

Wildlife Viewing Spectacles: Best Practices from Elephant Seal (*Mirounga* sp.) Colonies

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Abstract

Wildlife viewing spectacles that are accessible to the public are immensely popular, raise revenue, contribute to livelihoods, create awareness, and often support conservation. When spectacles are in the commons, they are vulnerable to overuse and ruin. Our aim was to identify best practices that provide access to the animals without disturbing them. Herein, we examine spectacles where thousands of people may view thousands of wild animals at predictable sites and times. We describe the viewing programs at three distinct sites where elephant seals (*Mirounga* sp.) breed: Año Nuevo and Piedras Blancas in California, and Península Valdés in Argentina. We compare the viewing operations with respect to mission, resources and accessibility, and the relationship between viewer number and colony growth, and then we report on the quality of the viewing experience. For best practices, we drew on 67 years of summed field research on these animals by both of us and with our familiarity with viewing programs at these sites. We conclude that five practices reduce viewer impact and enhance the viewing experience: (1) restricting visitor numbers and access to the animals; (2) monitoring impact of viewing on the animals and their habitat; (3) encouraging fundamental research of the animals on site; (4) using trained volunteer guides to interpret the attraction when possible; and (5) requiring independent oversight of commercial operations. All wildlife viewing operations could benefit from adherence to these practices when applicable. At their best, wildlife viewing spectacles are a showcase for sound conservation management and provide an inspirational experience that, for many, is akin to visiting the most sacred cultural places of humankind.

Key Words: wildlife watching, wildlife tourism, elephant seals, *Mirounga* sp., Año Nuevo, Piedras Blancas, Península Valdés

Introduction

Animals that gather in large aggregations are vulnerable to exploitation by humans for food or profit. In the 16th century, seabird rookeries were pillaged for meat, eggs, feathers for down or quill pens, and guano for fertilizer. A century or two later, shore-breeding marine mammals were killed for food, ivory, fur, and oil. In the 19th and the early part of the 20th centuries, the scale of exploitation was so great that many animal populations were decimated. In recent times, the focus has shifted from harvesting wildlife for resources to viewing animal aggregations for pleasure, entertainment, or knowledge. The most popular wildlife attractions are large terrestrial African mammals, whales, dolphins, and colonial nesting birds (Hoyt, 1993; Rivarola et al., 2001; Yorio et al., 2001; Okello et al., 2008). The cultural and economic benefits of wildlife watching are immense, and such activities have increased exponentially in the last two decades (Hoyt, 1992; Tapper, 2006). Consequently, the well being of the wildlife involved, along with their food resources and habitat, must be protected.

When large groups of animals are accessible, stationary, and predictable in space and time, thousands of people may observe thousands of animals on a daily basis at a single site. Viewing spectacles of this kind represent the extreme end of the dimension of wildlife watching. Predictability allows planning and facilitates global tourism. Pinniped-focused tourism is a rapidly growing economic attraction worldwide (Hoyt, 1992; Kirkwood et al., 2003). The main factor restricting seal and sea lion tourism is access to viewing sites.

Herein, we describe public viewings of large groups of elephant seals (*Mirounga* sp.) that gather annually to breed at three accessible mainland sites, some close to large human populations.

Because the elephant seal spectacles we describe are located in public parks, they are vulnerable to the excess use referred to metaphorically as the *tragedy of the commons* (Hardin, 1968). When parks are treated as open-access public resources, and tourists come in massive numbers, the values visitors seek may be steadily eroded, and the animals and their habitat are negatively impacted (Hoyt, 1993; Campbell et al., 2011). Analysis of viewing programs for elephant seals is a case study that provides valuable perspectives in the operation of sustainable conservation practices in many animals.

Background Information on Elephant Seals

There are two species of elephant seals: (1) the northern elephant seal (*M. angustirostris*), which inhabits the northern hemisphere in eastern Pacific waters; and (2) the southern elephant seal (*M. leonina*), which inhabits the southern hemisphere in circumpolar waters. The two species are similar in appearance and biology (Le Boeuf & Laws, 1994), but the southern species is larger. Both species were heavily exploited by sealers for oil rendered from their blubber during the 19th century, and their population continues to recover from these depredations. Historically, northern elephant seals avoided the mainland, where they were exposed to terrestrial predators such as bears and wolves. Today, these predators are no longer common, and the mainland presents attractive breeding and resting sites, which the elephant seals are colonizing. Elephant seals are most attractive to tourists during the annual 3-mo-long breeding season. The northern species breeds from December through mid-March and the southern species from mid-August through November (Le Boeuf & Laws, 1994). The elephant seals, which congregate predictably on coastal sites, provide an extraordinary and unique opportunity for viewers, comparable to wildlife viewing of large animals in Africa. Adult males in the north weigh over 1,800 kg; in the south, they are even heavier and may be up to 5 m long. Males engage in ferocious fights to attain high status in dominance hierarchies that give access to females and mating. The much smaller females arrive pregnant, gather in large groups or harems, give birth, nurse their pups for 4 wks, copulate, then return to sea to feed, weaning their pups by leaving them on the beach.

Methods

We describe the viewing programs for *Mirounga* at three rookeries: Año Nuevo (AN) and Piedras Blancas (PB) in California, and Península Valdés (PV) in Patagonia, Argentina (Figures 1a, 2a & 3a). We compare these sites with respect to mission, location *vis á vis* human habitation, viewing

operations, and the growth trend in elephant seal and tourist numbers, which reflects, in part, the effect of viewing on the animals.

We sought to determine whether tourists impacted the elephant seals by examination of tourist numbers and seal numbers over time, as well as by the direct observation of animals over decades. We reasoned that if seal numbers declined as tourists increased over the years, this would suggest a negative impact of viewers on pup production and restrict colony growth, given that other factors such as weather and predation could be ruled out. We obtained data on the number of pups born annually from our own research at AN and PV, from the literature (Condit et al., 2007; Ferrari et al., 2012), and from colleagues (R. Condit, P. Morris, and G. Oliver for recent counts at AN; and B. Hatfield via Friends of the Elephant Seal for PB). The number of pups born reflects the status of a colony, from which one can calculate the number of total animals associated with the colony (Condit et al., 2007). At each site, censuses of pups and total animals, by age category and sex, were conducted weekly or at optimal times during the breeding season beginning with initial colonization and spanning the entire colony's history.

