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Monthly variations in the physical and chemical properties of the restored southern Iraqi marshes

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Abstract

Water quality of the restored marshes of southern of Iraq were assessed for twelve months. The three studied restored marshes were Huwayzah , Suq Alshuyukh and East Hammar .Six surface-water monitoring stations (two stations for every marsh). Three water bodies recognized in the monitored marshes different in their water quality parameters, depending on their major resource (Tigris ,Euphrates & Shatt Al-Arab).Nutrients in the monitored marshes were higher than historical record in contrast to phosphate .No significant differences were existed concerning other water parameters in comparison with previous studies before the drainage and desiccation. Seasonal flacuation patterns were noticed for various water parameters.Sediments

1-Introduction

The southern marshes of Iraq known by their high biological productivity caused by the thick aquatic plants growth (Al-Hilli,1977 ;Al-Mayah,1992). The Iraqi waters were known by their alkalinity and hardness (Briugh,1960).The water of the marshes is resultant of the mixing of Tigres and Euphrates especially in the middle marshes while the western marshes derived its waters from Euphrates .Qurna and Huwayzah marshes take its water from Tigres and to leisure amount from Karkha river .Hammar marshes received its water from Euphrates and the eastern part from Shatt Al-Arab river .water quality of the marshes have been studied by several authors (Maulood et al., (1979); Al-Zubaidi (1985); Al-Lami (1986); Al-Aarjy (1988); Hussein *et al.* (1992).

2-Preparation to the trip:

Before every trip we make calibration to the (YASI 556 MPS) instrument for pH dissolved oxygen (DO) and conductivity.

Field measurement:

Sampling was done (at open water and near the vegetations) of the water bodies to assess their physical and chemical qualities at monthly intervals, with five replicates.

The five replicates were collected in thoroughly cleaned 2.5 Liter inert plastic containers, which were rinsed with station water before collection .The stoppers of the sample containers were closed properly to prevent outside contamination. The container was labelled describing the name of the water body ,date ,time, sampling point and condition under which it was sampled. Few drops of alcohol were added to preserve the samples.

Air and water temperature, conductivity, salinity, pH, total dissolved solid (TDS) and dissolved oxygen (DO) determined with instrument of (YASI 556MPS).

Flow rate determined by flow instrument .the depth was determined using measured rope Transparency were determined using Secchi disc (a metallic disc of 20 cm diameter with four quadrates of alternate black and white on upper surface.)as method shown in Lind (1979).

BOD (biological oxygen demand) determinate after 5 days with YASI instrument. Nutrients (phosphate and nitrate) were determinate as procedure shown in Parsons et al., (1984). Determination of Na, SO4-S ,NH4-N and Total N as methods shown in standard methods (1975).

3-Results

1. Air and water temperature: Fig. (1, 2)

Maximum temperatures were recorded during summer months and lowest in winter months. Changes in water temperature synchronized with air temperature, again the maximum (highest) temperature in July and lowest in January for all monitored stations.

2. Salinityand conductivity (E.C): Figs. (3, 4)

Monthly changes in salinities and conductivities values shows three modes, the first one represent EAST HAMMAR marsh considered as oligohaline marsh in comparison with other two. The second mode Suq Alshuyukh marsh and the third mode was HUWAYZAH marsh where the lowest salinities recorded.

3. Total dissolved solids (TDS): Fig. (5)

Monthly changes in HUWAYZAH marsh were comparable to SUQ SHUYUKH. The highest values were recorded in EAST HAMMAR.

4. Light transparency: Fig. (6)

The highest transparency was recorded in Huwayzah marsh .the lowest transparency was recorded in East Hammar due to tidal action.

5. Dissolved Oxygen (DO): Fig. (7)

The highest values were recorded in winter months and the lowest in summer months .However the marshes were well oxygenated and values never reached less than 5 mg/l at the monitored stations.

6. Biological oxygen demand (BOD): Fig. (8)

The highest values were recorded during the warm months and the lowest in cold months and for all monitored stations, reflecting biological activity.

