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STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL:DH

Atlantis Submarine

May 3, 2005

MEMORANDUM

TO: Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control

FROM: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

SUBJECT: Recommendation for Acceptance of the Final Revised Environmental Impact Statement for Atlantis Artificial Reef Project, offshore of Puamana Beach Park, Lahaina, Island of Maui

The Department of Land and Natural Resources, Office of Conservation and Coastal Lands Office is submitting the FEIS for the proposed Atlantis Artificial Reef project located offshore of Puamana Beach Park, Lahaina, Island of Maui. Please publish notice of availability for this project in the May 23, 2005 issue of the Environmental Notice. The applicant has agreed to provide the hard copies of the FEIS to your office. The applicant will submit an electronic copy of the project summary and the OEQC Bulletin Publication Form.

However, the OCCL notes there is still an unresolved issue regarding the level of environmental and project disclosure, and analysis regarding the development of Drop Zone B.

Should you have any questions please contact Dawn Hegger of the Office of Conservation and Coastal Lands at 587-0380.

Cc: Land Board Members
DOCARE/DOBOR/DAR/MDLO
Maui County Planning Department
DOH/CZM/DOT/NOAA/OHA
HIHWNMS/NMFS
U.S. Fish and Wildlife Service

2005-05-23 [redacted] FEIS
ATLANTIS SUBMARINES TWIN PEAKS ARTIFICIAL REEF

MAY 2 3 2005

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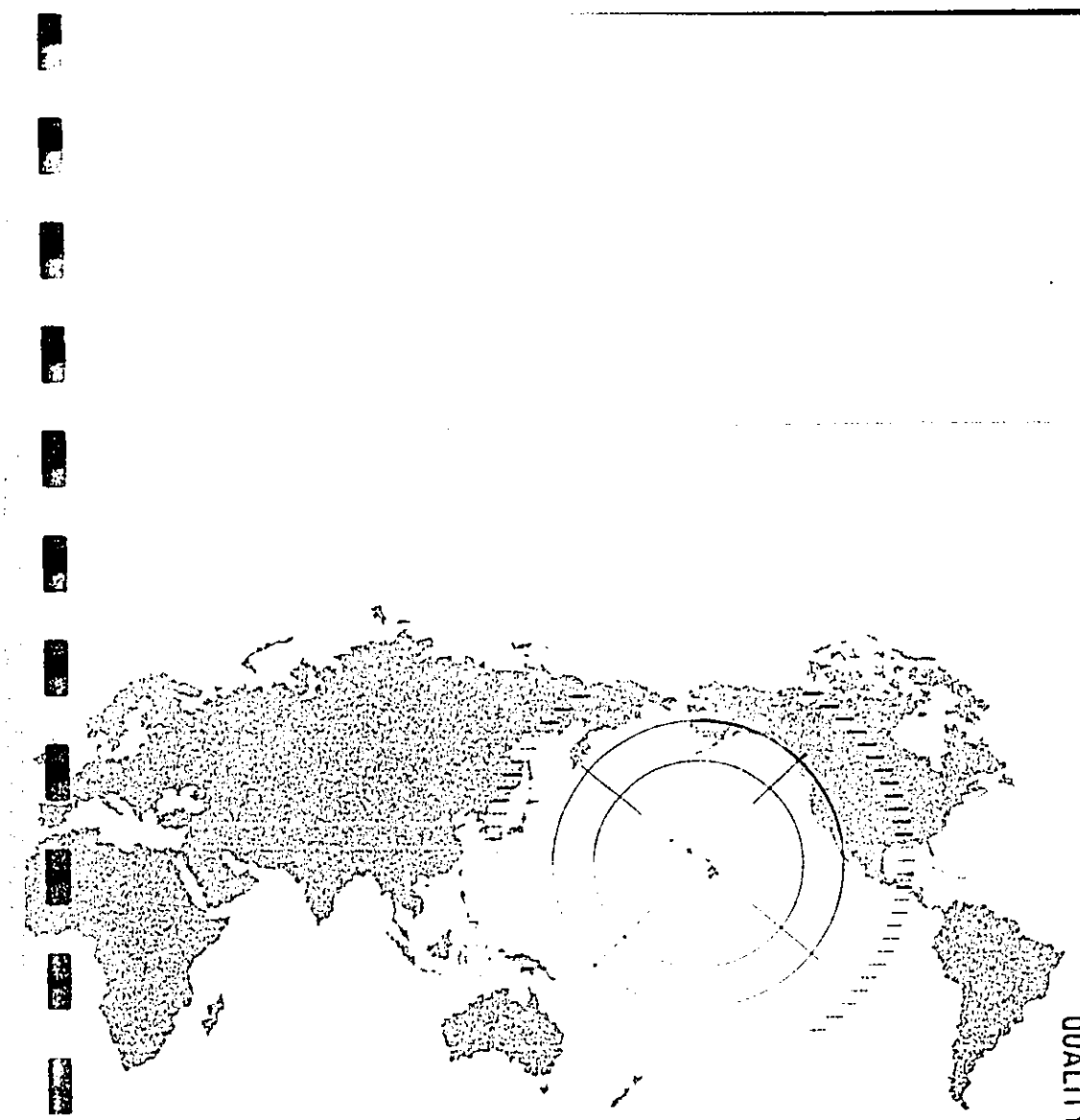

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BEI
BES ENVIRONMENTAL SERVICES

FINAL ENVIRONMENTAL IMPACT STATEMENT

Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

BES Project No.: 03-1267

Prepared For:
Atlantis Submarines Hawaii LLC
658 Front Street #175
Lahaina, Hawaii 96761

Prepared By:
BEI Environmental Services
311 Pacific Street
Honolulu, Hawaii 96817
808-535-6055

April 14, 2005

Final Environmental Impact Statement
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Prepared for:

Atlantis Submarines Hawaii, LLC
658 Front Street #175
Lahaina, Hawaii 96761

FINAL ENVIRONMENTAL IMPACT STATEMENT ARTIFICIAL REEF INSTALLATION OFFSHORE OF PUAMANA BEACH PARK LAHAINA, MAUI, HAWAII

BES Project No.: 03-1267

Prepared By:

Stephanie Mandina
Environmental Scientist

James T. Hayes
Director of Operations

BEI Environmental Services
311 Pacific Street
Honolulu, Hawaii 96817
808-535-6055

April 14, 2005

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EXECUTIVE SUMMARY

Atlantis Submarines Hawaii, LLC, (Atlantis) proposes to install two artificial reefs offshore of Puamana Beach Park, Maui, Hawaii. The plan is to sink a vessel, the Carthaginian, soon after approval and sink additional vessels and/or engineered artificial reef structures in the future to create artificial reefs at two locations designated Drop Zone A and Drop Zone B. An Environmental Impact Statement (EIS) was prepared because the proposed project site is within the Conservation District; therefore, it is subject to the environmental review law as stated in Chapter 343 of the Hawaii Revised Statutes and Title 11, Chapter 200 of the Hawaii Administrative Rules (Department of Health, Office of Environmental Quality Control). The proposed artificial reef project site consists of Drop Zones A and B, which each are one-half acre (21,780 square feet) areas approximately 3,100 feet offshore of Puamana Beach Park. The water is approximately 100 feet deep at the two Drop Zones and the two zones are approximately 1,500 feet apart (Figure 1).

This Final EIS presents the proposed project, reviews alternatives, and assesses the current environment and activities at the proposed project site. It describes the potential impacts of the project and means for mitigating these impacts.

The purpose of the proposed project is three-fold: 1) alleviate pressure on the existing natural reef system from overuse, 2) promote reef and fish biomass increase for commercial and recreational users, primarily divers, and 3) provide an educational opportunity to study the biomass increase over time. The proposed project should result in numerous long-term benefits as the three goals are achieved. Long-term productivity will include:

- Enhanced coral and fish populations in the project site area.
- Increased recreational diving and fishing opportunities for area commercial operations and the public.
- Alleviate pressure on existing natural reef system from overuse and damage by anchoring.
- Increased educational and economic opportunities for Hawaii residents.
- Improved submarine tours.

Potential short-term impacts during artificial reef installation include:

- Water quality degradation (increased turbidity) through seafloor disturbance and introduction of pollutants from the artificial reef into the water.
- Seafloor damage.
- Marine mammal and sea turtle disturbance.

- Ocean activities disturbance including both commercial and public activities.
- Local economic benefits.

Because the Carthaginian, and other artificial reef structures, can be installed in one day, potential short-term impacts should be minimal.

Potential long-term impacts due to artificial reef installation include:

- Marine community/environment alteration.
- Marine mammal and sea turtle disturbance and entanglement.
- Ocean activities alteration.
- Cultural impacts.
- Local economic benefits.
- Submerged/ceded land lease.

Long-term impacts may be significant, but are generally considered positive impacts because they achieve the three primary goals of the project.

Numerous mitigation measures have been incorporated into the proposed project to minimize possible short- and long-term impacts. The mitigation measures are summarized below:

- The Carthaginian, and any subsequent vessel, will be thoroughly cleaned to and beyond U.S. Coast Guard, Environmental Protection Agency (EPA), and State of Hawaii Department of Health (HDOH) requirements and standards. The vessels will be available for inspection by all interested agencies prior to installation. This will mitigate the chances of water quality degradation.
- The vessel will also be altered to make it safer for future divers, this will include simplifying rigging and removing loose materials. The vessel will be available for inspection by all interested agencies prior to installation. Furthermore, no loose materials will be used to ballast the vessel. This will make the artificial reef a safe recreational attraction and mitigate possible marine mammal and sea turtle entanglement concerns and concerns regarding the artificial reef producing floatable debris.
- The Carthaginian, and any subsequent vessel, will be carefully prepared for sinking and sunk in a very controlled manner to mitigate the possibility that the vessel would come to rest outside of the designated Drop Zone (Appendix D). This will mitigate the chance of unintended seafloor damage.

- The Carthaginian, and any subsequent vessel, will be stabilized on the ocean floor using an appropriate anchoring system. The anchoring system will be established using conservative design waves to evaluate potential movement of the vessel after installation (Appendix E). The anchoring system will prevent artificial reef movement during storms, mitigating the chance of unintended seafloor damage.
- The artificial reef installation process will be completed in less than a day; it will require an additional day to secure a vessel, however, a few divers can complete that with hand tools, resulting in minimal disturbance. Furthermore, artificial reef installation will only be performed between May 16th and December 14th when no marine mammals or sea turtles are present in the vicinity of the Drop Zone. These facts will mitigate all the possible short-term impacts of the project.
- Atlantis will inform the U.S. Coast Guard prior to installing artificial reefs per CFR 229.3. Atlantis will also inform users of the Lahaina Harbor prior to installing artificial reefs in order to reduce impacts to other ocean activities. This will help to mitigate ocean activities disturbance.
- The project site has been selected to reduce impact on existing habitats and inhabitants. The project site has either sandy or sandy and rocky environments with limited life, consisting mainly of *Halimeda* beds. This will mitigate significant negative marine community/environment alteration.
- A submerged mooring buoy will be installed on the Carthaginian (Figure 2), and any subsequent vessel installed as an artificial reef. The buoy will have a greater-than-necessary buoyancy in order to increase line tension to mitigate entanglement concerns. The buoy will be dedicated for public use. ~~Open access to the site will~~ to mitigate possible use conflicts at the site and reduce possible anchor damage to coral. This addresses ocean activities alteration once the artificial reef is in place.

As is the case with many projects, there are unavoidable impacts. The most obvious impact of placing an artificial reef is that the current ocean bottom, and whatever is living on it, is covered and a new, different habitat is created. The loss of 1 acre (43,560 square feet) of the habitats currently present at the project site is not considered a significant impact because similar conditions are prevalent in a wide area (at least 175 acres) around the project site. The project should produce an environment with more diversity, coral, and fish than the current habitat, and species in the surrounding current habitat will benefit from the presence of the artificial reef. The loss of the few bottom dwelling organisms that currently occupy the project site represent a minor portion of the surrounding community, and therefore their loss is a minor impact.

Minor unavoidable short-term impacts also include increased turbidity when artificial reefs are installed and secured, and temporary disruption of boating traffic and ocean activities during artificial reef installation activities. Both of these impacts should last less than one day.

The proposed project fits within the existing State of Hawaii Department of Land and Natural Resources (DLNR), Department of Health (HDOH), and National Marine Fisheries Service (NMFS) programs and uses for the project area. Furthermore, there is precedence for artificial reefs in the area and specifically within the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) because the State has maintained the Keawakapu Artificial Reef within the HIHWNMS offshore of Kihei, Maui since 1962.

1.0 INTRODUCTION

Atlantis Submarines Hawaii, LLC, (Atlantis) proposes to install artificial reefs offshore of Puamana Beach Park, Maui, Hawaii. The plan is to sink a vessel, the Carthaginian, now and sink other vessels or engineered artificial reef structures in the future to create artificial reefs at two "Drop Zones" (Figure 1). The subject of the EIS and the "project site" is the two Drop Zones (Drop Zones A and B), which are each a half acre in size, approximately 3,100 feet offshore from Puamana Beach Park, approximately 1,500 feet apart, and located where water is approximately 100 feet deep.

An Environmental Assessment was not prepared for this project because Atlantis anticipated a finding of impact and, therefore, began the environmental review process at the Environmental Impact Statement Preparation Notice (EISPN) stage. The EISPN was dated October 23, 2003. A number of comments on the EISPN were received and are included in Appendix A. Responses to the comments were prepared and sent to the commenting agencies; the responses are included in Appendix B.

Atlantis Submarines submitted a Draft Environmental Impact Statement (EIS), dated October 8, 2004, for review and comment by the agencies listed in Section 1.3. Any and all comments received ~~will be responded to and, if necessary, the EIS revised to address the comments~~within the 45-day comment period, which ended November 22, 2004, are included in Appendix K. Responses to all the comments were prepared and sent to the commenting agencies; the responses are included in Appendix L. Other comments received from the DLNR after the official 45-day comment period are also included in Appendix K with subsequent responses in Appendix L.

Atlantis is also in the process of obtaining the necessary permits to proceed with the project. After the environmental review process is complete and the project accepted, plus the appropriate permits issued, Atlantis will schedule installation of artificial reefs at the approved locations.

The public review and consultation for this EIS is being processed pursuant to Hawaii Revised Statues, Chapter 343 and Chapter 200 of Title 11 Administrative Rules, Department of Health Environmental Impact Statement Rules, and Office of Environmental Quality "The Environmental Guidebook, A Guidebook for the Hawaii State Environmental Review Process" dated October 1997 (HDOH, 1997).

1.1 Summary Sheet

Proposing Agency:	Atlantis Submarines Hawaii, LLC (Atlantis)
Agent Representing Proposing Agency:	BEI Environmental Services (BES)
Approving Agency:	Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL)
Proposed Action:	Install artificial reefs
Location:	Two half acre "Drop Zones" separated by approximately 1,500 feet and both approximately 3,100 feet southwest of Puamana Beach Park, Maui, centered on the following coordinates: Drop Zone A: 20° 51.167' N and 156° 40.432' W Drop Zone B: 20° 50.737' N and 156° 40.072' W
Area:	One acre (43,560 square feet) equally divided between two "Drop Zones"
Ownership:	State of Hawaii, Atlantis will obtain a non-exclusive easement for Drop Zones A and B
State Land Use District:	Conservation District
Maui County General Land Use:	Project site is governed by the State of Hawaii
Community, Development Plan, Zoning	Project site is governed by the State of Hawaii
Special Management Area:	None
Historic Site:	None
EIS Trigger:	Use of conservation land
Permits Required:	• DLNR Conservation District Use Application (CDUA) • State of Hawaii Department of Health (HDOH) Clean Water Branch (CWB) Section 401 Water Quality Certification (WQC) • State of Hawaii Coastal Zone Management (CZM) Program, Federal Consistency Assessment and Certification Form • US Army Corps of Engineers (USACE) Department of the Army, Rivers and Harbors Act Section 10 and Clean Water Act Section 404 DA permit.

Contact person for further information:	James T. Hayes Director of Operations BEI Environmental Services 311 Pacific Street Honolulu, Hawaii 96817 Phone: 808-535-6055 Fax: 808-535-6053 Email: jhayes@beihawaii.com

1.2 Reason for the EIS

An EIS is being prepared because the proposed project site is within the conservation district; therefore it is subject to the environmental review law as stated in Chapter 343 of the Hawaii Revised Statutes and Title 11, Chapter 20 of the Hawaii Administrative Rules.

1.3 Agencies and Parties Consulted

The following agencies, groups, and individuals were consulted during the preparation of this EIS.

Federal Agencies
US Fish and Wildlife Service
US National Marine Fisheries Service
US Army Engineer Division – Regulatory Branch
US Coast Guard
Hawaiian Island Humpback Whale National Marine Sanctuary

County Agencies
Dept. of Parks and Recreation
Dept. of Planning
Dept. of Public Works
Dept. of Water Supply
County Councilmember – Jo Anne Johnson
Maui Burial Council

Citizen Groups and Others
The Nature Conservancy
The Outdoor Circle
Public Access Shoreline Hawaii
The Sierra Club, Maui Chapter
Na Kupuna O Maui
Friends of Moku'ula

State Agencies
Dept. of Agriculture
Dept. of Accounting and General Services
Dept. of Business, Economic Development and Tourism – Coastal Zone Management Program
DBEDT Energy, Resources & Technology Division
DBEDT Planning Office
Department of Defense
Dept. of Hawaiian Homelands
Dept. of Health – Environmental Planning Office
Dept. of Health – Clean Water Branch
Dept. of Land and Natural Resources
Dept of Transportation
Office of Hawaiian Affairs
UH Environmental Center
UH Sea Grant Program
State Senator – Rosalyn Baker
State Representative – Brian Blundell

~~1.~~4A public meeting was also held on October 18, 2004 at the Wharf Cinema Center Conference Room located at 658 Front Street in Lahaina, Maui starting at 5 p.m. Fourteen people attended the meeting and made comments on the proposed project and the Draft EIS.

Comments received during the public meeting and received from the agencies and groups listed above during their review of the Draft EIS dated October 8, 2004 are presented in Appendix K and responses to those comments have been incorporated into this Final EIS and are presented in Appendix L.

1.4 Preparers

The following corporate entities contributed to the production of this Environmental Impact Statement:

- BEI Environmental Services (BES) – prepared the Environmental Impact Statement and performed the historical and cultural survey and ocean activities survey (Sections 5.1 and 5.5).
- Oceanic Institute (Oceanic) – performed a survey of bottom characteristics (Section 5.2.6), marine biology (Section 5.3.1), and water quality surveys (Section 5.4); their report is provided in Appendix H.
- Atlantis Submarines Hawaii, LLC (Atlantis) – performed boat traffic survey (Section 5.6), and contributed information regarding bottom characteristics (Section 5.2.6) and marine life observations at the subject site and their Waikiki artificial reef site (Section 5.3.2).

2.0 DETERMINATION

The overall and cumulative effects of the proposed project have been assessed against criteria established in HAR Title 11, Chapter 200 Environmental Impact Statement Rules, Section 12 (HDOH, Office of Environmental Quality Control). Although the significance criteria indicate that the project is not expected to have a significant environmental impact, Atlantis elected to complete the environmental review process to provide agencies and the public every opportunity for input and review prior to proceeding. The significance criteria are listed below and a simple statement regarding why the project is not expected to have a significant impact follows each criteria. Details of project impacts and mitigation are presented in Section 7.0.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.
   - Natural resources at the project site are currently limited and due to the site's distance offshore, water depth, and lack of natural resource has no known cultural resources. Placing an artificial reef should enhance marine habitat and promote coral and fish growth.
2. Curtails the range of beneficial uses of the environment.
   - The project should enhance, rather than curtail, beneficial uses at the project site by promoting coral and fish growth, and placing an attractive structure for diving and fishing activities.
3. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.
   - The project is consistent with the state's long-term environmental policies to conserve natural resources, enhance the environment, and create opportunities for residents to improve their quality of life through diverse economic activities that are in balance with the physical and social environment. The state encourages artificial reef development and installs artificial reefs itself. The project is also in line with the National Artificial Reef Plan (NOAA, 1985).
4. Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.
   - The project should benefit the economic and social welfare of the community and state plus provide greater opportunity for cultural fishing practices. The project should directly benefit the State's ocean recreation industry and recreational divers and fishermen.

5. Substantially affects public health.
   - The project should not affect public health.
6. Involves substantial secondary impacts, such as population changes or effects on public facilities.
   - The project should have little effect on population or existing public facilities. Atlantis already operates in the area and no significant change to their operation is foreseen.
7. Involves a substantial degradation of environmental quality.
   - The project should improve the environment at the project site by enhancing habitat and promoting coral and fish growth.
8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.
   - The project has set limits and does not commit any party to large actions.
9. Substantially affects a rare, threatened, or endangered species, or its habitat.
   - The project should provide additional ~~habitat and~~ resting places for green sea turtles and open the surrounding area to turtle foraging. Monk seals may also benefit from the project by providing both foraging and resting places. The size of the project and materials used are not expected to be an entanglement hazard or otherwise threaten humpback whales, sea turtles, monk seals, or dolphins.
10. Detrimentally affects air or water quality or ambient noise levels.
    - The project should not detrimentally affect the water quality in any way beyond the temporary increase in turbidity as the artificial reefs are placed on the bottom.
11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.
    - The project is not located in an environmentally sensitive area.
12. Substantially affects scenic vistas and view planes identified in county or state plans or studies.
    - The project should not affect vistas and view planes because it is underwater. The project should enhance underwater viewing by divers.
13. Requires substantial energy consumption.

- The only energy required to complete this project is that needed to prepare the Carthaginian and other vessels to be used as artificial reefs, install the artificial reefs, and secure the artificial reefs. After installation no energy will be consumed by the project.

3.0 PROJECT DESCRIPTION

3.1 Proposed Action and Purpose

Atlantis proposes to have Drop Zones A and B designated artificial reef sites and install an artificial reef at both Drop Zones, which are located on public conservation district land (ceded lands). Cleaned vessels and/or engineered artificial reef structures will be installed and serve as artificial reefs with associated mooring buoys at the Drop Zones. The purpose of the proposed project is three-fold: 1) alleviate pressure on the existing natural reef system from overuse, 2) promote reef and fish biomass increase for commercial and recreational users, primarily divers, and 3) provide an educational opportunity to study the biomass increase over time. The mooring buoy will allow safe and secure mooring above the artificial reefs.

This project is being funded by Atlantis and no state or county funds are involved. The project is not being performed to mitigate damage to another reef system by Atlantis or any other entity. Atlantis chose to support and fund the project because they have a vested interest in the three goals of the project and their corporate mission includes environmental stewardship.

3.2 Project Site

The project site consists of two one-half acre (21,780 square foot) Drop Zones located off the southern coast of Maui, approximately 3,100 feet southwest (offshore) of Puamana Beach Park, south of Lahaina (Figure 1). The project site consists of Drop Zone A, a one-half acre (21,780 square foot) area consisting of a circle with a diameter of approximately 167 feet centered on latitude 20° 51.167' north and longitude 156° 40.432' west and Drop Zone B, another one-half acre (21,780 square foot) area consisting of a circle with a diameter of approximately 167 feet centered on latitude 20° 50.737' north and longitude 156° 40.072' west. The water depth at both Drop Zones is approximately 100 feet (16 fathoms). It is proposed that the two Drop Zones be designated artificial reef sites where artificial patch reefs would be developed.

Upon approval of this EIS and related permits, Atlantis plans to first sink a vessel, the Carthaginian at Drop Zone A. As funds become available, Atlantis may further develop Drop Zones A and/or B through the installation of engineered artificial reef structures and/or other appropriately prepared vessels.

The location of the Drop Zones was based on a number of factors, including:

- The DLNR Division of Aquatic Resources and the U.S. National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Services both recommended that the artificial reefs be placed no deeper than 100 to 110 feet below the ocean surface to avoid creating an "attractive hazard to divers."

- The public in the area was primarily concerned that the artificial reefs be deep enough that they not impact area surf spots.
- Other agencies and permits require that the artificial reefs be deep enough and secured well enough so as not to shift during storm events and not rise to a depth less than 30 feet below sea level.
- The current environment on the sea floor should be such that the placement of the artificial reefs does not impact or disturb existing coral reefs or other critical habitats.
- The artificial reefs be located within Atlantis' current area of operation, know as the Twin Peaks area (Figure 3).

Based on these concerns and issues, the Drop Zones were revised from the three locations presented in the EISPN (BES, 2003) to the two locations presented in this Final EIS. The primary reason for the change was so that the two Drop Zones were both in water approximately 100 feet deep, allowing relatively low risk to recreational divers.

3.3 Vessel Artificial Reef Preparation, Description, and Installation

Initially, the Carthaginian will be used to form an artificial reef at Drop Zone A. In the future, additional ships may be used to form artificial reefs at Drop Zones A or B. When additional ships become available, they will be evaluated for potential use as artificial reefs at Drop Zones A and B. Additional ships would have to meet the following criteria to be installed as artificial reefs:

- They are of a size that fits within the limits of the drop zone, minus the area within the drop zone already used by an artificial reef. Therefore, the ship must not have a dimension longer than 167 feet (assuming no pre-existing artificial reef structure at the Drop Zone) or feature that would rise to less than 30 feet below ocean surface.
- The ship could be cleaned and prepared for use as an artificial reef to the applicable regulations.
- The ship could be secured to the ocean floor within the limits of the drop zone.

Any additional vessels used as artificial reefs would be subject to the same preparation and installation regimen as the Carthaginian, including cleaning, deployment, securing, and mooring as detailed below.

A description of the Carthaginian and the preparation procedures are described in the sections below. Methods to sink and secure the Carthaginian in the appropriate location are discussed. Mooring pin and buoy descriptions, locations, installation and use plans are provided. A photograph of the Carthaginian prior to cleaning is provided as Photograph 1 and Photographs 2 through 4 show the Carthaginian in its cleaned state ready for sinking and use as an artificial

reef. A diagram illustrating how the Carthaginian will appear once sunk at Drop Zone A is provided in Figure 2.

3.3.1 Carthaginian History

Krupp Shipworks, in Kiel, Germany, built and originally launched the vessel in 1920. Originally, the vessel was built as a steel-hulled, two-masted schooner. The vessel was later converted to diesel power and spent decades in the Baltic Sea serving as a mixed cargo freighter. In 1974 she began the transformation process from a functioning freighter to a replica of a 19th century trading ship that brought New England missionaries around Cape Horn to Hawaii and sailed throughout the Hawaiian waters (MuseumStuff.com, 2003). For the transformation, the hull was sandblasted, ballast was installed, the interior was rebuilt, and the rigging was completed by hand (Lahaina Restoration Foundation, 2003). Upon completion of the renovations, the Carthaginian served as a floating museum in Lahaina Harbor from 1978 to 2001.

3.3.2 Vessel Cleaning/Safety Preparations

Atlantis has completed the cleaning process of the Carthaginian in accordance with the Coast Guard Requirements for the Disposal of Abandoned Vessels Offshore and 40CFR 229.3 Transportation and Disposal of Vessels (Appendix C). The Coast Guard Requirements for the Disposal of Abandoned Vessels Offshore addresses artificial reef opportunities and has been closely followed in order to alleviate potential environmental impact and safety concerns.

Former items on the vessel that may have caused environmental impacts included:

- oil and lubricants associated with the engine, engine room, and bilges; and
- fuel contained in the two fuel tanks and fuel lines.

To avoid unacceptable adverse impacts to the environment, all liquid and gaseous chemicals have been removed. The two diesel fuel tanks have been emptied and cleaned by pumping out residual fuels and sludge. All fuel lines have been cleaned by the same manner and ~~filled~~ flushed with water. All oil and lubricants have been removed from the engine, engine room, and bilges.

Safety issues include:

- Objects that may impede navigational waters by extending to a depth of less than 40 feet below the surface of the water, such as the mast.
- Objects which may easily separate from the vessel such as all floatable materials, including loose wood construction that is not firmly affixed to the hull or steel members and any other materials that may float to the surface prior to becoming waterlogged.

- Objects that may pose an entanglement danger, such as loose lines and unsecured rigging.

Safety preparations included dismantling the upper masts (topmast, topgallant royal), and all yards. Originally each of the two main masts consisted of three sections; the top two sections will be removed prior to artificial reef installation. All Manila lines, hemp lines, synthetic lines, and wood blocks/tackle have been removed. The de-rigging was completed in January 2004 and illustrated in Photograph 2. Rigging left in place to support the main masts is made of steel and was reinforced with stainless-steel cable. The rigging will be further reduced prior to installation; rigging that has a net/ladder appearance and the topmast (the middle section of the original three mast sections) (Photograph 2) will be removed.

After de-rigging the vessel, all loose or potentially loose materials were evaluated and removed, if necessary. This resulted in essentially everything that was not bolted down being removed from the exterior and interior of the vessel.

3.3.3 Waste Disposal

All fuels, oils, lubricants, and oily wastewater were disposed at the Lahaina Harbor Waste Oil Facility. Solid waste material removed from the vessel was disposed of at the local landfill.

3.3.4 Vessel Description

This section describes the vessel in its current condition, ready for use as an artificial reef after being cleaned and partially dismantled to address environmental and safety concerns. The Carthaginian (Photograph 2) measures 120 feet in length, including the bowsprit and is 27 feet in width (beam). The vessel hull height is 13 feet at the stern, 12 feet midship, and 16 feet at the bow. The vessel has two ~~66~~50-foot high masts~~; each mast has two sections, a 50 foot long,~~ which are 1.5-foot diameter. The two upper sections of the original masts have been or will be removed prior to using the Carthaginian as an artificial reef ~~bottom section and a 16 foot long, 1.0 foot diameter top section~~. The vessel is approximately ~~66~~ 50 feet tall from hull bottom to mast top. The hull is made of steel and the bilge is currently filled with 35 tons of steel and concrete as ballast.

The only rigging remaining is made of steel or stainless-steel cable with steel blocks and is essentially the minimum necessary to support the two masts. Based on comments received on the Draft EIS, the rigging will be further simplified by removing any rigging that appears to have a net/ladder structure and the topmast (the middle section of the original 3 mast sections) (Photograph 2).

The ship weighs approximately 740,000 pounds (lbs).

3.3.5 Installing the Vessel as an Artificial Reef

The Carthaginian will be towed to Drop Zone A approximately 1-1/4 miles from its present location in Lahaina Harbor. Tow vessel options include the vessels Ocean Twin (powered by twin 8-71 Detroit diesel engines), or the Roxie (powered by twin 4-71 Detroit diesel engines). The Roxie is the vessel that tows the Atlantis submarine to and from the current dive site each day (the submarine weighs 160,000 lbs).

The ship will be sunk and aligned parallel to the shore and the prevailing tidal currents (Section 5.2.3) on the ocean floor at Drop Zone A (Figure 2). Offshore Marine Surveyors prepared a *"Carthaginian" – Deployment for Artificial Reef, Sinking Plan* for Atlantis Adventures, Inc., a copy of the plan is provided in Appendix D. The Carthaginian will be ballasted with the appropriate amount of concrete in the harbor and three anchors with temporary moorings will be placed at the Drop Zone, two for the bow and one for the stern, prior to deployment day. The anchors will be widely spaced with a great deal of scope in order to maintain the vessel in the proper position and orientation while the vessel is sunk. These are not the same anchors that will be used for securing the vessel (Section 3.3.6). On deployment day, the vessel will be towed to the project site, secured in position using the anchors and temporary moorings, then sunk by filling it with water using pumps and soft patches in the hull (Appendix D).

It is estimated that the Carthaginian can be towed from Lahaina Harbor to the project site and sunk in one day.

3.3.6 Securing the Vessel/Artificial Reef

Sea Engineering, Inc. conducted a stability analysis and completed a report titled *Stability Analysis for the Sinking of the Carthaginian*, dated March 2004. The analysis is based on placing the vessel at the project site in 90 to 100 feet of water and placing its hull parallel to the coastline and the strongest tidal currents. The document prepared by Sea Engineering, Inc. is provided as Appendix E.

Sea Engineering, Inc. found that under most conditions the ship would be secure without anchoring or securing, except in the Worst Scenario hurricane out of the southwest if the bottom friction coefficient is 0.7 or lower. Therefore, Sea Engineering, Inc. indicated four Manta Ray MR-1 or MR-2 anchors should be used to secure the ship on the bottom. All four anchors should be placed at a 90-degree angle to the centerline of the ship with the anchors placed on either side of the bow and stern of the ship (Figure 2). After the ship is on the bottom, the sand thickness where the anchors will be located will be probed. If 12 feet of sand can be found, the MR-1 can be used; if not, the MR-2 is the recommended option. The recommended installation depth below ocean floor for both the MR-1 and MR-2 anchors is 12 feet with the MR-1 being designed

for soft bottoms and the MR-2 designed for hard bottoms. The anchors are typically driven into the bottom with a 90-pound hydraulic jackhammer.

Atlantis plans to follow Sea Engineering, Inc.'s recommendations regarding the securing of the vessel on the bottom. It is estimated the anchoring can be completed in one day using a small motorboat, small crew, and hand-held tools.

3.3.7 Mooring Buoy Installation and Use Plan

Atlantis plans to install one submerged mooring ball for public use on each vessel installed as an artificial reef (Figure 2). The mooring will be available on a first-come first-serve basis. Atlantis' operation does not require the use a mooring. The mooring will be attached to a secure structure on the vessel such that the mooring line will be free and clear of all parts of the vessel. In order to minimize marine mammal and turtle entanglement concerns, a buoy with greater buoyancy than necessary will be used (to increase the tension on the cable).

3.4 Engineered Artificial Reef Structures, Preparation, and Installation

Engineered artificial reef structures are planned for possible future placement at Drop Zones A and B as funds become available. These structures will most likely be made of concrete similar to the Aqua Havens, Reefball, or similar products. By the time funds become available, technological advances in artificial reef structures may occur. Therefore, the specifications of engineered artificial reef structures will be released to all appropriate parties for comment and approval prior to the planned installation.

3.5 Atlantis Submarines Hawaii Maui Operations

This section describes Atlantis Submarines Hawaii, LLC's (Atlantis') operation on west Maui, Hawaii.

3.5.1 Daily Operations

Atlantis currently operates one 48-passenger submarine out of Lahaina Harbor. The dive tour site is located in an area known as Twin Peaks, approximately 1-1/4 miles south of the harbor and approximately 0.5 miles southwest of Puamana Beach Park, in water depths of 90 to 130 feet (Figure 3). In addition to the submarine, two support vessels are used for daily operations: a tender vessel and a surface vessel. The tender vessel carries passenger to and from the dive site and the surface vessel remains at the dive site with the submarine and assists with surfacing and manages surface traffic. Shore facilities are included in the dive operations.

Equipment checks are performed on the submarine and support vessels at the beginning and end of each operation day. The submarine is towed from the dock by the surface vessel (the Roxie) to the dive site where it remains for the day's operation. The tender vessel takes

passengers from the dock to the submarine. Passengers are transferred from the tender vessel to the submarine and back to the tender vessel following a 45 to 50 minute dive in the submarine. Throughout the day, new groups of passengers are taken to the submarine and the previous groups are returned to the dock. During the dive, the Surface Officer who is aboard the surface vessel tracks the submarine's progress through the tour route and keeps the dive area clear of surface traffic. The Surface Officer is responsible for the dive and gives the submarine the clearance to dive and surface. After diving is done for the day and the last passengers have disembarked, the submarine is towed back to the dock. All required maintenance is performed at night.

The submarine tour operates daily (Monday through Sunday) typically from 9 a.m. until 2 p.m. and the submarine dives and runs a 45 to 50 minute tour on a circular route. Currently, Atlantis typically runs five dive tours a day, therefore, approximately 200 people tour the area on the submarine every day. At certain times the number of tours a day increases to meet demand. The subsea tour route is completely within the Twin Peaks area (Figure 3), which encompasses the project site.

3.5.2 Changes to Operations Due to Artificial Reef Installation

No significant changes to Atlantis' operations are anticipated as a result of installing the artificial reefs. The most likely changes are that (a) the Carthaginian artificial reef will become the ending point of the dive tour, and (b) the times of operation will be lengthened to allow more dive tours per day, if demand increases.

3.5.3 Submarine Description

The submarine was designed by Atlantis Submarines International Inc. in Vancouver, British Columbia, Canada and built in Everett, Washington by Atlantis Submarines Hawaii Inc. The submarine is designed and built specifically to carry passengers. It carries a crew of three, 48 passengers, and can dive to depths of up to 150 feet on one-hour subsea tours.

The submarine is 65 feet long, 13 feet wide, 17.5 feet tall, and weights approximately 160,000 pounds. More submarine specifications are provided with the operation manual in Appendix F.

3.5.4 Safety Procedures

Atlantis maintains a comprehensive operations manual that provides descriptions of normal and emergency operating regulations (Appendix F). The following specific operating restrictions are outlined to ensure safe operations:

- The water depth at no time is to exceed 150 feet.

- The weather forecast will be monitored prior to departing for the dive site and throughout the day. Any significant weather patterns must be reported to the Operations Manager.
- The submarine shall not operate in sea conditions greater than sea state 3.
- The submarine shall not operate if surface or subsea currents exceed 1.5 knots.
- The submarine shall not operate if subsea visibility is less than 30 feet.
- The submarine shall not operate if surface visibility is less than one nautical mile.
- The submarine's UWT and VHF must be capable of operation.
- Other vessels operating in the area should be informed of the submarine's activities.
- The maximum speed of the submarine underwater is to be within its visibility limitations such that it can be completely stopped within 70 percent (%) of the visual distance.

In addition, the submarine is required to have on board minimum quantities of system charges or supplies and emergency supplies. Certain system faults (power, oxygen, etc.) will necessitate aborting the dive. The submarine is required to have on board minimum quantities of system charges or supplies and emergency supplies.

Hawaii Ocean Safety Team (H.O.S.T) produced a letter for ocean users regarding safety and convenience in submarine operating sites. A copy of the letter prepared by the Honolulu H.O.S.T. team regarding safe operation around Atlantis' Waikiki dive area is available in Appendix G. Atlantis will prepare a similar, but more detailed, letter regarding operations at the project site. The letter will be distributed to local recreational and commercial ocean users.

3.6 Development Schedule and Consultation Process

Upon completion of the environmental review process, acceptance of the project, plus obtaining all requisite permits, Atlantis plans to proceed with artificial reef installation. Atlantis has already cleaned the Carthaginian, disposed of hazardous wastes found or generated during cleaning, and is in the process of securing the vessel to address safety concerns.

It is estimated that all permits will be acquired by ~~November~~ May 2004~~5~~ and the Carthaginian vessel will be installed as an artificial reef at Drop Zone A within one month of permit approval.

Engineered artificial reef structures are planned for possible future placement at Drop Zones A and/or B, as funds become available. The specifications of engineered artificial reef structures will be released to all permitting agencies (DLNR, HDOH, CZM, and USACE), for comment and approval prior to installation.

4.0 ALTERNATIVES TO THE PROPOSED PROJECT

Atlantis considered alternatives to the proposed project ranging from no action to using alternative reef structures and sites. The alternatives are discussed in the following sections.

4.1 No Action Alternative

The "no-action" alternative would mean no modifications to the project site, thus it would remain undeveloped and in its natural state. The potential enhancement to habitat in the project site area and subsequent increase in coral and fish growth would not occur or occur at a much slower rate if an artificial reef is not installed. By not installing artificial reefs at the project site, the growth of recreational activities in the area may be slowed and/or the pressure on existing natural reef systems may increase.

This option would result in the Atlantis operation continuing as it does now. Much of the present tour crosses relatively barren, unproductive sand flats that provide little interest to Atlantis' customers or other ocean users. An artificial reef at the project site would provide several attractions for submarine passengers and other commercial and recreational users. The proposed mooring buoy would prevent coral damage caused by anchoring. Maintaining operations as they are will provide none of the environmental benefits of the proposed project and will result in a less attractive tourist product for Atlantis. This could possibly result in a less viable business and loss of jobs. Atlantis currently employs 27 people in their submarine business in Maui.

4.2 Alternative Reef Sites

Because Atlantis' operation area is limited to the Twin Peaks area (Figure 3) by the U.S. Coast Guard, Atlantis has only considered artificial reef sites within their Twin Peaks operational area. The project site was selected from a number of possible alternatives within the area. The currently proposed Drop Zones A and B were selected based on a number of factors, including:

- The DLNR Division of Aquatic Resources and the NOAA National Marine Fisheries Service (NMFS) both recommended that the artificial reefs be placed no deeper than 100 to 110 feet below the ocean surface to avoid creating an "attractive hazard to divers."
- The public in the area was primarily concerned that the artificial reefs be deep enough that they not impact area surf spots.
- Other agencies and permits require that the artificial reefs be deep enough and secured well enough so as not to shift during storm events and not rise to a depth less than 30 feet below sea level.

- The current environment on the sea floor should be such that the placement of the artificial reefs does not impact or disturb existing coral reefs or other critical habitats.
- The artificial reefs should be placed to allow maximum access and enjoyment for both private and commercial divers and other recreational activities.

Based on these concerns and issues, the Drop Zones were revised from the three locations presented in the EISPN (BES, 2003) to the two locations presented in this Final EIS. Drop Zones B and C, originally proposed in the EISPN, were considered as alternative artificial reef locations. Drop Zones B and C proposed in the EISPN were rejected primarily because the water depth at those locations exceeded 100 feet and would present an "attractive hazard to divers." The two drop zones now proposed are both in water approximately 100 feet deep, allowing relatively low risk to recreational divers yet deep enough for the Carthaginian to be placed on the bottom and not be a navigational hazard or shift during storms. Drop Zones A and B are located in relatively barren portions of the Twin Peaks area where the bottom is primarily sand with *Halimeda* beds for a wide expanse.

4.3 Alternative Reef Structures

Atlantis considered two general types of artificial reefs: vessels and fabricated materials. A steel-hulled vessel became the preferred alternative because vessels are considered more attractive dive destinations than fabricated reef materials (Section 7.2.3). Using a steel-hulled vessel has the following benefits (GSMFC, 1997):

- Vessels make interesting dive locations.
- Steel-hulled vessels have life spans as artificial reefs that may exceed 50 years.
- Vessels have high vertical profile, attracting both pelagic and demersal fishes.
- Sinking a vessel often crates a media event, which provides educational and awareness opportunities.
- Vessels provide alternatives to natural reef sites, alleviating stress on the natural system.

Drawbacks of using vessels as artificial reefs include (GSMFC, 1997):

- Some opponents of the use of ships consider them as merely diver attraction devices. Vessel artificial reefs can create sites where divers either preempt fishermen or create user conflicts that are more pronounced than on other natural or artificial reef sites.
- Vessels are costly and difficult to clean and prepare for use as artificial reefs.
- It can be difficult to maintain the interesting vertical profile of the ship and meet safety and depth requirements while retaining access and interest by divers and prevent the vessel from moving or becoming damaged during storms.

- Some opponents of using ships as artificial reefs suggest that the vertical profile of the ships spreads out the fish population and makes them easier for fishermen to gather.

Engineered artificial reef structures were also considered and have different benefits and uses from using vessels as artificial reefs. The different benefits seem to offset the drawbacks of vessels. Benefits include (GSMFC, 1997):

- Designed structures can be specifically engineered to meet requirements of a particular reef site or performance objectives.
- Materials used are long-lived, durable, and environmentally safe.
- Depending on construction design the structures can have lower vertical profile and are thought to be more apt to succeed in enhancing fish stocks and meeting biological goals.

Engineered structures have drawback that include (GSMFC, 1997):

- The materials, construction, and shipping requirements generally make artificial reefs more expensive than using materials of opportunity, such as vessels.
- The structures lack some of the appeal and potential public interest that the placement of a large vessel does. Divers are generally not attracted to engineered structure artificial reefs.

Based on a review of the available artificial reef materials and goals of the project, it was decided a combination of materials would best meet the project goals (Section 3.1). Placing the vessels will best meet goals 1 and 3 and partially meet goal 2. Placing engineered structures will alleviate some of the drawbacks of using vessels and best achieve goal 2 of the project.

5.0 ENVIRONMENTAL SETTING

The following sections describe the results of studies performed to evaluate the environmental setting of Drop Zones A and B.

5.1 Historical and Cultural Setting

The water body between the islands of Maui, Lanai, and Molokai is called the Au'au Channel and is known for its relative calm and safe waters. The project is offshore of the Lahaina area within the Au'au Channel. The historic Hawaiian name of the Lahaina area was Lele, which means to leap or to disembark, as from a canoe. Lele is thought to have been one of three significant population centers in pre-contact Maui and was home to significant leaders, including Kamehameha I. The area is believed to have been initially developed between 1200 and 1400.

After the death of Kamehameha I in 1819, explorer ships started to visit Lahaina regularly. Not far behind were Christian missionaries. Whaling ships also frequently anchored in the Au'au Channel offshore from Lahaina from the 1820s to about 1860. Missionaries and whaling ship suppliers made Lahaina their home. Whaling ships stocked up on fresh water and food supplies in Lahaina and their crews would rest and relax in Lahaina. In the 1890s sandalwood was exported from Lahaina to nations such as Russia and China. As the whaling and sandalwood trades waned, commercial activity and government shifted toward Oahu. Local commercial activity gradually shifted to sugar, beginning in the mid-1800s, and pineapple, beginning in the early 1900s. Pioneer Sugar Mill in Lahaina closed in the 1990s, but limited pineapple farming is still performed north of Lahaina by Maui Land & Pineapple Company, Inc.

Today Lahaina is primarily a tourist destination. In 1962, Lahaina was designated a registered National Historic Landmark under the provisions of the Historic Sites Act of August 21, 1935. In 1966, Lahaina was listed in the National Register of Historic Places. Lahaina is a Historic District with approximately 60 different Historical Sites. Development in the area is now focused on vacation and resort facilities and urban homes.

There are no historic sites known or likely to be present at Drop Zones A and B according to the State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division; therefore, "no historic properties will be affected" by this undertaking (Dagher, 2004). To further assess cultural resources and activities in the project site area, BES contacted the following individuals and groups to discuss the project.

Name	Action	Company/Organization	Telephone
Mr. Walt Fredericksen	Telephone Interview		572-8900

Name	Action	Company/Organization	Telephone
Mr. Sherwood Maynard	Telephone Interview	University of Hawaii, Department of Biology	956-8433
Dr. Melissa Kirkendahl	Telephone Interview	DLNR Historic Preservation Division	243-5169
Akoni Akana	Sent EISPN, Telephone and Personal Interview, Attended Public Meeting	Friends of Moku'ula	661-3659
Thelma Shimaoka	Sent EISPN, Telephone Interview	OHA, Community Resources Coordinator, Maui	243-5219
Rose Marie Dewey	Sent EISPN, Telephone Interview	Alu Like	242-9774
Charles Maxwell	Sent EISPN, Telephone Interview	Maui Burial Council	870-3345
Patty Nishiyama	Sent EISPN, Telephone Interview	Na Kupuna O Maui	667-4068
Leslie Kuloloio	Telephone Interview	Maui Burial Council, Na Kupuna O Maui	871-4001

None of the people contacted were aware of historic or cultural sites within ~~or nearby~~ the project site area (Drop Zones A and B). However, there are a number of historic or cultural sites and practices in the Lahaina and Puamana area, including:

- There are approximately 60 historic sites in Lahaina. In the vicinity of Lahaina Harbor, where Atlantis tour patrons embark and disembark, the following historic sites are present:
  - Hauola Stone (Pohaku O Hauola). Possibly since the 14th and 15th centuries, the Hawaiians used this special stone, now a historic site. The name of the stone means "extending life and health." Royalty would give birth at the stone in the belief it would prolong the life of and make their children healthier. In more recent times, it was believed that the stone provided healing powers because it is located where both fresh and salt water mix. Ailing persons would sit in the seat of the stone and offer prayers to regain health.
  - The Brick Palace. Former British convicts from Botany Bay, Australia built this building in 1798. It was the first western-style building in the Hawaiian Islands. The building was constructed at the command of Kamehameha I for his favorite wife, Queen Ka'ahumanu; however, the Queen is said to have preferred traditional grass house buildings. The building was used intermittently as a storehouse and residence until the 1850s. Today, at the historic site, only the foundation of the building remains.

- Pioneer Inn. This historic site is still an operating inn and dates back to 1901.
- Banyan Tree. The banyan tree in the Banyan Tree Park on the corner of Front and Canal Streets in Lahaina was planted in April 1873 to mark the 50th anniversary of the beginning of Protestant mission work in Lahaina. The banyan tree is a historic site and the centerpiece of the park.
- Lahaina Courthouse. The formal annexation of the Hawaiian Islands by the United States was marked at the courthouse in August 1898 by lowering the Hawaiian flag and raising the United States flag. The courthouse was built using stones from Kamehameha III's demolished Hale Piula Palace. The courthouse served as a customhouse and the center for anti-smuggling activities during the whaling era. The courthouse is now a historic site and primarily a tourist stop.
- The Old Fort. This historic site is at the southwestern corner of the Banyan Tree Park. The fort was built in the early 1830s after some sailors fired cannonballs at Lahaina during an argument with Protestant missionaries over the visits of native women to ships. The fort was used primarily as a prison and torn down in the 1850s to supply stones for the construction of Hale Paahao (the Lahaina prison).
- Moku'ula. The ahupua'a (region) of Waine'e (moving water), in what is now Lahaina, contained the ponds of Mokuhinia and the sacred island of Moku'ula. Moku'ula is believed to have been a political and spiritual center plus home to Maui's chiefly lines. Mokuhinia was a large spring fed natural wetland containing taro patches and fishponds and Moku'ula was an island within the wetland. Today, the area that was Moku'ula is occupied by Malu Ulu O Lele Parks, which are south of the Banyan Tree Park in Lahaina. The group Friends of Moku'ula (http://www.mokuula.com/) is working to restore portions of the former wetland and island.

• Cultural sites and practices in the vicinity of Puamana Beach Park include:

- The most common cultural practice in the area is surfing, which was observed during the Ocean Activities Survey (Section 5.5). The surf spots in the area include Launiupoko, Woody's, Puamana, and Puamana Point.
- Fishing is also a common cultural practice in the area and was observed during the Ocean Activities Survey (Section 5.5). Pole, spear, and net fishing occur along the shoreline. It was also reported that the shallow reef extending from Mala to Launiupoko had been the private reef of King Pi'ilani in ancient times. More recently, a few local families have made a living fishing in the area; however, that way of life appears to be disappearing.

- Limu collection is reportedly performed in the vicinity of Puamana Beach Park, but was not observed during surveys performed for this EIS. Limu was an important part of the Hawaiian diet. There were over two-dozen varieties of limu included in the native Hawaiian diet. Among the most popular types are the deep green limu ele'ele, the reddish-brown limu kohu, the pale brown limu lipoa, and limu manauea, which ranges in color from yellow ocher to magenta. According to Mr. Skippy Hau of the DLNR Division of Aquatic Resources (DAR), the following edible species of limu are commonly collected on Maui: limu manauea (sp. *Gracilaria*) (japanese name is ogo), limu lipoa (sp. *Dictyopteris*), limu wawae'iole (sp. *Codium*), and limu kohu (sp. *Asparagopsis*). Information regarding Hawaiian limu is available at www.botany.hawaii.edu/reefalgae/default.htm and www2.hawaii.edu/reefalgae/natives/sgfieldguide.htm.
- It was also reported that a heiau is located just offshore somewhere along the Puamana/ Launiupoko coastline. The heiau is a shark temple and was tended by a family that lived in a pole house on the water next to the heiau.

~~Several of the people contacted indicated that area residents have historically fished the area, generally closer to shore and primarily from the shoreline. Mr. Akana indicated that the shallow reef extending from Mala to Launiupoko had been the private reef of King Piilani. Others also noted the area is utilized by surfers.~~ This study indicates that while shallow ~~nearshore reefs~~ areas (within approximately 600 to 1,400 feet of shore) are used for cultural purposes, the deeper sandy bottom areas offshore, in which Drop Zones A and B are located, do not have direct cultural significance or use but are within a culturally significant ahupua'a.

5.2 Physical Marine Environment

5.2.1 General Setting

The project site (Drop Zones A and B) is located approximately 3,100 feet southwest (offshore) of Puamana Beach Park, south of Lahaina (Figure 1). The coastline between Makila Point and Launiupoko Point is relatively straight, with three perennial streams: Kauaula Stream, an unidentified stream, and Launiupoko stream. Two beach parks, Puamana Beach Park and Launiupoko Beach Park, are located between Makila Point and Launiupoko Point.

Shallow reef is present at Launiupoko Beach Park and Makila Point. These reefs extend approximately 600 to 1,400 feet offshore. The ocean bottom at Drop Zones A and B is predominantly undisturbed and undeveloped. Water depth at both Drop Zone A and B is approximately 100 feet.

5.2.2 Climate and Winds

The climate of the Hawaiian Islands is mild due to their geographical location. Ranging from approximately 19 to 22 degrees north latitude, the inhabited islands lie at the margin of the tropics and inside a belt of persistent trade winds and accompanying downwelling of upper-level air. The Hawaiian Islands are located in the middle of the Pacific Ocean, therefore the atmosphere over the islands is strongly influenced by the ocean, which supplies moisture to the air and regulates its temperature.

Atmospheric general circulation also influences the climate. Heated air at the equator rises, moves poleward at high aititudes, then sinks back to the surface over a broad area centered at around 30 degrees north, and then returns to the equator at the surface. In the Northern Hemisphere, air moving back to the equator along the surface is deflected by Earth's rotation to flow from northeast to southwest. These northeasterly surface winds, known as trade winds, are a dominant feature of Hawaii's climate. The trade winds are stronger and more persistent in summer, and weaker or sometimes absent in the winter months. The annual average trade wind speed is 13.5 miles per hour (mph). During the winter, storms move closer to the Hawaiian Islands, bringing clouds and rain with winds from the northeast, northwest, and southwest (Juvik et al, 1998).

Kona storms are low-pressure systems that develop in the subtropics at high altitudes and gradually extend toward the surface. During the winter, Kona storms will occasionally form west of Hawaii, bringing moist, southerly winds and rain.

The project site is located off the southwest, or leeward, coast of Maui and is sheltered from direct trade wind effects. Therefore, wind speed in the project site area tends to be lower than average for Hawaii.

Precipitation in Hawaii depends greatly on island topography. Leeward areas, such as the project site area, are usually drier than windward areas. Areas away from windward slopes depend on storms for rainfall and have clearly defined summer (dry) and winter (wet) seasons. Precipitation for the project site is approximately 15 inches per year (Juvik et al, 1998) concentrated in the winter months.

5.2.3 Currents

The Hawaiian Islands affect currents by two important mechanisms: interactions with large-scale ocean currents and wind speed variations in the lee of the islands. At the northern and southern boundaries of each island, trade winds with speeds of 22-44 mph are separated from the calmer lee by narrow wind shear lines. A large counterclockwise average circulation near the Hawaiian Islands is believed to result from the recurrent counterclockwise eddies spun up by the shear lines of Maui and Hawaii.

