

# CLIMATE RESILIENCE CRITERIA: GUIDANCE FOR METRO 2019 PARKS AND NATURE BOND MEASURE IMPLEMENTATION

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## OVERVIEW AND PURPOSE

The purpose of this document is to clarify intentions and provide guidance in support of advancing the 2019 parks and nature bond climate resilience criteria adopted through Metro Council Resolution 19-4988.

This document expands upon the language in the 2019 parks and nature bond measure by providing climate resilience context, strategies and best practices. With this context, it addresses the integral relationship between bond climate resilience and racial equity and community engagement criteria.

The language of this document is not binding, but rather is intended to help Metro and partners advance parks and nature-based climate solutions while working within the parameters of the bond measure text.

This document cannot contain all relevant information about climate resilience. However, it is a tool to support and strengthen bond related project and program development, as well as collaborative conversations with partners and community members around promising and successful strategies, practices and examples.

Document sections are as follows:

- Guidance and considerations for bond-funded projects and programs
- The climate resilience criteria with key issues and strategies relevant to each
- List of resources including documents referenced herein
- Overview of anticipated climate impacts and related strategies

### **The criteria are a place to begin.**

The climate resilience criteria as outlined in the bond measure – while important for guiding and evaluating bond programs and investments – are also a place to begin.

The criteria language in the bond resolution places emphasis on flood control, water quality and availability, urban forest canopy and natural cooling capacity, habitat quality and connectivity, and equitable community access to active transportation.

Adaptive strategies that enhance wildfire resilience and mitigation, regional food security,<sup>1</sup> smart and sustainable park development practices, and community access to water bodies are essential elements of resilience that bond-funded investments may advance, as well.

## **ADVANCING CLIMATE RESILIENCE: GUIDANCE AND CONSIDERATIONS**

A key outcome of the bond is increasing the climate resilience of our region through investments in nature broadly, advancing a vision of healthy lands and healthy people.

### **Metro Parks and Nature department’s vision for the region**

We envision a better future for greater Portland with healthy lands and healthy people. People from all backgrounds will benefit equitably from the values of nature and cultural heritage through a world-class regional parks system.

### **What is climate resilience?**

Climate resilience is a term that refers to the ability to anticipate, absorb, adapt to and recover from environmental changes and social or economic disruption.

Responding to climate change requires actions that advance both climate mitigation and adaptation (Union of Concerned Scientists, 2016).<sup>2</sup> For this reason, this document offers a definition of resilience that includes adaptation, or recovery response, as well as mitigation, or actions that slow the pace at which climate impacts become more severe or common over time.

Though climate mitigation and climate adaptation strategies can overlap, it is important to define each term independently.

**Climate mitigation** refers to actions that reduce the rate of climate change. Climate change mitigation is achieved by limiting or preventing greenhouse gas emissions and by enhancing activities that remove these gases from the atmosphere (IPCC WGO-14 and IPCC-54).

**Climate adaptation** refers to the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or make best use of beneficial opportunities. In some natural systems,

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<sup>1</sup> Metro Parks and Nature Department’s mission with respect to agricultural lands focuses on protecting natural resources on working lands in the near and mid-term.

<sup>2</sup> As of now Oregon is not on a path sufficient to meet its emissions reduction goals for 2035 or 2050, and meeting its 2020 goal is “highly unlikely” (Oregon Global Warming Commission, 2020).

human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2013).

Investing significantly in adaptive strategies that also reduce greenhouse gas emissions and sequester carbon is one important way to enhance regional resilience, consistent with the state of Oregon's 2021 State Agency Climate Change Adaptation Framework (DLCD, 2021).

Climate change is complex and so resilience measures – including those identified throughout this document – will be most effective when combined and managed to provide multiple benefits across environmental, social and economic systems.

### **What does a resilient ecosystem look like?**

Resilient ecosystems share fundamental qualities. Relatively intact ecosystems are known to be relatively resistant to major changes. Examples include well-connected and intact terrestrial habitat areas and floodplains connected to rivers and streams, which work together to protect healthy stream flows and produce stable temperatures for salmon and other cold-water species.

