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### RESEARCH ARTICLE

#### DEFINING DRY SURFACE AREA OF RAZZAH LAKE BY USING GIS.

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#### Abstract

Razzah Lake is considered the second largest water depression in Iraq and Euphrates is considered the main feeder through Warar Barrage which connects it to Habaniya Lake which receives water directly from Euphrates. The drop in Euphrates water level has led to a continuous drop in Razzah Lake water level. The research involves specifying the water surface area of the lake for the period 2007, 2010, 2013 using aerial photos of the lake which lies within the administrative boundaries of Karbala Province. A GPS model has been used to locate the dry areas during these periods, It was found that the lake dry surface area during the period 2007-2010 was 175,901 sq km while the dry area between 2010 and 2013 was 53,147 sq km, that is three times more.

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#### Introduction:-

Razzah Lake, is located almost in the center of Iraq as shown in Figure (1). It is within the administrative boundaries of Karbala and Anbar, it is fed with water from Habaniya Lake through Warar Barrage. Both receive water from Euphrates. Its northern part lies in Anbar Province and southern part within Karbala Province. Figure illustrates the Lake shape



Figure 1:- Razzah Lake relative to Iraq

Source: Internet



**Figure 2:-** Razzah Lake shape

**Source:** Internet

The surface area of Razzah Lake varies with water level. When the water level increases, the surface area increases and vice versa. Table (1) shows the surface area of Razzah Lake and the quantity of water stored on the whole Lake water level. It is noted the lowest point in the lake is 17 m at sea level and the highest level is 40m

**Table 1:-** shows storage capacity and surface area of Razzah Lake based water based on water level

1	elevation	area(km)	capacity-مليار متر مكعب
2	17	0	0
3	18	180	0.125
4	19	260	0.3
5	20	350	0.55
6	21	460	0.9
7	22	580	1.4
8	23	700	2.1
9	24	830	2.8
10	25	940	3.8
11	26	1050	4.85
12	27	1140	5.9
13	28	1230	7.05
14	29	1320	8.2
15	30	1430	9.4
16	31	1465	10.75
17	32	1510	12
18	33	1550	13.5
19	34	1585	15.25
20	35	1620	16.87
21	36	1660	18.5
22	37	1700	20.25
23	38	1740	22.12
24	39	1770	23.75
25	40	1810	25.75

Razzah Lake was characterized by the large number of tourist facilities (homes, tourist restaurants and complexes, tourist recreation centers) but because water was available in large quantity. But the drop in water level led to the deterioration of these facilities

#### **Research aim:-**

The research aims to achieve the following:

- Building a model of Razzah Lake for the recent years
- Specifying the areas that suffered water recession during the three periods

### Research problem

The research problem is represented by the continuous drop in Razzah Lake water level because it is no longer receiving water from Euphrates Research procedure, The researcher relied on aerial photos for the years 2007, 2010,2013 Of the study area, Razzah Lake as well as ARC MAP, ARC CATALOG to build area definition model.

### Research Methodology:-

The researcher adopted two methods. The first one is theoretical in which main data on GIS are given as well as giving conclusions and recommendations

#### The first Part:involves the importance of the data in GIS:-

Data are considered the backbone of GPS .A researcher described it as the blood of GIS and it represents the huge demount of data and information, Its resources are numerous and demand on it increases, there has been an increase in data entry to databases. The data lose their importance when they are old or inaccurate because they then have a negative impact on analysis results therefore GIS data and information should be given equal attention to that given to equipment and programs

Aerial photographic instruments are considered one of the main factors in the development and spread of GPS because with them we can get accurate digital images of various areas .The drawing of features can be done in two ways

#### Vector model:-

Data are represented in this model by structures of basic components called simple special components , they are (point, line and area ). They are defined digitally and the relations between them are called special or topological relations . Figure (3) illustrates patterns of these features .