Average surface ocean current, the North Pacific Equatorial Current, flows to the west-northwest, parallel with the west side of Maui at an average speed of 0.19 knot (10 centimeters per second) (Juvik et al, 1998). Tidal currents result from tidal variations in sea level, and nearshore they are often stronger than the large-scale flow. The semidiurnal and diurnal tidal currents measured off Oahu, Maui, and Hawaii Islands tend to be aligned with shorelines (Juvik et al, 1998).

The U.S. Geological Survey (USGS) Coastal and Marine Geology Program measured the currents off West Maui, Hawaii from 2001 to 2003 as part of a coral reef project. Measurements were made through the emplacement of a series of bottom-mounted instruments deployed in water depths of 10 meters (long-term station) and two meters (short-term station). The instrument at the long-term station was deployed over a period spanning 15 months (between November 2001 and February 2003). The current measurements were made offshore Kahana, Maui, approximately 7 miles to the north of the project site. The seafloor sediment at both instrument locations is a well-sorted carbonate sand (Storlazzi et al, 2003).

The results of the measurements showed that most of the daily variability in current speed and direction is due to the tides. As the tide rises, currents off Kahana flow to the northeast roughly parallel to shore; conversely, as the tides fall, the currents flow to the southwest roughly parallel to shore. Mean tidal current speeds plus or minus (+/-) one standard deviation five meters above the bed are 0.17 +/- 0.10 meters per second along the 10 meter isobath and 0.05 +/- 0.06 meters per second along the two meter isobath. The magnitude of the tidal currents is driven by the lunar tidal cycle. Overall, the tidal currents are faster and more consistent in the alongshore direction at the 10 meter site than inshore at the two meter site. During the winter when the deep-water wave heights are large, the currents, which flow primarily alongshore (shore-parallel), take on a more offshore component. In addition to flow modification caused by waves, the dominant factor driving flow other than the tides at the deeper 10-meter location are the winds or wind-induced sea-surface-height variations (Storlazzi et al, 2003).

The long axis of the Carthaginian will be aligned parallel to the shore and therefore, parallel with the tidal currents in the area.

5.2.4 Waves

Offshore of the Hawaiian Islands, the seas are moderately rough, with significant wave heights of 3 to 14 feet, varying seasonally with trade wind intensity. Between the islands, where the winds are funneled, the seas are intensified. The leeward side, shielded from the winds, is generally calmer. During winter, however, the wind can shift to the northwest or to the southwest, creating unusual sea conditions. The waves generated by trade winds and nearby storms tend to have short period (3 to 11 seconds).

Major storms in the north and south Pacific can generate long period (11 to 25 second) swells that reach Hawaiian shores. In the summer swells generated by winter storm in the south Pacific reach the south-facing shores of the islands. The waves are well sorted and are commonly 3 to 9 feet high. The largest south swell waves on record had some faces over 20 feet high in June 1995 (Juvik et al, 1998). In the winter swells generated by winter storms to the northwest reach the north and west facing shores of the islands. The waves tend to be larger and less sorted than the southern summer swells due to their relatively nearby origins. The largest northwestern waves can have faces over 60 feet high.

Hurricanes passing close to the Hawaiian Islands are another source of large waves and flooding, potentially occurring a few times a year, usually from July to September.

The south shores of the islands, shielded from northwesterly swells, are usually calm in winter. Vice-versa, the northern shores of the islands, shielded from southern swells, are relatively calm in the summer, with only trade-wind swells.

The project site is somewhat sheltered from large waves due to the nearby neighboring islands. Molokai provides protection from northwesterly swells, Lanai from westerly and southerly swells, Kahoolawe from southerly swells, and Maui from trade wind northeast swells. Sea Engineering, Inc. calculated wave forces on the proposed artificial reef based on southwesterly waves because other swell directions are primarily blocked by surrounding land masses and only the southwesterly waves will strike the Carthaginian artificial reef broad side. The waves analyzed by Sea Engineering, Inc. (Appendix E – Table 1) are much larger than any actual wave that would reach the project site area due to the proximity of the surrounding islands.

These adjacent islands also offer protection from the devastating effects of possible tsunamis. A tsunami is a series of very long waves triggered by a disturbance at the seafloor that displaces water. The Hawaiian Islands are exposed to tsunamis generated at the fault zones and submarine land slides along the Pacific Rim. Tsunami waves are imperceptible in the open ocean, but as they reach shallow water their energy is released and the waves may reach heights as great as 30 feet. Varying ocean depths and underwater topography cause the tsunami waves to change direction as they "wrap" around islands. Large, damaging waves may strike coasts that do not face the source of a tsunami (Juvik et al, 1998).

The first tsunami recorded in Hawaii occurred in 1819. Eighty-five others have been observed since then, 15 of which resulted in significant damage. The last four tsunamis recorded in the Hawaiian Islands since 1950 had the greatest effects on Oahu, Kauai, and the Big Island. The most destructive tsunami in the Hawaiian Islands occurred in 1946 and caused great devastation on the Big Island and Oahu. The 1946 event was the result of an earthquake in the Aleutian Islands to the north. The effect of that Tsunami was relatively minor in the site area

due to its protected location whereas effect on the north-facing Maui coast was nearly three times greater (Juvik et al, 1998).

5.2.5 Temperature Structure

The average surface water temperature is 24 degrees Celsius (°C) February through April and 26°C August through October. Near the surface the water column is mixed by the wind and has uniform properties such as temperature, salinity, and nutrients; the depth of this turbulent layer varies from nearly 400 feet in winter to less than 100 feet in summer. The temperature decreases sharply below the mixed layer, from 25°C at the surface to 5°C at 2,300 feet deep, then a gradual decrease to 1.5°C at the bottom. The zone of sharp temperature decrease is called a thermocline. The bottom water temperatures at the project site may fluctuate in the summer when the top of the thermocline may extend up to the 100-foot depth (Juvik et al, 1998).

During water quality sampling by Oceanic Institute in January 2004, the temperature in the project site area was very consistent from the surface to depths of approximately 100 feet. The mean ocean temperature throughout the water column was approximately 26°C (Appendix H).

5.2.6 Bottom Characteristics

Sea Engineering, Inc. inspected the bottom at the project site. They found the bottom to be covered with sand, and the sand thickness varied from 3 to 7 feet.

Oceanic Institute conducted a benthic photo-quadrat survey at the project site on January 13, 28, and 29, 2004, to characterize bottom type and composition, benthic community structure and distribution. Details of this survey are presented in the report titled *Water Quality and Marine Biological Baseline Surveys and Impact Analysis*, which is included in Appendix H. The survey was conducted along 50-meter survey transects at four stations at and adjacent to the project site (MB1 through MB4) and two additional stations in deeper water (MB5 and MB6). Survey transect MB3 is the location of Drop Zone A and transect MB4 is just southeast of Drop Zone B (Figure 4). The coordinates of the transect stations are listed in the following table.

Station ID	North		West	
	Degrees	Minutes	Degrees	Minutes
MB1	20	51.114	156	40.021
MB2	20	50.950	156	40.250
MB3, Drop Zone A	20	51.167	156	40.432
MB4, Drop Zone B	20	50.737	156	40.072
MB5	20	50.650	156	40.683
MB6	20	50.600	156	40.650

Substrate coverage was estimated by the point-intersect method. A 1.0 by 0.6 meter (m) quadrat frame was placed at ten randomly selected points along each 50-meter survey line. A

photograph of each quadrat placement was taken with an underwater camera fitted with a wide-angle lens. After being developed, each quadrat photo was overlain with a transparent sheet ruled with a 10 by 20 grid of lines. The substrate type under each of the 200 grid line intersections was identified and recorded. Living substrate, such as limu and coral, was identified by species. Nonliving substrate was classified as rock (limestone or basalt, if recognizable as such), rubble (primarily coral rubble), boulders, rocks and sand (Oceanic Institute, 2004).

Individual organisms >2 millimeters (mm) in size occurring within the quadrats were identified and counted. Living stony corals were identified to species. Dead coral heads were identified to species where possible. Colonial zoanthids and octocorals were recorded by the percent aerial coverage of the colony rather than the number of individuals. Over sand bottoms, macroalgae were recorded by the percent aerial coverage of the plants (Oceanic Institute, 2004).

The following table summarizes the percent bottom cover for bottom types, hard coral, and macroalgae along 50-meter transects at the six survey stations (Oceanic Institute, 2004).

Station	Sand	Rubble	Rock	Dead *Porites lobata* - Lobe coral	Dead *Porites compressa* - Finger coral	*Porites lobata* - Lobe coral	*Porites compressa* - Finger coral	*Ralfsia* - algae	*Halimeda* - seaweed
MB1	68.8%	0.0%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	27.4%
MB2	60.0%	0.0%	10.9%	0.0%	0.0%	0.0%	0.0%	0.0%	29.1%
MB3, Drop Zone A	67.3%	0.0%	2.2%	0.1%	0.1%	0.0%	0.0%	0.0%	30.5%
MB4, Drop Zone B	36.5%	15.5%	27.7%	13.7%	4.5%	0.0%	0.0%	0.4%	1.9%
MB5	28.0%	7.0%	36.8%	11.4%	2.5%	9.8%	4.6%	0.0%	0.0%
MB6	42.6%	8.1%	42.6%	2.8%	3.9%	0.0%	0.0%	0.0%	0.0%
Overall Mean	**50.5%**	**5.1%**	**20.7%**	**4.7%**	**1.8%**	**1.6%**	**0.8%**	**0.1%**	**14.8%**

Drop Zone A (Station MB3) is predominantly a soft bottom dominated by extensive beds (approximately 30% cover) of *Halimeda*, a calcareous green seaweed (limu). Similar conditions were observed in all directions for considerable distances during the survey including to and beyond station MB1 toward the shoreline, MB2 to the northwest, and to the northwest end of MB4 to the southeast. The observed sandy *Halimeda* beds encompasses an area of at least 175 acres at depths ranging from approximately 40 to 120 feet and likely extend to a much greater area than observed during this study.

Drop Zone B is just northwest of station MB4. Station MB4 had different characteristics than station MB1 but the sandy *Halimeda* beds were observed immediately to the northwest of the transect. Station MB4 was rockier than Station MB3, consisting of more dead coral and rock than sand; however, like station MB3, there was no live coral and the only living organism on the sea floor was a species of algae (*Ralfsia*) and *Halimeda*.

The remaining bottom consisted of scattered barren small rocks or rock outcrops. No living corals were seen along the transect lines; however, occasional small rock outcrops were observed scattered within the *Halimeda* beds and these outcrops supported hard corals (primarily *Porites lobata* and *Pocillopora meandrina*) and associated reef fish species (Oceanic Institute, 2004).

In deeper water at stations MB5 and MB6, the bottom was a generally flat and featureless limestone bench with scattered patches of sand, coral rubble, and dead and living coral heads. This bench extends to depths of 135-150 feet, where the bottom drops along a pronounced slope to a generally sandy plain at depths of 150 feet and greater (Oceanic Institute, 2004).

Atlantis currently operates in the area and observes the bottom characteristics in the project area on a daily basis. There are four small natural reefs that the Atlantis submarine currently visits during its tour (Figure 3). "South" and "North" reef are the largest formations and are plate coral reefs approximately four feet high and 15 by 30 feet in size. "Keiki" and "Lost Vegas" are smaller plate coral reefs approximately four feet high and 12 feet square. These features are the only significant reef features present in less than approximately 120 feet of water in the Twin Peaks area (Figure 3). The four small reef features are not within the Drop Zones and are surrounded by sandy bottom with *Halimeda* that constitutes most of the Twin Peaks area.

The bottom at the project site is classified as Class II Soft Bottom (HAR 11-54-07; HDOH, Clean Water Branch). As stated in HAR 11-54-04: "It is the objective of class II marine bottom ecosystems that their use for protection including propagation of fish, shellfish, and wildlife, and for recreational purposes not be limited in any way. Any action which may permanently or completely modify, alter, consume, or degrade marine bottoms ... may be allowed upon securing approval in writing from the director, considering the environmental impact and the public interest."

Oceanic Institute indicated that specimens of *Echinothrix diadema* (long-spined sea urchin) were occasionally observed near transects MB5 and MB6, but not actually in the transect survey area. No urchins or other large (>2 millimeters) invertebrates were observed in any of the benthic photoquadrats (Ziemann, 2005).

Extensive *Halimeda* beds and small amounts of *Ralfsia* were the only algae (limu) present in the project site area and at the six survey areas. Algae, such as *Halimeda*, are called

limu in the Hawaiian language and the word limu has gained general use in Hawaii. *Halimeda* is not considered edible by traditional Hawaiians but is a food source for sea turtles.

A comment received at a public meeting regarding the project questioned the nearest presence of edible limu. No biological surveys were performed in near-shore shallow water during the production of this EIS because the project site is in 100 feet of water (MB1 is the shallowest survey site and it was in approximately 50 feet of water). A study of the marine environment within approximately 650 feet of the Puamana Beach Park coastline was performed for another project. This area has a water depth of 4 to 8 feet and is the area in which the cultural practice of limu collection occurs (Section 5.1). A wider variety of limu was observed in the shallower water near Puamana Beach Park than at the deeper project site. Limu observed on the shallow shelf within approximately 650 feet of the coast line at Puamana Beach Park included *Acenthophora spicifera, Ahnfeltia concinna, Codium arabicum* (limu wawae'iole), *Coelothrix irregularis, Desmia hornemanni, Dictyosphaeria cavernosa, Dictyota acutiloba, D. bartayresii, D. sandwicensis, Gelidiopsis scoparia, ogo* or *Gracilaria bursapastoris* (limu manauea), G. *hululuwaena* or *Grateloupia filicina, Halimeda discoidea, Jania sp., Laurencia obtuse, Neomeris annulata, Padina japonica, Porolithon gardineri, P. onkodes*, and *Turbinaria ornate* (Sea Engineering, 2002).

The limu observed offshore of Puamana Beach Park includes both varieties traditionally harvested by Hawaiians for consumption and invasive varieties of algae that have begun to spread throughout the islands.

5.3 Marine Biology

During the preparation of this Final EIS a marine biology survey was performed. The survey concentrated on the demersal fishes near the ocean floor because that is the environment that will primarily be impacted by the proposed project. The survey did not account for larger organisms that are known to be present in the project site area. The survey and other marine organisms are discussed in the following sections.

5.3.1 Ocean Floor Transect Survey

Oceanic Institute conducted a marine biological survey at the project site on January 13, 28, and 29, 2004, to assess the magnitude of potential impacts resulting from installation of artificial reefs. Details of this survey are presented in the report titled *Water Quality and Marine Biological Baseline Surveys and Impact Analysis*, which is included in Appendix H. The marine biological survey consisted of the same quantitative transects used to evaluate bottom characteristics (Section 5.2.6). The transects were performed at four stations at and adjacent to the project site (MB1 through MB4) and two additional stations in deeper water (MB5 and MB6). Survey transect MB3 is the location of Drop Zone A and transect MB4 is just southeast of Drop Zone B (Figure 4). The coordinates of the stations are listed in Section 5.2.6.

A quantitative survey of fish community composition and species abundance was conducted along a 50-meter transect oriented parallel to the depth contours. During the survey, the diver identified, counted, and estimated sizes of all fish seen within a 5 meter-wide corridor centered along the transect line (Oceanic Institute, 2004).

The following table summarizes the abundance, number of species, diversity index, and total biomass of fish observed along 50-meter transects at the six survey stations (Oceanic Institute, 2004).

Species	MB1	MB2	Drop Zone A, MB3	Drop Zone B, MB4	MB5	MB6	Total
Acanthurus nigrofuscus – Brown surgeonfish					2	2	4
Acanthurus olivaceus – Orangespot surgeonfish				4	4		8
Acanthurus xanthopterus – Yellowfin surgeonfish			1		1		2
Aphareus furca – Small toothed jobfish						2	2
Amanses rubrocaudata – Filefish					1		1
Balistes fuscus – Yellow-spotted triggerfish					1		1
Bodianus bilunulatus – Tarry hogfish					1	1	2
Canthigaster jactator – Hawaiian whitespotted toby					2	3	5
Centropyge fisheri - Fisher's angelfish				8	4		12
Centropyge potteri – Russet angelfish					3	1	4
Cephalopholis argus –Peacock hind					1		1
Chaetodon kleini - Butterflyfish				2	4	4	10
Chromis agilis - Damselfish					8		8
Chromis hanui - Damselfish					6	5	11
Dascyllus albisella - Domino damselfish			65	8	4		77
Heniochus diphreutes - Pennant butterflyfish			10				10
Labroides phthirophagus – Hawaiian cleaner wrasse					2		2
Naso hexacanthus - Surgeonfish				2			2
Paracirrhites arcatus – Arc-eye hawkfish				4			4
Parupeneus multifasciatus - Goatfish				11	2		13
Pseudocheilinus evanidus - wrasse				15	5		20
Pseudocheilinus octotaenia – Eight-lined wrasse						1	1
Pseudojuloides cerasinus – Smalltail wrasse			5				5
Ostracion meleagris – Whitespotted boxfish				1			1
Oxycheilinus bimaculatus – wrasse				8	1		9
Seriola dumerili – Greater amberjack					1		1
Scarus sp. - Parrotfish						3	3
Stenojulis balteata - wrasse				7			7
Sufflamen bursa – Boomerang triggerfish					4	2	6

Species	MB1	MB2	Drop Zone A, MB3	Drop Zone B, MB4	MB5	MB6	Total
Sufflamen fraenatus – Masked triggerfish			1				1
Tetraodontis randallii - Randall's puffer	2	1	2				5
Xanthichthys mento – Redtail triggerfish					1	1	2
Total number	2	1	84	70	58	25	240
Number of Species	1	1	6	11	21	11	
Diversity	0.00	0.00	0.81	2.19	2.82	2.25	
Biomass (grams per square meter)	2.49	1.25	60.13	79.24	174.6	32.88	

Very few fish were seen along transects within the extensive *Halimeda* beds at stations MB1 through MB3. At MB1 and MB2, only individuals of Randall's puffer (*Tetraodontis randallii*) were seen. At MB3, which is the same location as Drop Zone A, only a pair of Randall's puffers were seen in the *Halimeda* beds (Appendix H, Plate 3). The transect line came very near a small hard coral reef, at which a large number of Domino damselfish (*Dascyllus albisella*) and Pennant butterflyfish (*Heniochus diphreutes*), were seen (Oceanic Institute, 2004; Appendix H, Plate 4); however, this small outcrop was not on the transect so those species were not counted. The species illustrated on Plate 4 (Appendix H) illustrate the types of fish that would likely be recruited to an artificial reef placed at Drop Zones A and B.

The more complex bottom at MB4, which is just southeast of Drop Zone B, harbored the greatest number of individuals seen during the surveys but was still relatively sparsely populated live reefs in other areas of Hawaii. Most abundant were the wrasses *Pseudocheilinus evanidus*, *Oxycheilinus bimaculatus*, and *Stenojulis balteata*. Goatfish (*Parupeneus multifasciatus*), Fisher's angelfish (*Centropyge fisheri*), and the Domino damselfish (*Dascyllus albisella*) were frequently seen. Surgeonfishes (*Acanthurus olivaceus* and *Naso hexacanthus*) and butterflyfish (*Chaetodon kleini*) were also seen (Oceanic Institute, 2004).

A large number of fish species were observed along transect MB5, primarily along the section within the hard bottom region at 140 foot depth (Appendix H, Plate 5). A total of 21 species were seen along this transect, the most abundant being the damselfishes (*Dascyllus albisella*, *Chromis agilis* and *Chromis hanui*). Five species of wrasses (Labridae), three species of surgeonfishes (Acanthuridae) and three species of filefishes (Balistidae) were seen (Oceanic Institute, 2004).

Fewer fish were seen along transect MB6 compared to MB5. A total of 25 individuals of 11 species were seen, with the butterflyfish *Chaetodon kleini* and the damselfish *Chromis hanui* being most abundant (Oceanic Institute, 2004).

Results of the marine biological survey indicate that the fish communities at the project site would be expected to harbor species typical of deeper reef areas, rather than the abundant,

small and colorful species typically seen on shallow reefs, since many of the reef fish species in Hawaii exhibit vertical zonation, i.e., are distributed within well-defined depth zones. Aggregations of reef fish were observed at scattered patch reefs on or near the quantitative transects conducted during the marine community surveys. The total number of fish observed and the number of species observed suggest that recruitment to the artificial reef structure will result in fish communities more-or-less typical of deeper Hawaiian reefs (Oceanic Institute, 2004).

5.3.2 Other Marine Biology

Marine mammals, turtles, and pelagic fishes are likely present in the project site area at times. These include Humpback whales, dolphins, sea turtles, and monk seals. Most of these species, or close relatives, are present throughout the world's tropical and warm-temperature waters. Of the marine mammals and turtles, Hawaii is home to or the breeding area for a significant number of humpback whales, monk seals, and green sea turtles. No pelagic fish, Humpback whales, dolphins, sea turtles, or monk seals were observed on or near the ocean floor by Oceanic Institute during their surveys (Sections 5.2.6 and 5.3.1); however, Oceanic Institute personnel did observed Humpback whales from their surface vessel (Ziemann, 2005).

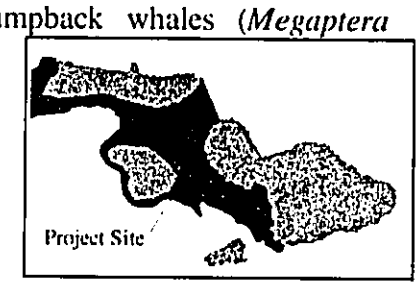
The only official records regarding large marine life in the vicinity of the project site is a marine life log kept by Atlantis personnel during the month of July 1997. Similar logs were kept by Atlantis personnel performing dives on the artificial reef offshore from Waikiki in June and July 1997. Atlantis no longer keeps a marine life log, but reports that no significant changes have occurred in the vicinity of the project since 1997, while the frequency of turtle and other large marine life sightings at the artificial reef offshore of Waikiki has continued to increase (Atlantis, 2004).

Pelagic Fish

During the month of July 1997, Ulua were frequently observed by Atlantis, amberjacks were observed on one day, eagle rays were observed on five days, and a white tip reef shark or "grey" shark was observed on three of the days.

Humpback Whales

The project site is within the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS), shown in green to the right. Humpback whales (*Megaptera novaeangliae*, an endangered species) are known to frequent the area between Maui, Molokai, Lanai, and Kahoolawe from December 15 through May 15. Humpback whales in the Central North Pacific stock spend the winter breeding and birthing in Hawaii, but they do not feed very much. The whales spend the summer in the North Pacific, where they feed. It is estimated there



are 4,000 humpback whales in the Central North Pacific stock (NOAA, 2001).

Whales were observed near the project area during the boat traffic survey (Section 5.6). Humpback whales were not observed during dives for the ocean floor transect survey (Section 5.3.1) or the water quality survey (Section 5.4), both conducted during the whale season. Whales are frequently observed by Atlantis' crew on the ocean surface during the winter season but were only observed approximately 10 times from the submarine in the project area during the 2003-2004 winter season. According to Atlantis employees, the whales appeared to be passing through the area and were never observed resting on the ocean floor (Atlantis, 2004).

Dolphins

There are three types of dolphins in the Hawaiian waters: spinner (*Stenella Longirostris*), bottlenose (*Tursiops truncates*), and spotted (*Stenella attenuata*). None of these dolphins are considered threatened or endangered under the Endangered Species Act of 1973. Spinner dolphins are regularly observed resting during the day relatively near shore around the main Hawaiian Islands, but move to deeper water to feed on fish at night. Spotted dolphins are related to and appear similar to spinner dolphins but have a white tip on their beak and have a spotted color pattern on their body. Spotted dolphins are typically found in the channels between the islands and do not rest near shore as the spinner does. Both spinner and spotted dolphins are usually found in large pods. Bottlenose dolphins are larger than either the spinner or spotted dolphins and are usually seen in smaller pods or groups of less than 10 individuals.

Spinner dolphins were not observed during the ocean activities survey, but were ~~or~~ reportedly observed by people interviewed during the survey (Section 5.5), were observed on the ocean surface during the boat traffic survey (Section 5.6), but not observed during the ocean floor transect study (Section 5.3.1). When Atlantis kept a marine life log during July 1997, three bottlenose dolphins were observed in the Twin Peaks area on two days of the month. Currently, Atlantis employees indicate they observe dolphins from the submarine in the project area approximately once every two months. Atlantis also occasionally observes dolphins at their Waikiki artificial reef dive site. At both the project site and the Waikiki artificial reef site, the dolphins appear to be transiting through the area and not spending extended periods of time in either the current sandy-bottom habitat of the project site or the artificial reef at the Waikiki dive site (Atlantis, 2004).

Monk Seals

Monk seals (*Monachus schauinslandi*, an endangered species) were not observed during the ocean activities survey (Section 5.5), but people interviewed during the survey had reportedly observed monk seals in the area. Monk seas were not observed during the ocean floor transect study (Section 5.3.1), the boat traffic survey (Section 5.6), or during dives for the water quality study (Section 5.4). Atlantis has never observed Monk seals at the project site. Monk seals had

not been observed at Atlantis' Waikiki artificial reef dive site until 2004. In 2004, Atlantis has observed a single monk seal approximately five times at the Waikiki artificial reef. The seal has been observed in the morning apparently relaxing around the ship wreck portion of the artificial reef (Atlantis, 2004).

It is estimated that 1,300 to 1,400 Hawaiian monk seals exist today (www.nmfs.noaa.gov/prot_res/species/Pinnipeds/hawaiianmonkseal.html). Most of the seals reside in the Northwestern Hawaiian Islands, however, seals are occasionally observed on the main Hawaiian Islands, including Maui. In 2001 it was estimated that 52 seals inhabit the main Hawaiian Islands (Baker and Johanos, 2003). A monk seal was frequently observed at Ho'okipa Beach Park on Maui's central-north shore in November 2004 while it was molting (Honolulu Advertiser, 2004). Seals feed at night on small reef fish, eels, lobster, octopus, and crab (MMC, 2000); typically dive to depths of 130 feet, but are known to dive up to 1,000 feet, to feed; and start breeding at an age of 5 to 7 years (MMC, 2000).

Recent research by the Hawaiian Monk Seal Research Program of the NOAA Fisheries Pacific Islands Fisheries Science Center (PIFSC) suggests that monk seals forage in sandy-bottom areas (Littnan et. al., 2004; Parrish et. al., 2002; and Parrish et. al., 2000). Both adult and juvenile monk seals have been observed foraging fish and cephalopods in sandy-bottom areas near relief (boulder, coral heads etc). Monk seals, particularly juveniles, have also been observed foraging on open sandy fields that have very little or no relief and targeting flat fish (Littnan, 2004).

Sea Turtles

There are four types of sea turtles that inhabit the Hawaiian Islands: green (*Chelonia mydas*, a threatened species), hawksbill (Eretmochelys imbricata; an endangered species), olive ridley (Lepidochelys olivacea; *a threatened species)*, and leatherback (Dermochelys coriacea; *an endangered species)*. Green sea turtles are the most common in Hawaii, inhabit the entire Hawaiian Archipelago, and are frequently observed around Maui. Green turtles are herbivores and primarily feed on sea grass and algae. Although green sea turtles are present in the waters around Maui, more than 90 percent of the green turtles in the entire Hawaiian Archipelago nest on sand islands at French Frigate Shoals (Balazs & Chaloupka, 2004), approximately 1,000 kilometers/620 miles west of Maui. Female turtles start to breed at an age of approximately 20 years but do not lay eggs every year. Juvenile green turtles spend their first approximately six years at sea then move to near shore areas. Turtles have long lives, but probably do not live to be 100 years old. Studies have estimated as many as 35,000 mature green sea turtles and perhaps 250,000 juvenile green sea turtles inhabit the Hawaiian Islands (Honolulu Star-Bulletin, 2004).

Hawksbill sea turtles are similar to green sea turtles in many respects but primarily feed on sponges and are solitary egg layers. The largest populations of Hawksbill turtles reside outside of Hawaii, but a small population is present in Hawaii. Hawksbill turtles are known to

lay eggs at beaches on Maui but their primary egg laying areas in the main Hawaiian Islands are on Hawaii and Molokai (www.nmfs.noaa.gov/prot_res/species/turtles/hawksbill.html).

The olive ridley sea turtle is generally smaller than the other sea turtles and, although it is the most abundant sea turtle worldwide, is rare in Hawaii. Like the green turtle, the olive ridley typically nest at select beaches, but in areas where they are rare, like Hawaii, can nest individually. The diet of olive ridley turtles is more diverse and can include crabs, shrimp, rock lobsters, jellyfish, and tunicates; however, in some parts of the world, it has been reported that the principal food is algae (www.nmfs.noaa.gov/prot_res/species/turtles/olive.html).

Leatherback turtles are significantly larger than other sea turtles. The largest populations of leatherback turtles reside outside of Hawaii, but a small population is present in Hawaii. Fishermen in Hawaiian commonly report seeing leatherbacks, generally within sight of land but in water deeper than 600 feet. Leatherbacks typically nest alone and do not return to the same beach for nesting every time. Leatherbacks spend most of their time in the pelagic environment (www.nmfs.noaa.gov/prot_res/species/turtles/leatherback.html).

Turtles were observed during the ocean activities survey (Section 5.5) and people interviewed during the survey had reportedly observed turtles in the area. Sea turtles were not observed during the ocean floor transect survey (Section 5.3.1), the boat traffic survey (Section 5.6), or dives for the water quality study (Section 5.4). Turtles were not observed in the Twin Peaks area when Atlantis kept a marine life log during the month of July 1997 and have not been observed in the project site since then either. Turtles are observed at Atlantis' Waikiki artificial reef dive site on nearly every dive. The turtles at the Waikiki artificial reef are particularly attracted to the shipwreck portion of the artificial reef. The turtles became prevalent at the Waikiki artificial reef approximately 6 years ago, going from 3 to 5 sightings a month in 1997 to daily sightings now. The turtles use the shipwreck as a resting place and have been observed feeding on algae in the surrounding area (Atlantis, 2004).

5.4 Water Quality

Oceanic Institute conducted a water quality survey in the vicinity of the project site on January 13 and 28, 2004 in order to generally characterize the water quality conditions and form a baseline of the water quality in the area. Details of this survey are presented in the report titled *Water Quality and Marine Biological Baseline Surveys and Impact Analysis*, which is included in Appendix H. During the survey, water samples were collected at six stations located at 100, 200, 500, 1,000, 1,500 and 2,000 meters from the shoreline along 3 offshore transect lines (Figure 4). For all stations, three samples were collected: one just below the surface, one 0.5 m above the bottom to a maximum depth of 25 meters, and one mid-way between surface and bottom to a maximum depth of 10 meters. Due to shallow water depths and high surf, samples were not collected at the 100-meter stations for Transects A and B (Oceanic Institute, 2004; Appendix H).

The project site area is designed as a Class A Marine Water by the HDOH (HAR 11-54-03; HDOH, Clean Water Branch). The HDOH rules state "it is the objective of class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters." The development of an artificial reef is in compliance with the HDOH's objectives for the area.

Results of the water quality survey indicate that levels of temperature, salinity, dissolved oxygen, and pH were generally uniform over the survey area and were in compliance with the numerical criteria water quality standards (WQS) established by the State of Hawaii Chapter 54 (HAR 11-54-06; HDOH, Clean Water Branch). Other water quality parameters for which numerical criteria have been established were not in compliance. Levels of turbidity, chlorophyll, nitrate+nitrite-N, total dissolved nitrogen, and total dissolved phosphorus all exceeded their respective numerical criteria (Oceanic Institute, 2004; Appendix H).

It was expected that some of the analytes would exceed the criteria because ocean waters in the area are listed on the *2004 List of Impaired Waters in Hawaii* (DOH, 2004). The list indicates ocean water along a long section of Maui's coastline, stretching from the Kihei Coast, through Maalaea Harbor, and around West Maui Coast, have numerous WQS exceedances including turbidity, nitrite/nitrate, total nitrogen, total phosphorous, and chlorophyll a. Sampling stations with exceedances include Puamana Beach Park and Launiupoko Wayside Park, which are the nearest sampling points to the project site.

A total of 48 individual water quality samples were collected. There was little variation in the results between locations, with the exception that turbidity was higher in the near shore samples (Appendix H, Table 2). The geometric mean of all the ~~results of the~~ water quality survey sample results ~~performed at the project site are~~ is summarized in the table below:

	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/l)	pH	Turbidity (NTU)	Total Suspended Solids (mg/l)	Chlorophyll (ug/l)	Ammonia-N (ug/l)	$NO_3 + NO_2$-N (ug/l)	Total Dissolved N (ug/l)	PO_4-P (ug/l)	Total Dissolved P (ug/l)	Silicate (ug/l)
Geometric Mean of all Results	25.8	34.62	6.35	7.91	0.43	48.26	0.18	<1.0	13.6	264.1	35.5	49.4	32.7
WQS Dry Open Coast	24.5 to 26.5	>32.0	>5.3	7.6 to 8.6	0.2	-	0.15	2.5	3.5	110.0	-	16.0	-

1. N = Nitrogen; NO_3 = Nitrate; NO_2 = Nitrite
2. P = Phosphorous; PO_4 = phosphate.
3. WQS for temperature indicates the temperature is not to vary more than 1 °C from ambient.

4. WQS for salinity indicates the salinity is not to vary more than 10 percent from natural.
5. WQS for dissolved oxygen indicates the concentration of dissolved oxygen is not to be less than 75 percent saturation, as a function of temperature and salinity; saturation at ambient T and S = 7.07 mg/l.
6. WQS for pH indicates the pH is not to deviate more than 0.5 units from a value of 8.1; minimum of 7.0 in coastal waters affected by terrestrial input.

While the mean concentrations of some water quality parameters in this survey exceeded the water quality standard numerical criteria, they were typical of levels observed in similar surveys around the island of Maui and the other main Hawaiian Islands (HDOH, 2004; Appendix H). The exceedances are more likely a symptom of nearby terrestrial land use than any activities taking place on or in the water in the vicinity of the project site.

5.5 Ocean Activities

An ocean activities survey was conducted to assess the various uses and frequency of use near the project area. The survey area included the shoreline extending from Makila Point to Launiopoko Beach Park and the offshore area (up to 2,000 feet from shoreline) between these two points. The survey area does not include the actual project area, Drop Zones A and B, because they are too far offshore to easily be observed from shore. This shoreline ocean activities survey was performed to observe the area nearest the project area that receives the heaviest use and discuss the project with ocean users. An activities survey of the actual project area was performed and is presented in Section 5.6.

Prior to performing the ocean activities survey, BES personnel contacted local organizations to collect information on resource use, scheduled events, other contacts, and potential interviewees.

The ocean activities survey was conducted on Sunday and Monday (one weekend day and one weekday), January 11 and 12, 2004, to observe and record the various ocean activities within the survey area and estimate the frequency of each activity. The survey was conducted by two environmental scientists each day between the hours of 7:00-11:00 a.m. and 12:00-5:00 p.m., for a total of nine hours each day per scientist. Photographs taken during the survey are included as Photographs 5 through 8.

The survey area was divided into eight sublocations (four per scientist), designated by the letters A through H (Figure 4). Of the nine daily survey hours, four hours (7:00 a.m., 10:00 a.m., 2:00 p.m., and 4:00 p.m.) were allocated for the two beach parks within the survey area; Puamana Beach Park and Launiopoko Beach Park (sublocations C and H), three hours were allocated for the remaining sublocations, and two hours were available for discretionary allocation depending on sublocation activities. A detailed summary of observations is presented in Appendix I.

The survey area is generally undeveloped for beach or ocean activities. Although Puamana Beach Park (sublocation B) and Launiupoko Beach Park (sublocation H) are County of

Maui parks, the only improvements are limited parking spaces along Honoapiilani Highway. Furthermore, the actual sand beach is generally less than 50 feet wide and the thin area between the sand beach and the highway is overgrown with scrubs and small trees.

To perform the ocean activities survey, an environmental scientist walked the shoreline of the survey area documenting the various ocean activities through visual observations, resource user interviews, and area resident interviews. All observations and interview responses were recorded on an *Ocean Activities Survey Form*. While surveying in the two beach park sublocations, the scientists stationed themselves at obvious entry and exit points to the shoreline and ocean and interviewed resource users regarding:

- type of activity,
- number of people in group,
- frequency of activity,
- nature of activity (personal or commercial),
- collection of what type of resources (if any),
- use of special equipment,
- endangered or threatened species observed during activity,
- other types of activities the person conducted along this shoreline, and
- any additional comments provided by the interviewees were recorded as well.

The ocean activities survey revealed that the predominant use of the project site shoreline area is for surfing and picnics, with the majority of the activity being conducted at Puamana Beach Park (sublocation B) and Launiupoko Beach Park (sublocation H). The peak activity hours are from 10 a.m. to 4 p.m. and resource use in the survey area increases during the summer months.

The observed activities were primarily restricted to areas within 800 feet of the shoreline. Generally, surf breaks were no more than 700 feet offshore so surfers were concentrated at that distance from shore and paddlers were either closer to shore or just beyond the surf break but still within approximately 800 feet of shore. Only boating activities exceeded a distance of 800 feet offshore and in most cases boats were merely transiting through the area between Lahaina Harbor and preferred fishing, diving, or snorkeling spots.

BES took photographs of activities and conditions during the survey. Photographs 5 through 8 show conditions and area uses at the time of the survey. The following sections describe ocean activities that were observed in the survey area.

5.5.1 Beach Resource-Based Activities

Numerous beach users were observed on the beaches within the study area performing and engaging in a number of different activities. The highest concentration of beach users was at Puamana Beach Park (sublocation B) and Launiupoko Beach Park (sublocation H); however, some of the activities were observed in sublocations C, E, and G. Most of the activities were observed to occur throughout the day and on a daily, or at least weekly, basis. Observed activities included:

- Walking along the beach shoreline.
- Playing various types of lawn games, including Baci Ball and lawn bowling, typically associated with private parties and picnics.
- Beachcombing and gathering of bottles and rocks.
- Photography and sightseeing, primarily of sunsets, surfers, whales (in the winter months), turtles, and Monk Seals (rarely present and not observed during BES' survey).
- Picnicking. Occasionally, large groups use Launiupoko Beach Park for parties or company picnics.
- Sunbathing.

Although there are no maintained campsites along the survey area shoreline, unauthorized camping occurs at sublocations C, G, and F. There were only a few people observed camping at sublocations C and G, and evidence of camping at sublocation F, including boulder rings for campfires.

5.5.2 Ocean Resource-Based Activities

Boating

Pleasure boating occurs daily and year-round and could be observed from the beach. Boat operators transit the project site in private and commercial tour boats to enjoy motor boating, sailing, fishing, diving, and whale watching. The boat traffic survey (Section 5.6) revealed that predominantly motorized commercial tour boats passed through the project site. The majority of the boats are transiting to and from Lahaina Harbor and preferred diving/snorkeling, fishing, or whale watching locations.

Fishing

Several methods of fishing were observed in the area. The target species varied with the method used but all the fish gathered were reportedly for personal consumption. Pole fishing occurs daily and year-round at sublocations A, B, C, E, and H, with increased activity during the

summer months. The main target species of pole fishers are papio, moana, squid, tako, and ulua. Spear fishing occurs frequently and year-round at sublocations B and C. The main target species of spear fishing are papio, taapae, squid, tako, black kala, humu, kumu, and ulua. Net fishing occurs frequently and year-round at sublocation C. Potential species for net fishing are based on availability. Dive fishing occurs frequently on a seasonal basis at sublocations A and B. The main target species of dive fishing are tako, kala, kumu, and palani.

Commercial charter boat fishing occurs frequently and year-round. Commercial fishing charter boats observed in and around the project site were transiting between Lahaina Harbor and preferred fishing grounds. Commercial fishing generally does not occur in the area.

Paddling

Outrigger canoe paddling occurs at Launiupoko Beach Park (sublocation H) mainly during the summer months; however canoe surfing occurs year-round. Canoe regattas are held annually each summer at Launiupoko Beach Park. Personal and commercial kayaking occurs frequently and year-round at Puamana and Launiupoko Beach Parks (sublocations B and H). These activities do not enter the Twin Peaks area because they are performed much closer to shore.

Research Activities

Puamana Beach Park (sublocation B) is currently a Hawaii Coral Reef Assessment and Monitoring Program (CRAMP) site. "CRAMP is a research program designed to identify the controlling factors, both natural and anthropogenic, contributing to the stability, decline, or recovery of Hawaiian reefs" (website: http://cramp.wcc.hawaii.edu). CRAMP research at Puamana Beach Park includes annual collection of benthic habitat data and fish data at three and 13-meter depths.

Eric Brown (pavona@aol.com), of the Hawaii Institute of Marine Biology, indicated that the Puamana Beach Park CRAMP site is monitored annually for fish abundance, coral recruitment, coral size-frequency distribution, coral growth and mortality, sediment, waves, and temperature.

Snorkeling and Scuba Diving

Snorkeling occurs frequently on a seasonal basis at sublocations A, B, and H. Scuba diving from the shoreline occurs frequently on a seasonal basis at Puamana Beach Park (sublocation B). Snorkeling and scuba diving activities are for personal recreation and are not associated with commercial tour operators.

Surfing and Swimming

Swimming occurs mostly at Puamana Beach Park (sublocation B) and Launiupoko Beach Park (sublocation H) throughout the day and year-round.

Board surfing occurs daily and year-round throughout the project site shoreline, with the majority of surfing taking place at Puamana and Launiupoko Beach Parks (sublocations B and H). The surf spots in the area include Launiupoko, Woody's, Puamana, and Puamana Point. The number of surfers using the shoreline increases during the summer months. Two to three commercial surf schools consistently use Puamana Beach Park throughout the year. Occasionally surfing classes are conducted at Launiupoko Beach Park.

Body boarding occurs frequently and year-round at sublocations A, B, and H. Canoe surfing occurs frequently and year-round mainly at Launiupoko Beach Park (sublocation H). Skim boarding occurs occasionally at sublocation H.

Generally waves in the study area were observed to have faces of less than 5 feet. It was reported that waves can reach up to 12 feet tall and remain good for surfing; however, this is rare and occurs mainly in the summer.

5.5.3 Concerns Noted During Interview Responses

The following concerns were voiced by resource users while conducting interviews:

- Cleanliness of submerged vessel and potential release of oils/lubricants. The vessel has been thoroughly cleaned and all oils and chemicals removed. This concern is addressed in detail in Sections 3.3.2 and 7.1.1.
- Wooden parts of vessel becoming disconnected from vessel and causing a danger in the water. All potentially loose and floatable material has been removed from the vessel. This concern is addressed in detail in Section 3.3.2 and 7.1.1.
- Impact of proposed project on diving conditions. The project is expected to dramatically improve diving conditions and this is discussed in Section 7.2.1.
- Public accessibility of proposed project. The artificial reefs will be open to the public, this is discussed in Section 7.2.3.
- Impact of proposed project on surf conditions. The project is not expected to have any impact on surf conditions. This is discussed in detail in Section 7.2.3.

5.6 Boat Traffic Survey

A boat traffic survey was conducted to provide information on items such as normal boat traffic, peak boat traffic hours, boating practices, boating purpose, and boating frequency. The Twin Peaks area (Figure 3) and former Drop Zones A, B, and C were first marked with floating

buoys for personnel to visualize the survey area. The currently proposed Drop Zone A is the same as the former Drop Zone A but currently proposed Drop Zone B is a different location than the former Drop Zone B; however, the current Drop Zone B is within the Twin Peaks area and only 1,500 feet from Drop Zone A, whereas the former Drop Zone B was over 3,000 feet away. The buoys were then removed a few days later. Because formerly proposed Drop Zones B and C (in deeper water) have been removed from consideration, the survey results have been simplified to address both the entire Twin Peaks area and only boat traffic that neared current Drop Zones A and B (Figure 1). The boat traffic survey began on December 1, 2003 and ended on January 23, 2004 and consisted of the following:

- Observations were made during the nearly two month long survey seven days a week from 8:30 a.m. to 4:00 p.m. using a motorized boat.
- Personnel recorded information on all boat traffic that passed within the project site on a *Boat Traffic Survey Form.*
- Personnel recorded the following information:
  - weather and sea conditions;
  - time the vessels are seen within the survey area;
  - estimated distance from the project site;
  - vessel type (power/sail);
  - approximate vessel length;
  - vessel make/name;
  - vessel ownership as commercial or private; and
  - activity engaged in.

The boat traffic survey revealed that predominantly motorized commercial boats passed through the Twin Peaks area and near Drop Zones A and B. The majority of the boats were transiting between Lahaina Harbor and preferred fishing, driving/snorkeling, or whale watching areas. Occasionally parasailing, fishing and whale watching were performed within the Twin Peaks area; however, diving and snorkeling were not observed in the area. Boats ranged in length from 10 feet to 105 feet. On average, one boat was observed in the entire Twin Peaks area every two hours during the survey period and one boat was observed every five hours within approximately 1,500 feet of Drop Zone A. The peak boat traffic hours are from 11 a.m. to 2 p.m. Observation details are listed on a spreadsheet in Appendix J.

The following boat activities were observed near the project site:

Parasailing

Parasailing occurs occasionally from motorized commercial boats near the project site. Boats operating parasailing activities were observed within 100 feet of the project site. Parasailing is supposed to be restricted to areas north of Lahaina and outside the HIHWNMS during the winter and only occur near the project site from May 16th to December 14th.

Fishing

Trolling occurs frequently around the project site from personal and commercial motorized fishing boats. Bottom fishing occurs occasionally near the project site from motorized commercial fishing boats. This activity was observed within 1,000 feet of the project site. Most of the boats observed were transiting to and from Lahaina Harbor.

Sailing

Sailing occurs frequently in the vicinity of the project site. Most of the sailboats observed are commercial boats transiting through the area. Several of the sailboats were also motoring because the wind is generally low in the project area because it is in the lee of West Maui Mountain.

Snorkeling and Scuba Diving

Snorkeling and scuba diving tour boats occasionally pass near the project site. Snorkeling and scuba diving tour boats did not stop to snorkel or dive within the Twin Peaks area. The majority of the boats observed are motorized commercial tour boats.

Sightseeing

Whale watching occurs daily on a seasonal basis. Several motorized commercial whale watching tour boats were observed around the project site. The majority of the whale watching tour boats were transiting to and from Lahaina Harbor.

Dolphin watching occurs occasionally around the project site from commercial sailboats. This activity was observed within 10 feet of the project site. This activity is typically performed in conjunction with whale watching and, therefore, does not occur as distinct commercial activity during the summer season.

Ocean Mammals Observed

Humpback whales are observed frequently near the project site during the winter season (December through April). During the boat traffic survey, the following whale observations were noted: breaching, slapping pectoral fin, and slapping tail. One whale was observed within 50 feet of the project site.

Dolphins are observed occasionally near the project site. During the boat traffic survey, dolphins were observed hunting within the project site.

6.0 LAND USE PLANS, POLICIES, AND CONTROLS

There are no regulations prohibiting the development of artificial reefs within the project site area. The following sections discuss relevant land and area use plans, policies, and controls.

6.1 Submerged Land Use and Artificial Reefs

Submerged lands in Hawaii are deemed to be in the Conservation District, and are governed by the DLNR through the submittal of a Conservation District Use Application (CDUA) and issuance of board or departmental permits. The artificial reef project involves the use of submerged lands in a resource subzone (R). The objective of the DLNR designed resource subzone is "to develop, with proper management, areas to ensure sustained use of the natural resources of those areas" (HAR 13-5-13; DLNR, OCCL). According to section (b)(5), "Lands and state marine waters seaward of the upper reaches of the wash of waves on shore to the extent of the State's jurisdiction, unless placed in a (P) or (L) subzone" belongs in the (R) subzone.

The HDOH defines the ocean bottom at the project site as a Class II soft bottom (Section 5.2.6) and the water at the project site as Class A (Section 5.4). Both the class of bottom and water at the project site indicate development of an artificial reef at the project site is within the regulatory designated uses provided the appropriate reviews and approvals are obtained.

The proposed project includes identified land uses permitted in the resource subzone (R): "R-2 Artificial Reefs (D-1) artificial reefs"; and "P-5 Moorings and Aids to Navigation (C-1) moorings and aids to navigation. This requirement is satisfied by obtaining a permit pursuant to chapter 200, HRS." Identified land uses beginning with the letter (C) require a departmental permit; and land uses beginning with letter (D) require a board permit (HAR 13-5-22 and HAR 13-5-24; DLNR, OCCL).

Below is a list of permits and/or approvals that have been identified as required for the project and the anticipated submission schedule.

PERMIT AND/OR APPROVAL	AGENCY	SUBMISSION SCHEDULE
Conservation District Use Application (CDUA)	Department of Land and Natural Resources (DLNR)	Upon submission of the Final EIS
Federal Consistency Assessment and Certification Forms	Coastal Zone Management (CZM) Program	Submitted with the Draft EIS
Section 401 Water Quality Certification (WQC)	Department of Health (HDOH) Clean Water Branch (CWB)	Submitted with the Draft EIS

PERMIT AND/OR APPROVAL	AGENCY	SUBMISSION SCHEDULE
Section 10 and 404 DA Permit Application	Army Corp of Engineers (USACE) Department of the Army	Submitted with the Draft EIS

Beyond the permits listed above, Atlantis will also apply for a term, non-exclusive easement for the areas taken up by Drop Zones A and B. The easement application will be submitted to the DLNR once the EIS has been approved. The easement will amount to a lease of ceded lands for the development of artificial reefs at the two drop zones.

The main goals of the State's environmental policy are to conserve natural resources, enhance the quality of life by establishing a commitment on the part of each person to protect and enhance Hawaii's environment and reduce the drain on nonrenewable resources. The proposed project complies with these goals by promoting coral and fish growth. The mooring buoy placed in the vicinity will eliminate the need for anchoring in the area, which is destructive to coral. These steps will not only help conserve marine resources in the area but also enhance them.

Atlantis believes their submarine tour as well as commercial and private diving will be enhanced by the proposed project. Enhancing these activities and industries educate visitors and residents on Hawaii's unique environmental and marine resources plus helps foster a commitment to protect and enhance these resources.

A National Artificial Reef Plan was developed in 1985 after the National Fishing Enhancement Act of 1984. The National plan was to enhance and diversify fishery resources, increase fishing opportunities, and contribute to coastal economies. The plan includes technical guidelines for creating and placing artificial reefs. Steel ships, such as the Carthaginian, are described as having been successfully used as artificial reefs worldwide, and that they can provide excellent diving and fishing opportunities (NOAA, 1985).

The placement of artificial reefs in the project site area is consistent with State and National programs and policies. Hawaii initiated artificial reef development in the late 1950s to increase and improve fishing opportunities for local fishermen (Kanenaka, 1994). The artificial reef program continues today and has resulted in the installation of seven artificial reefs, six off various locations around Oahu and one off the south shore of Maui. All seven artificial reefs have included the sinking of at least one vessel in nearshore waters (Kanenaka, 2004).

6.2 Fishing

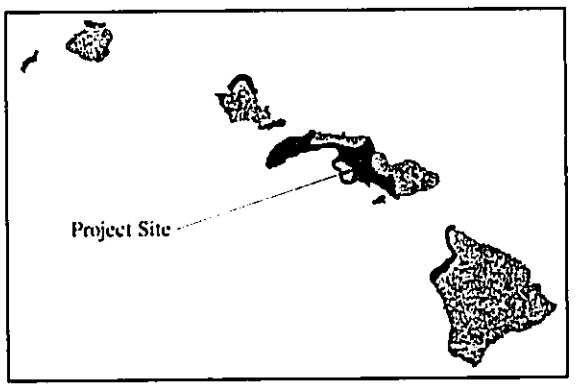
There are no fishing restrictions in the project site area or along the shoreline near the project site, except the size restrictions included in HAR 13-4 Part V - Protected Marine

Fisheries Resources, Chapters 83-95 (DLNR, Division of Aquatic Resources). There are bag limits and restricted seasons for select species as well.

6.3 Other Ocean Activities

The project site is in the vicinity of the West Maui Ocean Recreation Management Area (ORMA). The ORMA extends from shore to 3,000 feet offshore (HAR 13-256-106; DLNR, Division of Boating and Ocean Recreation). The project site is beyond the ORMA, being 3,100 feet offshore. Because the project site is more than 3,000 feet offshore, there are no restrictions on non-commercial ocean activities. Within the ORMA most non-commercial activities are allowed, except recreational thrill craft operation, with certain restrictions, and commercial activities such as parasailing, water sledding, and thrill craft operations are restricted to designated areas. Between a distance of 3,000 feet and 3 miles offshore, commercial activities such as parasailing are restricted to designated areas. Beyond three miles offshore, there are no restrictions on commercial or private operations.

The project site, and most of the area on the southwest side of Maui, is within the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS). The HIHWNMS, shown in green to the right, was established in 1997 to protect the North Pacific population of the endangered humpback whale. The protected area extends across the channel to Lanai and Molokai in the vicinity of the project site. The following activities are prohibited within the HIHWNMS:



- Approaching, or causing a vessel or other object to approach, by any means, within 100 yards of any humpback whale except as authorized under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA).
- Operating any aircraft above the Sanctuary within 1,000 feet of any humpback whale except as necessary for takeoff or landing from an airport or runway, or as authorized under the MMPA and the ESA.
- Taking any humpback whale in the Sanctuary except as authorized under the MMPA and the ESA.
- Possessing within the Sanctuary (regardless of where taken) any living or dead humpback whale or part thereof taken in violation of the MMPA or the ESA.
- Discharging or depositing any material or other matter in the Sanctuary; altering the seabed of the Sanctuary; or discharging or depositing any material or other matter

outside the Sanctuary if the discharge or deposit subsequently enters and injures a humpback whale or humpback whale habitat, provided that such activity:

- requires a Federal or State permit, license, lease, or other authorization; and
- is conducted: (a) without such permit, license, lease, or other authorization, or (b) not in compliance with the terms or conditions of such permit, license, lease, or other authorization.

- Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of either of the Acts or any regulations issued under either of the Acts (CFR Section 922.184, Subpart Q).

Between December 15th and May 15th, during the whale season, the operation of a thrill craft; engaging in parasailing, water sledding, or commercial high speed boating; or operating a motor vessel towing a person engaged in water sledding or parasailing within this area is prohibited (HAR 13-256-112; DLNR, Division of Boating and Ocean Recreation). Based on these restrictions, commercial activities involving parasailing, water sledding, and thrill craft operations are not allowed in the project site area. This prohibition is currently being challenged and may be removed.

Atlantis has been conducting submarine tours in the project site area for many years and has always operated in compliance with HIHWNMS rules regarding interactions between vessels and Humpback whales. The presence of an artificial reef will not result in any change to the submarine or surface support ship operations and Atlantis will continue to comply with HIHWNMS rules.

