

## Assessing Pellet Group Count Methods to Estimate Persian Fallow Deer Abundance (Case study: Dashte-e-Naz Wildlife Refuge)

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### Abstract

Keeping abreast of species abundance is central to wildlife conservation and management. We examined the effectiveness of pellet group count methods and line transect distance sampling for estimating Persian fallow deer (*Damamesopotamica*) abundance in Dasht-e-Naz Wildlife Refuge, northern Iran. Daily defecation rate of 10.03 and 18.33 was respectively obtained by sampling pellet groups in permanent strip transects in the study area and daily counts of defecated pellet groups in Eram Zoo. Estimated abundance of Persian fallow deer  $\pm$  95% CI using clearance plot count (37.06 $\pm$ 10.87), standing crop pellet group counts (36.59 $\pm$ 8.82), quick population survey method (30.15 $\pm$ 9.37) and line transect (58; 36-92) were compared. Considering the true population size (37 in 2008 and 40 in 2009), the accuracy of all methods (with equal sampling intensity) were verified. Estimated density in line transect method was considerably higher than the true population size, though the true mean was within the confidence interval. Standing crop pellet group count was recognised as the most precise method. Clearance plot method lasted 6.67 and 4.65 times more than standing crop and line transect method, respectively.

**Keywords:** Estimation of animal abundance, Line transect, Dasht-e-Naz wildlife refuge, Pellet group count, Persian fallow deer.

## Assessment of Surface Soil Contamination with Selected Heavy Metals in Semnan Industrial Complex and Surrounding Areas

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### Abstract

The purpose of this study was to evaluate the role of anthropogenic and lithogenic factors on the pollution of surface soil of Semnan industrial complex and surrounding areas by Pb, Zn, Cu, Ni, Cr and Cd. For this purpose, 93 composite surface samples were collected from 0-10 cm depth in an area of 117 Km<sup>2</sup> and aqua regia extractable elements concentrations were measured by atomic absorption. Enrichment index, geo-accumulation index, contamination factor, pollution load index were used for assessment of pollution. Comparing the concentrations and variations of heavy metals among geomorphic units indicated that Pb, Zn, Cd and Cu are under anthropogenic sources influence and Ni and Cr have lithogenic origin. Concentrations of Pb, Zn and Cd with averages of 93.9, 126.9 and 1.9 mg kg<sup>-1</sup> in units D (industrial complex unit) were significantly different from other units. Average concentrations of Cu, Ni and Cr in the area with values of 22, 20 and 9.7 mg kg<sup>-1</sup> respectively did not vary significantly along the units; although the Cu in D and E units (beside industrial complex) was slightly higher than other units. The highest Enrichment index (EI) occurred in D and E units and indicated the most pollution due to industrial activities. According to geoaccumulation index (I<sub>geo</sub>) the studied soils in the area with the exception of Pb and Cd grouped into uncontaminated class. Based on spatial distribution of PLI distribution showed higher pollution in D unit and units in eastern and southeastern of the area that were located in the direction of prevailing wind.

**Key words:** Enrichment index, Geo-accumulation index, Contamination factor, Pollution load index, Semnan industrial complex

## Investigation of Factors Affecting Soil Organic Carbon along a Gradient Climate in Kermanshah Province

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### Abstract

Soil organic carbon contributes to the fertility, health and quality of soil. At regional scale, climate is the most important external factor which directly and indirectly regulates soil organic carbon content. The objective of this study was to investigate factors influencing the amount of soil organic carbon along a climatic gradient in Kermanshah province. In this region, the temperature and precipitation varies from 6 to 18.4°C and 273 to 835mm, respectively. There was a strong correlation between temperature and precipitation with altitude so that precipitation increased and temperature decreased by altitude. 56 soil samples were taken along the climatic gradient from 0-15 and 15-30cm on summit slope position of Cretaceous calcareous parent material. Soil organic carbon varied from 1.2 to 2.44% in 0-15cm and from 0.4-2.61% in 15-30cm soil depth. Average soil organic carbon content in 0-15 cm was 1.2% that decreased to 1.04 in 15-30 cm. No relationship was found between soil organic carbon and climatic parameters. The absence of relationship between soil organic carbon and climatic parameters can be attributed to the narrow range of precipitation and temperature in the study area. It seems that the range of precipitation and temperature variations are not enough to cause significant difference in biomass production. Positive correlation of soil organic carbon with silt and clay content and negative correlation with sand content showed that variation in particle size distribution in this region is the main factor impacting on soil organic carbon content. Increasing the fine fractions in soil improves soil fertility and creates suitable conditions for vegetation and increases the soil organic carbon; On the other hand, organo-clay (silt) complexes protect the soil organic carbon against decomposition.

