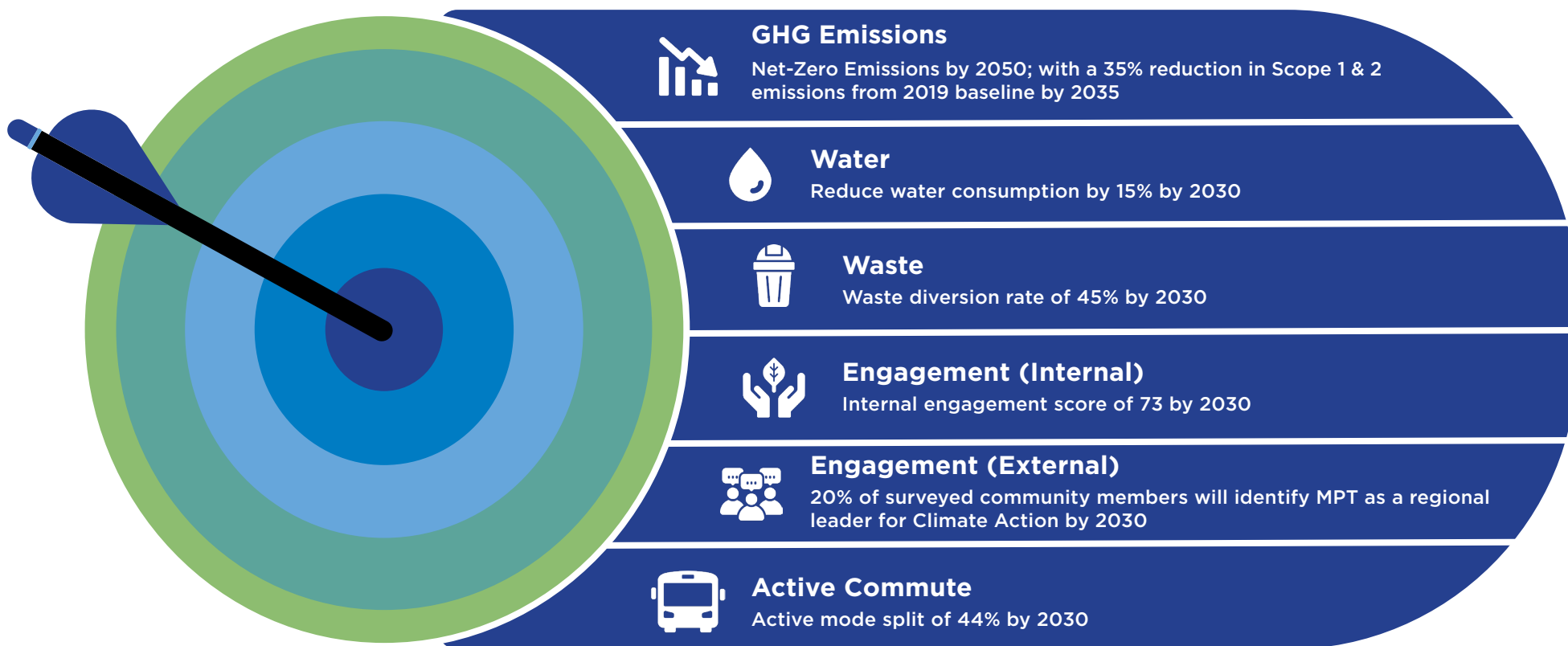
Based on the results of the first three workshops and information from the Discovery phase, Verdis Group identified four key topics around which Focus Teams were created to delve deeper into strategy development and implementation planning (**Organizational Sustainability, Community Resilience, Resilient Built Environment, and Resilient Living Systems**).

Vision areas, barriers, and strategic directions were organized to fall within at least one Focus Team's purview, to ensure all ideas were pulled forward from previous workshops. Focus Teams were convened to participate in Focused Implementation workshops where they refined the strategic directions, identified specific accomplishments to achieve within the first 2-3 years, and plotted the accomplishments alongside necessary action steps onto a timeline.

Goal Setting

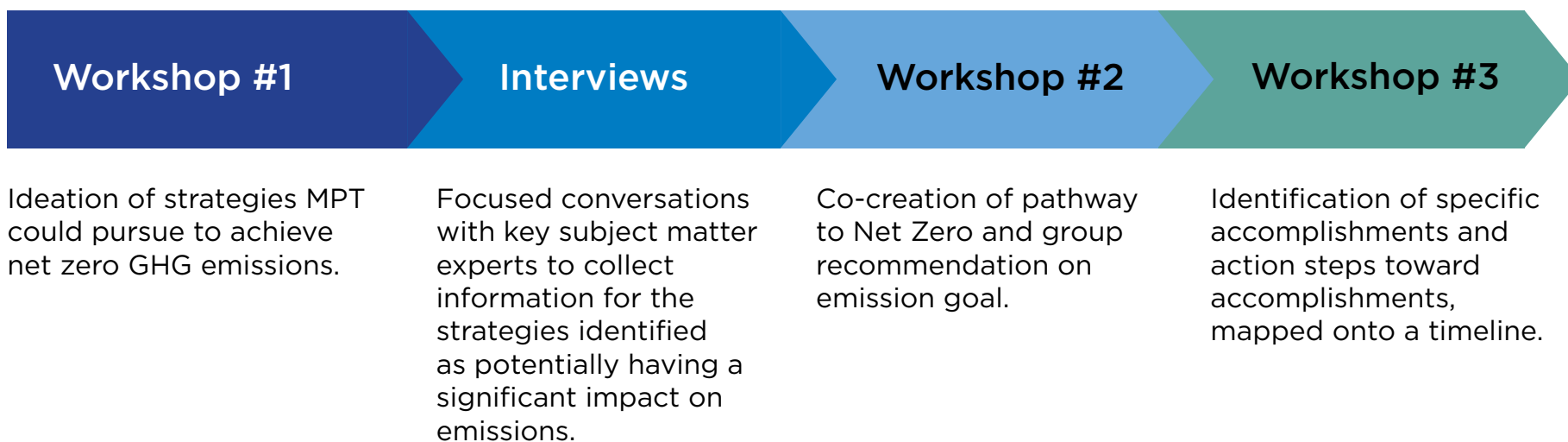
Using inputs from the entirety of the planning process, MPT established and affirmed six (6) Climate Action Plan goals, aligned with their focus areas:

Climate Action Plan Goals



Net Zero Pathway

Verdis Group completed a GHG inventory for Metro Parks Tacoma, alongside a process to build a list of strategies and their potential for reaching net zero emissions. The process consisted of four phases:



Discovery

The Discovery phase attempted to identify and establish the current state of Metro Parks Tacoma, in relation to sustainability and climate change risks, and encompassed a variety of data-gathering activities to set the stage for the planning process. It included peer research, a sustainability engagement survey, a community engagement survey, a review of climate impacts, baselines for likely metrics, interviews, and a greenhouse gas (GHG) inventory. This section of the report provides details on the methods and outcomes from a selection of Discovery activities.





Peer Review

A selection of Metro Parks Tacoma's peers were included in a review of industry actions and commitments. The selected peers enjoy a similar professional reputation within the Parks and Recreation industry. The table below summarizes the general background information of MPT peers, as well as their emissions, energy, or sustainability goals.

Table 2. Summary of Metro Parks Tacoma's peer institution's makeup and sustainability focus.

	City, State	Employees	Acres	Facility Types	Emission/ Energy Goals	Sustainability Priority Areas
Tualatin Hills Parks and Recreation	Beaverton, OR	1,000+ FT & PT	2,532 (park land)	Recreation Centers, Pools, Sports Fields & Courts, Parks, Trails, Waterfronts	100% of electricity is currently sourced through renewables	Emissions reduction, Sustainable purchasing, Water and environmental stewardship, Waste
Los Angeles Parks and Recreation	Los Angeles, CA	1,363 FT / 6,628 PT	16,000	Aquarium, Museums, Recreation and Fitness Centers, Playgrounds, Parks, Trails, Sports Fields & Courts	LAPRD does not have an emissions goal but is subject to Los Angeles' goal of zero carbon grid, buildings, and transportation	Environmental stewardship, equity, and wellbeing
Norfolk Parks and Recreation	Norfolk, VA	261	4,032	Zoo, Parks, Trails	NVPRD has no emissions goal, but is subject to Norfolk's goal to reduce overall building energy use citywide by 3% per year and 30% by 2030	NVPRD does not have sustainability prioritized in their Master Plan (2021), but is subject to Norfolk's goals
Metro Parks Tacoma	Tacoma, WA	450 FT/ 1000+ PT	2,905	Recreation Centers, Parks, Trails, Waterfronts, Zoo & Aquarium	GHG Emissions - Net Zero Emissions by 2050; with a 35% reduction in Scope 1 & 2 emissions from 2019 baseline by 2035 Active Commute - Active mode split of 44% by 2030	Emissions reductions, water, waste, community resilience

The review of Metro Parks Tacoma's peer institutions identified the following trends:

- Most peers have identified sustainability priorities within their Strategic Plans or Master Plans
- Of Metro Parks Tacoma's listed peers, only Tualitan Hills has a publicly published Climate Action Plan

MPT's peers have identified the following Key Focus Areas:

Environmental and Water Stewardship

- Protect habitats, wildlife, and ecosystem functions
- Pursue opportunities to reduce stormwater runoff and pollution
- Ensure activities are climate-neutral, produce zero waste, and generate no hazardous substances
- Provide stewardship of public lands, natural resources, and urban forestry

Emissions Reduction

- Ensure activities are climate-neutral, produce zero waste, and generate no hazardous substances

- Develop a sustainable purchasing program that considers the lifecycle effects of purchasing and operations on people and the environment
- Utilize renewable energy sources

Equity and Wellbeing

- Strengthen programs, experiences, and engagement in community
- Increase park equity and access to innovative park space
- Invest in staff and volunteers



Sustainability Engagement Survey

In October 2023, a survey was distributed to employees and volunteers to gain a better understanding of staff awareness of and involvement in sustainability efforts at Metro Parks Tacoma. A total of 607 individuals completed the survey, including full-time, part-time, and volunteers on staff. Employees in each department participated in the survey, resulting in a total employee response rate of 42%. The survey was distributed in two unique sessions, and the results of this report reflect a combination of those sessions.

The first survey was given to ZEED, and the second was directed at the rest of MPT (P&R, BAP, and G&D). Any responses received from ZEED employees in the second distribution of the survey were filtered out of the quantitative analysis to ensure that no double counting had occurred, however qualitative responses from ZEED employees were considered. Employees and volunteers were both included in the analysis.

The survey uses five questions to assess five dimensions of engagement on a 1-100 scale. The “scores” shown in the table below correspond to the percent of respondents who chose the two responses at the top of the scale (i.e., those who were very aware and moderately aware of efforts, as noted in the table).

Table 3. Summary of Metro Parks Tacoma's Sustainability Engagement Survey results

Dimension	2023 Score
Awareness of Efforts (<i>very/moderately aware</i>) at the organization to be more sustainable	43
Knowledge (<i>very/moderately aware</i>) about ways to be sustainable at work	55
Behavioral Frequency (<i>always/most of the time</i>) about ways to be sustainable at work	69
Perceived Norm (<i>always/most of the time</i>) perceptions of how often others engage in key sustainable behaviors	53
Awareness of Sustainability (<i>very/moderately familiar</i>) familiarity with the concept of sustainability	65
Overall Score	57

Five dimensions were measured in the Sustainability Engagement Survey and averaged for a score of 57.

The overall score is the average of the five dimensions and can be used as a metric to measure progress over time and compare to other organizations that have completed the survey.

Key Survey Findings

Overwhelmingly, Metro Parks employees feel that sustainability concepts are closely aligned with MPT's mission (81% of respondents agree) and that it is important for MPT to take steps toward a more sustainable and resilient organization (93% agree). Employees indicated that sustainability matters at MPT because it lessens MPT's impact on the environment (70%), it is the right thing to do (48%), and because it ensures that future generations will be able to meet their needs (46%).

MPT has already seen success in focused efforts toward wildlife conservation, and community engagement and outreach. Sustainability areas in which employees feel are top priorities for MPT to focus their future efforts on include waste reduction and sustainable purchasing (53% of respondents agree), conserving energy and pursuing clean sources (51%), and preserving green space (50%).



Community Input

Throughout the climate action planning process, community members had several opportunities to interact with and provide input on key components of the climate action plan. This feedback was provided through a community survey, 2 public meetings, and 3 workshops held for students.

Community comments were synthesized and are summarized below to highlight key community priorities:

- **92% of community members think it is moderately to very important for Metro Parks Tacoma to focus efforts on sustainability**
- **95% of respondents are moderately to very concerned about the impacts of climate change in Tacoma**

Community members think that the most important areas for Metro Parks Tacoma to focus their attention on are:

- Addition of green space
- Equitable urban canopy cover
- Coastal resilience solutions
- Increased opportunities for youth engagement and education
- Developing strong regional partnerships
- Acquiring renewable energy to power operations



Climate Vulnerability Assessment

A critical step in the climate planning process is understanding the specific ways that projected climate change impacts will likely affect an organization. By identifying likely climate hazards and consequences, organizations can take steps to reduce their risks through implementing adaptive measures.

Metro Parks Tacoma's climate planning process included identifying its specific vulnerabilities to climate change based on factors detailed in this section. The process resulted in valuable insights that MPT can use to improve its climate resilience.

This section will detail the methods used to conduct Metro Parks Tacoma's climate vulnerability assessment, describe climate impacts that MPT is likely to experience, and summarize the organization's adaptive capacity and vulnerability levels.

⁶ [2030 Tacoma Climate Action Plan, City of Tacoma, 2021.](#)

⁷ [Tacoma Climate Adaptation Strategy, City of Tacoma, 2016.](#)

⁸ [Hegewisch, K.C., Abatzoglou, J.T., Chegwidan, O., and Nijssen, B., 'Climate Mapper' web tool, Climate Toolbox, accessed on December 14, 2023.](#)

⁹ [Hegewisch, K.C., Abatzoglou, J.T., Chegwidan, O., and Nijssen, B., 'Future Climate Dashboard' web tool, Climate Toolbox, accessed on November 29, 2023.](#)

¹⁰ [Pierce County Hazard Mitigation Plan \(2020\), Pierce County, Washington](#)

¹¹ Mooney, Ann, Nathan Gilles, and Denise Lach, "The Vulnerability Assessment Workbook, Assessing your Community's Vulnerability to Climate Risks." Corvallis, Oregon: The Pacific Northwest Climate Impacts Research Consortium (CIRC), College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, 2020.

Methodology

The climate vulnerability assessment included the following steps:

Climate Projection and Impacts

Climate projection data and information for Tacoma, Washington, was obtained from the City of Tacoma Climate Action Plan⁶ (2021) and Climate Change Resilience Study⁷ (2016), "Climate Mapper,"⁸ and "Future Climate Dashboard" tool from the Climate Toolbox,⁹ and Pierce County Hazard Mitigation Plan.¹⁰

Data was collected in these categories:

- Heat indices: days at or above 90°F
- Average annual maximum temperatures
- Average summer and winter temperatures
- Average annual precipitation and frequency of heavy downpours
- Sea level increase range

Data described above was combined with existing information on Tacoma and Pacific Northwest's changing climate to gain a full profile of Tacoma's future climate. Following the framework developed by the Climate Impacts Research Consortium¹¹ (CIRC), a Vulnerability Assessment Table (VAT) was created to summarize climate impacts for Tacoma.

