Appendix 4.8 Ardeid Night Roost Survey

1 INTRODUCTION

1.1 Purpose of the Study

It has been brought into concern that the proposed project may affect the ardeids (a general term for egrets and herons) roosting beside the Wong Chuk Hang (WCH) nullah because a certain number of ardeids were regularly seen in the area. Ardeids in Hong Kong are commonly found in wetland areas including channelized river and nullah. Although the design of WCH nullah is of similar type to any other nullahs in Hong Kong, it attracts a high number of roosting ardeid nearby for an unknown reason. In view of the need for more comprehensive information to facilitate the assessment on the potential impact arising from the construction works, additional surveys were conducted to collect more information on the ardeid night roost in Hong Kong and particularly on the WCH roosting population.

1.2 Objective

- To investigate the habitat use of WCH nullah by ardieds.
- To identify any potential night roost at west Hong Kong Island.
- To review the status of ardeid night roost in Hong Kong by revisiting the previously recorded ardeid night roost locations.

1.3 Structure of the Report

The report presents in **Chapter 2** the observation on the WCH nullah and the behaviour of the roosting ardeids. The result of the survey for potential ardeid night roost on west Hong Kong Island is presented in the following **Chapter 3**. Finally, the updated status of the previously recorded ardeid night roost in Hong Kong was summarized and presented in **Chapter 4**.

2 STUDY ON WONG CHUK HANG ARDEID NIGHT ROOST

2.1 Background Information

A large aggregation of egrets was reported at the WCH nullah area by local residents. Some people even suggested that the site was used by egrets for breeding. However, in a territory-wide egretry survey conducted by Hong Kong Bird Watching Society (HKBWS) in 2008, the site was surveyed and it was concluded that no breeding was observed (Anon 2008). Despite the low possibility of being used by ardeids as a breeding ground, the habitat use and ecology of the roosting ardeid in WCH nullah is not fully understood.

Little Egrets are mostly a gregarious species and thus often gather in small parties, both flying and when fishing. In their wintering quarter in Europe, they spend the whole day at the foraging grounds. At dusk, they fly singly or in small parties to the roost in large trees, but bushes may be used if trees are unavailable (Voisin 1991). Little Egrets may congregate in great numbers at one roost, and use the same one each evening throughout the winter. The birds land directly in the trees and perch quickly on a suitable branch where they will sleep for the night. At dawn, they all leave the roost singly or in small parties to return to the foraging grounds.

This survey is to further describe the behaviour of the ardeid roosting at the WCH nullah. Information such as species abundance, time of roosting, favourite roosting plant species and flight route would be useful for ecological impact assessment.

2.2 Methodology

Ardeid night roost surveys were conducted once per month from August 2008 to July 2009 to describe the night roosting behaviour of ardeids at WCH nullah. The surveys started from 5:30p.m., approximately an hour before sunset, and lasts until the nightfall. Direct observation was made from a vantage point at Heung Yip Road. Species, abundance, returning time and flight route were recorded. The tree species favourable for aggregation of ardeid were located and identified. A staff working in an adjacent rehabilitation centre and a pedestrian at Heung Yip Road were interviewed to record the history of the ardeid population in WCH nullah.

2.3 Results

The degraded woodland on the southern hillside of the WCH nullah was found utilized by ardeid as a night roosting site. Six ardeid species including Little Egret, Great Egret, Cattle Egret, Chinese Pond Heron, Grey Heron and Black-crowned Night Heron were recorded at the site but it was primarily used by Little Egret for night roosting. A certain number of ardeids regularly return to the roost at sunset. When they returned to the site, they sparsely settle over the nullah area and adjacent degraded woodland before finally aggregating closely on a small patch of trees for night roosting. The tree species they used for night roosting are mostly amenity species such as *Mallotus paniculatus, Macaranga tanarius, Leucaena leucocephala, Ficus hispida* and *Cratoxylum cochinchinense*. The relationship between vegetation and egretry was studied through identifying the plant species used for breeding in the egretry survey 2004-08 by HKBWS (Anon 2004, 2005, 2006, 2007 and 2008). Bamboo tree and *Ficus microcarpa* were reported in the reports as the commonest plant species in egretry, but none of those plant species listed in the WCH night roost was used for nesting.

