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Assessment and recognition of structures characteristics of perennial and ephemeral rivers in Tehran province

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ABSTRACT

In this study, at the first step, the hydrographic net of province rivers were provided based on topography map (1:25000 scale) and hydrographic net from Tamab Iran (Company of Iranian Water Recourses Engineering). Based on these definitions, whole of Tehran province area was divided to 25 different areas. In this study, the areas comprises 415 streams, and in difference distances the complications e.g. bridge, terraces, diversion dam, floor dam, slop breaker, dike, epi, height of structures location, area of structures and impure slop in structures were evaluated in term of quality and quantity. Their conditions were presented in 25 area in our study area followed by tables and related descriptions. The results showed that maximum and minimum abundance were bridge (715 cases) and dike (6 cases), respectively. Eventually, with the implementation of this research, the quantity and quality of structures such as bridge, terraces, diversion dam, floor dam, slop breaker, dike, epi, height of structures location, in the watershed basins of Tehran, Damavand, Bileghan, Delichai, Jajrood Astalak, Varangerood and Lar are determined.

Keywords: River, Structures, Structures quantity, System of rivers and stream Data, ARC GIS Soft wares, Tehran Province

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INTRODUCTION

This article is a research work for longitude 50º, 22´, 47" to 53º, 08´, 39" and latitude 35º, 01´, 44" to 36º, 10´, 31". This region have 1331431 hectare area in up to more 70% from whole Tehran province and part of Alborz province (Sharifi, 2016). Considering that vast areas of the country are sedimentary plains and plains that include the bedrock of streams, small and large rivers, Flow of water in these ports due to the physical, chemical and mechanical Conditions of the materials, water flow in these channels causes erosion, flood and flood phenomena. Severely affected by human activities such as diversion and flow regulation, or mining, urban planning, or agriculture and or are currently threatened with these causes (Sharifi, 2016). This operation often has detrimental effects on the morphology or ecological conditions of the rivers. Currently, most of the rivers in arid regions are subject to change due to climate change, and river