Climate data projections were summarized in the VAT into three major categories, along with their related extreme events:

Temperature Alterations

- Extreme heat

Precipitation Variability

- Heavy downpours
- Flooding and landslides
- Droughts
- Wildfire

Sea Level Rise

- Coastal flooding and erosion
- Saltwater intrusion

Unless otherwise noted, data presented in this report reflects third party modeling for the Tacoma area, comparing averages from the 1990s to the projected conditions of the 2050s under the RCP 8.5 model (high scenario) as informed by the IPCC's Fifth Assessment report.¹²

¹² ["Fifth Assessment Report — IPCC." IPCC, 2014. Accessed November 2023.](#)

Organizational Impacts

Impacts for Metro Parks Tacoma resulting from the projected climate change were assessed during the Barriers and Consequences Workshop. The potential consequences of likely climate impacts for MPT was summarized into a narrative form.

Likelihood

The likelihood of each climate impact occurring was rated according to level of evidence. Levels of likelihood ranged from "improbable" to "very likely."

Stressors and Consequences

Possible intersections between climate and non-climate stressors were assessed. Non-climate stressors are impacts to MPT that are not related to climate, such as population growth, access to public funding, staff capacity, health trends, and shifts in the local economy, among others. Non-climate stressors were examined in terms of how they might compound, negate, or otherwise interact with the identified climate stressors related to temperature alteration, precipitation variability, and rising sea levels. After examining possible interactions between climate and non-climate stressors, a consequence level between "negligible" and "catastrophic" was determined.

Risk

Using the determined values for likelihood and consequence levels, a risk value from “low” to “extreme” was assessed for each climate impact category.

Adaptive Capacity

CIRC defines adaptive capacity as the “ability of a system to adjust to changes, manage damages, take advantage of opportunities, or cope with consequences.” To obtain information about Metro Parks Tacoma’s adaptive capacity, 39 members of MPT, from diverse divisions and with varied roles, assessed MPT’s current strengths and weaknesses in the categories of social potential, management potential, and organizational capacity. These adaptive capacity dimensions were assessed in relation to MPT’s ability to anticipate, respond to, and recover from the projected climate impacts involving temperature alterations, precipitation variability, and sea level rise. Survey results were analyzed, aggregated, and used to assign an adaptive capacity rating of “low,” “moderate,” or “high.”

Vulnerability

Using the determined values for risk and adaptive capacity, a vulnerability level of “low”, “moderate”, or “high” was assigned for each climate impact area.



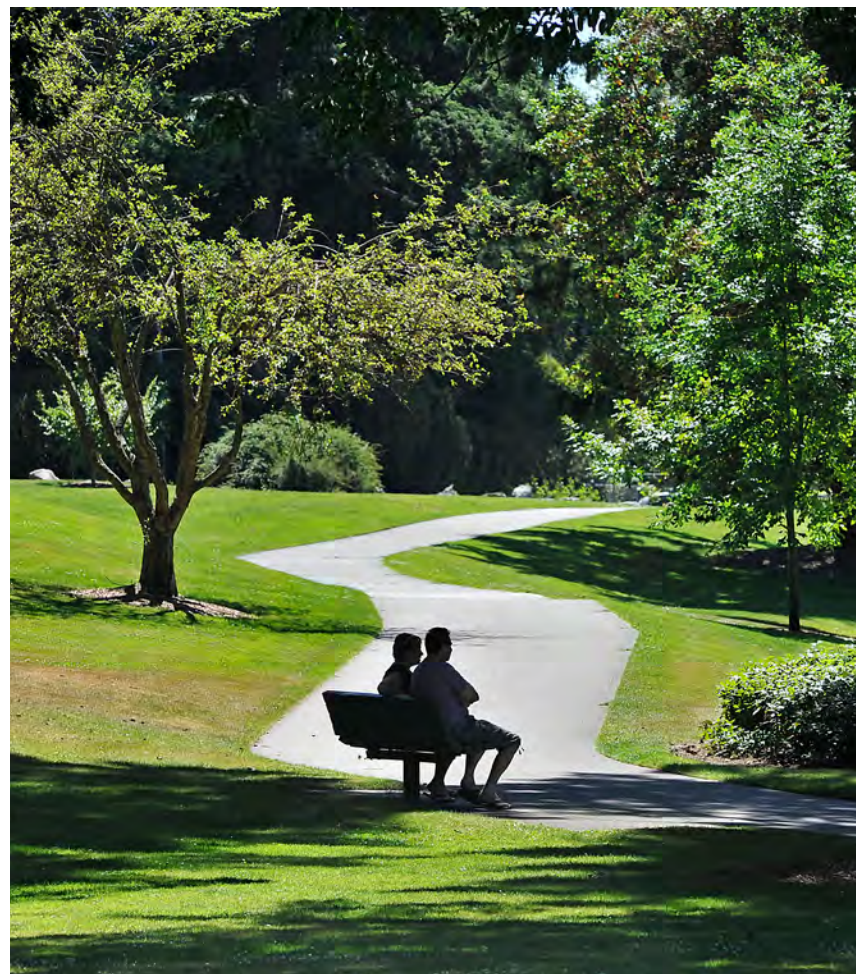
Projected Climate Impacts

Tacoma's projected climate impacts that are summarized in the Vulnerability Assessment Table fall into three main categories: temperature alterations, precipitation variability, and sea level rise.

Temperature Alterations

Tacoma is getting warmer and projected to get hotter by the 2050s. Average annual temperature in Tacoma, as is true of the rest of Pacific Northwest region, increased by 1.3°F between 1895 and 2011, and nighttime heat waves occurred more frequently over the last century (1901 to 2009).¹³ All seasons are expected to continue getting warmer, but most of the warming will be occurring in summer. By the 2050s, the average annual temperatures are projected to increase by 5.7°F. By the mid-century, also, respective average maximum and minimum summer temperatures are expected to increase by 6.0°F and 5.6°F, and average minimum winter temperatures will increase by 5.1°F. In keeping with these trends of Tacoma's warming climate, projections show that the average number of days at or above 90°F will increase from 4 days to 15 by the 2050s from

the 1990s, nearly quadrupling. Moreover, by 2050, Tacoma is projected to experience an average of about 28 days per year over 84.9°F,¹⁴ which is about the same as Omaha's average high temperature for summer.¹⁵



¹³ [Tacoma Climate Change Resiliency Study \(2016\).](#)

¹⁴ [ClimateCheck, accessed July 2024.](#)

¹⁵ <https://www.currentresults.com/Weather/Nebraska/Places/omaha-temperatures-by-month-average.php>

Given its urban setting, these extreme temperatures will be further elevated by the urban heat island effect. Urban heat island effect refers to the phenomenon of urban areas, or localized areas within cities, experience higher temperatures that surrounding rural areas.¹⁶ Tacoma's current urban heat island effect ranges from high to severe, and is expected to strengthen in the coming years with increase of warming.¹⁷

The urban heat island elevated temperatures are highest in Central and Southern Tacoma, places where vulnerable Tacoma populations reside (Figure 3).¹⁸ As Figure 3 shows, 63 MPT assets are located in areas with elevated temperatures due to the urban heat island effects. Extreme heat will not only pose to those assets a high risk of damage or degradation but also pose health and safety risks to MPT guests and staff.

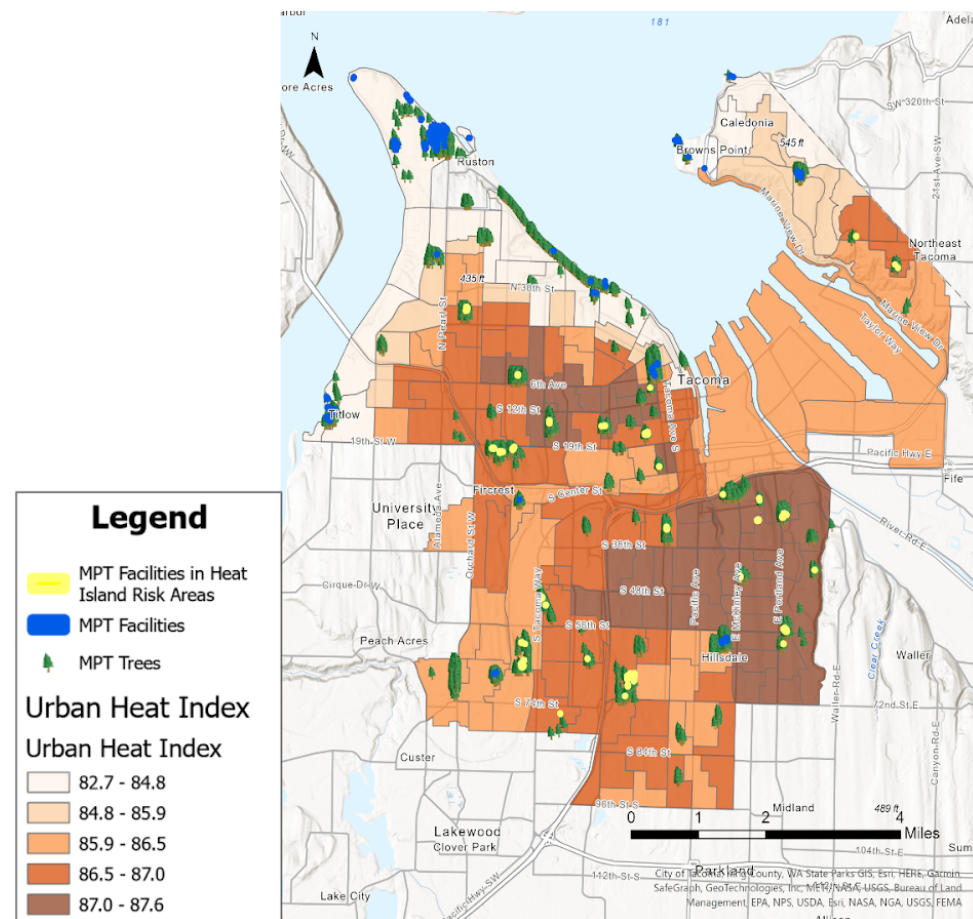


Figure 3: Areas of Urban Heat Island Effect with Elevated Average Temperatures in Central and South Tacoma

¹⁶ "Heat Island Effect | US EPA," Environmental Protection Agency, 18 March 2024. Accessed December 2024.

¹⁷ Ibid.

¹⁸ Adapted from Tacoma Climate Change Resilience Study (2016)



Precipitation Variability

While there is no significant projected increase in precipitation overall for Tacoma, by the 2050s, there is projected slight increase in precipitation for winter, spring, and fall, and substantial decrease for summer.^{19,20} By 2050s, the average fall precipitation for Tacoma will increase by over 6.1%, while winter and spring precipitation will increase by 7.9% and 3.1%, respectively.²¹

On the other hand, summer precipitation is expected to decrease by 14.2%. By the 2050s, there is an expected increase in frequency and intensity of precipitation during the wet seasons.²² With more atmospheric river events expected during the winter months, winter precipitation will be particularly severe, and most of it is projected to be rain given the milder winter temperatures.

¹⁹ [Tacoma Climate Change Resilience Study \(2016\)](#)

²⁰ [Puyallup Climate Change Impact Assessment \(2016\)](#)

²¹ [Hegewisch, K.C., Abatzoglou, J.T., Chegwidon, O., and Nijssen, B., 'Climate Mapper' web tool. Climate Toolbox, accessed on July, 2024.](#)

²² [Ibid.](#)

Flooding and Landslides

The combination of extreme precipitation falling as rain in the fall and snow melting earlier in the spring due to the projected warming temperatures is expected to result in severe flooding, as well as likely incidences of landslides in Tacoma.²³ Flood risk in Puyallup watershed, which Tacoma is part of, is expected to increase due to the combination of intense rainfall and increased sediment load. Therefore, as more frequent, heavy rainfall events are projected to occur in Tacoma area, along with more snowmelt runoff or rain-on-snow events due to warmer winter temperatures, riverine, flash, and surface flooding will continue to occur in the city and its environs, posing risks to community-wide property damage and disruptions to everyday life activities. As Figure 4 indicates, much of Tacoma area is flood prone, and 52 MPT assets are located in areas in existing flood risk areas.

Landslides are projected to become more common due to expected increases in frequency of extreme precipitation events in the fall, winter, and spring. More winter and spring precipitation, as well as snow melt, overall will increase ground saturation, contributing to a higher risk of landslides, and collapse of retaining walls due to seepage around them.²⁵

²³ Hegewisch, K.C., Abatzoglou, J.T., Chegwidan, O., and Nijssen, B., 'Climate Mapper' web tool. [Climate Toolbox](#), accessed on July, 2024.

²⁴ Adapted from Tacoma Climate Change Resilience Study (2016).

²⁵ Tacoma Climate Change Resilience Study (2016)

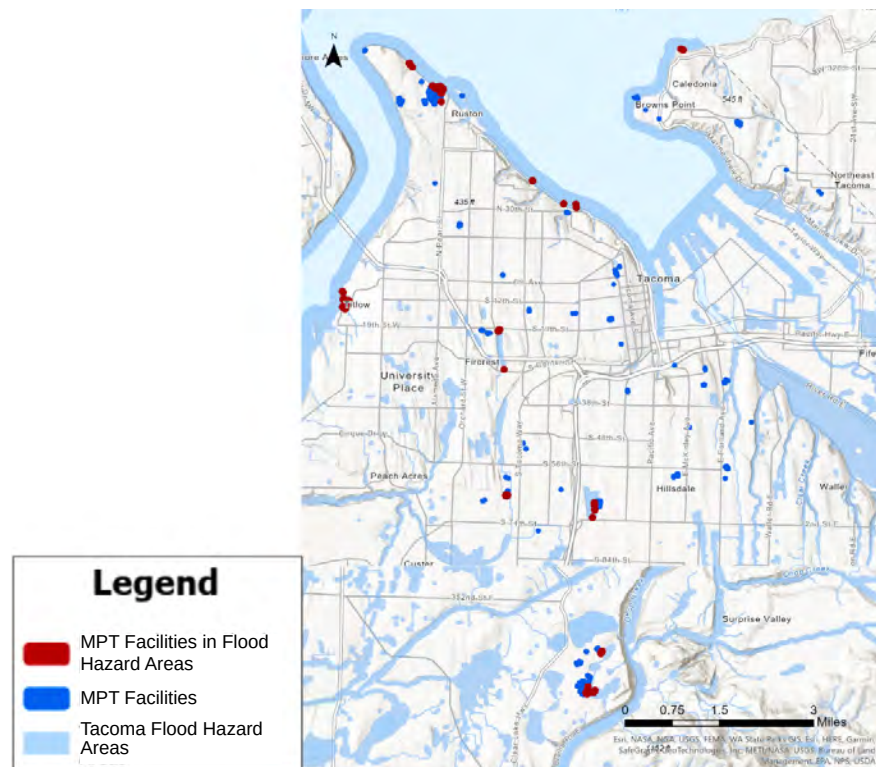


Figure 4: Areas of Tacoma with high flood risks²⁴

The movement of earth materials due to landslides will likely down trees and utility posts, damage structures, and block roadways and stormwater drainage systems. Many of the 52 MPT assets that are located in flood risk areas are also located within the present-day landslide-risk areas (Figure 5). Besides the risk of damage to MPT facilities, flooding and landslides will likely impede transportation in Tacoma, as major roads and railroads are closed (such as Ruston Way, Marine View Drive, Interstate 5), due to downed trees, landslide materials, and high water.