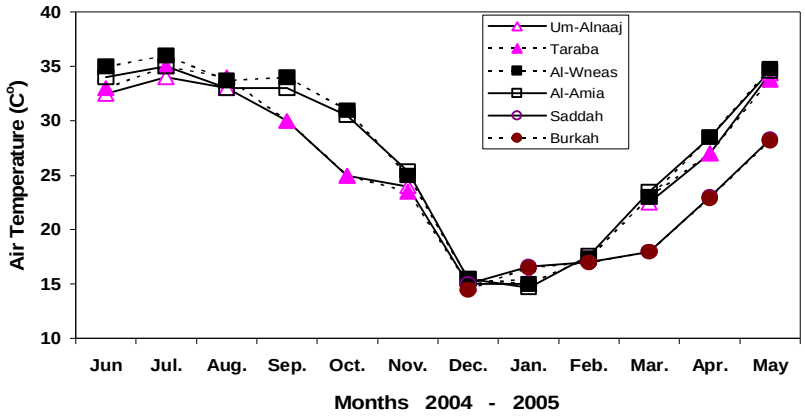

Fig.(1). Mean monthly of Air temperature C° in study stations, Jun 2004 – May 2005

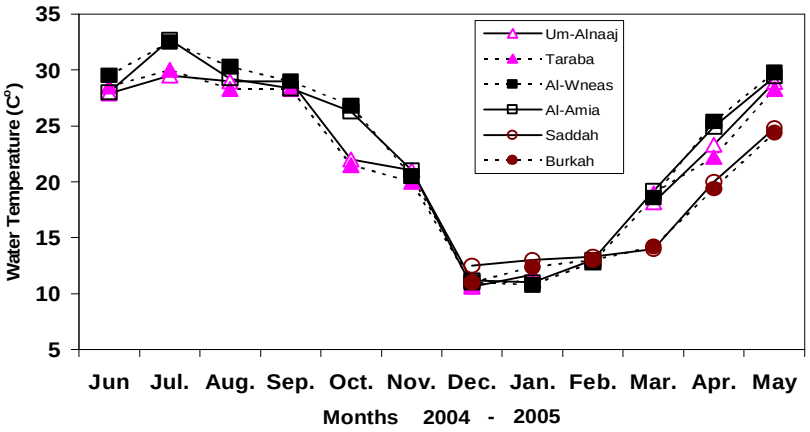

Fig.(2) Mean monthly of Water temperature C° in study stations, Jun 2004 – May 2005

