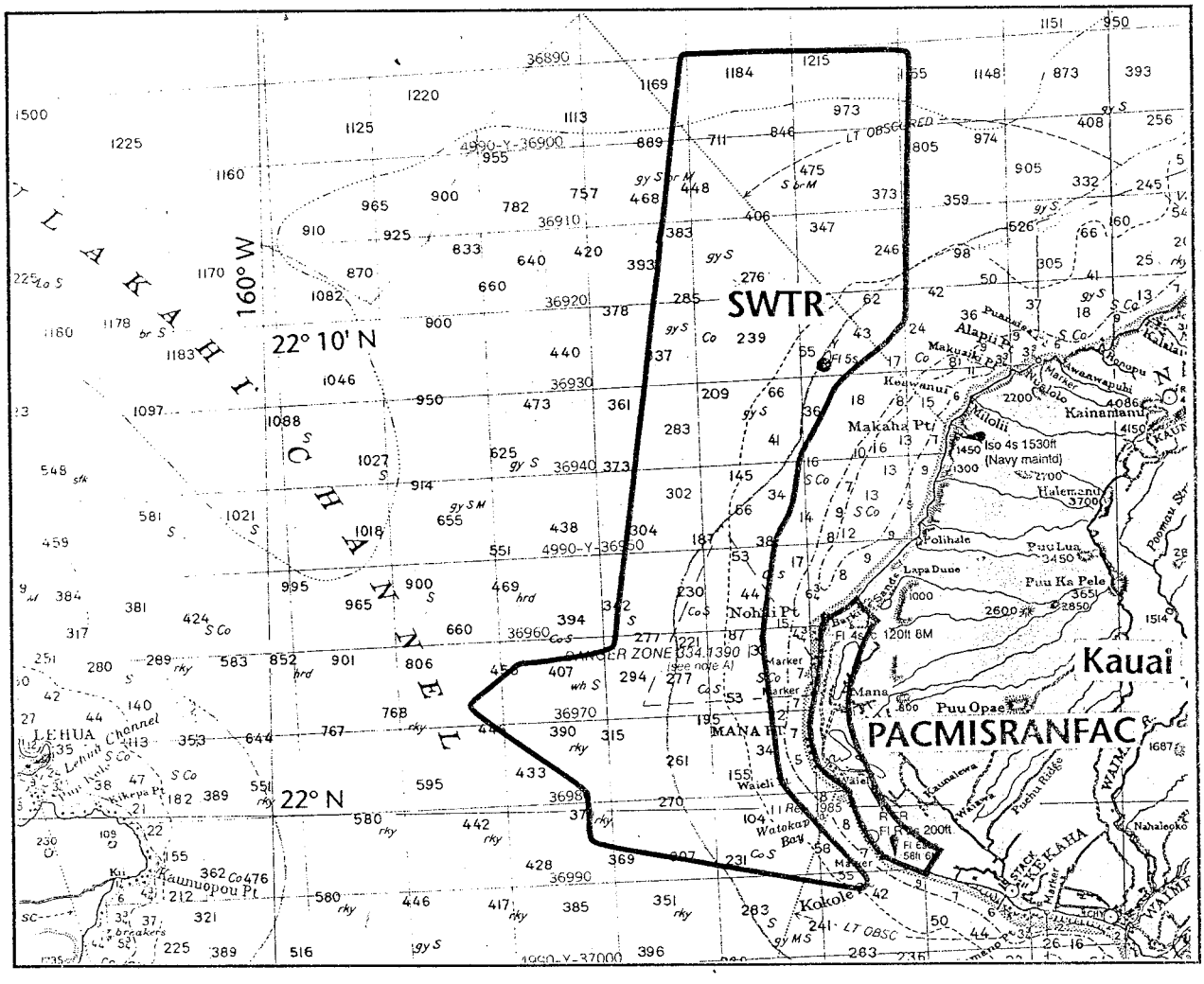
Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Environmental Assessment



Pacific Missile Range Facility
Barking Sands, Kauai, Hawaii

April 1997

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE NAVY

FINDING OF NO SIGNIFICANT IMPACT FOR THE INSTALLATION AND OPERATION OF A SHALLOW WATER TRAINING RANGE AT PACIFIC MISSILE RANGE FACILITY BARKING SANDS, KAUAI, HAWAII

Pursuant to Council on Environmental Quality regulations (40 CFR Parts 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA), the Department of the Navy gives notice that an Environmental Assessment (EA) has been prepared and an Environmental Impact Statement is not required for the installation and operation of a Shallow Water Training Range (SWTR) at Pacific Missile Range Facility (PMRF) Barking Sands, Kauai, Hawaii.

The proposed action is to enhance the existing underwater range by adding underwater instrumentation to an area approximately 100 square miles (259 km^2) on the east side (shoreward) of the existing deep underwater range, one to eight miles offshore of PMRF. Primary instrumentation will consist of 108 uni-directional passive (receive only) nodes, 2 low frequency (LF) bi-directional (receive and transmit) nodes, 8 high frequency (HF) bi-directional (receive and transmit) nodes, and connecting fiber optic cables. The fiber optic cable will be deployed on the ocean bottom at depths from 160 to 6,200 feet (49 to 1,890 meters). The fiber optic cable will be installed through the surf zone inside the two existing sea-shore interface conduits. In operation, the nodes will receive in-water acoustic signals and transmit them via the fiber optic cable to the existing shoreside cable building. The signal will then be transmitted to the existing Range Operations Center via an existing fiber optic cable. The eight HF nodes will enable underwater communication with submarines and will be operated approximately 10 to 30 hours a year. The LF nodes will only be used as an emergency alarm in the event a submarine enters water that is too shallow for safety. Other equipment to be installed as part of the proposed action includes: fiber optic telemetry electronics; a shallow water pressure housing unit for the electronics; and the interfaces from the cable to the pressure housing. No new construction or excavation is required in the beach or sand dune areas.

