# Middle Island

# Little Penguin Monitoring Program

# Season Report

# 2012-13

**Citation**

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## SUMMARY

The Little Penguin Monitoring Program has played a pivotal role in raising conservation awareness of the Little Penguin colony at Middle Island. The program has also provided important information on the recovery of the breeding population since the commencement of the Maremma Guardian Dog project which was initiated after a number of years of severe fox predation (Overeem & Wallis, 2006).

Over the 2012-13 monitoring season, a peak number of 112 adult Little Penguins were observed arriving at the island on 14th January 2013 during a dusk count, giving an estimated total number of 187 breeding adults arriving. The numbers of Little Penguins observed to arrive at the colony site over the last seven years suggest a steady increase in the population since 2005, when only four adult birds were observed in September.

Over the breeding monitoring surveys, 26 active (artificial and natural) burrows were checked for signs of Little Penguin breeding, including the presence of breeding pairs, eggs and chicks. Ten breeding pairs were observed within these burrows, producing a total of 16 eggs, of which 12 hatched. Only one chick failed to reach maturity, with 11 chicks successfully fledged. This gave a fledging rate of 1.1 chicks fledged per breeding pair.

A number of previous year's breeding success measures were compared to the current season, with fledging success ranging from 1.0 to 2.1 fledglings raised per breeding pair. Breeding success is known to naturally vary between seasons for Little Penguin colonies. Based on the known breeding ecology of Little Penguins across their range, the breeding results for the Middle island colony since 2006 would suggest successful breeding events are occurring in the absence of fox predation, and in the presence of their guardians, the Maremma Dogs.

Volunteer efforts have again been outstanding during the monitoring season of 2012-13, with an in-kind effort of over 280 hours collectively contributed to undertake the arrival counts and breeding surveys. The continuation of such strong support from a volunteer base and the local community will be very important for the Little Penguin Monitoring Program, the Maremma Project, and the efforts to conserve the Middle Island Little Penguins into the future.

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## BACKGROUND

The Little Penguin Monitoring Program at Middle Island, Warrnambool commenced in 2006/07, in conjunction with the Maremma Guardian Dog Trial. The trial aimed to alleviate ongoing fox predation that was responsible for a number of penguins kills observed during the birds' breeding season at the island between 1993 and 2005. The necessity for effective intervention was enhanced by the discovery of 286 penguin kills on a single day during the 2005/06 breeding season (King et al., n/d).

The monitoring program was developed to help inform the Middle Island Steering Committee on the success of the Maremma Guardian Dog Trial. Outcomes of the trial were positive, including an increase from four adult birds observed on 27th September 2005, to 29 observed on 12th Oct 2006. Following the trial's success, the Maremma Project, along with the associated little penguin monitoring, has continued as a world-first conservation project using the guardian-dog technique to protect native seabirds.

The strongest indicator that the Maremma Project has been successful is the cessation of observed fox kills over its seven year duration, compared to those noted in previous years from 1993 to 2005. The overall aim of the project was to allow the Little Penguin population to recover in the absence of fox predation, and become a viable colony that persists into the future. Therefore outcomes of the Little Penguin Monitoring Program that have shown growth in the island's breeding cohort, and completion of successful breeding events, have been important in providing accurate data to evaluate project success.

This report provides an overview of the Little Penguin Monitoring Program for the 2012/13 season, including outcomes from the arrival counts and breeding surveys, and a comparison with previous year's results.

**Figure 1.** A volunteer team from the 2012-13 monitoring season making the water crossing to Middle Island for a dusk count.

## OVERVIEW OF THE 2012-13 MONITORING PROGRAM

### Arrival Counts

Dusk arrival counts have been used as a surrogate measure of the size of the Middle Island colony's breeding cohort. Counts are scheduled to occur each fortnight over the breeding season, between late September and late February.

The counting of little penguins has historically occurred at six landing sites, which were originally identified by Overeem & Wallis (2003) (Figure 2). A volunteer team counts the number of little penguins passing the landing sites for an hour from the first arrival. Based on previous studies, it is predicted that approximately 60 percent of the total number of adults to arrive on that night is recorded during this time-frame, and this is used as the basis for generating the total estimate.