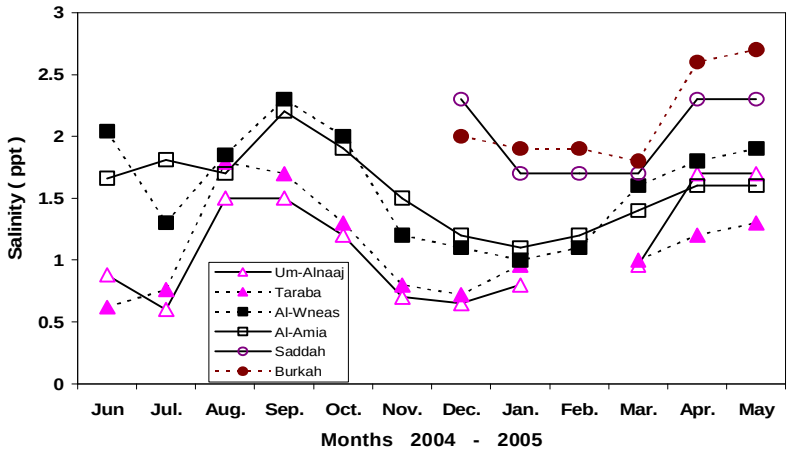

Fig . (3) Mean monthly of Salinity (ppt) in Study Stations, Jun 2004 – May 2005

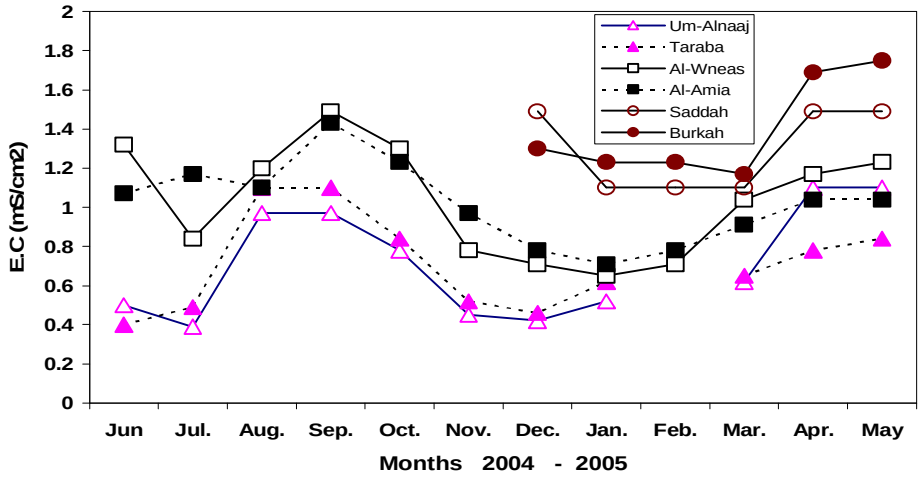

Fig.(4) Mean monthly of E.C (Ms/cm^2) in Study Stations, Jun 2004 – May 2005

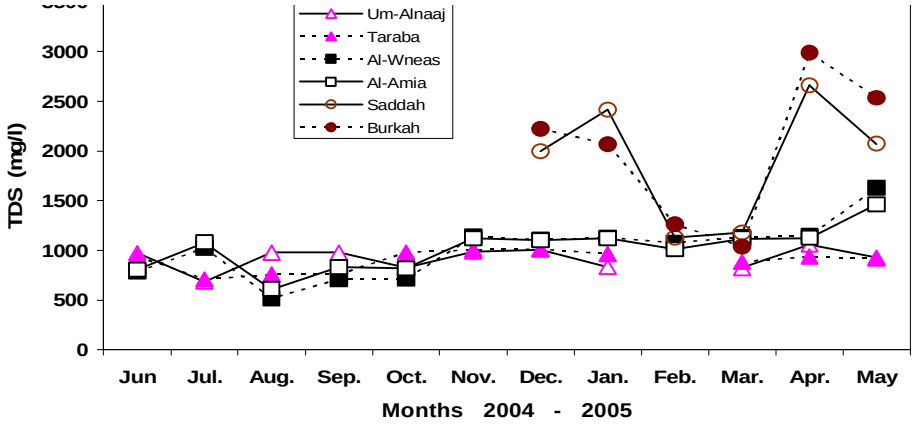

Fig.(5) Mean monthly of TDS (mg/l) in Study stations, Jun 2004-May 2005

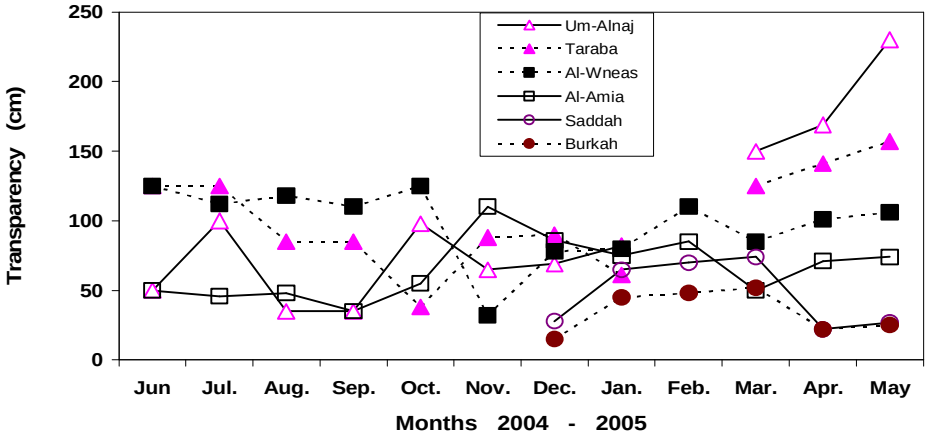

Fig.(6) Mean monthly of Transparency (cm) in Study stations, Jun 2004-May 2005

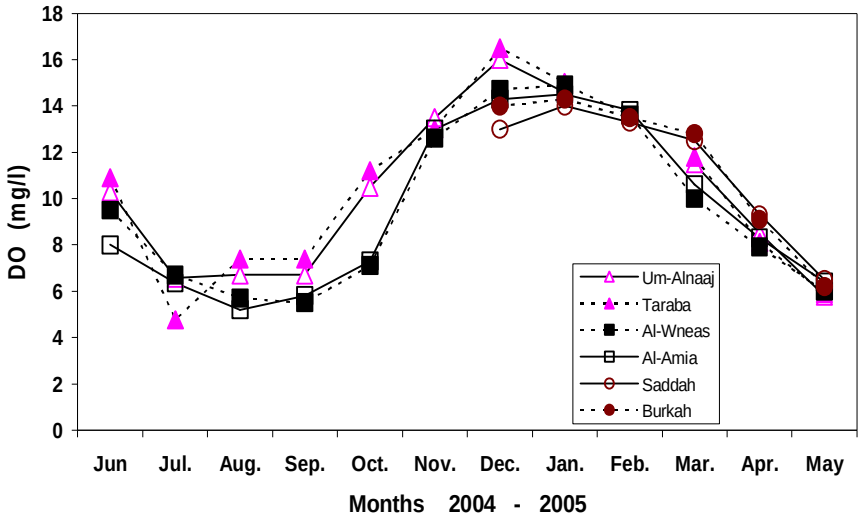

Fig.(7) Mean monthly of Dissolved Oxygen (mg/l) in study stations, Jun 2004 – May 2005