Installation of the SWTR instrumentation will not increase the number of range users, type, frequency, or duration of training activity at PMRF. Unmonitored Anti-Submarine Warfare (ASW) training currently occurs at the proposed site in waters adjacent to the existing deep water ranges. The proposed SWTR will provide the capability to monitor surface ship and undersea activities, and allow ASW training activities by surface ships and aircraft to be evaluated.

The Navy has shifted its emphasis from open ocean conflicts to shallow water conflicts as part of the current U.S. defense strategy. In order to maintain operational readiness of the Pacific Fleet, training in an environment similar to potential foreign threat environments is critical. However, current underwater ranges do not meet the requirements of a shallow water range. In 1995, the Senate Appropriations Committee authorized the establishment of shallow water range

capabilities in the Hawaiian Island chain. This authorization established the purpose of the range as a need for maintaining combat capabilities of the Pacific Fleet's aircraft, surface combatants, and submarines in shallow water antisubmarine warfare. Surface combatants and aircraft primarily need an area with either little or no commercial/recreational intrusions. The submarine community needs an area with extensive shallow water and minimal navigational hazards to accommodate multiple submarines. The geography of the Hawaiian Islands and the extensive use of many areas for commercial air and ship traffic result in no site being available to accommodate the full scope of aircraft, surface combatant, and submarine activities on one range. For this reason, it will be necessary to construct two autonomous ranges in order to fully satisfy Congressional direction. This FONSI addresses the first of the two ranges, i.e., the proposed SWTR for surface ships and aircraft ASW training off the coast of PMRF. A proposal for a functionally independent second SWTR for submarine ASW training at a different location will be addressed in another study in the near future.

Two alternatives were considered for the proposed action: the no action alternative and construction of the SWTR at Penguin Bank, Maui County. The Hawaiian Acoustic Tracking System (HATS) in the Maui basin, which is no longer in use, would be unable to fulfill the requirements for a large area surface and aircraft SWTR because of it's high commercial air and boating traffic and, therefore, was not considered a viable alternative site. The no action alternative would preserve the status quo, with no installation of the SWTR instrumentation. Though training operations would still continue in the shallow water areas, the lack of ability to track these efforts may increase the safety risk, and will not meet the Congressional mandate to provide a SWTR in Hawaii for the Pacific Fleet. Though the Penguin Bank site provides adequate geographic depth characteristics, surface ship and air training potential is limited because of the high commercial air traffic and fishing activities in the area. PMRF was, therefore, determined to be preferable to other Hawaii locations.

No significant environmental impacts will occur as a result of the proposed action. The proposed action will have no significant impact on topography, geology, or soils. No significant impacts to surface water or ground water resources will result from the proposed action. Temporary minor increases in water turbidity during cable installation will occur. No impacts to wetlands will occur. Though the SWTR will affect the State of Hawaii's coastal zone, it falls under Department of the Army Nationwide Permit #5, which has been granted a blanket Coastal Zone Management Program (CZMP) consistency determination by the Hawaii Office of Planning. No additional consistency determination is required for the proposed action. The State of Hawaii is in attainment of National Ambient Air Quality Standards. No significant impacts to air quality will occur because of installation or operation of the proposed SWTR. A small amount of trenching will occur next to an existing building, but vegetation is sparse and the area has been previously disturbed so no adverse impact is expected. The State Historic Preservation Officer has concurred with the determination that the proposed project will have no effect on significant historic sites. Temporary, but insignificant, air quality and noise impacts will occur during installation and hook-up of the system to existing shoreside facilities. No traffic impacts will occur because of the proposed action. The proposed site does not have soil contamination, and no hazardous materials will be generated during construction. The proposed

action will not significantly increase demand on existing utilities and infrastructure. No additional permanent personnel are associated with the proposed action. The proposed action will not have a disproportionately high or adverse effect on low income or minority populations.

No endangered or threatened plant or animal species will be impacted. No critical habitat for any threatened or endangered species or species of special concern will be affected as a result of implementing the proposed action. The transmitting frequencies used, low duty cycles, and the fact that no more than one node will transmit at any time will minimize the potential for acoustic impact on marine mammals and sea turtles. Ramping the low frequency emergency alarm during test deployment will also reduce the potential to startle marine mammals and turtles. The National Marine Fisheries Services has concurred with the Navy's determination that the installation and operation of the underwater nodes and low frequency alarm will not likely adversely affect threatened or endangered marine mammals or sea turtles. To the extent possible, exercises involving firing of inert (practice) torpedos will be limited to the period between April and December. Range operators and users will monitor the range acoustically (passive listening) and visually (by qualified observers aboard surface ships and aircraft) for the presence of humpback whales. Installation of the range will not occur during the months of February or March to avoid humpback whale season.

The nodes, cables, and equipment associated with the SWTR will not impact commercial or recreational boaters or fishing activity. PMRF's "no anchor zone" restriction will continue, but no additional restrictions on boating or commercial and recreational fishing will occur. Acoustic transmissions will not interfere with ship navigation or communication transmissions.

