

CONSERVATION STATUS OF THE WHITE-BELLIED SEA-EAGLE, OSPREY AND PEREGRINE FALCON ON WESTERN EYRE PENINSULA AND ADJACENT OFFSHORE ISLANDS IN SOUTH AUSTRALIA

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ABSTRACT

The White-bellied Sea-Eagle *Haliaeetus leucogaster*, Osprey *Pandion haliaetus* and Peregrine Falcon *Falco peregrinus*, use coastal cliffs, including those on offshore islands, as breeding sites. During November and December 2003 around 200 km of coastline between Drummond Point and Point Brown on western Eyre Peninsula, South Australia, was surveyed to determine the distribution and status of these raptor species. The status of breeding sites for these species was also determined on offshore islands in the region. An assessment of the vulnerability of nest sites to disturbance was also undertaken.

Nine occupied White-bellied Sea-Eagle territories were identified, six of which were located on offshore islands. No recently active nests or fledged young from the 2003 breeding season were found. Twelve occupied Osprey territories were identified, five of which were found to be active with seven pre-fledged young of varying ages. Three of the Osprey nests were on islands. Three occupied Peregrine Falcon territories were also identified.

Four Osprey nest sites, three of which were in Searcy Bay, averaged <7 km apart, representing a greater breeding population density than has been found elsewhere in South Australia. This concentration most likely reflects prey abundance and extensive all-weather foraging opportunity in the sheltered waters of nearby Baird Bay and low disturbance levels of nesting habitat.

INTRODUCTION

In this study the term coastal raptor collectively denotes the White-bellied Sea-Eagle *Haliaeetus leucogaster*, Osprey *Pandion haliaetus* and the Peregrine Falcon *Falco peregrinus*, as each is known to breed on or adjacent to coastal cliffs in South Australia. Each species is listed on Threatened Species Schedules of South Australian and some other State wildlife protection legislation, but none is nationally threatened.

In South Australia the White-bellied Sea-Eagle population has declined since European colonisation to c. 55 breeding pairs in 1995, due primarily to habitat disturbance and degradation (Dennis and Lashmar 1996). The Osprey population in South Australia is c. 50 breeding pairs (T. Dennis, unpubl. data), and being at the southern extremity of its range, is at low density compared with populations in tropical Australia (Marchant and Higgins 1993). The Peregrine Falcon is widespread and known to breed on suitable terrain in arid regions of the state as well as in more humid regions further south, including coastal cliffs.

In the latter half of last century, much of South Australia's coastline was disturbed and degraded by inappropriate agricultural practice, feral and domestic animal grazing pressure, inappropriate burning regimes, invasion by exotic plants, and uncontrolled recreation vehicle use (Bourman and Harvey 1986). In recent years, coincident with a property investment boom nation-wide, land subdivisions have proliferated along the state's coastal regions, including on Kangaroo Island and Yorke and Eyre Peninsulas. There appears to have been little assessment in the recent land subdivision approval process of the likely impacts of proposed land-use changes on sensitive remnant wildlife habitat. Inevitably, closer human settlement diminishes the wilderness quality of remote coastlines and further threatens the habitat of sensitive wildlife species, such as coastal raptors.

Top-order predators, such as raptors, can be used as environmental indicators of the stability of ecosystems and therefore biodiversity, in regions where remnant natural landscapes remain (Newton 1979). Little has been published in Australia on the likely affects of increased coastal access and human activities on raptor species, some of which require large foraging territories and nest site sanctity with surrounding wilderness as buffer areas for successful breeding (Richardson and Miller 1997). Disturbance to recognised threatened species, particularly around their nest sites, should be avoided (Olsen 1998).

The apparent decline in the White-bellied Sea-Eagle population in South Australia reported in the mid-1990s by Dennis and Lashmar (1996), and rising community concern over expanding coastal subdivisions led to a raptor survey being conducted on remote western Eyre Peninsula during the 2003 breeding season.

The aims of the survey were to:

- determine the distribution and status of the White-bellied Sea-Eagle and Osprey (and Peregrine Falcon opportunistically) on western Eyre Peninsula, South Australia; and
- assess the vulnerability of remaining breeding sites in the region to increased human disturbance.