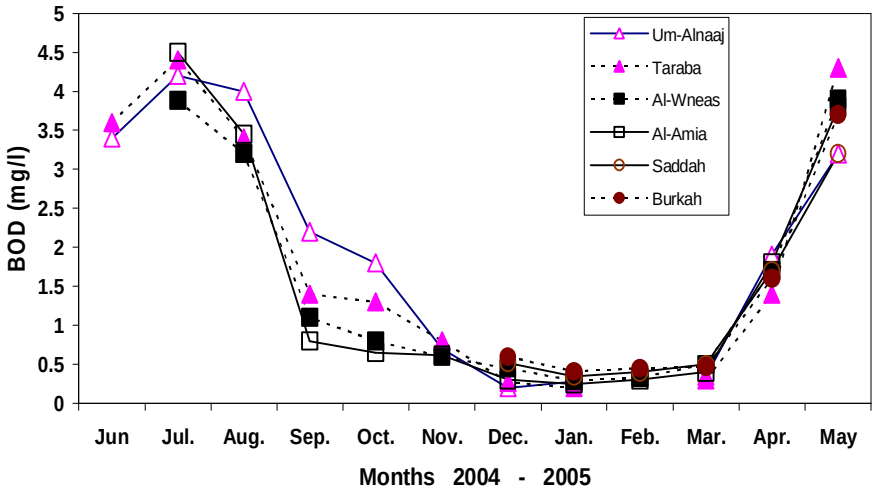

Fig.(8) Mean monthly of BOD (mg/l) in study stations, Jun 2004 – May 2005

7. Nitrate (NO3): Fig. (9)

Nitrate values were similar in Huwayzah and Suq Alshuyukh marshes and the lowest in the East Hammar .Highest values were recorded during cold months and the lowest in spring and for all stations.

8. Reactive phosphate (PO4):Fig. (10)

The highest values recorded in Suq Alshuyukh during winter months and the lowest were recorded in Huwayzah marsh, East Hammar values were in between.

9. Total nitrogen (TN): Fig. (11)

Monthly values have one mode in Huwayzah and Suq Alshuyukh marshes .The lowest values were recorded in East Hammar.

10. Ammonium (NH4): Fig. (12)

Monthly values were comparable in all monitored marshes .the highest values were in spring and summer marshes and the lowest in autumn and winter.

11. pH: Fig. (13)

Tow levels of monthly changes were recognized, the first of Huwayzah and the second represent Suq Shuyukh. East Hammar marsh values were in between the two .

12. Total alkalinity (HCO3): Fig. (14)

Monthly values were the same in all monitored marshes during the study period.

13. Sulphate (SO4):Fig. (15)

Monthly values were comparable in Huwayzah and Suq Alshuyukh marshes .the highest values were recorded in East Hammar during the monitoring period.

14. Sodium (Na):Fig. (16)

Three modes were recognized, the first was the highest in East Hammar and then followed Suq Alshuyukh, and the third mode was the lowest in Huwayzah marsh during the monitoring period.

15. ORP: Tab. (1)

Monthly changes show that highest ORP value was recorded in Huwayzah marsh in Dec. and the lowest was recorded in May in Huwayzah and Suq Alshuyukh .

16. Mean of Flow rate (cm/sec.):

Huwayzah marsh from 0.5 – 2.25, Suq Shuyukhfrom 1.0 – 8.0, East Hammar from 3.0 – 6.0

17. Sediments Texture &Composition:

The three monitored marshes showed differenced texture of their sediments, Huwayzah sediments were silt-clay and Suq Al-Shuyukh sand-clay and East Hammar formed of clay as exhibited in tab (2) . The highest TOC in Huwayzah and in East Hammar. The highest pH and Ec was in East Hammar and lowest in Huwayzah

