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# ENVIRONMENTAL PROTECTION DURING ARMED CONFLICT UNDER IHL

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## **Abstract**

Damage “to the environment is a serious but often overlooked result of armed conflict,<sup>1</sup> with major effects on ecosystems, biodiversity, and even human survival. International Humanitarian Law (IHL) offers legal tools to help limit this kind of harm, including the principles of distinction, proportionality, and precautions<sup>2</sup>. This paper looks at the environmental effects of war, the protections available under IHL, and real-world examples that show how warfare can damage the natural world”..

Environmental “damage has become an increasingly important, though still underrecognized, consequence of modern warfare. Although the immediate human suffering caused by war is well known, its lasting ecological effects—such as destroyed habitats, loss of biodiversity, degraded soil, and polluted water—are still not given enough attention in policy or practice. This paper explores how far International Humanitarian Law (IHL) goes in protecting the environment during armed conflict, with particular attention to core principles like distinction, proportionality, necessity, and precautions.”

The “study also points to the growing importance of the “due regard” principle, which calls on parties to a conflict to take environmental impacts into account even when there is scientific uncertainty.”

Using selected case studies —“including the Vietnam War, the Gulf War, the Kosovo conflict<sup>3</sup>, and the ongoing Russia–Ukraine war—this paper shows that environmental destruction remains a repeated and serious outcome of military operations. It also considers how international organizations help track damage and support recovery after conflict.”

In the end, “the paper argues that while IHL provides a valuable basis for protecting the environment, it can only be truly effective if it is implemented more strongly, supported by clearer standards, and better integrated into military decision-making.”

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<sup>1</sup> U.N. Env’t Programme, *Protecting the Environment During Armed Conflict* (2009).

<sup>2</sup> Int’l Comm. of the Red Cross (ICRC), *Customary International Humanitarian Law* (2005).

<sup>3</sup> Michael Bothe et al., *International Law Protecting the Environment During Armed Conflict*, 90 *Int’l Rev. Red Cross* 569 (2008).

**KEYWORDS:** International Humanitarian Law (IHL), Environmental Protection in Armed Conflict, Due Regard Principle, Proportionality and Distinction, Environmental Damage and Warfare.

## Introduction

The ongoing destruction of the environment is a significant and often overlooked outcome of modern warfare. International Humanitarian Law acknowledges these risks<sup>4</sup> and mandates various duties to lessen environmental damage. One such duty is the somewhat vague principle of due regard<sup>5</sup>, which aims to guarantee that military actions are carried out in a way that safeguards the natural world.

The ongoing destruction of the environment is a significant and often overlooked outcome of modern warfare. International Humanitarian Law acknowledges these risks and mandates various duties to lessen environmental damage. One such duty is the somewhat vague principle of due regard, which aims to guarantee that military actions are carried out in a way that safeguards the natural world.

Under International Humanitarian Law (IHL), the natural world is considered a civilian item<sup>6</sup>. This means it shouldn't be attacked unless it's being used for military purposes to the point where it becomes a military target. The principle of showing due regard works hand-in-hand with the rule of distinction<sup>7</sup>, emphasizing that environmental harm should be prevented unless absolutely necessary for military reasons and in line with all other IHL rules. "It also strengthens the requirement for precautions, obliging parties in a conflict to take "all feasible precautions" to prevent or reduce unintended environmental damage during military actions, even when scientific knowledge is uncertain. This signifies a significant change in thinking: commanders can't disregard environmental dangers just because their magnitude or duration is hard to predict precisely. The proportionality rule<sup>8</sup> is also crucial: any environmental damage must be considered as part of expected collateral damage, and attacks that are likely to cause disproportionate environmental harm compared to the expected military gain are forbidden."

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<sup>4</sup> Dieter Fleck, *The Handbook of International Humanitarian Law* (3d ed. 2013).

<sup>5</sup> ICRC, *Guidelines on the Protection of the Natural Environment in Armed Conflict* (2020).

<sup>6</sup> Protocol Additional to the Geneva Conventions of 12 August 1949 (Protocol I), art. 52, June 8, 1977, 1125 U.N.T.S. 3.

<sup>7</sup> ICRC, *Customary IHL Study*, Rule 1 (2005).

<sup>8</sup> Protocol I, supra note 6, art. 51(5)(b).

