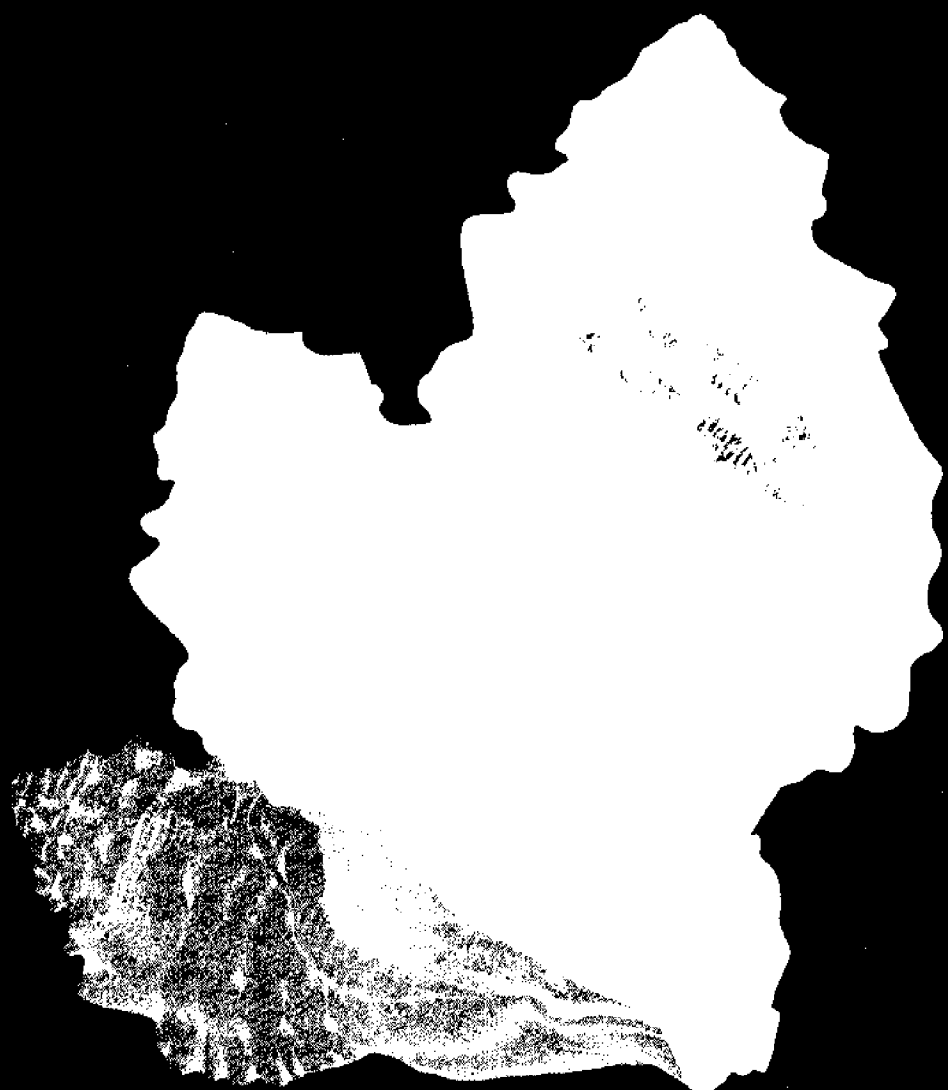
Part I

THE UNIVERSITY AT WORK IN THE OCEAN: Program Overview 1973-75

A biennial report of the activities of the University of Hawaii Sea Grant College Program



UNIHI-SEAGRANT-MR-77-03

DIRECTOR'S REPORT
Program Management

The Congress of the United States mandated, under the National Sea Grant Colleges and Program Act of 1966 (PL 89-688), a broad network of academic institutions which would have the capability of meeting local and national needs in realizing the opportunities and solving the problems related to the marine environment. A Sea Grant College must demonstrate the capability of pursuing multidisciplinary research, providing programs and opportunities for education and training at various levels, and having an aggressive and well-conceived program of publications and extension services. Hence, the designation, Sea Grant College Program, is one that is earned. The University of Hawaii was designated a Sea Grant College on October 17, 1972, in the fifth year of the existence of the program in Hawaii.

Predicated on the assumption that all Sea Grant projects ought to address real and vital needs of the state, Hawaii's Sea Grant College Program mustered the talents of the University's foremost marine-oriented experts in continuing to forge ahead in studies on the culture of plants and animals; skipjack, bait, and coral fisheries; ocean engineering; diving physiology; and environmental stress indices during Sea Grant Years 06 and 07. (See Table 1 for list of Years 06 and 07 projects.)