With flooding and landslides likely to disrupt economic activities and transportation system in Tacoma's tideflats areas as well as the city's other low-lying parts, MPT can expect significant, and likely, long-lasting disruptions to its operations, as its staff may not be able to get to work and MPT's damaged infrastructure may need repair, guests not able to travel to MPT assets or suffer financial losses to not be able to afford services.

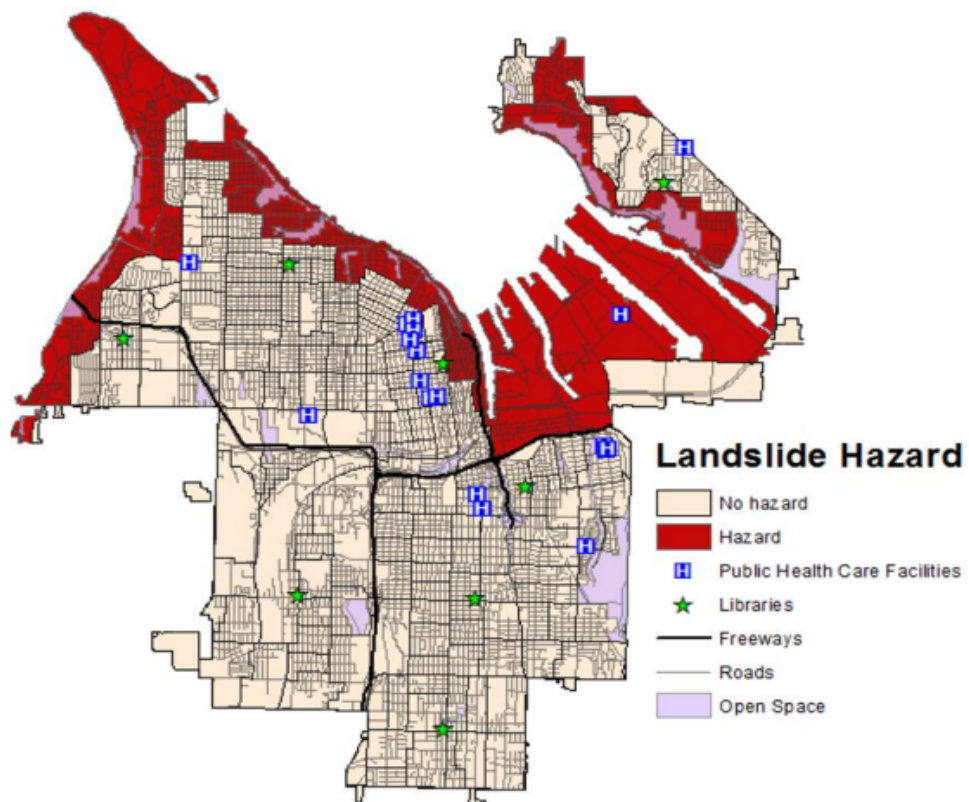


Figure 5: Landslide hazard areas in Tacoma²⁶

²⁶ Tacoma Climate Change Resilience Study (2016), page 58.

Droughts and Wildfires

As temperatures rise and precipitation shifts away from consistent and even distributions, the Tacoma region can expect severe drought events to increase. With projected high summer temperatures, significant decline in summer rainfall, and decline in spring snowpack, Tacoma will experience more frequent and severe droughts. Intense droughts can reduce vegetation cover of a landscape, causing heavy runoff and flash flooding when heavy rain occurs.²⁷ In Tacoma, an increase in severe droughts will result in significant stress for urban trees and landscaping. Unirrigated and newly planted street trees will be the most stressed by drought. Increased watering during plant establishment or dry summer will be needed and yet water supplies are expected to come under stress as well due to increase in droughts. Droughts may hinder MPT's, as well as Tacoma's, goal of expanding its urban canopy, especially in vulnerable communities, as more resources will be needed to maintain heat stressed trees and vegetation.

Wildfires in the Pacific Northwest region are projected to become large, severe and more frequent

²⁷ Myers, Dan. "Do extreme floods and droughts cause more extreme floods and droughts?" Indiana University Bloomington, 9 October 2021. Accessed April 2024.

²⁸ Blow, Ashli. "South Puget Sound Cities Now at High Risk for Wildfire". *The Urbanist*, April 7, 2023. last accessed on July 24, 2024.

²⁹ Pierce County, WA. *Hazard Mitigation Plan 2020-2025*.

³⁰ Ibid.

³¹ Tacoma-Pierce County Health Department.

due to projected warming and dryer conditions, and South Puget sound cities, including the city of Tacoma, have a high risk of wildfire.²⁸ Pierce County has identified fire risk to its wildland-urban interface areas as a significant natural hazard concern.²⁹ As such, wildfires in Tacoma and elsewhere in the region will most likely threaten infrastructure and facilities near or within urban forests and roadways with large vegetated areas, like Interstate 5.³⁰ MPT's tree assets, especially those within the wildland-urban interface areas, such as Northwest Trek Park and its facilities, will likely face significant risk of fire. Smoke pollution will be another important outcome of wildfires in Tacoma, and will likely pose health risks to people, particularly youth and elderly, and animals at MPT. Smoke may worsen air quality-related respiratory illnesses such as asthma and allergies, impact the community's ability to access outdoor recreation, stress indoor facilities with increased demand, and disrupt transportation due to low visibility conditions (Figure 4). As such, wildfires and smoke will likely cause significant disruptions to MPTs operations.

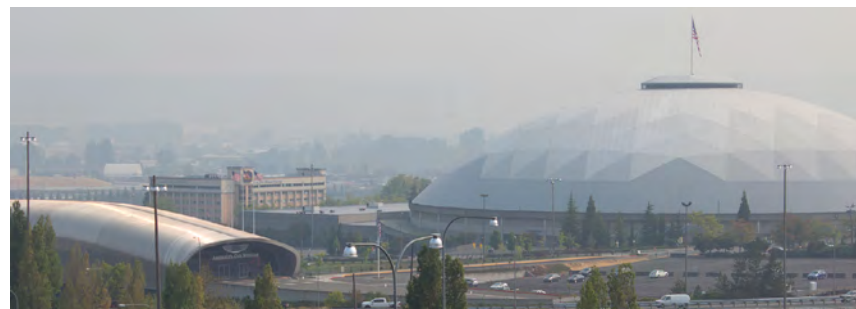


Figure 6: Wildfire Smoke in Tacoma³¹

Sea Level Rise

During the last century, sea level in the Puget Sound region has risen by 7.8 inches.³² By 2050, the sea level is expected to increase by as much as 19 inches and by 56 inches by 2100, relative to 2000 levels.³³ The projected sea level, when combined with high tides and storm surges, will increase the likelihood of extreme coastal events. High tides and storm surges will likely result in sea level rising to 24 inches, making 100-year flood events to become common occurrences.³⁴ The projected sea level rise combined with storm surge and high tides is expected to increase the frequency of flooding events and result in coastal erosion and saltwater intrusion into freshwater resources.³⁵

In Tacoma, extreme coastal events caused by the rising sea levels are expected to significantly degrade the city's shoreline and tidal flats physical infrastructure. Coastal flooding and erosion will disrupt transportation, both rail and road, specially in the tidal flats areas. Saltwater intrusion and inflow will corrode the physical infrastructure, including waste treatment plants.³⁶ Similar to the effects of river and surface flooding, extreme coastal events will disrupt MPT operations, as staff are not able to get to work and guests are unable to access MPT's coastal amenities due to degradation or loss of coastal transportation networks. Also, it is likely that MPT assets located in high sea level rise risk areas will be damaged and be out of commission as the organization works on repairs. 28 MPT assets are located in areas with projected sea rise levels of 10ft, making them highly vulnerable to the impacts of extreme coastal events (Figure 7 and Figure 8). Moreover, disruptions to operations of the Tacoma sea port due to extreme coastal events will likely impact Tacoma's local economy. Disruption to Tacoma's local economy will likely result in decline in guests at MPT assets, as well as inhibit the ability of MPT to source necessities needed for its operations.

³² Puyallup Climate Change Impact Assessment (2016)

³³ Tacoma Climate Change Resilience Study (2016)

³⁴ Ibid.

³⁵ Ibid.

³⁶ Ibid.

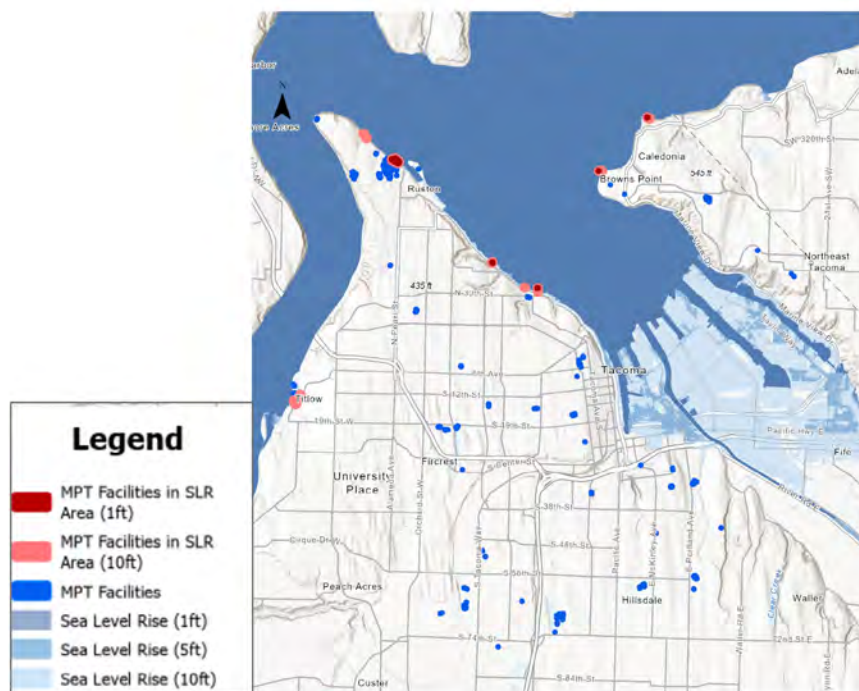


Figure 7: Areas of Tacoma with prone to sea level rise risks.

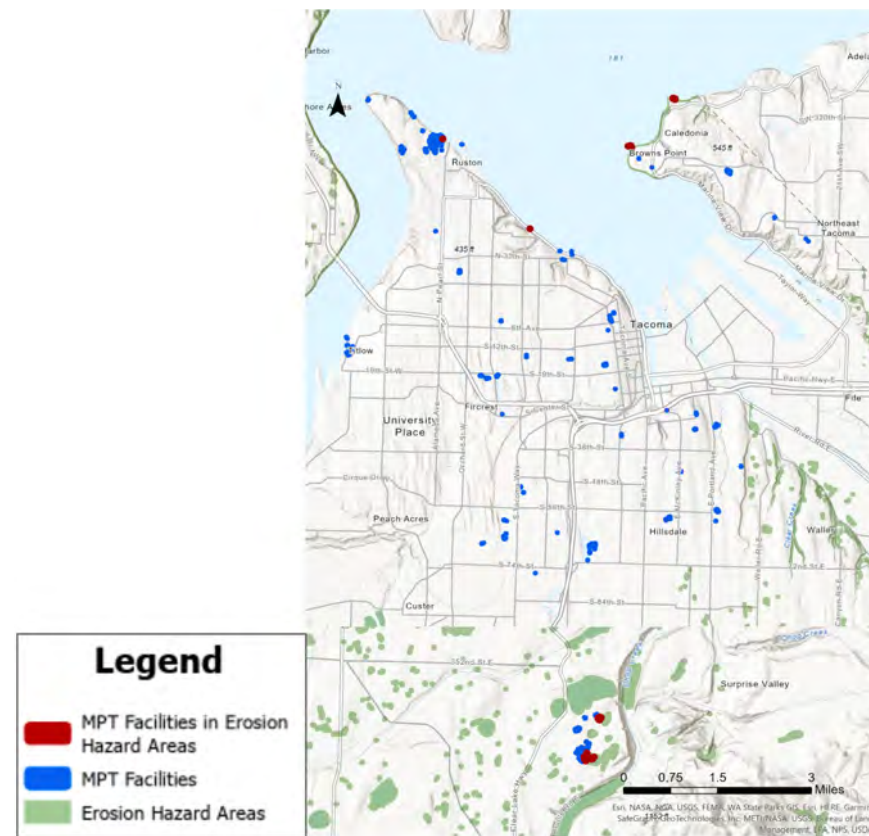


Figure 8: Areas of Tacoma with higher risk of coastal and inland erosion

Potential Consequences

Participants in the Barriers and Consequences Workshop identified these categories of potential consequences for Metro Parks Tacoma functional operations due to temperature alterations, precipitation variability, and sea level rise:

- Damage and loss of the built infrastructure
- Degradation and loss of natural infrastructure and services
- High demand for financial resources and revenue loss
- Negative safety and health impacts to staff, guests, and animals
- Operational interruptions and service disruptions

Expanded details within the above categories can be found in Appendix A.

After reviewing the potential consequences, in the context of the projected climate change data and information on non-climate stressors, a consequence level of negligible to catastrophic (see the following scale) was then assigned to each of these climate impact categories: temperature alterations, precipitation variability, and sea level rise.

- **Catastrophic.** MPT will cease to exist or have functions permanently altered.
- **Major.** Functions of MPT may be dramatically altered, such that value is undermined.
- **Moderate.** Functions of MPT may be diminished, such that operations and guest experience is degraded, but still present.
- **Minor.** MPT will continue to function but specific activities may be impaired.
- **Negligible.** MPT will not be visibly or functionally affected.

Temperature Alterations

Metro Parks Tacoma is becoming familiar with extreme heat and heat waves, as illustrated by its regular summer posts on extreme heat safety tips on its website, including information about its facilities which Tacoma residents and visitors could use to cool down.³⁷ As average annual temperatures and summer temperatures increase over the coming years, MPT will continue to experience impacts related to extreme temperatures, including degradation or loss of its natural and physical assets. Since MPT is located in a US region that historically is not characterized by hot summers, unknown impacts may arise when extreme temperature events occur at an increased frequency, severity, and/or longer duration.

Assessed Consequence Level: Moderate

³⁷ [Metro Parks Tacoma, "Beat the heat at spraygrounds, parks & pools."](#)

Precipitation Variability

With Tacoma receiving an average of about 40 inches of rain, and potential of four inches falling within a 24-hour period during extreme events, MPT is keenly aware of the local and regional flooding associated with extreme rainfall events.³⁸ When heavy downpours result in severe flooding, the impacts can be felt at the homes of MPT staff and visitors, and throughout the Tacoma region which can impact goods and services from vendors, as transportation and local economies are disrupted. On-site at MPT, flooding on facilities can disrupt operations. Many areas of Tacoma and some locations at MPT are in high flooding risk areas, which places various MPT facilities at a risk of damage. Additionally, with the projected warming temperatures and declining rainfall in summer months, droughts in Tacoma will become the norm. MPT natural assets will suffer serious stress. Tacoma has a water shortage plan, which identifies strategies to conserve water during periods of severe drought, which could lead to periods of limited permitted water consumption for MPT.³⁹ With the increasing likelihood of warm, dry summers, the risk of wildfire and associated wildfire smoke is likely to become a bigger concern in Tacoma, affecting MPT's tree assets, facilities, and communities with poor air quality and limited visibility.