In addition to the due regard requirement, “Articles 35(3) and 55 of Additional Protocol I<sup>9</sup> to the Geneva Conventions (1977) impose a stricter ban on warfare methods or means expected to inflict "widespread, long-term and severe" damage on the natural environment. It's vital to note that this is an absolute limit; if damage reaches this level, it's banned even if it would normally be permitted under the rules of distinction, precautions, and proportionality. These treaty stipulations are designed to avert devastating, large-scale ecological destruction, which is a much more limited scope than the effects usually covered by the due regard principle. Since Articles 35(3) and 55 only apply when all three conditions are met simultaneously, numerous types of environmentally damaging actions don't meet this high bar. This is precisely why the due regard obligation is so significant; it addresses the many instances of environmental harm that fall short of this severe threshold.”

### **Warfare's Lasting Environmental Impact**

Wars don't just hurt people; “they also do a lot of damage to the environment, and these problems can stick around for future generations. When wars happen, a lot of natural stuff gets ruined, which is bad for animals and messes up how people make a living. Using chemicals in fighting poisons water<sup>10</sup>, affecting both people and animals that need it to survive. On top of that, the air and ground get polluted from chemical weapons and nasty gases, making things even worse. This pollution ruins the soil, making it harder to grow things and causing long-term food problems in the areas that have been hit.”

### **Ways the Environment Suffers During Conflict**

- A. ”Homes Destroyed: When wars happen, the natural homes of animals and plants often get wrecked. This is bad for wildlife and messes up the delicate balance of nature. It's a sad result of fighting that impacts the environment and the people who depend on it.
- B. Climate Change: Burning fuel and using explosives<sup>11</sup> in war releases greenhouse gases that harm the climate.
- C. Animals on the Move: When animals are forced out of their homes, it's tough. They lose their habitat, can't easily find new ones, end up in more clashes with people, and struggle to migrate. This doesn't just put them at risk, but it also causes new problems

<sup>9</sup> Protocol I, supra note 6, arts. 35(3), 55.

<sup>10</sup> UNEP, *Environmental Consequences of War* (2016).

<sup>11</sup> Neta C. Crawford, Pentagon Fuel Use, Climate Change, and the Costs of War, *Brown Univ.* (2019).

like fighting over resources, more human-animal encounters, and changes in how they act.

- D. Dirty Air and Ground: Wars really pollute the air and soil<sup>12</sup>. Using chemical weapons, bombs, and burning stuff sends bad gases and tiny particles into the air. This not only pollutes the air but can also make people living in war zones sick for a long time.
- E. Water Gets Fouled Up: One of the worst environmental problems in war is messing up water supplies<sup>13</sup>. When water systems like dams and treatment plants are destroyed, clean water becomes hard to find. Plus, war can spill toxic chemicals and other dangerous stuff into rivers, lakes, and underground water, making it unsafe for people and animals who need it to live.
- F. Land Gets Ruined and Turns to Desert: Big guns, landmines, and other military gear can really damage the land.”

## **Environmental Damage Before Conflict Begins: The Impact of War Preparations**

- A. “Resource Extraction and Manufacturing<sup>14</sup>: - To prepare for war, nations require vast amounts of raw materials such as metals, oil, and other resources needed to build weapons, vehicles, ammunition, and other military infrastructure. This leads to large-scale mining operations, which can result in habitat destruction, soil degradation, and water pollution.
- B. Increased Carbon Footprint: The carbon footprint rises dramatically as armed troops conduct drills, construct infrastructure, and deploy supplies. Higher greenhouse gas emissions are caused by the manufacture of weapons and military hardware, the movement of people and products, and the usage of different military vehicles.
- C. Energy Consumption and Fossil Fuel Use<sup>15</sup>: - Another significant environmental issue is the military's reliance on fossil fuels. A substantial quantity of energy is needed to power tanks, aircraft, ships, and other military vehicles. High fuel consumption as a result of this energy demand contributes to air pollution and climate change.”

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<sup>12</sup> ICRC, *Environment and Armed Conflict* (2020).

<sup>13</sup> UNEP, *Water and Conflict* (2012).

<sup>14</sup> UNEP, *Resource Efficiency and War* (2010).

<sup>15</sup> Crawford, *supra* note 11.