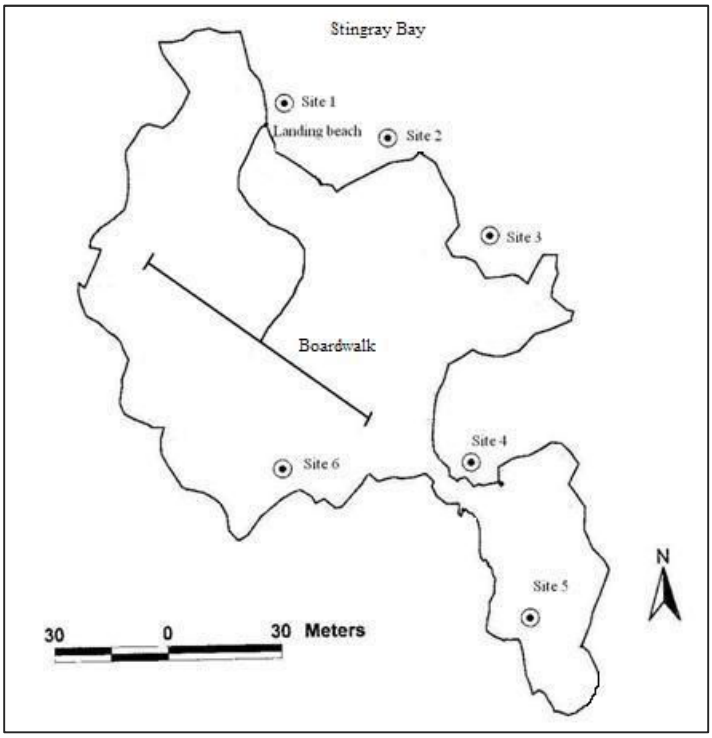


**Figure 2.** Trace map of Middle Island showing six landing sites used during Little Penguin dusk arrival counts (adapted from Overeem & Wallis, 2003).

Over the 2012/13 season, 9 arrival counts were completed between 8th October 2012 and the 12th March 2013 (Figure 3). Significant deepening of the channel running between Middle Island and Stingray Bay, as well as occasional adverse weather conditions, lead to the cancellation of three counts.