**Key words:** Soil organic carbon, Climate, Particle size distribution, Kermanshah

## **Evaluation of Green Roofs Impact on Air Temperature, Humidity and Carbon Dioxide Concentration in Tehran and Their Significance in Urban Sustainable Development**

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### **Abstract**

One of the most significant regulations of urban development and management in modern urbanism is attention to per capita green space. However, horizontal development of green space in Tehran is not economically plausible due to the increasing land price. Hence, the practical use of roofs and walls for vertical development of green space can be considered as a potential alternative for efficient utilization of urban land. Green roof, as a new approach of architecture and urbanism, is arisen from sustainable development concepts that can be used to increase the per capita green space and improve the quality of urban environment. The main objective of this study is to evaluate the genuine effect of green roofs on Tehran's microclimatic conditions and air quality. Two buildings with different roof covers (green and bitumen roof) were selected in district 17 of Tehran municipality and air temperature, humidity and carbon dioxide concentration data loggers were installed on both of them in three different status (inside the screen box, outside the screen box and near the surface). Also, to assess the indoor air quality, two air temperature and humidity data loggers were installed inside of both studied buildings. The measurements were set to be recorded in 15 minute intervals. According to the results, the obtained measurements illustrated significant differences between green roof and reference roof parameters. Depending on the measurement status, air carbon dioxide concentration of the green roof is 20-34 ppm lower than that of reference roof. Also, the green roof showed 1.4-6.1°C cooler air temperature and 10-17.5% higher air relative humidity than the reference roof. Furthermore, based on the results from monitoring the indoor air quality of studied buildings, the building with green roof has moderate temperature during the day. No special trend was detected for indoor humidity of either building.

**Keywords:** Green Roof, Microclimate, Environment, Tehran City.

## Morphological and Electrophoretical Comparison of Blood-Serum Proteins of *Spermophilus fulvus* and *Spermophilus xanthoprymnus* (Mammalia: Rodentia) in Iran

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### Abstract

This study was conducted to study the demographic status of Iranian souslik of *Spermophilus* using genus through the analysis of blood-serum proteins and morphological features. For this purpose, the globulin and albumin protein of blood-serum of 48 specimens of *Spermophilus* genus were collected from North east (Mashhad and Bojnord), West (Kurdistan, Hamadan, Ghazvin and Zanjan) and North-west of Iran (Pirahmadkandi, Kelisakandi and Nadloo villages) and were examined using the SDS-PAGE technique. Based on achieved results, there were 9-10 bands in globulin zone, 1-2 bands in post albumin zone, 2 bands in prealbumin zone for *S. xanthoprymnus* specimens in North-west of Iran and 9-11 bands in globulin zone, 2 bands in post albumin zone, 3 bands in prealbumin zone for *Spermophilus fulvus* specimens in North-east and West of Iran. They can be used along with the morphological and karyological characteristics to identify distribution of *S. fulvus* species in North-east and west of Iran, and *Spermophilus xanthoprymnus* species in North-west Iran. In addition, habitat, and morphological characteristics, along with their distribution status, which were recorded during sampling, are presented.

