FY 2002 ANNUAL REPORT

Natural Energy Laboratory of Hawaii Authority

An attached agency of the
Department of Business, Economic Development & Tourism
STATE OF HAWAII

JOINT MESSAGE
From the Executive Director and the Chairman of the Board

Tom Whittemore, Chairman of the Board, and Jeff L. Smith, Executive Director, with a sample of the new 55-inch pipe on display in the Research Compound.

The successful execution of our mission has been the focus of NELHA's accomplishments over this past year. Despite the economic impacts of events of September 11, 2001, the planning, design, and development of a number of long term projects by NELHA and its tenants reached their conclusions during FY 02, culminating with:

- Successful deployment of the world's deepest sea water pipe.
- Groundbreaking of the Federally funded NELHA Gateway Distributed Energy Resources (DER Center) Research Center.
- New commercial tenant development in the Small Business Compound.
- Government-Private industry partnering and development of alternative energy systems.
- Approval of new internationally-based commercial tenants for NELHA.
- Groundbreaking activities in the HOST Park for new commercial facilities by existing NELHA tenants.
- Additional Research and Development tenants locating at the facility.

These milestones are indicators that reflect both the ongoing economic growth at NELHA and the economic diversity that our tenants bring to the State of Hawaii. NELHA and its tenants have contributed and will continue to contribute to new industry development in aquaculture, renewable energy, biotechnology, ocean sciences and education. NELHA's accomplishments to date demonstrate the ability of Hawaii to be a leader in facilitating development of new commercial enterprises while also serving as a platform for unique research and development in leading edge technologies.

The daunting national events of 9/11 are in the past now, and we look forward to the events of the new year as we continue in our recovery from the challenges they presented. The Natural Energy Laboratory of Hawaii Authority is dedicated to providing the structure and elements that will contribute to a better quality of life for the Hawaii community. Towards this end, the Board of Directors is committed, the NELHA Staff is committed, and together we will strive to bring other successes and advances to our island state.

We thank each of you throughout the state for your support and ask that you continue to help us maintain NELHA as a venue for excellence in all areas in the years ahead.

Sincerely,

Jeff L. Smith
Executive Director

Tom Whittemore
Chairman of the Board

NELHA MISSION STATEMENT:

To develop and diversify the Hawaii economy by providing resources and facilities for energy and ocean-related research, education, and commercial activities in an environmentally sound and culturally sensitive manner.

The 40-ft. tall fiberglass-reinforced plastic canister, specially fabricated for the 55-inch pipeline pump station in HOST Park, dominates the work site above the underground sump where they will be installed.

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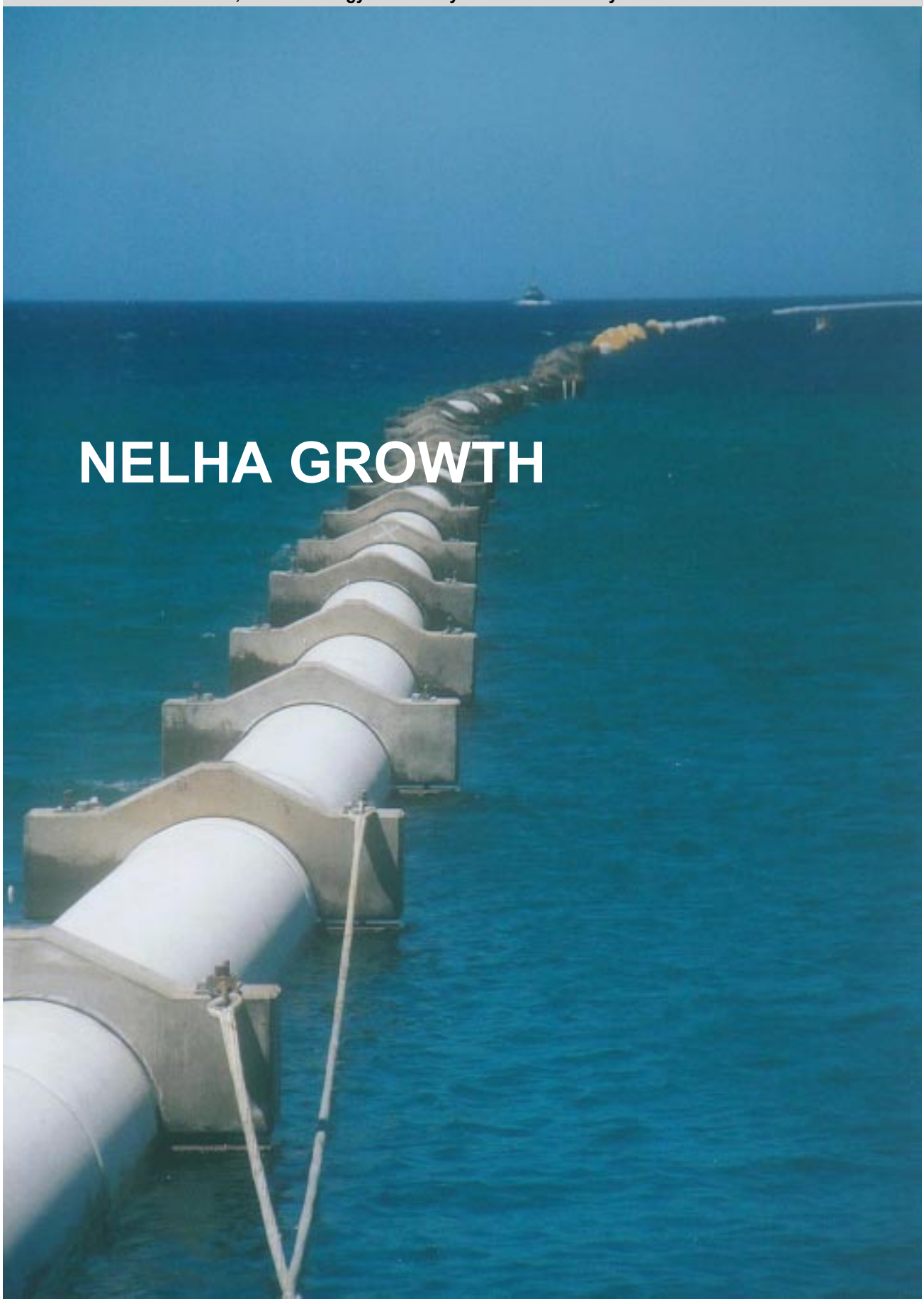


NELHA GROWTH

PROGRESS

THE NATURAL ENERGY LABORATORY OF HAWAII AUTHORITY (NELHA) is an ocean science and technology park whose mission is to bring economic development and diversification to West Hawaii. Its assets include a unique complement of support facilities, infrastructure, pristine natural resources, and leasable land for a wide range of tenant research, education, and commercial applications. A dual-temperature seawater system that is the only one of its kind in the world sets NELHA apart from all other technology parks and creates a prime setting for innovation and new industry development in this unique island coastal setting. The NELHA story now spans 28 years and is an example of public investments by visionary state leaders that have yielded multiple returns for the benefit of all.

FY 2002 WAS "THE YEAR OF THE PIPELINE" for NELHA. In a major engineering feat, NELHA installed the world's largest and deepest ocean pipeline to an unprecedented depth of 3,000 feet. The project would earn the American Society of Civil Engineers (ASCE) 2002 Hawaii Section Outstanding Civil Engineering Achievement Award and be nominated for the national level ASCE award as well. NELHA contractor Makai Ocean Engineering, Inc. worked closely with NELHA staff to design the pipeline system and Healy Tibbitts Builders, Inc. was contracted to assemble and deploy the pipelines in the waters offshore of NELHA's Kona properties and then build the pump station onshore. Deployment of the offshore pipelines was completed in October 2001 and specially designed pump station canisters were in place at the onshore sump by June 2002. The new dual 55-inch diameter pipelines will carry surface and deep seawater to the pump station at the Hawaii Ocean Science and Technology (HOST) Park. An onshore distribution system will be installed during FY03 to complete the 12-year project.

FY 2002 also brought with it tremendous economic challenges in the aftermath of the 9/11 terrorist attacks on our nation. NELHA tenant businesses dependent on the travel and tourist industries were heavily impacted,

ABOVE: One of the vessels used during the deployment of the NELHA 55-inch pipeline waits in position during the well-orchestrated operation in October 2001 off Keahole Point. OPPOSITE PAGE: The air-filled 55-inch coldwater pipeline, with its nearshore section secured to concrete anchors, floats in position before flooding and final deployment on the sea floor.

however, many tenants pressed forward with ongoing business expansion in spite of the economic downturn.

In November 2001, new tenant Moana Technologies LLC, a shrimp broodstock development company, commenced construction of research facilities in the NELHA Research Compound and initiated preparations for development of 11.4 acres in the HOST Park. In January 2002, anchor tenant Cyanotech Corporation announced the formation of a business unit, Cyanotech Japan YK with an office in Tokyo to better serve Japanese customers. In April 2002 Big Island Abalone Corporation completed construction of its new 10-acre, state-of-the-art commercial production facility in the HOST Park, making it the largest abalone production facility in the world outside of China.

New project approvals included a pre-commercial research proposal for a shrimp genomics company, SyAqua Research LLC, a new subsidiary of SyGen International, world leader in swine genetics and pork products for over 30 years. Also approved was a commercial proposal by Unlimited Halibut Corporation, a new Canadian venture that will introduce fresh halibut and sablefish to Hawaii and Pacific markets.

High-value fresh abalone are being sent daily to international markets by NELHA tenant Big Island Abalone Corporation.

FY 2002 saw the completion of the long-planned NELHA Small Business Compound, a sector of 1-2 acre lots for smaller commercial tenants. NELHA also contracted Hawaii-based environmental planners Planning Solutions, Inc. to reexamine onshore seawater disposal protocols and to verify best practices for NELHA tenant project use.

In marketing activities, the Administrative & Projects Manager/Gateway Manager continued to represent NELHA in DBEDT integrated marketing committee meetings during FY02 and also pursued the creation of a new marketing tool to serve NELHA and the Gateway development projects. In June FY02, NELHA's Scientific/Technical Project Manager participated in a DBEDT-sponsored trade mission to Korea to introduce Asians to NELHA and other Hawaii-based ocean resources. Interest in NELHA by Asian companies has been increasing, particularly with regard to deep seawater resources.

Significant progress was made towards developing the NELHA Gateway project which will generate additional revenues to support overall NELHA operations. The NELHA Gateway vision consists of three thrust areas: (1) Distributed and Renewable Energy, (2) Ocean Resources, and (3) Public Outreach, Education, and Commercial Activities. In December 2001, NELHA issued a much-anticipated Request for Proposals for the Gateway Ocean Center development in a 75-acre section of the HOST Park. By the end of FY02, planning and design of the 6.5 acre Gateway Distributed Energy Resources (DER) center in the HOST Park was well underway with groundbreaking ceremonies scheduled for August 2002 and construction activities planned for FY03. Federal funds for the project were secured through the supportive efforts of Senator Daniel K. Inouye over the last several years.

In response to a 1995 executive mandate, NELHA continued to work towards reducing its fiscal dependence on General Funds. As shown in Table 1, Figure 1, and Figure 2, the use of Special Funds has been increasing steadily. By FY02, Special Fund use had reached 60% and General Fund use was reduced to 40%.

Table 1. PROPORTION OF SPECIAL FUND (SF) AND GENERAL FUND (GF) OPERATIONAL SUPPORT

FY	SF%	GF%	FY	SF%	GF%	FY	SF%	GF%
91	0%	100%	95	2%	98%	99	47%	53%
92	0%	100%	96	36%	64%	00	56%	44%
93	0%	100%	97	31%	69%	01	59%	41%
94	29%	71%	98	44%	56%	02	60%	40%

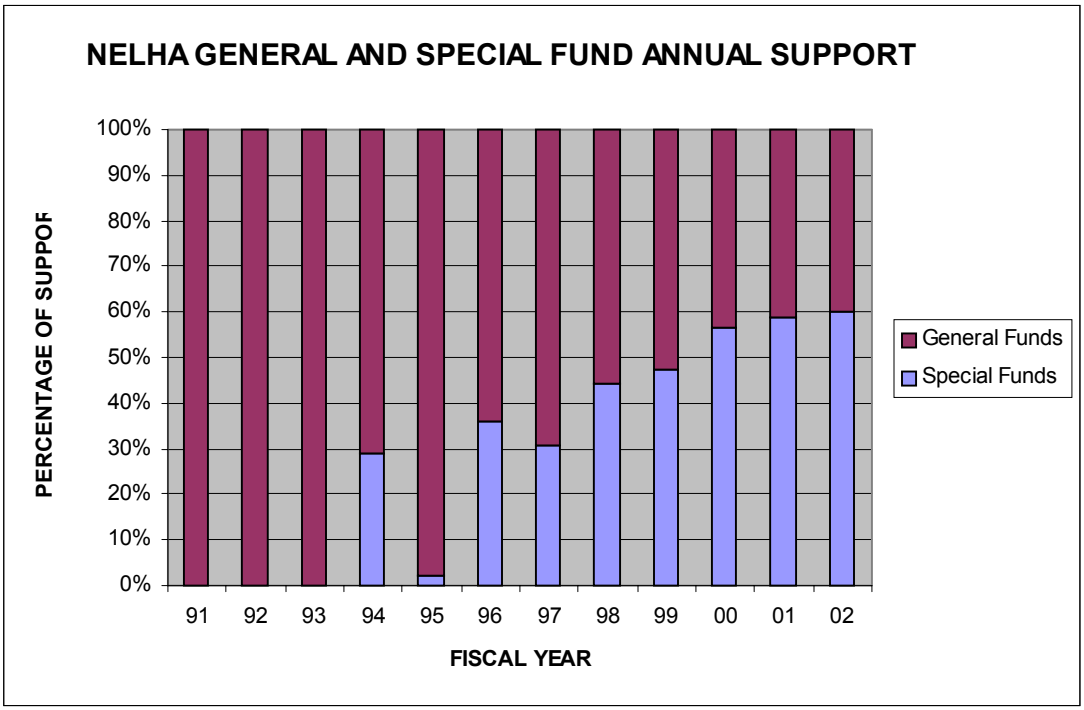


FIGURE 1. NELHA GENERAL AND SPECIAL FUND ANNUAL SUPPORT. NELHA's operational dependence on General Funds (GF) has been progressively decreased since FY94 as Special Fund support has increased. In FY95, due to a legislative oversight, NELHA was not granted authority to expend its Special Funds, resulting in a larger proportion of GF support for that one year. NELHA's long term goal is to be supported solely by Special Fund revenues of land and percentage rents from its tenants.

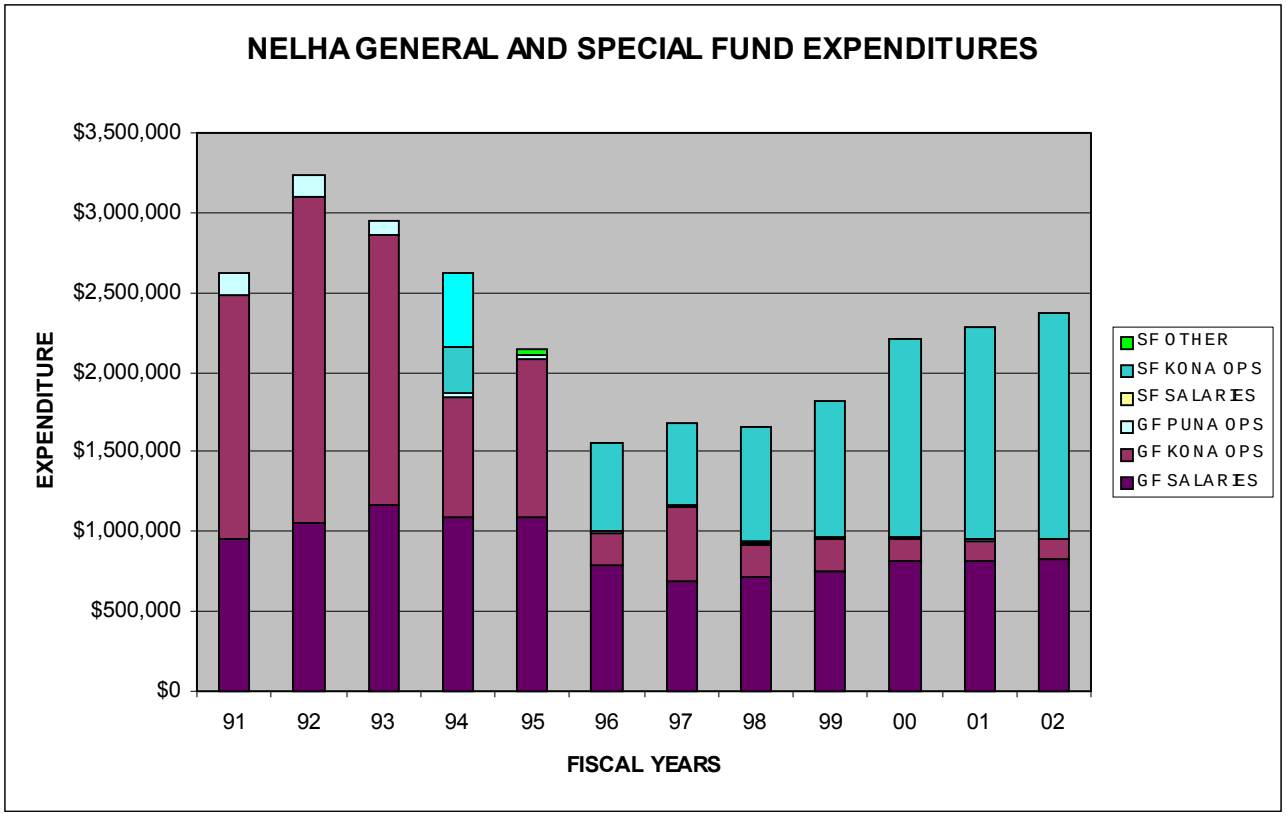


FIGURE 2. NELHA GENERAL AND SPECIAL FUND EXPENDITURES.

HISTORICAL PERSPECTIVES

CREATED ON THE HEELS OF A NATIONAL ENERGY CRISIS in 1974, NELHA has evolved through multiple stages over its 28-year history from a research support facility to the successful business development park that it is today. The Hawaii State Legislature first established it as a state corporation, named the Natural Energy Laboratory of Hawaii (NELH), on 322 acres of land at Keahole Point, adjacent to a new state airport facility, both accessed by a newly developing coastal highway. The initial function of the NELH facility was research support, focusing on the development of alternate energy and related technologies, specifically centered around the ocean thermal energy conversion (OTEC) process. Facility and project funds were administered through the Research Corporation of the University of Hawaii.

RESEARCH PROJECTS BEGAN in an oceanic setting, in 1976 with a buoy-mounted biofouling and corrosion project and, in 1979, with the world's first net power-producing OTEC plant, "Mini-OTEC," on a barge moored in the waters off of Keahole Point. After six years of permit applications and extensive environmental impact studies, NELH obtained a master lease for 322 acres of coastal property from the state's Department of Land and Natural Resources (DLNR). This enabled the new agency to construct its first buildings in 1980 to house administration, operations, a power center, and a laboratory. A dual-temperature seawater system using 12-inch diameter pipelines was installed, accessing Class AA ocean waters from depths of 45 feet, and installing the world's first deepwater pipeline to access water from 2000 feet. Onshore OTEC-related and aquaculture research projects quickly ensued.