Assessed Consequence Level: Moderate

³⁸ [Metro Parks Tacoma, "Flooding."](#)

³⁹ [Tacoma Public Utilities, Water Shortage Response Plan](#)

Sea Level Rise

Puget Sound region, including Tacoma region is familiar with coastal flooding caused by high tides (especially king tides) and wind-driven waves.⁴⁰ In the coming years, the combination of rising sea levels, high tides and coastal windstorms will result in extreme coastal flooding and coastal erosion, impacting shoreline and low lying areas of Tacoma. The increase in extreme coastal flooding events will disrupt the economy of Tacoma, as well as the operations of MPT, as major coastal roadways, the rail, and port of Tacoma may face closures, and city and MPT facilities and amenities are damaged.

Assessed Consequence Level: Moderate

⁴⁰ [State of Washington Department of Ecology, "King tides showcase future sea level rise."](#)

Adaptive Capacity

Adaptive capacity refers to the ability of an organization or community to adjust to changes, manage damages, or cope with consequences. Staff were invited to engage in multiple interactive sessions that identified climate risks, familiarized participants with the dimensions of organizational adaptive capacity, and provided a mechanism for collecting quantitative and qualitative input.

Staff evaluated adaptive capacity across the three dimensions (social potential, organizational capacity, and management potential) as defined by CIRC and described in the Table 4. Staff scored each dimension using the nonexistent (1) to superior (5) criteria:

- 1. **Nonexistent.** Not functional or does not exist.
- 2. **Poor.** Not adequate, but provides modest function.
- 3. **Fair.** Could easily be improved.
- 4. **Good.** Better than adequate, but could use improvement.
- 5. **Superior.** This is the ideal condition.

Staff responses were then aggregated to determine an average score. The resulting averages were then assigned a value of Low (1 - 2.3), Moderate (2.4 - 3.6), or High (3.7 - 5). The dimension, description, and averaged score are reflected in Table 4.

Table 4. Metro Parks Tacoma’s adaptive capacity by dimension as assessed by staff.

Adaptive Capacity Dimension	Description	Rating
Social Potential	Relationships between MPT employees that allow them to make collective decisions about the future.	3.42 Moderate
Organizational Capacity	Individual MPT employee capacity, combined with others in the organization and local communities to make organizational choices in the face of change.	3.22 Moderate
Management Potential	Rules, regulations, and management styles that allow MPT and its employees to adapt to changing conditions.	3.22 Moderate

Vulnerability Level

Vulnerability levels were assigned based on the risk and adaptive capacity for each climate category. The table below summarizes the climate impact categories and their corresponding levels of likelihood of occurrence, consequence if/when the impact occurs, risk to the MPT, Metro Parks Tacoma's adaptive capacity, and the MPT's overall level of vulnerability (Table 5).

Table 5. Metro Parks Tacoma's adaptive capacity by dimension as assessed by staff.

Climate Categories	Likelihood	Consequences	Risk	Adaptive Capacity	Vulnerability Level
Temperature Alterations • Extreme heat days • Heat waves • Urban heat island	Likely	Moderate	High	Moderate	Moderate
Precipitation Variability • Flooding • Landslides • Droughts • Wildfire and smoke	Likely	Moderate	High	Moderate	Moderate
Rising Sea Level • Coastal flooding • Coastal erosion • Saltwater intrusion	Likely	Moderate	High	Moderate	Moderate

Climate Vulnerability Assessment Summary

Tacoma is already experiencing the effects of climate change, from increasing frequency of extreme summer heat, heavy downpours and flooding events, severe wildfire smoke, to sea level rise and extreme coastal events. In the coming years, these climate impacts will increasingly continue to be felt throughout Tacoma's community, and are likely to become more challenging for Metro Parks Tacoma to navigate as intensity and frequency of multiple and overlapping impacts steadily increase.

Temperature alterations, precipitation variability, sea level rise, will continue to present the greatest risks and opportunities for disruption of MPT operations and services to the Tacoma community. Effects from extreme heat and its amplification by the urban heat island, impacts from surface, riverine and coastal flooding, droughts, and wildfires will negatively affect Metro Parks Tacoma physical and natural assets and infrastructure, staff capacity, and visitor experience. As extreme events continue and increase in frequency and intensity, MPT must monitor, plan, respond, and recover from these events in a sustainable, resilient, inclusive, and equitable manner.

While it is a respected anchor institution in the city of Tacoma, and a leader in provision of parks, recreation, and zoological services to the larger Tacoma region, Metro Parks Tacoma may rely on and strengthen its existing partnerships with local government agencies and community organizations to strengthen its own operations and the surrounding communities' climate resilience, preparedness, and responses related to climate change. Opportunities exist for MPT to strengthen their adaptive capacity internally by providing training, education, and actionable strategies for staff to be aware of. Some of the Metro Parks Tacoma's local and regional partners have developed climate related strategies, such as Tacoma's Climate Action Plan, making it imperative for MPT to ensure it is in alignment with local and regional climate efforts.

GHG Inventory

Included in the Discovery phase and embedded throughout the process of the Climate Action Plan were activities and workshops dedicated to establishing an organizational Net Zero Pathway (NZP). To achieve net zero GHG emissions, Metro Parks Tacoma will reduce its emissions from the established baseline by 90% through strategies like energy efficiency upgrades, investment in renewable energy, and supporting alternatively-fueled vehicles.

The first steps of the NZP were to affirm Metro Parks Tacoma's existing emissions, inclusive of Scope 1, Scope 2, and Scope 3 sources. GHG inventory methods and results are presented below (a full detailing on the NZP outcomes is within the Mitigation section of this report).



Greenhouse Gas Inventory

A GHG emissions inventory for Metro Parks Tacoma was completed early on in the Discovery phase, covering emissions associated with Scope 1 (direct, onsite), Scope 2 (indirect emissions from owned sources), and select Scope 3 (various indirect emissions) categories. Metro Parks Tacoma provided sufficient data to calculate these emissions and establish a baseline, and Verdis Group analyzed the data using proprietary tools.

Verdis Group measured annual emissions data for 2019, consistent with the baseline established for the Zoological and Environmental Education Department in previously-contracted GHG work. Metro Parks Tacoma produced 9,700 MtCO₂e in 2019 across all scopes included in the analysis (see Figure 1). Select Scope 3 categories included purchasing, capital goods, employee commute, business travel, waste, and wastewater.

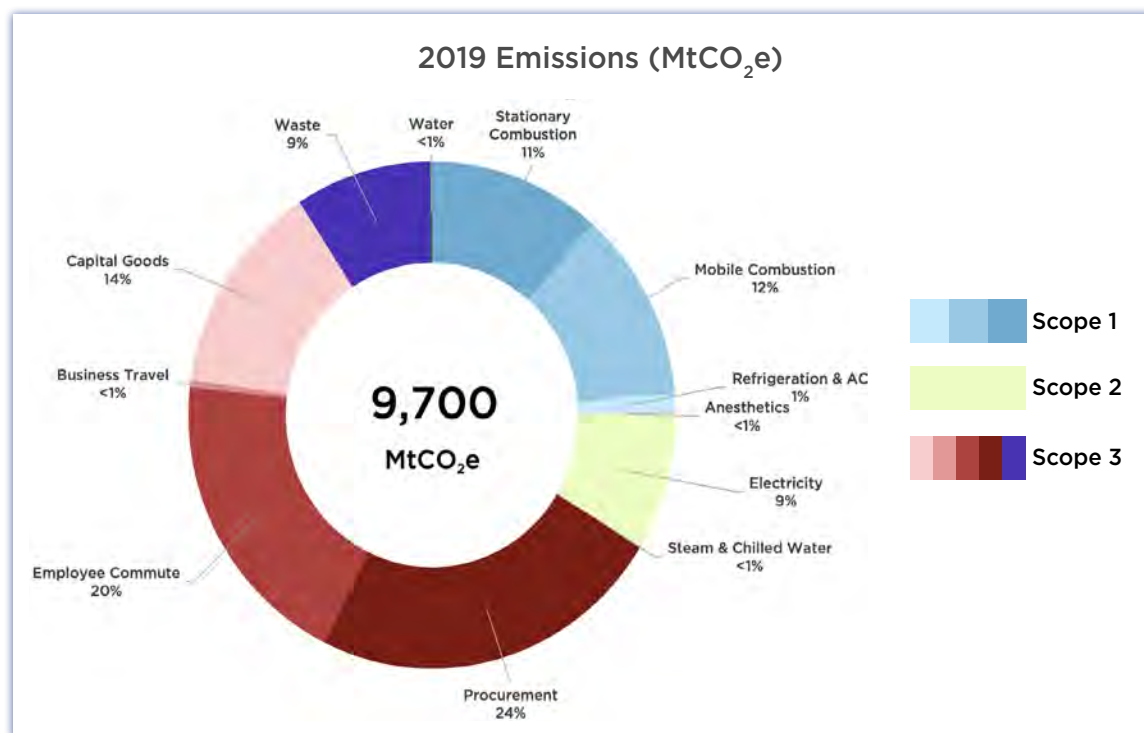


Figure 1. Metro Parks Tacoma's baseline GHG emissions by Scope, 2019

The primary source of emissions in 2019 is from operating expenses (24%) followed by employee commute (20%). As Metro Parks Tacoma has changed considerably since this baseline year, Verdis Group also analyzed certain emissions categories for a 2023 inventory. Stationary combustion and electricity GHG emissions data were calculated, and in the four years since baseline, Metro Parks Tacoma has already reduced emissions in these categories by 28%.

Methods

Verdis Group accounted for emissions from four gases: carbon dioxide, methane, nitrous oxide, and refrigerants, which constitute the vast majority of emissions for most organizations. Methane and nitrous oxide are more potent greenhouse gases than carbon dioxide. To compare them equally, Verdis Group converted these gases into carbon dioxide equivalents. For example, methane is approximately 25 times more powerful than carbon dioxide, so methane emissions are multiplied by approximately 25 to produce the carbon dioxide equivalent.

Emissions factors were sourced from the Environmental Protection Agency (EPA), the Energy Information Administration (EIA), Energy Star, Puget Sound Energy (PSE), and Tacoma Public Utility (TPU), which report annual emissions factors (the amount of carbon dioxide released per kWh generated).

Other Relevant Information

- Applicable framework: Greenhouse Gas Protocol
- Reporting lead: Ashley Jonas for Verdis Group
- Reporting period covered: January 1, 2019 to December 31, 2019
- Organizational boundary: the inventory applies the consolidation approach of operational control.
- Operational boundary: emissions sources included in this inventory are Scope 1, Scope 2, and selected Scope 3 (purchased goods and services, capital goods, employee commuting, business commuting, and waste generated in operations).

Assumptions

During the completion of the inventory, the reporting team made several assumptions that are disclosed below:

- Methane (CH₄) and nitrous oxide (N₂O) emissions from mileage are not calculated due to their low impact on emissions for mobile combustion and complexity required to gather this information.
- It is assumed that the chilled water is using an absorption chiller, as this is most common.
- The estimated weights for recycled material is based on the assumption that the containers permit commingled cardboard and paper recyclables but not glass.
- It is estimated that containers are typically 70% full at the time of pick-up for the purposes of calculating the volume of waste.
- It is estimated that yard waste is picked up 13 times per year.
- Due to a lack of consumption data for natural gas usage, it is assumed that the 2019 prices for natural gas at ZEED were the same prices per therm as the fuel purchased for the rest of MPT.
- Mobile combustion data was not available in the format of mileage vehicles were driven or the amount of fuel used. Instead, the reporting team made estimations on the regional cost of fuel by month to input total fuel consumption.
- Emissions from the use of refrigerants were calculated based on an assumed annual leakage rate of 4% of the capacity charge for all equipment.
- Employee commute emissions for the 2019 inventory are based on a proprietary survey distributed and analyzed by Verdis Group, assessing the percentage of respondents commuting by various modes of transport, which has been extrapolated to the rest of the employee population. This survey was conducted in 2023 and applied to the 2019 inventory under the assumption that commute patterns are not significantly different than the baseline year.
- It is assumed that when employees select the option of carpooling for their commute, that on average, they are carpooling with one other person.
- An assumed average fuel economy of 22 miles per gallon was used to estimate business travel emissions from personal vehicle mileage reimbursements.

Results

The majority of Metro Parks Tacoma's GHG emissions are from procurement followed by employee commute (see Table 6).

Table 6. Sources of Metro Parks Tacoma's GHG emissions, 2019.

Scope	Likelihood	Consequences	Risk
1	Stationary Combustion	From combustion of fuels in stationary sources (e.g., boilers, furnaces).	1,103
1	Mobile Combustion	From the fuel consumption vehicles owned by MPT.	1,190
1	Refrigerants	From the use of refrigeration and air conditioning equipment.	127
1	Anesthesia	From the use of anesthetics used for the treatment of animals.	1
2	Electricity ⁴¹ (market-based)	From the generation of purchased electricity that is consumed on-site. Based on the most refined utility-specific data.	847
2	Electricity ⁴² (location-based)	From the generation of purchased electricity that is consumed on-site. Based on grid average data.	4,189
2	Chilled Water		<1
3	Procurement	Upstream lifecycle emissions from the production of goods and services purchased or acquired by MPT	2,282
3	Capital Goods	From purchased items related to capital improvement projects, such as machinery, buildings, facilities, and vehicles.	1,325
3	Employee Commute		1,894
3	Waste & Wastewater Treatment	From third-party disposal and treatment of waste generated in operations.	888
3	Business Travel	From transportation of employees for business-related activities in vehicles not owned or operated by MPT, including aircraft, trains, buses, passenger cars and rideshare trips. Business travel also includes emissions from hotel lodging.	43
Total			9,700

⁴¹ Market-based electricity emissions are used to generate total company-wide emissions.

⁴² Location-based electricity emissions are not used in calculating the company-wide emissions total, but are disclosed per reporting requirements.



Metro Parks Tacoma's total measured emissions for 2019 are equivalent to any of the following⁴³:

 **2,309**
passenger vehicles driven for one year

 **1,265**
homes' energy use for one year

 **11,325**
acres of US forests sequestering carbon
for one year

 **22,458**
barrels of oil consumed

⁴³ [Annual equivalents based on EPA Greenhouse Gas Equivalencies Calculator](#)

Vision

“What would a more sustainable and climate resilient Metro Parks Tacoma be like in 10 years?”

At the outset of the strategic planning process, Task Force members were asked to reflect on the current state of Metro Parks Tacoma, as represented in the Discovery phase outcomes. Members were asked to think about what they would like to see in place in 10 years, in order to create a vision that would guide the rest of the planning process. Their responses were organized and refined to create the following vision statements.

Nature-inspired and climate positive.

Metro Parks Tacoma leverages nature-inspired strategies and frameworks, like Nature-Based Solutions, Biomimicry, and the Living Building Challenge, to achieve climate-positive status. All Metro Parks Tacoma operations are powered by renewable energy, energy efficient, and water conservation and protection is a priority. Metro Parks Tacoma supports community-wide carbon reduction through the availability of public electric vehicle charging stations within its locations and infrastructure that supports multi-modal active transportation. Metro Parks Tacoma has developed a zero waste plan and has aligned park design standards and purchasing procedure with that plan. Comprehensive park design standards incorporate natural and multicultural elements to the management of open and green spaces, including implementation of green stormwater management systems. Land management practices are sustainable and build regional resiliency to projected climate impacts.



Focused community outreach, education, and advocacy.

