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The comparison of effect of conservation on biodiversity and density indeces of wintery waterfowl and wader birds in Maroon dam in protected area and Jaizan dam

Ahmad Bahrebar [1], Seied Saeed Mohaghegh [2], Behroz Behrouzirad [3], Mostafa Bahrebar [4] Seied Mehdi Amininasab [5] and Ayat Rohina

[1] M.Sc. of Environmental Science, Islamic Azad University, Dehdasht branch, Iran.

[2] Postgraguated of Environmental Engineering and instructor of Dehdasht Payam noor Universuty, Kohkiloievaboirahmad.

[3] Assistant Professor of Environmental Science, Ahvaz Science and Research Branch, Islamic Azad University, Ahvaz, Iran.

[4] M. Sc. Of Animal Physiology, Academic Member of Dehdasht Branch, Islamic Azad University, Iran.

[5] M. Sc. of Environmental Science, Behbahan University, Behbahan, Iran.

[6]Postgraduated of watershed management and instructor of Payam noor university at Kohkiloie va Boirahmad branch and Young researcher club, Islamic Azad university, Yasouj branch.

ABSTRACT

This study was performed in second half of year 2009.For bird counting , monthly from Septamber until March 2009. Total counted birds in Maroon lake were (971). Maximum number of counted birds was in February (191) and minimum of counted was in Septamber (95). Total counted birds in Jaizan were (385. Maximum number of the counted bird was in February (84) and minimum of counted (52) was in Januarry. Comparision of density of waterfowl and wader birds between Maroon lake and Jaizan lake shown that density was in Maroon was (0.48) bird per hectar and in Jaizan was 3.20 bird in hectar in during study time. Density maximum in maroon lake was (0.09) bird/hectar while it was (0.7) bird/hectar in jaizan lake in February. The density minimum in maroon lake was (0.04) bird/hectar in March while it was (0.4) bird/hectar in Jaizan lake in January. According to Morrista index, maximum difference between two lakes was (0.33) in January and maximum similarity was (0.64) in February. It is concluded that biodiversity and density waterfowl birds and waderbirds in compare with natural lakes were very low. That is seems that difference factors such as depth lake, poor vegetation cover, continuous change in water depth, large slope in border zones and unsuitable quality of water have important role in this matter

Corresponding Author E-mail: ahmad.bahrebar@gmail.com

but since these limitation were less in Jaizan. the diversity and density index were higher in compare with Maroon. conservation effect on the biodiversity and density indexes by regression tests shown that the conservation effect on the biodiversity and density of waterfowl and waderbirds between Maroon lake in the protected area and the Jaizan lake was not significant (p-value=0.059).

Key words: Conservation, Jaizanlake, Maroon lake, Diversity index, Density

INTRODUCTION

Making dams on the rivers is from factors of development in the new world. They are made with each goal, have negative and posotive effects on the environment- addition the main purpose of dam construction-that over all discussed environmental impacts.(Bahadorifar,2008). Each dam has Unique features and Scale environmental changes are influenced by location.Anyway, they influence on the biota and also they can influence on biodiversity. Water supplies also have a positive impact and negative effects on terricolous and aquatic species. In dry areasWater supplies provide a permanent water source thatmay be useful for many species.(Davison & Delany, 1998).water supplies has increased extensively permanent water sources in the south Africa and has had an important effect on the distribution and number of waterfowls (Cown & Riet, 1998).Dams build suitable habitat for the birds than once just current river exist.(Davidson & Delany, 1998).Environmental programs is not possible for any region Without knowing the Status of a region's flora, fauna and biodiversity.(Bahadori far, 2008).Birds are the most important living things that they have economic, outing, social, aesthetic values and And many other values. Waterfowls dependent to conditions such as temperature, vegetation, security, food and etc.(Elemberg et al. , 1994).By calculating bird density and diversity indices, indicates the status of the region and quality of habitat.(Shayan kia, 2003).Lakes of maroon and Jaizan as two artificial lakes are located interval 19 km , 40 km, respectively, form Behbahan city of Khozestan province. From between these two lakes, Maroon lake is protected by environment office. Effect of conservation on the diversity and density indices is studied. Pondeybegan to study changes in bird diversity due to Pongdam construction in India in 1992. He concluded that abundance and diversity of species has increased considerably. Mushtagh et al (2013) investigated variariations in the physico-chemical properties of Dal Lake, Srinagar and Kashmir. The purpose of this study was comparision conservation effect on biodiversity and density indeces of wintery waterfowl and wader birds between Maroon lake that is located in protected area and Jaizan lake where isnot protected

MATERIALS AND METHODS

Maroon dam lake and Jaizan dam lake were studing confine. Maroon is located in the protected area of Khaeez and Sorkh in Kohgiluye province. Jaizanlake is located in the distance 40 km from Behbahan city in the Khuzestan province. The area of Maroon lake is 2000 hectar and the area of Jaizan is 120 hectar. Lakes of maroon and Jaizan as two artificial lakes are located interval 19 km , 40 km, respectively, form Behbahan city of Khozestan province.

