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Resumen. Las pistas y la información social son importantes en las decisiones que muchos animales realizan para asentarse. En las aves coloniales marinas, estas decisiones están basadas en información recolectada durante una fase de prospección, en la cual la información social de individuos de la misma especie es clave para los jóvenes. Sin embargo, las pistas específicas que usan las aves que prospectan y las razones de ello continúan siendo temas de debate. Usamos un enfoque experimental para evaluar una hipótesis de atracción de la misma especie, prediciendo que durante las prospecciones nocturnas los individuos de *Sterna forsteri* utilizan información social en la forma de pistas sonoras. Específicamente, usamos experimentos de reproducción de sonidos previamente grabados para evaluar si las aves que prospectan usan las vocalizaciones de individuos de la misma especie para localizar sitios potenciales de anidación y planteamos la hipótesis de que la actividad de los individuos que prospectan debería aumentar durante la reproducción de las llamadas de los individuos de la misma especie. Empleando un enfoque teórico de información encontramos que, como predicho, la reproducción de grabaciones aumentó la actividad de los individuos que prospectan apoyando la hipótesis de atracción de la misma especie. Durante la reproducción de grabaciones, la actividad aumentó por sobre los niveles de fondo en un 271% en la Isla Langara y en un 458% en las Islas Aleutianas. Adicionalmente, la actividad de los individuos de *Sterna forsteri* disminuyó con un aumento de la altura de las olas, a medida que la fase lunar se acercó a llena, y con un aumento de la distancia a la colonia ocupada más cercana. Concluimos que los individuos que prospectan utilizan las vocalizaciones de los individuos de la misma especie para localizar sitios coloniales potenciales y que se pueden emplear las grabaciones para acelerar el proceso de recolonización de áreas en donde la especie ha sido extirpada históricamente.

increased Ancient Murrelet activity, supporting a conspecific attraction hypothesis. During playback, activity increased over background levels by 271% at Langara Island and by 458% in the Aleutian Islands. In addition, Ancient Murrelet activity decreased with increasing wave height. We conclude that prospectors use conspecific vocalizations to locate potential colony sites and that playback may be used in management to speed the process of recolonization of areas from which the species has been extirpated historically.

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of colonies before choosing one (e.g., Henaux et al. 2007). Once an individual chooses a colony, it often shows high site fidelity by returning to the same location year after year, and decisions to remain or move are based largely upon reproductive success and timing of reproductive failure (Danchin et al. 1998, Schmidt 2004, Naves et al. 2006).

Generally, colonial individuals prefer settling amid conspecifics (e.g., Podolsky and Kress 1989), a preference likely due to the risks associated with pioneering new habitat (Forbes and Kaiser 1994) and the advantages of acquiring high-quality habitat and choice among a selection of mates (Schjørring et al. 1999). Conspecific attraction increases an individual's ability to access social information used in settlement-decisions by acting as an indication of an area's general suitability (Shields et al. 1988), a way to assess site quality (Stamps 1988, Doligez et al. 2003), and as the first step in identifying seemingly suitable breeding sites (Danchin et al. 1991). The use of conspecific cues as a proxy of habitat quality reinforces coloniality, with areas of suitable habitat remaining unoccupied (Danchin and Wagner 1997, Greene and Stamps 2001). Studies aimed at testing a conspecific-attraction hypothesis have successfully used decoys and call playbacks to attract birds to areas of interest to a researcher (Kotliar and Burger 1984, Podolsky and Kress 1989, Crozier and Gawlik 2003, Harrison

Columbia (54° 14' N, 133° 01'



FIGURE 1. Locations of sites of playback at (a) Langara Island (location of current Ancient Murrelet colony boundaries shaded at McPherson Point), (b) Little Sitkin Island, and (c) Amatignak Island.