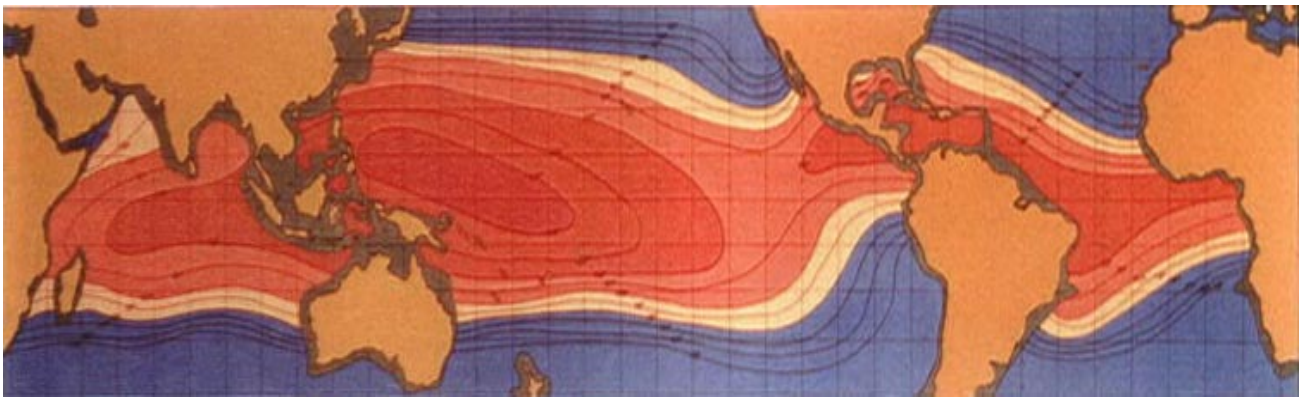
BY THE END OF THE FIRST DECADE of its existence, research and demonstration activities had firmly established NELH as the premier location for OTEC development and revealed the tremendous economic potential of other seawater-based industries. As a result, in 1984 the Hawaii State Legislature took the next logical step, authorizing commercialization at the state facility and turning NELH into a business development park. The first commercial tenant signed on in 1984 and would soon be followed by other entrepreneurial interests.

TO ACCOMMODATE THE ANTICIPATED NEED for more commercial space, in 1985 the Legislature created the Hawaii Ocean Science and Technology (HOST) Park on an adjacent property where commercial projects spawned by NELH research activities could grow and mature. The state's High Technology Development Corporation (HTDC) initially administered HOST Park, starting with 421.120 acres of land which was soon augmented to 548 acres. In addition to over 350 acres of leasable lands, HOST Park assets included a landscaped front entrance, a seawater system installed on NELH property, and a public beach park.

IN 1990, NEW LEGISLATION MELDED NELH AND HOST PARK into one entity and created the Natural Energy Laboratory of Hawaii Authority (NELHA) to oversee operations, maintenance, development, leasing, and administration for the combined 870 acres, including all infrastructure, facilities, tenant leased property, and public beach park. NELHA was also reorganized as a state agency and administratively attached to the Department of Business, Economic Development and Tourism (DBEDT).

IN THE DECADE OF THE 1990'S, NELHA BLOSSOMED in the coastal desert of Keahole, inaugurating a new era of business development for the state of Hawaii. At the beginning of the decade, NELHA operating funds were supported 100% from state General Funds. During the 1990's, NELHA began growing its Special Fund through the collection of ground rents and fees for services from the new tenant businesses it was nurturing.

IN THE NEW MILLENNIUM, NELHA's tenants continue to mature and implement commercial development plans for facility construction along with production and marketing of new high-value products for the global market. New business startups continue to join the NELHA community, all investing heavily in Hawaii's economy by developing productive facilities in the lava desert. NELHA's income from base rents is becoming more secure as tenants make long term commitments through long term subleases. As established tenant businesses realize significant profits from sales of their high-value products, they have begun to pay percentage rents to add to the NELHA revenue stream. By FY02, Special Funds provided 60% of NELHA's operational support, and General Fund dependence had been reduced to 40%.



Regions of Earth where the delta T between surface and deep seawater would allow OTEC and other deep seawater applications to be economical, indicated by the red, orange, and yellow coloration.

TO FURTHER BOOST NELHA'S REVENUE STREAM, focused development of the NELHA Gateway Project and the Ocean Center Commercial Area continued in earnest during FY02. These projects will create new venues for research, education and commercial development in renewable energy, ocean sciences, marine biotechnology, and other areas, and grow new profit centers to boost NELHA's overall financial growth.

NELHA TODAY IS A SUCCESSFUL WORK IN PROGRESS and an economic model for other communities around the world. What began as an innovative setting for research and development in ocean science and technology has launched a new era of economic development and diversity for Hawaii and its people.

THE FIGURES SPEAK FOR THEMSELVES. Unlike many other government projects which demand a one-way drain on tax dollars each year, NELHA yields measurable returns to the state in terms of revenues, jobs, and economic activity. The less than $1 million of General Funds annually appropriated for NELHA operations yields approximately double that amount in taxes alone. NELHA Special Fund revenues continue to rise, allowing increasing Special Fund support of operations and decreasing dependency on annual General Fund allocations.

BY FY01, NELHA TENANT REVENUES TOPPED $15 MILLION per year, demonstrating the success of the innovative tenant business enterprises which shipped unique and valuable products to destinations around the world. New products included health and nutritional supplements, fresh seafood, and new production technologies. In the area of job creation, NELHA and its tenants provided livelihoods for over 220 Kona residents, for whom 176 positions were privately funded. Most importantly, activities generated by NELHA and its tenants together provide an estimated $30-40 million per year in total economic impact, calculated using standard economic multipliers. The NELHA story is a success story, continuing to evolve and bring new economic development and diversification to West Hawaii and this island state.

OUTSTANDING RESOURCES

A unique complement of natural and logistical resources at Keahole Point gives NELHA a decided advantage over other locations and other business development parks.

• INSOLATION is consistently high at NELHA, with the rate of incoming natural sunshine ranked above that of any other coastal site in the United States. Rainfall is correspondingly low, less than 15 inches per year, maximizing days of clear, cloudless skies.

• PROXIMITY TO AN INTERNATIONAL AIRPORT allows tenants to export fresh product directly to Asian markets, as well as those of the continental United States and other countries. The Kona International Airport at Keahole expansion plans include an international terminal and a closer working relationship with NELHA and its tenant companies as traffic to the Big Island and particularly West Hawaii increases.

A professional diver works on a pipeline in waters at Keahole Point during early years of NELHA's development

• LOCATION at Keahole Point is an ideal setting for an ocean science facility primarily due to its steep offshore bathymetry and narrow band of coral reef, characteristic of the geologically youthful Big Island. The steep bathymetry affords close proximity to deep ocean water, accessed within a mile from shore at Keahole Point. Contrast this to geologically older locations such as islands with more extensively developed reef systems or continental coasts where access to deep ocean water may typically be 50-100 miles from shore.

• A CONTINUOUS AND AMPLE SUPPLY of both warm and cold seawater is available at NELHA from the world's deepest and largest seawater pipelines. Two operating dual temperature pipeline systems and third under construction bring valuable natural liquid resources to shore for distribution in NELHA's seawater supply system.

• WARM SURFACE SEAWATER (SSW) is pumped onshore continuously, drawing from an inlet pipe located 600 feet offshore at a depth of 45 feet from the surface and 45 feet above the ocean bottom. The waters from which the NELHA SSW is drawn are rated Class AA in water quality and range in temperature from 76° to 82°F (24.5° to 27.5°C) year-'round.

• COLD DEEP SEAWATER (DSW) is continuously pumped from 2,000 foot depths via the world's deepest cold seawater supply pipelines and is distributed onshore through the largest seawater delivery system of its kind. The DSW is drawn from chilly deep ocean water less than a mile from shore at a constant 43°F (6°C), virtually pathogen-free and rich in the inorganic nutrients essential for plant growth.

• SEAWATER SYSTEM EXPANSION plans are in the works, with a new pipeline, pump station, and distribution system to be online providing deep seawater from 3,000 foot depths by the middle of CY03.

• THE LARGE TEMPERATURE DIFFERENCE ("DELTA T") BETWEEN SSW AND DSW brought onshore makes NELHA ideal for development of ocean thermal energy conversion (OTEC) technologies. Hawaii is one of the few locations in the developed world that is included in the broad band of oceanic waters in which these "delta T" conditions exist, circling the globe within about 23 degrees of latitude to the north and south of the equator.

• LOCATION WITHIN A STABLE POLITICAL CLIMATE is a plus for any business venture weighing options at

sites around the world. Other places in the equatorial regions where warm and cold seawater might also be accessible tend to be in politically unstable settings in developing countries. The access to both cold deep and warm surface seawater in one location, with a sufficient "delta T" to make energy production feasible through OTEC-related technologies, is not available elsewhere in a location as ideal as at Keahole.

• LOCATION WITHIN A FRIENDLY COMMUNITY is an added benefit to any business which establishes activities here. Schools, hospitals, and all the components of a highly desirable place to live are here in this community. An added plus is the Hawaiian "Aloha Spirit" which is alive and well in Kona, bringing not only thousands of visitors here again and again from year to year, but also new business ventures who make a conscious choice to include quality of life in their bottom line.

With all of these resources, NELHA offers its existing and potential tenants an ideal setting in which to explore and develop ocean-related research, business and education ventures.

RESOURCE APPLICATIONS

NELHA's abundance of natural resources has provided fertile ground for the development of useful applications such as new ways to cool and heat, new ways to produce and save energy, new products to enhance the quality of life. For example, past research projects at NELHA have explored applications using the deep seawater (DSW) resource for energy production by ocean thermal energy conversion (OTEC), low cost energy-saving air conditioning, and thermally controlled environments for the culture of valuable crops through aquaculture and coldwater agriculture methods. The following section describes some of the applications for which cold seawater and other NELHA resources may be used, but this list is by no means complete. There are many other possible uses, some still waiting to be discovered.

• DEEP SEAWATER AIR CONDITIONING. One of the most cost-effective small-scale applications is for air conditioning since traditional methods use energy-hungry technologies. A simple set up using a fan and an automobile radiator, substituting deep cold seawater for the traditional liquid coolant, can provide a surprisingly

A simple heat exchanger is at the heart of deep seawater-based cooling in the Research Compound.

effective air conditioning unit for a small room. Saltwater-induced corrosion might limit its lifetime, but replacement with use of recycled parts would keep costs minimal. Ideally, a heat exchanger such as flat plate titanium models designed for long term use would provide years of virtually maintenance-free service. Such models are currently in use at a growing number of tenant as well as NELHA facilities at Keahole. Natural coldwater cooling using this application of NELHA's ample deep seawater resource in three NELHA buildings alone saves NELHA and the state of Hawaii up to an estimated $4,000 per month in electrical costs. Deep seawater is used to cool freshwater which is then circulated in the building's cooling system. The seawater is then recycled for other uses, so the cooling capacity is obtained virtually 'cost-free' in an integrated deep ocean water system.

In 1993, the NELHA Hale He'ena Laboratory Building was built in the Research Compound, a mirror image design of the first Laboratory Building constructed in 1981. Unlike the first Laboratory Building which was originally designed to use a traditional air conditioning system and later retrofitted for DSW cooling, Hale He'ena was engineered specifically to take advantage of the deep seawater cooling technologies developed at NELHA. The building was later nominated for engineering project of the year by the Kona-Kohala Chapter of Hawaii Society of Professional Engineers. The project set the standard against which all future deep seawater air-conditioning systems would be judged.

• INDUSTRIAL COOLING APPLICATIONS that use deep seawater to chill storage space can provide significant cost savings to traditional refrigerator or freezer technologies. Studies show that deep seawater air conditioning combined with industrial cooling has tremendous implications for improving economics and decreasing environmental impact of large scale coastal developments in tropical climates. This concept has excellent cost-savings potential especially when used on a large scale at a site where a cluster of coastal developments could be supplied with cold deep seawater from a central supply. For further cost savings, freshwater could be chilled using the deep seawater in a centralized heat exchanger, then circulated to a series of users via a closed loop to eliminate seawater-induced corrosion problems at user sites. The capital expended on such a project could be recouped over a relatively short period of time, making it extremely cost-effective.

• RENEWABLE ENERGY PRODUCTION from natural resources inspired the creation of the Natural Energy Laboratory of Hawaii in 1974. Ocean thermal energy conversion (OTEC), the use of ocean thermal differences to make electricity, had first been proposed in 1881, but it took the oil embargo of 1973-4 to catalyze political interest and commitment to support its research and development. Hawaii was an ideal setting since it is located within the tropical band of oceanic waters where the temperature difference ("delta T") between surface and deep seawater is sufficiently large to make OTEC an economically feasible energy production method. OTEC technologies, inherently large in scale, require correspondingly large scale seawater systems such as are located at NELHA. As a result, most of the world's major OTEC research projects have been located at NELHA since 1979.

Mini-OTEC, the world's first net power producing OTEC plant, was constructed and floated offshore of Keahole Point in 1979. The proof-of-concept demonstration system generated up to 52 kW of electricity and was hailed as a major breakthrough in ocean energy development. This successful project, a partnership between the state government, Lockheed Missiles and Space Co. and several other private companies, heralded the coming of a new wave of research and development based on cold and warm seawater resources. Since that time, the world's largest net power producing plant, rated at 210 kW gross, was built and tested at NELHA through a federally-funded research grant. It was preceded by a series of experiments testing components for the two main OTEC system types: closed-cycle and open-cycle OTEC. The next step in the R&D process will be a scaling up towards commercialization, developing pilot plant designs in the range of 1-10 MW.

NELHA provides an ideal venue for research, development, demonstration and commercialization of a wide range of renewable energy technologies based on solar and other resources. As an island state with no indigenous fossil fuel resources, Hawaii actively seeks investments in practical, economical renewable energy technology development and application aimed at increasing the ratio of indigenous to imported energy resources. In FY02, Hawaii continued to rely on imported fossil fuels which supplied 89% of the State's total energy needs. Since energy is a key factor shaping Hawaii's economy, environment and standard of living, development of a

NELHA's 1979 Mini-OTEC project at Keahole Point, Kona, Hawaii, was the first net power-producing plant using the innovative ocean thermal energy conversion process invented in 1881 by French engineer Jacques D'Arsonval.

self-sufficient, stable and environmentally friendly energy supply continues to be vital to assuring continued prosperity and a high standard of living for Hawaii's people.

• DISTRIBUTED ENERGY RESOURCES (DER). According to the DOE's Energy Efficiency and Renewable Energy Network (EREN), DER includes a variety of small (from a few kilowatts up to 50 MW), modular power-generating technologies that can be combined with energy management and storage systems and used to improve the operation of the electricity delivery system, whether or not those technologies are connected to an electricity grid. DER devices can provide opportunities for greater local control of electricity delivery and consumption. On a broader scale, DER technologies are playing an increasingly important role in the nation's energy portfolio. They are aimed at more efficient use of energy and can be used to meet baseload power, peaking power, backup power, remote power, power quality, as well as cooling and heating needs. DER technologies and resources offer a faster, less expensive alternative to the construction of large, central power plants and high-voltage transmission lines to meet the country's need for high-quality, reliable sources of electricity. NELHA and its planned Gateway DER facility will provide an ideal location for DER technology research, development, demonstration, and commercialization.

• SOLAR RESOURCES—The same intense sun that warms the surface waters around Keahole Point also provides a ready source of natural energy that can be converted into usable form through the use of photovoltaics, photobioprocessors, and other solar energy-dependent technologies. NELHA's Keahole Point location and low rainfall combine to make the site ideal for research and development of all solar technologies.

• AQUACULTURE PRODUCTS were recognized, early in the development of the NELH facility, as economically profitable co-products of the energy technologies being developed here. With its unique complement of logistical and natural resources, NELHA has become recognized as a premier location for aquaculture development. NELHA's abundant supplies of cold, clean, nutrient-rich deep seawater and warm surface seawater combine with the ideal weather conditions to provide optimum growing environments. Since the aquaculture industry is the fastest growing sector of the U.S. federal agriculture program, aquaculture is an attractive area for business development in Hawaii.

Many of NELHA's tenants are involved in aquaculture, growing various species of high-value marine or aquatic plants and animals. It is a relatively new industry that is growing in importance as world fisheries feel the increasing pressures of over-harvesting. There will be a greater need for alternative sources to replace or supplement the "wild" catch from the world's oceans in the future. NELHA's unique resources are very well-suited for businesses that wish to capitalize on this market potential. From tropical reef fish culture in warm Keahole seawater to Maine lobster culture in Keahole deep seawater, any combination of temperature regimes may be used to create optimum growing conditions for plants and animals at no extra cost. This results in growout system technologies that are more cost-effective than traditional chilling or warming technologies used by the industry elsewhere in the world.

NELHA tenant-produced coldwater lobster claws and ogo seaweed fill a buffet platter.

• MICROALGAE or microscopic plants grow extremely fast in the ideal conditions at NELHA. Over 30,000 different species have been identified worldwide, yet only a few have been commercially developed to date. Some of these are being cultured both in commercial production facilities and as experimental research ventures by businesses at NELHA. Products from microalgae include food supplements, pigments used in molecular medical tagging and cosmetic products, natural fertilizers, organic mosquitocides, cancer-inhibiting drugs, and many others. Microalgae can also be a vital link in the early stages of growout of marine animals when larvae are microscopic. Companies such as Taylor Resources, Inc. and Coast Seafoods, Inc. culture large amounts of microalgae to feed clam and oyster spat which are sent after a few months to restock growout areas located near company headquarters in the Pacific Northwest.

• MACROALGAE are larger marine and aquatic plants, also known as seaweed or sea vegetables. These can be used for food, medicinal resources, and other purposes. Like microalgae, macroalgae can be grown optimally at Keahole Point, and a number of businesses at NELHA are taking advantage of this opportunity. The low rainfall rate of about 15 inches per year greatly reduces the possibility of rainfall dilution of the growing medium in land-based ponds or tanks so that they can be left open to receive the free and ample sunshine year-'round.

Microalgae-based companies are capitalizing on the sunny location at NELHA to grow microscopic plants that yield valuable commercial products.

• MARINE BIOTECHNOLOGY holds great promise for the companies at NELHA that choose to venture into this area. Both pharmaceutical and nutraceutical products can be obtained through the mass culture of a variety of marine organisms. Through life cycle manipulation, genetic engineering, and selective breeding, the production of both plant and animal species can yield a variety of useful products for commercial applications.

A vast market potential exists for a segment of the biotechnology industry based on the production of microalgae, microscopic one-celled marine and aquatic plants. Researchers point out that microalgae are the fastest growing plants on earth, able to double their weight daily in laboratory cultures, and exceeding the average growth of trees by a factor of 100. They grow optimally when provided with the natural resources of sunlight, water, carbon dioxide and nutrients. In turn, they can yield a vast array of high-value pharmaceutical and nutraceutical products, with applications to carbon

dioxide mitigation, AIDS research, pharmaceuticals, drug discovery, food supplements, and even alternative energy.

