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Use of GIS in Survey Vegetation and Environmental Factors of Mangrove Forests in Bandar-e Khamir (Persian Gulf, Iran)

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ABSTRACT: In this survey, tried to show role of GIS in Vegetation and environmental factors of mangrove forests in Bandar-e Khamir(Persian gulf, Iran) as the figs has been presented. At each station dissolved oxygen, salinity, temperature and pH of water were recorded using portable Horiba U-10. These data recorded by GPS device and so transported to a GIS database. Recorded data transferred to UTM (Univer Transfer Mercator) for analyzing by Arqview software. Ratio Vegetation Index (RVI) and Normalized Difference Vegetation Index (NDVI) were analysed. At station 1, maximum water temperatures, salinity, DO and pH were recorded 34.5±0.1 (in summer), 36.46±0.05 (in summer), 7.71± 0.1(in spring) and 8.28±0.01 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 20.46±0.01 (in fall), 30.1±0.005 (in fall), 5.53± 0.1(in summer) and 7.79±0.01 (in autumn). At station 2, maximum water temperatures, salinity, DO and pH were recorded 34.6±0.15 (in summer), 36.4±0.2 (in summer), 7.54± 0.3(in spring) and 8.32±0.02 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 21.6±0.1 (in winter), 30.2±0.15 (in winter), 5.54± 0.1(in autumn) and 7.84±0.03 (in autumn). At station 3, maximum water temperatures, salinity, DO and pH were recorded 34.46±0.057 (in summer), 36.63±0.15 (in summer), 7.06± 0.2(in spring) and 8.33±0.03 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 2156±0.01 (in fall), 30.1±0.01 (in fall), 5.59± 0.01(in autumn) and 7.8±0.01 (in autumn). At station 4, maximum water temperatures, salinity, DO and pH were recorded 34.42±0.28 (in summer), 36.3±0.43 (in summer), 7.98± 0.1(in spring) and 8.34±0.01 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 21.52±0.02 (in fall), 30.2±0.007 (in fall), 5.15± 0.1(in summer) and 8.07±0.01 (in autumn). At station 5, maximum water temperatures, salinity, DO and pH were recorded 34.43±0.15 (in summer), 36.55±0.07 (in summer), 5.86± 0.1(in spring) and 8.32±0.01 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 21.52±0.04 (in fall), 30.4±0.01 (in fall), 5.61± 0.1(in autumn) and 8.07±0.01 (in autumn).
KEY WORDS: GIS, Vegetation, environmental factors, mangrove forests

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INTRODUCTION

The Persian Gulf is one of the hottest areas in Asia, and the salinity is higher than it is in the high seas. The Persian Gulf is one of the most important gulfs in the world from the point of view of fishing and industry [1]. The Persian Gulf is a semi-enclosed sea located between the latitudes of 25-32 N and longitudes of 48-56 E. This water basin is shallow continental shelf with an average depth of 35 meters. Developed from the Arvand estuary, it reaches a maximum depth in the Strait of Hormuz [1].

Mangroves are as euryhaline vascular plants living on sheltered tropical as well as subtropical coastlines throughout the world. These plants about 70 species including 27 genera and 19 families [2] as covered about 200,000 km2 in estuarine and marine ecosystems [3]. Mangrove ecosystems are intensively endangered. Hence due to their transitional nature, these systems are ecologically linked to terrestrial, fluvial and marine ecosystems [4]. Local environmental conditions, such as salinity, DO and sediment type effected on abundance, richness and diversity of intertidal benthic assemblages [5]. As Such assemblages are also impacted by human action. Therefore changes of environmental conditions are paralleled by structural and compositional changes of both forest and mudflat assemblages [6-9]. Bandar-e Khamir (Persian Gulf, Iran) has been covered by nearly 1000 ha of mangroves forest as many pecies live in in mangrove ecosystems for example multiple phyla, including Porifera, Mollusca, Arthropoda, Annelida, Nematoda, Sipunculoidea, Platyhelminthes, and Chordata. Mangrove forests of Hormozgan province at Khamir Port are located in the northern part and considers among mangrove forest of the Persian Gulf center [10]. In this survey, tried to show role of GIS in Vegetation and environmental factors of mangrove forests in Bandar-e Khamir (Persian Gulf, Iran) as the figs has been presented.

