METHODS OF OSPREY (PANDION HALIAETUS) NEST RELOCATION IN NORTHERN RED SEA, AN INITIAL REVIEW

JAMES MASSEY

Beacon Development Company, King Abdullah University of Science and Technology
E-mail: james.massey@kaust.edu.sa

Abstract - As part of the conservation efforts in the northern Red Sea development areas in Saudi Arabia, the nests of Osprey (Pandion haliaetus) have been moved, out of nesting season, to relocate them away from areas where they would be damaged or disturbed by development. Whilst the provision of nesting artificial habitat options has been well published, the attempt to relocate existing nests is poorly described in the literature and conservation guidance. This initial review provides year one results from attempts to relocate the nest sites as well as the methods employed to identify suitable locations and move the existing nest material.

Keywords - Osprey, nest, mitigation, Pandion haliaetus, relocation, trial, methodology.

I. INTRODUCTION

1.1 Osprey nests in Northern Red Sea

Osprey nests (Pandion haliaetus) are a feature of many of the offshore islands along Saudi Arabia coast, and in coastal areas. . The osprey is a medium-large raptor which is a specialist fish-eater with a worldwide distribution. Ospreys are partially migratory, with semi resident individuals (often female) seen most of the year (less frequently in summer). (Jennings, 2010), Saudi Aramco, 2020) Breeding is preferred on undisturbed predator and pest free islands near coastal areas. Recorded active and disused nests are present throughout the three main gigaprojects along the Saudi Arabia Red Sea northern coast. Breeding is noted from November or December, and a single brood with a clutch of 2-4 eggs are recorded. Usually a single female with one or more males. Once fledged family groups remain in the area of the nest and island until April to May when they disperse (Jennings, 2010) Saudi Aramco, 2020). Although classed as a species of least concern (IUCN and HCP), disturbance especially through breeding season is not permitted and is avoided by all the development projects (Symes et al, 2015). Osprey appear to show preference for returning to the same nest site each year. Nests are often recorded as being rebuilt and improved each year or abandoned for a preferred location on the same island, one nest on Tiran Island in the northern Red Sea is noted as active for over 80 years (Habib, 2019)Where a clutch of several juveniles fledge, an adolescent female is often present the following year, and first year (often unsuccessful) nests are often noted close to the occupied nest either on an adjacent island or sometimes at the opposing end of an island. Nests of other pairs are not found within approximately 2 – 2.5 km of an active nest.

1.2 Need for Relocation

Due to the need for development a number of nests in the areas of the Saudi giga projects has been identified as at risk of disturbance or destruction from planned early construction activities. It is possible as the pace of development and construction increases that a number of additional nests could also be impacted. Traditionally Osprey nest mitigation has been limited to the provision of an alternate nearby habitat. These are often perch and pole constructions in a nearby location, in mangrove areas or shallow sea areas. Many organizations such as RSPB, International Osprey Foundation, US Wildlife Services, New Jersey Division of Fish and Wildlife, Australian Department of Wildlife etc. all provide clear instructions and information (with some variance in methods) for the construction of artificial nest bases. In the Red Sea development areas, for the most part, whilst there is extensive development proposed under the Vision 2030 programme this is limited to 20-30 % of the total potential habitat (coastal areas and islands) available within each gigaprojects area. The remaining areas are identified for conservation, compensation and offset and enhancement. As a result, whilst any disturbance to species is attempted to be avoided, where island development has been identified, early mitigation to remove the nests of Osprey (outside the breeding nesting and fledglings season (Dec- April)) has been undertaken . The main aim is to minimize potential interaction and disturbance. Provision of artificial nesting habitat such as nesting poles at the same location will encourage the osprey to be in near contact with the proposed development and increase the long-term likelihood of detrimental interaction. As a result, suitable sites on adjacent islands have been identified to encourage the Osprey to move to avoid the interaction.

II. METHOD DETAILS

2.1. Nest relocation need

As noted, in where possible, any disturbance of osprey nests (active, not active or abandoned) is avoided. However, due the necessity of ongoing