7.0 PROBABLE IMPACTS AND MITIGATION

As with any action, the project will have an effect on the environment in the project area. Both favorable and unfavorable effects are possible. The potential impacts include both short-term and long-term impacts. The short-term impacts are potential impacts during the installation of artificial reefs structures at Drop Zones A and B. The long-term impacts are those associated with the establishment of artificial reefs in the area. The short-term and long-term potential impacts and mitigation measures are discussed separately in the following sections.

7.1 Short-Term Impacts

Potential short-term impacts during artificial reef installation include:

- Water quality degradation through seafloor disturbance and introduction of pollutants from the artificial reef into the water.
- Seafloor damage.
- Marine mammal and turtle disturbance.
- Ocean activities disturbance, including both commercial and public activities.
- Local economic benefits.

Because the Carthaginian, and other artificial reef structures, can be installed in one day (Section 3.3.5), potential impacts should be minimal. Each of the potential short-term impacts is discussed in the following sections.

7.1.1 Water Quality Degradation

The artificial reef structures (the Carthaginian, other vessels, and manufactured reef structures) will be cleaned to U.S. Coast Guard, EPA, and HDOH standards (Section 3.3.2; Appendix C) prior to being towed to the appropriate drop zone. Petroleum products, potentially toxic materials, and floatable debris will be removed from any structure prior to installing it as an artificial reef. The Carthaginian will be inspected prior to deployment to ensure it is cleaned to the satisfaction of any of the three agencies listed above. After installation of an artificial reef, Atlantis will monitor the area for a minimum of 2 hours to ensure that no floating debris comes to the surface. Atlantis will also do a post sinking inspection dive, with one of the objectives being to look of any potential loose articles. These steps will mitigate the potential introduction of pollutants and floating debris from the artificial reef structures placed at Drop Zones A or B.

The only water quality parameter likely to be effected by the physical placement or presence of an artificial reef structure is turbidity. Turbidity is likely to increase when the artificial reef makes contact with the seafloor. Carefully locating and preparing the artificial reef

prior to sinking it will minimize seafloor disturbance. The Carthaginian will not be allowed to sink until it is in the right orientation and right location (Section 3.3.5; Appendix D). When possible, artificial reef structures will not merely be dropped, but will be lowered gradually until contacting the seafloor; this is not possible in the case of the Carthaginian due to its size and weight.

Once an artificial reef makes contact with the bottom it will not be moved. It is estimated the Carthaginian can be deployed in one day (Section 3.3.5) and it can be secured to the bottom in one day (Section 3.3.6). These steps will minimize disturbance to the seafloor and, therefore, turbidity during artificial reef installation.

The only remaining potential water quality degradation would be a release from one of the ships or pieces of equipment used to tow or sink the artificial reef. The ships involved will be inspected prior to performing artificial reef placement to ensure they are not carrying any unnecessary chemicals or excessive quantities of chemicals that could spill during the work. In general, the ships will follow their spill prevention plans to mitigate the possibility of a release during artificial reef placement.

7.1.2 Seafloor Damage

A possible impact during installation is damage to marine organisms on the seafloor by uncontrolled sinking of the vessel. The drop zones have been selected to minimize damage to seafloor currently serving as a significant habitat (Sections 5.0; Appendix H). The sinking process will be controlled (Appendix D) in order to ensure the vessel is placed within the planned Drop Zone and does not touchdown in another area.

The Carthaginian, and any other vessel to be deployed as an artificial reef, will be ballasted using concrete to the maximum extent possible in the harbor prior to being towed to the Drop Zone. Concrete was selected to ballast the vessel to mitigate the possibility of ballast material escaping from the vessel and covering the surrounding sea floor. This has been observed at artificial reef sites where gravel was used to ballast a vessel.

Three anchors with temporary moorings will be placed at the Drop Zone, two for the bow and one for the stern, prior to deployment day. The anchors will be widely spaced with a great deal of scope in order to maintain the vessel in the proper position and orientation while the vessel is sunk. On deployment day, the vessel will be towed to the project site, secured in position using the anchors and temporary moorings plus a support vessel, then sunk by filling it with water using pumps and soft patches in the hull (Appendix D).

7.1.3 Marine Mammal and Turtle Disturbance

The project site is within the HIHWNMS (Section 6.3). Due to the possibility of disturbing a humpback whale, artificial reefs will not be installed during the whale season, which

is considered to extend from December 15th to May 15th. The possibility of disturbing a ~~marine mammal~~ Humpback whale will be mitigated by not performing artificial reef installation during the whale season.

Other endangered species including Hawaiian monk seals and green sea turtles inhabit the area but monk seals have never been observed at the project site and sea turtles are very rarely observed at the project site area (Section 5.3.2). These species do not have defined seasons in Hawaiian waters and could be disturbed by short-term project impacts during artificial reef placement. Noise is not likely to be a significant short-term impact because ships regularly transit through the area and the placement process does not include any explosive methods. Increased turbidity caused by artificial reefs touching down on the sea floor is the greatest possible short-term impact to endangered species.

In order to mitigate short-term impacts on protected species, artificial reefs will not be installed if any marine mammals or turtles are observed in the area. Prior to artificial reef installation, scuba divers or the Atlantis submarine will survey the target Drop Zone for the presence of any dolphins, seals, and turtles. If any are present, the artificial reef installation will be postponed until the dolphins, seals, or turtles are no longer visible in the area.

7.1.4 Ocean Activities Disturbance

There may be temporary disruption of normal boating traffic and ocean activities during the day of artificial reef installation. The ocean activities survey (Section 5.5) and the boat traffic survey (Section 5.6) indicate impact will be minimal. Only one vessel every two hours normally pass through the Twin Peaks area and only one vessel every five hours came within approximately 1,500 feet of Drop Zone A. Most of the vessels are commercial operations transiting between Lahaina Harbor and preferred fishing, driving/snorkeling, or whale watching areas. These commercial operators are familiar with Atlantis' submarine operation in the project site area and know to keep a distance from their operation. Atlantis will further mitigate the potential impact by informing Lahaina Harbor users of the operation prior to installing an artificial reef.

7.1.5 Local Economic Benefits

The installation of artificial reefs at the project site by Atlantis will require the use of area merchants. Although the cleaning, installation, and securing of the Carthaginian and other reef structures will be short, significant expertise and resources will be required. Economic benefits will range from the production of this EIS and supporting documents to divers required to install the anchors that will secure the Carthaginian (Section 3.3.6).

7.2 Long-Term Impacts

Potential long-term impacts during artificial reef installation include:

- Marine community/environment alteration.
- Marine mammal and turtle disturbance and entanglement.
- Ocean activities alteration.
- Cultural impacts.
- Local economic benefits.
- Submerged/ceded land lease.

Long-term impacts may be significant, but are generally considered positive impacts because they achieve the three primary goals of the project: 1) alleviate pressure on the existing natural reef system from overuse, 2) promote reef and fish biomass increase for commercial and recreational users, primarily divers, and 3) provide an educational opportunity to study the biomass increase over time. Each of the long-term impacts is discussed in a separate section below.

7.2.1 Marine Community/Environment Alteration

Environment Alteration

The first and most obvious impact of placing an artificial reef is that the current ocean bottom, and whatever is living on it, is covered and a new, different habitat created. Currently the seafloor at the project site is generally a flat, featureless sandy and rocky bottom with varying degrees of algae coverage and few to no fish; however, there were occasional small rock outcrops, but not live coral, supporting reef fish (Sections 5.2.6 and 5.3.1; Appendix H).

The loss of one acre (approximately 43,560 square feet) of the habitats currently present at Drop Zones A and B is not considered a significant impact because:

- Similar conditions are prevalent in a wide area around the project site. The drop zones account for less than one percent of the sandy *Halimeda* beds in the immediate area (Section 5.2.6; Appendix H).
- The artificial reef habitat will support a greater diversity and number of coral and fish species than the current habitat.
- The species present in the surrounding area that are not likely to be attracted to the artificial reef (i.e. worms, algae, and seaweed) will benefit from the artificial reef's presence in the area through the flux of more biological material.

It has been suggested that the placement and long-term presence of the artificial reef will not only impact the sandy bottom immediately beneath it but also the surrounding area. However, the artificial reefs proposed for installation are not anticipated to have a significant impact on the surrounding sandy-bottom area over the long term. No significant impacts are expected because, unlike aquaculture operations, the only alteration to the environment is the placement of a substrate for naturally occurring marine life to grow on and live around. No outside nutrients or organisms will be introduced to the environment as part of the project. Therefore, the only impact to the surrounding area would be the same as for a sandy-bottom area around a natural reef.

Any changes in the environment around the artificial reef are expected to be gradual because coral and fish will gradually be recruited to the artificial reef. It is likely that organisms living in the sandy-bottom around the artificial reef will gradually change in reaction to the gradual changes at the artificial reef. These changes should be gradual and find a natural balance. For example, if the *Halimeda* around the artificial reef starts to grow faster as a result of increased natural occurrence of nutrients (i.e., more fish feces), sea turtles attracted to the shelter provided by the artificial reef will consume it.

This supposition has been born out in observations made at other artificial reef sites. Observations made by Mr. Brian Kanenaka, of the DLNR Division of Aquatic Resources, at state artificial reefs around Oahu and Maui suggest that there will be no significant impact on the immediately surrounding area. The Keawakapu Artificial Reef, built by the state, is located on a flat sandy bottom on the south side of Maui, similar to the project site. After the artificial reef was re-installed in 1989, there have been no observed changes in the surrounding sandy area. The states other artificial reefs were installed in different environments (i.e., hard bottom), but like the Keawakapu reef, no direct negative impact to the surrounding environment has been observed (Kanenaka, 2004).

Similarly, there have been no observed significant changes to the sandy-bottom area in the area seaward of the Atlantis Waikiki artificial reef. The Waikiki artificial reefs were placed on a sandy bottom just seaward of a rocky ridge with a gradual slope. When the artificial reefs were installed the area was barren of coral and fish but some algae was present in a nearby sandy-bottom area. Over the 15 years since the artificial reefs were installed, a significant amount of coral and fish have been recruited to the artificial reef, which has also attracted turtles and a seal. Coral reef has also begun to establish itself on the nearby rocky ridge landward of the artificial reef, but the immediately adjacent sandy-bottom area seaward of the artificial reef remains barren. Sea turtles have been observed foraging in the nearby algae areas (Atlantis, 2004). These observations suggest that habitat around the artificial reef has benefited from its presence, but areas where shifting sands prevented coral and algae from becoming established before artificial reef placement did not significantly change following artificial reef installation.

Limu

Halimeda is the only limu present at the project site and surrounding area (Section 5.2.6). *Halimeda* is not considered edible by traditional Hawaiians but is a food source for sea turtles. The sandy proposed Drop Zones contain small amounts of *Halimeda*; therefore, the proposed artificial reefs will cover a small amount of *Halimeda*. The development of the artificial reef is anticipated to result in an increase in coral and fish at the project site. The increased biota at the artificial reef will result in a greater flux of nutrients in the vicinity of the artificial reef. This increased flux may benefit the surrounding *Halimeda*. A dramatic change in limu at the project site is not anticipated because they have not been observed at other artificial reefs in Hawaii and any changes will be gradual and balanced by natural processes.

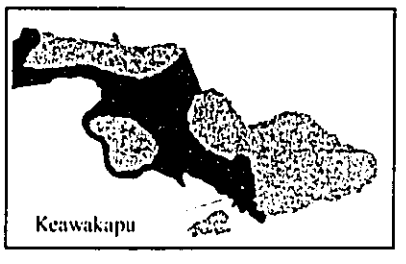
The nearest known edible varieties of limu are in shallow water (4 to 8 feet) within approximately 650 feet of the shoreline at Puamana Beach Park (Section 5.2.6). Invasive varieties are also present in the near-shore environment. The project site is not anticipated to have in impact on either the native edible limu or the invasive limu in the near-shore area because the proposed Drop Zones are nearly half a mile away and in water 100 feet deep. The prevailing currents in the area are parallel to the shore (Section 5.2.3) so there should not be significant transport between the project site and the near-shore environment.

Coral and Fish Populations

Numerous studies have been completed on the impacts to the marine environment by artificial reefs. The studies have consistently shown that artificial reefs enhance reef habitat and increase fish biomass within the reef site. For this reason there are several federal and state programs promoting and facilitating responsible and effective artificial reef development.

Locally, research has focused on the effects of the State artificial reef sites, the Atlantis artificial reef site off Waikiki Beach on the island of Oahu, and the Voyager Submarines Hawaii (Voyager) artificial reef site off Ala Moana Beach Park on the island of Oahu. The State program includes artificial reefs constructed of vessels, tire modules, concrete building materials, mid-water fish aggregation devices (FADs), auto bodies, and specially constructed modules. Surveys conducted annually at the four State artificial reef sites have shown that the reefs have attracted and sustained large numbers of fish and other marine life at previously barren areas (Kanenaka, 1994).

One state reef system known as the Keawakapu Artificial Reef is located on a flat sandy bottom on the south side of Maui within the HIHWNMS (shown in green to the right). The distance from shore and depth of water at the Keawakapu reef is similar to the proposed project site. The Keawakapu reef was first established in 1962, then in 1989 it was re-established after the original materials



deteriorated, and in 1997 it was expanded with the addition of a 63-foot former longliner and three bargeloads of specially designed "Z" habitats. Between 1990 and 1997 an average survey at Keawakapu Artificial Reef found an abundance of 3,744 fish per acre with 32 fish species present. This far exceeds the number of fish present before the artificial reef was established (DLNR, 1998) and the number currently at Drop Zones A and B (Section 5.3.1).

Atlantis installed artificial reefs in an area off the coast of Waikiki Beach on the island of Oahu starting in 1989. Voyager similarly installed artificial reefs in an area off the coast of Ala Moana Beach Park on the island of Oahu in 1998. The projects had similar goals and uses as the proposed project. The artificial reefs installed off Oahu included vessels placed in 100 feet of water in areas used by submarine tours. Studies of these artificial reef sites before and after vessel placement were performed to evaluate their impacts and effectiveness.

A number of studies were done prior to and after the installation of the Atlantis and Voyager artificial reefs off the coast of Oahu. These studies include: Brock, 1987; Brock, 1994; Bailey-Brock et al, 1994; Brock, 1995; and MRC, 1997. These studies found that prior to the placement of the Atlantis and Voyager artificial reefs the areas were generally devoid of significant fish populations (0.6 to 44 grams/square meter) and live coral was restricted to the crests of ledges, which amounted to a very small percentage of the entire area. After the artificial reefs were installed, the fish biomass was observed to increase up to 25 times to 1,165 grams/square meter.

Coral recruitment and growth on the artificial reef vessels was also observed to be rapid and dramatic compared to the surrounding natural habitat. Approximately one and a half years after the Atlantis reef was installed, approximately 250 colonies of *Pocillopora meandrina* and *Porites labata* corals were measured on the upper surfaces of the ship; the largest corals measured 129 to 299 square centimeters and the smallest were 5 to 28 square centimeters. Approximately eight years after the Atlantis reef was installed, high densities (3 colonies/square meter) of corals were observed on the horizontal decks of the vessel but much lower densities of coral were observed on the vertical vessel surfaces.

Fish Aggregation

The U.S. Department of the Interior's Fish and Wildlife Service commented on the EISPN that "artificial reefs tend to aggregate marine organisms and make capture easier, which may enhance the commercial and recreational harvest of reef fishes at the proposed artificial reef. However, artificial reefs may have little impact on overall productivity of reef fish populations, may not promote reef fish growth, and may in effect increase pressure on populations occurring on nearby natural sites (National Research Council, 2001), adding to the overall overuse of marine resources in the area."

There are several factors that can inhibit the growth of the reef fish population. A certain area may be limited by food, shelter, or the ability to reproduce faster than being harvested. At the Atlantis reef off Waikiki Beach large fluctuations in fish stocks have been observed and the bulk of the fluctuation was attributed to fishing at the site. In 1994 it was estimated that the daily fishing catch on the artificial reef vessel was approximately 31 kilograms (kg), which suggests that in one day fishermen remove what should be taken from the natural coral reef system in the area over an annual period. Furthermore, the annual catch at the artificial reef is probably far in excess of *in-situ* production, suggesting that much of what is being caught are fishes that have aggregated around the artificial reef rather than what was produced due to the presence of the artificial reef (Brock, 1994).

Brock calculated that annual gross proceeds from consumptive use of the caught fish at the artificial reef is four percent of the annual net profit derived from using the site solely as a dive tour destination. Thus, the value of the site as part of a well-planned tour attraction far outweighs the value of enhanced consumptive use, both in terms of education and economic value.

Mr. Brian Kanenaka, Aquatic Biologist and artificial reef specialist at the DLNR, feels that fish may aggregate to artificial reefs but the reefs do not make it easier for fishermen to capture all the fish in an area. Because artificial reefs provide hiding places, not all fish are accessible to fishermen and fish are able to breed at higher densities than they were in the previously barren habitat. In Mr. Kanenaka's experience of annual observations at many artificial reefs and nearby natural reefs, there is a marked increase in fish population at the artificial reef over time but the fish population at nearby natural reefs is not diminished (Kanenaka personnel communication, 2004).

Mr. Todd Barber, Chairman of Reef Ball Foundation, has suggested that using vessels as artificial reefs do not achieve fish stock enhancement or biological goals because taller artificial reefs can reduce fishing effort and increase catch rates. Mr. Barber concedes that vessels have merit when the goal of the project includes diving and tourism benefits. Mr. Barber and others have concluded through monitoring at manufactured artificial reef structures that they create essential fish, invertebrate, and marine plant habitats. Because the structures have less vertical relief and more accurately resemble natural reef environments, such as cliff faces and rock piles, the fishing effort is similar to that at natural reefs. Therefore, if manufactured reefs are placed in previously barren areas, they can dramatically improve fish stocks and biological goals of artificial reef projects (Contributors to NOAA discussion group list, coral.aoml.noaa.gov/pipermail/coaral-list/; Mr. Todd Barber, www.reefball.com).

Two different types of artificial reefs are proposed to address concerns regarding fish aggregation (Section 7.2.1) and diver attraction concerns and balance the benefits and drawbacks of the different artificial reef materials (Section 4.3). The use of vessels is proposed to create

interesting dive locations and fishing opportunities and the use of engineered structures is proposed to promote fish growth and population increase to counter possible fishing pressure on the vessels.

Shark Attraction

Surfers and divers interviewed during the ocean activities survey (Section 5.5) indicated they were concerned that the presence of artificial reefs offshore may attract sharks. Obviously, the surfers of Maui are concerned that the artificial reef may increase the number of sharks in the area and, therefore, the likelihood of attack. There are several lines of evidence that indicate the presence of an artificial reef does not increase the number of aggressive sharks in an area or the likelihood of a shark attack on a surfer.

The project site is similar to artificial reefs installed in shallow waters off the island of Oahu (Waikiki Beach, Ala Moana Beach, and Maile Point). In those three areas of Oahu, surfers are riding waves offshore and an artificial reef is present in 100 feet of water further offshore. In all cases, approximately the same distance separates the surfers and artificial reefs. There are more surfers using the Waikiki and Ala Moana areas than the numbers observed in the project area (Puamana and Launiupoko beaches). Furthermore, the artificial reefs offshore of Waikiki and Ala Moana are larger than those proposed at the project site. Only one shark encounter was reported in the Waikiki and Ala Moana area between 1990 and 2003. Forty-six shark encounters were reported statewide during that time period (DLNR, www.hawaiisharks.com/incidents.html). The attack occurred near the entrance to Kewalo Basin, home to many sports fishing charter boats.

According to Mr. John Naughton of NMFS, artificial reefs do attract more sharks to an area because the number of fish in the area increases. The presence of sharks is an indication of a complete, healthy marine ecosystem. Mr. Naughton has made numerous dives at artificial reefs and aquaculture sites and observed that non-aggressive shark species are typically present, but aggressive types such as tiger sharks or white sharks are not. The most common sharks observed at artificial reefs are blacktip sharks (*Carcharhinas limbatus*), sandbar sharks (Carcharhinas plumbeus), and reef whitetip sharks (*Triaenodon obesus*), which typically feed on reef fishes, not large prey. Galapagos sharks (*Carcharhinas galapagensis*) may be present in lesser numbers in the periphery of the artificial reef. Mr. Naughton has no knowledge of a serious or fatal shark attack occurring around existing artificial reefs or aquaculture sites (Naughton, 2004).

Mr. Naughton's observations correlate with recorded observations by Atlantis personnel at the Waikiki artificial reef site in 1997. Atlantis observed a blacktip and/or whitetip shark most days they logged marine life in the summary of 1997. A hammerhead shark was also observed on one day and a tiger shark was observed once when scuba divers were also present at the artificial reef. Whitetip and "grey" sharks are infrequently observed at the project site now

(Section 5.3.2). These observations indicate that the number of blacktip and whitetip sharks will likely increase as the artificial reef develops, but aggressive tiger sharks will remain infrequent visitors to the area.

The DLNR studies the possible correlation between artificial reefs, fish feeding, and shark risks to inshore recreational users in 1994. The DLNR study included monitoring the Atlantis artificial reef site off Waikiki Beach and nearby natural reefs. No sharks were observed at the artificial reef site but sharks were observed at a nearby natural reef site. At the time of the study, the artificial reef had been present for over 5 years, yet over that time sharks of any variety had not been attracted to the artificial reef. The findings of the study could not show a relationship between artificial reefs, fish feeding, and risks from sharks (DLNR, 1994).

Research by Dr. Kim Holland of the University of Hawaii, Hawaii Institute of Marine Biology, Shark Research Institute indicates that the addition of a single feature in the waters of Hawaii is unlikely to affect Tiger shark numbers in the immediate area. His research indicates that Tiger sharks are constant swimmers that have large home areas that can include more than one Hawaiian island and involve traversing offshore waters (Holland et al, 1999). Holland's research has indicated that Tiger sharks swim over their large home areas in search of prey but that their home area is so large that the addition of one small feature will not affect their movement or density.

7.2.2 Marine Mammal and Turtle Disturbance and Entanglement

There has been some concern expressed that the placement of artificial reefs in the project site area, which is within the HIHWNMS, may disturb marine mammals and sea turtles. Marine mammals in the area include whales, monk seals, and dolphins. There are a number of reasons that it appears the proposed artificial reefs will not significantly disturb marine mammals and sea turtles, including:

- the marine mammals and turtles are extremely mobile,
- the artificial reefs will impact a very small percentage of the current sandy-bottom habitat, and
- the state and others continue to develop artificial reefs around the state without any apparent negative impact to marine mammals or sea turtles.

If anything, the project should improve the habitat for marine mammals and turtles, particularly the smaller ones, by providing additional habitat and resting places plus more biological activity in the area.

Humpback Whales

~~To mitigate possible Humpback Whale disturbance, artificial reefs will only be installed between May 16th and December 14th, when Humpback Whales are generally not present in the Hawaiian Islands.~~The primary long-term impact of concern to humpback whales is entanglement, which is discussed for all mammals and turtles below. The only other possible long-term impact to humpback whales raised during this EIS has been the loss of possible resting areas. Humpback whales have been observed resting on the ocean floor in Hawaii. The frequency of this activity is unknown and appears to occur during relatively long dives (greater than 10 minutes), in warm water, in water less than 600 feet deep, and in areas where the bottom is relatively smooth (Mattila, 2004).

The footprint of the proposed artificial reef is small compared to the area of the surrounding sandy-bottom habitat. The use of the area by whales for resting is likely rare because it has not been observed often and never observed at the project site by Atlantis (Section 5.3.2). Therefore, because the project eliminates a very small portion of the sandy-bottom area open to possible whale resting, this impact is considered negligible compared to long-term benefits of the proposed project.

Dolphins

The primary long-term impact of concern to dolphins is entanglement, which is discussed for all mammals and turtles below.

Monk Seals

Monk seal population declines in the 1990s in the Northwest Hawaiian Islands has been largely attributed to decreased prey, possibly as a result of commercial lobster fishing. Other limiting factors include aggressive male seal behavior, shark predation, entanglement in marine debris, and disease (MMC, 2000). The proposed project is unlikely to have any long-term negative impact on monk seals because it will be free of loose material that would cause entanglement, which is further discussed below. The project should provide beneficial habitat for the monk seal's prey (small reef fish and crustaceans) and provide resting and hiding spots for seals. Therefore, the project may provide long-term benefits for monk seals by increasing habitat. The recent sightings of a monk seal at Atlantis' Waikiki artificial reef (Section 5.3.2) supports this.

Sea Turtles

The population of green sea turtles in the Hawaiian Archipelago has significantly recovered since nesting habitat disturbance ceased in the 1950s and harvesting ceased in the 1970s. Long-term studies of the number of nesting females in the French Frigate Shoals and turtle growth rates in the southern Hawaiian Islands suggest that the population may be

approaching habitat carrying capacity (Balazs & Chaloupka, 2004a,b). An increase in accessible foraging habitat can only benefit sea turtles. The current sandy-bottom habitat appears to provide limited foraging opportunities because turtles are never observed in the area (Section 5.3.2). However, the *Halimeda* in the area could be a food source for green sea turtles.

The sea turtles may not be feeding in the area because it lacks vertical relief, which turtles prefer because it provides refuge and resting places (Balazs, 2004). The artificial reef would provide vertical relief, which turtles could use for refuge and resting, potentially opening the surrounding sandy-bottom area up for turtle foraging. An increased use of the area surrounding the Waikiki artificial reef by turtles (Section 5.3.2) and the presence of turtles at a para-sail platform wreck near Maui's Mala Wharf, and the State's Keawakapu artificial reef (Balazs, 2004; Kanenaka, 2004) support the position that the vertical relief will open the area to foraging by turtles. Therefore, although the artificial reef will not likely generate a significant new food source for sea turtles, it will provide refuge and resting areas so turtles may be able to better exploit the foraging area around the artificial reefs.

Marine Mammal and Sea Turtle Entanglement

Marine mammal and sea turtle entanglement has been raised as a possible long-term impact. The Carthaginian rigging has been dramatically reduced to mitigate entanglement concerns. Based on comments from NOAA and the public on the Draft EIS, the rigging will be further reduced before the Carthaginian is installed as an artificial reef. Any rigging that appears to have a net/ladder structure (Photograph 2) will be removed prior to installation. The remaining rigging on the Carthaginian is all metal, taut, and compact in design to mitigate entanglement concerns. Vessels used in the future would be similarly prepared for use.

Entanglement records show that most events occur in slack net mesh (such as drift nets or fish weirs), slack vertical lines (such as crab pot or lobster pot floats), or surface lines (such as long-lining gear). The proposed project is not considered to be an entanglement hazard because mooring, anchoring, and rigging lines are minimal, heavy, and taut (Celikkol, 1999; Wursig and Gailey, 2002).

Another study that reviewed the interactions between marine mammals and Hawaii's fisheries (Nitta and Henderson, 1993) found that major entanglement problems for small marine mammals were all related slack lines, similar to humpback whale entanglements. Floating gill nets, drift nets, long-lines, and slack lines, such as crab pot float lines, represent the major entanglement concerns for marine mammals.

Dr. David Mattila, of the NIHWNMS, indicated entanglement issues with taut lines have arisen when the lines are long and not too tight (i.e., aquaculture cages, fish weirs). However, due to the short length, minimal number, and/or metal composition of the rigging and mooring tether, Dr. Mattila felt the Carthaginian was not a significant entanglement treat (Mattila, 2004).

The Keawakapu Artificial Reef, managed by the State, already exists within the HIHWNMS. This artificial reef includes a 63-foot former longliner vessel and engineered artificial reef structures. There have been no reports of entanglements related to this artificial reef, which has been present in various forms since 1962. This fact only suggests that materials such as steel-hulled vessels (without rigging in the case of the 63-foot former longliner) and engineered artificial reef structures placed at the Keawakapu reef are not entanglement threats.

7.2.3 Ocean Activities Alteration

Existing Site Users

The only existing site user in the immediate project site area, Drop Zones A and B, is Atlantis. The boat traffic survey (Section 5.6) indicated that the majority of the boats in the area are transiting between Lahaina Harbor and preferred fishing, diving/snorkeling, or whale watching areas. Occasionally parasailing, fishing, and whale watching occur near the project site area. However, on average only one boat, other than Atlantis vessels, was present in the relatively large Twin Peaks area every two hours and only one vessel came within approximately 1,500 feet of Drop Zone A every five hours. Existing users of the area around the project site are aware of Atlantis' operation and understand the safety protocols to follow as outlined in the H.O.S.T. information (Appendix G). Because Atlantis' operation will not change as a result of artificial reef placement, no impacts are expected with existing site users.

Surfers

A few surfing breaks are located along Puamana Beach Park and Launiupoko Beach Park (Section 5.5.2) landward of the project site. Surfers in those areas expressed concerns that debris emanating from the artificial reef would impact their safety in the water and that the presence of the artificial reef would affect the waves at the surf spots. Atlantis has been operating at the Twin Peaks site since 1994 without impacting surfers in the area.

It is unlikely debris will emanate from the artificial reef because, in the case of the Carthaginian, it has been clean and stripped of loose material per U.S. Coast Guard requirements, and, in the case of fabricated artificial reefs, there are no loose parts to break off. The bulk of the wooden portions of the Carthaginian have been removed; the only remaining wooden components on the Carthaginian are the two masts and deckhouse (Section 3.3.4). The masts are substantial enough to resist deterioration for some time (likely 5 years) and are held in place by metal rigging. The deckhouse is bolted to the metal hull but will deteriorate faster than the mast due to its relatively thin construction. The rigging will hold the masts in place for a period of time after they deteriorate. Both the masts and the deck house wood will not be buoyant enough to float and create a hazard by the time they degrade to the point that they become loose from the metal hull and rigging.

The stability analysis (Appendix E) used conservative design waves to evaluate potential movement of the Carthaginian after installation. The anchoring system proposed should prevent any movement during storms.

Some surfers expressed concern that the presence of the Carthaginian or other artificial reef would change the contour of the ocean bottom and, therefore, change the characteristics of the waves ridden by surfers at nearby beaches. A breaking wave, which surfers ride, is a complex thing formed and affected by wind, swell (size, direction, and period), seafloor, other waves, tides, and currents. Due to the large number of factors effecting breaking waves, the characteristics of a wave at a surfing location may change many times over the course of a day, either subtly or dramatically as conditions change. The number of influences make it impossible to mathematically or physically model the possible changes to a wave at a particular location due to the addition of an isolated artificial reef half a mile out to sea from the break.

Evaluating similar existing situations can best assess possible impacts on nearby surfing waves by the installation of artificial reefs in the project site area. Similar concerns were raised prior to the installation of artificial reefs around Oahu including the installation of artificial reefs offshore of very popular surfing breaks in Waikiki, Ala Moana Beach Park, and Maili Beach. The number and size of vessels sunk offshore of Oahu surfing breaks are greater than that proposed for the project site. In addition, all of the vessels on Oahu were placed in water of shallower or equal depth as Drop Zones A and B. There have been no reported impacts on surfing waves as a result of artificial reef installation off Oahu (Division of Aquatic Resources, DLNR; personal communication). Based on this experience, the installation of artificial reefs at the project site should have no impact on surfing waves inshore of the site.

Future Site Users

The purpose of the proposed project is three-fold: 1) alleviate pressure on the existing natural reef system from overuse, 2) promote reef and fish biomass increase for commercial and recreational users, primarily divers, and 3) provide an educational opportunity to study the biomass increase over time. If these three goals are met, not only will Atlantis' tour be more attractive to visitors, but the project site area will be more attractive to a number of other users, including:

- commercial scuba tours,
- private recreational scuba divers, and
- fishermen (spear, net, trap, and line)

The artificial reefs will be accessible to scuba divers because they will be placed in approximately 100 feet of water. A combination of vessels and engineered structures may be used at both Drop Zones A and B. By using the Carthaginian first, divers will have access to an attractive destination immediately. In a survey of divers in Florida it was reported that 54.2

percent of all dive trips were to artificial reefs, many of which consisted of vessels, and 66.7 percent of the divers stated they preferred to dive at ship and barge sites rather than other artificial reef materials (GSMFC, 1997).

Atlantis reports that an average of six boats utilize their artificial reef site offshore of Waikiki on a daily basis. Less than half this number is expected at the project site due to its relative isolation from harbors and large populations centers compared to Waikiki.

Facilitating access to the Carthaginian, and future vessels, for all users will minimize potential conflicts with future users. Atlantis understands that it has non-exclusive use of the project site and will not limit access to the area. In fact, Atlantis will encourage recreational and commercial use of the site. To facilitate access, a submerged mooring will be installed on each vessel used as an artificial reef, including the Carthaginian (Section 3.3.7). The mooring will remain open to anyone on a first-come-first-serve basis and will provide a safe alternative to anchoring. Anchoring is destructive to coral reefs and endangers divers and submarines below.

7.2.4 Cultural Impacts

As discussed above, the proposed project is not anticipated to have a negative impact on the most common cultural practices in the project site area: surfing, fishing, and limu collection. Fishing is the only cultural activity likely to be performed at the project site; however, during the preparation of this EIS and throughout Atlantis' use of the area as a submarine dive spot, fishing has not been observed at the project site. As discussed in Section 7.2.1, the proposed project is anticipated to markedly increase the biomass and diversity of fish at the project site. Because the artificial reef is open to all, the project is anticipated to create a new fishing area and enhance cultural fishing opportunities.

The proposed project site is in a culturally significant ahupua'a and there are many other projects taking place within the ahupua'a. Other projects proposed, approved, or ongoing in the Lahaina area include: Lahaina Watershed Flood Control Project, Honoapi'ilani Highway Lahaina Bypass, Lahaina Small Boat Harbor Ferry Pier Improvements, and housing and agricultural subdivisions. These other projects are expected to have greater cultural impacts than the proposed artificial reef project because they will have an impact on both land and near shore environments where cultural resources and the general population are concentrated. Inclusively, these projects will likely have a significant impact on the culture of the Lahaina area, the environment in general, and perhaps even the environment at the proposed artificial reef.

The biggest impact to the ahupua'a as a result of all the development ongoing or proposed for the Lahaina area is likely increased storm water runoff and increased sediment discharge. Increased runoff and sediment can have a negative impact on the near-shore environment, which supports the cultural practices of limu collection, fishing, and surfing. Increased runoff can also have an adverse impact on coral. The Lahaina Watershed Flood Control Project is designed to

alleviate some of these impacts; however, it moves the storm water and sediment discharge point to a point near Puamana Beach Park from areas in Lahaina town. (Munekiyo & Hiraga, 2003). Atlantis will endeavor to prevent unnecessary environmental impacts in the area in order to preserve the cultural significance of the community, of which they are apart, and preserve the natural marine environment, on which the proposed project depends, through educational programs and community participation.

7.2.5 Local Economic Benefits

Atlantis is part of the rapidly growing recreational diving, ocean recreation, and eco-tourism industries. The rapid growth of these sustainable industries is in the interest of the State and underscores the importance of protecting, enhancing, and managing the ocean resources that support the industry. Primary areas where the industry can make improvements according to industry members include installing artificial reefs for habitat enhancement and promoting the use of moorings rather than anchors, which damage corals (Tabata and Reynolds, 1995). The proposed artificial reef project will create these resources and therefore benefit the industry.

7.2.6 Submerged/Ceded Land Lease

Atlantis will obtain a term, non-exclusive easement for the areas taken up by Drop Zones A and B. The amended ocean leasing law directly addresses the issue of distribution of lease payment, as it relates to the State's obligation to the OHA, which oversees the use of ceded lands held in trust by the State. Atlantis will adhere to the law regarding all ceded lands lease payments. The public trust is supported by this project and the public interest benefits through the positive impacts of the project. The project will provide educational and recreational benefits to the public and benefit cultural fishing practices as well.

7.3 Unavoidable Environmental Impacts

The first and most obvious impact of placing an artificial reef on the ocean floor is that the current ocean bottom, and whatever is living on it, is covered and a new, different habitat created. The loss of one acre (43,560 square feet) of the habitats currently present at the project site is not considered a significant impact because similar conditions are prevalent in a wide area around the project site. The project should produce an environment with more diversity, coral, and fish than the current habitat, and species in the surrounding current habitat will benefit from the presence of the artificial reef (Section 7.2.1). The loss of the few bottom dwelling organisms that may occur currently at the project site represent a minor portion of the surrounding community.

Minor unavoidable short-term impacts also include increased turbidity when the artificial reefs are installed and secured (Section 7.1.1), and temporary disruption of boating traffic and

ocean activities during artificial reef installation activities (Section 7.1.4). Both of these impacts should last less than one day.

8.0 SUSTAINABILITY ANALYSIS

A sustainability analysis evaluates the relationship between local short-term uses of the environmental resources and long-term productivity at the project site, Drop Zones A and B. The short-term uses of the environment for the proposed artificial reef project are primarily associated with the deployment and installation operations necessary to install the artificial reefs. The installation of each artificial reef should only take one day (Section 3.3.5) and the securing of the Carthaginian and future vessels at the project site should only take an additional day (Section 3.3.6). Installation activities will all be performed from surface-based ships. The securing activities will require a small boat and scuba divers using hand-held equipment. Therefore, short-term use of the environment will be negligible. No maintenance of the artificial reefs should be necessary once they have been installed.

The proposed project should result in numerous long-term benefits as the three goals (Section 3.1) are achieved. Long-term productivity will include:

- Enhanced coral and fish populations in the project site area,
- Increased recreational diving and fishing opportunities for area commercial operations and the public,
- Alleviate pressure on existing natural reef system from overuse and damage by anchoring,
- Increased educational and economic opportunities for Hawaii residents, and
- Improved submarine tour for visitors.

The proposed project requires the commitment of a long-term lease of submerged lands for the establishment of an artificial reef. Once the artificial reef is established it is essentially irreversible and irretrievable. It is anticipated that the steel hulled Carthaginian will remain intact and a viable artificial reef for over 50 years. As the life of the artificial reef nears its end, it is assumed it will be allowed to naturally degrade without the need for removal. By the time the artificial reef structures do degrade they will not be floatable and will be sufficient covered with coral and other growth so that they essentially will become part of the natural landscape, albeit, no longer recognizable as the Carthaginian or other artificial structure.

9.0 REFERENCES

Atlantis Submarines Hawaii LLC (Atlantis), 2004. Personnel communication between Atlantis employees (Mr. Jim Walsh and Mr. Bob Thain) and BES employees (Mr. James Hayes and Ms. Stephanie Mandina). December 2004.

Bailey-Brock, Julie; R. Brock; and A. Kam (Bailey-Brock et al), 1994. Abstract: *Coral Growth on a Sunken Vessel Servicing as an Artificial Reef in Hawaii.* Bulletin of Marine Science, Vol. 55, No. 2-3.

BEI Environmental Services (BES), 2003. *Environmental Impact Statement Preparation Notice, Artificial Reef Installation, Twin Peaks, Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii.* BES Project No. 03-1267. October 23, 2003.

Baker, J. D., and T. C. Johanos (Baker and Johanos), 2003. *Abundance of the Hawaiian Monk Seal in the Main Hawaiian Islands.* Biol. Conserv. Vol 116 Pages 103-110. 2003.

Balazs, Mr. George H. (Balazs), 2004. Personnel Communication between Mr. George H. Balazs of the NOAA Fisheries PIFSC and James T. Hayes of BES. December 2004.

Balazs, George H. & Milani Chaloupka (Balazs & Chaloupka), 2004a. *Thirty-year Recovery Trend in the Once Depleted Hawaiian Green Sea Turtle Stock.* Biological Conservation, Vol. 117, Pages 491-498. 2004.

Balazs & Chaloupka, 2004b. *Spatial and Temporal Variability in Somatic Growth of Growth of Green Sea Turtles (Chelonia mydas) Resident in the Hawaiian Archipelago.* Marine Biology Vol. 145, Pages 1043-1059. May 28, 2004.

Brock, Richard (Brock), 1987. *Biological Assessment of a Site Proposed for Habitat Enhancement Offshore of Waikiki, Oahu.* Appeared as Appendix B in the Draft Environmental Impact Statement, The Operation of Submersibles as a Public Attraction in the Waters off Waikiki, Oahu, Hawaii, prepared by AECOS, Inc.

Brock, 1994. *Beyond Fisheries Enhancement: Artificial Reefs and Ecotourism.* Bulletin of Marine Science, Vol. 55(2-3), P. 1181-1188.

Brock, 1995. *Assessment of Biological Attributes of the Atlantis Artificial Reef, Waikiki, Oahu, Continuing Studies, Atlantis Submarines of Hawaii.*

Celikkol, B., 1999. *Biological Assessment of the University of New Hampshire Open Ocean Aquaculture Demonstration Project Finfish Component.* Prepared for U.S. Army Corps of Engineers, New England Division, Concord, MA. Page 60 plus appendices.

Dagher, Cathleen A., 2004. *Chapter 6E-42 Historic Preservation Review – Environmental Impact Statement Preparation Notice for the Proposed Twin Peaks Artificial Reef Installation.* January 5, 2004.

Department of Health, State of Hawaii (HDOH), 1997. *The Environmental Guidebook, A Guidebook for the Hawaii State Environmental Review Process.* October 1997.

HDOH, 2004. *Final 2004 List of Impaired Waters in Hawaii.* Prepared under Clean Water Act 303(d). June 16, 2004.

Department of Land and Natural Resources (DLNR), 1994. *Final Report on the Relationship Between Fish Feeding, Artificial Reefs and the Risk From Sharks on Inshore Recreational Users at Waikiki Beach, Oahu.* In response to House Concurrent Resolution No. 180 House Draft 1 Seventeenth Legislature, 1993 Regular Session. December 1994

DLNR, 1998. *Nearshore Projects, Fish Recruitment at Keawakapu Artificial Reef.* Current Line, Vol. 2, No. 1. January 1998.

Gulf States Marine Fisheries Commission (GSMFC), 1997. *Guidelines for Marine Artificial Reef Materials.* January 1997.

Hau, Skippy (Hau), 2004. Personnel Communication between Mr. Skippy Hau of the DLNR Division of Aquatic Resources – Maui and Ms. Stephanie Mandina of BES. December 2004.

Holland, K.N., B.M. Wetherbee, C.G. Lowe and C.G. Meyer (Holland et al), 1999. *Movements of Tiger Sharks (Galeocerdo cuvier) in Coastal Hawaiian Waters.* Marine Biology, No. 134, pages 665-673.

Honolulu Advertiser, 2004. *Seal lounges at Maui windsurfing contest.* Thursday, November 11, 2004.

Honolulu Star-Bulletin, 2004. *Comeback, the Hawaiian Green Sea Turtle Rebounds from Precariously Low Population Levels Thanks in Large Part to a Hawaii Researcher.* Monday, January 5, 2004.

Juvik et al, 1998. *Atlas of Hawaii, Third Edition.* University of Hawaii Press, Honolulu.

Kanenaka, 1994. Abstract: *Hawaii's Artificial Reef Program: Past, Present and Future.* Bulletin of Marine Science, Vol. 55, No. 2-3.

Kanenaka, Brian, 2004. State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources, personnel communication, April and December 2004.

Lahaina Restoration Foundation, 2003. Carthaginian. November. Keyword: Brig Carthaginian. http://www.lahainarestoration.org/carthaginian.html.

Littnan, Dr. Charles (Littnan), 2004. Personnel Communication between Dr. Charles Littnan of the NOAA Fisheries PIFSC and James T. Hayes of BES. December 2004.

Littnan, Charles L., Jason D. Baker, Frank A. Parrish, and Gregory J. Marchall (Littnan et. al.); 2004. *Effects of Video Camera Attachment on the Foraging Behavior of Immature Hawaiian Monk Seals.* Marine Mammal Science, Vol. 20, No. 2, Pages 345-352. April 2004

Marine Mammal Commission (MMC), 2000. Hawaiian Monk Seal (*Monachus schauinslandi*), Species of Special Concern, Annual Report to Congress, 1999. P. 44-55, Chap. 3. 2000.

Marine Research Consultants (MRC), 1997. *Assessment of Water Quality and Marine Community Structure in the Vicinity of the Voyager Submarines Hawaii Dive Site, Honolulu, Hawaii.* April 30, 1997. Appears as Appendix A of Final Environmental Impact Statement Voyager Submarines Hawaii Artificial Reef Installation prepared by Sea Engineering, Inc. and dated April 30, 1998.

Mattila, Dr. David (Mattila), 2004. Personnel Communication between Dr. David Mattila of the HIHWNMS and James T. Hayes of BES. December 2004.

Munekiyo & Hiraga, Inc., 2003. *Final Environmental Impact Statement, Lahaina Watershed Flood Control Project.* Prepared by Munekiyo & Hiraga, Inc. for U.S. Department of Agriculture, Natural Resources and Conservation Service, West Maui Soil and Water Conservation District and the Applicant Agency: County of Maui, Department of Public Works and Environmental Management. December 2003.

MuseumStuff.com, 2003. Brig Carthaginian. November. Keyword: Brig Carthaginian. http://www.museumstuff.com/rec/org_20020201_10987.html.

National Oceanic and Atmospheric Administration (NOAA), 1985. *National Artificial Reef Plan.* NOAA Technical Memorandum NMFS OF-6.

Naughton, John (Naughton), 2004. Personnel Communication between Mr. John Naughton of NOAA NMFS and Ms. Stephanie Mandina of BES. December 2004.

Nitta, E.T., and J.R. Henderson, 1993. *A Review of Interactions Between Hawaii's Fisheries and Protected Species.* Marine Fisheries Review, Vol 55 (2), pages 83-92.

NOAA, 2001. *Humpback Whale (Megaptera novaeangliae): Central North Pacific Stock.* Fisheries Stock Assessment Report. Revised October 30, 2001.

Oceanic Institute, 2004. *Twin Peaks Artificial Reef Installation, Lahaina, Island of Maui, Water Quality and Marine Biological Baseline Surveys and Impact Analysis.* Prepared by David A. Ziemann, Ph.D. April 2004.

Parrish, Frank A., Kyler Abernathy, Gregory J. Marshall, Birgit M. Buhleier (Parrish et. al.); 2002. *Hawaiian Monk Seals (Monachus schauinslandi) Foraging in Deep-Water Coral Beds.* Marine Mammal Science, Vol. 18, No. 1, Pages 244-258. January 2002.

Parrish, Frank A., Mitchell P. Craig, Timothy J. Ragen, Gregory J. Marshall, and Birget M. Buhleier (Parrish et. al.); 2000. *Identifying Diurnal Foraging Habitat of Endangered Hawaiian Monk Seals Using a Seal-Mounted Video Camera.* Marine Mammal Science, Vol. 16, No. 2, Pages 392-412. April 2000.

Sea Engineering, Inc., 2003. *Coastal Processes, Marine Water Quality, and Nearshore Biological Investigations for the Lahaina Watershed Flood Control Project.* In Final Environmental Impact Statement, Lahaina Watershed Flood Control Project, prepared by Munekiyo & Hiraga, Inc. for U.S. Department of Agriculture, Natural Resources and Conservation Service, West Maui Soil and Water Conservation District and the Applicant Agency: County of Maui, Department of Public Works and Environmental Management, dated December 2003. September 2002.

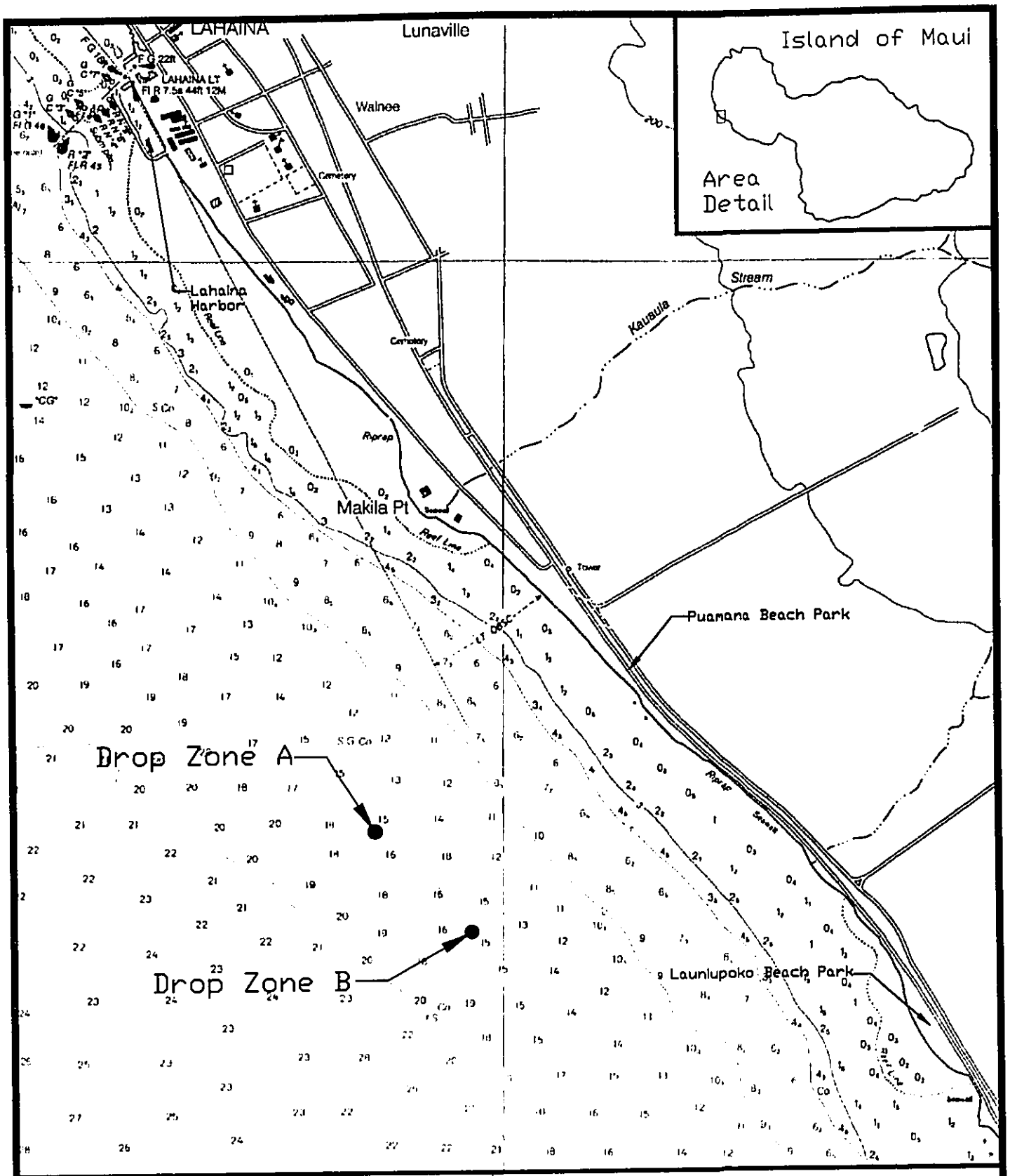
Storlazzi, C.D and Jaffe, B.E., 2003. *Coastal Circulation and Sediment Dynamics along West Maui, Hawaii, Part I: Long-term measurements of current, temperature, salinity and turbidity off Kahana, West Maui: 2001-2003.* U.S. Geological Survey Open-File Report 03-482.

Tabata, Raymond S. and E. Reynolds (Tabata and Reynolds), 1995. *Hawaii's Recreational Dive Industry: Results and Recommendation of a 1990 Study.* Sea Grant Marine Economics Report, June 1995.

Wursig, B., and G.A. Gailey, 2002. *Marine Mammals and Aquaculture: Conflicts and Potential Resolutions.* Pages 45 – 59 in Responsible Marine Aquaculture. R.R. Stickney and J.P. McVey (eds). CAB International.

Ziemann, David A. (Ziemann), 2005. Personnel Communication between Dr. David A. Ziemann of Oceanic Institute and James T. Hayes of BES. March 2005.

