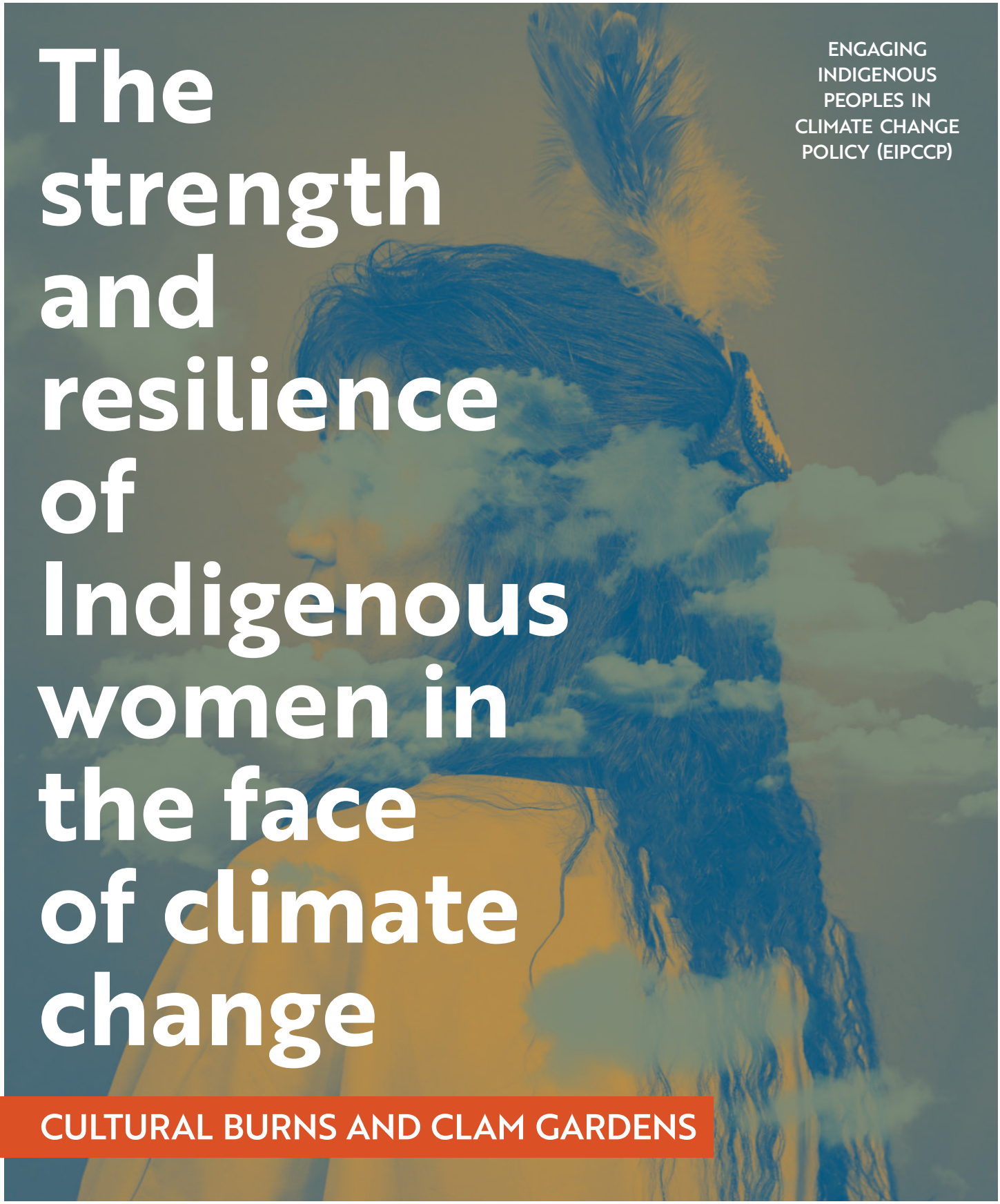

ENGAGING INDIGENOUS PEOPLES IN CLIMATE CHANGE POLICY (EIPCCP)

The strength and resilience of Indigenous women in the face of climate change

CULTURAL BURNS AND CLAM GARDENS

Updated Toolkit

March 2026

Native Women's Association of Canada

L'Association des femmes autochtones du Canada

Native Women's Association of Canada
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The Native Women's Association of Canada (NWAC) is a national Indigenous advocacy organization representing the political voices of Indigenous women in all their diversity in Canada. NWAC advocates for and works with Métis, Inuit and First Nations – on- and off-reserve, status, and non-status, disenfranchised – across Canada. NWAC works to enhance, promote and foster the social, economic, cultural, and political well-being of Indigenous women in all their diversity within their respective communities and Canadian society.

