

Alaska Department of Transportation and Public Facilities “Water Quality Modeling for Harbors”



FY02 Grant Award: \$58,800 Project Match: \$39,200



Description and Purpose: This project will develop computer-modeling tools and a manual for permit reviewers and harbor designers to use to evaluate internal basin circulation and improve water quality in proposed harbors in marinas. We will use the results of the work done at the University of Washington to calibrate our models and extend the results to quantify water quality. Without this project, the incremental, cumulative effects of poorly designed harbors will increase. Good harbor designs can enhance habitat.

Evaluation of Environmental Benefits:

- Provides a tool to maintain good water quality
- Clarify design criteria for harbor designers and reviewers
- Improve long-term health of fish and marine organisms in and around harbors
- Provide results to University of Alaska for incorporation into engineering curricula.
- Reduce mitigation costs by improving environmental quality of harbors (saving millions of dollars)
- Our product will replace *Planform Effect on Circulation and Flushing of Small Boat Harbors* (Nece, et al., 1979), the primary design tool used by engineers over the past 20 years. This new manual will provide similar long-range benefits to the state through improved harbor design.



Deliverables for this project include:

Coastal and Harbor Design Procedures Manual available at www.dot.state.ak.us

- This manual compiles and summarizes the model results into a format from which a user can quickly determine the effects of changing input variables on water quality. It will include water quality criteria that ADEC is likely to accept in evaluating the 401 Clean Water permit application. The manual serves two long-term purposes:

1. As a tool that ADEC personnel can use to evaluate the effect that specific harbor designs will have on the water quality.
 2. As an appendix to the water-quality section of the *Alaska Coastal and Harbor Design Manual*.
- **A computer program** that permit designers to quickly screen alternatives and give them ideas on how water quality can be enhanced. This would allow designers to avoid plans that might have deleterious water quality impacts.
 - **User-friendly interfaces** that allow rapid interpretation of millions of data bytes clearly and concisely.
 - **Provides** a tool for faculty at UAA to teach fundamentals of proper harbor design. Students will carry this knowledge into their professional careers providing long-term benefits to Alaska's water quality.

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