

## LETTER FROM THE CONSERVATION FRONT LINE

# Not just trash! Anthropogenic marine litter as a 'charismatic threat' driving citizen-based conservation management actions

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Resources are limited in conservation, increasing competition for funds and public attention. To optimize the availability of resources for conservation, charismatic or umbrella species and ecosystems, have been utilized to attract the public's attention, gather consensus and optimize strategies (Caro & O'Doherty, 1999; Albert, Luque & Courchamp, 2018). Nevertheless, conservation managers, working in local operational projects, carried out in small sites, often cannot select appropriate surrogate species or ecosystems. We think that, in these contexts, and with a little imagination, this role could be assigned not to species and ecosystems but to factors or processes of threat ('surrogate threats'), as well as to conservation management measures ('surrogate measures'), aimed, not only at mitigating the impact of the threat, but also at promoting a pro-environmental change in citizens with knock-on effects for biodiversity conservation. Indeed, similar to species and ecosystems, many threats can have a paradoxical charisma, provoking a strong emotional impact on people: for example, fires, poaching and anthropogenic litter are striking examples since fire, blood and environmental pollution are dramatically obvious to the general public. A similar approach can be proposed for striking conservation actions, able to attract attention and communicate a wide set of environmental problems. A decade ago, Salafsky *et al.* (2008) pointed out how, in strategies implemented at specific sites, it may be necessary to shift the focus from biological targets (species or ecosystems) to local threats and conservation actions.

Among human-induced threats, marine litter represents a threat with a large ecological, economic and esthetic impact (Laist, 1987; Rochman *et al.*, 2016). The presence of litter, in the sea and along the coasts, causes impact such as the entrapment, poisoning, suffocation of marine and terrestrial organisms and cascading effects on trophic webs (Bergmann, Gutow & Klages, 2015). Moreover, its presence is easily (and negatively) perceived, even by a non-technical public

(Tudor & Williams, 2003), inducing strong socioeconomic impacts and political responses (Gall & Thompson, 2015). At the same time, macro- and meso-litter are relatively easy to be removed by people, with minimal support from technical equipment (Storrier & McGlashan, 2006). All this makes the measures implemented against this problem ('coastal clean ups') extremely attractive, as compared to actions that are planned to respond to more complex threats (fires, poaching, invasive species etc.), that require the use of significant amounts of resources, professional operators, policies and technology.

Clean up measures, by citizens, have a strong charismatic impact, requiring little time and minimal expense, at least at local level (e.g. Rosevelt *et al.*, 2013; Hartley, Thompson & Pahl, 2015). These actions can achieve multiple goals; in fact, in addition to the simple direct removal of large amounts of litter, through these activities people acquire awareness of, sometimes, neglected and degraded sites, thereby also showing a role for umbrella measures in communicating, either local ecosystem values (birds nesting on dunes, rare psammophilous plants), or other conservation problems (trampling, feral dogs, recreation disturbances, off-road motor-vehicles). The constant, and continuous accumulation of litter on the coasts whilst, on one hand, requires a periodic effort to remove them, on the other hand encourages the affiliation and accountability of the people to a site through experiential actions. Manual skills and emotions, together with social relations and the assignment of roles and responsibilities, represent strategic factors encouraging a non-aware public to develop Pro-Environmental Behaviors (Jacobson, McDuff & Monroe, 2015). The definition of concrete, and simple objectives in response to expectations, leads to motivation and commitment (Decker, Riley & Siemer, 2012). The collective research on causes, effects and solutions ('Which organisms are impacted by different litter types? How to remove it in our specific context?') stimulates

system-level thinking and creativity, both necessary ingredients in all project phases of conservation projects (Orr, 1999; Battisti, 2018). The achievement of results, even within a few hours, makes people feel satisfied with having achieved 'smart' goals ('I did something to change the world for the better').

A project carried out in a nature reserve of central Italy ('The Treasure Island' in the Torre Flavia wetland, Special Conservation Area; Battisti, 2016), in 2017, involved >3500 children and adults removing marine litter that had been deposited on the coastal dunes. In this case, we found that marine litter, and the related clean up actions, played unexpected charismatic and umbrella roles. Indeed: (1) a large number of people have been attracted and impressed by this threat (role of charisma), and (2) during the clean-up actions, they realized how other hidden, or unperceived (but often more striking), threats that are locally present (role of 'umbrella' toward >15 threats; Battisti *et al.*, 2008); thereby, focusing attention on this highly impacted (and forgotten) area. The removal of the litter was also used as an 'umbrella measure' toward many conservation targets, conveying the value of the dune ecosystems (psammophilous vegetation, rare birds nesting on dunes, such as *Charadrius alexandrinus*, included in Annex 1, 147/2009/UE 'Bird' Directive).

During cleanup operations, local conservationists have the opportunity to share specific knowledge of a site, developing a 'sense of place' (strategic in conservation; Jacobson *et al.*, 2015), and conveying its ecosystem value to an audience to whom it has been largely overlooked. Moreover, the threat of marine litter, and the charismatic clean up actions, help to combine the message of conservation with that of the civic duty and the values of common goods (Cooper *et al.*, 2007; Mc Kenna *et al.*, 2007).

There is great debate about 'citizen science' in conservation (Newman *et al.*, 2012): using marine litter and cleanup actions as, respectively, surrogate threat and measures, could transition society toward the birth of the so called 'citizen management' (Finn, 1994). In this regard, the cleanup actions, under the supervision of local experts acting as facilitators, can also convey problem solving and project thinking in conservation (Hockings *et al.*, 2006), drawing public attention toward ecosystem values, problems, solutions, decision-making actions, strategy building and communicating complex management concepts to a wide audience. Therefore, these cleanup actions should not be undervalued as naïve interventions against a 'trash world', instead, in our experience, these apparently simple 'Trojan horse' measures may drive a meaningful social change in conservation management. Comparative before-after-control-impact (BACI) approaches (Underwood, 1994), applied to assess marine litter impact (Katsanevakis *et al.*, 2007), and studies assessing the educational outcomes during, and after, cleaning actions (Jacobson *et al.*, 2015), could furnish key data supporting our empirical evidence regarding the medium- and long-term beneficial effects of the measures acting against this charismatic threat.

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