engineering work is required to change sediment discharge, river course, stream depth, flood plain and water quality (Fore, Karr, & Wisseman, 1996). The economic development of a community is closely related to the ability to maximize the benefits and minimize damages caused by rivers. A river repeatedly changes its cross-section, longitudinal profile, flow rate and pattern through the processes of scouring and sediment transport (Phillips, Slattery, & Musselman, 2005).
Understanding these processes is essential in order to stabilize the cultural and economic development of the river and in the present project, by understanding the forms of the rivers and streets of Tehran province, I hope to take an effective step in realizing the issues (Phillips et al., 2005). On the other hand, geological, tectonic and topographic factors influence the morphology of rivers and predict the trend of river changes. Changes and displacements occurring as a result of the natural process or human abnormal development along the course of the geometric dimensions of the river are a logical consequence of the river system's response to a new equilibrium (Phillips et al., 2005).
Therefore, dealing with the river should be quite conscious and governed by special rules, because any change, although a position in the structure of the river, will cause a number of new developments in a broader range of which it is necessary before any action is taken, The river response can be predicted (*).Top of Form
One of the most important phenomena in earth crust processes is the flow of water and rivers not only play a role in the general picture of the earth's surface, but also determine the shape of human life on the planet. If these benefactors are not preserved altogether, the destruction and loss of soil, lack of food and the loss of human, economic and social resources (Kondolf, 1997).
Generally, preservation of natural resources can prevent soil erosion, sediment transport, flood and drought and, while ensuring the stability of river water regime and geometric characteristics of rivers, provides optimal utilization of natural resources. This operation is not possible with proper planning and management (Fore et al., 1996). The rivers and their fertile plains have long since been the focus of the formation and growth of human civilizations. Therefore, riverside margins are a suitable place for agricultural, industrial and commercial activities; therefore, studying these areas is necessary in order to obtain accurate knowledge and study of possible problems and risks in order to maintain optimum utilization of natural resources (Phillips et al., 2005).
However, the precise study of the pychnrudy pattern and morphology of the region as an effective parameter in all of the above activities seems to be essential in order to understand the risks and ways of preserving existing resources and capital. Regardless of the great role that rivers play in the lives of human societies, unfortunately, the inaccurate use of river basins as well as the dismemberment of the rivers and rivers that have undergone rivers and rivers have changed their hydrological, hydraulic and ecological conditions, which led to the creation of Difficulties and problems have been abundant. The most important problems that are present in the rivers are the reduction of river discharge and increased pollution (Phillips et al., 2005).
Increasing the population, especially the increase and development of residential areas mainly on the margins of the rivers, increases the utilization of rivers and increases the amount of wastewater and waste materials and residues entering the rivers. This causes a sharp increase in the pollution of the rivers (Fore et al., 1996). While much of the water used to drink the population of neighbouring residential areas or areas away from the river is also provided by the rivers. Therefore, not only the cost of water treatment is increased, but some of the contaminations may not be treated and controlled, leading to the spread of diseases and the limitation of the health of the people, especially the development of industries along the river boundary and the direct transfer of industrial waste into them into chemical contamination They added (Phillips et al., 2005).
In order to properly plan and properly exploit the water resources of the country, it is important and essential to have river resources data and data. Therefore, with the implementation of this project, various data on the characteristics of rivers and streams in Tehran province have been extracted and extracted. This information is provided and coordinated by the Provincial Executive for rivers and caches on maps 1: 250,000. Data was collected through available reports and field surveys (Sharifi & Norouzi, 2018).
The classification and codification of the watersheds of the country and the study areas carried out by the Water Resources Research Center (Tabib) have been used to standardize the units and also facilitate the access to statistics and information. Based on the categorization carried out by Tchaik, the whole country has been divided into 6 main domains, 30 sub-subdivisions and 1,121 study areas. In this regard, the study areas in each province will be considered as the smallest unit of work. It should be noted that this project is one of the national plans related to the processes and models of erosion and sedimentation in the streams and streams (Sharifi & Norouzi, 2018).
Water is the source of the life and blessings of God, and it becomes a source of mourning if it is not used in a proper way (Pollock, Beechie, & Jordan, 2007). In the present world, water has become a political tool and has a special place in the economy. As such, for the purpose of development, rehabilitation, land rehabilitation, etc., the above measures will not be possible unless identifying water resources, in particular, identifying the rivers and rivers of the country, and presenting management and management plans and policies (Fore et al., 1996). The current action will not be possible without identifying and collecting accurate statistics and information from the country's water and soil resources. After identifying and collecting information, they can be categorized in various categories such as morphology, efflux, water quality, vegetation cover, etc., and prioritizing the research and implementation plans. Due to the abundance of existing GIS software for designing and building spatial databases, it is possible to design and construct an integrated environment from the spatial database and related GIS software for maintenance, organization and retrieval of information through a small expense (Kondolf, 1997). In general, one of the cases that distinguishes this research from similar studies in Iran (in order to store spatial data and search available information) is the different structure of the proposed software, its simplicity and low cost, and its emphasis on its GIS structure. Also, this software emphasizes the need for users to have quick and easy access to spatial layers, rather than just descriptive information (Pollock et al., 2007).

MATERIALS AND METHODS

As mentioned above, it has been used to standardize the units of work and also to facilitate access to statistics and information from the classification and codification of watershed basins and study areas conducted by the Iranian Water Resources Research Center (Tamab).According to the division of the Tamab, the whole country is divided into 6 main basins or the very large basins (Caspian Sea basins, Persian Gulf and Oman Sea, Lake Urmia, Central, Hamoon, Serakhs), 12 smaller basins (Caspian Basin, Gulf Fars and the Sea of Oman, Lake Urmia, Lake Qom, Isfahan and Sirjan, Neyriz or Bakhtegan, Jazmourian, Desert palin, Lut Desert, Ardestan, Yazd and Kerman, Qara-Qom Desert, East or Hamoun), 30 Sub-basins and 1121 Study Areas Division and coding, according to which the Caspian Sea basins, Persian Gulf and Oman Sea, Lake Urmia, Central, Hamoon Srkhrs respectively codes 1, 2, 3, 4, 5 and 6 that more than 90 percent of the study area code 4 and only one case has the code 1(Sharifi & Norouzi, 2018).

