Environmental Conservation **26** (3): 212–217 © 1999 Foundation for Environmental Conservation

A survey of ecotourism on islands in northwestern México

B.R. TERSHY[1, 2*], L. BOURILLÓN[3], L. METZLER[4] AND J. BARNES[4]

[1]*Island Conservation & Ecology Group, PO Box 141, Davenport, California 95017, USA,* [2]*Institute of Marine Sciences, University of California, Santa Cruz, California 95064, USA,* [3]*Centro de Conservación y Aprovechamiento de los Recursos Naturales, ITESM-Campus Guaymas, AP 484, Guaymas, Sonora 85400, México and* [4]*Prescott College, 220 Grove Ave, Prescott, Arizona 86301, USA*

Date submitted: 6 April 1998 Date accepted: 13 April 1999

Summary

The >150 islands in north-western México are relatively pristine, but may easily be damaged by unregulated human use. Tourists visit many of these islands, but their numbers and impact are unknown. To examine some of the costs and benefits of ecotourism we sent a questionnaire to 42 ecotourism companies that visit islands in north-western México; 29 respondents reported that tourist days on these islands had increased at >7% yr^{-1}, from <15 000 in 1986 to about 47 000 in 1993. Neither government regulation nor cost of trips were reported to be important impediments to tourism growth. In 1993, ecotourist organizations visiting islands reported spending US$3.7 million, none of which went directly to the protection and management of the islands. We provide several management options to increase the conservation benefits of ecotourism and minimize the negative impacts.

Keywords: Gulf of California, Baja California, human use, conservation, management

Introduction

Islands are of great importance to the conservation of biodiversity, yet they have suffered a disproportionate number of extinctions. Although less than 20% of the world's animal species are restricted to islands, 75% of all recorded animal extinctions since 1600 have been on islands (World Conservation Monitoring Centre 1992).

Like all visitors, ecotourists can have a negative impact on island ecosystems in two ways. They can unintentionally disturb colonial nesting seabirds, breeding pinnipeds and other animals, or trample vegetation (Anderson *et al*. 1976; Anderson & Keith 1980; Hill & Rosier 1989; Hulbert 1990; Burger & Gochfeld 1993; Tershy *et al*. 1997). They can also introduce exotic species, such as plant seeds, ants, spiders, lizards, mice and rats, all of which can stow away in equipment brought ashore (Atkinson 1989). Thus, ecotourism, like other human uses of small islands, must be carefully managed.

* Correspondence: Dr Bernie Tershy, Institute of Marine Sciences, A-316 EMS Bldg, University of California, Santa Cruz, CA 95064, USA Tel: +1 408 459 3610 Fax: +1 408 459 4882 e-mail: tershy@cats.ucsc.edu

Ecotourism can also contribute to regional and national economies (Boo 1990; Groom *et al*. 1991); it can even foster conservation if some of the generated income is invested in protection, or if it increases the value that local people place on small islands and their biota. Therefore, the conservation objective is to maximize the economic and conservation benefits of ecotourism while minimizing its negative impacts on these fragile places (Lindberg 1991).

The >230 islands, islets, and rocks off north-western México (northwest of 18°N, 105°W) have a large number of endemic plants and animals; some are globally important seabird and pinniped breeding colonies, and overall the islands comprise some of the most ecologically-intact archipelagoes in the world (Huey 1964; Soulé & Sloan 1966; Soulé & Yang 1973; Avise *et al*. 1974; Case & Cody 1983; Grismer 1993; Velarde & Anderson 1994; Keitt 1998; Donlan *et al*. in press; McChesney & Tershy in press). The high degree of ecological integrity of these islands is likely to be due to their aridity and geographic isolation, and to the low human population density on much of the adjacent mainland (Tershy *et al*. 1997). In the last 30 years, however, the accessibility and attractiveness of the islands have increased because of a near tripling of the human population on the adjacent mainland, as well as increased road construction, other infrastructure development (Reich 1984), and increased commercial fishing activities. Consequently, the number of people using these islands, and problems associated with human use, appear to be increasing (Velarde & Anderson 1994; Tershy *et al*. 1997), but there are few specific data.