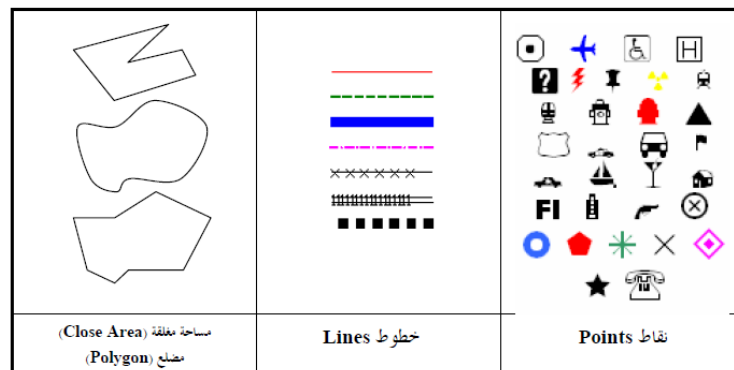


Figure 3:- Pattern of features. (point, line and area)

#### Rastor model:-

Data are represented in this model in the form of net or two dimensional matrix consisting of small cells called pixel .Each pixel has a value reflecting feature type and nature of the clarity because the pixel is the average of lighting or absorption measured electronically .The less the digital value of the pixel , the clearer the image. For example, an image with (0.5) m pixel value (the researcher has adopted this type) is which the pixel value is greater than an image in which the pixel value is 3 or 4 . Figure (4) illustrates this

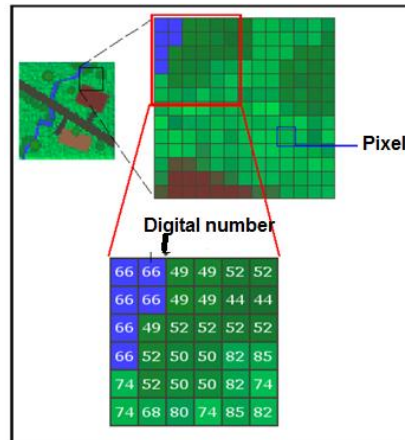


Figure 4:- illustrates the pixel

Programs on GPS are numerous, they cover Surface, GlobalMapper, Arc. Gis which deal with spatial digital data in terms of collection, storage, analysis and exposition depending on geographical location. The researcher has adopted Arc and Gis in this research

The data sources used by GPS are of two types

1. Spatial data which cover radar data aerial images (which the researcher has adopted) as well as maps
2. Non spatial data which cover descriptive data such as tables and statistical

**The second part:- Building Razzah Lake model**

The researcher has used the southern part of the lake which lies within the administrative boundaries of Karbala province because aerial2020r photos are available for the years (3007.2010, 2013)

**Steps in building a model of study area:-**

There are several methods for building the model. Below are the steps of building the model according to one method

1-The photos of Razzah Lake part in Karbala province for the three years were retrieved from Arc Map, they are shown in Figure (5)

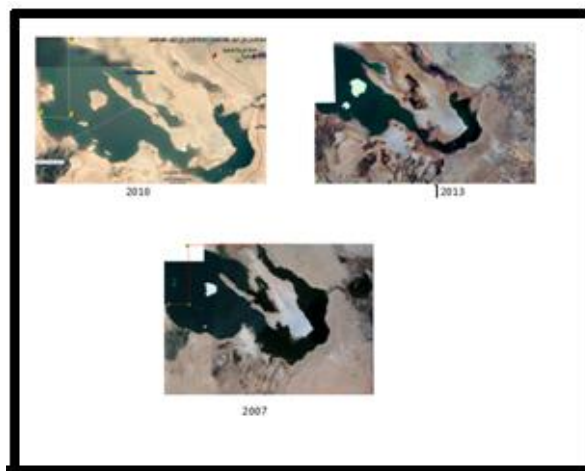


Figure 5:- Aerial views of Razzah Lake for years (3007. 2010, 2013)

Sources: The researcher

2- Drawing the boundaries if the water surface for each year using Arc Map as well as drawing the islands.

