Behaviour of water birds in the Coorong region

This report provides an overview of a large data base provided to DEWNR that documents the behaviour of various waterbirds over multiple years and multiple sites. A key behavioural variable is the amount of time a bird allocates to foraging. When resources are poor more time needs to be allocated to foraging. Table 1 provides a summary of the percent of time allocated by different species to foraging at multiple sites (9-18 in anyone year) in each of seven years. There were no data collected in 2010. Tables 2-10 provide data by site and year for selected bird species. Table 11 compares some data collected in January 2014 with similar data collected in January 1985 (1985 data are not included in the database).

The intention with this data set is to identify the species that have consistently high allocations of time to foraging and also within species those sites where the allocation of time to foraging is lower than for other sites. Species with low allocations of time to foraging are unlikely to be struggling to secure their food requirements while those that do are likely to be struggling and sensitive to changes in food resources. On these grounds most of the fish-eating species spend relatively little time foraging (e.g. Table 1, 9 (White-faced Heron) and 10 (Great Cormorant). The various shorebirds, including stilts, sandpipers and plovers spend considerably more time foraging, often over 90% suggesting this group of birds is particularly vulnerable to reductions in food supply and or access to food. For some of these species there is historical evidence to suggest that high allocation of time to foraging is typical for these birds in the Coorong (Table 11). Various waterfowl also may allocate considerable amounts of time to foraging.

The intention in this report is to simply highlight the variability between species, as well as the variation between sites and between years within a species. This provides a range of values that can be used in subsequent modelling of habitat suitability. The variability between sites and between years for species suggests that some years and sites are better quality sites for those species. Linking these data to resource levels is the next step in developing these behavioural data as indicators of habitat quality. The nature of the individual data sets are complex, and some of that complexity is lost in the summary tables. For example data are collected over five periods spread evenly across the day and the behaviour can vary diurnally. For some sites the numbers of birds present is small and so behavioural data for those sites may be less reliable. In the tables attached those sites and years where the numbers of birds recorded was small are indicated.

Table 1. The range in percent time that various birds allocated to foraging across sites where counts of birds present totalled more than 100. The bracketed numbers indicate the number of sites where the percentage of time allocated by birds to foraging was ≥ 50%, followed by the number of sites where the percentage of time allocated by birds to foraging was < 50%. Species with a large number of sites where the time allocated to foraging is >50% are the species most likely to be limited by food.

