

Advantages and challenges of government, non-profit and for-profit approaches to eradications: leveraging synergies by working together

G. R. Howald¹, C. J. Donlan², P. McClelland³, N. Macdonald⁴, and K. J. Campbell⁵

¹ *Island Conservation, 400-163 Hastings Street W., Vancouver, B.C., V6B 1H5, Canada. <Gregg.Howald@islandconservation.org>.* ² *Advanced Conservation Strategies, P.O. Box 1201, Midway, Utah 84049, USA and Copeland Fellow in Global Sustainability, Amherst College, Amherst, MA 01002, USA.* ³ *Department of Conservation, Southern Islands Area, P.O. Box 743, Invercargill 9840, New Zealand.* ⁴ *Prohunt Incorporated, 4360 E. Main Street, Suite A, #478 Ventura, CA 93003 USA.* ⁵ *Island Conservation, La Cedrela, Apt. 1, Puerto Ayora, Santa Cruz Island, Galápagos Islands, Ecuador, and School of Integrative Systems, University of Queensland, Gatton, Queensland 4343, Australia.*

Abstract The removal of invasive mammals from islands has become a powerful tool for restoring ecosystems and preventing extinctions. As larger and more complex islands are being targeted for restoration, eradication campaigns will become even more complex and multidimensional – biologically, operationally, and financially. Eradication projects are typically conducted by governmental conservation agencies (GCAs), non-governmental organisations (NGOs), or for-profit enterprises (FPEs). Partnerships across these three organisational types are increasingly common. The organisational structure of the institutions involved in eradication and other restoration campaigns undoubtedly plays a role in the effectiveness and nature of outcomes. We briefly explore the advantages and challenges of different organisational structures conducting invasive mammal eradication programmes. We do so to explore potential synergies that arise from strategic partnerships between different types of organisations. GCAs commonly enjoy special privileges, reliable operational budgets, and simplified lines of communications – all of which are advantages to managing an eradication project. However, they often face challenges, including lack of experience, vulnerability to outside pressures, and a risk averse atmosphere. NGOs often have relative advantages in fundraising capacity and flexibility. Their challenges include permitting, fundraising pressure, and less accountability. FPEs commonly enjoy less regulation and bureaucracy, have more operational flexibility and excellence, and incentives for innovation. Limited project control, near-sighted investment, and risk avoidance can present them with challenges during eradication projects. Recent partnerships that executed watershed eradication campaigns over the last decade suggest that working together on island restoration programmes can leverage synergies. Partnering across organisational structures is likely to be a highly effective strategy for mainstreaming invasive species eradications.

Keywords: Innovation, partnerships, organisational structure, mainstreaming eradications, Project Isabela, NZ Department of Conservation, Santa Cruz Island, Anacapa Island

INTRODUCTION

The removal of invasive mammals from islands has become a powerful tool for restoring ecosystems and preventing extinctions. There have been over 900 successful eradications worldwide, and recent innovative programmes suggest that area is often no longer the limiting factor for removing invasive mammals from islands (Cruz *et al.* 2009; Donlan and Wilcox 2008; Howald *et al.* 2010; Macdonald and Walker 2008; McClelland and Tyree 2002). Eradication projects are complex endeavours that blend logistical planning, environmental compliance, scientific research, operational management, and public relations. As larger and more complex islands are targeted for restoration, eradication campaigns will become even more complex and multi-dimensional – biologically, operationally, and financially.

Eradication projects are typically conducted by governmental conservation agencies (GCAs), non-governmental organisations (NGOs or, in a few cases, community groups), or for-profit enterprises (FPEs). Partnerships across these three organisational types are increasingly common. The organisational structure of the institutions involved in eradication and other restoration campaigns undoubtedly plays a role in the effectiveness and nature of outcomes. This effect of organisational structure on outcomes is seen in other disciplines. For example, in primary health-care, large managed care organisations often fail to provide quality care due to complexities and fragmentation of the organisation (Barr 1995). In contrast, smaller organisations often lack the internal depth and external reach to drive objectives through complex bureaucracies.

