Classification of Litter Pollutants in the Main Branches of Shatt Al- Arab River and the management

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Abstract:-

The aim of this study to classify the litter pollutants in the main branches of Shatt Al- Arab River in Basrah city southern Iraq, for raise the public environmental awareness to protect the water sites from pollution, for that litter was assessed for three main branches of Shatt Al-Arab River in urban area of Basrah city, Al-Khandak, Al- Ashar, and Al- Khora, Litter samples were collected during the period between July and August. Random quadrate method was used to determined and classified litter for its main types and sources. Statistical properties were calculated and the observed values show that plastic drinking water and beverages bottles have the maximum value about 387992 Kg in all branches and the card boxes have a minimum value about 2380 Kg, Al-Khora channel was the most polluted area its have 453033 Kg of total litter weight, and the maximum value was for plastic drinking water and beverages bottles about 186283 Kg (41,12% percentage), the minimum value for plastic food oil bottles this type was not found in this area. Al-Khandak channel have 237311 Kg of total litter weight, the maximum value for plastic drinking water and beverages bottles about 99708 Kg (42,02%persentage), and the minimum value for plastic toys that was not found in this area. Al-Ashar have the lees value from the litter total weight about 179837 Kg, the maximum value was for plastic drinking water and beverages bottles about 102000 Kg (56,72%persentage) and the minimum for car oil cans about 100 Kg. According for that the results find out that there is a correlation between population and the amount of the litter pollutants in the study area.

Key Words: litter pollutants, Shatt Al-Arab, Litter management

Introduction:-

The increasing use of plastic materials in the last decades **(**Valavanidis & Vlachogianni), as the increasing of population and urbanization produce large

amounts of litter pollutants especially plastic litter pollutants this accumulate in the rivers because of its slow biodegradability. Because litter is the most visible form of pollution and its presence creates a negative impression in Basrah as one of the port cities, and in order to raise the awareness of the public to keep the water sites from litter pollutants it became urgent to conduct the present study.

Litter can be defining as any manufactured or processed solid waste material that enters the aquatic environment from any sources (Coe & Rogers, 1997). Its also define as any unavoidable material no longer use to the disposer resulting from an activity, which has no immediate economic demand and which must be disposed of. (NISP, 2003). Litter pollution classified under the physical pollutants and its sources, land based rubbish, rubbish from the small boats to the water ways, the road side littering like garbages in the street or gutters, bottled water, fast food packaging, furniture, syringes, computer disks, packing materials, garbage bags and uncontrolled building waste. The solid waste in the urban areas generated from house hold, industries, markets, abattoir and shops also the demolition gutters debris that caused in charge the sewage water to the water ways. (Meadows, 1995). Waste is commonly classified into three, these are solid, liquid and gaseous wastes. Solid wastes are residual from homes, businesses and institutions and referred to as trash, garbage, rubbish, throwaways in the street or dropping in water ways, for example bottles, can, plastics, paper, battery casings and nylon.(Adedibu, 1982), also these wastes can be classified on the basis of source , environmental risks, utility and physical property, solid wastes which is commonly used are classified as municipal solid wastes, industrial solid wastes, agricultural solid wastes mining and mineral wastes, construction and demolition wastes health care wastes radio active (nuclear) wastes, human and animal wastes. Litter also can be define as unwanted materials or substances that are left or discarded after use also included products of process lines or materials that may be required by law to be disposed off (Okecha, 2000). Litter can caused a whole range of problems for the human community and to the aquatic environment when these litter travel through the storm water system to our rivers and water ways. Litter also affected on animals like fish and aquatic birds. (Bourne, 1976, Wehle and Coleman, 1984, Degange and Newby, 1980, Furness, 1985, Schrey and Vank, 1987).