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For more information on NWAC's work related to the *Engaging Indigenous People in Climate Policy* project or to reach out about any questions regarding this report, please contact: environment@nwac.ca

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INTRODUCTION

Indigenous women sharing knowledge and resilience

Climate change is increasingly transforming lands, waters, and ecosystems, affecting both communities and the natural systems that sustain life. Indigenous women in all their diversity experience unique impacts due to their deep connection to the land and water through roles such as caring for the land, harvesting traditional foods, managing medicines, and maintaining cultural sites. Extreme weather, wildfires, coastal erosion, and other environmental disruptions threaten these activities, impacting their livelihoods, access to food, economic security, and cultural practices. These pressures affect their physical, emotional, and spiritual well-being, even as they continue to uphold responsibilities for community care and maintenance of their territories.

Despite these challenges, Indigenous women have preserved and passed down knowledge and practices that support ecosystem health and community resilience. Their expertise in environmental kinship and the interconnectedness of natural cycles, including the seasons, tides, fire and moon cycles, provides traditional approaches to addressing climate change and sustaining both the environment and community well-being. To share these insights and practices, the Native Women's Association of Canada (NWAC) developed this toolkit as a part of the *Engaging Indigenous People in Climate Change Policy* (EIPCCP) project funded by Environment and Climate Change Canada (ECCC).

Two of the most pressing climate-related challenges impacting Indigenous Peoples across Canada are intensified wildfire seasons and the rising and warming oceans. This toolkit spotlights two cultural practices, *Good Fire* (cultural burns) and *Loxiwe* (clam gardens), chosen for their relevance to these challenges. Wildfires threaten forests and grasslands, while rising seas and warming ocean waters damage coastal shorelines. These practices demonstrate how Indigenous women's knowledge provides place-based, culturally grounded strategies that protect biodiversity, restore habitats, and strengthen food systems.

This resource is intended for Indigenous women in all their diversity who wish to engage with land- and water-based practices, and for anyone seeking to understand Indigenous approaches to caring for the environment. Through the stories and case studies shared here, readers can see how Indigenous women are integral to sustaining ecosystems, nurturing community resilience, and responding to climate change in ways that are both effective and deeply rooted in culture and tradition.

GENDER AND CLIMATE →

A path towards justice

As climate change intensifies wildfires, reshapes coastlines, and stresses ecosystems, its impacts differ depending on roles, knowledge, and connections to the land. For women, these effects are felt in deeply personal ways, shaping their ability to respond and adapt. Efforts to recognize and support women's equality have been underway globally since the 1970s, when growing movements for women's rights called attention to the need for fairness and inclusion **[1]**.

The recognition of gender in climate policy has unfolded gradually over several key moments. In the 1970s, advocacy for women's rights gained global momentum. By 1992, world leaders met at the Earth Summit to discuss climate change, yet women's voices and gender considerations were largely absent. Three years later, the 1995 Beijing Platform for Action emphasized that women's empowerment and equality were essential for sustainable development. At this time, the Canadian government adopted Gender-Based Analysis Plus (GBA+), a tool to help consider diverse gender impacts when shaping policy **[1,2]**.

In 2001, the UNFCCC created the Women and Gender Constituency, a more systematic, gender-responsive approach to climate policies. Over the next two decades, progress continued: encouraging women's participation (2009), adding gender to national climate strategies (2010), improving gender balance (2012), and launching the Lima Work Programme on Gender (2014). This was followed by the Gender Action Plan in 2017, with extensions in 2019 and 2021 (see Figure 1, adapted from Maguire et al., 2023). In 2024, the Lima Work Programme was renewed for another decade, reaffirming a long-term global commitment to embedding gender considerations in climate governance **[1,3]**.

Yet even with these global frameworks, Indigenous women remain largely excluded from climate policy. While women everywhere experience disproportionate impacts from climate change, Indigenous women are uniquely affected due to their deep connections to land, water, and ecosystems. Their lives and livelihoods, traditional foods, medicines, and cultural sites remain closely intertwined with the environment. Their exclusion from decision-making not only continues the inequalities created by colonialism, but it also weakens climate action by overlooking the knowledge and experience of those who are among the most deeply connected to, and most affected by, environmental change **[4,5]**.

