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Module 9
Environmental Changes and Challenges in the Circumpolar World

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Key Terms and Concepts

- northern ecosystems
- environmental sustainability
- Arctic whaling industry
- mining as a disruptive activity
- militarization of the North
- global warming

Learning Objectives

Upon completion of this module students will be able to:

1. Understand the nature and extent of environmental change in the Circumpolar North
2. Know the historical and contemporary threats to the environmental integrity of the region
3. Outline the difference between indigenous and industrial concepts of resource use and the relationship with the environment
4. Know the role and impact of military activity on the Northern ecology
5. Understand the impact of global or extra-regional pollution on the North
6. Outline the nature of human-ecological interaction in the Circumpolar North

Module Readings

Read the Overview and Lecture for Module 9, then read the assigned reading from the *Reading File* given below.

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Reading 26: Gail Osherenko and Oran R. Young, "Arctic Ecosystems: Environmental Interests"

Reading 27: William O. Pruitt Jr. "The Northern Environmental Imperative"

Overview

This module will introduce you the nature and extent of environmental change in the Circumpolar North. It highlights the historical and contemporary threats to the environmental integrity of the region. The first part discusses the vulnerability of the Northern ecosystem and the relationship of Indigenous peoples with environmental sustainability. The second part outlines the history of the relationship between capitalism and Euro-American demand for Northern resources. Following this, the module notes the emergence of contemporary critiques of Northern resource developments and highlights contemporary issues and challenges.

Lecture

In his insightful book on human-environment interactions, Bill McKibben describes our contemporary world as having experienced *The End of Nature.* His argument is simple: unlike generations past, when one could find vast expanses of the globe that did not provide examples of human intrusions, the hand of humanity now weighs noticeably on the entire earth. He uses a variety of illustrations from northern regions to make his point. Airborne pollution, improperly stored chemicals from earlier development projects, Arctic haze, and global warming are but a few examples of how human activity, often in far distant locations, can been seen everywhere on earth.

The message is particularly relevant for the Circumpolar World, for this region has long been among the most inaccessible on earth, protected by distance, climate, and sheer size from major environmental changes introduced by humans. The original inhabitants, the Inuit, Saami, and others, lived closely with the ecosystem and did not seek to make major changes. The North's environment had its own challenges, to be sure, including the length of the winters; extreme cold; short, intense summers; the effects of ocean ice, snow and wind; and the tight interconnections between flora and fauna. But the indigenous populations made few marks of their passing and lived softly on the tundra, in the sub-Arctic forests, and along the often ice-locked shorelines.

Over the past 200 years, that has changed dramatically. The expansion of European populations into Circumpolar regions have brought significant alterations of the natural environment. Some have been short, dramatic, and ecologically catastrophic. Others have been subtle, slow, and no less

important. The pace has accelerated in recent years, highlighted by intense concern about the present and future impacts of global warming on northern landscapes.

Marks on the Land: Vulnerability of Northern Ecosystems

Circumpolar regions suffer from one central and inescapable reality. They are ecologically vulnerable regions, lacking the adaptive capacity of more southern regions. In tropical, sub-tropical and temperate zones, areas which have also experienced dramatic human-induced environmental changes, many ecological changes have been overcome by the ability of the plant and animal world to respond to changes and to regenerate old growth or infill with new populations following an ecological set-back. While the harshness and bleakness of the Circumpolar World is often exaggerated—the region is not as environmentally poor and vacant as southern myth has long suggested—the capacity of the land, its plant covering, and its animal and fish populations to regenerate themselves following a significant environmental change is quite limited. As a consequence, ecological disruptions sit heavily on the Northern landscape. Relatively minor intrusions—a house foundation, a trench dug on the permafrost, over-fishing in an isolated stream, a chemical spill near a creek—often lay heavily on the land for decades after the event. Human beings, much less so the Indigenous peoples than latter day developers, have consequently left major marks on the land. These signs of human activity provide an excellent indication of the ebb and flow of human history—miners' cabins and mining works, military activity, explorers' cairns, and the like—but they are also reminders of the comparative vulnerability of the northern ecology.