In this paper, we briefly explore the advantages and challenges of different organisational structures conducting

invasive mammal eradication programmes (i.e. GCAs, NGOs, and FPEs). Our objective is to explore potential synergies that arise from strategic partnerships between different types of organisations. We highlight some of those advantages, challenges, and synergies by briefly discussing four recent eradication programmes as case studies.

THE ROLE OF ORGANISATIONAL STRUCTURE

An organisation emerges whenever people cooperate over time in order to get things done. An effective organisation is one that is able to achieve its purposes or aims. Four factors influence an organisation's effectiveness: system, culture, leadership, and power (Fairtlough 2005). Organisations garner advantages when systematic and standard procedures are in place. Organisations with many established systems and standards are bureaucratic, and are often viewed as cumbersome. Systems and rules, however, can promote effectiveness. A shared organisational culture encourages efficient communication within an organisation. Similar to its systems, an organisation's culture can be either enabling or coercive (Fairtlough 2005). A leader makes sense of an organisation and helps others do the same. Research in the private sector has revealed insights on superior leadership and its characteristics, perhaps most importantly the requisite of a combination of personal humility with professional will (Collins 2005). Power, both complex and dynamic, is a necessary part of getting things done. More often than not, discourse about power within organisations is suppressed, and a hierarchical nature of power is considered to be inevitable and natural (Hardy and Stewart 1996). Heterarchical organisations are more horizontal in nature and can hold advantages over those with more hierarchical structure, such as speed of action

(Fairtlough 2005). Effective organisations tend to possess enabling systems, trust-generating cultures, superior leadership, and accountable power (Collins 2001, 2005; Fairtlough 2005).

The eradication of invasive mammals from islands has become highly specialised and often relies heavily on technology and skilled labour. In the private sector, organisations that specialise in a few complex operations often have an efficiency advantage over less specialised organisations (Collins 2001). Such efficiency advantages are also likely to apply to conservation organisations, including those that specialise in the eradication of invasive mammals (Roemer and Donlan 2005).

Organisational Structure and Island Restoration

Government Conservation Agencies: When and where GCAs are committed to eradications, there have been highly successful programmes, such as the 50+ year commitment to fox eradication from the Aleutian Islands, Alaska by the U.S. Fish and Wildlife Service (Ebbert and Byrd 2002). In fact, most invasive mammal eradication campaigns have been conducted by GCAs, particularly those in Australia and New Zealand (Campbell and Donlan 2005; Howald *et al.* 2007). The natural heritage of both countries has long been heavily impacted by invasive species, and thus agencies exist that have invasive species research and management as one of their primary roles. Examples include the New Zealand Department of Conservation (DOC) and Australia's Invasive Animals Cooperative Research Centre.

There are some clear advantages of GCAs conducting eradication campaigns. Many GCAs enjoy special privileges that facilitate the efficiency of an eradication campaign, such as the ability to use select toxins or exemptions from permits. They may also have reliable operational and programmatic budgets that can be used to subsidise costly components of eradication campaigns such as logistics, legal council, and environmental monitoring. Further, a GCA eradication campaign may enjoy simplified lines of communication and require less inter-agency communication. This is particularly true in countries like New Zealand, where there is a single layer of bureaucracy compared to countries with multiple layers of government (e.g., provincial and federal).

Other common characteristics of GCAs present challenges to operating effective eradication campaigns. Given the multi-layer, largely hierarchical decision-making infrastructure of many government agencies and their adherence to internal policy, they can face challenges when decisions need to be made swiftly. Many GCAs around the world have little, if any, experience with invasive species management, which presents a suite of challenges for managing an eradication campaign. GCAs also tend to be risk averse and subject to political and public opinion pressures – inside and outside a particular project (Roemer and Donlan 2005).