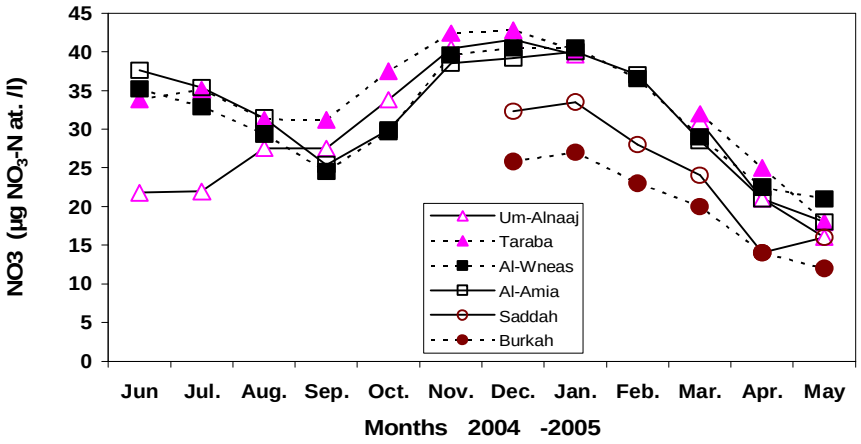

Fig.(9) Mean monthly of Nitrat (µg NO3-N at. /l)in study stations

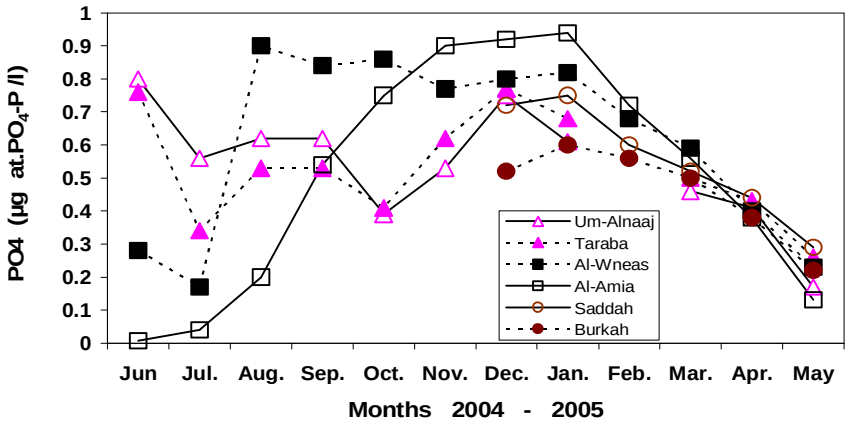

Fig.(10) Mean monthly of Reactive Phosphat (µg/at PO4-p/l) in study stations, Jun 2004 – May 2005

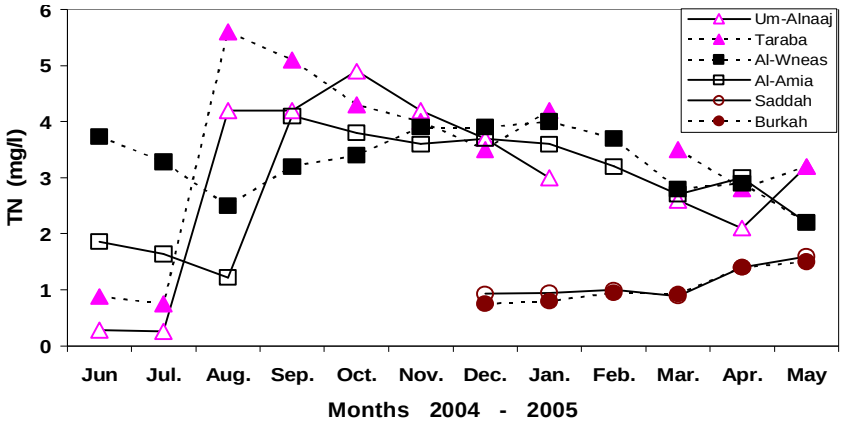

Fig.(11) Mean monthly of Total Nitrogen (mg/l) in study stations, Jun 2004 – May 2005