We obtained data on the number of tourists viewing the elephant seals and visiting the sites daily from records kept by rangers and archivists with the California Department of Parks and Recreation at AN, the Friends of the Elephant Seal at PB, and the Administradora del Área Natural Protegida for PV. All observations on disturbance were opportunistic and judgemental (i.e., not quantified). In the field, however, we had myriad opportunities to observe whether the elephant seals were disturbed by the presence of viewers. Obvious signs of disturbance are staring or rearing up and vocalizing in the direction of threat, moving away, or charging the viewer. We queried rangers and guides who were present at the sites daily on whether they observed viewers disturb the elephant seals and, if so, under what conditions.

We did not set out to identify and quantify the best practices for operating viewing programs of elephants seals sustainably or to collect systematic data from tourists about their viewing experience. Rather, over the course of 67 total years of studying elephant seals and observing the viewing operations at each of the sites, we identified practices that best protected the animal's welfare while also providing a high-quality wildlife viewing experience. We conducted research annually at two of the three sites soon after they were colonized by elephant seals and before or soon after viewing programs were established for the public: BL directed research at AN from 1968 to 2008, while CC directed research

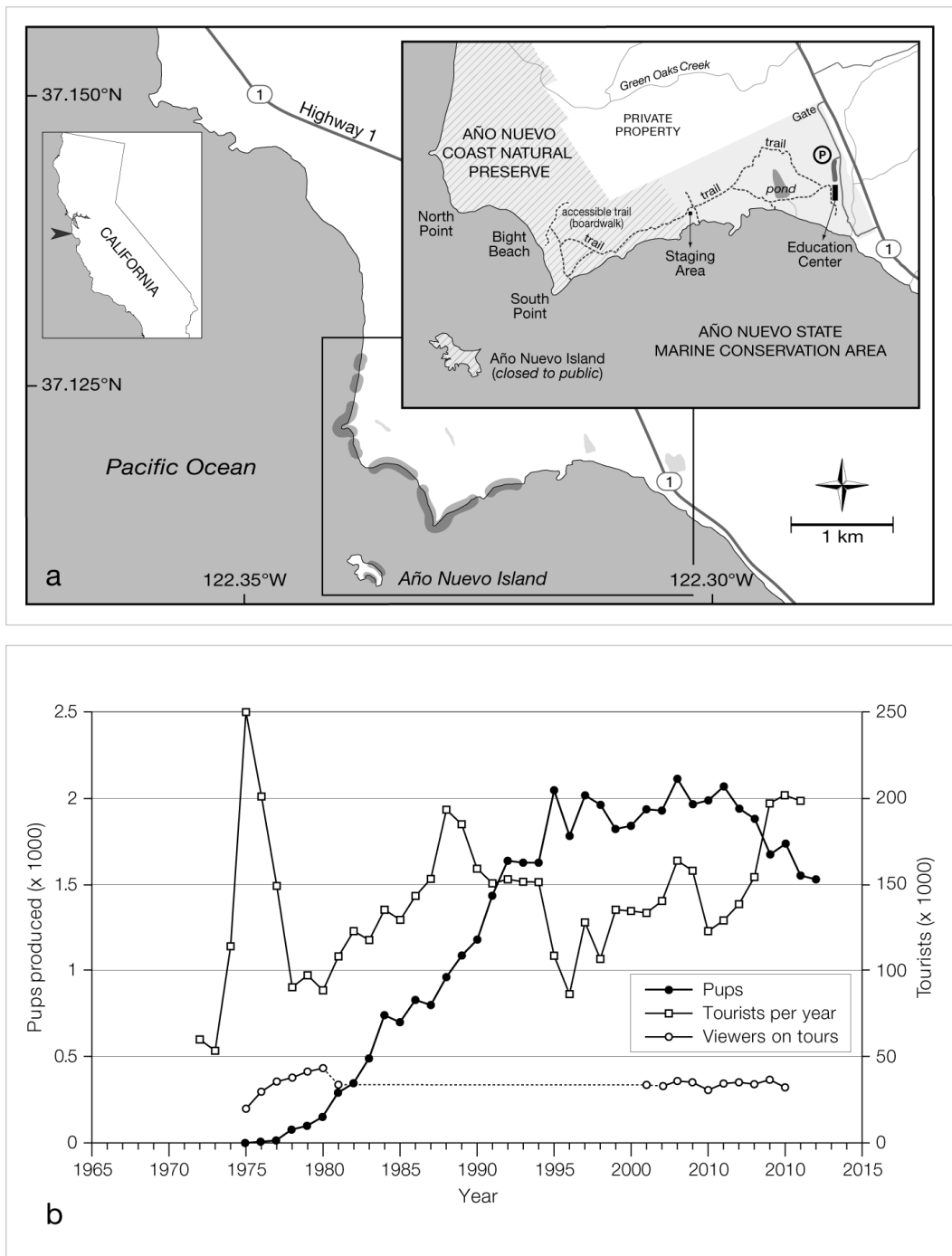


Figure 1. Año Nuevo Coast Natural Preserve in California showing (a) a schematic representation of the distribution of elephant seals at the peak of the breeding season (dark areas) and elements of the tour program such as the entrance to the reserve, parking (P), the Marine Education Center, and walking trails to the elephant seal viewing areas; and (b) number of pups produced at Año Nuevo (closed circles); total number of visitors to the park per year (open squares); and number of tourists visiting the elephant seals during the breeding season, mid-December through March (open circles), with the dotted line giving the mean number of viewers on tour from 1982 to 2002.