Non-governmental Organisations: NGOs are increasingly playing prominent roles in island restoration programmes. For example, the NGOs Island Conservation (USA) and Grupo de Ecología y Conservación de Islas (México) have made impressive strides in restoring the islands of northwest México over the past fifteen years (Tershy *et al.* 2002; Aguirre-Muñoz *et al.* 2008). An NGO conducting an eradication programme may enjoy some advantages. First, NGOs, particularly non-membership organisations, possess systemic flexibility with respect to prioritisation, planning, and operations. Second, they have potential access to more revenue streams via diverse fundraising activities compared to GCAs. Third, the independent nature of NGOs can shelter them from some

political and social pressures, allowing them to become embedded in the communities where they are working.

NGOs are by no means immune to the many challenges of eradication campaigns. They can be stifled, sometimes for long periods, by permitting requirements and environmental compliance. This is particularly the case with nebulous or overly onerous permit processes present in some countries. The economics of eradication campaigns and programmes are often complex (Donlan and Wilcox 2007), with short bursts of high activity followed by long periods of little or no activity. This cycle can put financial pressure on NGOs to maintain fundraising abilities in order to maintain capacity for the next eradication campaign. Lastly, the efficiency and effectiveness of conservation NGOs can suffer due to a lack of accountability from funders (Ferraro and Pattanayak 2006). This climate is, however, beginning to change as environmentally focused foundations and others adopt return on investment approaches.

For-profit Enterprises: FPEs are playing increasingly important roles in invasive mammal eradications around the globe, either managing entire eradication campaigns or solely the on-the-ground components (Bell 2002; Kessler 2002; Macdonald and Walker 2008). FPEs are often subject to less regulation and bureaucracy than other organisations. FPEs often also have operational flexibility; they are able to hire the most highly qualified personnel and adopt best practices for the situation under the constraints of the contract. Both of these conditions – less “red tape” and operational flexibility – contribute to promoting innovation. Lastly, appropriately structured contracts, such as those that are performance-based, can promote innovation in techniques and technology.

Being vulnerable to contracts for solvency, FPEs face many challenges to conducting invasive mammal eradication programmes. They are often particularly vulnerable to funding gaps. FPEs can struggle to maintain a highly skilled staff and costly equipment (e.g., helicopters) during the downtime between campaigns. Many challenges stem from the nature of the contract. FPEs can have limited control of a project due to contract restrictions. This effect is compounded by “contract paradox”: the largest liability with contracting out eradications is a lack of understanding about the effort and skills needed to achieve eradication by the contractee, which is compounded by the fact there is a lack of suitably qualified contractors with the skills or knowledge to complete the eradication. FPEs may be resistant to performance-based contracts (where time to eradication is the performance measure), since the complex nature of some eradications and the range of issues outside of the FPE's control present a suite of risks. Subsequently, FPEs often prefer “input” contracts, where they are paid for delivered tasks (e.g., helicopter hours or number of treated hectares) that have a chance of providing eradication success. Collaborations that work toward performance-based contracts that also share operational and political risks will increase the conservation return on investment of invasive mammal eradications from islands.

Leveraging Synergies

Eradications are becoming more complex in all respects. Eradication campaigns are increasingly run by partnerships as opposed to a single organisation. We briefly explore four recent landmark eradication campaigns, starting first with the collective accomplishments of DOC.

DOC and Campbell Island Restoration Project (New Zealand): GCA Campaign

In 2001, DOC eradicated Norway rats (*Rattus norvegicus*) from Campbell Island (11,216 ha), the world's largest invasive rodent removal to date (McClelland and

TABLE 1 Innovations within the NZ Department of Conservation (modified from Wright and de Joux 2003).

Mindshift: moving from control mentality to eradication ethic.

Capability Development Across Disciplines: engineering improvements in methods and technologies.

Mainstreaming Best Practices: using the Island Eradication Advisory Group to ensure best practices are employed.

Stretch Goals: taking on bigger challenges.

Tyree 2002; Towns and Broome 2003). This landmark project was successful due to decades of experience by DOC in invasive species eradication and project management. The government agency, along with its accomplishments, serves as a premier case study of innovation in the public service (Wright and de Joux 2003). Throughout its existence, DOC has facilitated and institutionalised innovations that contribute to effective invasive mammal eradication projects (Table 1). Those innovations are of high utility to any organisation tackling island restoration programmes.

