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The Respect Wildlife Campaign: A collaborative effort to reduce human disturbance to California's coastal wildlife

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A form of nature-based tourism known as *ecotourism* is an immense and burgeoning industry (Bowker et al. 2012; Balmford et al. 2015; Murray et al. 2019). For a time, the boon of ecotourism seemed an irreproachable alternative to the extractive exploitation of wildlife, and many communities derived benefits by preserving living, thriving natural areas and encouraging tourism in a non-consumptive manner (Duffus and Dearden 1990; Gössling 1999; Stronza et al. 2019). However, as more people have sought experiences in nature and encounters with wildlife, the risks of overcrowding sensitive habitats and disturbing the vital behavior patterns of the species living in those habitats have mushroomed. Without intervention, upsurges in outdoor recreation (e.g., Bowker et al. 2012; Mitrovich et al. 2020) and visitation to California's natural areas (National Park Service 2020; Pendleton and Kildow 2006) will negatively impact wildlife through human disturbance (Larson et al. 2016; Lucas 2020; Steven et al. 2011). Can communities in California preserve the benefits of ecotourism and other human recreational activities while mitigating some of their more adverse consequences on coastal wildlife?

Visitors to California's coastal areas seek opportunities to view and photograph marine wildlife specifically, or they may incidentally encounter marine wildlife while partaking in other activities (e.g., hiking, kayaking, boating, stand-up paddleboarding, scuba diving, fishing, tide-pooling, sightseeing, exercising, picnicking). For locals and visitors alike, seeing or photographing a bird taking flight or catching the gaze of a seal can be an exhilarating

experience and a treasured connection with nature. The skyrocketing popularity of posting wildlife encounters (e.g., wildlife selfies) on social media can drive visitors to engage in risky close approaches to obtain the perfect photograph (Ward-Paige 2016; Cherry et al. 2018; Pagel et al. 2020). But the human experience—the risks and rewards of wildlife encounters—does not always end well for the animals.

Visible changes in an animal's behavior can signal the disruption caused by close approaches by humans (Fig. 1), but some species can experience an elevated heart rate (stress response) without overt behavioral change (MacArthur et al. 1982; Coetzee and Chown 2016). Frequent and chronic disruption leads to reduced fitness, disrupts vital and sensitive activities—feeding, breeding, nursing, resting, migrating—and contributes to negative consequences (e.g., energetic stress, separation of mothers and young, interference in parental care, habituation, site abandonment), all of which can impact survival and population viability (Spaul and Heath 2016; Monti et al. 2018; Perona et al. 2019; Doherty et al. 2021). Whether intentional or inadvertent, human disturbance alters an animal's normal behavior, carries a physiological cost, and can produce cascading, ecosystem-wide consequences (Klein et al. 1995; Heil et al. 2007; Gaynor et al. 2018; Suraci et al. 2019; Doherty et al. 2021).

The COVID-19 pandemic has added to the complexity and urgency of the wildlife-disturbance issue by triggering unprecedented and unexpected shifts in outdoor recreation activities, especially in coastal areas. The outdoor gear industry saw a 56% sales jump in paddlesport equipment and a 31% increase in camping equipment in June 2020 over the same period in 2019 (NPD Group 2020). Highlighted on social media as a COVID-safe activity, tide pooling in locations like Pillar Point near San Francisco exploded, with hundreds of visitors crowding these areas during low tides (Marshall-Chalmers 2021). Despite limitations on daily entries, reduced services, and timed reservations, visitation boomed at some national parks through summer 2020 (Rott 2020). This upsurge in outdoor recreation, fueled in part by people with little or no experience in nature and lacking awareness of Leave No Trace principles (Marion and Reid 2001), likely increased the occurrences of wildlife disturbance and habitat degradation in 2020. COVID-19 restrictions further exacerbated the problem of wildlife disturbance by curtailing formal interpretive programs at state and federal parks and virtually eliminated in-person delivery of information to recreationists about appropriate behavior around wildlife.

Figure 1. Examples of visible changes to sea otter behavior due to human disturbance. (A-D) A time series of 4 images captured through a high-powered spotting scope showing a group of sea otters being disturbed by an approaching kayaker. (A), the group is resting, (B) the otters are alert, (C) the animals are agitated and one dove, and (D) the entire group dove. (E) A large raft of sea otters fleeing from a pursuing kayak.