Total Count method is used for bird counting that is suggestive method by WI. Monthly counting is used from Septamber until March 2009. For calculation diversity and density indices, Murista similarity Index is used for comparissionog similarity between two lakes, too, T-test statistical azmoons of spssare used for detection normality data. Regression azmoons are used for express relation diversity and density to conservation.

From these formulas are used for detection of density and frequency.

$$P=\frac{N}{A} \qquad =\frac{n_i}{A}P_i$$

Diversity indices are used,too (table 1).

Table 1- detection indices of diversity, richness, evenness and dominance

	Title of index
$H = \sum_{i-1}^{s}[p_i Lnp_i]$	Shanoon-wiener diversity
$D = 1-\sum_{i-1}^{s}\left[\frac{ni(ni-1)}{N(N-1)}\right]$	Simpson diversity
$\lambda_2 = \frac{s}{\sqrt{N}}$	Simpson dominance
$=_{mf}R \quad \frac{s-1}{Ln(N)}$	Margalef richness
$=_{mn}R \frac{s}{\sqrt{N}}$	Manhink richness
$V = \frac{D}{D_{max}}$	Simpson eveness
$E=\frac{H}{lnS}$	Shanoon-wiener eveness

: result of division number individuals species upon N n_i

N: total individuals species A: area of region

S: number of species

These indices are compared between two lakes after the calculation.

DISCUSSION AND CONCLUSION

During study ocserated 971 from 8 species in Maroon lake and 385 from 10 species in Jaizan lake (tables2 and 3).

Table 2: number of total waterflows and wader birds ovsrevated in Maroon lake in the second half of year.

March	February	January	December	November	October	Name of	Row
35	86	71	84	21	25	*Phalacrocoraxcarbo*	1
62	55	20	36	53	-	*Anasplatyrhynchos*	2
-	15	21	-	27	17	*Tachybaptusruficollis*	3
11	-	14	27	31	26	*Podicepscristatus*	4
16	5	9	25	40	14	*Ardeacinerea*	5
-	8	3	-	4	8	*Hoplopterusindicus*	6
22	5	11	8	14	5	*Cerylerudis*	7
9	17	11	-	-	-	*Egrettagarzetta*	8

Table 3- total of numberwaterflows and wader birdsovsrevated in Jaizan lake in the second half of year.

March	February	January	December	November	October	Name of	Row
18	25	4	11	15	8	*Phalakrocoraxcarbo*	1
5	11	7	3	9	5	*Egrettagarzetta*	2
11	17	5	22	-	-	*Nycticoraxnycticorax*	3
15	4	7	5	-	7	*Tringaochropus*	4
8	7	5	4	11	9	*Ardeacinerea*	5
14	-	11	-	7	5	*Hoplopterusindicus*	6
2	9	5	7	-	4	*Alcedoatthis*	7
4	11	5	3	6	6	*Cerylerudis*	8
-	-	3	-	8	7	*Egretta alba*	9
3	-	-	-	3	4	*Halcyon smyrnensis*	10

Percentage of relatively(ratio) frequency of birds with severance waterfowl and water bird in the Maroon lakeis shown that frequency of waterfowl is more than wader (chart 1).