Several organisational characteristics contribute to DOC's effectiveness at systematically removing invasive mammals from islands. First, the agency has a clear and focused mission, which is to protect and enhance the environment using two key steps: "expand biodiversity effort" and "minimise bio-security risks". DOC is an integrated conservation service, and in general stakeholder buy-in is limited, as are other competing interests such as outdoor recreation at many sites targeted for conservation. This is in contrast to other government agencies outside New Zealand, such as the US National Park Service (US-NPS) and Australia's State Park and Wildlife Agencies. Second, DOC runs its eradications as a programme as opposed to single, independent projects. For example, Campbell Island was part of a larger five-island restoration programme. As such, this provided some funding flexibility within the programme. Staff positions also had secure funding during the long planning process when levels of effort fluctuated greatly, and were dedicated full-time when actual operations were underway.

One potential challenge of a GCA conducting eradication campaigns single-handedly is the perception of them serving as the prosecutor, defender, judge, and jury. For the Campbell Island programme, this potential transparency issue was overcome by contracting out the legal tests required for resource consent to another territorial authority. In nations where there are well-established federal and state natural resource agencies that provide some "checks and balances", transparency is less of a project risk.

Anacapa Island Restoration Project (USA): A GCA-NGO Partnership

The Anacapa Island Restoration project removed ship rats (*Rattus rattus*) from a small island (300 ha) in the US Channel Islands National Park, located off southern California. The project was the first aerial rodenticide application in North America and involved innovative non-target mitigation strategies due to the presence of an endemic rodent. The eradication campaign and the non-target mitigation programmes were both successful (Howald *et al.* 2010). The Anacapa Island Restoration Project was conducted as a partnership between the US-NPS and the NGO Island Conservation.

This GCA-NGO partnership provided some advantages. The US-NPS managed the political and permitting issues, while Island Conservation focused on the scientific, technical and logistic obstacles. When legal claims were made by animal rights organisations, the government was able to provide the necessary legal resources to successfully fight those claims in court (Howald *et al.* 2010). Island Conservation was not implicated in the lawsuit; US-NPS was both the landowner and held the ultimate decision authority for the project. The division of labour proved effective, allowing the NGO to focus on operations and the GCA to provide critical support on and off the island, essentially shielding the project from the legal and negative public relations campaigns. Effective partnership and dialogue between the partners provided a clear division of responsibilities that led to the successful implementation of the project. The main potential disadvantage of a GCA-NGO partnership, or almost any partnership, is the diffusion of responsibility. This risk must be managed through a clear and effective partnership relationship with absolute transparency about project activities on both sides. Responsibilities need to be clearly defined to ensure success, and so if the eradication fails, it cannot be blamed on one group or another.

Project Isabela (Ecuador): A GCA-NGO-FPE Partnership

Project Isabela was a multi-stage eradication programme in the Galápagos Islands that targeted feral goats (*Capra hircus*), pigs (*Sus scrofa*), and donkeys (*Equus asinus*) on three islands in the archipelago. Two of the islands targeted, Santiago (58,465 ha) and Isabela (458,812 ha), were much larger in size than any other islands where invasive herbivores had previously been removed (Campbell *et al.* 2004; Carrion *et al.* 2007; Cruz *et al.* 2009; Cruz *et al.* 2005). This successful project was funded in part by the Global Environment Facility and co-managed by the Galápagos National Park and the Charles Darwin Foundation. The United Nations Development Program (UNDP) was also a partner, managing funds coming from the Global Environment Facility. In addition, aerial hunting aspects of the campaign were contracted to a private company from New Zealand. The GCA-NGO-FPE organisational structure of Project Isabela provided a number of advantages in navigating the many planning and implementation challenges of the project, particularly the dynamic socio-politics. Project Isabela survived 10 Galápagos National Park Directors, several Ministers of the Environment, and five Ecuadorian Presidents.