FIGURE



TRUE NORTH

Base Map Reference: NOAA "Approaches to Lahaina" 7th Ed., Mar. 24/01, depth in fathoms (1 fathom = 6 feet)

0' 750' 1500'
0' 250' 1500'

BES
BEI Environmental Services

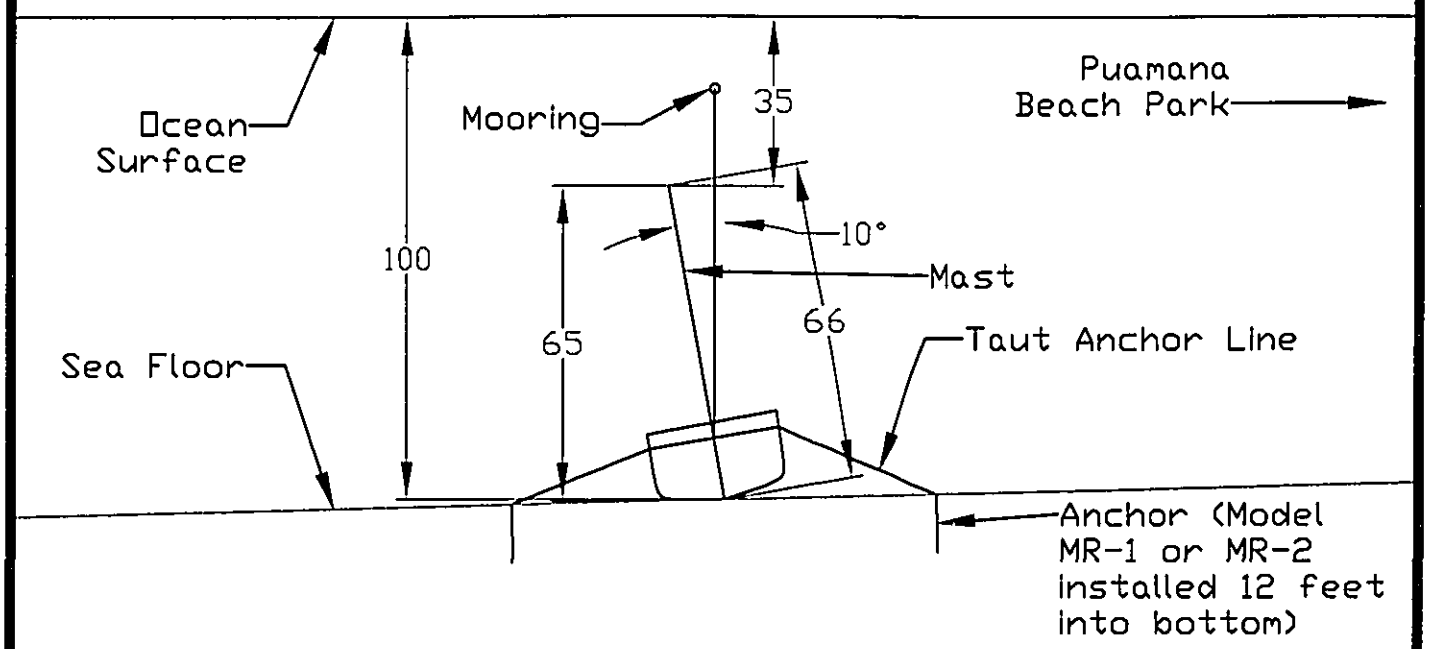
Project Site Location Map

Artificial Reef Installation, Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii

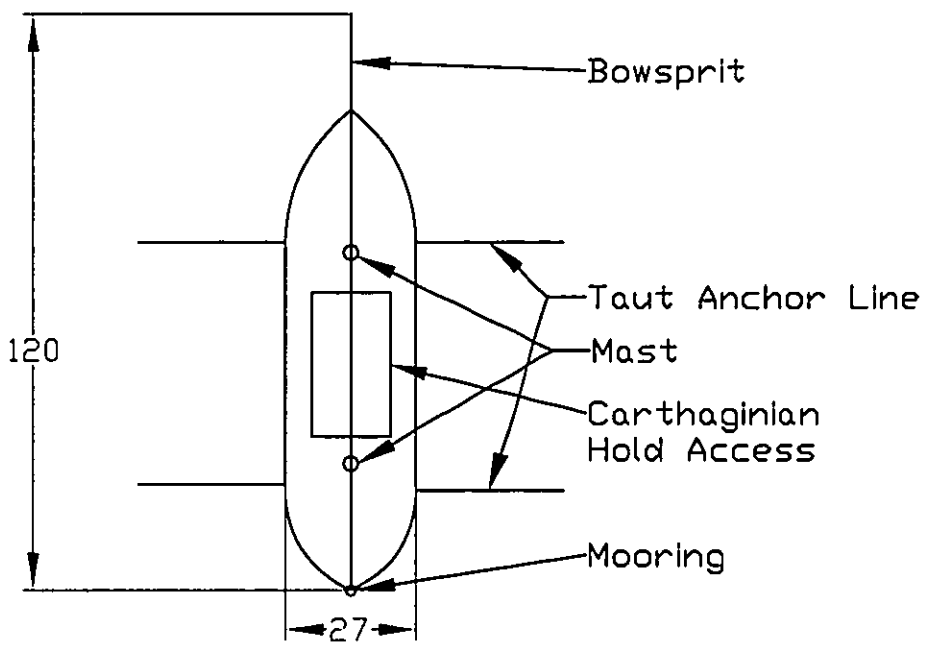
BES Job No.: 03-1267

Figure No.: 1

CROSS SECTION VIEW OF CARTHAGINIAN ARTIFICIAL REEF



PLAN VIEW OF CARTHAGINIAN ARTIFICIAL REEF



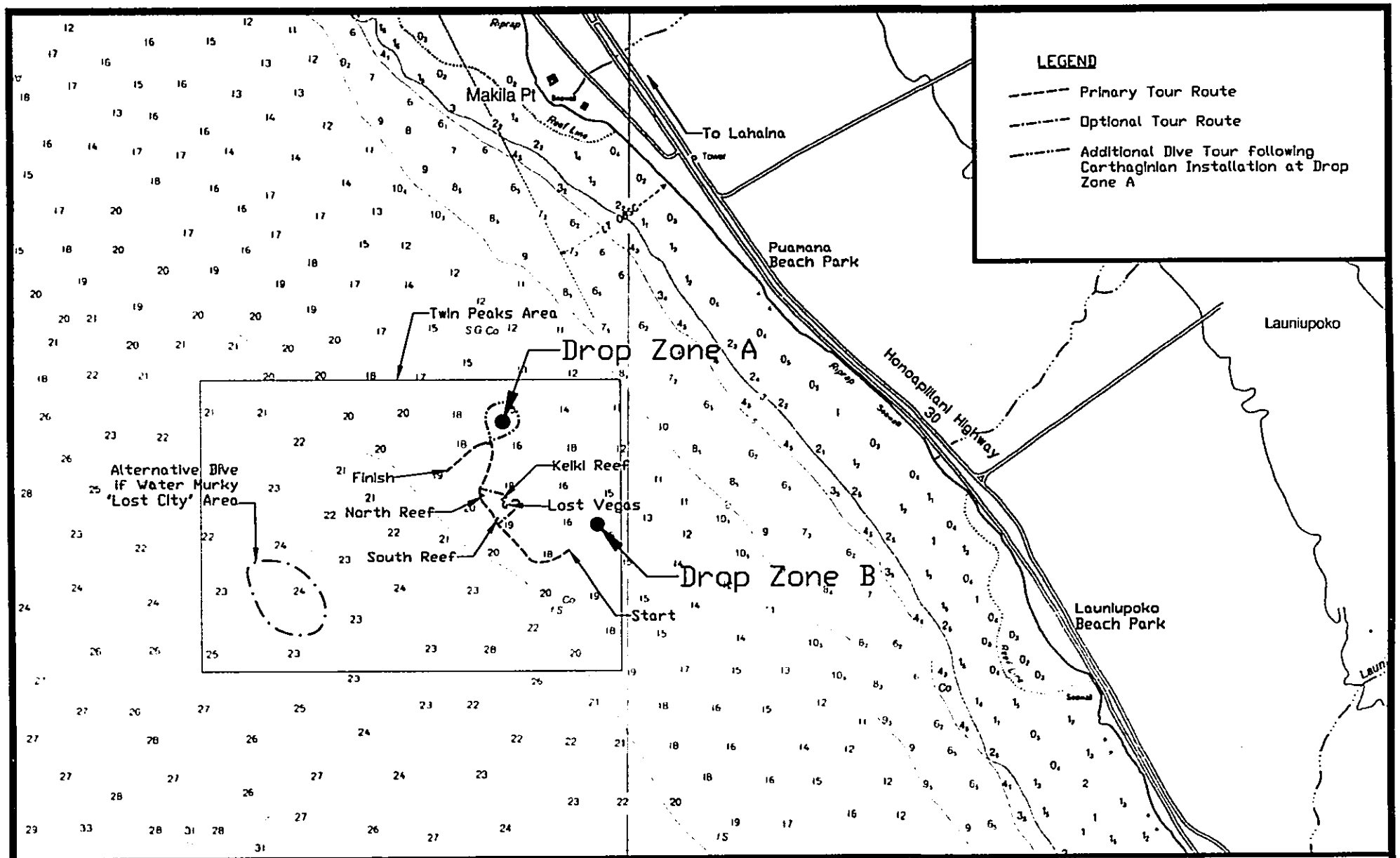
BES
BEI Environmental Services

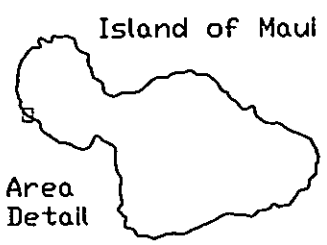
DEPICTION OF CARTHAGINIAN ON OCEAN FLOOR AS ARTIFICIAL REEF

Drop Zone A, 3,100 feet offshore Puamana Beach Park, Maui, Hawaii

Date: 03-Aug-04

Figure: 2





TRUE NORTH

Base Map Reference: NOAA 'Approaches to Lahaina' 7th Ed., Mar. 24/01, depth in fathoms (1 fathom = 6 feet)

0' 750' 1500'
0' 250' 1500'

BES Environmental Services

Illustration of Drop Zones and Submarine Dive Tour Route

Artificial Reef Installation, Offshore of Puamana Beach Park, Maui, Hawaii

BES Job No.: 03-1267

Figure No.: 3

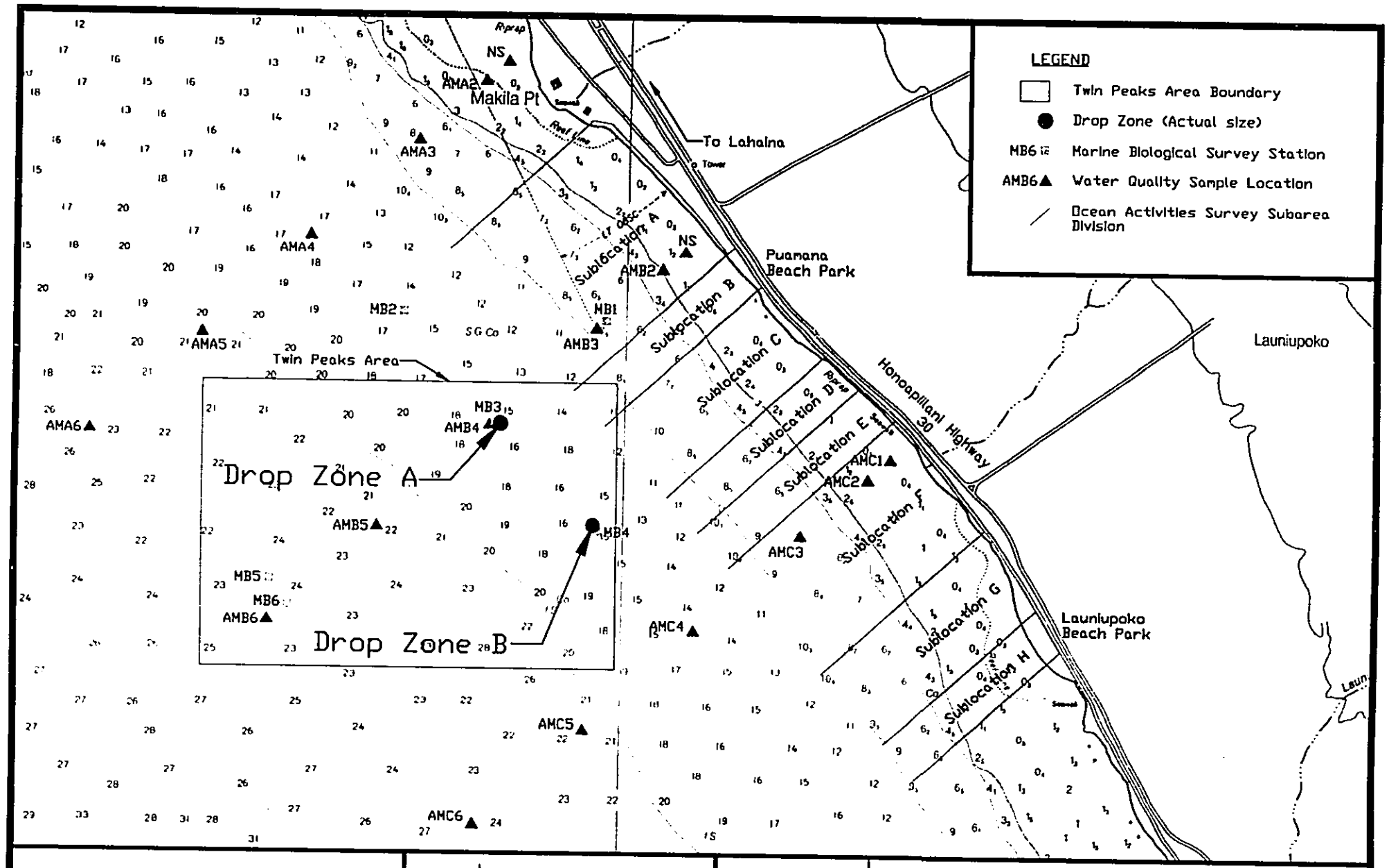


Illustration of Drop Zones, Sampling Locations, and Survey Areas

Artificial Reef Installation, Offshore of Puamana Beach Park, Maui, Hawaii

BES Job No.: 03-1267

Figure No.: 4

PHOTO

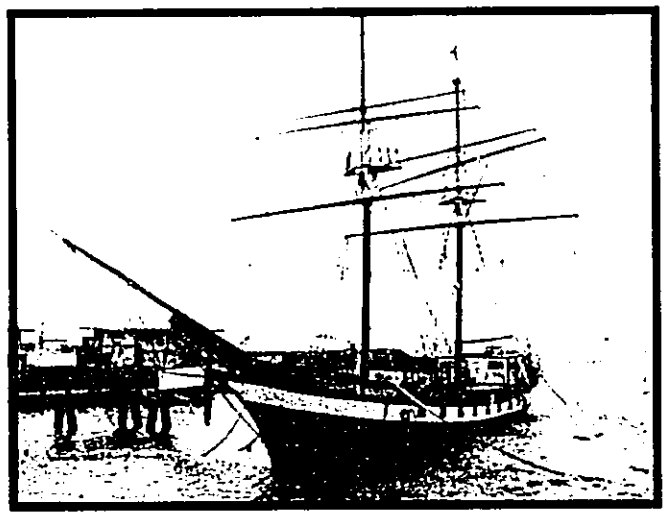


Photo 1. Carthaginian before cleaning.

Photo 2. Carthaginian after cleaning.

Photo 3. Detail of Carthaginian rigging after cleaning.

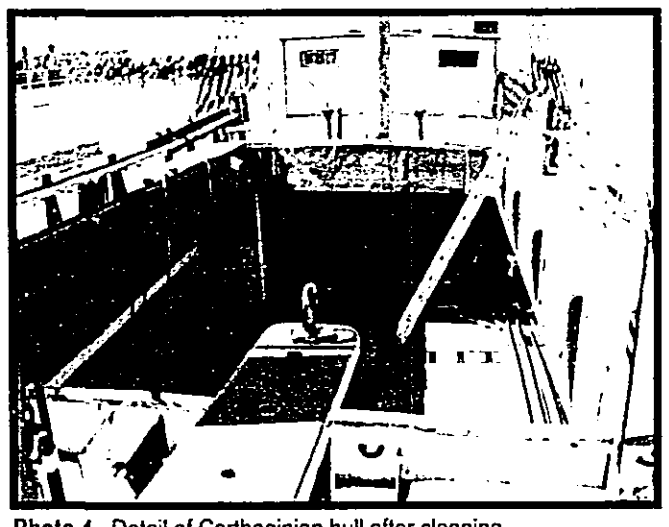


Photo 4. Detail of Carthaginian hull after cleaning.

BEI Environmental Services	**Photographs**	Job No: 03-1267
	Twin Peaks Artificial Reef Installation	Date: 04/13/04
	Maui, Hawaii	Photos: 01-04

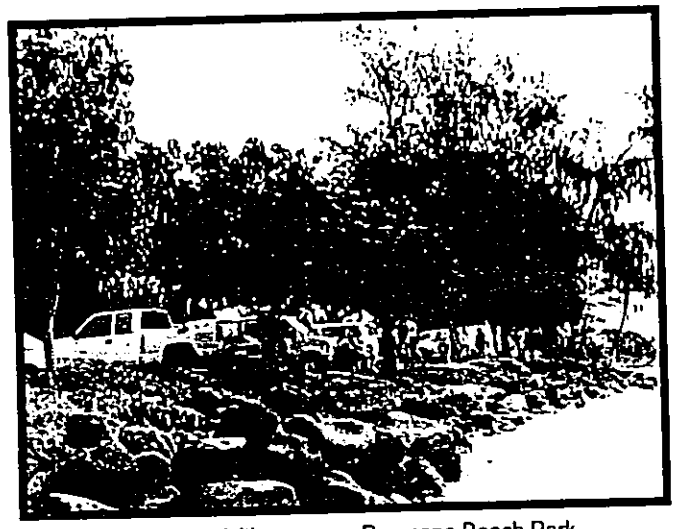


Photo 5. Ocean activities survey, Puamana Beach Park, sublocation B.

Photo 6. Ocean activities survey, surf and shoreline, sublocation D.

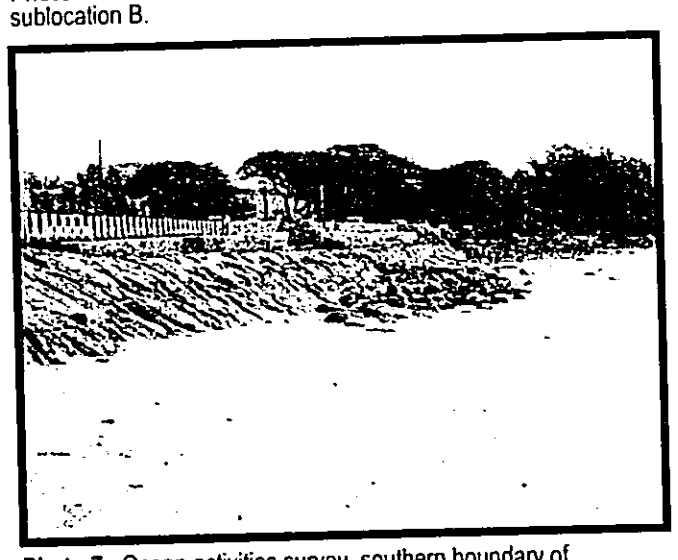


Photo 7. Ocean activities survey, southern boundary of sublocation E.

Photo 8. Ocean activities survey, southern portion of Launiupoko Beach Park, sublocation H.

BEI Environmental Services	**Photographs**	Job No: 03-1267
	Twin Peaks Artificial Reef Installation	Date: 04/13/04
	Maui, Hawaii	Photos: 05-08

APPENDIX A

APPENDIX A

Comments on Environmental Impact Statement Preparation Notice (EISPN)

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD03/1184

December 9, 2003

Jodi Pang
Atlantic Submarines Hawaii LLC
c/o BEI Environmental Services
311 B Pacific Street
Honolulu, HI 96817

RE: EIS Prep Notice Twin Peaks Artificial Reef Installation

Dear Ms. Pang:

Thank you for the opportunity to comment on the above reference project. We offer the following comments:

Historical and Cultural Settings

The EIS should address the impact of your project on access to fishing grounds or any impact to existing fishing grounds. Furthermore, if you plan to chum the reef you must address the impact of increased predator fish, including sharks, on fish stock in the area, and on access to swimming, surfing and diving. The cultural impact statement should also include data on how the reef will affect any surfing areas in the vicinity.

We suggest that you contact local residents of Lahaina who may be affected by the location of this artificial reef. The EIS should list the members of the Native Hawaiian community who were contacted and brief summary of their comments.

We suggest that you contact the following people:

Thelma Shimaoka, Community Resources Coordinator, Office of Hawaiian Affairs
140 Hoohana St., Ste 206
Kahului, HI 96732
808-243-5219

Akoni Akana, Executive Director, Friends of Moku'ula, 808-661-3659

Keeaumoku Kapu, P.O. Box 11524, Lahaina HI 96761, 808-661-0620

Additionally, you should contact members of the royal societies and members of local Hawaiian civic clubs.

Thank you for this opportunity to comment. We look forward to receiving the draft EIS. Please contact Pua Aiu at 594-1931 or by e-mail at paiu@oha.org if you have further questions.

Sincerely,

Clyde W. Namu'o
Administrator

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

HAWAI'I HISTORIC PRESERVATION DIVISION REVIEW

Log #: 22003.2705
Doc #: 0312CD40

Applicant/Agency: Jodie Pang
Address: Atlantis Submarines Hawaii LLC
care of BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

SUBJECT: Chapter 6E-42 Historic Preservation Review – Environmental Impact Statement Preparation Notice for the Proposed Twin Peaks Artificial Reef Installation
Ahupua`a: N/A
District, Island: Lahaina, Maui
TMK: (2) Zone 4

1. We believe there are no historic properties present, because:

____ a) intensive cultivation has altered the land
____ b) residential development/urbanization has altered the land
____ c) previous grubbing/grading has altered the land
____ d) an acceptable archaeological assessment or inventory survey found no historic properties
__✓__ e) other: The project is located a half-mile offshore on submerged lands, where no historic sites are known or likely to be present.
2. This project has already gone through the historic preservation review process, and mitigation has been completed ___.

__✓__ Thus, we believe that "no historic properties will be affected" by this undertaking

Staff: Cathleen A. Dagher Date: 5 January 2004

Cathleen A. Dagher
Assistant Maui/Lana`i Islands Archaeologist
(808)-692-8023

c: Sam Lemmo DLNR Ofc. of Conservation & Coastal Lands P.O. Box 621 Hon, HI 96809
Office of Environmental Quality Control 235 S. Beretania St., #702 Honolulu, Hawaii 96813
Cultural Resources Commission, Planning Dept, 250 S. High Street, Wailuku, HI 96793

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

October 6, 2003

Ms. Jodie Pang
Senior Environmental Scientist
BEI Environmental Services
311-B Pacific Street
Honolulu, Hawaii 96817

Dear Ms. Pang:

RE: INSTALLATION OF AN ARTIFICIAL REEF LOCATED OFFSHORE OF THE PUAMANA BEACH PARK, LAHAINA, MAUI, HAWAII.

This is to confirm that the proposed artificial reef installation is not within the Special Management Area (SMA); therefore, does not require an SMA permit.

We have no additional comments at this time. Should you have any questions, please contact Francis Cerizo, Staff Planner, at (808) 270-7253.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:FAC:nsg
xc: Francis Cerizo, Staff Planner
03/ZAED General File
S:\ZONING\REPLY\03reply\PangBES.wpd

Pang, Jodie

From: John Naughton [john.naughton@noaa.gov]
Sent: Wednesday, December 17, 2003 2:45 PM
To: Jodie.Pang@beihawaii.com
Cc: Naomi McIntosh; Margaret Akamine; Alan Everson; Steve Kolinski; Samuel Pooley
Subject: Artificial Reef EIS Prep Notice

Jodie:

Thanks for the call yesterday following up on the EIS Preparation Notice recently sent out by your company, BEI Environmental Services. It is our understanding that the EIS will be prepared on behalf of Atlantis Submarines Hawaii for an artificial reef complex offshore of Puamana Beach, Maui, Hawaii.

As I explained over the phone, National Marine Fisheries Service (NMFS) normally does not provide formal comments on State of Hawaii EIS Prep Notices. However, because of the nature of the proposed project, I'm sending a few considerations which will have to be dealt with during the federal permitting process.

NMFS is supportive of artificial reef development, providing a number of issues are considered during the development phase. We have published the National Artificial Reef Plan (NOAA Technical Memorandum NMFS OF-6) which details appropriate design, construction, and siting or location of artificial reefs. Our NMFS Habitat Program worked closely with Atlantis Submarine during placement of their artificial reefs off Waikiki. Based on this effort, several issues should be considered during planning for the proposed Maui project:

1. The artificial reefs should be placed on flat coral pavement substrate well away from any living coral colonies, escarpments, or other essential natural habitat features.

2. The artificial reefs should be constructed in such a manner as to prohibit break up or shifting during storm surf conditions.

3. The EIS Prep Notice states that the artificial reefs will be placed in water depths between 72 and 168 feet. Because of the use of these areas by recreational scuba divers, NMFS recommends they be placed no deep than 110 feet.

As we discussed, the proposed project area is within the Hawaiian Islands Humpback Whale National Marine Sanctuary. Consequently you will need to closely coordinate the project with the Sanctuary Manager. In addition, the NMFS Protected Species Program will have to evaluate the proposal under the Endangered Species Act.
The NMFS Habitat Program will in all probability need to conduct survey dives at the proposed artificial reef sites prior to placement of any materials on the bottom, to insure no natural habitats will be impacted.

NMFS appreciates the early notice of this proposed project, and we look forward to working with you and the applicant in the future.

John Naughton
Pacific Islands Environmental Coordinator

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2 , Wailuku, Hawaii 96793

December 12, 2003

Ms. Jodie Pang
Atlantis Submarines Hawaii LLC
BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Dear Ms. Pang:

SUBJECT: TWIN PEAKS ARTIFICIAL REEF INSTALLATION

We have reviewed the proposed action for the subject project and have no comments to offer at this time.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

GLENN T. CORREA
Director

c: Patrick Matsui, Chief of Planning and Development
Sam Lemmo, DLNR - Office of Conservation and Coastal Lands
Office of Environmental Quality Control

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

In Reply Refer to:
PN-04-22

DEC 10 2003

Atlantis Submarines Hawaii LLC
c/o Jodi Pang
BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Re: Review of Environmental Impact Statement Preparation Notice for Artificial Reef Installation at Twin Peaks, Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii.

Dear Ms. Pang:

The U.S. Fish and Wildlife Service (Service) has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for Artificial Reef Installation at Twin Peaks, Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii. The lead organization for the project is Atlantis Submarines Hawaii LLC. The Service offers the following comments for your consideration.

The proposed action is to install artificial reefs at three proposed locations offshore of Puamana Beach Park, Maui, Hawaii. The artificial reefs will consist of an existing cleaned vessel and/or engineered artificial reef structures to create an artificial reef. Preparation and cleaning of the vessel for sinking will follow U.S. Coast Guard regulations and will be discussed in the Draft Environmental Impact Statement (DEIS). Mooring buoys would be installed above the artificial reefs. As stated in the EISPN, the purpose of the proposed project is threefold: 1) to alleviate pressure on the natural reef system from overuse, 2) to enhance the existing habitat by promoting reef and fish growth for commercial and recreational users, and 3) to provide an educational opportunity to study the biomass increase over time.

As stated above, the purpose of the proposed project is to alleviate pressure on the natural reef system from overuse and at the same time enhance the existing habitat by promoting reef fish growth for commercial and recreational users. These two goals need considerable discussion in the Draft EIS as they appear to be potentially contradictory. Artificial reefs tend to aggregate marine organisms and make capture easier, which may enhance the commercial and recreational harvest of reef fishes at the proposed artificial reefs. However, artificial reefs may have little impact on overall productivity of reef fish populations, may not promote reef fish growth, and may in effect increase pressure on populations occurring on nearby natural sites (National Research Council, 2001), adding to the overall overuse of marine resources in the area. Additional justification and explanation of how the addition of artificial reefs would accomplish the stated goals is recommended. *

The EISPN discusses potential short-term and long-term detrimental and beneficial impacts and the need for Army Corps of Engineers (Corps) Rivers and Harbors Act Section 10 and Clean Water Act 404 Permits. The Service recommends that if unavoidable project-related impacts are expected to the coral reef ecosystem including seagrass beds and/or coral reefs, the applicant review Corps Regulatory Guidance Letter (RGL) 02-2 for guidance on addressing appropriate mitigation. The DEIS should describe the mitigation measures proposed for avoiding unnecessary impacts, minimizing unavoidable impacts, and compensating for project-related resources losses.

In summary, the Service recommends a thorough explanation (citing references) how the placement of artificial reefs in Hawaii will reduce pressure on existing marine resources and simultaneously enhance the commercial and recreational use of these same marine resources. If unavoidable project-related impacts are anticipated we recommend early discussions among the relevant resource agencies concerning RGL 02-2.

The Service appreciates the opportunity to comment on the EISPN. If you have any questions regarding these comments, please contact Marine Specialist Antonio Bentivoglio by telephone at (808) 792-9400 or by facsimile transmission at (808) 792-9580.

Sincerely,

Gina Shultz

Gina Shultz
Acting Field Supervisor

cc: DLNR, Hawaii
OEQC, Hawaii
NMFS, PIRO Honolulu
USEPA-Region IX, San Francisco

Citation:
National Research Council. 2001. Marine Protected Areas: Tools for Sustaining Ocean Ecosystems. National Academy Press. Washington D.C.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 2, 2003

LD-NAV

ATLANTISCDUP.RCM

Ms. Jodie Pang
Atlantis Submarines Hawaii, LLC
C/O BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Dear Ms. Pang:

Subject: Draft Environmental Impact Statement Preparation Notice
Applicant: Atlantis Submarines Hawaii LLC
Project: Twin Peaks Artificial Reef Installation
Location: Submerged Land, Lahaina, Island of Maui
Authority: DLNR Office of Conservation and Coastal Lands

Thank you for the opportunity to review and comment on the subject matter.

The Department of Land and Natural Resources' (DLNR) Land Division made available or distributed a copy of the document pertaining to the subject matter to the following DLNR Divisions for their review and comment:

- Division of Aquatic Resources
- Division of Forestry and Wildlife
- Division of State Parks
- Engineering Division
- Division of Boating and Ocean Recreation
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Maui District Land Office

Enclosed is a copy of the Engineering Division, Division of Aquatic Resources and Office of Conservation and Coastal Lands comment.

Base on the attached responses, the Department of Land and Natural Resources has no other comment to offer at this time.

If you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1-808-587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: MDLO

Suspense Date: 11/26/03

State of Hawaii
Department of Land and Natural Resources
Division of Aquatic Resources

Date: 11/28/03

TO: William Devick, Administrator JH for WD
THROUGH: Richard Sixberry, Aquatic Biologist
FROM: Brian Kanenaka, Aquatic Biologist
SUBJECT: Comments on Draft EIS Prep. Notice

Comments Requested by:		Date of Request:	Date Rec'd:
	D. Mamiya, Admin. Land Division	11/6/03	11/12/03

Summary of Proposed Project

Title: Twin Peaks Artificial Reef Installation

Project by: Atlantis Submarines Hawaii LLC

Location: Lahaina, Maui

Brief Description:

The applicant is proposing to scuttle a vessel and/or add engineered artificial reef structures to create an artificial reef offshore of Puamana Beach Park south of Lahaina, Maui. The projects 337 acre offshore site is an area known as Twin Peaks. There are three proposed "drop zones" and each zone would utilize approximately 5,000 square feet of sea floor for installation of an artificial reef. The depths of the zones range between 90 to 144 feet. Various surveys of the existing marine life would be conducted at each drop zone along with water quality analysis and a survey of ocean activities

Comments:

The Division is very concerned about the proposed depths that artificial reef material would be placed. Material placed at depths below 100 feet may create an "attractive hazard" to divers exploring or fishing at the

site. We strongly recommend that no material be scuttled or deployed at depths in excess of 100 feet. In addition the following specific comments are provided:

2.1.3 A mooring plan should explain the establishment and maintenance of a limited number of moorings for the artificial reef sites. There has been a proliferation of legal and illegal moorings and weights throughout the State. The number, location, and use of these moorings should be made clear with the public and coordinated through DOBOR. If it becomes too popular, would Atlantis have priority for established times or would there be a multiple number of moorings allowed for public use. Would these moorings be limited to day use only? Would other materials be allowed to be added to the artificial reef site? Can rocks or boulders be added? Who would monitor or approve these additions? We support the establishment of artificial reefs at appropriate diving depths to increase alternative diving opportunities. The location of these reefs must be discussed through a public meeting presentation to determine if there could be existing fishing sites and possible conflicts with existing users.

2.1.6 Is the Carthaginian being cleaned for deployment on this artificial reef site?

2.2.3 We would like to review the video and data from the surveys. This data should be presented to the public prior to the final establishment of reef sites. (Puamana is an established CRAMP site.)

2.2.4 Water quality data should also be presented to the public. (Could this project be affected by a proposed channelization project in this area?)

2.2.5 Ocean activities survey should also be presented. Surveys should be taken at different times of the year because of seasonal sea conditions and public use.

2.2.6 Would temporary buoys be used to mark the project site boundaries during monitoring?

2.4.1 Marine mammal presence during the humpback whale season or the presence of dolphins should be noted. We have responded to beached green turtles (honu) and seals at Puamana.

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 6, 2003

LD/NAV L-2980
Ref.: ATLANTISCDUP.CMT Suspense Date: 11/27/03

MEMORANDUM:

TO:
XXX Division of Aquatic Resources (DD)
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
*XXX Engineering Division
XXX Division of Boating and Ocean Recreation (DD)
Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Maui District Land Office (DD)

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement Preparation Notice
Applicant: Atlantis Submarines Hawaii LLC
Project: Twin Peaks Artificial Reef Installation
Location: Submerged Land, Lahaina, Island of Maui
Authority: DLNR Office of Conservation and Coastal Lands

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the document is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Signed: Jason K. Koga Date: 11-19-03

Name: Jason K. Koga Division: MDLO

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 6, 2003

LD/NAV
Ref.: ATLANTISCDUP.CMT

L-2980
Suspense Date: 11/27/03

MEMORANDUM:

TO:
XXX Division of Aquatic Resources (DD)
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
*XXX Engineering Division
XXX Division of Boating and Ocean Recreation (DD)
Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Maui District Land Office (DD)

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement Preparation Notice
Applicant: Atlantis Submarines Hawaii LLC
Project: Twin Peaks Artificial Reef Installation
Location: Submerged Land, Lahaina, Island of Maui
Authority: DLNR Office of Conservation and Coastal Lands

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the document is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments. (X) Comments attached.

Signed: [signature] Date: 11/14/03

Name: Dawn Hegger Division: OCCL

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

FILE NO.:MA-3170

NOV 17 2003

MEMORANDUM

TO: Nicholas Vaccaro
Land Division

FROM: Dawn Hegger
Office of Conservation and Coastal Lands

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for Proposed Installation of an Artificial Reef by Atlantis Submarines Hawaii LLC, in Offshore Waters of Puamana Beach Park, District of Lahaina, Island of Maui.

The Department has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the proposed installation of an artificial reef by Atlantis Submarines Hawaii LLC, in off shore waters of Puamana Beach Park, District of Lahaina, Island of Maui.

The Department notes that artificial reefs is an identified land use in the State Land Use Conservation Resource Subzone, pursuant to Section 13-5-24, Hawaii Administrative Rules (HAR) R-2 "Artificial Reefs." This would require a Board Permit.

The Department looks forward to your future Conservation District Use Application. (CDUA). Should you have any questions, please contact Dawn Hegger of our Office of Conservation and Coastal Lands staff at (808) 587-0380.

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
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CONSERVATION AND COASTAL LANDS
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STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 6, 2003

LD/NAV
Ref.: ATLANTISCDUP.CMT

L-2980
Suspense Date: 11/27/03

MEMORANDUM:

TO:
XXX Division of Aquatic Resources (DD)
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
*XXX Engineering Division
XXX Division of Boating and Ocean Recreation (DD)
Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Maui District Land Office (DD)

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Impact Statement Preparation Notice
Applicant: Atlantis Submarines Hawaii LLC
Project: Twin Peaks Artificial Reef Installation
Location: Submerged Land, Lahaina, Island of Maui
Authority: DLNR Office of Conservation and Coastal Lands

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the document is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments. (✓) Comments attached.

Signed: _____ Date: 11/13/03

Name: ERIC T. HIRANO, CHIEF ENGINEER Division: Engineering

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/NAV

Ref.:

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone ___.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Robert Sumimoto at (808) 523-4254 or Mr. Mario Siu Li at (808) 523-4247 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments:_____

_____

(✓) Other: The National Flood Insurance Program (NFIP) does not have any zone designations for the project area. The project area is not habitable and/or insurable NFIP does not have specific regulations of development within the area.

Should you have any questions, please call Mr. Eric Yuasa of the Planning Branch at 587-0254.

Signed: _____
ERIC T. HIRANO, CHIEF ENGINEER

Date: 11/13/03

BOR-A

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

November 6, 2003

LD/NAV
Ref.: ATLANTISCDUP.CMT

L-2980
Suspense Date: 11/27/03

MEMORANDUM:

TO:
XXX Division of Aquatic Resources (DD)
*XXX Division of Forestry & Wildlife
*XXX Division of State Parks
*XXX Engineering Division
XXX Division of Boating and Ocean Recreation (DD)
Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Maui District Land Office (DD)

FROM: Dierdre S. Mamiya, Administrator
Land Division

RECEIVED
LAND DIVISION
2003 NOV 14 A 10:33
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

SUBJECT: Draft Environmental Impact Statement Preparation Notice
Applicant: Atlantis Submarines Hawaii LLC
Project: Twin Peaks Artificial Reef Installation
Location: Submerged Land, Lahaina, Island of Maui
Authority: DLNR Office of Conservation and Coastal Lands

Please review the document pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the document is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nick Vaccaro at ext.: 7-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Signed: Carol Ihé Date: _____

Name: Carol Ihé Division: DBOR

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

December 8, 2003

Mr. James Walsh
Atlantis Submarines Hawaii LLC
658 Front Street, No. 175
Lahaina, Hawaii 96761

Mr. Samuel Lemmo
Office of Conservation and Coastal Lands
Department of Lands and Natural Resources
State of Hawaii
1151 Punchbowl Street, Room 220
Honolulu, Hawaii 96813

Ms. Jodie Pang
BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Dear Messrs. Walsh and Lemmo and Ms. Pang:

The Office of Environmental Quality Control has reviewed the environmental impact statement preparation notice and final environmental assessment for the Atlantis Submarines Twin Peaks Artifical Reef offshore of Puamana Beach Park in Lahaina, and offers the following comments for your consideration and response.

1. ***Impacts (Direct, Indirect and Cumulative) of the Proposed Action to Cultural Resources or Cultural Practices.*** With respect to Item 2.2.1 in the final environmental assessment, Act 50, Session Laws of Hawaii, Regular Session of 2000, requires that impacts (direct, indirect and cumulative) of the proposed action to cultural resources or practices be assessed in a Chapter 343, Hawaii Revised Statutes environmental assessment or environmental impact statement. This is a ***separate and distinct requirement from the historic preservation requirements*** set forth in Chapter 6E, Hawaii Revised Statutes. In conjunction with your ocean activities survey in item 2.2.5, please consult with knowledgeable community members and professionals on cultural resources and practices in the Lahaina area and discuss in the draft environmental impact statement contemporary cultural resources (e.g., marine resources such as fish, seaweed, sea creatures, surf breaks and the names of the waves and winds, etc.) as well as practices (fishing, gathering, religious practices, board surfing, body surfing, etc.) in the region, and the impacts the action may have on these resources and practices. Please refer to our website at http://www.state.hi.us/health/oeqc/index.html for guidance on assessing cultural impacts.

Thank you for taking the time to prepare a concise yet comprehensive environmental assessment. Thank you also for the opportunity to comment. If there are any questions, please call Leslie Segundo at (808) 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to
EMD / CWB

11041CEC.03

November 17, 2003

Ms. Jodie Pang
BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Dear Ms. Pang:

Subject: Environmental Impact statement (EIS) Preparation Notice (PN) for Twin Peaks Artificial Reef Installation, Lahaina, Island of Maui

Thank you for the opportunity to provide comments for the subject DEI preparation. Atlantis Submarines Hawaii, LLC (Atlantis Submarines) proposes to install an artificial reef offshore of the Puamana Beach Park, Maui, Hawaii. The plan is to sink a vessel and/or engineered artificial reef structures to create an artificial reef. The project site is an area known as Twin Peaks which is located on the southern coast of Maui, approximately 0.5 miles southwest of Puamana Beach Park, south of Lahaina. The Twin Peaks area covers approximately 337 acres (14,684,375 square feet) and depth range from 72 to 168 feet. There are three (3) proposed artificial reef installation drop zones within the project site. Each drop zone will utilize approximate 5,000 square feet of sea floor for installation of an artificial reef. Upon approval, Atlantis Submarines plans to first sink a vessel at one of the proposed drop zones. As funds become available, Atlantis Submarines plans to develop the other artificial reef installation areas through the use of engineered reef structures and/or other appropriately cleaned vessels.

We are providing the following general comments based on the scope of the project presented in the EISPN:

1. As stated in the EISPN, a Federal Clean Water Act (CWA) Section 401 Water Quality Certification (WQC) is required for the application for a Department of the Army (DA), CWA Section 404 permit. The Section 401 WQC application form and guidelines may be picked up at our office or downloaded from our website at: http://www.state.hi.us/doh/eh/cwb/forms/wqc-index.html.

2. Additional information regarding upland construction and operations related activities and activities related potential discharges shall be provided to the Department of Health (Department), Clean Water Branch for a determination on whether a National Pollutant Discharge Elimination System (NPDES) permit is required. A NPDES general permit coverage is required for the following activities:

a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

b. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. **An NPDES permit is required before the commencement of the construction activities.**

The CWB requires that a Notice of Intent (NOI) to be covered by a NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.state.hi.us/doh/eh/cwb/forms/genl-index.html.

The Atlantis Submarines may be required to apply for an individual NPDES permit if there is any type of activity in which the discharge from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible. An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at http://www.state.hi.us/doh/eh/cwb/forms/indiv-index.html.

Hawaii Administrative Rules (HAR), Section 11-55-38, also requires the owner to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. Please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

3. The EIS shall contain an antidegradation analysis to demonstrate that the project will meet both the Federal and State Antidegradation Policies as specified in Title 40, Code of Federal Regulations (CFR), Section 131.12, and HAR, Subsection 11-54-01.1, respectively.

   The Department is in the process of amending HAR, Subsection 11-54-01.1 to ensure that State's policy is consistent with the 40 CFR 131.12(a)(1) through (a)(3) requirements. The proposed HAR amendment may be found in the Department's web site at: http://www.hawaii.gov/health/eh/epo/index.htm.

4. State WQS contains two (2) types of uses to be protected: a) Existing uses; and b) designated (protected) uses. The terms "existing uses" and "designated (protected) uses" are defined in 40 CFR §131.3.

Therefore, in addition to address concerns in protecting the existing uses as discussed in item 1, above, the Atlantis Submarines shall also ensure that the construction of the proposed artificial reef and the operation of the submarines are consistent with designated (protected) uses as specified in HAR, Section 11-54-03. Therefore, Atlantis Submarines shall establish adequate and effective best management practices to ensure that construction of the proposed artificial reef and the operation of the submarines will not interfere or become injurious to any assigned uses made of, or presently in, State waters.

5. The EIS shall contain adequate information to demonstrate that the construction of the proposed artificial reef and the operation of the submarines will meet applicable water quality criteria established for the proposed project site.

   There are two (2) sets of criteria established in HAR, Chapter 11-54: a) Basic Criteria; and b) Specific Criteria. Basic criteria are applicable to all State waters regardless of the classification or locations. They are identified in HAR, Section 11-54-04. Specific criteria are specified in HAR, Sections 11-54-06 (Marine Waters), 11-54-07 (Marine Bottoms), and 11-54-08 (Recreational Criteria).

6. As part of the Section 401 WQC application requirements, an applicable monitoring and assessment plan shall be properly established and implemented. The CWB's **"General Monitoring Guideline for Section 401 Water Quality Certification Projects"** contains the minimal monitoring requirements for a construction activity and is applicable to the proposed artificial reef construction project. Post construction (operations) monitoring shall also be properly developed and implemented.

Should you have any questions or need additional assistance, please contact Mr. Edward Chen of the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

c: PICO/Region 9/EPA
Regulatory Branch, HED/COE
Mr. Sam Lemmo, DLNR
CZM Program, Office of Planning/DBEDT
OEQC/DOH
Chief, DEHP/Maui

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

November 12, 2003

Regulatory Branch

Ms. Jodie Pang
BEI Environmental Services
311-B Pacific Street
Honolulu, Hawaii 96817

Dear Ms. Pang:

This letter responds to your request for comments on the Environmental Impact Statement Preparation Notice for the Twin Peaks Artificial Reef Installation, dated November 4, 2003. Based on the information you provided I have determined that a Department of the Army (DA) permit will be required for this project under the authorities of both Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200400048.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

APPENDIX B

APPENDIX B

Responses to Comments on EISPN

March 30, 2004
BES Project No.: 03-1267.01

Brian Kanenaka
Aquatic Biologist
State of Hawaii Department of Land and Natural Resources
Division of Aquatic Resources
Post Office Box 621
Honolulu, Hawaii 96809

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Kanenaka:

Thank you for your comments dated November 28, 2003 and submitted by the Department of Land and Natural resources (DLNR) Land Division on December 2, 2003 on the proposed Twin Peaks Artificial Reef Installation. Your comments will be included in the Draft Environmental Impact Statement (EIS). Responses to your comments are provided below:

1. There are three proposed drop zones. Drop Zone A, B, and C are at an approximate depths of 90, 138, and 144 feet respectively. The recommendation to not deploy structures in excess or 100 feet depth will be taken into consideration to avoid creating an "attractive hazard to divers."

2. Two moorings are planned for the vessel serving as an artificial reef. The moorings will be for public use and will be operated on a first come, first serve basis, available at all hours. Number, location and use of the moorings for additional artificial reef structures will be assessed in the future, as needed. A mooring plan will be included in the Draft EIS and it's implementation coordinated through DLNR Division of Boating and Ocean Recreation.

   Other engineered structures will be discussed briefly in the Draft EIS. Upon impending installation of the additional engineered structures, the details will be released to appropriate governing agencies for approval.

   Existing on-site users of the project site and nearby shoreline has been interviewed or documented in the ocean activities survey conducted in January 2004. The ocean activities survey results will be incorporated into the Draft EIS.

3. Prior to the vessel being sunk as an artificial reef, the Carthaginian, will be cleaned to EPA and USCG standards, removing hazardous substances and safety hazards. The vessel preparations will be detailed in the Draft EIS.
4. Data from the surveys will be presented in the Draft EIS. Select photographs of the marine biological survey areas will be included in the draft EIS and all available photographs will be forwarded to the DLNR. Data from research work completed at Puamana Beach Park, a Coral Reef Assessment and Monitoring Program (CRAMP) Site will be reviewed.
5. Data from the water quality assessment will be presented in the Draft EIS, which will be available for public review. The proposed channelization project will be taken into consideration during our planning process.
6. The ocean activities survey was conducted in January 2004 and interviewee provided input on current as well as seasonal uses and the activity frequency throughout the year.
7. To initiate the boat traffic survey, temporary buoys were used to visually locate the project site and drop zones then removed after a few days so that boaters conduct business as usual.
8. The ocean activities survey was conducted in January during the humpback whale season (November through April) and included marine mammal and sea turtle sightings. Based on observations and interviews performed during our survey, only a few beached animals have been observed in the area.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Skippy Hau, DLNR Division of Aquatic Resources, Maui

March 30, 2004
BES Project No.: 03-1267.01

Eric T. Hirano
Chief Engineer
State of Hawaii Department of Land and Natural Resources
Engineering Division
Post Office Box 621
Honolulu, Hawaii 96809

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Hirano:

Thank you for your comment dated November 13, 2003 on the proposed Twin Peaks Artificial Reef Installation. Your comment will be included in the Draft Environmental Impact Statement (EIS). BES understands that the National Flood Insurance Program (NFIP) does not have specific regulations of development within the project area.

Should you have any questions, please do not hesitate to call.

Sincerely,
BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

Dawn Hegger
State of Hawaii Department of Land and Natural Resources
Office of Conservation and Coastal Lands
Post Office Box 621
Honolulu, Hawaii 96809

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. Hegger:

Thank you for your comment dated November 14, 2003 on the proposed Twin Peaks Artificial Reef Installation. Your comment will be included in the Draft Environmental Impact Statement (EIS). We understand that the proposed project requires a board permit and we look forward to working with the Office of Conservation and Coastal Lands (OCCL) during the Conservation District Use Application process to obtain a Board Permit.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Sam Lemmo, Office of Conservation and Coastal Lands

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

Cathleen A. Dagher
Assistant Maui/Lana'i Islands Archaeologist
State of Hawaii Department of Land and Natural Resources
Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. Dagher:

Thank you for your comment letter dated January 5, 2004 on the proposed Twin Peaks Artificial Reef Installation, State Historic Preservation Division Document #:0312CD40. Your comment will be incorporated into the Draft Environmental Impact Statement (EIS). We look forward to your involvement in reviewing of the Draft EIS.

Should you have any questions, please do not hesitate to call.

Sincerely,
BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

BEI Environmental Services
311-8 Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

Mr. Denis R. Lau, P.E.
Chief
State of Hawaii Department of Health
Clean Water Branch
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Lau:

Thank you for your comments dated November 17, 2003 (EMD/CWB 1104CEC.03) on the proposed Twin Peaks Artificial Reef Installation. Your comments will be included in the Draft Environmental Impact Statement (EIS). Responses to your comments are provided below:

1. The Federal Clean Water Act (CWA) Section 401 Water Quality Certification (WQC) will be applied for in association with the Department of the Army (DA) CWA Section 404 permit according to the specified guidelines.
2. As of this date, there are no plans for upland construction and operations, which may cause potential storm water discharges. If plans change to emit potential storm water discharges, the Hawaii Department of Health (HDOH) will be informed.
    a. The proposed project plans currently does not include industrial activities as defined in Title 40, Code of Federal Regulations, sections 122.26 (b)(14)(i) though 122.26 (b)(14)(ix) and 122.26 (b)(14)(xi).
    b. As defined in 122.26 (b)(14)(x), construction activity including clearing, grading, and excavation is not planned on upland areas. HDOH will be consulted during the installation planning process.
    c. It is understood that Atlantis Submarines Hawaii, LLC. may be required to apply for an individual National Pollutant Discharge Elimination System (NPDES) permit should there be any type of activity in which discharge from the project into State water and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible. HDOH will be consulted during the installation planning process.

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

d. The State Historic Preservation Division (SHPD) has reviewed the EISPN and believes that "no historic properties will be affected" by this undertaking. A copy of the SHPD review letter is attached for your use.

3. The EIS will include a water quality assessment/antidegredation analysis to comply with antidegredation policies as specified in Title 40 CFR, Section 131.12 and proposed amendment of Hawaii Administrative Rules (HAR), Subsections 11-54-01.1.

4. Existing and designated (protected uses) will be assessed in the Draft EIS. Any impacts to existing or designated (protected) uses will have mitigation measures developed. In addition, the artificial reef installation contractor and Atlantis Submarines Hawaii, LLC will implement best management practices to avoid/prevent interference with existing or designated (protected) uses in State waters.

5. The Draft EIS will contain detailed information on the cleaning of the vessel to be sunk and the installation plans. When additional vessels and/or engineered structures are ready to be installed, details will be provided to appropriate agencies, such as HDOH CWB for review and approval. The Draft EIS will also evaluate the proposed project to the applicable criteria established in the amended HAR Chapter 11-54:

   a. 11-54-04 Basic Water Quality Criteria (WQC); toxic pollutants will be removed from the vessel prior to being sunk and are not anticipated to be a concern. The vessel is being cleaned to Environmental Protection Agency (EPA) and United States Coast Guard (USCG) standards and will undergo USCG inspection prior to being sunk.

   b. 11-54-06 Marine Waters, Open Coastal, Class A. Dry criteria applies as per the Water Quality Management Plan for the County of Maui.

   c. 11-54-07 Marine Bottoms, Soft Bottom, Class II.

   d. 11-54-08 Recreational Criteria, Marine. This criteria is not applicable because the proposed project Site will not discharge sanitary sewer waste during installation of the artificial reef or operations of submarine tours and it is greater than 1,000 feet from the shoreline.

6. A monitoring and assessment plan will be established in association with the Section 401 WQC requirements, but not presented as part of the Draft EIS. Generally, it will consist of monitoring requirements for a construction activity (installation of the vessel as an artificial reef) and monitoring requirements during submarine operations to tour the artificial reef, if necessary.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

Attachment: State Historic Preservation Division Review Letter

cc: Mr. Edward Chen, HDOH, Clean Water Branch, Engineering Section

March 30, 2004
BES Project No.: 03-1267.01

Glenn T. Correa
Director
County of Maui Department of Parks & Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawaii 96793

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr.Correa:

Thank you for your comment letter dated December 12, 2003 regarding the Twin Peaks Artificial Reef Installation. We look forward to your involvement with the review of the Draft Environmental Impact Statement.

Should you have any questions, please do not hesitate to call.

Sincerely,
BEI ENVIRONMENTAL SERVICES

James T. Hayes
Senior Geologist

cc: Patrick Matsui, County of Maui Department of Parks & Recreation, Chief of Planning

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

Michael W. Foley
Planning Director
County of Maui Department of Planning
250 South High Street
Wailuku, Hawaii 96793

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Foley:

Thank you for your comments dated October 6, 2003 on the proposed Twin Peaks Artificial Reef Installation. Your comment will be included in the Draft Environmental Impact Statement (EIS). Responses to your comments are provided below:

1. Thank you for confirming that the proposed project Site is not within the Special Management Area (SMA).

Should you have any questions, please do not hesitate to call.

Sincerely,
BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Francis Cerizo, County of Maui Department of Planning

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

John Naughton
Pacific Islands Environmental Coordinator
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Area Office
1601 Kapiolani Boulevard, Suite 1110
Honolulu, Hawaii 96814

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Naughton:

Thank you for your comments via email dated December 17, 2003 on the proposed Twin Peaks Artificial Reef Installation. These comments will be included in the Draft Environmental Impact Statement (EIS). Responses to your comments are provided below:

1. A marine community structure assessment has been conducted to assess the marine biology at each of the three proposed drop zones. The site reconnaissance and biological analysis will provide the data necessary to select the most appropriate substrate for the artificial reefs while avoiding existing coral reefs, escarpments, and/or other essential natural habitat features. The marine community structure assessment results will be included in the Draft Environmental Impact Statement (EIS).
2. Each installation of artificial reefs (cleaned vessel and/or engineered structures) will be installed in the best possible manner to withstand storm surf conditions to prevent beak up or shifting. An analysis of storm surf forces on the artificial reefs will be provided to appropriate agencies prior to the artificial reef installation.
3. The recommendation to place the artificial reefs no deeper than 110 feet will be taken into consideration. The selected artificial reef sites will ultimately depend on a number of variables and the proposed project will be modified as necessary to coordinate with agency and public concerns.
4. The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) Manager has provided comments on the EIS preparation notice. Also, the National Marine Fisheries Service (NMFS) Protected Species Coordinator has been contacted

for informal consultation. We look forward to working with NMFS and the HIHWNMS on this project in the near future.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

March 30, 2004
BES Project No.: 03-1267.01

Genevieve Salmonson
Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. Salmonson:

Thank you for your comment dated December 8, 2003 on the proposed Twin Peaks Artificial Reef Installation. Your comment will be incorporated into the Draft Environmental Impact Statement. Responses to the comment is provided below:

1. Cultural resources and practices will be detailed in the Draft EIS. The ocean activites survey includes consultation with knowledgeable community members who live and utilize the project site and nearby shoreline. This survey includes native Hawaiian practices, contemporary cultural practices (fishing, gathering, religious practices, board surfing, body surfing, etc.), and the associated cultural resources (fish, seaweed, sea creatures, surf breaks, names of waves and winds, etc.).

   Knowledge of the cultural resources and practices will allow an assessment of potential impacts, if any, to these activities and propose mitigation measures, if necessary.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

Clyde W. Namu'o
Administrator
State of Hawaii
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Namu'o:

Thank you for your comments dated December 9, 2003 on the proposed Twin Peaks Artificial Reef Installation. Your comments will be included in the Draft Environmental Impact Statement (EIS). Responses to your comments are provided below:

1. Cultural resources and practices will be included in the Draft EIS. The ocean activities survey includes contacting local residents and users of the project site and nearby shoreline to assess potential impacts to cultural resources and practices. As requested, cultural impacts will address impacts, if any, to fish stocks, fishing grounds, potential increase of predator fish, wave dynamics, surfing, swimming, and diving.
2. The three contacts provided and their comments will be incorporated into the Draft EIS along with other members of the Native Hawaiian and local community who have provided information on the cultural recourses and practices in the proposed project site and nearby shoreline.

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc Pua Aiu, State of Hawaii Office of Hawaiian Affairs

March 30, 2004
BES Project No.: 03-1267.01

George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Corps of Engineers
U.S Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Young:

Thank you for your comments dated November 12, 2003 on the proposed Twin Peaks Artificial Reef Installation (USACE File No. 200400048). BEI Environmental Services understands that a Department of the Army (DA) permit is required and plans to submit a DA permit application to the USACE soon after the Draft EIS.

Should you have any questions, please do not hesitate to call.