We surveyed the ecotourism organizations that visit islands in north-western México to address three general questions. First, what is the approximate contribution of island-related ecotourism to the regional economy? Second, what factors influence island-related ecotourism? Third, is use of islands in north-western México by ecotourists decreasing or increasing? We combine the results of this survey with information from related studies on human use of islands in north-western México (Bourillón *et al*. 1994; Tershy *et al*. 1997) to discuss the conservation and economic costs and benefits of ecotourism on these islands.

Methods

We developed a 35-item multiple choice and short answer survey for ecotourism organizations visiting islands in north-western México (available upon request from B. Tershy). We sent a trial survey to three organizations whose owners had

expressed interest in the study, then modified the survey based on their suggestions. We developed an initial list of 95 ecotourism organizations from advertisements and personal contacts and mailed the survey to them in June 1994. We also requested information on additional organizations. From survey respondents we learned of an additional 13 organizations to which we sent the survey between June and December 1994.

When an organization did not return the survey after one month, we attempted to contact them by telephone. When unable to contact them by telephone, we tried to learn something about them from individuals involved in ecotourism in north-western México. We also used follow-up telephone interviews to clarify answers to the returned surveys, or in some cases, to complete partially-completed surveys.

We sent surveys to 98 companies, schools and individuals. Fifty-two surveys were returned by the recipients, of which 29 were ecotourism organizations that ran trips to islands in north-western México. We questioned local ecotour operators to learn something about the 47 surveys not returned by recipients. We learned that 17 were no longer in business, 3 did not run trips to islands in north-western México, 14 were unknown and thought to be very small, or not to have run trips to islands in north-western México, and 13 were known to have run trips to islands in north-western México as of 1993. We summarize data only from the 29 respondents who conducted ecotours to islands in north-western México, unless otherwise noted. Because the questionnaires were not answered entirely by all respondents, samples sizes vary amongst questions.

Results

Expenditures in México

The ecotour organizations that responded to our survey reported bringing an estimated 7160 tourists on 427 trips to north-western Mexican islands in 1993. These organizations averaged 14 (SD ± 25) trips each, ranging from 1–140 trips. These trips amounted to ~46 935 tourist days and ~2800 trip days in 1993 (mean duration of trip = 11 ± 22, range 2–120 days). These organizations reported spending US$250–55 000 in México per trip (median = US$4000). The total amount reportedly spent in México during 1993 was US$3 759 450. We divided this by the total tourist days to estimate that about US$80 was spent per tourist day. These expenses did not include meals, gifts and other items purchased directly by the tourists, or international air fares (many organizations do not include international air fares in the costs of their trips).

According to 20 ecotour organizations, their customers vacationed in México independently before or after the tour an average of 2.4 ± 2 days (range 1–7 days). We multiplied the number of customers for each organization by that organization's estimate of what percentage of their customers stayed in México before or after the trip, and for how long. This gave us a crude estimate of about 13 270 additional tourist days generated by ecotourism to islands in north-western México in 1993. We have no data on how much money these tourists spent per day.

The 29 ecotour organizations that responded to our survey reported employing 104 Mexican nationals, but we had no data to estimate the total number of employment days. Most organizations reported employing Mexican nationals as guides/naturalists and boat captains or crew (Fig. 1*a*). On average the organizations reported that ~35% of their employees were Mexican nationals (average 35 ± 30%, range 0–78%). Most organizations reported that English speaking skills were important for increasing the likelihood of hiring more Mexican nationals (Fig. 1*b*).

Factors that influenced ecotourism in northwestern México

Natural history and a clean environment were rated highest amongst factors that attracted customers to north-western México (Fig. 1*c*). Respondents reported wanting to have more natural history and cultural information (e.g. regional brochures, books, videos) available for their trips (Fig. 1*d*), and more language and natural history training for their guides (Fig. 1*e*).

Trash, logistic problems and traditional tourism/vacation home development were the three most important factors that reportedly decreased the quality of trips. Government regulations and the cost of the trip were some of the least important factors (Fig. 1*f*).