The beginning of the biennium, 1973-75, was the start of the upturn for oceanography in the state. The first session of the 7th State Legislature in 1973 instituted the first major cuts in the University's budget. But by August the *Honolulu Advertiser*, the city's morning daily, noted in an editorial entitled "Oceanography hopes," four developments as pluses for marine programs: the re-organization of the non-profit Oceanic Institute, a private research group; the growth of the Pacific Maritime Academy, a private merchant marine officer training center; the groundbreaking of the University of Hawaii facility, Snug Harbor Oceanographic Expeditionary Center, at Sand Island; and the awarding of $1.097 million to the University of Hawaii under the National Sea Grant Colleges and Program Act.

"These developments are particularly encouraging because they follow, and should help calm ripples of uncertainty over Hawaii's potential in oceanography," the editorial concluded.

The mood during Years 06 and 07 was, therefore, one of cautious optimism. The worst had happened, and now things were going to proceed forward. For Sea Grant the biennium was a landmark. When the first session of the 7th State Legislature adjourned, the legislators had become fully exposed to the University's Sea Grant College Program and had included a line item in the state's biennium budget of $120,000 "to fund Hawaii's Sea Grant Program." In the process, with testimony presented by Director Jack Davidson, the program received unprecedented exposure and support in the State Legislature. Other university and state marine programs, too, received special appropriations, including the Waikiki Aquarium, based on a special issue of the *Sea Grant Newsletter*.

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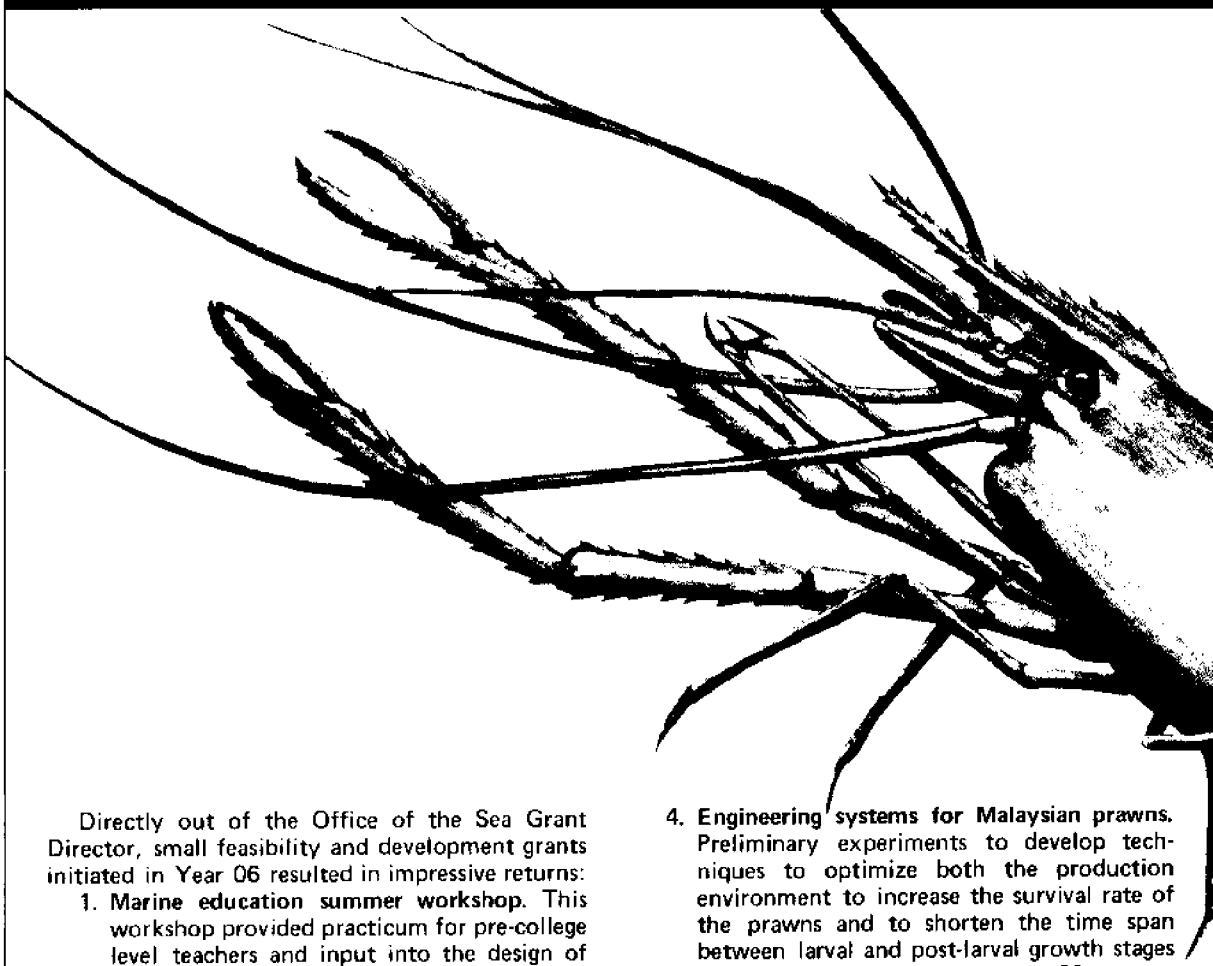
program development projects