METHODS

A section of western Eyre Peninsula coastline extending c. 200 km from Drummond Point (34°09'S, 135°14'E) in the south to Point Brown (32°09'S, 135°14'E) in the north to Point Brown (32°33'S, 132°51'E) on the northern end of Streaky Bay (Figure), was selected for survey to determine the current distribution and status of White-bellied Sea-Eagle and Osprey, as little was

known of their conservation status there. Likely habitat was surveyed by systematic ground search during the 2003 breeding season. The longest foot traverse sections were c. 18 km between Baird Bay and the northern end of Venus Bay Peninsula and c. 12 km around Cape Blanche (Figure). The remainder, excluding non-breeding habitat such as low cliffs and sandy beaches, included visits to known sites and relatively short (<5 km) search

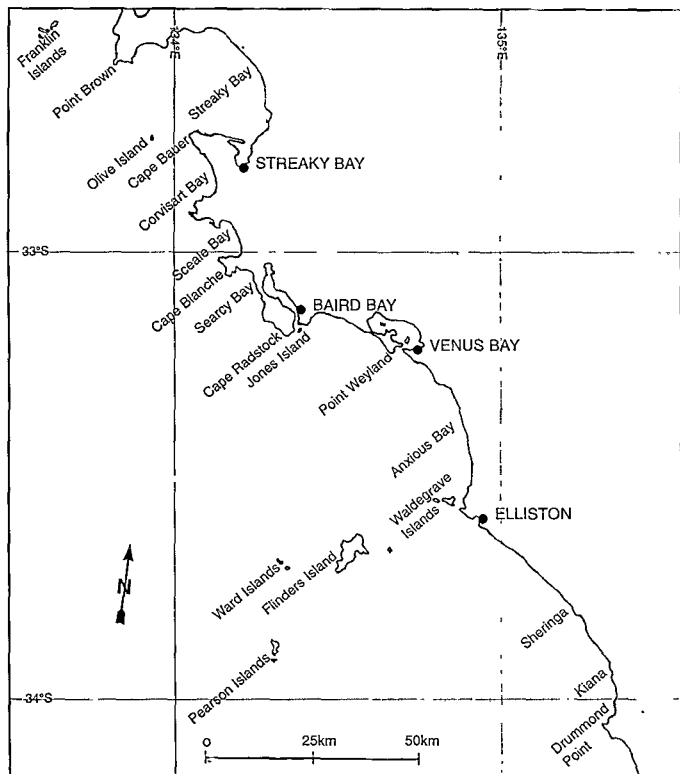


Figure. Map of western Eyre Peninsula in South Australia, showing the main geographical features mentioned in the text and Table.

traverses from points of vehicle access. Areas of likely habitat, where coastal subdivision had been approved or proposed, were included for survey.

In addition to the ground survey, comprehensive consultation and involvement of local resource people and others was undertaken before, during and after the survey period. These included landowners, surfers, recreational and professional fishers, local ornithologists, CSIRO seal biologists, Department for Environment and Heritage staff, Coastal Management project officers from local Councils, tourist information staff and tourism operators at Elliston, Baird Bay and Streaky Bay. I incorporated reliable information gleaned from these sources into the results for a small number of sites that were not possible to ground-truth. This consultation process sought to:

- confirm known nest site locations and obtain data from recent observations;
- confirm additional potential breeding habitat suited to coastal raptors throughout the area; and
- gauge the scale and trend of human activities that may be affecting known sites.

The data from White-bellied Sea-Eagle sites on Waldegrave and Olive Islands were based on visits in July 2003 (T. Dennis, unpubl. data). The recent status of sites in the Investigator Group of islands was determined from abalone fishers active in the area.

Telescope and binoculars were used extensively during the survey and to determine signs of recent nest preparation or nest contents at active sites.

Survey timing

The temporal extents of the breeding seasons for White-bellied Sea-Eagle and Osprey in South Australia are somewhat variable, with latitude affecting the former (Marchant and Higgins 1993; T. Dennis, unpubl. data).

As only one visit to the region was possible in 2003 the survey was conducted through November to mid-December. At this time incubation was expected to be complete for Osprey and if feeding young, the subsequent heightened adult foraging behaviours would assist an experienced observer in locating an active nest site. However, White-bellied Sea-Eagle young would have fledged by mid-November and rarely return to the nest platform. Although fledged young would be harder to locate, unless on the wing, evidence of recent use of the nest platform would still be obvious from leafy nest lining material, prey

remains and heavy excretion 'chalking' around the immediate perimeter of the nest.

Terminology

The universally accepted raptor survey and research terminology developed by Postupalsky (1974) was adapted and used throughout, i.e.:

Breeding territory — the area containing one or more nest sites within the home range of one mated pair of birds, which was defended against conspecific birds and other species.

Occupied territory — where two adult birds appeared together in the vicinity of the nest(s) in the breeding season, with or without observation of courtship behaviour or copulation.