The project was embedded between two institutions, which provided it some autonomy and two potential structures for decision-making. This structure allowed for flexibility, drawing from opportunities and benefits from each of the institutions. For example, the Charles Darwin Foundation acted as a conduit for funding, and enjoyed greater flexibility in budgetary spending than did the Galápagos National Park, allowing the Foundation to cover project costs when needed. The eradication campaign was thus able to continue without breaks despite a lack of funding within the National Park for hunters' salaries at the start of each financial year. The non-profit and diplomatic status of the Charles Darwin Foundation also facilitated contracting outside of Ecuador and importation of firearms and ammunition. Project Isabela's formal affiliation with the Galápagos National Park offered distinct advantages as well, including direct access to the Park's infrastructure, which facilitated efficient logistics such as access to boats and dog kennels.

There were also project advantages achieved by contracting out the aerial component of the eradication campaign. Most importantly, highly skilled personnel and specialised equipment could be efficiently folded into the programme, which allowed additional focus and resources to be spent on more experimental components of the project. An aerial hunting contract also provided some risk sharing. While the risk of eradication failure was carried by Project Isabela, since the FPE was paid per unit of effort (i.e. helicopter hours and a mobilisation component), operational delays and any associated financial risks were borne on the FPE as opposed to Project Isabela.

Not surprisingly, challenges also emerged from this GCA-NGO-FPE partnership. There was added complexity in project planning, particularly the need for coordinating annual budgets. Project Isabela was also vulnerable to potential crisis situations within the Galápagos National Park or the Charles Darwin Foundation. During the project, a large-scale oil spill and a large wildfire overwhelmed staff capacity, and temporarily paralysed Project Isabela.

The use of the intergovernmental agency UNDP as a partner in Project Isabela has yet to be replicated in any other eradication campaign. The UNDP provided a project advantage because of the ability to commit to large cash outlays from a single source. The agency also streamlined large contracts (e.g., helicopter contracts), and provided high-level direction and pressure to keep the project a priority for the various Ecuadorian government agencies. The UNDP did, however, bring added bureaucracy that was more focused on process than on products. As a consequence, commitment to timelines was difficult, and some funds were needlessly consumed while the project awaited the release of additional funding.

Santa Cruz Island (USA): A GCA-NGO-FPE Partnership

Feral pigs were recently removed from Santa Cruz Island, Channel Islands National Park. Santa Cruz Island (24,900 ha) is located off southern California and co-managed by the NGO The Nature Conservancy (TNC) and US-NPS. The eradication campaign, its ground operations run by Prohunt, Inc., removed pigs from the island in fifteen months, followed by 11 months of monitoring (Macdonald and Walker 2008; Morrison *et al.* 2007).

The pig eradication on Santa Cruz Island was a result of GCA-NGO-FPE partnership between the US-NPS, TNC, and Prohunt, Inc. Synergy emerged from this partnership that contributed to the unprecedented speed and effectiveness of the eradication campaign. The US-NPS and TNC shared resources to garner support and approval of the eradication programme, including fundraising, environmental compliance, and public outreach. Local, state, and federal political support was critical for the project, and resources

and expertise were needed to overcome animal welfare challenges throughout the project. Such support ensured operations continued uninterrupted despite multiple legal challenges. Support and leadership on these issues by the US-NPS and TNC allowed Prohunt to focus on the actual removal of feral pigs from the island.

The structure of the eradication contract with Prohunt, Inc. facilitated an effective campaign. With the exception of helicopter fuel and on-island accommodation, which were supplied by US-NPS and TNC, the three-year fixed price end-user contract was straightforward to manage. As long as the contractor did not violate established guidelines (e.g., poison, snares, and lead ammunition were banned) and followed reporting standards, Prohunt was free to adopt a suite of eradication techniques, along with the sequence in which they were applied.