During the site visits in spring and summer in 2009, neither ardeid nests nor fledglings were found at the roost which indicated that the site was not used for breeding. The result is consistent with that of the HKBWS egretry survey in which the site was surveyed but no ardeid nest was recorded (Anon 2008). It is uncertain when the ardeids started roosting at the site, but a health care worker in the nearby rehabilitation

centre reported that aggregation of egrets were seen at the nullah area since 4 to 5 years ago (i.e. since 2003/04). On the other hand, a survey on wintering ardeid night roost conducted by AFCD in 2003 (Lee et al. 2004) did not report the sighting of ardeid night roost at WCH. It is therefore reasonable to speculate that the night roost has around 4 to 5 years history.

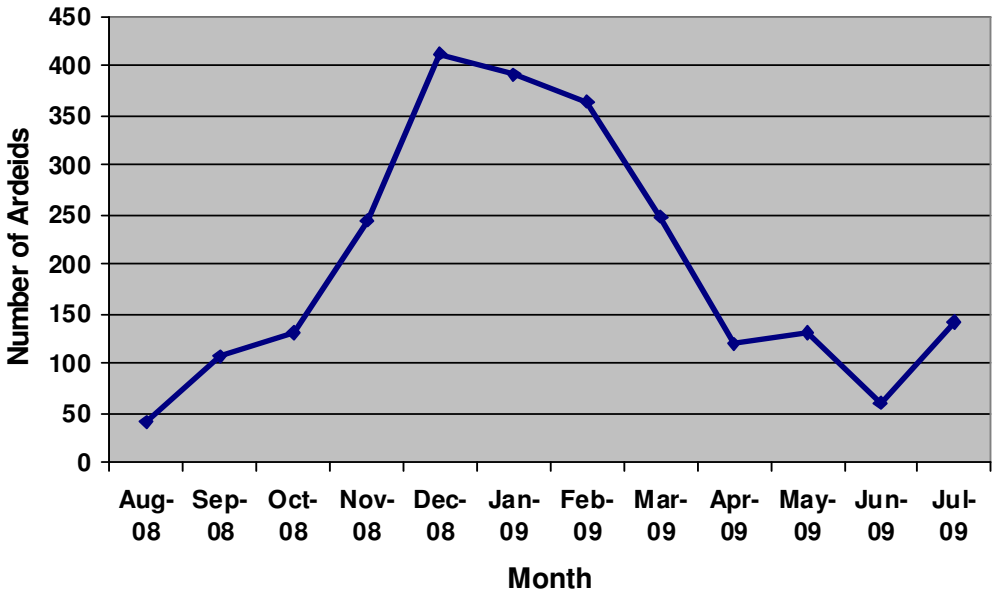
The number of ardeids roosting at the site increased progressively from 41 in August 08 to 412 in December 08, levelling from January and February 09 before a gradual drop in March 09 (**Table 1** and **Figure 1**). The trend of progressive increase from summer to winter indicated the presence of a high proportion of migratory population in the roosting ardeids. After the peak wintering season from December to February, the number of ardeids at WCH fell along with the departure of the wintering population until it reached a stable and relatively low level from April to July.

Table 1: Number and species of ardeid night roosting at Wong Chuk Hang nullah

	Little Egret	Great Egret	Cattle Egret	Chinese Pond Heron	Total Roosting Population
Aug 08	41	0	0	0	41
Sept 08	105	0	0	2	107
Oct 08	125	4	0	2	131
Nov 08	237	7	0	0	244
Dec 08	407	5	0	0	412
Jan 09	390	1	0	0	391
Feb 09	356	8	0	0	364
Mar 09	244	4	0	0	248
Apr 09	113	4	3	0	120
May 09	129	1	1	0	131
Jun 09	60	0	0	0	60
Jul 09	142	0	0	0	142

*Black-crowned Night Heron, a nocturnal species commonly seen at the WCH nullah, is excluded from the table as it is not involved in the night roosting community.

Figure 1 Record of night roosting ardeid population at Wong Chuk Hang nullah from August 2008 to July 2009



2.4 Conclusion

A small section of degraded woodland south of WCH nullah is used by ardeids for a night roosting site. Although a variety of ardeid species were recorded at the nullah, the night roosting population is dominated by Little Egrets. It was observed that a certain number of ardeids regularly returned to the WCH nullah every evening and settled on the same patch of trees. The roosting population showed a clear seasonal change which peaks in winter but is lowest in summer.

