

Environmental and Ecological Damage as "Collateral Damage": The Case of SpaceX's Starship Launch

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Abstract

This study examines the concept of "collateral damage" in the context of environmental and ecological impact. It focuses on the SpaceX Starship launch, a significant event in space exploration, and its repercussions on the local environment. While the launch was deemed a success in advancing space exploration, reports from U.S. wildlife officials highlight the severe damage inflicted on the local ecosystem. The analysis reveals the existence of a notion termed "protected zones," which diverges from the conservationist perspective, emphasizing the safeguarding of corporate interests over environmental preservation. The study also explores the limited financial and regulatory resources allocated to ecological rehabilitation compared to those allocated to corporate interests. Furthermore, it sheds light on the restricted access granted to biologists for post-launch environmental assessment, emphasizing the need for a more comprehensive approach to ecological restoration. Drawing on ecological data spanning thousands of years, the study underscores the considerable time and effort required to restore tropical forests to pre-damage levels, emphasizing the challenges of relying solely on financial compensation for environmental "collateral damage."

Keywords: Collateral damage, environmental impact, ecological restoration, SpaceX, protected zones, conservation, financial compensation, space exploration.

"Are humans in a toxic, abusive relationship with nature? Love is strange."

In "Glands of Love"; *Meandering Sobriety* [1]

Introduction

In the realm of environmental and ecological discussions, the term "collateral damage" is often invoked to describe the unintended harm inflicted on natural ecosystems as a result of various human activities. This paper explores the notion of "collateral damage" in the context of SpaceX's Starship launch, a pivotal event in the realm of space exploration, and its profound implications for the local environment. Despite the successful execution of the launch in terms of space exploration, reports from U.S. wildlife officials underscore the extensive environmental destruction left in its wake.

The SpaceX Starship, a super-heavy lift spacecraft designed for carrying massive cargo and astronauts into deep space, attempted to reach orbit on April 20, 2023, under a contract with

NASA. Although the spacecraft exploded over the Gulf of Mexico while attempting to reach orbit, the launch was still considered a significant step forward in space exploration [2]. However, according to reports from U.S. wildlife officials, the Starship launch had a severe adverse impact on the local environment. Upon surveying the launch site after the event, they discovered concrete debris scattered throughout the area. Debris and concrete fragments were strewn over a vast expanse of approximately 155 hectares. The term "debris" implies a reduction or avoidance of impact. In reality, it represented the remnants of large concrete structures with meter-deep craters on the mudflat.

Additionally, the launch led to a wildfire in the Texas national forest covering an area of 1.4 hectares. A series of burrows and wild bobwhite quail eggs were incinerated.

Of course, this area was designated for a U.S. national strategic mission, and as such, these damages were categorized as "collateral damage." When compared to the billions of dollars invested in spacecraft development, these costs may seem inconsequential.

However, this scenario highlights the existence of a concept known as a "protected zone," distinct from the conservationist concept often discussed [3]: a place where corporate-induced environmental damage is shielded. Consequently, if such "protected zones" continue to expand for other businesses, how will the true "protected zones" for ecological and biodiversity purposes be diminished?

Furthermore, funding for "protected zones" dedicated to ecological purposes is often limited [4], while those allocated to corporate "protected zones" seemingly overflow with financial resources and influence [5].

In practice, biologists were not granted early access to assess the environmental and plant and animal life conditions in the area following the launch due to SpaceX restrictions [3].

According to an analysis of ecological records spanning 20,000 years in the journal *Nature Communications*, restoring a tropical forest to 95% of its pre-damage state requires over 200 years [6]. This underscores that if businesses rely solely on financial compensation to offset environmental damage, often termed as "collateral damage" in this context, the time demands for restoration are immense and challenging to meet.

References

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