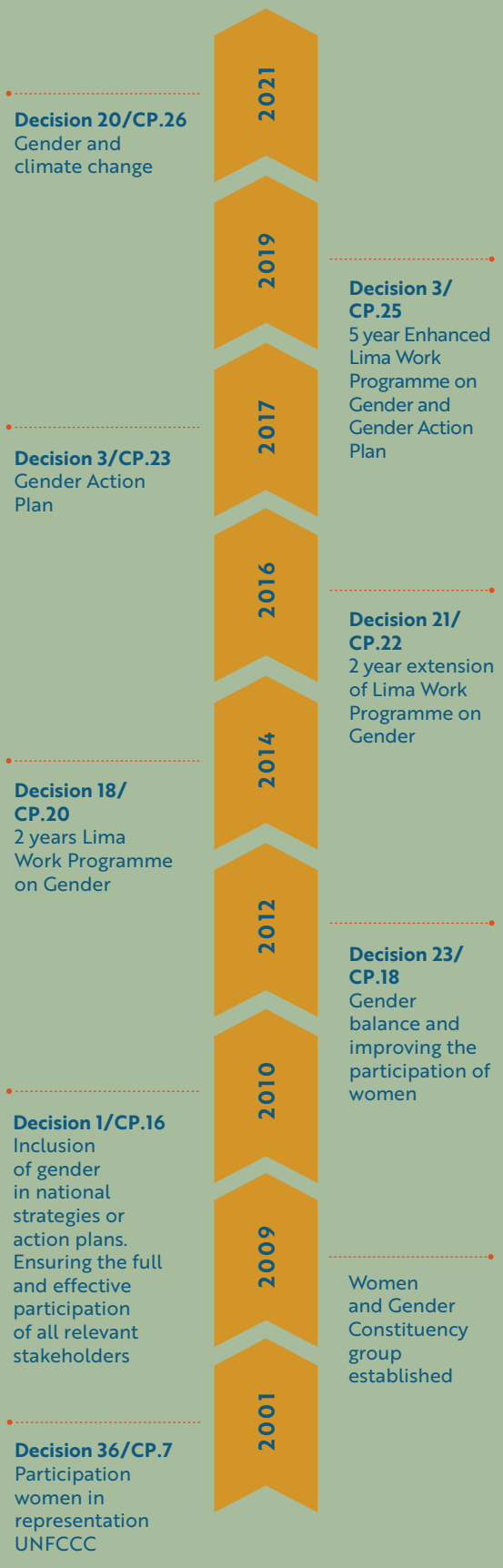

Figure 1
The History of Gender in the United Nations Framework convention on Climate Change **[1]**

Indigenous women leading with knowledge

Women around the world are disproportionately impacted by climate change. In 2022, the UN estimated that 80% of people displaced by climate-related disasters were women, who often experience heightened vulnerability during floods, wildfires, and droughts. Loss of homes and livelihoods, reduced access to clean water and healthcare, and increased safety risks all worsen during crises, and women continue to take on the majority of caregiving and household responsibilities. These gendered pressures shape how women experience climate change and their ability to respond **[5,6]**.

For Indigenous women, these challenges are further intensified. While they face many of the same gender-specific impacts as other women, Indigenous women experience climate change in ways deeply tied to their relationships with land, water, and culturally rooted responsibilities. Their access to traditional foods, medicines, harvesting areas, ceremonial places, and community economies is threatened as ecosystems change. Colonial policies have also limited their access to decision-making spaces, increasing vulnerabilities and limiting their ability to shape environmental policies that directly affect their lives and knowledge systems **[4,5]**.

Despite these injustices, Indigenous women continue to be seen in climate resilience efforts in powerful ways. Their expertise is rooted in environmental kinship and in understanding the interconnectedness of natural cycles, seasonal changes, moon phases, tides, fire cycles, and more. This knowledge allows them to respond to climate impacts in ways that are place-based, culturally meaningful, and proven to strengthen community well-being **[7,8]**.

Research shows that when women are involved in climate action, outcomes improve: resources are managed more effectively, conservation efforts are strengthened, emissions decrease, and communities become better prepared for disasters. Indigenous women's guidance goes even further, drawing upon ancestral practices that restore habitats, protect biodiversity, and reinforce traditional food systems. Their involvement is not only necessary, but it also strengthens climate action locally, nationally and globally **[4,7,8]**.

In many Indigenous cultures, women hold responsibilities grounded in balance, reciprocity, and relational care for both land and community. Centring Indigenous women in climate decision-making ensures that policies, funding, and research reflect the real needs and strengths of their Nations. When their perspectives guide climate strategies from the beginning, responses become more equitable, more effective, and more aligned with ecological relationships **[4,8]**.