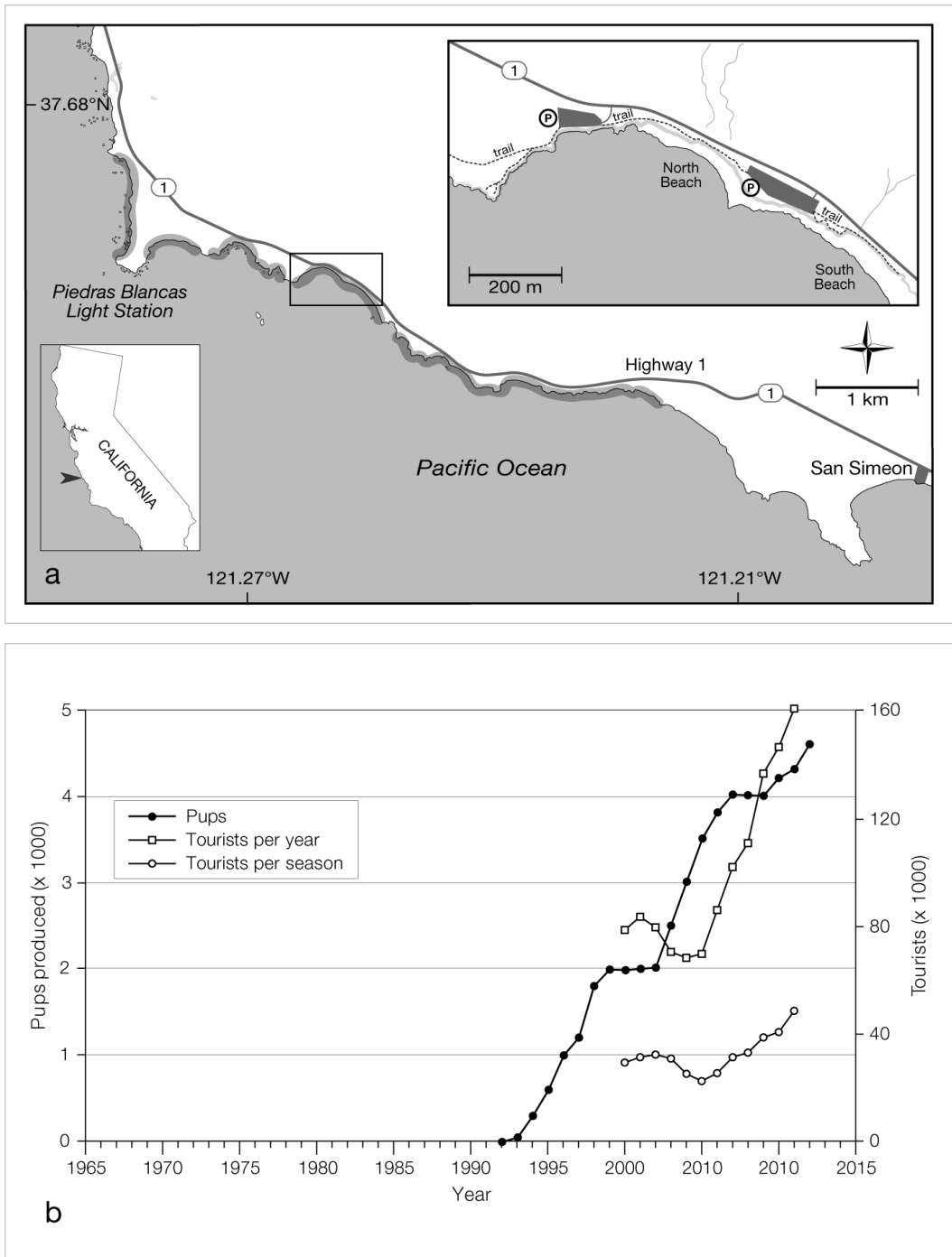


Figure 2. The Piedras Blancas site in California showing (a) a schematic representation of the viewing area, boardwalk trail, parking lots (P), and the distribution of elephant seals at the peak of the breeding season (dark areas); and (b) number of pups produced (closed circles), total number of visitors per year in contact with docents (open squares), and number of tourists visiting the elephant seals and in contact with docents during the breeding season (open circles).

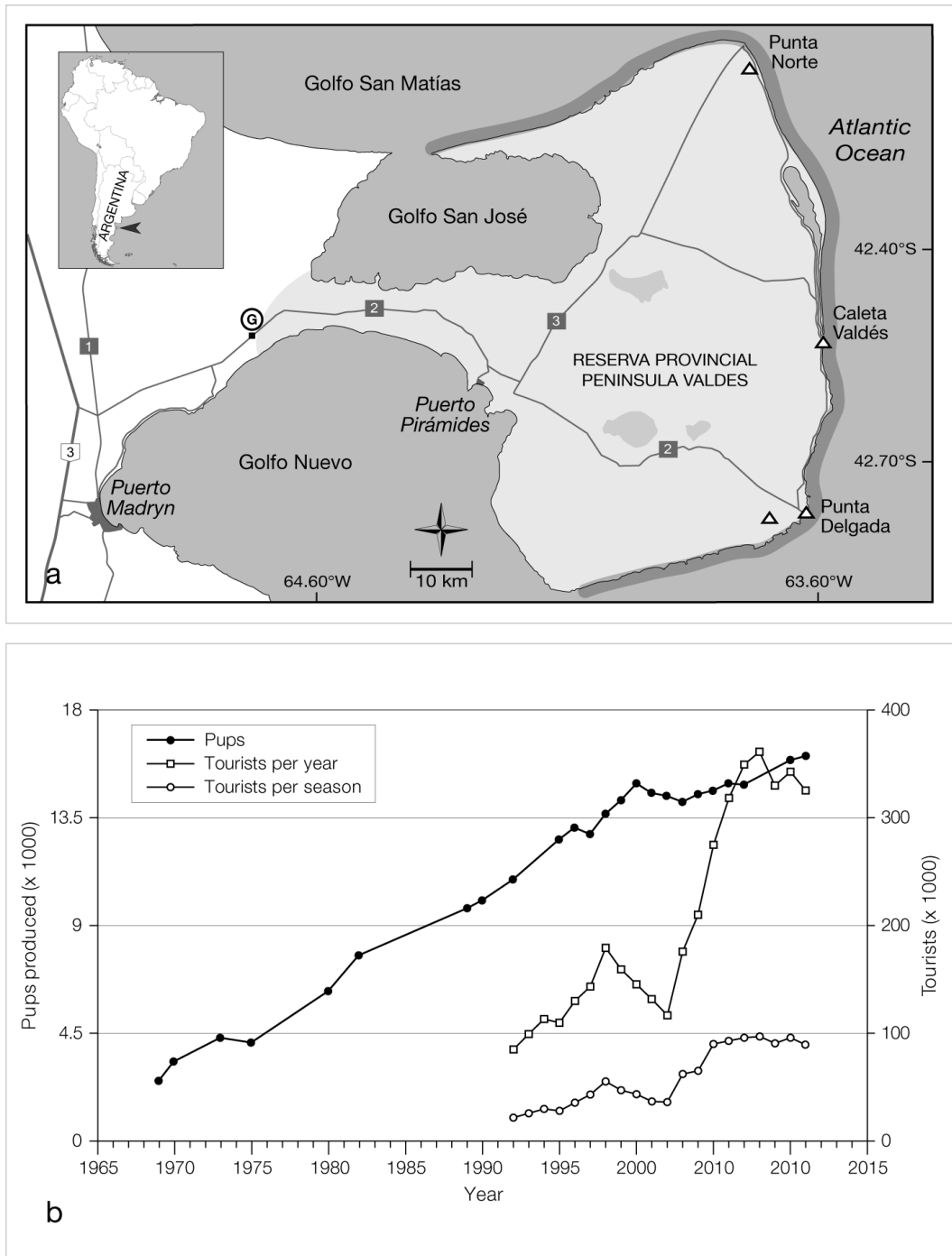


Figure 3. The Península Valdés site in Argentina showing (a) a schematic representation of the distribution of elephant seals at the peak of the breeding season (dark areas), the gate entrance to the park (G), the roads (2 & 3), and the principal viewing areas (triangles); and (b) number of pups produced (closed circles), total number of tourists per year (open squares), and number of tourists visiting the elephant seals during the breeding season (open circles).