In the lake in the form of polygon. Figure (6) illustrates this where each color represents the area of water surface for each year adopted in the research



Figure 6:- illustrates Razzah Lake surface area for the three years

Source : The researcher

3-When these layers are assembled, they appear as in Figure (7) which shows the structure of these areas and the areas from which water has ebbed

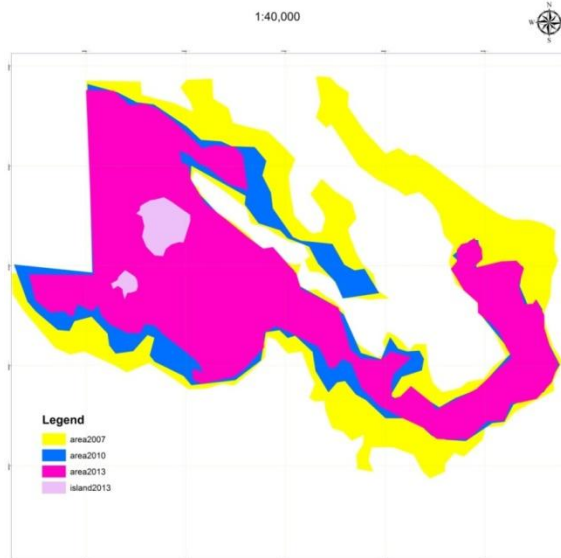


Figure 7:- shows the structure of these areas

Source : The researcher

4-Stages for building water surface model .Arc toolbox was opened and a model was built for each year .This model contains the water surface and te islands in it as shown in Figure (8).The goal of this process is defining the pure area of the lake after deducting the island area from the lake total area

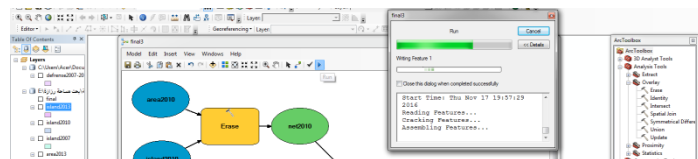
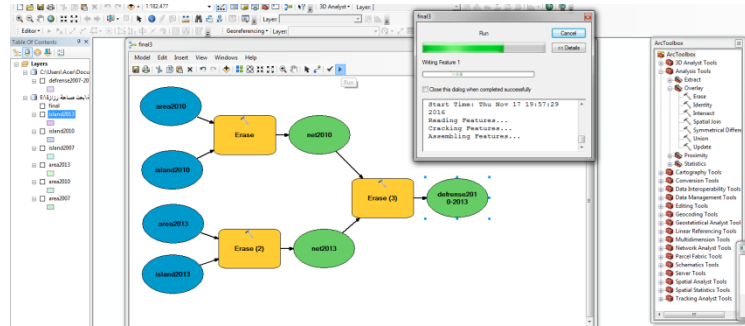


Figure 8:- shows how Razzah Lake model works

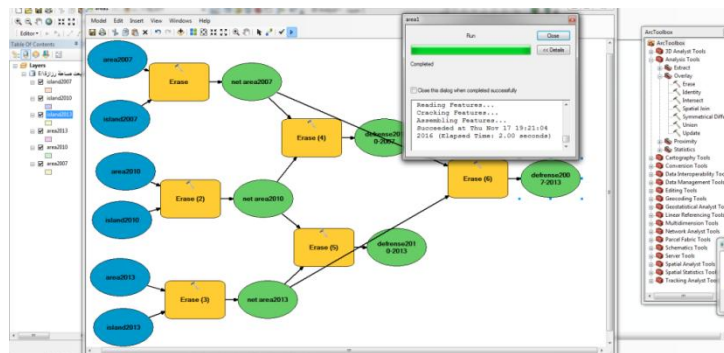
Source : The researcher

5-Another model was made which connects the pure areas for the years (2007, 2010, 2013)to find out the areas which suffered from water ebb as shown in Figure (9)

