Case Study

The United States Conservation Movement of the nineteenth century evolved into the Environmental Movement of the twentieth century: Could "One Health" be the Movement for the twenty-first century?

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Abstract

A historical case-study which describes the development of environmental protection concepts during the last two-hundred years in the United States, related predominantly to Republican politicians.

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Introduction

The evolution of the conservation and preservation movement into a more comprehensive environmental movement is intertwined with key historical events and influential figures. The One Health movement represents a promising and potentially new phase in our approach to health and environmental challenges.

The Early Conservation and Preservation Movement

In the late 1800s, John Muir was the country's most influential naturalist and conservationist, urging people to write politicians and "make their lives wretched until they do what is right by the woods"(1). In part as a result of his activism, the twentieth century that followed was a period of new thinking and doing:

- President Theodore Roosevelt, a Republican, played a pivotal role in the conservation movement in the United States during his time in office from 1901 to 1909. His contributions included: expanding the national parks system; setting aside millions of acres of land for protection; establishing the U.S. Forest Service in 1905; promoting the management and sustainable use of forested lands; implementing measures to protect wildlife; advocating for the establishment of wildlife refuges, including the first federal bird reservation in 1903; and promoting the idea of conservation as a national policy, emphasizing the need to protect natural habitat (2).

- In the 1960s, Rachel Carson, a marine biologist, transformed the conservation movement into a broader environmental movement largely due to her seminal book, "Silent Spring,". Published in 1962, it brought widespread attention to the dangers of pesticide use, particularly DDT (dichloro-diphenyl-trichloroethane), by presenting compelling evidence that synthetic chemicals were harming wildlife, ecosystems, and, ultimately, human health. Carson's work was revolutionary in linking environmental degradation to public health concerns, raising awareness about the dangers of pesticides. It led to increased environmental advocacy and the establishment of regulatory frameworks aimed at curbing pollution and chemical use (3).

- President Richard Nixon significantly contributed to transforming the conservation movement into a wider environmental movement by signing landmark environmental laws, including the 1969 National Environmental Policy Act (NEPA) and the 1970 Clean Air Act which established the Environmental Protection Agency (EPA);his Administration emphasized controlling pollution, addressing issues such as water quality and hazardous waste, reflecting a shift from conservation to advocating for international cooperation, leading to the first U.S. participation in global environmental agreements (4).

- From 1989 to 1993, another Republican president, George Walker Bush, signed the Clean Air Act Amendments of 1990; expanded federal government authority to regulate air pollution and address acid rain and urban smog; and continued U.S. commitment to the Montreal Protocol, which aimed to reduce ozone-depleting substances. The U.S. played leadership roles in promoting international cooperation on environmental issues, advocating for sustainable development in international fora, and adopting policies

designed to maintain environmental quality while balancing economic growth (5).

In sum, over the last century, some of the most important measures supporting environmental legislation and action were accomplished under Republican leadership.

Connecting Environmental and Public Health

The case of DDT reminds us how environmental issues are often tied to public health. DDT was synthesized in 1874 and in 1939 became a key tool during World War II for controlling vector-borne diseases such as malaria and typhus, affecting both military and civilian populations. After the war, DDT became widely used as an agricultural insecticide and was approved by the Food and Drug Administration in 1945 for public health vector control. Initially heralded as a miraculous pesticide that could combat disease-carrying insects, DDT's harmful effects on wildlife and humans gradually came to light. Studies began to find that it could accumulate in the food chain, with high concentrations in predators like birds. It was linked to reproductive issues, developmental problems, and cancer in humans, raising critical questions about the safety and implications of widespread chemical use. In the United States DDT was banned for most uses, as was the case in many developed countries. The Stockholm Conference on Persistent Organic Pollutants (POP) banned DDT for agricultural uses worldwide in 2001 but allowed continued small applications where needed for malaria coontrol. The backlash against DDT showcased the need to consider human health alongside environmental preservation (6).

As a result, environmental thinking began to embrace public health, advocating for safer alternatives and promoting sustainable practices. This intersection of environmental and public health concerns can be seen in retrospect in laying the groundwork for pursuing a One Health concept.

The One Health Idea

One Health is a collaborative framework that recognizes the interconnectedness of human, animal, plant, and environmental health. It emphasizes that people's health is linked to the health of animals, plants, and our shared environment, promoting an integrated approach to tackling health challenges (7).

The One Health concept is gaining increasing attention because of global health threats, such as zoonotic diseases, antibiotic resistance, and pandemics. Outbreaks like SARS, bird flu, and COVID-19 highlight the intricate relationships between human, animal, and environmental health. As economies and ecosystems face unprecedented changes due to climate change and habitat loss, a One Health approach provides a pathway to possible solutions to mitigate risks, lessen economic impact, and promote resilience across all levels of life.

A recent illustration of a subject receiving increased health-related attention alongside more traditional environmental concerns is that of plastics (8). We are beginning to see the need to research possible links between micro and nano plastics and multiple health challenges, including many noncommunicable diseases and fertility. These particles are found in the animals and plants we humans consume, in the air we breathe, and in the water, we drink - they are simply everywhere. In essence, the micro and nano plastics threat touches all the core elements of the One Health concept.

The Possible Next Emphasis for the Environmental Movement

The adoption of a One Health approach could and should be the next phase in addressing comprehensive health challenges**.** It will require:

Interdisciplinary collaboration across disciplines, uniting professionals in human health, veterinary medicine, environmental science, social sciences, and policymaking.

Emphasizing prevention is key in any One Health approach. Understanding the interconnected pathways of disease transmission and environmental degradation can help develop proactive strategies that can reduce the likelihood of outbreaks.

Engaging the public in One Health initiatives will foster awareness and encourage individuals to recognize their role in creating a healthier environment. Campaigns that highlight the connections between lifestyle choices and environmental health can empower communities to take action.

Policymakers need to integrate One Health principles into existing health and environmental policies, supporting both environmental sustainability and public health.

Continued research into the relationships between human, animal, plant, and environmental health is essential. This includes impacts of climate change, habitat loss, and pollution on health outcomes and developing innovative solutions.

A Huge Challenge, But One Worth Taking On

The evolution in the United States from early conservation and preservation to the modern environmental movement, catalyzed by Rachel Carson's work and the recognition of the dangers posed by DDT, marked a significant shift in how we understand and respond to environmental challenges. Multidisciplinary collaboration, policy, and adequate resource commitments will be challenging.

But we now have new tools such as Artificial Intelligence (AI), and far more sophisticated quantum computing technologies are on the horizon, opening prospects to rapidly expand knowledge, surveillance, and practical application (9). If brought to bear to support such new tools when applied and support a One-Health approach, the benefits will be healthier individuals, communities, and ecosystems for all.

Past Republican Administrations have created a rich legacy of supporting conservation and the environment. The current Administration has an opportunity to follow in their footsteps, but at this point, it does not appear interested.

Perhaps it is worth listening now to John Muir and write politicians, " making their lives wretched until they do what is right by the woods."

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