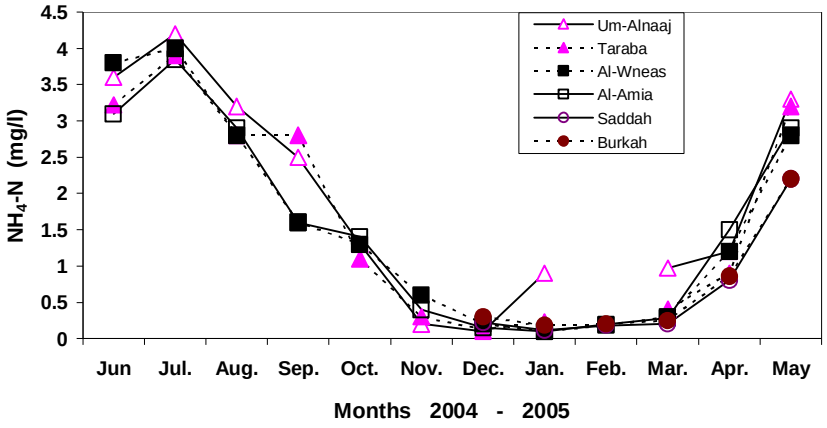

Fig.(12) Mean monthly of NH_4 (mg/l) in study stations, Jun 2004 – May 2005

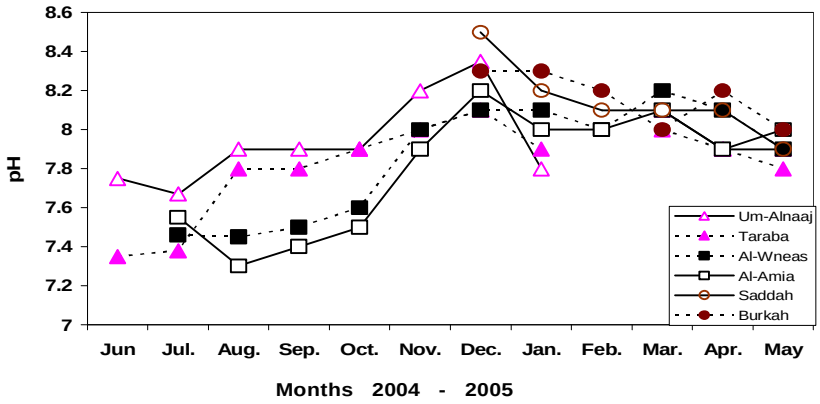

Fig.(13) Mean monthly of pH In Study Stations, Jun 2004 – May 2005

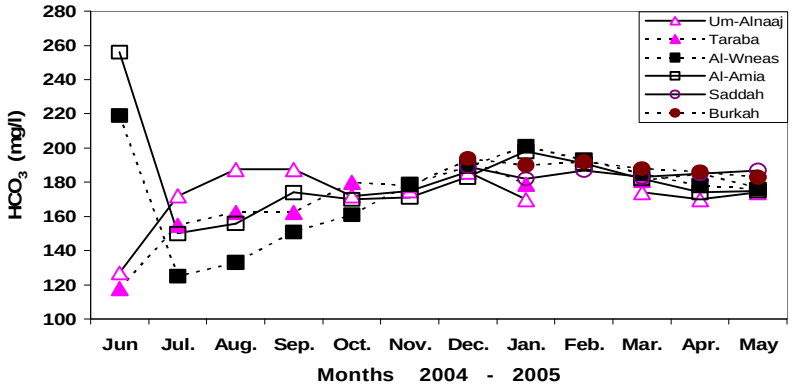

Fig.(14) Mean monthly of HCO_3 (mg/l) in study stations, Jun 2004 – May 2005

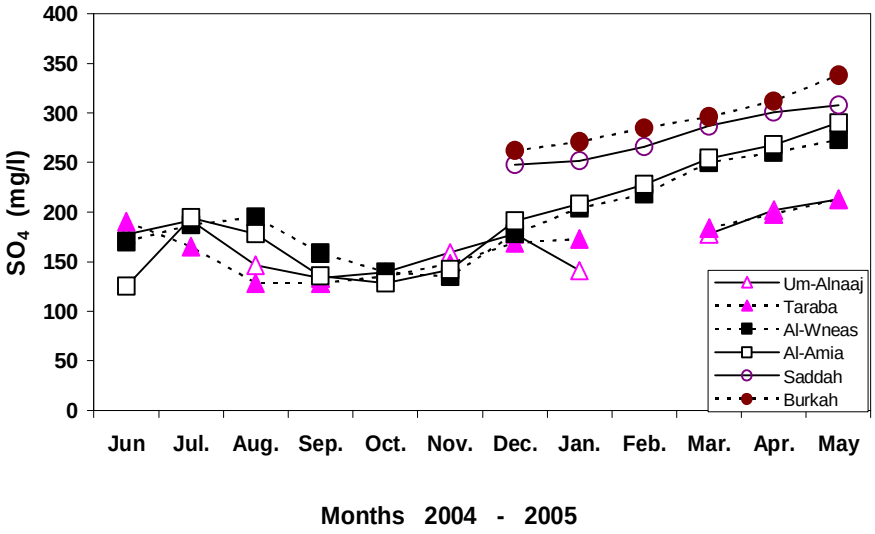

Fig.(15) Mean monthly of SO_4 (mg/l) in study stations, Jun 2004 – May 2005

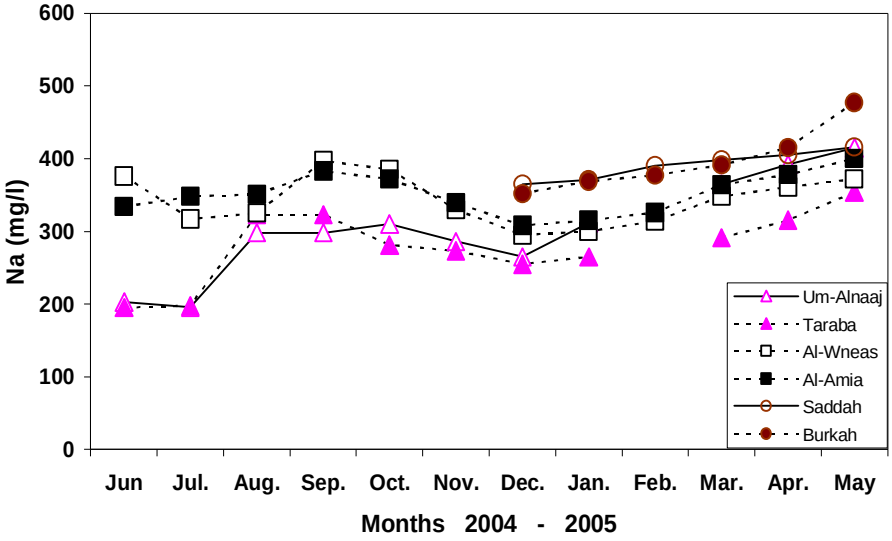

Fig.(16) Mean monthly of Na (mg/l) in study stations, J 2004 – May 2005

Table(1) Mean monthly of ORP (mV) in study Marshes ,Dec2004-May2005

Month	Marsh					
	Huwayzah		Suq Shuyukh		East Hammar	
	Um Alnaaj	Taraba	Alwineas	Amia	Saddah	Burkah
Dec.	80.6	95.3	81	74		
Jan.	88	91.8	74	72	89.5	94
Feb.			81	86	83	87
Mar.	73	80	60	57	79	85
Apr.	61	64	55	44	57	59
May	42	37	37	38	73	65

Table (2) Texture of sediments of studied marshes and some ecological parameters of it's emulsify

Station	Type of sediment	TOC %	pH	EC (mS/cm2)
Um Alnaaj	SULT-CLAY	2.4	7.8	2.3
Taraba	SULT-CLAY	2.8	7.6	2.6
Alwineas	SAND-CLAY	1.7	7.8	4
Amia	SAND-CLAY	1.1	7.7	3.8
Saddah	CLAY	0.3	8	5.2
Burkah	CLAY	0.8	7.9	5.5

4-Discussion

In general we could recognize three separate water bodies Huwayzah, Suq Shuyukhand East Hammar, characterized to be on the alkaline side as other Iraqi fresh water bodies (Al-Lami *et al.*, 1996; Hussein *et al.*, 2000).

Measured parameters including salinity and conductivity showed a monthly increase in summer and decrease in winter .the lowest was in Huwayzah and the highest in East Hammar, the same was true for TDS, BOD, TN, NH4.

TDS values were of the same range noticed by several authors. Huwayzah and Suq Shuyukhwere more conserved monthly style while East Hammar fluctuate more due to the tidal effect of Arabian Gulf via Shatt Al-Arab.

