

Annex 3-F

Ardeid Use of the Study Site

The main ardeids recorded during the survey consisted of six regularly seen species: Night Heron, Chinese Pond Heron, Cattle Egret, Little Egret, Great Egret and Grey Heron. Other ardeids including Yellow Bittern, Striated Heron and Intermediate Egret were rarely encountered and are excluded from discussion in this *Annex*.

The mean number of ardeids in winter (mean per visit during winter) was compared between the Eastern Channel alignment and the control site (Western Channel area). The purpose of the comparison was to test the following hypothesis:

- H_0 : The Eastern Channel and the control site support equal numbers of ardeids during winter.
- H_1 : The control site supports more ardeids than the Eastern Channel during winter.

Results are shown in *Table a*.

Table a *Mean Numbers of Ardeids at the Eastern Channel alignment and the control site, winter 1997/98*

	Control Site	Eastern Channel
No. of visits (n)	17	16
mean no. birds per visit	142.882	17.588
standard deviation (s)	92.262	9.888

Using t-test analysis, the null hypothesis (equality of mean ardeid numbers between the two sites) was rejected ($t = 5.28$; $P < 0.01$; d.f. = 31; one-tailed test). The abundance of ardeids was higher in the control site over winter.

As noted in Chapter 3, the Eastern Channel alignment and the control site vary in a number of ways, including size, number of ponds, and ambient disturbance levels. The greater abundance of ardeids in the control site could be attributable to the much larger number of fish ponds along the alignment rather than to lower levels of disturbance. To account for this possibility, the mean numbers of birds per pond per visit during winter in the Eastern Channel alignment and the control site were compared (*Table b*). The following hypothesis was tested:

- H_0 : The mean numbers of ardeids per pond per visit was equal at the Eastern Channel alignment and the control site during winter.
- H_1 : The mean number of ardeids per pond per visit was greater in the control site than in the Eastern Channel during winter.

Table b *Mean Numbers of ardeids per pond per visit at the Eastern Channel alignment and the control site, winter 1997/98*

	Control Site	Eastern Channel
No. of visits (n)	17	16
mean no birds per pond per visit	3.040	0.977
standard deviation (s)	2.005	0.548

Using t-test analysis, the null hypothesis (equality of means) was rejected ($t = 3.97$; $P < 0.01$; d.f. = 31; one-tailed test). The abundance of ardeids per pond per visit in the control site was higher than along the Eastern Channel alignment during winter.

In summary, the ardeid pattern of use was not uniform throughout the study area. Fewer ardeids used the fishponds in the Eastern Channel area, and the abundance of ardeids was significantly higher in the control site during winter.

Some insight into the probable importance of the study area to breeding ardeids can be gained by comparing existing data with results of field surveys. Sources reviewed included Young and Cha (1995) for breeding ardeid populations in Hong Kong, and winter waterfowl counts undertaken by the Hong Kong Bird Watching Society (HKBWS).

Table c compares SAR breeding numbers of 5 ardeid species with peak counts of these species in fish ponds within the study area.

Table c *Comparison of ardeid breeding population and numbers present in mid-summer in the study area*

<u>Species</u>	<u>Total breeding pairs in SAR 1990-1995</u>	<u>Peak count in study area during summer (from field surveys)</u>	<u>Percentage of 1990-1995 breeding population</u>
Night Heron	97-485	9	0.9 - 4.6
Chinese Pond heron	95 - 171	75	21.9 - 39.5
Cattle Egret	53 - 107	10	4.7 - 9.4
Great Egret	0 - 5	5	up to 50
Little Egret	100 - 334	40	6 - 20

Table c indicates the value of the fish ponds within the study area to these 5 species, and highlights the study area's importance to Chinese Pond Herons and Little Egrets (the two most common ardeid species within the study area). It should be noted, however, that not all birds counted in the study area during the summer months can be assumed to be of breeding age.

Juvenile ardeids immediately after fledging are inexperienced foragers (Draulans 1987). Juvenile Chinese Pond Herons in the Deep Bay area are entirely dependent on fish ponds, where non-commercial fry are easily taken (Young 1993). Lower feeding success rates in juvenile Little Egrets in the Deep Bay area were documented by Britton (1993) and Kwok

(1993). Ponds thus provide a nursery function for juvenile ardeids, and loss of such nursery areas within the study area may affect post-fledging survival rates.

Young (1993) found that adult Chinese Pond Herons fed primarily on intertidal mudflats in summer and upon non-commercial fish species and dipterans in fish ponds in winter. Cornish (1996) found that breeding Little Egrets at Tsim Bei Tsui compensated for loss of access to intertidal habitats during high tide periods by increasing foraging in fish ponds. However, Wong (1991) found that over 50% of Little Egrets made use of fish ponds irrespective of tides.

The importance of the study area in terms of the winter population of ardeids in Deep Bay is shown in *Table d*. The Deep Bay waterfowl counts undertaken by HKBWS cover the greater part of the Deep Bay area.

Table d Comparison of peak ardeid totals within the study area and those recorded during the Deep Bay 1998 mid-winter waterfowl count (HKWBS)

<u>Species</u>	<u>Mid-winter Deep Bay total- January 1998</u>	<u>Peak count in study area during winter</u>	<u>Percentage of Deep Bay total</u>
Night Heron	448	8	1.8
Chinese Pond Heron	215	65	30.2
Cattle Egret	42	50	120
Little Egret	1042	247	23.7
Great Egret	640	54	8.4
Grey Heron	1118	77	6.9

The study area, based on the above comparison of the peak count in mid-winter and the Deep Bay total, is very important for Chinese Pond Heron, Cattle Egret, Little Egret, Grey Egret and Grey Heron. Given the preference of these species for the ponds in the study area as a whole (the Western Channel alignment in particular), habitat loss in this area may affect Deep Bay ardeid populations as a whole.