These connections are reflected in the cultural practices highlighted in this toolkit. *Good Fire*, guided by the knowledge of Indigenous women Fire Keepers, restores balance to forests and grasslands. *Loxiwe*, upheld for generations by Indigenous women along the Pacific coast, nourishes shorelines and sustains marine ecosystems. Both practices show how Indigenous women's knowledge systems respond to climate impacts as well as regenerate the lands and waters themselves.

As seen throughout this section, global gender and climate frameworks, from the 1992 Earth Summit to the UNFCCC Gender Action Plans, have created space for gender-responsive policy, yet they have often overlooked Indigenous women. Integrating their involvement bridges this gap, grounding international commitments in the lived realities, cultural teachings, and climate solutions Indigenous women have carried since their earliest ancestors cared for these lands. This ensures that climate action is not only equitable but ecologically rooted, community-driven, and enduring.

CHANGING LANDSCAPES →

Climate, wildfires, and coastal challenges

Since the Industrial Era, human activities have increased the burning of fossil fuels, releasing greenhouse gases that trap heat in the atmosphere and speed up the Earth's natural warming cycles. This has raised global temperatures, causing ice to melt, sea levels to rise, and oceans to become warmer and more acidic. Extreme storms, floods, droughts, and intensified wildfires are also happening more often **[5]**.

Ecosystems have always adapted to natural changes, but the added stresses from global warming are pushing them to their limits. Biodiversity, meaning the variety of plants, animals, and other living things, helps ecosystems respond and stay balanced. The more diverse an ecosystem is, the better it can adapt to changes, because some species can survive and support the system when conditions shift. Indigenous Peoples have long understood these connections, working with land and water in ways that reflect care, balance, and responsibility. Indigenous women, in particular, play key roles, sharing knowledge and nurturing ecosystems to help them adapt and thrive **[9,10]**.

As Mother Earth's temperature keeps rising, Canada is warming at twice the global average, making the effects of climate change more severe across the country. Ecosystems are feeling the strain, with hotter, longer wildfire seasons and growing pressures on coastal shorelines from erosion, rising seas, and warming ocean waters **[5]**.

These shifts in the climate, combined with dry conditions and the natural buildup of vegetation on the forest floor, have already caused record-breaking wildfires, making them hotter and harder to control. In 2023, over 18 million hectares burned, displacing about 30,000 Indigenous Peoples from their homes and communities. In 2025, nearly 9 million hectares burned across almost every province and territory, forcing over 45,000 Indigenous Peoples to evacuate. The scale and intensity of these fires highlight how these changing conditions are placing increasing pressure on both landscapes and communities **[11,12, 13]**.

At the same time, climate change is reshaping Canada's coastlines, altering the land and waters along the shore. Rising seas, stronger storms, and shifting sea ice are causing more frequent and severe coastal flooding and erosion. Bigger waves and storm surges, along with the loss of protective sea ice, are wearing away beaches, dunes, and intertidal zones. As these natural barriers shrink, shorelines become more exposed, making flooding and erosion even worse. Together, these wildfire and coastal impacts emphasize how climate change is transforming both the country's forests and its coasts, affecting ecosystems and communities alike **[14]**.

As wildfire seasons grow more intense and coastal ecosystems face increasing pressures, Indigenous-led practices offer real, practical solutions. Cultural burning, known as *Good Fire*, and *Loxiwe*, or clam gardens, guided by the knowledge and wisdom of Indigenous women, use traditions passed down through generations to care for the land and water. These practices not only reduce wildfire risks and restore habitats but also strengthen shorelines, illustrating how Indigenous Knowledge protects biodiversity, supports communities, and keeps both forests and coasts healthy **[15,16]**.

ROOTED IN RESILIENCE →

Ancestral knowledge and conservation in action

The two traditional Indigenous practices of *Good Fire* and *Loxiwe* illustrate the deep relationships between people, ecosystems, and seasonal cycles, highlighting how Indigenous Knowledge systems sustain biodiversity, support food security, and maintain ecological balance **[15,16]**. This section explores their history, environmental impacts, and revival, including case studies showing how ancestral knowledge continues to guide conservation efforts today. Central to these stories are Indigenous women in all their diversity, whose expertise and care have been essential in maintaining both ecosystems and cultural traditions. Despite colonial disruption, these time-honoured practices endure as living expressions of resilience, guardianship, and the profound connection between Indigenous women, their communities, and the environment **[17]**.