A growing market demand for healthcare products created by the aging of the generation of "baby boomers" nationwide is providing new opportunities for products that can boost and maintain health and help combat the ravages of time. The few microalgae of the 30,000 known species that have been explored in drug discovery research have yielded compounds potentially useful in the treatment of cancer, HIV, and degenerative diseases. For example, a naturally occurring pigment, astaxanthin, obtained from certain microalgae species, is believed to improve human health and immunological support, as well as survival and fertility in fishes, poultry and livestock. Even the roughest estimates of market potential for astaxanthin are impressive. Reliable sources value the annual market at more than $185 million, growing at 8% per year. Emerging markets in poultry and livestock feeds could add another $125 million. World market price is $2,500 per kilogram. Near-term markets for microalgae products in general are estimated in excess of $3 billion per year. For the long term, some estimate these figures may exceed $10 billion per year.

Increasing efficiency is an important element of maintaining market competitiveness for commercial production based on both open pond and closed photobioreactor systems. NELHA provides an ideal location for the development of these technologies, and NELHA-based companies such as Aquasearch Inc. (recently reorganized as Mera Pharmaceuticals, Inc.) and Cyanotech Corporation are already reaping the benefits of their research and development successes in these areas.

• COLDWATER AGRICULTURE is a new area of development in which cold deep seawater is used to cool soil temperatures to create unique microclimates in a subtropical coastal setting. Test crops at NELHA's Keahole facility have demonstrated immense potential in the manipulation of growing conditions to increase and improve yield and shorten growing times for both temperate and tropical plants. The late Hawaii State Senator Richard Matsuura used the term "blue-green revolution" to describe this new field of agriculture which combines "blue" (ocean) and "green" (agricultural) technologies. He likened it to the "green revolution" of agriculture which increased local production of land-based crops in underdeveloped countries such as India and Thailand several decades ago. NELHA tenant Common Heritage Corp. is capitalizing on this potential, assisting third world countries to develop sustainable coastal communities by adapting integrated seawater systems to support food, water, and energy production.

Grapevines can be grown using deep seawater "cold-ag" methods which allow manipulation of growing seasons to maximize crop yields ten-fold over traditional methods.

TENANTS

NELHA's tenants are the key to its success. It takes expertise plus a good dose of persistence, tenacity, and resourcefulness to make a new entrepreneurial venture succeed. NELHA tenants' stellar record speaks volumes for the NELHA model and the business acumen of the long time tenants who maintain steady business activity from year to year.

During the reporting period, 15 NELHA tenants were fully commercialized, six were engaged in pre-commercial research, five were involved in basic research, and three were providing educational or community services. Of these 29 active tenants, 23 were from the private sector. Five more new projects were preparing to join the NELHA community as tenants.

Percentage rent revenues to NELHA increased by 30% from the previous year, as shown in Figure 3, despite the economic hardships in national and global markets.

During FY02, NELHA's 29 tenants were leasing 310 acres or 43% of all its leasable lands. Of the 870 acres under NELHA's jurisdiction, 52% was in use by the end of FY02 with another 46 acres slated for development in the coming year by seven tenants.

The following section, arranged in alphabetical order, provides a brief description of each tenant's activities at NELHA.

AQUASEARCH, INC. (MERA PHARMACEUTICALS*)

Aquasearch Inc. has been a tenant at NELHA since 1995. Specializing in marine biotechnology, it has been a global leader in the development of proprietary, cost-effective, photobioreactor technology for commercial scale production of pure cultures of microalgal species, and in research and development of high-valued products derived from microalgae. Aquasearch has capitalized on its new 3-acre Hawaii Research, Development and Production (HRDP) Facility, constructed during FY99, allowing Aquasearch scientists to conduct

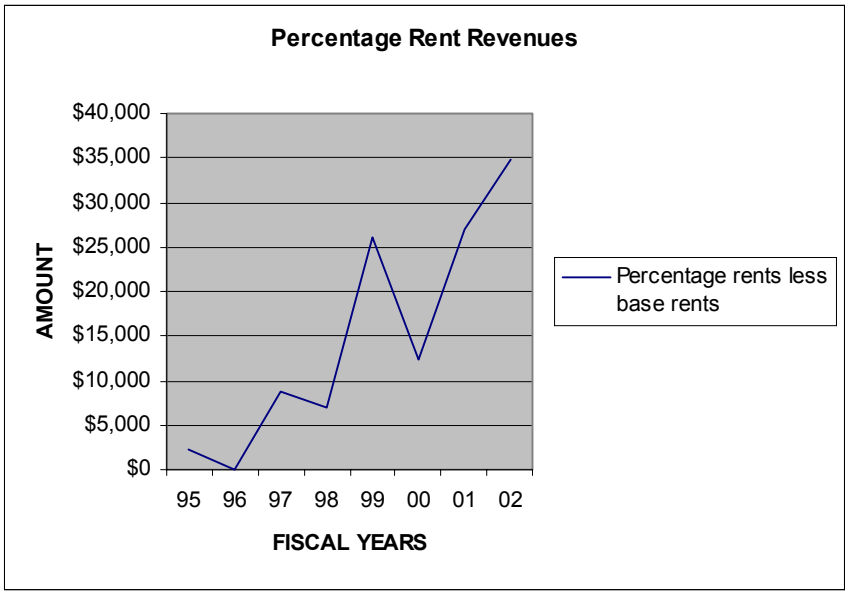


FIGURE 3. Percentage rent from tenants is collected by NELHA when 2% of gross sales, less allowable exclusions, is greater than base rent. Data shows payments beyond the minimum base rent for leased land.

LEFT: Big Island Abalone Corporation's shipping boxes. RIGHT: Ezo awabi abalone from BIAC's NELHA aquafarm growout tanks.

R&D on new microalgae products on the lab bench and to ramp up from laboratory-scale culture flasks to fully computerized mass production, all in the same location. The cornerstone of the microalgae-based business and key to this versatility is Aquasearch's proprietary and economical photobioreactor technology, the Aquaculture Growth Module (AGM). Due to its research advances, AGM cultures yield ten-fold increases from previous production capacities.

During FY02, Aquasearch underwent major organizational changes, including involuntary bankruptcy proceedings, and a change in leadership. By June 2002, reorganization plans were confirmed in U.S. Bankruptcy Court in Hawaii, allowing the company to rapidly proceed with pursuit of its goals of developing, producing, and marketing nutraceuticals and pharmaceuticals derived from aquatic plants. Reorganization financing was in place or committed to allow the payment of creditors' claims in accordance with the reorganization plan.

*A name change to Mera Pharmaceuticals after a merger with the company of the same name was anticipated to reflect the increased long term emphasis on pharmaceutical discovery and development. In the meantime, the company aggressively continued to market their nutraceutical line and looked forward to new beginnings in this burgeoning field of economic development.

BIG ISLAND ABALONE CORPORATION

The Big Island Abalone Corporation (BIAC) capitalizes on global demand for fresh abalone products and its expertise and experience in abalone culture and production. The NELHA Board first approved BIAC's proposal in FY97, allowing the company to commence pre-commercial research phase activities in early FY98. BIAC is commercializing the closed culture of abalone, focusing on production of high-value Japanese northern abalone for the Asian market on the first ten-acre increment of its planned 60-acre aquafarm.

During FY 02, BIAC forged ahead with its commercial development on its newly completed 10-acre state-of-the-art abalone aquafarm in the HOST Park, now the largest single abalone production facility in the world outside of China. With a design capacity of 100 tons/year, BIAC's aquafarm has performed exceedingly well, growing inventory rapidly.

The company has over 1 million *Ezo awabi* abalone in stock and began shipping this highly prized species to market in the first quarter of 2002. Proprietary production methods have made the BIAC nursery one of the highest yielding in the world. The company launched sales of its new "Souvenir Six Pack" with JALPAK, a major travel agent, to allow visitors to carry home live abalone in an insulated carry-on box. BIAC ships both *Ezo* and red abalone to local, Asian and domestic US markets.

BLACK PEARLS, INC.

Black Pearls, Inc. (BPI) developed specialized hatchery technology for black-lip pearl oysters, *Pinctada margaritifera*, to allow production of valuable black pearls in Hawaii and the Pacific. BPI pioneered ocean leasing in Hawaii, to prepare the way for the state's first commercial pearl farming efforts. The company sought to obtain an ocean lease for a site on the island of Oahu which would be stocked with seed provided by the hatchery/nursery facilities at NELHA in Kona, and continues to work towards obtaining a lease, the first of its kind in Hawaii. Using its mobile hatchery methods, the company also operates a commercial pearl farm in the Marshall Islands, and has been working with established pearl farm operations in the Philippines to boost production. During FY02, BPI commenced development of its new commercial site in the NELHA Small Business Compound and engaged in transferring equipment and livestock from the Research Compound site to the new commercial facilities.

CHC President John Craven and grapevines in a coldwater agriculture 'vineyard' at Keahole.

COAST SEAFOODS

A well-established oyster company originally incorporated in 1946 in Washington state, Coast Seafoods Company has become the largest oyster company in the U.S. Coast Seafoods operates a nursery at NELHA to provide an economical way to grow bivalve spat year-round. The organisms are shipped to Hawaii immediately after settling from the last swimming larval stage, when they are about 1 mm in size, then given a "Hawaiian growout vacation" in the sunny climate of the NELHA facilities. Three and one half months later, they are returned to headquarters in the Pacific Northwest for final planting and growout in the ocean.

At the company's Keahole Point facilities, clam and oyster seed production is the focus, with additional work to research further improvements to the nutritional content of the algae fodder and to optimize processing techniques used to grow the oyster and clam seed. During FY 02 the company reported a number of advances in culture methods, including: successful spawning, larval rearing and settlement of shellfish larvae; introduction of new commercially important bivalve species and establishment of new market territory; adoption of continuous algal culture methods; introduction of new high quality algal culture methods for shellfish larvae; and introduction of successful oyster culture methods.

COMMON HERITAGE CORPORATION

Common Heritage Corp. (CHC) exists to further its mission of the "management of innovation for the benefit of the Common Heritage." To this end CHC maintains a demonstration site at NELHA that incorporates an integrated system of deep ocean water technologies for a state of the art "starter system" that can be applied in coastal communities around the world such as Haiti, the Cape Verde Islands, Curacao, Mexico, and others with access to cold deep ocean water.

CHC first dedicated its unique DOW demonstration system at NELHA on January 31, 1998, to celebrate its many significant world class breakthroughs in the use of coldwater technologies. The CHC facility has since become known as the birthplace of the blue-green revolution.

The integrated DOW demonstration system employs deep ocean water sequentially to air condition the CHC office, to generate fresh water by condensation, to supplement irrigation, to generate fresh water in a development model of a desalinization device called a "hurricane tower" (patent pending), to cool a chill house and its chill boxes and food preparation area, to provide cold for the coldwater agriculture of wine grapes, to provide cold for the coldwater agriculture of a wide spectrum of agricultural crops normally grown in nontropical

climates, to provide cold for coldwater agriculture of superior tropical crops and landscaping of the facility, to provide cold and nutrients for the aquaculture of sea vegetables, to provide cold and nutrients for the aquaculture of “fruits de mer,” and to provide cold for creature comforts (water fountains, coldwater showers, field tents, and other habitat comforts).

CYANOTECH CORPORATION

Cyanotech Corporation has specialized in developing and commercializing natural microalgae-based products at NELHA since 1984 and has become NELHA’s largest and most productive tenant, with 90 acres currently in production. The well-established company produces a variety of high-value products for the nutritional supplement and immunological diagnostics markets in addition to microalgae-based products for the aquaculture feed/pigments and food coloring markets.

As NELHA’s anchor tenant, Cyanotech’s annual revenues are in excess of $15 million, derived principally from sales of products made from unique strains of the microalgae “Spirulina” for the vitamin and supplement market. As the world leader in microalgae technology, the company produces high-value natural products from microalgae, and is the world’s largest commercial producer of natural astaxanthin from microalgae. Products include BioAstin® natural astaxanthin, a powerful antioxidant with expanding applications as a human nutraceutical; NatuRose® natural astaxanthin for the aquaculture and animal feed industries; Spirulina Pacifica®, a nutrient-rich dietary supplement; and phycobiliproteins, which are fluorescent pigments used in the immunological diagnostics market. Spirulina and BioAstin are sold directly online as well. Ongoing research is showing many health benefits of the microalgae food supplements.

In July 2001, Cyanotech was awarded U.S. Patent 6,258,855, “Method of Retarding and Ameliorating Carpal Tunnel Syndrome,” based on the protective properties of BioAstin natural astaxanthin. In May 2002, Cyanotech reported that a double-blind, placebo-controlled clinical study of its BioAstin natural astaxanthin product by an outside research group showed improvement in the condition of patients with Carpal Tunnel Syndrome. Patients in the study using BioAstin reported a reduction in both the severity and duration of pain. According to a recent Occupational Safety and Health Administration (OSHA) study, an estimated three million Americans suffer from Carpal Tunnel Syndrome with total costs to the economy, including workplace disruption, estimated to exceed $15 billion annually.

In a move to better service its growing customer base in Japan, Cyanotech formed a Japanese business unit, Cyanotech Japan YK, with an office in Tokyo, commencing January 2002. Through this unit, Cyanotech will be able to economize on shipping, provide more timely delivery to customers and allow customers to conduct business in Japanese Yen rather than US Dollars. Of interest to Japanese as well as other aquaculture interests worldwide, feeding studies in Japan have shown that NatuRose is more effective than synthetic astaxanthin, particularly for aquacultured species such as the popular finfish Sea Bream (or “Tai”), a major seafood product in Japan. NatuRose has also been shown to be very effective when used with other species of fish and land animals.

In April 2002, Cyanotech announced new clinical evidence suggesting that the use of Spirulina stimulates the human immune response to cancer. This is the second cancer study with Spirulina on humans and the first to suggest a possible mechanism. Japanese researchers at the Osaka Center for Cancer and Cardiovascular Diseases found that a hot water extract of Spirulina taken orally caused a statistically significant increase in both the number and the effectiveness of immune cells called natural killer cells.

Cyanotech currently markets its products in the United States and thirty other countries through a combination of retail, wholesale and private label channels. As evidence of its environmentally responsible philosophy, Cyanotech was the first microalgae company in the world to receive third party organic certification as an ISO 9002 Registered Quality System. The company incorporates natural production methods and resources as well as extensive recycling of raw materials and nutrients. The Cyanotech production system operates without the use of pesticides and herbicides, and does not create erosion, fertilizer runoff or water pollution. These methods make good economic as well as environmental sense, resulting in lower operating costs overall.

ENZAMIN USA

Enzamin USA, Inc. is a company with origins in Japan where it has a well-established product line based on *Bacillus natto*. This bacterial strain is derived from fermented soybeans, or *Natto*, a food item reputed to have many health benefits and popularized in Japan since the 17th century.

In September 2000 the company received approval to commence pre-commercial research at NELHA to develop health drinks, health foods, dietary supplements and skin care products utilizing water and minerals derived from DSW. Enzamin has a previous record of success in the beauty care business with over $100M annual sales. It is a solid company with an excellent reputation and the financial ability to be a long term asset to NELHA due in part to its strong existing market and distribution network. It currently sells diet drinks, supplements and beauty aids I over 20 major spas and over 6,000 beauty shops. One advantage the company has is its broad base with many products which makes it less vulnerable to the whims of a fickle consumer market.

Research and development activities, including test marketing of new deep seawater products, occurred during FY02, with commercial operations projected to begin in FY 03. Funds are already available to accomplish these plans without the company having to seek external funding. Enzamin feels it can enhance NELHA's reputation by developing strong ties to the local community through such avenues as job creation as well as donating health products to hospitals, nursing homes, and other health facilities. The company is actively pursuing the acquisition of a long term sublease to implement its long range plans on its new commercial site in HOST Park.

HAWAII DEEP MARINE, INC.

Renting laboratory, office and outdoor space in the Research Compound, Hawaii Deep Marine, Inc. continued its R&D and test marketing activities during FY 02. Under a former name, Hawaii Deep Marine Water Production Plant LP, the company commenced seawater desalination in FY00 using state-of-the-art reverse osmosis (RO) technology. Test marketing activities commenced soon thereafter to optimize production methods and perfect products that could meet the high food and beverage standards in Japan.

Deep seawater products are proving to be very popular in Japanese consumer markets.

The Japanese consumer market has developed a fascination with deep ocean water due to research and development activities conducted in Kochi Prefecture and other locations in Japan. HDMI was established to tap into the growing beverage and health supplement market that is developing in Japan and Asia centered around the use of deep seawater.

In FY01, the company also began leasing 4.5 acres of commercial space in the HOST Park, expeditiously grading the property in September 2000 in anticipation of the impending commercialization of the new business. New management and reorganization at the end of FY01 brought additional resources and expertise to serve the company's ambitious development plans. New product development continued in FY 02, with test marketing of new food grade products commencing in both Japan and Hawaii to eager consumer markets.

HAWAII DEEP OCEAN WATER LLC

Hawaii Deep Ocean Water (HDOW) LLC has been conducting pre-commercial research and development since 1999 using NELHA deep seawater resources. The company maintains a small research lab at NELHA. A strong parent company based in Gifu Prefecture, Japan, for over 20 years provides support and a well-developed production, marketing, and sales system into which the new products are being introduced. HDOW has commenced test marketing of deep sea water beverages in Japan with promising results and is actively devel-

oping other novel products as well. Commercial production of the innovative products will be launched in the Spring of 2003 at a facility expansion site in Gifu in April 2003, with more activity in Hawaii to follow. The company plans to embark on its commercial production phase at NELHA in the next few years, with the intention of bringing a bottling plant to the HOST Park.

HIGH HEALTH AQUACULTURE, INC.

High Health Aquaculture (HHA) supplies certified Specific Pathogen-Free (SPF) broodstock to the world's shrimp hatcheries. They operate a first phase facility that includes basic infrastructure (water, air, electrical and security systems) and broodstock rearing tanks and a shrimp reproduction system. During FY00-01, the company continued to work on developing new stocks of certified Specific Pathogen-Free (SPF) stocks of *P. stylirostris* and *P. vannamei*. During FY02, the company completed buildout on expansion acreage, doubling production capacity. The company's motto is: "Healthy shrimp are profitable shrimp."

INDO-PACIFIC SEAFARMS, INC.

Indo-Pacific Sea Farms' mission is to develop and commercialize innovative technologies for sustainable production of reef-dwelling organisms. IPSF's present research and development emphasis is on photosynthetic molluscs and cnidarians, primarily giant tridacnid clams and scleractinian corals. These photosynthetic-capable animals derive nutrition from their association with microscopic algal symbionts called zooxanthellae. The pristine seawater supply at NELHA provides an ideal environment for these organisms. Cultivation requirements for the plant-animal symbionts are similar to those of free-living microalgae and include ample tropical sunlight, warm surface seawater and a carefully controlled concentration of deep seawater to control temperature and supplement essential inorganic nutrients. IPSF uses no commercial feeds and produces no seawater pollution with this novel approach. IPSF products are currently in demand in the seafood and aquarium industries and also have potential biomedical applications.

KONA BAY MARINE RESOURCES, INC.

Formerly known as Kona Bay Oyster and Shrimp Company, Kona Bay Marine Resources, Inc. (KBMR) produces blue shrimp as well as oysters and clams in a specialized symbiotic polyculture system. The KBMR culture system reduces labor required for operations while increasing product output. This makes a significant difference in projected business development costs and has contributed to their confidence about the future. During the reporting period, KBMR maximized production on its existing 2.5 acre commercial grow out operation and put into place plans for further expansion onto approximately 20 acres for their next stage of development in HOST Park while simultaneously negotiating a long term sublease with NELHA.