Organizations were asked if they would support a voluntary conservation 'tax' collected equally from all groups using the islands and administered by a non-profit, non-governmental organization to support conservation actions and research in the areas they visited. Of the 24 organizations that answered this question, 18 favoured the tax, 3 were against the tax, and 3 answered 'maybe'. Of the 18 respondents that answered yes, 10 thought the tax should be 3% of the daily cost of the trip for each day on an island, 3 respondents thought the tax should be 5%, and 5 would support an unspecified flat fee or donations. None thought the tax should be 7% or higher. Seventy-eight per cent of the respondents reported that their customers would be more willing to pay this tax if it went towards specific definable conservation projects.

Growth of ecotourism to islands in north-western México

More than 30% of all organizations had been in business for less than four years, and more than 50% for less than 10 years (Fig. 2). The data are consistent with a rapid increase in the number of ecotourism providers, or with most companies going out of business after four years of operation. Most of the new organizations ran trips in which tourists travelled to and from the islands in sea kayaks.

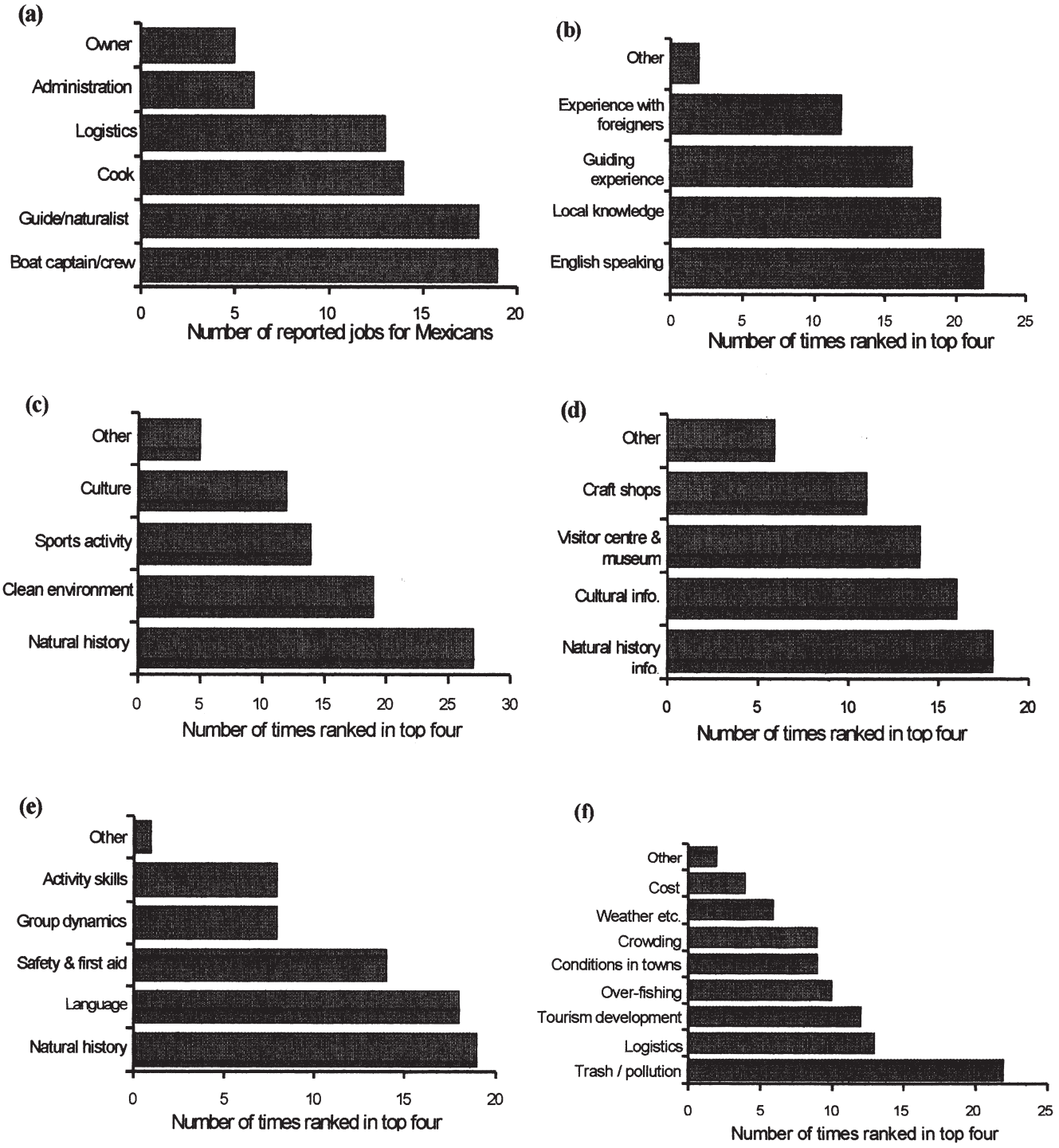