When *Good Fire* walks the land

For many generations, Indigenous communities across the country have cared for the land with what is often called *Good Fire*, small, purposeful burns that help forests, grasslands, and other ecosystems thrive. Fire Knowledge Holders, guided by Traditional Knowledge and a deep understanding of the seasons, weather, and plant behaviour, walked the land carefully, watching for signs it was ready. Early spring, usually within the first two weeks, offered cool air and damp ground, allowing the fire to move slowly across the land. Summer, with its heat and dryness, was always avoided **[19,20]**.

As the flames crept across the land, they acted like a natural cleansing breath. Dry branches and old plants were cleared away, sunlight reached the forest floor again, warming the soil and inviting new life. Berry bushes, medicinal plants, and other culturally important species grew stronger and more vibrant. Many of these plants had evolved alongside fire: some seeds only open with heat, while others grow stronger and more abundant after a gentle burn **[19]**.

Short video:
Good Fire (an accessible introduction to the practice).

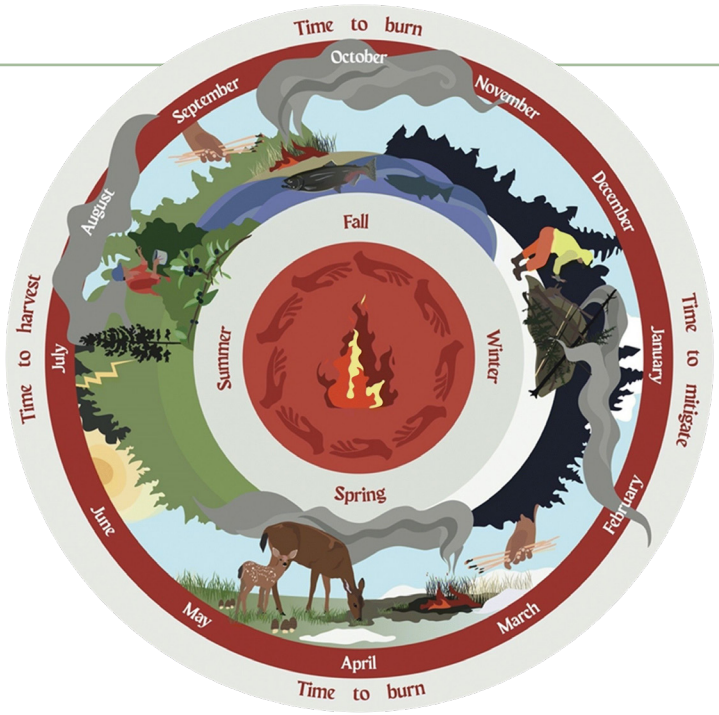

FIGURE 2

A seasonal calendar illustrating aspects of Indigenous fire stewardship. The calendar depicts times to conduct safe "cool" burns (spring and fall months, when snow is still on the ground or before snow or rain falls), time to mitigate wildfire risk (in the winter, when fuels can be reduced, especially fuels in heavily forested and community-interface areas), and time to harvest (when foods and medicines are abundant, due to carefully timed cultural burning). Many hands (centre) depict inter-generational continuity and community-based relationships with fire, which are embedded in knowledges that have been passed down for millennia. Image concept by K.M. Hoffman and A.C. Christianson, design and illustration by Alexandra Langweider of Align Illustration **[18]**.

Every landscape has its own rhythm with fire. Grasslands thrived with a burn every year or two, ponderosa pine forests every seven to fifteen years, and lodgepole pine forests only every sixty to one hundred years. When these cycles were respected, the land stayed healthy, pests remained low, and plants and animals flourished. After European colonization, settlers initially used fire to clear land for farming and other development. Lacking the distinctive knowledge of local ecosystems that Indigenous Peoples held, they misunderstood the purpose and effects of *Good Fire*. Colonial governments soon outlawed these practices, with regulations appearing as early as 1610 in Newfoundland, and by the early to mid-1900s, cultural burning was largely banned from coast to coast to coast. Without these time-honoured cycles, dry brush and fuels accumulated, setting the stage for the hotter, faster-spreading wildfires that now sweep the land **[19,22]**.

Today, Elders, Knowledge Keepers, and communities are restoring *Good Fire*, not only to heal the land but also to maintain cultural knowledge and continuity. While some colonial-era restrictions remain, limiting where burns can take place, the revival of cultural burning is increasingly recognized as essential for restoring healthy, resilient landscapes. Indigenous-led burns offer a model for ecological balance and community safety as wildfire seasons worsen **[15,19]**.