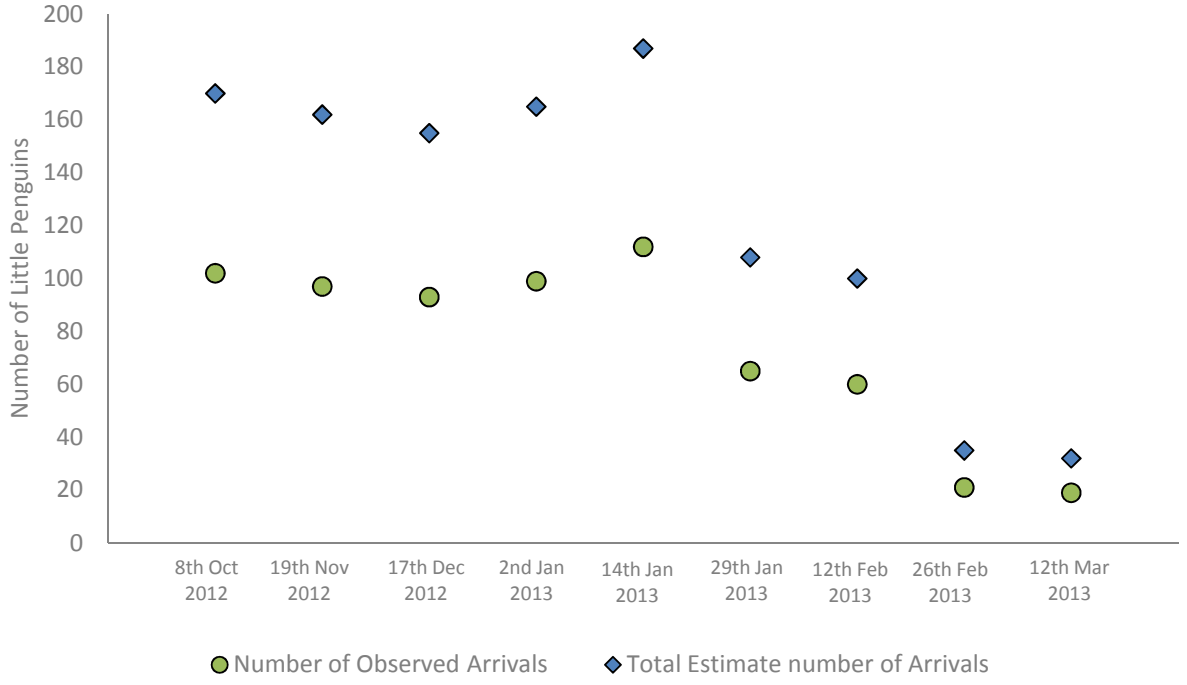


**Figure 3.** Number of observed arrivals and total estimate of arrivals of *Eudyptula minor* (Little Penguin) adults at Middle Island over the 2012-13 breeding period.

The inter-seasonal variation in count estimates is consistent with that of previous years (Figure 4). This is considered to be a natural variation and representative of the breeding activities of the adults at the time. For example, the peak in arrivals around December to January aligns with the peak in the number of hatchlings that are no longer dependant on the care of one parent during a day (Overeem & Wallis, 2003).

This allows for both parents to forage simultaneously, with both subsequently arriving back at dusk. The continual decline in arrival numbers after the majority of chicks have been fledged can be attributed to the prolonged sea foraging of adults to increase condition before their energy expensive annual moult. Following the moult most colony members will visit the island much less frequently, and over winter the colony in essence is absent.

To account for the natural inter-seasonal variation, a peak count for each season has been used to compare the estimate colony size for the Little Penguins over time. This was found to display the same trend as the mean count figure for each season. A peak count for the season of 112 occurred on 14$^{th}$ January 2013 (Figure 3). This gave a total estimate number of 187. The change total estimate arrival numbers since the commencement of the trial shows a positive linear trend ($r = 0.846^2$) (Figure 5).