KONA COLD LOBSTERS LTD.

Kona Cold Lobsters Ltd. (KCL) utilizes the deep cold seawater supplied by NELHA to create a habitat for live Maine lobsters and live Dungeness crabs. KCL imports live lobsters and crabs from the natural fisheries and rejuvenates them in cold seawater holding pens for distribution throughout the Hawaiian Islands and select Asian destinations. KCL is therefore able to provide the freshest, most stable supply of live Maine lobster in the Pacific basin. Currently KCL services over 50 customers on five Hawaiian Islands, including supermarkets, restaurants, and resorts, meeting their specific size and quantity requirements on a daily basis.

Maine lobster natually occur only in temperate climates, but can thirve in the subtropical coastal desert of Keahole if kept in a supply of chilly, pristine NELHA deep seawater.

Moana Technologies, Inc. commenced its pre-commercial research project during FY02, testing the suitability of colorful covered structures such as these for its production facilities.

KCL also has the expertise and experience to culture Maine lobsters in a multidisciplinary system that includes broodstock, husbandry, nutrition, pathology and habitat design. KCL has successfully bred and raised lobsters from egg to sexual maturity for over 20 years. Recovery of the lobster fishery after a long period of decline lowered market prices sufficiently to put production of a high-quality Hawaiian-bred Maine lobster on hold, but KCL maintains the capacity to become operationally independent of the natural fishery should environmental conditions change.

MARINE BIOPRODUCTS, INC.

A subsidiary of Marine BioProducts International Corporation of Canada, Marine BioProducts, Inc. established a research facility at NELHA in 1998 to investigate the feasibility of commercial macroalgae culture in the Keahole environment. The research project solved a number of problems, and concluded that commercial applications were indeed feasible. The Vancouver-based company planned to be the first agar producer to offer premium specialty agar products extracted from specific strains of cultivated seaweeds utilizing its proprietary cultivation and extraction technologies. The company engaged in extended negotiations with NELHA for approximately 20 acres of land in HOST Park, but after the 9/11 economic downturn, found that a Hawaii facility would not be possible after all and, in February 2002, withdrew its bid on the commercial space in HOST Park to focus its resources on existing processing facilities in Canada.

MOANA TECHNOLOGIES, INC.

Moana Technologies, Inc. received NELH Board approval in concept in April 2001 for an ambitious commercial project specializing in shrimp brood stock genetics using traditional breeding techniques. The new company came to NELHA with a strong technical team and solid financial backing. Project principals signed a Facilities Use Agreement for pre-commercial research space in the Fall of 2001. The new company developed a facility on Oahu which serves as a quarantine site to screen all genetic stock prior to introduction at the company's NELHA Keahole sites. During FY 02, successfully quarantined shrimp stock were transferred to the NELHA research site following strict biosecurity protocols. At NELHA, animal grow out cycles will be closely monitored

and access to the site limited only to company personnel with biosecurity clearance. The company received NELHA approval of its Final Proposal/Business Plan in July 2001 and subsequently negotiated a long term sublease for an 11.4 acre commercial site in HOST Park. Preparation for major construction activities initiated during FY 02 set the stage for buildout during the following year.

Responsible aquaculture of marine ornamentals such as this live seahorse can help alleviate the impact of overfishing on natural fisheries around the world.

OCEAN RIDER, INC.

Ocean Rider, Inc. came to NELHA in 1998 from Harbor Branch in Florida. Citing the pristine quality of the seawater supply as the primary attractant, the company soon established an active pre-commercial research project in the NELHA Research Compound to optimize proprietary culture systems for the care and feeding of these exotic and beautiful animals. The company is developing proprietary breeding and grow out facilities and methods for the commercial production of seahorses, primarily targeting the live ornamental fish industry outside of Hawaii.

During FY 02, the company sought and obtained a long term sublease on a commercial lot in the new NELHA Small Business Compound and began construction of its new facilities. Transfer of equipment and livestock was also begun as the new site was being prepared. Sales of seahorses have continued to increase, and satisfied customers worldwide continue to report gratitude for the high quality services and products from this innovative company.

ONO TAKE, INC.

Ono Take, Inc. has been using deep seawater to create temperature-controlled environments for the cultivation of mycomedicinal mushrooms. The company specializes in production of the highly esteemed *shiitake (Lintinula edodes), reishi* (*Ganoderma lucidum*) and *maitake* (*Grifola frondosa*) mushrooms. These have long had a reputation in the Far East for support and enhancement of human immunological function. Scientific research suggests the active ingredient in these mushrooms, a polysaccharide compound identified as beta glucan D-fraction, may support healthy levels of macrophage and natural killer cells, inhibiting the growth of certain cancer cells, and may also support production of interferons. During FY00-01, Ono Take continued research and development to produce an encapsulated form of the mycomedicinal mushrooms for test marketing.

Ono Take uses deep seawater to maintain temperature-controlled microclimates preferred by the fruiting bodies of these fungi. Cold ocean water chills fresh water in a small heat exchanger, eliminating potential corrosion in the cooling system. They are able to cool down 12,000 cubic feet of culture room space from 80º to 70º F (ten degrees) using approximately 203Kgal/month of DSW (approximately $15 worth per month). DSW warms only 6ºF in the heat exchanger, allowing it to be recycled for other uses.

PACIFIC HARVEST, INC.

Pacific Harvest, Inc. (PHI) has established the largest Pacific threadfin (locally known as *moi*) aquafarm in the state at NELHA. *Moi* were so highly prized in ancient Hawaii that they were reserved for consumption only by royalty. In recent years, the natural fishery has been depleted, and commercial *moi* farming now has great market potential as a new industry for Hawaii.

Pacific threadfin, or moi, was once reserved only for Hawaiian royalty. It is a highly prized, delicate fish favored by many.

During FY 02, PHI completed its construction on expansion of growout facilities and development of a hatchery/nursery to provide an independent source of juveniles. The company continued to develop culture methods for other high value finfish, including *kahala* (amberjack), a highly prized species that, in nature, is plagued by parasites but can be cultured parasite-free. PHI also expanded research activities to include *omilu, mahimahi* and marine ornamental finfish to broaden its capabilities for the future.

ROYAL HAWAIIAN SEA FARMS, INC.

Royal Hawaiian Sea Farms, Inc. (RHSF) has been in business at Keahole since 1987 and commercially produces *limu*, or edible sea vegetables. Sales of these popular nutritious delicacies have consistently reached over two tons per week. A pickled *ogo* (*Gracilaria*) product is being processed under the "Waimanalo Ko-Ko" brand. In addition to *limu*, RHSF also produces salt water tilapia (*Tilapia*) and milkfish (*Chanos*). Intensive applied research is being conducted to investigate the potential of commercially producing edible sea cucumbers (*Stichopus*), the Hawaiian limpet, *opihi* (*Cellana*), and warm water abalone (*Haliotis*).

STATE UNIVERSITY OF NEW YORK MARINE SCIENCE CENTER/GEORGIA INSTITUTE OF TECHNOLOGY

Dr. Jeanette Yen of Georgia Institute of Technology, formerly with the State University of New York at Stony Brook Marine Science Center, has been conducting research at NELHA periodically for many years. She focuses on the micro-processes involved in the feeding behavior of a type of deep seawater copepod. Living in all the oceans of the world, copepods are small marine crustaceans which form an important link in the oceanic food web, passing nutrients from single-celled plants (phytoplankton) to larger animals such as fish, for whom they serve as food.

Dr. Yen's research involves the study, on a microscale, of fluid dynamics involved in copepod feeding behaviors. She relies on the supply of experimental organisms obtained by straining the incoming deep seawater supply at NELHA. Obtaining specimens by this method of collection is more economical, less time-consuming, and less damaging to the organisms than the traditional method of collecting these types of organisms from research vessels.

TAYLOR SHELLFISH—KONA

Taylor Shellfish–Kona is a subsidiary of Taylor United, a family-owned company reputed to be the largest commercial shellfish producer in the U.S. Headquartered in Quilcene, Washington, since the late 1960s, Taylor achieves maximum marketing flexibility by operating a range of nursery and growout locations for several varieties of shellfish.

One of these sites is a nursery at NELHA where both Manila clams (*Venerupis japonica*) and Pacific oyster (*Crossostrea gigas*) spat enjoy a "Hawaiian growout vacation" during their early months of growth. The company's shellfish "seed" or "spat" start life in a hatchery in the Pacific Northwest. When only about 250 microns in size, soon after settlement from the swimming, or planktonic stage, they are brought to the Kona facility. After about three months of growth on screens and sand-filled raceways, they reach about 5-6 mm, and most are returned to Washington state for 1-4 years of growout to market size in Taylor's facilities.

The NELHA nursery annually produces 100-120 million oyster seed and 200-300 million clam seed. Some of these are also sold to other oyster and clam farms around the world, including destinations as far away as South Africa.

The Kona nursery makes good economic sense to Taylor since the unique NELHA dual seawater supply enables the company to maintain the precise temperature regimes required by the delicate early stages of growth for very low cost, and Hawaii's winterless climate allows year-round productivity instead of only seasonal production. During FY00-01, Taylor Shellfish–Kona worked on developing an expansion of their facilities to meet growing market demand for their high quality products.

UNIVERSITY OF HAWAII INFRASOUND LABORATORY OF HAWAII

UH-ISLA's IS59 infrasound array is located on the slopes of Mt.Hualalai, an exceptionally quiet setting.

A unique project that collects and analyzes data from infrasonic signals (pressure disturbances whose frequencies are below the hearing range of the human ear) in the atmosphere became a NELHA tenant during FY00-01. Approved by the NELHA Board in August 1999, the Infrasound Laboratory of Hawaii ("ISLA") is a project of the Hawaii Institute of Geophysics and Planetology at the School of Ocean and Earth Sciences and Technology, University of Hawaii at Manoa.

Initially supported through U.S. Department of Defense funds, ISLA is part of an international network dedicated to monitoring compliance with the Comprehensive Nuclear Test Ban Treaty (CTBT). The CTBT seeks to eliminate the proliferation and use of nuclear weapons and to ensure complete global disarmament under strict international control.

ISLA operates and maintains IS59, or KONA, a 4-element infrasound array located on the forested slopes of Mt. Hualalai. The array has exceptionally low ambient noise levels and acoustic detection thresholds and can detect low-frequency atmospheric sound waves generated by natural and man-made sources such as explosions, volcanic eruptions, meteorite impacts, and severe weather and thus may provide advance warning of potential threats to Hawaii.

ISLA can analyze various aspects of infrasonic wave propagation, source characterization, and event location. Ongoing research concentrates on infrasonic tracking of storms systems, modeling sound wave propagation over thousands of kilometers, characterizing the ambient infrasonic field in the Pacific, optimizing wind-noise-reducing systems, and ray-tracing of wave paths from atmospheric meteor entries.

UNIVERSITY OF HAWAII SEA GRANT EXTENSION SERVICE

The national Sea Grant College Program supports an innovative program of research, education and extension services directed to the improved understanding, management, and use of marine resources of the state, region and nation. Sea Grant is a collaborative effort of the public and private sectors, utilizing federal, state and community support. The University of Hawaii at Manoa (UHM) has been a charter Sea Grant college since 1970, and, through its Sea Grant College Program in the School of Ocean and Earth Science & Technology (SOEST), maintains an Extension Service (SGES) office in West Hawaii at NELHA.

The Hawaii Sea Grant College Program serves a geographic area that includes the Hawaiian archipelago and the U.S.-affiliated Pacific islands. Sea Grant funds research in aquaculture, fisheries, shoreline processes, and education. Its Extension Service focuses on technology transfer, coastal resource management, environmental education, sustainable economic development and capacity building and training. Shaping the program offered in West Hawaii is the mission statement: "To raise consciousness about marine and coastal resources, build consensus, understanding and commitment to establish a sustainable resource management ethic."

In the early days of NELH, it was Sea Grant that provided funding for the first aquaculture research projects which explored economically promising uses of deep seawater at Keahole during the 1980s. Results provided the evidence for launching the first NELH tenant aquaculture businesses. UH Sea Grant also funded the first coldwater agriculture experiments at NELH in the 1980's, opening up further terrestrial applications using deep seawater.

NELHA OUTREACH SUPPORT. The UH-SGES Agent is responsible for providing at least one NELHA public presentation per week as part of a cooperative agreement with NELHA. UH-SGES plays a pivotal role in NELHA outreach functions by coordinating the new volunteer docent training course and maintaining the resulting docent program to supplement the existing NELHA outreach services. During FY02, Agent Sara Peck worked with Hawaii Community College to deliver training coursework to teach presentation and tour guide skills to interested Big Island residents.

Ambassador docent Roy Damron explains NELHA's accomplishments to interested visitors.

During FY02, numerous public presentations were made by the volunteer NELHA docents. In addition, this enthusiastic volunteer group also continued to work on upgrading and maintain NELHA visitor displays and exhibit materials. With the guidance of NELHA's administrative office and UHSGES, the Ambassador volunteers formed an independent, not-for-profit corporation, the "Friends of NELHA" (FON), dedicated to telling the NELHA story to visitors and residents, to providing volunteer support for the Ambassador program, and to fostering community support for NELHA's initiatives.

UNIVERSITY OF CALIFORNIA AT SANTA CRUZ

Dr. Matthew McCarthy of the Ocean Sciences Department at the University of California at Santa Cruz brought his research proposal to NELHA during FY 02 seeking to conduct some basic research in the summer of 2002 centering on biogeochemical cycles in the ocean from an organic chemical perspective. His specialty focus is on how organic molecules link biological and geochemical processes and mediate flows of carbon, nitrogen, and energy. A main area of interest has been understanding the identity, sources and dynamics of the reservoir of dissolved organic nitrogen in the oceans.

The goal of his research project was to couple unparalleled access that NELHA provides to large volumes of central Pacific seawater with large volume ultrafiltration techniques, in order to isolate large samples of naturally occurring dissolved organic nitrogen compounds. These large samples then allow his laboratory to apply a number of novel and experimental techniques toward a larger goal of understanding organic nitrogen composition and its cycling in the open sea. Dr. McCarthy planned to conduct two continuous sampling series at NELHA in the summer and winter of 2002.

UWAJIMA FISHERIES, INC.

Uwajima Fisheries, Inc. (UFI) operates a facility at NELHA for growing *hirame*, a flounder highly prized by the Japanese for *sashimi* and *sushi*. Uwajima Fisheries markets their 1.5 to 2 pound *hirame* through a Honolulu distributor who supplies the Oahu *sushi* market. UFI manages the maturation and spawning of their broodstock for year-'round production of eggs. UFI also utilizes the NELHA surface and cold deep seawater for the semi-intensive polyculture of marine shrimp, milkfish and the edible seaweed, *Gracilaria spp.*, also known locally as *ogo*. With this system they are able to produce high quality, superior products.

Additionally, UFI engages in broodstock management, spawning, larval rearing and commercial production of Pacific threadfin (*moi*) for local markets. UFI continued work to expand its production site, adding nearly two acres to its existing site during FY01, and worked with NELHA to allow preservation of a small archaeological site on its premises.

U.S. COAST GUARD

Since December 2000, the U.S. Coast Guard has been operating a radio direction finding (DF) antenna on the NELHA Laboratory Building at Keahole Point to aid mariners in distress. The Coast Guard uses VHF sites around the island to respond to mariner distress calls. Six sites in Hawaii are monitored from Sand Island, however the site at NELHA would help in determining the mariner's actual location. NELHA is a perfect site due to its unobstructed views, low RF noise, and accessible power and phone lines. The DF antenna they installed is only 35 inches high and weighs approximately 14 pounds. The federal agency has plans to upgrade systems in the year 2005 and, although a site a NELHA may not be necessary at that time, in the interim it is a vital component to ensure mariner safety. NELHA provides electrical service and access for maintenance to the Coast Guard at no cost as a public service.

WEST HAWAII EXPLORATIONS ACADEMY—PUBLIC CHARTER SCHOOL

The West Hawaii Explorations Academy (WHEA) operates as a public charter school on a small site at NELHA, becoming the first charter high school in the State of Hawaii in May 2000. The school began its tenancy at NELHA in 1994 as an integrative educational program of Konawaena High School and the state Department of Education. Each year its student body, consisting of mostly juniors and seniors, spend a full academic year at NELHA working on projects related to the resources available at Keahole Point.

By FY 02, construction activities had been completed to double the size of an existing 30' x 40' pavilion-style shop, install semi-perimeter fencing, excavate for campus-wide underground electrical service, and expand the existing 30' x 30' classroom/office constructed by the Department of Education. Attaining status as a New Century Charter School opened up opportunities for funding from state and federal sources and also increased program autonomy for the innovative school.

WHEA continues to make important contributions to science through student research efforts and to the development of local talent to feed into the human workforce pool. WHEA student projects have included educational presentations to 2500 elementary school students, 300 middle and high school students and 300 adults per year; a solar car prototype; design and construction of an electric car which placed first in a field of 24 high school teams from across the state in the annual HELCO-sponsored Electron Marathon championship race; an environmentally friendly wastewater cleaning project using native *makaloa* grass (sponsored by a collaboration of Bishop Museum, the National Biological Service, and the Amy Greenwell Ethnobotanical Garden); a VOG monitoring project; hydroponic and cold-water agriculture; and one commercial and several research aquaculture projects.

WOODS HOLE OCEANOGRAPHIC INSTITUTION

The Woods Hole Oceanographic Institution (WHOI) website explains that WHOI "is a private, independent, not-for-profit corporation dedicated to research and higher education at the frontiers of ocean science. Its primary mission is to develop and effectively communicate a fundamental understanding of the processes and characteristics governing how the oceans function and how they interact with the Earth as a whole." WHOI researcher Dr. Daniel Repeta traveled from Woods Hole, Massachusetts, to conduct large volume sampling of dissolved organic matter from NELHA's seawater supply in February 2002. In keeping with the WHOI mission, his work focuses on the long term study of natural mechanisms by which the element carbon is sequestered in seawater due to phytoplankton growth, and the chemical composition of organic carbon as it moves through natural oceanic cycles. Use of NELHA resources for studies such as this one saves scientists valuable time and money since the alternative would be booking costly time on a research vessel. Dr. Repeta completed his sampling activities successfully and planned to return in 2003.

SUPPORT SERVICES

BOARD OF DIRECTORS

The NELHA Board Vision Statement: "Growing sustainable industries for the 21st century" summarizes the Board's intent that NELHA's many activities all support its legislative mandate to promote economic development and diversity.

The NELHA Board of Directors is responsible for establishing policies pertaining to NELHA operations and growth, maintaining NELHA property and facilities, reviewing and approving proposals from prospective and existing tenants, and planning and coordinating the development of the NELHA site. NELHA staff provide support with technical assistance and by developing staff recommendations to assist the Board in its decision-making. Board members serve as volunteers and represent a broad range of interests.

Investigative committees formed by the Board during FY 01 continued to serve their purposes well during FY 02 by allowing specific issues to be addressed and discussed outside of Board meetings, streamlining the actual monthly meetings of the Board. The committees included the Commercial Activities Committee and the Science Development Committee (formerly the Strategic Development Committee) which joined the statutorily established Research Advisory Committee in providing the Board with valuable review and investigation of specific topics. An Audit Committee was disbanded during FY 02 when its members left the Board. These committees included Board and community members with expertise in specific areas of relevance to NELHA. In accordance with HRS Chapter 92, Hawaii's "sunshine law", all committee and board meetings are publicly announced and are open to the public

In March 2002, the Board voted to move all of its monthly meetings to the Kona site at NELHA instead of alternating with a Honolulu venue every other month, with the option of meeting at other locations as needed. This change was prompted by NELHA's growth and dynamics, proximity to tenant project sites, facilitation of more tenant participation, ready access to NELHA staff, files and other data during Board meetings, and quorum issues.