MATERIAL AND METHODS

Five stations (St.1-3) were periodically sampled at Bandar-e Khamir along the coasts of southern Iran, in spring, summer, autumn and winter 2007. At each station dissolved oxygen, salinity, temperature and pH of water

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RESULTS AND DISCUSSION

Fig 1 shows amounts of DO (dissolved oxygen) in study area. Fig 2 shows amounts of pH in study area. Fig 3 shows amounts of salinity in study area. Fig 4 shows amounts of water temperature in study area. Fig 5 shows Ratio Vegetation Index (RVI) in study area. Fig 6 shows Normalized Difference Vegetation Index (NDVI) in study area.

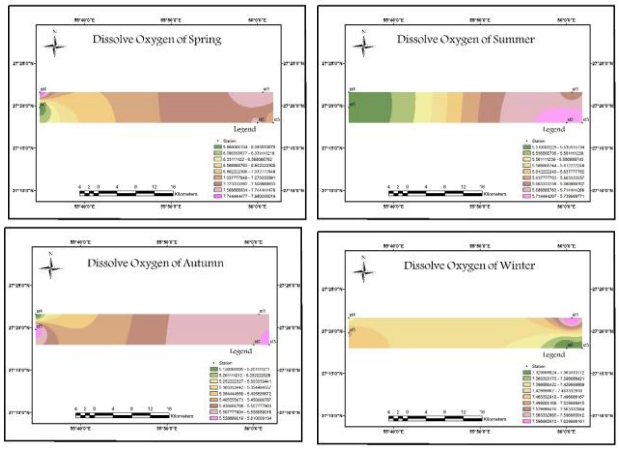

Fig 1. GIS map of Dissolve Oxygen

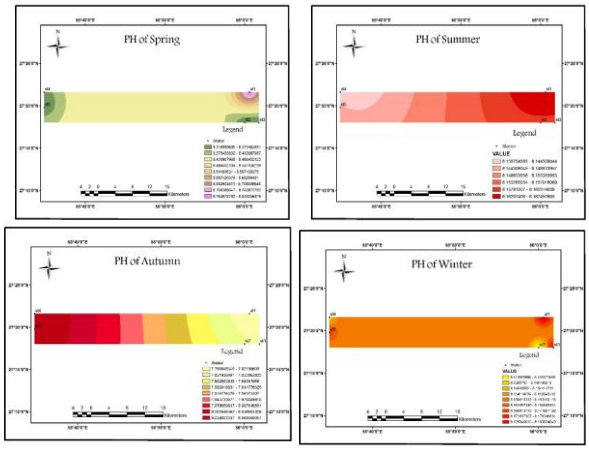

Fig 2. GIS map of Ph

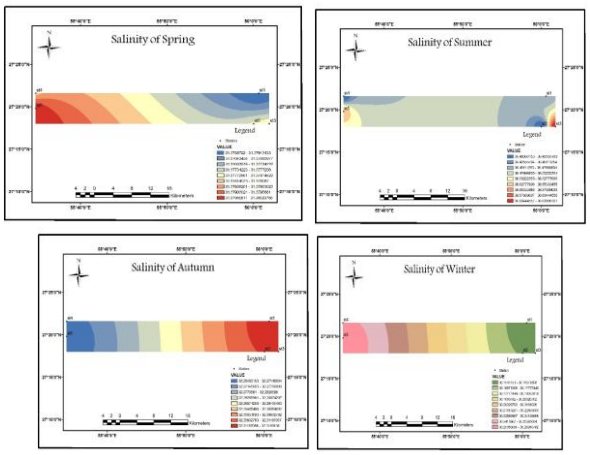

Fig 3. GIS map of salinity

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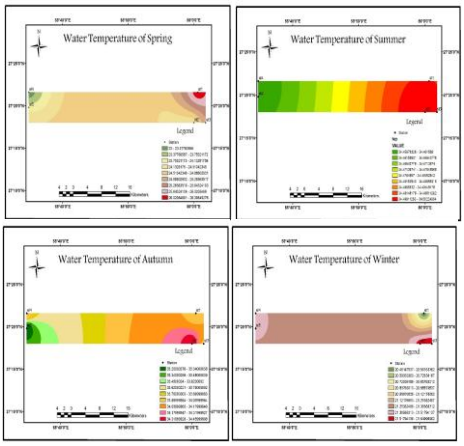