Study Area and Methods:-

Litter samples were collected from three selected branches of Shatt Al-Arab river, 1- Al- Khandak, 2- Al-Ashar and 3- Al-Khora. As show in Fig. (1)

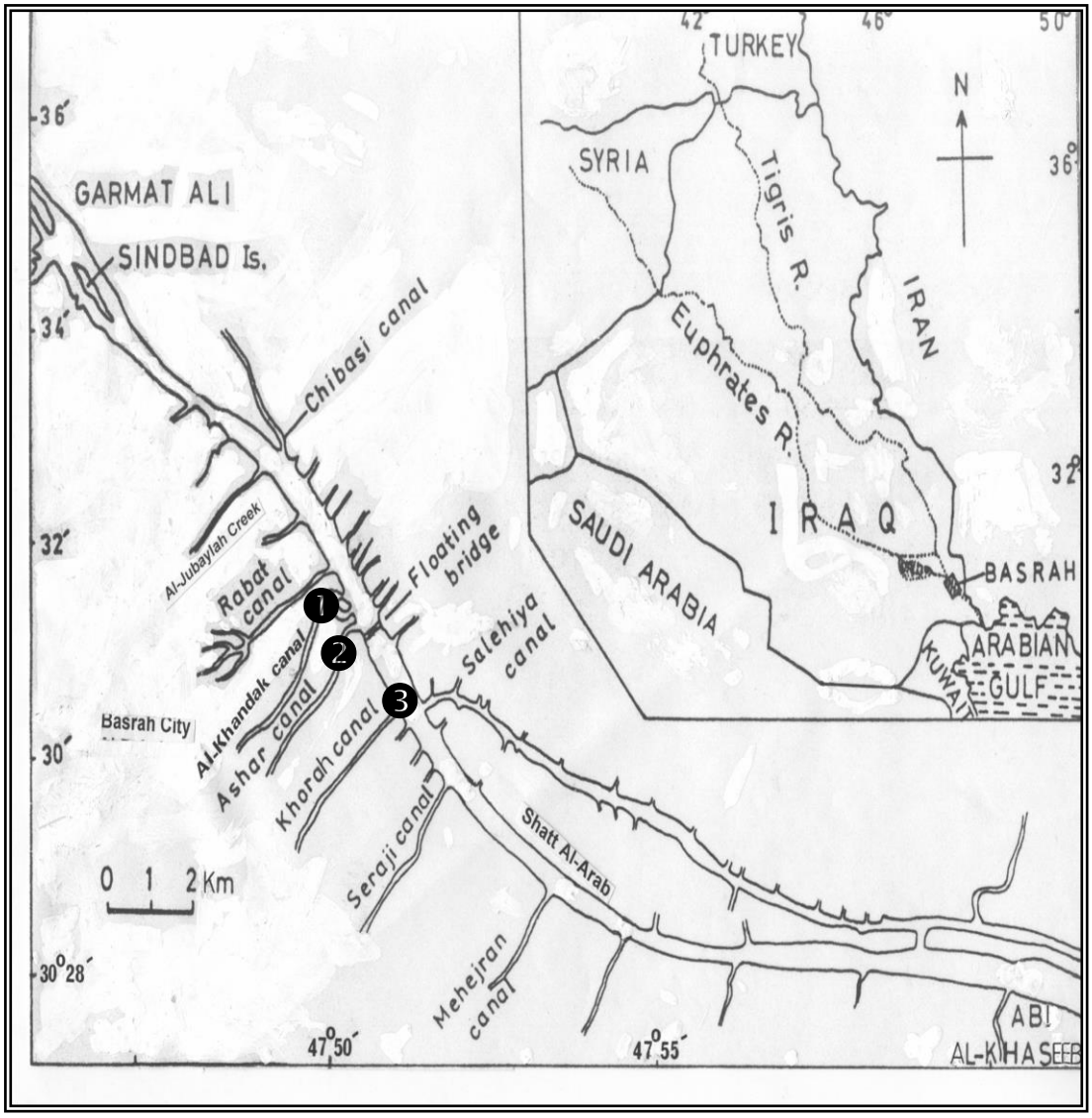

Fig.1. Location of sampling sites at the study area on the Shatt Al-Arab River.

