



SPR RESEARCH PROGRAM

SECOND-STAGE PROBLEM STATEMENT

FY 2010

ODOT Research Unit
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I. PROBLEM NUMBER

GHE-10-11

II. PROBLEM TITLE

Climate Change Impact on Coastal River Estuaries in Oregon

III. RESEARCH PROBLEM STATEMENT

U.S. Route 101 and other ODOT highways traverse numerous estuaries along Oregon's coast. These roadways affect, and in turn are affected by, changes in the function of the estuary caused by both the presence of the roadway as well as changes in sea level. Likewise, future climatic changes may also affect the function of both the roadways and the estuaries. A great deal of money and effort continues to be focused on restoring estuaries to their more natural function. To validate present methods, develop improved future methods, and to adapt to changing future conditions it is important to monitor conditions in the estuaries and along the roadways.

IV. RESEARCH OBJECTIVES

It is proposed that ODOT monitor the physical processes and the roadway features of the Salmon River Estuary to better understand the effects of changes to ODOT's facilities and various restoration efforts as well as sea level rise and climate change. The proposed data will targeted to form the foundation for ODOT's efforts to maintain the function of the coastal roadway system and to fulfill our obligation as environmental stewards. The Salmon River Estuary has been selected from the many estuaries crossed by ODOT highways because of the existence of past monitoring and changes that are already planned for the highway.

The Objective of this research is to improve our understanding of the interactions of ODOT's facilities with estuary system. Specifically the intent is to gather data to verify that changes in ODOT's facilities and in the estuary produce the expected results or give new understanding to what really happened.

V. WORK TASKS, COST ESTIMATE AND DURATION

The main focus of the monitoring proposed for this research project is the hydrology of the estuary around the highway. Conceptually this project will monitor flow and stage at a number of locations influenced by and influencing the highway and related structures. Additional physical parameters such as water temperature and water salinity will also be monitored at those sites. Settlement, aggradation, degradation, channel migration and avulsion are also intertwined with the hydrology. Therefore elevation profiles will be taken in and around the highway and monitoring sites to track changes due to those phenomena. The water table will also be monitored at some locations.

Biological parameters such as vegetation, invertebrates, fish use and movement, fish diets, consumption rate and growth will not be part of this monitoring. It is anticipated that other agencies, or others in ODOT, will conduct complimentary biological monitoring.

It is proposed that monitoring be initially funded for 10 years. Therefore the duration of this project is 124 months to allow for finalizing the details of monitoring and for installation of equipment. The total cost is estimated at \$305,000. This amount budgets for some replacement and rehabilitation of equipment over the course of the project. Duration of monitoring can be easily extended or shortened as determined by circumstances.

VI. IMPLEMENTATION

It is anticipated that the data from this monitoring will inform and guide on-going construction and maintenance

where highways cross estuaries up and down Oregon's coast. This result should come about through changes to design manuals and guides. Likewise the results may influence changes to maintenance practices in response to what is learned. It is also possible that what is learned about changes occurring along the coast will influence planning and transportation improvement projects.

VII. POTENTIAL BENEFITS

By monitoring conditions and changes in the Salmon River Estuary we will better understand how the roadway/estuary system functions and how it responds to changes of all kinds (restoration, climate, sea level, construction). With this understanding ODOT will be better able to protect, maintain, improve, and construct these roadways. Our ability to do this while protecting the environment and enhancing ecosystem function will also be improved. Agriculture in the estuaries will benefit as well. In general we will be able to make more informed responses to current and future changes to fulfill our agency mission.

VIII. SUBMITTED BY

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