at PV from 1988 to 2012. From these perspectives, we observed the viewing operations during the elephant seal breeding seasons over time, communicated weekly changes in colony numbers from censuses conducted by us and our colleagues and students to the operators, and advised managers of the viewing programs on elephant seal matters. In particular, BL advised on the viewing program at AN while it was being developed. We both had experience working at both sites. In addition to our work at AN and PV, we also observed the elephant seals and the viewing program at PB during 15 visits to the site conducted over the last 20 y. At each of the three sites, we queried the site managers, guides, and rangers on their operations and their opinions on the effects of visitors on the elephant seals; and we questioned viewers about their motivations for visiting the sites, their expectations, and their rating of the experience. It is from this prolonged and close exposure that we inferred best practices in viewing operations.

We submit that it is useful to consider the categories of participants and their interests in the comparisons that follow from our analyses. This terminology, or the “cast” of a wildlife viewing spectacle, reveals much about the scenarios of interaction between the humans and elephant seals at each site. We use the following terms:

- *The Attraction* – the elephant seals
- *The Customers* – the tourists
- *The Enforcers* – rangers of the state or guards of private land who enforce the rules for viewing the attraction
- *The Interpreters* – docents, guides, or students who interpret the attraction and associated natural history for the customers
- *The Researchers* – scientists who monitor and study the attraction and provide the information that the interpreters deliver to the customers
- *The Providers* – those who transport customers to the attraction and provide amenities (food, drink), necessities (lodging, garbage collection), or special access, or the owners of private land who offer viewing
- *Other Stakeholders* – includes local business people, representatives of the community, and nongovernmental organizations (NGOs)

Results

Study Sites

Año Nuevo, California—Año Nuevo State Park (AN) is controlled by the California State Department of Parks and Recreation; the rangers enforce the viewing program. The park is located on one of the highest populated coastlines in the

United States (Figure 1a). The entrance to the park on Highway 1 provides easy access to the customers from San Francisco to the north and the Monterey Bay communities to the south. The attraction is a 30-min walk from the park entrance.

- *History* – Northern elephant seals colonized Año Nuevo Island in 1961 (Radford et al., 1965), and research on the elephant seals in the area has been continuous since that time. In 1975, the elephant seals began breeding on the adjacent mainland at AN (Le Boeuf & Panken, 1977). That winter, thousands of tourists converged on the park to see the elephant seals. The park staff was overwhelmed, and rangers opted to restrict public access to the beaches and enlist volunteer students from the nearby University of California at Santa Cruz to guide groups of tourists to view the elephant seals. The students were trained by rangers on park regulations, such as staying on the trails and getting no closer than 8 m from any elephant seal, and by researchers studying elephant seal biology. The student guides received class credit at UC Santa Cruz for mastering and learning to interpret background information on the area’s history and ecology for park visitors (Le Boeuf & Kaza, 1981). After a decade of conducting tours at AN, trained docent volunteers replaced student guides as interpreters.

- *Mission* – The aim at AN is to create opportunities for high-quality outdoor recreation while aligning with the California State Parks’ mission “to preserve, protect, restore, interpret and manage the unit’s archaeological, cultural, natural, aesthetic and scenic resources, features and values, making them available to the public for their educational, inspirational and recreational benefits” (see www.parks.ca.gov/?page_id=523).
- *Operations* – The tour program was initiated in the mid-1970s and continues today. All visitors during the winter breeding season must be part of a guided tour that is reserved in advance and led by a trained interpreter. Up to 25 tours are led daily, with each tour limited to 20 people. The cost of entering the park is \$10/d to park a car and \$7/person to reserve a place on a tour. Funds collected from customers during the elephant seal breeding season averaged \$218,000/y during the last decade, most of which went into a general state fund with only a fraction earmarked to return to this park. Outside of the breeding season, tourists may view the elephant seals by walking to designated viewing areas where an interpreter is on site to answer questions. Tours begin at the Visitor Center (Figure 1a), which provides information, merchandising, and restrooms.

The round trip guided elephant seal walk at AN is 4.8 km and takes 2.5 h to complete.

Tours are led to one or more sites overlooking the attraction—an elephant seal harem located in the sand dunes on the shoreline (Figure 4a). Viewers may view the elephant seals from as close as 8 m—a distance that does not arouse the elephant seals, is safe for people, and affords a good perspective (Le Boeuf & Kaza, 1981). The way to the lookouts is flexible because the paths are often blocked by elephant seals moving about in the dunes and around harems.

Interpreters explain the behavior and provide up-to-date information on elephant seal numbers and research findings, which they receive from researchers, and information on local natural history. The information may include number of pups born to date, identifying the alpha male in the dominance hierarchy, recent births or a female about to give birth, and recent published findings of behavior at sea (e.g., Le Boeuf et al., 2000).

The docent corps at AN consists of 200 volunteers. Interpreters complete a rigorous 10-wk training program (see www.parks.ca.gov/?page_id=25259), and classes are taught by elephant seal and natural history experts using a textbook designed for this purpose (Le Boeuf & Kaza, 1981). More than half of the guides are experienced, having been in the program for 10 y or more.

- *Elephant Seal and Visitor Numbers* – The number of viewers at AN had no noticeable effect on pup production or colony growth. Pup numbers at the mainland rookery increased rapidly from one in 1975 to over 2,000 in 1995 and then stabilized at slightly under 2,000 pups after 2006 (Figure 1b) (Le Boeuf et al., 2011). Since 1995, up to 8,800 elephant seals (including 1,500 to 2,000 pups) were present for viewing each year. In contrast, the number of visitors on tour viewing the elephant seals during the breeding season over the last 35 y was stable, averaging 31,500/y (Figure 1b). Overall, tours were filled at approximately 60% of maximum capacity, owing mainly to inclement weather.

A comparison of tourist and seal numbers at the most frequently viewed harem, the Tar Sands harem, also suggests that the number of viewers had no noticeable effect on pup production. While customers were stable each year, the peak number of female elephant seals varied in the range of 300 to 500 over the last two decades. This annual variation in peak females and pups at this harem was similar to that observed in the entire colony (i.e., all harems) (Le Boeuf et al., 2011).