Sincerely,
BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: William Lennan, U.S. Army Corps of Engineers, Regulatory Branch

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

March 30, 2004
BES Project No.: 03-1267.01

Ms. Gina Shultz
Acting Field Supervisor
United States Department of the Interior
US Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Room 3-122, Box 50088
Honolulu, Hawaii 96850

Subject: **Environmental Impact Statement Preparation Notice Comments**
Twin Peaks Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. Shultz:

Thank you for your comments dated December 10, 2003 (PN-04-22) on the proposed Twin Peaks Artificial Reef Installation. Your comments will be included in the Draft Environmental Impact Statement (EIS). Responses to your comments are provided below:

1. The Draft EIS will clarify and explain the stated purpose of the propose project, citing references as requested.
2. The proposed project will first endeavor to avoid any potential impacts. If it is assessed that the proposed project will cause unavoidable impact to the coral reef ecosystem, inclusive of seagrass beds and/or coral reefs, consultation will be arranged with appropriate resource agencies. The U.S. Army Corps of Engineers Regulatory Guidance Letter (RGL) 02-2 will be reviewed for guidance on mitigation measures, if unavoidable impacts are encountered.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Antonio Bentivoglio, US Fish and Wildlife Service, Marine Specialist

APPENDIX C

APPENDIX C

Coast Guard Requirements for the Disposal of Abandoned Vessels Offshore

COAST GUARD REQUIREMENTS POR THE DISPOSAL OF ABANDONED VESSELS OFFSHORE:

Marine Safety Office Honolulu has been continually queried regarding the standards for sinking vessels for either ocean dumping or for the creation of artificial reefs. Typically, these vessels are small fishing vessels between 85-250 feet in length. They have become financially incapable of continuing in the fishing trade and the owners have insufficient funds to maintain the hull. The high cost of either cutting the vessels into small transportable pieces for land disposal or towing them to scrap yards is not economically feasible. The standards in this document should not be applied to EMERGENCY RESPONSE situations where time is of the essence. Unique vessels or vessels having been in trades other than fishing may use the same listing but evaluation of additional hazards posed may be necessary. 40 CFR Part 229 outlines the federal requirements for the Ocean Dumping of vessels outside of 12 nautical miles under a GENERAL PERMIT. The Environmental Protection Agency (EPA) reviews applications and must concur on proposed ocean disposal outside of 12 nautical miles. In Hawaii, sinkings over 12 nautical miles offshore occur typically in water over thousands of feet deep. Ocean disposal of vessels inside 12 nautical miles is not permitted under the existing GENERAL PERMIT authorized at 40 CFR Part 229. However, artificial reef placement typically within State waters, inside 3 nautical miles, would be authorized separately by a Corps of Engineers Permit.

Disposal according to federal rules must not present unacceptable adverse effects on human health and with no significant damage to the resources of the marine environment or on the marine ecosystem.

1. The following standard is to preclude the dumping of vessels, which may cause unacceptable adverse impacts to the marine environment outside of 12 nautical miles.
    a. Oil must be removed from the vessel. No pools or puddles of oil may remain. Fuel tanks and day tanks should be drained of oil then filled with water. Tanks previously containing heavy oils' which may have a residual, should be evaluated as to whether a substantial threat to the environment exists. Engine crankcases and fuel lines should be drained of oil and filled with water.
    b. Liquid or gaseous chemicals must be removed.
    c. Loose plastics must be removed. Some vessels may have installed insulation around cargo holds. These installations should be evaluated as to whether the insulation poses a significant hazard or may float free during the sinking.
    d. No radioactive material may be present.
    e. All float free material must be removed.
    f. All hemp and synthetic lines must be removed.
2. Prior to and during the sinking greater than 12 nautical miles, the following monitoring must occur:
    a. At least one vessel to remain on scene for two hours after the sinking.
    b. A lookout shall be maintained and collect any debris sighted.
    c. A report should be made to the Marine Safety Office of any sheen sighted.

d. A Global Positioning System (GPS) position report shall be provided to the Marine Safety Of fice and to the National Ocean Survey of the actual sinking location.

3. The following standard is to preclude the placement of a vessel, which may cause unacceptable adverse impacts to the marine environment when part of the artificial reef program.
   a. All the standards for sinking under the GENERAL PERMIT must be complied with.
   b. In addition, closer attention should be paid to chemical contaminants that may pose a significant hazard in shallow waters.
   c. The sunken vessel may not pose a risk to navigation expected in the area.
   d. The location for the vessel sinking shall be designated.
   e. Verification shall be made of the actual location where the vessel lays on the bottom.
4. Prior to and during the placement of the artificial reef vessel, the following monitoring must occur.
   a. At least one vessel to remain on scene for four hours after the sinking.
   b. A lookout shall be maintained and collect any debris sighted.
   c. The vessel should be prepared to clean up any sheen sighted that may impact the environment.
   d. The Coast Guard will require a monitor for these sinkings.
   e. Verification shall be made that the vessel does not pose a navigational threat. A Global Positioning System (GPS) position report shall be provided to the Marine Safety Office and to the National Ocean Survey of the actual sinking location.
5. Notifications to be made during the permitting process:
   a. Preliminary notification at the earliest opportunity of desired activities will greatly improved our ability to assist.
   b. An inspection of the vessel is required prior to disposal to insure compliance with the intent of the rules. Notification ten days prior to sinking is required but a longer lead-time could avoid delays.
   c. Notification shall be made 48 hours in advance of the sinking.
   d. Notification shall be made by phone 12 hours in advance of departure to the Marine Safety Office. The phone number is (808) 522-8260 or (808) 927-0830.

APPENDIX D

APPENDIX D

***"Carthaginian" – Deployment for Artificial Reef, Sinking Plan*, Prepared by Offshore Marine Surveyors and dated April 3, 2004**

Offshore Marine Surveyors

47-149 Iuiu Street
Kaneohe, Hawaii 96744

Serving Hawaii and the Pacific Basin

Ph: (808) 239-9471
Fax: (808) 239-9472
E-mail: wardgraessle@netscape.net

April 3, 2004

Jim Walsh, Gen. Manager
Atlantis Adventures, Inc.
658 Front Street, #175
Lahaina, HI 96761

Invoice No: 0360
Report No: 04-0462

Re: "CARTHAGINIAN" - Deployment for Artificial Reef Sinking Plan

Pursuant to your request for a sinking plan for the vessel "CARTHAGINIAN" in a location off the southwest shore of Maui, I would recommend the following procedures be implemented. It is my understanding that Sea Engineering has provided you with a plan for securing the vessel to the sea bottom once sunk.

1. "CARTHAGINIAN" will be ballasted dockside before deployment with concrete injected into hull compartments as needed until the desired weight for stability is achieved.

2. Prior to deployment day, three anchors are to be set at the site by the Contractor; two from the bow and one from the stern.

3. The anchors will be placed at suitable angles and scope for attachment to the bow and stern of the "CARTHIGINIAN" on deployment day. The anchors will be widely spaced with a great deal of scope and allow for maintaining the bow and stern in proper position and orientation while the hull is flooded and sinks to the bottom.

4. The bitter ends of the anchor lines will be attached to submerged (30') mooring balls for ease of retrieval on deployment day.

5. Prior to departure from Lahaina Harbor, Contractor will attach hoses to pre-determined locations on the "CARTHAGINIAN", connected to a central manifold, for later hook-up to ballast pumps on the support vessel. (see # 8 below)

6. Contractor will tow the "CARTHAGINIAN" to the location on deployment day. Prior to arrival at the location, they will place marker buoys for maintaining the bow and stern of the "CARTHAGINIAN" in her proper location and orientation.

7. Contractor will attach the bitter ends of the anchors to the bow and stem of the "CARTHAGINIAN".

8. Contractor will position a support vessel with 50' of line attached off the stern of the "CARTHAGINIAN", to assist in holding the "CARTHAGINIAN" in proper orientation to the bow anchors and marker buoys.

9. Contractor will supply a minimum of (2) high-capacity sea water pumps, to initiate the flooding of the "CARTHAGINIAN". They will be attached to the hose manifold and tested prior to the soft patches being removed.

10. The "CARTHAGINIAN" will have a total of four (4) soft patches (installed by the Contractor) cut in the hull and deck above the water-line, each at least 3' x 5'.

11. Once the support vessel is in position and the pump is connected and confirmed to be operational, Contractor will remove the soft patches from the outside of the hull and flooding via the pump manifold will commence.

12. The support vessel will be moored, and the hoses hooked up, in a manner to enable easily and quickly disengaging from the "CARTHAGINIAN" when the water line reaches any open soft patch. Once water flow begins in any one of the four patches, the support vessel will disconnect all hoses and lines and clear the area. All hoses and lines will be retrieved from the "CARTHAGINIAN" by the Contractor using divers after deployment to the bottom.

13. The bow and stern anchors will be left in place and re-tensioned within the first week of deployment by the Contractor. They will remain in place until the permanent mooring arrangement has been fully deployed.

14. A representative from Offshore Marine Surveyors will conduct a final inspection of the "CARTHAGINIAN" and be on-site to supervise and assist with the sinking evolution.

If the sinking plan is implemented and carried out using the procedures listed above, the vessel should come to rest on the bottom upright and in the proper orientation. Once on the bottom the mooring proposal put forth by Sea Engineering will ensure that the "CARTHAGINIAN" remains in position even during severe weather conditions.

Survey conducted and reported issued without prejudice.

Ward Graessle
Marine Surveyor

APPENDIX E

APPENDIX E

***Stability Analysis for the Sinking of the Carthaginian*, Prepared by Sea Engineering, Inc. and dated March 2004**

STABILITY ANALYSIS
FOR THE
SINKING OF THE CARTHAGINIAN
LAHAINA, MAUI

Prepared For:
Atlantis Submarines Hawaii
Lahaina, Maui

Prepared By:
Sea Engineering, Inc.
Waimanalo, Hawaii

March 2004

#04-9

INTRODUCTION

Atlantis Submarines Hawaii is proposing to sink a sailing vessel, the Carthaginian, off the southwest cost of Island of Maui in a water depth of 90 feet. The sunken ship will be aligned parallel to the shore and the prevailing tidal currents. Sea Engineering, Inc. was retained by Atlantis to calculate the design wave forces on the ship and to evaluate and select a preferred method for holding the ship in place during the occurrence of design wave conditions. This report presents the results of the study.

WAVE FORCE CALCULATIONS

The ship will be directly exposed to waves approaching from the southwest. Waves approaching from this sector include summertime south swell, Kona storm waves and hurricanes.

Three cases of design wave conditions were used to calculate wave forces on the sunken ship:

Case 1 - Severe Kona storm wave:
This case was based upon the wave conditions that occurred during the January 1980 Kona storm, the worst in the past 25 years. This storm caused extensive flooding, beach erosion and structural damage on Maui.

Case 2 - Model Scenario hurricane

Case 3 - Worst Scenario hurricane in Hawaiian waters

The characteristics of the two scenario hurricanes are defined by Haraguchi (1984) and are based on historical storms in North Pacific Ocean. The two recent hurricanes, Hurricanes Iwa and Iniki, which severely affected in the Hawaiian Islands, fall between the Model Scenario hurricane and the Worst Scenario hurricane. The wave conditions for the scenario hurricanes were characterized by numerical hurricane models and are described in a report by C.L. Bretschineider and Edward K. Noda and Associates, 1985. The deepwater wave conditions for the three cases are summarized in Table 1.

The ship length is 90 feet (plus a 30-foot bowsprit) and the beam is 22 feet. The hull height of the vessel is 13 feet at the stern, 12 feet at the midships and 16 feet at the bow. The vessel has a superstructure and two 70-foot high masts. Each mast has two sections, a 50-foot long, 1.5-foot diameter bottom section and a 20-foot long, 1.0-foot diameter top section.

The wave forces on the sunken vessel were calculated by summing the wave forces on the two masts and on the vessel hull. The wave forces on the masts were calculated by using the methodology of wave force calculation on a cylindrical pile, described in the Shore Protection Manual (1984). The wave forces on the hull were calculated by assuming that the hull is represented by a large rectangular block located on the sea bottom (R.G. Dean and R.A. Dalrymple, 1984). The block size for the sunken vessel is 90 feet long, 20 feet wide and 14 feet high. The weight of the ship used in the calculations was 340 tons for the hull (assumed to be steel) and 35-tons of cement ballast, for a total weight of 375 tons in air (equivalent to 316 tons in seawater).

Once the horizontal and vertical forces were calculated the vessel stability was evaluated for assumed bottom friction coefficients of 1.0 and 0.7. The range of bottom friction coefficients for sand bottoms is from 0.6 to 1.4 (R.A. Grace, 1978). The calculation results are summarized Table 2 for a friction coefficient of 1.0 and in Table 3 for a friction coefficient of 0.7. The turning moments are given in Table 4. The results indicate that the sunken vessel will be stable for a bottom friction coefficient of 1.0 during all selected wave conditions, but it is unstable (sliding) for a bottom friction coefficient of 0.7 during the Worst Scenario hurricane.

Table 1. Deepwater Wave Conditions.

Case	Storm Type	Deepwater Waves		
		Height (ft)	Period (sec.)	Direction
1	Severe Kona storm	17.0	9.0	SW
2	Model Hurricane	36.2	13.3	SW
3	Worst Hurricane	51.8	15.8	SW

Case 1 = Kona storm waves
Case 2 = Scenario Model Hurricane waves for Hawaii
Case 3 = Scenario Worst Hurricane waves for Hawaii.

Table 2. Wave Forces on the vessel for bottom friction coefficient, f = 1.0

Case	Fh (tons)	Fv (tons)	W (tons)	Net Weight W-Fv (tons)	Weight x Friction f(W-Fv) (tons)	Net Resistance F(W-Fv)-Fh (tons)
1	46	46	316	270	270	224
2	98	95	316	221	221	123
3	137	128	316	188	188	51

Table 3. Wave Forces on the vessel for bottom friction coefficient, f = 0.7

Case	Fh (tons)	Fv (tons)	W (tons)	Net Weight W-Fv (tons)	Weight x Friction f(W-Fv) (tons)	Net Resistance F(W-Fv)-Fh (tons)
1	46	46	316	270	189	143
2	98	95	316	221	155	57
3	137	128	316	188	132	-5

Fh = Horizontal wave force
Fv = Vertical wave force
W = Ship weight

Table 4. Turning moment around the bottom of the ship

Case	Turning Moment by Wave (Mh) (tons-ft)	Resisting Turning Moment by Net Weight (Mv) (tons-ft)	Stability Mv –Mh (tons-ft)
1	344	2700	2360
2	820	2210	1390
3	1280	1880	600

Although a hurricane has never directly impacted the site in recorded history, we recommend that hurricanes Iwa and Iniki be used as guidelines. The resultant worst-case forces would therefore fall midway between cases 2 and 3. Since the actual coefficient of friction is not known, we recommend the use of 0.7, a conservative figure. Given these assumptions, the ship would be stable against horizontal movement (net resistance of about 30 tons) during the design condition. Since the force calculations are based upon simplifying assumptions that introduce some uncertainty into the results, we recommend some additional steps be taken to increase stability. Possible options are discussed below. The moment calculations indicate that the ship will be stable against overturning. It should be noted that the moment calculations assume that the ship is laying flat on the bottom after sinking.

POSSIBLE STABILIZATION METHODS

There are four ways to increase the stability of the ship: the addition of extra ballast, Manta Ray anchors, rock bolts or standard anchors and chain.

Additional Ballast

Adding ballast to the ship while it is berthed could be the cheapest method of stabilization. If this is feasible, the naval architect completing the plan of sinking should determine the amount of ballast that could be added.

Manta Ray Anchors

Manta Ray Anchors are typically used on sand, mud or clay bottoms, but some Manta Ray models have also been driven into coral. The anchors are driven into the bottom, typically using a hydraulic jackhammer, and then pulled back slightly to open the flukes and increase the holding power. Several sizes are available, and holding power can exceed 10-tons per anchor. Each anchor could installed at an angle to vertical, and then connected by turnbuckles and chain to the ship. The larger Manta Ray anchors should be driven 12 to 14 feet into the bottom to develop full holding capacity. During our last inspection of the present Atlantis mooring, we probed the sand thickness at the proposed site. The results indicate that the sand thickness varies from 3 to 7 feet, so if this option is chosen, the anchors may have to be driven into hard bottom material.

Rock Bolts

In hard limestone bottoms, rock bolts provide high holding capacity (up to 30 tons per bolt) for an economical price. However, the bolts would be difficult to install at the proposed site due to the overburden of sand. In addition, the quality of the underlying hard material is not known.

Standard Anchors and Chain

The use of standard surplus anchors connected to the ship by chain would be feasible for this location. Standard Navy stockless anchors placed in sand develop four to five times their weight in holding capacity. Anchors could be placed at the site, jetted into the sand and then connected to the ship by chain.

SELECTED ANCHORING METHOD

Atlantis Submarines Hawaii has indicated that the use of Manta Ray anchors would be the preferred stabilization method. The anchors would be driven into the bottom and secured by chain to the ship. We recommend that two Manta Ray anchors be installed at the bow of the ship and two anchors at the stern. This configuration, in addition to increasing stability, will also prevent rotation of the ship during severe storms. All four anchors should be at 90-degree angles to the centerline of the ship.

Either the Manta Ray MR-1 or MR-2 should be used. These anchors are very similar and both are rated for 15,000 to 20,000 pounds of effective holding power (note that the actual holding power is highly dependent upon soil conditions). The MR-1 is designed for installation in soft material and requires a minimum of 12 feet of material to develop full holding power. The MR-2 is similar, but has a smaller bearing area and can be driven into coral bottom material (telephone conversation with Mr. Frank Gibert, the area distributor at 808-845-6467). According to Mr. Gibert, the MR-2 anchors have been driven into the Lahaina Roadstead in similar bottom conditions to those at the proposed site.

As mentioned above, our preliminary survey indicated that the thickness of the sand overburden at the site ranged from 3 to 7 feet. After the ship is on the bottom, the sand thickness where the anchors will be located should be probed. If 12-feet of sand can be found, the MR-1 can be used; if not, the MR-2 is the recommended option. The recommended installation depth for the MR-2 is also 12-feet. The anchors are typically driven into the bottom with a 90-pound hydraulic jackhammer. Required time to drive a MR-2 anchor to full embedment depth may be 60 to 90 minutes, so diver bottom time is a factor that must be considered.

REFERENCES

Bretschineider, C.L. and Edward K. Noda and Associates, 1985. *Hurricane Vulnerability Study for Honolulu, Hawaii, and Vicinity, Vol 2, Determination of Coastal Inundation Limits for Southern Oahu from Barbers Point to Koko Head*, Prepared for U.S. Army Engineer Div., Pacific Ocean Planning Branchm Flood Plains Management Section, Fort Shafter, Hawaii.

Coastal Engineering Research Center, Department of the Army, 1984. *Shore Protection Manual.*

Dean, R.G. and Dalrymple R.A., 1984. *Water Wave Mechanics for Engineers and Scientists*, Prentice-Hall, Inc. New Jersey.

Grace, R.A., 1978. *Marine Outfall Systems, Planning, Design, and Construction*, Prentice-Hall, Inc., New Jersey.

Haraguchi, Paul, 1984. *Hurricanes in Hawaii*, Prepared for and published by Pacific Ocean Div., Corps of Engineers.

APPENDIX F

APPENDIX F

Atlantis Hawaii Operations Manual

1.0 OVERVIEW

1.1 INTRODUCTION

This section "Overview" briefly describes the operation of the Submersible and surface support vessels.

The Submersible was designed by Atlantis Submarines International Inc. in Vancouver, British Columbia, Canada and built in Everett, Washington, U.S.A. by Atlantis Submarines Hawaii Inc. The Submersible is designed and built specifically to carry passengers. It carries a crew of three, 48 passengers (M48) and 64 passengers (M64) to depths of up to 150 feet on one hour subsea tours.

1.2 DESCRIPTION OF TYPICAL OPERATION

The site's operation involves a tourist submersible(s), support vessels, and shore facilities for the purpose of carrying passengers (tourists) on subsea sightseeing tours.

Before the submersible is scheduled to depart the maintenance facility, the crew arrives and carries out pre-dive procedures. There are pre-dive (equipment) checklists for the Submersible, all surface vessels and support boats which must be completed by the appropriate personnel and reviewed by the Senior Pilot prior to the start of the day's diving activity.

The Submersible departs the dock before dive time and proceeds to the dive site where it remains for the rest of the day's operation. The dive site may change from day to day, or even during the day depending on the currents and weather.

Passengers are taken by a Tender Vessel from the dock to the Submersible, and back to the dock. The passengers on the Submersible disembark to the Tender Vessel and the new passengers are transferred to the Submersible.

The Tender Vessel stands by at the dive site until all the passengers are in the Submersible and the hatches are closed. The vessel then proceeds to the dock to return the passengers from the previous dive to shore and to stand-by for the boarding of the next group of passengers.

The Submersible dives and runs a 45 to 50 minute tour depending on passenger transfer times. Timing is critical in order to maintain the schedule. The tour is run in a circular route so as to terminate where it began.

During the dive the Surface Officer, through experience and U.W.T. communication, tracks the submersible's progress through its predetermined course and keeps the dive area clear of other surface traffic. The Surface Vessel is skippered by the Surface Officer, who is in charge of the dive. He maintains communications with the Submersible and the Tender Vessel at all times so as to be able to respond to any problems or emergencies. The Surface Officer gives the Submersible the final clearances "cleared to dive" and "cleared to surface".

At the end of the tour, the Submersible is given clearance to surface by the Surface Officer and the Tender Vessel is standing by on site with another load of passengers ready to repeat the sequence.

After diving is secured for the day and the last passengers have disembarked, the Submersible returns to the dock for the post dive check. All required maintenance is performed at night, the Submersible's batteries are put on charge and the air banks are filled in preparation for the next day's operation.

In the event that two Submersibles are operating at the same dive site, refer to Appendix V. In the event that three Submersibles are operating at the same dive site, refer to Appendix VI.

3.0 OPERATING REGULATIONS

3.1 INTRODUCTION

The Operating Regulations identified within this section must be adhered to for good operating practise and for overall safety of the Submersible operation.

3.2 OPERATING RULES

Observance of the following rules increases the overall safety during a Submersible operation.

1) UWT/VHF

Voice contact must be established at least every 15 minutes between the Surface Vessel and Submersible and is to be initiated by the Surface Officer.

2) LOGS

All logs must be kept fully up to date by relevant personnel. All original Pre-Dive Logs must remain onshore and are not to be carried on board the Submersible or Surface Vessel.

3) DESIGNATION

Necessary signals on the Surface Vessel are to be shown at all times. These should be consistent with THE INTERNATIONAL REGULATIONS for preventing collisions at Sea (1972) and THE INTERNATIONAL CODE OF SIGNALS (1969).

4) COLLISION

If collision is anticipated due to non-recognition of signals or any other reason, the Surface Vessel (Surface Officer) must take action as is necessary to avoid collision, at the same time ordering the Submersible whether to surface, not to surface, or what evasive action may be required.

5) UNAUTHORIZED VESSEL

If another vessel approaches despite signals, it should be warned by all possible means including:-

- Whistle
- Search Lights
- VHF
- Flares
- Foghorn/Siren

6) LOCAL AUTHORITIES

The local authorities (Port Authority, Coast Guard, etc.) are to be informed of the activities of the Submersible and Support Vessels.

Refer to Appendix IV for a description and chart of approved dive site.

Any new dive site must be approved by the local OCMI prior to conducting passenger carrying operations.

Any changes to a previously approved dive site must be approved by the local OCMI.

7) SITE SURVEYS

After each major storm or violent act of nature (e.g. earthquake, tidal wave) which may alter the nature of the sea-bed at the dive site it will be necessary to survey the dive site prior to conducting passenger dives. The site will be surveyed using the submarine and divers as required to ensure that no entanglement or entrapment hazards have developed on the site. The submarine should remain well clear of the bottom while conducting the survey to avoid the possibility of becoming entangled or entrapped on new hazards on the site. Any and all hazards are to be removed from the dive site prior to commencement of the days diving activities.

8) A minimum of two certified scuba divers, other than the crew required for navigation of the surface tender vessel, are to be immediately available in the event of an emergency.

3.3 OPERATING RESTRICTIONS

Observation of the following restrictions ensures that operations are carried out within accepted safety limitations.

1) AREA LIMITATIONS

The water depth at no time is to exceed the submersible's maximum Certified Operating Depth of 150 feet.

2) The Senior Pilot will monitor the NOAA weather channel on the radio each day, prior to departing for the dive site. Any significant weather patterns must be reported to the Operations Manager.

The Senior Pilot is responsible for monitoring any changes in weather patterns throughout the day by monitoring local weather channels, Coast Guard information notices and by using their own observations.

3) SEA CONDITION

The Submersible is not to be operated in sea states greater than Sea State 3. (Wind 14 knots - average waves 2.0 - 2.9 feet).

(Reference Appendix III as defined by ABS.)

4) CURRENTS

The Submersible is not to be operated if surface or subsea currents exceed 1.5 knots.

5) SUBSEA VISIBILITY

The Submersible is not to be operated if the subsea visibility is less than 30 feet.

6) WEATHER CONDITIONS

The Submersible is not to be operated if the surface visibility is less than one nautical mile, or if the visibility is likely to reduce to less than one nautical mile during operations.

7) COMMUNICATIONS

The submersible's UWT and VHF must be capable of operation during operations.

8) SURFACE TRAFFIC

Due consideration is to be taken of other vessels operating in the area. Where possible, local vessel operators should be informed of the submersible's activities, both surfaced and submerged.

9) SPEED

The maximum speed of the Submersible underwater is to be within its visibility limitations such that a full stop can be accomplished within 70% of the visual distance.

10) MINIMUM SYSTEM CHARGES FOR A NORMAL OPERATIONAL DIVE

For a normal passenger dive the submersible is required to have on board minimum quantities of system charges or supplies. These minimum quantities ensure the ability to conduct a normal dive operation and in the event of an emergency ensures adequate charges and supplies are on board to meet the operational design criteria of the emergency systems

The minimum amount of oxygen that must be carried in the reserve bank is based on ABS regulations that require one cubic foot of oxygen per person per hour for 24 hours for the certified rating of the submersible. The actual number of oxygen cylinders installed in the reserve bank is optional, some examples are listed in the following chart.

NOTE: The minimum quantities listed are for **one single dive and not for an operational day of diving.**

(Ref. Chart on Minimum System Charges)

11) MINIMUM QUANTITIES OF EMERGENCY SUPPLIES

(Ref. Chart on Minimum Quantity of Emergency Supplies)

12) SYSTEM FAULTS RESULTING IN CANCELLING OR ABORTING DIVES

The following list of system faults, which if they occur during a dive, will necessitate aborting of a dive.

- Loss of 240 VDC main power supply
- Loss of 24 VDC main power supply
- Loss of 24 VDC communications battery
- Loss of emergency power supply
- Electrical ground fault leakages
  - 240 VDC in excess of 24 VDC
  - 24 VDC in excess of 13 VDC
- Battery amp hour meter reading less than that required for 24 hour life support
- Loss of both H2 monitors
- Loss of both O2 monitors
- H2 monitoring system readings greater than 40% L.E.L. on either monitor
- Inability to maintain O2 monitoring system reading between 20% and 22%
- Loss of both vertical thrusters
- Loss of both stem thrusters
- Loss of scrubber fan
- Loss of air conditioning
- Loss of underwater communications
- Any and all fires
- Any hull, penetrator or viewport leakages
- Loss of high pressure air in one or both banks
- Loss of low pressure air
- Inability to control cabin pressure
- Loss or discharging Halon 1301 charge, or hand-held fire extinguishers
- Any internal (Freon) leakages from air conditioning unit
- Loss of O2 (pressure) in either the operating or emergency bank
- Flooding of water ballast tanks
- Internal leakage in air system
- Internal leakage in oxygen system
- Damage or equipment failure to air ballast system
- Loss of steering control
- Loss of both water ballast pumps.

In addition, while not cause to abort a dive, the following will prevent starting a dive until the situation is corrected.

- Loss of battery amp hour meter and volt meter
- Loss of analog depth gauges
- Loss of one vertical thruster
- Loss of bow thruster
- Loss of one stern thruster
- Loss of one O2 monitor
- Loss of one H2 monitor

NOTE: The annunciator panel must be activated during all diving operations. All alarm functions must remain operational during a dive.

13) AUTHORIZATION

The Senior Pilot gives the final authorization to commence the day's operation after reviewing the appropriate day's logs and maintenance records for all vessels, ensuring vessels have been properly maintained, charged and checked.

Authorization to dive (open vents) can only be issued by the Surface Officer after he closes the hatches, clears the deck, receives confirmation from the Pilot that the hatches are closed and

dogged and after both Surface and Tender Vessels have departed the Submersible.

Pilot must request and receive from the Co-Pilot and Attendant the confirmation "hatch secure" prior to starting Submersible dive procedure.

Pilot must request surfacing clearance authorization from the Surface Officer prior to surfacing (excluding emergency ascent situations).

Authorization to open the hatches must be given by the Surface Officer after he visually ensures Submersible's freeboard and stability.

Co-Pilot and Attendant open hatches after receiving authorization from the Pilot.

14) The sub must not be given clearance to surface:

a) When there is uninformed boat/ship within 200 yards of the surfacing area.

b) When there is a boat/ship travelling in such a way that it will be within 200 yards of the sub by the time it surfaces.

c) When the sub may drift within 200 yards of a boat/ship/object during its ascent. i.e., because of currents, winds, accidental operation of stern thrusters, or headway due to bow-up attitude during surfacing.

d) When the Surface Officer does not have visuals on the sub.

e) When the sub is not in position to surface (proper heading and location should be achieved before clearance is given).

(1) "Material Safety Data Sheets" - contains data sheets on all hazardous materials and substances encountered at an operational site.

2.0 BUILDER

Atlantis IX was designed by Atlantis Submarines International Inc., 55 West 8th Avenue, Vancouver, British Columbia, Canada and built by Atlantis Submarines Hawaii, Inc. in Everett, Washington, U.S.A.

3.0 CLASSIFICATION

Atlantis IX was designed and built in accordance with the American Bureau of Shipping rules and regulations contained in their "Guidelines for the Classification of Manned Submersibles, 1990 and is classed as "A1 - Submersible" and approved by the United States Coast Guard.

4.0 PURPOSE

Atlantis IX was designed and built to carry 48 passengers plus 3 crew members to a depth of up to 150 feet of sea water for the purpose of conducting subsea sightseeing tours.

5.0 ATLANTIS SERIES 2 - SPECIFICATIONS

PASSENGER CAPACITY		48
LENGTH OVERALL		65 feet
BEAM		13 feet
HEIGHT - with conning tower		17.5 feet
DRAFT - Surfaced		8 feet
CERTIFIED DEPTH		150 feet
SPEED		2.5 knots
FORWARD VIEWPORT	Quantity	1
	Type	Spherical Sector with square edges
	OD	53.12 inches
	Thickness	2.5 inches
SIDE VIEWPORTS	Quantity	26
	Type	Flat disc
	OD	25.5 inches
	Thickness	3.25 inches
BATTERY CAPACITY	240 VDC Main	1,280 A/H @ 6 hour rate
	24 VDC Main Control	560 A/H @ 6 hour rate
	24 VDC Emergency	100 A/H @ 20 hour rate
	24 VDC Communications	240 A/H @ 6 hour rate
HIGH PRESSURE AIR	Pressure	2,700 psi
EMERGENCY LIFE SUPPORT		1,224 Man-hours (24 Hours x 51 People)
CLASSIFICATION	American Bureau of Shipping	Class A1 Submersible
	United States Coast Guard	

APPENDIX G

APPENDIX G

Hawaii Ocean Safety Team (H.O.S.T) Letter Regarding Submarine Operating Sites

Dear Ocean User:

Welcome to this Coast Guard designated Submarine Operation area. We encourage the use of this site for your activities.

A submarine operating site has several unique considerations, for the safety and convenience of all concerned, the Hawaii Ocean Safety Team (H.O.S.T) has worked with the various users of these sites, including diving operators, boating groups, Atlantis Submarines, and Voyager Submarines, to develop this information card. Please take the time make yourself familiar with it's contents.

1. Submarines like Voyager and Atlantis rely on their ability to surface immediately in the event of a malfunction or other urgency. For this reason, they have several policies and procedures in place which are meant to discourage boats from operating overhead of their submerged submarines. For your safety, the submarine crew may offer advice or instructions while you are operating in this area.
2. The submarines are relatively slow moving underwater. Despite this slow speed, they are very heavy, and their propellers are deceivingly powerful. If your operation involves scuba diving please keep your divers well clear of the submarine. If possible, remain within the view of the submarine's operators. The thruster wash or unexpected surfacing of the submarine could result in an uncontrolled diver's ascent.
3. Anchors and chains can be a serious hazard to submarines and to vessels and divers attached to them, and therefore, both submarine operators prefer the you use the moorings that are provided. Be aware though the even with the mooring, the site can accommodate only certain traffic levels. By tying up your vessel when the site is already fully occupied, you may be creating an unsafe situation.

All submarine operations have a surface boat. This boat serves as the "Control Tower" of the operation. It can be identified from a distance by the blue and white alpha flag that it flies during submarine operations. This vessel can be approached through radio, telephone, or hand signals, and the "Surface Officer" on board will be happy to answer any questions that you might have regarding the above 3 items, or any other issues such as weather and current reports. The call signs, frequencies and telephone numbers are listed on the reverse of this card.

Both company's surface vessels carry multiple radios, have the support of multiple vessels, and have significant shore side facilities, and therefore make excellent emergency contacts in any situation.

If you have any questions at all please contact the numbers listed on the card, or call the USCG Marine Safety Office at (808) 522-8260

Happy Boating!

Sincerely,

H.O.S.T

APPENDIX H

APPENDIX H

***Water Quality and Marine Biological Baseline Surveys and Impact Analysis*,**
Prepared by Oceanic Institute and dated April 2004

Oceanic Institute
CENTER FOR APPLIED AQUACULTURE AND MARINE BIOTECHNOLOGY

April 9, 2004

Jim Hayes
BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Dear Mr. Hayes:

Subject: Twin Peaks Artificial Reef Installation, Lahaina, Island of Maui

The Oceanic Institute is please to submit our final report presenting the results of our water quality and marine biological surveys and impact assessment for the above project. In summary, we do not expect any significant negative impacts to water quality or biological communities in the Twin Peaks site; rather, we expect the proposed artificial reefs will enhance local fish communities by providing structure and shelter in an otherwise relatively flat and featureless bottom.

If you have any questions or require further information, please contact me.

Sincerely,

David A. Ziemann, Ph.D.

Enclosure: Final Report

Makapuu Point 41-202 Kalanianaole Highway, Waimanalo, Hawaii 96795 • Phone (808) 259-7951 • Fax (808)259-5971

Twin Peaks Artificial Reef Installation, Lahaina, Island of Maui

Water Quality and Marine Biological Baseline Surveys and Impact Analysis

Prepared for:
BEI Environmental Services
311 B Pacific Street
Honolulu, Hawaii 96817

Prepared by:

David A. Ziemann, Ph.D.
Lytha D. Conquest
Oceanic Institute
41-202 Kalanianaole Highway
Waimanalo, Hawaii 96795

April 2004

Twin Peaks Artificial Reef Installation, Lahaina, Island of Maui

Water Quality and Marine Biological Baseline Surveys and Impact Analysis

Introduction:

Atlantis Submarines Hawaii, LLC proposes to install an artificial reef offshore of Puamana Beach Park, Maui, Hawaii. The plan is to sink a vessel and/or engineered artificial reef structures to create an artificial reef to provide additional viewing opportunities for Atlantis submarine visitors, other commercial operations, and the general public. The project site is an area known as Twin Peaks, located on the southern coast of Maui, approximately 0.5 miles southwest of Puamana Beach Park, south of Lahaina (Figure 1). The proposed Twin Peaks artificial reef installation area covers approximately 337 acres (14,684,375 square feet) and depth range from 72 to 168 feet. There are three (3) proposed artificial reef installation drop zones within the project site: the primary site at a bottom depth of approximately 90 - 100 feet, and two sites in close proximity at bottom depths of 135 – 155 feet. Each drop zone will utilize approximately 5,000 square feet of sea floor for installation of an artificial reef. Upon approval, Atlantis Submarines plans to first sink a vessel at the primary drop zone. As funds become available, Atlantis Submarines plans to develop the other artificial reef installation areas through the use of engineered reef structures and/or other appropriately cleaned vessels.

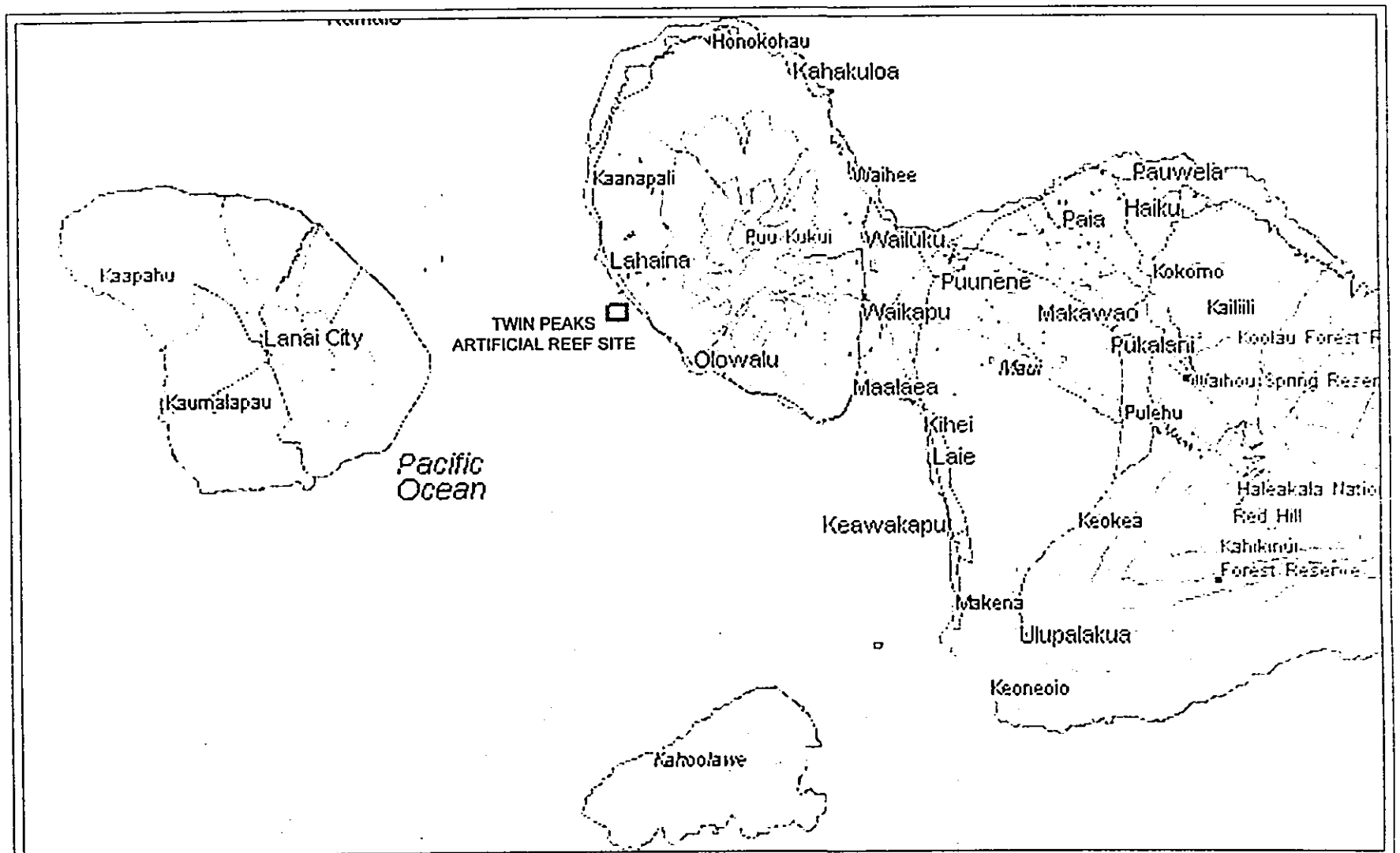
An Environmental Impact Statement is being prepared to assess the potential for significant impacts of the artificial reef zone designation and subsequent proposed ship sinking and artificial reef construction.

This report presents the results of baseline water quality and marine biological surveys conducted in and adjacent the Twin Peaks artificial reef site, and addresses the potential for impacts to water quality, marine biological communities and natural marine resources as a result of the proposed activities. Specific concerns focus on the potential for changes to water quality conditions, and direct or indirect impacts on marine biological communities or natural resources which may result from the artificial reef placement.

Methods:

Water Quality Surveys

Water quality conditions along Hawaiian coastlines are influenced by a range of factors, including tidal exchange with oceanic waters, surface discharge from surrounding lands during heavy rainfall events, and continuous discharge of nutrient-laden groundwater. While the placement of artificial reef structures may not directly affect water quality, the potential impacts of artificial reef structures to biological communities will depend to some extent on the water quality conditions, particularly dissolved nutrient levels, in the area of placement. In order to generally characterize the water quality conditions of the proposed artificial reef site, water quality surveys were conducted at the Twin Peaks site on January 13 and January 23, 2004.



The Oceanic Institute Makapuu Point Waimanalo, Hawaii 96795	TWIN PEAKS ARTIFICIAL REEF INSTALLATION LOCATION OF STUDY SITE	Figure 1

During the survey, water samples were collected at six stations located at 100, 200, 500, 1000, 1500 and 2000 m from the shoreline along 3 offshore transect lines (Figure 2). Sampling along Transects A and B was conducted on January 13; sampling along Transect C was conducted on January 28. For all stations, three samples were collected: one just below the surface, one 0.5 m above the bottom to a maximum depth of 25 m, and one mid-way between surface and bottom to a maximum depth of 10 m. Due to shallow water depths and high surf, samples were not collected at the 100 m stations for Transects A and B.

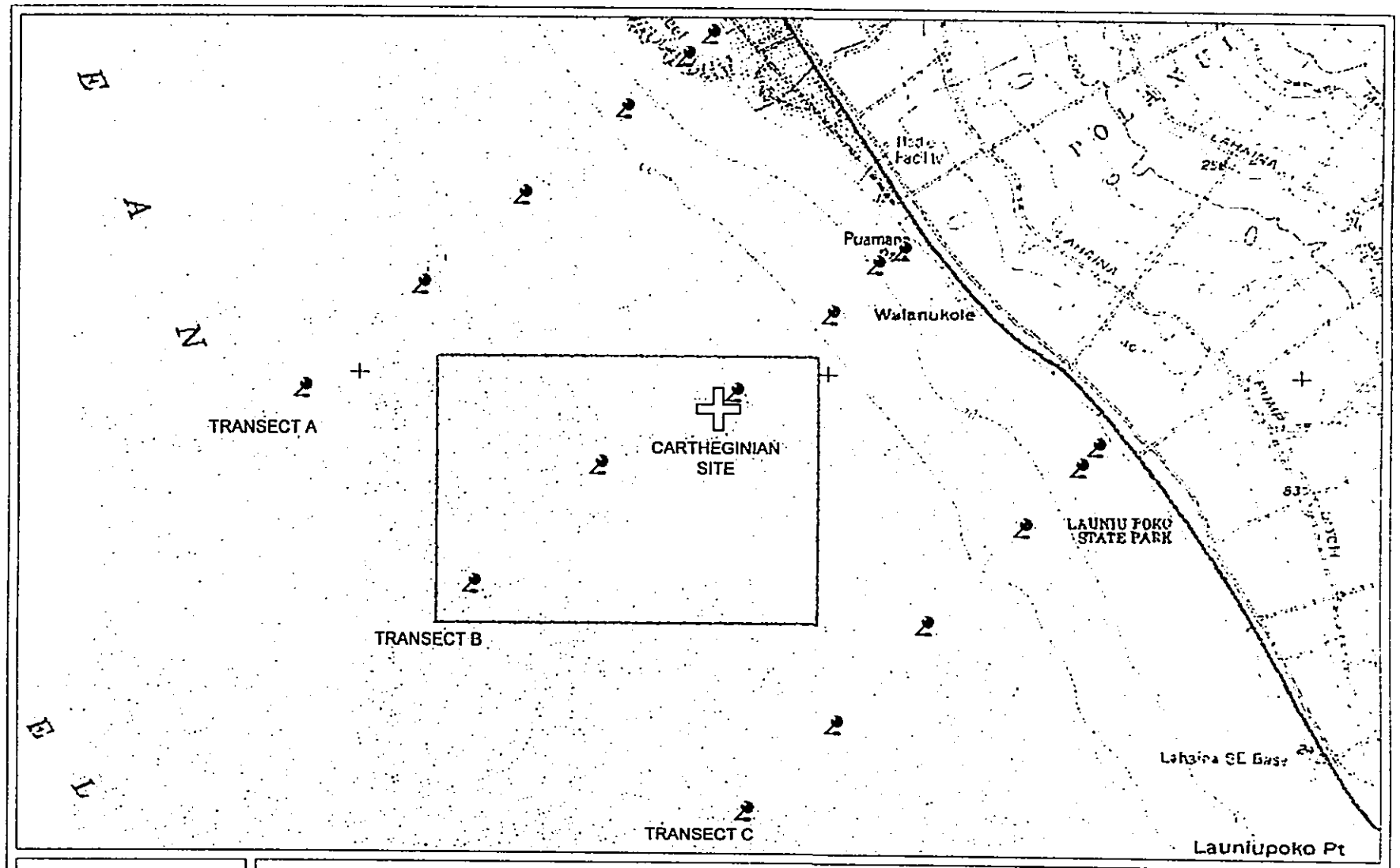
At each station, water samples were collected with a Niskin bottle which was triggered to collect a sample at the desired depth. Measurements of pH, temperature, dissolved oxygen and turbidity were made immediately after collection with a portable pH probe, a temperature/DO sensor and a portable turbidity meter (Table 1). Upon retrieval, water samples were placed in 1 liter polyethylene bottles and held on ice for shipment to the analytical lab. Upon receipt at the lab, subsamples of each sample were filtered for determination of total suspended solids and chlorophyll. The filtrate was analyzed for total dissolved nitrogen (TDN) and phosphate (TDP), nitrate + nitrite-nitrogen (NO3-N), ammonia-nitrogen (NH4-N), reactive phosphate (PO4-P) and silicate. Unfiltered subsamples were analyzed for salinity.

Marine Biological Survey

Marine benthic and fish communities may be directly impacted by the placement of the sunken ship or other artificial reef structures at the proposed drop zones. Direct impacts may be negative in the destruction of existing habitat, or positive in the installation or construction of new habitat. Indirect impacts may arise from the new habitat provided by the artificial reefs, and associated changes in community structure. To assess the magnitude of these potential impacts, marine biological surveys were conducted at the Twin Peaks site on January 13, 28 and 29, 2004.

The marine biological surveys consisted of quantitative transects at four stations at and adjacent the primary drop zone: one station at the drop zone (MB3), one station located approximately 500 m inshore of the drop zone (MB1), and stations located approximately 500 m to either side of the drop zone parallel to the coastline (MB2, MB4). Two additional potential artificial reef sites (stations MB5 and MB6) in deeper water (140-150 feet) were also surveyed (Figure 3). At each site, a quantitative survey of fish community composition and species abundance was conducted along a 50 m transect oriented parallel to the depth contours. During the survey, the diver identified, counted and estimated sizes of all fish seen within a 5 m-wide corridor centered along the transect line.

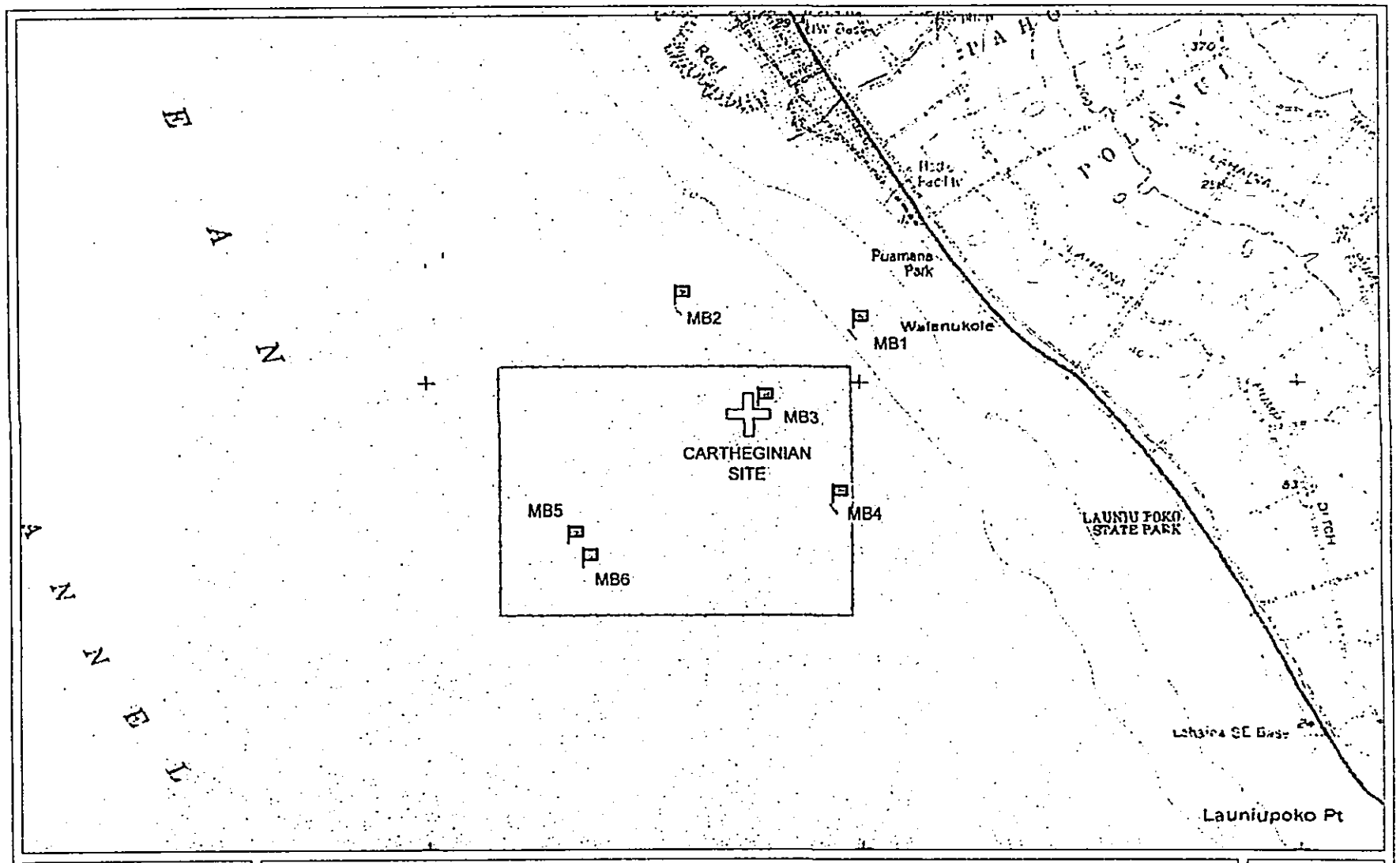
The fish survey was followed by a benthic photo-quadrat survey to characterize bottom type and composition, benthic community structure and distribution. Substrate coverage was estimated by the point-intersect method. A 1.0 m x 0.6 m quadrat frame was placed at ten randomly-selected points along the 50 m survey line. A photograph of each quadrat placement was taken with an underwater camera fitted with a wide-angle lens. After being developed, each quadrat photo was overlain with a transparent sheet ruled with a 10 x 20 grid of lines. The substrate type under each of the 200 grid line intersections was identified and recorded. Nonliving substrate was classified as rock (limestone or basalt, if recognizable as such), rubble (primarily coral rubble), boulders, rocks and sand.



The Oceanic Institute Makapuu Point Waimanalo, Hawaii 96795	TWIN PEAKS ARTIFICIAL REEF INSTALLATION LOCATION OF WATER QUALITY SURVEY STATIONS	Figure 2

Table 1. Water quality parameters examined during the study, and analytical method.

WATER QUALITY PARAMETER	COLLECTION AND ANALYSIS METHOD
Temperature	YSI portable dissolved oxygen/temperature meter
Dissolved Oxygen	YSI portable dissolved oxygen/temperature meter
pH	Oakton pH Testr 3+ portable pH meter
Turbidity	Hach 2100P turbidimeter; Standard Methods, 1986
Salinity	Laboratory salinometer
Water Samples:	5-liter Niskin bottles
Nutrients	Technicon AutoAnalyzer II;
Total nitrogen	D'Elia et al., 1977
NH_4	Solorzano, 1969
NO_3/NO_2	Technicon Inc., 1977
Total Phosphorus	Grasshoff et al., 1983
Orthophosphate	*Murphy and Riley, 1962*
Silicate	Strickland and Parsons, 1972
Chlorophyll	Filtration, acetone extraction,Turner Designs fluorometer; Strickland and Parsons, 1972
Total Suspended Solids	Filtration, Cahn electrobalance, Standard Methods, 1986



The Oceanic Institute Makapuu Point Waimanalo, Hawaii 96795	TWIN PEAKS ARTIFICIAL REEF INSTALLATION LOCATION OF BIOLOGICAL SURVEY STATIONS	Figure 3

Individual organisms >2 mm in size occurring within the quadrats were identified and counted. Living stony corals were identified to species. Dead coral heads were identified to species where possible. Colonial zoanthids and octocorals were recorded by the percent areal coverage of the colony rather than the number of individuals. Over sand bottoms, macroalgae were recorded by the percent areal coverage of the plants.

For fish populations the species diversity was calculated using Shannon's Index (Ludwig and Reynolds, 1988) of:

$$H' = -\sum_{i=1}^{n} (n_i/n \; ln \; n_i/n)$$

where n_i = the number of individual in the i^{th} species and n = the total number of individuals on the transect.

Results:

Water Quality

The results of water quality surveys conducted at the Twin Peaks artificial reef site on January 13 and 28, 2004 are presented in Table 2. Levels of temperature, salinity, dissolved oxygen and pH were generally uniform over the survey area and with values typical of coastal Hawaiian waters. Turbidity levels averaged 0.43 NTU, were generally low (less than 0.2 NTU) at offshore stations, but showed elevated levels at stations 100, 200 and 500 m from shore. Chlorophyll concentrations averaged 0.18 ug/l, with elevated concentrations only at the 100 and 200 m stations.

Salinity averaged 34.62 ppt, and showed very little evidence of lower values near the shoreline due to freshwater input by either surface discharge or groundwater outflow. Silicate concentrations were elevated at the 100 m station at Transect C and the 200 m stations at all three Transects, however, indicating some groundwater influx along that reach of coastline. Nitrate+nitrite concentrations were also elevated at these inshore stations, but little differences in phosphate concentrations were seen. Ammonia was at levels below the limit of detection (1.0 ug/l) for all samples. Total dissolved nitrogen and total dissolved phosphorus concentrations showed no consistent patterns related to terrestrial nutrient input.

