IMPACT OF TRAFFIC NOISE ON BIRD POPULATIONS IN KINABALU PARK, SABAH, MALAYSIA

AUDDREY AMBROSE

FACULTY OF SCIENCE AND NATURAL RESOURCES
UNIVERSITI MALAYSIA SABAH
2018

IMPACT OF TRAFFIC NOISE ON BIRD POPULATIONS IN KINABALU PARK, SABAH, MALAYSIA

AUDDREY AMBROSE

THESIS SUBMITTED IN FULFILLMENT FOR THE DEGREE OF MASTER OF SCIENCE

FACULTY OF SCIENCE AND NATURAL RESOURCES

UNIVERSITY MALAYSIA SABAH

2018

ABSTRACT

Kinabalu Park is well-known as one of the best eco-tourist destinations in the world. This park contains a high diversity of flora and fauna, in addition to its outstandingly scenic mountainous landscape with Mount Kinabalu, the highest mountain in the Malay Archipelago, as its backdrop. Many tourism activities related to natural resources can be carried out in this park, such as birdwatching. The bird diversity in Kinabalu Park is exceptionally high, including many species that are endemic to this area. Since its establishment as the first national park in Malaysia in 1964, the number of tourist visiting this park has increased exponentially. Areas inside the park are accessible via an excellent network of paved roads, and over the years this has resulted an increasing level of mechanical disturbance in the form of noise emitted by motorized vehicles (i.e. traffic noise) inside the park area. This study was conducted to investigate the impack of traffic noise on bird's populations in Kinabalu Park area. The specific objectives were (1) to determine the bird's species richness and bird's abundance that present in high traffic noise and low traffic noise; (2) to investigate the impact of traffic noise on bird populations in terms of bird's species and bird's abundance. Three levels of traffic noise intensity were used in this study i.e. high traffic noise – defined as noise level ≥60dB, low traffic noise – defined as noise level < 60dB, and areas with no or minimal traffic noise serving as a control treatment. Four sampling sites were selected in this study, all of which were located along man-made trails inside the forests, within the Kinabalu Park area. The high and low traffic noise treatment were represented by three sites, arranged in a pairwise manner; and the control treatment was represented by one site. In order to address the objectives of this study, three different approaches were used i.e. (1) traffic noise mapping by Radioshake Sound Level Meter; (2) bird survey by using point count method; and (3) vegetation survey by enumerating all trees ≥10 cm DBH within the vegetation plots. Data gathered were analyzed using descriptive statistics, diversity index and regression analysis. Overall, a total of 1150 individual of birds were recorded representing 33 species and 20 families. Results of data analysis showed that species richness and diversity of birds in low traffic noise areas were significantly higher than in the high traffic noise areas. Moreover, a significant negative relationship was detected between traffic noise levels and bird's species richness and abundance. The results of this study generally suggest that traffic noise is an important factor that affects the bird's population. Therefore, this finding helps the Kinabalu Park Headquarters to better manage the park by taking into account the traffic noise as well as wildlife preservation.

ABSTRAK

KESAN BUNYI TRAFIK TERHADAP POPULASI BURUNG DI TAMAN KINABALU, SABAH, MALAYSIA

Taman Kinabalu terkenal sebagai salah satu destinasi eko-pelancongan terbaik di dunia. Taman ini mengandungi kepelbagaian flora dan fauna yang tinggi, selain landskap pergunungannya yang indah dengan Gunung Kinabalu, gunung tertinggi di Kepulauan Melayu, sebagi latar belakangnya. Banyak aktiviti pelancongan yang berkaitan dengan sumber asli boleh dilakukan di taman ini, seperti pemerhatian burung. Kepelbagaian burung di Taman Kinabalu sangat tinggi, termasuk banyak spesies yang endemic di kawasan ini. Sejak penubuhannya sebagai taman kebangsaan pertama di Malaysia pada tahun 1964, bilangan pelancong melawat taman ini telah meningakt dengan pesat. Kawasan di dalam taman ini boleh diakses menerusi rangkaian jalan berturap yang sangat baik, dan sejak kebelakangan ini telah mengakibatkan peningkatan gangguan mekanikal dalam bentuk bunyi yang dipancarkan oleh kederaan bermotor (iaitu bunyi bising) di kawasan taman. Kajian ini dijalankan untuk menyiasat kesan bunyi bising terhadap populasi burung di kawasan Taman Kinabalu. Objektif khusus adalah (1) menentukan kekayaan spesies burung dan kelimpahan burung yang hadir dalam bunyi lalu lintas yang tinggi dan bunyi bising yang rendah; (2) untuk menyiasat kesan bunyi bising pada populasi burung dari segi spesies burung dan kelimpahan burung. Tiga tahap keamatan bunyi lalu lintas yang digunakan dalam kajian ini ialah bunyi bising tinggi - yang ditakrifkan sebagai tahap hingar ≥60dB, bunyi bising yang rendah - ditakrifkan sebagai tahap bunyi <60dB, dan kawasan yang tidak ada atau bunyi bising minimum yang berfungsi sebagai rawatan kawalan. Empat tapak pensampelan dipilih dalam kajian ini, yang semuanya terletak di sepanjang laluan buatan manusia di dalam hutan, di kawasan Taman Kinabalu. Rawatan bunyi lalu lintas yang tinggi dan rendah diwakili oleh tiga tapak, disusun secara berpasangan; dan rawatan kawalan diwakili oleh satu tapak. Untuk menangani objektif kajian ini, tiga pendekatan yang berbeza digunakan iaitu (1) pemetaan bunyi trafik oleh Radioshake Sound Level Meter; (2) kajian burung dengan menggunakan kaedah kiraan titik; dan (3) kajian tumbuh-tumbuhan dengan menghitung semua pokok ≥10 cm DBH di dalam plot tumbuh-tumbuhan. Data yang dikumpul dianalisis menggunakan statistik deskriptif, indeks kepelbagaian dan analisis regresi. Secara keseluruhan, sejumlah 1150 individu burung telah direkodkan mewakili 33 spesies dan 20 keluarga. Keputusan analisis data menunjukkan bahawa kekayaan spesies dan kepelbagaian burung di kawasan bunyi bising yang rendah jauh lebih tinggi daripada di kawasan bunyi bising yang tinggi. Selain itu, hubungan negatif yang signifikan dikesan antara tahap bunyi bising dan kekayaan dan kelimpahan spesies burung. Hasil kajian ini umumnya menunjukkan bahawa bunyi bising adalah faktor penting yang mempengaruhi populasi burung. Oleh itu, penemuan ini membantu Ibu Pejabat Taman Kinabalu untuk menguruskan taman dengan lebih baik dengan mengambil kira bunyi bising serta pemuliharaan hidupan liar.