Sampling & Data Collection:

Three channels were studied at Basrah city, southern part of Iraq, Al-Khanda, Al-Ashar and Al-khora.The lengths were 12, 10 and 17 Km for Al-Khandak, Al-Ashar and Al-Khora channels, respectively. The study channels were divided to three parts first part at the area near the point of discharge to Shatt Al-Arab river, second at middle area of the channel length and the third part at the area of starting of the channel. The area was calculated for each channel, as 5M for width multi by the length of the channel.

Complete random quadrate method was used to collect samples by using squire wooden frame 1 X 1 M. Three replicates at 0, 10 and 20 M in each sampling area were collected.

Results & Discussion:-

Litter pollution is the most visible form of pollution and its presence creates a negative impression. Litter can caused a whole range of problems for the human community and to the aquatic environment when these litter travel through the storm water system to our rivers and water ways. Litter also affected on animals like fish and aquatic birds. Due to the growth of population in Basrah as one of the port cities, human carelessness many of the litter types leave in the environment and many of them dropping in the rivers and channels. Statistical properties were calculated and the observed values show in table(1), plastic drinking water and beverages bottles have the maximum value about 387992 Kg in all branches and the card boxes have a minimum value about 2380 Kg, Al-Khora channel was the most polluted area its have 453033 Kg of total litter weight, and the maximum value was for plastic drinking water and beverages bottles about 186283 Kg, the minimum value for plastic food oil bottles this type was not found in this area. Al-Khandak channel was have 237311 Kg of total litter weight, the maximum value for plastic drinking water and beverages bottles about 99708 Kg, and the minimum value for plastic toys that was not found in this area. Al-Ashar have the lees value from the litter total weight about 179837 Kg, the maximum value was for plastic drinking water and beverages bottles about 102000 Kg, and the minimum for car oil cans about 100 Kg. The litter type that was have the maximum value of total weight in all channels was the plastic drinking &beverages bottles even of the less weight of the plastic, you can recognized the large amounts of this type that will be thrown in this channels and that will caused the increasing in the litter pollution by plastics because its not analyzed easily and stay in the environment for long time, this is shown in the study of (Williams &Simmons,1996) that the minimal photo degradation and biodegradation of plastic is the major reason for the longevity of such plastic and that make to be widespread on both river and channel banks.

The reason to be Al-Khora channel the most polluted area was the urbanization, finding the hospitals, the play parks and the shows of cars that caused to be this area one of the most litter polluted area. Al-Khandak channel crossed on of the most

populated area finding the main market in Basrah city centre, the abattoir, the parks and the shows of the furniture's, that caused this type of pollution.
Al-Ashar channel crossed through high population area finding of the most governmental directories and the urbanized areas caused this type of pollution. The conclusion from this study depend on two facts the first is the problem of the quality of drinking water in Basrah city, and the high salinity in water sources, that will caused to the high amount of plastic drinking water and beverages bottles that used from the population for drinking purpose. The second fact is the high population in these urbanized areas the main source of litter pollution, this agree with (Abu-Hilal and Al-Najjar 2009) study that see the litter pollution increase was parallel to urbanization and population growth in the port cities. The problem of litter pollution in this area appears to be mainly due to the accumulation of the land based sources includes plastic bottles, plastic containers, plastic bags, cans, glass fragments, card boxes, foot wear and polystyrene(Styrofoam). (Debrot *et al*,199,Golik&Gertner,1992, Shiber & Barrales-Rienda,1991, Wade *et al*,1991), that transportation by wind to this channels and distribution all over the channel by the effect of the high and low tide currents in Shatt Al-Arab river. Litter also caused many health effects for human community due to increasing of leaf litter in huge amounts and the other types of litter, wood fragments, and hazardous materials include drug containers, syringes, broken glass and metallic cans witch caused to bacteria and fungi to grow fast witch caused many health problems and aquatic pollution, this show in the study of (Baldy *et al*, 1995). The percentage of each litter item was calculated for each channel as show in fig.1, fig. 2, and fig.3. The results of this study will assist the litter managements to solve the litter pollution problem in Basrah city, and also to raise the environmental awareness for the public to control the amount of the litter that they throw it in the water sites.