Numerical criteria for selected water quality parameters established by the State of Hawaii Chapter 54 water quality standards are presented in Table 2. Numerical criteria presented are for "Dry Open Coast" waters, the classification into which the Twin Peaks waters fit. Geometric means were calculated for all listed water quality parameters for comparison to the numerical criteria. The geometric means for turbidity, chlorophyll, nitrate+nitrite-N, total dissolved nitrogen and total dissolved phosphorus for water quality samples collected in the Twin Peaks area exceeded their respective water quality standards numerical criterion.

Table 2. Results of water quality analyses of samples collected in the area of the proposed Twin Peaks artificial reef site, Lahaina, Maui. Station locations are shown in Figure 2. Surveys along transects AMA and AMB were conducted on January 13, 2004; the survey along transect AMC was conducted on January 28, 2004. Samples could not be collected at stations AMA-1 and AMB-1 due to surf and shallow water depth. "nd" means the concentration was below the limit of detection (1.0 ug/l for ammonia-N). "na" means no analysis was performed due to instrument malfunction.

Station	Depth (m)	Temperature (Degree C)	Salinity (ppt)	Dissolved Oxygen (mg/l)	pH (units)	Turbidity (NTU)	Total Suspended Solids (mg/l)	Chlorophyll (ug/l)	Ammonia-N (ug/l)	NO3+NO2-N (ug/l)	Total Dissolved Nitrogen (ug/l)	PO4-P (ug/l)	Total Dissolved Phosphorus (ug/l)	Silicate (ug/l)
AMA 2	0	25.6	34.64	6.16	7.68	0.63	33.0	0.21	nd	10.9	279.2	45.3	53.1	45.6
AMA 2	4	25.6	34.64	6.26	7.71	1.38	8.6	0.30	nd	12.3	275.3	44.6	48.6	33.7
AMA 2	8	25.6	34.41	6.25	7.71	4.62	42.9	1.00	nd	18.4	231.2	46.7	49.1	82.7
AMA 3	0	25.8	34.64	6.09	8.06	0.41	61.2	0.18	nd	11.8	215.1	44.5	48.0	22.4
AMA 3	6	25.5	34.65	6.27	8.19	0.59	58.3	0.22	nd	10.4	411.7	44.8	48.1	22.4
AMA 3	12	25.5	34.65	6.23	8.25	2.08	35.3	0.37	nd	10.2	380.8	44.6	47.5	22.4
AMA 4	0	25.5	34.65	6.28	8.05	0.21	101.0	0.15	nd	9.2	370.0	44.3	48.3	22.4
AMA 4	10	25.4	34.65	6.28	8.01	0.18	49.5	0.18	nd	10.8	383.7	44.3	48.1	33.6
AMA 4	25	25.7	34.66	6.06	7.77	0.19	75.6	0.21	nd	10.9	382.3	44.8	50.4	22.4
AMA 5	0	25.7	34.63	6.27	7.93	0.19	77.4	0.15	nd	10.7	421.4	44.3	48.2	22.4
AMA 5	10	25.5	34.65	6.33	7.96	0.19	47.7	0.16	nd	10.4	229.0	44.0	51.0	22.4
AMA 5	25	25.7	34.74	6.29	8.00	0.20	32.7	0.21	nd	10.8	346.3	44.5	49.2	22.4
AMA 6	0	25.7	34.65	6.25	8.00	0.23	101.5	0.15	nd	11.0	377.3	45.0	48.1	22.4
AMA 6	10	25.6	34.65	6.38	8.08	0.20	96.6	0.16	nd	10.5	361.8	44.0	48.5	40.2
AMA 6	25	25.6	34.67	6.32	8.16	0.20	35.5	0.16	nd	10.9	346.8	44.3	49.7	22.4
AMB 2	0	25.9	34.59	6.26	7.65	4.82	80.6	0.37	nd	20.8	355.3	46.5	52.0	109.5
AMB 2	4	25.7	34.61	6.43	7.71	4.20	38.7	0.51	nd	17.9	260.9	45.9	51.2	87.6
AMB 2	8	25.6	34.63	6.33	7.74	3.08	29.8	0.47	nd	14.6	232.1	45.6	49.0	72.4
AMB 3	0	26.2	34.63	6.41	7.84	0.56	28.1	0.16	nd	11.7	369.6	45.1	48.6	33.7
AMB 3	7	25.7	34.65	6.37	7.87	0.92	31.1	0.20	nd	11.3	208.0	45.4	49.1	22.4
AMB 3	14	25.7	34.65	6.30	7.80	3.89	73.9	0.54	nd	12.7	249.3	45.6	50.0	22.4
AMB 4	0	26.2	34.64	5.94	7.57	0.29	45.4	0.14	nd	11.1	203.0	44.6	52.2	22.4
AMB 4	10	25.6	34.62	6.44	7.93	0.17	115.5	0.09	nd	10.4	136.9	44.6	52.5	22.4
AMB 4	25	25.7	34.68	6.38	7.91	0.41	65.2	0.17	nd	11.1	253.5	44.8	50.4	22.4
AMB 5	0	26.1	34.66	6.27	7.94	0.15	21.3	0.11	nd	10.6	258.9	45.0	51.2	22.4
AMB 5	10	25.6	34.66	6.40	7.96	0.17	33.8	0.09	nd	10.8	231.3	45.1	49.6	22.4
AMB 5	25	25.7	34.67	6.42	7.94	0.17	22.8	0.12	nd	11.4	251.7	46.3	53.6	22.4
AMB 6	0	26.1	34.67	6.33	7.92	0.15	31.8	0.09	nd	11.1	212.6	44.8	54.3	22.4
AMB 6	10	25.6	34.56	6.37	8.02	0.21	12.9	0.09	nd	10.6	225.0	44.6	53.3	42.8
AMB 6	25	25.6	34.68	6.39	8.03	0.17	34.5	0.12	nd	10.9	206.8	44.6	48.4	22.4

Table 2. Results of water quality analyses of samples collected in the area of the proposed Twin Peaks artificial reef site, Lahaina, Maui. Station locations are shown in Figure 2. Surveys along transects AMA and AMB were conducted on January 13, 2004; the survey along transect AMC was conducted on January 28, 2004. Samples could not be collected at stations AMA-1 and AMB-1 due to surf and shallow water depth. "nd" means the concentration was below the limit of detection (1.0 ug/l for ammonia-N). "na" means no analysis was performed due to instrument malfunction.

Station	Depth (m)	Temperature (Degree C)	Salinity (ppt)	Dissolved Oxygen (mg/l)	pH (units)	Turbidity (NTU)	Total Suspended Solids (mg/l)	Chlorophyll (ug/l)	Ammonia-N (ug/l)	NO3+NO2-N (ug/l)	Total Dissolved Nitrogen (ug/l)	PO4-P (ug/l)	Total Dissolved Phosphorus (ug/l)	Silicate (ug/l)
AMC 1	0	25.8	34.68	6.32	na	1.31	76.7	0.22	nd	20.8	220.7	25.0	48.4	81.1
AMC 1	1	25.7	34.67	6.38	na	2.61	60.0	0.36	nd	22.8	212.8	24.3	49.1	89.2
AMC 1	2	25.8	34.64	6.28	na	4.66	82.0	0.75	nd	30.3	226.9	24.8	48.0	137.9
AMC 2	0	25.8	34.68	6.47	na	0.62	59.8	0.20	nd	21.6	210.3	24.2	47.6	56.3
AMC 2	2	25.8	34.69	6.49	na	1.12	35.5	0.22	nd	23.2	215.9	24.2	49.8	62.9
AMC 2	4	25.8	34.68	6.49	na	0.84	60.4	0.23	nd	23.4	559.5	23.9	49.1	63.3
AMC 3	0	25.9	34.59	6.53	na	0.20	58.4	0.09	nd	19.5	270.6	23.6	48.0	22.4
AMC 3	7	25.7	34.63	6.48	na	0.27	39.2	0.12	nd	19.6	205.9	23.3	49.1	22.4
AMC 3	14	25.7	34.67	6.47	na	0.38	43.6	0.14	nd	19.7	260.9	23.6	49.5	44.9
AMC 4	0	26.3	34.56	6.23	na	0.13	53.3	0.10	nd	20.4	267.2	23.7	48.0	22.4
AMC 4	10	25.8	34.58	6.52	na	0.42	58.7	0.11	nd	12.5	197.8	23.4	46.1	22.4
AMC 4	25	25.9	34.65	6.52	na	0.23	71.5	0.17	nd	13.3	203.0	24.0	48.7	22.4
AMC 5	0	25.9	34.57	6.48	na	0.12	72.4	0.08	nd	13.1	268.8	23.9	48.0	22.4
AMC 5	10	25.7	34.60	6.52	na	0.33	51.5	0.11	nd	13.1	200.1	23.7	49.1	22.4
AMC 5	25	25.9	33.75	6.50	na	0.20	78.3	0.16	nd	12.9	264.8	24.2	45.8	34.9
AMC 6	0	26.1	34.56	6.52	na	0.12	52.7	0.09	nd	13.2	248.9	23.9	48.0	58.0
AMC 6	10	25.9	34.60	6.50	na	0.16	45.0	0.12	nd	13.3	199.9	24.0	48.4	22.4
AMC 6	25	26.2	34.66	6.43	na	0.20	74.2	0.13	nd	13.4	262.3	23.6	49.5	22.4
Geometric Mean		25.8	34.62	6.35	7.91	0.43	48.26	0.18	<1.0	13.6	264.1	35.5	49.4	32.7
WQS Dry Open Coast		24.5 - 26.5 note 1	>32.0 note 2	>5.30 note 3	7.6 - 8.6 note 4	0.20	--	0.15	2.5	3.5	110.0	--	16.0	--

note 1: Temperature shall not vary more than 1 degree C from ambient
note 2: Salinity shall not vary more than 10% from natural
note 3: Dissolved Oxygen shall be not less than 75% saturation, as a function of temperature and salinity; saturation at ambient T and S = 7.07 mg/l
note 4: pH shall not deviate more than 0.5 units from a value of 8.1; minimum of 7.0 in coastal waters affected by terrestrial input

Benthic Communities

The results of quantitative photo-quadrat benthic community surveys conducted at the Twin Peaks artificial reef site on January 13 - 29, 2004 are presented in Table 3. Pictures of typical bottom types at each station are presented in Appendix A.

The bottom at stations MB1, MB2 and MB3 was composed of a sand/mud mix which supported extensive growths (approximately 30% cover) of *Halimeda opuntia*, a calcareous green seaweed (Appendix A, Plates 1 – 3). The remaining bottom consisted of scattered barren small rocks or rock outcrops. No living corals were seen along the transect lines. However, occasional small rock outcrops were seen scattered within the *Halimeda* beds at stations MB1 – 3. These outcrops supported hard corals (primarily *Porites lobata* and *Pocillopora meandrina*) and associated reef fish species (Plate 4).

The bottom at station MB4 consisted of a mix of sand, rock and coral rubble, with scattered heads of dead hard corals *Porites lobata* and *P. compressa*. The northern end of the transect line just entered the extensive *Halimeda* bed in which stations MB1 – 3 were located.

Bottom topography at stations MB5 and MB6 consisted of a broad limestone bench at depths of 130 – 140 feet (Plates 5 and 7), broad, sand-covered plains at 155 feet (Plates 6 and 8), and a narrow slope transitioning between the two areas. The bottom at station MB5 consisted of approximately 37% rock, 28% sand, 11% rubble, 11% dead *Porites lobata* and 2.5% dead *P. compressa*. Live heads of *P. lobata* and *P. compressa* covered 9.8% and 4.6% of the bottom, respectively. The bottom at MB6 consisted primarily of sand (42.6%) at the deeper end of the transect and rock (42.6%) at the shallower end. Rubble (8.1%), dead *Porites lobata* (2.8%) and dead *P. compressa* (3.9%) constituted the remainder of the bottom. No living corals were seen along the MB6 transect.

Fish Communities

The results of quantitative fish community surveys conducted at the Twin Peaks artificial reef site on January 13 - 29, 2004 are presented in Table 4. Quantitative counts and estimates of diversity and biomass for each transect are presented in Appendix B.

Very few fish were seen along the transects at stations MB1 – 3, within the extensive *Halimeda* beds. At MB1 and MB2, only individuals of Randall's puffer (*Tetraodontis randallii*) were seen. At MB3, only a pair of Randall's puffers were seen in the *Halimeda* beds. The transect line came very near a small hard coral reef (similar to that shown in Plate 4), at which a large number of Domino damselfish (*Dascyllus albisella*) and Pennant butterflyfish (*Heniochus diphreutes*), were seen.

The complex bottom at MB4 harbored the greatest number of individuals seen during the surveys. Most abundant were the wrasses *Pseudocheilinus evanidus*, *Oxycheilinus bimaculatus* and *Stenojulis balteata*. Goatfish (*Parupeneus multifasciatus*), Fisher's angelfish (*Centropyge fisheri*), and the Domino damselfish (*Dascyllus albisella*) were frequently seen. Surgeonfishes

Table 3. Percent bottom cover for bottom types, hard coral and macroalgae along 50 m transects at six locations within the Twin Peaks artificial reef permit zone. Surveys were conducted on January 13, 28 and 29, 2004. Transect locations are shown in Figure 3.

Station	Sand	Rubble	Rock	dead *Porites lobata*	dead *P. compressa*	*P. lobata*	*P. compressa*	*Ralfsia*	*Halimeda*
MB1	68.8%	0.0%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	27.4%
MB2	60.0%	0.0%	10.9%	0.0%	0.0%	0.0%	0.0%	0.0%	29.1%
MB3	67.3%	0.0%	2.2%	0.1%	0.1%	0.0%	0.0%	0.0%	30.5%
MB4	36.5%	15.5%	27.7%	13.7%	4.5%	0.0%	0.0%	0.4%	1.9%
MB5	28.0%	7.0%	36.8%	11.4%	2.5%	9.8%	4.6%	0.0%	0.0%
MB6	42.6%	8.1%	42.6%	2.8%	3.9%	0.0%	0.0%	0.0%	0.0%
Overall Mean	**50.5%**	**5.1%**	**20.7%**	**4.7%**	**1.8%**	**1.6%**	**0.8%**	**0.1%**	**14.8%**

Table 4. Abundance, number of species, diversity index and total biomass of fish observed along 50 m transects at six locations within the Twin Peaks artificial reef permit zone. Surveys were conducted on January 13, 28 and 29, 2004. Transect locations are shown in Figure 3. Species arranged by total abundance.

Species	MB1	MB2	MB3	MB4	MB5	MB6	Total
Dascyllus albisella			65	8	4		77
Pseudocheilinus evanidus				15	5		20
Chromis hanui					6	5	11
Parupeneus multifasciatus				11	2		13
Centropyge fisheri				8	4		12
Chaetodon kleini				2	4	4	10
Heniochus diphreutes			10				10
Oxycheilinus bimaculatus				8	1		9
Acanthurus olivaceus				4	4		8
Chromis agilis					8		8
Stenojulis balteata				7			7
Sufflamen bursa					4	2	6
Canthigaster jactator					2	3	5
Tetraodontis randallii	2	1	2				5
Pseudojuloides cerasinus			5				5
Paracirrhites arcatus				4			4
Centropyge potteri					3	1	4
Acanthurus nigrofuscus					2	2	4
Scarus sp.						3	3
Alphareus furca						2	2
Bodianus bilunulatus					1	1	2
Labroides phthirophagus					2		2
Naso hexacanthus				2			2
Acanthurus xanthopterus			1		1		2
Xanthichthys mento					1	1	2
Cephalopholis argus					1		1
Pseudocheilinus octotaenia						1	1
Sufflamen fraenatus			1				1
Ostracion meleagris				1			1
Seriola dumerili					1		1
Balistes fuscus					1		1
Amanpses rubrocaudata					1		1
Total number	2	1	84	70	58	25	240
Number of species	1	1	6	11	21	11	
Diversity	0.00	0.00	0.81	2.19	2.82	2.25	
Biomass (g/m2)	2.49	1.25	60.13	79.24	174.66	32.88	

(*Acanthurus olivaceus* and *Naso hexacanthus*) and butterflyfish (*Chaetodon kleini*) were also seen.

A large number of fish species were observed along the transect at station MB5, primarily along the section within the hard bottom region at 140 foot depth (Plate 5).A total of 21 species were seen along this transect, the most abundant being the damselfishes (*Dascyllus albisella*, *Chromis agilis* and *Chromis hanui*). Five species of wrasses (Labridae), three species of surgeonfishes (Acanthuridae) and three species of filefishes (Balistidae) were seen.

Fewer fish were seen along the transect at MB6 compared to MB5. A total of 25 individuals of 11 species were seen, with the butterflyfish *Chaetodon kleini* and the damselfish *Chromis hanui* being most abundant.

Discussion:

Water Quality

Water quality conditions along Hawaiian coastlines are influenced by a range of factors, including tidal exchange with oceanic waters, surface discharge from surrounding lands during heavy rainfall events, and continuous discharge of nutrient-laden groundwater. While the placement of artificial reef structures may not directly affect water quality, the potential impacts of artificial reef structures to biological communities will depend to some extent on the water quality conditions, particularly dissolved nutrient levels, in the area of placement.

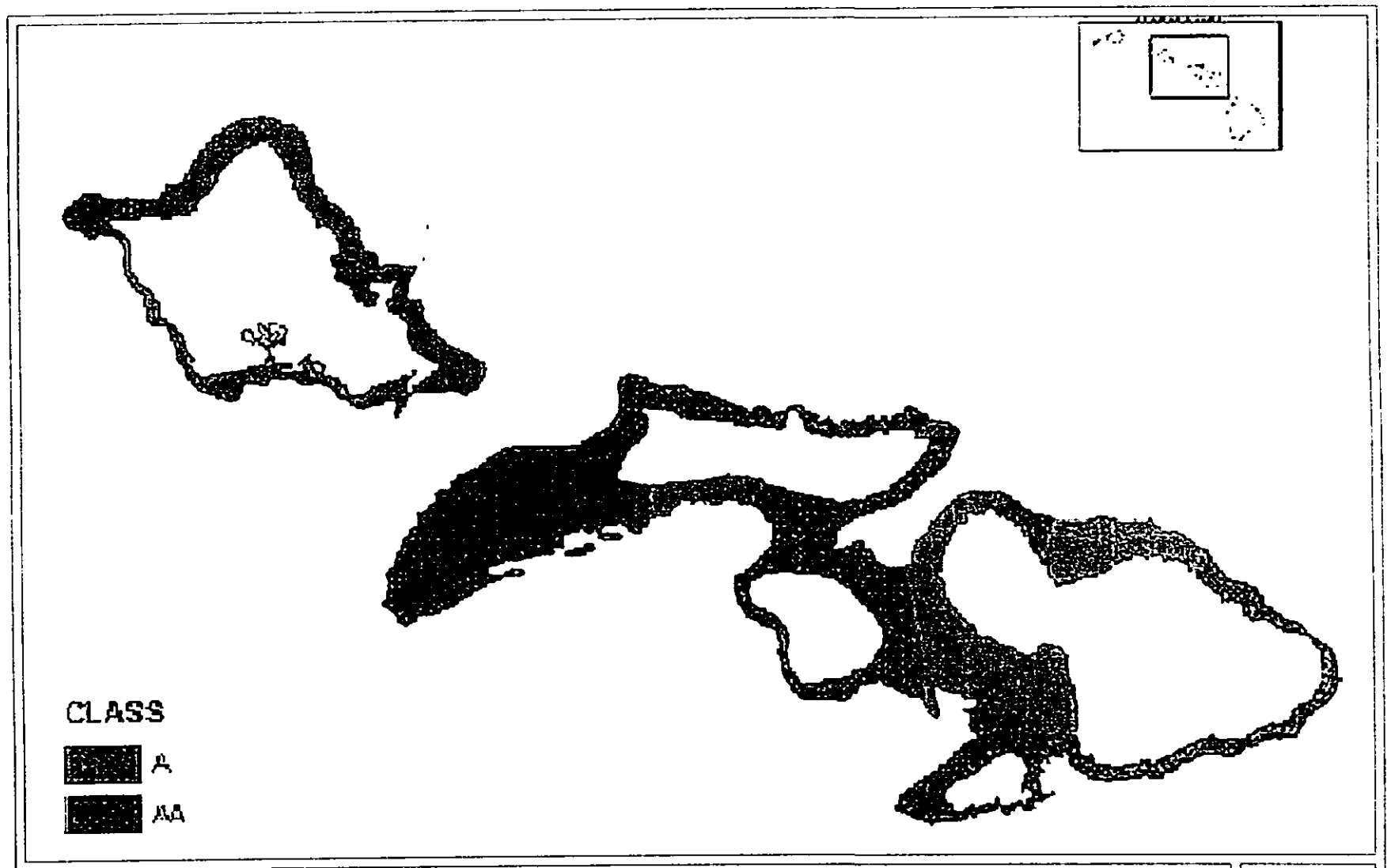
The state of Hawaii has established both basic and specific criteria for marine water quality (Appendix C).

§11-54-04 Basic water quality criteria applicable to all waters.
(a) All waters shall be free of substances attributable to domestic, industrial, or other controllable sources of pollutants, including:

(1) Materials that will settle to form objectionable sludge or bottom deposits;
(2) Floating debris, oil, grease, scum, or other floating materials;
(3) Substances in amounts sufficient to produce taste in the water or detectable off-flavor in the flesh of fish, or in amounts sufficient to produce objectionable color, turbidity or other conditions in the receiving waters;
(4) High or low temperatures; biocides; pathogenic organisms; toxic, radioactive, corrosive, or other deleterious substances at levels or in combinations sufficient to be toxic or harmful to human, animal, plant, or aquatic life, or in amounts sufficient to interfere with any beneficial use of the water;
(5) Substances or conditions or combinations thereof in concentrations which produce undesirable aquatic life;
(6) Soil particles resulting from erosion on land involved in earthwork, such as the construction of public works; highways; subdivisions; recreational, commercial, or industrial developments; or the cultivation and management of agricultural lands.

Water quality surveys conducted in the Twin Peaks region found no evidence of any substances which would not be in compliance with the above basic water quality criteria.

The Twin Peaks site lies within Class A waters, as delineated in Chapter 54 (Figure 4). Use objectives and allowable uses for Class A waters have been established.



The Oceanic Institute Makapuu Point Waimanalo, Hawaii 96795	TWIN PEAKS ARTIFICIAL REEF INSTALLATION STATE WATER QUALITY CLASSIFICATION AREAS	Figure 4

(2) Class A.
It is the objective of class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class.

The planned placement of artificial reefs within the Twin Peaks site will not result in any condition which is not compatible with the objectives and allowable uses of Class A waters.

Physical water quality characteristics (temperature, salinity, dissolved oxygen, pH) of the coastal waters within and adjacent the Twin Peaks artificial reef site were in compliance with the numerical criteria set by the Chapter 54 water quality standards (Appendix C) (Other water quality parameters for which numerical criteria have been established were not in compliance, however (Table 2). Levels of turbidity, chlorophyll, nitrate+nitrite-N, total dissolved nitrogen, and total dissolved phosphorus all exceeded their respective numerical criteria.

While the concentrations of water quality parameters in this survey exceeded the water quality standard numerical criteria, they were typical of levels observed in similar surveys around the island of Maui and the other main Hawaiian Islands. Geometric means for water quality parameters from other surveys conducted within the Hawaiian Islands are presented in Table 5. Water quality conditions at the Twin Peaks site are similar in many respects to that at other sites on Maui and other of the main Hawaiian Islands. For all studies cited, turbidity and chlorophyll levels were generally similar and all exceeded the applicable numerical criteria. All sites except Paia, on the northern coast of East Maui, had ammonia-N levels lower than the numerical criteria. Levels of nitrate+nitrite-N were most variable, with the Twin Peaks and Paia sites showing the highest levels, sites off Kihei and Hokulia showing intermediate levels, and Kaunakakai showing low levels. Levels of total dissolved nitrogen and total dissolved phosphorus were highest at the Twin Peaks site and lower and generally uniform at all other study sites. The differences in the levels of dissolved nutrients and particulate material between areas of the island of Maui most likely reflect differences in coastal and upslope land uses. Ammonia levels may be high offshore of areas that utilize septic tanks or cesspools for waste disposal, or offshore of ā wastewater treatment plant with injection well disposal. Groundwater in areas of commercial agriculture often contains elevated levels of nitrate+nitrite-N and phosphorus from the application of fertilizers.

Benthic Communities

Bottom communities in the northeastern portion of the Twin Peaks site are predominantly soft bottom communities dominated by extensive beads of *Halimeda*. Water depths within this area range from 80 – 120 feet. Further to the southwest, the bottom changes to a generally flat and featureless limestone bench with scattered patches of sand, coral rubble, and dead and living coral heads. This bench extends to depths of 135 – 150 feet, where the bottom drops along a pronounced slope to a generally sandy plain at depths of 150 feet and greater.

Table 5. Comparison of geometric means for water quality parameters as determined in selected surveys around Maui and the main Hawaiian Islands. WQS are the state water quality standards numerical criteria for dry open coastal waters.

Survey	Location	Turbidity (NTU)	Chlorophyll (ug/l)	Ammonia-N (ug/l)	Nitrate-N (ug/l)	TDN (ug/l)	TDP (ug/l)
WQS		0.20	0.15	2.5	3.5	110	16
OI, 2004	Twin Peaks, Maui	0.43	0.18	<1.0	13.6	264	50
OIC, 1992	Kihei, Maui	0.20	0.26	0.9	8.7	127	15
OIC, 1992	Kaunakakai, Molokai	0.35	0.18	1.4	1.3	126	17
OIC 1993	Paia, Maui	0.60	0.53	8.4	17.0	154	17
AECOS 2003	Hokulia, Hawaii	0.29	0.25	2.0	8.5	148	12

The placement of the ship proposed for the northeastern corner of the Twin peaks site would have little direct effect on bottom communities of the area. The footprint of the ship will be approximately 40 x 10 m (120 x 30 feet), or 400 square meters. The *Halimeda* bed within which the ship would be placed was not mapped during the present surveys. The bed extended from the end of the transect at MB4 to well past the end of the transect at MB2, a distance of approximately 2 km in the along-shore direction, and from inshore of MB1 to offshore of MB3, a distance of 0.5 km. At a minimum, then, the *Halimeda* bed covers an area of 2.0 x 0.5 km, or 1,000,000 square meters. The area directly impacted by the ship footprint would constitute at most 0.04% of the *Halimeda* area.

The bottom communities within the Twin Peaks artificial reef site do not fall within any of the Chapter 54 reef community classes:

§11-54-07 Uses and specific criteria applicable to marine bottom types.
(e) Reef flats and reef communities.

(1) As used in this section:
"Nearshore reef flats" means shallow platforms of reef rock, rubble, and sand extending from the shoreline. Smaller, younger flats projected out as semicircular aprons while older, larger flats form wide continuous platforms. Associated animals are mollusks, echinoderms, worms, crustaceans (many living beneath the surface), and reef-building corals.
"Offshore reef flats" means shallow, submerged platforms of reef rock and sand between depths of zero to three meters (zero to ten feet) which are separated from the shoreline of high volcanic islands by lagoons or ocean expanses. Dominant organisms are bottom-dwelling algae. Biological composition is extremely variable. There are three types: patch, barrier, and atoll reef flats; quite different from one another structurally. The presence of heavier wave action, water more oceanic in character, and the relative absence of terrigenous influences distinguish offshore reef flats.
"Protected reef communities" means hard bottom aggregations, including scattered sand channels and patches, dominated by living coral thickets, mounds, or platforms. They are found at depths of ten to thirty meters (thirty-two to ninety-six feet) along protected leeward coasts or in shallow water (up to sea level) in sheltered lagoons behind atoll or barrier reefs and in the calm reaches of bays or coves.
"Wave-exposed reef communities" means aggregations, including scattered sand channels and patches, dominated by corals. They may be found at depths up to forty meters (approximately one hundred thirty feet) along coasts subject to continuous or heavy wave action and surge. Wave-exposed reef communities are dominated biologically by benthic algae, reef-building corals, and echinoderms.

Rather, they seem to most appropriately be classified as soft bottom communities:

(f) Soft bottom communities.

(1) As used in this section:
"Soft bottom communities" means poorly described and "patchy" communities, mostly of burrowing organisms, living in deposits at depths between two to forty meters (approximately six to one hundred thirty feet). The particle size of sediment, depth below sea level, and degree of water movement and associated sediment turnover dictate the composition of animals which rework the bottom with burrows, trails, tracks, ripples, hummocks, and depressions.
(2) Water areas to be protected:
Class II - All soft bottom communities;

While only specific criteria setting limits on oxidation-reduction potential of the soft bottom sediment are set forth, it would seem appropriate that these bottom communities be protected in the same general way as the more visible reef communities:

> (3) Specific criteria to be applied to all reef flats and reef communities: No action shall be undertaken which would substantially risk damage, impairment, or alteration of the biological characteristics of the areas named herein. When a determination of substantial risk is made by the director, the action shall be declared to be contrary to the public interest and no other permits shall be issued pursuant to chapter 342, HRS.

The planned placement of artificial reefs within the Twin Peaks site will not result in any actions which would not comply with the specific criteria for reef communities.

Fish Communities

Fish are highly mobile and would not be directly impacted by the placement of artificial reef structure within the Twin Peaks site. In other areas of the Hawaiian Islands, the placement of ships and other artificial substrate has resulted in the aggregation of small to large numbers of fish around the new structure. The placement of the ship and potentially other artificial reef structure at the Twin Peaks site could be expected to result in the same fish aggregation as seen elsewhere.

Since many of the reef fish species in Hawaii exhibit vertical zonation, i.e., are distributed within well-defined depth zones, the fish communities at the Twin Peaks site artificial reefs would be expected to harbor species typical of deeper reef areas, rather than the abundant, small and colorful species typically seen on shallow reefs. Aggregations of reef fish were observed at scattered patch reefs on or near the quantitative transects conducted during the marine community surveys. The relatively high numbers and numbers of species observed suggest that recruitment to the new structure will result in fish communities more-or-less typical of deeper Hawaiian reefs.

Summary

In summary, we do not expect any significant negative impacts to water quality or biological communities in the Twin Peaks site; rather, we expect the proposed artificial reefs will enhance local fish communities by providing structure and shelter in an otherwise relatively flat and featureless bottom.

REFERENCES

Aecos Laboratory of Hawaii. 2003. Hokulia Resort Comprehensive Monitoring Program, August 2003 Monitoring Report. Prepared for Circuit Court of the Third Circuit, Kealakekua. 34 pp.

American Public Health Association. 1992. Standard Methods for the Examination of Water and Wastewater. Washington, D. C. 1193 pp.

D'Elia, C. F., P. A. Steudler and N. Corwin. 1977. Determination of total nitrogen in aqueous samples using persulfate digestion. Limnol. Oceanogr. 22: 760-764.

Grasshoff, K., M. Ehrhardt and K. Kremling, eds. 1983. Methods of Seawater Analysis. Verlag Chemie, Weinheim. 419 pp.

OI Consultants. 1992. Kihei Gateway Marine Environmental Assessment. Prepared for R. M. Sato & Associates, Honolulu. 20 pp. + tables and figures.

OI Consultants. 1992. Kaunakakai Drainage Master Plan Water Quality and Marine Biological Studies; Impact Analysis. Prepared for Wilson Okamoto & Assoc., Honolulu. Two separately numbered parts.

OI Consultants. 1993. Paia/Makana Subdivision Drainage Impact Study. Prepared for Gentry Hawaii, Ltd., Honolulu. 34 pp.

Murphy, J. and J. P. Riley. 1962. A modified simple solution method for the determination of phosphate in natural waters. Anal. chim. Acta 27: 31-36.

Sea Engineering, Inc. 2000. Modifications for Barbers Point Harbor: Evaluation of Turbidity and Jetty Construction. Prepared for Parsons Brinckerhoff, Honolulu. Individually-numbered sections.

Solorzano, L. 1969. Determination of ammonia in natural waters by the phenolhypochlorite method. Limnol. Oceanogr. 14: 799-801.

Strickland, J. D. F and T. R. Parsons. 1972. A Practical Handbook of Seawater Analysis. Bull. Fish. Res. Bd. Canada 167. 311 pp.

Technicon Inc. 1977. Nitrate and nitrite in water and seawater. Technicon, Inc. Industrial Method No. 158, f/w/a.

APPENDIX A

Plates of Typical Bottom Types at Quantitative Biological Survey Transect Stations within the Twin Peaks Artificial Reef Site

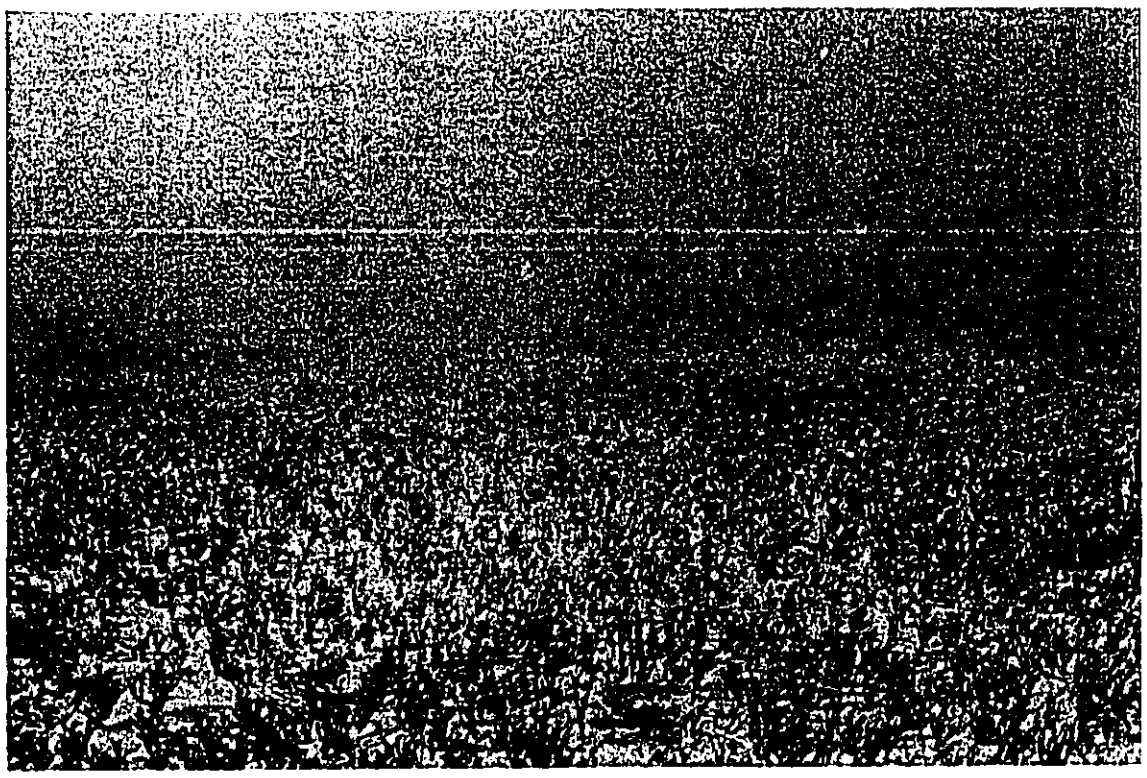


Plate 1. Typical sand / *Halimeda* bottom at Twin Peaks station MB1.

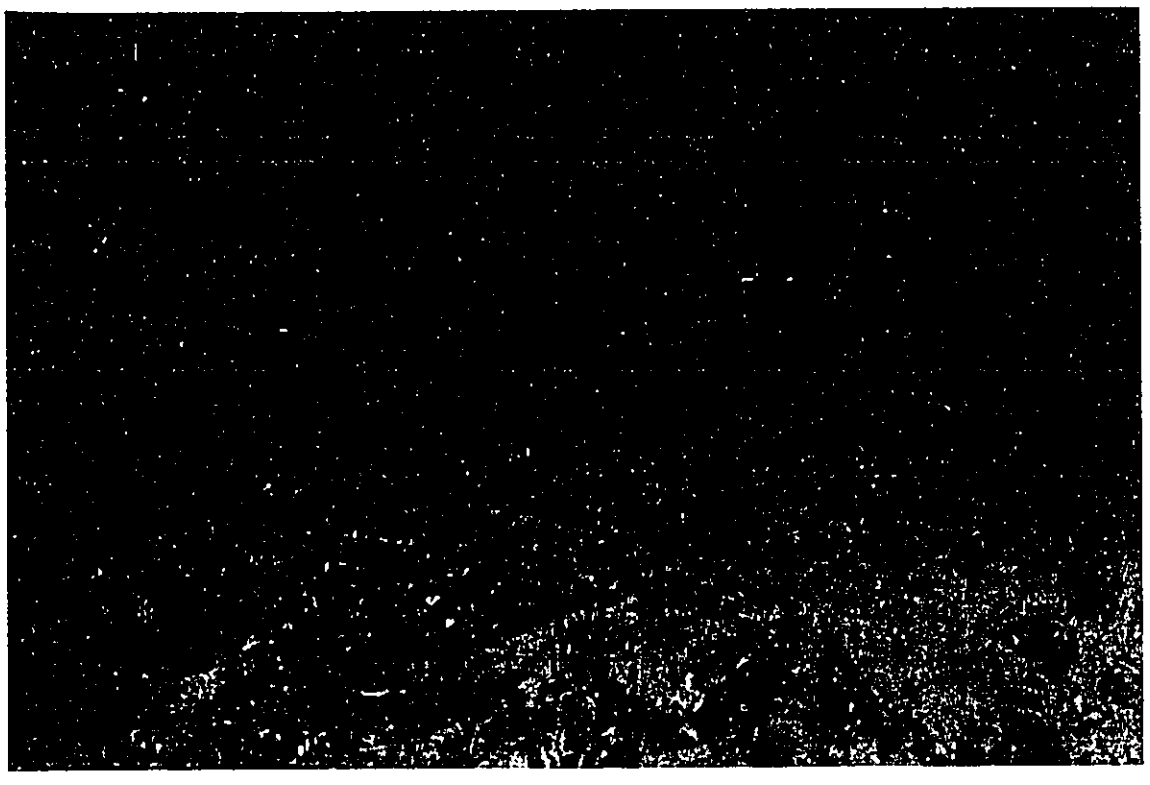


Plate 2. Typical sand / *Halimeda* bottom at Twin Peaks station MB2.

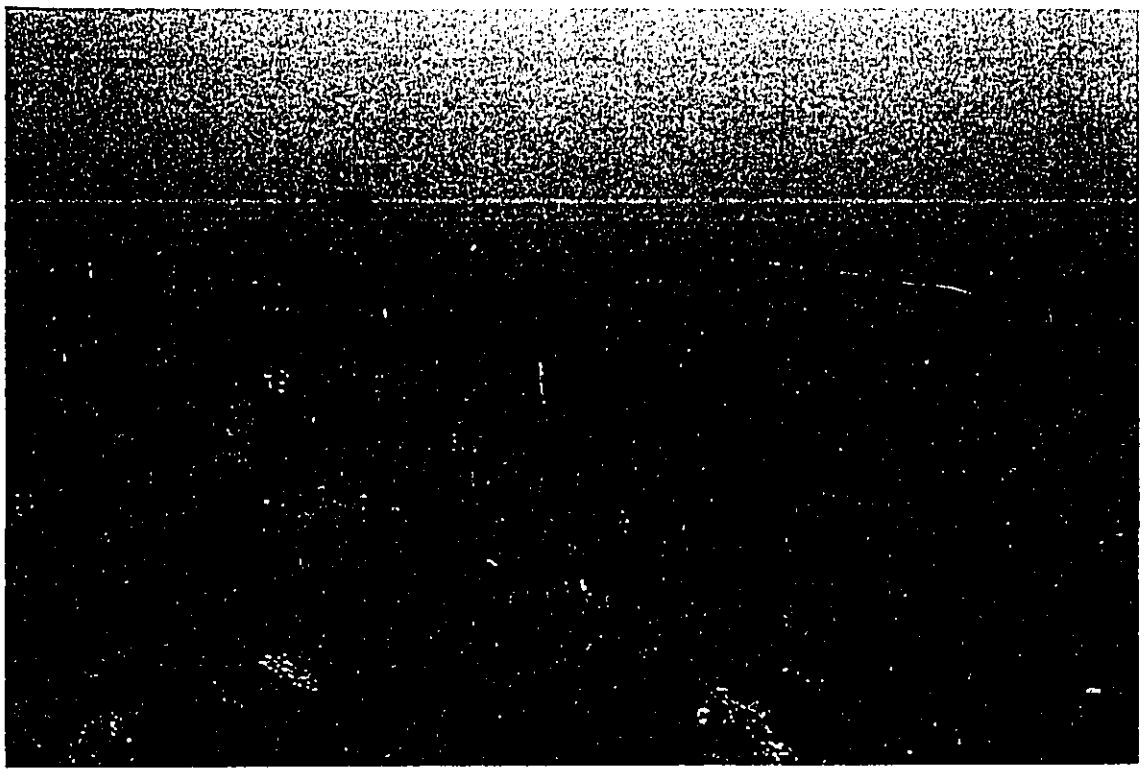


Plate 3. Typical sand / *Halimeda* bottom at Twin Peaks station MB3.

Plate 4. Hard coral patch reef near Twin Peaks station MB3.

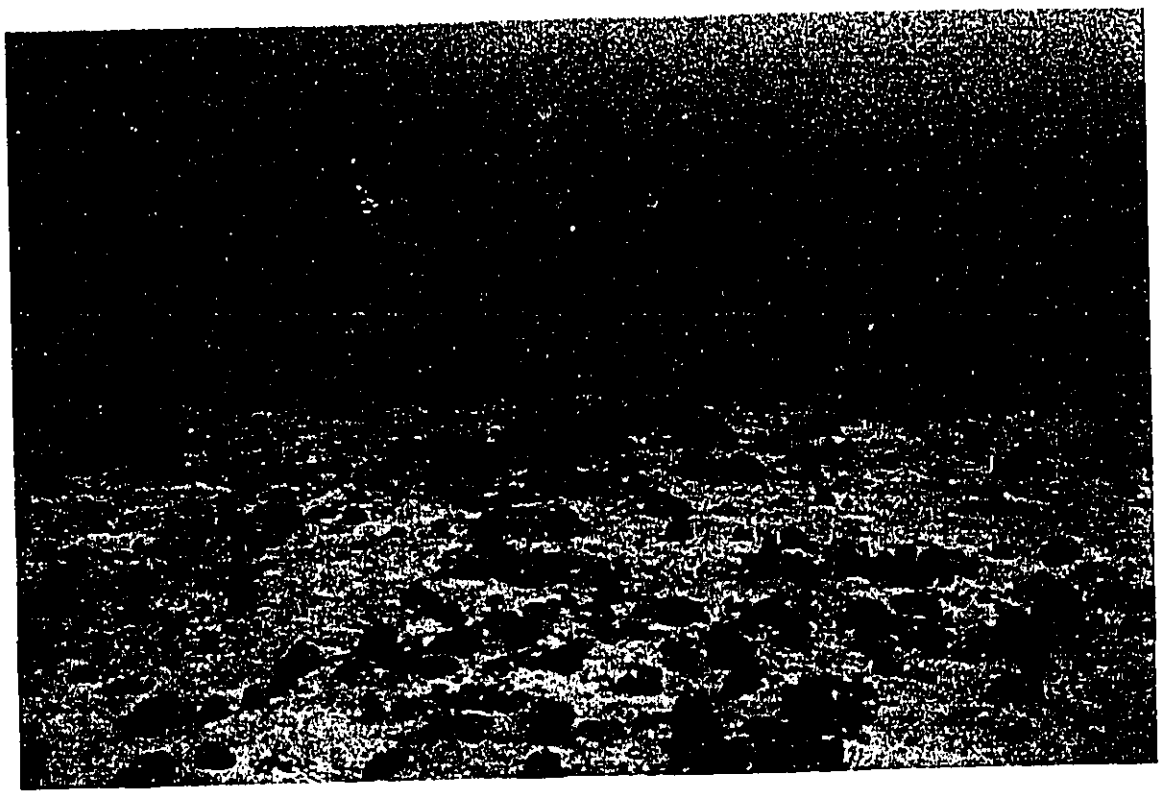


Plate 5. Typical bottom at 140' bench at Twin Peaks station MB5.

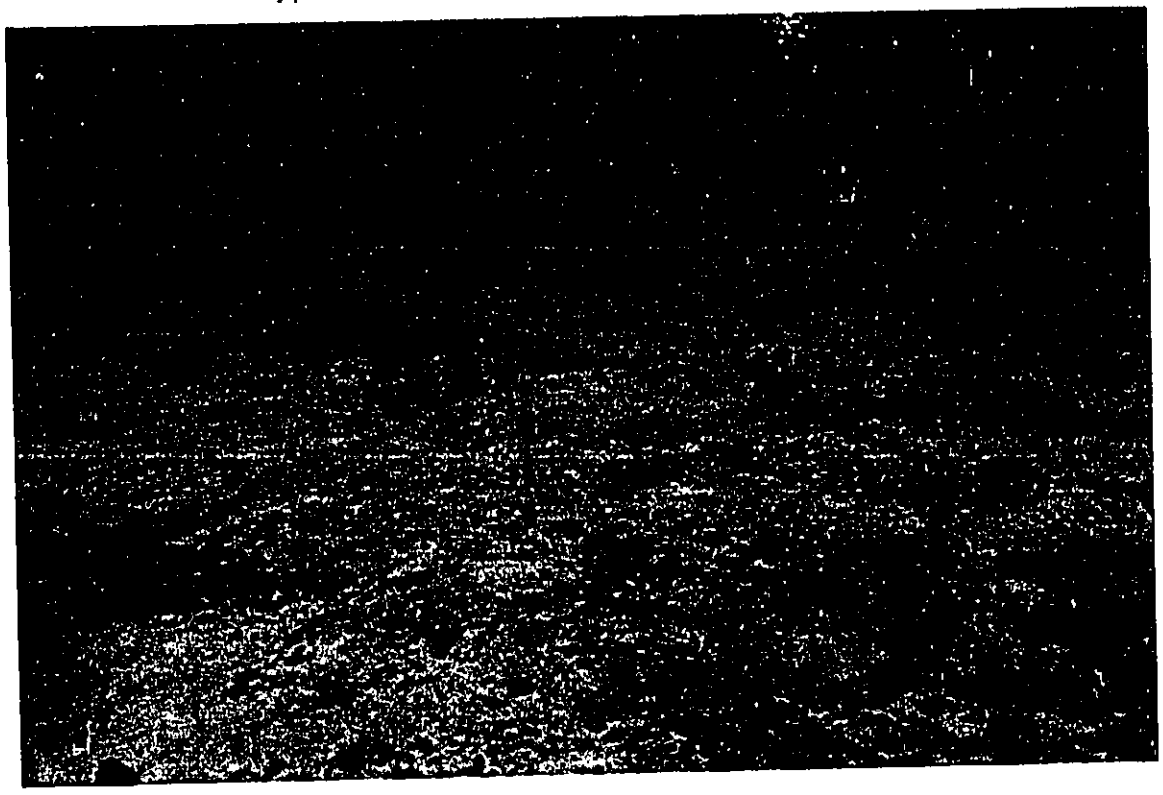


Plate 6. Typical bottom at 155' sand flat at Twin Peaks station MB5.

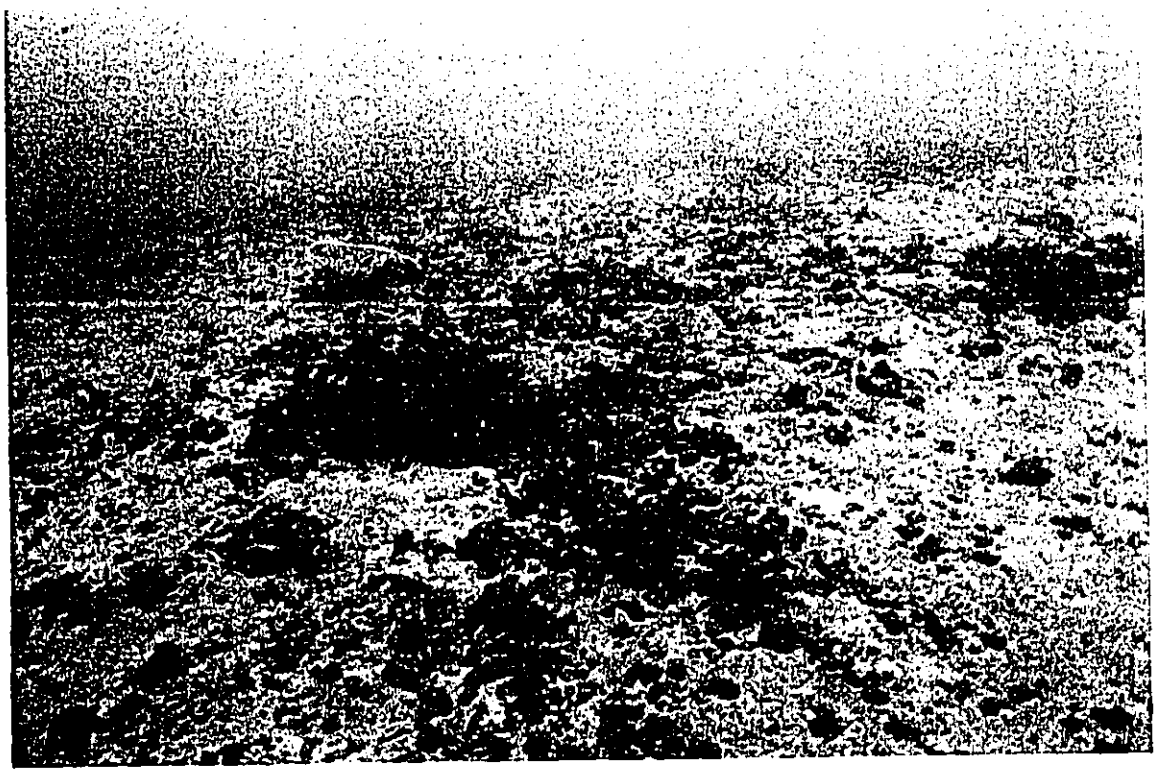


Plate 7. Typical bottom at 140' bench at Twin Peaks station MB6.

Plate 8. Typical bottom at 155' sand flat at Twin Peaks station MB6.

APPENDIX B

Quantitative Fish Counts and Estimates of Diversity and Biomass
at Quantitative Biological Survey Transect Stations
within the Twin Peaks Artificial Reef Site

MB1

Family	Scientific name	number	diversity	biomass
Tetraodontidae	*Tetraodontis randallii*	2	0.000	0.412
	Total number	2		
	Number of species	1		
	Diversity	0		
	Total biomass	0.412		

MB2

Family	Scientific name	number	diversity	biomass
Tetraodontidae	*Tetraodontis randallii*	1	0.000	0.206
	Total number	1		
	Number of species	1		
	Diversity	0		
	Total biomass	0.206		

MB3

Family	Scientific name	number	diversity	biomass
Acanthuridae	*Acanthurus xanthopterus*	1	-0.053	4.096
Balistidae	*Sufflamen fraenatus*	1	-0.053	2.717
Chaetodontidae	*Heniochus diphreutes*	10	-0.253	0.659
Labridae	*Pseudojuloides cerasinus*	5	-0.168	0.166
Pomacentridae	*Dascyllus albisella*	65	-0.198	1.681
Tetraodontidae	*Tetraodontis randallii*	2	-0.089	0.614
	Total number	84		
	Number of species	6		
	Diversity	0.814		
	Total biomass	9.933		

MB4

Family	Scientific name	number	diversity	biomass
Acanthuridae	*Acanthurus olivaceus*	4	-0.164	11.141
	Naso hexacanthus	2	-0.102	0.233
Chaetodontidae	*Chaetodon kleini*	2	-0.102	0.053
Cirrhitidae	*Paracirrhites arcatus*	4	-0.164	0.187
Labridae	*Stenojulis balteata*	7	-0.230	0.242
	Pseudocheilinus evanidus	15	-0.330	0.207
	Oxycheilinus bimaculatus	8	-0.248	0.141
Mullidae	*Parupeneus multifasciatus*	11	-0.291	0.399
Ostraciidae	*Ostracion memeagris*	1	-0.061	0.013
Pomacanthidae	*Centropyge fisheri*	8	-0.248	0.240
Pomacentridae	*Dascyllus albisella*	8	-0.248	0.235

Total number	70
Number of species	11
Diversity	2.186
Total biomass	13.090

MB5

Family	Scientific name	number	diversity	biomass
Acanthuridae	*Acanthurus xanthopterus*	1	-0.070	2.744
	Acanthurus olivaceus	4	-0.184	4.700
	Acanthurus nigrofuscus	2	-0.116	0.122
Balistidae	*Balistes fuscus*	1	-0.070	1.503
	Sufflamen bursa	4	-0.184	0.769
	Xanthichthys mento	1	-0.070	0.216
Carangidae	*Seriola dumerili*	1	-0.070	16.200
Chaetodontidae	*Chaetodon kleini*	4	-0.184	0.031
Labridae	*Pseudocheilinus evanidus*	5	-0.211	0.163
	Bodianus bilunulatus	1	-0.070	0.620
	Amanpses rubrocaudata	1	-0.070	0.016
	Oxycheilinus bimaculatus	1	-0.070	0.018
	Labroides phthirophagus	2	-0.116	0.022
Mullidae	*Parupeneus multifasciatus*	2	-0.116	0.203
Pomacanthidae	*Centropyge fisheri*	4	-0.184	0.069
	Centropyge potteri	3	-0.153	0.090
Pomacentridae	*Dascyllus albisella*	4	-0.184	0.338
	Chromis agilis	8	-0.273	0.076
	Chromis hanui	6	-0.235	0.057
Serranidae	*Cephalopholis argus*	1	-0.070	0.864
Tetraodontidae	*Canthigaster jactator*	2	-0.116	0.032
	Total number	58		
	Number of species	21		
	Diversity	2.819		
	Total biomass	28.854		

MB6

Family	Scientific name	number	diversity	biomass
Acanthuridae	*Acanthurus nigrofuscus*	2	-0.202	0.122
Balistidae	*Sufflamen bursa*	2	-0.202	0.384
	Xanthichthys mento	1	-0.129	0.216
Chaetodontidae	*Chaetodon kleini*	4	-0.293	0.031
Labridae	*Pseudocheilinus octotaenia*	1	-0.129	0.035
	Bodianus bilunulatus	1	-0.129	1.071
Lutjanidae	*Alphareus furca*	2	-0.202	3.293
Pomacanthidae	*Centropyge potteri*	1	-0.129	0.030
	Chromis hanui	5	-0.322	0.006
Scaridae	*Scarus sp.*	3	-0.254	0.230
Tetraodontidae	*Canthigaster jactator*	3	-0.254	0.014

Total number	25
Number of species	11
Diversity	2.245
Total biomass	5.432

APPENDIX C

Hawaii Administrative Rules, Title 11, Department of Health, Chapter 54
Water Quality Standards
(extracted sections)

HAWAII ADMINISTRATIVE RULES
TITLE 11
DEPARTMENT OF HEALTH
CHAPTER 54
WATER QUALITY STANDARDS

§11-54-04 Basic water quality criteria applicable to all waters.
(a) All waters shall be free of substances attributable to domestic, industrial, or other controllable sources of pollutants, including:

(1) Materials that will settle to form objectionable sludge or bottom deposits;
(2) Floating debris, oil, grease, scum, or other floating materials;
(3) Substances in amounts sufficient to produce taste in the water or detectable off-flavor in the flesh of fish, or in amounts sufficient to produce objectionable color, turbidity or other conditions in the receiving waters;
(4) High or low temperatures; biocides; pathogenic organisms; toxic, radioactive, corrosive, or other deleterious substances at levels or in combinations sufficient to be toxic or harmful to human, animal, plant, or aquatic life, or in amounts sufficient to interfere with any beneficial use of the water;
(5) Substances or conditions or combinations thereof in concentrations which produce undesirable aquatic life;
(6) Soil particles resulting from erosion on land involved in earthwork, such as the construction of public works; highways; subdivisions; recreational, commercial, or industrial developments; or the cultivation and management of agricultural lands.