Directly out of the Office of the Sea Grant Director, small feasibility and development grants initiated in Year 06 resulted in impressive returns:

1. **Marine education summer workshop.** This workshop provided practicum for pre-college level teachers and input into the design of the marine education curricula for secondary schools.
2. "E Komo Kai," a water safety film. Produced in Hawaii under joint sponsorship with the City and County of Honolulu Parks and Recreation Department, this film has been widely distributed in the state and even loaned to out-of-state agencies.
3. **Makahiki Kai—Festival of the Sea.** The first annual Makahiki Kai, a program of marine exhibits, was launched with 10,000 students viewing displays in marine pollution, transportation, geology, recreation, biology, and water safety among other subject areas in a week-long festival which was held in the Exhibition Hall of the Honolulu International Center (since renamed the Neal S. Blaisdell Center).
4. **Engineering systems for Malaysian prawns.** Preliminary experiments to develop techniques to optimize both the production environment to increase the survival rate of the prawns and to shorten the time span between larval and post-larval growth stages were successful. A better than 60 percent survival rate was maintained even with a shortening of the larval cultural period from 35 to 21 days.
5. **Other studies.** Other mini-projects funded through the Director's Office were:
   - Sea solar energy systems
   - Ocean transportation opportunities and challenges for Hawaii
   - Regional baitfish workshop
   - Fish promotion project
   - Maui baseline surveys
   - Environmental monitoring program
   - Manganese processing
   - Marketing of fresh fish in Hawaii

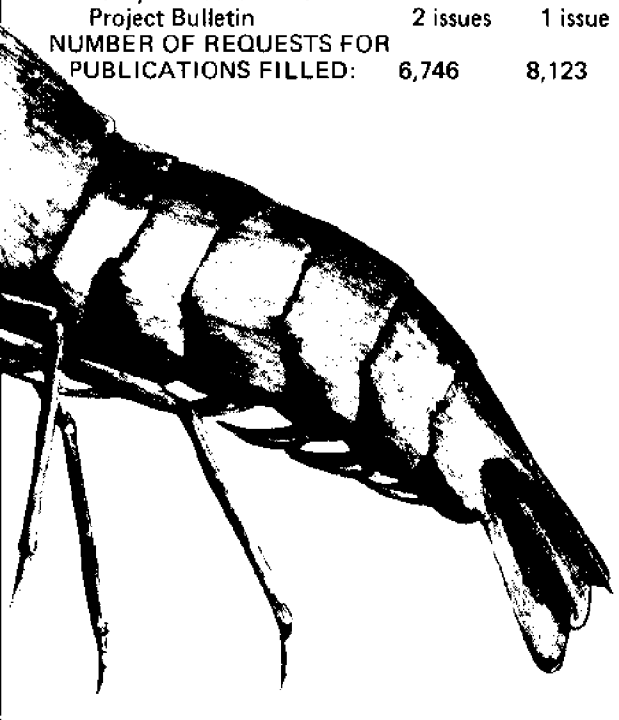
These short-term projects were funded to fill immediate needs of some agency or to serve as a small slice of a larger project to complete the data requirement of that project.

publications

In Year 07, the publications office was removed from Advisory Services and placed in the Director's Office to reflect the programwide function which the publications program in fact served.

