

2.4. Conclusion

Water quality assessment is carried out by the criterion of exceeding the MPC (maximum permissible concentration). For each river section (Figure 2), for each time interval, the water flow, the total volume of the pollutant, the concentration of pollutants were calculated. The amount of pollution in each of the sections depends on the difference between the flow of contaminants to the site (from the upper section or sources of pollution in this area) and the transport of contaminants to the next downstream section. Figure 8 shows the results of the simulation of water discharge for plot No. 48. As can be seen from the figure, the average annual water discharge in the river is 566 cubic meters per second (m^3 / s) [5,6]. According to the Institute of Geography, the average annual water discharge in the river was 520 cubic meters per second. Thus, the deviation was ~ 8%. The result of pollutant comparison is shown in Table 2.

TABLE 2: The Arrangement of Channels.

Name of pollutant	MPC mg/l	Obtained max value mg/l	Obtained min value mg/l	Avg. Calculated value mg/l	Avg. Data from observation station mg/l
BOD	3	0,45	0,30	0,37	0,405833
DO	6	13	9	10	9,6
NO3	9,1	1,2	0,6	0,82	1,069167
NH4	0,39	0,06	0,03	0,032	0,03825

3. Acknowledgements

We would like to express a gratitude to reviewers for valuable comments. The work supported by the grant No. 1749\GF4 of Ministry of Education and Science of The Republic of Kazakhstan.

4. References

- [1] Andrew Battin, Russel Kinerson, Ph.D., Mohammed Lahlou, Ph.D. EPA's Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) A Powerful Tool for Managing Watersheds 2014
- [2] Jalal K Jamalov, Daniyar B Nurseitov and Kairat A Bostanbekov, "Modelling of non-point source pollution transport for the Charyn River Basin," *COMPUTER MODELLING NEW TECHNOLOGIES*, vol.20, №4, pp. 37-43, 2016.
- [3] Robert C. Johanson, John C. Imhoff, Harley h. Davis, Jr., Users manual hydrological simulation program-fortran (Hspf), United states Enviromental Protection Agency/ Environmental Research Laboratory Athens GA, April 1980.
- [4] Gkatzoflias, D., Mellios, G., Samaras, Z., "Development of a web GIS application for emissions inventory spatial allocation based on open source software tools", *Computers and Geosciences*, vol.52, pp. 21-33., 2013.
- [5] E.T. Orazov, A.I. Tverdovsky., "Simulation and theoretic modeling of the long-term dynamics of the Kazakhstan water basin of Lake Balkash", Water resources of Central Asia and their use. Materials International Scientific-Practical Conference devoted to the summing-up of the "Water for Life" decade declared by the United Nations. Volume 1., pp. 141-147., Almaty, Kazakhstan, September 22–24, 2016.
- [6] G. Terekhov, S.A. Long., "Experience in diagnosing the flow of water in the rivers of the middle reaches by the example of the main tributaries of the Ile River in the Chinese sector of the basin", Water resources of Central Asia and their use. Materials International Scientific-Practical Conference devoted to the summing-up of the "Water for Life" decade declared by the United Nations. Volume 1., pp. 178-181., Almaty, Kazakhstan, September 22–24, 2016.