Human disturbance of wildlife is a global issue that affects innumerable species (Larson et al. 2016). A growing body of research into the consequences of human-caused disturbance has revealed that some species or taxonomic groups are more vulnerable to disturbance and are more frequently disturbed. Additionally, species that garner more public interest can generate funding to study wildlife-disturbance issues. Marine mammals comprise charismatic species that have suffered well-documented incidences and costs of anthropogenic disturbance. Phocids, or true seals, are among the best-studied marine mammals with respect to human disturbance. Documented impacts range from visually apparent reactions like behavioral changes (e.g., van Polanen Petel et al. 2008) and site abandonment (e.g., Kenyon 1972) to less obvious internal physiological changes, such as increased heart rate (e.g., Karpovich et al. 2015). A study of harbor seals (*Phoca vitulina*) at Bolinas Lagoon in Marin County, California, found that humans disturbed seals on 71% of the days that researchers monitored them and that 72% of disturbances caused seals to disperse, resulting in short-term (28 ± 20.8 min) site abandonment (Allen et al. 1984). A study spanning three decades by Becker et al. (2011) at nearby Drakes Estero, also in Marin County, found that disturbance caused by mariculture activities resulted in long-term spatial displacement of breeding and pupping harbor seals.

Scientists have documented harmful effects from human disturbance in a myriad of other marine mammal species. For example, changes in activity budgets and increased energetic costs to killer whales (*Orcinus orca*) in response to boat traffic (Williams et al. 2006), behavioral changes of gray whales (*Eschrichtius robustus*) in response to anthropogenic noise (Moore and Clarke 2002), reduced foraging activity of bottlenose dolphins (*Tursiops truncatus*) in response to vessel presence (Pirotta et al. 2015), and increased behavioral responses and associated energetic costs of southern sea otters (*Enhydra lutris nereis*) in response to various anthropogenic stimuli (Barrett 2019). Significant effort has gone into mitigating disturbance to marine mammals, including federal legislation such as the Marine Mammal Protection Act (1972), regional and local restrictions such as seasonal and geographic closures and distance regulations (e.g., Young et al. 2014), and outreach programs such as Team OCEAN (Gunvalson 2011), with variable, but generally insufficient, effectiveness.

The public is often less aware of the effects repeated disturbances have on seabirds. Disturbance to seabirds is harmful and is particularly pronounced during the nesting season (e.g., Beale and Monaghan 2004). Human disturbance of nesting activity can lead to nest abandonment, dislodging of eggs and chicks from nest sites, predators feeding on eggs and chicks, exposure of eggs and chicks to heat or cold, and drowning of chicks when forced to fledge early. Specifically, human disturbance has been shown to reduce reproductive success in surface-nesting seabirds such as brown pelicans (*Pelecanus occidentalis*; Anderson and Keith 1980; Anderson 1988) and common murres (*Uria aalge*; Rojek et al. 2007); burrow-nesters such as Cassin's auklets (*Ptychoramphus aleuticus*; Albores-Barajas and Soldatini 2011); rocky-shoreline-nesting birds such as European oystercatchers (*Haematopus ostralegus*; Verhulst et al. 2001); and beach-nesting birds such as western snowy plovers (*Charadrius nivosus nivosus*; Lafferty 2001; Ruhlen at al. 2003).

Some studies have even documented impacts of human disturbance on invertebrate communities within rocky intertidal habitats in California (e.g., Lucas and Smith 2016); wildlife that often are not considered by the public as they flock to shorelines and parks in droves for recreational pursuits. Some invertebrates may shift their distribution within the intertidal habitat (e.g., Lucrezi et al. 2009) and other populations may be artificially elevated,

fostered by visitor food scraps (e.g., Steiner and Leatherman 1981; Schlacher et al. 2011), which in turn may increase intraguild predation. Recreational harvesting of mussels and other habitat-forming species could weaken the intertidal habitat (Marshall-Chalmers 2021).