Based on information gathered during preparation of the EA, the Navy finds that installation and operation of the SWTR at PMRF Barking Sands, Kauai, Hawaii will result in no significant adverse environmental impacts.

The EA addressing this action may be obtained from: Commander, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii 96860-7300 (Attn: Mr. Gerald Gibbons, Code 231GG) telephone (808) 471-9338. A limited number of copies of the EA are available to fill single copy requests.

8 August 1997 Thomas J. Peeling

Date

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Special Assistant for Environmental Planning
Environmental Protection, Safety and Occupational Health Division
Deputy Chief of Naval Operations (Logistics)

Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Environmental Assessment

Pacific Missile Range Facility
Barking Sands, Kauai, Hawaii

April 1997

COVER SHEET

Proposed Action:	Installation and operation of underwater instrumentation to support a Shallow Water Training Range (SWTR) at Pacific Missile Range Facility (PACMISRANFAC) Barking Sands, Kauai, Hawaii. Project involves installation of underwater nodes, cables to shore and connection to shoreside facilities.
Type of Document:	Environmental Assessment (EA)
Lead Agency:	Department of the Navy Pacific Missile Range Facility (PACMISRANFAC) Barking Sands, Kauai, Hawaii
Coordinating: Agencies:	Naval Air Systems Command Pacific Division, Naval Facilities Engineering Command
Contact:	Mr. Gerald Gibbons, Code 231GG Environmental Planning Division Pacific Division, Naval Facilities Engineering Command Pearl Harbor, Hawaii 96860-7300 Telephone (808) 471-9338

The PACMISRANFAC Barking Sands proposes to install underwater instrumentation to support a Shallow Water Training Range (SWTR) offshore of Barking Sands, Kauai, Hawaii. The SWTR will extend the present underwater training area (1,000 square miles/2590 km^2) by approximately 100 additional square miles (259 km^2) shoreward, providing PACMISRANFAC with the capability to monitor ongoing Navy training exercises being conducted in shallow water areas. Primary instrumentation will consist of 108 uni-directional passive nodes (receive only), 8 high frequency (HF) bi-directional nodes (receive and transmit) and 2 low frequency (LF) bi-directional nodes (receive and transmit). The nodes will be connected to existing shoreside facilities at PACMISRANFAC by fiber optic cables. The eight HF nodes will enable underwater communication with submarines. The LF nodes will be used as an emergency alarm in the event a submarine enters waters too shallow for safety. Frequency and duration of existing training operations will not change. No increase in PACMISRANFAC personnel is anticipated.

The project will not result in any significant environmental impacts that cannot be mitigated, either during the installation or operation of the SWTR instrumentation. The State Historic Preservation Officer has concurred with the Navy's determination that the undertaking will have "no effect" on significant historic sites. The Navy has completed an informal Section 7, Endangered Species Act consultation with the National Marine Fisheries Service, which has concurred with the Navy's determination that installation and operation of the underwater nodes and LF alarms will not adversely affect threatened and endangered marine species.

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List of Acronyms

AICUZ	air installations compatible use zone
ASUW	anti-surface warfare
ASW	anti-submarine warfare
BARSTUR	Barking Sands Tactical Underwater Range
BSURE	Barking Sands Underwater Range Expansion
CINCPACFLT	Commander in Chief, Pacific Fleet
CAA	Clean Air Act
DLNR SHPD	Department of Land and Natural Resources, State Historic Preservation Division
DoD	Department of Defense
DOH	Department of Health
DRMO	Defense Reutilization and Marketing Office
EA	environmental assessment
EMOC	electrical mechanical optical cable
ESA	Endangered Species Act
ESQD	explosives safety quantity distance
FONSI	Finding of No Significant Impact
GFM	government furnished material
HATS	Hawaiian Acoustic Tracking System
HF	high frequency
IMA	intermediate maintenance activity
LF	low frequency
NEF	Naval Expeditionary Forces
MIW	mine warfare
NAVSEA	Naval Sea Systems Command
NMFS	National Marine Fisheries Service
NUWC	Naval Undersea Warfare Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NPDES	National Pollutant Discharge Elimination System
OIS	Ocean Instrumentation Subsystem
PACMISRANFAC	Pacific Missile Range Facility
PACNAVFACENGCOM	Pacific Division Naval Facilities Engineering Command
SAC	Senate Appropriations Committee
SES	Shore Electronics Subsystem
SHPO	State Historic Preservation Officer
SSI	Sea-Shore Interface
SWTR	Shallow Water Training Range
USW	undersea warfare

EXECUTIVE SUMMARY

This Environmental Assessment (EA) is an administrative action for the installation and operation of Shallow Water Training Range (SWTR) instrumentation at the Pacific Missile Range Facility (PACMISRANFAC) Barking Sands, Kauai, Hawaii. The EA has been prepared pursuant to the National Environmental Policy Act (NEPA), in accordance with Chapter 2, OPNAVINST 5090.1B of 1 November 1994.

Purpose and Need for Project

In response to changes in the global political, economic and military climates, the U.S. post-Cold War defense strategy has shifted its emphasis from open ocean conflicts to shallow water conflicts. Because current underwater ranges do not meet the requirements of a shallow water range, in 1994, the Senate Appropriations Committee (SAC) authorized funds to "establish a shallow water range capability off the Navy's Pacific Missile Range Facility at Barking Sands, Kauai or at another appropriate location in the Hawaiian Island chain," in order to "make a major contribution to maintaining the combat capabilities of Pacific Fleet aircraft, surface combatants, and submarines, especially in the area of littoral area anti-submarine warfare."