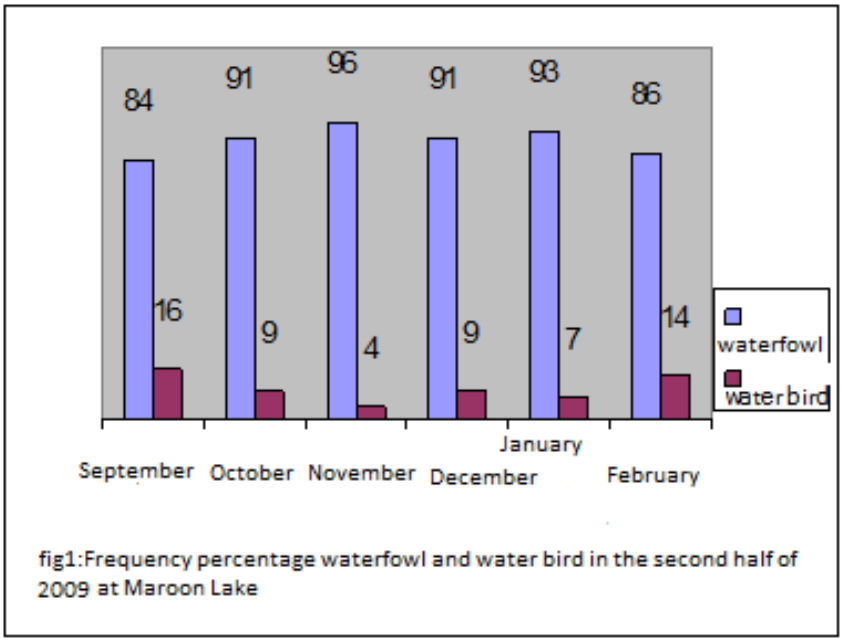


fig1:Frequency percentage waterfowl and water bird in the second half of 2009 at Maroon Lake

Percentage of relatively (ratio) frequency of birds with severance waterfowl and waderbird in the lake Jaizan is shown that frequency of waterfowl is more than wader except January (chart 2).

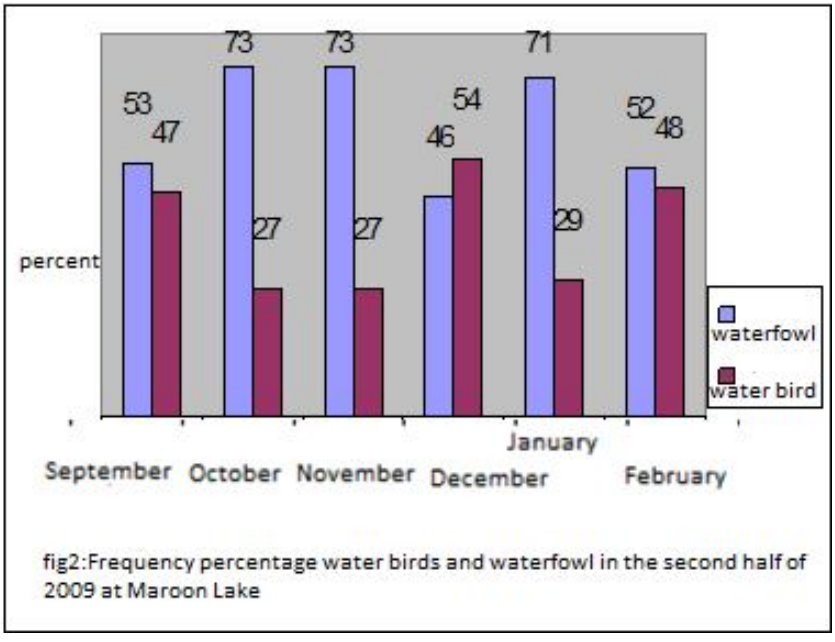
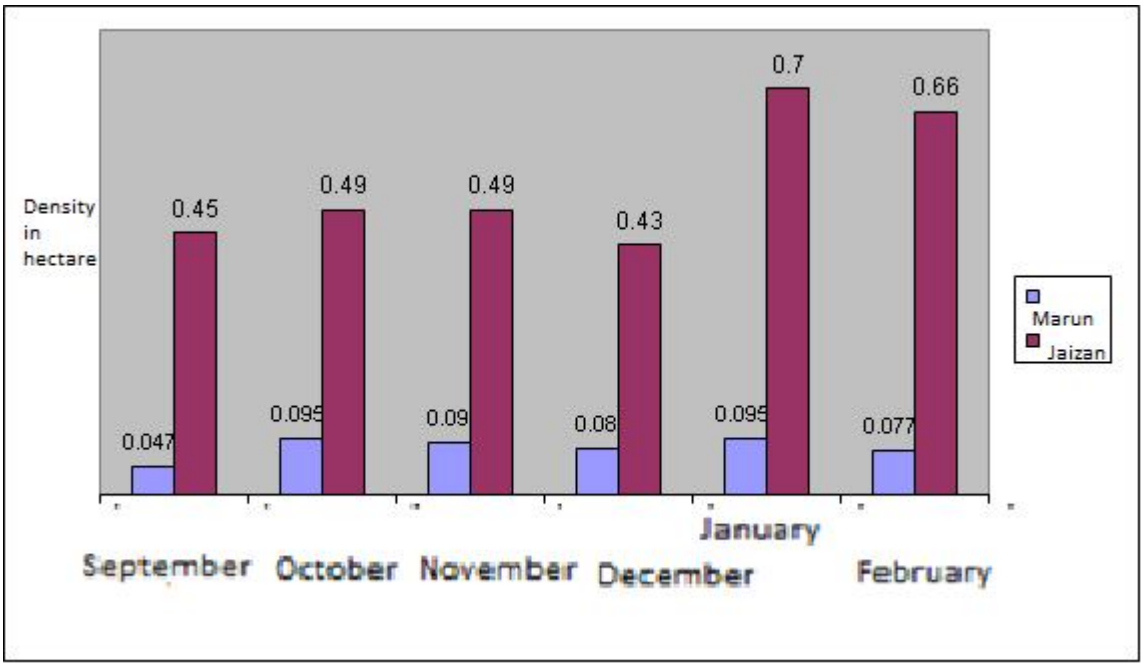