## **Unseen Victims: Challenges in Recognizing Environmental Damage from Armed Conflict**

- A. “Destruction of Monitoring Infrastructure: - During armed conflicts, critical environmental monitoring systems<sup>16</sup> and infrastructure, such as weather stations, research facilities, and water quality monitoring equipment, are often damaged or destroyed. Without these tools, it becomes difficult to gather accurate data on pollution levels, biodiversity loss, or the extent of habitat destruction.”
- B. Limited Access to Affected Areas<sup>17</sup>: - Many conflict zones are difficult or impossible to access due to the presence of active fighting, landmines, or the danger of unexploded ordnance. These hazards make it physically dangerous for environmental experts, researchers, and organizations to enter and assess affected areas.
- C. Complexity of Environmental Damage: - The environmental consequences of war are often multifaceted and difficult to track. They can include chemical contamination, destruction of ecosystems, pollution of air and water, disruption of wildlife, and long-term soil degradation.
- D. Long-Term Effects and Delayed Consequences: - The environmental consequences of armed conflicts may not be immediately evident. For instance, chemical pollutants, radioactive materials, or destroyed ecosystems can have long-term effects on both the environment and human health
- E. Environmental Degradation and Human Suffering: Because communities may be uprooted or displaced during armed conflict, environmental damage is frequently linked to human suffering. face grave health risks as a result of pollution, tainted water, or damaged infrastructure. This makes evaluating environmental harm more difficult because it needs to take social instability and human rights abuses into account.

## **The Role of International Humanitarian Law in Safeguarding the Environment**

- A. How fundamental principles affect environmental protection:
  - a. The principle of distinction requires<sup>18</sup> parties in a conflict to tell the difference between military targets and civilian objects. This also covers the natural

<sup>16</sup> UNEP, *Post-Conflict Environmental Assessment* (2008).

<sup>17</sup> ICRC, *Challenges in Conflict Zones* (2019).

<sup>18</sup> Protocol I, *supra* note 6, art. 48.

environment, which cannot be deliberately attacked unless it qualifies as a direct military objective.

- b. The principle of proportionality requires that environmental damage must not be excessive compared with the military advantage expected. Its purpose is to avoid undue harm to the environment in pursuit of military goals.
- c. The principle of necessity means that military action must be genuinely required to achieve a legitimate military objective, which helps prevent needless destruction, including damage to the environment.

IHL also protects natural resources, as discussed below.

B. Protection of natural resources<sup>19</sup> under IHL:

IHL protects civilian objects, and this protection can also apply to natural resources such as forests, water sources, and farmland. Although IHL does not deal with environmental protection in a fully explicit way, the Geneva Conventions and their Additional Protocols forbid the destruction of civilian property unless it is absolutely required for military purposes. This can extend to the protection of natural resources during armed conflict, making sure they are not destroyed unless such destruction is strictly necessary for military operations.

For instance, Additional Protocol I of 1977 specifically bans methods of warfare that cause “widespread, long-term and severe damage” to the natural environment. This rule is intended to protect vital natural resources from unnecessary harm during conflict and highlights the importance of preserving the environment in times of war.

There are also some specific provisions that deal with environmental protection and natural resources.

C. “Specific provisions addressing environmental protection:

Certain rules within IHL directly deal with protecting the environment during armed conflict. These include the following:

- a. For instance, Article 35(3) of Additional Protocol I bans methods or means of warfare that are likely to cause widespread, long-term, and severe harm to the natural environment. This plays an important role in limiting environmental damage during armed conflict.

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<sup>19</sup> Hague Convention (IV) Respecting the Laws and Customs of War on Land, Oct. 18, 1907.

- b. Article 55 of the same protocol also protects works and installations that contain dangerous forces, such as dams, nuclear power plants, and oil refineries, from attack because their destruction could lead to catastrophic environmental harm. It also states that “care shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage.” Together, these rules created the “triple standard” threshold, meaning that environmental harm must be widespread, long-term, and severe to count as a violation, a standard that has often been difficult to apply in practice.”
- c. ENMOD Convention<sup>20</sup>: The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (1976) was adopted in direct response to environmental warfare methods used during the Vietnam War. ENMOD forbids the hostile use of environmental modification techniques that have “widespread, long-lasting or severe effects.”