(c) Marine waters.

(1) Class AA.
It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected.
No zones of mixing shall be permitted in this class:

(A) Within a defined reef area, in waters of a depth less than 18 meters (ten fathoms); or
(B) In waters up to a distance of 300 meters (one thousand feet) off shore if there is no defined reef area and if the depth is greater than 18 meters (ten fathoms).
The uses to be protected in this class of waters are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment. The classification of any water area as Class AA shall not preclude other uses of the waters compatible with these objectives and in conformance with the criteria applicable to them;

(2) Class A.
It is the objective of class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. These waters shall not act as receiving waters for any discharge which

has not received the best degree of treatment or control compatible with the criteria established for this class. No new sewage discharges will be permitted within embayments. No new industrial discharges shall be permitted within embayments, with the exception of:

(A) Acceptable non-contact thermal and drydock or marine railway discharges, in the following water bodies:

(i) Honolulu Harbor, Oahu;
(ii) Barbers Point Harbor, Oahu;
(iii) Keehi Lagoon Marina Area, Oahu;
(iv) Ala Wai Boat Harbor, Oahu; and
(v) Kahului Harbor, Maui.

(B) Storm water discharges associated with industrial activities (defined in 40 C.F.R. Section 122.26(b)(14)) which meet, at the minimum, the basic water quality criteria applicable to all waters as specified in section 11-54-04, and all applicable requirements specified in the chapter 11-55, titled "Water Pollution Control"; and

(C) Discharges covered by a National Pollutant Discharge Elimination System general permit, approved by the U.S. Environmental Protection Agency and issued by the Department in accordance with 40 C.F.R. Section 122.28 and all applicable requirements specified in chapter 11-55, titled "Water Pollution Control".

(d) Marine bottom ecosystems.

(1) Class I.

It is the objective of class I marine bottom ecosystems that they remain as nearly as possible in their natural pristine state with an absolute minimum of pollution from any human-induced source. Uses of marine bottom ecosystems in this class are passive human uses without intervention or alteration, allowing the perpetuation and preservation of the marine bottom in a most natural state, such as for nonconsumptive scientific research (demonstration, observation or monitoring only), nonconsumptive education, aesthetic enjoyment, passive activities, and preservation;

(2) Class II.

It is the objective of class II marine bottom ecosystems that their use for protection including propagation of fish, shellfish, and wildlife, and for recreational purposes not be limited in any way. The uses to be protected in this class of marine bottom ecosystems are all uses compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation. Any action which may permanently or completely modify, alter, consume, or degrade marine bottoms, such as structural flood control channelization, (dams); landfill and reclamation; navigational structures (harbors, ramps); structural shore protection (seawalls, revetments); and wastewater effluent outfall structures may be allowed upon securing approval in writing from the director, considering the environmental impact and the public interest pursuant to sections 342D-4, 342D-5, 342D-6, and 342D-50, HRS in accordance with the applicable provisions of chapter 91, HRS.

[Eff 11/12/82; am and comp 10/6/84; am and comp 04/14/88; am and comp 01/18/90; am and comp 10/29/92, am and comp **APR 17 2000** (Auth: HRS §174C, §§342D-1, 342D-4, 342D-5) (Imp: HRS §§342D-4, 342D-5)

§11-54-06 Uses and specific criteria applicable to marine waters.

(b) Open coastal waters.

(1) As used in this section:

"Open coastal waters" means marine waters bounded by the 183 meter or 600 foot (100 fathom) depth contour and the shoreline, excluding bays named in subsection (a);

(2) Water areas to be protected (measured in a clockwise direction from the first-named to the second-named location, where applicable):

(A) Class AA.

(i) Hawaii - The open coastal waters from Leleiwi Point to Waiulaula Point;

(ii) Maui - The open coastal waters between Nakalele Point and Waihee Point, and between Huelo Point and Puu Olai;

(iii) Kahoolawe - All open coastal waters surrounding the island;

(iv) Lanai - All open coastal waters surrounding the island;

(v) Molokai - The open coastal waters between the westerly boundary of Hale o Lono Harbor to Lamaloa Head. Also, the open coastal waters from Cape Halawa to the easterly boundary of Kaunakakai Harbor;

(vi) Oahu - Waimanalo Bay from the southerly boundary of Kaiona Beach Park, and including the waters surrounding Manana and Kaohikaipu Islands, to Makapuu Point. Also, Waialua Bay from Kaiaka Point to Puaena Point, and the open coastal waters along Kaena Point between a distance of 5.6 kilometers (3.5 miles) from Kaena Point towards Makua and 5.6 kilometers (3.5 miles) from Kaena Point toward Mokuleia;

(vii) Kauai - The open coastal waters between Hikimoe Valley and Makahoa Point. Also, the open coastal waters between Makahuena Point and the westerly boundary of Hoai Bay;

(viii) Niihau - All open coastal waters surrounding the island;

(ix) All other islands of the state - All open coastal waters surrounding the islands not classified in this section;

(x) All open waters in preserves, reserves, sanctuaries, and refuges established by the department of land and natural resources under chapter 195 or chapter 190, HRS or similar reserves for the protection of marine life established under chapter 190, HRS, as amended; or in the refuges or sanctuaries established by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service;

(B) Class A - All other open coastal waters not otherwise specified.

(3) The following criteria are specific for all open coastal waters excluding those described in section 11-54-06(d). (Note that criteria for open coastal waters differ, based on fresh water discharge.)

Parameter	Geometric mean not to exceed the given value	Not to exceed the given value more than ten per cent of the time	Not to exceed the given value more than two per cent of the time
Total Nitrogen (ug N/L)	150.00* 110.00**	250.00* 180.00**	350.00* 250.00**
Ammonia Nitrogen (ug NH -N/L)	3.50* 2.50**	8.50* 5.00**	15.00* 9.00**
Nitrate + Nitrite Nitrogen (ug [NO +NO]-N/L)	5.00* 3.50**	14.00* 10.00**	25.00* 20.00**
Total Phosphorus (ug P/L)	20.00* 16.00**	40.00* 30.00**	60.00* 45.00**
Chlorophyll a (ug/L)	0.30* 0.15**	0.90* 0.50**	1.75* 1.00**
Turbidity (N.T.U.)	0.50* 0.20**	1.25* 0.50**	2.00* 1.00**

* "Wet" criteria apply when the open coastal waters receive more than three million gallons per day of fresh water discharge per shoreline mile.
** "Dry" criteria apply when the open coastal waters receive less than three million gallons per day of fresh water discharge per shoreline mile.
Applicable to both "wet" and "dry" conditions:
pH Units - shall not deviate more than 0.5 units from a value of 8.1, except at coastal locations where and when freshwater from stream, stormdrain or groundwater discharge may depress the pH to a minimum level of 7.0.
Dissolved Oxygen - Not less than seventy-five per cent saturation, determined as a function of ambient water temperature and salinity.
Temperature - Shall not vary more than one degree Celsius from ambient conditions.
Salinity - Shall not vary more than ten per cent from natural or seasonal changes considering hydrologic input and oceanographic factors.
k units = the ratio of light measured at the water's surface to light measured at a particular depth.
L = liter
Light Extinction Coefficient is only required for dischargers who have obtained a waiver pursuant to Section 301(h) of the Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251), as amended, and are required by EPA to monitor it.
N.T.U. = Nephelometric Turbidity Units. A comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. The higher the intensity of scattered light, the higher the turbidity.
ug = microgram or 0.000001 grams

§11-54-07 Uses and specific criteria applicable to marine bottom types.

(e) Reef flats and reef communities.

(1) As used in this section:

"Nearshore reef flats" means shallow platforms of reef rock, rubble, and sand extending from the shoreline. Smaller, younger flats projected out as semicircular aprons while older, larger flats form wide continuous platforms. Associated animals are mollusks, echinoderms, worms, crustaceans (many living beneath the surface), and reef-building corals.

"Offshore reef flats" means shallow, submerged platforms of reef rock and sand between depths of zero to three meters (zero to ten feet) which are separated from the shoreline of high volcanic islands by lagoons or ocean expanses. Dominant organisms are bottom-dwelling algae. Biological composition is extremely variable. There are three types: patch, barrier, and atoll reef flats; quite different from one another structurally. The presence of heavier wave action, water more oceanic in character, and the relative absence of terrigenous influences distinguish offshore reef flats.

"Protected reef communities" means hard bottom aggregations, including scattered sand channels and patches, dominated by living coral thickets, mounds, or platforms. They are found at depths of ten to thirty meters (thirty-two to ninety-six feet) along protected leeward coasts or in shallow water (up to sea level) in sheltered lagoons behind atoll or barrier reefs and in the calm reaches of bays or coves.

"Wave-exposed reef communities" means aggregations, including scattered sand channels and patches, dominated by corals. They may be found at depths up to forty meters (approximately one hundred thirty feet) along coasts subject to continuous or heavy wave action and surge. Wave-exposed reef communities are dominated biologically by benthic algae, reef-building corals, and echinoderms.

(2) Water areas to be protected:

(A) Class I.

(i) All reef flats and reef communities in preserves, reserves, sanctuaries, and refuges established by the department of land and natural resources under chapter 195 or chapter 190, HRS, or similar reserves for the protection of marine life under chapter 190, HRS, as amended; or in refuges or sanctuaries established by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service;

(ii) Nearshore reef flats:

Hawaii Maui
Puako Honolua
Lanai Oahu
Northwest Lanai Reef
Hanauma Bay
Molokai Kauai
Western Kalaupapa
Nualolokai
Southeast Molokai Reef
Hanalei
Honomuni Harbor (Anini to Haena)
Kulaalamihi Fishpond

(iii) Offshore reef flats:
- Moku o Loe (Coconut Island, Kaneohe Bay, Oahu)
- Kure Atoll
- Pearl and Hermes Atoll
- Lisianski Island
- Laysan Island
- Maro Reef
- French Frigate Shoals

(iv) Wave exposed reef communities:
- Hawaii
  - 1823 Lava Flow (Punaluu)
  - 1840 Lava Flow (North Puna)
  - 1868 Lava Flow (South Point)
  - 1887 Lava Flow (South Point)
  - 1955 Lava Flow (South Puna)
  - 1960 Lava Flow (Kapoho)
  - 1969 Lava Flow (Apuna Point)
  - 1970 Lava Flow (Apuna Point)
  - 1971 Lava Flow (Apuna Point)
  - 1972 Lava Flow (Apuna Point)
  - 1973 Lava Flow (Apuna Point)
- Maui
  - Hana Bay
  - Makuleia Bay (Honolua)
  - Molokini Island
  - All wave exposed reef communities
- Molokai
  - Moanui Kahinapohaku Waikolu - Kalawao
  - Halawa Bay
- Oahu
  - Sharks Cove (Pupukea)
  - Moku Manu (Islands)
  - Outer Hanauma Bay
  - Waimea Bay
  - Kawela Bay
  - Kahana Bay
- Kauai
  - Ke`e Beach
  - Poipu Beach
  - Kipu Beach
- Niihau
  - All wave exposed communities
- Lehua (off Niihau)
  - All wave exposed communities

(v) Protected reef communities:
- Hawaii

Puako
Honaunau
Kealakekua
Kiholo
Anachoomalu
Hapuna
Kahaluu Bay
Keaweula (North Kohala)
Milolii Bay to Keawaiki
Kailua-Kaiwi (Kona)
Onomea Bay
1801 Lava Flow (Keahole or Kiholo)
1850 Lava Flow (South Kona)
1859 Lava Flow (Kiholo)
1919 Lava Flow (Milolii)
1926 Lava Flow (Milolii)

Maui

Honolua
Ahihi-La Perouse (including 1790 Lava Flow at Cape Kinau)
Molokini Island
All protected reef communities

Lanai

Mancle
Hulopoe

Molokai

Southeast Molokai

Oahu

Hanauma Bay
Kalaupapa Moku o Loe
Honomuni Harbor (Coconut Island, Kaneohe Bay)

Kauai

Hoai Bay (Poipu)

Northwestern Hawaiian Islands

Kure Atoll Lagoon
Pearl and Hermes Lagoon
Lisianski Lagoon
Maro Reef Lagoon
French Frigate Shoals Lagoon

(B) Class II.

(i) Existing or planned harbors may be located within nearshore reef flats showing degraded habitats and only where feasible alternatives are lacking and upon written approval by the director, considering environmental impact and the public interest pursuant to section 342D-6, HRS.

Hawaii

Blonde Reef (Hilo Harbor)
Kawaihae Small Boat Harbor

Maui

Lahaina Harbor
Kahului Harbor

Lanai

Manele

Molokai

Kaunakakai Harbor
Hale o Lono Harbor
Palaau (2.4 kilometers/1.5 mile, east of Pakanaka Fishpond)

Oahu

Keehi Boat Harbor
Ala Moana Reef
Honolulu Harbor
Heeia Harbor
Kaneohe Yacht Club
Ala Wai Harbor
Haleiwa Boat Harbor
Maunalua Bay
Pearl Harbor
Kaneohe Bay
Kahe
All other nearshore reef flats not in Class I;

(ii) Offshore reef flats:

Oahu

Kapapa Barrier Reef
Kaneohe Patch Reefs (Kaneohe Bay)

(iii) All other wave exposed or protected reef communities not in Class I.

(3) Specific criteria to be applied to all reef flats and reef communities: No action shall be undertaken which would substantially risk damage, impairment, or alteration of the biological characteristics of the areas named herein. When a determination of substantial risk is made by the director, the action shall be declared to be contrary to the public interest and no other permits shall be issued pursuant to chapter 342, HRS.

(A) Oxidation-reduction potential (EH) in the uppermost ten centimeters (four inches) of sand patches shall not be less than +100 millivolts;

(B) No more than fifty per cent of the grain size distribution of sand patches shall be smaller than 0.125 millimeters in diameter;

(C) Episodic deposits of flood-borne soil sediment shall not occur in quantities exceeding equivalent thicknesses for longer than twenty-four hours after a heavy rainstorm as follows:

(i) No thicker than an equivalent of two millimeters (0.08 inch) on living coral surfaces;

(ii) No thicker than an equivalent of five millimeters (0.2 inch) on other hard bottoms;

(iii) No thicker than an equivalent of ten millimeters (0.4 inch) on soft bottoms;

(D) The director shall determine parameters, measures, and criteria for bottom biological communities which may be affected by proposed actions. The location and boundaries of each bottom-type class shall be clarified when situations require their identification. For example, the location and boundaries shall be clarified when a discharge permit is applied for or a waiver pursuant to Section 301(h) of the Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251 et seq.) is required. Permanent benchmark stations may be required where necessary for monitoring purposes. The water quality standards for this subsection shall be deemed to be met if time series surveys of benchmark stations indicate no relative changes in the relevant biological communities, as noted by biological community indicators or by indicator organisms which may be applicable to the specific site.

(f) Soft bottom communities.

(1) As used in this section:

"Soft bottom communities" means poorly described and "patchy" communities, mostly of burrowing organisms, *living in deposits at depths between two to forty meters* (approximately six to one hundred thirty feet). The particle size of sediment, depth below sea level, and degree of water movement and associated sediment turnover dictate the composition of animals which rework the bottom with burrows, trails, tracks, ripples, hummocks, and depressions.

(2) Water areas to be protected:

Class II - All soft bottom communities;

(3) Specific criteria to be applied - Oxidation-reduction potential (EH) in the uppermost ten centimeters (four inches) of sediment should not be less than -100 millivolts. The location and boundaries of each bottom-type class shall be clarified when situations require their identification. For example, the location and boundaries shall be clarified when a discharge permit is applied for or a waiver pursuant to Section 301(h) of the Act is required.

[Eff 11/12/82; am and comp 10/6/84; am and comp 04/14/88; am and comp 01/18/90; am and comp 10/29/92, am and comp **APR 17 2000**] (Auth: HRS §§342D-1, 342D-4, 342D-5) (Imp: HRS §§342D-4, 342D-5)

APPENDIX I

APPENDIX I

Ocean Activities Survey Summary

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumptio
11-Jan-04		B	Baci ball	1	1 x week	P	
11-Jan-04		B	Baci ball	1		P	
11-Jan-04	1521	B	Beach walking	3		P	
11-Jan-04	1350	E	Beach walking	3		P	
12-Jan-04	1236	A	Beach walking	2		P	
12-Jan-04	755	H	Beach walking	1		P	
12-Jan-04	845	H	Beach walking	2		P	
12-Jan-04		H	Beach walking	3		P	
12-Jan-04	1015	H	Beach walking	1		P	
12-Jan-04	1400	H	Beach walking	2		P	
12-Jan-04	1450	H	Beach walking	4		P	
12-Jan-04	1452	H	Beach walking	2		P	
12-Jan-04	1518	H	Beach walking	2		P	
12-Jan-04	1536	H	Beach walking	3		P	
12-Jan-04	1540	H	Beach walking	3		P	
12-Jan-04	1610	H	Beach walking	2		P	
12-Jan-04	1643	H	Beach walking	1		P	
11-Jan-04	1019	B	Boat			C	
11-Jan-04	1019	B	Boat			C	
11-Jan-04	1335	D	Boat			C	
11-Jan-04	1335	D	Boat			C	
11-Jan-04	846	H	Boat				
11-Jan-04	858	H	Boat			C	
12-Jan-04	900	B	Boat			C	
12-Jan-04	900	C	Boat			C	
12-Jan-04	826	H	Boat			C	
12-Jan-04	1350	F	Boat			C	
11-Jan-04	1026	B	Body board	1		P	
11-Jan-04		B	Body board			P	
11-Jan-04	1252	B	Body board	1		P	
11-Jan-04	1517	B	Body board	2		P	
11-Jan-04		H	Body board	9	3 x month	P	
11-Jan-04		H	Body board	11	5-6 x year	P	
11-Jan-04		H	Body board	4	weekends	P	
11-Jan-04	1428	H	Body board	4	1x week	P	
11-Jan-04		H	Body board	3	1 x year	P	
12-Jan-04	1301	A	Body board			P	
12-Jan-04	1650	A	Body board	3		P	
12-Jan-04		B	Body board	1	3 x week	P	
12-Jan-04		B	Body board	3		P	
12-Jan-04		H	Body board	10		P	
11-Jan-04		C	Camping		3 x week	P	

ACTIVITIES SURVEY

Resource nsumption	Additional Comments	Name	Phone
	Observed from other sublocation.		
	Tourists.		
	Tourists.		
	Tourists.		
	Atlantis Submarines 20' chase boat (Roxie).		
	Atlantis Submarines 30' transport boat.		
	Atlantis Submarines 20' chase boat (Roxie).		
	Atlantis Submarines 30' transport boat.		
	Unable to determine if pleasure or fishing boat, traveling north to south		
	Tug pulling submarine, traveling north to south.		
	Atlantis Submarines 20' chase boat (Roxie).		
	Atlantis Submarines 20' chase boat (Roxie).		
	40' boat, may be for diving, traveling north to south.		
	60' boat (passenger or fishing) traveling south to north.		
	Tourists.		
	Tourists at condominiums have observed boady boarding andsurfing in this survey area.		

OCEAN ACTIVI

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumption
11-Jan-04	850	C	Camping	2	5 x week	P	
12-Jan-04	920	C	Camping	2		P	
11-Jan-04	710	H	Canoe surfing	3	2 x week	P	
11-Jan-04	1040	B	Catamaran			P	
11-Jan-04		B	Collect bottles	1		P	
11-Jan-04		B	Collect rocks			P	
11-Jan-04	700	B	Dive	1	2 x month	P	ko, kumu, kala, p
11-Jan-04		A	Dive		Seasonal	P	
12-Jan-04	750	H	Ferry			C	
11-Jan-04		A	Fishing		Seasonal	P	
11-Jan-04	1040	H	Fishing boat				
12-Jan-04	754	B	Fishing boat			C	
12-Jan-04	830	B	Fishing boat			C	
11-Jan-04		B	Kayak	1		P	
11-Jan-04		H	Kayak	1	varies	P	
11-Jan-04		H	Kayak	22		P	
11-Jan-04		B	Lawn bowling	1		P	
11-Jan-04		C	Net fishing		3 x week	P	
12-Jan-04	820	B	Park Maintenance	1	5 x week	-	
12-Jan-04	700	H	Park Maintenance	1	5 x week	-	
12-Jan-04	1348	F	Passenger boat			C	
11-Jan-04	801	B	Photography	1		P	
11-Jan-04	1412	B	Photography	1		P	
11-Jan-04		B	Picnic	1	1 x month	P	
11-Jan-04	755	B	Picnic	2		P	
11-Jan-04		B	Picnic	2	everyday	P	
11-Jan-04		B	Picnic	2	everyday	P	
11-Jan-04	1635	C	Picnic	1		P	

ACTIVITIES SURVEY

Resource nsumption	Additional Comments	Name	Phone
	Usually sees 3 turtles. Concerned about cleanlines (oil/lubricants should be removed) of the vessel to be sunk.	Jacob Silva	808-344-5079
	Did not interview those in encampment.		
	Concerned that wooden parts of vessel may break apart and cause a danger in the water. Also emphasized that surfing and fishing activities increase in the summer.		
	30' catamaran.		
gmu, kala, pal	Concerned with the numerous surf schools and overuse of the beach park. Concerned about the diving conditions.		
	~80' ferry traveling north to south.		
	Traveling south to north.		
	60' fishing boat traveling west to east.		
	60' fishing boat traveling west to east.		
	He has been in the maui parks division for 33 years, providing park maintenance. Puamana Beach park is a favorite drive-by lunch spot. In 1990 Puamana Beach Park became a Maui County beach park. Laniuopoko has been a Maui County Beach Park since it was established in 1970.	Manny Martin, County of Maui	
	Manny Martin has been in the maui parks division for 33 years, providing park maintenance. Laniuopoko has been a Maui County Beach Park since it was established in 1970. Observes the following activities: surfing classes (up to 12 people), personal and commercial kayak use, and pole and net fishing. Special events include hotel employee parties, canoe regattas (usually in summer), birthday parties, weddings, and DOE (keiki) summer excursions. May be up to 1,000 beach users per day during the summer.	Manny Martin, County of Maui	
	50' boat traveling south to north.		
	Observed from other sublocation.		

OCEAN ACTIVITIES SURVEY

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumption	Additio
11-Jan-04	1010	B	Picnic	25		P		Picnickers p
11-Jan-04	1036	B	Picnic	2		P		
11-Jan-04	1045	B	Picnic	2		P		
11-Jan-04	1050	B	Picnic	5		P		
11-Jan-04	1055	B	Picnic	2		P		
11-Jan-04	1056	B	Picnic	2		P		
11-Jan-04	1210	B	Picnic	18		P		Picnickers
11-Jan-04		B	Picnic			P		
11-Jan-04		B	Picnic	5	2-5 x week	P		
11-Jan-04	1257	B	Picnic	2		P		
11-Jan-04	1259	B	Picnic	2		P		
11-Jan-04	1259	B	Picnic	2		P		
11-Jan-04	1305	D	Picnic	1		P		
11-Jan-04	1315	D	Picnic	1		P		
11-Jan-04	1400	B	Picnic	29		P		Picnickers
11-Jan-04	1405	B	Picnic	2		P		
11-Jan-04		B	Picnic	3	2 x week	P		
11-Jan-04		B	Picnic			P	papio, moi	
11-Jan-04	1509	B	Picnic	2		P		
11-Jan-04	1509	B	Picnic	2		P		
11-Jan-04	1510	B	Picnic	1		P		
11-Jan-04	1515	B	Picnic	2		P		
11-Jan-04	1517	B	Picnic	1		P		
11-Jan-04	1535	B	Picnic	4		P		
11-Jan-04	1544	B	Picnic	2	once a month	P		
11-Jan-04	1545	B	Picnic	3		P		
11-Jan-04	1550	B	Picnic	1		P		
11-Jan-04	1555	B	Picnic	1		P		
11-Jan-04	1620	B	Picnic	6		P		
11-Jan-04	1625	B	Picnic	3		P		
11-Jan-04	1640	B	Picnic	1		P		
11-Jan-04	841	H	Picnic			P		
11-Jan-04	1003	H	Picnic	5	1 x week	P		
11-Jan-04	1008	H	Picnic	4	first time	P		Say the
11-Jan-04	1021	H	Picnic	3	1 x week	P		
11-Jan-04	1036	H	Picnic	5	2 x month	P		Havi
11-Jan-04			Picnic	2		P		
11-Jan-04		H	Picnic	22		P		
11-Jan-04	1405	H	Picnic	13		P		
11-Jan-04	1412	H	Picnic	3		P		
11-Jan-04	1417	H	Picnic	11	5-6 x year	P		
11-Jan-04	1420	H	Picnic	3		P		
11-Jan-04	1445	H	Picnic	4		P		
11-Jan-04	1446	H	Picnic	5		P		

[TIES SURVEY

n	Additional Comments	Name	Phone
	Picnickers present upon arrival.		
	Picnickers present upon arrival.		
	Picnickers present upon arrival.		
	Say their daughter surfs here.		
	Having a birthday party.		
	Tourists.		
	Tourists.		

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumption
11-Jan-04		H	Picnic	3		P	
11-Jan-04		H	Picnic	3	2 x week	P	
11-Jan-04	1628	H	Picnic	2		P	
11-Jan-04	1628	H	Picnic	2		P	
11-Jan-04		H	Picnic	1	20 x year	P	
11-Jan-04	1638	H	Picnic	2		P	
12-Jan-04	730	B	Picnic	1		P	
12-Jan-04	731	B	Picnic	1		P	
12-Jan-04	805	B	Picnic	1		P	
12-Jan-04		B	Picnic			P	
12-Jan-04	832	B	Picnic	2		P	
12-Jan-04	840	B	Picnic	2		P	
12-Jan-04	1000	C	Picnic	3		P	
12-Jan-04	1010	B	Picnic	1	2 x week	P	
12-Jan-04	1025	B	Picnic	2		P	
12-Jan-04	1025	B	Picnic	2		P	
12-Jan-04	1025	B	Picnic	2		P	
12-Jan-04	1055	B	Picnic	2		P	
12-Jan-04	1059	B	Picnic	2		P	
12-Jan-04		B	Picnic	1	3 x week	P	
12-Jan-04	1328	B	Picnic	3	2-3 x week	P	
12-Jan-04	1330	B	Picnic	2	5 x week	P	
12-Jan-04	1331	B	Picnic	2	everyday	P	
12-Jan-04	1400	B	Picnic	2		P	
12-Jan-04	1400	B	Picnic	2		P	
12-Jan-04		B	Picnic	6		P	
12-Jan-04	1521	B	Picnic	1		P	
12-Jan-04	1605	B	Picnic	2		P	
12-Jan-04	1634	B	Picnic	2		P	
12-Jan-04	1640	B	Picnic	3		P	
12-Jan-04	1641	B	Picnic	4		P	
12-Jan-04	1641	B	Picnic	1		P	
12-Jan-04	1400	H	Picnic	10		P	
12-Jan-04	1449	H	Picnic	2		P	
12-Jan-04	1507	H	Picnic	2		P	
12-Jan-04	1515	H	Picnic	2		P	
12-Jan-04	1607	H	Picnic	2		P	
12-Jan-04	1628	H	Picnic	3		P	
11-Jan-04	1411	H	Picnic (Reading)	1		P	
11-Jan-04		B	Pole fishing	1	once every 2 months	P	papio
11-Jan-04			Pole fishing	1		P	

IVITIES SURVEY

ce tion	Additional Comments	Name	Phone
	Young adults hanging out on the side of the the road.		
	Has seen turtles.		
	Has seen turtles everyday. Concerned about acess to the proposed project. Would like it available to the public. Likes the proposed project.	Adam	808-205-2285
	Picnickers present upon arrival.		
	Tourists.		
	Tourists.		
	Young adults hanging out in parking lot.		
0			

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumptio
11-Jan-04		B	Pole fishing			P	
11-Jan-04	835	C	Pole fishing	3	3 x week	P	papio, moan
11-Jan-04		C	Pole fishing	2	5 x week	P	squid
11-Jan-04	1350	C	Pole fishing	1		P	
11-Jan-04	1640	C	Pole fishing	2		P	
11-Jan-04		A	Pole fishing		Seldom	P	
11-Jan-04		A	Pole fishing		Yearly	P	
11-Jan-04		B	Pole fishing			P	
11-Jan-04	1420	H	Pole fishing	4	weekends	P	tako, papio, ul
12-Jan-04	950	C	Pole fishing	2		P	papio
12-Jan-04	1540	C	Pole fishing	1		P	
11-Jan-04	1556	B	Sail boat			P	
11-Jan-04	859	H	Sail boat			P	
11-Jan-04	1510	G	Sail boat				
11-Jan-04	1545	G	Sail boat				
12-Jan-04	1237	A	Sail boat			C	
11-Jan-04			Scuba Dive	1		P	
11-Jan-04		B	Scuba Dive	5	2-5 x week	P	
12-Jan-04	1620	H	Showering	1		P	
12-Jan-04	1642	H	Showering	1		P	
12-Jan-04	935	C	Sightsee	1		P	
12-Jan-04	1000	C	Sightsee	1		P	
12-Jan-04	1000	C	Sightsee	1		P	
11-Jan-04		H	Skim board	9	3 x month	P	
11-Jan-04		B	Snorkel	5	2-5 x week	P	
11-Jan-04		H	Snorkel	2	1-2 x week	P	
12-Jan-04	1535	A	Snorkel	2		P	
12-Jan-04		B	Snorkel	1	3 x week	P	
12-Jan-04		B	Snorkel	3		P	
12-Jan-04		H	Snorkel	3		P	
11-Jan-04		B	Spear fishing	1	2 x month	P	
11-Jan-04		B	Spear fishing	1		P	
11-Jan-04		B	Spear fishing	1		P	squid, taapae
11-Jan-04		C	Spear fishing		3 x week	P	
11-Jan-04		B	Spear fishing	1	2 x week	P	ck kala, humu,
11-Jan-04		H	Spear fishing	4	weekends	P	tako, papio, ul
12-Jan-04	1254	A	Sport fishing boat			C	
11-Jan-04	1019	B	Submarine			C	
11-Jan-04	1335	D	Submarine			C	
11-Jan-04		H	Submarine			C	
12-Jan-04	845	B	Submarine			C	
12-Jan-04	900	C	Submarine			C	
11-Jan-04		B	Sunbathe	2	everyday	P	
11-Jan-04			Sunbathe	4	3-4 x week	P	

CTIVITIES SURVEY

source sumption	Additional Comments	Name	Phone
o, moana	Has seen turtles.	Kapio	808-248-7664
iquid			
	Observed from other sublocation.		
	Observed from other sublocation.		
apio, ulua			
apio			
	30' sail boat traveling east to west.		
	Traveling north to south		
	Traveling south to north.		
	Traveling south to north.		
	60' sail boat traveling east to west.		
taapae			
humu, papi	Saw a monk seal about 10 months ago.		
pio, ulua			
	30' sport fishing boat traveling east to west.		
	Atlantis Submarine.		
	Atlantis Submarine.		
	Atlantis Submarine.		
	Atlantis Submarine.		

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumption
11-Jan-04	1600	H	Sunbathe	2		P	
11-Jan-04	1600	H	Sunbathe	2		P	
12-Jan-04	1507	B	Sunbathe	3		P	
12-Jan-04	1510	B	Sunbathe	1		P	
12-Jan-04	1534	B	Sunbathe	2		P	
12-Jan-04	1539	B	Sunbathe	1		P	
12-Jan-04	1648	B	Sunbathe	2		P	
12-Jan-04	1400	H	Sunbathe	2		P	
12-Jan-04	1430	H	Sunbathe	1		P	
12-Jan-04		H	Sunbathe	2		P	
12-Jan-04	1456	H	Sunbathe	5		P	
12-Jan-04		H	Sunbathe	3		P	
11-Jan-04	1647	H	Sunset watching	2		P	
11-Jan-04	1648	H	Sunset watching	2		P	
12-Jan-04	1646	H	Sunset watching	2		P	
12-Jan-04	1646	H	Sunset watching	1		P	
11-Jan-04	700	B	Surf	2	4 x week	P	
11-Jan-04	709	B	Surf	1	2 x week	P	
11-Jan-04	720	B	Surf	1	2 x week	P	
11-Jan-04	725	B	Surf	1	4 x week	P	
11-Jan-04	730	B	Surf	1	2 x week	P	
11-Jan-04	740	B	Surf	1	everyday	P	
11-Jan-04	743	B	Surf	1	2 x week	P	
11-Jan-04	745	B	Surf	1	4 x week	P	
11-Jan-04	750	B	Surf	1	3 x week	P	
11-Jan-04	755	B	Surf	2		P	
11-Jan-04	800	B	Surf	2	everyday	P	
11-Jan-04	800	B	Surf	2	everyday	P	
11-Jan-04	935	A	Surf			P	
11-Jan-04	940	A	Surf		Seasonal	P	
11-Jan-04	959	A	Surf		Yearly	P	
11-Jan-04	1000	A	Surf			P	
11-Jan-04	1005	A	Surf	1		P	
11-Jan-04	1420	A	Surf	3		P	
11-Jan-04	1443	A	Surf	1		P	
11-Jan-04	1600	A	Surf	3		P	
11-Jan-04	1010	B	Surf	6		P	
11-Jan-04	1021	B	Surf	2		P	

TIVITIES SURVEY

ource mption	Additional Comments	Name	Phone
	Tourists.		
	-		
	The beach park lacks parking. Has seen turtles.	John Kim, Park Maintenance	808-870-2840
		Bruce Anderson	808-572-8290
		Simon Park	808-276-3603
	Tourist.		
	concerned that surfboard rentals from surf shops do not provide sufficient information to tourists. In June 2004 the County of Maui will ban surf schools at 12 beach park locations.	Michael Knauer	808-205-7122
	Walks dogs daily. Concerned about the increase in surf schools using the beach park and parking area.	Pam Powers	808-298-1537
	Tourists.		
	As the Security Guard for the Puamana Complex he has observed surfing and fishing activities.		
	As a resident he has observed surfing, diving and fishing.		
	As a resident he has observed surfing mostly during the summer.		
	Tourist. He has observed surfing in this area.		
	Surfers in water upon arrival.		

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumptio
11-Jan-04	1022	B	Surf	2		P	
11-Jan-04	1024	B	Surf	2		P	
11-Jan-04	1026	B	Surf	4		P	
11-Jan-04	1028	B	Surf	1		P	
11-Jan-04	1035	B	Surf	1		P	
11-Jan-04	1037	B	Surf	2		P	
11-Jan-04	1046	B	Surf	2	2 x week	P	
11-Jan-04	1100	B	Surf	1	3 x week	P	
11-Jan-04	1210	B	Surf	11		P	
11-Jan-04	1210	B	Surf	1	4 x week	P	
11-Jan-04	1225	B	Surf	1	everyday	C	
11-Jan-04	1235	B	Surf	2	6 x week	P	
11-Jan-04	1236	B	Surf	2		P	
11-Jan-04	1241	B	Surf	5	2-5 x week	P	
11-Jan-04	1241	B	Surf	5	2-5 x week	P	
11-Jan-04	1241	B	Surf	2		P	
11-Jan-04	1241	B	Surf	2		P	
11-Jan-04	1241	B	Surf	2		P	
11-Jan-04	1246	B	Surf	2		P	
11-Jan-04	1249	B	Surf	1		P	
11-Jan-04	1250	B	Surf	2		P	
11-Jan-04	1251	B	Surf	1		P	
11-Jan-04	1252	B	Surf	5		P	
11-Jan-04	1305	D	Surf	3		P	
11-Jan-04	1315	D	Surf	2		P	
11-Jan-04	1420	D	Surf	1		P	
11-Jan-04	1400	B	Surf	15		P	
11-Jan-04	1425	B	Surf	1		P	
11-Jan-04	1429	B	Surf	2		P	
11-Jan-04	1434	B	Surf	1		P	
11-Jan-04	1440	B	Surf	3	2 x week	P	
11-Jan-04	1446	B	Surf	2		P	
11-Jan-04	1450	B	Surf	1		P	
11-Jan-04	1451	B	Surf	2		P	
11-Jan-04	1455	B	Surf	1		P	
11-Jan-04	1500	B	Surf	8	once a month	P	
11-Jan-04	1501	B	Surf	3		P	
11-Jan-04	1535	B	Surf	1		P	
11-Jan-04	1536	B	Surf	2		P	
11-Jan-04	1549	B	Surf	1		P	
11-Jan-04	1601	B	Surf	1		P	
11-Jan-04		B	Surf	2		P	

ACTIVITIES SURVEY

Resource Consumption	Additional Comments	Name	Phone
	Always sees turtles here.		
	Summer months are busier. Concerned with overuse of the beach park. Has seen turtles.	George Norton	808-986-1073
	Surfers in water upon arrival.		
	Has seen turtles. He is ok with proposed project.		808-385-7222
	He has approximately 21 clients on weekends per month. Has seen turtles, sharks, stingrays.	Mario of Surfdog (surf school/rentals)	
	Group was ok with the proposed project.		
	Observed from other sublocation.		
	Surfers in water upon arrival.		

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumptio
11-Jan-04	1643	B	Surf	1		P	
11-Jan-04	1650	B	Surf	1	everyday	P/C	
11-Jan-04		H	Surf	3		P	
11-Jan-04	732	H	Surf	1	varies	P	
11-Jan-04	738	H	Surf	2	2 x week	P	
11-Jan-04	752	H	Surf	2	1-2 x week	P	
11-Jan-04	752	H	Surf	1	3+ x week	P	
11-Jan-04	840	H	Surf	3	2 x month	P	
11-Jan-04	853	H	Surf	1	1 x month	P	
11-Jan-04	859	H	Surf	1		P	
11-Jan-04	1402	G	Surf	4		P	
	1000	H	Surf	15		P	
11-Jan-04			Surf	5	1 x week	P	
11-Jan-04	1009	H	Surf	2	2 x week	P	
11-Jan-04	1011	H	Surf	1		P	
11-Jan-04	1020	H	Surf	1		P	
11-Jan-04	1035	H	Surf	2	1 x month	P	
11-Jan-04	1037	H	Surf	2		P	
11-Jan-04	1053	H	Surf	4		P	
11-Jan-04	1214	E	Surf	4	3-4 x week	P	
11-Jan-04	1400	H	Surf	22		P	
11-Jan-04	1405	H	Surf	7		P	
11-Jan-04	1410	H	Surf	1	1 x month	P	
11-Jan-04	1412	H	Surf	2		P	
11-Jan-04	1413	H	Surf	9	3 x month	P	
11-Jan-04		H	Surf	11	5-6 x year	P	
11-Jan-04		H	Surf	3		P	
11-Jan-04		H	Surf	4	1x week	P	
11-Jan-04	1440	H	Surf	1	1 x week	P	
11-Jan-04	1444	H	Surf	3		P	
11-Jan-04	1453	H	Surf	3	first time at this beach	P	
11-Jan-04	1459	H	Surf	1		P	
11-Jan-04	1500	H	Surf	3	2-3 x year	P	
11-Jan-04	1500	H	Surf	2		P	
11-Jan-04	1500	G	Surf	7		P	
11-Jan-04	1513	G	Surf	3		P	
11-Jan-04	1515	G	Surf	2		P	
11-Jan-04	1612	H	Surf	2		P	
11-Jan-04	1620	H	Surf	3	2 x week	P	
11-Jan-04	1625	H	Surf	3	1 x year	P	
11-Jan-04	1635	H	Surf	1	20 x year	P	
12-Jan-04		B	Surf			P	

:TIVITIES SURVEY

ource imption	Additional Comments	Name	Phone
	Owner of Surfdog. He has seen turtles and a monk seal.	Spike	808-250-7873
	Concerned about ship breaking apart and causing a danger in the water.		
	Concerned about project's effect on surf.		
	Observed from other sublocation.		
	Surfers in water upon arrival.		
	Visiting - lived here before and surfed here a lot.		
	Has seen turtles in the water.		
	Birthday party group.		
	Surfers in water upon arrival.		
	Say that uses in area vary throughout the year.		
	Surfers in water upon arrival.		
	Also does kayaking once a year.		

Draft EIS
Twin Peaks Artificial Reef
Lahaina, Maui, Hawaii

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumptio
12-Jan-04	1010	B	Surf	2	2 x week	P	
12-Jan-04	1045	B	Surf	1	1 x week	P	
12-Jan-04	1301	A	Surf			P	
12-Jan-04	1535	A	Surf	1		P	
12-Jan-04	1310	B	Surf	1	3 x week	P	
12-Jan-04	1321	B	Surf	1	everyday	P	
12-Jan-04		B	Surf	3	2-3 x week	P	
12-Jan-04		B	Surf	2	everyday	P	
12-Jan-04	1500	B	Surf	3		P	
12-Jan-04		B	Surf	3		P	
12-Jan-04	1516	B	Surf	1		P	
12-Jan-04	1520	B	Surf	1		P	
12-Jan-04	1521	B	Surf	5		P	
12-Jan-04	1544	B	Surf	2		P	
12-Jan-04	1659	B	Surf	1	5 x week	C	
12-Jan-04	1000	H	Surf	2		P	
12-Jan-04	1000	H	Surf	3		P	
12-Jan-04	1010	H	Surf	2	2 x week	P	
12-Jan-04	1400	H	Surf	4		P	
12-Jan-04	1540	H	Surf	1		P	
11-Jan-04	1457	B	Surf	5	everyday	P	
12-Jan-04		B	Surf Schools (2 consistently)			C	
11-Jan-04		C	Surveyor Observation				
11-Jan-04		A	Surveyor Observation				
11-Jan-04	930	G	Surveyor Observation				
11-Jan-04	949	G	Surveyor Observation				
11-Jan-04		G	Surveyor Observation				
11-Jan-04		E	Surveyor Observation				
11-Jan-04		F	Surveyor Observation				

[03-1267.01]

ACTIVITIES SURVEY

Resource Consumption	Additional Comments	Name	Phone
	Tourists.		
	Has seen turtles. There are 2-3 surf schools at Puamana Beach Park. She does not feel that the proposed project would impact the shoreline.		
	He is employed by Surfdog. He is usually there mornings and afternoons to rent boards and teach surfing. Has seen turtles, no seals.	Tom	
		Chad	808-205-0924
	3 Surfers in the water upon arrival.		
	Local surfers state that the current along the shoreline changes constantly and daily.		
	Employed by Surfdog. Has 10-15 clients a week. Has seen turtles.	Donny	
	Surfers in water upon arrival.		
	Surfers in water upon arrival.		
	ok with the proposed project.		
	Two encampments were located in sublocation C. There were several (4-10) fishing pole holds along the shoreline in sublocation C.		
	There are condominiums near the shoreline. Residents usually picnic, sunbath, BBQ in their back lanai/backyard.		
	Turtle in water approximately 40' from shore at north end of sublocation.		
	Turtle in water approximately 40' from shore at north end of sublocation.		
	Someone is living camping inside culvert located in middle of sublocation.		
	There were three fishing pole holds along the shoreline at the south end of sublocation E.		
	South end of sublocation F has an access road to beach and there is evidence that camping occurs here.		

Date	Military Time	Sub-location	Activity	Number of Users	Frequency	Personnal/ Comercial	Resource Consumption
12-Jan-04	1400	D	Surveyor Observation			-	
11-Jan-04	1025	B	Swim	2		P	
11-Jan-04	1655	B	Swim	4		P	
11-Jan-04		H	Swim	4	1x week	P	
12-Jan-04	1513	B	Swim	1		P	
12-Jan-04	730	H	Swim	2		P	
12-Jan-04		H	Swim	5		P	
12-Jan-04	1617	H	Swim	3		P	
11-Jan-04	1429	H	Watching	1		P	
12-Jan-04	1501	H	Watching	2		P	
12-Jan-04	1645	H	Watching	2		P	
12-Jan-04	1659	H	Watching	1		P	
12-Jan-04	1030	H	Wedding photography	2		P	
11-Jan-04		B	Whale watch	2	once a month	P	
12-Jan-04		B	Whale watch	3	once a month	P	
12-Jan-04		B	Whale watch	2	5 x week	P	

CTIVITIES SURVEY

source umption	Additional Comments	Name	Phone
	No activities in the water or on the shoreline from 1400-1500.		
	Tourists.		
	Tourists watching from vehicle.		
	Potential surfer, surfboard on car.		

APPENDIX J

APPENDIX J

Boat Traffic Survey Summary

Draft EIS
Artificial Reef Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

BOAT TRAFFIC SURVEY
OBSERVATIONS NEAR DROP ZONE A

Date	Military Time	Vessel Make/Name	Length (est. ft.)	Power M=Motor S=Sail	Craft Type C=Commercial P=Private	Ocean Activity	Distance from Proposed Drop Zone A (est. ft.)	Compass Heading	Additional Comments
02-Dec-03	1110	Ocean Explorer	55	M	C	passing through	100 ft from A	N	
02-Dec-03	1135	Dominion	46	M	C	passing through	100 ft from A	N	
02-Dec-03	1150	Start Me Up	32	M	C	passing through	300 ft from A	N	
02-Dec-03	1210	Luckey Strike II	42	M	C	passing through	400 ft from A	N	
04-Dec-03	1050		21	M	P	passing through	300 ft from A	S	
04-Dec-03	1105	Ocean Explorer	54	M	C	passing through	300 ft from A	N	
04-Dec-03	1250	Judy Ann	42	M	C	passing through	500 ft from A	S	
05-Dec-03	1125	Tera Lani	55	M	C	passing through	700 ft from A	S	
05-Dec-03	1230	Judy Ann II	43	M	C	trolling	500 ft from A	S	
05-Dec-03	1357	Lahaina Princess	55	M	C	passing through	800 ft from A	N	
05-Dec-03	1419	Tera Lani	55	M	C	passing through	700 ft from A	N	
05-Dec-03	1610	Maui Princess	105	M	C	passing through	600 ft from A	S	
05-Dec-03	1700	Paragon	65	M	C	passing through	800 ft from A	S	
06-Dec-03	1038	Snorkle Cat	45	M	C	snorkeling	300 ft from A	S	
06-Dec-03	1105	Ocean Explorer	54	M	C	passing through	500 ft from A	N	
06-Dec-03	1150	Tera Lani	60	M	C	passing through	500 ft from A	N	
06-Dec-03	1226	Dominion	50	M	C	passing through	200 ft from A	N	
07-Dec-03	1055	Kiele V	50	S	C	passing through	1800 ft from A	SE	
07-Dec-03	1059	Shangrala	50	S	C	passing through	1800 ft from A	SE	
07-Dec-03	1215	Iwa Lele	35	M	C	passing through	400 ft from A	N	
08-Dec-03	938	Ocean Explorer	55	M	C	passing through	2640 ft from A	S	
08-Dec-03	1035	Rainbow Chaser	36	M	C	passing through	1000 ft from A	S	
09-Dec-03	1145	Dominion	46	M	C	passing through	300 ft from A	N	
09-Dec-03	1246	Lahaina Princess	65	M	C	passing through	2640 ft from A	N	
10-Dec-03	1100	Judy Ann II	45	M	C	passing through	500 ft from A	N	
10-Dec-03	1148	Scotch Mist	50	S	C	passing through	100 ft from A	S	
11-Dec-03	1330	Kiele V	55	M-S	C	passing through	600 ft from A	N	
12-Dec-03	1345	Kiele V	55	M-S	C	passing through	500 ft from A	N	
12-Dec-03	1730	Scotch Mist II	55	M-S	C	passing through	500 ft from A	N	
14-Dec-03	933	Lahaina Princess	65	M	C	whale searching	over A	NW	
15-Dec-03	1005	unknown	32	M	C	passing through	500 ft from A	S	
16-Dec-03	1230	Dominion	55	M	C	diving, passing through	500 ft from A	NW	
17-Dec-03	1102	Ocean Explorer	55	M	C	passing through	200 ft from A	NW	
17-Dec-03	1110	Lahaina Princess	65	M	C	passing through	200 ft from A	NW	
17-Dec-03	1146	Ocean Explorer	55	M	C	passing through	200 ft from A	SE	
17-Dec-03	1333	Kiele V	45	M-S	C	passing through	200 ft from A	NW	
17-Dec-03	1333	Kaulana	65	M	C	passing through	200 ft from A	NW	

BOAT TRAFFIC SURVEY
OBSERVATIONS NEAR DROP ZONE A

Date	Military Time	Vessel Make/Name	Length (est. ft.)	Power M=Motor S=Sail	Craft Type C=Commercial P=Private	Ocean Activity	Distance from Proposed Drop Zone A (est. ft.)	Compass Heading	Additional Comments
17-Dec-03	1450	Gemini	65	M-S	C	passing through	600 ft from A	NW	
18-Dec-03	940	Ocean Oddessy	65	M	C	whale watching	400 ft from A	NW	
19-Dec-03	1000	Tera Lani	55	M	C	passing through	700 ft from A	SE	
19-Dec-03	1105	Rainbow Chaser	45	M-S	C	passing through	500 ft from A	NW	
20-Dec-03	1130	Gemini	55	M	C	passing through	600 ft from A	SE	
20-Dec-03	1130	Milohi Pair	70	M	C	passing through	700 ft from A	NW	
20-Dec-03	1350	Kiele V	55	M	C	passing through	800 ft from A	NW	
21-Dec-03	1100	Kapalua Kai	60	M-S	C	passing through	300 ft from A	S	
21-Dec-03	1145	Gemini	65	M-S	C	passing through	100 ft from A	S	
21-Dec-03	1250	Dominion	55	M	C	passing through	600 ft from A	S	
21-Dec-03	1400	Trilogy IV	50	M-S	C	passing through	3 ft from A	N	
21-Dec-03	1405	Kapalua Kai	60	M-S	C	passing through	200 ft from A	N	
22-Dec-03	915	whales	N/A	N/A	N/A	heading south	500 ft from A	SE	three whales
22-Dec-03	1345	Lahaina Princess	55	M	C	passing through	800 ft from A	NW	
22-Dec-03	1405	Trilogy	65	M	C	passing through	1000 ft from A	NW	
23-Dec-03	1330	Kaulana	70	M	C	passing through	800 ft from A	NW	
23-Dec-03	1405	Trilogy	60	M	C	passing through	700 ft from A	NW	
24-Dec-03	908	Rainbow Chaser	45	M-S	C	passing through	100 ft from A	S	
24-Dec-03	1254	Judy Ann II	45	M	C	passing through	200 ft from A	N	fishing, trolling
24-Dec-03	1345	Kiele V	65	M-S	C	passing through	200 ft from A	N	
24-Dec-03	1350	Whale Express	32	M	C	passing through	400 ft from A	N	
24-Dec-03	1355	Manutea	45	M	C	passing through	400 ft from A	N	
24-Dec-03	1400	Judy Ann II	45	M	C	passing through	300 ft from A	S	trolling
24-Dec-03	1410	unknown	23	M	P	passing through	100 ft from A	S	
25-Dec-03	1000	Tera Lani	55	M-S	C	passing through	600 ft from A	S	
25-Dec-03	1345	Lahaina Princess	70	M	C	passing through	500 ft from A	N	
25-Dec-03	1415	Judy Ann II	45	M	C	trolling	600 ft from A	S	
26-Dec-03	940	fishing boat	15	M	P	passing through	1000 ft from A	NW	
26-Dec-03	1000	pleasure boat	15	M	P	passing through	1000 ft from A	SE	
26-Dec-03	1035	Kiele V	55	M	C	passing through	800 ft from A	SE	
26-Dec-03	1130	Dominion	48	M	C	passing through	800 ft from A	NW	
26-Dec-03	1345	Lahaina Princess	65	M	C	passing through	800 ft from A	NW	
27-Dec-03	1315	Dominion	43	M	C	passing through	600 ft from A	S	
27-Dec-03	1325	Dauntless	43	M	C	passing through	400 ft from A	S	
27-Dec-03	1345	Lahaina Princess	70	M	C	passing through	200 ft from A	N	
29-Dec-03	930	Ocean Explorer	55	M	C	passing through	400 ft from A	S	
29-Dec-03	1300	Judy Anne II	50	M	C	passing through	800 ft from A	NW	