The study region with area 1331431 hectare have latitude 50,22,47 to 53,08,39 and longitude 35,01,44 to 36,10,31 in up to more 70% from whole Tehran province and part of Alborz province(Fig.1). According to the division of the Tamab, the whole study region of Tehran province is divided to area 25 with numbers 1515, 41151, 41521, 41522, 41523, 41524, 41525, 41526, 41531, 415321, 415322, 415331, 415332, 415333, 415341, 415342, 415343, 415344, 415345, 47143, 47144, 47145, 47146, 471531, 471533 (Fig.2). The total number of runways in the studied areas is 415 stream and about 3088 thousand-meters part (Simon, 1995). In each quantitative and qualitative information area, the structural effects such as bridge, terraces, deviances dam, floor dam, slop breaker, dike, epi, height of structures location, approximate area covered by the structure and gross gradient of the site of the structure of the relevant executive branches, in particular the Office of Natural Resources and Watershed Management in Tehran, as well as the Google site as far as possible to be collected and divided into watershed areas of the region has been evaluated and evaluated (Vitousek, Mooney, Lubchenco, & Melillo, 1997).

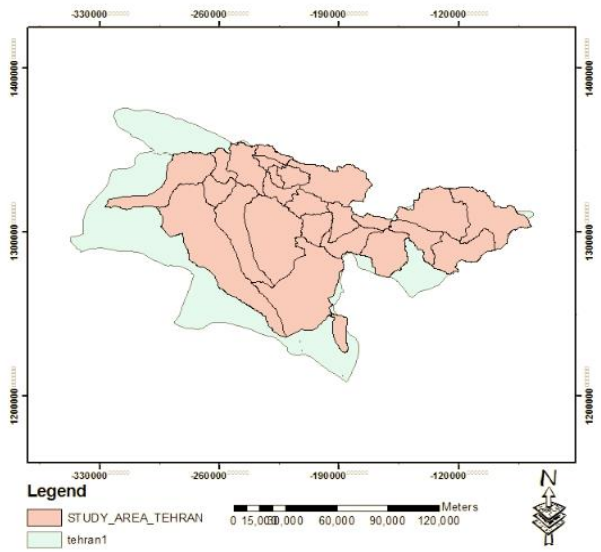

Fig.1 Study region and that's overlap with Tehran province

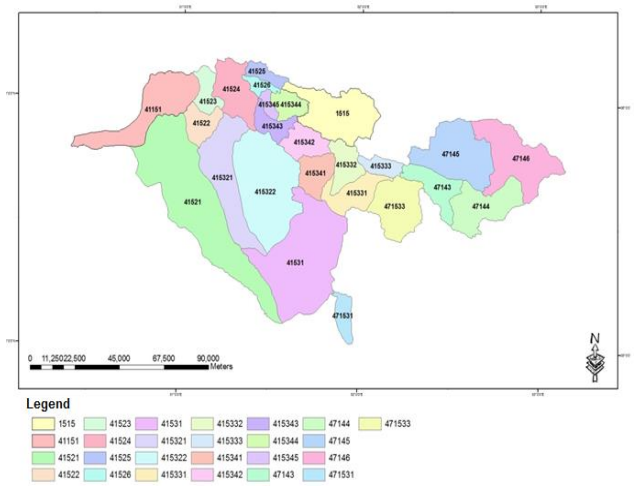

Fig .2 Location and region 25 distribution in whole Tehran province

In order to carry out the present project and start practical work in the first step, the above mentioned steps are based on topographic maps of the scale of 1:250000 based on the hydrographic grid of Iran Water Resources Engineering Company (Tamab Iran), in the software environment of the GIS Hydrographic Network of Rivers The province was prepared (Fig.3).

