Assesment of mechanicaloperationson hydrodynamic features of flood

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Abstract

The flood is one of the natural disasters. It doesn't create itself but the landuse change will be caused it. It makes a lot of human and financial losses every year. In this study in Gonbad chi basin to assess the impact of Watershed mechanical operation on flood mapping used fuzzy method and AHP method and composition of slope mapping, landuse, permeability and flow accumulation that called base mapping. In next step by determining the location of mechanical operations and separation of the operation according to dam height and determine the extent of the effect of the mechanical operation using elevation contour lines, the mapping of impact of watershed management operations was prepared. In the end with composition of base mapping with impact of mechanical operations, a new map that called flood mapping is created. Although the results have a positive approximately 9% impact on reducing the risks of flood but these results in a sufficient number of suitable structures would be more effective than showed.

Keywords: AHP, flood mapping, fuzzy, Gonbad chi, mechanical operations.

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The use of chlorophyll fluorescence indices to identify environmental stresses (drought and salinity) in leaves of Mutica Pistachio (*Pistacia mutica* L.)

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Abstract

High temperature, high radiance, low vapor pressure, and lack of precipitation in most months characterize arid ecosystems. Under these conditions, tree crops such as pistachio suffer from drought combined with salinity stress. In order to investigation effects of combined salinity and drought stress on function of photosynthetic apparatus, Mutica pistachio (*Pistacia mutica*) seedlings were subjected to four osmotic stress treatments (induced by NaCl and polyethylene glycol) including: control, low osmotic stress, moderate osmotic stress and high osmotic stress. Thus, chlorophyll fluorescence parameters such as F_0, F_m,F_v,F'_m,F'_0,F'_m,F'_v, F_s,F_0/F_m,F_v/F_m,F_v/F_0,F'_v/F'_m, ΦPSII,*ETR* and *qP* were measured and calculated. Significant alterations in F_0 and F_m were just observed at high osmotic stress that show injure to photon transfer process from antenna to reaction centers. Likewise, a significant reduction in F_v/F_m at high osmotic stress depicted light photo oxidation in photosystem II. Significant increase in F_0/F_m ratio at high osmotic stress appeared a suffering in functional performance of photosystem I. Significant alterations in ΦPSII and NPQ (as decrease and increase, respectively) showed a high non-photochemical dissipation of light energy in photosynthetic apparatus. Significant decrease in *qP* initiated at moderate osmotic stress and reached to the lowest at high osmotic stress. This reduction implies that light use efficiency by the plants has reduced. This investigation proved that the both groups of chlorophyll fluorescence parameters (dependent and independent) have an important role to study the effects of environmental stresses on photosynthetic apparatus.

Keywords: chlorophyll, photochemical, photon, photosystem, plastoquinone, stress.

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Prioritization of sub-watershedsusing morphometric and land Use change Analysis

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Abstract

Prioritization of sub -watersheds is very important in the natural sources and watershed management. In this study, the morphometric para meter and landuse chang es using RS and GIS techniques used in order to identify erosion-prone sub-watersheds. The Morphometric parameter such as basin relief, the linear pa rameters (drainage density, bifurcation ratio, length of overland flow, stream frequency and drainage texture) and the shape parameters (elongation ratio, compactness coefficient, basin circularity, shape index and for m factor) were considered. The landuse map of Talar watershed using RS technique provided into five land, rangeland, forest, residential, irrigated farming, dry land farming in 1999 and 2014. Prioritization of sub -watersheds were implemented into four categories as very high, high, medium and low base on morphometric para meter, landuse chang e analysis and finally integration of morphometric para meter and land use chang e analysis. based on integ ration of morphometric and land use analysis 9 sub-watershed with 656.0% area were considered in the very high priority, 6 sub -watershed with 25.22% are a in the high priority, 5 sub -watershed with 12.19% area in the medium priority and 1 sub-watershed with 2.03% area in the low priority. The most of basin are a is located in the high priority that requires immediate action to erosion control and implementprotection programs.

Keyword: erosion-prone, Talar watershed, watershed practices.

