

# Sowing The Dragons Teeth: Land Mines And The Global Legacy Of War

Pagination not final (cite DOI) / Pagination provisoire (citer le DOI)



ARTICLE

## The effects of modern war and military activities on biodiversity and the environment

Michael J. Lawrence, Holly L.J. Stemberger, Aaron J. Zoldero, Daniel P. Struthers, and Steven J. Cooke

**Abstract:** War is an ever-present force that has the potential to alter the biosphere. Here we review the potential consequences of modern war and military activities on ecosystem structure and function. We focus on the effects of direct conflict, nuclear weapons, military training, and military produced contaminants. Overall, the aforementioned activities were found to have overwhelmingly negative effects on ecosystem structure and function. Dramatic habitat alteration, environmental pollution, and disturbance contributed to population declines and biodiversity losses arising from both acute and chronic effects in both terrestrial and aquatic systems. In some instances, even in the face of massive alterations to ecosystem structure, recovery was possible. Interestingly, military activity was beneficial under specific conditions, such as when an exclusion zone was generated that generally resulted in population increases and (or) population recovery; an observation noted in both terrestrial and aquatic systems. Additionally, military technological advances (e.g., GPS technology, drone technology, biotelemetry) have provided conservation scientists with novel tools for research. Because of the challenges associated with conducting research in areas with military activities (e.g., restricted access, hazardous conditions), information pertaining to military impacts on the environment are relatively scarce and are often studied years after military activities have ceased and with no knowledge of baseline conditions. Additional research would help to elucidate the environmental consequences (positive and negative) and thus reveal opportunities for mitigating negative effects while informing the development of optimal strategies for rehabilitation and recovery.

**Key words:** war, biodiversity, ecosystem structure, conflict, military activities, environment, conservation biology.

**Résumé :** La guerre est une force omniprésente ayant le potentiel d'altérer l'atmosphère. Les auteurs passent en revue les conséquences potentielles des activités guerrières et militaires modernes sur la structure et le fonctionnement des écosystèmes. On met l'accent sur les effets directs et indirects des conflits, des armes nucléaires, des entraînements militaires et des contaminants des produits militaires. Dans l'ensemble, on constate que les activités préalablement mentionnées ont des effets négatifs écrasants sur la structure et le fonctionnement des écosystèmes. Avec des altérations dramatiques des habitats, la pollution et les perturbations environnementales contribuent au déclin des populations et aux pertes de biodiversité provenant des effets aigus et chroniques sur les systèmes terrestres aussi bien qu'aquatiques. Tout de même dans certains cas, en présence d'altérations massives de la structure des écosystèmes, la récupération est avérée possible. Il est intéressant de noter qu'une activité militaire fut bénéfique sous des conditions spécifiques telles que la création d'une zone d'exclusion, en générant des augmentations générales des populations ou une reprise des populations; ceci fut observé en milieux terrestres aussi bien qu'aquatiques. De plus, les avancées des technologies militaires (p. ex. la technologie GPS, les drones, la biotélémétrie) ont fourni aux scientifiques de la conservation de nouveaux outils pour la recherche. Compte tenu des défis associés avec la conduite de recherches dans les sites d'activités militaires (p. ex. accès restreint, conditions dangereuses) les informations concernant les impacts militaires sur l'environnement sont relativement rares et ne sont étudiées qu'après nombreuses années après la fin des activités militaires sans connaissance des conditions de base des populations. En plus, la recherche aiderait à élucider les conséquences environnementales (positives et négatives), révélant ainsi des opportunités pour mitiger les effets négatifs, tout en fournissant des informations pour le développement de stratégies optimales pour la récupération et la réhabilitation. [Traduit par la Rédaction]

**Mots-clés :** guerre, biodiversité, structure des écosystèmes, conflit, activités militaires, environnement, biologie de la conservation.

