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A framework for a critical physical geography of 'sacrifice zones': Physical landscapes and discursive spaces of frac sand mining in western Wisconsin

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ABSTRACT

The term *sacrifice zone* has been applied within activism, journalism, and scholarship to a wide range of polluted and degraded areas, including places playing host to relatively new extractive activities. This article proposes a conceptual framework for analyzing the phenomenon of the sacrifice zone within the emerging research paradigm of critical physical geography, using the illustrative case of frac sand mining in western Wisconsin, USA. In this case, we find that the meanings of *sacrifice* and the *sacrifice zone* vary along two major dimensions—the object of sacrifice and the initiator of sacrifice—and we propose that future research should attend to relationships between these dimensions and the efficacy of the framing for influencing future landscape change. We also argue that analyses in critical physical geography require investigating how in controversial situations some physical geographic (and human geographic) explanations and accounts stabilize as "matters of fact" and others emerge as disputed "matters of concern." The latter, we contend, generate the conditions that lend themselves to the "sacrifice zone" frame. We suggest that this distinction both complicates and enriches efforts to integrate social and biophysical explanations.

1. Introduction

The *sacrifice zone*, a Cold War term originally applied to areas made uninhabitable by nuclear fallout (Kuletz, 1998; Lerner, 2010), has recently been repurposed and applied to a wide range of polluted and degraded areas, including places hosting relatively new extractive activities. In the past decade, best-selling journalists Chris Hedges (Hedges and Sacco, 2012) and Naomi Klein (2014) have made prominent use of the term, and its use in scholarship has increased significantly.[1] The sacrifice zone also has become a common discursive frame through which activists articulate local environmental grievances (e.g., Lerner, 2010). Although the term has no fixed definition, it frequently reflects the notion that the health and way of life of communities—often low-income or minority—have been permanently sacrificed for some other interest, whether the "common goods" of security or development or simply the private interest of short-term profit.[2] However, others argue that all communities, even the most affluent, are in danger of becoming sacrifice zones (e.g., Winkler, 2017). The term frequently also evokes images of irredeemably degraded physical landscapes: places in which not just human populations but entire ecosystems have been sacrificed.

Despite its conceptual ambiguities, the term *sacrifice zone* has become a resonant way of framing, imagining, identifying, and classifying places for the purpose of contesting activities perceived by their opponents as destructive (Martin, 2003). By identifying a place as a sacrifice zone, individuals not only advance the claim that the place is being sacrificed, but also suggest that it shares essential attributes with the places others have identified as sacrifice zones. Even with the widespread diffusion of sacrifice zone rhetoric, few have analyzed the elements and effects of this discursive framing of places or have considered the relationship between sacrifice zone discourse and the physical landscapes it names. What do activists mean when they frame places and landscapes as sacrifice zones? What kinds of physical transformations lend themselves to such a framing, and why? How might this framing help shape the future of landscape change? Does it make a difference to identify places as sacrifice zones? We contend that examining the uses of this ambiguous term is important for building an understanding of how sacrifice zone discourse resonates in so many different places and situations—including places that are not obviously marginalized.

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[1] Results of a Google Scholar search on "sacrifice zones" show that the phrase's use more than doubled between 2005–2010 (215 results) and 2010–2015 (485). A Google Ngram search shows a steady, sharp rise in the use of the term from the early 1980s to the mid-2000s (https://books.google.com/ngrams/).

[2] Some online authors cite Wikipedia's broad definition of the sacrifice zone as "a geographic area that has been permanently impaired by environmental damage or economic disinvestment," but this is not a consensus definition (https://en.wikipedia.org/wiki/Sacrifice_zone).

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We investigate these questions through a case study of sacrifice zone discourse mobilized against the mining of "frac sand"—sand mined for hydraulic fracturing—in its epicenter of production: western Wisconsin, USA. Our objective is not to evaluate the term's utility, to refine its meaning, or to discover timeless laws underlying its deployment, but rather to identify key attributes and dimensions that it has taken on as a distinctive, resonant framing of place. We characterize sacrifice zone discourse in sand mining areas as a response to landscape change and the risk of negative impacts on human health, economic livelihood, and ways of life. It is also a response to uncertainty about this risk, as well as the perception that scientific knowledge production about frac sand mining and its impacts has been distorted by powerful economic and political actors. In this case, we find that meanings of *sacrifice* and the *sacrifice zone* vary along two major dimensions: the object of sacrifice and the initiator of sacrifice. As for how sacrifice zone discourse is helping shape the trajectory of landscape change in this region, it is too early to tell. However, we suggest that the mobilizations this discourse has helped animate may have slowed down the rapid spread of sand mining.