Although several laws prohibit the disturbance of wildlife, such as the Marine Mammal Protection Act, the Endangered Species Act, and the Migratory Bird Treaty Act, enforcement personnel cannot monitor the millions of users spread along the California coastline. The legal definitions of what constitutes wildlife disturbance are vague, open to interpretation, and difficult for the general public to understand. As a result, resource managers have primarily defaulted to requiring or recommending minimum distance guidelines for avoiding wildlife disturbance. Though these distance guidelines are well-intentioned, research indicates that compliance can be low (e.g., Johnson and Acevedo-Gutiérrez 2007; Acevedo-Gutiérrez et al. 2011), the recommendations may not be adequate for particular species or taxa (e.g., Beale and Monaghan 2004; Young et al. 2014), and enforcement can be difficult or impossible. Additionally, visitors' perceptions of acceptable approach distances for wildlife rarely match the established distance guidelines or regulations (e.g., Taylor and Knight 2003). In most cases, individuals intend no harm and do not believe that their actions will alter wildlife behavior and cause undesirable effects (e.g., Slater et al. 2019); however, once a disturbance occurs, many recreationists will attempt to shift blame for wildlife disturbance to others rather than accepting personal responsibility for their conduct (e.g., Taylor and Knight 2003).

To improve compliance with guidelines, agencies and groups have employed signs as a tool for obtaining compliance with wildlife protection laws and guidelines and for reducing wildlife disturbance; however, little evidence exists that signs can produce immediate or lasting behavior change (e.g., Acevedo-Gutiérrez et al. 2011). Governmental and nongovernmental entities (e.g., National Oceanic and Atmospheric Administration, Sea Otter Savvy) have also implemented localized and taxa-specific measures to minimize disturbance to coastal wildlife in California. Examples of these initiatives and taglines include Whale SENSE, No Selfies with Seals, SeaLife Stewards, and Respect the Nap. While some of these actions have yielded reductions in disturbance (Gunvalson 2011; Allbrook and Quinn 2020), messaging within the various programs about approach distances and avoidance measures has often conflicted (Fig. 2), and most actions have not halted the increasing trajectory of disturbance or created lasting behavioral change in coastal visitors. In recognition of these issues, wildlife-disturbance experts along the California coast began coordinating their efforts to reduce wildlife disturbance by attending the first California Coastal Wildlife Disturbance Symposium (CCWDS) in 2015. The CCWDS brought together staff from government, NGOs, and local businesses to discuss the relative effectiveness of diverse efforts to mitigate human-caused disturbance to coastal wildlife. At that first CCWDS, the idea of developing a statewide campaign to address disturbance to marine wildlife in California emerged during a small breakout session. The group identified that while localized efforts to curtail coastal wildlife disturbance had occurred, no unified statewide effort existed in California to tackle the problem. Subsequently, the group recruited a diverse coalition of experts to advise on the development of a formal initiative, the Respect Wildlife Campaign (RWC), that would generate consistent science-based messaging across multiple communications platforms and define, establish, and instill a norm of responsible behavior among people in the presence of marine wildlife.

Over the past five years, an RWC working group has met regularly to work toward the development and implementation of the RWC. The RWC approach is unique because the

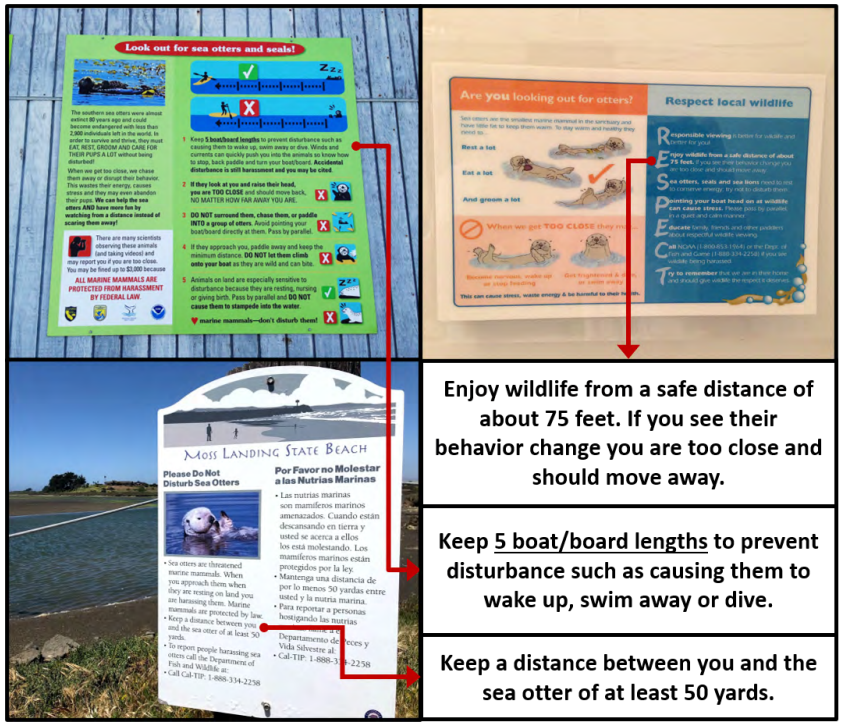

Figure 2. Examples of signs posted in Moss Landing, California, that provide conflicting guidance about the appropriate distance for paddlers to avoid disturbing sea otters.

