

# Data Integration for the Purpose of Improved Ocean Resource Management in Hawaii

The Hawaii Ocean Resources Management Plan (ORMP) Working Group requests approval for agencies to pool resources to underwrite the costs of a project that will integrate data streams that currently exist within various ORMP member agencies into the Hawaii Ocean Observing System (HiOOS) data system, which is described below. The additional funding the Working Group seeks will be utilized to hire additional personnel within HiOOS and each respective agency to manage and translate datasets, design and develop novel data architectures, and develop the necessary web-services technologies to integrate data into a cohesive system.

## **Background:**

The Hawaii Ocean Resources Management Plan (ORMP) calls for cooperation and collaboration among a broad spectrum of governmental and non-governmental agencies in order to preserve and protect our valuable ocean resources. These resources serve not only as the legacy of those who came before us, but provide the ties that bind aspects of our culture and spirituality to the sea, sustain our daily lives, and ensure our future growth.

True interagency cooperation is essential for successful management and preservation of our coastal resources—this cooperation depends upon, among other things, open and sustained communication among all sectors in the development of policy and strategic planning as well as the free exchange of data relevant to the physics, biology, and chemistry of our coastal environment. These data, specifically those linked to the health, productivity, safety, and stability of the coastal ocean is essential for understanding the present state of the ocean as well as for understanding the complex linkages that tie the oftentimes disparate focus areas of ocean resource management together.

Recent efforts at the US federal level to create an Integrated Ocean Observing System (IOOS) have led to the development of the Hawaii Ocean Observing System (HiOOS), a regional pilot project of the larger Pacific Islands Ocean Observing System (PacIOOS). HiOOS and PacIOOS are funded, in part, through cooperative agreements with the NOAA IOOS program office. HiOOS aims to provide timely, accurate, reliable information (data and derived products) about the open and coastal ocean to a variety of public and private users through the integration of data streams from multiple sensing platforms throughout our coastal zone. The integration of such diverse and unique datasets is accomplished through a unique data architecture that responds to the requests of the user and seamlessly marries relevant data streams to produce both conjoined datasets as well as user-defined products.

## **Needs Statement:**

While initial HiOOS efforts focus on the integration of data streams from new sensor technology currently being deployed in the coastal waters, consideration of existing data sets and real-time data feeds is essential to provide a wholly accurate picture of the processes that affect our coastal waters—specifically as those processes relate to coastal hazards mitigation, ecosystem management and resource preservation, ocean safety and recreation, and understanding and

mitigating the influence of climate change. Integration of existing datasets in the Hawaiian Islands, while beneficial to the pursuit of HiOOS to build a truly comprehensive ocean observing system, would contribute to the efficacy of the ORMP through the integration of data streams from various agencies concerned with ocean resource management and improve the communication, transfer of information, and growth of knowledge among and between ORMP member agencies.

Historically, data related to ocean resources have been collected and managed by a number of different agencies within the state and county governments. These data, while usually accessible through the agency responsible for its collection and maintenance, have not been systematically integrated and incorporated into a larger data system in which various streams of data can be compared and evaluated simultaneously. This lack of cohesion in the collection and dissemination of relevant oceanographic data has long stood as a barrier to successful ocean resource management implementation—not only at our local state level but in the national and international community as well.

The ORMP Working Group proposes the integration of these data streams into the HiOOS data system using data management policies and procedures currently being developed by HiOOS. To reach this goal, the ORMP Working Group proposes the addition of personnel within HiOOS and each respective agency to manage and translate datasets, design and develop novel data architectures, and develop the necessary web-services technologies to integrate data into a cohesive system.

#### **Funding needs:**

There are three full-time positions within HiOOS required to fulfill this proposal, including a data manager, a web developer, and a database and data-server architect.

The breakdown of positions and salaries to reside within the HiOOS structure is as follows:

- One full-time data manager (\$150k per annum) would be necessary to administer the HiOOS integration of data streams and maintain the online capabilities of the system.
- One full-time personnel concerned with management of data systems and data server architecture can be hired at an annual cost of ~\$120k (1 FTE, salary and fringe).
- One additional position within HiOOS would be needed for web services, including maintenance of web pages, data product development and presentation, and user interaction (1 FTE at ~\$120k).

In addition, a network of data specialists to reside within the ORMP county and state agencies is described as follows:

- Six part-time personnel to serve as data specialists, focused on preparing and processing data sets and integrating data into the HiOOS system would reside within each ORMP county/state agency and can be hired at an annual cost of ~\$50k (1/2 FTE, salary and fringe). The number of part-time programming staff assigned to data providers would depend upon the number of relevant, unique, and available data sets marked for inclusion. Six positions annually would allow for the incorporation of data that reside within the members of the ORMP at the state and county level.

**Table 1: Data management position summary**

Position	Location	FTE	# Requested	Annual Cost (\$k)
Data Manager	HiOOS	1	1	150
Database and Server Architect	HiOOS	1	1	120
Web Developer	HiOOS	1	1	120
Data Specialist	ORMP Member Agency	0.5	6	300
				690