Based on the case study, we develop a conceptual framework for analyzing the emergence of sacrifice zone discourse, which we situate within the emerging research paradigm of critical physical geography (Lave et al., 2014; Lave, 2015). Critical physical geography aims to close the longstanding gap between physical geography and critical human geography, not simply through dialogue and encounter, but through research thoroughly integrating both. In its early stages, at least two orientations seem to be taking shape: (1) bringing political-economic and sociocultural processes more explicitly and rigorously into explanations in physical geography, while also integrating biophysical processes more fully into accounts of social geographic phenomena; and (2) conducting physical geographic research with greater reflexivity and critical sensitivity to the politics of scientific knowledge production. Our framework aims to bring elements of both orientations together, considering not only how the discursive frame of the sacrifice zone relates to the forces shaping a regional physical geography, but also how the mobilization of this frame connects with controversies over the production of physical geographic knowledge.

We also seek to contribute to the development of critical physical geography more generally, arguing that analyses in this subfield require investigating how in controversial situations some physical geographic (and human geographic) explanations and accounts circulate as "matters of fact" and others emerge as disputed "matters of concern" (Latour, 1999, 2004a, 2004b, 2005, 2008). We suggest that this distinction both complicates and enriches efforts to integrate social and biophysical explanations. Because these efforts also aim to problematize the production of geographic facts, they must attend to the variability of uncertainty, particularly in cases of controversy and conflict.

2. Critical physical geography and extractive zones as sacrifice zones

2.1. Critical physical geography

Although critical physical geography has numerous antecedents, it has only recently taken shape as a defined approach to research. In an influential programmatic statement, Lave et al. (2014: 7) define critical physical geography (CPG) as "work that combines critical attention to relations of social power with deep knowledge of biophysical science or technology in the service of social and environmental transformation." Aspects of CPG resonate with other geographic subfields, such as political ecology and environmental economic geography (see Bridge, 2008). What distinguishes CPG, however, is its emphasis on developing critical perspectives on physical geographic knowledge and explanations. On the one hand, this means developing explanations of biophysical phenomena that incorporate social, economic, and political forces, and vice versa; on the other, it means interrogating the distinctive ways that explanations of biophysical phenomena *themselves* circulate and intervene in political conflict. As an extension of "both political ecology and the tradition of critique within physical geography," CPG involves full integration of physical and critical human geography, combining the knowledge and analytical strengths of both and requiring full reciprocal engagement:

> The integrative holism of CPG requires critical human geographers to engage substantively with the physical sciences and the importance of the material environment in shaping social relations, while expanding physical geographers' exposure to and understanding of the power relations and human practices that shape physical systems and their own research practices.
>
> Lave et al., 2014: 4

In a subsequent introduction to a special issue on critical physical geography, Lave (2015: 571) specifies two defining orientations: "careful attention to (1) biophysical landscapes and the power relations that have increasingly come to shape them, and (2) the politics of environmental science and the role of biophysical inquiry in promoting social and environmental justice."

These two orientations are evident in subsequent empirical and theoretical work in critical physical geography. Some of this work emphasizes the aim of making physical geography more reflexive and critical about the underlying assumptions of its practices of producing knowledge (e.g., Tadaki et al., 2015; Blue and Brierley, 2016). Other recent scholarship focuses on developing explanations of physical landscape formation that incorporate both biophysical and political-economic processes. For example, combining geospatial analysis of soil contamination with historical narrative drawing on archival and secondary sources, McClintock (2015) explains the present-day distribution of lead-contaminated soil in Oakland as the result of a combination of geophysical and political-economic processes. Others have proposed more general models and frameworks for integrated analysis; Van Dyke (2015: 595), for instance, proposes state-and-transition models as a potential framework that can "facilitate the development of complex, innovative, and critical narratives to interpret the interplay of biophysical and social drivers that drive adjustments in socio-biophysical landscapes." Although we do not pursue state-and-transition models, we take up Van Dyke's (2015: 610) subsequent suggestion to "direct critical attention toward the social framings and narrative descriptions of landscape states," focusing on the framing of landscapes as sacrifice zones.

But we also aim to contribute to critical physical geography by highlighting the significance of distinctions between explanatory factors that have stabilized as indisputable "matters of fact" and those that circulate in controversies as disputed "matters of concern." Latour (1999: 307) described *matters of fact* as scientific propositions that have become "indisputable and obvious," but only as the "outcome of a long process of negotiation and institutionalization." One point of the concept of *matters of concern* is to direct analytical attention to this process, rather than accepting facts as "simply there": "A matter of concern is what happens to a matter of fact when you add to it its whole scenography, much like you would do by shifting your attention from the stage to the whole machinery of a theatre" (Latour, 2008: 39). However, in a second sense of the term, matters of concern also describe propositions that have not yet been established as facts; in contrast with matters of fact, matters of concern are "highly uncertain and loudly disputed" and "warm, interested, controversial" (Latour, 2005: 114, 125). Eventually, such propositions can become provisionally settled, institutionalized, and "blackboxed" as matters of fact (Latour, 1999: 304; 2004a). In our analysis, we aim to show how in controversies over frac sand mining, some explanations emerge and circulate as accepted matters of fact and others as disputed matters of concern. In the conclusion, we suggest that this distinction carries important implications for how critical physical geography integrates human and physical explanations.