CONCLUSIONS AND RECOMMENDATIONS

Advantages and challenges to successful eradication projects can depend on the type of organisational structure (Table 2). There can be real challenges to collaborations across organisational types in invasive mammal eradications. For example, different cultures can make effective communication difficult. Further, unless roles and responsibility are explicitly defined, diffusing and sharing responsibilities can present a moral hazard and elevate the risk of eradication failure. Based on our experiences, however, the potential advantages of collaboration are often greater than the challenges. Every eradication campaign is unique, with partners often hoping to move a project forward in their own way. No matter which way a project or programme is moved forward, it is important to leverage those advantages, while minimising the challenges in order to mainstream invasive species eradication from islands. Partnering across organisational structures is an effective strategy for leveraging synergies, and successful implementation of island restoration projects.

ACKNOWLEDGEMENTS

CJD thanks the Alcoa Foundation and Island Conservation for support.

REFERENCES

Aguirre-Muñoz, A.; Croll, D.A.; Donlan, C.J.; Henry, R.W.; Hermosillo, M.A.; Howald, G.R.; Keitt, B.S.; Luna-Mendoza, L.; Rodríguez-Malagón, M.; Salas-Flores, L.M.; Samaniego-Herrera, A.; Sánchez-Pacheco, J.A.; Sheppard, J.; Tershy, B.R.; Toro-Benito, J.; Wolf, S. and Wood, B. 2008. High-impact conservation action: invasive mammal eradication from the islands of western Mexico. *Ambio* 27: 101-107.

Barr, D.A. 1995. The effects of organisational structure on primary care outcomes under managed care. *Annals of Internal Medicine* 122: 353-359.

TABLE 2 Some advantages and challenges of eradication campaigns run by government agencies, non-governmental agencies, and for-profit enterprises.

	Govt Conservation Agency	Non-governmental Agency	For-profit Enterprise
<i>Advantages</i>	Special privileges	Fundraising capacity	Less regulation and bureaucracy
	Reliable operational budget	Flexibility (planning & operations)	Incentive for innovation
	Hierarchical and/or simple lines of communication	Independence	Operational flexibility and excellence
<i>Challenges</i>	Lack of experience	Permitting	Risk avoidance
	Subject to political pressures	Fundraising pressure	Limited project control
	Risk averse	Less accountability	Near-sighted investment