fig2:Frequency percentage water birds and waterfowl in the second half of 2009 at Maroon Lake



Detection of density in Maroon shown that maximum density was in February with 0/095% bird per hectar and minimum density was in Octobr with 0/047% bird per hectar (chart 3). Maximum density among species, was baklan with 0/ 16% per hectar and minimum density was didomak with 0/01% per hectar in Maroon lake. Also, Detection of density in Jaizan shown that maximum density was in February with 0/7% bird per hectar and minimum density was in January with 0/43% bird per hectar (chart 3). Maximum density among species, was baklan with 0/67% per hectar and minimum density was white breast with 0/08% per hectar in Jaizan lake. Result of Shanoon-wiener and Simpson diversity indices in two lakes with severance month is shown in table 4.

Table 4 - Result of Shanoon-wiener and Simpson diversity indices in two lakes with severance month

month						lake	Diversity index
March	February	January	December	November	October		
1/558	1/446	1/690	1/366	1/766	1/651	Maroon	Shanoon-wiener
1/985	1/796	2/218	1/665	1/842	2/143	Jaizan	
0/755	0/701	0/754	0/702	0/817	0/801	Maroon	simpson
0/857	0/825	0/890	0/778	0/846	0/897	Jaizan	

Result of Margalef and Manhink richnessIndices in two lakes with severance month is shown in the table 5.

Table 5- Result of Margalof and Manhink richness Indices in two lakes with severance month

months						lake	Richeness index
March	**February**	**January**	**December**	**November**	**October**		
0/99	1/14	1/38	0/77	1/14	1/09	Maroon	margalef
1/82	1/35	2/02	1/49	1/47	1/99	Jaizan	
0/481	0/506	0/632	0/372	0/507	0/616	Maroon	manhink
1/006	0/764	1/248	0/944	0/911	1/23	Jaizan	

Also, result of Simpson dominance in two lakes with severance month is shown in the table 6.

Table 6- result of Simpson dominance in two lakes with severance month

March	February	January	December	November	October	month
0/481	0/506	0/596	0/372	0/507	0/781	Maroon
1	0/763	1/248	0/943	0/911	1/213	Jaizan

Resuilt of Shanoon-wiener and Simpson evenness in two lake with severance month is shown in the table 7.

Table7- Resuilt of Shanoon-wiener and Simpson evenness in two lake with severance month

months						lake	Eveness index
March	**February**	**January**	**December**	**November**	**October**		
0/869	0/743	0/816	0/845	0/913	0/621	Maroon	Shanoon-wiener
0/903	0/923	1/009	0/856	0/947	0/975	Jaizan	
0/666	0/472	0/499	0/663	0/764	0/802	Maroon	simpson
0/723	0/744	0/873	0/606	0/850	0/931	Jaizan	

Result of Murrista similarity index is shown in chart4.