geotechnical investigation and development in NEOM, AMAALA and The Red Sea Development Company (TRSDC) areas, to avoid destruction of the nests, BDC ecologists have relocation a small number of Osprey nests to prevent their removal. This has occurred post fledgling season and the nests have been carefully disassembled and then rebuilt at the closes point outside the construction area. Osprey, unlike other raptors present such as Sooty falcon (Falco concolor) show a level of acclimation to human presence (Jennings, 2018) . Exclusion zones of 250m have been established where nests are active. This is based on behavioural observations and the maximum distance where behaviour does not appear altered. At within 150 m, osprey will vocalise and often leave the nest area, with close flying passes of any intruders. An interesting observation is that Osprey act aggressively to several other bird species and an area around the nests (around 150m) is also often devoid of other nesting birds such as terns and white eyed gulls. Similarly Sooty falcon, who are highly territorial to other raptor and gull species but will exclude nearly all other species from their nesting area, however, seem to tolerate osprey on these island habitats, and visa versa, with nesting often found on the same islands. BDC ecologists in conjunction with consultation with regional expert ornithologists, Mike Jennings (Jennings 2010, and pers comm) and Mike McGrady (McGrady et al 2020 and pers comm) have been developing mitigation for both these species for the development projects. In relation to Osprey, the method of relocation has been developed and trialled at a number of locations to prevent nest loss. Early results indicate some success of the use of the nests by Osprey pairs in the subsequent seasons. Further assessment will be required before this is can be confirmed, however, the nest move to date are summarized in Table 1.

Island	Project	Nest #	Nest status
Al Osh al Sharqi	TRSDC	3	1 Active , 2 Abandoned
Al Numan	AMAALA	1	Abandoned / Inactive
Ummahat Al Sheikh	TRSDC	1	1 Active
Sindalah	NEOM	2	Inactive / Abandoned

Table1: Osprey Nests moved to date



Figure 1: Typical Active nest (Photo: Massey J, 2019)





Figure 2a & bPhotos of inactive (non breeding) nests (used as a perch only) (Photo: Massey J, 2019)

2.2. Evaluating relocation sites

Traditional methods for provision of alternate nest sites for Osprey focus on erecting poles and nest platforms to encourage nesting after the existing nest is destroyed or removed.

In this case, whilst reviewed and this method has potential at some sites, there was an immediate need to provide an alternative that could be used the next season, as the islands were likely to be in construction phase for a number of years. Based on conversations with regional raptor experts, sites were identified mimicking the orientation of the nest to be moved.

These were located within 3-5km of the disturbed site (nearest suitable available island) and at least 1.5km from any existing nest sites or pairs on the receiving island. To replicate the core of the nest, natural raised areas were examined.

Those with roots of Haloxylon salicornicum or other coastal scrub to provide stability were targeted (Figure 3) or other areas with natural rise of around 1 m high from duned effects. Approximately same setting as the nest that was moved. Locations were selected in the same orientations and with the same viewpoints, set back from the coast and general site layout as the removed nest.



Figure 3. Site selection (Photo: Massey J, 2019)

2.3 Nest move instead of artificial habitat

Osprey rebuild their nests each season, however, there is a potential correlation between the amount of expended energy required to build the nest before laying and the success of the clutch. Where Osprey use tree or mangrove perch to construct nests the pole arrays are extremely successful, however on Red Sea islands, there are no ground dwelling predators and few trees (one osprey pair on the island of Shureyrah have a nest in mangrove area but very few islands have any substantial mangal cover).

The nests are on the ground and constructed to a height to provide the perch and vantage point. The concern is that if pairs were left to start new nests at the season they would not use the raised platforms as these do not mimic the habitat they are used to and may try to construct nests in less favourable areas, where they are less suitable or at greater risk of human disturbance. The main concern is to ensure the pair do not try to reuse their previous nest site which may now be adjacent to risks from construction.

2.4 Nest move process

With no established methodology for moving the nest a pragmatic approach was taken to move as much of the material as possible to a new site. The outer area was carefully deconstructed and wrapped. As it was disturbed the active nests had a strong smell of urea and were active with insects and small lizards. The team worked from the outside in.

There was some 'filtering' of material where driftwood and natural materials were preserved for the move but plastics and especially sheet plastics were removed and disposed of. Metal and bone were also found in the nests. Once the team worked to the central core, a proportion of the sand material was bagged for relocation. The surface material of feather, dried algae etc was separately bagged to be replaced on the nest surface.

The material was then moved by small boat to the new island site (Figure 4). The inactive nests were less cohesive with the central core being subject to a level of erosion, and much of the driftwood and other material was very brittle for weather and sun exposure. As much material as possible was removed and it was determined to combined the material from the two inactive nests for the construction of one nest at the relocation site. Gloves and protective PPE were worn throughout including face masks due to sharps, faecal matter and bones and animal waste.

2.5 Other sites

Al Numan and Sindalah are much rockier islands, both are larger and formed from bedrock rather than aggregated sands. As a result on both sites the core was less pronounce with the nests associated with rock outcrops. At Ummahat Al Sheikh, the nest moved was quite substantial indicating it had been used repeatedly for several years.