PACMISRANFAC subsequently initiated discussions with the Pacific Fleet to determine shallow water training requirements. The requirements call for an area with no or minimal commercial/recreational intrusions, with extensive shallow water maneuver area and minimal navigation hazards. Because no single site in the Hawaiian Islands can meet all these requirements, it has been determined that two autonomous ranges will be required in order to satisfy the Congressional direction. The first range, the subject of this Environmental Assessment, and hereafter referred to as the "proposed project," will be located offshore of PACMISRANFAC Barking Sands. It is in an area with minimal recreational and commercial boating traffic and minimal commercial air traffic. The second range will be located in a different area and will be addressed by a separate environmental document.

The proposed project will install the underwater instrumentation required to monitor and evaluate training activities within shallow water areas. The SWTR will be an extension of PACMISRANFAC's existing underwater range, known as the Barking Sands Tactical Underwater Range (BARSTUR) and Barking Sands Underwater Range Expansion (BSURE). The SWTR instrumentation will be

designed, fabricated and installed by the Naval Undersea Warfare Center (NUWC) Division Newport. Once the SWTR instrumentation is installed and tested, the range will be operated by PACMISRANFAC.

The existing underwater range is used for submarine, surface ship and aircraft anti-submarine warfare (ASW) training. Generally, training involves only one submarine on the range at any given time and may include a combination of ASW operations. Installation of the new SWTR instrumentation will not result in any new training exercises at PACMISRANFAC nor increase the frequency or duration of current training exercises. Installation of the new SWTR instrumentation will provide range operators with the capability to monitor and evaluate these on-going operations in shallow water areas, thus enhancing existing training evaluation and range operation safety.

Existing Conditions

PACMISRANFAC's existing instrumented underwater range provides deep water coverage of approximately 1,000 square miles (2,590 km^2). The proposed project will expand the instrumented range area by approximately 100 square miles (259 km^2), or about 10 percent.

Alternatives Considered

Proposed Action

The SWTR instrumentation consists of three subsystems: 1) Ocean Instrumentation Subsystem (OIS); 2) Sea-Shore Interface (SSI) and 3) Shore Electronics Subsystem (SES).

The OIS component consists of 118 underwater nodes deployed over an approximate 100 square mile area (259 km^2), one to eight miles offshore (1.6 to 13 km). The nodes will be placed on the ocean bottom at depths from 160 to 6,200 feet (49 to 1,890 m), and connected to the shore via cable.

During training exercises, the nodes will receive in-water acoustic signals from submarine, target and torpedo pingers, which will be transmitted to a shore-based operations center. The signals will provide tracking data used during the training exercises. Ten of the 118 nodes will be bi-directional, having a transmit capability to enable underwater communication with submarines, while the remaining 108 nodes will only be capable of receiving signals. Two of the ten bi-

directional nodes will be capable of providing communication via a low frequency alarm, in the event that a submarine moves into waters too shallow (less than 500 feet) and does not respond to normal communications. The OIS cables will come ashore within the existing submerged cable right-of-way covered by State General Lease 3952. The SSI is the pipe or conduit which protects the OIS cables as they come ashore through the surf zone. Two existing conduits will be used for the SSI. On shore, the cables will be connected, through underground conduits, to existing shoreside facilities which receive and process the signal data. The SES is all the necessary equipment and circuitry to power the OIS and to receive, transmit and process acoustic data. The SES power supplies will be located in the cable hut (Bldg. 410), with the rest of the equipment in the Range Operations Center (Bldg. 105).

Other Alternatives

Alternatives to the proposed action which were considered include 1) no-action and 2) construction of a SWTR at Penguin Bank, Maui County. Under the no-action alternative, the SWTR would not be constructed. Although there would be no installation-period impacts, existing underwater facilities would continue to provide deep water training capability, and ongoing training operations would continue at current levels without the SWTR instrumentation.

The second alternative considered is construction of a SWTR at Penguin Bank, Maui County. This site has the required shallow water topographic characteristics and meets Congressional direction to establish a Hawaii-based shallow water range. A major disadvantage of this alternative is that unlike the proposed action, there is no existing range activity or shoreside support facilities. As a result, new shoreside facilities must be constructed, potentially increasing construction-related impacts. Additional studies would be required to determine archeological and historic impacts. Training would be expanded into a new geographical area. Combined deep water/shallow water warfare training would not be possible.

Shallow water aircraft ASW training would be greatly impaired due to existing commercial air traffic routes above the area. Shallow water surface ship ASW training would be impaired due to the presence of concentrated commercial fishing in the area. This site does not fulfill the mandatory requirement for surface ship and aircraft ASW shallow water training.

Environmental Consequences and Mitigation

No significant environmental impacts that cannot be mitigated are expected as a result of the proposed action.

Terrestrial Impacts

Existing PACMISRANFAC electrical systems can accommodate the project and no major upgrades or modifications to PACMISRANFAC utility systems are anticipated. The project will not adversely impact ship navigation, or commercial or recreational fishing and boating.

The SWTR cables will come ashore within two existing spare conduits which are being installed as part of a separate cable repair project. Shoreside trenching to install the cable between the manhole and Bldg. 410 will be confined to an existing utility corridor. The State Historic Preservation Officer (DLNR-SHPO) has concurred with the Navy's determination that the project will have "no effect" on significant historic sites.

The SWTR will not increase the number of personnel at PACMISRANFAC or increase the number of range users. PACMISRANFAC range training activity levels are generally limited by the training budgets of its users, and not determined by range assets. Successful, established procedures governing interaction between range users and ocean users will be continued.

