L'evolució del projecte Europeu de recerca INTERFACES (Desembre 2015)

Ja fa 2 anys que estem treballant en el projecte Europeu de recerca INTERFACES amb el desenvolupament de varis treballs a l'Urban River Lab avaluant el paper diverses espècies halòfites (soles i amb tècniques de bioingeniería del paisatge) en la biogeoquímica de l'aigua. A continuació et mostrem un resum dels treballs de recerca que la nostra companya Myrto Nikolakopoulou està duent a terme, en el marc del seu doctorat.

The use of several species of helophytes, used for river restoration, on the reduction of nutrient loads. A study in artificial flumes.

Our interest is the investigation of the effects of river restoration techniques, specifically the plantation of helophytes, on pore water chemistry, focusing on understanding the mechanisms that control changes in carbon and distinguishing the specific factors that drive the biogeochemical processes responsible to improve water quality.

We hypothesize that,
1) Stream restoration techniques (e.g. plantation of helophytes), will create hot spots of metabolic activity by increasing water residence time and modifying water chemistry (through exudates and root respiration).
2) The surface of the root system of helophytes will constitute a habitat for microorganisms and thus create hot spots of metabolic activity.
3) Labile dissolved carbon will increase the microbial abundance, which will result in nutrient load reduction.

Our objectives:
- Distinguish which species commonly used for river restoration is more effective in modifying water residence time.
- Distinguish which species commonly used for river restoration is more effective in promoting biogeochemical processes that reduce nutrient loads.
- Study the effect of labile dissolved carbon in nutrient mitigation, by testing the hypothesis that labile carbon will increase microbial abundance which will result in nutrient load reduction

In a set-up of 12 artificial flumes, we will test the effect of three helophyte species, on water residence times and on nutrient mitigation, as well as the effect of labile dissolved carbon on nutrient mitigation. The designed experiment includes three vegetated treatments and one unvegetated which serves as control, all replicated by three. Pore water samples will be collected from 5 piezometers per flume, installed along its length, in order to characterize the system longitudinally for carbon, nitrogen and phosphorus compounds, as well as DO concentrations. Conservative tracer and nutrients' slug injections will be conducted, before and during labile carbon fertilization, in order to estimate water residence time and nutrient uptake. After the end of the above experiment, root system characterization will take place. The aerial part of the plants will be removed and the root system will be separated from the sediment using mechanical methods. Root dry biomass and volume will be determined and its relation with changes in pore water chemistry will be studied.