

## Conference Paper

# Behavior and Ecological Study of Marine Birds in Alas Purwo National Park Southern Coast—Indonesia

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**Abstract**

Alas Purwo National Park is habitat for marine birds and stopover for some the migratory birds. The purpose of this research was to determine behavior that could be observed in populations of marine birds and their habitat in the Alas Purwo National Park. The research location was in the Alas Purwo National Park southern coast, in region Plengkung to Cungur, Banyuwangi East Java. This research was done for 2 mo, July 21 to 30 and August 2015. The observations were observed in the morning (at 6:00 am to 9:00 am) and afternoon (15:00 pm to 18:00 pm). This study used a purposive sampling method to determine the location of the observations near the coast. The observations of marine birds habitat and behavior used survey methods and direct observation at the plot along the coastline. Identification and calculation of marine bird populations conducted in each observation plots. The plots exploration by foot and repeated three times. The behavior of marine birds that can be observed were birds clustered beach sunbathing on the beach, wallowing in the water, drinking and foraging in the surrounding water and flew low over the waters up to the mangrove areas for perch. Marine birds habitat are in mangrove and near the coast with moderate temperatures, high air humidity, low water temperature, and light intensity is sufficient.

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## 1. Introduction

Birds are one of the natural resources in Indonesia. There are an endemic and migration birds that stopped temporarily. Marine birds are a group of animals that are found alive and living in water areas such as swamps, mangroves, estuaries and coastal [1]. In Indonesia were identified about 19 sites of marine birds internationally interest and had the Ramsar criteria. Almost all locations are located in the area of mudflats which is continuous with the coastal mangrove forests [2]. The location is the nesting place, shelter, breeding and feeding various types of birds. Birds also have an important role in the ecosystem, such as pollinators, seed spread and pest control. Some people also favor birds because of their beautiful feather, sounds (whistling and singing) and the specific behavior each species [3].

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As a conservation area, Alas Purwo National Park has a high diversity of bird species in high enough quantities and specific. The diversity of bird species that inhabit the Alas Purwo National Park are 236 species. Alas Purwo National Park is habitat for marine birds and several species of migratory birds [3, 4]. Bird species that do not have migration capabilities have higher sensitivity than the species that can migrate to extinction. Species that can migrate can avoid unfavorable environmental conditions [5].

In ecology, aquatic birds were divided into three groups, birds that live in freshwater (water birds) are included in Order Anseriformes and Ciconiformes. Birds that live on the beach (shore-birds), including Order Charadriiformes. Birds that live in the open ocean (marine birds) are included in Order Pelecaniformes. Order of Charadriiformes, there are a few families, such as Charadriidae, Scolopacidae, Sternidae and Laridae. Order of Ciconiformes, there are several families, namely Ciconiidae, Ardeidae and Anatidae [4]. Each member of the Order of the water birds including the endemic bird species and birds which are protected under Government Regulation No. 7 of 1999, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and International Union for Conservation of Nature (IUCN) [3, 6].

## 2. Material and Method

The research location was in the Alas Purwo National Park southern coast, in region Plengkung to Cungur, Banyuwangi East Java. This research was done for two months, July 21 to 30 August 2015. The observations were observed in the morning (at 6:00 am to 9:00 am) and afternoon (15:00 pm to 18:00 pm). This study applied a purposive sampling method to determine the location of the observations near the coast [7]. The observations of marine birds habitat and behavior used survey methods and direct observation at the plot along the coastline. Identification and calculation of marine bird populations conducted in each observation plots. The plots exploration by foot and repeated three times.

Identification of species of marine birds in the observation made by the morphology using Field Guide Birds. Observations waterfowl habitat in the coastal forest vegetation formations (inshore) and mangrove forest (offshore) with environmental parameters. Behavioral observations, which gathered in the population, running, perch or nesting, feeding and type of food, dipping the head into the water, diving, swimming, voiced (whistling and singing), flew over the water and sensitivity to disturbance (presence of predators and human activity).

## 3. Results and Discussions

The observation result found three orders of the Charadriiformes, Coraciiformes and Ciconiiformes, seven families and 16 species of marine birds. Bird species that are

found in the study site comes from the family Scolopacidae as many as five species (Table 1.). A number of individuals are different in each location, the highest number of individuals are *Sterna bergii* (Lichtenstein, 1823) contained in the plot Cungur-Bedul. In the plot Bedul-Ngagelan and Ngagelan-Triangulation, there are only two species, namely *Halcyon chloris* (Boddaert, 1783) and *Alcedo atthis* (Linnaeus, 1758). Environmental conditions influenced this result, the number of species and number of individuals in each observation location. Habitat conditions are right and away from human disturbance also an assortment of food sources have much bird species [8].