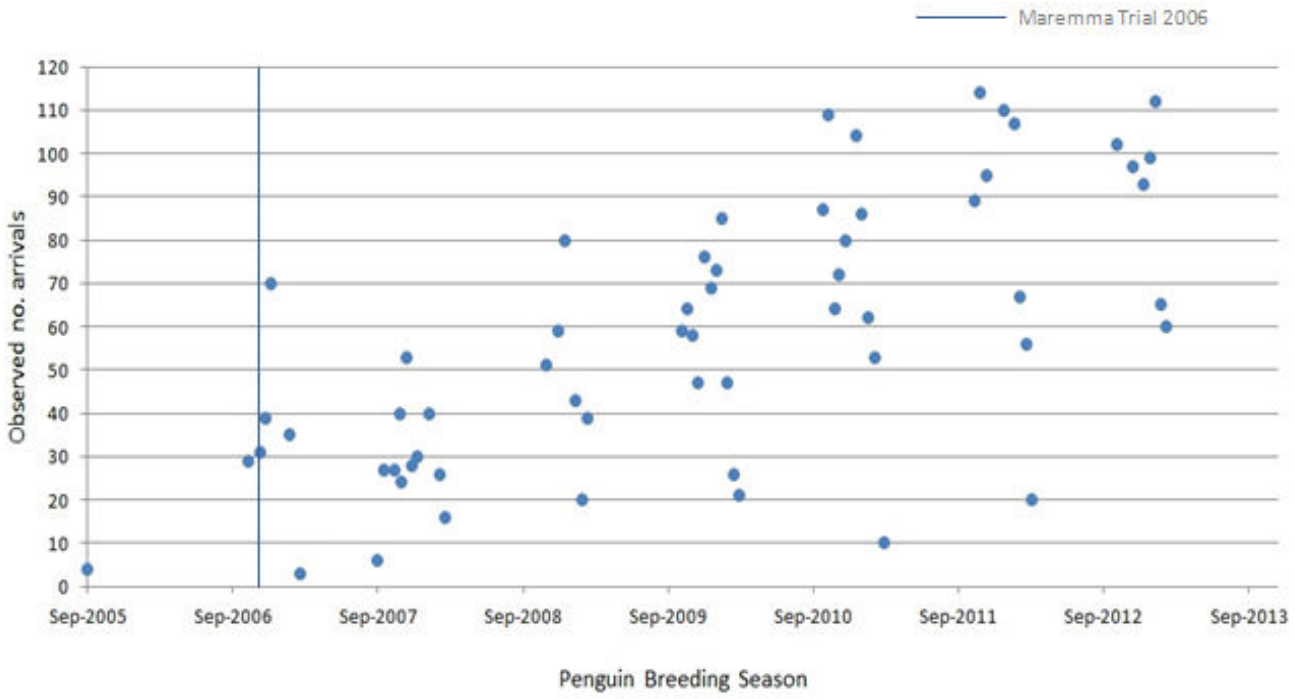


**Figure 4.** Observed number of *Eudyptula minor* (Little Penguin) arrivals during seasonal dusk counts undertaken from September 2005 to March 2013

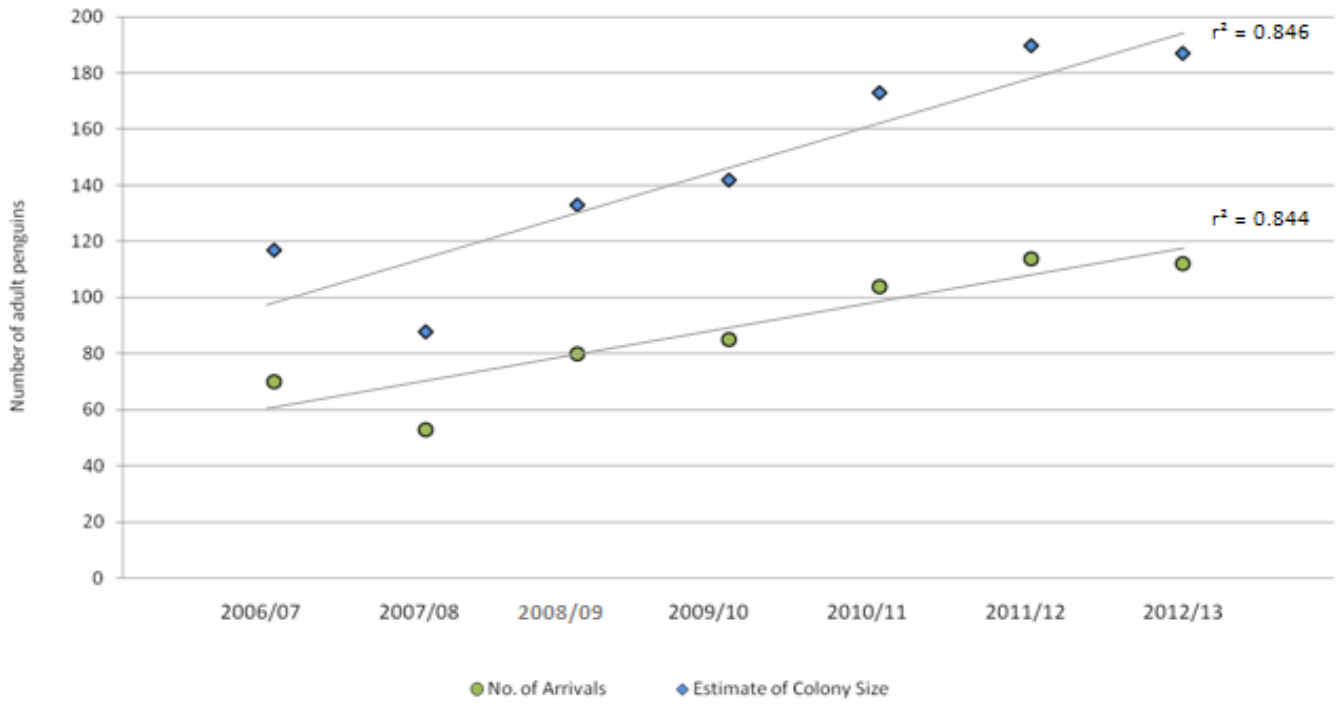


**Figure 5.** Peak seasonal count of adult arrivals and total estimated number of arrivals for *Eudyptula minor* (Little Penguin) at Middle Island