Year	2014	2013	2012	2011	2009	2008	2007
Sites surveyed	12	9	18	12	10	11	11
AP	0-66% (1,8)	0-47% (0,6)	0-58% (2,13)	0-58% (2,7)	0-1% (0,2)	5% (0,1)	0-71% (1,7)
ASD	6-80% (3,5)	0-91% (1,4)		0-52% (2,4)		5% (0,1)	1-57% (1,3)
ASH			0-61% (1,9)			0% (0,1)	67-89% (2,0)
AWI	80-81% (2,0)		32-41% (0,3)	91% (1,0)		79-96% (2,0)	81-88% (2,0)
BAG							85% (1,0)
BBD	32% (0,1)						
BLW							0% (0,1)
BS	70-100% (4,0)	35-99% (3,1)	63-99% (5,0)	80% (1,0)		72-100% (3,0)	77-95% (2,0)
BSW	1-98% (2,1)	50-95% (4,0)	19-91% (3,2)	0-92% (2,3)	66% (1,0)	53-89% (2,0)	23-77% (3,1)
BTNH	100% (1)						
BWS	58-84% (3,0)	31-85% (3,0)	51-85% (4,0)		92% (1,0)	80% (1,0)	21-80% (1,1)
CAT	0-66% (1,4)	0-18% (0,3)	0-80% (2,5)	58% (1,0)		3% (0,2)	0-20% (0,4)
CBG						13% (0,1)	
CHT	18-89% (4,2)	0-72% (1,3)	1-86% (2,1)	4-71% (1,3)	0-71% (2,1)	0-85% (1,2)	1-87% (3,4)
COO		71-85% (2,0)	2-92% (2,2)				
CTER	0-8% (0,3)	0-7% (0,4)	0-16% (0,6)	0-36% (0,7)	0% (0,1)	0% (0,1)	0-1% (0,2)
CUS	69-100% (4,0)	59% (1,0)			99% (1,0)		18-99% (4,1)
FT		0% (0,1)		88% (1,0)	0% (0,1)	0-49% (0,3)	1-13% (0,4)
G	42-94% (7,1)	29-85% (2,1)	50-80% (3,0)	49-84% (2,1)	75% (1,0)	61-92% (4,0)	6-82% (5,1)
GCG	11-83% (2,2)	31-70% (1,1)	87% (1,0)			11% (0,1)	62% (1,0)
GCO	0-3% (0,2)	0-4% (0,2)	0-5% (0,7)	0-17% (0,7)	0% (0,1)	3% (0,1)	0% (0,2)
GE		84% (1,0)					
GHC			0% (0,1)				
GT	10-96% (6,5)	1-97% (6,2)	0-93% (7,4)	8-19% (0,2)	6-52% (1,1)	0-77% (1,4)	9-88% (1,4)
HHD	44% (0,1)	70-88% (2,0)	96% (1,0)				
HHG	35-100% (6,1)	3-78% (3,4)	1-84% (2,3)			59% (1,0)	10-75% (2,1)
LBC	1% (0,1)	3-97% (1,1)	0-30% (0,5)	0-25% (0,3)			0% (0,1)
LEG							55% (1,0)
LPC	4% (0,1)	0% (0,1)	0-11% (0,7)		1% (0,2)	0-2% (0,3)	1-13% (0,4)
MD	51% (1,0)			98% (1,0)	8% (0,1)	0% (0,1)	8% (0,1)
MLW	17-77% (1,5)	0-44% (0,4)	1-32% (0,7)	8-95% (1,4)			17-47% (0,3)
PBD	66% (1,0)		21-52% (1,1)	58-63% (2,0)		0-66% (1,2)	55-82% (3,0)
PCO		0-18% (0,3)	3% (0,1)	0% (0,1)	2% (0,1)		0% (0,1)
PED		36% (0,1)	72-95% (3,0)				
PGP	24% (0,1)	66% (1,0)				68% (1,0)	2-10% (0,2)
PO				76% (1,0)			
RCP	21-99% (7,3)	35-98% (7,1)	64-100% (7,0)			15% (0,1)	6-88% (5,2)
RNA	36-90% (5,3)	14-87% (2,5)	29-91% (3,2)	10-74% (2,1)			45-61% (2,1)
RNS	18-97% (10,1)	69-99% (9,0)	29-99% (10,1)	23-33% (0,3)	1-98% (3,1)	20-94% (4,1)	14-100% (8,3)
SG	0-57% (1,11)	1-93% (2,7)	0-30% (0,12)	0-52% (1,10)	0-38% (0,6)	0-99% (2,9)	1-76% (2,9)
SNI				87% (1,0)			
STS	43-98% (9,1)	73-98% (9,0)	68-100% (11,0)		0-100% (4,1)	5-98% (5,3)	4-99% (6,3)
WFAH	20-56% (1,2)	35-87% (2,1)	66% (1,0)	53-90% (2,0)		58% (1,0)	60-67% (2,0)
WT	2-98% (6,5)	2-99% (5,3)	2-100% (10,5)		0-54% (2,1)	1-36% (0,8)	1-84% (1,7)