**Key words:** *Spermophilus fulvus*, *Spermophilus xanthoprymnus*, Albumin, Globulin, Blood-serum.

## Evaluation of the Biodegradation and Growth Ability of Kerosene by Several Bacteria Isolated from Oil-Contaminated Soil and Water

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### Abstract

Bioremediation is an effective approach to address inevitable spillage of oil. In this research, three soil and two wastewater samples contaminated by petroleum were collected from Bandar Abbas Refinery, Iran. These samples were used for isolation of bacteria, which can be used to clean polluted lands at 37°C. The biodegradation activity of the selected bacteria was analyzed by Gas Chromatography. The biochemical tests, 16S rDNA sequence, and API 20 E kit were utilized so as to identify isolations. Nine strains were isolated and cultured in modified SSM medium at 37 °C. Four bacteria were selected for identification because of their high growth rate in kerosene tests. The identification tests showed that these bacteria belong to *Enterobactercloacae*, *Enterobacterhormaechei*, and two of them belong to *Enterobactersakazakii* that could degrade 32.24%, 11.98%, and 44.92% of 10% kerosene as sulfur source during 7 days, respectively. Hence, these bacteria had considerable potential to degrade kerosene in a short time and they can be considered as excellent candidates for petroleum biodegradation.

**Keyword:** Bioremediation, Kerosene, Enterobacter cloacae, Enterobacter hormaechei, Enterobacter sakazakii

## Negative Impacts of Future Climate Changes on Mountain Lacertid Lizards in Iran

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### Abstract

Three-lined Lacerta (*Lacerta media*) is a diurnal lizard species belonging to Lacertidae family. In present study, applying species distribution modeling techniques (SDMs) and Geographical Information Systems (GIS), the impacts of future climate change on distribution of this species were assessed. Results revealed that considerable proportions of current distribution of Three-lined Lacerta will be lost due to future climate changes. Moreover, the impact of future climate changes upon ecological niche breadth was studied using ENMTools. It was found that the breadth of ecological niche will decrease in response to climate change. Results of this study showed the likelihood of extinction local populations of Three-lined Lacerta due to future predicted climate change.

**Keywords:** Reptile, Extinction, Conservation, Ecological niche, MAXENT.

## Prediction of CO<sub>2</sub> Emission Hotspot due to Land Use Change

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### Abstract

Land cover/use change leads to emission of carbon stored in soil and vegetation as CO<sub>2</sub> gas. In this research, land use change of Deylaman region in Guilan province was modeled by LCM in 2050 based on 4 land use change sub-models and driver variables. Soil organic carbon was measured by Walkley-Black method and soil organic carbon density was calculated. Then, the change of soil organic carbon stock in different land uses was calculated based on the change of land use area. The results show that if land use change has a stable trend, the forest and rangeland area will decrease 9% and 23.4% respectively. Assuming that the environmental condition and the density of soil organic carbon are stable, this reduction of natural vegetation and expansion of cropland and residential areas will lead to the loss of soil organic carbon stock and emission of about  $3.88 \times 10^5$  Mg carbon as CO<sub>2</sub> gas within the next 40 years.

**Key Words:** Soil Organic Carbon Stock, Carbon Dioxide, Land Use Change, LCM



# Absorption of Ion of Cadmium Heavy Metal from Aqueous Solutions using Chitin Produced from Green Tiger Prawn Skin (*PenaeuseSemisulcatuse*) Persian Gulf: Kinetic Studies

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## Abstract

Nowdays, heavy metal contamination has turned into a big environmental concern. The aim of this study was investigating the removal and recovery of heavy metal cadmium from aqueous solutions through extracted chitin from the shell of Green Tiger shrimps (*PenaeuseSemisulcatuse*) of Persian Gulf. In this study, the effect of parameters such as pH, the concentration of metal ions, absorbent dosage and contact time on the efficiency of removal of cadmium ion were studied. Properties and characteristics of absorbent surface were analyzed by Scanning electron microscope (SEM) method. Maximum efficiency of absorption of cadmium ions by the prepared chitin was identified to be 94.27%. This efficiency was calculated in laboratory conditions including i.e. pH 6, the initial concentration of cadmium ion of 20 ppm, contact time of 80 min, the absorbent dosage of 3gr/L, temperature of 25 °C, and the mixing speed of 200 rpm. To determine the mechanism of absorption, pseudo-first and pseudo-second kinetic model were used. The kinetic study showed that cadmium ion absorption process follows the pseudo second-order kinetic model.