Temporary noise will be generated during node and cable installation, shoreside trenching and installation of electronic equipment. All occupational safety and health guidelines will be followed. Construction-period dust will be controlled by implementation of proper construction and erosion control techniques.

There is no known petroleum or other subsurface contamination of the project site. The project will not involve construction or demolition which could release asbestos in Bldgs. 410, 515 and 105. Standard operating procedures for range users will continue to be followed to reduce risks of generating/releasing hazardous materials. Ongoing training activities at the range are continuing actions that are not a part of this EA. The project is in compliance with the federal Clean Air Act, Section 176(c), which pertains to federal actions.

Marine Impacts

The project is not expected to have significant or irreversible impacts on the marine environment. Installation of the nodes and shoreside construction will not affect threatened or endangered species or habitats.

Scans for marine mammals will be conducted during cable laying, and the cable laying vessel will maintain a minimum distance of 100 yards (91 m) from any whales sighted. Cable deployment will not be conducted during peak humpback whale season (mid-February to mid-March). Turbidity and sediment resuspension caused by pulling the cable through the existing sea/shore interface conduits will be temporary and will not have long-term environmental impacts. No new construction is required in the nearshore area. No operational period drainage runoff is anticipated.

The Navy has determined that operation of the SWTR transmitters will have no adverse effect on marine mammals, including endangered humpback whales and sperm whales. There will be no increase in operational tempo or overall use of the underwater range because of the project. The eight high frequency projectors will have a low duty cycle and utilize frequencies above those generally used by humpback whales. No more than one projector will be used at a time. The two low frequency alarms will be tested prior to each training exercise (for about 30 seconds), and used during emergencies (anticipated at less than 90 minutes a year, if at all). The acoustic impact of the alarms during testing will be mitigated by gradually ramping the amplitude, to minimize startling of marine mammals.

The Navy has completed an informal Section 7, Endangered Species Act consultation with the National Marine Fisheries Service (NMFS). The NMFS has concurred with the Navy that the installation and operation of the passive hydrophone array (nodes), bi-directional communication nodes and low frequency alarms are not likely to adversely affect endangered humpback whales, sperm whales, hawksbill turtles or threatened green sea turtles that might be found within or near the project area.

Permits and Approvals

Necessary permits and approvals for the project have been obtained. A Section 106, National Historic Preservation Act consultation with the DLNR-SHPO has been completed. An informal Section 7, Endangered Species Act consultation

with the NMFS has been completed. The project is covered under the U.S. Department of the Army (DA) Nationwide Permit 5, and the Corps of Engineers has determined that no further DA processing is necessary. A Section 401 Water Quality Certification from the State Department of Health is not required, as the project does not involve discharge or fill.

Navy authority to use submerged lands within the three-mile territorial limits of the State of Hawaii for installation and operation of the SWTR at PACMISRANFAC Barking Sands is found in Section 6 of the Submerged Lands Act, 43 U.S. Code 1314, which reserves to the United States the necessary rights to use the submerged lands for purposes of commerce, navigation, national defense and international affairs.

The Navy has determined that the project will affect the State's coastal zone. Under the recently revised DA nationwide permit system (effective 11 February 1997), a blanket Coastal Zone Management (CZM) consistency determination for DA Nationwide Permit 5 was provided by the State of Hawaii's Office of Planning, the state's CZM program office. As a result, the SWTR will not require a separate CZM consistency determination. The Army Corps of Engineers will notify the Office of Planning of the project as part of its permit review process.

The project has been reviewed in accordance with Executive Order 12898 and Secretary of the Navy Notice 5090 for environmental justice. There will be no known significant or adverse environmental impacts to minority or low-income communities as a result of the project.

Conclusion

In summary, the environmental impacts associated with the proposed project are not significant and can be mitigated through appropriate design and engineering.

The EA is on file and may be reviewed by interested parties at the place of origin: Commander, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii, 96870-7300 (Attn. Mr. Gerald Gibbons, Code 231GG), telephone (808) 471-9338. A limited number of copies of the EA are available to fill single copy requests.

