Identification of Effective Criteria for Artificial Reefs Site Selection Using Analytical Hierarchy Process Methodology (A Case Study: Coral Reefs in the Kish Island)

Mousavi, Seyed Hassan[1*]; Danehkar, Afshin[2]; Shokri, Mohammad Reza[3];
Poorbagher, Hadi[4]; Javanshir, Arash[5]; Azhdari, Heshmatollah[6]

1- Faculty of Natural Resources, University of Tehran, Alborz Province, Karaj, Email: s.h.mousavi1363@gmail.com
2- Faculty of Natural Resources, University of Tehran, Alborz Province, Karaj, Email: a_danehkar@yahoo.com
3- Faculty of Bio-Sciences, Shahid Beheshti University, Tehran Province, Tehran, Email: shokri.mr@gmail.com
4- Faculty of Natural Resources, University of Tehran, Alborz Province, Karaj, Email: hpoorbagher@yahoo.com
5- Faculty of Natural Resources, University of Tehran, Alborz Province, Karaj, Email: arashjavanshir@hotmail.com
6- The Persian Gulf and Oman Sea Ecological Research Institute, Hormozgan Province, Bandarabbas, Email: h_azhdari@yahoo.com

Abstract

The purpose of this study was to find important criteria and sub-criteria for artificial reefs site selection for conservation of coral reefs in the Kish Island coastal areas (the Persian Gulf). This study was carried out using Delphi questionnaire and Analytical Hierarchy Process (AHP) methodology. We reviewed papers, which were related to the aim of the study. Four main criteria (physical environment, biological environment, managerial and socio-economical factors) and 32 sub-criteria were found to be important in stability of the coral reef ecosystems. The selected criteria and sub-criteria were re-assessed by 9 experts using a Delphi questionnaire. Subsequently, 13 sub-criteria (water depth, distance from natural reefs, water temperature, bottom slope, distance from polluted areas, competitive species, turbidity, natural larval supply, salinity, bottom type, currents, distance to ship waterways and economical advantage of reefs establishment) out of four main criteria were selected as the final sub-criteria for artificial reef site selection in coastal areas of the Kish Island. In order to obtain relative weights and prioritization of the final criteria and sub-criteria, pair-wise comparisons were used (by Expert Choice 11). According to AHP, the weights of main criteria (physical, biological, managerial and socio-economical factors) were 0.553, 0.287, 0.122 and 0.038, respectively. Also, the weights of final 13 sub criteria were 0.153, 0.151, 0.091, 0.083, 0.081, 0.077, 0.073, 0.058, 0.056, 0.051, 0.046, 0.042 and 0.038, respectively. The results of the present study showed that physical environment and water depth were the most important criteria and sub–criteria, respectively, for selecting a site to construct artificial reefs in the Kish island coastal areas.

Keywords: Site selection, Criteria, Analytical Hierarchy Process (AHP), Artificial reef, Coral reefs, Kish Island, Persian Gulf.