

The North Pacific Fisheries Application Center

University of Alaska Fairbanks

This subcontract is for the implementation and application of modern ocean observing and modeling capabilities at the North Pacific Fisheries Application Center (NPFAC). The NPFAC is operated by the University of Alaska Fairbanks as part of the University of Alaska Sea-Air-Land Modeling and Observing Network (SALMON) Project and is the counterpart to the Atlantic Regional Fisheries Application Center (ARFAC) at the University of Massachusetts Dartmouth.

The emphasis at the NPFAC will be to implement the initial stages of a coastal ocean observing network in Prince William Sound (PWS) including an array of surface current measuring high-frequency (HF) radar and *in situ* mooring arrays in the entrance to PWS, Hinchinbrook Entrance, to measure subsurface currents, temperature and salinity. As part of this proposal, these observations will be combined with satellite observations of sea surface temperature, ocean color, and surface winds to address the circulation and mixing in the ocean and their effect on the productivity at the lower trophic that supports the very productive fisheries in PWS and the Northern Gulf of Alaska.

In addition to the ocean-observing network, this proposal seeks funding for two-way outreach to clients of the region (including fisherman, fishing cooperatives, hatcheries, and state and federal management agencies) and education at the K-12 levels. “Two-way” outreach includes assessing clients’ needs, informing clients of the NPFAC/SALMON activities and products, developing useful and usable products for clients, and training clients on use of products. This will be accomplished through sponsored workshops, partnerships with user-groups, using clients’ vessels for technical and scientific field work, and individual and group discussions.

Additionally, we will develop data products to provide easy, timely, and useful access to the data and train end users in their use and application.

NPFAC is built upon the University of Alaska’s long-term scientific investigations of the waters and fisheries in Alaskan waters including the Gulf of Alaska and Prince William Sound (PWS). We will address important societal issues of marine and aviation safety, search and rescue operations, hazardous (oil) spill trajectory forecasts, and natural resource and fisheries management issues in PWS. The observational oceanographic and fisheries system that will be developed for PWS will eventually be adapted to Cook Inlet and the Bering Sea after testing of the system in PWS. The University of Alaska has curricula in fisheries, fisheries management and oceanography, and this proposal will build on those programs. A major effort will be to extend them to outreach programs in marine communities. The NPFAC efforts will focus on:

- Implementing relevant forecasting capabilities similar to AFMIS;
- Deploying new observational technologies in remote areas where power and communications are limited;
- Leveraging these technologies for fishing fleet and community educational and outreach purposes.

The collaboration between the two centers is based upon our mutual interests and our recent collaborative program that address ocean-related issues of societal concern with modern

existing and newly developing scientific and technical approaches. The cooperative studies will:

- Upgrade the computational and visualization capabilities of AFMIS;
- Adapt AFMIS for application to the high latitude fisheries/oceanography using PWS as proof-of-concept.

Observational Program in PWS

The ability to observe the circulation in PWS and make nowcasts/forecasts using the Regional Ocean Model System (ROMS, Rutgers U.) are important aspects of the proposed work. The modeling work is being developed under separate funding and in this proposal we are focusing on the observations. The main thrust of our efforts in PWS is to implement a surface current measuring HF radar and two moorings in Hinchinbrook Entrance (**Figure 1**). HF radar will provide two-dimensional surface currents over the central part of the sound out to 60 km from the location of the radars. Initial plans are to locate the radars on Goose and Naked Islands. Where the range circles overlap (and there is line of sight to both locations) we will obtain two-