Active territory — contained a nest site where eggs were laid (may be determined from incubation behaviour only) or young were recorded.

Nest site — situation of the most frequently used nest within a territory.

Alternative nest — one of sometimes several nest structures (or scrapes) within the home range of one pair of birds.

Failed nest — where no eggs were laid, eggs failed to hatch, or young were lost.

Abandoned nest/territory — one not used or not occupied in the previous five years.

Active territory status was assigned after observing:

- courtship flights and/or copulations;
- prolonged incubation behaviour; and/or
- young in obvious juvenile plumage in the nest or nearby begging food from adults.

Occupied territory status was assigned when:

- territory defence behaviours were observed but the nest site was not found or was inactive; and/or
- an adult pair was seen in proximity of the nest site(s) interacting without aggression.

Nest disturbance vulnerability assessment

Each nest site was assessed for likely threats and assigned a disturbance category, either low, moderate or high, using the following criteria:

Low — nest site in remote setting; cannot be reached by terrestrial predators or people; no roads, tracks or walking trails within 1000 m; few people visit the location on foot to within 1000 m of the nest site during the breeding season.

Moderate — nest site in semi-remote setting; cannot be reached by terrestrial predators but people may gain access with difficulty to within photography or hand-thrown missile range; roads,

tracks or walking trails occur within 500–1000 m of the nest; few people visit the location on foot within 500 m of nest site during breeding season. *High*—nest site in disturbed or developed setting; may be accessed by terrestrial predators and people; therefore vulnerable to deliberate vandalism, harassment or disturbance; roads, tracks, walking trails or dwellings occur within 200–500 m of the nest; frequent people visits/movements on foot within 200–500 m of and above the nest site during breeding season.

Equipment

Survey equipment carried included 1:50,000 topographical map sheets, a hand held GPS, a CDMA mobile phone, 8.5 x 42 binoculars, a 20–60 x 77 mm spotting scope and tripod, and a 35 mm SLR camera with 28–105 mm lens.

RESULTS

Distribution and abundance

The geographic distribution and number of occupied territories of White-bellied Sea-Eagle, Osprey and Peregrine Falcon located during the survey conducted in November and early December 2003 are set out in the Table. The assessment of threats to each site is also included.

Searcy Bay/Cape Blanche coastal land subdivision precinct

The three occupied Osprey territories found at Searcy Bay represent a greater density of this species than found elsewhere in the survey area and a greater density than is known from elsewhere in South Australia (T. Dennis, unpubl. data). These territories, one of which likely failed early in the season, are on a 10.5 km stretch of coastline, with nest sites c. 2.5 and 8 km apart. The nearest territories to these are at Jones Island, c. 21 km southeast and Cape Bauer c. 34 km north.

The three Osprey territories, an occupied White-bellied Sea-Eagle territory nearby on Cape Blanche, and an active Peregrine Falcon site, combine to make the Searcy Bay area a significant coastal habitat and a breeding refuge for these vulnerable species.

Habitat disturbance

Throughout western Eyre Peninsula there is a long-standing tradition of pioneering vehicle access to remote coastal features. Many of these tracks originated in the 1970s, coincident with

the proliferation of four-wheel-drive vehicle ownership in South Australia, remote area recreational fishing expeditions and the influx of surfers and surfing cult followers.

A number of abandoned nest sites in the survey area were located in areas developed for tourism access to coastal vantage points, or where regularly used recreational vehicle tracks access remote sections of coastline. These tracks are generally situated on or near the cliff edge, well above nest platform height. Studies elsewhere have shown that when made from above, intrusions by vehicles or people present a greater perceived threat, and therefore disturbance, to nesting raptors than when approached from below (Poole 1989; Olsen 1998).

White-bellied Sea-Eagle — In this survey, probable abandoned sea-eagle territories were found at four sites:

Kiana to Sheringa — where coastal vehicle access has extended along the cliffs over the last decade.

Searcy Bay — where abandoned nests were found half way between the currently occupied territories at Capes Radstock and Blanche, near a popular surfing location. This area probably would have supported an additional territory because of its proximity to Baird Bay where prey is abundant.

Cape Bauer — a tourist road passes within 300 m and secondary tracks penetrate to within 80 m and above the nest; consequently the nest is highly unlikely to be used again. The nest was last active in 1981, after which the pair moved to Olive Island (T. Dennis, unpubl. data). *Point Brown* — abandoned, last active in the early 1980s.