Interconnected networks of healthy and protected natural areas allow native species to occur and migrate in natural abundances, ages and sizes. Resilience is also fostered by allowing natural cycles and disturbances to run their course, rather than attempting to rigidly control them (Hixon et al., 2010).

United States Environmental Protection Agency's climate change indicators for healthy ecosystems include:

- Decreased fire risk and improved ability to bounce back from wildfires
- Stable or cooler stream temperatures, even as air temperatures rise
- Increased ability of wildlife to meet their needs in new areas and begin breeding season in good condition
- Improved wintering habitat conditions for birds that are shifting wintering ranges to our region
- Native pollinators that are able to find food and shelter and provide pollination services (U.S. EPA)

While these indicators help practitioners and policy-makers understand and track climate science, impacts and ecosystem changes, they may not represent a comprehensive list.

## Who is most impacted by climate change?

Because impacts on human health and well-being are complex, often indirect and dependent on multiple societal and environmental factors, the development of climate indicators for human and community health is challenging and still emerging (U.S. EPA).

However, the evidence is clear: Black, Indigenous and people of color and Tribal nations are disproportionately impacted by climate change.<sup>3</sup> This is a result of government policies and practices that oppress and marginalize people in and through processes and decisions that directly impact their lives.

For example, analysis conducted across 108 U.S. cities found that formerly redlined areas – the product of federal policies that established a discriminatory home loan system based on race – correlate to current-day heat islands (Hoffman et al, 2020).<sup>4</sup> These redlined neighborhoods often have fewer trees and vegetation, which provide shade and help reduce temperatures on hot days.

Largely the result of these same unjust and discriminatory policies and investment patterns, people of color, individuals with disabilities and people with low incomes are more likely to live in locations with high natural hazard risk, especially floodplains.

Indigenous health is based on interconnected social and ecological systems (USGCRP, 2018). The climate crisis poses significant threats to Tribal ceded and ancestral lands, burial sites, culturally valued resources such as First Foods, and Tribal and Indigenous health, economies and livelihoods including the practice of traditional ways of life.

### **A community definition of resilience infrastructure.**

Resilience infrastructure includes equitable and affordable housing options,<sup>5</sup> active transportation and public transit, green infrastructure, healthy and culturally

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<sup>3</sup> It is well documented that climate change will not be borne equally by all people. Racial and social inequities are reliable predictors of climate vulnerability (DLCD, 2021; USGCRP, 2018; USDN, 2017).

<sup>4</sup> Based on a study of 108 U.S. urban areas: in 94% of cases, “neighborhoods located in formerly redlined areas – that remain predominantly lower income and communities of color – are at present hotter than their non-redlined counterparts” (Hoffman et al., 2020).

<sup>5</sup> “A lack of affordable housing for our communities to rent or own prevents attachment to our neighborhoods and natural environments.” (Native American Youth & Family Center et. al. 2016).

relevant foods, renewable energy resources, green jobs, health services and community centers (NAYA et al., 2016).

While some resilience infrastructure is ineligible for parks and nature bond funding, parks and nature-focused investments have the potential to positively contribute to some resilience initiatives led by and for systematically oppressed communities. In addition, bond investments may even help catalyze community resilience activities at various scales, including those outside bond eligibility.

### **Ensuring benefits and preventing harm is foundational.**

Directing immediate and sustained bond-eligible investments to benefit Black, Indigenous and people of color communities and people with low incomes can help create the conditions for greater resilience across the region.

It is Metro's intention that community members and partners guide bond-funded investments and that program staff work hard to ensure that benefits accrue as intended.

As articulated by a coalition of community organizations, "a climate resilient community requires adaptation and mitigation infrastructure that doesn't displace current residents, destroy social cohesion, and exclude them from the benefits of public investment." (NAYA et al., 2016).