The following reports and newsletters were published during fiscal years 06 and 07:

Type of Publication	FY 06	FY 07
Technical reports	5	5
Advisory reports	7	13
Miscellaneous reports	3	2
Journal contributions	16	16
Cooperative reports	1	6
Newsletters:		
Sea Grant	12 issues	12 issues
Coastal Zone Communiqué	13 issues	4 issues
Quality of Coastal Waters Project Bulletin	2 issues	1 issue
NUMBER OF REQUESTS FOR PUBLICATIONS FILLED:	6,746	8,123



The staff is composed of an editor, an assistant for publication, and a graphics artist in addition to the coordinator for publications who has taken on other functions, including legislative liaison for the program.

student impact

The impact of Sea Grant on both graduate and undergraduate students is visible and marked. In Years 06 and 07 a total of 46 students (Table 2) who were involved in Sea Grant projects received graduate degrees. The stipend, provided by Sea Grant and received through various departments, such as biology, economics, ocean engineering, oceanography, zoology, botany, and physiology, enabled 26 graduate students in Year 06 and 23 in Year 07 to finish their graduate work and, in most instances, the research on which the student based his or her thesis or dissertation was a component of, if not the total, project which was funded by Sea Grant.

Hence, Sea Grant funds have had a direct impact on graduate research and academic achievement. In Table 3, a composite of students and their activities after graduation indicates that six graduate students in Year 06 and eight in Year 07 were hired in their respective fields after they received their degrees at the University of Hawaii. The figures reflect only those students whose whereabouts are known to project managers, and hence, do not reflect graduate students who may have gone into other fields and those who no longer maintain contact with project personnel. An interesting change occurred in the number of all graduates hired by academic institutions between Years 06 and 07. During the latter year, academic institutions suffered major budget cuts across the nation which was reflected in a drop in hires from 20 to 4 in one year or 80 percent as opposed to the drop from 12 to 10 hires by private firms, a decrease of only slightly more than 15 percent.

TABLE 3. EMPLOYMENT STATUS OF STUDENTS WHO WERE INVOLVED IN SEA GRANT PROJECTS

Discipline	Degree Earned 06/07						Employer 06/07	
	BA	BEd	BS	MS	PhD	Unknown	Academic Institution	Private Firm
Biology	1/		1/				2/	
Computer Programming			1/				1/	
Electrical Engineering			1/				1/	
General Education		1/	1/				2/	
Liberal Studies	2/					/2	2/	/2
Marine Affairs	/1							/1
Marine Biology	1/						1/	
Marine Technology						/3	/1	/2
Ocean Engineering				5/3	1/			6/3
Oceanography				/1	/2		/1	/2
Political Science	2/							2/
Psychology	2/						2/	
Zoology	13/				/2		11/2	2/
TOTAL	21/1	1/	4/	5/4	1/4	/6	22/4	10/10

TABLE 1. STATUS OF PROJECTS: YEARS 06 and 07

Project Title	Year Funded 06 (1973-74) new	06 (1973-74) continuing	06 (1973-74) completed	07 (1974-75) new	07 (1974-75) continuing	07 (1974-75) completed
Marine Resources Development						
Tropical animal aquaculture		x			x	
Tropical marine agronomy		x			x	
Diseases of Malaysian prawns	x	x			x	
Ecology of precious corals and development of precious coral fisheries			x			
Pre-management study of tuna bait resources in Hawaii and the Trust Territory			x			
Manganese resources				x	x	
Ciguatoxin: a possible new bioassay; its mechanism of action; its biological origin				x	x	
Socioeconomic and Legal Studies						
Economic analysis of Pacific tuna development		x				x
Ocean law and administration		x			x	
Marine Technology Research and Development						
Seaward extension of urban systems		x			x	
Beach and surf parameters			x			
Recovery of offshore sand resources			x			
Human performance in the sea		x			x	
Pipeline survival under ocean wave attack				x	x	
Applicability of deep ocean pressure curing to the Hawaiian concrete industry				x	x	
The comparative seakindliness of three designs for an interisland system				x	x	
Marine Environmental Research						
Ecological investigations of fish eggs and larvae		x				x
Quality of coastal waters			x			
Hydrologic and ecologic inventories of coastal waters in West Hawaii				x	x	
Reef fish populations of Hawaii and their commercial exploitation				x	x	
CORMAR: a coral reef management program in Hawaii				x	x	
Circulation atlas for Oahu, Hawaii				x	x	
Marine Education and Training						
Marine agronomy course			x			
Marine technician training program		x			x	
Marine option program		x			x	
Blue-water marine laboratory	x	x			x	
Planning for a coordinated kindergarten through high school (K-12) marine education program				x	x	
Marine and freshwater aquaria II: public education and public involvement				x	x	
Total Projects:		17			22	