The Board issued several requests for proposals (RFP) during FY 02 to support NELHA development. In the fall of 2001, an RFP was issued seeking proposals for a "centerpiece" commercial development to primarily engage in various ocean-related theme activities at the Keahole NELHA site as one of the core components of the NELHA Gateway. The primary objective of this solicitation was to seek proposals that would support development of activities with ocean-related themes that incorporate and feature NELHA resources while supporting NELHA's primary mission as outlined in HRS 227-D.

The success of NELHA prompted DBEDT to sponsor a study, the results of which were summarized in a report, "Preliminary Design for a NELHA Type Facility." The report recommended Kauai as the next best location for a coastal facility modeled after NELHA. The study was publicized in August 2001 and cited South Point on the Big Island, Port Allen and Kekaha on Kauai as the top three sites. The original study selecting NELH's location in the 1970's had concluded that South Point was the top choice due to its geological features, however Keahole was selected due to its combination of geological and logistical features.

MASTER PLANNING

During FY02, Board members also addressed long range planning following discussions in August 2001 with the State Department of Transportation (DOT) Director regarding intersection configuration, related roadway issues, and recommended options to support NELHA initiatives. As a result, the Board modified the NELHA Master Plan, designating a 75-acre area adjacent to the Queen Kaahumanu Highway on the north side of the NELHA Access Road to be set aside for commercial development and another area of approximately 40 acres to the south of the NELHA Gateway DER center site as a location for possible higher education facilities. The Board also endorsed the incorporation of a fully channelized intersection at the NELHA highway entrance in the DOT- Highways Division plan for this area. Subsequently, an RFP was issued for the NELHA Gateway Ocean/Commercial Center to seek developers for the 75-acre area.

NELHA is seeking funding to support development of an airport connector road to connect an approximately 0.75 mile gap between two existing roadways at the Kona International Airport at Keahole and NELHA. Staff have been working with legislators including State Senator Lorraine Inouye and U.S. Senator Daniel K. Inouye towards this end.

PERSONNEL

At-Large Governor's Appointee Director Barry Mizuno submitted his resignation in August 2001 due to potential conflicts of interest. The Executive Director was asked to sit in on HTDC and HSDC meetings in the interim until a replacement was selected. Richard Henderson, former state senator, joined the Board in December 2001, and Marni Herkes of the Kona-Kohala Chamber of Commerce in April 2002. Long time representative of the University of Hawaii (UH), Dr. Ralph Moberly, retired in October 2001, and was succeeded by Dr. Richard Rocheleau of the UH Hawaii Natural Energy Institute, and long time DLNR representative, Mason Young, served through December 2001 then was succeeded by DLNR Land Agent Harry Yada in January 2002. Director Richard Lim's term expired in June 2002. Tom Whittemore, whose term ended June 30, 2002, was re-appointed for a second term through June 2006. Director Peter Young was elected to succeed John Corbin as Vice-Chair through the end of the calendar year, and then succeed Director Whittemore as Chairman of the Board in CY2003.

ADMINISTRATION

The administrative staff includes the Executive Director, Administrative & Projects Manager/NELHA Gateway Manager, Fiscal Officer, Operations Manager, Scientific/Technical Director, Engineering Projects Coordinator, and Leasing & Tenant Relations Specialist. These individuals work closely together to manage the NELHA facilities, plan its infrastructure, recruit new tenant prospects, and maintain the systems and physical plant that allow NELHA to operate as the successful agency that it is. They also coordinate and implement required procedures with the Departments of Accounting and General Services, Agriculture, Land and Natural Resources, Transportation, Budget and Finance, Health, and the Attorney General, as well as the Governor's Office, the Hawaii State Legislature, and various County and Federal agencies. The Executive Director oversees all operations and functions of the NELHA Sections, working at the pleasure of the Board of Directors.

LEGISLATION

NELHA appreciated the support from the many legislators and their staffers who provided vital information before, during and after the 22nd Session of the Hawaii State Legislature. Funding was sought for $1 million to fund Phase 2 of NELHA's potable water supply line.

FY 02 brought additional challenges as the Legislature struggled to balance the state budget by cutting agency budget requests and raiding special funds. In this regard, NELHA did not fare well. Through passage of Act 178, NELHA lost $200,000 of its hard-earned special fund reserves as of July 1, 2002, and through Act 177, its FY03 General Fund appropriations were reduced by $254,411. This decrease of over $450,000 will have significant impacts on the biennium budgets for FY03-04 and beyond.

In other legislation, Act 103 Relating to Subleasing of Public Lands provides the opportunity for NELHA to further streamline lease processing through the state system by allowing waivers from the currently required BLNR approvals. Act 77 Relating to Energy Resources mandates that all state agencies must reduce energy consumption in general and expand the use of renewables while reducing dependency on petroleum generated energy.

State Representative Helene Hale introduced an initiative to re-open the NELHA Puna site for private sector projects using geothermal heat in much the same way as ocean cold water is being used at NELHA Keahole. NELHA had operated a successful community research program there in the 1980s. Although the resolution

was passed by the Legislature, NELHA could not endorse its signing by the Governor due to an estimated reopening cost of $1 million and a yearly operating budget of $75,000.

REORGANIZATION

The Executive Director continued to pursue reorganization of NELHA staff positions, an ongoing effort for the last several years to update the official organization chart currently used by the State Budget & Finance Department and Legislature. The old chart still shows positions that were abolished during the 1994 downsizing. During FY 02, new position descriptions were submitted, reflecting the current and future needs of NELHA operations.

SOLAR ENERGY PROJECT

Following the consideration of an innovative proposal by Solar Electric Alternative, Inc. to bring photovoltaic power arrays to NELHA, the Board of Directors decided to open the field to other proposers in order to find the best the market had to offer. Therefore, in Dec 2001, the Board voted to issue a Request for Proposals to provide solar power for equipment located on the NELHA Ka'u pump station site. Before the RFP was issued, requesting proposals by mid-April 2002, it was expanded to include selected pumping stations and administrative buildings.

The intent of the NELHA Board of Directors, through this solicitation, was to reduce operating costs and simultaneously demonstrate the viability of renewable energy technologies by encouraging the installation of renewable energy systems to provide power for water pumping and other infrastructure requirements at NELHA. During FY02, NELHA commenced negotiations with PowerLight Corporation, the selected proposer, regarding the installation of a series of photovoltaic arrays at NELHA facilities to allow solar powered pumping of its seawater supplies and electrical supply for its administrative buildings.

NELHA OUTREACH

Visitor interest in NELHA and its activities is high, but due to severe staffing and funding cutbacks since the mid-1990s, staff time to provide these services has been virtually reduced to zero. An agreement between NELHA and the University of Hawaii Sea Grant Extension Service (UH-SGES) since 1997 has allowed the UH-SGES West Hawaii Extension Agent, who also serves the greater West Hawaii community, to provide certain NELHA outreach services in exchange for use of NELHA office space in a mutually beneficial arrangement.

Under the guidance of the Sea Grant Extension Agent, the newly created, independent not-for-profit Friends of NELHA volunteer docent group has continued to work on developing and maintaining improvements to the open-air visitor area in the Research Compound and provide weekly presentations to visitors. Additional sessions to train new docents were conducted during FY 02, increasing the volunteer pool for NELHA outreach while adding to docent skills for general use in the Kona community.

ENDANGERED SPECIES HABITAT MITIGATION

Inadvertent creation of a habitat favored by the native Hawaiian Stilt resulted in proliferation of a small population of the endangered species at a tenant aquaculture site several years ago. Air safety concerns at the nearby airport and tenant biosecurity concerns were in direct conflict with the habitat support mandated by the endangered status of the species. NELHA continued to work closely with the DLNR Division of Fish and Wildlife, DOT Airports Division (DOT-A), and the Federal Aviation Administration (FAA) to find a satisfactory resolution to this situation. Tenant projects are cautioned to avoid creation of new potential habitats for local animal species.

PUNA GEOTHERMAL FACILITY

Puna Geothermal Ventures was the successful responder to NELHA's Request for Proposals for lease of the Puna Geothermal Facility. Since the HGP-A geothermal well at the facility was plugged and abandoned in 2000, there is no remaining heat source. Projects requiring geothermal fluids have not been feasible since the power plant and steam flow were discontinued in 1989. PGV will use the facility primarily for storage and staging at its neighboring power plant. They will also refurbish and expand the existing visitor center to present the history and current activities at HGP-A and PGV. There is strong community support for re-initiation of some of the community geothermal technology projects developed at the site in the late 1980s, so PGV has agreed to cooperate with proposals for re-instituting such projects by allowing the installation of a recirculating loop to transfer heat from their neighboring power plant.

OPERATIONS SECTION

The Operations Section manages the operation and maintenance of all of NELHA's facilities and equipment. Its staff is dedicated to maintaining an efficient and safe working environment, reliable services, and premium quality resources, central to the uniqueness and success of NELHA as a facility.

The most critical responsibility is maintaining continuous delivery of deep and surface seawater in addition to the electricity, freshwater and other essential services required by NELHA's diverse group of tenants. Each member of the Operations Staff is committed to providing tenants with uninterrupted seawater supply. NELHA's ability to provide tenants with cold and warm seawater 24/7 is an important asset that attracts many tenants to the Keahole facility.

Operations staff members include skilled planners, mechanics, electricians, and maintenance specialists who work cooperatively to fulfill NELHA's mission. Many of the improvements to NELHA's physical plant over the years have been completed using NELHA's internal "self help" philosophy. Staff members are encouraged to combine their initiative, talents and trades to complete projects in-house that might otherwise have a higher cost or long delivery time if pursued through traditional means. With this approach, both time and tax dollars have been saved in the overall operations of the facility. During FY02, Operations staff members were busy with many projects, each one providing vital support to NELHA and its tenants.

SEAWATER SYSTEM IMPROVEMENTS

Variable Frequency (Speed) Drive motor controllers were installed for two new deep seawater pumps and one new surface seawater pump. Ops staff also upgraded the alarm systems at the Deep Seawater Booster Pump Station in HOST Park, and the alarm system in the NELHA Research Compound. Two additional 35 hp Flygt submersible pumps were also purchased.

STAFFING AND TRAINING.

As part of the ongoing reorganization, the position of Electrical Engineer, vacated during FY 01, was retitled Operations Supervisor / Electrical Engineer and was ably filled by Mike Bloomfield in June 2002. Vehicle/ Construction Equipment Mechanic position was vacated by Mark Vail in September 2001; this position would not be filled until after the close of FY02. Donald DeSilva came aboard in November 2001 as General Laborer. In a continuing effort to update staff training and expand their areas of expertise, Utility Electrician Justin Pitts attended Danfoss Electronics – Variable Frequency Driving schooling and training in Chicago during FY02.

18" DSW PIPELINE. Operations staff began operating the 18" DSW pipeline on a continuous basis starting November 14, 2001. Since its initial installation as a backup system in 1987, the 18" pipeline has provided emergency deep seawater to NELHA. An increase in deep seawater demand by Big Island Abalone Corporation's new 10-acre commercial farm site in HOST Park prompted this operational change.

Shipboard view of work deck during the deployment of the 55-inch pipelines during FY 02.

UTILITY CARTS

NELHA took advantage of surplus sales in golf carts at a nearby resort, and purchased three of the battery-operated carts from the Mauna Lani Bay Resort for use as Utility Carts for Operations staff. To increase their efficiency, photovoltaic electric panels were installed on all nine of NELHA's utility carts.

SMALL BUSINESS INCUBATOR COMPOUND

In planning since 1997, the NELHA Small Business Compound was finally completed during FY 2002. Four 1-2 acre lots were rough graded with a complement of utility connections completed including: 1) permanent deep seawater and surface seawater utilities to each lot, and 2) temporary electric service to Lots "B" (Ocean Rider, Inc.) and Lot "C" (Black Pearls, Inc.)

NELHA LABORATORY BUILDING IMPROVEMENTS

The NELHA Laboratory Building was among the first buildings constructed in the Research Compound in 1979. Proximity to the ocean takes its toll on metal fixtures of all kinds, necessitating periodic replacement. During FY02, fifteen (15) corroded windows were removed from the Laboratory Building and replaced with double pane / vinyl-framed windows.

NELHA RESEARCH COMPOUND IMPROVEMENTS

A number of small projects were completed during FY 02 to support improvements within the Research Compound to benefit tenant projects there. Operations staff:

- Installed new seawater, electric and telephone utilities for Moana Technologies' IF1 and IF2 sites
- Installed new surface seawater supply for Ocean Rider, Inc.
- Upgraded Interim Visitor Center with new live displays and 55" pipeline section.
- Replaced 400 feet of Research Compound security fencing
- Removed Closed Cycle-OTEC experimental apparatus remaining from 50kW research project.
- Installed new deep and surface seawater supply pipeline along Research Compound for Taylor Resources-Kona

TENANT UTILITY IMPROVEMENTS

Outside of the Research Compound in the NELHA technical park, Operations staff completed electric and telephone improvements for Kona Cold Lobster Ltd., Ono Take Inc. and Common Heritage Corporation to remove them from connection to NELHA utilities infrastructure. This was the final step in eliminating the utility infrastructure developed in the 1980s prior to development of the technical park by separating technical park tenants from the Research Compound. All tenants in the technical park are now independently serviced by the local utility company.

SCIENTIFIC/TECHNICAL SECTION

The Scientific/Technical Section provides engineering support for all infrastructure development and land use at NELHA. The section also provides consultation and support services to NELHA tenants on an as-needed, as-available basis. The Scientific/Technical Staff also conducts NELHA's Comprehensive Environmental Monitoring Program (CEMP) by performing the sample collection, analysis and data reporting for the range of environmental monitoring tasks necessary to maintain the pristine quality of the unique natural resources of Keahole Point on which NELHA and its tenants depend

HOST PARK 55-INCH SEAWATER SUPPLY SYSTEM

NELHA made engineering history with its ocean deployment project, bringing near to completion a project that has spanned 12 years and five executive directors. The pipelines and an onshore distribution system, to be completed during FY 03, will service the HOST Park area. The design for this seawater supply system was begun in 1989 and completed in 1997. Makai Ocean Engineering, Inc. of Waimanalo has been the primary design and engineering contractor on this project since its inception.

The deployment involved a flotilla of approximately 30 vessels over a ten-day period. NELHA staff worked with the U.S. Coast Guard to establish a mariners' security zone and implement other safety measures. Community outreach efforts were also conducted prior to deployment to ensure that the fishing, ocean recreation, and other stakeholders were provided with schedule, safety, and other pertinent information.

A blessing of each of the sites at which work would be carried out for the 55-inch pipeline project was conducted to bring unity and focus to the challenges ahead.

A staging area at Kawaihae Harbor was prepared for the critical pipeline assembly process to fuse the individual pipe sections into 1,000 foot lengths, to later be joined at sea into the final lengths needed for the dual pipeline system.

The massive size of the 55-inch pipelines is apparent in this view of the pipelines next to some heavy equipment. The pipes are made of high density polyethylene (HDPE), manufactured on the mainland U.S. and shipped by barge to Hawaii.

The HDPE pipe sections for the 55-inch pipeline were heat fused using a special fusing apparatus, shown here in this photo. The fuse is said to be stronger than the pipe itself.

The initial construction phase was the installation of the shore crossing, begun in 1994 and completed in January 1997. Two 55-inch (inside diameter) tunnels begin about 500 feet onshore in a pit about 30 feet below sea level and extend about 500 feet offshore, where they break out of the bottom at about 80-foot depth. The tunnels, one carrying surface seawater and the other attached to a deep seawater pipeline extending to 3000feetdepth, are lined with concrete and fiberglass for long term transport of seawater.

The deep seawater pipeline was assembled and installed in the summer and fall of 2001. 9,200 feet of 55-inch diameter high density polyethylene (HDPE) pipe were shipped by barge from California in 55- and 60-ft lengths. These were assembled at Kawaihae Harbor, about 20 miles north of NELHA, into nine pieces each about 1000 feet in length. As those pieces were launched into the water, 180 large concrete anchors were fastened to the pipe, which remained full of air so that it continued to float with the anchors. On October 5, 2001, after all nine pieces were floating with anchors in the harbor, they were flanged together into a continuous pipeline almost two miles long and weighing (in air) more than four million pounds. Overnight on October 6-7, large tugboats towed the pipeline to Keahole Point, where it was positioned for sinking by flooding from the nearshore end.

The initial sinking process had to be aborted about midnight on October 7, when one of the two 4- 1/4 inch diameter nylon hawsers being used to maintain 60 tons of continuous tension required to prevent buckling during deployment parted. Though no one was injured, the breaking of the line made it impossible to continue with the deployment. Large compressors on the barge pumped air back into the pipeline, forcing out the water and re-floating the nearshore pipeline and anchors. The pipeline remained in position on the surface until two new 270-ft long hawsers could be fabricated and flown in from Houston. The new hawsers arrived in Kona on Wednesday afternoon, October 10th and were installed for the final deployment, which went very smoothly on Thursday evening, October 11th. Once the pipeline was full of water, with the offshore end hanging about 90 feet below the offshore barge, divers were scheduled to remove the blind flange so that water could be pumped through the pipeline. Unfortunately, strong currents at that time made it impossible for divers to work, so the pipeline had to be lowered to the bottom with the blind flange still attached. The offshore pipeline intake reached its final position at 3,000 feet depth shortly after noon on October 12th.

Over the next three days, a remotely operated vehicle (ROV) removed all of the 22 nuts and all but three of the bolts around the blind flange, but the remaining bolts hung up on the polyethylene pipe. Efforts to “blow off” the 1-1/2 ton blind flange by pumping water through the pipeline were unsuccessful, so on the evening of October

LEFT: The intake end of the deep seawater pipeline floats on the ocean offshore of NELHA's Keahole Point properties while the pipe is being positioned in the critical moments before sinking. RIGHT: Tugboats and other vessels which assisted in the complex process to install the new 55-inch pipeline system.

15th, the ROV picked up a shackle lowered from another vessel and attached it to the flange. After the ROV retired to a safe distance, the flange was pulled free, leaving a successfully deployed pipeline on the bottom. This is by far the largest and longest deep seawater intake pipeline ever deployed.

A short "spool piece" was then fabricated and installed to connect the pipeline to one of the existing shore crossing tunnels. The contractor next installed a large surface water intake structure at the offshore end of the other tunnel. To reduce the entrainment of marine organisms, this structure has a "velocity cap" which minimizes vertical currents and a large surface area that will reduce the horizontal intake speeds to less than one ft/sec.

Following the successful deployment, many accolades were given to the project participants. In the July 2001 issue of Building Industry magazine, an article about NELHA contractor Healy Tibbitts Builder, Inc. quoted their representative as saying, "It was the most challenging project I have ever been involved in." The article explained that the object was to install a 55-inch diameter high-density polyethylene pipe underwater, from just offshore out into open ocean, and listed the challenges: the total length of the pipe is 9,000 feet, nearly 2 miles; it begins in water 85 feet deep and ends at a depth of 3,000 feet; and the pipeline had to be completed in less than six months. In an exceptional demonstration of professional teamwork and engineering innovation, contractor Healy Tibbitts met each challenge successfully, completing the pipeline deployment in October 2001.

