

# Evaluation the Severity of Aquatic Environments Desertification

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**ABSTRACT:** This investigation has been conducted to find criteria suitable to place aquatic environments in one of the desertification classes. The criteria suggested putting the aquatic ecosystems in five degree of severity. These are slight, moderate, severe, very severe and exceptionally or catastrophic. These depend on the main reasons which cause aquatic ecosystems deterioration as follow:

1. Slight desertification has high plankton population, underexploited, no pollution, excellent D.O levels, salinity values less than 0.5 ppt, PH = 7.00 and productivity reduce less than 10 %
  2. Moderate has moderate plankton population, moderately exploited, slight pollution, very high D.O levels, salinity values 0.5 -17 ppt and pH = 8.069 and productivity reduce 25%
  3. Severe, low plankton population, fully exploited, low pollution, high D.O levels, salinity values 16 ppt, slight decrease in pH from 8.069 and productivity reduce 50 %
  4. Very severe, slight plankton population. Overexploited. moderate pollution Moderate D.O levels, salinity values 32 – 37 ppt, pH more decrease in pH 8.069 productivity reduce 75 %
  5. Exceptionally or catastrophic, no plankton population, depleted, High pollution low D.O levels, salinity values more than 37 ppt, high decrease in pH PH 8.069 and zero productivity.
- These criteria could be used to place any aquatic ecosystem in one of the desertification classes.

**KEYWORDS:** Severity degrees, Aquatic desertification, criteria, plankton population, D.O, salinization levels, Iraq.

## I. INTRODUCTION

Terrestrial desertification has been studied and defined by many researchers. It defined by the conference on Environment and Development hold in Riode Janeiro as land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.

Terrestrial or Land desertification is defined by the author as the phenomenon of environment deteriorated in general, which leads to lower productivity of natural resources due to soil erosion, salinization of land, waterlogging in irrigated land, and the removal of vegetation and pollution [1]. The human accelerates or slows down this process as the more natural conditions prevailing extreme human impact was larger and more damaging. It could be argued that desertification results from poor human use of natural resources [2] and [3].

According to U.N. Environmental Programme ([4] and [5]), 250 million people around the world were directly threatened by desertification and a further 750 million people were indirectly threatened. Over 100 countries are suffering from the adverse social and economic impact of desertification. The influence of wind direction on sand dunes movement of Lower Mesopotamian plain. Basrah has been studied (Abdulla [1] and [6]) put pollution as a major cause of desertification phenomenon in Iraq.

There are many study concerns with aquatic environment ([7], [8] and [9]). However, the aquatic environment desertification has not been defined clearly nor its causes determined. The criteria used to estimate its degree is not clear as in terrestrial desertification.

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Therefore, the aim of this investigation was to evaluation the severity of aquatic environments desertification depending on its causes.

## II. MATERIALS AND METHODS

To understand and evaluate the severity of aquatic environments desertification, the following information has been taken into account:

1 – The major causes of aquatic desertification are suggested as:

- Plankton population
- Over fishing and over exploitation
- Pollution
- Productivity

2 – According to the causes of desertification mentioned above the author put the aquatic ecosystems in five degree of severity. These are slight, moderate, severe, very severe and exceptionally or catastrophic.

3 - Aquatic desertification has been defined according to the causes and the degree of severity.

## III. RESULTS AND DISCUSSION

Table 1 shows the criteria suggested to estimate the degree of desertification:

- Slight desertification has high plankton population, underexploited, no pollution, excellent D.O levels, salinity values less than 0.5 ppt, PH = 7.00 and productivity reduce less than 10 %
- Moderate has moderate plankton population, moderately exploited, slight pollution, very high D.O levels, salinity values 0.5 -17 ppt and pH = 8.069 and productivity reduce 25%
- Severe, low plankton population, fully exploited, low pollution, high D.O levels, salinity values 16 ppt, slight decrease in pH from 8.069 and productivity reduce 50 %
- Very severe, slight plankton population. Overexploited. moderate pollution, moderate D.O levels, salinity values 32 – 37 ppt, pH more decrease in pH 8.069 productivity reduce 75 %
- Exceptionally or catastrophic, none plankton population, depleted, High pollution low D.O levels, salinity values more than 37 ppt, high decrease in pH PH 8.069 and zero productivity

Table 1 .The criteria suggests by the author to estimate the degree of aquatic desertification.

Aquatic desertification degree	Plankton population	Over fishing and Over exploitation	Pollution	Productivity reduction %
Slight	High	Underexploited	<b>Non pollution</b> Excellent D.O levels, salinity values Less than 0.5 ppt, and **PH = 7.00	Reduce less than 10 %
Moderate	Moderate	moderately exploited	<b>Slight pollution</b> Very high D.O levels, salinity values 0.5 -17 ppt and ***pH = 8.069	Reduce 25%
Severe	low	fully exploited	<b>Low pollution</b> High D.O levels, salinity values 16 ppt Slight decrease in pH from 8.069	Reduce 50%
V .severe	Slight	overexploited	<b>Moderate pollution</b> Moderate D.O levels, salinity values 32 – 37 ppt and PH more decrease in pH 8.069	Reduce more than 75%

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Exceptionally or catastrophic	None	depleted	<b>High pollution</b> Low D.O levels, salinity values more than 37 ppt and High decrease in pH8.069	Zero productivity
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\*D.O. levels of dissolved oxygen in the water\*\*Fresh water pH \*\*\* Ocean present PH =8.069[10] and [11].

These criteria could be used to place any aquatic ecosystem in one of the mentioned desertification degrees based on the properties of aquatic environments.

Table (2) the means properties of Al-hammar marsh water South Iraq[12].

Plankton population	Over fishing and Over exploitation	Pollution			Productivity Reduction %
		DO	pH	ppt	
Moderate	moderately exploited	8.4	7.8	3.2	50

As an example, this aquatic environments (Al-hammar marsh) could be placed in slight to moderate desertification (table, 2).

The aquatic environments desertification could be defined as the phenomenon of the deterioration of aquatic environments as a result of human activities associated with various types of pollution, over-fishing, over exploitation, illegal fishing, increasing oxygen-demanding substances, increasing water temperature and global climate change that lead to the devastation of aquatic environments.

#### IV. CONCLUSION

According to the results of this study, any aquatic environments could be placed in the proper desertification degrees (slight, moderate, severe, very severe and exceptionally or catastrophic) based on the properties of the studied aquatic environments.

The aquatic environments desertification has been defined as the phenomenon of the deterioration of aquatic environments as a result of human activities associated with various types of pollution, over-fishing, over exploitation, illegal fishing, increasing oxygen-demanding substances, increasing water temperature and global climate change that lead to the devastation of aquatic environments.

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