Metro Parks Tacoma leverages its position as a community service provider in the Tacoma region to educate the community about the increased occurrences, and health risks, of extreme weather events and provide emergency support during those events, including the use of its facilities as community resilience hubs. Focused efforts have been made to promote sustainable behaviors within and away from the parks. Metro Parks Tacoma uses innovative multi-generational and multicultural approaches, such the use of storytelling, to engage the community on climate action, actively seeking out voices from youth and vulnerable groups, and cultivating champions for continued action and advocacy. Opportunities to engage and participate in climate action implementation are clearly communicated to park visitors. Partnerships with key parties have ensured universal and inclusive access to open and green spaces and associated social amenities for all residents, including edible plants of ethnic groups in Tacoma community gardens.

Energized staff engagement.

Sustainability is deeply ingrained in the culture at Metro Parks Tacoma. Employees are trained in environmental and climate decision making, and have the knowledge and ability to support Metro Parks Tacoma as a leader in sustainability and climate resilience. Programs have been established to incentivize staff to increase environmentally responsible behaviors, supporting Metro Parks Tacoma's sustainability and climate goals. Employees use active commuting methods, and barriers to using active transportation methods are mitigated.



Adaptive and resilient built environment.

Metro Parks Tacoma's built environment is adaptive to the projected climate impacts for the Tacoma region, including extreme heat, heavy rain, rising sea level, landslide, and wildfire, and is responsive to climate resilience needs of the Park District operations and vulnerable residents. Building envelopes have been tightened and are able to maintain operations during extreme temperatures. Risk mitigation procedures have been implemented ensuring that capital planning accounts for the projected climate impacts. Building occupants have been educated about their role in mitigating the effects of weather on building operations and facilities are flexible to serve as resilience hubs for the communities of Tacoma.

Guiding Focus Areas

Using the Vision statements as a north star throughout the planning process, the Task Force identified four focus areas to guide their strategies and actions.

The focus areas align and fall within the climate action plan categories of mitigation, adaptation, and resilience—as expanded upon in the remaining sections of this plan.



Guiding Focus Areas

Organizational Sustainability

Strategic Direction: Align internal processes to prioritize sustainability and climate positive decisions.

Sustainability and climate resilience are deeply ingrained within Metro Parks Tacoma, where organizational governance, including policies, procedures, staffing, and fiscal prioritization, support MPT's sustainability and climate goals.

Community Resilience

Strategic Direction: Build community resilience through internal and external engagement.

Staff and external community are engaged in sustainability and climate action through education, professional development, incentives, and emotional support.

Resilient Built Environment

Strategic Direction: Commission resilient built infrastructure to navigate climate impacts.

Metro Parks Tacoma's built environment is adaptive to the projected climate impacts for the Tacoma region, including extreme heat, heavy rain, rising sea level, landslides, and wildfire.

Resilient Living Systems

Strategic Direction: Support resilient living systems.

Land and animal management practices are sustainable, build local and regional resilience to projected climate impacts, and leverage nature-inspired strategies that support a climate-positive Metro Parks Tacoma.

Mitigation

Mitigation refers to strategies that reduce an organization's impact on the environment, and, in alignment with the **Organizational Sustainability** Focus Area identified in the CAP planning process, include MPT's emissions, water consumption, and waste management.



Organizational Sustainability

Strategic Direction: Align internal processes to prioritize sustainability and climate positive decisions.

Sustainability and climate resilience are deeply ingrained within Metro Parks Tacoma, where organizational governance, including policies, procedures, staffing, and fiscal prioritization, support MPT's sustainability and climate goals.

Aligned CAP Goals

GHG Emissions - Net Zero Emissions by 2050; with a 35% reduction in Scope 1 & 2 emissions from 2019 baseline by 2035

Water - Reduce water consumption by 15% by 2030

Waste - Waste diversion rate of 45% by 2030

Active Commute - Active mode split of 44% by 2030

Priority Strategies & Key Actions

Develop a Climate Action Plan (CAP) team

- Establish new work plans
- Identify CAP team roster
- Form and establish team

Conduct a district-wide utility audit

- Dedicate staff to the utility audit
- Review status of previous and current audit efforts
- Establish timeline allotted per utility type
- Conduct audits

Incorporate Sustainability Scoring criteria into organizational decision making processes

- Align effort kickoff with formation of CAP team
- Develop scoring criteria
- Engage interested parties in review of criteria
- Rollout criteria across organization

Implement waste reduction plan

- Establish waste guidelines for events
- Update construction project guidelines
- Improve tracking abilities for waste streams

Implement Net Zero Pathway (NZP)

- Fleet Decarbonization: 75% conversion by 2040
- Decarbonized Heating & Natural Gas Conversion: 90% electrified by 2050
- Renewable Energy Sourcing: clean electricity by 2025
- Procurement: reduce MPT Scope 3 Procurement emissions

Implement water conservation plan

- Identify, document, and map location of metering and submetering devices
- Evaluate and prioritize areas for additional meter installations
- Establish schedule for meter commissioning
- Install and implement automated systems where feasible
- Design and implement staff training around water conservation

Net Zero Pathway

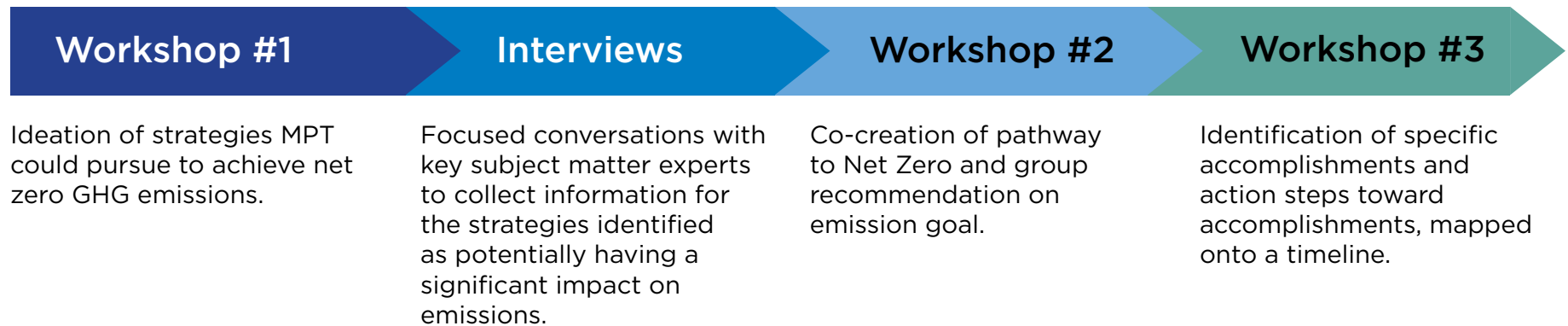
Embedded in the CAP planning process were activities and workshops dedicated to establishing an organizational Net Zero Pathway (NZP). Net Zero means MPT will reduce emissions by at least 90% through strategies like energy efficiency upgrades and renewable energy investment, with carbon offsets used only to mitigate the last 10% of emissions.

This section includes the results of the NZP process for Metro Parks Tacoma, district-wide, as well as outcomes from a ZEED-specific net zero pathway process.

Goal: Reduce Scope 1 & 2 emissions by 35% by 2035 and achieve net zero GHG emissions by 2050 from 2019 baseline

Overview

Following the GHG inventory, Verdis Group and 16 key participants co-created a Net Zero Pathway (NZP) for Metro Parks Tacoma to measure the strategies available to the organization to reduce its emissions and recommend a reduction goal. The process consisted of the phases below:



Other Relevant Information

- Applicable framework: Science Based Target Initiative⁴⁴
- Net zero boundary: Scope 1 and 2
- Baseline: 2019 - 3,268 MtCO₂e
- Scope 3 Exclusions: procurement, capital goods, employee commute, business travel, and waste

Results

Based on staff inputs provided during interviews, information gathered from external sources, such as PSE, expertise provided by Verdis Group, and in alignment with the City of Tacoma's GHG emissions reduction goals, the majority of participating team members recommended that Metro Parks Tacoma achieve net zero emissions by 2050.

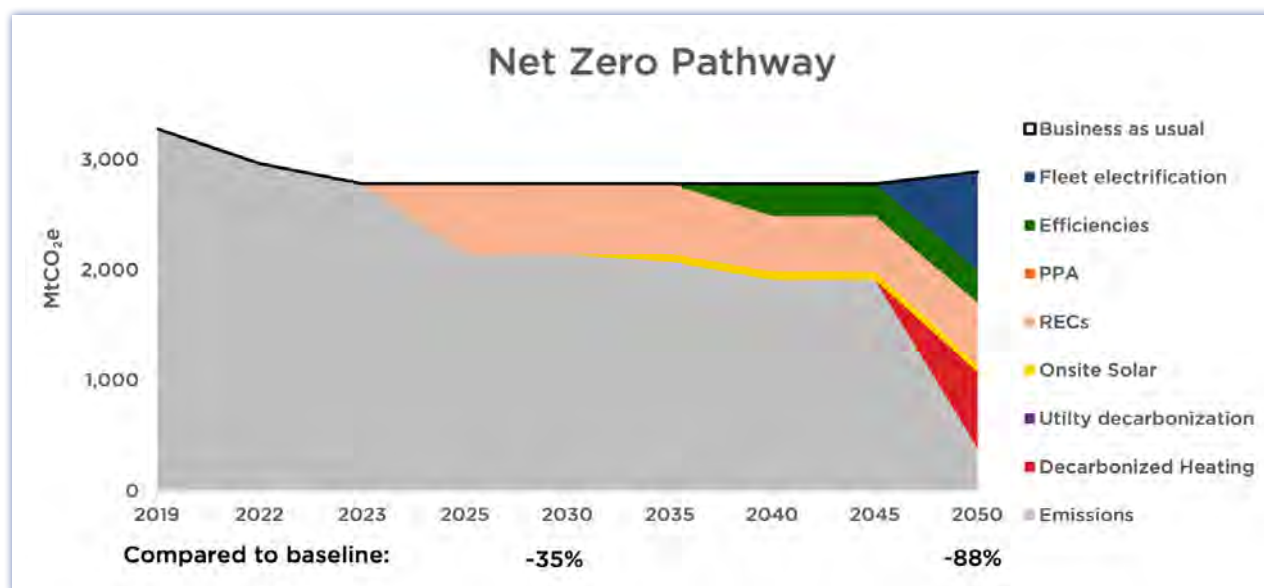


Figure 2. Metro Parks Tacoma's pathway to net-zero emissions

⁴⁴ [Scienced Based Target Initiative, "The Corporate Net-Zero Standard."](#)

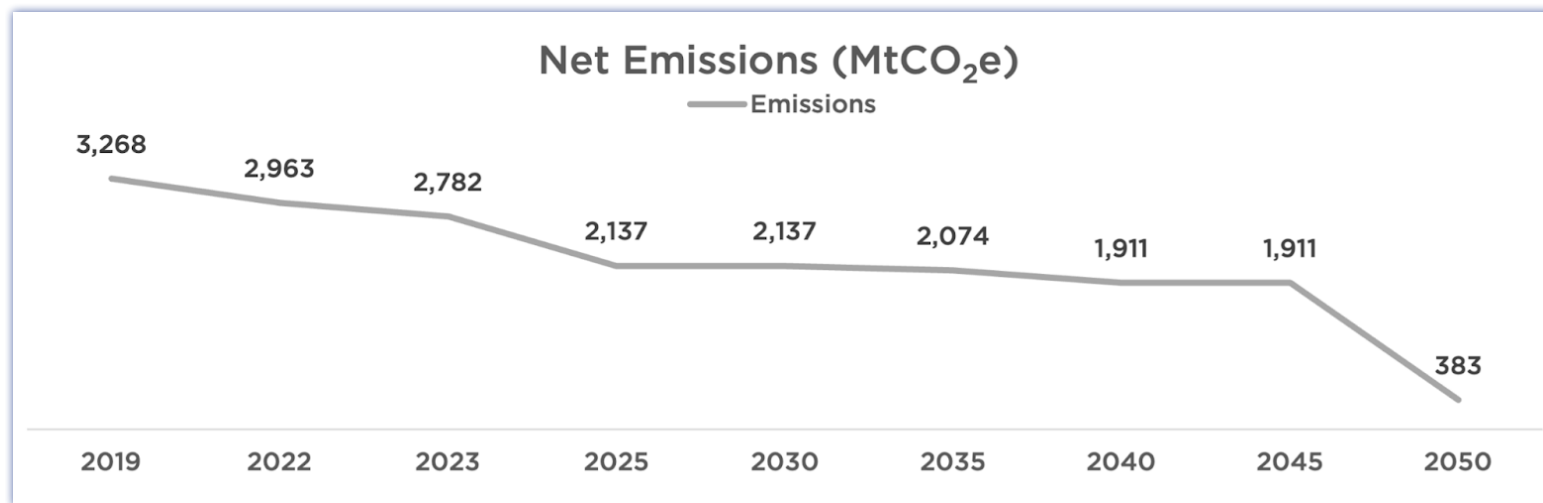


Figure 9. MPT's GHG emission reduction forecast

This recommendation was also based on a model used by Verdis Group which charts Metro Parks Tacoma's path to net zero using a baseline of 2019 and boundary of Scope 1 and 2 emissions (see Figure 2). During this second NZP workshop, the participants also came to a consensus that Metro Parks Tacoma should set an interim goal of reaching 35% reduction in emissions from the baseline by the year 2035.

During the discussions, Verdis Group and Metro Parks Tacoma had the opportunity to review the pathway model and decide when and to what extent the strategies would be undertaken. Below is an in-depth assessment of the decarbonization strategies considered.

Key Strategies and Actions

Efficiencies and Energy Savings by 2040

20% by 2040 at MPT

25% by 2040 at NWT

For every organization, the first step to decarbonization is often to invest in energy conservation measures that will allow them to be as efficient as possible. Metro Parks Tacoma has already made great strides in this area since 2019, which is noticeable in the data measured. From 2019 to 2023, the district has reduced energy usage by 7% (see Figure 10). The following recent projects have successfully contributed to this reduction:

- More efficient heat pumps at SPA
- Commissioning project reduced mechanical energy usage to a third of what it was before
- New HVAC at Headquarters converted from gas to electric
- Centre at Norpoint installation of energy efficient boilers
- 95% lighting at Northwest Trek has been retrofitted with LEDs
- Northwest Trek has optimized heating and cooling needs with smart thermostats

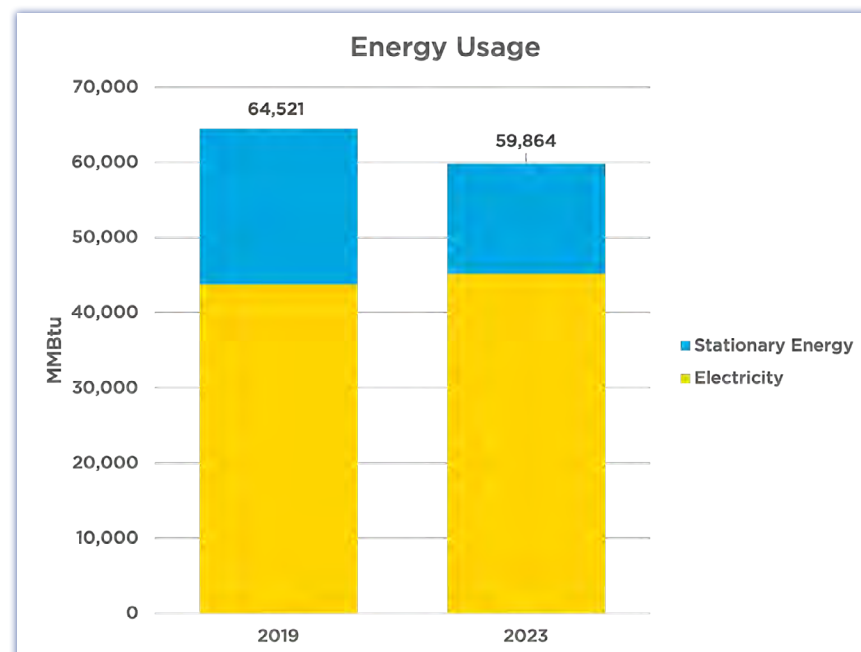


Figure 10. Over the course of 4 years, Metro Parks Tacoma has made great strides to decrease energy consumption.