**Breeding Monitoring**

Breeding monitoring aims to provide a measure of breeding success for the season, by collecting information on the number of eggs, chicks, and fledglings produced for each identified breeding pair. The 2002-13 monitoring precedure followed that of previous seasons.

Due to delays caused by the deepening of the channel and adverse weather, the first monitoring visit was conducted on the 11th November, and breeding adults were already observed with chicks at this time. Ideally visits would start before the hatching of chicks. However in years of high breeding success, egg laying can start as early as July, with hatchlings appearing as early as August. This was the case during the breeding season of 1999/2000 where Overeem and Wallis (2003) found 34 pairs already breeding on the first monitoring in August.

At the beginning of the breeding monitoring, a number artificial nest boxes as well as natural burrows were identified and marked, as those selected for regular checking over the duration of the breeding season. A total of 55 nest sites were monitored on the upper vegetated surface of the island, with 26 of them active (adult, egg, chick, or scats present).

**Figure 6.** Chicks observed during the 2012-13 Little penguin breeding season at Middle Island.
Left: 1-2 week old chick. Right: 4-5 week old chick.

The collation and analysis of the breeding data collected followed the methodology used by Phillip Island Nature Park. Each measure of success is displayed as a proportion. Key measures of breeding success were:

***Hatching success:*** number of chicks hatched / egg laid (range = 0 to 1)

***Fledging success:*** number of chicks fledged / chick hatched (range = 0 to 1)

***Egg success***: Number of chicks fledged / egg laid (range = 0 to 1)

***Fledging rate:*** Number of chicks fledged / breeding pair (range = 0 to 6)

Within the surveyed nest sites, a total of 10 breeding pairs were observed, with each recorded to produce one clutch. A total of 16 eggs were laid, 12 of which hatched to produce eggs (*Hatching success* = 0.75). Only one chick failed, with 11 being determined to be fledged (*Fledging success* = 0.92). This gave a Fledging rate of 1.1 chicks fledged per breeding pair. The number of chicks fledged per egg laid (*Egg success)* was 0.68.

Little Penguin colonies across south-eastern Australia have been found display a significant degree of variation between seasons in their breeding success. This also appears to be true for the Middle Island colony. Measures of breeding success were compared over a series of seasons, with the fledging rate ranging from 1.0 to 2.1 fledglings per pair (Figure 7). At Phillip island, a 20 year average of 0.8 chicks (range = 0.3 to 1.3) were found to fledge per breeding pair across study sites (Chiaradia, 1999). At Granite Island in South Australia, fledging rates over nine seasons between 1990 and 2006 were found to average 0.58 chicks (range = 0.3 to 1.0) (Bool & Goldsworthy, 2007). In comparison to these figures, the breeding success at Middle Island appears high.