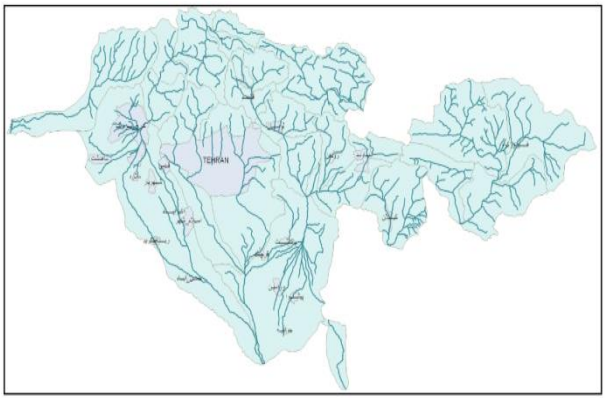

Fig.3 Hydrographic network and the position of the waterways in them

After the steps mentioned, referring to the executive agencies related to the Office of Natural Resources and Watershed Management of the Tehran province as well as on the site Google along with field activities, as far as possible, quantitative and qualitative information on structural complications such as bridge, terraces, diversion dam, floor dam, slop breaker, dike, epi, height of structures location, area of structures and impure slop of the site of the structure were collected and divided into the basin of the watershed region and evaluated, which summarizes these studies in The discussion and conclusion is presented.

DISCUSSION

In different parts of this paper, we tried to introduce the generalities of the research project, introduce the study area, introduce the rivers and the basics of the theory of the project into its main part, the research method and its results, at the

first, in order to standardize the units and facilitate accessibility, the data are derived from the classification and codification of watershed basins and the study areas conducted by the Iran Water Resources Research Center (Tamab). As noted above, according to the division of Tamab, the whole Iran country is divided into 6 main basins or super-basins (Caspian Sea basins, Persian Gulf and Oman Sea, Lake Urmia, Central, Hamoon, Serakhs), 12 smaller basins (catchment areas Caspian Sea, Persian Gulf and Oman Sea, Urmia Lake, Qom Lake, Isfahan and Sirjan, Nayyriz or Bakhtegan, Jazmourian, Plain Desert, Lut Desert, Ardestan, Yazd and Kerman, Qare-Qom Desert, East or Hamoun), 30 sub-sub basins And 1121 study areas have been classified and codified, according to which the catchment areas of the Caspian Sea and the central plateau of the Basin There are codes 1 and 4, respectively, with more than 90% of the area having code 4 and only one item code 1, the total range of Tehran in the province has 25 parts or watersheds, where the distribution of different types of structures in the areas and Their rivers (watersheds) have been evaluated quantitatively. Summarized in Table 1. (Also in tables 1, letters A instead of the bridge, the letter B instead of the terrace, the letter C instead of the diversion dam, the letter D instead of the floor dam, the letter E instead of the slop breaker, the letter F instead of the dike, the letter G Instead of Epi, the letter H instead of the total area of the terrace area is the letter I, the mean of the gradient of the basin, and finally the letter J as the sum of the structures in the basin. According to Table 1, the bridges with the number of 715 Most frequencies and dikes with the least number of 6 are frequent in the catchment area of the region. The catchment area of Payab Damavand with 114 structures and the Varangerood watershed with 3 structures are the highest and the least, respectively. These structures are included in the region.

Table.1: Status of structures on canals and rivers in the watershed area

Row	Basin name	Basin area(hectare)	Number of structural types constructed in basins and rivers									
			A	B	C	D	E	F	G	H	I	J
1	Lar	77234	14	-	48	21	3	-	-	-	5.01	86
2	Kordan	78206	26	10	3	-	-	-	-	10	12.4	39
3	Bileghan	197350	60	2	1	1	-	-	-	4.17	03.1	64
4	Karaj1	23351	8	-	-	-	-	-	-	-	65.7	8
5	Karaj2	19149	6	-	-	-	-	-	-	-	28.7	6
6	Karaj3	44404	56	6	-	15	-	-	-	8	18.10	77
7	Varangerood	12342	3	--	-	-	-	-	-	-	62.3	3
8	Velayatrood	8316	15	2	-	1	-	-	-	5.2	73.7	18
9	Payabjajrood	159535	46	3	1	4	1	6	9	3	61.1	70
10	Kan	81095	17	-	-	-	-	-	-	-	1.5	17
11	Masiletehran	129333	91	9	-	13	1	-	-	14	58.4	114
12	Payabedamavand	34656	16	2	-	5	-	-	-	2	28.3	23
13	Ah-Era	26762	29	2	-	8	-	-	-	3	34.4	39
14	Sarabedamavand	14732	9	1	-	5	-	-	-	1	52.5	15
15	Jajroodeastalak	27602	18	3	1	-	1	-	-	5.2	54.2	23
16	Lavasanat	27020	24	7	-	-	-	-	-	7.8	8.5	31
17	Jajroodeahar	18770	30	10	-	-	-	-	-	5.11	29.5	40
18	Garmabdar	18067	43	5	-	-	2	-	-	5.4	54.7	50
19	Shemshak	6975	24	5	-	2	-	-	-	6	04.7	31
20	Dalichai	33854	29	13	1	4	1	-	-	5.15	35.6	48
21	Hableroode2	56097	18	1	-	-	2	-	-	3.2	84.3	21
22	Namrood	81675	46	5	-	21	-	-	1	5.3	9.4	73
23	Phyroozkooh	83207	35	-	-	1	-	-	-	-	34.2	36
24	Payabeavanake	15832	5	-	-	-	-	-	-	-	84.0	5
25	Kilan	55867	47	14	-	19	-	-	-	5.19	03.6	80
Sum	**----**	**1331431**	**715**	**100**	**55**	**120**	**11**	**6**	**10**	**9.134**	**94.4**	**1017**