Marine birds are vary in the range of habitats they use. For example, relating to water masses and frontal systems and whether they use these as specialists or generalists. They are also impacted by several threats, primarily habitat loss, disturbance, and hunting. Forest birds including marine birds are more sensitive to disturbance because their survival depends on the availability of habitat resources. Many marine birds mostly use mangroves for their resting and nesting area. Mangroves are salt-tolerant, woody plants that form low-diversity forests with complex food webs and ecosystem dynamics. Mangroves inhabit the upper intertidal zones of saltwater areas, primarily in tropical and subtropical regions within 30° of the equator at higher latitudes, tidal marshes replace mangroves [9].

| Order/Family<br>English name | Scientific name        | Status          | Habitat  | Behavior  | Diet   |
|------------------------------|------------------------|-----------------|--|---|--|
| <b>Charadriiformes</b>       |                        |                 |  |   |  |
| <b>Scolopacidae</b>          |                        |                 |  |   |  |
| Black-tailed Godwit          | <i>Limosa limosa</i>   | Near threatened | sandy areas [10]   | highly gregarious and migrates on a broad front, making long-distance flights, often overland between relatively few staging and wintering areas [10] | Insects, annelid, mollusks, ragworms, crustaceans, spiders, fish eggs, spawn, tadpoles of frogs [10] |
| Common Redshank              | <i>Tringa totanus</i>  | Least concern   | coastal saltmarshes, inland wet grasslands with short sward [11]         | very noisy and seems to act as a sentinel for other wader species [11]  | insects, spiders, annelid worms, mollusks, crustaceans [11]  |
| Grey-tailed Tattler          | <i>Tringa brevipes</i> | Least concern   | muddy and sandy coasts, seldom seen in large flocks except at roost [12] | forage on the ground or water, picking up food by sight, disyllabic whistle, and Wandering a rippling trill [12]                                      | insects, crustaceans, and other invertebrates [12]   |

|                       |                          |               |   |  |  |
|-----------------------|--------------------------|---------------|---|--|--|
| Wandering Tattler     | <i>Tringa incana</i>     | Least concern | Found on rugged, rocky coastlines, jetties, and breakwaters, coastal estuaries [13]   | Feeding habitat on coastal rock platform, wade in deep water, and may immerse its head completely to catch food [13]     | Eats insects, larvae, worms and mollusks [13]  |
| Whimbrel              | <i>Numenius phaeopus</i> | Least concern | tundra in the breeding season. In the winter, it can be found in coastal areas on mudflats, marshes, and shorelines [14]                | uses its long, curved bill to probe deep in the sand and mud for food. It wades in shallow water in search of foods [14] | crabs, fish, worms and mollusks. It also eats insects, seeds, berries, and leaves [14]             |
| <b>Charadriidae</b>   |                          |               |   |  |  |
| Pacific Golden Plover | <i>Pluvialis fulva</i>   | Least concern | coastal mudflats, beaches, reefs, also on short grasslands or around freshwater pools, lakes, rivers, marshes, rice fields [15]         | forage in a peck-and-run method; quickly running in an upright position, pausing to peck, then running again [15]        | bivalves and other mollusks, worms, crustaceans, spiders, berries, seeds and leaves [15]           |
| <b>Sternidae</b>      |                          |               |   |  |  |
| Great Crested Tern    | <i>Sterna bergii</i>     | Least concern | warm temperate coastal parts, roosting and breeding in large colonies [16]  | plunge diving to a depth of up to 1 m, dipping from the surface, and food is usually swallowed in mid-air [16]           | Fish, cephalopods, crustaceans and insects [16]  |
| <b>Coraciiformes</b>  |                          |               |   |  |  |
| <b>Alcedinidae</b>    |                          |               |   |  |  |
| Collared Kingfisher   | <i>Halcyon chloris</i>   | Least concern | widespread presence, perch and wait for branch, post, fence, mount, wire, overlooking open grass, shallow water, mudflats Or beach [17] | hammering shells against stones to get at the mollusk or hermit crab, snatch prey caught by others [17]                  | fish, crabs, and prawns, to lizards, small snakes, insects, tadpoles, earthworms, crustaceans [17] |