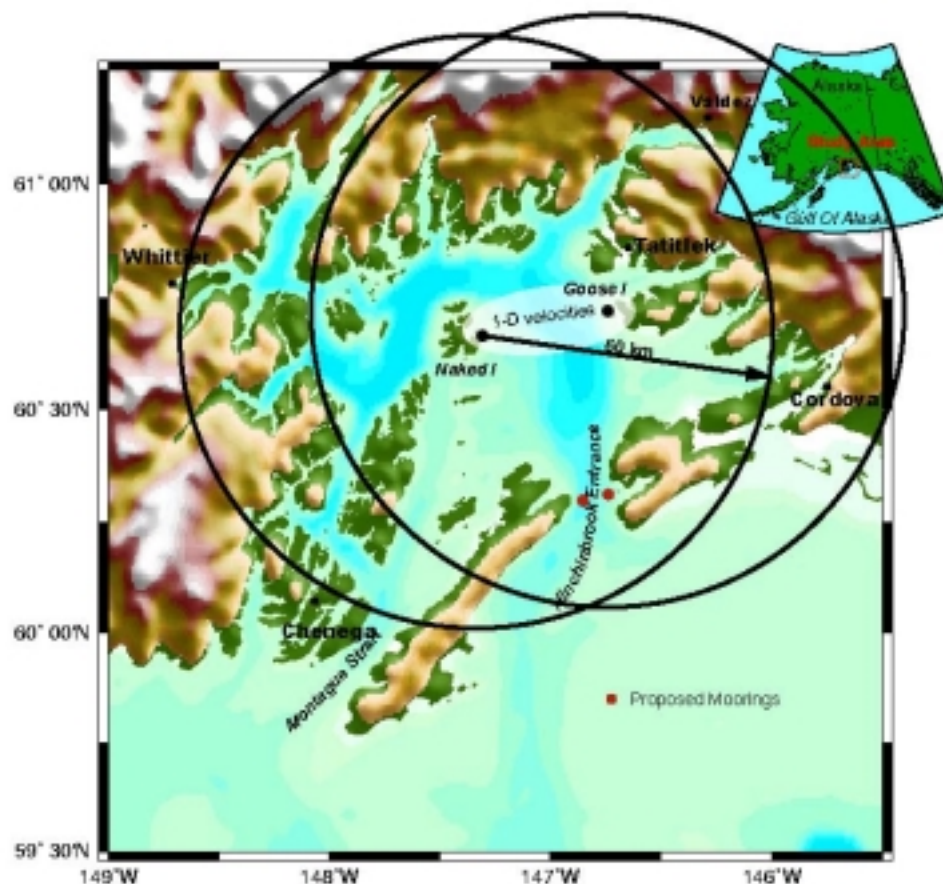


Figure 0 Location of CODARs and proposed moorings.

dimensional currents, except for the regional labeled “1-D velocities”, where the juxtaposition of

the radars gives redundant velocities. With this configuration, we expect to measure surface currents in Hinchinbrook Entrance.

The moorings in Hinchinbrook will consist of a profiling conductivity-temperature-depth recorder (CTD) and acoustic Doppler current profiler. Two moorings will be deployed in Hinchinbrook Entrance since opposing lateral currents occur in the entrance.

Budget Justification

The budget is divided into two sections due to the difference in indirect costs on research versus education activities at UAF.

Dave Musgrave will be the lead PI (**Figure 2**) and will oversee all aspects of the work in this proposal including coordination with the ocean, atmospheric and ecosystem modeling (funded elsewhere) and a total of two-months salary is budgeted, with one of those months to be matched from the SALMON Project/UA.