### **Examining the Impact and Accountability of Global Organizations and Non-Governmental Groups**

International organisations such as the United Nations (UN), the International Committee of the Red Cross (ICRC), and non-governmental organisations (NGOs) play a vital part in tracking environmental damage and promoting environmental protection during armed conflict. For instance, the United Nations Environment Programme<sup>21</sup> (UNEP) has carried out environmental assessments in post-conflict areas and supported the restoration of damaged ecosystems.

NGOs also operate on the ground to record environmental violations, help with post-conflict environmental recovery, and push for stronger enforcement of international humanitarian law (IHL) to reduce environmental harm. These organisations are essential for drawing attention to the environmental impact of war and encouraging stronger and more complete legal protections.

In 2020, the ICRC issued guidelines<sup>22</sup> that revised its earlier 1994 version. These guidelines

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<sup>20</sup> Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, Dec. 10, 1976, 1108 U.N.T.S. 151.

<sup>21</sup> UNEP, *Post-Conflict Environmental Recovery* (2019).

<sup>22</sup> ICRC, *Guidelines on the Protection of the Natural Environment* (2020).

include the following:

- a. Methods and means of warfare must be used with proper regard for the protection and preservation of the natural environment.
- b. Warfare tactics that intentionally cause, or are expected to cause, environmental damage are strictly prohibited.
- c. Any deliberate use of environmental destruction as a weapon, including military changes to climate or terrain that result in widespread, long-lasting, or severe effects, is prohibited under the ENMOD Convention and customary IHL.
- d. The natural environment must not be treated as a target of attack.
- e. The guidelines also suggest identifying and designating demilitarised zones in environmentally important or fragile areas to protect them from conflict.

### **The Environment's Journey from Ruin to Recovery Following the Aftermath of War**

Besides helping prevent environmental damage during war, IHL also contributes to repairing and restoring the environment once the fighting is over.

Article 55 of Additional Protocol I requires occupying powers to safeguard and conserve the natural resources in the territories under their control. This duty includes making sure those resources are managed in ways that aid the region's recovery and allow displaced people to return home safely.

International aid organizations often have an important role in environmental recovery after conflict, helping restore ecosystems, rebuild infrastructure, and deal with the environmental harm caused by war.

### **Practical Examples of Environmental Harm and Their Lessons: Moving from Concept to Experience**

#### 1. Vietnam War (1955–1975)

The Vietnam War is one of the clearest and most well-documented examples of the deliberate use of environmental modification for military objectives. "Operation Ranch Hand, carried out between 1962 and 1971, involved the aerial spraying of about 20 million gallons of herbicides, including the notorious Agent Orange<sup>23</sup>, across

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<sup>23</sup> Jeanne M. Stellman et al., Agent Orange Exposure, 422 *Nature* 681 (2003).

Vietnamese forests and farmland. This campaign stripped away vegetation from around 20% of South Vietnam's forests and 36% of its mangrove regions.

The environmental impacts included the destruction of 14% of South Vietnam's forest cover, the near collapse of coastal mangrove ecosystems, soil erosion and loss of nutrients, the buildup of dioxin in the food chain, and long-lasting disruption to ecological succession. The scale of the environmental destruction in Vietnam eventually helped drive the creation of the ENMOD Convention, which bans the hostile use of environmental modification techniques.”

## 2. Gulf War (1990-1991)

During the 1991 Gulf War, “Iraqi forces intentionally spilled about 4 to 8 million barrels of crude oil into the Persian Gulf and ignited more than 600 oil wells in Kuwait<sup>24</sup>. These fires burned for almost nine months, releasing roughly 500 million tons of carbon dioxide and creating smoke clouds that rose up to 10,000 feet, while raising local temperatures by as much as 10 degrees Celsius. About 3.5 million tons of crude oil also spread into the desert, causing devastating harm to coastal habitats and wildlife.

The environmental consequences included severe air pollution across the region, oil lakes covering around 5% of Kuwait's land area, contamination of groundwater aquifers, destruction of desert ecosystems, and damage to marine ecosystems that affected fisheries. This war exposed weaknesses in international humanitarian law on environmental protection, since the legal standards in place were not sufficient to deal with this kind of intentional environmental destruction.”

## 3. Kosovo Conflict (1998-1999)

During the Kosovo conflict, NATO airstrikes on industrial sites in Serbia caused major environmental pollution. The bombing of the Pančevo industrial complex<sup>25</sup> released thousands of tons of toxic substances into the air, soil, and the Danube River. These pollutants included mercury, ammonia, vinyl chloride, dioxins, petroleum products, and polychlorinated biphenyls (PCBs), many of which are long-lasting and cancer-causing. Armour-piercing shells used in the conflict also contained depleted uranium, adding heavy metals to the environment.

