

information on known-aged common murres, will be used to refine and assess recolonization efforts. All research conducted on the Farallon National Wildlife Refuge must be approved by the U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex. All research conducted is evaluated by Refuge staff to ensure that the activities associated with the research are compatible with the purposes for which the refuge was established.

*Proposed Actions:* Social attraction techniques will be used to recolonize common murres at Devil's Slide and San Pedro rocks. The use of social attraction techniques, similar to those used elsewhere to encourage recolonization by several seabird species, will be employed (Kress 1983, Podolsky 1985, Podolsky and Kress 1989). It is possible that small numbers of common murres are still alive that originally bred at Devil's Slide Rock. Therefore, it is important to begin the recolonization project as soon as possible in order to attract any remaining common murres that have a history of attachment to this colony. Preliminary work will consist of selecting observation points to view recolonization sites, constructing and installing observation blinds, obtaining access permits, and purchasing needed equipment. Aerial surveys of central California breeding seabird colonies and periodic observations of breeding colonies from mainland vantage points will be conducted in spring and summer 1995. Additional aerial reconnaissance of Devil's Slide and San Pedro rocks will be conducted to obtain photographs for mapping the restoration sites. Reconnaissance trips to Devil's Slide and San Pedro rocks will take place to determine equipment and procedures needed to deploy social attraction equipment. Ladders may be installed to allow safe access onto the colonies for project personnel.

Decoys and audio equipment will be placed on the rocks in fall 1995 before common murres begin to frequent nesting islands. Recordings of common murre breeding vocalizations will be made at the Farallon NWR. Between 100 and 200 life-size common murre decoys will be positioned on suitable nesting habitat on Devil's Slide and San Pedro rocks. The decoys will be secured to the rock in a fashion that simulates occupied common murre colonies. Densities and locations of decoys will be based on past aerial photos of the active Devil's Slide Rock colony (taken in 1982) and observations of common murres at existing reference sites from mainland vantage points and aerial

photos. Several omnidirectional weather resistant loudspeakers will be positioned at the recolonization sites. Compact disks of California common murre vocalizations will be played prior to and throughout the breeding season from December to August. Daily observations of the recolonization sites will begin once decoys have been deployed and will continue through July. Devil's Slide Rock will be observed from the mainland using a portable blind and telescope. San Pedro Rock observations will occur from a blind located on the rock, from a boat, and/or from the mainland.

Data collected will include common murre arrival date, number of common murres present, behavior of common murres, interaction with other species (e.g., Brandt's Cormorants), location on rock, attendance patterns, diet or feeding behavior, and presence of predators. Prospecting common murres will be plotted by location on maps of the recolonization site. One or more aerial photographic censuses of the central California common murre colonies will be conducted annually between May and June. The censuses will be used to calculate annual breeding population sizes at the recolonization sites and nearby reference colonies in central California, compare trends between years, and assist in determining numbers of common murres not visible from the mainland or boats. Social attractants will be displayed through the breeding season until after common murres normally leave the breeding sites, usually in July. The decoys and audio equipment will be collected after all bird breeding on the rock has been completed. Equipment will be checked, cleaned, and replaced as necessary. The equipment will be redeployed during the following fall before common murres begin to frequent nesting islands. Monitoring of recolonization sites will continue annually after the first social attractants are deployed. The Trustee Council will reevaluate the recolonization efforts annually and revise as necessary. In addition, the use of techniques such as time-lapse photography and radiotelemetry to assist in monitoring birds will be investigated and used if technically and economically feasible. However, the placement and retrieval of such equipment in a way that does not cause undue disturbance to common murres or other seabirds and is secure from human vandalism or theft may be a problem.

The breeding behavior and colony attendance of common murres will be monitored at four nearby colonies in the

Point Reyes National Seashore and/or the Gulf of the Farallones National Marine Sanctuary: Point Reyes, Point Resistance, Double Point Rocks, and Miller Point Rocks. These sites will serve as reference sites for the recolonization sites. Several variables will be monitored to allow comparison to recolonization sites, including population size and status, attendance patterns, timing, breeding phenology and success, behavior, interaction with other species, diet or feeding behavior, impacts of predators, human perturbations, and other disturbances. The population size and status would be determined using methods similar to those employed by Birkhead and Nettleship (1980), Gaston et al. (1983), Mudge (1988), and Hatch and Hatch (1989). Only subcolonies that can be viewed from a safe location will be selected. Reconnaissance work and preliminary observations and logistics would begin in spring/summer 1995. This work would consist of obtaining access permits to conduct work, selecting subcolonies to be studied, selecting plots within subcolonies, and conducting aerial surveys of the colonies. The monitoring period would parallel that followed at Devil's Slide and San Pedro rocks.

Winter and summer attendance, selected aspects of breeding biology of banded and unbanded common murres, and many of the same parameters measured at recolonization and nearshore reference sites will also be monitored at breeding sites at the South Farallon Islands. Established and new study plots, individually-banded birds, blinds, and other facilities will allow for the study of summer and winter attendance in more detail than at nearshore locations. Monitoring would include determining arrival dates, winter attendance patterns (breeding versus nonbreeding common murres), winter behavior of nonbreeding and breeding common murres, site fidelity of breeding common murres, reproductive success, population size, and impacts of predation. Monitoring at the South Farallon Islands will continue for 2 years and may be continued if needed to support refinement of recolonization methods or to facilitate interpretation of data at other colonies.

This restoration project will provide unique opportunities to enhance public knowledge concerning seabirds, seabird conservation, and the marine environment. Every attempt will be made to educate the public through presentations, news coverage, and other appropriate venues. Emphasis will be placed on greater awareness of seabird resources in the area, the problems