

## COMMENT

### Military ecology more fitting than warfare ecology

The importance of state defence throughout human history warrants inclusion of military operations in discussions of environmental conservation. The sub-discipline warfare ecology was recently proposed (Machlis & Hanson 2008) to cohere these discussions. Words have the power to clarify, but they also have the power to confuse or polarize public opinion. Inaccurate terms and colloquialisms in the sciences should be identified and replaced with more accurate terms. My objective herein is to discuss how the epithet warfare ecology does little to attract input from important audiences affected by military operations, while an alternative descriptor would engage these audiences.

Working on ecological issues in relation to military operations can be complex (Anon. 2011). Many stakeholders are biased toward a zero sum viewpoint, whereby benefits of militarization are inescapably attached to environmental degradation (Marler *et al.* 2012). These and other traits of this subdiscipline render it vulnerable to the research-implementation divide that separates academicians from important audiences (Knight *et al.* 2008; Shackleton *et al.* 2009). This vulnerability is acute in localities of permanent military installations, where ecologists, conservationists, practitioners, academicians, economists, preservationists and military employees collide with local landowners.

Environmental damage during warfare is generally accepted as an unavoidable form of collateral damage. In contrast, the civilian community is not accepting of environmental damage that results from military operations during periods devoid of armed conflict (Marler & Moore 2011). Usage of the term warfare ecology consequently leads to confusion, and has the potential to inadvertently disenfranchise the stakeholders who consider warfare irrelevant to their concerns about the military. If ecologists respect the need to bridge the great divide with these audiences, a more accurate epithet for the subdiscipline is required.

The illegal entry of a United States (US) Navy vessel through the Tubbataha Marine Park in the Philippines in January 2013 provides a relevant peacetime example. Grounding of the vessel and destruction of reef habitat followed its unauthorized passage through these protected waters. Audiences that became involved included the United Nations Educational, Scientific and Cultural Organization, the World Wide Fund for Nature, the International Maritime Organization, the USA's Agency for International Development and National Oceanic and Atmospheric Administration, Tubbataha Marine Park staff, the Philippine Department of Foreign Affairs, Department of Justice, Department of Transportation and Communications and Department of Environment and Natural Resources, the Philippine Coast-

guard, the Congress of both federal governments, the local Palawan Island government, nationalistic groups opposed to any foreign involvement in Philippine affairs, conservation biologists and commercial fishers. None of these partisan audiences would consider warfare ecology as a subdiscipline that was relevant to their peacetime environmental disaster. The US Navy failed to explain why its ship entered prohibited territory in this Philippine World Heritage Site.

The nascent military buildup on Guam and Tinian islands (Marler & Moore 2011) illuminates other examples. The local stakeholders do not connect the ongoing environmental degradation to warfare. Some historical examples further reveal the irrelevance of the term warfare ecology. (1) Land condemnations for conversion to military needs were rampant on Guam at times when no armed conflict was occurring (Marler & Moore 2011). (2) The brown tree snake *Boiga irregularis* was introduced to Guam around 1950, and thrust Guam on the international scene as a heavily-cited example of a collapsing ecosystem (Rodda *et al.* 1992). This invasion was perpetrated by the US military as they redistributed military assets throughout the region. It did not occur during warfare, yet it is one of the most influential turning points in the ecological history of Guam, and the cascading environmental responses continue to date (Mortensen *et al.* 2008; Rogers *et al.* 2012). (3) The US military repeatedly distributed *Leucaena leucocephala* seeds throughout barren habitats in Guam and Tinian from the 1940s to the 1960s. This species is now one of the most troublesome invasive plant species in the Mariana Islands (Marler & Moore 2011). Similarly, military land management and training activities negatively affect conservation activities in California, Colorado, Washington, Wisconsin, Texas, Manitoba and western Europe (reviewed by Quist *et al.* 2003).

These examples did not occur during actual local warfare, yet collectively they reveal the negative impact that military culture imposes on environmental conservation. They demonstrate the term warfare ecology is too constrictive to adequately cover all aspects of how ecology is influenced by military operations, at least from the viewpoints of the affected permanent civilian residents and local government officials who cope with military culture in their neighbourhoods.

The Anthropocene (Crutzen 2002) has ushered in the seven billionth Earth resident, thus pressures on global resources will only increase in regions where territorial claims are at odds. For example, ten countries claim partial ownership of land in the resource-rich South China Sea. Some islands in these disputed waters are occupied by military personnel from several of the claimants, and the situation has attracted military attention from Australia, the

USA and Japan. Military posturing is a crucial component of ongoing multilateral parley, yet the majority or possibly all of the impending decisions about exploiting natural resources and the conservation concepts requiring research during the process will occur without actual armed conflict. Furthermore, neopopulism and other political and social networking developments are changing the driving forces that define how the military component of state governments relates to the common well-being of constituents (Moisés 2011). For example, Filipino netizens flooded cyberspace with communications for weeks after the Tubbataha reef incident, calling for more expansive reparations from the USA.

These examples of the negative impact of peacetime military activities on the environment may be contrasted with examples of peacetime benefits. The largest area of unimproved calcareous grasslands in Western Europe has been sustained primarily because of its use as a UK military training zone (Toynton & Ash 2002). Similarly, the Korean Demilitarized Zone was established in 1953 to ensure a zone devoid of armed conflict and improve bilateral negotiations, but inadvertently established a highly successful nature sanctuary (Brady 2008).

Embracing the provocateur role is sometimes justified by ecologists, especially when attempting to use knowledge or experience to spark interest from the general public on urgent environmental issues. However, using rhetoric by choosing a sensationalist term such as warfare, which excludes major audiences from the dialogue and fails to bridge boundaries, has the potential to do the opposite. Environmental scientists are called on to consider the ethical and rhetorical aspects of their communications in order to stimulate and respect the inputs of all audiences. A more appropriate term is needed, as this subdiscipline of ecology will undoubtedly become increasingly important in the coming years. Following the lead of the purveyors of the geography subdiscipline military geography (Galvano & Palka 2010), I suggest the umbrella term 'military ecology' would be more fitting for this subdiscipline of ecology. The resulting integrity would embrace the full spectrum of issues interfacing environmental conservation and all aspects of military life during peacetime, preparation for war, warfare and post-war restoration operations. The established term warfare ecology could be subsumed under military ecology, by accurately constricting its application to ecological issues directly tied to armed conflict.

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