Table 2. The percentage of time Sharp-tailed Sandpipers allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	**77%**	**91%**	5%		**77%**		
Campbell Park				No Birds	No Birds		
Gemini Downs				No Birds	**100%**	**83%**	**43%**
Jack Point	26%	**88%**	100%	29%	**91%**	**93%**	79%
Kindaruar					0%		
Long Point	**4%**	**38%**	**88%**			**96%**	**69%**
Loveday Bay					No Birds		
Mark Point	**19%**	**5%**	**94%**	No Birds	**90%**		**71%**
Monument Road	**98%**	**98%**	**97%**	No Birds	**91%**	**97%**	**60%**
Monument Road Backwater				No Birds	**76%**		
Morella Basin							**94%**
Mundoo Channel	**94%**	**93%**					
Nalpa East					No Birds		
Napla North					No Birds		
Noonameena	**94%**	**91%**	94%	No Birds	**90%**	**88%**	**96%**
Parnka Point	3%	**45%**	**0%**	No Birds	**68%**	**97%**	**92%**
Pelican Point	**9%**	74%	**100%**	No Birds	**88%**	**97%**	**98%**
Point Sturt				No Birds	**89%**		
Policeman's Point							90%
Poltalloch					No Birds		
Salt Creek	**84%**	50%	0%	No Birds	No Birds	**73%**	**75%**
Villa dei Yumpa	**99%**	100%	No Birds	No Birds	**99%**	**98%**	**98%**

Table 3. The percentage of time Greenshank allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	**81%**	**61%**	No Birds		**62%**		
Campbell Park				No Birds	No Birds		
Gemini Downs				No Birds	No Birds	100%	**84%**
Jack Point	No Birds	0%	No Birds	No Birds	100%	100%	100%
Kindaruar					No Birds		
Long Point	**6%**	34%	100%			**85%**	**52%**
Loveday Bay					No Birds		
Mark Point	**68%**	59%	98%	**49%**	**80%**		40%
Monument Road	**64%**	**82%**	**75%**	11%	81%	84%	**81%**
Monument Road Backwater				**84%**	**50%**		
Morella Basin							100%
Mundoo Channel	**82%**	**92%**					
Nalpa East					No Birds		
Napla North					No Birds		
Noonameena	10%	100%	No Birds	50%	No Birds	**59%**	**42%**
Parnka Point	100%	100%	No Birds	No Birds	100%	89%	**94%**
Pelican Point	**50%**	No Birds	79%	0%	98%	84%	**77%**
Point Sturt				No Birds	No Birds		
Policeman's Point							**82%**
Poltalloch					No Birds		
Salt Creek	71%	**86%**	79%	**55%**	42%	**29%**	**68%**
Villa dei Yumpa	No Birds	No Birds	No Birds	No Birds	0%	33%	98%

Table 4. The percentage of time Red-capped Plovers allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	69%	91%	No Birds		100%		
Campbell Park				No Birds	No Birds		
Gemini Downs				No Birds	**100%**	**98%**	**93%**
Jack Point	No Birds	100%	57%	31%	**92%**	**80%**	93%
Kindaruar					No Birds		
Long Point	**6%**	75%	49%			**84%**	**35%**
Loveday Bay					No Birds		
Mark Point	**62%**	100%	100%	No Birds	**94%**		**21%**
Monument Road	No Birds	No Birds	No Birds	No Birds	100%	100%	No Birds
Monument Road Backwater				No Birds	No Birds		
Morella Basin							**89%**
Mundoo Channel	**86%**	No Birds					
Nalpa East					No Birds		
Napla North					No Birds		
Noonameena	**60%**	94%	100%	No Birds	100%	**93%**	**91%**
Parnka Point	**61%**	**15%**	0%	No Birds	**83%**	**93%**	**85%**
Pelican Point	**27%**	No Birds	100%	No Birds	**98%**	**98%**	**88%**
Point Sturt				No Birds	**82%**		
Policeman's Point							**97%**
Poltalloch					No Birds		
Salt Creek	76%	No Birds	No Birds	No Birds	92%	**97%**	**99%**
Villa dei Yumpa	**88%**	40%	No Birds	No Birds	**64%**	**35%**	**39%**