CHAPTER ONE
PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

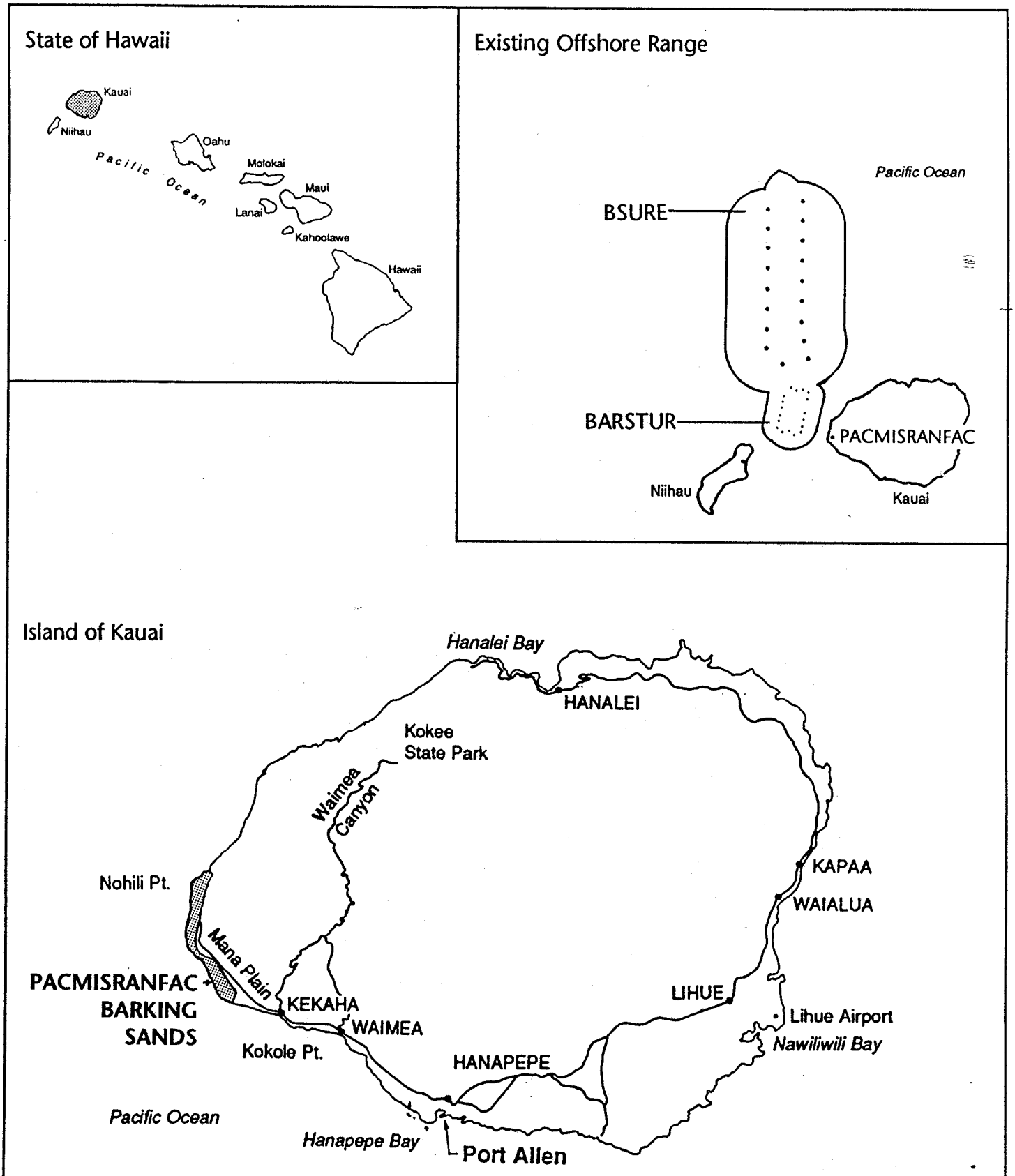
This Environmental Assessment (EA) is prepared pursuant to the National Environmental Policy Act (NEPA) and in accordance with OPNAVINST 5090.1B of 1 November 1994. The EA describes the installation and operation of the Shallow Water Training Range (SWTR) instrumentation at the Pacific Missile Range Facility (PACMISRANFAC) Barking Sands, Kauai, Hawaii.

The Naval Undersea Warfare Center (NUWC) Division, Newport, in support of Naval Air Systems Command PMA-248, proposes to install the SWTR instrumentation at PACMISRANFAC in response to the Pacific Fleet's need for a shallow water surface ship and aircraft anti-submarine warfare (ASW) training area. The project will provide the capability to monitor training within shallow water areas, providing an extension to PACMISRANFAC's existing deep water training capabilities. The SWTR instrumentation will not result in any new training operations at PACMISRANFAC, nor an increase in the frequency or duration of ongoing training. The SWTR hardware will be designed, fabricated and installed by the NUWC Division Newport. Once the instrumentation is installed and tested, the range will be operated by PACMISRANFAC.

1.2 BACKGROUND

PACMISRANFAC is the largest instrumented deep water, surface, air and undersea training range in the world, and is part of a national training range complex for launching, tracking and collecting data. Training ranges at PACMISRANFAC include underwater, surface and air space ranges.

PACMISRANFAC operates an underwater training range for offshore underwater tracking of submarines, weapons and underwater targets, located seven miles (11 km) west of its Kauai facility, north of the Kaulakahi Channel between Kauai and Niihau (Figure 1). The range, known as Barking Sands Tactical Underwater Range (BARSTUR), was established in 1967 to provide deep water training for the Navy. BARSTUR consists of 42 bottom-mounted nodes at depths from 1,500 to 6,000 feet (460 to 1,800 m), placed within a rectangular area approximately 5 miles by 10 miles (8 by 16 km). The range has an effective area of approximately 120 square miles (310 km^2).