CONCLUSION

As mentioned in the various sections of the present paper, the research projects were presented and the study area was introduced, and in the technical sections of the river basin paper, more than a structural look was investigated and summarized, which summarizes the results as follows:

A: Bridges among the studied structures with the number of 715 most frequencies and dikes with the number of 6 least abundant in the region.

B: The watershed basin of Tehran with the number of 91 Hole bridge and the Varangerood catchment area with 3 Hole bridge has the highest and the least number of bridges in the region, respectively.

C: The watershed area of Delichai with 13 Terraces and with an approximate level of 15.5 hectares and the watershed of Hableh Rood 2 and Sarab Damavand with 1 number and the different levels respectively have the largest and the smallest Terraces structures in the area, And the basins of the Karaj 1, Karaj 2, Lar, Varangerood, Kan, Firoozkooh, and Evanakei basins lack terraces.

D: The Lar basin with 48 diversion dam and the Bileghan basin, PayabeJajrood, Jajrood astalak, Delichai with 1

diversion dam respectively have the largest and the smallest diversion dam in the region, respectively, and The basins of the Karaj1, Varangerood, Velayat Rood, Kan, Masil-e-Tehran, Payabe Damavand, Ah-Ira, Sarab-e-Damavand, Lavasanat, Jajroodahar, Garmabdar, Shemshak, Payab-e-evanakei, Karaj 2, Kilan, Kordan, Bileghan, Firoozkooh, Hableh Rood 2 , Namrood, Karaj 3 have no diversion dam structures.

E: The Lar watershed and Namrood watershed with 21 and floor Dam number of watersheds, Bileghan watershed, Velayat Rood, Firoozkooh with 1 floor Dam have the highest and the lowest floor Dam structure The area is located in the middle of Karaj basins, Varange Rood, Kan, Masil-e- Tehran, Payabe Damavand, Ah-Ira, Sarab Damavand, Jajrood-Astalak, Lavasanat, Jajroodahar, Garmabdar, Shemshak, Evanakei Payab, Karaj 2, Kilan, Kordan, Dalichai, Hableh Rood 2,Karaj 3 and Jajrood substructure lack the floor Dam structure.

F: The Lar basin with 3 breaker slopes and catchment basins of Jajrood, Tehran, Jajrood Astalak and Delichai with 1 number of breaker sloping structures have the highest and lowest breaker slope structures, respectively. In the region, the basins of the Karaj 1, Varangerood, Velayatrood, Kan, Damavand, Ah e Era, Sarab Damavand, Lavasanat, Jajroodahar, Garmabdar, Shemshak, Payabe Evanakei, Karaj 2, Kilan, Kordan, Bilegghan, Firoozkooh, Hableh Rood 2, Namrood, Karaj 3 lack breaker slope structures.

G: In the studied watersheds, only the Jajrood watershed basin with 6 dikes in the region is present, and the other basins have no dike structures.

H: In the studied watersheds, only the Payab Jajrood catchment area with 9 items and Namrood watershed with the number of 1 have Epi in the region, and the other basins have no epi structures.

I: The watershed basin of Karaj 3 with a mean value of 10.18% and the Evanakei Payab catchment basin with a mean value of 0.84% have the highest and lowest average mean slope of the stream in the region, which should be the structural activities of the structures Considered

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