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Base flow estimation in Tireh Dorood river in order to environmental flow assessment

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Abstract

Commonly used environmental flow evaluation tec hniques range is complexity. Some requires stream flow re cords alone, and some accounts for the habitat requirements of individual species life-stages and physical characteristics of the stream. Hydrological based methods for environmental flow assessment are the first step in planning for environmental allocation in developing countries. For determining environmental needs in a water ecosystem knowledge of the minimum discharg e is needed that in hy drology named base flow. Determining needs to hy drograph separation. For this purpose 30 y ears daily flow data of Tireh Dorood hydrometery station, on Tire h Lorestan River was selected. Base flow calculated for daily data from 1982-2011 using BFI, Recursive Digital Filter and HYSEP methods. Results show that base flow in this river forms between 74 -78 % of stream flow. Comparing methods using error measures shows that sliding limit method and Lyne and Hulic method with filter index of 0.9 are suitable methods for base flow separation in Tireh River.

Keywords: base flow index, Eckhardt, Hysep, Lyne- Hollick, recursive digital filter.

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Investigation in the necessities of instream flow needs assessment in the rivers using hydro-ecological methods

(Case study: Delichai river in Tehran, Iran)

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Abstract

In the present research necessities of instream flow needs (IFN) assessment in the rivers with focusing on Delichai River as case study is investigated using the hydro-ecological methods. At first, IFN is assessed using two common approaches of the Tennant and wetted perimeter. Then considering that Rainbow trout is the most important and dominant species in this river, ecological condition of the river for this species is investigated and physical habitat evaluation is carried out. According to the results, differences among the evaluated IFN value from the Tennant and wetted perimeter methods are very large and results of these two methods will be ambiguous. According to the habitat time series curve, habitat suitability condition is also very different for three life stages of Rainbow trout. Available suitable habitat is also very variable in different months of the year. Thus, assessing a special value for IFN will be very difficult. In case of using wetted perimeter method, stakeholders don't have right to exploit the river, and in case of using methods like minimum of the Tennant method for IFN assessment according to the habitat time series irrecoverable tensions for river ecosystem will be created, especially in critical months like spawning of the target species (March & April). Generally, at first longitudinal habitat suitability distribution of the river must be extracted and then IFN value must be assessed according to the habitat suitability time series of each reach.

Keywords: Delichai river, habitat suitability, hydro-ecological methods, instream flow needs, rainbow trout.

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Effect of the landfill leachate to quality of groundwater of Bojnourd city with the approach standard landfill design or replacement of anaerobic digester

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Abstract

One of the factors that plays a significant role in the contamination of ground water resources is solid waste and urban waste. 200 tons of waste is generated daily in the city Bojnourd and the amount of waste causes the release of 33 million liters of leachate per year. That the lack of proper waste disposal systems and landfills poor design caused concern about the influence of hydrocarbons and heavy metals into g roundwater is has been. I n this study, 2 wells upstream and 2 wells downstream in the side of landfill were sampled. The average concentration of variables NH_3 ،NO_3^- ،PO_4^{3-} ،SO_4^{2-} ،Cl ،Mg^{2+} ،K^+ و Na^+ in the upstream wells Is measured respectively, 0.02, 20.27, 0.17, 141.2, 89.8, 38.52, 2.8, 27.6 mg /l and wells downstream, 08.8, 51.25, 0.5, 200.1, 182.2, 71.32, 7.1, 218.8 mg/l. Due to the hig h concentration of pollutants of NO_3^- ،PO_4^{3-} ،Mg^{2+} ،K^+ ،Na^+ و TDS to a standard amount can be found that I nfluence of wa ste landfill lea chate to the of g roundwater in the are a causes contamination wells surrounding the landfill. In this paper, in addition to ex amining groundwater pollution in the city of Bojnourd, is recommend that to design and locate the new standard burial place by using fuzzy logic and to found four th place with ranking criteria for burial or should be used anaerobic digestion instead of waste disposal.

Keywords: Aquifer, Bojnourd, groundwater, landfill, leachate.