The clear trend of increase in night roosting population from summer to winter indicated that the night roosting Little Egret population consists of a large portion of migratory population. It was observed that the majority of the roosting population would leave the night roost after winter and the site would not be used for breeding activity.

3 SURVEYS ON ARDIED NIGHT ROOSTS IN WEST HONG KONG ISLAND

3.1 Background Information

Although an ardeid night roost was identified in WCH nullah, it is not known from where the egrets originate and where they go for foraging during daytime. From the night roost survey (shown in **Chapter 2**), more than 400 egrets were recorded in the WCH roost which is far more than the total number of ardeids found foraging at Aberdeen Channel and Aberdeen Typhoon Shelter. It is therefore reasonable to suggest that the roosting population in WCH nullah includes not only those foraging at Aberdeen Channel area but also a larger population foraging outside Aberdeen Channel area.

In view of the highly dynamic ardeid population, it was suspected that another night roost was present at an adjacent area and ecologically related to the WCH roosting population. Indeed, a roosting site for Black-crowned Night Heron was identified in Tai Shui Wan in Ocean Park, 1.5km apart from WCH nullah, in the 2004 egretry survey (Anon 2005). Any ardeid night roost found along the coastline in western Hong Kong could serve as an alternative roosting site for the WCH population and such information is important for impact assessment.

The objective of this survey is to search for any potential ardeid night roost in west Hong Kong Island by tracing the ardeid flight route during late evening when the ardeid return to the roost singly or in a large group. The flight route result was also used for interpreting the foraging or roosting habitat during daytime.

3.2 Methodology

11 vantage points along the coastline in southwest Hong Kong Island (from Kennedy Town to Chung Hom Kok) were selected for the surveys (**Table 2**). All the survey locations are on the waterfronts and have a broad view over the neighbouring coastal area. The surveys were conducted in mid wintering season, i.e. December 08 to February 09, when the abundance of the migratory ardeid is at peak level and thus the result is most significant. The surveys started from 5:30p.m., approximately an hour before sunset, when the ardeid start to return to their roosting ground (Voisin 1991). If flying ardeids were spotted, their flight routes would be followed to trace their roosting locations. All the background information including the species, abundance, flight route, time and final destination were also recorded.

3.3 Result

Flying ardeids with obvious flight path were observed in Kennedy Town, Waterfall Bay Park, South Horizon, Aberdeen West Typhoon Shelter and Aberdeen Channel. No obvious ardeid flight movement was observed along the coastline in Sandy Bay, Cyber Port, Sea view Promenade and Chung Hom Kok.

A total of 8 Little Egrets was observed in Kennedy Town which finally settled and roosted in Little Green Island. All the flying egrets observed from Aberdeen West Typhoon Shelter and Aberdeen Channel were heading to the same destination, the WCH nullah night roost. On 29th December 08 during the count at Aberdeen West Typhoon Shelter and Aberdeen Channel, more than 400 egrets were found flying from West Typhoon Shelter to the WCH direction while 8 Little Egrets were found flying from south of Ap Lei Chau toward WCH through the Aberdeen Channel (shown as flight route B & C in **Figure 2**). This observation revealed that the majority of the WCH nullah roosting population use the flight route through the Aberdeen West Typhoon Shelter when returning to night roost.

In both counts in Waterfall Bay Park and South Horizon, a complex of flight routes was observed. During the count at Waterfall Bay Park, roughly 100 Little Egrets was seen flying from the south to the WCH direction via the West Typhoon Shelter which is likely referring to the same population observed from