Figure 1 Survey responses. (a) Number of Mexican nationals employed in several categories by ecotourism organizations that visit islands in north-western México (employment may be year round, seasonal or temporary). (b) Factors that would reportedly make ecotourism organizations more likely to hire Mexican nationals. (c) Most important things that attract ecotourists to islands in north-western México. (d) Facilities and information that would increase the quality of ecotourism to islands in north-western México. (e) Training that ecotour organizations would like their guides to have. (f) Factors that decrease the quality of ecotourists' experience on trips that visit islands in north-western México.

Significantly more organizations said that the number of their customers had increased rather than decreased in the last 3, 5, and 10 years (3 years = 23 increase : 1 decrease, $p < 0.001$; 5 years = 17 increase : 2 decrease, $p = 0.005$; 10 years = 16 increase : 0 decrease, $p < 0.001$; all tests two-tailed binomial probability tests).

https://doi.org/10.1017/S0376892999000296 Published online by Cambridge University Press

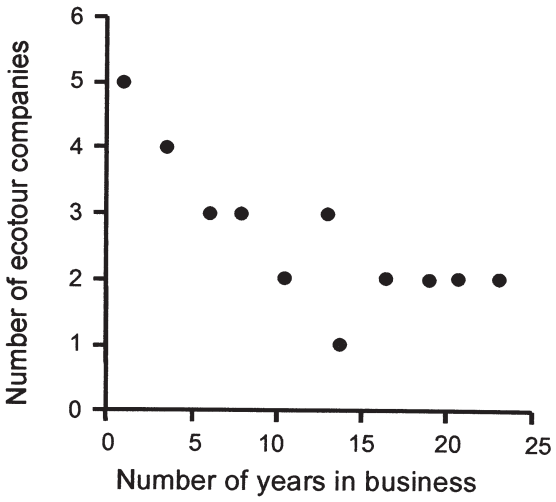

Figure 2 Growth of the number of ecotourism organizations visiting islands in north-western México. Data are number of companies that reported having been in business for each two-year period from 1–2 years through 21–22 years.

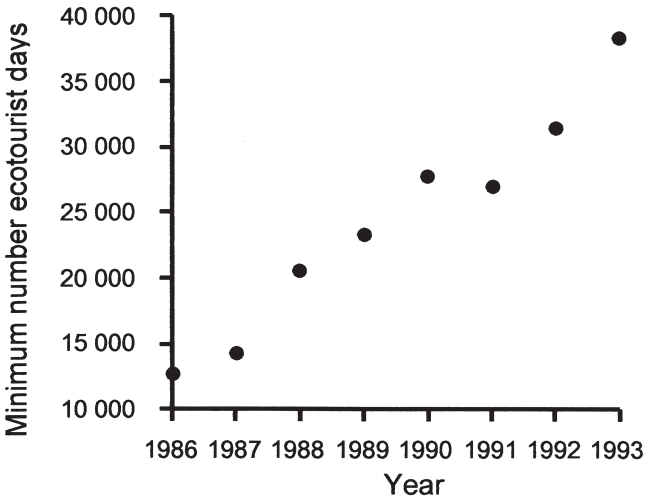

Figure 3 Growth of ecotourism to islands in north-western México as measured by the number of ecotourist days from 1986–93.