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Optimization of DRASTIC model by support vector machine and artificial neural network for evaluating of intrinsic vulnerability of Ardabil Plain Aquifer

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Abstract

With respect to population growth and agricultural development in Ardabil Plain, vulnerability assessment of the plain aquifer is necessary for management of groundwater resources and the prevention of g roundwater contamination. In this study, vulnerability of Ardabil plain aquifer to pollution was evaluated by DRASTIC method. DRASTIC model was prepared by seven effective parameters on vulnerability, including groundwater depth, net recharge, aquifer media, soil media, topography, impact of vadose zone, and hydraulic conductivity as seven raster layers at 1:30000 scales. Then DRASTIC index was calculated after ranking and weighting that it was obtained 82 to 151 for Ardabil plain. The support vector machine (SVM), feedforward network (FFN) and recurrent neural network (RNN) models were adapted for optimizing the DRASTIC model to obtain the most accurate results of vulnerability evaluation. For this purpose, the DRASTIC parameters and the vulnerability index were defined as inputs data and output data respectively for models, and nitrate concentration data were divided in two categories for training and testing. DRASTIC index in training step was corrected by the related nitrate concentration, and after model training, the output of model in test step was verified by the nitrate concentration. The results show that 3 models of artificial intelligence are able to assessment of aquifer vulnerability, but the Support vector machine (SVM) with the least value of RMSE for all Eastern, Western and Southern parts of the plain is 6.74, 3.93 and 3.78, respectively and the highest value of R^2 is 0.73, 0.79 and 0.72, respectively had the best results in the test step. According to this model, the northern and western parts of the plain are classified as high pollution potential areas and should be more protection of these areas.

Keywords: Aquifer vulnerability, Ardabil Plain, artificial intelligence, DRASTIC Model, support vector machine.

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The effect of climatic and geology parameters on groundwater resources quantitative and qualitative (Case study: Mahvelat)

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Abstract

This research was conducted in order to study the effect of climate and g eology factors on groundwater sources in Mahvelat plain. In order to study the groundwater quality and quantity considering groundwater resources including wells and quants; using groundwater surface, Electric Conduction (EC) and the Total Density Solution (TDS), the maps of groundwater surface fluctuation and quality parameters were prepared by geostatistical methods in ArcGIS 9.3 software environment. At second phase for determination the causes of changes in groundwater quality and quantity, factors such as reduced rainfall and droughts (Standardized Precipitation Index (SPI) was used), geology, sedimentology (The g eology maps were provided), stick up saltwater front from adjacent desert area were studied. The results zoning maps of groundwater quality and quantity showed that water level has been decreased in most part of the study area. Studding hydro-chemical parameters showed that the highest concentration of the mentioned para meters was at output of area in the we st and southwe st. Changing procedure of water quality was rising and toward salinity until the end of the period. The results of water quantitative and qualitative parameters showed that increase of exploitation wells in differe nt ways, such as incr easing land for gardening (especially pistachio), rainfall decrease and drought have caused decline in groundwater level and that followed with progress of saltwater fronts from neighboring deserts in the south and west of the studied area through rivers and cables affected and decreases its quality. However, these zones in terms of qualitatively causes influence decrease and feeding of ground water level because have fine grained sediments and the presence of abundant salt and evaporite deposits. If this trend continues, in near future in addition to the development and exacerbation of adverse environmental effect we will see severe damage to agriculture because of lack of serious and practical activities for decrease indiscriminate harvesting and lack of water table balance.

Keywords: drought, formation, saltwater, variable, zonation.

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Drought modeling and Management Using SPIand RDI Indexes (Case study: Markazi province)

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Abstract

Drought is defined as the continuous and abnormal moisture deficiency and phenomenon is unavoidable that most parts of the world are facing. Drought is a natural hazard that creates a lot of damages to human health and natural ecosystems. In every drought study, four main characteristics are considered: severity, duration, frequency or return period and areal extent. The objective of this study was to analyze these characteristics of drought and to use them in plotting drought maps over the Markazi province. To study the drought and modeling, deferent indexes has been invented, an index is the Standardized Precipitation Index and one index is Reconnaissance Drought Index. To review the 10 synoptic stations with the same period of 13 years (1379-1392) at the monthly time scale was used. The indexes are calculated by the software drinc, zoning maps of drought in a separate area is provided by the Arc GIS. The most severe drought in Ashtian station in year of blue of 87-86 and lowest drought in Station Komijan in year of blue 87-86 was seen. Drought map of the Markazi province using the Standardized Precipitation Index and Reconnaissance Drought Index of lowland areas during the drought was seen. These areas are located in the central and western plains, among which in Arak, Komijan and Shazand are whittherisk of drought.

Keywords: Arc GIS, drought mapping, reconnaissance drought index, software drinc, standardized precipitation index.

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