At the northern end of Venus Bay an adult sea-eagle was found dead at Ozzies Beach in late July 2003 and only one adult was sighted subsequently in the area throughout the breeding season (D. Armstrong, *in litt.*).

The nest site at Olive Island may also be under current threat due to a boat charter operator commencing tours there in 2002 and people venturing ashore at sensitive times during the breeding season would cause the birds to desert the nest. The sensitive period extends over half the year, from the commencement of courtship in June through to mid-December. By then, any young produced should have gained strength and confidence through the period of aerial awkwardness and low stamina, which occurs in all species

Table. General location, status and threat assessment of coastal raptor breeding territories found to be occupied in 2003 on western Eyre Peninsula and adjacent offshore islands.

Species	Locality	Territory active	Threat assessment
White-bellied Sea-Eagle	Pearson Islands	Not confirmed	Low
	Flinders Island	Not confirmed	Low
	Ward Islands	Not confirmed	Low
	Waldegrave Islands	Not confirmed	Low
	Venus Bay Peninsula	No	Low
	Cape Radstock	No	High
	Cape Blanche	No	Moderate
	Olive Island	Not confirmed	Moderate
	Franklin Islands	Not confirmed	Low
Osprey	Kiana	No	High
	Sheringa	Yes	High
	Flinders Island	Not confirmed	Moderate
	Ward Islands	Yes	Low
	Anxious Bay	Yes	High
	Venus Bay Peninsula	Yes	Moderate
	Jones Island	No	Moderate
	Searcy Bay (south)	Yes	Moderate
	Searcy Bay (mid)	Yes (failed)	High
	Searcy Bay (north)	Yes	Low
Peregrine Falcon	Cape Bauer	No	Moderate
	Point Brown	Yes	Moderate
	Kiana	Not confirmed	Low
	Venus Bay Peninsula	Yes	Low
	Cape Radstock	Yes	Low
	Searcy Bay	Yes	Low

after initial fledging. Olive Island is too small (c. 10 ha) for fledglings to find refuge there if disturbed by people ashore and the mainland may be too far away for them to reach safely (c. 7 km distant).

Osprey — Most nest sites found were on disjointed sections of cliff or stacks surrounded by water, which is typical of this species (Marchant and Higgins 1993).

Although the Osprey has demonstrated tolerance to human activity and to changes in the environment elsewhere, some long-standing nest sites, isolated from other occupied territories in the survey area, were found inexplicably abandoned. These included:

Venus Bay Peninsula and islands — where seemingly ideal all-weather foraging and abundant prey should support more than the one pair located there. One explanation may be interspecies conflict with resident White-bellied Sea-Eagles (T. Dennis, unpubl. data; also see Marchant and Higgins 1993).

Searcy Bay — at two locations where fishing

and surfing have been long-standing activities. Corvisart Bay — The Dreadnoughts' nest site (a series of offshore limestone stacks), despite its physical isolation and previous use over several decades, was deserted.

Other recently active Osprey nest sites considered likely to be experiencing disturbance included the Cummins Memorial site near Kiana Beach, 'Two Rocks' surfing location in Seale Bay, and 'Razors' surfing location on Cape Bauer. At the last, a tourist access road, carpark, walking track and lookout, deliberately situated to overlook the nest, were developed in 2000.

Although Ospreys have demonstrated resilience to human presence and activity, they are still vulnerable to displacement through disturbance when a new activity occurs near to the nest (Poole 1989; Clancy 1991).

Peregrine Falcon — On the limestone coastal cliffs in the region, falcon nest scrapes were typically secreted well down from the cliff edge, secure from predators, but often impossible to see

from above. Often the falcon's overt territorial defence behaviour is the only evidence of a breeding event nearby. Subsequently the presence of young could not be confirmed at the Searcy Bay site where the typically concentrated, radial scat pattern and prey remains were visible from above.

DISCUSSION AND MANAGEMENT ISSUES

White-bellied Sea-Eagle

Most large eagle species, including the White-bellied Sea-Eagle, use the same nest structure in consecutive years over long periods of time but are renowned as being sensitive to disturbance during the breeding season (Clunie 1994; Olsen 1998). In South Australia, the White-bellied Sea-Eagle population is estimated at c. 55 occupied territories and there is evidence of a substantial decline in the number of breeding territories on mainland South Australia since European colonisation (Dennis and Lashmar 1996). In addition, a long-term study on Kangaroo Island, where around one third of the state's White-bellied Sea-Eagle population is found, showed that sea-eagle territories in which some form of disturbance occurred in the breeding season produced significantly fewer young over time than those remote from human activities and infrastructure (T. Dennis, in prep.). Considering the Vulnerable status of the White-bellied Sea-Eagle in South Australia and the small number of occupied territories remaining on mainland western Eyre Peninsula, some of which are subject to continuing disturbance, these factors need to be considered by land-use planners and coastal lands management authorities in South Australia.

