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The MS GIS Program and Ocean GIS

The University of Redlands is a private institution that incorporates the concept of space in its academic curriculum. This is typified by the integration of the spatial process in learning activities, as well as in the methodology for finding solutions to research problems in several programs. The Master of Science in Geographic Information Systems Program of the university is designed to help students gain an understanding of theories and concepts used in GIS technology. Students of the program apply GIS in real world solutions for clients in several areas including ocean related studies.

Several ocean GIS related projects have been completed and some are ongoing. A recent student project created tools for identifying wetland areas that will become vulnerable along the southern California coastline based on models of sea level rise. An ongoing project is creating web and mobile GIS applications for reporting locations and the attributes of marine mammals seen by the public. This will help researchers track the habitat and distribution of the mammals.

Human Ocean Interaction and the Coastal Interface

The world's oceans are integral to the survival of all species on earth particularly humans. As we continually exploit the ocean as a resource, there is a growing need to understand and mitigate human impact on the underlying terrain as well as ocean circulation patterns. Our inadequate understanding of human impact on the ocean is most apparent along the coasts where fragile environments such as wetlands are disappearing at an alarming rate.

The nature of ocean waves and winds along the coast are understood to a considerable extent. However the impact of human activities on increasing frequency and energy of these phenomena are poorly understood. The resultant increase in the rate of erosion and sometimes deposition are however glaring to all. It is becoming more important that we understand how canals, shipping lanes, increased atmospheric emissions as well as sea floor scouring for resources affects ocean cycles if we are to save coastal wetlands and the millions of people who rely on them for their livelihood.

The flora and fauna in coastal areas are diverse and are often sensitive to changes in sea level or amount of salt content. As the sea level changes consequent to climate change, marine life forms are becoming more vulnerable. An understanding of the ecology of these life forms is required and must be integrated with coastal area planning to ensure their continued survival. A sizeable percentage of the human population lives in coastal areas and a lot of expensive assets are also located within such areas. These increasingly vulnerable areas are stabilized by coastal life forms. If we do not prevent the disappearance of coastal marine life forms, the loss would be greatly accelerated. It is only by gaining an understanding of the impact of human activities on oceans that we can begin to mitigate the effects of the changing nature of interactions between the ocean and the land highlighted above.