The final phase of the NELHA pipeline installation contract, completed in June 2002, involved construction of the seawater pump station at the onshore end of the two tunnels. This facility employs a unique design in which the pumps are mounted in large vertical "canisters" prefabricated from fiberglass reinforced plastic (FRP). The assembly of these 40-ft tall, 5-ft and 10-ft diameter canisters next to the pump station was an impressive site that dominated the Keahole Point coastline for several weeks in the spring of 2002. Three pumps are provided on each of the surface and deep water pipelines - two required for full flow and one for backup.

This seawater system is designed to provide a flow of 40,500 gal/min of surface seawater at 76°- 82°F and 27,000 gal/min of deep seawater at about 38°F. It will be distributed to users throughout the HOST Park via a distribution system using booster pumps pushing the water through delivery pipelines alongside the NELHA Access Road. The contract for this HOST Park seawater distribution system is scheduled to be awarded by December 2002.

NELHA Staff Jan War and Tom Daniel aboardship during the evening pipeline deployment.

DEEP SEAWATER AIR CONDITIONING

NELHA has demonstrated the efficacy of using deep seawater for air conditioning via the simple system that now cools laboratory buildings at a fraction of the operating cost that would be required for a conventional chiller system. NELHA's contractor, Makai Ocean Engineering, Inc. of Waimanalo, has also participated in a much larger demonstration, the Lake Source Cooling project at Cornell University, which provides 20,000 tons of air conditioning for the Cornell campus via a 63 inch diameter pipeline that brings the deep cold waters from Cayuga Lake.

We hope to make this exciting cost-saving technology available to HOST Park tenants via a closed chill water loop encircling the park. The fresh water in the loop will be chilled by thermal contact with deep seawater in a heat exchanger mounted near the shoreline. Use of a closed loop will dramatically reduce the energy required to pump the water to the top of the host park area, since the work against gravity is recovered as the water flows back down the loop and the only pumping load will be that required to overcome friction in the pipeline.

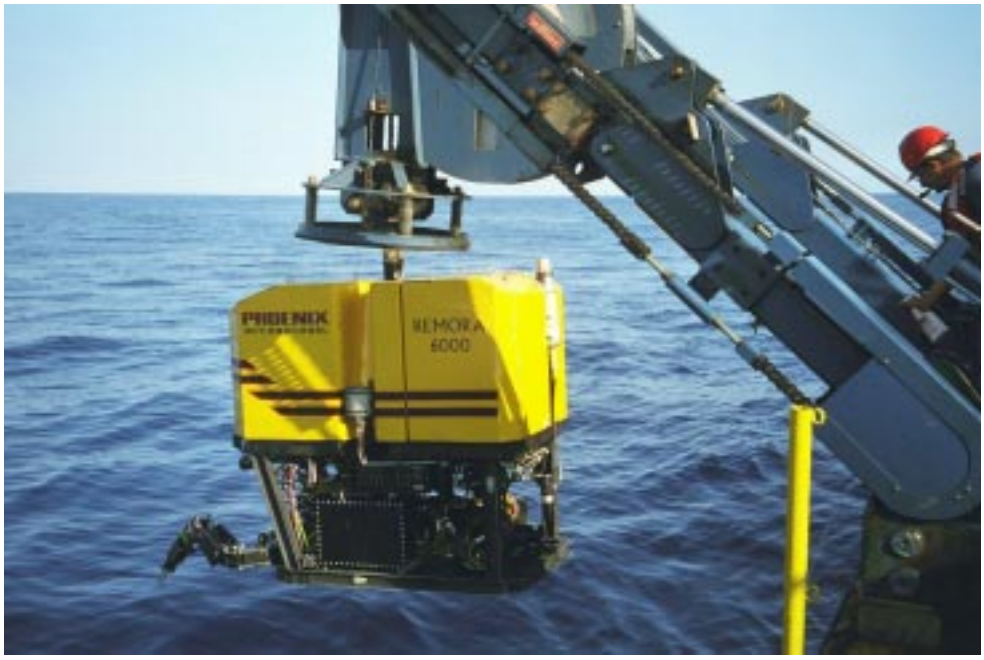
Preliminary studies by Makai Ocean Engineering indicated that 400 tons or more of air conditioning could be provided at an operating cost less than 20% of that for conventional systems. NELHA will seek future funding for the detailed design of such a system for installation the HOST Park.

SEAWATER RETURN SYSTEM IMPROVEMENTS

Under contract to NELHA, Planning Solutions, Inc. of Honolulu has analyzed existing seawater return systems at NELHA and recommended changes that will improve the environmental and economic efficiency of those systems. These consultants have recommended that NELHA tenants use injection wells, rather than the open trenches formerly recommended, for returning used seawater to the environment.

ANALYTICAL LABORATORY AND COMPREHENSIVE ENVIRONMENTAL MONITORING PROGRAM

NELHA's Analytical Laboratory collects and disseminates the information needed to protect NELHA's valuable seawater and groundwater resources. Environmental monitoring activities include sample collection, analysis,



The remotely operated vehicle is launched for a final inspection of the new pipeline after deployment.

data recording, and testing of incoming and outgoing seawater, as well as groundwater, anchialine pond water and biota onshore, and benthic and midwater biota and water quality in the oceanic waters offshore. Data are also reported in compliance with regulatory requirements of other government agencies including the Department of Land and Natural Resources, the County Planning Department, the Office of Environmental Quality Control, and the Department of Health. The NELHA analytical laboratory is well-equipped for these tasks in terms of both equipment and personnel, with a forward-looking, multi-disciplinary environmental monitoring team of experienced technicians.

A view of an American flag posted by the work crew on the pump station canisters prior to installation at the HOST Park work site.

Much of the Analytical Laboratory's work involves implementation of the Comprehensive Environmental Monitoring Program (CEMP) at NELHA which collects and analyzes samples from more than 100 sites both onshore and offshore. The CEMP allows NELHA to monitor its pristine environment, and serves as an early detection system should any irregularities in seawater effluent disposal occur. Throughout FY 02, the NELHA analytical laboratory continued to perform the essential monitoring activities as required.

DEPARTMENT OF HEALTH CONSENT ORDER AND COMPLIANCE

In March 2002, the State of Hawaii Department of Health issued a Consent Order to NELHA settling a Finding of Violation concerning an incident at a seawater outfall in September 1998. The DOH cited that NELHA's NPDES permit, which set guidelines for the outfall use, did not include the disposal of the refrigerant R141B found in sediment samples from the outfall and nearby tidepool.

The NPDES (National Pollutant Discharge Elimination System) permit is required for any point source of effluent water. In 1981, NELHA had obtained such a permit for a small beach outfall located about 200 yards from the water's edge for disposal of surface and deep seawater from research projects nearby. The location of the outfall on the upper beach area would allow cold seawater to warm in the tidepool and for its relatively high nutrient levels to be reduced by the natural proliferation of algae. In compliance with the NPDES permit, the water quality at the outfall, in the tidepool, and in offshore waters were closely monitored by NELHA technicians over a ten-year period prior to the incident. No impacts to offshore waters were ever detected.

The DOH reported that minute quantities of R141B were found in some organisms and in outfall and tidepool sediment samples taken in September 1998 after beachgoers had reported numerous small dead fish floating in the tidepool. Although the DOH alleged that R141B may have been the cause, no causal evidence was ever presented, leading NELHA staff and environmental consultants to deduce that the fishes had most likely died as a result of thermal shock, caused by occasional influxes of cold deep seawater into the warmer tidepool. The original NPDES application had anticipated that thermal shock might periodically cause such small scale impacts to the tidepool system. According to the Materials Safety Data Sheet from the nationally standardized MSDS chemical management system, R141B is not toxic even at concentrations much higher than those found in the outfall. R141B is a hydrofluorocarbon that has been widely used as a foam blowing agent in the plastics industry. The source of the R141B was traced to a NELHA research tenant who was using the hydrofluorocarbon as a clathrate former in a process to demonstrate chemical extraction of freshwater from seawater.

DOH and NELHA reached a settlement for the incident that included a fine of $100,000 for the permit infraction. NELHA has paid a $10,000 fee and will provide in-kind analytical chemistry and microbiology services on statewide DOH Supplemental Environmental Projects (SEP) for the remaining $90,000 over a four-year period. NELHA has one of the best-equipped analytical laboratories in the state of Hawaii. It has been agreed that

these analyses will only be performed within the constraints of existing personnel and equipment, utilizing time within the ongoing sampling and analysis schedule for the CEMP. Initial SEP analyses are scheduled to begin in January 2003.

Negative publicity generated by the DOH handling of the incident over the four-year period prompted the federal project sponsor to cancel the funding for the innovative desalination work at NELHA. Although the researchers did not renew their project in Hawaii, they continued their work in California, where the technology has since been shown to be successful, environmentally benign, and commercially competitive with alternative desalination technologies.

NELHA research projects are carefully reviewed by its Research Advisory Committee which found the project to merit NELHA approval due to its potential benefits to mankind and minimal potential environmental impact.

NELHA cancelled its NPDES permit in 1999 when it was no longer required. All effluent seawater is disposed into trenches, pits, or wells on shore, following the recommendations of a Supplemental Environmental Impact Statement completed for NELHA in 1987.

LEASING & TENANT RELATIONS SECTION

The Leasing and Tenant Relations Section provides information to prospective tenants, serves as point of contact for new tenant applications, coordinates project proposal review, manages NELHA's tenant and master leases, processes tenant land use agreements, and monitors compliance with the terms and conditions of those legal documents. NELHA land use agreements govern the use of its support facilities for research tenants and land and infrastructure for education and commercial tenants, summarizing NELHA policy, terms and conditions of use.

Throughout FY02, a continuing review and streamlining of the leases and lease processing occurred both internally at NELHA and in cooperation with the Land Division of the Department of Land and Natural Resources. New legislation supported by DLNR and passed into law (Act 103) opened the door for NELHA to apply for a waiver in FY03 of the currently required BLNR approval of subleases. NELHA continued to be aided by legal counsel at the Department of the Attorney General to expeditiously review and process lease agreements, strengthen the standard leases and ensure alignment with master lease provisions and state regulations.

The Aquasearch Growth Module is a commercial-scale closed photobioreactor used to culture microalgae.

NELHA tenants Ocean Rider, Inc. and Moana Technologies LLC tenants transitioned from research land use agreements to long term subleases. By the close of FY02, a third tenant, Turquoise Technologies, Inc., had negotiated a long term sublease for installation of antenna equipment to provide wireless Internet service to NELHA tenants. Several other tenants were engaged in review and negotiations for subleases.

New projects included oceanographic research project from University of California at Santa Cruz, a shrimp genomics project, SyAqua Research LLC, from California, and a new Canadian aquaculture enterprise, Unlimited Halibut Corporation, which will introduce fresh halibut and black cod to the Pacific region, more accustomed to frozen versions of these tasty finfish.

GATEWAY PROJECT

The NELHA Gateway will be located at the entrance to the Hawaii Ocean Science & Technology (HOST) Park and serve as a gateway facility to the NELHA properties. Organizers envision a campus setting intended to serve as a premier center for research and development, demonstration, deployment, education, outreach and techno-tourism. The NELHA Gateway is being planned to support three focus areas:

1. Distributed Energy Resources (DER)
2. Ocean Sciences, Marine Bio-products, and related fields
3. Education, Outreach, Tourism

During FY 02, the Administrative and Projects/Gateway Manager worked with Board members and the Executive Director on continuing development and management of this important NELHA project.

NELHA GATEWAY DER CENTER

Phase One of the NELHA Gateway Project will involve design and construction of the Distributed Energy Resources Center, a facility to support the development of renewable and distributed energy resources and technologies through research and commercial incubation activities.

By the start of FY 2002, $2.5 million of federal funds had been appropriated for design and construction of the planned NELHA Gateway Distributed Energy Resources (DER) Center. NELHA responded to U.S. Department of Energy (US-DOE) solicitation for financial assistance applications with the “Hawaii Hydrogen Infrastructure Initiative” pre-proposal which was positively received. For the next stage in the solicitation, the State Energy Administrator ERTD assumed responsibility for developing and submitting the full proposal.

At a Hawaii Island Economic Development Board “Renaissance Forum” in January 2002, keynote speaker Senator Daniel K. Inouye noted that the Gateway DER Center will be “ a national energy center that will play a strong role in allowing development of energy self-sufficiency for the Island of Hawaii and the Nation.”

To advise the NELHA Gateway Manager regarding suitability of proposals, direction of programs, and other matters related to the NELHA Gateway DER Center, the eight-member Distributed Energy Resources Advisory Committee (DERAC) was formed in February 2002. The DERAC met monthly by conference call and in April 2002 convened for a Strategic Planning session.

The CEROS Technical Director pledged $20,000 of its budget to support NELHA Gateway Project Development in 2002.

By March 2002, the Design Bid Request for Quotation Proposals (RFQP-02-21-NELHA) for the NELHA Gateway Distributed Energy Resources Center had been issued with closing on Friday, April 26th. Honolulu-based firm Ferraro Choi & Associates (FCA) was selected from the five responses to the solicitation after careful review by the Gateway Plan and Design Services Evaluation Committee. FCA is a LEED-certified architectural firm under the “Leadership in Energy and Environmental Design (LEED) Green Building Rating System” and will both design the project and provide construction management services.

FUNDING. An additional $479,000 of federal funds were secured by September 2001 and $485,000 allocated in April 2002, bringing the total federal funds for the project to $3,464,000. In June 2002, an additional $450,000 in federal funds was appropriated to support program development, bringing total funding to $3,914,000.

PARTNERSHIPS. By the end of FY02, partnerships were confirmed between NELHA, the University of Hawaii at Manoa’s Hawaii Natural Energy Institute (HNEI) and private company Sentech, Inc. for a research and development program. HNEI was created in 1974 to seek new forms of energy that would supplant the

nation's tremendous dependence on fossil fuels, and has since become an acknowledged international leader in the energy field. Sentech Inc. is a company specializing in the design and manufacture of position sensing transducers along with supporting signal conditioning and instrumentation. A joint effort between NELHA and New Mexico Tech to accelerate the development, integration, and deployment of distributed generation technologies was also formed as part of program development. Finally, a partnering relationship was also confirmed between NELHA and The Kohala Center to develop and implement a public outreach and education program for the DER center facility.

OCEAN CENTERPIECE

In the Fall of 2001, a Request for Proposals (RFP) for the Gateway Project's second focus area was issued by the Board of Directors seeking proposals for a "centerpiece" commercial development. After closing, six proposals were received. it was surmised that economic impacts of the 9/11 tragedy limited the number and range of responses to this solicitation, so the RFP was to be reissued at a later date.

The primary objective of the "centerpiece" solicitation is to support development of ocean-related theme activities that can feature the unique resources found at NELHA while supporting NELHA's primary mission pursuant to HRS 227-D. Approximately seventy-five (75) acres adjacent to and visible from the main highway, Queen Kaahumanu Highway were dedicated to commercial development with the potential for additional acreage becoming available as needed for future expansion. The proposed "centerpiece" development will be located adjacent to the NELHA Gateway DER and renewable energy research and education center.

Broad areas of interest for the NELHA Gateway Ocean Centerpiece concept may include, but not be limited to, the following:

—Ocean-theme exhibit and aquarium facilities and associated commercial activities for the general public
—Marine research laboratory and support facilities for publicly sponsored and/or privately sponsored research
—Ocean-theme education and entertainment facilities (may include water parks, restaurants, and other retail components)
—Facilities encompassing applied research, development and demonstration of prominent or emerging ocean technologies
—Commercially viable enterprises which are compatible with and enhance the theme of the proposed Ocean Centerpiece

NELHA specifically will be seeking those proposals that demonstrate strong revenue generation opportunities for both the developer and for NELHA. These proposals should emphasize the use of new and existing resources and technologies to reduce fossil fuel dependence and reduce and conserve potable water, and may include applications that utilize deep seawater and surface seawater. environmental concerns, utility use and conservation, infrastructure use, and community enhancement. Those Offerors who can be successful exclusively by locating at this site due to the unique resources at NELHA will have a competitive advantage in the selection process.

FISCAL SECTION

The NELHA Fiscal Section works closely with the State of Hawaii Department of Budget and Finance, the Department of Accounting and General Services, and Department of Business, Economic Development and Tourism to manage NELHA's financial resources. In addition to responding to the many reporting requirements of these departments, the Fiscal Section's responsibilities also include day-to-day management and oversight of:

—Budgeting
—Inventory of fixed and movable assets
—Petty Cash disbursements
—Purchasing
—Accounts Payable and Accounts Receivable
—Tracking of General, Special, Federal, and State Capital Improvement Funds

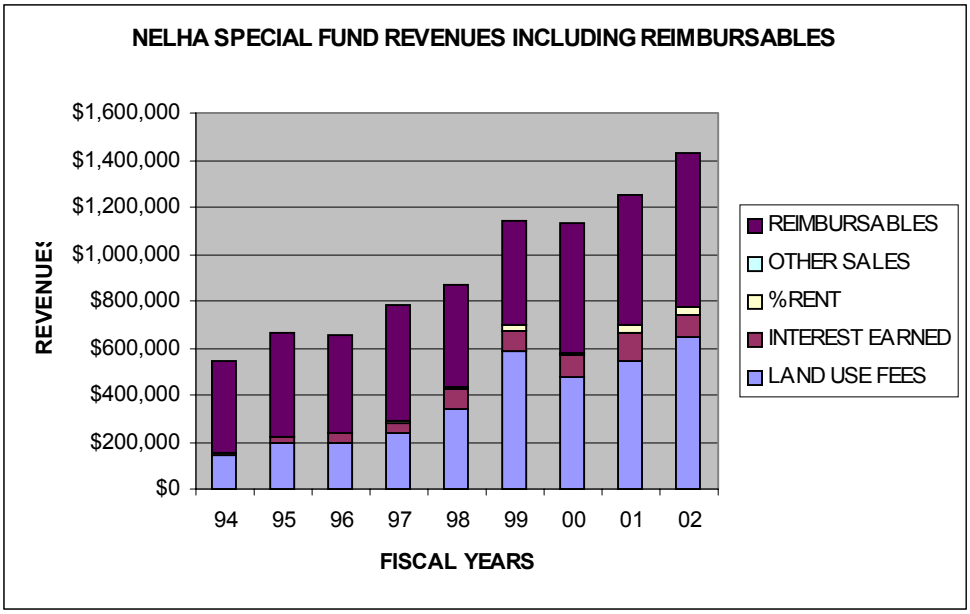
STAFFING. Fiscal Clerk position was vacated by Shermaine Miner in August 2001, to be filled by Theresa Shelby in September. The Fiscal Clerk provides essential support to the Fiscal Officer by assisting with monthly billings, monitoring of tenant accounts, and other critical fiscal operations.

LONG TERM GOALS. NELHA's long term financial goal is to become economically self-sustaining. Managing costs of maintaining its unique facilities and infrastructure to attract and support a variety of tenants who can find economic success is key. As NELHA moves forward to implement this task, the fiscal staff continuously provides critical data and guidance to help the NELHA administration and Board to meet their goals. As FY02 drew to a close, NELHA staff braced to face the coming year of belt tightening due to legislative action which reduced General Fund appropriations and Special Fund reserves and which will increase overall personnel costs.