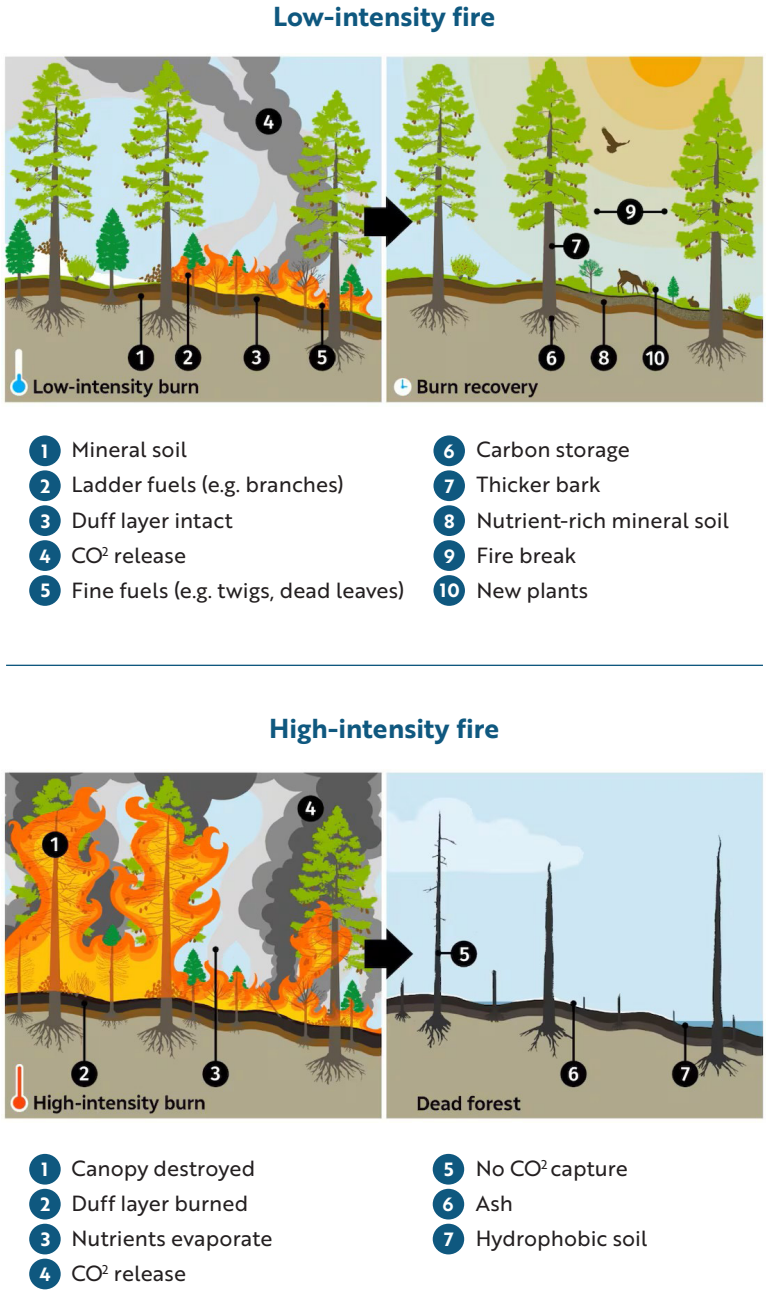

FIGURE 3

Visual comparison of cultural burning and wildfires **[21]**.

Today, Elders, Knowledge Keepers, and communities are restoring *Good Fire*, not only to heal the land but also to maintain cultural knowledge and continuity.

INDIGENOUS WOMEN ARE SHAPING THE WORK OF *GOOD FIRE*

Each Indigenous community has its own protocols for burning. Historically, men and women held different roles: men led fires for hunting and trapping while women guided burns to support harvesting and the growth of medicinal and culturally significant plants **[19,20]**.

The work of Indigenous women in all their diversity draws on deep ecological understanding and a long-standing responsibility to protect community wellbeing. *Good Fire* is more than a management tool; it is a cultural practice grounded in spirituality, reciprocity, and relational accountability. Its revival in the face of colonial bans reflects the resilience of Indigenous women, who continue to uphold the safety and health of their territories **[23]**.

Across Turtle Island and Inuit Nunangat, Métis fire expert Dr. Amy Cardinal Christianson collaborates with Indigenous women and their communities to reclaim cultural burning. As a Senior Fire Advisor with the Indigenous Leadership Initiative, she helps advance Indigenous-led fire strategies, co-authors guides on cultural burning, and co-hosts the *Good Fire* podcast, earning recognition with the 2025 Lynn Orstrad Award: Women in Wildlife Resiliency **[24]**.