Table 5. The percentage of time Australian Shelduck allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	20%	No Birds	No Birds		0%		
Campbell Park				0%	**1%**		
Gemini Downs				**52%**	**5%**	**47%**	**58%**
Jack Point	0%	0%	0%	**27%**	**2%**	No Birds	0%
Kindaruar					**61%**		
Long Point	89%	0%	No Birds			0%	**34%**
Loveday Bay					0%		
Mark Point	0%	0%	No Birds	0%	**4%**		0%
Monument Road	59%	0%	No Birds	0%	0%	0%	No Birds
Monument Road Backwater				No Birds	No Birds		
Morella Basin							**53%**
Mundoo Channel	0%	0%					
Nalpa East					0%		
Napla North					21%		
Noonameena	**1%**	0%	5%	**15%**	3%	**18%**	**6%**
Parnka Point	**9%**	0%	0%	0%	16%	0%	**6%**
Pelican Point	**15%**	0%	0%	0%	0%	**0%**	**6%**
Point Sturt				**51%**	**0%**		
Policeman's Point							**80%**
Poltalloch					**1%**		
Salt Creek	**57%**	**5%**	0%	**1%**	**29%**	4%	**18%**
Villa dei Yumpa	11%	40%	No Birds	0%	34%	**91%**	9%

Table 6. The percentage of time Grey Teals allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	40%	**0%**	0%		**43%**		
Campbell Park				No Birds	0%		
Gemini Downs				40%	1%	**94%**	**89%**
Jack Point	0%	No Birds	No Birds	19%	**0%**	**1%**	**18%**
Kindaruar					No Birds		
Long Point	**4%**	No Birds	No Birds			**64%**	**71%**
Loveday Bay					No Birds		
Mark Point	**3%**	1%	**6%**	No Birds	**57%**		**31%**
Monument Road	31%	100%	**52%**	No Birds	**93%**	**85%**	**57%**
Monument Road Backwater				No Birds	**91%**		
Morella Basin							**65%**
Mundoo Channel	**71%**	**77%**					
Nalpa East					No Birds		
Napla North					0%		
Noonameena	0%	0%	24%	No Birds	**3%**	**77%**	**26%**
Parnka Point	0%	No Birds	0%	No Birds	**8%**	**80%**	**43%**
Pelican Point	**1%**	**5%**	No Birds	No Birds	**52%**	**1%**	**10%**
Point Sturt				No Birds	**90%**		
Policeman's Point							**96%**
Poltalloch					No Birds		
Salt Creek	0%	**0%**	No Birds	**8%**	**58%**	3%	0%
Villa dei Yumpa	0%	No Birds	No Birds	0%	**89%**	**97%**	**78%**

Table 7. The percentage of time allocated by Black Swans to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	**77%**	67%	No Birds		35%		
Campbell Park				**19%**	**19%**		
Gemini Downs				No Birds	No Birds	56%	0%
Jack Point	No Birds	No Birds	No Birds	No Birds	No Birds	0%	0%
Kindaruar					**91%**		
Long Point	0%	0%	No Birds			No Birds	No Birds
Loveday Bay					0%		
Mark Point	13%	0%	No Birds	No Birds	**32%**		No Birds
Monument Road	**63%**	**89%**	**66%**	**0%**	11%	**77%**	**70%**
Monument Road Backwater				**91%**	0%		
Morella Basin							No Birds
Mundoo Channel	**23%**	**53%**					
Nalpa East					0%		
Napla North					**67%**		
Noonameena	25%	0%	No Birds	**91%**	0%	**95%**	No Birds
Parnka Point	No Birds	No Birds	No Birds	No Birds	No Birds	0%	No Birds
Pelican Point	9%	0%	No Birds	No Birds	20%	15%	73%
Point Sturt				0%	No Birds		
Policeman's Point							**98%**
Poltalloch					**67%**		
Salt Creek	**53%**	No Birds	No Birds	**4%**	No Birds	**72%**	**1%**
Villa dei Yumpa	No Birds	0%	No Birds	No Birds	0%	**50%**	0%