This led to serious concerns about soil and water pollution as well as risks to human

<sup>24</sup> U.N. Compensation Comm'n, *Environmental Damage Report* (2005).

<sup>25</sup> UNEP, *Kosovo Conflict Environmental Assessment* (2001).

health.

The main environmental effects included the release of 2,100 tons of ethylene dichloride and 460 tons of vinyl chloride monomer, mercury pollution in the Danube River, higher levels of carcinogens in nearby communities, and the destruction of biodiversity in affected waterways. The United Nations Environment Programme (UNEP) carried out environmental assessments in Kosovo after the conflict, setting an important example for monitoring environmental damage in war-affected areas.

#### 4. Russia-Ukraine War (2022-present)

The “Russia-Ukraine war has caused extensive, serious, and potentially long-term environmental harm, often referred to as ecocide<sup>26</sup>. Explosions have released toxic materials like lead, mercury, depleted uranium, and other chemical substances that contaminate the air, water, and soil. Damage to industrial sites during the fighting has resulted in chemical spills and pollution that affect not only Ukraine but also nearby countries. More than 12,000 square kilometres of natural reserves have been destroyed, damaging rare species and fragile ecosystems.

The war has also increased the risk of nuclear accidents, sharply raised greenhouse gas emissions, and left some soils polluted and unsuitable for farming. The destruction of the Kakhovka Dam caused severe chemical contamination that devastated ecosystems along the Dnipro River and the Black Sea, with major effects on marine life. Mining, agricultural pollution, chemical leaks, and fires have further worsened this environmental disaster. Recovery is expected to take at least 15 years after the war ends, with long-term consequences for both human health and biodiversity.”

## Conclusion

The “principle of due regard signifies<sup>27</sup> a subtle yet significant change in International Humanitarian Law (IHL), asserting that environmental protection is not an optional or extraordinary consideration but a fundamental component of lawful warfare. It necessitates careful attention to environmental impacts, even when faced with uncertainty. However, without consistent legal precedent, its practical effect hinges on whether states and other belligerents integrate this norm into their military strategies, rules of engagement, training

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<sup>26</sup> UNEP, *Ukraine Environmental Impact Report* (2023).

<sup>27</sup> ICRC, *supra* note 22.

programs, targeting decisions, and overall decision-making processes that acknowledge ecological repercussions. Enhancing due regard in this manner is vital not only for preserving natural environments but also for securing the well-being, health, and long-term viability of communities affected by armed conflict.

A relevant opportunity to advance this objective is the current revision of the San Remo Manual, which outlines due regard duties concerning the marine environment. This revision presents a crucial chance to maintain and, if feasible, reinforce the obligations related to due regard and environmental protection. The aim is to ensure that any updated version includes effective measures for damage mitigation and reflects the ongoing development of IHL's environmental provisions.

Protecting the natural environment during armed conflict has become an important but still insufficiently developed area of International Humanitarian Law (IHL). As this paper has shown, modern warfare does not harm only civilians and infrastructure; it also leads to extensive, lasting, and sometimes irreversible damage to the environment. From the defoliation efforts in the Vietnam War to the oil well fires of the Gulf War and the industrial contamination seen in Kosovo and Ukraine, the natural environment has repeatedly suffered as a largely overlooked victim of war.

IHL offers a valuable legal basis for responding to this kind of harm. Fundamental principles like distinction, proportionality, and military necessity place constraints on how hostilities are carried out and, in doing so, also help protect the environment. In addition, treaty rules such as Articles 35(3) and 55 of Additional Protocol I specifically prohibit methods and means of warfare that cause widespread, long-term, and severe environmental damage. Still, as noted earlier, the very high threshold for applying these provisions has reduced their effectiveness in practice.

Against this background, the principle of “due regard” has emerged as an important normative step forward. It calls on parties to a conflict to take environmental impacts into account, even when there is scientific uncertainty or when the damage does not reach the strict thresholds set by treaty law. This developing principle points to a broader change in approach, one that increasingly treats environmental protection as a necessary part of lawful military action rather than a secondary or optional concern.”

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