Specially designed, 40-ft. tall white fiberglass reinforced plastic canisters loom in the background south of the HOST Park Booster Pump Station. A crane is lifting one of them into the sump where it will be installed to house the pumps for the new 55-inch pipeline delivery system.

LEFT: NELH section (322 acres) of NELHA properties, close to full development during FY02. NELHA anchor tenant Cyanotech Corporation's colorful microalgae raceways dominate the property.

BELOW: HOST Park section (548 acres) of NELHA properties. NELHA tenant Big Island Abalone Corporation had begun grading a subleased 10-acre parcel, visible in foreground, at the time of this photograph on June 01, 2000. Directly makai is a dark spot on coastline marking the site of new 55-inch pipe pump station.


NELHA SPECIAL FUND REVENUES INCLUDING REIMBURSABLES
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
94
95
96
97
98
99
00
01
02
FISCAL YEARS
REIMBURSABLES
OTHER SALES
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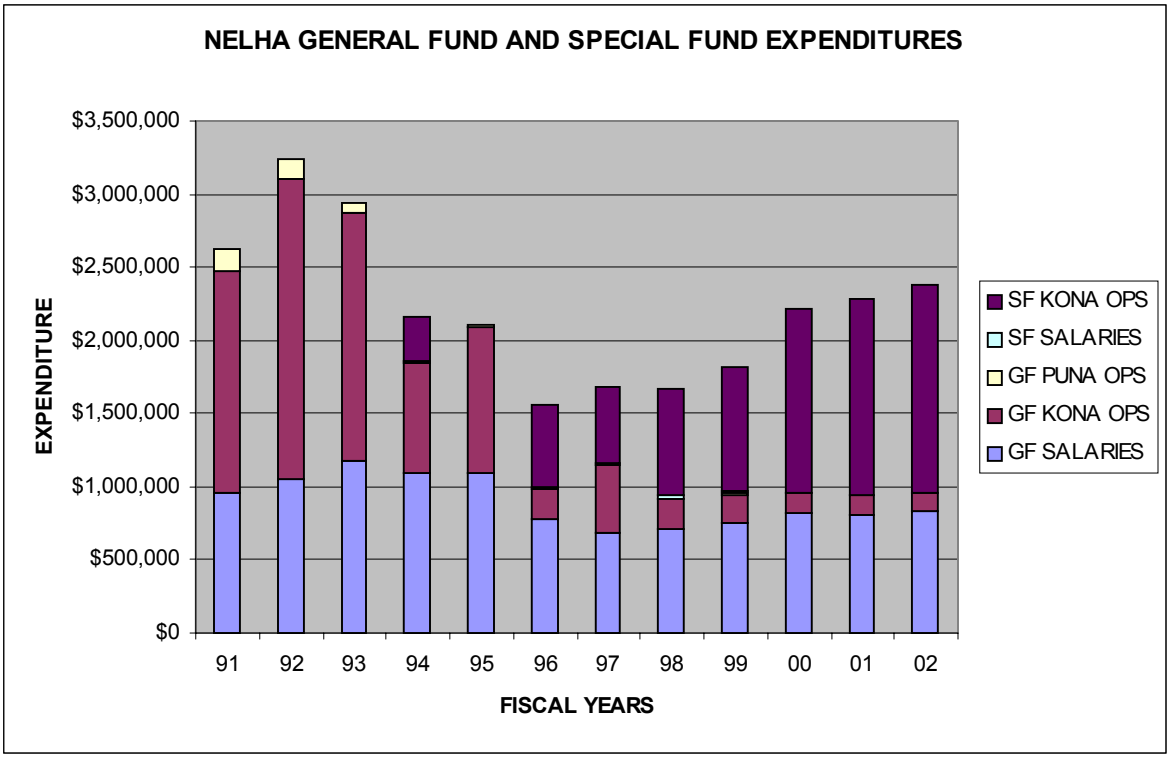
INTEREST EARNED
LAND USE FEES


NELHA GENERAL FUND AND SPECIAL FUND EXPENDITURES
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
91
92
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94
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99
00
01
02
FISCAL YEARS
SF KONA OPS
SF SALARIES
GF PUNA OPS
GF KONA OPS
GF SALARIES

FINANCIAL OVERVIEW

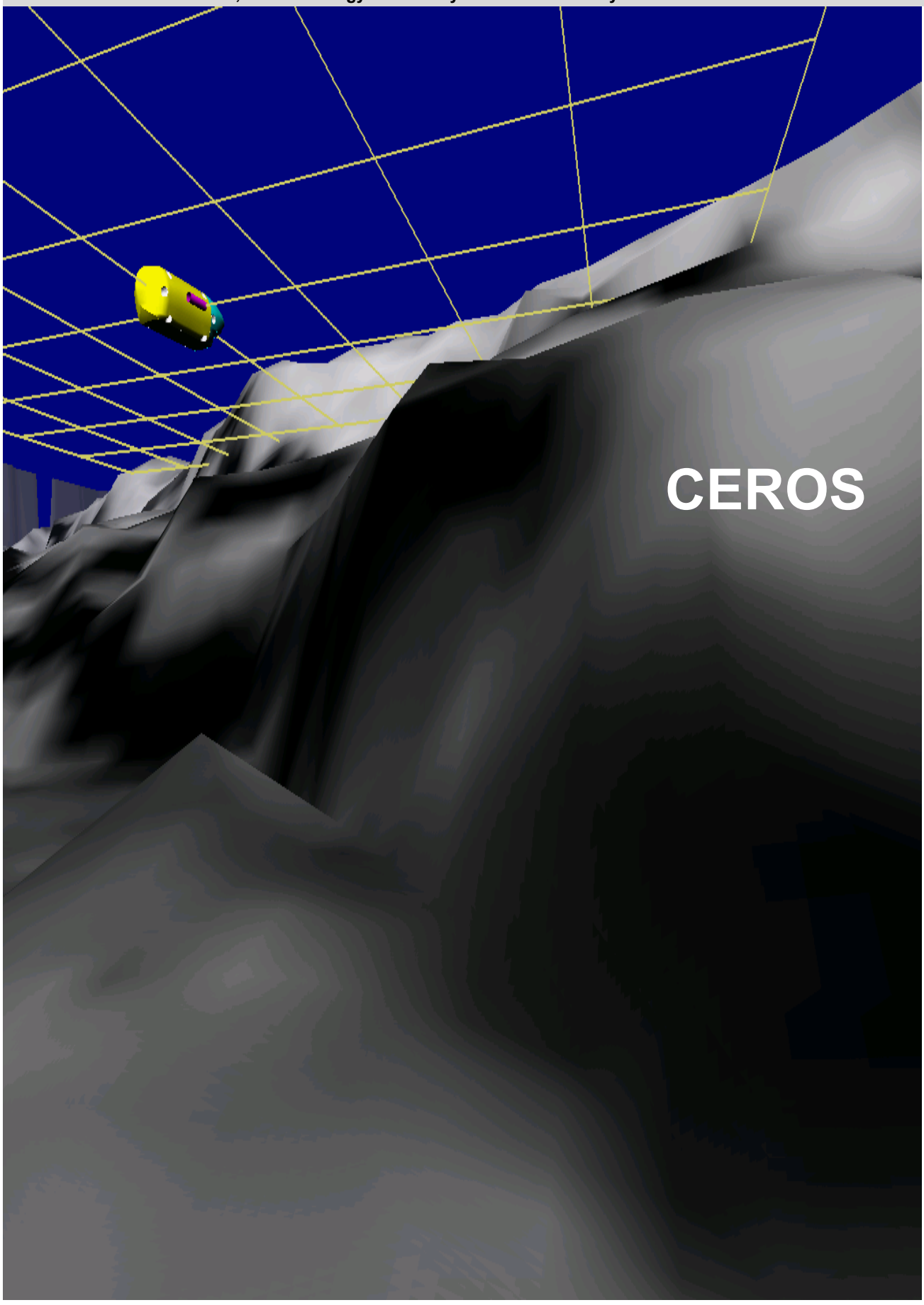
STATEMENT OF OPERATIONS

FY 02 (July 1, 2001 to June 30, 2002)

CATEGORY	REVENUES	EXPENDITURES
General Funds		
State Funds	$1,019,316.00	
Subtotal	*$1,019,316.00*	
GF Salaries		$832,636.16
GF Kona Operations		$118,451.16
Subtotal		*$951,087.32*
Special Funds		
Land Use Fees	$645,743.44	
Reimbursables	$657,989.73	
Interest Received	$94,943.49	
Percentage Rents	$34,788.51	
Subtotal	*$1,433,465.17*	
Total Revenue	**$2,452,781.17**	
SF Salaries		$0.00
SF Kona Operations		$1,425,368.98
Subtotal		*$1,425,368.98*
Total Expenditures		**$2,376,456.30**

FINANCIAL POSITION

Special Fund Balance at FY Start	$1,795,060.69
State General Fund Appropriations	$1,019,316.00
Special Fund Revenues	$1,433,465.17
Subtotal	*$4,247,841.86*
General Fund Expenditures	$951,087.32
Special Fund Expenditures/journal entries	$1,425,368.98
Unrequired G/F Returned to St Treasury/DBEDT	$68,228.68
Subtotal	*$2,444,684.98*
Special fund transfer from prior years	$1,570.09
Ending Special Fund Balance at FY End	**$1,804,726.97**


CEROS

CEROS

The National Defense Center of Excellence for Research in Ocean Sciences (CEROS)

New Ocean Technology for Hawaii

CEROS is a unique technology development program between the State of Hawaii and the federal Defense Advanced Research Projects Agency (DARPA). CEROS demonstrates that the State can be responsive to the needs of the Department of Defense for state-of-the-art ocean technology. Complete information about CEROS is on the website, www.ceros.org.

CEROS is a State program entirely supported by federal funds. The program started in 1993, with $5 million appropriated for CEROS in the supplemental federal appropriation for the Department of Defense. Federal support for CEROS comes to the State through a Cooperative Agreement with DARPA, the principal technology development agency for the Department of Defense (the Internet was a DARPA project, for example). DARPA also provides technical and administrative guidance to assure that the program remains responsive to the needs of the federal defense establishment while helping the technical commercial base develop in Hawaii. DARPA has been an excellent partner in this task.

CEROS is in many ways a special federal/state partnership. CEROS started as a project of the High Technology Development Corporation (HTDC) and became part of the Natural Energy Laboratory of Hawaii Authority (NELHA) in 1996. HTDC and NELHA are among the State's "attached agencies" in the Department of Business, Economic Development & Tourism (DBEDT).

Attached agencies act as quasi-corporate entities within the State structure. The NELHA Board of Directors oversees NELHA operations and grants CEROS its authority to issue State contracts for technical development projects. The best depiction of the CEROS/NELHA relationship is as two separate programs joined by a common Board of Directors. NELHA has proven to be a good and appropriate "home" for CEROS.

From the start, DARPA sought an efficient CEROS organization to turn the federal funds, which are appropriated annually, into funded contracts in as short a period as possible. Thus, CEROS runs annual competitive solicitations for technical projects and handles the entire process from initial announcement (in October) to contract negotiation and commitment (usually in the following June). Since 1993, CEROS has funded 140 technical projects for about $54.6 million.

The CEROS program operates on less than 8% administrative overhead (i.e. 92% of the federal funds go into the Core technical program). The CEROS personnel list is 4: Technical Director, Fiscal Assistant, Program Manager for Outreach and Administration, and Contracts and Grants Administrator. CEROS maintains a Projects Office at NELHA headquarters in Kailua-Kona and a Contracts Office in Honolulu.

CEROS point of contact: William A. Friedl, CEROS Technical Director, billf@ceros.org.

SeeRescue® CORPORATION. Rescue streamer deployed at sea for high vis-

PREVIOUS PAGE: OCEAN IMAGING CONSULTANT, INC. Virtual image of ROVer's eye-view of ocean bottom bathymetry.

Funded Projects

AQUACULTURE TECHNOLOGY, INC.

- Naturally Occurring Antibodies from Marine Algae *Chaetoceros* (FY94) ($171,485)
- Naturally-Occurring Antibacterial and Antifungal Substances from Marine Algae *Chaetoceros*, *Nitzschia* and *Thalassiosira* (FY95) ($206,960)
- Continuous Production of Marine Algae *Chaetoceros spp*. In An Open System (FY97) ($440,000)

BAND, LAVIS & ASSOCIATES, INC.

- Application Of Techniques and Comparative Effectiveness of Non-Toxic Anti-Fouling Surfaces to Immersed Nettings Used In Naval and Aquaculture Industries (FY97) ($225,483) [Subcontractor: Black Pearls, Inc. Holualoa, HI]

BBN TECHNOLOGIES

- Develop HYDROFIST: A Nonexplosive Means for Generating Intense and Focused Underwater Shock Waves (FY99, FY00) ($999,819; $800,000) [Subcontractor: Navatek Ships, Ltd. (a subsidiary of Pacific Marine), Honolulu, HI]
- Implement and Demonstrate ASW Targeting and Weapon Control Using Non –Organic Sensors: Netted Combat Control System (Netted CCS) (FY01, FY02) ($1,112,450; $799,987)

BLACK PEARLS, INC.

- Probiotic Bacteria: The Key to Expanded Use Of Deep Seawater in Tropical Aquaculture and the Solution to a Growing Industry Problem (FY97) ($121,392)
- A Continuous-Culture Closed-System Deep Seawater Photobioreactor for Microalgal Culture for Hatcheries and Pharmaceuticals (FY00) ($173,201)
- Developing a Sensitive, Sessile Monitor for Non-Point Source Heavy Metal Pollution for Tropical and Sub-Tropical Indo-Pacific Waters (FY01) ($138,097)

COX ENVIRONMENTAL SYSTEMS COMPANY

- Water Properties Miniature Optical Sensor Project (FY00) ($215,004)

DETECTION LIMIT TECHNOLOGY, INC.

- Development of Fiber-Optic Chemical Sensors (FOCs) For Remote In-Situ Monitoring of pH and Carbon Dioxide in Seawater (FY93) ($236,700)
- Development Of A Fiber-Optic Based Autonomous Buoy for *In-Situ* Monitoring of pH, pCO_2, Temperature, O_2, and Water Quality In Seawater (FY94) ($331,800)
- Solution Plus *In-Situ* Ocean Sediment Chemical Analyzer (FY96, FY97) ($320,000; $360,000)
- PCB Analyzer for Shallow Ocean Water (FY98) ($380,000)
- Automated SERS Immunoassay Detection System: Detection of an Aquaculture Virus and “Dog Nose” Sensor for TNT Detection (FY00) ($439,937)
- Improved “Dog Nose” Sensor for Real-Time Ocean TNT Detection and Quantification and Fish Virus Detection (FY02) ($350,000) [Subcontractors: Iowa State University Institute for Physical Research and Technology, Mike Bray Engineering]

DYNAMICS TECHNOLOGY, INC.

- Analysis of synthetic Aperture Sonar Data for Geological Surveys (FY00) ($98,239)

EDWARD K. NODA & ASSOCIATES, INC.

- Hurricane Risk Analysis and Modeling of Coastal Flooding For The Hawaiian Islands (FY93) ($213,929)
- Modeling of Hurricane-Induced Coastal Flooding for the Hawaiian Islands (FY98) ($182,345)

GATEWAY TECHNOLOGIES INTERNATIONAL, INC.

- Radar/Sensor Signal Processing Research of Shallow Water Surveillance Technologies (FY93) ($385,794)
- HIRADSIM Workstation Development Project - Continuation Of Existing Work Advanced HIRADSIM Small Target - Time Domain - Maritime Radar Mode (FY94) ($250,000)
- Personal Emergency Lifesaving System (PELS) (FY98) ($240,920)

GUIDENET, INC.

- Using Software Agents to Acquire and Visualize Environmental Information for ASW Surveillance (FY98, FY99) ($305,000; $360,000)
- Workflow Paradigm for ASW by Reliable METOC Data and Tasks (FY00) ($397,050)

IBM/LORAL FEDERAL SYSTEMS; KEWALO BASIN MARINE MAMMAL LABORATORY

- Acoustic Analysis Tool Kit (FY93) ($432,000)

INNOVATIONS HAWAII

- Extended Source Apparent Motion (E-Sam) Lighted Signals For Protection Of The Marine Environment (FY93, FY94) ($241,108; $177,180)

INNOVATIVE TECHNICAL SOLUTIONS, INC.

- Temporally Enhanced Adaptive Multi-Spectral (TEAMS) System for Detection of Underwater Objects (FY01) ($34,953)

MAKAI OCEAN ENGINEERING, INC.

- Cost-Effective GPS-Based Sensor For Measurement Of Heave, Pitch, Roll And Heading On Oceanographic Platforms With O.3 Degree Resolution (FY93, FY94) ($230,250; $235,000)
- Loop Avoidance Control during the Deployment and Retrieval of Submarine Cables (FY96) ($287,000) [Subcontractor*:* Knapp Engineering, Inc. (new name is Structural Solutions), Aiea, HI]
- An Automated Control System For Deployment of Small Diameter Cables and Towed Bodies—a Cable Lay Simulator (FY94) ($325,000)
- Design, Construction, and Operation of a Fifty Kilowatt Closed Cycle OTEC Plant and Application Of Results To The Design of a One Megawatt OTEC Plant (FY94, FY96) ($649,759; $287,000)
- Internet-Enabled Engineering Tool for Dynamically Analyzing and Planning World-Wide Subsea Cable and Array Installations (FY98) ($379,985)
- Improving Flow from Deep Water Pipeline (FY00) ($388,950)
- Remote Monitoring and Expert Control of Submarine Cable and Array Installations (FY00) ($345,737)
- Computation of Submarine Towed array Shapes and Dynamics Based on Array Sensors, Indirect Current Sensing and In-situ Drag Coefficient Measurements (FY02) ($479,513)

PACIFIC MARINE, INC. Unique hull design of midfoil ship, visible as vessel is suspended from a crane.

MISSION RESEARCH CORPORATION

- Ocean Doppler Lidar (FY95) ($381,000)

NAVATEK, LTD.

- The Modification of a Whole Ship Design Synthesis Model to Accept Ship Designs Employing Advanced Lifting Body Technology (FY02) ($356,000) [Subcontractor: Band, Lavis and Associates, Inc., Severna Park, MD]

NEPTUNE TECHNOLOGIES, INC.

- Diver Homing Device (FY95, FY97) ($200,000; $39,300)

NEXTWAVE ENGINEERING

- Snap-To Amphibious Footwear System (FY01) ($75,700)

OCEAN ENGINEERING CONSULTANTS, INC.

- Swath Motion/Structural Software Development (FY94) ($121,000)
- Swath Motion/Structural Software Development and Verification (FY95) ($168,000)
- Flow Simulation and Visualization for Swath Ships (FY96) ($161,372)
- SWATH Ship Software and Verification (FY00) ($164,954)

OCEANIC IMAGING CONSULTANTS, INC.

- The DiVRS (ROVer's) Eye Terrain Database Visualization as an Aid to Underwater Navigation (FY98, FY99) ($239,652; $275,482)

THE OCEANIC INSTITUTE

- Cultured Fish as Biological Indicators of Pollution (FY99) ($216,766) [Subcontractor: Associated Laboratories, Orange, CA]

OCEANIT LABORATORIES, INC.