Only in the recent past have governments, companies, military agencies, and others paid more than passing attention to the long-term effects of these intrusions. Short-term northern developers were generally unconcerned about the downstream implications of their actions. Southerners, particularly in North America, came into the region to make money or fame; they had no intention of staying. The ecology bears the marks of their impermanence and the lack of interest in, and knowledge of, the widespread environmental effects of human activities. The Circumpolar World now faces a formidable task in responding to the ecological impact of earlier developments, be it military installations in the Canadian North, the residue of mining activities in Alaska, nuclear plants and disposal sites in northwestern Russia, untreated human waste in Siberia, hydro-electric projects in Scandinavia, and thousands of other smaller but still noticeable alterations to the sub-Arctic and Arctic ecosystem.

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Walking Gently: Indigenous Peoples and Environmental Sustainability

In sharp contrast to the significant environmental changes that will be considered later, Indigenous peoples occupied Circumpolar spaces for generations without causing major ecological disruptions. As recent scholarship in other parts of the world has shown, it is incorrect to assume that Aboriginal populations had no impact on their natural environments. Harvesting, small-scale alterations of water flows, human-set forest fires, and other activities did change the non-human environment in ways both subtle and dramatic. For the most part, however, Indigenous peoples lived gently with the land and natural world. They did not hunt northern game to extinction, because they needed the sources of food, clothing, and other needs to be available year after year. Aboriginal cultures in many parts of the North did produce small surpluses, harvesting what they had access to in abundance and trading those supplies with distant peoples who had access to other resources. But the small size of the markets, difficulties transporting goods over vast distances, and a limited interest in accumulation of material possessions (which they would have had difficulty transporting in any case) reduced the level of surplus-driven harvesting. Their societies rested on a very clear understanding of the relationship between human activity, the animal world, climate, and landscape.

Environmental sustainability was central to survival, and the migration patterns, harvesting activities, and social-cultural systems of Indigenous people adapted to ensure, as much as possible, that they did little damage to their surroundings. Like all human societies, northern Indigenous peoples made mistakes. They might over-hunt a particular area, or fail to anticipate a shift in the migration patterns of key animal herds. Small mistakes—an improperly tended fire—could and did have very serious ramifications. But to a very substantial degree, Indigenous peoples in the sub-Arctic and Arctic managed to respect the recuperative limits of their environment, if only because they paid so dearly (in personal hardship, death, and social distress) from their mistakes.

Capitalism, European Demands, and Northern Resources

The delicate balance between humanity and nature did not survive the arrival of southern Europeans. Outsiders were drawn to the North from the very beginning by the search for opportunity. The first explorers came looking for routes through or around the vast northern districts, hoping to uncover profitable shipping lanes to the rich lands of the far east. Very quickly, expectations that the vast, seemingly frozen lands held enormous quantities of resource wealth motivated others to try their hand at northern exploration. Martin Frobisher embodied this attitude, coming first to Baffin Island in search of a passage to the Orient, and then returning in speculative

ventures in which he hoped to collect the rich mineral deposits that he believed were there.

Europe, a materially wealthy and acquisitive region, sought to identify and exploit resource wealth of the region, even in the days of early capitalist development. Capitalism and mercantilism, which viewed economic development as proceeding in the best interests of the colonial powers, drove companies and individuals to see the Circumpolar World as a resource hinterland, available to the first to identify opportunities. This resulted in an eager but ecologically intrusive expansion into the region.

Some of the activities melded with indigenous uses of the land and resources, and had a comparatively small impact on the environment. Meat hunting or collection in northern regions, for example, put added pressure on available stocks of wild game and, in some areas, caused hardships for local indigenous populations. The localized destruction of game (often associated with other development activities) did not always mean a permanent change; when the outsiders left, the passage of time could and usually did allow the animal populations to rebound. The emergence of the fur trade as a significant global economic force introduced different imperatives. In this instance, the Europeans generally relied on Indigenous people to collect and transport the furs to trading posts where they were collected and shipped to European markets. Indigenous peoples responded creatively to this new economic opportunity, for they sought access to the tools and other material artefacts of Europe. While there were some examples of commercially-induced over-hunting, particularly during periods of intense competition between non-indigenous fur trading companies, the fur trade offered an ecologically sustainable option for Aboriginal people to participate in the market economy. The fur trade, in particular, did alter indigenous relations with the animal world, for it required the harvesting of surplus pelts for sale to foreign traders. The commercialization of animals and animal products had, over time, the effect of increasing resource use, although rarely to the point where animal populations were hunted to extinction (a point that Indigenous people's organizations have made repeatedly to animal-rights and anti-fur trade organizations).