**Keywords:** shell of Green Tiger shrimps (*PenaeuseSemisulcatuse*), chitin, cadmium ion, absorption, kinetic

# Assessment of Environmental Components of Developing *Feyzabad* Irrigation and Drainage Network in line with Rural Development (Case Study: *Feyzabad* Irrigation and Drainage Network of Fars province)

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## Abstract

Environmental Impact Assessment (EIA) is done to predict, recognize, and analyse in detail all positive and negative impacts of natural and human environment plans. Accordingly, the purpose of current study was measurement of environmental components (physical, ecological and socio-cultural) of establishing *Feyzabad* irrigation and drainage network in Fars province. In this study, ICOLD Matrix method was used. In this method, the environmental components of each project activity in the construction and operation phases were measured. Findings revealed that plans left positive impacts upon environment on the whole (+148 score). It must be noted that, the socio-cultural, ecological and physical environments respectively received +187, -13 and -26 scores. In other words, negative impacts on the environment were insignificant in comparison with positive effects. Therefore, implementation of *Feyzabad* irrigation and drainage network project in Fars province, once standards are observed, is allowed. According to results, some recommendations have been presented at the end.

**Keywords:** Environmental Impact Assessment, Irrigation and drainage network, Rural development, Fars province.

# Equilibrium and Kinetic Study of Absorption Behavior of Cd Ions from Aqueous Solutions using Egg Shell Nano-Particles

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## Abstract

Heavy metals are non-degradable in the environment and can be dangerous for many species. So, removal of heavy metals from water and wastewater is an important process. In this study, absorption of Cadmium ion from the aqueous solution using egg shell nanoparticles has been investigated. For this purpose, effect of several parameters such as pH, concentration of absorbent, contact time, initial concentration of metal ion and agitation speed were studied. The best efficiency for absorption of Cd ions by this absorbent is determined 99.1 % obtained at temperature, pH, contact time, the concentration of adsorbent, initial concentration of Cd ion and agitation speed of 30°C, 9, 40 min, 5 g/L, 20 mg/L and 200 rpm, respectively. The pseudo first order and pseudo second order kinematic models were used for consideration of kinetic behaviors of experimental data that pseudo second order kinematic model had more ability to describe the kinetic behavior of nano-adsorbent. Also, to study the equilibrium behavior of absorbents, two equations such as Langmuir and Freundlich were used which both models showed high ability to describe the isotherms behavior. So, this absorbent can be used as a natural and cheap absorbent.

**Key words:** Cadmium ions, Kinematic and isotherm models, Egg shell nanoparticles, Absorption

# The Impact of Sodium Bicarbonate and Pyrolysis Temperature and on the Efficiency of Palm Leaf Residues on Zinc and Cadmium Removal from Aqueous Solution

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## Abstract

The main purpose of this study was to examine the applicability of Palm leaf residues and biochars in the removal of zinc and cadmium from aqueous solutions. Four absorbents including untreated palm leaf, palm leaf treated with 0.3 M sodium bicarbonate, palm leaf biochar at 400°C and palm leaf biochar at 600°C were used. Results showed that all applied absorbents removed more Cd in comparison with Zn. Overall, studied adsorbents in the removal of both metals ranked as follow: untreated palm leaf < palm leaf treated with 0.3 M sodium bicarbonate < palm leaf biochar at 400°C < palm leaf biochar at 600°C. Our results showed that Freundlich and Langmuir isotherms were the best models describing the removal of Cd and Zn from aqueous solutions due to their relatively low standard error of estimate and high coefficients of determination. According to the results, it seems that palm leaf biochar could be an effective and low-cost adsorbent for the removal of toxic heavy metals from polluted water.