The number of ecotourist days on islands in north-western México increased at an average of 3422 user days per year between 1986 (the earliest year from which all organizations in business in that year reported) and 1993 (Fig. 3). We used simple linear regression to calculate the average increase in reported user days since 1986 (slope = 3422, $r^2 = 0.981$, $F = 149.1$, $p < 0.0001$). Because we were unable to get data on user days from any of the out-of-business organizations, this measure is susceptible to under-reporting of past user days. However, from our conversations with people familiar with the local ecotourism industry, it appears that only one of the out-of-business organizations brought more than 150 customers a year to islands in north-western México. At least two of the organizations that did not respond to our surveys brought more than 150 ecotourists a year to islands in north-western México. Thus, we believe that Figure 3 shows a conservative trend in the increase in ecotourism user days on islands in north-western México.

Discussion

Small island ecosystems are susceptible to human use, and the negative impacts of visitors can be extreme. Thus, the number of visitors that can visit a small island without causing significant damage is often much lower than in comparable continental areas. For relatively pristine islands, or islands with colonially breeding animals, even a few visitors can cause significant disturbance. Ecotourists, however, are eager to visit islands and may be willing to pay handsomely for this privilege. Because ecotourism has the potential to contribute to the conservation of islands and to local economies, tourism officials and managers of protected areas are faced with the difficult task of allowing some ecotourism, but managing it to cause the least possible harm to island biota.

The data from our survey indicate that with respect to north-west Mexican islands, both the number of ecotourism organizations (especially kayaking organizations that often camp on the islands) and the number of ecotourists have increased steadily in recent years. Current levels of regulation have not placed an intolerable burden on ecotourism organizations, and additional regulation may be necessary to limit visitor-caused disturbance and other negative impacts. Certainly, policies to encourage ecotourism to islands in north-western México would appear to be unnecessary.

Because it can be politically difficult to set the number of permitted visitors below current levels of use (Kenchington 1989), it may be easier to establish the lowest possible numbers of permitted visitors on north-west Mexican islands now. Once established, these numbers can always be adjusted upwards, but may be difficult to adjust downwards.

The impact of ecotourists on small islands is determined by their total number and behaviour. Tershy *et al.* (1997) found that some ecotour companies were able to bring carefully controlled groups onto San Pedro Mártir Island in the Gulf of California with only minor negative impacts, while other groups caused significant disturbance whenever they landed on the island. Camping on islands, transporting equipment, food and other supplies onto islands, and closely approaching sensitive wildlife are all activities that increase

the likelihood that ecotourists will harm small island ecosystems (Tershy *et al*. 1992, Bourillón *et al*. 1994). The most sensitive islands in north-west México can be safely enjoyed by ecotourists from a small skiff or kayak, without ever having to land (Tershy *et al*. 1997). Thus guidelines or regulations that address the behaviour and activities of ecotourists on the islands of north-west México can dramatically decrease the negative impacts of ecotourism without affecting its beneficial contribution.

Tourism-related facilities on the islands of north-west México, such as landing piers, storage buildings and living areas, may increase the likelihood of introduced species reaching the island and becoming established (Smallwood 1994). They can also detract from the feeling of wilderness and a clean unspoiled environment which attract many ecotourists to the islands.

Kenchington (1989), Lindberg (1991) and Groom *et al*. (1991) have all emphasized that the competition for a limited resource, which has plagued open access fisheries, can also be detrimental to protected areas if ecotourism is an open access industry. Placing limits on the number of ecotourism organizations visiting the islands of north-west México (a limited entry industry) could make it easier to enforce regulations on the number of permitted visitors and their activities. Limited entry could also encourage ecotourism organizations to develop voluntary conservation and service guidelines above and beyond those mandated by the National Institute of Ecology (INE), which manages the protected islands in north-western México, and by the Secretariat of Tourism (SECTOUR), which promotes and regulates tourism in México (Kenchington 1989; Lindberg 1991).