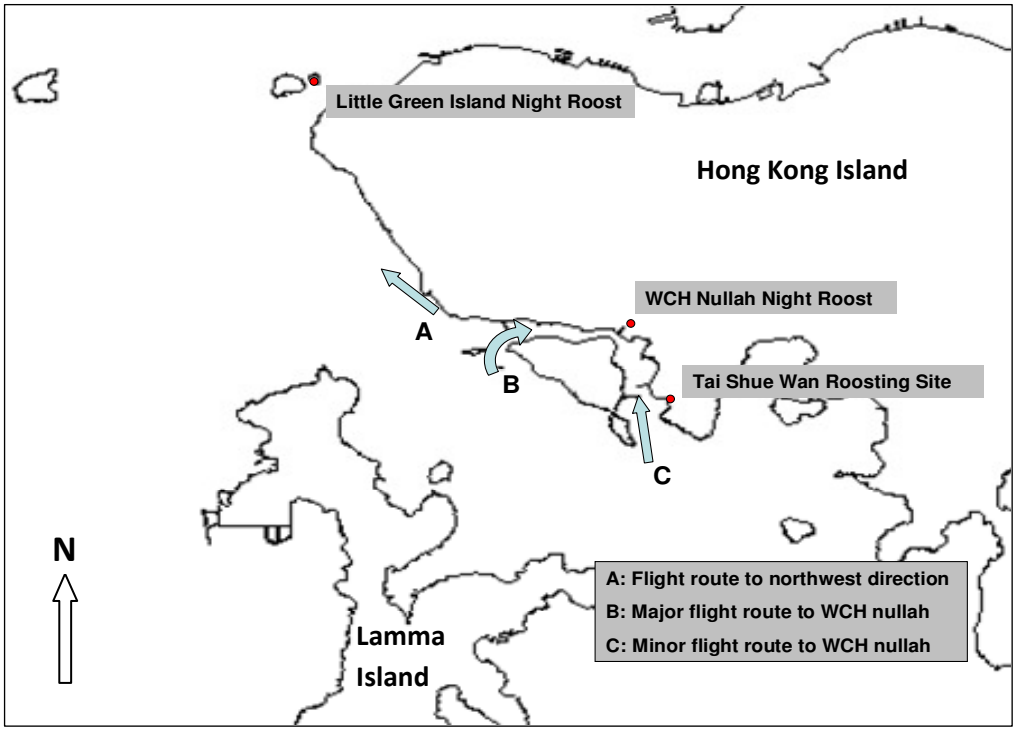
Aberdeen West Typhoon Shelter. Meanwhile, about 50 Little Egrets were found flying north-westward, a direction toward southwest Kowloon or east Lantau (shown as flight route A in **Figure 2**). This observation is consistent with that at Southern Horizon on 16 February 2009 when a total of 203 were found flying from south of Ap Lei Chau toward WCH direction and about 50 were flying in the northward direction. Therefore it is believed that a night roost is present somewhere northwest of Hong Kong Island.

On the other hand, 31 Black-crowned Night Herons were found in Tai Shue Wan inside Ocean Park on 20 February 2008. The survey was conducted at daytime because Black-crowned Night Heron is a nocturnal species that forage at night but rest at daytime. Despite its close distance to the WCH nullah roosting site, interaction among the roosting sites are not expected because both locations are utilized by ardeid species with different habits.

Table 2 Locations and Date of the Ardeid Night Roost Survey

Locations	Survey Date
1. Kennedy Town	15 January 2009
2. Sandy Bay, Pokfulam	20 January 2009
3. Cyber Port, Pokfulam	20 January 2009
4. Waterfall Bay Park, Wah Fu	12 February 2009
5. Aberdeen West Typhoon Shelter	29 December 2008
6. Aberdeen Channel	29 December 2008
7. Southern Horizon	17 February 2009
8. Tai Shue Wan, Ocean Park	20 February 2009
9. Seaview Promenade, Deep Water Bay	30 December 2008
10. Chung Hom Kok (Westward direction)	10 February 2009
11. Chung Hom Kok (Eastward direction)	10 February 2009

Figure 2 Result of the Ardeid night roost survey in west Hong Kong Island



3.4 Conclusion

Along the coastline in west and southwest Hong Kong Island, roosting ardeids were found in Little Green Island, WCH nullah and Tai Shue Wan. Although Little Green Island is an egretry with more than 30 breeding pairs in 2008 breeding season (Anon 2008), only 8 individuals were found roosting in winter 2008/09.

The WCH nullah is the only night roost in the territory. The observation in Aberdeen West Typhoon Shelter revealed that the roosting population is not only confined to the ardeids foraging at Aberdeen Typhoon Shelter but also include a population foraging at south of Hong Kong Island. It is worth noting that a small population was found flying from Aberdeen West Typhoon Shelter in the northward direction which indicates the presence of another roosting site at a location northwest of Hong Kong Island. Despite a far distance from south of Aberdeen to the potential roosting site northwest Hong Kong, it has been observed at the field that the egrets fly regularly for a long distance from their foraging ground to return to their night roosting site.

