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Climate Contingencies: Weather, Disaster, and Resilience in North American History

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Introduction

Weather is not background. In North America it has been a decisive actor—sometimes gentle, often unforgiving—shaping where people settle, what they grow, how they build, and whom they protect. This book calls these forces climate contingencies: the shocks and variabilities that interrupt plans, reorder priorities, and expose the often-hidden scaffolding of society. Hurricanes, droughts, and cold snaps are not only meteorological events; they are social tests that reveal what communities value and whom systems are designed to serve. By following these disruptions across centuries, we can see how governance, markets, and culture have been repeatedly retooled in the wake of wind, water, heat, and ice.

The scope of this book is continental and comparative. It spans Indigenous seasonal knowledge and colonial encounters during the Little Ice Age, the rise of industrial cities and modern forecasting, and the era of sprawling suburbs and critical infrastructure. Case studies range from the Mississippi floodplain and Prairie wheat belts to Atlantic hurricane coasts, the Pacific Northwest’s storm tracks, the Canadian Shield’s ice-bound towns, and Caribbean territories tied into North American political economies. Each chapter situates a severe event within its ecological context and then follows its social and policy afterlives—how a storm became a seawall, a drought became an irrigation compact, a blizzard became a building code. Disasters are treated not as isolated tragedies but as processes unfolding through decisions made long before the sky darkened.

Methodologically, the book braids environmental history with policy analysis. It draws on archives and oral histories, engineering reports and legislative debates, insurance records and investment prospectuses, as well as climate proxies and reanalysis datasets that help reconstruct past conditions. This interdisciplinary approach allows us to hold human choices and physical hazards in view at the same time: river levees and sediment budgets, redlining and heat islands, crop prices and precipitation regimes. The aim is not to adjudicate nature versus society, but to show their co-production—how economies and infrastructures magnify or mute the effects of climatic extremes.

Several themes recur. Settlement patterns often placed the most vulnerable on the most volatile landscapes—barrier islands, floodplains, canyons, and fire-prone edges—while concentrating wealth and power on higher, safer ground. Agricultural booms rode wet years and collapsed in dry ones, leaving behind debt, dust, and migration that reshaped labor markets and national politics. Urban planning and public health repeatedly learned from crisis: sanitation reforms after heat and cholera, zoning and elevation standards after storm surge, energy codes and grid hardening

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after ice storms and heat waves. Policy innovations, from the New Deal to modern disaster declarations, tended to expand the state's role while revealing the uneven geography of relief and recovery.

Resilience, as used here, is not a slogan for "bouncing back," but a measure of a community's capacity to absorb shocks, reorganize, and pursue justice while doing so. It is built in layers—science and early warning, robust and flexible infrastructure, diversified economies, and, crucially, social networks of care and accountability. The book highlights strategies that reduce exposure and vulnerability: restoring floodplains, designing for failure and safe-to-fail systems, strengthening building codes, reforming insurance to reflect risk without abandoning the poor, supporting Indigenous stewardship, and planning for managed retreat where staying put imperils lives and livelihoods. True resilience requires confronting legacies of exclusion and ensuring that adaptation does not reproduce them.

Finally, the chapters argue that remembering is itself an adaptation strategy. Amnesia is costly: the fading of flood marks and storm stories invites rebuilding risk. Conversely, institutions that carry memory—tribal knowledge, community organizations, public archives, and transparent risk disclosures—enable better choices when the next contingency arrives. In an era of accelerating extremes, historical perspective is not a luxury; it is a tool for governing uncertainty. By tracing how past climate shocks reshaped societies, economies, and policy, this book offers a grounded guide for leaders and communities seeking to build a more resilient North America.

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CHAPTER ONE: Landscapes of Risk: Indigenous Ecologies and Seasonal Strategies

Long before the weather was measured in degrees and named by satellites, people in North America read it in the bend of grasses, the smell of thawing soil, the direction of swallows, and the low growl of distant thunder over dry hills. Climate was not an abstraction; it was a timetable and a teacher. Seasonal pulses of cold and heat organized when to hunt, where to fish, which seeds to sow, and how long to stay before moving camp. These were not romantic responses to a natural world left to itself, but practical strategies finely tuned to the continent’s diverse ecologies and its occasional cruelties. Risk was a constant companion, and preparation was woven into daily life.