Current ecotourism to islands in north-western México provides no formalized direct benefits to the conservation of the islands, however, several organizations voluntarily pick up trash on islands, and the two largest organizations, Baja Expeditions and Special Expeditions, have donated valuable ship time for workshops on the management of the islands. The potential indirect benefits of ecotourism to the islands may also be minimal because most of the islands are formally protected, uninhabited, and have few terrestrial resourses that can be economically exploited. Consequently, there is little pressure for non-ecotourism related developoment on the islands.

If the indirect conservation benefits of ecotourism are minimal, then emphasis should be placed on maximizing direct benefits. The current system of independently initiated voluntary contributions is important and should be encouraged. However, in an open access industry, companies that 'cheat' by not making voluntary contributions may be at a distinct competitive advantage (Lindberg 1991). Establishing formalized voluntary user fees may significantly increase the benefit of ecotourism to the islands of north-west México. Studies of ecotourism have shown that most protected area entrance fees are well below what foreign tourists are willing to pay (e.g. Boo 1990; Lindberg 1991). If money from user fees were used to support enforcement of conservation regulations, island restoration projects or other forms of island protection and management, the overall benefit of ecotourism to these island ecosystems could be significant. Most of the companies that responded to our survey indicated that they would be willing to pay a 3% user fee if it were administered by a non-profit, non-governmental organization. In 1993, such a fee would have provided more than US$100 000 for the management of north-west México islands.

Ecotourism that is managed to maximize only short-term economic benefits can eventually cause the degradation of the protected areas which attracted the ecotourists in the first place. Thus, in the long term, there may be no conflict between maximizing both the conservation and economic benefits of ecotourism (Lindberg 1991). However, because the future is uncertain, long-term advantages are often discounted, and most economic and political decisions are based on short-term benefits. Fortunately, even in the short-term it may be possible to maximize both the conservation and economic benefits of ecotourism by the careful use of user fees (Lindberg 1991), or by selection for organizations that spend more money in México per user day and have an equal or lower impact on the islands.

Acknowledgements

We thank the many people working in ecotourism organizations whose love and concern for the islands of north-western México were expressed by the hours they spent filling out our survey and providing us with additional information. We especially thank Greg Meyer of Great Expeditions for sharing his expertise on ecotourism. We also thank Barbara Johnston, Dawn Breese, Don Croll, and Marisol Tordesillas for their reviews of the manuscript. Funding was provided by the Environmental Projects Fund of the British Embassy to México.

References

Anderson, D.W. & Keith, J.O. (1980) The human influence on seabird nesting success: conservation implications. *Biological Conservation* **18**: 65–80.

Anderson, D.W., Mendoza, J.E. & Keith, J.O. (1976) Seabirds in the Gulf of California: a vulnerable international resource. *Natural Resources Journal* **16**: 483–505.

Atkinson, I. (1989) Introduced animals and extinctions. In: *Conservation for the Twenty-first Century,* ed. D. Western & M.C. Pearl, pp. 54–75. New York, USA: Oxford University Press: 365 pp.

Avise, J.C., Smith, M.H., Selander, R.K., Lkawlor, T.E. & Ramsey, P.R. (1974) Biochemical polymorphism and systematics in the genus *Peromyscus*. V. Insular and mainland species of the subgenus Haploylomys. *Systematic Zoology* **23**: 226–38.

Boo, E. (1990) *Ecotourism: the Potentials and Pitfalls.* Washington, DC, USA: World Wildlife Fund: 77 pp.

Bourillón, L., Valdés, C. & Tershy, B.R. (1994) Evaluation and regulation proposal of the human activities in the Midriff Islands Region of The Gulf of California, México Project No. 19723.

Unpublished report, World Wildlife Fund, Washington, DC, USA: 52 pp.

Burger, J. & Gochfeld, M. (1993) Tourism and short-term behavioural responses of nesting masked, red-footed, and blue-footed, boobies in the Galápagos. *Environmental Conservation* **20**: 255–9.

Case, T.J. & Cody, M.L., eds. (1983) *Island Biogeography in the Sea of Cortez.* Berkeley, USA: University of California Press: 508 pp.

