## Project Plan SP 2014-005

# Access and human use at Penguin Island and related implications for management of Marine Park assets and visitor risk

**Marine Science**

### Project Core Team

| | |
|---|---|
| **Supervising Scientist** | George Shedrawi |
| **Data Custodian** | George Shedrawi |
| **Site Custodian** | George Shedrawi |

### Project status as of Nov. 27, 2017, 3:42 p.m.

Approved and active

### Document endorsements and approvals as of Nov. 27, 2017, 3:42 p.m.

| | |
|---|---|
| **Project Team** | granted |
| **Program Leader** | granted |
| **Directorate** | granted |
| **Biometrician** | granted |
| **Herbarium Curator** | not required |
| **Animal Ethics Committee** | not required |

# Access and human use at Penguin Island and related implications for management of Marine Park assets and visitor risk

## Science and Conservation Division Program

Marine Science

## Parks and Wildlife Service

Service 2: Conserving Habitats, Species and Ecological Communities

## Project Staff

| Role | Person | Time allocation (FTE) |
|---|---|---|
| Supervising Scientist | George Shedrawi | 0.05 |
| Research Scientist | Alan Kendrick | 0.0 |
| Research Scientist | Michael Rule | 0.0 |

## Related Science Projects

## Proposed period of the project

Dec. 1, 2013 – March 31, 2015

# Relevance and Outcomes

## Background

Penguin Island (PI) and the surrounding shallow waters of Shoalwater Islands Marine Park (SIMP) are a popular destination for Perth locals, national and international tourists. In managing the marine bio-physical assets of SIMP the Department of Parks and Wildlife (DPaW) also has a responsibility for providing, managing and maintaining appropriate access opportunities and protection for visitors who are involved in visitation and appreciation of the natural environment. PI is also an important habitat for coastal birds, including the EPBC listed little penguin, _Eudyptula minor_ whose largest WA colony is found nesting on the island. In 1996, this colony of genetically distinct penguins was given the highest conservation status of all colonies in Australia, and these penguins remain a key performance indicator for management in the Shoalwater Islands Marine Park. As part of the visitor management process, DPaW measures change in visitor participation. In the case of PI, visitation (visitor participation) is predominantly measured through counts of people arriving on commercial tourist operator vessels. Although the majority of visitors reach PI on these vessels, other visitors intermittently arrive by crossing a sand bar that joins the Island to the mainland. To monitor these arrivals, the use of remote cameras offers DPaW the opportunity of making more informed choices of how to manage visitor risk. This is needed, as at low tide the sandbar may be partially exposed from the water for much of its length which can make the journey seem secure, when in fact rising tides and wind driven currents can make the trip hazardous. Although warning signs are present both on the mainland and Penguin Island advising visitors of the risks inherent in the sandbar crossing, these are regularly ignored and staff often spend many hours assisting and rescuing visitors who have run into difficulties. Historically crossing the sandbar has resulted in two deaths and multiple rescues of people who have tried to access or leave Penguin Island via the sandbar. In December 2010, a drowning incident instigated a coroner's inquest and further management recommendations, in addition to existing strategies, have been introduced into the daily management of Penguin Island. These include, but are not limited to o The development of a standard operating procedure for closing the sandbar during high risk sea conditions o Parks and Wildlife contracting Surf Life Saving Australia for beach patrols and informing the public of the dangers of crossing the sandbar on foot o Increased presence of Parks and Wildlife staff and ranger patrols during high risk periods o Increased number of contacts by Parks and Wildlife rangers informing the public of the dangers by crossing the sandbar o Review of signage and introduction of an electronic board outlining sandbar closures Due to the inherent risks associated with crossing the sandbar to access Penguin

Island, Parks and Wildlife, under the direction of the coroners working group, has been tasked with assessing visitor risk and identifying the conditions under which risk may be further mitigated. The same remote camera set-up can also be used to inform marine park managers on the condition of the little penguin colony. The number of little penguins counted from nightly imagery (infrared) provides an early indication of behavioural changes that may occur as a result of increased pressures on little penguins during the breeding season. This is particularly important as the period of highest visitor participation on PI coincides with breeding and moulting of little penguins, both periods when little penguins are at their most vulnerable.

### Aims

- Assess Visitor Risk;
- Establish a remote camera system which records visitor movements across the sand bar;
- Assess the number, characteristics of individuals or families, and timing of visitor movements across the sand bar;
- Assess the reliability of current estimates of visitor sand bar use by DPaW and Surf Lifesaving;
- Compare the number of visitors crossing the sandbar with those using the private ferry service;
- Determine factors (timing and environmental conditions) that predict periods of high use of the sand bar crossing;
- Penguin Condition Monitoring (abundance);
- Refine the process for recording beach arrivals to PI of little penguins; and
- Assess the numbers of returning penguins to PI at strategically placed locations.