Where you lived set the terms of survival. On the Great Plains, the thunderbolt that split the sky in summer also brought the first grasshoppers and a flush of prairie clover; bison herds shifted with moisture, and people shifted with them. On the Great Lakes and the St. Lawrence corridor, ice-out on the lakes signaled the run of whitefish and sturgeon, while the first buds of sugar maple announced the sweet season of sap. Along the Pacific coast, salmon runs arrived like clockwork, shaped by ocean temperatures and river flows. The subtropical Gulf Coast, meanwhile, held a different rhythm—wet summers nourished shellfish and maize, and autumn’s storms arrived like punctuations.

In the Southwest, the monsoon was less a guarantee than a gamble. Summer thunderstorms could nourish a maize field or flash-flood a village arroyo. The Ancestral Puebloans learned to build into cliffs, where rock shelter and runoff could be managed, and to cultivate drought-hardy crops like maize and tepary beans. The Hohokam engineered extensive irrigation canals in the Salt and Gila River valleys, adapting to unpredictable floods by designing channels with spillways and berms. Archaeology shows deliberate cycles of abandonment and reoccupation—evidence of a strategy to disperse risk across multiple microenvironments rather than overcommitting to a single valley.

In the eastern woodlands, communities like the Haudenosaunee practiced a complementary agriculture of maize, beans, and squash, the “Three Sisters,” whose intertwined growth reduced pests and soil depletion. Seasonal rounds balanced farming with hunting and gathering, moving as resource availability dictated. This mobility was not a sign of instability; it was a tool for resilience. When drought shortened the growing season or blight touched a crop, people shifted settlements or foraged more intensively. Oral traditions and long-held practices encoded these

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contingencies, making flexibility a matter of law as much as logistics.

Farther north, among Inuit and other Arctic peoples, weather was the unforgiving curriculum of life. Sea ice thickness, wind patterns, and the behavior of caribou determined travel routes and hunting windows. Elders’ knowledge of currents, ice fracture lines, and seasonal animal migrations formed a complex atlas of risk that made winter hunting both possible and perilous. In the subarctic boreal forest, Dene and Cree communities followed migratory herds of caribou and moose, timing movements to freeze-up and thaw. The seasonal extremes were not simply endured; they were anticipated, mapped, and negotiated through social rules about sharing and safety.

Coastal communities along the Atlantic and Gulf shores built shell rings and middens that mark centuries of adaptation to shifting shorelines and storm surges. The precise placement of villages reflected lessons from centuries of hurricanes: higher ground, access to freshwater, and proximity to diverse marine resources. In the Pacific Northwest, cedar forests provided materials for longhouses and canoes that could weather heavy rains and coastal storms. Potlatch economies reinforced social networks, ensuring that a bad harvest or a lost canoe could be offset by obligations and gifts. Disaster preparedness was as much about social ties as physical structures.

Fire was another dimension of seasonal strategy. Indigenous peoples across the continent used controlled burns to manage fuel loads, improve grazing, and promote useful plants like camas or berries. In California’s oak woodlands and the Southeast’s pine savannas, low-intensity fires reduced the likelihood of catastrophic blazes and maintained open habitats. These practices were not uniform; they were tailored to local topography and species. By shaping vegetation, communities moderated the impact of drought and heat, even as they set the stage for a mosaic of productive landscapes that could better absorb the shocks of dry years.

Knowledge of climate variability was encoded in stories and ceremonies that carried forward across generations. Tribes of the Great Plains developed complex ritual calendars tied to the movement of stars and the appearance of certain plants. The Pawnee, for instance, oriented their calendars to celestial phenomena and agricultural cycles, integrating observations of weather with cosmology. In the Southwest, Pueblo calendars marked the solstices and the arrival of summer rains. These systems were not infallible, but they created a shared language for predicting and responding to climate events, a social infrastructure of memory that could be activated when conditions changed.