TABLE 2. NUMBER OF STUDENTS INVOLVED IN SEA GRANT PROJECTS DURING YEARS 06 AND 07 AT MANOA CAMPUS

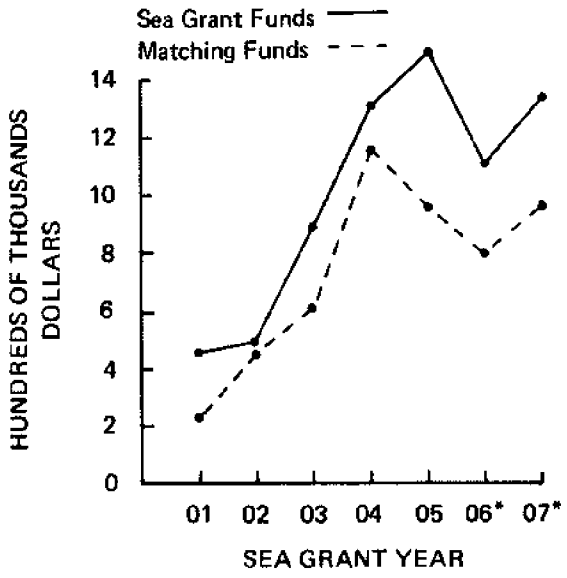
Discipline	DEGREE EARNED/TO BE EARNED											
	UG	G	AA	AS	BA	BS	JD	MA	MS	PhD	Unknown	TOTAL
Year 06												
Animal Science		1									1	1
Anthropology	1										1	1
Architecture	1										1	1
Art	3										3	3
Biological Oceanography		3							1/	2/		3
Biology		1			1/							1
Botanical Science		6							2/1	1/2		6
Business	2				1/						1	2
Chemistry		1			1/							1
Civil Engineering		1			1/							1
Economics		2							1/	/1		2
Elementary Education	1					1/						1
Engineering	1										1	1
English	1										1	1
Genetics		1									1	1
Human Development	1										1	1
Law		1					1/					1
Library Science	1										1	1
Marine Technology	1	4		4/		1/						5
Mathematics		1				1/						1
Microbiology		1									1	1
Nursing	1					1/						1
Ocean Engineering	1	15							14/1	1/		16
Physiology		3							1/	2/		3
Political Science		1			1/							1
Undeclared	2					1/					1	2
Zoology	11	4			6/	4/					5	15
TOTAL	28	45		4/	11/	9/	1/		19/2	6/3	19	73
Year 07												
Animal Science		2			1/						1	2
Anthropology		1									1	1
Art	3										3	3
Biological Oceanography		2							1/		1	2
Biology	2					1/					1	2
Civil Engineering	2	2				3/					1	4
Economics		1								1/		1
Electrical Engineering	1										1	1
European Languages	1										1	1
Genetics		1									1	1
Geology	1	1				1/					1	2
Horticulture	1										1	1
Law		4					4/					4
Liberal Studies	3										3	3
Marine Affairs	1										1	1
Marine Technology	9		1/	4/							4	9
Microbiology		1						1/				1
Ocean Engineering		10							9/	1/		10
Oceanography		4							1/		3	4
Psychology	1										1	1
Recreation	1										1	1
Secondary Education	1										1	1
Special Education					1/							1
Undeclared	8										8	8
Zoology	14	10			1/	4/			3/	1/3	12	24
TOTAL	49	40	1/	4/	3/	9/	4/	1/	14/	3/3	47	89

funding

Federal funding from the NOAA Office of Sea Grant increased from $1.1 million in Year 06 to $1.3 million in Year 07 (Figure 1), although there was a decrease of nearly $600,000 from Year 05. Overall, the University matching funds stabilized within approximately the $.5 million mark but a small increase of nearly $75,000 occurred in the non-university matching funds (Table 4). Within categories, Marine Education and Training, Program Management, and Advisory Services were the areas of budget increases (Table 4). Marine Education and Training received about a 58 percent increase in funding and the shifting of the publications office from Advisory Services to Program Management increased program administration funding by more than 40 percent. Advisory Services, while maintaining nearly the same dollar amount, gained about 33 percent with the shifting of the publications office to the Director's Office. The increase enabled Advisory Services to implement its long contemplated statewide expansion by hiring three county-based advisory agents and four statewide specialists.