The roosting site at Tai Shue Wan in Ocean Park is exclusively used by Black-crowned Night Heron, a nocturnal species, for day roosting. Although the location is not far from WCH nullah, the site is not likely to be used by the WCH night roosting population.

4 SURVEYS ON HONG KONG ARDEID NIGHT ROOSTS

4.1 Background Information

Ardeid night roosts are known for their highly changeable in locations and roosting population. During the wintering season, aggregation of roosting ardeid is often seen near wetland areas, especially at the northwest New Territories in Hong Kong. The roosting location can be in temporal basis and even change form day to day on a small scale. In an EIA study at Kau Si Chau, a roosting site of 72 Black-crowned Night Heron previously recorded in 2000/01 was found totally abandoned in 2004/05 without a major change in surrounding environment (BVHK 2005). Tam Kon Chau Egretries, which is also used for non-breeding night roost, where 1,998 night roosting ardeid have been recorded in 2003 (Lee *et. al.* 2004) but was not used by any ardied in 2008/09 winter (observed in our site visit in Jan 2009). Similar phenomenon has also been observed in A Chau Egretry, the largest in Hong Kong, in which a population of 711 night roosting ardeids were recorded 2003 but the location was changed to adjacent mangrove area in winter 2006/07. All this information reveals that the behaviour of the non-breeding ardeid is highly unpredictable and it is difficult to justify the ecological importance of a night roost habitat to the ardeid community. This survey aim at preliminarily investigate the nature of roosting ardeid in Hong Kong with focus on the duration and stability of the roosting sites. Such information can facilitate impact assessment in the EIA report.

The ardeid night survey conducted by AFCD in 2003 is the most relevant literature to describe the distribution, size and nature of the night roost in Hong Kong. The ardeid night roosts recorded in the literature were revisited to update their current status. The general environment of the night roosts was recorded to describe the characteristics of the night roosting sites.

4.2 Methodology

Six ardeid night roost sites previously recorded in Lee *et al.* (2004) were chosen as target sites to update their current status. Among the 19 winter night roosts recorded in the literature, only 6 sites are exclusively night roost and therefore chosen for the survey. Other night roosts that also served as ardeid breeding sites were not included in the survey because they are also used for breeding purpose and different to the case in WCH nullah.

Each site was visited during the wintering season (December to February) at dusk (5:30p.m. to 6:30p.m.) except the Tai Shue Wan and Waterfowl Collection Pond, Mai Po Nature Reserve (MPNR), which had been recorded with roosting Black-crowned night heron at day time. If a large aggregation of ardeid species were present at the site, species and abundance were recorded. If no aggregation of ardeids were observed, the flight route of the ardeids were traced as far as possible to search for their potential roosting site.

4.3 Results

Gei Wai 13, MPNR

The site is situated in MPNR, an important feeding and roosting site for wetland-dependent birds. 74 Chinese Pond Herons were recorded in 2002 but none were recorded during the site visit on 20th Jan, 2009. The gei wai is a brackish water pond with adjustable water level which is originally a shrimp cultivation pond but now serve for nature conservation purpose.

Waterfowl Collection Pond, MPNR

The site is a freshwater pond habitat with some trees at pond side situated inside MPNR near the education centre. 94 Black-crowned Night Heron were recorded in 2002 but none were recorded during the

site visit on 20th Jan, 2009.

Causeway Bay

The site is situated at a waterfront near Causeway Bay Fire Station. A total of 83 Little Egrets, 3 Great Egrets and 9 Black-crowned Night Heron was recorded in 2003. During the survey on 29th January, 2009, a total of 200 Little Egrets, 12 Great Egrets and 4 Black-crowned Night Herons were recorded. They initially aggregated on a tree at the waterfront, but at nightfall they moved landward and settled on a large fig tree at the north-eastern part of Victoria Park. The tree is situated within the Victoria Park area abutting some recreational facilities. The roosting population increased from 94 in 2003 to 214 in 2009.

Fung Lok Wai

The site is a fishpond area in the northwest New Territories with a recorded roosting population of 100 Little Egrets and 290 Great Egrets 2002. It was surveyed on 28th December 2008 and an aggregation of 212 Little Egrets, 259 Great Egrets and 3 Grey Herons were recorded.