- Low-Cost Prebuckled Cylindrical Pressure Hulls (FY93, FY94) ($342,800; $91,000)
- Computational and Physical Modeling of the Hurricane Tower Desalination System (FY97) ($150,000)
- Three-Dimensional Cloud Height Indicator for Marine Application (3D-CHIMA) (FY01, FY02) ($400,000; $360,390)

OCEANTEK, INC.

- An Ocean Bottom Span Analyzer for Survey Planning and Installations of Submarine Cables and Pipelines (FY99) ($188,000)

OCEANTRONICS, INC.

- Submarine Electronic Charting System (FY99) ($95,000)
- Electronic Charting Display and Information System (ECDIS-N) for the Navy with Special Emphasis on Submarine Navigation – Phase II (FY00) ($98,000)
- Submarine Electronics Charting System – Final Phase (FY01) ($200,000)

ORINCON HAWAII, INC.

- Underwater Echolocation for Object Recognition (FY93, FY94, FY95) ($769,732; $652,685; $696,925) [Subcontractor: Hawaii Institute of Marine Biology, Kailua, HI]
- Advanced Real-Time Signal Processor (ARTS) and ASW Commanders Workstations (ADM-3) (FY95, FY96) ($862,095; $871,771)
- An Upgraded ARTS Processor for Maritime Patrol Aircraft Applications (FY98) ($373,000)
- Antisubmarine Warfare Commander's Workstation Upgrades and Advanced Real-Time Signal Processor for CTF-12 Applications (FY97) ($500,000)
- Submarine-Launched, Two-Way, Fiber Optics-Linked Communications Buoy (FY96) ($160,000) [Subcontractor: Sippican, Inc., Marion, MA]
- An Improved Acoustic Intercept Receiver for Submarine Applications (FY97, FY98) ($450,000; $560,000)
- An Integrated System for Detection, Classification, Localization, Tracking and Reporting of Submarine Contact Data (FY97) ($700,000)
- Situation Awareness System (SAS) Processor for Submarine Applications, Phase 2 and At-Sea Evaluation (FY 98, FY99) ($171,777; $775,864)
- Automation and Integration of Environmental Factors into ASW Tracking. (FY99) ($497,415)
- Mission Reconfigurable Signal Processing System (FY00) ($749,504)
- Passive Assured Access System (FY01) ($749,203)
- Theater-Wide Situational Awareness for Decision Wall (FY01) ($150,000)
- Safety-of-Ship System (FY02) ($350,000)
- Portable and Improved Mission Reconfigurable Signal Processor (PIMRSP) (FY02) ($440,000)

PACIFIC ENVIRONMENTAL TECHNOLOGIES

- Development of a Miniaturized Mass Spectrometer-Based Sampling System for In Situ Measurements of Dissolved Gas and/or Solutes in Marine Waters, and for Protein Characterization that leads to Microbial Identification (FY99) ($141,743)
- Capillary Electrophoresis-Mass Spectrometry and Other Instrumental Enhancements for In Situ Measurement of Dissolved Gas and Solutes in Marine Waters, Atmospheric Gases and Aerosols and Large Organic Compound Identification (FY00) ($171,864)

PACIFIC MARINE & SUPPLY COMPANY, INC.

- Tri-Strut Ship Research and Development (FY94) ($365,400)
- Design, Construction and Sea Trials of a 30-Foot Manned Test Model of a Midfoil SWAS (FY95, FY96) ($500,000; $280,000)
- CFD Code Validation and Improvement Using Large Scale Tests: Optimization of Design for High Froude Number Underwater Body Operating at Near Surface (Midfoil and Slice) and Subsequent Construction and Testing of Optimized Underwater Body (FY97) ($663,300)
- Development, Fabrication, and Demonstration of a Patentable Combination Propeller-Pump Jet Integrated Propulsion Pod with Boundary Layer Suction (FY98, FY99) ($300,000; $1,019,000)
- Large-Scale Producibility Demonstration of CEROS-Developed Three-Dimensional Lifting Bodies for Use in the U.S. Navy's Littoral Support Craft (LSC) Program (FY00) ($980,000)
- Flapping Foil Technology for Motion Stabilization of Novel High-Speed Vehicles (FY01) ($250,000)

RAYTHEON SYSTEMS (formerly HUGHES AIRCRAFT, formerly ALLIANT TECHSYSTEMS)

- High-Resolution Bottom-Penetrating Acoustic Sensors and Signal Processing Algorithms for Reduction of False-Alarm Probability in UXO Hunting (FY 94) ($980,766) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]
- High-Resolution Bottom Penetrating Synthetic Aperture Sonar Using Multi-Vertical Row Array and Subbottom Classifier Sonar (FY95) ($990,083) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]
- High-Resolution Bottom Penetrating Synthetic Aperture Sonar for Use in Buried UXO Hunting (FY96) ($982,087) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]
- Integrated Sensor System for Search and Classification of Subbottom Objects (FY97) ($753,008) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]
- Multi-Spectral, Interferometric Synthetic Aperture Imaging Sonar (FY98) ($550,034) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc.]
- Frequency Agile Sequential Transmission Synthetic Aperture Sonar (FastSAS) - Risk Reduction Technology Demonstration for NetTORP (FY99) ($119,976) [Subcontractors: University of Hawaii School of Ocean and Earth Science Technology (SOEST), INTECH, Inc., Sea Engineering, Inc., Honolulu Shipyard, Inc.]

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION (SAIC)

- Effects of Underwater Noise on Marine Mammals Offshore Hawaii (FY93) ($246,324)
- Web-Based Processing for State-of-the-Art Large Aperture Multi-Dimensional (SLAM) Array (FY99) ($500,000)
- Web Based, Propagation & Noise Effects on Signal Processing (FY00) ($670,000)
- Web Based Simulation, Modeling and Signal Processing (FY01) ($399,868)

SCIENCE & TECHNOLOGY INTERNATIONAL (STI) (formerly SETS Technology, Inc.)

- Hyperspectral Remote Sensing for Maritime Applications (FY93, FY94) ($691,800; 647,974)
- Dual Mode Fluorescence Imaging for Maritime Applications (FY95, FY96) ($794,976; $996,428; $100,000) [Subcontractor: SAIC, Woods Hole, MA]
- Grazing Angle Imaging Lidar For Organic Mine Countermeasures (FY96) ($698,227) [Subcontractor: SAIC, San Diego, CA]
- Undersea Fanbeam Spectral Imaging (FSI) Risk Reduction Technology Demonstration (FY98) ($398,895)
- PAX River DFI Prototype (FY98) ($565,498)

SCIENTIFIC SOLUTIONS, INC.

- Implementation of an Ocean Acoustic Laboratory at PMRF (FY01, FY02) ($150,392; $450,000)

SEA ENGINEERING, INC.

- Development of a Technique to Identify Pollutant Sources and Impacts in Coastal and Oceanic Waters (FY94) ($146,000)
- Development of a Broadband FM Sub-Bottom Profiler for Seafloor Imaging and Sediment Classification (FY93, FY94) ($292,000; $223,870) [Subcontractor: Precision Signal, Inc., Boca Raton, FL]
- Development of a 3-D, Forward/Aft Sweeping High Resolution Buried Object Imaging System (FY97, FY98) ($388,660; $421,200) [Subcontractor: Precision Signal, Inc., Boca Raton, FL]
- On-Site, Preliminary Analysis of Sediment Core Samples (FY97) ($102,650) [Subcontractor: Jet Propulsion Laboratory, California Institute of Technology]
- Development of an Ultra-High Resolution Non-Destructive Technique for Stress Detection for Marine Applications (FY98) ($319,154)
- Development of an Enhanced Resolution Filter for Improving Sonar Imagery (FY99) ($148,287) [Subcontractor: MultiSpec Corporation, Cherry Hill, NJ]

SEE/RESCUE CORPORATION

- Life/Float the One-Person Survival Craft (FY98) ($70,000)
- Enhanced Sea and Land Rescue Visibility System (FY99) ($253,839) [Co-contractor: TerraSystems, Inc., Honolulu, HI]
  - Compact-Inflatable-Mobile Survival Platform for Military/Special Forces and Commercial Applications (FY00) ($120,000)
  - Emergency Supplemental Floatation System (ESFS) (FY02) ($45,007) [Subcontractor: Kaysam Worldwide, Inc., Totowa, NJ]

STRUCTURAL SOLUTIONS, INC. (formerly KNAPP ENGINEERING)
- Low-Cost Prebuckled Cylindrical Pressure Hulls (FY93, FY94) ($414,450; $571,000) [Project partner: Oceanit Laboratories, Inc. (Honolulu, HI)]
- 3-D Finite Element Design of Cables (FY 96, FY97) ($145,000; $190,000)
- Smart Scuba (FY98, FY99) ($319,000; $312,000)
- A Probe for In Situ Characterization of Marine Carbonate Sands and Other Sediments (FY98) ($220,000)
- Modeling of Cable Fatigue (FY00) ($190,000)
  - Experimental Investigation of Cable Fatigue (FY01) ($192,000)
  - Structural Modeling of Synthetic Fiber Ropes (FY02) ($195,000)

SYNTHETIC TECHNOLOGY CORP.
- Bioactive Marine Isonitrile Compounds from Hawaiian Sponges as Models for Synthetic Nontoxic Antifoulant and Antibiotic Agents (FY 95) ($155,055)
- Bioactive Marine Isonitrile Compounds from Hawaiian Sponges as Models for Synthetic Nontoxic Antifoulant and Antibiotic Agents. Synthetic Analogs, Paint Formulations, and Mechanisms of Action (FY96, FY97) ($326,553; $300,033) [Subcontractor: Pacific Biomedical Research Center of the University of Hawaii]

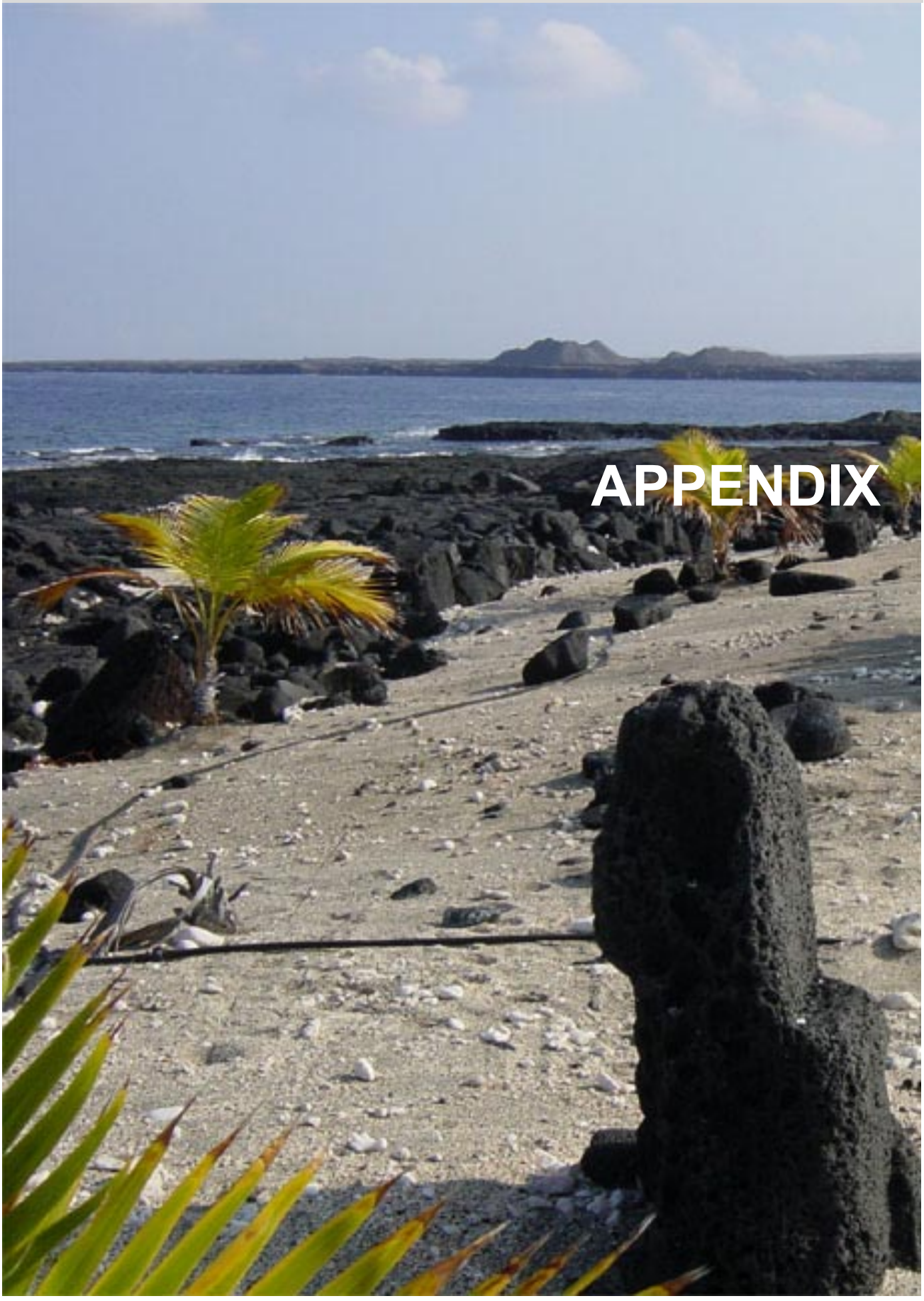
TERRASYSTEMS, INC.
- Development of an Underwater Video Camera for Optical Contrast and Range Enhancement Using Spectral Stretching (FY96) ($247,323) [Subcontractor: Sea Engineering, Inc. Waimanalo, HI]
- Development of an Underwater Compositional Mapping (UCM) System (FY98) ($351,177) [Subcontractor: Sea Engineering, Inc. Waimanalo, HI]
- Enhanced Sea and Land Rescue Visibility System (FY99) ($253,839) [Co-contractor: SeeRescue Corporation, Honolulu, HI]
- vSAR: Video Search and Rescue (FY01) ($352,123) [Subcontractor 1: vSAR Corporation, Honolulu, HI; Subcontractor 2: ORINCON Corporation, Kailua, HI]
- Reconnaissance of Mines and Obstacles in the Surf Zone (FY01) ($34,999)

THERMAL ENERGY STORAGE, INC.
- Development and Testing of a Clathrate Desalination Research Facility (FY96) ($250,000) [Subcontractor: Makai Ocean Engineering, Kailua, HI]

TREX ENTERPRISES
- Development of a Sensor for Pesticide Monitoring Based on Porous Silicon Optical Biosensor (FY00) ($537,000)
- Porous Silicon Biosensor (FY01) ($499,826)

VARIAN ASSOCIATES
- Laser Heterodyne Imaging for Shallow Water Surveillance (FY95, FY97) ($299,674; $395,435) [Subcontractor 1: (FY95): Oceanit Laboratories, Honolulu, HI; Subcontractor 2: (FY97): Detection Limit Technologies, Inc. Honolulu, HI]

NEXT PAGE: View of NELHA Ho'ona Archaeological Preserve beach trail.



APPENDIX

INFORMATION FOR PROSPECTIVE TENANTS

NELHA continues to seek new business, education, and research tenants to join the growing community in this oceanside setting who are offering the Hawaii community a new range of diversified economic alternatives to tourism and traditional agriculture. By laying the groundwork for new industry incubation, NELHA has successfully initiated a new era of economic development and diversification to benefit the West Hawaii community. Tenant activities at NELHA stimulate the economy by engaging in business with local companies to prepare the land for development, carry out construction of new facilities and infrastructure, provide air, land, and sea transport for imported supplies and valuable products for export. New industry development by NELHA tenants provides employment opportunities for residents and development of a variety of novel and valuable products.

NELHA provides a setting to encourage appropriate research, business, education development, including turnkey research facilities, subsidized seawater rates, competitive land and facility rental rates, and the support of its management, technical, and operations staff. Master permits and the existing infrastructure save business start-ups thousands of dollars in capital investment and many months of time. During the first five years of a long term sublease, commercial tenants may earn offsets against percentage rent to further assist them in the early stages of development. Percentage rents are due only after the fifth year, to allow the tenant time to establish the new business and for it to mature. With the payment of percentage rents, NELHA can begin to realize returns on its investments of time and infrastructure support for that new business.

THE APPLICATION PROCESS

NELHA welcomes applications from business, research and educational interests desiring to engage in research, commercial, or educational activities at its Keahole Point facilities. The skilled professional staff at NELHA are available to assist tenants from the initial application stage through establishment of new tenancy, facility planning and development, and long term leasing. Interested parties should consult with NELHA Staff to explore project feasibility and suitability before applying for tenancy.

The application process starts with submission of a Preliminary Proposal following the guidelines in the NELHA Project Initiation Packet (PIP). Applicants may obtain a PIP from the Leasing & Tenant Relations Specialist who will also assist in the application process. Project areas must fit within the guidelines established by legislative mandate, HRS 227D, utilizing the unique resources available on-site, while not harming the environment. All project proposals must be approved by the NELHA Board of Directors, and tenancy begins with the final execution of a land use agreement. Research projects are required to submit a Research Proposal and complete one round of staff review and board approval. Commercial projects must complete a two-stage approval process that involves two rounds of approval, including the submission of a Preliminary Proposal and a Final Proposal/Business plan with financial projections.

NELHA Staff and its Board of Directors seek those projects that can make significant contributions to the advancement of research, education, or economic development for the West Hawaii region. For more information, contact the Executive Director or the Leasing & Tenant Relations Specialist.

PRECEDING PAGE: A view of the Ho'ona Archaeological Preserve, maintained by NELHA Operations Staff.

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University of Hawaii at Manoa

Ralph Moberly, Ph. D. *(until October 2001)*
Department of Geology and Geophysics
School of Ocean and Earth Sciences and Technology
University of Hawaii at Manoa

Richard C. Lim *(until June 2002)*
Hawaii Strategic Development Corporation Board of Directors

PERSONNEL *(from July 1, 2001 through June 30, 2002)*

NELHA

Jeff L. Smith, *Executive Director*

Michael Bloomfield, *Operations Supervisor/Electrical Engineer (from June 2002)*

Thomas Daniel, Ph. D., *Scientific/Technical Director*

Michael Dee, *General Laborer (from February 2001 through September 2001)*

Donald DeSilva, *General Laborer (from November 2001)*

Kimber Deverse, *Chemist III*

Monica Dunse, *Microbiologist III*

Georgette Espinueva, *Secretary III*

Ernest Galt, *Maintenance Mechanic II*

Karin Haleamau, *Groundskeeper II*

Gisela Hetherington, *Chemist III*

Jacqui Hoover, *Administrative & Projects Manager/Gateway Manager*

Sheryll Kaniho, *Fiscal Officer*

Barbara Lee, *Leasing &Tenant Relations Specialist*

Shermaine Miner, *Fiscal Clerk (until August 2001)*

Anthony Mitchell, *Maintenance Mechanic I*

Jeff Nichols, *Engineering Projects Coordinator*

Eugene Pierce, *Electrician II*

Justin Pitts, *Utility Electrician*

Theresa Shelby, *Fiscal Clerk (from September 2001)*

Mark Vail, *Vehicle/Construction Equipment Mechanic I (until February 2002)*

Jan War, *Operations Manager II*

CEROS

Bill Friedl, *Technical Director*

Jacquie Brewbaker, *Program Manager for Outreach & Administration*

Corinne Giles, *Office Manager*

Donna Mau, *Contracts & Grants Administrator*

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