



University of Zabol  
Graduate school  
Faculty of Soil and Water  
Department of Rang Maneagment and Watershed

**Sc.The Thesis Submitted for the Degree of M  
in the field of Watershed Maneagment**

**Title:**

**Evaluation of synthetic unit hydrograph methods  
for flood estimation in Atrak Watershed**

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**Abstract:**

This study aimed to determine the capability and efficiency of synthetic unit hydrograph in assessing the hydrological basin Atrak (North Khorasan) was performed. Therefore, natural and synthetic unit hydrograph using morphological data, rainfall and hydrometric surveys (blue, 91-90 years) for the Shirin darreh basin and Shourak from Shirvan city functions that are Atrak river branches. Three methods of synthetic unit hydrographs (Snyder, SCS, and Triangular), compared to the normal unit hydrograph (Observational) basin were studied. Statistically compared using the RMSE statistic Nash-Sutcliffe coefficient was performed. Excel software for drawing graphs, ArcGIS software to produce thematic maps of the watershed and SPSS software was used for data analysis. The results showed that the estimated peak flow and time of peak flow based method to calculate the time Schneider and triangular method is more efficient compared to other methods. Since the physical characteristics of the basin, rainfall has a large impact on the hydrograph, offered, the effect of this factors on the hydrograph shape separately and together in future studies were investigated.

**Key words:** Unit Hydrograph, Flood Estimation, Northern Khorasan