Each of the research categories obtained increases in funding with the exception of Marine Environmental Research which decreased about 21 percent in total funding.

FIGURE 1. SEA GRANT AND MATCHING FUNDS, YEARS 01-07



*budgeted total, not expended amount

TABLE 4. FUNDING LEVELS BY CATEGORIES FOR THE UNIVERSITY OF HAWAII SEA GRANT COLLEGE PROGRAM

	Sea Grant Year 06			Sea Grant Year 07		
	NOAA Grant	University Matching	Other Matching	NOAA Grant	University Matching	Other Matching
Marine Resources Development						
Aquaculture	$ 328,281	$ 97,588	$ 82,700	$ 360,964	$151,632	$ 87,101
Living Resources Other Than Aquaculture	25,429	13,146	25,200	11,116	12,278	3,100
Marine Biomedicinals and Extracts	5,000	1,633	14,062	24,832	27,100	18,027
Mineral Resources	–	–	–	43,694	5,591	117,103
Socio-Economic and Legal Studies						
Marine Economics	10,000	4,595	–	13,467	4,841	–
Ocean Law	7,500	8,935	–	32,806	12,968	5,000
Marine Technology Research and Development						
Ocean Engineering	154,686	35,074	88,087	171,857	16,955	56,175
Resources Recovery and Utilization	129,255	74,270	15,656	135,193	67,110	15,000
Transportation Systems	–	–	–	21,131	9,016	10,000
Marine Environmental Research						
Coastal Zone Management	159,695	75,412	12,170	–	–	–
Coastal Management Decisions	–	–	–	36,349	32,856	25,000
Ecosystems Research	–	–	–	63,932	20,733	16,800
Applied Oceanography	–	–	–	25,720	11,134	–
Marine Education and Training						
College Level	8,200	10,872	–	–	–	–
Vocational Marine Technician Training	20,000	39,811	9,200	25,392	47,489	20,000
Other Education	31,097	22,042	40,279	68,568	70,943	33,289
Advisory Services						
Extension Program	117,301	29,373	57,295	118,463	24,046	–
Program Management and Development						
Program Administration	105,656	41,811	4,856	185,226	48,477	4,000
TOTAL	**$1,102,100**	**$454,562**	**$349,505**	**$1,338,700**	**$563,169**	**$410,595**
TOTAL MATCHING		**$804,067**			**$973,764**	

Program Overview

Thus, at the conclusion of seven years of growth and development, the University of Hawaii Sea Grant College Program has matured and has begun to define areas of program focus. In research, the aquaculture of the giant Malaysian prawn (*Macrobrachium rosenbergii*) and the high carrageenan-producing algae (*Eucheuma* spp.), floating platforms as support systems for urban and technological development, coral reef management, coastal water quality studies, the study on beach and surf parameters, studies on human performance in the sea, and the development of a submarine sand mining system have received significant funding and emphasis. Personnel on these research projects were participants in national meetings and have published reports or journal articles and papers on the results of their research and their Sea Grant-funded research has gained local and national recognition.

Under education, the Marine Option Program, which is designed for undergraduates, has begun to be recognized nationally as an innovative approach to a planned hands-on marine experience for college students. The technician training program was phased out as a developmental activity at Leeward Community College in Year 07. The Blue-Water Marine Laboratory cruise program which was begun in Year 06 has developed an enthusiastic following among high school teachers and students. A new venture into curriculum research and development for pre-college education was launched in Year 07 as a first effort of its kind among Sea Grant institutions.

The hiring of county-based agents and statewide program area specialists under the Marine Advisory Program in Year 07 implemented a plan formulated in Year 06. The expanded staff will enable MAP to respond to local problems on a person-to-person basis through county-based agents.

Within the wide scope of research, education, and advisory services, the University of Hawaii Sea Grant College Program is addressing critical, practical needs of the state in marine-related areas. The question of real needs can almost always be viewed from the standpoint of fiscal and personnel constraints and priorities of the times. What are indices of being on target? Perhaps, the most real and measurable index is financial support, not only from the University, but especially from non-university sources. The line-item matching appropriation of $120,000 to the University of Hawaii Sea Grant College Program from the State Legislature in Year 06 was the most dramatic evidence of support. In addition, the increase in other non-university matching funds of about $75,000 also speaks to increasing support from the larger community.

With the diversity of talent available at the University of Hawaii, the Sea Grant College Program is fully capable of and prepared to address the needs of the state as they become identified.

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