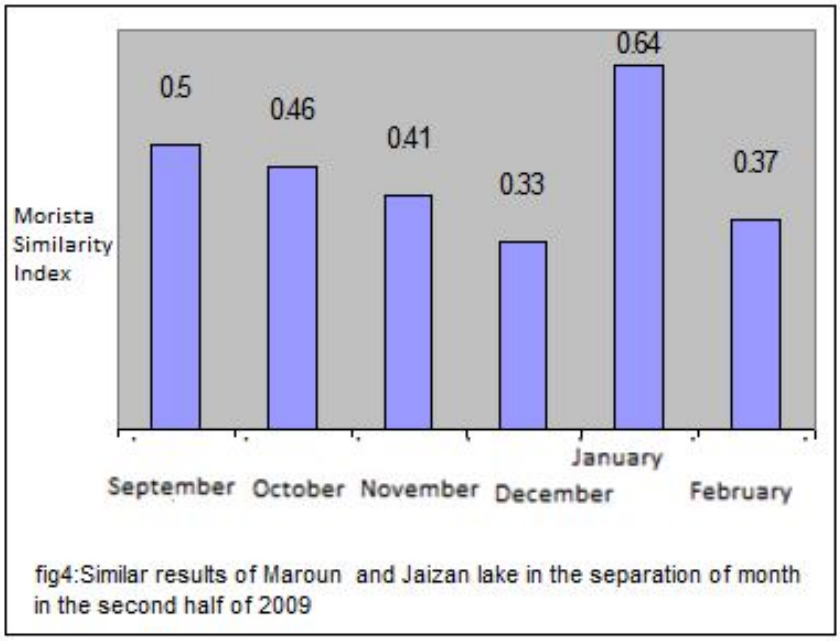


fig4:Similar results of Maroun and Jaizan lake in the separation of month in the second half of 2009

Comparission of density showed that mean density is 0/48 and 3/20 bird per hectar in Maroon and Jaizan ,perpespectively. Density is more Jaizan. One of the implements for wetland and lakes is using from density indices that whatever species diversity is be more, formed communities have more complexity . hence, stability is better and also these communities are able to good response to environmental changes. Tray performed survey, difference of values were significant among Shannon-Wiener and Simpson diversity indices, Margalef and Manhink richness indices and Simpson dominance in the two lakes (p-value<0/05). Difference isnot significant between Simpson and Shannon-Wiener ….indices (p-value>0/05).Murrista index is used for similarity between two lakes. Result illustrated that maximum similarity is in the February with 0/64. Though,the area of Jaizan lake is less rather than Maroon lake (120 hectar and 2000 hectar), following elements can be have important role for more density and diversity in the Jaizan in the comparission with Maroon:

1.depth of Maroon is more rather than Jaizan , hence, whatever depth is be more, infilteration of light is less and production is less too.

2.slope of edge is very important for wader birds. In the edges of Maroon, so Maroon is located in mountainous zone, slope is very much and vegetation cover is very limited. Therefore, Jaizanlake has more density and diversity.

3.vegetation cover have better better situation in the Jaizan lake in comparission with Maroon lake. It seems that because of great swing in the water depth in Maroon lake, beached zones, more times are under the water and these subject redound that vegetation isnot be in the more beached zones. Also, it seems that great slope is important. Waderbirds usually are seen in the wet zones and low depth of wetland edge. Therefore, in the large dam lakes, edge zones are deep and edge slope is great, hence, tray performed survey, density and diversity arenot more. Denisity and diversity of waterfowl are more than

waderbirds in the two lakes. David Swanepolandcolleaguesin 2006 to examine the dam began Thee water sklooffor water fowls. In this study, average waterfowl sand wader birds wererespectively3086and1321in summerandwinter. Theyconcluded that despite the size (82kmalong thelakeenvironment), the damhaslittleimportanceforthe conservationof waterfowls.Theylookedat thelongtermdeclinedue toreducednumbers ofaquaticbirds,treesandvegetationfromconstruction ofthedam. Aroundthe Maroonlake, wesaw thelowdiversityanddensity ofbirdsthat seems to lack, or very little vegetation around the lake in this area affects. Bahadoriniya in the study of diversity and density of waterfowl and waderbirds in the Bezangan natural lake with 80 hectares,The number of birds counted in 3099 that Compared to the lakes of Maroon and Jaizan shows a much greater density, Although the area of these two lakes is more. Also, she counted 636 birds in Shahid Yaghoobi dam lake with 78 hectar that Indicates a low density in the lakes behind the dams. According to the survey, though Maroon lake is located in protected area, diversity and density of birds were much higher in Jaizan lake compared to Maroon lake. Jaizan lake having an area less than Maroon, because of having diversity and density compared to Maroon lake and better vegetation can be important as protected area. In this study, Maroon lake with an area of 2000 hectar, is of minor imporatnce for conservation of waterfowls and waderbirds. For review Protective effect on the density and diversity indices, was used from Regression Azmoon. Results indicated that effect of conservation on the density and diversity of wintering waterfowls and waderbirds isnot significant in the Maroon lake in the protected area and Jaizan lake (p-value=0/059).

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