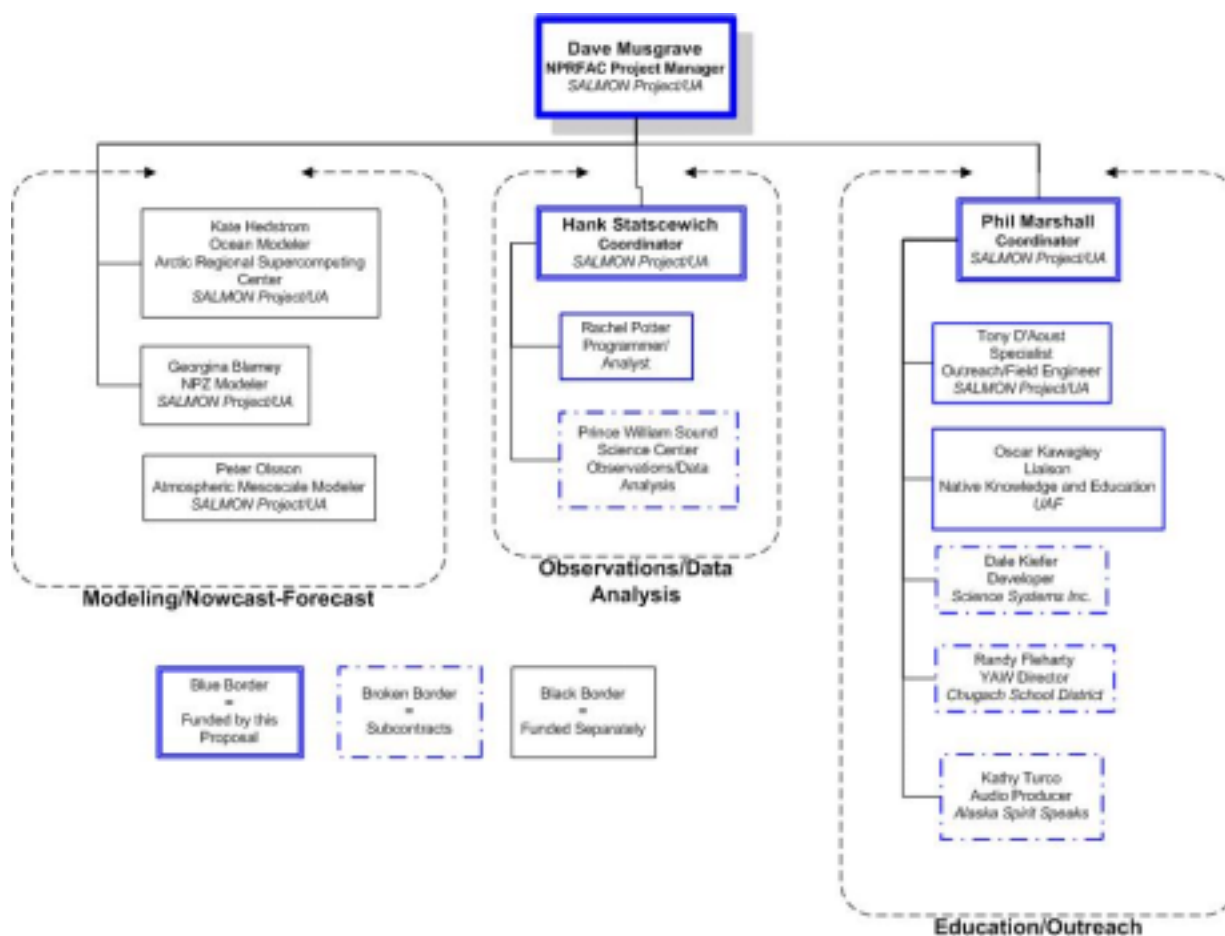


Figure 2. Organizational structure of NPFAC.

Hank Statscewich will coordinate the extensive observational and data analysis aspects of the project including the HF surface current radar systems and the moorings in Hinchinbrook

Entrance. He will also provide content for and maintain the SALMON Project web site and incorporate data collected under this proposal at the web site. We request three months of salary for his educational web activities and six months of funding for the observational aspects of his work.

Under him will be Rachel Potter who will analyze satellite imagery from AVHRR, SeaWiFs, MODIS and sea level winds from SAR, and implement the AFMIS structure in Prince William Sound and the Northern Gulf of Alaska at UAF. We are requesting nine months of salary for her efforts.

Statscewich will also coordinate with ongoing efforts of Mr. Shelton Gay of the Prince William Sound Science Center PWSSC) in Cordova. The PWSSC is implementing many monitoring activities in PWS that are available to this project. The subcontract to PWSSC will provide three months salary for Mr. Gay to help with shared data analysis and coordinated field operations.

Phil Marshall will coordinate the education and outreach aspects of the project including interaction with Randy Fleharty of the Youth Area Watch in the Chugach School District (see below), audio productions by Kathy Turco of Alaska Spirit Speaks, native and local knowledge as facilitated by Oscar Kawagley of UAF, and the development of new visualization and data products through a subcontract to Dr. Dale Kiefer (see below) for education and outreach. Mr. Marshall will develop curriculum in oceanography for K-12 for use in schools in PWS, initially, and eventually elsewhere in Alaska. We are requesting six months of salary for him in this proposal.