Mobility and settlement were complementary strategies. Many communities practiced seasonal transhumance, moving between winter villages and summer camps as resources permitted. This reduced pressure on any single patch of land and provided options when one area suffered from drought or flood. Archaeological records show

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repeated shifts in village locations in response to river dynamics, soil exhaustion, or fire regimes. In regions with abundant resources, permanent settlements were possible, but even there, houses were adapted to climate—thick-walled earth lodges on the Plains, raised timber platforms in the humid Southeast, and insulated semi-subterranean dwellings in the Southwest.

Trade networks played a crucial role in climate risk management. The exchange of shells, obsidian, maize, and hides moved resources from surplus regions to those under stress. In the Southwest, elaborate trade routes connected the Colorado River basin with the Rio Grande valley, allowing communities to access resources during droughts. On the Gulf Coast, shell beads and marine goods traveled inland, while maize and pottery moved toward the coast. These networks functioned as insurance policies, spreading risk across wider geographies and reinforcing social ties that could be mobilized in emergencies.

Seasonal knowledge also shaped architecture and infrastructure. The tipi, often romanticized as a simple cone, was a sophisticated climate-responsive dwelling: adjustable smoke flaps and side panels allowed ventilation in heat and insulation in cold, and its portability fit the rhythms of bison herds and weather. Pueblo architecture, with its thick adobe walls, provided thermal mass to moderate temperature swings, while strategically placed windows captured winter sun and summer shade. In the Pacific Northwest, cedar longhouses were designed to shed heavy rain and resist wind. These structures were not static; they evolved as communities learned from storms and droughts.

Indigenous diplomacy often included climate contingencies. Agreements among neighboring nations specified hunting rights, fishing locations, and travel corridors, anticipating seasonal conflicts when resources were scarce. The Iroquois Confederacy’s Great Law of Peace embedded rules for conflict resolution that took into account agricultural cycles and food storage. In the Great Basin, Shoshone and Bannock bands negotiated access to seasonal camps and water sources. These arrangements acknowledged that environmental variability could strain relations, and they provided mechanisms to adapt without resorting to violence.

The arrival of Europeans introduced new vulnerabilities. Colonial settlement often fixed people in place where Indigenous strategies had prized flexibility. Towns built on floodplains and coastal lowlands lacked the seasonal retreat options practiced by Indigenous communities. Crops like wheat and rye replaced or supplemented native maize, beans, and squash, altering the seasonal calendar and exposing settlers to unfamiliar risks. In the Caribbean and along the Atlantic seaboard, plantation economies intensified dependence on a narrow set of crops, magnifying the impacts of storms and drought. The new settlements inherited old hazards but often ignored the old lessons.

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European newcomers also brought different ideas about fire. Suppression policies replaced controlled burns, leading to fuel accumulation and more severe wildfires. In New England and the Mid-Atlantic, early colonists cleared forests for agriculture without adopting the mosaic burning practices of local nations. This altered wildlife habitats and increased erosion, making floods more likely and fields more susceptible to drought. Over time, these changes would feed back into the climate system, but the immediate effect was to heighten vulnerability to seasonal extremes.

Indigenous knowledge systems continued to inform settler communities in many places. Accounts from New France document Wabanaki guides teaching snowshoe travel and winter survival; in New Spain, Jesuit missions adapted agricultural techniques from Pueblo and O’odham peoples. Coastal pilots relied on local knowledge of currents and weather signs. In some regions, this cross-cultural learning reduced risk; in others, it was ignored or suppressed. The result was a patchwork of resilience and fragility across the continent, shaped as much by politics as by weather.

Food storage technologies were a critical buffer against variability. In the Southwest, granaries built into cliffs protected maize from moisture and pests. On the Great Plains, bison jerky and pemmican—fat mixed with dried meat—provided concentrated calories for winter. In the boreal forests, fish were dried on racks over fires, and berries were sun-dried or packed into oil. These techniques ensured that bad years did not become catastrophic ones. Storage required planning and labor, but it turned seasonal surplus into security. Colonizers often underestimated the complexity of these systems, leading to food shortages when crops failed.