The managements:

Methodology of litter management has many forms but the suitable forms depend on many variables environmental awareness might be considered relatively new item for Iraqi society members environmental education might be considered relatively new for Iraq, environmental awareness at the societal level (individuals and institutions) is a major pillar in developing the environmental level and performance of any social system. Poor public awareness is however noticeable despite the tireless efforts of MoE, environment departments and directorates in different ministries and CSOs. This can be attributed to the following reasons:

1- The concepts of environmental awareness is new in the Iraqi society in addition to the limited individuals and institutional awareness due to the economic and security priorities under the current conditions

2- Failure to integrate the environmental dimension in the educational framework, which aims at promoting environmental awareness at all social levels

3- Society and individuals follow behavioral patterns of negative impact on health and environment

as the document of national strategy for Iraqi environment protection from(2013-2017) shows.(The national environmental strategy and action plan for Iraq 2013-2017).For that reason the public awareness through public involvement projects and public participation in the environmental protection activities must be activated also collection by waste disposal vehicles should then follow promptly. These will then be transported and disposal of in the appropriate places for proper storage, treatment or recycling (Awomeso et al, 2010). The cooperation between all the services institutions to reduce the problem of litter pollutants and trends towards anti-litter in rivers and aquatic sites

Table-1- Litter composition total weight (Kg) in the main branches of Shatt Al-Arab river.

Litter Types	Al-Khandak	Al-Khora	Al-Ashar	Total
Plastic Bags	36775	176425	19637	232837
Wood Fragments	907	1259	713	2879
Glass Bottles	28242	23729	6350	58321
Plastic Boxes	49167	9167	20000	78333
Plastic Drinking Water & Beverages Bottles	99708	186283	102000	387992
Beverages Cans	1842	2797	1740	6378
Styrofoam	1139	1704	990	3833
Foot Wear	3373	911	1002	5286
Car Oil Cans	251	39353	100	39703
Garments	783	1847	692	3321
Card Boxes	1118	623	640	2380
Plastic Kitchen Eqwepment	3150	541	9683	13374
Plastic Detergent Bottles	1753	3276	670	5698
Plastic Food Oil Bottles	6913	0	7858	14771
Plastic Toys	0	431	6000	6431
Fragments	1041	2491	723	4255
Others	1152	2198	1038	4388