- Bell, B.D. 2002. The eradication of alien mammals from five offshore islands, Mauritius, Indian Ocean. In: Veitch, C.R. and Clout, M.N. (eds.). *Turning the tide: the eradication of invasive species*, pp. 40-45. IUCN, SSC, Invasive Species Specialist Group. IUCN, Gland, Switzerland and Cambridge, U.K.
- Campbell, K. and Donlan, C.J. 2005. Feral goat eradications on islands. *Conservation Biology* 19: 1362-1374.
- Campbell, K.; Donlan, C.J.; Cruz, F. and Carrion, V. 2004. Eradication of feral goats *Capra hircus* from Pinta Island, Galápagos, Ecuador. *Oryx* 38: 328-333.
- Carrion, V.; Donlan, C.J.; Campbell, K.; Lavoie, C. and Cruz, F. 2007. Feral donkey (*Equus asinus*) eradication in the Galápagos. *Biodiversity and Conservation* 16: 437-445.
- Collins, J. 2001. *Good to great: why some companies make the leap...and others don't*. Harper Collins, New York, U.S.A.
- Collins, J. 2005. Level 5 leadership: the triumph of humility and fierce resolve. *Harvard Business Review*, July-August, pp. 136-139.
- Cruz, F.; Carrion, V.; Campbell, K.J.; Lavoie, C. and Donlan, C.J. 2009. Bio-economics of large-scale eradication of feral goats from Santiago Island, Galápagos. *Journal of Wildlife Management* 73: 191-200.
- Cruz, F.; Donlan, C.J.; Campbell, K. and Carrion, V. 2005. Conservation action in the Galápagos: Feral pig (*Sus scrofa*) eradication from Santiago Island. *Biological Conservation* 121: 473-478.
- Donlan, C.J. and Wilcox, C. 2007. Complexities of costing eradications. *Animal Conservation* 10: 156-158.
- Donlan, C.J. and Wilcox, C. 2008. Integrating invasive mammal eradications and biodiversity offsets for fisheries bycatch: conservation opportunities and challenges for seabirds and sea turtle. *Biological Invasions* 10: 1053-1060.
- Drucker, P. F. 2004. *The daily Drucker: 366 days of insight and motivation for getting the right things done*. Harper Business. New York.
- Ebbert, S.E. and Byrd, G.V. 2002. Eradications of invasive species to restore natural biological diversity on Alaska Maritime National Wildlife Refuge. In: Veitch, C.R. and Clout, M.N. (eds.). *Turning the tide: the eradication of invasive species*, pp. 102-109. IUCN, SSC, Invasive Species Specialist Group. IUCN, Gland, Switzerland and Cambridge, U.K.
- Fairtlough, G. 2005. *The three ways of getting things done: hierarchy, heterarchy, and responsible autonomy organisations*. Triarchy Press, Dorset, U.K.
- Ferraro, P.J. and Pattanayak, S.H. 2006. Money for nothing? A call for empirical evaluation of biodiversity conservation investments. *PLoS Biology* 4: e105.
- Hardy, C. and Stewart, C. (eds.). 1996. *The handbook of organisation studies*, pp. 642-658. Sage Publications, London, U.K.
- Howald, G. Donlan, C.J.; Faulkner, K.; Ortega, S.; Gellerman, H.; Croll, D.A. and Tershy, B.R. 2010. Eradication of black rats from Anacapa Island. *Oryx* 44: 30-40.
- Howald, G.; Donlan, C.J.; Galván, J.P.; Russell, J.; Parkes, J.; Samaniego, A.; Wang, Y.; Veitch, D.; Genovesi, P.; Pascal, M.; Saunders, A. and Tershy, B. 2007. Invasive rodent eradication on islands. *Conservation Biology* 21: 1258-1268.
- Kessler, C.C. 2002. Eradication of feral goats and pigs and consequences for other biota on Sarigan Island, Commonwealth of the Northern Mariana Islands. In: Veitch, C.R. and Clout, M.N. (eds.). *Turning the tide: the eradication of invasive species*, pp. 132-140. IUCN, SSC, Invasive Species Specialist Group. IUCN, Gland, Switzerland and Cambridge, U.K.
- Macdonald, N. and Walker, K. 2008. A new approach for ungulate eradication: a case study for success. ProHunt Incorporated, Ventura, CA., U.S.A.
- McClelland, P. and Tyree, P. 2002. Eratication: the clearance of Campbell Island. *New Zealand Geographic* 58: 86-94.
- Morrison, S.A.; Macdonald, N.; Walker, K.; Lozier, L. and Shaw, M.R. 2007. Facing the dilemma at eradication's end: uncertainty of absence and the Lazarus effect. *Frontiers in Ecology and Environment* 5: 271-276.
- Roemer, G.W. and Donlan, C.J. 2005. Biology, policy and law in endangered species conservation: II. A case history in adaptive management of the island fox on Santa Catalina Island, California. *Endangered Species Update* 22: 144-156.
- Tershy, B.R.; Donlan, C.J.; Keitt, B.; Croll, D.; Sanchez, J.A.; Wood, B.; Hermosillo, M.A. and Howald, G. 2002. Island conservation in northwest Mexico: A conservation model integrating research, education and exotic mammal eradication. In: Veitch, C.R. and Clout, M.N. (eds.). *Turning the tide: the eradication of invasive species*, pp. 293-300. IUCN, SSC, Invasive Species Specialist Group. IUCN, Gland, Switzerland and Cambridge, U.K.
- Towns, D.R. and Broome, K.G. 2003. From small Maria to massive Campbell: forty years of rat eradications from New Zealand islands. *New Zealand Journal of Zoology* 30: 377-398.
- Wright, A. and de Joux, V. 2003. *Getting results: case studies of innovation in the public service*. Published by Amherst Group Ltd.