**Key words:** Palm leaf, sodium bicarbonate, Biochar, Zinc and Cadmium.

# Measurement of Mercury Concentration in the Hair and Milk of Mothers and its Relation with the Number of Dental Amalgam Filling and Mother's Diet (Case study: City of Zahedan)

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## Abstract

In this study, some traits of mothers including; dietary habits and dental care, the length of pregnancy, and number of children that influence upon concentration of mercury in their milk and hair were examined. Forty healthy mothers were selected and their milk and hair were sampled. Mean mercury concentration in their milk and hair was found 1.23 ( $\mu\text{g} / \text{g}$ ) and 1.81 ( $\mu\text{g} / \text{g}$ ), respectively. The analysis showed that fish consumption and number of dental amalgam fillings were the factors which had positive correlation with mercury concentration of mothers. The effect of factors such as number of children, length of pregnancy, fruit consumption and the birth weight of infants had negative impact on mercury level of mothers. Preventive strategies against mercury exposure include consuming appropriate portions of fish of low mercury, better dental care, and proper nutrition during pregnancy.

**Keywords:** Maternal Factors, Mercury, Milk, Hair.

# Identification of Factors Impacting on Satisfaction of General Tourists and Tourists of Recreational Regions in Karaj-Chalous Road

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## Abstract

Nowadays, people are increasingly turning to recreational activities, especially nature-based recreations. In this research, personal characteristics of tourists and factors which affect on their satisfaction were investigated through social studies and value judgments. Accordingly, 110 questionnaires were randomly filled by general tourists of Chalous Road and 210 questionnaires were filled by tourists of recreational regions in 7 identified regions. Then, the reliability of the questionnaire was measured using Cronbach's Coefficient Alpha in SPSS. The coefficient value was 0.79 for general tourists and 0.73 for tourists of recreational regions. In the next step, correlation of factors, which are related to satisfaction of tourists, was analyzed through calculation of the Spearman correlation coefficient in SPSS. In general, a significant relationship was detected between satisfaction level and service quality, host behavior quality, environmental quality, and management and planning quality at 99% confidence level. However, regarding the population of general tourists of Chalous Road, there was no significant relationship between satisfaction level and improvement of management and planning quality at 95% confidence level.

**Keywords:** Chalous road, Satisfaction, Social studies, Tourism attraction, Value judgment

## Response of Flooded Weeping Willow Seedlings to a Heavy Metal ( Zinc)

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### Abstract

This study investigates the tolerance of weeping willow (*Salix babylonica* L.) seedlings grown in flooded regime against different concentrations of zinc (Zn) heavy metal. For this purpose, in a sheltered status under flooding conditions the seedlings had been exposed to five different levels of zinc concentration (0, 100, 1000, 1500 and 2000  $\mu\text{m}$ ) for 120 days. Seedling survival in all Zn concentrations was 100%. With the increase of Zn concentration, diameter growth, leaf area, specific leaf area of seedlings did not change, but in most of Zn levels, shoot growth, leaf dry biomass and total dry biomass decreased. In each Zn treatment, Zn concentration was greater in root than in shoot. The highest translocation factor (0/59) was observed in 1000  $\mu\text{m}$ . Tolerance index of shoot and root in higher Zn concentrations was >90%. With regard to the 100% survival, suitable growth and good tolerance index of seedlings, it can be stated that in flooding conditions this species has high ability for refining the Zn-contaminated soils until concentration of 2000  $\mu\text{m}$ . Thus, we recommend, the ability of phytoremediation of the flooded seedlings of weeping willow at higher Zn concentrations, as well as, the capability of its root filtering for remediation of the polluted soil and water of the industrial and agricultural activities to be considered by researchers. Likewise, plantation of weeping willow in urban green space, coasts and plateaus, rivers margins and flooded environments polluted to zinc heavy metal should be considered in operational programs.