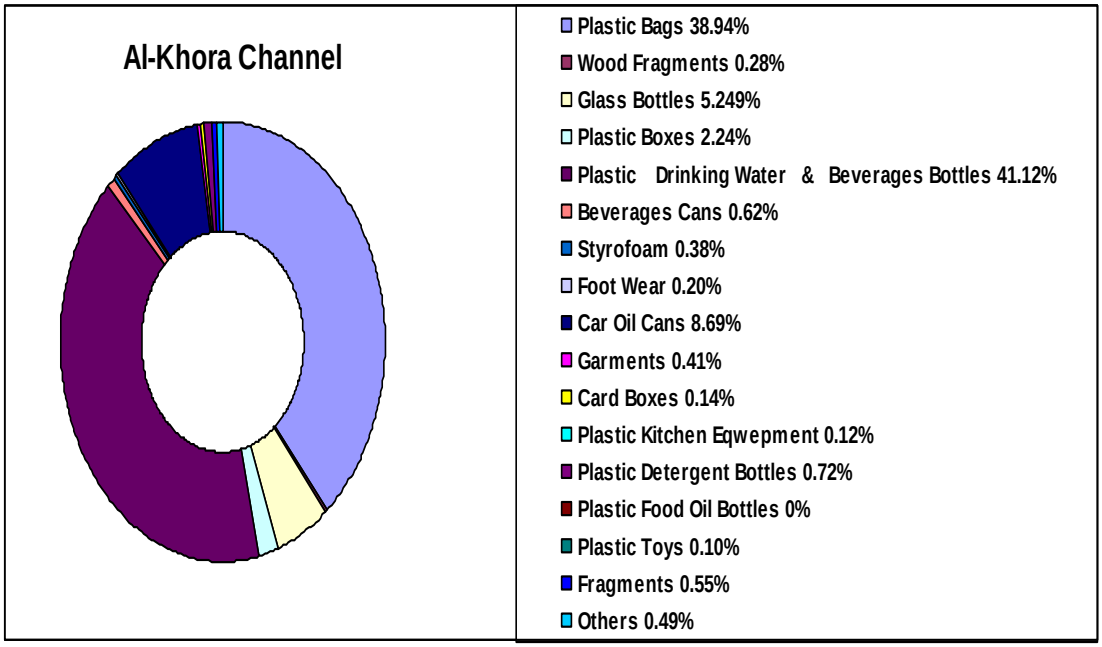

Fig.1. The percentage of litter types in Al-Khora channel.

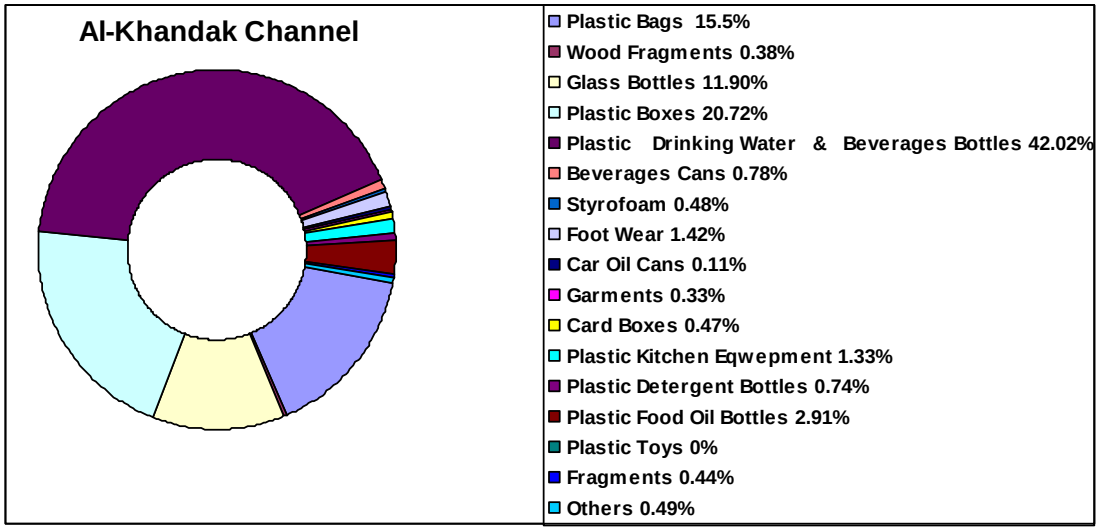

Fig.2. The percentage of litter types in Al-Khandak channel.