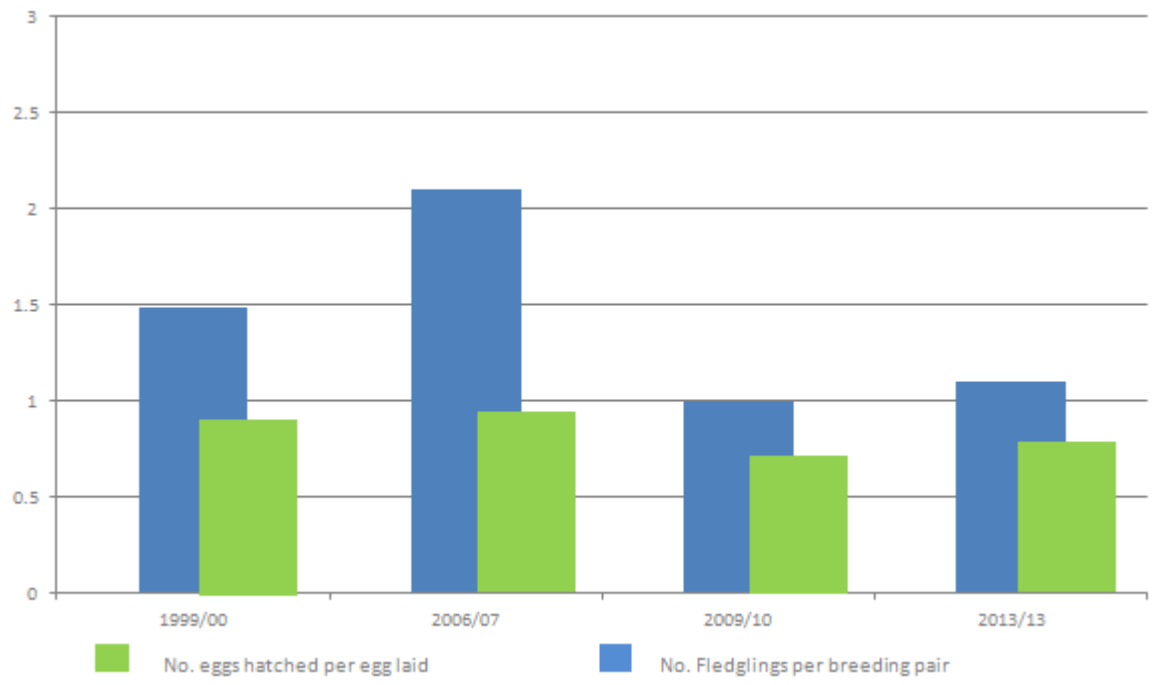


**Figure 7.** The number of chicks fledged per breeding pair (blue) and number of eggs hatched per egg laid (green) of the sampled population of *Eudyptula minor* (Little Penguin), Middle Island

A significant environmental factor in determining breeding success is thought to be food availability. Within the breeding season, the alternate guard and feeding arrangements of breeding pairs make adults dependant on successful foraging within sea areas close to their breeding site (Chiaradia, 1999).

Like other seabirds along the far-western Victoria coastline, the high average breeding success of Middle Island compared to other sites may be due to the availability of plentiful foraging grounds within the Bonney Upwelling. However, land based pressures such as predation and human trampling have also found to display reduced breeding vigor at a large number of colony sites. Bool and Goldsworthy (2007) found that while foraging parameters such as trip duration, type and mass of food catch were not significantly different between Granite Island and the nearby West Island, measures of breeding success were.

The Little Penguin colony of Granite Island, unlike West Island was exposed to human visitation, as well as predation by foxes and cats. Over successive seasons, the average fledging rate for West Island was 0.78, compared to 0.58 at Granite Island. The authors concluded that Little Penguin colonies were disproportionally susceptible to several threats and hazards both on land and at sea, and a small increase in the pressure of one or few factors could ultimately lead to local extinctions (Bool & Goldsworthy 2007).

The breeding monitoring results suggest that the Little Penguins at Middle Island have been able to undergo successful breeding events in the absence of predation by the European Fox. Of note, the presence of well-trained Maremma Dogs does not appeared to have caused significant disturbance to the breeding behavior of the Little Penguins.

**Observed Human Impacts**

During the breeding monitoring, team members found five nest boxes vandalized (Figure 8). Within one of the vandalized nest boxes, an abandoned Little Penguin egg was found. Other vandalized boxes occurred directly adjacent to active boxes and natural burrows. The impact of human trampling has been noted at the site in previous years. In the 1999-2000 season, Overeem and Wallis (2003) documented that 33% of the failure of chicks and 16% of the failure of eggs in sampled burrows was caused by human trampling.