There is potential to yield further efficiencies and decrease emissions. Participants in the NZP process estimated the potential to reduce emissions related to energy inefficiencies by 25% at Northwest Trek and 20% throughout the remaining assets of Metro Parks Tacoma. These energy savings are also expected to result in cost savings over time.

While planning for the implementation of energy efficiency projects, the following points need to be considered:

- Beyond the environmental benefit of using less energy, there is also a financial benefit for projects that offer an acceptable ROI.
- Reducing energy consumption will allow Metro Parks Tacoma to reduce the amount of renewable energy that would need to be purchased.
- An energy audit will help the facilities team to prioritize the efficiency projects and lay out a plan to reach their efficiency goals.
- As Puget Sound Energy decarbonizes, the emissions per kWh of electricity used at Northwest Trek will decrease, resulting in a lower impact of energy savings over time.

When forecasting energy usage, it is important to take into consideration the potential increase in consumption that may arise from the expansion of the district. Exact growth plans for Metro Parks Tacoma through the year 2050 are not known, however, it is likely that they will see an increase in net square footage of conditioned space; with this increase will be a corresponding increase in energy usage. It is strongly recommended that Metro Parks Tacoma ensure all new spaces are electrified to ensure MPT is not expanding the timeline for reliance on natural gas-consuming equipment. The final version of the model estimates a net change in square footage by approximately 10% by 2050.

Decarbonized Heating by 2050

Finding heating alternatives that will not require the use of fossil fuels such as natural gas has been identified as a key strategy for MPT's decarbonization. Currently accounting for about 11% of total emissions, natural gas does not have a path to emit less emissions over time like electricity does. Therefore, natural gas must be phased out to reach GHG emissions goals. Considering the substantial changes necessary to retrofit existing systems, conversion is not expected to happen in the short term, but MPT could aim to achieve a retrofit of 90% by 2050 to reach net zero.

Sources of natural gas consumption at MPT range from generators to saltwater heating boilers at the Zoo to swimming pools. Due to the sheer cost it would take to convert this equipment to electricity, it will be important to look for funding opportunities and grants focused on electrification in the short term. Additionally, the life expectancy of natural gas systems will need to be taken into consideration. For example, the South Pacific Aquarium boilers were replaced several years ago, and it would not be logical to convert until these boilers reach their end of useful life. On the other side of the spectrum, MPT can forecast a replacement schedule for which sources will age out at what times. During these replacement times, MPT will need to determine and act upon its commitment to avoid natural gas in all new purchases and reach significant reduction in natural gas usage by 2050.

Electrification of the current infrastructure presents various challenges that need to be considered and worked through with Tacoma Public Utilities and engineering consultants:

- **Load:** If MPT converts to electric heating, it would sharply increase the load and an assessment needs to be conducted to confirm if the utility can provide this amount of electricity to the district.
- **Cost:** In several of these projects, the upfront cost is much greater than the continued use of fossil fuels, but there is the opportunity to consider the return on investment. For electric boilers, natural gas is currently more cost effective than electricity and therefore a preferred source of energy for heating. However, it is expected that this trend will reverse if nation-wide usage of natural gas decreases as per scientific recommendations and infrastructure costs consolidate on remaining users.⁴⁵ All electrification options listed are supported by the Inflation Reduction Act which offers varying levels of financial support.
- **Reliability:** Further investment in backup generation might be required in case of power outage on the electricity grid.

On-Site Solar by 2035

One strategy for Metro Parks Tacoma to reduce GHG emissions is to generate renewable energy on-site. Electricity use at Northwest Trek accounts for 43% of Trek's individual GHG emissions baseline, indicating an opportunity to reduce emissions from electricity consumption. Verdis Group analyzed two buildings at Trek for potential rooftop solar arrays: Main Building and Maintenance Shop. The solar study was conducted using Helioscope, a solar modeling tool, to estimate generation potential. According to the high-level models, these options could reduce Trek's consumption of electricity from Puget Sound Energy by 8% and 18%, respectively, according to usage patterns in 2022 (see Table 6).

⁴⁵ [U.S. Energy Information Administration. "AE02021 Natural Gas."](#)



Figure 11. Potential Main Building solar panel installation at Northwest Trek.

At the Main Building (see Figure 11), estimates on energy generation and payback have been determined to be conservative in nature, as there are plans in place to reduce tree cover in the parking lot. With a shorter canopy, these panels can now be placed on the south and west ends of the roof, which are more optimal locations for capturing sunlight. However, the payback period is also on the high end because of the relatively low cost of electricity at PSE. At the Maintenance Shop (see Figure 12), the larger array, discussion centered around the quality

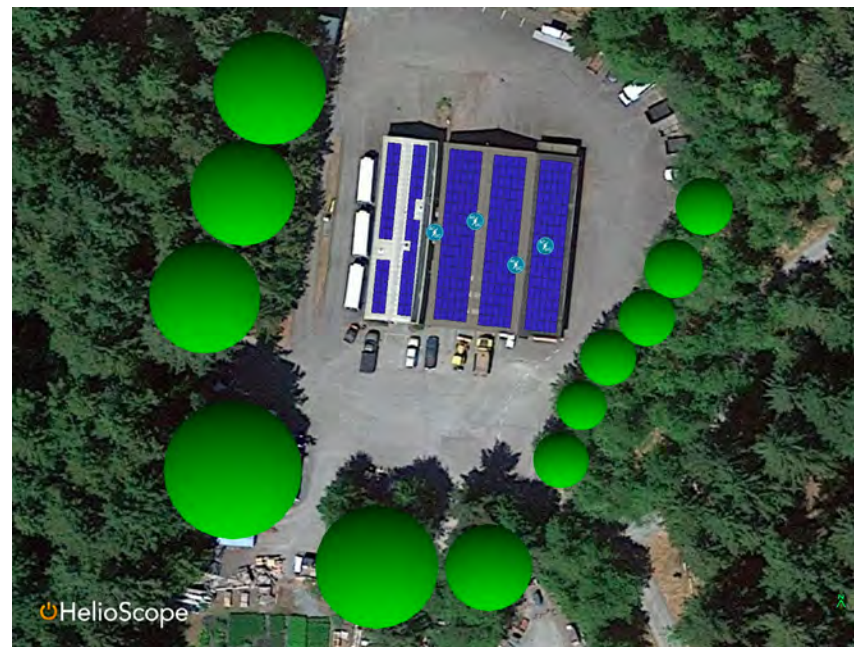


Figure 12. Potential Maintenance Shop solar panel installation at Northwest Trek.

of the roof and its ability to withstand the weight of solar panels. This project can be held off until a new roof is built with plans in place to suit solar energy. Workshop participants estimated that if these projects were pursued, they would be completed by 2035 for a reduction of 72 MtCO₂e per year.

MITIGATION

Both solar projects were modeled at Northwest Trek because renewable energy is a higher priority there, as Puget Sound Energy has an energy generation mix that is more reliant on coal and natural gas compared to the rest of the district; Tacoma Public Utilities uses hydro, nuclear, and wind power. One recurring theme throughout the Net Zero Pathway is the necessity for Northwest Trek to find options for renewable electricity. The remaining part of Metro Parks Tacoma already procures substantially cleaner electricity through TPU and, therefore, doesn't need to invest in onsite solar to achieve more carbon reductions.

Workshop participants voiced concerns on the payback period and finding funding for solar projects. It will be important for Northwest Trek to look into more sophisticated models and consult an engineering firm to obtain more precise estimates on rooftop solar projects. Investing in solar can also serve to provide benefits aside from reducing

electrical emissions. Naturally, Northwest Trek would become more resilient with solar power to supplement existing electricity usage. Since the park experiences frequent power outages, it may be of interest to explore battery storage options to allow operations to continue even when the utility cannot provide electricity. It would then be up to the developer to determine pricing with the addition of batteries. When discussing pricing and funding opportunities for solar installation, MPT should consider federal subsidies and grants available for solar investment, which can significantly reduce upfront costs. It will be important to consider the ROI on these investments because longer payback periods are more difficult to fund and may require a little more creativity in the budgeting process. These strategies could maximize the financial feasibility of the solar installation project.

Table 6. Solar Model Estimates

Solar Models	System Size kW	Annual Production MWh	Energy Offset %	Cost \$	Annual Savings \$	Payback Period Years
Main Building	58	56	8%	\$121,716	\$4,460	21
Maintenance Shop	125	124	18%	\$213,056	\$9,934	17

Aside from these opportunities at Northwest Trek, there do not seem to be further onsite opportunities for solar generation throughout Metro Parks Tacoma. Many of the buildings within the district maintain flatter rooftops, which aren't ideal for solar production. Northwest Trek was the priority site for consideration with regard to solar, as it is expected to make a larger impact on emissions reductions within ZEED. ZEED has its own net zero pathway within MPT and will need solutions to decarbonize its electricity in order to meet net zero emissions within this boundary because the Northwest Trek's electricity takes up a larger portion of that inventory.

Renewable Energy Procurement

Utility Decarbonization by 2045

Northwest Trek's electricity provider, PSE, has set a net zero emissions goal for 2045.⁴⁶ This is also backed by several legislative measures from the state of Washington.⁴⁷ As PSE increases the amount of renewable energy in its mix, Northwest Trek's Scope 2 emissions will decrease. However, if the utility is to reach its net zero emissions goal, it will need partnerships that can help them to increase the renewable energy in the mix and reduce the electricity demand in the region. As more

organizations continue to electrify, load will be added to the utility, while at the same time, the utility will strive to add renewable energy. Metro Parks Tacoma can expect their emissions to reduce over time, but should not exclusively rely on utility decarbonization to eliminate their electricity emissions. TPU has not published plans in place to decarbonize as so much of its portfolio is already comprised of clean energy sources, like hydropower.

Electricity consumption represents a considerable portion of GHG emissions for Metro Parks Tacoma, surmising 26% of the net zero boundary baseline. As such, one of the most important strategies Metro Parks Tacoma can pursue is finding ways to utilize renewable energy to mitigate electricity emissions. Within the district, Point Defiance Zoo and Aquarium and Northwest Trek are the largest consumers of electricity, followed by People's Community Center, STAR Center, and Center at Norpoint. In all certainty, achieving net zero emissions requires the district to procure a cleaner source of electricity.

There are several avenues MPT could pursue to purchase renewable energy for its energy consumption. Perhaps the simplest way would be to procure renewable energy credits (RECs) from existing utility providers through the green plans they offer. It is important to first verify that these programs retire the RECs on behalf of their customers, so MPT can be certain to gain the benefit of the clean energy in its GHG inventory. MPT's existing electricity providers, Puget Sound Energy (PSE) and

⁴⁶ [Puget Sound Energy. Clean Energy Implementation Plan.](#)

⁴⁷ [The Clean Energy Transformation Act puts Washington in a position to have an electricity supply free of greenhouse gas emissions by 2045.](#)

Tacoma Public Utilities (TPU) offer convenient green programs, which allow customers to purchase RECs as part of their existing electricity bills for an added fee.

PSE's Green Power Program⁴⁸ funds wind and solar energy projects on behalf of customers that opt-in to the program. MPT can account for the added costs of the renewable energy component by planning for it in the budgeting process.

RECs may also be obtained through means other than green programs. They are also traded on the market between developers, brokers, and buyers. RECs are a flexible means of purchasing renewable energy off-site, as they can be purchased directly without the need for a long-term contract. RECs are deemed as lower risk options to accelerate the conversion to cleaner power. The downside to them is that there will always be a fee associated with them, and it is not always clear that they are bringing additional clean energy to the grid. Therefore, RECs are a lower impact solution compared to something like a Power Purchase Agreement (PPA).

PPAs are long term contracts that organizations enter into to fund the development of renewable energy, typically for ten to fifteen years. In some cases, PPAs may be virtual (VPPAs), a similar agreement, but in this case the organization purchases the renewable energy credits on an ongoing basis from

the developer rather than directly receiving the renewable energy electrons produced by the project. VPPAs tend to be located in a different part of the country from the buyer, but have a similar impact to a physical PPA. PPAs and VPPAs require complex agreements, and a certain threshold of total MWh consumption for a developer to commit to a project. Metro Parks Tacoma may consider finding regional partners to develop a financially advantageous project with a developer or join existing group initiatives, such as the Aquarium Conservation Partnership VPPA through Point Defiance Zoo & Aquarium's membership.

Electrify 75% of the Fleet by 2050

Fleet emissions account for a more significant portion of MPT's GHG emissions than most organizations, due to the nature of the work. In 2019, mobile combustion emissions accounted for 12% of the GHG inventory. To take action on reducing these emissions, MPT will have to consider alternatively-fueled vehicles that would have a lower carbon footprint than existing internal combustion engine vehicles. At present, the district owns one battery electric vehicle and several Toyota Prius Hybrids, so there is plenty of potential for conversions in this space. It is also worth noting that mobile combustion emissions included all gasoline invoices, therefore, small equipment fuel usage is also incorporated into this reduction strategy.

⁴⁸ [Puget Sound Energy, Green Power for Business.](#)

There are very specific fleet needs that present challenges for finding appropriate and equivalent conversion options. Replacement vehicles need to be able to handle long distances, rugged terrain, maintain battery life when it is an electric vehicle, and the cost of maintenance needs to be somewhat reasonable when compared to cheaper counterparts. Plans for future vehicles also need to consider the shorter lifespan of EVs when making decision. Despite these notable challenges, the workshop team reasoned that it would be possible to aim for 75% fleet conversion to electric or alternatively-fueled vehicles by 2040 in hopes that technology will continue to advance and make the hardships of owning EVs less difficult and prevalent. It is an important strategy to attack because it won't be possible to achieve net zero goals without meeting this level of conversion.

MPT has several options to consider when transitioning its fleet from traditional fossil fuels to less carbon-intensive alternatives. Electric counterparts for heavy-duty vehicles and equipment are becoming increasingly efficient and technologically advanced, and even electric golf carts could play a role in reducing emissions. For fleet components that may not be suitable for battery conversion, the organization could explore the use of biodiesel, which utilizes biogenic emissions reported separately from the traditional GHG inventory, thereby reducing mobile combustion emissions.

To begin, the team should develop an EV conversion plan, keeping in mind replacement timelines, budget, funding, and alternative options. The NZP model demonstrates how emissions will decrease over time with 75% conversion by 2040, however, if MPT is able to frontload this progress with conversions for the vehicles using the most fuel it will make a stronger impact on reducing emissions up front, helping MPT to reach interim reduction goals.

The additional spend for this decarbonization strategy is considered to be the cost gap between gas and electric engines, plus any additional costs that come with upkeep of unique vehicles, quicker depreciation, and shorter lifespans in the case of battery vehicles. However, government rebates and incentives, which can provide savings of up to several thousand dollars per electric vehicle, can help offset the initial cost gap and make the transition to a more sustainable fleet more financially viable.

Additional Scope 3 Emissions

While accounted for in their greenhouse gas inventory, and included in consideration for strategies that reduce emissions contributions, Scope 3 categories are not reflected in the Net Zero Pathway above.