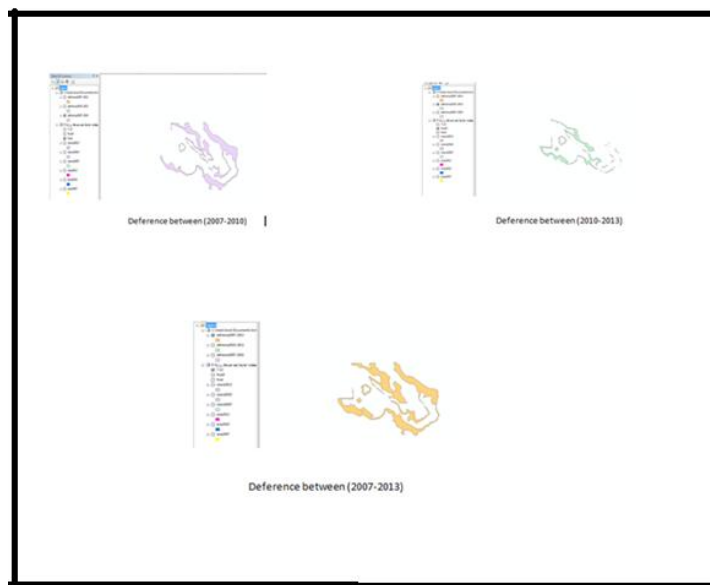


**Figure 9:-** shows how Razzah Lake model works to define the areas which suffered from water ebb  
**Source :** The researcher

6-After the model was run, the areas which suffered water ebb between 2007 and 3013 were calculated as shown in Figure (10) while Figure (11) shows the pure areas between each two periods



**Figure 10:-** shows how the model works between the years (2007, 2013)



**Figure 11:-** shows the pure areas from which water receded between each two periods  
**Source :** The researcher

7-From the data base built for model , the lake area lying within the administrative boundaries of Karbala was found for, the three years as well as the areas from which water receded as shown in Table c.

**Table 2:-** The areas from which water recede during the three years and their circumference

Area(km <sup>2</sup> )	Deference between years
171.839	2007-2010
53.137	2010-2013
224.976	2007-2013

Area(km <sup>2</sup> )	year
500.944	2007
329.105	2010
275.968	2013

Boundary(km)	year
235.866	2007
183.586	2010
156.924	2013

**Source :** The researcher

**Third part:** Conclusions and recommendations

### Conclusions:-

1. The lake surface area dropped by 35% during 2010 compared with 2007 that is 171,839 sq km
2. lake The surface area dropped by about 17% during 2013 from that of 2010. That is 53.137 sq km
3. lake The surface area dropped by about 45% during 2013 from that of 2007. That is 224,976sq km
4. The lake surface area diameter in 2007 was 235,866 km
5. The lake surface area diameter in 2010 was 183,586 km that is a drop of 23% from 2007
6. surface area The lake diameter in 20013 was 156,924,km 2010 that is a drop of 15% from 2010 that is a drop of 34% from 2007
7. After 2013, the lake surface area dropped less than in the previous years because the water quantity was low
8. Most areas which suffered water recession lie in in the northern east and southern west which that these two areas have higher topography than other areas of the lake
9. Most sandstorms over Karbala are because it lie west part s in southern east of the lake
10. Recreation facilities stopped

### Recommendations:-

1. It is necessary to feed the lake with water from Euphrates through Warar Barrage to improve Karbala climate and fish life and thus improve tourism
2. It is necessary that the related government bodies should provide aerial photos and specialized spatial data

### References:-

1. Al-Jawahriy, Zuhair Abdul Wahab, Ass.Prof, Building a Digital Elevation Model for Razaza Lake by Using GIS, International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249 – 8958, Volume-3, Issue 1, October 2013, p294
2. Omari, D. Mohammed bin Awad, spatial techniques converted data and information, into digital form, Department of Geography, Faculty of Arts, King Abdul Aziz University, p. 5
3. . The General Administration for curriculum design and development, the General Organization for Technical Education and Development Terminator, Saudi Arabia, Rapporteur of the GIS, Survey Section, p. 34
4. General Administration to design and develop curricula, op. Cit., P. 37
5. Christopher, J, 1999. "Geographical Information Systems and Computer Cartography", Addison Wesley Longman Limited, pp.19-38s.