The osprey pair at this location had been observed actively using the nest for two seasons, however, for whatever reason they had not laid at the island. The nest was rebuilt and lined each year in preparation. The nest at this location was over 1.5m high and nearly 3m in diameter. It was one of several nests on the island utilize as perches aby the pair. This nest had the same construction as the first active nest moved on Al Osh al Sharqi.

III. RESULTS AND DISCUSSION

3.1. Moving success

In order to minimize interference with the Osprey, no tagging or tracking was conducted. A number of the pairs are ringed, but there are no records of the individuals to compare against and identifying the ring numbers without specialist ornithological optics is difficult.

Unfortunately 2021 observations including breeding season (late 20202 to 2021) were minimal due to travel and site restrictions from COVID. As a result the success of the nesting in the relocated nests has not fully been established. However, a breeding pair have been recorded at the location on Al Osh al Sharqi, and the previous nest site was unoccupied in 2020 (Figure 5). Of the material moved from the inactive nests, this was dispersed and removed and but not used at the site It is hoped that the material was utilised by relocated (and resident) Osprey for nest material.



Figure 4. Moved artificially constructed Osprey nest (Photo: Massey J, 2019)



Figure 5. Active pair of Osprey (Pandion haliaetus) at the relocated nest site, 2020 (Photo Massey J 2020)

3.2. Discussion and limitations

Osprey are a notable species, of local importance and a significant indicator of ecosystem health. Whilst they are offered a level of protection under the national legislation, they are not considered an endangered species and therefore the effort in conservation at the current time is less than the focus on turtles and other species. On the coast and offshore island the population appears relatively successful, as many of the island have pairs associated with them, and a number of coastal nest sites have noted fledging chicks on seasonal observations. The unprecedented level of development in Saudi Arabia, means that the projects are acutely aware of the potential pressure on this and other species, particularly the cumulative effects. As a result, relocation programmes such as this one, and future population studies and artificial habitat provision is likely. Unlike sooty falcon, osprey exhibit a level of acclimation with human presence within their habitat, though not at their nest sites. Population assessments, including area utilisation of the species would significantly help the understanding of the range and area utilisation would be a key element in better understanding the species and the potential interaction from the developments. Incidental observations note osprey present throughout much of the year, but with significantly greater numbers in the breeding and fledging season, which may indicate some semi-resident population in the area or utilisation beyond the normally considered migratory window. The relocation of nest material does seem to have met with some success but further more structured research in needed. The provision of relocated nest provides are starter nest for the pairs, which may help with breeding where disturbance is unavoidable due to development. Confirming that osprey that have had nest sites disturbed are utilising the relocated sites is a key area for investigation, however, the mitigation is successful on a population level as it supports the number of breeding pairs present, even if the impacts on the individuals cannot be confirmed as successful. This practice is currently preferable to provision of fully artificial habitat as it provide a more natural replacement for these individuals, which are not tree or elevated nesting as the same species does in Europe, Canada and the US. The lack of such habitat means they have adapted to create these larger constructed mounds, which should be replicated where possible. The utilisation of the moved material, also means that the effort to relocation inactive nests also has benefit, even if the man-made nest is not used.

IV. CONCLUSIONS

4.1 Summary

Moving of nest material and the construction of artificial nests has some success on these projects. Further work is needed to identify 0f the pairs move with the nest or if other pairs use the area. Old nests are scavenged for material Success is based on limited observations, significantly more work is needed, however, as the nests need a mitigation strategy where they will be impacted by human presence or development then measures need to be taken. It should be noted that if nests are moved without increased disturbance at the previous nest site then pairs will attempt to rebuild at the previous location.

1. Preferable method to the erection of artificial pole nests
2. Allows removal to a designated locating to assist with development plans.
3. Further assessment needed. Success is only based on limited observation due to lack of site access and the proposed structured survey due to Covid restrictions.
4. Moving of older abandoned material also has potential species benefit.
5. Further research into the other sites and success is required in 2022.

4.2. Further Investigation

Understanding the distribution of pair records, but also an overview of the number and location of nests across the area is needed, especially where there are also coastal populations located in areas that are difficult to access. As a substantial area of the northern Red Sea is now identified under management for the development of the Vision 2030 plan, and for conservation, additional data collection and an overview of the population, species distribution and nesting will be possible in the near future. Identification of individuals that are ringed for comparative records as well as ringing those that are not recorded may also provide good insight on the residence and returning specificity of individuals and the population as well as better understanding of the success. By being able to identify individuals nesting, the return of new fledglings through to their breeding it will be possible how loyal family groups are to particular areas and the level of interaction between the population on the islands. As such this will in turn

allow the identification of which pairs are utilising which nests and therefore if this method is successfully providing an alternate nest for displaced individuals. In addition, material from the nests should also be marked so that it can be established if inactive nest material is being used by the displaced par, the population in general or if it is being removed by another actor.