BOAT TRAFFIC SURVEY
OBSERVATIONS NEAR DROP ZONE A

Date	Military Time	Vessel Make/Name	Length (est. ft.)	Power M=Motor S=Sail	Craft Type C=Commercial P=Private	Ocean Activity	Distance from Proposed Drop Zone A (est. ft.)	Compass Heading	Additional Comments
30-Dec-03	1400	Lahaina Princess	55	M	C	passing through	300 ft from A	N	
31-Dec-03	1240	Dominion	50	M	C	passing through	600 ft from A	NW	
05-Jan-04	938	Ocean Explorer	55	M	C	passing through	200 ft from A	S	
05-Jan-04	1030	Ocean Explorer	55	M	C	passing through	200 ft from A	N	
05-Jan-04	1130	Gemini	55	S	P	passing through	200 ft from A	S	
06-Jan-04	1350	Lahaina Princess	55	M	C	passing through	600 ft from A	NW	
07-Jan-04	1047	Kapalua Kai	55	M	C	passing through	1500 ft from A	SE	
07-Jan-04	1240	Dominion	45	M	C	passing through	600 ft from A	NW	
08-Jan-04	1122	Dauntless	48	M	C	passing through	over A	NW	
11-Jan-04	1115	Extended Horizons	35	M	C	passing through	300 ft from A	N	
12-Jan-04	900-1430					none			no activity.
13-Jan-04	910	Sundancer II	28	M	C	EIS diving			
13-Jan-04	1400	Wahine Ra	50	M-S	C	passing through	500 ft from A		
16-Jan-04	1735	Hinatea	55	M	C	passing through	300 ft from A	NW	
17-Jan-04	959	Humpback whale	45	N/A	N/A	breaching	50 ft from A	S	
17-Jan-04	1327	Lahaina Princess	65	M	C	molo transit	A	NW	
18-Jan-04	1140	whales	N/A	N/A	N/A	N/A		SE	
19-Jan-04	1350	Lahaina Princess	55	M	C	passing through	500 ft from A	NW	
20-Jan-04	945	Lahaina Princess	65	M	C	passing through	500 ft from A	N	
21-Jan-04	1130	Humpback whale	N/A	N/A	N/A	N/A	300 ft from A	N	
21-Jan-04	1149	Express	35	M	C	passing through	400 ft from A	NW	
22-Jan-04	1345	Lahaina Princess	65	M	C	passing through	100 ft from A	NW	
22-Jan-04	1406	SOL	65	M	C	passing through			
23-Jan-04	1715	Dominion	42	M	C	passing through	100 ft from A	NW	
25-Jan-04	1142	Tera Lani	49	M-S	C	passing through	100 ft from A	SE	
25-Jan-04	1519	Wiki Wahine	25	M	C	whale watching/passing through	200 ft from A	NW	
27-Jan-04	1050	:15 only	32	M	P	whale watching, bottom fishing		SE	
28-Jan-04	900	Sundancer II	30	M	C	EIS diving	over A		in area all day

BOAT TRAFFIC SURVEY
OBSERVATIONS NEAR FORMER DROP ZONES B AND C

Date	Military Time	Vessel Make/Name	Length (est. ft.)	Power M=Motor S=Sail	Craft Type C=Commercial P=Private	Ocean Activity	Distance from Former Drop Zone B or C (est. ft.)	Compass Heading	Additional Comments
02-Dec-03	1245	Kainoa	26	M	C	passing through	600 ft from C	N	
03-Dec-03	932	Ocean Explorer	55	M	C	passing through	300 ft from C	S	
03-Dec-03	1043	Kiele V	55	M	C	passing through	600 ft from C	S	
03-Dec-03	1242	fishing boat	40	M	C	passing through	over C	N	
03-Dec-03	1442	Gemini	65	S	C	dolphin watching	10 ft from B	N	dolphins at site
03-Dec-03	1200-1400	UFO parasail	25	M	C	parasailing	600 ft from B	N	
04-Dec-03	950	fishing boat	21	M	P	trolling	400 ft from C	S	
04-Dec-03	1140	Maui Princess	80	M	C	passing through	800 ft from C	N	
04-Dec-03	1240	Kainoa	32	M	C	passing through	800 ft from C	N	
04-Dec-03	1330	Dominion	46	M	C	passing through	500 ft from C	S	
05-Dec-03	1342	Off Off	25	S	P	passing through	200 ft from B	S	
06-Dec-03	1047	Whaler	10	M	P	trolling	200 ft from C	N	
06-Dec-03	1146	Gemini	60	M	C	passing through	300 ft from C	S	
07-Dec-03	1500	sailboat	20	S	P	passing through	2640 ft from C	W	
08-Dec-03	1145	UFO parasail	20	M	C	passing through	300 ft from B	E	
09-Dec-03	1200	Power Cat	26	M	P	passing through	500 ft from C	S	
09-Dec-03	1450	Scotch Mist II	45	S	C	passing through	300 ft from C	N	
10-Dec-03	958	Blue Nordic	17	M	C	passing through	1800 ft from C	N	parasailing
10-Dec-03	1300	fishing boat	20	M	C	passing through	1200 ft from C	S	
10-Dec-03	1454	Scotch Mist	50	S	C	passing through	800 ft from C	N	
12-Dec-03	1045	Scotch Mist II	55	M-S	C	passing through	600 ft from C	S	
12-Dec-03	1120	Start Me Up	50	M	C	passing through	1000 ft from C	N	
12-Dec-03	1400	Ocean Explorer	55	M	C	passing through	1000 ft from C	S	
13-Dec-03	926	Casey Ann	32	M	C	parasailing	300 ft from C	NW	
13-Dec-03	1047	Casey Ann	32	M	C	parasailing	100 ft from C	SE	
13-Dec-03	1126	Casey Ann	32	M	C	parasailing	1000 ft from C	SE	
13-Dec-03	1047	Kiele V	65	M-S	C	daytrip	500 ft from C	SE	
14-Dec-03	929	Lahaina Princess	65	M	C	whale searching	440 ft from C	E	
14-Dec-03	1140	Scotch Mist	36	S	C	sailing	370 ft from C	NW	
14-Dec-03	1408	Boston whaler	18	M	P	trolling	200 ft from C	SE	
15-Dec-03	1300-1530	Hookela	32	M	C	bottom fishing	1000 ft from C		
16-Dec-03	1055	Trilogy	65	M	C	passing through	2000 ft from C	S	
16-Dec-03	1404	Scotch Mist II	55	S	C	sailing	200 ft from C	S	
18-Dec-03	955	Napili Explorer	45	M	C	whale watching	500 ft from C	N	
18-Dec-03	1111	Bertram	36	M	C	fishing	375 ft from C	NW	
18-Dec-03	1207	fishing boat	26	M	P	passing through	350 ft from C	NW	
18-Dec-03	1245	Tera Lani	50	M-S	C	passing through	600 ft from C	N	

BOAT TRAFFIC SURVEY
OBSERVATIONS NEAR FORMER DROP ZONES B AND C

Date	Military Time	Vessel Make/Name	Length (est., ft.)	Power M=Motor S=Sail	Craft Type C=Commercial P=Private	Ocean Activity	Distance from Former Drop Zone B or C (est. ft.)	Compass Heading	Additional Comments
18-Dec-03	1300	Absolute	50	M	C	fishing	500 ft from C	N	
19-Dec-03	1550	Judy Ann II	46	M	C	fishing, trolling	100 ft from C	SE	
20-Dec-03	1116	fishing boat	20	M	P	passing through	300 ft from C	NW	
20-Dec-03	1126	sailboat	25	M	P	passing through	500 ft from C	SE	
20-Dec-03	1140	USCG cutter	100	M	C	passing through	600 ft from C	NW	
20-Dec-03	1410	Scotch Mist II	45	S	C	passing through	500 ft from C	SE	
20-Dec-03	1445	Scotch Mist II	45	M	C	passing through	500 ft from C	NW	
21-Dec-03	957	Tera Lani	65	M-S	C	passing through	100 ft from C	S	
22-Dec-03	1035	Kiele V	55	M	C	passing through	1000 ft from C	SE	
22-Dec-03	1355	Whale Express	35	M	C	passing through	800 ft from C	N	
22-Dec-03	1400	Judy Ann II	45	M	C	trolling	800 ft from C	SE	
23-Dec-03	1410	Ocean Explorer	54	M	C	passing through	1000 ft from C	S	
24-Dec-03	1055	Ariel II	45	M	C	passing through	200 ft from B,C	N	fishing, trolling
24-Dec-03	1110	Kiele V	65	M-S	C	passing through	400 ft from B,C	S	
24-Dec-03	1115	Ocean Explorer	55	M	C	passing through	800 ft from B,C	N	
25-Dec-03	1030	Judy Ann II	45	M	C	trolling	1000 ft from B,C	N	
26-Dec-03	1100	fishing boat	20	M	P	trolling	500 ft from C	SE	
28-Dec-03	1100	private yacht	75	M	P	passing through	1000 ft from C	SE	
28-Dec-03	1130	Whale Mist II	50	M	C	passing through	1000 ft from C	SE	
28-Dec-03	1145	whales	N/A	N/A	N/A	N/A	200 ft from C	SW	2-3 whales, tail slapping
28-Dec-03	1145	Maui Nui Explorer	45	M	C	whale watching	400 ft from C	NW	
28-Dec-03	1435	Absolute	35	M	C	trolling	500 ft from C	SE	
29-Dec-03	1230	fishing boat	20	M	P	passing through, trolling	600 ft from C	SE	
29-Dec-03	1305	Wahine Ra	50	M-S	C	passing through	400 ft from C	E	
30-Dec-03	1400	Paragon	55	M-S	C	passing through	800 ft from C	E	
30-Dec-03	1315	Ocean Explorer	55	M	C	passing through	100 ft from C	N	
31-Dec-03	1240	fishing boat	40	M	C	trolling	1000 ft from C	N	
31-Dec-03	1408	Judy Anne II	40	M	C	trolling	200 ft from C	N	
31-Dec-03	1604	USCG Rob	20	M	C	passing through	500 ft from C	NW	
01-Jan-04	845-1200					none			no activity due to rainy weather
02-Jan-04	845-1200					none			no activity due to rainy weather
03-Jan-04	845-1200					none			no activity due to rainy weather
04-Jan-04	1005	Lahaina Princess	65	M	C	whale watching	1000 ft from B,C	E	whales in area, but moved on
06-Jan-04	1250	Boston whaler	20	M	P	passing through	800 ft from C	SE	
06-Jan-04	1300	fishing boat	30	M	C	passing through	300 ft from C	NW	
07-Jan-04	1245	Reel Hood	35	M	C	passing through	300 ft from C	N	
07-Jan-04	1300	Ocean Parting	20	M	C	passing through	400 ft from C	NW	

BOAT TRAFFIC SURVEY
OBSERVATIONS NEAR FORMER DROP ZONES B AND C

Date	Military Time	Vessel Make/Name	Length (est. ft.)	Power M=Motor S=Sail	Craft Type C=Commercial P=Private	Ocean Activity	Distance from Former Drop Zone B or C (est. ft.)	Compass Heading	Additional Comments
07-Jan-04	1302	Rainbow Charm 2	50	M	C	passing through	1000 ft from C	N	
07-Jan-04	1315	No Problem	45	M	C	passing through	1000 ft from C	NW	
07-Jan-04	1400	fishing boat	20	M	P	passing through	800 ft from C	NW	
08-Jan-04	1025	Kiele V	50	M	C	passing through	500 ft from B	S	
09-Jan-04	930	Kamehameha	30	S	C	passing through	500 ft from B	S	
09-Jan-04	1302	OCOA	22	S	P	passing through	700 ft from B	SE	
10-Jan-04	1425	unknown sailboat	25	S	P	passing through	60 ft from C	SE	
10-Jan-04	1440	Maui Jim	55	M	P	passing through	300 ft from C	NW	
12-Jan-04	900-1430					none			no activity.
13-Jan-04	910	Sundancer II	28	M	C	EIS diving			
14-Jan-04						none			dive cancelled
15-Jan-04						none			dive cancelled
16-Jan-04	1043	Kapalua Kai	60	M	C	snorkel/passing through	C	SE	
16-Jan-04	1135	Lahaina Princess	65	M	C	passing through	200 ft from C	SW	
16-Jan-04	1740	Ocean Explorer	55	M	C	passing through	600 ft from B,C	NW	
17-Jan-04	1020	Tera Lani	50	M-S	C	whale watching/passing through	B/C	SE	
17-Jan-04	1215	Boston whaler	14	M	P	fishing	B/C		fishing on dive site
17-Jan-04	1247	Wahine Ra	52	M-S	C	whale watching/passing through	B/C	NW	
21-Jan-04	930	Maui Jim	60	M	P	passing through	600 ft from C	SE	
21-Jan-04	1600	Unreel	45	M	C	passing through	700 ft from C	NW	
23-Jan-04	1331	Dominion	42	M	C	passing through	400 ft from B,C	SE	
24-Jan-04	1045	Humpback whale	40	N/A	N/A	N/A	600 ft from B		Two whales
24-Jan-04	1100	Dolphins	6-7	N/A	N/A	N/A	over B,C		Two dolphins, hunting
25-Jan-04	1136	Gemini	49	M-S	C	passing through	100 ft from B,C	SE	
26-Jan-04	1300	sailboat	50	M	P	passing through	500 ft from C	NW	
29-Jan-04	1039	No Problem	55	M	C	trolling	800 ft from B,C	NW	
29-Jan-04	1230	Humpback whale	40	N/A	N/A	N/A	900 ft from B,C	NW	Two whales, slapping pectoral fin

Notes:
Former Drop Zones B and C were located in deeper water approximately 3,000 feet southwest from Drop Zone A.
Drop Zone B has been moved to a point approximately 1,500 feet southeast of Drop Zone A in water approximately 100 feet deep (Figure 1).

APPENDIX K

Comments on Draft Environmental Impact Statement (Draft EIS)

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD04/1602

November 23, 2004

James Walsh
Atlantis Submarines Hawaii, LLC
C/O BEI Environmental Services
311 Pacific Street
Honolulu, HI 96817

RE: Request for review and comment on the Draft Environmental Impact Statement for an Artificial Reef Installation Offshore of Puamana Beach Park, Lahaina, Maui

Dear James Walsh,

The Office of Hawaiian Affairs (OHA) is in receipt of your October 8, 2004, request for comments on the above project, which would include the installation of two artificial reefs. OHA thanks you for your patience and offers the following comments and concerns.

We do not generally promote dumping anything on our ocean floors, particularly as submerged lands are ceded lands, which OHA has constitutional and statutory mandates to protect and preserve. This project seems well-thought out, however, and we will rely on the input of other federal (i.e., the U.S. Fish and Wildlife Service, the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS), and the National Marine Fisheries Service) and state agencies to address concerns about potential impacts on federally endangered species such as the Hawaiian Green Sea Turtle, Humpback Whale, and Hawaiian Monk Seal (the latter two species and their environments which are also protected by the federal Marine Mammal Protection Act). OHA recognizes that some precedence has been set through the State's maintenance, since 1962, of the Keawakapu Artificial Reef within the HISWNMS and offshore of Kihei, Maui.

OHA has further concerns about any potential impacts to traditional and customary gathering, access and use rights in the area, both during and after the proposed artificial reef installation process. Recognized Native Hawaiian traditional and customary gathering, access and use rights should not be restricted – even during the installation process – except as necessary to ensure safety. If such safety-related restrictions are put in place, alternate access routes must be provided.

Thank you for the opportunity to comment. If you have further questions, please contact Heidi Guth at 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

CC: Office of Environmental Quality Control
235 South Beretania Street
Suite 702
Honolulu, HI 96813

Sam Lemmo
DLNR – Office of Conservation and Coastal Lands
1151 Punchbowl Street, Room 220
Honolulu, HI 96813

James Hayes
Director of Operations
BEI Environmental Services
311 Pacific Street
Honolulu, HI 96817

UNIVERSITY OF HAWAI'I AT MĀNOA
Environmental Center

November 22, 2004
RE 0742

Jim Walsh
Atlantis Submarines Hawai'i, LLC
658 Front Street, No. 175
Lahaina, Hawai'i 96761

Dear Mr. Walsh:

Draft Environmental Impact Statement (DEIS)
Artificial Reef Installation
Lahaina, Maui

Atlantis Submarines Hawai'i, LLC, plans the installation of two artificial reefs and an associated mooring buoy, offshore of Puamana Beach Park in order to alleviate pressure on the existing natural reef, promote reef and fish biomass for recreational and commercial purposes, and provide an educational opportunity to study the biomass increase over time. This project is located in a Conservation District; accordingly, a draft Environmental Impact Statement was prepared.

The Environmental Center conducted this review with the assistance of Michelle Teng, Civil and Environmental Engineering; and Kerry Halford, Environmental Center.

General Comments

This draft EIS is written clearly and covers most potential impacts and mitigation measures adequately. Two issues of concern with this project are the number of drop zones and the likelihood of vessel movement by large waves.

Drop Zones

In the letter addressed to Brian Kanenaka in Appendix B, three drop zones are mentioned: A, B, and C to be deployed at 90, 138, and 144 feet respectively. Nowhere in the draft EIS is a third drop zone discussed. Is this an oversight and if so, why is the third drop zone not mentioned throughout?

2500 Dole Street, Krauss Annex 18, Honolulu, Hawai'i 96822-2313
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

Wave Threat

On page 21 section 5.2.4, the draft EIS discusses large wave threats posed by swells generated by hurricanes and tsunamis. The depths of the dropped vessels, particularly at the more shallow site, are at a range susceptible to disruption resulting from very large wave action. The movement of a vessel submerged in water is proportional to the froude number, a dimensionless variable that relates the velocity of the liquid, the gravitational constant, and the depth of the liquid. For a water speed of 40 mph, the froude number is approximately one. As the speed on the water increases so does the froude number. When the froude number surpasses one, the terminology for this is supercritical, and an immersed vessel will disrupt the fluid flow and become unstable. Hurricanes and tsunamis are known to produce water speeds of up to 100 mph.

Although the proposed drop sites are ordinarily in waters protected from wave exposure, catastrophic storm or tsunami events may create atypical conditions under which severe waves are a possibility. *In the final EIS, this issue should be discussed more* meticulously.

Thank you for the opportunity to review this Draft EIS.

Sincerely,

John T. Harrison, Ph.D.
Environmental Coordinator

cc: OEQC
DLNR
BEI
James Moncur, WRRC
Michelle Teng
Kerry Halford

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc4@health.state.hi.us

November 22, 2004

Mr. James Walsh
Atlantis Submarines Hawai'i LLC
658 Front Street, No. 175
Lahaina, Hawai'i 96761

Mr. Samuel J. Lemmo, Administrator
Office of Coastal Lands and Conservation
Department of Land and Natural Resources, State of Hawai'i
1151 Punchbowl Street, Room 220
Honolulu, Hawai'i 96813

Ms. Jodie Pang
BEI Environmental Services, Inc.
311 Pacific Street
Honolulu, Hawai'i 96817

Dear Messrs. Walsh and Lemmo and Ms. Pang:

The Office of Environmental Quality Control has reviewed your draft environmental impact statement for the Atlantis Submarines Twin Peaks Artificial Reef off Puamana Beach in Lahaina and offers the following comments for your consideration and response.

1. ***Homeland Security Effects***: Please consult with the U.S. Coast Guard and discuss the role of recent rules governing offshore activities near ports and shorelines by the U.S. Department of Homeland Security on activities proposed.

Thank you for the opportunity to comment. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

November 22, 2004

Mr. James Walsh
Atlantis Submarines Hawaii, LLC
c/o BEI Environmental Services
311 Pacific Street
Honolulu, HI 96817

Dear Mr. Walsh:

RE: Draft Environmental Impact Statement for the Artificial Reef Installation, Offshore of Puamana Beach Park, Lahaina, Island of Maui, Hawaii (LTR 2004/3910)

The Maui Planning Department (Department) has reviewed the above referenced document and recommends maximizing the exposed substrate area to enhance coral growth.

Further, the Department is forwarding comments from the University of Hawaii, Sea Grant Extension Service regarding the project.

Thank you for the opportunity to comment. Should you require additional clarification, please contact Ms. Kivette A. Caigoy, Environmental Planner, at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:KAC:do
Enclosure
c: Wayne A. Boteilho, Deputy Planning Director
Clayton I. Yoshida, AICP, Planning Program Administrator
Kivette A. Caigoy, Environmental Planner
OEQC
DLNR, Office of Conservation and Coastal Lands
Project File
General File
K:\WP_DOCS\PLANNING\EIS\2004\3910_ArtReefInstallation.wpd

NOV 24 2004

UNIVERSITY OF HAWAI'I

Sea Grant Extension Service
Maui Community College

11/19/2004

Atlantis Submarines Hawaii, LLC
C/O BEI Environmental Services
311 Pacific Street
Honolulu, HI, 96817

Dear Mr. Walsh,

Re: Draft EIS, Artificial Reef Installation, Offshore of Puamana Beach Park

Thank you for the opportunity to comment on this application.

As the Carthaginian will be placed at a depth of approximately 100 feet, it is very unlikely that this will have a negative effect on coastal processes, sediment supply or sediment transport to nearby beaches. The stability analysis provided by Sea Engineering thoroughly addresses all other potential issues related to oceanographic conditions.

Sincerely,

Zoe Norcross-Nu'u
Sea Grant Coastal Processes Extension Agent, Maui County

310 Kaahumanu Avenue Kahului, Maui, HI 96732 Telephone: (808) 984-3335 Facsimile (808) 243-4623
E-Mail: norcross@hawaii.edu

ARTIFICIAL REEF OFFSHORE OF PUAMANA BEACH PARK PUBLIC COMMENT FORM

Name: Vicki McCarty
Address: P.O. Box 1224
Lahaina HI 96764

Email: Vmcarty@aol.com.
Telephone:

Comment: Please take the rigging off the ship — so it does not harm TURtles & other marine life

Mail to:
Mr. Jim Hayes
BEI Environmental Services
311 Pacific Street
Honolulu, HI 96817

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Pacific Islands Regional Office
1601 Kapiolani Boulevard, Suite 1110
Honolulu, Hawaii 96814-0047

November 22, 2004

Atlantis Submarines Hawaii, LLC
C/O BEI Environmental Services
311 Pacific Street
Honolulu, HI 96817
Attn: Mr. James Walsh

RE: Draft Environmental Impact Statement, Artificial Reef Installation Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii

Please reference Consultation No. I-PI-04-324:MMD

Dear Mr. Walsh:

This letter provides comments of the National Marine Fisheries Service, Pacific Islands Regional Office, Protected Resources Division (PRD) on the Draft Environmental Impact Statement (DEIS) for the Artificial Reef Installation Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii, dated October 8, 2004. The National Marine Fisheries Service (NOAA Fisheries) is charged with implementing statutory authorities under the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 *et seq.*) and the Marine Mammal Protection Act of 1972 (MMPA), as amended (16 U.S.C. 1361 *et seq.*) and, thus, PRD is authorized to provide comments in this capacity for protected marine species present in the central and western Pacific.

PRD has several comments on the DEIS, as follows:

1. Section 7.1.3. Short-term impacts to marine mammals. Because not only whales but dolphins, Hawaiian monk seals, and sea turtles are present in the project area, potential short term impacts to these species should be considered as well. (Please also note that, because this section appears to be the only one addressing short-term impacts to marine protected species, the title should be revised to incorporate marine turtles in addition to marine mammals.) Because these species are present year-round, mitigation to minimize impacts to whales alone is not sufficient to protect these other protected species. This section should include a discussion of the possible types of impacts, and the likely mitigation measures associated with them (e.g., turbidity, noise, etc.)

2. Section 7.2.2. Long-term impacts to marine mammals.

   - Please revise the title of this section to incorporate impacts to marine turtles as well as marine mammals.

   - The long-term impact associated with the potential entanglement hazard posed by the project needs greater discussion. The Carthaginian, as pictured in Photo 2 in the DEIS, still retains a significant amount of rigging. On page 47, however, the text indicates that the rigging on the

vessel has been dramatically reduced. As a result, it is unclear how much rigging actually remains on the vessel. To the extent that Photo 2 does not accurately depict the state of the vessel upon sinking, an updated photo would be useful to understanding the vessel's status and to evaluating potential marine mammal entanglement hazards. However, assuming the vessel will be sunk as pictured in Photo 2, the rigging may pose a significant entanglement hazard to Hawaiian monk seals, sea turtles, and dolphins. In addition to the Nitta and Henderson study cited in the DEIS, whales have been observed to become entangled in taut lines (contact Dr. David Mattila, Hawaiian Islands Humpback Whale National Marine Sanctuary, for examples). The submerged mooring buoy line could also present an entanglement hazard, because it appears to involve a slack line. This section should more fully explore the possibility of this type of entanglement and potential mitigation measures; such as reductions in the number of lines and/or amount of rigging (and related sections should be modified in parallel as appropriate).

- The analysis assumes that the ecosystem type affected by the proposed project (i.e., soft, sandy bottom) provides no foraging opportunities or habitat of value to protected resources, and that a reef ecosystem will have an inherent net benefit by offering greater biodiversity in the area. Recent research on Hawaiian monk seal foraging behavior, however, suggests that seals forage in sandy bottom areas and possibly other non-reef areas. The document should cite sources to identify whether the project could affect food sources (e.g., algae and bottomfish), resting areas, foraging patterns, or other habitat requirements for sea turtles, monk seals, and dolphins. Please contact Dr. Bud Antonelis, of the NOAA Fisheries Pacific Islands Fisheries Science Center Protected Species Division, for specific studies, data, and references to address these research questions. In particular, Dr. Charles Littnan, the monk seal foraging ecologist on Dr. Antonelis's staff in the Protected Species Division, is involved in an ongoing "crittercam" study of monk seal foraging behaviors. Mr. George Balazs, also on Dr. Antonelis's staff in the Protected Species Division, can provide detailed foraging and habitat information for sea turtles.

- The project is described as encompassing approximately one acre, with the Carthaginian placement encompassing one-half of that acre (Drop Zone A) and a future artificial reef being established at the other half acre (Drop Zone B). The description of the affected environment suggests that this acre represents a minimal portion of available habitat of similar type in the area (i.e., one acre out of approximately 175 total acres). However, the discussion should be expanded to consider the potential for the artificial reef to change the environment in areas adjacent to the one-acre project area. In particular, while an effect on one acre may seem insignificant if the remainder of the non-reef area remains the same, there may be significant impacts if the presence of the artificial reef causes changes in areas outside of the project area (i.e., installation of a reef ecosystem may have corollary effects on nearby non-reef areas, enlarging the impact). This concept should be discussed and evaluated.

- The fact that the Keawakapu artificial reef is present in the Hawaiian Islands Humpback Whale National Marine Sanctuary and there have been no reports of entanglements does not necessarily mean that the Carthaginian would not pose an entanglement hazard. The level of hazard will depend on prior removal of entangling rigging.

PRD appreciates the opportunity to comment on the DEIS. Please contact me at telephone (808) 973-2937 and fax (808) 973-2941 with further questions or comments regarding this letter.

Sincerely,

Tamra Faris

Tamra Faris, Assistant Regional Administrator
Protected Resources Division

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF: OCCL:DH

Atlantis Submarine

MAR - 8 2005

James Hayes
Director of Operations
BEI Environmental Services
311-B Pacific Street
Honolulu, Hawaii 96817

Dear Mr. Hayes,

SUBJECT: Atlantis Submarine Draft Final Environmental Statement

The Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL) has reviewed your Draft Final Environmental Statement (FEIS) located offshore of Puamana Beach Park, Lahaina, Island of Maui, submitted on January 10, 2005.

The OCCL is attaching the comments from the Division of Aquatic Resources (DAR) regarding the proposed artificial reef project. The OCCL notes Atlantis Submarine may wish to address the concerns regarding the species lists for invertebrates, algae and revise the fish specie list, and GPS coordinates (**Exhibit 1**).

The OCCL Atlantis Submarine may wish to further discuss the following sections:

- Section 4.2 Alternative Reef Sites – the section should mention the prior Drop Zone locations and identify where they were located in conjunction to the two Drop Zones;
- Section 5.0 Environmental Setting - Atlantis Submarine should revise all the text in the Draft FEIS regarding Drop Zone A (MB # 3 as identified in the Figure # 4);
- When discussing Hawaii Administrative Rules (HAR), please identify which department and/or division the HAR the document is referring to;
- Section 5.3 Marine Biology – please discuss why the survey did not account for larger organisms known to be present in the project site area;
- Section 5.3.2 Other Marine Biology – please discuss whether more recent data 2004 –2005 exists regarding marine biology;
- Section 5.4 Water Quality – please describe whether the water chart describes an individual site or is a compilation of all sites;

- Section 5.5.3 Concerns Noted During Interview Responses – please discuss what steps, impacts, and/or mitigation measures Atlantis Submarine is taking to address the concerns stated by interviewees;
- Section 6.3 Other Ocean Activities – please discuss the mitigation measures that Atlantis Submarine will take regarding the prohibited activities in the HIHWNMS (i.e. what may happen when a submarine tour is within the proposed Drop Zone A and a whale is in the vicinity, or loss of habitat);
- Section 7.1.3 Marine Mammal and Turtle Disturbance – please discuss the long term impacts of possible loss of habitat for whales; and
- Section 7.2.1 Environmental Alteration – please change the text to reflect MB # 3 studies in regards to this section.

The OCCL still has concerns over the level of environmental and project disclosure, and analysis regarding the development of Drop Zone B.

Should you have any questions on any of these conditions, please feel free to contact me of our Office of Conservation and Coastal Lands at 587-0381.

Aloha,

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

CC: Division of Aquatic Resources
County of Maui Planning Department
Maui Land District Office

STATE OF HAWAII
Department of Land and Natural Resources
Division of Aquatic Resources

MEMORANDUM

To: Francis Oishi, Acting Administrator
Via: Alton Miyasaka, Acting Program Manager
From: Tony Montgomery, Aquatic Biologist
Subject: Comments on Draft Final Environmental Impact Statement for Artificial Reef Installation offshore of Puamana Beach Park, Lahaina, Maui, Hawaii

Comments Requested By: Samuel J. Lemmo, Administrator, Conservation and Coastal Lands

Date of Request: 210/05 **Date Received:** 2/10/05

Summary of Project

Title: Artificial Reef Installation Offshore of Puamana Beach Park, Lahaina, Maui, Hawaii

Project by: Atlantis Submarines Hawaii LLC

Prepared By: BEI Environmental Services

Location: Beach Park, Lahaina, Maui, Hawaii

Brief Description:

The applicant proposes to install two artificial reefs offshore of Puamana Beach Park, Maui, Hawaii. One artificial reef would be the vessel, the Carthaginian, and the other artificial reef would additional vessels or engineered artificial reef structures. The drop zones would be one-half acre each approximately 3,100 feet offshore at a water depth of 100 feet deep.

The purpose of the proposed project is three-fold: 1) alleviate pressure on the existing natural reef system from overuse, 2) promote reef and fish biomass increase for commercial and recreational users, primarily divers, and 3) provide an educational opportunity to study the biomass increase over time.

Comments:

According to Appendix A Brian Kanenaka commented on the draft EIS Preparation Notice. All comments were subsequently addressed in a response letter and are included in the current draft EIS.

The draft EIS does not explicitly state exact GPS coordinates for the drop zones or zone area. This is useful information in determining the location in relation to various map data currently available. We request these coordinates be provided to DAR for further investigation to compare documented resources to known mapped resources.

Surveys for the proposed area were conducted by The Oceanic Institute. A species list was created for fish, but one was not created for invertebrates and algae. This should be created in order to develop baseline information on species diversity in the proposed area. Often there are alien species concerns associated with artificial reefs, but without a baseline species information, these concerns

cannot be addressed or understood. In addition, the fish species list may not be complete. Plate 4 in The Oceanic Institute report (Appendix H) shows several individuals of Pseudantias bicolor, Hawaiian Bicolor Anthias. However, this species is not included in the species list (Table 4). This brings into question the thoroughness of the list and surveys.

The general evaluation and conclusion of the area's habitat seems reasonable. Unless there is undocumented relief in the area or other unusual resource, there would be no expected significant impact in the area. However, more specifics on the area (GPS coordinates) and a better species list would allow a more thorough evaluation.

Final Environmental Impact Statement
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

APPENDIX L

Responses to Comments on Draft EIS

BES
BEI Environmental Services

April 28, 2005
BES Project No.: 03-1267.01

Vicki McCarty
P.O. Box 12245
Lahaina, Hawaii 96761

Subject: **Response to Comments of Draft Environmental Impact Statement**
Atlantis Submarines
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. McCarty:

Thanks you for attending the public meeting regarding the above-referenced project on October 18, 2004 and submitting a written comment. Your comment was:

Please take the rigging off the ship – so it does not harm whales and other marine life.

As a result of your comment and those of others, Atlantis will remove the rigging with a net/ladder-like appearance and the topmast (the middle section of the original 3-section mast) will be removed from the Carthaginian prior to deployment. Rigging left on the vessel will be the minimum necessary to hold the remaining mast in place. The remaining rigging is all metal cable and will be taught. Experts in marine mammal and sea turtle entanglement have reviewed the condition of the vessel and believe it will not be an entanglement hazard.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Jim Walsh, Atlantis Submarines

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

Attachment:

BES letter dated April 28, 2005 to NMFS regarding Response to Comments of Draft Environmental Impact Statement

cc: Jim Walsh, Atlantis Submarines

BES
BEI Environmental Services

April 28, 2005
BES Project No.: 03-1267.01

Clyde W. Namu'o
Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Subject: **Response to Comments of Draft Environmental Impact Statement**
Atlantis Submarines
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Namu'o:

Thanks you for your letter dated November 23, 2004 commenting on the above-referenced project. Your letter indicated:

> *OHA generally does not promote dumping anything on our ocean floors, particularly as submerged lands are ceded lands, which OHA has constitutional and statutory mandates to protect and preserve. This project seems well-thought out, however, and OHA will rely on the input of other federal (i.e., the U.S. Fish and Wildlife Service, the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS), and the National Marine Fisheries Service) and state agencies to address concerns about potential impacts on federally endangered species such as the Hawaiian Green Sea Turtle, Humpback Whale, and Hawaiian Monk Seal (the latter two species and their environments which are also protected by the federal Marine Mammal Protection Act).*

The Protected Resources Division of the National Marine Fisheries Service's (NMFS) Pacific Islands Regional Office did comment on the Draft EIS. We have attached our letter responding to their comments, which also presents their comments. BES has addressed the NMFS' comments in the Final Environmental Impact Statement (FEIS), which you will receive in distribution from the DLNR. The FEIS also includes all the comment letters received and each response.

The long-term impact on the surrounding area is discussed in Section 7.2.1 of the EIS. In the DEIS, this section included a discussion of the primary issue historically related to artificial reefs and their impact on the surrounding area: fish aggregation. This section has been expanded in the FEIS to discuss other possible impacts on the surrounding area to address your comment. Additions have been made to Sections 7.2.1 include:

"It has been suggested that the placement and long-term presence of the artificial reef will not only impact the sandy bottom immediately beneath it but also the surrounding area. However, the artificial reefs proposed for installation are not anticipated to have a significant impact on the surrounding sandy-bottom area over the long term. No significant impacts are expected because, unlike aquaculture operations, the only alteration to the environment is the placement of a substraight for naturally occurring marine life to grow on and live around. No outside nutrients or organisms will be introduced to the environment as part of the project. Therefore, the only impact to the surrounding area would be the same as for a sandy-bottom area around a natural reef."

Sixth Comment

The fact that the Keawakapu artificial reef is present in the Hawaiian Island Humpback Whale National Marine Sanctuary and there have been no report of entanglements does not necessary mean that the Carthaginian would not pose an entanglement hazard. The level of hazard will depend on prior removal of entangling rigging.

We agree with your comment. The fact that there are no reported entanglements at the Keawakapu artificial reef only indicates that the materials used at the Keawakapu reef have not resulted in entanglement of marine mammals or turtles. Only if the same materials are used at the proposed artificial reef does this suggest there will not be any entanglements at the proposed reef. The vessel deployed at the Keawakapu artificial reef is a 63-foot former longliner with no rigging. As a result of your comment and other received, the net/ladder-like portions of the rigging and the topmast (the middle section of the original 3-section mast) will be removed from the Carthaginian prior to deployment and the mooring buoy will be a high buoyancy buoy. This will further mitigate entanglement hazards.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Jim Walsh, Atlantis Submarines

greater than necessary buoyancy to keep the line stiff and relatively tight. Another alternative is to place 3 to 4 foot long sections of PVC pipe over the line to make it semi-rigid. The Final EIS indicates the mooring buoy will be a high buoyancy buoy in order to increase the tension on the line and mitigate entanglement concerns.

Fourth Comment

Section 7.2.2. The analysis assumes that the ecosystem type affected by the proposed project (i.e., soft, sandy bottom) provides no foraging opportunities or habitat of value to protected resources, and that a reef ecosystem will have an inherent net benefit by offering greater biodiversity in the area. Recent research on Hawaiian monk seal foraging behavior, however, suggests that seals forage in sandy bottom areas and possibly other non-reef areas. The document should cite sources to identify whether the project could affect food sources (e.g., algae and bottomfish), resting areas, foraging patterns, or other habitat requirements for sea turtles, monk seals, and dolphins. Please contact Dr. Bud Antonelis, of the NOAA Fisheries Pacific Island Fisheries Science Center Project Species Division, for specific studies, data, and references to address these research questions. In particular, Dr. Charles Littnan, the monk seal foraging ecologist on Dr. Antonelis's staff in the Protected Species Division, is involved in an ongoing "crittercam" study of monk seal foraging behaviors. Mr. George Balazs, also on Dr. Antolelis's staff in the Protected Species Division, can provide detailed foraging and habitat information for sea turtles.

The DEIS did not say the current sandy-bottom habitat "provides no foraging opportunities or habitat of value to protected resources." The DEIS said and FEIS says that the current sandy-bottom habitat is relatively barren and similar conditions exist in at least a 175-acre area around the proposed artificial reef site. Based on this, the EIS concludes that creating a 1-acre artificial reef will not significantly impact the existing habitat, whether it is a valuable habitat to protected resources, or not. Furthermore, the EIS suggests the presence of an artificial reef in the sandy area will likely benefit organisms in the surrounding sandy area through increased nutrient flux. Subsequent discussions with experts on protected species (monk seals and turtles) and observations made at the Waikiki artificial reef by Atlantis suggest the presence of the artificial reef, which will create vertical relief in the project area, may help open the area to foraging by protected species.

Significant subsections regarding dolphins, seals, and turtles have been added to FEIS Sections 5.3.2, 7.1.3, and 7.2.2. A discussion of the artificial reef's potential impact on the surrounding sandy-bottom area is discussed in response to the next comment.

Fifth Comment

The project is described as encompassing approximately one acre, with the Carthaginian placement encompassing on-half of that acre (Drop Zone A) and a future artificial reef being established at the other half acre (Drop Zone B). The description of the affected environment suggests that this acre represents a minimal portion of available habitat of similar type in the area (i.e., one acre out of approximately 175 total acres). However, the discussion should be expanded to consider the potential for the artificial reef to change the environment in areas adjacent to the one-acre project area. In particular, while an effect on one acre may seem insignificant if the remainder of the non-reef area remains the same, there may be significant impacts if the presence of the artificial reef causes changes in areas outside of the project area (i.e., installation of a reef ecosystem may have corollary effects on nearby non-reef areas, enlarging the impact). This concept should be discussed and evaluated.

Second Comment

Section 7.2.2. Long-term impacts to marine mammals. Please revise the title of this section to incorporate impacts to marine turtles as well as marine mammals.

Section 7.2.2 of the FEIS is now titled "Marine Mammal and Turtle Disturbance and Entanglement."

Third Comment

Section 7.2.2. The long-term impact associated with the potential entanglement hazard posed by the project needs greater discussion. The Carthaginian, as pictured in Photo 2 in the Draft EIS, still retains a significant amount of rigging. On Page 47 of the Draft EIS, however, the text indicates that the rigging on the vessel has been dramatically reduced. As a result, it is unclear how much rigging actually remains on the vessel. To the extent that Photo 2 does not accurately depict the state of the vessel upon sinking, an update photo would be useful to understanding the vessel's status and to evaluating potential marine mammal entanglement hazards. However, assuming the vessel will be sunk as pictured in Photo 2, the rigging may pose a significant entanglement hazard to Hawaiian monk seals, sea turtles, and dolphins. In addition to the Nitta and Henderson study cited in the Draft EIS, whales have been observed to become entangled in taut lines (contact Dr. David Mattila, Hawaiian Islands Humpback Wale National Marine Sanctuary, for examples). The submerged mooring buoy line could also present an entanglement hazard, because it appears to involve a slack line. This section should more fully explore the possibility of this type of entanglement and potential mitigation measures; such as reductions in the number of lines and/or amount of rigging (and related sections should be modified in parallel as appropriate).

The plan was to deploy the Carthaginian as it appears in Photo 2. This photograph and rigging details were presented to the Hawaiian Islands Humpback Wale National Marine Sanctuary, including Dr. David Mattila, prior to preparation of the Draft EIS. BES spoke further with Dr. Mattila after receiving this comment. Generally, Dr. Mattila agrees that fewer, shorter, and tighter/stiffer cables and lines are preferred; but the condition of the Carthaginian in Photo 2 is acceptable although he would like to see the number of lines minimized to the extent possible. According to Dr. Mattila, entanglements issues with taut lines had arisen when the lines are much longer and not too tight (i.e., aquaculture cages, fish weirs). In addition, Mr. George Balazs, of the NOAA Fisheries Pacific Island Fisheries Science Center Project Species Division, indicated the rigging in Photo 2 did not present a significant turtle entanglement concern but suggested rusting sharp pieces of cable strands could be abrasive to turtles and divers visiting the site. The rusting and abrasion is not considered a significant long-term impact because by the time the rigging starts to degrade it will likely have marine organisms living on it, which will shield turtles and others from possible abrasions. Furthermore, there are many natural sharp objects on coral reefs, possible small sharp objects resulting from rigging deterioration are not considered significantly different from these natural sharp objects. As a result of your comment and those received from others, Atlantis will remove the net/ladder-like portions of the rigging and the topmast (the middle section of the original 3-section mast) that appear in Photograph 2 before the Carthaginian is deployed as an artificial reef.

The mooring line is not a slack line; the buoyancy of the buoy at the end of the line keeps the line tight. Tight is a relative term and the mooring buoy is not as tight as the remaining rigging. Dr. Mattila suggested using a chain or wire cable instead of rope and a buoy with

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BEI Environmental Services

April 28, 2005
BES Project No.: 03-1267.01

Tamra Faris
Assistant Regional Administrator
Protected Resources Division, Pacific Islands Regional Office
National Marine Fisheries Service, National Oceanic and Atmospheric Administration
U.S. Department of Commerce
1601 Kapiolani Boulevard, Suite 1110
Honolulu, Hawaii 96814-0047

Subject: **Response to Comments of Draft Environmental Impact Statement**
Atlantis Submarines
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. Faris:

Thanks you for your letter dated November 22, 2004 commenting on the above-referenced project. We have addressed your comments in the Final Environmental Impact Statement (FEIS), which you will receive in distribution from the DLNR, and present our responses to your comments below.

First Comment

Section 7.1.3 (of the Draft EIS). Short-term impacts to marine mammals. Because not only whales but dolphins, Hawaiian monk seals, and sea turtles are present in the project area, potential short term impacts to these species should be considered as well. (Please also note that, because this section appears to be the only one addressing short-term impacts to marine protected species, the title should be revised to incorporate marine turtles in addition to marine mammals.) Because these species are present year-round, mitigation to minimize impacts to whale alone is not sufficient to protect these other protected species. This section should include a discussion of the possible types of impacts, and the likely mitigation measure associated with them (e.g., turbidity, noise, etc.).

In response to this comment, Section 7.1.3 of the Final Environmental Impact Statement (FEIS) is now titled "Marine Mammal and Turtle Disturbance." The section has been expanded significantly to address short-term impacts to marine mammals. The FEIS indicates that in order to mitigate short-term impacts on protected species, artificial reefs will not be installed if any marine mammals or turtles are observed in the area. Prior to artificial reef installation, scuba divers or the Atlantis submarine will survey the target Drop Zone for the presence of any dolphins, seals, and turtles. If any are present, the artificial reef installation will be postponed until the dolphins, seals, or turtles are no longer visible in the area.

range susceptible to disruption resulting from very large wave action. The movement of a vessel submerged in water is proportional to the froude number, a dimensionless variable that relates the velocity of the liquid, the gravitational constant, and the depth of the liquid. For a water speed of 40 mph, the froude number is approximately one. As the speed on the water increases so does the froude number. When the froude number surpasses one, the terminology for this is supercritical, and an immersed vessel will disrupt the fluid flow and become unstable. Hurricanes and tsunamis are known to produce water speeds of up to 100 mph.

Although the proposed drop sites are ordinarily in waters protected from wave exposure, catastrophic storm or tsunami events may create atypical conditions under which severe waves are a possibility. In the final EIS, this issue should be discussed more meticulously.

The University of Hawaii Sea Grant Extension Service at Maui Community College indicated, "The stability analysis provided by Sea Engineering thoroughly addresses all other potential issues related to oceanographic conditions." (Comment letter dated September 19, 2004.)

Sea Engineering, Inc. selected the worst case waves expected to occur at the project site and then used standard ocean engineering techniques to calculate the forces on various components of the Carthaginian (i.e., hull and mast). These techniques calculate near bottom water velocities under the design wave conditions (EIS Appendix E), and then the resulting forces of the Carthaginian are calculated. The methods are supported by wave theory and empirical measurements.

Tsunamis in 100 feet of water will result in rising and falling water levels over a period of 15 to 20 minutes. Forces on the sea bottom will be minimal and are not a design constraint. They can result in high velocities on land, during the uprush and downrush of the water, particularly if buildings or the topography channelizes it.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Jim Walsh, Atlantis Submarines

BES
BEI Environmental Services

April 28, 2005
BES Project No.: 03-1267.01

John T. Harrison, Ph.D.
Environmental Coordinator
Environmental Center
University of Hawaii at Manoa
2500 Dole Street, Krauss Annex 19
Honolulu, Hawaii 96822-3980

Subject: **Response to Comments of Draft Environmental Impact Statement**
Atlantis Submarines
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Harrison:

Thanks you for your letter dated November 22, 2004 commenting on the above-referenced project. We have addressed your comments in the Final Environmental Impact Statement (FEIS), which you will receive in distribution from the DLNR, and present our responses to your comments below.

First Comment

Drop Zones: In the letter addressed to Brian Kanenaka in Appendix B, three drop zones are mentioned: A, B, and C to be deployed at 90, 138, and 144 feet respectively. Nowhere in the draft EIS is a third drop zone discussed. Is this an oversight and if so, why is the third drop zone not mentioned throughout?

The letters in Appendix B of the Draft EIS dated October 8, 2004 are responses to agency comments on the EIS Preparation Notice for the project, which was dated October 23, 2003. In the EIS Preparation Notice the proposed project included the three Drop Zones you mention in your comment. Based on comments received on the EIS Preparation Notice and other input received during the production of the Draft EIS, the number and location of Drop Zones was revised to the two presented in the Draft EIS. The primary reason for the change from the three Drop Zones presented in the EIS Preparation Notice to the two Drop Zones presented in the Draft EIS was so that the all the Drop Zones were in water no more than 100 feet deep, allowing relatively low risk to recreational divers.

Second Comment

Wave Threat: On page 21 section 5.2.4, the draft EIS discusses large wave threats posed by swells generated by hurricanes and tsunamis. The depths of the dropped vessels, particularly at the more shallow site, are at a

BES
BEI Environmental Services

April 28, 2005
BES Project No.: 03-1267.01

Genevieve Salmonson
Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Subject: **Response to Comments of Draft Environmental Impact Statement**
Atlantis Submarines
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Ms. Salmonson:

Thanks you for your letter dated November 22, 2004 commenting on the above-referenced project. Your comment was:

Homeland Security Effects: Please consult with the U.S. Coast Guard and discuss the role of recent rules governing offshore activities near ports and shorelines by the U.S. Department of Homeland Security on activities proposed.

BES researched your comment and found that Homeland Security rules only become more stringent for vessels that carry 150 passengers or more. At Lahaina Harbor no boat carrying more than 149 passengers is allowed to enter the harbor. Therefore, Homeland Security rules do not apply to the project site area and will not have any impact on the proposed project.

Should you have any questions, please do not hesitate to call.

Sincerely,
BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Jim Walsh, Atlantis Submarines

BEI Environmental Services
311-B Pacific Street • Honolulu, Hawaii 96817 • Phone 808.535.6055 • Fax 808.535.6053 • www.beihawaii.com

BES
BEI Environmental Services

March 22, 2005
BES Project No.: 03-1267.01

Mr. Samuel J. Lemmo
Office of Conservation and Coastal Lands
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Subject: **Response to Comments of Draft Final Environmental Impact Statement**
Atlantis Submarines
Artificial Reef Installation
Offshore of Puamana Beach Park
Lahaina, Maui, Hawaii

Dear Mr. Lemmo:

Thanks you for your letter dated March 8, 2005 commenting on the above-referenced project. Attached to your letter was a memorandum from the Department of Land and Natural Resources (DLNR), Division of Aquatic Resources (DAR), which also commented on the Draft Final Environmental Impact Statement (FEIS). We have prepared the following responses to your comments and the DAR comments below.

First Comment

Section 4.2 Alternative Reef Sites – the section should mention the prior Drop Zone locations and identify where they were located in conjunction to the two Drop Zones.

The previously considered, but rejected, drop zones (Drop Zones B and C in deeper water) will be mentioned in Section 4.2 and the reason for their elimination (too deep for SCUBA divers) will also be stated.

Second Comment

Section 5.0 Environmental Setting – Atlantis Submarines should revise all the text in the Draft FEIS regarding Drop Zone A (MB#3 as identified in the Figure #4).

Section 5.0 will be edited to correctly identify Drop Zone A and marine life survey location MB3 as being the same location, instead of MB1. Although Section 5.0 of the Draft FEIS incorrectly stated MB1 and Drop Zone A were the same, the information presented in the section concerning bottom conditions and marine life was the MB3 location data. Therefore, although the number was incorrect, the information was correct.

Third Comment

When discussing Hawaii Administrative Rules (HAR), please identify which department and/or division the HAR the document is referring to.

This will be done.

Fourth Comment

Section 5.3 Marine Biology – please discuss why the survey did not account for larger organisms known to be present in the project site area.

The Oceanic Institute survey team did not observe any larger marine organisms during the quantitative fish and benthic community surveys conducted by SCUBA per the methods outlined in their report (Appendix H of Draft FEIS). Oceanic Institute has indicated that they did observe humpback whales during the water quality surveys (performed from a boat) and/or during surface intervals between survey dives; however, no whales were sighted in the vicinity of the ocean floor survey stations during the survey. If larger organisms, such as whales, turtles, seals, or pelagic fish, had been observed in the survey area, it would have been noted in the Oceanic Institute report.

Fifth Comment

Section 5.3.2 Other Marine Biology – please discuss whether more recent data 2004-2005 exists regarding marine biology.

No other recent accurate marine biology surveys have been performed in the area to Atlantis' knowledge. Atlantis reports that the marine life observed during submarine tours has not changed significantly since the marine life logs were last kept in 1997. For instance, turtles and seals are still not observed but Ulua and other fish are periodically observed.

Sixth Comment

Section 5.4 Water Quality – please describe whether the water chart describes an individual site or is a compilation of all sites.

The chart in Section 5.4 of the Draft FEIS presents the "geometric mean of all results." Individual sample results are provided in Table 2 of the Oceanic Institute report in Appendix H of the Draft FEIS. Only the mean is included in the body text of the Draft FEIS because there is little variation in the data. The text of Section 5.4 will be edited to further clarify what is presented in the chart.

Seventh Comment

Section 5.5.3 Concerns Noted During Interview Responses – please discuss what steps, impacts, and/or mitigation measures Atlantis Submarine is taking to address the concerns stated by interviewees.

All the concerns expressed by the individuals during the survey are addressed in Section 7.0 of the Draft FEIS. References to applicable section in the Draft FEIS that relate to each concern will be added to each bullet item in Section 5.5.3.

Eighth Comment

Section 6.3 Other Ocean Activities – please discuss the mitigation measures that Atlantis Submarine will take regarding the prohibited activities in the HIHWNMS (i.e. what may happen when a submarine tour is within the proposed Drop Zone A and a whale is in the vicinity, or loss of habitat).

Atlantis has been performing submarine tours in the project area for many years and has always operated in compliance with HIHWNMS rules regarding interactions between vessels and Humpback whales. The presence of the artificial reefs will not result in any change to the submarine or surface support ship operation when a Humpback whale is spotted.

Ninth Comment

Section 7.1.3 Marine Mammal and Turtle Disturbance – please discuss the long term impacts of possible loss of habitat for whales.

Section 7.1.3 discusses short-term impacts. Section 7.2.2 discusses the long-term impacts to marine mammals and turtles. Section 7.2.2 concludes: "because the project eliminates a very small portion of the sandy-bottom area open to possible whale resting, this impact is considered negligible compared to long-term benefits of the proposed project." This conclusion was reached after extensive consultation with multiple Humpback whale experts, who agreed that the small footprint of the proposed project would not result in a loss of habitat for Humpback whales.

Tenth Comment

Section 7.2.1 Environmental Alteration – please change the text to reflect MB#3 studies in regards to this section.

This correction will be made. Like Section 5.0, discussed in the Second Comment, although the number was incorrect, the information was correct.

DAR's First Comment

The draft EIS does not explicitly state exact GPS coordinates for the drop zones or zone area. This is useful information in determining the location in relation to various map data currently available. We request these coordinates be provided to DAR for further investigation to compare documented resources to known mapped resources.

The following GPS coordinates were collected by Oceanic Institute in the field at each of their marine biological (MB) survey locations. Drop Zone A (DZA) is the same location as MB3 and Drop Zone B (DZB) is the same location as MB4.

Station ID	North		West	
	Degrees	Minutes	Degrees	Minutes
MB1	20	51.114	156	40.021
MB2	20	50.950	156	40.250
MB3/DZA	20	51.167	156	40.432
MB4/DZB	20	50.737	156	40.072
MB5	20	50.650	156	40.683
MB6	20	50.600	156	40.650

The coordinates will be added to the appropriate sections of the FEIS.

DAR's Second Comment

Surveys for the proposed area were conducted by The Oceanic Institute. A species list was created for fish, but one was not created for invertebrates and algae. This should be created in order to develop baseline information on species diversity in the proposed area. Often there are alien species concerns associated with artificial reefs, but without a baseline species information, these concerns cannon be addressed or understood. In addition, the fish species list may not be complete. Plate 4 in The Oceanic Institute report (Appendix H) shows several individuals of Pseudantias bicolor, Hawaiian Bicolor Anthias. However, this species is not included in the species list (Table 4). This brings into question the thoroughness of the list and surveys.

Regarding invertebrates: Oceanic Institute has indicated that specimens of *Echinothrix diadema* (long-spined sea urchin) were occasional observed in the deeper areas of the Atlantis site, near MB5 and MB6 but not actually in the transect survey area. No urchins or other large (>2 millimeters) invertebrates were observed in the benthic photoquadrats.

Regarding algae: The only macroalgae observed by Oceanic Institute were a small amount of *Ralfsia* and extensive beds of *Halimeda opuntia*. The algae information is included in a chart in Section 5.2.6 of the Draft FEIS and Table 3 of the Oceanic Institute report (Draft FEIS Appendix H).

Regarding fish species list: The list summarizes only the fish observed on the transect lines. The scene in plate 4 is a "Hard coral patch reef near Twin Peaks station MB3." Plate 4 was included to illustrate the types of fish that may be recruited to an artificial reef. Plate 3 shows the actual conditions at station MB3. If you examine Plate 3 and compare it to the fish survey information for MB3 it will be apparent that the fish survey is both thorough and accurate. The drop zones, and the hence the marine survey transect stations, were selected to be areas devoid of patch reefs and vertical relief in order to minimize project impacts.

Should you have any questions, please do not hesitate to call.

Sincerely,

BEI ENVIRONMENTAL SERVICES

James T. Hayes
Director of Operations

cc: Jim Walsh, Atlantis Submarines