### Expected outcome

Characterise visitors using the sandbar to access penguin Island and provide information on management strategies that may be considered to enhance the current risk management program;

Project recommendations for the long term monitoring of little penguins as part of the WA Marine Monitoring Program (WAMMP); and

Recommendations on what knowledge gaps require future research.

### Knowledge transfer

A briefing document to the Shoalwater Island Marine Park Coordinator reporting key findings from the project including recommendations on changes that may be considered to enhance the current risk management program; and

Report to the Shoalwater Island Marine Park Coordinator reporting key findings of LIttle Penguin condition including recomendations for future monitoring.

### Tasks and Milestones

Report 1 - 31 May 2014 Access and human use at Penguin Island and related implications for management of Marine Park assets and visitor risk

Final Report 2 - 30 June 2015 Access and human use at Penguin Island and related implications for management of Marine Park assets and visitor risk

### References

## Study design

### Methodology

A FOSCAM IP outdoor 1MP outdoor camera will be used mounted on a 3m high light pole at the end of the jetty on Penguin Island (Figure 1). The camera will face the sandbar and record video footage between 7am to 6pm daily from May 2013 to March 2015. The camera will be connected to a ubiquity HF transmitter that routes to a MiniMac computer located on Penguin Island (Figure 2). Remote communication with the computer and camera is achieved via a Vivid Wireless link on Penguin Island. Visitors using the sandbar to access and leave Penguin

Island will be logged from the daily video recordings. The equipment carried by visitors crossing the sandbar will be documented and used to determine their intentions for crossing.

Data on the number of visitors using the ferry will be collected to compare with the number of visitors using the sandbar as an access and leaving point to/from the island. The daily average number of visitors will be compared to the daily average number surveyed using the remote camera. The same days will be chosen for both visitor and ferry counts.

Sea conditions, including tide conditions and type will be assessed using Austides (2013 and 2014) software program. In addition, a number of other risk metrics will also be assessed from reviewing the video and linking the time stamp to available weather information (Table 1). In this analysis, two types of weather variations (clear and cloudy) and two types of sea conditions (calm and rough) will be recorded. Relatively still, undisturbed water conditions or apparent motion in the absence of wind stress will be classified as Calm. The presence of surface chop (small and frequent seas/waves) due to wind will be classified as Rough.

The assigned level of risk (low, mid or high) according to crossings will be determined by tidal conditions of spring and neap and when sandbar was open or closed. The period and height variation between low and high tide is lengthened during spring tides, therefore, people crossing the sandbar on foot during the middle of this spring tide will be associated with increased risk. Furthermore, as sandbar closures are implemented by in situ Department staff due to unfavourable and dangerous water conditions people crossing the sandbar during closure times will be associated to a high risk category regardless of apparent weather, sea or tide conditions. During neap tides, there is little variation between low and high tides, however, people crossing at neap mid tides will be classified as mid risk.

The daily average count of visitors for each month arriving or leaving Penguin Island via the sandbar was analysed with a two-way ANOVA in the r-Package rcmdr using  = 0.05. The statistical analysis was used to determine if the means of two sets (arriving or leaving) were significantly different from each other for each month analysed.

**Table1**. Metrics and source of metrics collected

| **Metric** | **Source** |
|---|---|
| Date and time | Video time stamp |
| Description of persons; Adult, Juvenile or Child | Video visual assessment |
| Family group | Video visual assessment |
| Swimming | Video visual assessment |
| Equipment, if any | Video visual assessment |
| Direction of travel | Video visual assessment |
| Weather conditions | Video visual assessment |
| Sandbar closures by Parks and Wildlife staff | DPAW records |
| Sea conditions, including tide conditions and type | Video visual assessment and tide model |
| Surf Life Saving; present or absent | DPAW records |
| Public and school holidays | WA school holiday calendar |

## Biometrician's Endorsement

granted

# Data management

## No. specimens

## Herbarium Curator's Endorsement

not required

## Animal Ethics Committee's Endorsement

not required

## Data management

Data will be collected and stored electronically on the corporate T-Drive until project completion. It will then be transferred to electronic storage medium and stored with Corporate Information Services (CIS) and catalogued.

WAMMP operating budget and little penguin project funding.[2]Funding to be provided from a combination of MSP, coroners Committee and Shoalwater Islands Marine Park. Funds, to be agreed as required prior to the project commencing.WAMMP operating budget and little penguin project funding.Funding to be provided from a combination of MSP, coroners Committee and Shoalwater Islands Marine Park. Funds, to be agreed as required prior to the project commencing.

| Staff (FTEs) | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Scientist (SC2) (MSP) | 0.05 FTE | 0.05 FTE | 0.05 FTE |
| Technical officer (Region/MSP) | 0.2 FTE | 0.2 FTE | 0.2 FTE |
| Operating Budget (000'$) | | | |
| Consolidated funds | $4,000 | $2,000 | |

# Budget

# Consolidated Funds

# External Funds