Tsuen Wan

The site is at the waterfront near the Tsuen Wan Rivera Park. 63 Little Egrets were reported in 2002. However, no aggregation of ardeids were found during the site visit on 2nd January 2009 although a few Little Egrets were found at the coastal area. The flight routes of the Little Egrets were traced and it was found that they all flew in the southward direction along the Rambler Channel at dusk although no night roost was found in the vicinity.

Sha Ha, Sai Kung

The site is a natural coastline with a few village houses alongside the Sai Sha Road. A total of 40 Little Egrets and 10 Great Egrets were recorded in 2003. The site was revisited on 10 January 2009 but no aggregation of egrets were found in Sha Ha. Meanwhile, a small aggregation was spotted in Tai Chau, a small island at approximately 0.8km east of Sha Ha. The roosting population included a total of 30 Little Egrets and 5 Great Egrets.

Summary

Only 2 out of 6 previously recorded ardeid night roosts in winter 2002/03 are still actively used in winter 2008/09, which are Fung Lok Wai and Causeway Bay. In both sites, the roosting population increased, from 390 to 471 at Fung Lok Wai and from 95 to 212 in Causeway Bay. For the other four sites, no roosting ardeid was found, except at Sha Ha where another night roost was identified on a neighbouring island.

It was observed from this survey that all ardeid night roosts are situated in close proximity to water. The roosts at Causeway Bay, Tsuen Wan and Sha Ha (Sai Kung) were in close proximity to the sea, while the roosts at MPNR and Fung Lok Wai were near freshwater or brackish water ponds.

4.4 Conclusions

The locations and roosting population of ardeid night roosts are highly changeable. Only 2 out of 6 night roost recorded in 2002/03 are still active in 2008/09. The roosting population of the active roosting sites also highly fluctuate. As highlighted in the case in Causeway Bay, it doubled from 95 in 2003 to 210 in 2009. However, conversely, in the Tam Kon Chau case the night roost with 1,998 individuals in 2003 was abandoned in 2009. Although the field survey was only conducted once in each site during the 2008/09 winter season and on a preliminary basis, the field observation gave a glimpse on the fluctuating nature of the ardeid wintering night roost.

As observed in the field, the presence of a water source is an important factor for the selection of night roosting sites. Although the roosting ardeids may not forage at nearby waters, they prefer to roost at a patch of vegetation with water source in vicinity.

5 CONCLUSIONS

As confirmed in the HKBWS egretry survey and the field observation from the present study, the WCH nullah was used by ardeid for roosting but not for breeding. Despite the fact that some egretries in Hong Kong are also used as non-breeding roosting site in winter, there is no recorded case in Hong Kong to show a non-breeding roosting site would gradually transform into a breeding site.

A clear seasonal variation on the roosting population indicates a high proportion of the roosting population is made up of migratory individuals. As revealed in the survey result, the WCH ardeid night roost is more prominent during the wintering season when a migratory population is present. Most of the wintering ardeids would leave the site in spring and only a very small non-breeding population would stay at the site until summer.

In the survey along the western coastline of Hong Kong Island, it was found that the WCH is the only ardeid night roosting site in southwest Hong Kong Island. The roosting population included not only the population foraging at Aberdeen Channel and Aberdeen Typhoon Shelter but also those foraging at a coastal area far south of Hong Kong Island. As observed at field, a significance number of ardeid regularly return from the south of Hong Kong Island toward the WCH nullah at dusk via Aberdeen Typhoon Shelter West. Meanwhile a small population was found flying from Aberdeen West Typhoon Shelter in the northbound direction to another potential night roost northwest of Hong Kong Island. The complexity of the evening flight route revealed that wintering ardeids could fly over a long distance on a daily basis from foraging ground to night roosting site and the unidentified night roost somewhere northwest of Hong Kong Island could be an alternative site for those foraging at the far south of Hong Kong Island.

It was thought that ardeid night roosts fluctuate in location and population. The results of the present survey reconfirmed the unstable nature of ardeid night roost. Despite the WCH having reportedly more than 4 years history, the underlying reasons affecting the selection of night roost is not yet understood. Thus, it is difficult to predict the stability and lifespan of the night roost. Nonetheless, it is believed that the presence of the WCH nullah is an important factor to keep the WCH night roost in place as the presence of water sources have been identified in all recorded ardeid night roost and is therefore considered as a major factor for roosting site selection.

6 REFERENCES

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