Harvesting activities conducted by non-Indigenous peoples and companies, in contrast, proved far more disruptive. The Arctic whaling industry is an excellent case in point. Through the eighteenth and early nineteenth centuries, limited demand for whales and whale products, and the nature of ocean whaling, largely restricted activity to more southerly, accessible districts. Beginning in the early nineteenth century, however, improvements in ships and hunting hardware, and a rapidly accelerating demand for whale products (particularly oil and baleen, used in buggy whips, corsets, and other applications), resulted in the decimation of easily reachable whales. Pushed by high prices, whaling companies expanded their activities into Arctic regions. The aggressive activities of the whalers quickly depleted resources, forcing the commercial harvesters to push even further North. In the eastern Arctic, the large herds between Baffin Island and Greenland and in Hudson Bay were over hunted, almost to the point of extinction.

Aggressive hunting on the west coast of North America forced the whalers to expand north through Bering Strait and across the top of the continent to the Beaufort Sea and Mackenzie River delta. The dramatic harvesting activity associated with Herschel Island caused enormous disruptions in the Arctic whale populations, with total devastation prevented only by a sharp decline in prices and demand (associated with the development of the petroleum industry, in particular).

At much the same time as the northwest expansion of whaling, miners also began to explore the sub-Arctic and the southern fringes of the Arctic. Difficulties with mining technology, supplying and shipping requirements, and limited knowledge of northern conditions generally, limited mining activity to the sub-Arctic regions until after the Second World War. The miners headed North, believing correctly that the vast northern landscape hid hundreds of major mineral deposits. Their intrusions proved critical in altering the human-ecology equation in the region. The miners came to "strike it rich," to use a gold-miner's phrase. Few intended to stay, and only a handful passed more than a few years in the region. They were driven by the prospect of personal wealth, and by the realization that southern markets would support their explorations and celebrate their discoveries.

Mining, particularly before the onset of greater environmental sensitivities in the post-1960 era, is a disruptive activity. Much of the devastation is localized around the mining sites. Hard rock mines—and most of the early operations were small mines of this variety—involve digging deep underground in search of minerals. The immediate surroundings were transformed. Tree cover was generally cut down to provide timber for the mining operations. Earth and rock removed from mine shafts were dumped with little regard for the impact on the landscape, particularly creeks and rivers. Certain mining practices introduced toxic chemicals into the mix, and these chemicals often poisoned fish populations and plant life around the mine sites. Similarly, the activities of the miners themselves had a broader ecological impact through over-hunting and over-fishing, forest fires, cutting local timber, and otherwise transforming the immediate environment. There were related, broad changes, including the construction of mining roads, railways, townsites, and other infrastructure to support the core mining activities, and these developments extended the environmental disruptions beyond the immediate area.

Other mining activities had a broader impact. Placer gold mining, for example, resulted in the stripping of the top soil and the scouring of the gold-bearing strata. Hydraulic measures, including dredges, removed vast quantities of potentially valuable ground and processed it through sluices or other devices. The result was the transformation of creek bottoms and hillsides into virtual moonscapes. Water courses were diverted to meet the miners' needs, disrupting fish populations and despoiling creeks and rivers for dozens of miles downstream. The dredge tailings, stripped of gold, nutrients and soil, resulted in miles and miles of sterile, rock-covered landscape, which are still in evidence several generations after the initial activity.

Placer mining, which started off as individual enterprise, and in most gold fields soon changed into a corporate activity, attracted hundreds and thousands of "get rich quick" prospectors to mining camps around the Circumpolar World. Some gold rushes, particularly the stampedes to the Klondike in northern Canada and several smaller rushes in Alaska, drew world-wide attention and sparked major development booms. The vast majority petered out soon after the initial discovery. The larger placer activities, however, brought dramatic changes to the environment, ranging from the development of infrastructure to service the miners, the mining operations themselves, and intense competition with local Indigenous peoples for the fish and meat supplies available in the district.