Projects, like FireSmart Canada's *Blazing the Trail Initiative*, celebrate stories and teachings from Indigenous communities, including women from across the country, affirming what Indigenous Peoples have always known: fire is connection, renewal, and medicine **[19]**.

FIGURE 4

Dr. Amy Cardinal Christianson putting fire on the land **[25]**.

HOW *GOOD FIRE* HEALS THE EARTH

The ecological benefits of cultural burning are clear. *Good Fire* reduces fuel layers, lowering wildfire risks, restores habitats, encourages berry growth and supports species adapted to open landscapes. Furthermore, it manages invasive species and maintains the natural cycles of forests, grasslands, and wetlands **[15,22]**.

Indigenous-led case studies illustrate this knowledge in action. In May 2025, the Kainai Nation, located in southern Alberta, created the first Indigenous Fire Guardians Program. By blending Blackfoot Ecological Knowledge, ceremony, and formal training, the guardians can restore grasslands, reduce wildfire risk, and support biodiversity. Indigenous women are participating in this program as Fire Guardians, trainers, and Knowledge Holders, strengthening community bonds and cultural authority **[26]**.

Across the Boreal Forest, which spans from Newfoundland to Yukon, communities are revitalizing berry patch burns, a practice long led by Indigenous women who used fire to increase berry abundance, size, and sweetness. These burns demonstrate that women were not just gatherers; they actively shaped the land, using fire as a tool of survival, nourishment, and cultural continuity **[27,28]**.

Good Fire is more than a practice; it is a living legacy, holding space for culture, safety, and the enduring relationship between people and the land

Together, these examples show how *Good Fire* offers practical, effective responses to modern climate challenges. By reducing wildfire severity, restoring habitats, and supporting culturally important foods, cultural burning strengthens both environmental health and community resilience.

Ensuring this knowledge continues, carried forward by the strength and care of Indigenous women in all their diversity, is essential for the health of the land, the resilience of communities, and the well-being of future generations. As seen from the cases above, *Good Fire* is more than a practice; it is a living legacy, holding space for culture, safety, and the enduring relationship between people and the land.

The story of *Loxiwe*: Life at the shore

Clam or sea gardens, also known as *Loxiwe*, in Lik'ʷala, meaning "place of rolling rocks together," are ancient Indigenous systems for growing and harvesting seafood, practiced for over 3,500 years by coastal Nations across the Pacific Northwest. Indigenous women and children carefully rolled or carried large rocks to the low tide line, stacking them into walls that trap sand and crushed shells. Over time, these terraces gently reshaped the shorelines, creating sheltered habitats where clams and other marine life thrived, as shown in *Figures 5 and 6*. *Loxiwe* are grounded in deep Traditional Knowledge, working with the natural rhythm of tides, seasons, and ecological renewal. For countless generations, they nurtured sustainable food systems while protecting beaches against erosion and rising waters, reflecting the skill, knowledge and care of those who built them **[16]**.

Revitalized *Loxiwe* are proving to be powerful ecological and climate resilience systems. Their terraces trap cooler, nutrient-rich sediment that protects clams during extreme heat, helping young clams survive and grow even during severe heatwaves. The specific structure of these gardens improves water flow, adds crushed shell that reduces harmful bacteria, and creates healthier clam beds than unwalled beaches. *Loxiwe* also expand shoreline habitat, support a wider range of culturally important species, and help limit invasive species **[31,32]**.

These gardens also serve as living classrooms, offering Indigenous youth opportunities to learn about the rhythm of the sea, responsibilities for caring for the environment, and the interconnection between people and marine ecosystems **[33]**. At Nəts'inuxw *Matsayno*, on the Kwiakah Reserve in British Columbia, a youth from the Kwiakah Nation is actively leading a *Loxiwe* restoration project through the Indigenous Science Division at Environment and Climate Change Canada. This project is guided by Knowledge Holders, including an Anishinaabe woman from Lake St. Martin First Nation, highlighting the power of intergenerational and inter-Nation collaboration and showcasing how these traditions continue to guide new generations **[34]**. Learn more about the project here: *Clam Gardens, Ancient Indigenous Technology and Sustainable Food Source*.