Fig 4. GIS map of water temperature

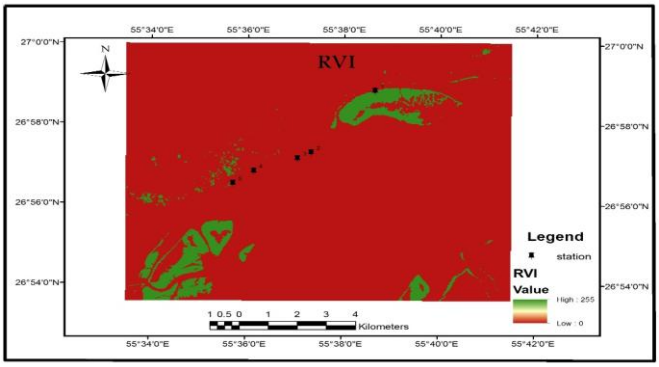

Fig 5. GIS map of RVI

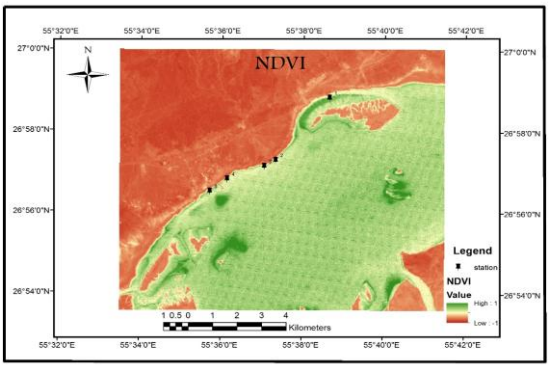

Fig 6. GIS map of NDVI

At station 1, maximum water temperatures, salinity, DO and pH were recorded 34.5±0.1 (in summer), 36.46±0.05 (in summer), 7.71± 0.1(in spring) and 8.28±0.01 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 20.46±0.01 (in fall), 30.1±0.005 (in fall), 5.53± 0.1(in summer) and 7.79±0.01 (in autumn).

At station 2, maximum water temperatures, salinity, DO and pH were recorded 34.6±0.15 (in summer), 36.4±0.2 (in summer), 7.54± 0.3(in spring) and 8.32±0.02 (in spring). Minimum water temperatures, salinity, DO and pH were recorded 21.6±0.1 (in winter), 30.2±0.15 (in winter), 5.54± 0.1(in autumn) and 7.84±0.03 (in autumn).

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There is a definite patterns in distribution and diversity of organisms based on all environmental factors as salinity and temperature rate in tide condition and risk of lack of disolved oxygen and food decreases [11]. One of environmental factors which effects on dispersion and density of macro benthos species is Dissolved oxygen. Dissolved oxygen is one of environmental factors which affects dispersion and density of effective macro benthos species and the muddy bottoms at tide. So, in sediment surface larger of muddy bottoms may face the problem of

lacking oxygen. Continued decrease in dissolved oxygen lead to extinction or Polycheate will be dominant in ecosystem. Due to tiny grain sediment that they keep the water in sediment, it may cause prevent from severe changes in Salinity. One of the physicochemical factors that have major effect on macro benthos diversity is pH. Hence without being pH stability, macro benthos are unable to control their Physiological mechanism. Occurrence of metal pollutant increases in water cause increases in pH < 8 which lead to death of aquatic organisms. Ratio of CO2 forms is another main works of pH in water. As a way that in there are more free forms of CO2 in pH=4 and in pH=7 bicarbonate reach to maximum in ecosystem [12].

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