General Location

Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Not to scale

Figure 1

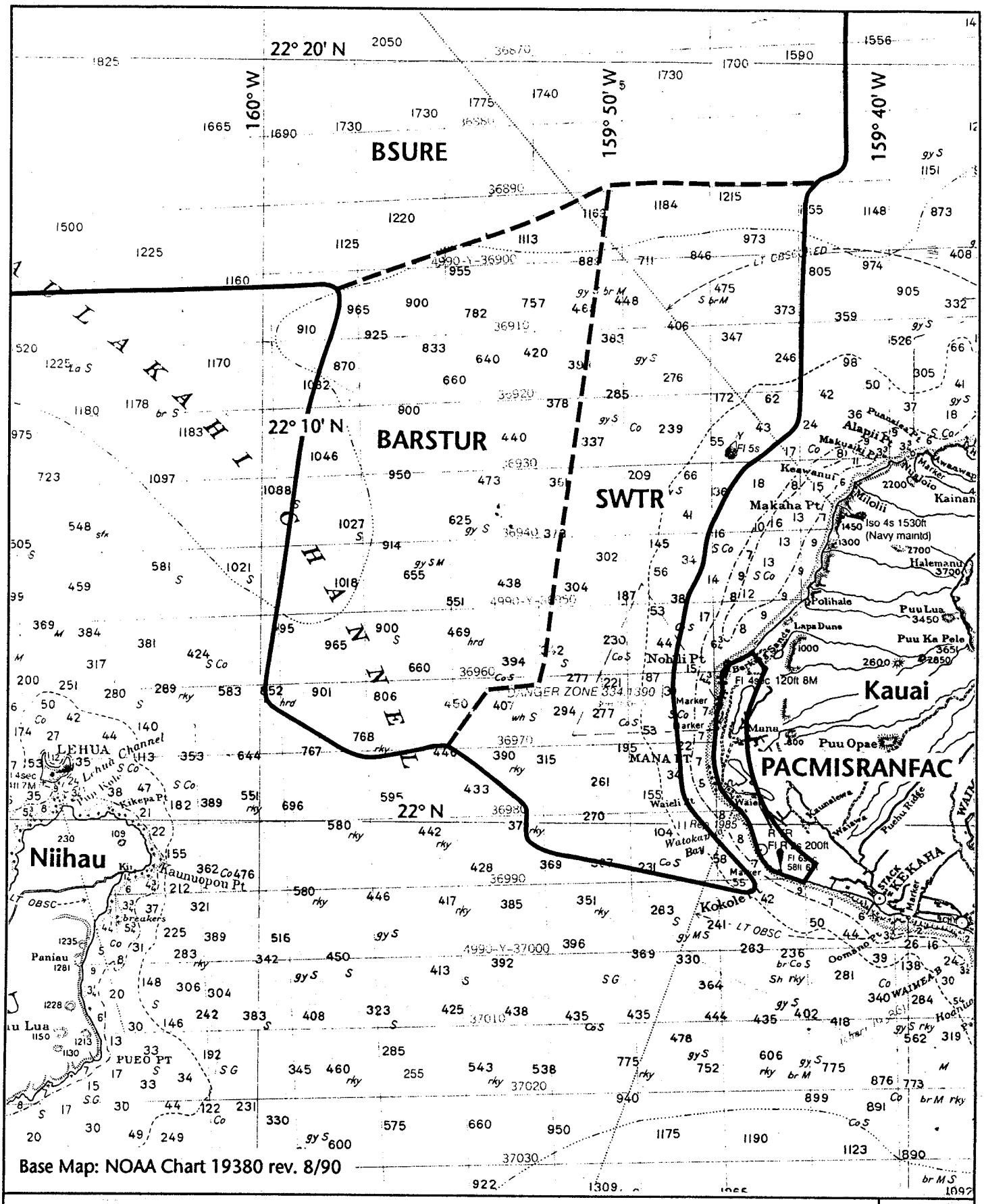
In 1976, the BARSTUR range was expanded to the north, to include 18 bottom-mounted nodes laid out in a rectangle of roughly 7.5 by 32 miles (14 by 59 km). This portion of the range, referred to as the Barking Sands Underwater Range Expansion (BSURE), is in deeper water with nodes placed at depths from 6,000 to 15,000 feet (1,830 to 4,570 m) and an effective area of about 900 square miles (2,330 km^2). With the BSURE, the range has a total effective area of about 1,000 square miles (2,590 km^2).

The bottom-mounted nodes or hydrophones within the range receive short duration pulses of sound (pings) from pingers mounted on torpedoes, underwater targets and submarines. The nodes convert the pings to an electrical signal that is transmitted to shore via an underwater cable system. On shore, the signals are processed and displayed to allow military personnel to evaluate their effectiveness and improve future operations. The nodes are also used to receive voice communications from submarines.

1.3 PURPOSE AND NEED FOR PROJECT

The world political, economic and military climate has changed dramatically in recent years. International events, including the collapse of the Warsaw Pact, reunification of Germany, and the end of the Cold War have greatly reduced the likelihood of superpower confrontation. As a result, other nations are now able to more aggressively pursue nationalistic goals and/or expand their regional power. One of the major objectives of current U.S. defense strategy is to address the sources of regional conflict and instability through forward presence and effective crisis response. As part of this defense strategy, the Navy has shifted its emphasis from open ocean conflicts to shallow water conflicts.

The Department of the Navy's Pacific Fleet plays an important role in this shallow water mission. In order to maintain the readiness of the Fleet, training in an environment similar to the potential foreign threat environment is critical. However, current underwater ranges are deep water ranges, such as the Barking Sands Tactical Underwater Range, or small test and evaluation ranges, such as the now defunct Hawaiian Acoustic Tracking System, that do not meet the requirements of a shallow water range. In 1994, the Senate Appropriations Committee (SAC) authorized twenty-five million dollars to "establish a shallow water range capability off the Navy's Pacific Missile Range Facility at Barking Sands, Kauai or at another appropriate location in the Hawaiian Island chain," in order to "make a major contribution to maintaining the combat capabilities of



Regional Location

Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Nautical Miles

2 4 6

(Soundings in Fathoms)

Figure 2

Pacific Fleet aircraft, surface combatants, and submarines, especially in the area of littoral area anti-submarine warfare."

As a result of the 1994 SAC funding authorization, PACMISRANFAC initiated discussions with Pacific Fleet to determine shallow water training requirements. Surface combatants and aircraft primarily need an area with either no or minimal commercial/recreational intrusions. The submarine community needs an area with extensive shallow water and minimal navigational hazards.