Active Commuting and EV Support

Aligned CAP Goal

Active Commute - Active mode split of 44% by 2030

Similar to fleet decarbonization, electric vehicles will play an important role in reducing commute emissions. As the grid gets cleaner, EVs will be charged with more renewable electricity and present a better alternative for the share of employees driving alone to work, as was discussed in the second NZP workshop, there will always be a need for some individuals to drive alone to work. MPT will have to decide on the appropriate benefits and/or resources to support and accelerate EV adoption among employees and volunteers. Examples of such programs include free charging with stations at work, as many employees indicate a penchant to charge at work and stipends for home charging installation for qualifying employees.

Employee commute as an emissions category was excluded from the scope of the net zero boundary, as in most cases, organizations are making goals for reducing the emissions that they have most control of reducing. As Scope 3 emissions by definition are indirect and more difficult to control, they have been omitted from the net zero pathway. However, Metro Parks Tacoma can strive to take action to support ways in which these categories of emissions can still be reduced.



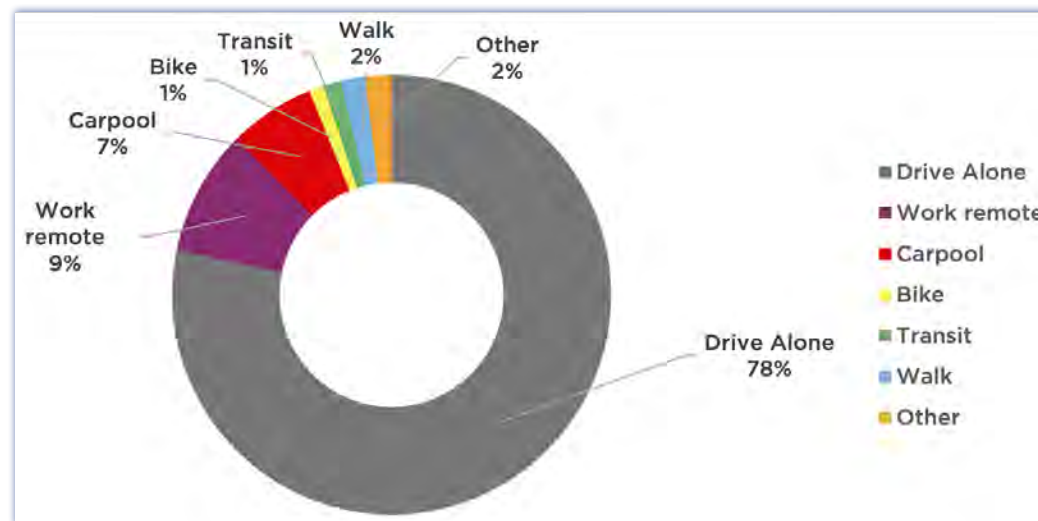


Figure 13. MPT's employee commute mode split is 22%, the percentage of trips made via active commute modes, including remote work.

Based on a survey distributed and analyzed by Verdis Group, employee commute is estimated to generate 1,895 MtCO₂e of emissions per year, accounting for 20% of total emissions at baseline. The survey further breaks down the way in which people are commuting and highlights that 78% of employee trips are made driving alone to work (see Figure 13). The survey had a 42% response rate with 398 employees completing it out of 950. The average one-way distance to work for employees is 13.7 miles. When employees commute using an active mode of transportation, it not only helps MPT reduce its emissions, but also contributes to employee wellness.

Through interviews with key participants in human resources, planning, and government relations, Verdis Group arrived at a strong potential mode split of 42%, which MPT can use as a goal for reducing the number of trips to work in single occupancy vehicles. While it is understood that active commuting is not attainable for every employee individually nor likely for every shift (weather limitations, schedules, etc.), there still exists opportunity for MPT to assist employees in their endeavors to actively commute. Through these conversations, the team arrived at potential percentages for each mode (see Table 7).

Table 7. Current commute patterns were measured via survey, while potential commute changes were estimated based on interviews with key parties.

	Current	Potential
Drive Alone	78%	58%
Carpool	6%	16%
Transit	1%	6%
Walk and Bike	3%	5%
Other	2%	2%
Remote Work	9%	13%

An active commuting program would help employees choose their preferred mode of transportation and make progress towards a higher mode split, the percentage of trips made actively commuting to work. The benefits that Metro Parks Tacoma includes in its active commute program must be finalized internally, but may include:

- Carpool matching program complete with stipends and incentives
- Secure and accessible bike storage
- Free emergency ride home policy
- Guidelines allowing for more flexible work schedules to accommodate for less reliable commute modes and bus schedules
- Option for more positions to embrace remote work opportunities
- Exploring ways to fund the upgrade of EV infrastructure and installation of new on-site charging stations
- Offering stipends on the purchase of EVs or home chargers for qualifying employees
- Joining other local government agencies in the ORCA pass plan for MPT employees

Net Zero Vendors

Priority Strategy & Key Actions

Contract with vendors with Net Zero Plans

- Establish guidelines/standards/metrics that rate vendors
- Differentiate expectations from Capital versus non-capital purchasing
- Review and evaluate list of existing vendors
- Select a certification or key metric for vendor compliance

Although procurement and capital investment emissions are not part of Metro Parks Tacoma's final net zero pathway, actions can be implemented today to mitigate those indirect emissions and get a more refined picture to set a goal in the future. In fact, a large percentage of MPT's GHG inventory includes emissions from indirect Scope 3 supply chain emissions: 24% of MPT's baseline emissions come from procurement alone. As these numbers are generated by other organizations' Scope 1 and 2 emissions, MPT's emissions from vendors are considered indirect. However, the emissions occur as a result of MPT's decision-making when it comes to purchasing. By making different choices, MPT can reduce these emissions through collaboration with its vendors.

Emissions from MPT's purchased goods and services were separated by operating expenses and capital expenses to ensure these categories are comparable year over year. Using current methodologies, two factors impact the magnitude of emissions from these GHG emissions: dollars spent and carbon intensity of each category. It is important to focus on addressing the expense categories that have the highest spend and higher carbon intensity factors when approaching emissions reductions for procurement and capital goods. In 2019, MPT's most intense operating purchases came from animal food, animal medicines, and food supplies. For capital purchases, building and infrastructure improvements are the primary carbon sources. In terms of higher spend categories, operating supplies, professional services, and furniture purchases are also key factors impacting MPT's procurement emissions. Targeting these categories with reduction strategies will most efficiently move the needle on reducing Scope 3 GHG emissions.

While sustainable procurement strategies tend to be less rigid and more challenging to address, there are a series of steps that Verdis Group has identified that can help MPT on its journey to net zero emissions with its vendors. The first action to be taken would be to identify the vendors that represent 70% of the total annual spend. With these vendors, MPT can send out a questionnaire addressing sustainability, or issue a request that vendors submit climate disclosures to the Climate Registry.

It would be ideal to track supplier management metrics over time, such as an analysis of the percentage of vendors that have GHG inventories, GHG targets, and GHG reduction plans. A vendor questionnaire can be used with current and new suppliers alike, and could even be used in the selection process of new suppliers, prioritizing companies that have stronger sustainability commitments. Further, MPT's procurement representatives could meet with these large vendors and discuss an improvement plan to reach MPT's standards.

Based on procurement emissions comprising a significant proportion of the emissions profile, the need to work towards a network of net zero vendors becomes a key priority for MPT in terms of climate mitigation. By committing to decarbonize their own operations, vendors will pass on the benefits to MPT. As an example, some seafood providers have already set Science-Based Targets⁴⁹ and are targeting emissions reductions related to their vessels and transportation, which could in turn reduce their customers' carbon footprints.

To effectively implement these reduction strategies, MPT should begin by reviewing existing 'green' purchasing guidelines to ensure alignment with its sustainability and climate goals. This process

involves identifying and implementing procedures that integrate these policies across the organization. Analyzing the current inventory of purchases will reveal opportunities to adjust practices toward policy alignment, while also identifying certification guidelines for eco-friendly options, such as products made from recycled materials. Establishing clear thresholds and targets will help guide procurement decisions, ensuring that they contribute to MPT's broader environmental objectives. A key step is to develop a more centralized purchasing structure, supported by an online store or portal where staff can access approved and vetted products.

To ensure these changes are effectively adopted, a comprehensive training and communication plan is essential, reinforcing the new purchasing expectations and promoting a cultural shift within MPT. This training should be led from the top, recognizing that while staff may initially resist losing some autonomy over their purchasing decisions, the long-term benefits of a sustainable procurement approach are significant. Additionally, it's crucial to consider equity in vendor selection, ensuring that decisions are not only environmentally sound but also socially responsible. By incorporating these strategies, MPT can create a robust and equitable procurement framework that supports its journey toward net zero emissions.

⁴⁹ [United Nations Global Compact: Ocean Stewardship Coalition, Setting Science-Based Targets in the Seafood Sector: Best Practices to Date, 2023](#)

Water-Waste-Energy Nexus

While the Net Zero Pathway includes tracking and reducing emissions across energy uses, energy is only one component of the water-waste-energy nexus, an intersection key to consider when addressing climate change.

Water

Goal: 15% reduction in water consumption by 2030

Baseline Data

MPT has been tracking its water usage for many years, which provides the opportunity to explore trends in the data going back. MPT reduced its total water use by approximately 24% from 2006 to 2019, and the project team decided to continue the trend to reduce the water it consumes by 15% with 2019 functioning as the baseline year. MPT can target key water meters to focus its conservation efforts, such as Dune Peninsula, Wright Park, and Fort Nisqually Living History Museum. The meter at 6200 N Park Ave alone comprises about 20% of MPT's baseline water usage. To reach its goal by 2030, MPT will have to average a reduction in water usage of 3% per year to reach a total annual usage of 188,684 CCF. It is important to note that this goal is based on an overall reduction in water consumption, which will need to take place regardless of MPT's growth.

Priority Strategy & Key Actions

Implement water conservation plan

- Identify, document, and map location of metering and submetering devices
- Evaluate and prioritize areas for additional meter installations
- Establish schedule for meter commissioning
- Install and implement automated systems where feasible
- Design and implement staff training around water conservation

While Tacoma currently has an abundant water supply, droughts and floods put stress on water systems by damaging infrastructure and causing contamination, including risks of saltwater intrusion. While reducing water is a mitigation strategy because of its interconnection with energy use, climate-smart adaptation also considers ways to reduce water use in order to prepare for future water scarcity concerns.

While opportunities still exist for Metro Parks Tacoma to implement impactful conservation measures, it has already invested in significant water reduction measures in recent years, including the implementation of water recycling at splash parks, and the completion of a comprehensive water utility assessment in Point Defiance Park. Metro Parks Tacoma will continue to detect and isolate leaks in its water system as it upgrades its aging infrastructure.

Waste

Goal: 45% diversion rate by 2030

Baseline Data

MPT is committed to increasing its recycling and composting rates through its waste diversion goal of 45%. A large portion of composting tonnage is picked up as yard waste from Point Defiance and Wapato Park. A majority of the recycling is generated at Point Defiance Zoo and Aquarium, Sera Athletic Complex, and Eastside Community Center.



Figure 14: MPT's baseline waste diversion rate is 25%.



Figure 15: To reach a diversion rate of 45%, MPT will have to increase recycling and compost weights by a combined 20%.

Priority Strategy & Key Actions

Implement waste reduction plan

- Establish waste guidelines for events
- Update construction project guidelines
- Improve tracking abilities for waste streams

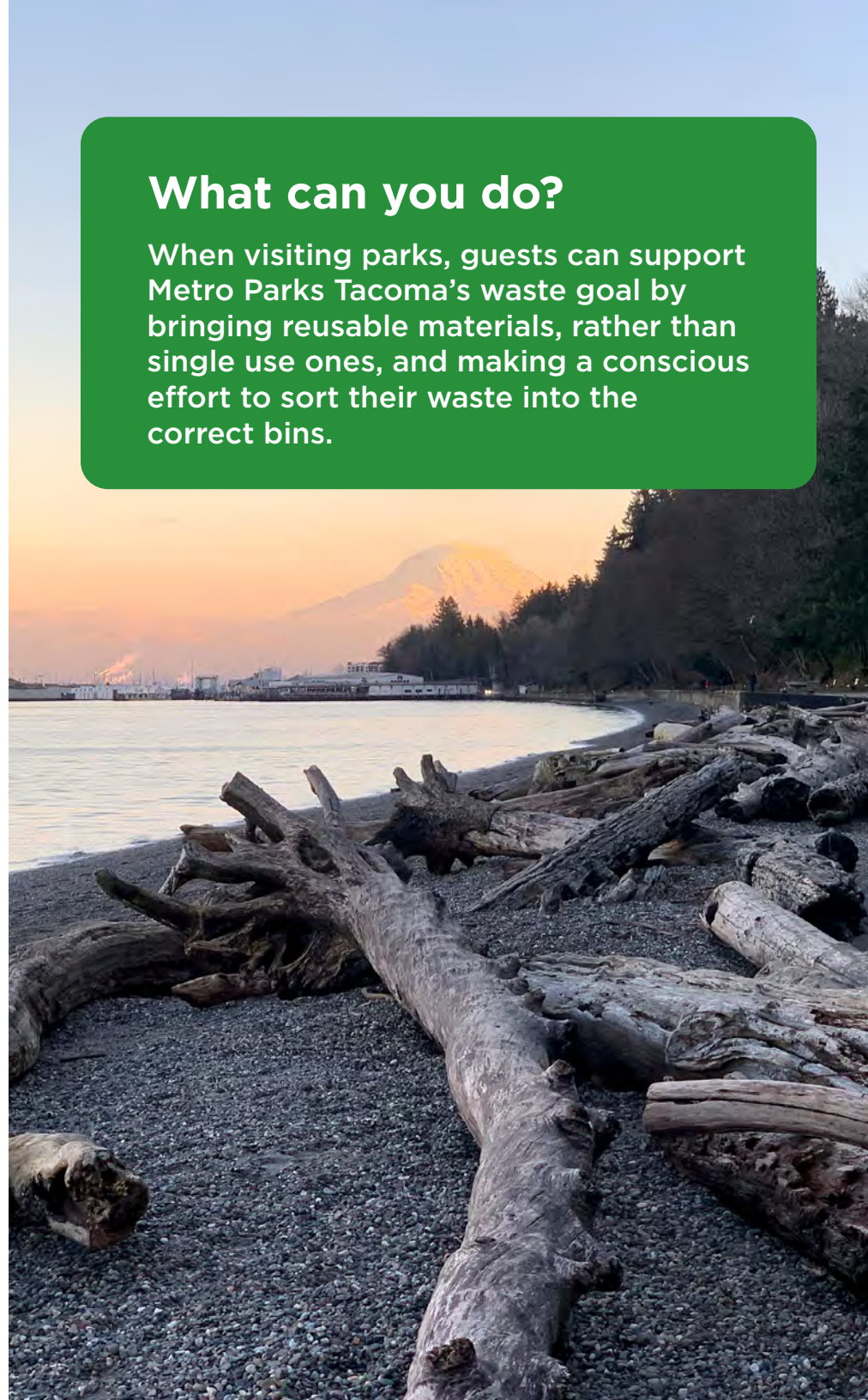
Reducing waste is a critical component of climate action for a variety of reasons. First, waste (particularly organic waste) sent to the landfill creates methane emissions, which are more potent than carbon dioxide⁵⁰ and have significant impacts on the environment as well as the health of the surrounding community.⁵¹ Second, waste (particularly plastic) often ends up in waterways and green spaces. Appropriately, eliminating plastic pollution and protecting wildlife and the spaces they inhabit is an established focus within several of MPT's existing Zoo and Aquarium peers. Lastly, reducing waste is a smart strategy - it saves money and resources, allowing for greater investment in impactful initiatives.