DO, Reactive phosphate, CO3, HCO3 and ORP have different pattern of fluctuations decrease in summer and increase in winter.

Monthly changes in BOD values effect the amount of organic material oxidize by the action of bacteria and other microrganisms (Best and Ross, 1971; Stirling, 1985), which represent a vital natural function of water bodies in wetlands.

Fluctuation in values of nutrients effect the activity of marshes through the utilization of nutrients by phytoplankton and macrophytes in primary production. Huwayzah, Suq Shuyukhhad a higher values than East Hammar, in general these values higher than previous (historical) records, could be related to the increase in using fertilizer in agriculture and domestic swage.

The lower values of phosphorus recorded in our monitoring program than previous due to the big demand by aquatic organisms to grow in the recently inundulated marshes. The changes in Ammonium values explain that the natural cycle of decomposition and decay in the marshes taking place, the same was noticed previously by Hussain *et al.*, (1991).

Nutrients (Nitrate and phosphate) showed a monthly changes especially in summer and increase in winter months. The behaviour of different parameters monitored were the same as historical recorded (Table 3), even the ranges were about to the as previously recorded with exception of nutrients especially nitrate was higher than before, these signs indicated that water quality was more or less the same as before. From the above results obtain we could conclude the water quality support the natural life of marshes. No significant differences exist between natural and restored stations.

The water quality of inundulated marshes allowed different organisms to grow, reproduce and disperses in a manner similar to that of natural healthy water bodies that historical recorded.