Piedras Blancas, California—PB is in Hearst San Simeon State Park, which controls most

of the land west of Highway 1. Elephant seals congregate along the beaches in this region. The California state transportation system owns the parking lots near the elephant seal rookery, and the beaches run parallel to the Pacific Coast Highway (Highway 1), giving easy access to thousands of drivers passing by during the elephant seal breeding season (Figure 2a). Visitors simply park their cars, walk a few meters, and have access to the attraction—up to a thousand or more elephant seals packed tightly on the beaches a few meters below a fenced-in boardwalk (Figure 4b).



Figure 4. Photographs showing (a) viewers on a tour viewing elephant seals at Año Nuevo under guidance of two docent/interpreters (red jackets) (Photo by Frank S. Balthis); (b) the view from the boardwalk at Piedras Blancas, showing the proximity of Highway 1 at the upper left, the main parking lot in the upper middle, and main breeding beach at upper right (Photo by Burney J. Le Boeuf); and (c) a private viewing of elephant seals at Península Valdés (Photo by Agustín Ayuso).

Highway 1 is as close as 10 to 20 m from the elephant seals with the boardwalk in between. This spectacle has been described as “a sight one would normally associate with some exotic locale in National Geographic” (www.amwest-travel.com/awt_pbseal.html).

- *History* – Northern elephant seals first appeared on the beaches at PB in 1990, and the first pup was born in 1992 (Figure 2). Because these beaches are so close to the highway, the initial problem was to keep the people and elephant seals separated. This was addressed by highway relocation in 1997 and boardwalk construction in 2003.
- *Mission* – The PB colony and the elephant seal-viewing operation is overseen by one to two park rangers who enforce the regulations, but the day-to-day operation of the spectacle is managed by volunteer docents who belong to a stakeholder, the Friends of the Elephant Seal NGO. The mission of this NGO is “dedicated to educating people about elephant seals and other marine life and to teaching stewardship for this special place called the Central Coast of California” (see www.elephantseal.org).
- *Operations* – About 100 volunteer docents are trained to act as interpreters at PB (www.elephantseal.org). Approximately three to four interpreters are on-site daily during the 3-mo breeding season. Enforcers and interpreters get updates on seal numbers every 2 wks from a researcher associated with the U.S. Geological Survey.

The number of tourists viewing the elephant seals is limited by availability of parking. Two parking lots adjacent to the viewing site hold 220 cars (Figures 2a & 4b). There is no charge to stop at this vantage point to observe the elephant seals. An interpreter meets tourists as they approach the attraction and answers questions. Docents count the number of tourists spoken to daily, which is recorded as tourists who visit the site; it is estimated that three to four times this number are not met by an interpreter and, therefore, not included in the count.

- *Seal and Customer Numbers* – Tourists viewing the elephant seals at PB over the past 20 y did not negatively impact pup production and colony growth as evidenced by the exponential growth of both elephant seals and tourists (Figure 2b). The elephant seals increased from one pup born in 1992 to 4,600 pups produced in 2012. Total tourists counted over the entire year revealed a similar increase in numbers.

Península Valdés, Patagonia, Argentina—PV is a UNESCO World Heritage Site with a surface of 3,600 km² (Figure 3a). Virtually all the land is

privately owned by sheep ranchers. The coastline is administered by the government of the Province of Chubut and is effectively a protected area. The coastline and the waters adjacent to the peninsula offer the opportunity to observe other species besides elephant seals: southern right whales (*Eubalaena australis*), South American sea lions (*Otaria flavescens*), Magellanic penguins (*Spheniscus magellanicus*), and killer whales (*Orcinus orca*). PV is sparsely inhabited: about 800 people live in the town of Puerto Pirámides, 70 km from the elephant seal beaches, and the closest city is Puerto Madryn, about 100 km from Puerto Pirámides, with 80,000 permanent residents. Two airports connect the area to Buenos Aires.

- *History* – Elephant seals were recorded at PV as early as the 1950s (Ferrari et al., 2012). The colony was initially concentrated near Punta Norte (Le Boeuf & Petrinovich, 1974), but in the 1970s and 1980s, the elephant seals began extending their distribution south along the eastern end of the peninsula, notably from Punta Cero to Punta Delgada (Figure 3a). In contrast with their northern counterparts, the attraction is spread over a vast area of about 200 km, and elephant seal aggregations are small and widely dispersed. Thus, the potential number of animals that can be viewed at a time is a few hundred elephant seals at Punta Norte and up to a few thousand at Punta Delgada (Baldi et al., 1996; Lewis et al., 1998).
- *Mission* – The PV protected area has the mission of “maintaining essential ecological processes and life support systems, preserving genetic diversity and ensuring the sustainability of any use of species or ecosystems” (aanppv_nueva.peninsulavaldes.org.ar). The plan imposes no limit on the number of customers who may visit the peninsula.
- *Operations* – The administration of PV is split into two authorities. The first, rangers, are employees of the provincial tourism agency. They are the enforcers of the rules and serve also as interpreters. They patrol the critical wildlife areas along the coastline and provide information to tourists at public places. Fourteen rangers work on the peninsula, and six of these directly oversee elephant seal areas. Visitor access is managed by the second group of authorities, the employees of the Administradora del Área Natural Protegida Península Valdés—a heterogeneous body presided over by a representative of the provincial government and owners. Local NGOs and researchers are stakeholders with little influence on the day-to-day administration and enforcement of rules in the area.

A visit to PV to observe wildlife targets several species, not just elephant seals. It is done either as part of a tour contracted with a private agency or as an independent visitor by car. The visit to the attraction consists of a circuit beginning at the isthmus of about 400 km completed in 8 to 10 h (Figure 3a). The typical excursion during the elephant seal's breeding season starts at Puerto Madryn and stops at Puerto Pirámide for whale watching by boat, followed by visits by car to Punta Delgada, Caleta Valdés, or Punta Norte for viewing elephant seals, penguins, and the seascape.

An entrance fee is paid at a gate of the isthmus (Figure 3a). The fee for adult visitors in January 2013, converted to USD at the official exchange rate, was \$1.60 per person for locals, \$6 for nationals, and \$20 for foreigners. Tourist agencies are service providers to people lacking their own transportation and pay an additional \$1.50 (4 per vehicle). In 2011, about 12,000 trips of vehicles belonging to private providers paid approximately \$23,000 in entrance fees. About 30% of the customers paid a tourist agency for service. All 150 active guides/interpreters work for one of 70 private tourist companies. Guides are paid about \$100 for one full day of work. Total income in entrance fees (individuals and vehicles) was about \$1.6 million in 2011. Thirty percent of the income in entrance fees supports provincial parks that are less popular than PV; the rest is reinvested into the management of PV.