Table 8. The percentage of time Whiskered Terns allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Ewe Island	**38%**	**28%**	74%		**66%**		
Campbell Park				No Birds	100%		
Gemini Downs				No Birds	No Birds	**99%**	44%
Jack Point	85%	No Birds	No Birds	No Birds	**70%**	**89%**	**98%**
Kindaruar					**96%**		
Long Point	**5%**	**1%**	**0%**			**10%**	**13%**
Loveday Bay					**64%**		
Mark Point	**36%**	36%	**54%**	0%	**53%**		**43%**
Monument Road	**15%**	**31%**	**52%**	No Birds	**63%**	**87%**	**71%**
Monument Road Backwater				No Birds	No Birds		
Morella Basin							**98%**
Mundoo Channel	17%	**24%**					
Nalpa East					**74%**		
Napla North					**100%**		
Noonameena	**1%**	**1%**	0%	0%	**56%**	**56%**	**7%**
Parnka Point	**84%**	0%	No Birds	No Birds	**31%**	**5%**	**67%**
Pelican Point	**14%**	**16%**	84%	No Birds	**88%**	**94%**	**34%**
Point Sturt				No Birds	**2%**		
Policeman's Point							**89%**
Poltalloch					**5%**		
Salt Creek	**1%**	**30%**	No Birds	No Birds	**5%**	**2%**	**2%**
Villa dei Yumpa	0%	No Birds	No Birds	No Birds	**4%**	65%	**81%**

Table 9. The percentage of time White-faced Herons allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Campbell Park				0%	29%		
Ewe Island	66%	67%	No Birds		100%		
Gemini Downs				0%	No Birds	15%	41%
Jack Point	0%	0%	71%	No Birds	40%	17%	0%
Kindaruar					**66%**		
Long Point	58%	No Birds	33%			50%	**26%**
Loveday Bay					25%		
Mark Point	67%	67%	No Birds	80%	94%		**56%**
Monument Road	**67%**	56%	No Birds	0%	0%	22%	55%
Monument Road Backwater				**90%**	0%		
Morella Basin							39%
Mundoo Channel	**60%**	**58%**					
Nalpa East					0%		
Napla North					43%		
Noonameena	0%	100%	No Birds	0%	26%	**35%**	No Birds
Parnka Point	No Birds	0%	0%	0%	0%	**87%**	**20%**
Pelican Point	0%	No Birds	No Birds	0%	0%	0%	86%
Point Sturt				**53%**	40%		
Policeman's Point							No Birds
Poltalloch					42%		
Salt Creek	No Birds	No Birds	No Birds	12%	25%	**64%**	35%
Villa dei Yumpa	33%	0%	No Birds	0%	0%	69%	86%

Table 10. The percentage of time Great Cormorants allocated to foraging at sites surveyed from 2007-2014 but not including 2010. Blank spaces indicate that no survey was conducted in that year at that site. The values in bold indicate when counts of birds present (excluding those flying) totalled more than 100.

SITE	YEAR						
	2007	2008	2009	2011	2012	2013	2014
Campbell Park				**0%**	**1%**		
Ewe Island	0%	0%	No Birds		0%		
Gemini Downs				No Birds	No Birds	No Birds	No Birds
Jack Point	No Birds	No Birds	No Birds	No Birds	0%	No Birds	No Birds
Kindaruar					30%		
Long Point	0%	No Birds	No Birds			0%	No Birds
Loveday Bay					22%		
Mark Point	0%	No Birds	0%	**3%**	**0%**		0%
Monument Road	**0%**	**3%**	0%	**17%**	**5%**	**4%**	**3%**
Monument Road Backwater				No Birds	No Birds		
Morella Basin							No Birds
Mundoo Channel	5%	0%					
Nalpa East					**0%**		
Napla North					**2%**		
Noonameena	0%	No Birds	No Birds	**4%**	0%	0%	No Birds
Parnka Point	0%	No Birds	No Birds	0%	No Birds	No Birds	No Birds
Pelican Point	**0%**	0%	0%	**3%**	**0%**	**0%**	**0%**
Point Sturt				4%	5%		
Policeman's Point							0%
Poltalloch					**1%**		
Salt Creek	No Birds	No Birds	No Birds	No Birds	No Birds	0%	No Birds
Villa dei Yumpa	No Birds	No Birds	No Birds	No Birds	No Birds	0%	No Birds

Percentage of birds foraging

	Year	
Species	1985	2014
ASD	26%	55%
BS	17%	98%
CUS	88%	95%
FT	14%	20%
GCG	9%	43%
GT	80%	75%
HHG	34%	80%
RCP	58%	64%
RNA	26%	54%

RNS	90%	93%
SG	50%	23%
STS	87%	94%