Government agencies must work in partnership to address the complex issues that evade silos and reverse historical patterns of racial discrimination, neighborhood disinvestment and disenfranchisement in decision-making. Coordinated anti-displacement efforts are a key example.<sup>6</sup>

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<sup>6</sup> A study sponsored by Metro concludes that "environmental projects without an adequate anti-displacement housing plan in place make housing less affordable, contributing to displacement." The same literature review finds that renters, older adults and low-income residents are most vulnerable to gentrification (Metro, 2021).

## **There is no climate resilience without climate justice.<sup>7</sup>**

Evidence suggests that climate resilience efforts are much more successful when led by members of the local community (USDN, 2017). In order to maximize the potential for resilience across our region, bond-funded improvements should:

- Occur in collaboration with historically oppressed communities (DLCD, 2021)
- Include long-term relationship-building between Tribal and local/regional governments, which is essential to the “full and effective participation of Indigenous peoples” (Gruening et al., 2015)<sup>8</sup>
- Incorporate strategies into community engagement that build financial and social capital (NAYA et al., 2016; DLCD, 2021)
- “Increase the diversity of the...workforce engaged in climate work to reflect Oregon’s population and to ensure effective climate adaptation” (DLCD, 2021)
- Embed community-based leadership that may continue through ongoing resilience work (NAYA et al., 2016; DLCD, 2021)

Tribes and Indigenous communities, adaptive and resilient since time immemorial, are established experts in resilience work (Gruening et al., 2015; NCAI, 2020). Assigning value to and centering Indigenous knowledge, Traditional Knowledge and environmental justice in climate change science, planning and action is imperative. This must be done in ways that uphold Tribal sovereignty and respect the requirement for the Free, Prior and Informed Consent of Indigenous Peoples (CTUIR 2021; NCAI, 2020; ATNI, 2020).

At the same time, it is quite common for government agencies and their staff to lack awareness of this expertise and of the risks that climate change poses to Tribal and Indigenous cultural integrity (Gruening et al., 2015).<sup>9</sup> This suggests the need to

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<sup>7</sup> Climate Justice and Resilience: Communities of color now live on the frontlines of the climate crisis and experience the worst impacts of it, while those with power and privilege remain relatively protected and resourced to respond to a changing world. Tackling the climate crisis requires confronting racial inequity and working toward climate justice through a racial justice lens. As we recover, we can seize this opportunity to implement climate solutions and transform our systems to foster resilience, health and equity (Metro, 2021. Strategic Recovery Framework: Exhibit A to Staff Report).

<sup>8</sup> Often, formal consultation with Tribal governments does not meet the levels of coordination necessary for effective adaptation and mitigation actions (Gruening et al., 2015).

<sup>9</sup> Natural and ecological resources are “essential to the vitality of Tribal [and Indigenous] economic, social, cultural and spiritual health” (Gruening et al., 2015).

invest in staff education as a foundation for effective collaboration towards resilience solutions.

## **THE BOND CRITERIA, ANNOTATED**

Per Metro Council direction in the parks and nature bond resolution, all projects funded by the bond must satisfy at least one of the five following climate resilience criteria.

The additional information provided in this section is meant to support the delivery of bond-funded programs that advance and employ climate resilience best practices.

### **Protect, connect and restore habitat to support strong populations of native plants, fish and wildlife *so that they can adapt to a changing climate.***

A changing climate will inevitably result in shifts in plant and wildlife species ranges. Species that once thrived in a given place will no longer do so, and new species that could not thrive there now will.

This criteria is focused on conserving and connecting relatively large, intact natural areas -- two of the primary ways to help wildlife and other organisms adapt to climate change.

We really don't know which species will need to move where, and when. This strategy is meant to support a system in which ecosystem processes are able to continue and where species can self-adapt to the maximum degree possible.

That means starting with the healthiest possible populations in well-managed refugia that are connected to each other and embedded in as habitable a matrix (i.e., surroundings) as possible.

While imperative for plant and wildlife adaptation, land protection and forest restoration are also key climate mitigation strategies, in part because forests store carbon. Less acknowledged but also important, prairie and savanna (grasslands) and wetlands also sequester and store carbon, retaining it in the soil rather than the trunks of trees.<sup>10</sup>

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<sup>10</sup> Although forests can potentially store more carbon per acre, carbon stored in soil is less vulnerable to rapid loss due to wildfire.