**Keywords:** Flooding regime, Tolerance Index, Translocation Factor, Weeping willow, Zinc (Zn)

## Zoning the Recreational Capacity of Yasuj's Forest Park using Multi-Criteria Decision Methods in GIS

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### Abstract

Yasuj's forest park with an area about 1000 ha is located in Northeast of Yasuj in Iran. To implement the zoning of the recreational capacity of the park and to map suitable areas for centralized and decentralized recreations and to determine the required areas for rehabilitation and restoration, by searching references, attending to the existing standard criteria and using experiences of expertise with attending to the circumstance of the park and the available data in this context, the important criteria impacting upon process of evaluation of park's recreational capacity were selected. Using AHP, these selected criteria were prioritized. Health and security were found of the highest priority but the criterion of forest strata was of the lowest priority i.e the twenty-second criterion. The criteria of slope, distance of access to roads, type of landscape, distance of access to water sources, altitude, percentage of tree cover density and aspects were selected as data layers which providing maps of them was feasible. And then based on these criteria; a model to investigate the recreational capacity of the park was developed. According to the suggested model and using Weighted Linear Combination in GIS, the zoning map of the park was created. Calculated areas for the zones showed that 581.7 ha of park's area is suitable for decentralized recreation, 269.2 ha for rehabilitation, 99.32 ha for centralized recreation and 88.7 ha of the park's area, because of the slopes over than 60 percent, should be kept as the protected zone.

**Keywords:** Analytic hierarchical process, Boyer Ahmad, Centralized recreation, Decentralized recreation, Ecotourism



# Monitoring and Analysis of Landscape Pattern of Lorestan Province and its Change Process in GIS Environment

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## Abstract

This research was an attempt to study land cover changes of Lorestan province during 1989 to 2013 and results of this investigation were applied in landscape pattern and change process analysis. This study was done using five landscape pattern metrics consisting of Normalized Entropy, Edge Density, Patch Area, Patch Compactness and Relative Richness and 10 landscape change processes consisting of Attrition, Aggregation, Dissection, Creation, Shrinkage, Perforation, Shift, Deformation, Enlargement and Fragmentation. Results showed that from 1989 to 2013, about 5166.7 km<sup>2</sup> of forests were destroyed and residential areas expanded about 47.71 km<sup>2</sup>. In this period the rate of deforestation was about 1.68 percent/year. Also, the results of Lorestan landscape pattern analysis showed these changes: Normalized entropy changes from 0.00189 to 0.313, Relative richness from 11.19 to 22.82 percent, Edge density from 0.002 to 0.44 m/ha, Patch area from 92.04 to 193171.7 ha and Patch compactness from 0.006 to 0.568 patches in 100ha. Indeed, four processes including Attrition, Aggregation, Creation and Dissection occurred in study area. Results of this research can be used in policy making and management measures.

**Key words:** Land cover, Landscape Pattern Analysis, Landscape Change Process, Lorestan Province.

## Phosphorus Adsorption Behavior in Sediments Trapped Behind Successive Check-dams

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### Abstract

Adsorption of phosphorus by sediments has a vital role in controlling its concentration in overlying river water flow. Experiments were conducted to assess the phosphorus adsorption behavior of sediments trapped behind successive check-dams. To characterize phosphorus adsorption, two seasonal waterways from *Noshan* and *Anbi* regions of Urmia city, Northwestern Iran, were selected. *Noshan* and *Anbi* waterways had three and five check-dams, respectively. Phosphorus adsorption on sediment samples and a sample from original soil of the adjacent hillslope of each waterway were evaluated in batch experiment condition. Results indicated that the sediment characteristics have changed orderly toward waterway direction because of the selective sedimentation processes. Sediments from downstream dams with finer texture had higher capacities for P adsorption than upstream dams with coarser texture. Four empirical models, namely, Freundlich, Langmuir, Temkin, and Van-Huay were employed to describe P isotherm data. Results indicated that the Van-Huay and Freundlich models with the coefficient of determination of 0.935 and 0.932 are superior in describing P adsorption data in comparison with Temkin and Langmuir models. The structural similarity of Van-Huay and Freundlich models was proved by experimental data. There were significant correlation between characteristics of sediment samples and coefficients of selected isotherm models. Sediment sand content has significant inverse relationship ( $r = -0.748$ ;  $p < 0.05$ ) with the  $n$  of Freundlich model which illustrates low capacities of P sorption by sand fractions.

**Keywords:** Eutrophication; Sediment; Phosphorus; Adsorption Isotherm; Check-dam