ACKNOWLEDGMENTS

BDC and the author acknowledges the invaluable input and expertise of leading regional ornithologists Mike Jennings and Mike McGrady in the development of these approaches and their advice on criteria for relocation site selection. BDC and the author also thanks TRSDC, AMAALA and NEOM as well as 360 Holdings for allowing the presentation of this data and findings from work undertaken for their developments.

REFERENCES

[1] BDC, 2018 Rapid Ecological Baseline Survey for Sindalah Island, NEOM, Beacon Development Company, KAUST

[2] BDC, 2019 Sindalah Island, Red Sea Week, Environmental Socio-economic Impact Assessment, NEOM Beacon Development Company KAUST, Oct 2019

[3] BDC, Environmental Baseline Survey Report Island 6-8, 60 Investments, Beacon Development Company

[4] Boland, C. and Abdullah, A.S. and Burwell, B. and Roberts, P. and Babbington, J. and Shobrak, M. and Al-Boug, A. and Jennings, M.C. and Castell, P. 2020, The Birds of Saudi Arabia, Saudi Aramco, ISBN 9781860635038

[5] Boland, C. and Abdullah, A.S. and Burwell, B. and Roberts, P. and Babbington, J. and Shobrak, M. and Al-Boug, A. and Jennings, M.C. and Castell, P. 2020, The Birds of Saudi Arabia, Saudi Aramco, ISBN 9781860635038

[6] Centre for Conservation Biology, Osprey Watch, Build ann osprey nest http://www.osprey-watch.org/learn-about-osprey/build-an-osprey-nest/ (accessed 2021)

[7] G. Díaz, O. Trujillo, and E. Hernández . 1986. Situación del Águila Pescadora (Pandion haliaetus) en Canarias. Boletín de la Estación Central de Ecología 29:67–72. (In Spanish). http://scholar.google.com/scholar_lookup?title=Situaci%C3%B3n+del+%C3%81guila+Pescadora+(Pandion+haliaetus)+en+Canarias.&volume=29&publication_year=1986&pages=67-72

[8] Habib, Mohammad (2019) Breeding Status of Ospreys in Egypt (Red Sea) from 2012 to 2018, Raptors Conservation, DOI: 10.19074/1814-8654-2019-38-43-58 accessed via https://www.researchgate.net/publication/333319319_Breeding_Status_of_Ospreys_in_Egypt_Red_Sea_from_2012_to_2018

[9] Jennings, M.C, (2010) Atlas of Breeding Birds of Saudi Arabia, Fauna of Saudi Arabia, 25:1-751

[10] International Osprey Foundation; Build and Osprey nest (accessed 20201) https://www.ospreys.com/downloads-2/files/OspreyNestPlan.pdf

[11] New Jersey Fish and Wildlife (2020) Osprey Nest Placement (accessed 2021) https://www.state.nj.us/dep/fgw/ensp/pdf/osprey_platform_planandmaterials.pdf

[12] Ontario Ministry of natural Resources (2011) building and Osprey Platform, (accessed 2021) https://cvc.ca/wp-content/uploads/2011/09/ospry.pdf)

[13] P. R. Fisher, S. F. Newton, H. M. A. Tatwany, and C. R. Goldspink . 2001. Variation in the diet of Ospreys Pandion haliaetus, Farasan Islands, southern Red Sea - preliminary observations. Vogelwelt 122:205–218. http://scholar.google.com/scholar_lookup?title=Variation+in+the+diet+of+Ospreys+Pandion+haliaetus,+Farasan+Islands,+southern+Red+Sea+-+preliminary+observations.&volume=122&publication_year=2001&pages=205-218

[14] RSPB, Birds and habitats: Osprey, Wildlife Guides https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/bird-a-z/osprey/

[15] Roy Dennis Foundation, 2017 How to build and osprey nest (accessed 2021) https://www.roydennis.org/o/wp-content/uploads/2017/11/How-to-Build-an-Osprey-Nest.pdf

[16] Symes A, Taylor J, Mallon D, Porter R, Simms C, 7 Budd K, (2015) The Conservation Status and Distribution of Breeding Birds of the Arabian Peninsular, Cambridge ad Gland, IUCN, SEPAA 58

★★★