Term project proposal

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Background

Estuarine ecosystems play an important role in transporting and processing nutrients between watersheds and the coastal ocean [Mooney, 2012]. Human activities have profound impacts on the function of these ecosystems: changes of Land use and Land cover (LULC) affect the nutrient export of watersheds by changing not only the nutrient input quantity, but also the pathways from land to river. A better understanding of the relationship between riverine nutrient fluxes and the LULC of the associated watersheds can further inform the regulator and help them make decisions about nutrient management at the watershed level.

Objective

Compare best available information about the nutrient fluxes in the Mission and Aransas River (MR and AR) with the Land Use and Land Cover (LULC) and geographic features of the associated watersheds to gain insight into how human activities (LULC) affect riverine nutrient fluxes under various geographic settings in these two watersheds. To achieve this goal, we will specifically

a) obtain nutrient flux estimates in the down-stream locations of MR and AR;
b) compile LULC and other available geographic data for the MR and AR watersheds;
c) investigate the correlation between downstream nutrient flux and upstream flux plus the LULC along with the geographic data of the surrounding watersheds,
d) use the correlation obtained in (c) to predict the downstream fluxes in scenarios of future LULC changes.

Data Availability

Nutrient concentration and river discharge data of AR and MR were collected and analyzed by Mooney and McClelland [Mooney, 2012]. LULC information can be downloaded from the National Oceanic and Atmospheric Administration Coastal Services Center's Coastal Change Analysis Program. Geographic data are available in the USGS GAGE-II data set.

Expected Result

The expected outcome of this project will include:

a) maps of nutrient fluxes, LULC, and geographic feature of the associated watersheds generated by GIS;
b) Prediction of nutrient fluxes under future LULC conditions calculated by GIS.