in meters for Langara Island from the Fisheries and Ocean Canada website (<http://www.dfo-mpo.gc.ca/science/data-donnees/index-eng.html?sub=climWeath#result>) and for direction of light, and vocalizations during 186 hour-long in Central Dixon Entrance weather buoy 46145, located at 54° 22' 20" N, 132° 20' 00" W off the coast of Langara Island. In the Aleutian Islands, colony attendance by prospecting Ancient Murrelets decreased as the full moon approached, presumably because the increased light from a full moon increased the risk of predation at the colony (Major 2011). To keep our data for Langara Island and the Aleutian Islands consistent, we downloaded information on moon phase for Langara Island from the Astronomical Applications Department of the U.S. Navy (<http://aa.usno.navy.mil/index.php>).

We broadcast the same recordings used at Langara Island during June and July 2008 at one abandoned colony site on each island, Williwaw Cove on Little Sitkin Island (HLM) and Ulva Cove on Amatignak Island (ILJ) (Fig. 1b, c). It is unknown when the last Ancient Murrelets bred on each of these islands, but the presence of foxes dates to 1923 (S. Ebbert, pers. comm.), and Ancient Murrelets were certainly extirpated from these islands long before the 1990s. Thus, as at Langara Island, the population had no individuals with a memory of breeding at either of these Aleutian Island-colonies. We confirmed their absence by again noting the absence of departing family groups during our playback trials. Furthermore, our playback sites were located in protected coves on the northern (Little Sitkin Island) and eastern (Amatignak Island) sides of the islands; during the summer the direction of prominent winds and storms in the Aleutians is from the south (average over the course of our observations) and does

Charadriiformes, which includes the auks (Kroodsma 1982). Differences in innate vocalizations could nonetheless arise from genetic differentiation of isolated populations, but we noticed no such differences in our general examination of calls recorded in the two regions. If such a difference did exist, we might expect to see response to playback of “foreign” calls reduced from that to locally recorded vocalizations—something we considered when interpreting the results of our experiments.

STATISTICAL ANALYSES

To assess whether Ancient Murrelet activity (i.e., summed nightly arrivals, departures, and vocalizations) (1) increased during playback (only the first three trials—silent, playback,

DISCUSSION

Our experimental data support an important prediction of the conspecific-attraction hypothesis: Ancient Murrelets prospecting at night used conspecific vocalizations to locate and orient to potential colony sites. In seabirds generally, including the Ancient Murrelet (Gaston 1992), prospecting occurs near the end of the breeding season (i.e., during fledging) when the most reliable information about reproductive success at the site is available (Danchin et al. 1991, Boulinier et al. 1996). Most studies suggest that late-season prospecting is an adaptation that allows prospectors to evaluate conspecific reproductive success at the site (Boulinier et al. 1996, Danchin et al. 1998). We suggest Ancient Murrelets choose this time because departures of chicks (an indicator of reproductive success) coincide with increased calling at colony sites, providing a very reliable cue with information about the site's quality.

Seabird colonies can be loud places (Feare et al. 2003). In general, nocturnal seabirds have highly transmissible calls, but constraining environmental conditions at a colony (wind, vegetation, etc.) may

heights were low, and when moon phase was closest to the new moon (Table 2). However, the range encompassed by the standard errors of the parameter estimates overlapped zero for all terms except trial, indicating that those effects were weak.

We did not find a lingering post-experiment effect of playback, as the best-supported model was the null model, which received all of the weight among our candidate models (Table 3).

conspecific reproductive success, and interact with potential mates, later deciding to settle on the basis of these observations (Danchin et al. 1998, Seppänen et al. 2007). The timing of prospecting and the use of vocalizations to locate colony sites support our conspecific-attraction hypothesis, as our results demonstrate that Ancient Murrelets use audio information from conspecifics when choosing which sites to visit.

Ancient Murrelets gather offshore 1 to 2 hr before sunset, flying from “gathering grounds” to the colony (Gaston 1992). Prospectors may use these grounds as yet another indication

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