The sites available for viewing elephant seals at PV are restricted to a total of 4 km of the 200-km shoreline. Sites providing access to the attraction are divided into public and private viewing places (Figure 3a). The principal public viewing site for elephant seals is at Caleta Valdés. Others are the Punta Norte reserve and, until recently, Punta Delgada. Customers are restricted to viewing the elephant seals behind a fenced area on bluffs that overlook the beaches. Sites at Caleta Valdés and Punta Norte are on cliffs about 10 to 40 m above the animals and 50 to 100 m away from them (Figure 4c). Viewers are not allowed near the beaches. Public places can be crowded because customers transported by private agencies often arrive at the attraction sites at the same time. Three private sites are run by land owners with permits from the province. Access to these beaches is achieved by driving through private property. Land owners are service providers and local enforcers who limit the number of customers by hotel accommodations and management plans. Together, they could accommodate at most 70 to 80 people per day; in practice,

numbers are much lower. At private *estancias* (rural estates), there are even fewer customers; they enjoy closer access to the attraction, including observations at beach level; and the quality of the viewing experience is enhanced. Elephant seal viewing at these private sites costs more than viewing at public areas.

- *Tourist and Seal Numbers* – Tourists did not negatively impact pup production or colony growth as evidenced by positive growth rates of both people and elephant seals (Figure 3b). Pup production increased steadily from 2,408 in 1969 to 15,238 in 2010, while tourists viewing the elephant seals during the breeding season increased at a similar rate since recording began in 1992 when about 20,000 tourists were counted, and in 2010 when the number of tourists was close to 100,000.

Best Practices

We identified the following practices with efficient viewing operations that met the goal of providing a rich, natural experience for tourists without endangering the welfare of the wildlife attraction being viewed:

1. *Restrict access to the animals.* As animals are typically on public spaces, the success of viewing wildlife operations is frequency dependent and is vulnerable as an unmanaged "commons" (Hardin, 1968). Unrestricted free access reduces the experience for all and ultimately threatens the attraction itself and the entire program. A range of restrictions may apply to wildlife tourism such as reducing, modifying, redirecting, or preventing visitation (Tapper, 2006). For elephant seals, visitor access is most restricted at AN; the number of tours per day and the number of tourists in a tour are limited; during the nonbreeding season, the number of walk-in tourists are not limited, but they are restricted to a few vantage points above beaches. There are no restrictions on number of tourists at PB, but interpreters can talk to only a fraction of them. There are no restrictions on tourist numbers at public sites at PN; at private viewing sites, the number permitted is limited by the management plan of the owner-operator.
2. *Monitor the impact of viewing on the animals and their habitat.* Disturbance of the attraction by the customer must be avoided. This, however, is difficult to measure because some animals are more sensitive to disturbance than others and the effects of viewer disturbance on the watched animals may be graded from subtle changes in behavior to obvious ones such as moving away, or to physiological changes that require sampling and further disturbance. Moreover, while immediate reactions are observable, effects may

- be delayed in time and, thus, linking impacts to a cause/effect relationship can be difficult. The general perception at each site is that disturbance from customers is minimal as the combined efforts of enforcers and interpreters minimizes disturbance. No systematic study of the effect of visitor disturbance on elephant seals, however, has been conducted.
3. *Promote and encourage fundamental studies of the behavior and biology of the animals.* Scientific study of the animals provides a wealth of vital information for training and interpretation that is transferable to viewers, and this knowledge enhances the viewers' experience and aids in the long-term conservation of the species. Research is best conducted by independently funded researchers (e.g., university researchers and their students, or by state or federal employees). Research addresses viewer impact on the wildlife and provides fundamental information on the animal and its habitat. The effect of scientific studies on the animals must also be monitored and differentiated from viewer effects. Fundamental study of the behavior and biology of elephant seals has been an integral part of the AN program since its inception. Studies of the elephant seals have not been conducted at PB with the exception of periodic censuses during the breeding season. Studies of the elephant seals at PV have been conducted over the last two and a half decades, focusing on demographic and behavioral studies.
 4. *Volunteer programs are a vital, effective, and cost-saving means of interpreting the attraction and helping to enforce the rules.* Volunteers are motivated, informed, and reliable interpreters who interface with the viewing public, transfer information obtained by researchers, and perform many other needed tasks. Having an ample corps of volunteer interpreters who are trained in interpreting the attraction and the habitat allows implementation of programs that do not exhaust park budgets. In our experience, volunteer guides are passionate, committed, and willing stakeholders because of their love of the animals and the place. Volunteers are rewarded by being in the field interpreting the animals to appreciative visitors. The elephant seal programs at both AN and PB rely on volunteers for their operations; to administer the programs with paid employees would require a significant increase in funding from the state or significant increases in entrance fees. In California, the Department of Parks and Recreation sets entrance fees at all parks, and most proceeds go into a general fund. A critical difference between the northern and southern operations is that PN programs do not utilize volunteers.
 5. *Commercial viewing programs require independent oversight.* The rules and regulations of viewing programs must be consistent with protecting the attraction. This is usually the case with state or federal operations in which protection of animal resources is primary. Communication and enforcement are the responsibility of rangers and interpreter/docents and are effective. Commercial operations, however, are based on a different set of values between the customer, the stakeholders, and the attraction. Independent oversight is required for two reasons: (1) to minimize the inherent conflict of interest between maximizing profits and protecting the attraction, and (2) to provide a check on self-regulation. Many commercial programs are self-regulated because they provide access to the attraction, which is usually distant or moving, but this makes independent monitoring difficult. Of the three viewing programs of elephant seals that we address, PV is the only commercial operation. Rangers enforce the rules and regulations at public sites where service providers are in competition and viewing sites may be crowded. Rangers do not closely monitor all private viewing sites. It is up to some owner/operators to communicate and enforce the rules to viewers. To date, the low number of visitors at private viewing sites minimizes disturbance and appears to provide a satisfying viewing experience. Nevertheless, independent monitoring is advisable, even though operators of commercial viewing programs appreciate that the attraction must be protected to be sustainable.