In Victoria the White-bellied Sea-Eagle population has declined, resulting in the species being listed as a threatened taxon under that state's *Flora and Fauna Guarantee Act*, with a conservation Action Plan being prepared (Clunie 1994). Although guidelines for raptor habitat protection have been developed and published by Birds Australia, the White-bellied Sea-Eagle was not listed as requiring a Species Recovery or Management Plan in South Australia (Olsen 1998), despite evidence of significant population decline (Dennis and Lashmar 1996).

Osprey

Osprey reaction to disturbance varies considerably between pairs (Poole 1989). Although varying levels of habitat disturbance were found

at most breeding sites on western Eyre Peninsula, several of the sites rated as highly disturbed were active with young present. This suggests a level of resilience and acceptance of nearby human activity and infrastructure. However, the vacant territories in Corvisart Bay and on the Venus Bay Peninsula at sites with low disturbance levels are not easily explained.

The Birds Australia Conservation Statement No. 2 rates the Osprey in South Australia as a species requiring 'targeted research to identify key conservation areas and requirements for development of a management plan: 1 highest priority' (Olsen 1998). This seems an appropriate recommendation considering the small population (c. 50 pairs) in South Australia, found mainly in the west of the state (T. Dennis, in prep.).

Peregrine Falcon

Although listed as Rare in South Australia, the Peregrine Falcon is widespread and found over a wide range of habitats. In coastal regions their nest sites are typically placed on precipitous limestone cliffs and usually remote from human disturbance. The Birds Australia Conservation Statement No. 2 rates the Peregrine Falcon in South Australia as in the category 'Recovery or Management Plan needed' (Olsen 1998).

Searcy Bay

In the remote area encompassing Searcy Bay, the relative concentration of occupied Osprey and White-bellied Sea-Eagle territories and breeding sites may represent a distribution pattern and density for these species typical for Eyre Peninsula before European colonisation. These nesting sites are on, or adjacent to, lands assigned for subdivision by local planning committees without any apparent assessment of the likely impacts. This situation highlights the need for habitat protection measures, such as sanctuary or refuge covenants, around sensitive wildlife habitats on private lands in South Australia.

Olive Island

Olive Island is a significant breeding refuge for several threatened species. In addition to the White-bellied Sea-Eagle, the Fairy Tern *Sterna nereis* successfully bred on the island in considerable numbers (>25 pairs) in February 2003 (D. Armstrong, pers. comm.) and it is a major colony site for the endemic Australian sea lion *Neophoca cinerea*, recording >100 births in July 2003

(Shaughnessy, Dennis and Seager 2005). In line with other island Reserves of similar significance in South Australia, Olive Island should be considered for Prohibited Area status under the *National Parks and Wildlife Act*, thereby limiting public access and drawing appropriate attention to its significance.

Zoning

In parts of Europe and the United States of America, land-use zoning regulations have been adopted to give special protection to sensitive wildlife habitats including raptor breeding sites (Newton 1979). In Alaska's vast wilderness areas, buffer zones of undisturbed habitat have been set aside from any form of modification, including increased human presence, to give sanctity to raptor nesting sites. These are 1.6 km in diameter around each Bald Eagle *Haliaeetus leucocephalus* and Osprey nest site and 3.2 km around each Peregrine Falcon breeding cliff (Olendorff and Kochert 1977; Richardson and Miller 1997). For large raptor species such as the White-bellied Sea-Eagle, disturbance occurring above the nest is more threatening than from below (Olsen 1998). In Tasmania, nest sites of the Endangered subspecies of Wedge-tailed Eagle *Aquila audax fleayi* are given special protection under a Forest Practices Code, with a radius of at least 250 m (or 500 m where the nest platform is directly visible from an elevated position) left undisturbed around each nest during forestry operations. Where possible, such refuges are to be 'incorporated into streamside reserves, wildlife corridors or wildlife priority areas' (Gaffney and Mooney 1992). Similar spatial refuge covenants could be adapted and applied to important raptor conservation areas on South Australia's coastline, including western Eyre Peninsula. Without such provisions, threatened species may continue to be displaced to sub-optimal habitats because of inappropriate and ill-informed landuse planning and development assessment processes.

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