Water management was another arena of adaptation. Along the Rio Grande, acequias—community irrigation canals—were maintained collectively, with rules for allocating water during drought. In the Great Basin, where water was scarce, settlements clustered around springs and lakes, and seasonal movements tracked ephemeral flows. On the Pacific coast, communities exploited estuaries and tidal zones, which buffered them against variability in rainfall. These practices recognized water as a shared resource and embedded social obligations in its management. When colonial governments imposed individual water rights, these cooperative systems were disrupted, increasing vulnerability.

Travel and communication strategies were finely attuned to climate. Winter travel across frozen lakes and rivers required knowledge of ice thickness and safe routes. Inuit hunters used harpoons and dogsleds to navigate shifting sea ice, while in the subarctic, snowshoes and toboggans facilitated movement through deep snow. In the summer, canoes were essential for river travel and coastal journeys. Signals such as smoke, fire, and drumming conveyed messages across distances, coordinating movements and warning of danger. These networks were not just practical; they were social, binding communities together in shared awareness of environmental

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conditions.

Archaeological and ethnographic records reveal that risk was spread deliberately. Villages were spaced to avoid overexploitation of local resources; families maintained rights to multiple garden plots; and kin networks spanned different ecological zones. If one valley suffered drought, relatives in another valley could offer support. This distribution was not accidental; it was a strategy to avoid catastrophic failure. Colonial administrators often viewed these dispersed settlements as disorganized, missing the logic that mobility and redundancy were forms of resilience rather than signs of underdevelopment.

Seasonal ceremonies also encoded ecological knowledge. The timing of dances, feasts, and rituals often aligned with key transitions—first salmon, first corn, first snow. These events reinforced communal awareness of environmental conditions and fostered cooperation. In some regions, ceremonies included redistribution of stored food, ensuring that those with fewer reserves could weather lean periods. The social and ecological calendars were intertwined, making resilience a cultural practice as much as an economic one. When colonial authorities banned or altered these ceremonies, they inadvertently undermined local capacity to manage risk.

The introduction of horses in the eighteenth century transformed seasonal strategies on the Great Plains. Increased mobility allowed for more efficient bison hunting and broader networks of trade and alliance. However, it also intensified pressure on bison herds and altered land use patterns. Some communities expanded their seasonal ranges, while others became more sedentary near river valleys. These changes had mixed effects on resilience: greater access to resources in good years, but greater dependence on a single species and more vulnerability if that system faltered. The ecological and social shifts would echo through the next century.

Even the timing of storms and droughts shaped cultural landscapes. Oral histories from the Gulf Coast describe long cycles of hurricane activity, remembered and retold as cautionary tales. On the Great Plains, stories of the “long dry” guided decisions about where to dig wells and how deep to plant. In the Pacific Northwest, narratives of great floods served as reminders to build above the floodline and to respect the power of rivers. These memories were not merely literary; they were practical tools that informed settlement and preparation. Ignoring them often proved costly.

The resilience of Indigenous systems lay not in perfect prediction but in flexible response. Communities expected variability and planned for it. They diversified their economies, managed resources collectively, and maintained social networks that could be mobilized when conditions changed. Their strategies were grounded in intimate knowledge of place—knowledge that took generations to accumulate. When new settlers arrived, they often brought different assumptions about stability and control, setting the stage for future conflicts over land, water, and the right to adapt.

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These early lessons in climate contingency remain relevant. Modern infrastructure and economies are complex, but the core principles of flexibility, redundancy, and shared knowledge still apply. Indigenous histories show that resilience is not a static property but an ongoing process of learning and adjustment. They remind us that the land itself is a teacher, and that paying attention to its signals—seasonal pulses, animal behaviors, plant cues—can reduce vulnerability. In an era of accelerating climate change, the landscapes of risk are still shaped by how we read the weather and organize ourselves in response.

In the centuries that followed, the seasonal strategies developed by Indigenous peoples would collide with new settlement patterns and economic ambitions. The Little Ice Age would test colonial assumptions about predictability, pushing Europeans and Indigenous nations alike to adapt to colder, more variable conditions. Yet the foundations laid in these early periods—the value of mobility, the wisdom of diversified economies, and the importance of social networks—would continue to echo through North American history, informing the ways communities weathered the storms to come.

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