Discussion

Site Comparisons

There are substantial differences between the three viewing spectacles. AN is a walking park exposed to the sun and winter wind and rain; it is accessible to many, but it takes some effort. PB is a drop-in park where large groups of people can view the elephant seals quickly, for free, with little effort, and visitors can linger all day; it is close to a large metropolitan population. PV is the most remote of the three sites. It is a drive-in park and requires at least a full day to visit. In our opinion, AN provides the best wildlife experience because the guide-to-viewer ratio is high; the interpreter is a source of information about the attraction and the area throughout the tour; the viewers are on nearly the same level as the elephant seals, in close proximity to harems; and elephant seals may be moving on all sides of the small group of viewers, which keeps the viewers alert. The view from the boardwalk at PB is close to the elephant seals,

panoramic, and safe, but the viewer may be in a crowd of other viewers, and the guide-to-viewer ratio is low, giving less opportunity to learn from the interpreters the value of the unique wildlife at that site. PB provides an incredible view of many elephant seals up close for the viewer in a hurry. PV gives close encounters to a few viewers at private sites—those willing to pay premium prices—but most viewers at public sites see the seals from a distance in larger groups.

Most visitors come to AN exclusively to see the elephant seals. The situation is similar at PB, but at this location some visitors combine viewing the elephant seals with a visit to nearby Hearst Castle or as a short stopover along the travel route. At PV, viewing elephant seals during the breeding season is coupled with watching Southern right whales by boat (Rivarola et al., 2001). Whales, not elephant seals, are the main attraction for customers during the spring. Watching elephant seals is, however, coupled with the whale-watching experience that attracts most visitors to PV.

Volunteers are vital for the operations at AN and PB. AN could not open the park to visitors were it not for docent volunteers. As a rough economic analysis indicates, if the State of California had to pay the 200 volunteer guides for the 18,283 h spent on the job annually, the cost would be \$390,525 (assumes paying each guide \$21.36/h, which includes insurance and benefits). This is substantially more than the total fees collected during the year, which averaged $\$217,871 \pm \$48,020/y$ during the last 10 y (see www.parks.ca.gov/?page_id=23308). Paying salaries from increases in entrance fees is an alternative, but this would have to be consistent with California State Department of Parks and Recreation regulations. Park administrators set park fees. Similarly, the viewing program at PB could not function as is without volunteers. Indeed, if there were no volunteers, it would be difficult to simply close AN or PB because the areas would have to be policed effectively to keep people out due to the dangerous nature of elephant seals. It follows that much attention is spent on guide training at AN and PB; experienced volunteers train new volunteers. Volunteers are not part of viewing programs at PV. There may be multiple reasons for this. The attraction at PV is a great distance from cities with citizens who have the time and the interest to volunteer. A program consisting of volunteers would be competitive with programs using professional guides. Lastly, the remoteness of the elephant seals and the proportion of visitors who require transportation provide the ideal setting for a commercial program.

All three sites described herein restrict viewer access, but only AN does it as part of its management plan. This allows the operators to provide close-up viewing of a few harems where a viewer

can see all the basics of elephant seal life, including dominance relations among males, mating behavior, and birth and maternal care, in plain sight. PB relies on availability of parking to limit visitors, but this still permits up to 1,000 visitors in the viewing area at the same time. At the highest levels of tourist concentrations, the PB facility is taxed, and the wildlife experience of the individual viewer may be reduced. Moreover, docents are limited in the number of viewers with whom they can interact. At PV, only privately owned and operated sites control the number of visitors who access the viewing areas at a given time via limited lodging accommodations and costs thereof.

Unlike in California, unlimited tourism in Patagonia is not considered negative because of the economic benefits that it brings to the local communities and the region (Rivarola et al., 2001). The services provided to customers who visit the public areas, on the contrary, are most likely to negatively impact the watched animals and downgrade the individual viewing experience because providers are in competition for more viewers. Operators at private sites decide the rate that they charge the customer to stay close to the attraction and access it. Private operators agree to follow rules regarding approaching the attraction, but proximity to the elephant seals is really up to them to decide as rangers are not supervising their operations.

Beyond simple monitoring of animal numbers, annual research programs on the basic biology of elephant seals have been conducted at AN and PV over the course of several decades. At AN, these studies report on topics ranging from social behavior (Le Boeuf, 1972, 1974; Cox & Le Boeuf, 1977; Le Boeuf & Reiter, 1988) to feeding habits and feeding areas (Condit & Le Boeuf, 1984; Le Boeuf et al., 2000; Le Boeuf & Crocker, 2005), seal physiology (Blackwell & Le Boeuf, 1993; Thorson & Le Boeuf, 1994; Crocker et al., 2001), and population genetics and dynamics (Hoelzel et al., 1993, 2002; Condit et al., 2007). At PV, the focus of research has been on demographics (Ferrari et al., 2009, 2012), foraging ecology and behavior (Campagna et al., 2007b; Eder et al., 2010), and conservation (Campagna et al., 2007a). These studies afford a wealth of information to guides with which to interpret what viewers see, thus, enriching the wildlife experience. While resources related to past and current research are readily accessible to guides at AN, guides at PV are not regularly trained by researchers, and they have the additional difficulty of accessing the scientific literature in a language with which they are not native.

Although information about the attraction is vital to interpreters and the tourism enterprise, the two processes are uncoupled and independent. Tourism does not support or sustain scientific

research in any of the places studied. Neither the administrators of the programs nor the service providers support the research that is so fundamental to their mission or business and that is intertwined with the sustainability of their activities. Entrance fees, which are a negligible proportion of the expense of tourism at places like AN and PV, could be increased to finance some of the research that provides the necessary information about the attraction. Instead, virtually all scientific study of the animals is supported by federal funding, private foundations, or private donors to the researchers themselves or to their institutions.

Despite the differences among the three focal sites and their operations, there was no evidence that viewers impaired the growth of any of the three elephant seal colonies; both viewers and elephant seals increased significantly at each site during the period observed. Moreover, our observations over the years, as well as subjective reports of rangers and guides, are in agreement that viewers had minimal influence on elephant seal behavior. Of course, we must emphasize that monitoring the effects of viewing on the elephant seals was not a subject of special study at any of the sites. Moreover, elephant seals are unusually robust against disturbance by humans (Le Boeuf, 1995); indeed, this trait made them easy prey for sealers. Elephant seals, therefore, may be more resistant to low levels of disturbance than other species of large mammals.