|                      |                         |               |  |   |   |
|----------------------|-------------------------|---------------|--|---|---|
| Common Kingfisher    | <i>Alcedo atthis</i>    | Least concern | shores of lakes, ponds, streams, and in wetlands [18]  | sit on a perch some distance from each other and engage in territorial displays, usually entails displaying beaks and plumage, fights where a bird will grab the other's beak and try to hold them under water [18]                 | Fish, insects, aquatic crustaceans, other marine invertebrates [18]                                   |
| <b>Ciconiiformes</b> |                         |               |  |   |   |
| <b>Ardeidae</b>      |                         |               |  |   |   |
| Great-billed Heron   | <i>Ardea sumatrana</i>  | Least concern | coral reefs, mangroves, large rivers, tidal mudflats, shallow ponds [19]   | very vocal, giving deep, guttural and resonant "roaring" calls, feeds in shallow water, spearing fish with its long, sharp bill, wait motionless for prey, or slowly stalk its victim [19]  | Fish [19]   |
| Javan Pond Heron     | <i>Ardeola speciosa</i> | Least concern | flooded grasslands, marshes, ponds and the margins of lakes, mangroves, coastal flats and reefs [20]                           | Standing motionless, feeds by walking with slow steps, hunts in the open, primarily feeds solitarily, also occurs in small dispersed groups and occasionally in large groups, flies to roost in the evening in twos and threes [20] | fish, frogs, and insects (grasshoppers, beetles, ants, and termites), earthworms and crustaceans [20] |
| Pacific Reef Egret   | <i>Egretta sacra</i>    | Least concern | ocean shore, rocky coasts and nearby shallow reefs, mangrove-lined shores, mudflats, beaches, and tidal rivers and creeks [21] | hunts by walking or creeping along slowly with a distinctive, deeply crouched posture, periodically standing upright to scan for prey, quickly chasing or lunging [20]  | small fish and crabs, insects, mollusks and lizards [20]  |

|                         |                               |                 |   |   |  |
|-------------------------|-------------------------------|-----------------|---|---|--|
| Grey Heron              | <i>Ardea cinerea</i>          | Least concern   | rivers meet the ocean, areas with standing water, freshwater rivers, streams, lakes, marshes, and fish farms [22]         | In the daytime, they rest on the ground, but as it gets dark, they rest in trees, adult aggressive behaviors involve looking directly towards the intruder [22]   | insects, crustaceans, frogs and small mammals [22]         |
| <b>Ciconiidae</b>       |                               |                 |   |   |  |
| Lesser Adjutant         | <i>Leptoptilos javanicus</i>  | Vulnerable      | large rivers, lakes, swamps, fresh and saltwater wetland and wooded areas, coastal in mangroves and intertidal flats [23] | sedentary within their range, except for local movements in response to rain falls and availability of food, mostly silent clattering their bills, making hissing and moaning sounds [23]   | fish, frogs, reptiles, locust and large invertebrates [23] |
| <b>Accipitridae</b>     |                               |                 |   |   |  |
| White-bellied Sea Eagle | <i>Haliaeetus leucogaster</i> | Least concern   | coasts, islands, and estuaries, lakes, ponds, and rivers [24]   | seen on warm early mornings riding the coastal thermals, holding their wings in a V-shape, hunt sea snakes, and fish prey that are found near the water surface. They may also scavenge on refuse [24]  |  |
| Lesser Fish Eagle       | <i>Ichthyophaga humilis</i>   | Near threatened | rivers and streams, lakes, reservoirs and tidal lagoons in wooded country [25]  | spotted perched on boughs overhanging a stream or waterhole, catch their prey near the surface of water by swooping on it, owlish "oo-wooks", loud gurgles of "awh-awhr" and "chee-warr", weird clanging scream or shout, uttered singly [25] |  |

TABLE 1: Marine Bird Species, Behavior, Habitat, and Diet.

## 4. Conclusions

Marine birds spend most their life at sea and feed mainly on the marine organism. Surface-shoaling fish are important for marine birds, but that feeding and surviving out at sea is not straight forward task. Migration in birds can be defined as a regular return movement between geographically separated breeding and wintering ranges.

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