Subcontracts

Chugach School District

A major part of the proposed project is educational outreach at the K-12 grades. We are partnering with the ongoing Youth Area Watch of the Chugach School District, which has schools in the small PWS communities of Whittier, Tatitlek and Chenega. We will be developing curriculum that details the relationship between oceanography and marine natural resources of concern to Alaskan communities. Special emphasis will be given to physical and satellite oceanography. Students in the Youth Area Watch will provide ancillary oceanographic and meteorological observations that will be compared to the observations from remote sites (HF radar and moorings).

System Science Applications

We are requesting \$50,000 for a subcontract to Dr. Dale Kiefer of Science System Applications to implement an oceanographic-based GIS system for PWS and the northern Gulf of Alaska. This system is similar to the version developed for the AFMIS system on Georges Bank. The subcontract will include training on the system for our scientific personnel and the clients (general public) of PWS.

Alaska Spirit Speaks

A subcontract to Ms. Kathy Turco in the amount of \$17,600 will provide four months of effort on audio slide shows to illustrate oceanographic principles and research for K-12 students and the general public.

Prince William Sound Science Center

We are collaborating with the Prince William Sound Science Center in both our observational program and modeling program. The PWSSC will be the focal point for tide gauge, meteorological and ship survey observations. We are requesting \$20,000 for Mr. Shelton Gay to foster the timely exchange of data and analysis programs.

Travel costs

We are requesting travel costs for fieldwork as well as workshop and scientific meeting attendance. Additional travel is requested for the Youth Area Watch summer interns to participate in the fieldwork.

Ship Time

Ship time is requested in the amount of \$20,000, which is equivalent to 5 days at \$4,000 per day. The Alyeska Pipeline Ship Escort Response Vessel System (SERVS) will provide additional ship time at no cost.

Supplies

Supplies for the observational and educational components total \$22,000 and include stationary, computer, audio, and general supplies.

Publications

Publication costs in the amount of \$11,000 include scientific journal publications (\$3,000) as well as educational materials (\$8,000).

Equipment costs

The HF radar will be purchased from CODAR OCEAN SENSORS. The \$239,000 includes hardware and software for two remote sites using 12-14 MHz band radar, training, central site computer software and modems, a transponder for antenna pattern measurements, shipping, one-year warranty and installation costs incurred by CODAR employees. \$50,000 is requested for site preparation.

Two remote wind/solar/propane power stations are requested at \$18,000 apiece.

Two moorings are requested at \$75,000 each.

We are requesting \$13,000 for three computers, two digital cameras and two digital video cameras for development of education and outreach materials.

Time Line

Observations

May 1, 2002- Aug 1, 2002: acquire observational equipment; obtain permits for CODAR and moorings.

June 1, 2002 – Aug 15, 2002: test CODAR in Cook Inlet or Valdez Arm (greater accessibility).

Aug 15-Sept 30, 2002: Install CODAR in PWS.

Oct 1, 2002-Apr 1, 2003: Operate CODAR in Cook Inlet or Valdez Arm to test radar under winter and icing conditions.

Apr 1, 2003: Install CODAR in PWS.

July 15, 2002: Deploy moorings in Hinchinbrook Entrance.

Jan 1, 2003: Redeploy moorings in Hinchinbrook Entrance.

Apr. 30, 2003: Redeploy moorings in Hinchinbrook Entrance

Education/ Outreach

May 1, 2002-Apr. 30, 2003: Contact clients through scooping workshops and individually.

May 1, 2002-Apr. 30, 2003: Cooperative work with Chugach School District in developing curricula for 2003 school year.

May 1, 2002- Apr. 30, 2003: Develop audio slide shows and disseminate through web and CD's.

May 1, 2002- Aug. 30, 2002: Put past observations from moorings, cruises, and satellite imagery into GIS system.

Sept. 1, 2002- Apr. 30, 2003: Put fisheries data into GIS system and include any real-time observations from tide gauges and meteorological stations.