Additional context and guidance:

- “Restore ecological resilience, thereby strengthening government capacity to ensure Tribal and Indigenous access to culturally valued resources and First Foods on ceded and ancestral territories” (ATNI, 2020).
- Support [Indigenous] community-based projects that develop a relationship with the land and the ability to harvest and eat from the landscape (Metro, 2019).
- Limit risk and impact to cultural landscapes and resources – especially those important to Black, Indigenous and people of color (BIPOC) communities -- without placing undue stress on the larger ecosystem (DLCD, 2021).
- “Focus protection and restoration on connected and resilient refuge and direct future development activities to less resilient areas” (DLCD, 2021).
- “Habitat connectivity is important at all geographic scales, especially to address climate change” (Metro, 2019).
- “.... restoring floodplain connectivity, restoring stream flow regimes, and re-aggrading incised channels are most likely to ameliorate stream flow and temperature changes and increase habitat diversity and population resilience. By contrast, most restoration actions focused on in-stream rehabilitation are unlikely to ameliorate climate change effects” (Beechie et al, 2013).

**Protect and restore floodplains, headwaters, streams and wetlands to increase their capacity to handle stormwater to protect vulnerable communities from flooding.**

This criteria is focused on reducing flood risk. Investments applying this criteria should prioritize flood mitigation. Bond funds may be used to accomplish this by investing in natural systems and improving ecosystem functions.

Changes in precipitation and temperature will result in changes in the size and frequency of flood events. Increasing the ability of natural systems to absorb and store water through healthy headwaters, wetlands, and rivers and streams connected to their floodplains will minimize the impact of these changes.

Oregon’s Climate Adaptation Framework places emphasis on restoration of upper watersheds and headwaters, riparian buffers and function, and stream channel wetlands (DLCD, 2021).



To meet this criteria, bond-funded projects could result in voluntary buy-out and conversion of developed properties located in low-lying areas susceptible to flooding. Conversion to a nature park (vs. conversion to an undeveloped natural area) would apply at least one additional climate resilience criterion to mitigate development impacts.

Additional context and guidance:

- “...the primary climate risks to Oregon’s built environment include increased risk to already vulnerable communities, affecting communities with buildings and infrastructure located in floodplains and estuaries. Those who suffer most are low-income and underrepresented communities” (DLCD, 2021).
- Expand and restore riparian buffers and stream channel wetlands where needed to improve riparian function and water quality, increase stream flow, reduce flood damage and provide habitat for fish and wildlife (DLCD, 2021).
- Focus conservation and restoration on upper watersheds, which are key to protecting water quantity and quality throughout a watershed (DLCD, 2021).
- Restoring forests and wet meadows, and the streams that run through them, provides multiple benefits for water supplies such as replenishing groundwater, holding water later into the summer, decreasing flood risks, reducing sediment transport and maintaining cooler water temperatures (DLCD, 2021).

### **Increase tree canopy in developed areas to reduce heat island effects.**

This criteria focuses on addressing disproportionate human exposure to intra-urban heat.

Urban areas are more susceptible to extreme heat events due to the phenomenon referred to as the heat island effect in which areas with little shade and a lot of pavement are warmer than surrounding areas.

In Portland, land surface temperatures in formerly redlined areas -- frequently low income neighborhoods and neighborhoods of color today -- are roughly 13 degrees Fahrenheit warmer than in historically affluent white neighborhoods (Hoffman et al., 2020).

Increased summer temperatures and drought will continue to disproportionately affect health outcomes among vulnerable populations.<sup>11</sup> Increased temperatures will also result in financial burdens as the cost of cooling increases alongside associated energy demand.

While bond criteria language focuses on expanding the urban tree canopy, tree planting is just one heat intervention strategy. In fact, it may be necessary to combine vegetative cooling more generally with other interventions in order to have a notable positive effect (Makido et. al., 2019).<sup>12</sup>

Vegetative cooling in the form of expanded tree canopy and understory, eco-roofs, community gardens, parks, bioswales and restored urban ecosystems can provide additional climate benefits such as carbon storage and sequestration, improved air quality, pocket spaces of beauty and respite, habitat for birds and other wildlife, economic value, and overall human and biotic resilience.