The Second World War and Post-War Developments

The pace and intensity of environmental change in the Circumpolar North changed dramatically during and after the Second World War. During the war, the Allied governments expanded operations in northern Canada, Alaska, and Siberia and the northwest of the USSR. The Axis invasion of Norway brought increased activity to northern Norway. The imperatives of war meant that little attention was paid to considerations of environmental impact or long-term viability. Hastily built projects soon emerged across the region, such as airfields in remote locations, a major pipeline from the Mackenzie Valley to Whitehorse, Yukon, a 1500 mile road to Alaska, and dozens of military installations. In many instances, oil spills, disruptions of rivers and streams, forest fires sparked by construction activity, over hunting by soldiers and workers, and other ecological changes accompanied the war-time projects. Many of the activities left permanent marks on the landscape, reminders of the frailty of the region's ecosystems and the haste associated with war-time defence.

New imperatives emerged after the war. A consumer and military-driven boom, heightened by the political uncertainties of the Cold War, launched a search for new resources, particularly base minerals and energy sources. The rising standard of living in North America and Europe convinced developers and governments to expand northern infrastructure and tap into northern resource wealth. In the USSR, the government launched a major settlement and development program in Siberia and the Soviet Far North, expanding existing resource extraction activities, adding to the already formidable Soviet detention camps, and building substantial cities and military encampments in the sub-Arctic and Arctic regions.

This activity brought major changes to the Circumpolar North. Mines opened up, many of them spawning company towns. Roads, railways, airfields, and other support services expanded across the region. Major hydro-electric developments were undertaken (although several of the most dramatic proposals never made it past the drawing board). The North was viewed, almost universally, as a new development zone. Little if any

thought was given—for environmental sensibilities were poorly developed—to the downstream and long-term implications of these projects. Local residents often protested. Many of the northern Aboriginal organizations initially emerged as a result of opposition to major development schemes (including an American plan to use a nuclear bomb to create a harbour along Bering Strait). Thousands of newcomers flooded into northern settlements. While few stayed for more than a few years, they collectively added significantly to the pressure on the landscape and on northern resources.

It is difficult, even from the perspective of 40 to 50 years later, to fully appreciate the scale and impact of this development activity. Roads were blasted through mountain ranges. Hydro projects flooded rivers in isolated northern regions. Huge and largely untouched stands of forests came under the loggers' saws. New mines open up by the dozen, several of them large scale operations attracting thousands of workers. The USSR, in particular, experienced a massive population growth in its northern regions, with the growing cities and towns adding to the pressure on the carrying capacity of the land. Within a quarter of a century, much of the sub-Arctic and major portions of the Arctic had been surveyed, explored, investigated and, where promising results were uncovered, developed. To this has to be added the still little-known effects of full-scale militarization on the North. Across the Circumpolar regions, governments constructed dozens of radar stations, military bases, and special equipment and storage centres. Many of these hastily constructed and poorly adapted complexes would, over the coming years, add dramatically to the stock of polluting sites in the region.

Portions of the northern ecosystem had been transformed, in some regions quite dramatically, although the sheer bulk of the North gave the impression that change had been minimal. Rivers had been dammed, creating vast man-made lakes (several large enough to alter the regional climate). Vast swaths of forest had been exploited, and sawmills and pulp mills dotted the sub-Arctic. Incinerators and largely unregulated pulp mills discharged large quantities of pollutants into the air and water systems. Mines, likewise, spread pollutants, in some areas leaving dramatic scars on the landscape. Military sites, including those associated with continental defence, often stocked large quantities of chemicals. In many locations, these toxic substances leeched into the ecosystem, disrupting flora and fauna. Much of the ecological change was localized and, because of the distances involved, largely invisible to southern eyes. In Siberia, for example, the extensive mining and industrial disruptions of the region remained largely hidden behind a veil of Soviet secrecy and travel restrictions.