core collaborating group includes meshes information from biologists, interpreters, resource managers, and social scientists from governmental agencies and non-governmental organizations with extensive input from local marine-recreation business operators, communication and marketing experts, and other stakeholders (see Table 1). The RWC has maintained its connection to the CCWDS, which has become a valued forum for organizers and attendees to share ideas, celebrate innovation, and learn from each other's successes and failures. During the COVID-19 pandemic, the CCWDS transitioned to a virtual platform in 2020 and broadened its reach to more than 130 attendees from 30 agencies, organizations, and other entities in California and other states. This experience brought home the power of virtual platforms for reaching new audiences and creating new partnerships. Although social media can exacerbate wildlife disturbance by showing people engaged in improper behavior around wildlife, the RWC sees opportunities to alleviate human impacts using those same platforms.

A fundamental lesson from the past five years of RWC collaboration is that changing human behavior is a complex endeavor. While it is clear that wildlife benefits the most when groups work in partnership to create unified, consistent messaging, the challenge of reaching diverse audiences with messages that will inspire and endure persists. The RWC aspires to plant seeds of awareness that will touch upon people's core beliefs or educate in such a way that respectful wildlife engagement becomes a part of those core beliefs. The RWC messaging will use the concept of *conflict transformation* to deconstruct embedded beliefs and behavior toward wildlife and realize constructive change (Lederach and Maiese

Table 1. Core collaborators in the California statewide Respect Wildlife Campaign.

Core Collaborator	Entity Type
Audubon California	nonprofit organization
Bureau of Land Management	federal agency
California Department of Fish and Wildlife	state agency
MPA Collaborative Network	sponsored organization
California State Parks	state agency
Defenders of Wildlife	nonprofit organization
Monterey Bay Kayaks	for profit
Office of National Marine Sanctuaries	federal agency
National Park Service	federal agency
Oceans Unmanned	federal agency
Save the Whales	nonprofit organization
Sea Otter Savvy	nonprofit organization
U.S. Fish and Wildlife Service	nonprofit organization

2003; Zimmermann et al. 2020). A conflict transformation approach will reframe the conflict (i.e., wildlife disturbance) from a problem to an opportunity, a shift in perspective that will build relationships and engender improved behavior (i.e., respect) toward wildlife. All RWC messaging will seek to transform wildlife viewers who inadvertently or intentionally harm wildlife into advocates for responsible wildlife viewing (Ardoin et al. 2015).

To evaluate the RWC's effectiveness and contribute to the body of knowledge on how to change human behavior to protect coastal wildlife, social scientists within the RWC collaborative group will employ an arsenal of survey instruments to collect data over five years on a range of campaign actions. Social media metrics, survey analyses, interviews, field monitoring, and other tools will document the efficacy of interpretive information, education and outreach initiatives, and social media ads in an effort to identify how human behavior changes with respect to coastal wildlife disturbance. In turn, clarifying people's perceptions, values, and expectations regarding marine and coastal wildlife, ecosystems, and habitats will help inform and guide the ongoing refinement of outreach and communication strategies. From a management perspective, the RWC will encourage improved public compliance with wildlife protection laws, regulations, and guidelines. To solidify and reinforce its messaging, the RWC will publicize information about measurable decreases in the incidence of wildlife disturbance and any resulting short- or long-term positive individual and population-level effects for coastal species.

With visitation to natural areas increasing and novices attempting new outdoor recreation activities, the need for clear, consistent messaging to protect wildlife and fragile ecosystems across parks, beaches, and open spaces in California will only intensify (Ardoin et al. 2015). Whether or not people engage in wildlife-watching activities, they have an impact on wildlife. Mitigating the disruption of wildlife, particularly during vulnerable life-history stages, is critical for species conservation. By continuing to operate through multi-agency, multi-organization task groups, the RWC will facilitate better education and

outreach with clearer objectives and messaging, foster a new ethic of respect for wildlife in all people who live in or visit coastal California, and serve as a model for other programs within California, across the United States, and around the globe.

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