Additional context and guidance:

- The specific land use characteristics of an area are relevant when mitigating urban heat. “Differences in baseline vegetation or green infrastructure may explain variation in the effectiveness of cooling strategies” (Makido et al., 2019).
- Vegetative cooling combined with green roofs, cool roofs and/or cool paving may be most effective, depending on place (Makido et. al., 2019).

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<sup>11</sup> In the U.S. vulnerable communities such as older adults, people with low incomes, and people with pre-existing health conditions are more likely to experience heat-related illness and death (Hoffman et. al., 2020).

<sup>12</sup> A 2019 Portland-based study of six green infrastructure interventions across six different land use types concluded that one mitigation solution alone would not significantly reduce extreme heat. Re-vegetation – not limited to tree planting – is one of the six interventions (Makido et. al., 2019).

## **Use low-impact development practices and green infrastructure<sup>13</sup> in project design and development.**

The purpose of this criteria is to integrate functions of the natural environment into traditionally engineered projects and reduce the climate and wildlife impacts of park and infrastructure development.

Examples of green infrastructure include bioswales, rain gardens, waterfront parks with well-connected riparian zones and vegetated lakesides, wildlife overpasses and fish ladders, hedgerows in agricultural zones, pollinator gardens along corridors, and other treatments that enhance ecosystem integrity and function.

Green infrastructure that helps sequester carbon, mitigate urban heat islands and that contributes to food security in areas with highest potential for adverse climate impacts have been identified as a priority by community-based organizations in the region including Native American Youth & Family Center, Coalition of Communities of Color and Opal Environmental Justice Oregon (NAYA et al., 2016).

Reducing fire and flood risk is essential and should be prioritized through every step of project planning and development. Reducing water demand, capturing and cleaning stormwater, and connecting and enhancing wildlife and pollinator habitat are functions of green infrastructure and sustainable design that every bond-funded project should advance wherever possible.

Projects aligning with this criteria should also seek to incorporate bird friendly facilities design, Dark Sky standards for lighting (to protect migrating songbirds and invertebrate life cycles), and cooling strategies such as green roofs, cool roofs and paving, and vegetative cooling.

All built projects managed by Metro or occurring on property stewarded by Metro must apply Metro's green building policy (update under way), which has identified the Sustainable SITES Initiative's (SITES) Gold standard as the parks development standard.

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<sup>13</sup> The Oregon Climate Adaptation Framework describes green infrastructure as infrastructure that "...incorporates the natural environment into traditionally engineered projects to provide multiple benefits, including support for ecosystem integrity and functions in developed areas. Green infrastructure may include site-specific management and watershed-level techniques such as land preservation and the restoration of wetlands, side channels, riparian vegetation, and floodplains that naturally store water and reduce runoff" (DLCD, 2021).

One goal of SITES is to transform the market through design, development and maintenance practices. Key tenets of this goal include applying a systems thinking approach and life-cycle analyses in design, materials selection and ongoing operations.

This includes reducing carbon emissions from the lifecycle of building materials and reducing energy use associated with the construction, development and operation of new and renovated buildings and infrastructure. Carbon neutrality is an ambitious and admirable goal for any project.

Resilient and low-carbon design strategies include natural ventilation, daylighting, building orientation, high performance building envelope, solar plus battery storage, rainwater capture and storage, and water- and energy-smart visitor amenities.

Additional context and guidance:

- “Focus protection and restoration on connected and resilient refuge and direct future development activities to less resilient areas” (DLCD, 2021).
- “Promote...green infrastructure, particularly in disadvantaged communities, including projects that expand urban tree canopies and improve access to parks, trails, gardens, and natural areas” (DLCD, 2021).
- “Promote historic property rehabilitation practices and adaptive reuse to limit climate impact from new materials production” (DLCD, 2021).
- "Adaptation measures should be low-emissions themselves, as well as work in synergy with climate change mitigation whenever possible" (Union of Concerned Scientists, 2016).
- “[Applying] performance-based design standards, integrated project delivery, building life cycle assessments, and green building rating systems are common strategies for enhancing levels of community resilience” (U.S. Climate Resilience Toolkit).