The USSR, evidence later revealed, had experienced profound ecological changes in this period. The joint imperatives of military security and resource development convinced the government to move with dispatch to open up the vast, resource-rich region. With few checks and no significant external scrutiny, Soviet development agendas left a harsh and disruptive legacy in the region. Major industrial plants introduced toxins and other chemicals into the ecosystem. Military waste dumps and installations, a

significant number involving nuclear materials and waste, damaged substantial sections of the North. Few other regions in the world experienced such dramatic change in the post-war period; Soviet developments left a legacy that would last for decades, if not longer.

Emergence of Critiques of Northern Resource Developments

The ecological transformations did not pass unnoticed. Local populations, especially Indigenous peoples who continued to rely on harvesting activities, were disrupted by resource, military, and other developments. Declining animal and fish populations, chemical spills, industrial waste, and other environmental changes had a significant impact on harvesting activities. Non-indigenous peoples, likewise, lived with the consequences of industrial and military pollution and began to protest the repeated intrusions into their lives. They were joined in their protests in the 1960s by the rising international environmental movement. Protest groups, like Greenpeace, the Sierra Club, Friends of the Earth, and others, introduced a new environment sensibility into the debate about Northern development, industrialization, and militarization. The alliances proved uneasy—Aboriginal groups, in particular, broke with Greenpeace over the latter's attacks on the fur trade—but they introduced an expanded set of arguments.

Environmental sensitivities joined with the growing interest of tourists in "unspoiled wilderness" to produce an international groundswell of concern about the pace of environmental degradation in the region. The emergence of the protesters ensured, initially only in the West, that governments and developers paid greater attention to environmental considerations. New and stricter regulations provided a higher measure of protection against industrial and other ecological disruptions. In Western countries, environmental concerns convinced governments to undertake clean-up efforts. The Distant Early Warning Line across the Canadian and American Norths, for example, left a disruptive legacy in the region; in the 1990s, the government launched an expensive program of removal and restitution of the landscape. These initiatives represented only a small step toward reclaiming damaged and transformed locales, but pleased environmentalists and local residents, who were worried about the continued presence of pollutants in their territories.

The State of the Arctic and Sub-Arctic

To outside observers, the Circumpolar North is largely untouched by human hands and remains one of the world's most pristine environments. There are signs of global pollution, as seen in the prevalence of Arctic haze (which produce intriguing sunsets and which provide a blunt reminder of the widespread impact of industrialization). Wilderness travellers celebrate the thousands of undeveloped lakes and endless stretches of rivers that remain

largely unchanged. Water and air, for the most part, do not carry the pollutants that have become a regular part of industrial life. The white cloak of sub-Arctic and Arctic winters gives the region a near-virginal presence, reducing human occupation to a minor influence in a vast, powerful, and seemingly unchanged land.

The ecological changes, however, have been substantial. In many areas, animal, fish, and sea mammal populations have been greatly reduced, if not destroyed, by the intrusions of non-Aboriginal hunters. Invisible pollutants, in the form of military chemicals and region-wide industrial pollutants, have entered the food chain. The nature of northern plants is such that pollutants are concentrated in lichens and other small plants, which are crucial elements in the food supply for northern animals. The discovery of significant quantities of toxic chemicals in the breast milk of Inuit women in Northern Canada, and the even greater incidence of industrial-related illness in Siberia, are but two examples of the lingering and potentially dangerous effects of northern pollution. Equally important, if relatively little known, is the influence of extra-regional pollution. Industrial plants in China, Japan, Western Europe, and other regions discharge huge quantities of air pollution into the atmosphere. Significant quantities of these air-borne materials end up in the Northern regions, where they settle into the ecosystem.

There are many areas in the world which show the marks of ecological change more dramatically than the Circumpolar North (although there are few regions that match the devastation in certain areas of Siberia and the Russian northwest). Given the vulnerability of the sub-Arctic and Arctic ecosystems, however, even relatively small ecological changes can have significant and lingering impacts in this part of the world. In those places where the activity of non-indigenous people has been most intense, such as mining sites, military installations, urban developments, industrial plants (particularly forestry) and hydro-electric projects, there have been significant, regional impacts.