Table (3): Comparative between Historical and Present study Data

Author	Maulood B.K. *et al.*, (1979)		Al-Zubaidi,A.M. (1985)		Al-Lami, A. A. (1986)		Al-Aarjy M.J. (1988)		Hussein ,S.A. (1991)		PRESENT STUDY (2004-2005)		
Marsh	Abu Suban	Burkat Baghdad	Al-Shafi	Um-Alshuweeh	Lower Al-Hammar	Um Al-Huwali	Al-chibayesh	Al-Hammar	Al-chibayesh	Al-Hammar	Al-Huwayzah	Suq Al-Shuyukh	East Hammar
Salinity ppt	0.54	0.27	2.18	1.02	2.5	3.3	1.96	1.56	1.9	1.5	1.11	1.59	2.08
pH	8.3	8.3	7.95	7.8	8	8.1	7.16	7.28	7.1	7.2	7.88	7.83	8.16
Transparency cm							160	280	115	280	100	82	41.1
Dissolved Oxygen mg/l	3.8	4.9	5.97	5.82	4	6.5	9.1	8.3	8.9	8.3	10.1	9.49	11.5
Total N mg/l							0.75	2.13	0.57	0.29	3.2	3.09	1.09
Reset. PO_4 g at. P/lμ	0.37	0.31	0.39	0.43	0.4	0.6	0.91	0.74	0.9	0.7	0.53	0.56	0.51
NO_3 g at. N/lμ	3.90	6.00	1.70	0.83	1	0.3	0.55	2.05	0.55	0.20	31.4	31.8	22.5
NH4-N mg/l	0.00	0.00					0.02	0.08	0.02	0.09	1.26	0.79	0.64
Na mg/l	232	80									292	347	394
HCO_3	336	290	154	209	105	118	102	113			171	178	187

4-Conclusions

1-The water bodies recognized in the monitored marshes different in their water quality parameters, depending on the major resource (Tigris ,Euphrates & Shatt Al-Arab).

2-Nutrients in the monitored marshes were higher than historical record.

3-No significant differences were existed concerning other parameters in comparison with previous studies before the drainage and desiccation.

5-References

Al-Lami, A. A. (1986). An ecological study on phytoplankton for some of marshes Southern Iraq. Msc. thesis. University of Basrah. 96p.

Al-Laami, A.A.; Sabri, A.W.; Kassim, Th.I. And Rasheed, K.A. (1996).The ecological effects of Diyala river on Tigris river I.Limnology.J.Coll.Educ.For Women, Univ.Baghdad.7 (1) 84-92.

Al-Zubaidi, A. J. M. (1985). Ecological study on the algae (phytoplankton) in some marsher near Qurna-Southern Iraq. M. Sc. Thesis, Univ. Of Basrah,Iraq.

Best, G.A. and Ross, S.L. (1971). Clyole river purification board Eastkilbride., Glasgow. 87pp.

Hussain, N.A.; Al-Najar, H.H.; Al-Saad, H.T.; Usif, A.H. and Al-Saboonchi, A.A. (1991) essential scientific study on Shatt Al-Arab. MSC.Univ.Basrah.391PP.

Hussein, S.A.;Ahmed,H.A. and Abed,J.M (1992) Seasonal variations in some biological conditions in the Shatt Al-Arab river and Al-Hammar marsh Marina Mesopotamica .7(2):175-194.

Lind O.I (1979) Handbook of common methods in limnology. V.Mosby Co.St.Luis, 199PP.

Maulood, B.K., Hinton, G.C.F., Kamees, H.S., Saleh, F. A. K., Shaban, A. A., and Al-Shahwani, S.M.H. (1979). An ecological survey of some aquatic ecosystems in southern Iraq. Tropical Ecology 20 (1): 27-40.

Parsons T.R., Maita Y. and Lalli C.M. (1984) A Manual of chemical and biological methods for sea water analysis.

Standard methods for the examination of water and wastewater (1975), 14 The Edition, 1286pp.

Stirling, H.P. (1985). Chemical and Biological methods of water analysis for aquaculture alists. Stirling Univ.Scotland (119) pp.

التغيرات الشهرية في الصفات الفيزيائية والكيميائية للاهوار المسترجعة في جنوب العراق

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الملخص

اجري البحث في حزيرانِ 2004 ولمدة اثنا عشر شهراً لتَقييم نوعيةِ الماءِ للاهوار المسترجعة جنوب العراق. تـم انتخـاب سـتّ محطاتِ للدراسةِ (محطتان لكُلّ هور). شملت اهوار الدراسة كل من هور الحويزة وهور سوق الشيوخ وهور شرق الحمار، . قيست العوامل الفيزيائية والكيميائية للماء بواقع شهري والبعض الآخر تم قياسها في المختبر. تم تحليل مستخلصات رواسب محطات الدراسة. اوضحت نَتائِجُ الدراسة بأنّ هناك ثلاثة أنماطِ يعود ذلك الى وجود مصادر مختلفة لتزويد الاهوار المدروسة بالمياه. المواد المغذّية في الاهوار المـسترجعة كانت اعلى من تلك المسجّلةِ قبل التجفيف. ومن خلال نتائج البحث اتضح عدم وجود فروق واضحة لبقية مؤشـرات الميـاه بالمقارنـة مـع الدراسات السابقة.