Parallels with Other Viewing Spectacles

The best practices we describe are especially important to consider relative to species that may be more vulnerable to disturbance than elephant seals. There has been extensive documentation of disturbance associated with wildlife viewing. High levels of tourism in Africa subject animals to acute disturbance (Caro, 1994; Sindiga, 1995). A common report in cetaceans, great apes, and birds is that watched animals feed less and are more vigilant (Stechkenreuter et al., 2012). Bottlenose dolphins (*Tursiops* sp.) that are exposed to long-term disturbance have been reported to decrease in abundance or abandon preferred areas (Bejder et al., 2006), and southern right whales have been shown to curtail their social interactions (Rivarola et al., 2001; Vermeulen et al., 2012). Magellanic penguins in Argentina habituate to the presence of humans when the intensity of visitation is sustained, but they are more affected in more isolated areas where human presence is less predictable (Walker et al., 2006). In many situations, too little attention is paid to reducing disturbance, and rules and regulations are too rarely enforced, especially in commercial operations (Rivarola et al., 2001).

Restricting viewer access is necessary in virtually all types of wildlife tourism if maintenance of the program and viewer experience is optimal and balanced. Indeed, if tourism is uncontrolled, protection of wildlife and the environment is virtually impossible, and the viewing experience is degraded. Both of these conditions are ruinous. Restrictions may be imposed in a variety of ways such as limiting permits to tour operators, increasing costs with quality of tour, limiting viewers at the site, limiting viewing time, and closing certain areas to viewers. Although operators of most whale-watching tour vessels must adhere to numerous rules and regulations regarding access (<http://iwc.int/wguidelines>; Rivarola et al., 2001), with 9 million people in 87 countries and territories watching cetaceans on an annual basis, sustainability of the approach is questionable: "There are not enough accessible, friendly cetaceans with time available—after feeding and socializing—to allow for nine million close encounters per year" (Hoyt, 2003). Enforcing these existing rules and regulations is no easy matter, especially with animals that move about in large areas that may extend across national borders. Therefore, the effectiveness of the restrictions imposed must be monitored and acted on accordingly.

Conducting fundamental research on the species watched results in benefits to the operators and the viewers as demonstrated by the current review of elephant seal tourism. In whale watching and in wildlife viewing in Africa, however, most operations are strictly commercial, and there is little opportunity or attention to fundamental research (Tapper, 2006). Research during whale-watching operations is minimal, consisting primarily of identification of the species or of individuals. Only 35% of the world's whale-watching operations have naturalists or knowledgeable guides onboard; only 9% of operators have research being conducted on their trips; and 57% never conduct research or offer information to scientists (Hoyt, 2003).

The compatibility of research with wildlife viewing depends on the objectives of the operator, existing knowledge about the animal, and what the customers want. If the basic natural history of the species being viewed is known, further study is less urgent. Yet, long-term monitoring of the population is critical for conservation programs associated with viewing animals, and such monitoring efforts can inform customers about the current status and threats to target species. As for what viewers want, this runs the gamut in Africa from species that pose the threat of personal harm or death; to large animals that are abundant and can be approached closely; to rare, threatened,

vulnerable, or unique animals; to those with large social displays; to those that gather in large groups to migrate. Some viewers relish proximity to a dangerous animal, as occurs when they view African lions, or they want to view or photograph the animal, as is the case with birdwatchers who want to add to their lists. Others prefer to know the animal at a deep level; they want the full story of the animal's life. It is ironic that many of the whales being watched—the most popular and economically viable wildlife viewing—are relatively poorly known, with few exceptions such as humpback whales (*Megaptera novaeangliae*) (Clapham, 2008), because they are difficult to observe and study. The viewer is privileged to get brief glimpses of the whole animal. In contrast, viewers watching elephant seals are guaranteed to see close encounters. Indeed, they may quite easily see birth, death, reproduction, and struggle up close, the very stuff of life. Clearly, it is not simply what is seen and how much is known that attracts viewers. Systematic research is needed on viewer motivations and expectancies, and what they take away from a wildlife experience. Interpreters need to know what appeals to the customers and assume that they are always willing to learn more when scientific information is presented properly (Sweeney, 2009).

The utilization of volunteer interpreters can determine the outcome and success of a viewing program and offers great advantages at the stable, land-based viewing spectacles of many wildlife attractions. Where suitable, strong volunteer programs free the operator to manage a spectacle without the need to make a profit, and viewers benefit as well as the watched animals.

Commercial operations differ fundamentally from state- or NGO-controlled operations. For-profit operations are inherently competitive and warrant careful oversight to protect the animals. When the attraction that is commercially accessed is remote or moving, oversight and enforcement of regulations becomes difficult and expensive; the default, which often prevails, is leaving the providers/operators to police themselves with respect to regulation and animal protection. This puts the private operator into the cruel bind of the commons: do more business by stretching the rules or abide by the rules and risk financial losses.

Conclusions

Wildlife viewing spectacles attract millions of people annually and continue to increase in popularity around the world. They provide dynamic illustrations of vital aspects of animal behavior in natural settings that educate and excite interest in wildlife, offering strong justification for

the conservation of species and the wild places in which they live. Sound conservation operations, however, must be developed and enacted to make viewing programs sustainable. We identify practices derived from observation of elephant seal viewing programs that protect the watched animals and their habitats while also providing viewers with a memorable wildlife experience. The lessons learned from *Mirounga* can be applied to the development of best practices for other marine and terrestrial animals.

Viewing programs for wildlife are diverse. Whatever model is used, unrestricted, grand-scale tourism must be avoided because it leads to two tragedies of the wildlife viewing commons. The first is that tourism affects the animal attraction negatively; the adage is "Don't kill the goose that lays the golden eggs." Determining these effects is based on study and knowledge of the animal attraction. Research should be an intrinsic component of the operation, and enforcers have much to gain from basing regulations on consultation with researchers. The second tragedy is that massive tourism degrades the wildlife experience for the individual viewer.

Viewing programs and the practice of conservation are different when the goal is to maximize economic return rather than to preserve and celebrate an aesthetic experience of nature. In practice, these values are rarely satisfied simultaneously and are often in contradiction with each other. Viewing spectacles depends first on the protection of the attraction while, at the same time, satisfying the customer. Commercial benefits, including benefits to the community, should be a consideration only after the animals are safe and visitors are pleased. The behavior of viewers, or their sheer number at a spectacle, should not degrade or destroy the wildlife experience for individual viewers.

The escalation of wildlife viewing programs worldwide requires close watching and controls because large operations conflict with the inspirational experience, requiring personal, direct contact, coupled with a sense of privacy, isolation, and awe that applies to the visitation of the most sacred cultural places of humankind. At stake is not only the welfare of the species or the sustainability of the spectacle, but the feeling of joy, wonder, and respect associated with the celebration of nature as magnificent. Identifying the practices that enable programs to successfully balance viewer access without jeopardizing the welfare of the animals is the goal.

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