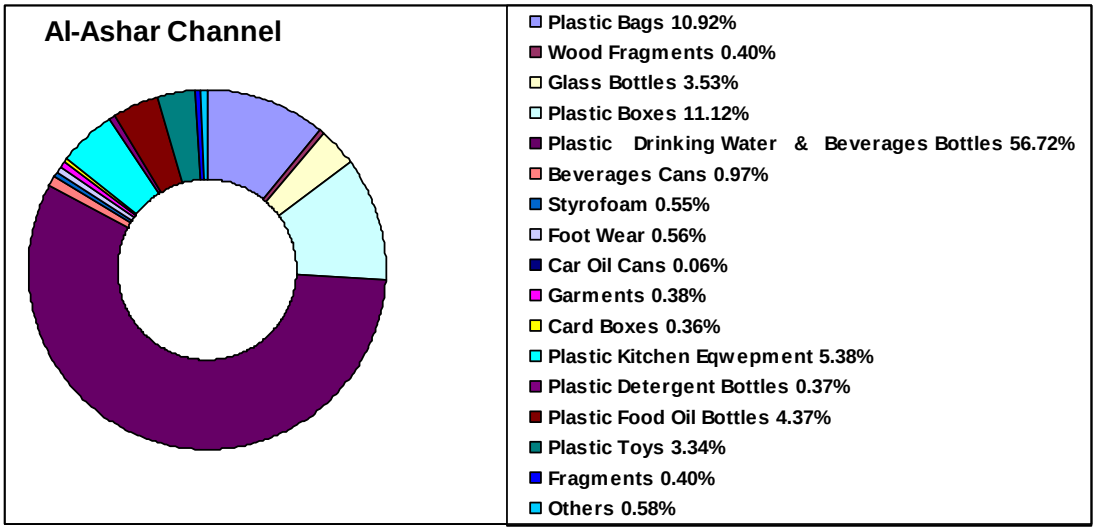

Fig.3. The percentage of litter types in Al-Ashar channel.

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الملخص:

الهدف من هذه الدراسة لتصنيف الملوثات من الركام والقمامة ألصلبه في الفروع الرئيسية من نهر شط العرب في مدينة البصرة جنوب العراق وذلك لرفع مستوى الوعي البيئي العام للحفاظ على شط العرب وحمايتها من التلوث وتم ذلك في ثلاثة فروع رئيسية من شط العرب نهر في المناطق الحضرية من مدينة البصرة، الخندق، العشار، والخوره ، تم جمع عينات من القمامة

خلال الفترة ما بين شهري يوليو وأغسطس. تم استخدام طريقة المربعات العشوائي لهذا الغرض. تم حساب الخصائص الإحصائية وأظهرت النتائج أن قناني مياه الشرب والمشروبات البلاستيكية لها القيمة القصوى حوالي ٣٨٧٩٩٢ كلغم في جميع الفروع والصناديق الكرتونية لديها قيمة الحد الأدنى عن ٢٣٨٠ كلغم، وكانت قناة الخوره المنطقة الأكثر تلوثا بحوالي ٤٥٣٠٣٣ كلغم من الوزن الإجمالي للقمامة، والحد الأقصى لقيمة قناني مياه الشرب والمشروبات البلاستيكية حوالي ١٨٦٢٨٣ كلغم، قيمة الحد الأدنى لقناني زيت الطعام البلاستيكية لم يتم العثور على هذا النوع في هذا الموقع. قناة الخندق لها ٢٣٧٣١١ كلغم من الوزن الإجمالي القمامة، والحد الأقصى لقيمة قناني مياه الشرب والمشروبات البلاستيكية حوالي ٩٩٧٠٨ كلغم، والحد الأدنى لقيمة اللعب البلاستيكية التي لم يتم العثور في هذا الموقع. العشار لها اقل القيم من القمامة الوزن الإجمالي حوالي ١٧٩٨٣٧ كلغم، وكان الحد الأقصى لقيمة قناني مياه الشرب والمشروبات البلاستيكية حوالي ١٠٢٠٠٠ كلغم، والحد الأدنى لعلب زيت السيارات حوالي ١٠٠ كلغم. وفقا لذلك النتائج تجد أن هناك علاقة بين كثافة السكان وكمية الملوثات من القمامة في منطقه الدراسة

الكلمات المفتاحية: ملوثات القمامة والركام، شط العرب، إدارة النفايات