In the Gulf Islands National Park Reserve, located off the southeast coast of Vancouver Island, BC, Hul'q'umi'num' and WSÁNEĆ Nations are working alongside Parks Canada to restore *Loxiwe*. Here, Traditional Knowledge is carefully blended with scientific research to support the recovery of native clam populations, demonstrating that these gardens are not only culturally meaningful but also highly skilled and sustainable systems for protecting coastal ecosystems **[35]**. Together, these projects highlight why Indigenous women's knowledge, passed from generation to generation, is vital for climate resilience and healthy coastal ecosystems.

FIGURE 6

On Calvert Island, British Columbia, the subtle rock line of an extant clam garden is a reminder of how Indigenous peoples turned the sea into a shellfish garden. Photo courtesy of the Hakai Institute **[30]**.

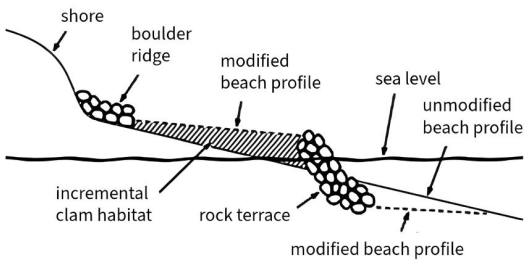

FIGURE 5

Schematic clam garden profile. Illustrates the incremental habitat extension associated with clam gardens at tidal datum **[29]**.

INDIGENOUS WOMEN'S KNOWLEDGE AND ROLE IN CLAM GARDENS

For thousands of years, Indigenous women on the Northwest Coast have been the primary caretakers of clam gardens. Their work went far beyond harvesting: they dug and tended clams, turned and loosened sediments, maintained rock walls, cleared predators, and spread crushed shell pieces, techniques that improve clam growth and ensure long-term productivity. These activities reflect deep ecological knowledge, including understanding tides, moon cycles, seasonal patterns, and sustainable harvesting practices passed from mothers, aunties, and grandmothers to younger generations **[16,36]**.

In multiple Indigenous communities along the Pacific coast, women also held governance authority over the lands and waters, giving them the power to decide when, how, and who cared for them. Their work supported families and communities year-round, ensuring reliable food sources, preserving cultural practices, and maintaining complex social and legal systems. Kwakwaka'wakw's Clan Chief *Kwaxsistalla* recalls, "when I was quite young, we used to dig clams every winter. You know, when everybody, all the men [were] in the Big House, potlatch, and all the women are out digging clams." illustrating how women's labour and knowledge sustained both ecosystems and community life **[38,39,40,41]**.

The impact of passing down this ancestral knowledge runs deep within Indigenous peoples and their communities. For example, a short video documents a restoration project led by Wei Wai Kum Knowledge Holder and Archaeologist Christine Roberts in the territory of the Wei Wai Kum First Nation on Northern Quadra Island, off the coast of British Columbia: *Clam Gardens - Nanwakolas Council*. This illustrates how knowledge is actively shared, taught, and revitalized across generations, connecting communities with their ecological and cultural heritage.

Loxiwe continue to embody the enduring relationship between people, place and the sea. As communities restore these gardens, Indigenous women's knowledge guides not only the care of clams but the passing of culture, language, and ecological wisdom to future generations. These terraces tell a story of resilience, guardianship and interconnection, reminding us that the health of the land, the waters and the communities are inseparable **[36,41]**.

FIGURE 7

A Kwakwaka'wakw woman harvesting shellfish. Her name, the date, location, and photographer unknown. Catalogue # MCR 6002 Museum at Campbell River **[37]**.

CONCLUSION

↓

Caring for the land, waters, and communities

Indigenous women in all their diversity carry knowledge and practices honed over generations, rooted in deep relationships with land, water, and all living beings. Through traditions like *Good Fire* and *Loxiwe*, they sustain ecosystems, strengthen food systems, and nurture cultural and community well-being.

Climate change presents unprecedented challenges, from intensified wildfires to rising seas, but Indigenous women respond with skill, care, and ancestral insight. Their practices restore habitats, protect biodiversity, and ensure that cultural knowledge continues to guide new generations. In doing so, they demonstrate that resilience is not only about surviving change, but about actively nurturing life, balance, and connection across people and ecosystems.

Recognizing and supporting Indigenous women's knowledge strengthens communities, ecosystems, and climate solutions. Their practices remind us that effective responses to environmental change are rooted in tradition, in the guidance of ancestors, and in the care and resilience passed forward through generations. Indigenous women show that knowledge, care, and resilience carried across generations are essential for sustaining the land, the waters, and the people who depend on them.

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