During this season team members attempted to sample nest sites that were easily and safely accessible. Knowledge of existing 'safe-routes' would decrease any incidences of nest trampling, however for members of the public that are not aware of the sensitivity of the area, the sandy and shallow nest sites would be very susceptible to considerable damage. Ongoing liaisons between the Warrnambool Coastcare Landcare Group, Warrnambool City Council members, the Local Laws officers and police has helped in responding to incidences of public accessing the top of the island.


**Figure 8.** (Left) News headline features in the Warrnambool Standard (Right) example of observed damage to nest boxes from vandalism at Middle Island over the 2012-13 season.

A media release during the breeding season was also sent out to help raise awareness of the potential damage that can be caused following the vandalism of the boxes. Community members have also been vigilant in contacting local authorities when they observe unauthorised access. Further engagement and informative measures such as strategically placed signage on the island and Stingray Bay, or school education programs could also be effective in addressing this issue.

**Volunteer Involvement and Raising Awareness**

Volunteers have assumed a pivotal role in the Little Penguin Monitoring Program at Middle island since its inception. For this season alone, the in-kind effort of volunteers equated to approximately 280 hours. Projected for the life of the program this contribution equates to over 2000 hours. The current email list that updates volunteers on the program consists of 226 people, with 42 new subscribers added this season. A large number of new volunteers had expressed interest in the monitoring program and had been added to the email list following promotional events such as the Meet the Maremma tours, WCLG information booths at local events such as the Warrnambool Sustainable Living Festival, and WCLG talks at Deakin University.

The highlight of the season was arguably the filming of a program piece featuring the Maremma Project and Middle island penguins on 'ABC Catalyst – On The Road' in December. The program was televised twice on the free to air channel ABC1. The Catalyst cast and crew, with the help of the Little Penguin monitoring team, WCLG members and WCC staff were able to film on the island for one of the breeding surveys and arrival counts. The program painted a romantic snapshot picture for viewers of the Maremma Project's journey over the past decade, and further connected the project to the public.


**Figure 9.** (Left) Caption from the Wildiaries live camera internet feed (Right) Little Penguin at the beach platform at Middle Island filmed during the ABC catalyst segment on the Maremma Project (photo from ABC Catalyst website).

A newly formed partnership between Warnnambool City Council and web based company 'Wildiaries' has also presented a new and exciting way to follow the plight of the Little Penguins during their time on Middle Island this season. A number of live cameras were set up in artificial nest boxes, feeding live footage of active little penguin adults and chicks to the web. Tender displays of nurture and dependence between parent and chick could be observed from one of the cameras during the breeding season. The footage also displayed the harshness of nature, with extreme weather days putting observable stress on the birds.

As well as providing people all across the globe an opportunity to engage with and learn about the Middle Island Little Penguins, this footage also provides new opportunity for future breeding monitoring seasons to 'fill in the gaps' of the previously unobserved day to day events of the breeding lifecycle.

## REFERENCES

Bool , N. M. & Goldsworthy, S. D. (2007). *What is causing the decline of Little Penguins (Eudyptula minor) on Granite Island, South Australia.* Report to the South Australian Department of Environment and Heritage, Wildlife Conservation Fund, and Nature Foundation South Australia. Adelaide, South Australia.

Chiaradia, A. (1999). *Breeding biology and feeding ecology of Little Penguins at Phillip Island – A basis for a monitoring program.* PhD thesis. University of Tasmania.

King, K. A., Wallis, R. L., Peucker, A. S., Williams, D. & Fitzgibbons, I. (n/d). *Successful protection against predation on Little Penguins (Eudyptula minor) in Australia using Maremma Guard Dogs*. Unpublished.

Overeem, R. L. & Wallis, R. L. (2003). Little Penguin *Eudyptula minor* at Middle Island Western Victoria: Current Status. *The Victorian Naturalist.* **120**(3):76-83.

Overeem, R. L. & Wallis, R. L. (2006). Decline in numbers of Little Penguin *Eudyptula minor* at Middle Island Western Victoria. *The Victorian Naturalist*. **123**(6): 230-234.