Contemporary Challenges and Dangers

The ecological transformation of the Circumpolar North continues apace. The lingering effects of earlier interventions remain a fact of regional life; that most towns and cities in the region live in close proximity to one or more of these polluted sites means that the region's population is vulnerable to the effects of past ecological disasters. Pressure to develop the region continues apace. Oil and gas exploration and extraction continues, and proposals exist for major pipelines to bring these resources to southern markets. It needs to be noted, however, that such projects will not proceed without significant support from regional Aboriginal populations and under much more stringent guidelines than existed in earlier generations. While such activities increase the possibility of major oil spills and other ecological disasters, like the Exxon Valdez accident off the coast of Alaska, government and industry supervision and early intervention initiatives in the

face of environmental disasters hold the potential to prevent widespread damage. More important, perhaps, than the prospect of a disaster is the increased pressure to develop the minerals, timber, fish, and other resources of the northern regions. While there are fewer examples of major environmental disruptions than in the past, the pollutants and chemical dumps remain a reality of northern ecological life.

There is another potential barrier to environmental rehabilitation. The cost of northern clean-up is extremely high. Distances are substantial, costs are very high, and working conditions are difficult. When balanced again similar, and sometimes more dramatic, ecological challenges in southern areas, it is often difficult to generate government and public enthusiasm for northern clean-up operations. While military refuse dumps and spills have attracted considerable attention in Western nations, initiatives in Russia are few and far between. The costs of ecological restoration run into the billions of dollars. Because most of the sites are far removed from southern eyes, and pose little direct threat to southern populations, the public will to address these remote ecological changes is relatively slight.

The greatest environmental threat to the Circumpolar North in our age—albeit one that is surrounded by scientific debate and political confusion—comes from the widespread effects of global warming. Evidence is emerging across the North in the form of higher temperatures; melting permafrost; new insects; potential changes in animal, bird, and fish behaviour; and alterations of flora in the region. Indigenous people report dramatic and meaningful changes in their long-stable environments. The trajectory of global warming is unknown, as are the implications of long-term temperature changes on the sub-Arctic and Arctic regions. Should contemporary conditions extend into the future, however, the prospect exists for major transformations and a significant uprooting of the northern ecology.

Environmental Options

The Circumpolar North does not exist in isolation. Contemporary conditions reflect the legacy of a history of intrusion, industrial and resource development, and, over the past half century, rapid ecological change. Over the past three decades, northerners have become acutely aware of the two major factors in environmental change: local and regional development and wide, global transformations which have a particularly dramatic impact on the vulnerable and fragile ecosystem of the sub-Arctic and Arctic regions. Northern residents are speaking out more frequently, demanding government and corporate attention to existing environmental dangers and endeavouring to draw attention to the regional impact of such influences as global warning, air-borne pollution, and the threat to the North from extra-regional ecological disasters (such as the Chernobyl nuclear accident). Northerners are acutely aware of the fact that they exist in an interconnected global ecosystem, and that they could continue to feel the effects of

industrial, military and other processes taking place far outside the region. Politicians, environmentalists, and Indigenous leaders continue their efforts to draw attention to the vulnerability of the North, and of southern responsibility for the ecological changes that occurred and are occurring in the Circumpolar North. While tourism brochures and southern imagery continues to present the sub-Arctic and Arctic as vast stretches of unbroken wilderness, largely untouched by human intervention, the reality is that the North, like the rest of the globe, has experienced the "end of nature." From Siberia to Greenland to Alaska, the transformative capacity of the contemporary industrial world can, in ways invisible and open, small scale and dramatic, subtle and direct, be seen throughout the region.

Study Questions

1. Why has environmental change and damage in the Circumpolar North expanded since the 1950s?

2. Why is the Circumpolar North particularly vulnerable to environmental disturbances?

3. What impact has the environmental movement had on resource development in the Circumpolar North?

4. Which sectors of the economy and society have had the greatest impact on the environment of the Arctic and sub-Arctic?

5. What are the key differences between Aboriginal and industrial approaches to the environment?

Supplementary Readings/Materials

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