## **Invest in segments of the regional trail system to expand active transportation opportunities for commuting, recreation and other travel.**

Shifting vehicle trips to active modes of travel such as trail walking and biking, thereby reducing greenhouse gas emissions, is essential to slow or mitigate the effects of climate change.<sup>14</sup> Regional trails play an important role.

Regional trails can also improve the resilience of our transportation system. As flooding, erosion, landslides and extreme heat (i.e., weather events and related hazards) compromise roadways and transit infrastructure, regional trails build network redundancy, in turn creating options in ways to travel.<sup>15</sup>

Another intention of the bond is to invest in trails that will help provide equitable access to natural areas for people of color including immigrants, and people with low incomes. This is a climate adaptation response, primarily, in that it can bring the many health and social benefits of recreation within closer physical reach.

Respite from extreme urban heat via connections to water bodies and mental health benefits associated with being in nature are just two examples of adaptive responses that trail connections to nature – and access to nature more generally -- can help strengthen.

One of Metro’s goals is to prioritize trails in ways that advance climate mitigation and climate adaptation. Both mitigation and adaptation are critical elements of regional climate resilience and they should be thoughtfully balanced in trails program implementation.

This is because, generally speaking, strengthening the transportation (i.e., mitigation) potential of the regional trails system requires at least a partial focus on how many people the system will serve. In comparison, providing equitable access to nature and recreation (i.e., adaptation) requires a focus on who the trail system will serve.

Additional context and guidance:

- Provide “inclusive access to human-scale infrastructure and options, in which walking, cycling....become achievable community norms” (NAYA et al., 2016).

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<sup>14</sup> Transportation is Oregon’s largest contributor to greenhouse gas (GHG) emissions, accounting for roughly 39% of total state emissions in 2016 (Oregon Global Warming Commission, 2018).

<sup>15</sup> Of course, with more extreme weather events trails also become more susceptible to damage and failure. Therein lies the importance of sustained trails infrastructure management and maintenance and building trails in appropriate locations (Adaptation Partners).

- Prioritize trail projects through meaningful partnership with community members and community-based organizations led by and for people most affected (NAYA et al., 2016).
- Developing trails in existing [habitat] disturbance corridors and along habitat edges, keeping out of core habitat areas, and avoiding high quality connector habitat are ways to mitigate the impacts of trail development on natural communities and wildlife, thereby improving resilience outcomes (Metro).
- “Enhance [transportation] system redundancy wherever possible” (DLCD, 2021).

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## **ADDITIONAL RESOURCES**

[Bureau of Indian Affairs Tribal Resilience Resource Guide](#)

[Climate Positive Design Resources](#)

[Guidelines for Considering Traditional Knowledge in Climate Change Initiatives](#)

[National Congress of American Indians climate change resources](#)

[National Park Service Cultural Resources Climate Change Strategy](#)

[Northern Institute of Applied Climate Science \(NIACS\) Adaptation Menus](#)

[Oregon Climate Change Research Institute Tribal Climate Adaptation Guidebook](#)

[Resources for learning about climate and environmental justice \(compiled 4/8/21\)](#)

[United Nations Declaration on the Rights of Indigenous Peoples](#)

[University of Oregon Tribal Climate Change Project website](#)

**Plans developed by Tribes in the region:**

[2020 Tribal Multi-Hazard Mitigation Plan for The Confederated Tribes of Siletz Indians](#)

[Climate Action Plan for the Territories of the Yakama Nation](#)

[Columbia River Inter-Tribal Fish Commission Spirit of the Salmon Plan](#)

[Confederated Tribes of the Umatilla Indian Reservation: Climate Change Vulnerability Assessment](#)

[Nez Perce Tribe Climate Change Program](#)