Donlan, C.J., Tershy, B.R., Keitt, B.S., Sanchez, J.A., Wood, B., Weinstein, A., Croll, D.A., Hermosillo, M.A. & Aguilar, J.L. (in press). *Proceedings of the Fifth California Islands Symposium. March 29 to April 1, 1999. Santa Barbara Museum of Natural History*. Santa Barbara, California: Santa Barbara Museum of Natural History.

Grismer, L.L. (1993) The insular herpetofauna of the Pacific coast of Baja California, Mexico. *Herpetological Natural History* **1**: 1–10.

Groom, M.J., Podolsk, R.D. & Munn, C.A. (1991) Tourism as a sustained use of wildlife: a case study of Madre de Dios, Southeastern Peru. In: *Neotropical Wildlife Use and Conservation,* ed. J.G. Robinson & K.H. Redford. Chicago, USA: University of Chicago Press: 520 pp.

Hill, G. & Rosier, J. (1989) Wedgetailed Shearwaters, White-capped Noddies and tourists development on Heron Island, Great Barrier Reef Marine Park. *Journal of Environmental Management* **29**: 107–14.

Huey, L.M. (1964) The mammals of Baja California. *Transactions of the San Diego Society of Natural History* **13**: 85–168.

Hulbert, A.R. (1990) The response of Ruddy Shelduck, *Tadorna ferruginea,* to tourist activity in the Royal Chitwan National Park of Nepal. *Biological Conservation* **52**: 113–23.

Keitt, B. (1998) Ecology and conservation biology of the Black-vented Shearwater (*Puffinus opisthomelus*) on Natividad Island, Vizcaino Biosphere Reserve, Baja California Sur, Mexico. M.Sc. thesis, University of California, Santa Cruz: 89 pp.

Kenchington, R.A. (1989) Tourism in the Galápagos Islands: the dilemma of conservation. *Environmental Conservation* **16**: 227–36.

Lindberg, K. (1991) *Policies for Maximizing Nature Tourism's Ecological and Economic Benefits*. Washington, DC, USA: World Resources Institute: 37 pp.

McChesney, G.J. & Tershy, B.R. (in press) History and status of introduced mammals and impacts to seabirds on the California Channel and Northwestern Baja California Islands. *Colonial Waterbirds.*

Reich, P.L. (1984) *Statistical Abstract of the U.S. Mexico Borderland*. Los Angeles, USA: UCLA Latin America Center Publications: 179 pp.

Smallwood, K.S. (1994) Site invasibility by exotic birds and mammals. *Biological Conservation* **69**: 251–9.

Soulé, M. & Sloan, A.J. (1966) Biogeography and distribution of the reptiles and amphibians on islands in the Gulf of California Mexico. *Transactions of the San Diego Society of Natural History* **14**: 137–56.

Soulé, M. & Yang, S.Y. (1973) Genetic variation in the side-blotched lizards on islands in the Gulf of California. *Evolution* **27**: 593–600.

Tershy, B.R., Breese, D., Angeles, A., Cervantes, M., Mandujano, M., Hernández, E. & Córdoba, A. (1992) Natural history and management of Isla San Pedro Mártir. Unpublished report to Conservation International-México, 59-A Col. Miramar, Guaymas, Sonora, Mexico 85450: 83 pp.

Tershy, B.R., Breese, D. & Croll, D.A. (1997) Human perturbations and conservation strategies on San Pedro Mártir Island, Islas del Golfo de California Reserve, México. *Environmental Conservation* **24**: 261–70.

Velarde, E. & Anderson, D.W. (1994) Conservation and management of seabird islands in the Gulf of California: setbacks and successes. In: *Seabirds on Islands: Treats, Case Studies & Action Plans,* ed. D.N. Nettleship, J. Burger & M. Gochfeld, pp. 229–43. Cambridge: ICBP Technical Publication: 318 pp.

World Conservation Monitoring Centre (1992) *Global Biodiversity: Status of the Earth's Living Resources*. London, UK: Chapman and Hall: 594 pp.