SO YOU MEASURED CHEMICAL PARAMETERS IN A WELL FIELD AND SO NOW WHAT?

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ABSTRACT

Indiana Purdue University Fort Wayne (IPFW) is located adjacent to one of three rivers passing through Fort Wayne, Indiana. A well field (containing 20 wells) was established in a wetland along a small creek that flows into the St. Joseph River, one of the three rivers in Fort Wayne. Four of these wells and the creek are being monitored biweekly to track the effect precipitation has on some parameters and also to find any correlation between the concentration of the parameters. The parameters being tested for are sulfate, phosphate, and nitrates. Unfortunately weather has not cooperated so precipitation influence has not been studied in much detail. Future testing will be done to determine a precipitation/parameter relationship.

AIM

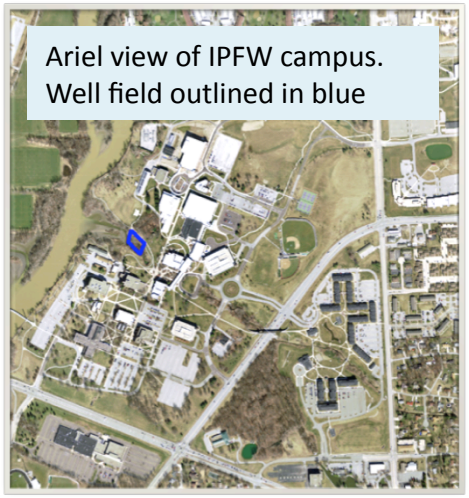
- To determine a correlation between chemical parameters in a well field and whether precipitation has an effect on these parameters.

METHOD

- Twice a week the temperature, pH, conductivity, and depth of water was measured from 4 wells and the river. Utilizing a suction pump, water was then collected into plastic collection bottles. Upon return to the lab, the concentration of NO3, PO4, and SO4 were measured using a colorimeter.

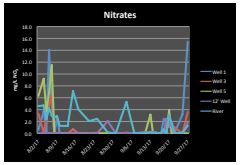
BACKGROUND

- 20-well field constructed along a small creek flowing into the St. Joseph River is located on the west of the IPFW campus.

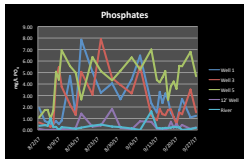


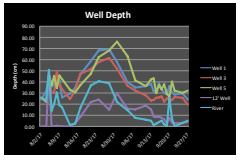
RESULTS

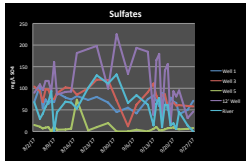
The water chemistry is presented in an abbreviated table format as well as in graphs representing some chemical parameters. The results cover the summer of 2013 time frame.



Date	Well	Depth (cm)	SO_4 (mg/L)	PO_4 (mg/L)	NO_3 (mg/L)
8/6/13	1	38.74	64	0.52	4.7
	3	30.48	97	0.47	6.4
	5	45.40	10	1.68	11.5
	12	0.00	117	0.02	0.0
	River	20.32	69	0.27	3.0
8/14/13	1	29.53	79	4.71	0.0
	3	24.45	102	2.21	0.0
	5	30.48	7	4.99	0.0
	12	2.86	93	0.19	0.0
	River	2.54	67	0.11	7.1
8/20/13	1	46.67	82	7.86	0.0
	3	47.31	85	5.06	0.0
	5	47.31	3	6.35	0.0
	12	21.91	191	0.29	0.0
	River	36.83	101	0.38	2.1







INTERPRETATION

- Depth of well is inversely related to both temperature and concentration of Nitrates. It is directly related to the pH.
- Conductivity is directly related to temperature and inversely related to Nitrates.
- Temperature is directly related to Nitrates.
- The Sulfates and Phosphates in Well 5 are inversely related to the river water level.
- The Nitrates in the 12' Well are directly related to Wells 1 & 3.
- The river chemistry varied the most while the 12-foot well varied the least. This implies that the river water and the other shallow wells are greatly affected by what goes on at or close to the land surface.

FUTURE PLANS

- The weather was not very cooperative with this project. Once more frequent testing began, there was a severe lack of rain. When rain finally fell, it came too often to be able to distinguish a pattern in the parameters. Future testing will continue in hopes of finding a relationship, if any, between precipitation and the chemical parameters.

ACKNOWLEDGEMENTS

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A close-up of the well field

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