⁵⁰ [United States Environmental Protection Agency, Importance of Methane.](#)

⁵¹ [UN Environment Programme, "Methane emissions are driving climate change. Here's how to reduce them." August 20, 2021.](#)

What can you do?

When visiting parks, guests can support Metro Parks Tacoma's waste goal by bringing reusable materials, rather than single use ones, and making a conscious effort to sort their waste into the correct bins.



Adaptation and Resilience

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as the process taken to “adjust to the actual or expected climate and its effects.”⁵² This includes things like structures to protect against sea level rise, irrigation systems that combat water scarcity, and planting trees, which reduce air pollution and contribute to cooling in urban areas. These are often physical actions taken to address specific climate hazards.

Resilience refers more broadly to the capacity of a community or organization “to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate.”⁵³ In contrast to adaptation, it is about building a holistic approach that addresses social, environmental, and economic factors that contribute to a community or organization’s ability to cope with the impacts of climate change, including a range of actions across policy, infrastructure, services, planning, education, and communication.⁵⁴

⁵² [IPCC, 2014: Annex II: Glossary \[Mach, K.J., S. Planton and C. von Stechow \(eds.\)\]. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change \[Core Writing Team, R.K. Pachauri and L.A. Meyer \(eds.\)\]. IPCC, Geneva, Switzerland, pp. 117-130.](#)

Community Resilience

Strategic Direction: Build community resilience through internal and external engagement.

Staff and external community are engaged in sustainability and climate action through education, professional development, incentives, and emotional support.

Aligned CAP Goals

Engagement (Internal) - Engagement score of 73 by 2030

Engagement (External) - 20% of surveyed community members will identify MPT as a regional leader for Climate Action by 2030

⁵³ [Climate Resilience Portal, Center for Climate and Energy Solutions.](#)

⁵⁴ [“What is the difference between climate change adaptation and resilience?” The London School of Economics and Political Science. 12 September 2022.](#)

Priority Strategies & Key Actions

Define and communicate decision making, roles, and responsibilities to staff

- Identify climate-aligned staff and decision makers
- Determine roles and responsibilities
- Communicate out decisions to staff

Activate district-wide Green Team in 2025-26 biennium

- Finalize Climate Action planning process
- Establish membership and priorities for the team

Create a community Climate Action Plan stakeholder group

- Identify optimal composition of group
- Establish structure and charter
- Recruit membership

Establish and refine MPT and partner collaborative priorities

- Establish Green Team and Climate Action Plan stakeholder group
- Monitor and track Green Team and stakeholder group progress
- Review climate aligned partner project opportunities
- Establish formal agreements with partners

What can you do?

Stay up to date with climate action at Metro Parks Tacoma. Sign up for our email list to hear about ways to get involved.

Resilient Built Environment

Strategic Direction: Commission resilient built infrastructure to navigate climate impacts.

Metro Parks Tacoma's built environment is adaptive to the projected climate impacts for the Tacoma region, including extreme heat, heavy rain, rising sea level, landslides, and wildfire.

Priority Strategies & Key Actions

Develop and implement agency design standards

- Review current agency design standards
- Review updated sustainability and climate-smart design best practices
- Identify components to integrate into agency design standards
- Engage staff in review and refinement of standards

Complete a comprehensive inventory of assets and climate risks

- Review current inventory of assets to ensure it is comprehensive
- Identify high risk assets
- Identify adaptation measures for high risk assets
- Prioritize assets for implementation

Update Emergency Management Plan with climate disruption scenarios

- Identify staff for review and updating process
- Review current management plan for climate-aligned opportunities
- Review current and future climate disruption risks
- Establish appropriate protocol for navigating disruptions
- Update plans

Implement utility redundancy infrastructure

- MPT to include Key Actions, none were provided in implementation workshop

Resilient Living Systems

Strategic Direction: Support resilient living systems.

Land and animal management practices are sustainable, build local and regional resilience to projected climate impacts, and leverage nature-inspired strategies that support a climate-positive Metro Parks Tacoma.

Forests, watersheds, mountains, and shorelines contain multiple ecosystems that perform a variety of ecosystem functions. These functions in turn provide beneficial goods and services that enrich the human experience, such as water filtration, raw material production, recreation, climate regulation, and more. Ecosystems can also support urban communities as they adapt to changing climates. Disaster risk resilience describes nature's role in preventing and mitigating natural hazards such as floods, hurricanes, fires, and urban heat island effect.

Ecosystem services—the benefits people receive from nature—are critical to human survival. As natural capital degrades, ecosystem functions are impaired and the value of ecosystem goods and services that humans receive decreases. When these services are lost, the economic impacts can be measured in a variety of ways, including adverse health impacts, decreased productivity, and property loss. Conversely, when ecosystems are expanded or Nature-based Solutions are developed, society receives additional benefits.

In economics, economic value (or utility) measures the overall benefit of a good or service. It is not necessarily the same thing as a market price or market value, but rather describes the innate worth of a commodity to people. These are called “non-market benefits,” and, by definition, non-market benefits are not things that are bought or sold directly. Without valuing non-market benefits, these essential benefits are undervalued or valued at zero, leading to decisions that do not reflect their true value to society. Valuing non-market goods and services enables these benefits to be compared with traditional economic benefits and enables more effective decision-making.

To value ecosystem goods and services, Earth Economics employs the benefit transfer method (BTM), in which estimates of economic value are based on primary valuation studies of similar goods or services produced in comparable conditions (e.g., climate, terrain, soils, species). BTM is often the only practical, cost-effective option for producing reasonable estimates of the wide range of services provided by ecosystems rapidly and at-scale.

Earth Economics valued the ecosystem services created by three Nature-based Solutions already used by Metro Parks Tacoma and determined the costs based on data shared by Metro Parks Tacoma and literature of NbS costs relevant to the Pacific Northwest. Four scenarios were developed for expanding NbS.

A Benefit-Cost Analysis (BCA), a decision-making tool used to determine whether investments produce positive net benefits, was conducted for each scenario.

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Priority Strategies & Key Actions

Identify and prioritize budget needs

- Review cost projections for available nature-based solutions (NbS)
- Engage leadership in conversations on options and costs
- Prioritize projects for implementation

Align living collections guidelines with projected local climate conditions

- Review current collections guidelines, including animal care manuals
- Identify opportunities for climate-aligned alterations to current and future practice
- Engage living collections staff in identifying, reviewing, and vetting alterations
- Implement updated guidelines

Implement nature-based solutions (NbS) for coastal resilience

- Engage partners in identifying and reviewing NbS
- Prioritize NbS opportunities with partners
- Identify and seek funding support for implementation
- Implement NbS options

Update wildfire mitigation plans

- Review current wildfire plans
- Craft and post RFP for updated plan
- Engage organization in plan process
- Implement plan



Appendices

Appendix A: Barriers to the Vision

Purpose: To summarize the barriers that the Task Force collaboratively discerned during the Barriers Workshop. Barriers described are not problems to be fixed nor are they points of blame. Rather, barriers are blocks specifically to the vision. Barriers are internal and external factors blocking our collective path forward. Understanding our barriers helps open windows of opportunity to fully realize our vision. Workshop participants responded to the question:

“What is blocking us from moving toward our vision?”

Barriers

1. Fragmented regional collaboration and unclear role of Metro Parks within the region
 - Interagency collaboration on shared maintenance has been met with resistance
 - Unclear authority on ownership of waterfront parcels
 - Metro Parks Tacoma’s role in the region and the community is unclear to staff
 - Stronger alignment of Metro Parks Tacoma’s priorities with community priorities is needed
 - Fear of public perception of failure strains organizational decision-making
 - Relationships with multicultural leaders need to be prioritized despite competing priorities
2. Uncoordinated internal departments and unclear roles
 - The role of individuals’ work focus within the strategic or global perspective is unclear
 - Shifting workplace values and a lack of commitment to standards are resulting in less movement toward achieving goals

- Metro Parks Tacoma has clunky internal decision making processes and needs matrixed decision-making tools
- Development and availability of training resources are deprioritized
- Staff time is stretched thin leading to selection of pathways with the least resistance rather than the safest courses of action
- Efforts of staff that are non-production focused are not recognized by leadership

3. Conflicting budget and mission prioritization

- Metro Parks Tacoma's mission and purpose is stretched across too many priorities and has diluted progress toward advancing priorities
- Public support for investments is needed to create resilient infrastructure
- Metro Parks Tacoma is funding multiple crises at once, straining resources (i.e. housing, food, mental health, etc.)
- Staffing shortages limit programming
- Changing design standards will increase project costs and potentially reduce community support.

4. Politicization of climate change inhibits action

- Competing values internally and among collaborators slow progress
- Government environmental regulations set the bar too low
- Changing political will limits quick action
- Lack of consensus and understanding of the impacts of climate change limit support for initiatives

5. Underdeveloped sustainability expertise within the organization

- Sustainability is a “new” program area within Metro Parks Tacoma that needs to be developed
- Research, data, and internal expertise is needed to identify best practices

Appendix B: Climate Consequences

Purpose. To summarize the consequences that were identified during the March 6, 2024 Barriers & Consequences Workshop. Participants in the workshop identified likely impacts to their functional areas (Planning and Asset Management, HR and Risk, Finance and Business Operations, etc) in response to the question:

“What consequences may Metro Parks Tacoma face given the projected climate impacts?”

Consequences

1. Damage and loss of the built infrastructure

- Shoreline infrastructure and properties will likely experience significant damage or loss due to rising sea levels and increasingly intense coastal storms
- Extreme heat and wildfires may stress or cause severe damage to facilities and utility infrastructure
- Increasingly intense inland flooding due to extreme precipitation will likely result in damages to facilities and transportation infrastructure

2. Degradation and loss of natural infrastructure and services

- Shoreline land and its ecosystem will likely be degraded or potentially disappear due to coastal erosion and salt water intrusion caused by rising sea levels and increasingly intense coastal storms
- Native vegetation and trees will likely experience stress, may fail to adapt, and potentially disappear along with their associated ecosystems due to extreme droughts, heat, wildfires, and flooding
- Fresh water resources will likely experience increased seasonal stress, or potentially decline or degrade due to droughts and salt water intrusion

3. High demand for financial resources and revenue loss

- Increased demand for power loads due to extreme heat will potentially result in high utility costs
- Increased need for infrastructure maintenance due to climate damage and stress will require more funding
- Property insurance will likely increase due to high demand to conduct unexpected repairs to damaged assets or their replacement
- Construction of new climate adaptive infrastructure for people and animals will likely constrain capital budget
- Staff productivity may decline due to climate disruptions to their working conditions or personal lives

4. Negative safety and health impacts to staff, guests, and animals

- Staff and guest heat-related illnesses will likely become more common
- Increases in heavy downpours and flooding will be a safety hazard to staff and guests traveling to and from MPT assets
- Extreme heat and cold will likely cause stress or harm to animals at MPT facilities
- Wildfires and smoke will potentially result in respiratory-related health problems for animals and people

5. Operational interruptions and service disruptions

- Extreme heat and flooding may restrict the ability for MPT staff to travel to work
- Extreme heat and storm events may result in power and internet outages
- Community programming will likely be impeded by extreme heat, flooding, and wildfire smoke

Appendix C: Guiding Focus Areas

Organizational Sustainability

Strategic Direction: Align internal processes to prioritize sustainability and climate positive decisions.

Sustainability and climate resilience are deeply ingrained within Metro Parks Tacoma, where organizational governance, including policies, procedures, staffing, and fiscal prioritization, support MPT's sustainability and climate goals.

Vision elements and strategies to consider:

- Identify and leverage novel sources of funding and grants to finance sustainability
- Create new revenue streams through the implementation of virtual programming
- Coordinate and right size budgets
- Ensure funding is allocated to all priority requirements
- Staff sustainability with key positions that ensure success (Analyst, Coordinator, Grant Manager)
- Establish role clarity for sustainability initiatives and conduct time audits to release capacity constraints for responsible parties
- Prioritize sustainability projects with strong co-benefits
- Establish comprehensive sustainable and resilient procurement standards
- Explore diverse financial mechanisms to protect against risk
- Develop and implement a Net Zero Pathway
- Establish sustainable building design standards
- Identify emissions sequestration options in tandem with mitigation
- Develop and implement waste reduction strategies
- Develop and implement a chemical management strategy
- Conduct water audit and implement conservation measures

Community Resilience

Strategic Direction: Build community resilience through internal and external engagement.

Staff and external community are engaged in sustainability and climate action through education, professional development, incentives, and emotional support.

Vision elements and strategies to consider:

- **Staff and sustainability culture**

- Reactivate district-wide green team
- Build sustainability culture and expertise into job descriptions, hiring, and onboarding
- Allow staff opportunities to adopt spaces or projects as stewards
- Provide regular educational opportunities and training for staff (hands-on activities, lunch and learns, safety trainings, sustainability decision-making etc.) to build a safe and climate aware culture within MPT
- Support staff in utilizing alternative transportation methods to work, limit on-site meetings only to those necessary
- Explore policy updates that support staff and their families in adapting to Tacoma's changing climate
- Support staff in recycling with infrastructure, guidance, and planning

- Establish clarity of priorities and emphasize leadership support to sustainability by clarifying roles and responsibilities

- **Community Resilience and Education**

- Create a communications plan for climate change and the changing infrastructure of Metro Parks Tacoma
- Establish Metro Parks Tacoma's sustainability and resilience priorities with its partners
- Build and maintain strong partnerships within the Tacoma region to expand engagement and empower equitable education and advocacy
- Create centralized communication methods key parties in Tacoma
- Prioritize youth engagement in sustainability programming
- Implement additional educational and environmental programming and educational opportunities

Resilient Built Environment

Strategic Direction: Commission resilient built infrastructure to navigate climate impacts.

Metro Parks Tacoma's built environment is adaptive to the projected climate impacts for the Tacoma region, including extreme heat, heavy rain, rising sea level, landslides, and wildfire.

Vision elements and strategies to consider:

- Include resilience to future climate impacts into the design standards
- Implement utility redundancy infrastructure
- Survey for impacts/loss associated with rising sea levels
- Forecast weather events and prepare systems
- Update emergency management plan with climate disruption scenarios
- Improve safety incident response plan/ emergency evacuation
- Implement flood mitigation through landscape design
- Identify and prioritize high risk assets for adaptation measures

Resilient Living Systems

Strategic Direction: Support resilient living systems.

Land and animal management practices are sustainable, build local and regional resilience to projected climate impacts, and leverage nature-inspired strategies that support a climate-positive Metro Parks Tacoma.

Vision elements and strategies to consider:

- Establish new plant guidelines aligned with projected climate changes
- Plant climate adaptive, diverse, drought-resistant plants
- Develop an urban forest management plan for the district
- Update wildfire mitigation plans
- Update built environment based on new patterns (ex: indoor/outdoor birds)
- Implement nature based solutions for coastal resiliency
- Activate engagement related to Commencement Bay planning
- Advance the planning for Ruston Way
- Include concerns on existing and emergent zoonotic diseases in collection planning
- Include planning for future climate conditions in animal care manuals

Appendix D: ZEED's Net Zero Pathway Report

[ZEED's Net Zero Pathway Report](#)

CAP Goals