### Introduction

Conflict has been an ever-present aspect of human civilization. Indeed, the manifestation of conflict in direct combat and military engagements has continuously plagued the world throughout the 20th century leading to more than 100 million human deaths across a number of major and minor wars (Westing 1980; Pedersen 2002; Sarkies et al. 2003; Leitenberg 2006). Beyond war's rather obvious negative impacts on human populations (Pedersen 2002; Machlis and Hanson 2009), human warfare has

also been documented as having a significant influence on the biosphere across a range of ecological scales (Dudley et al. 2002; Machlis and Hanson 2009). The degree to which warfare can exert an impact upon an ecosystem and its constituent populations rests entirely on the nature of the disturbance, the sensitivity of the biological system (including resilience), and the timescale of the impacts (Westing 1971; Demaris et al. 1999; Dudley et al. 2002; Warren and Büttner 2006; Warren et al. 2007). Consequently, human conflict has the potential to impart a wide range of impacts

Received 20 June 2015. Accepted 14 September 2015.

M.J. Lawrence, A.J. Zoldero, D.P. Struthers, and S.J. Cooke, Fish Ecology and Conservation Physiology Laboratory, Department of Biology and Institute of Environmental Science, Carleton University, 115 Colonel By Drive, Ottawa, ON K1S 5B6, Canada.

H.L.J. Stemberger, Department of Biology, Carleton University, Ottawa, ON K1S 5B6, Canada.

Corresponding author: Michael J. Lawrence (e-mail: m\_lawrence27@live.ca).

Environ. Rev. 23: 1–18 (2015) dx.doi.org/10.1139/er-2015-0039

Published at www.nrcresearchpress.com/er on 17 September 2015.

Sowing the Dragon's Teeth: Land Mines and the Global Legacy of War [Philip C. Winslow] on tuforparawebmasters.com \*FREE\* shipping on qualifying offers. Each year an.He writes about the International Campaign to Ban Landmines and the ways in which Sowing the Dragon's Teeth: Land Mines and the Global Legacy of War.Published under the auspices of the Unitarian Universalist Association of Congregations--Verso t.p.Sowing The Dragon's Teeth Pa Txt, Land Mines and the Global Legacy of War, Sowing The Dragon's Teeth,, Paperback, Text.Available in the National Library of Australia collection. Author: Winslow, Philip C; Format: Book; xi, pages: illustrations, maps ; 22 cm.Each year an estimated twenty-six thousand people are killed or maimed by land mines-more than million of them sown like the mythical dragon's teeth in.Home > Beacon Press Sowing the Dragon's Teeth. Sowing the Dragon's Teeth. Land Mines and the Global Legacy of War.Summary. Each year an estimated 26, people are killed or maimed by the more than million anti-personnel land mines -- sown like the mythical dragon's.SOWING THE DRAGONS TEETH LAND. MINES AND THE GLOBAL LEGACY OF . WAR PDF - Search results, In Greek myth, dragon's teeth feature prominently.Sowing the Dragon's Teeth: Land Mines and the Global Legacy of War By Philip C Winslow Beacon Press, pages; \$ Marti Rabinowitch The.Nay Htun, Landmines Prolong Conflicts and Impede Socioeconomic Sowing the Dragon's Teeth: Land Mines and the Global Legacy of War (Boston: Beacon.For example, see Paul Davies, War of the Mines: Cambodia, Landmines and the Sowing the Dragon's Teeth: Land Mines and the Global Legacy of War.Register Free To Download Files File Name: Sowing The Dragons Teeth Land Mines And The Global Legacy Of War PDF. SOWING THE DRAGONS TEETH.Americas Watch, Landmines in El Salvador and Nicaragua: The Civilian Victims, The . Sowing the Dragon's Teeth: Landmines and the Global Legacy of War.Sowing the Dragon's Teeth: Land Mines and the Global Legacy of War. Explore Land Mine, Dragon's Teeth, and more!.1, - live from the Landmines Conference soldiers left to fight in World War II, dozens of journalists from around the world jammed into Winslow, who just wrote a book on landmines called Sowing the Dragon's Teeth, was chatting with ."Landmines - Challenges to Humanity and Environment". 20 April .. Sowing the Dragon's Teeth: Landmines and the Global Legacy of War.

[\[PDF\] Why Is The Sky Blue: Answers To Questions You Always Wanted To Ask](#)

[\[PDF\] Open Source .Net Development](#)

[\[PDF\] Chinese Politics And The Succession To Mao](#)

[\[PDF\] The Man Who Wrestled With God: Light From The Old Testament On The Psychology Of Individuation](#)

[\[PDF\] Amelia Bedelia Makes A Friend](#)

[\[PDF\] Genetic Immunization](#)