Due to the geography of the Hawaiian Islands, a chain of volcanic islands with limited shallow-water shelf areas and steep slopes leading to extensive deep-water areas, only limited areas provide the depth and size characteristics required for a shallow-water training range. In addition, many commercial air traffic routes criss-cross the islands and there is extensive use of shallow-water areas for commercial and recreational boating activities. This limits the availability of many potential shallow-water range areas for conducting surface ship and aircraft operations. Other potential areas that have minimal air and boating traffic, instead have steep slopes and inherent safety problems for submarines and are, therefore, not conducive to extensive submarine training. Because of these combined problems, there are no sites within the Hawaiian Islands that can provide the full scope of surface ship, aircraft, and submarine shallow-water ASW training in close proximity to Fleet assets in Pearl Harbor. For this reason, it is necessary to construct two autonomous ranges in order to satisfy Congressional direction. The first range will be located in an area with minimal recreational and commercial boating traffic, and minimal commercial air traffic, therefore providing a safe training area for surface ship and aircraft shallow-water ASW monitoring and evaluation. The second future range will be located in an area with an extensive amount of shallow-water and limited underwater submarine safety hazards, thereby providing a safe and effective training area for submarine shallow-water ASW monitoring and evaluation.

This Environmental Assessment will address the first of the two ranges, which will provide Pacific Fleet assets stationed in or transiting to or from the Hawaiian Islands with the capability to monitor and evaluate surface ship and aircraft shallow-water ASW training using undersea tracking range technology. The existing deep water undersea tracking range offshore PACMISRANFAC has been utilized as a Pacific Fleet training area since 1967. Unmonitored shallow water training currently takes place at the PACMISRANFAC facility in the waters adjacent to the deep water range. Exercises such as a surface ship and aircraft attempting to locate a single "target" submarine within the proposed SWTR area

allow the Navy to conduct shallow water ASW training. However, there is no means for evaluating and "grading" the effectiveness of their operations in the shallow water area. Only the deep water BSURE and BARSTUR areas have the capability to monitor activities real-time and play them back as a two dimensional display during training evaluation debriefings. The display basically shows the position of each vehicle within the range area in x, y and z coordinates throughout the training exercise. The proposed PACMISRANFAC SWTR will provide the capability to monitor surface ship and undersea activities, such as inert practice torpedo firings, real time within the shallow water area and allow training activities to be evaluated in debriefings after exercise completion.

The proposed project will enhance the existing underwater range and add 118 nodes over an approximately 100 square mile (259 km^2) area to the east (shoreward) of the existing underwater range, one to eight miles (1.6 to 13 km) offshore of PACMISRANFAC (Figure 2). The SWTR nodes will be deployed at depths between 160 and 6,200 feet (49 and 1,890 m). Although this includes waters deeper than a typical "shallow water" area, it is necessary in order to provide uninterrupted, continuous tracking between the existing range and the SWTR. By expanding the instrumented area of the range, monitoring of ongoing shallow water training exercises will be possible.

1.4 ENVIRONMENTAL PERMITS AND APPROVALS

1.4.1 Department of the Army Permit/State Water Quality Certification

The U.S. Army Corps of Engineers regulates construction in navigable waters under the authority granted by Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act of 1977 and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended.

The Department of the Army (DA) has determined that the project is authorized by the Army Corps of Engineers Nationwide permit #5, Scientific Measuring Devices, and that no further DA processing is necessary (Appendix 4). The DA authorization, effective 12 March 1997, remains valid for two years. As part of its approval process, the DA has notified agencies including the National Marine Fisheries Service, Fish and Wildlife Service, Environmental Protection Agency, State Coastal Zone Management program office, State of Hawaii Department of Land and Natural Resources and Kauai County Planning Department. The Coastal Zone Management program has issued a blanket CZM consistency determination for Nationwide permit #5 projects.

No DA authorization is required for the actual landing of the cable, since two existing conduits will be used. The existing conduits have received DA approval as part of a separate BSURE repair project. The SWTR project does not require a Section 401 Water Quality Certification from the State of Hawaii.

1.4.2 List of Permits and Approvals Obtained

The following is a listing of environmental permits and approvals that have been obtained for the project. No further environmental permits or approvals are required. The project's relationship to these various policies are discussed in Chapter 4.

Permit/Approval	Agency
Federal	
Department of Army Permit (Nationwide Permit 5, Scientific Measuring Devices)	Army Corps of Engineers, Pacific Ocean Division
Consultation, Section 106, National Historic Preservation Act	Dept. of Land & Natural Resources-State Historic Preservation Division
Informal Consultation, Section 7, Endangered Species Act	National Marine Fisheries Service; and U.S. Fish & Wildlife Service

CHAPTER TWO
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This chapter describes the proposed installation and operation of underwater instrumentation to support a SWTR at PACMISRANFAC. As discussed in Section 1.3, the now defunct Hawaiian Acoustic Tracking System (HATS) is a small test and evaluation range in the Maui Basin area that does not fulfill the requirements for a large area surface and aircraft shallow-water anti-submarine warfare (ASW) training monitoring and evaluation range. The former HATS range area is criss-crossed by many commercial air traffic routes and has a high level of recreational and commercial boating activity, making it inhospitable to extensive surface and aircraft training use. Therefore, the alternative of using the HATS area is not viable and will not be addressed any further in this document. This chapter will discuss two alternatives to the proposed action including 1) "no-action;" and 2) installation/operation of the SWTR at Penguin Bank, Maui County.

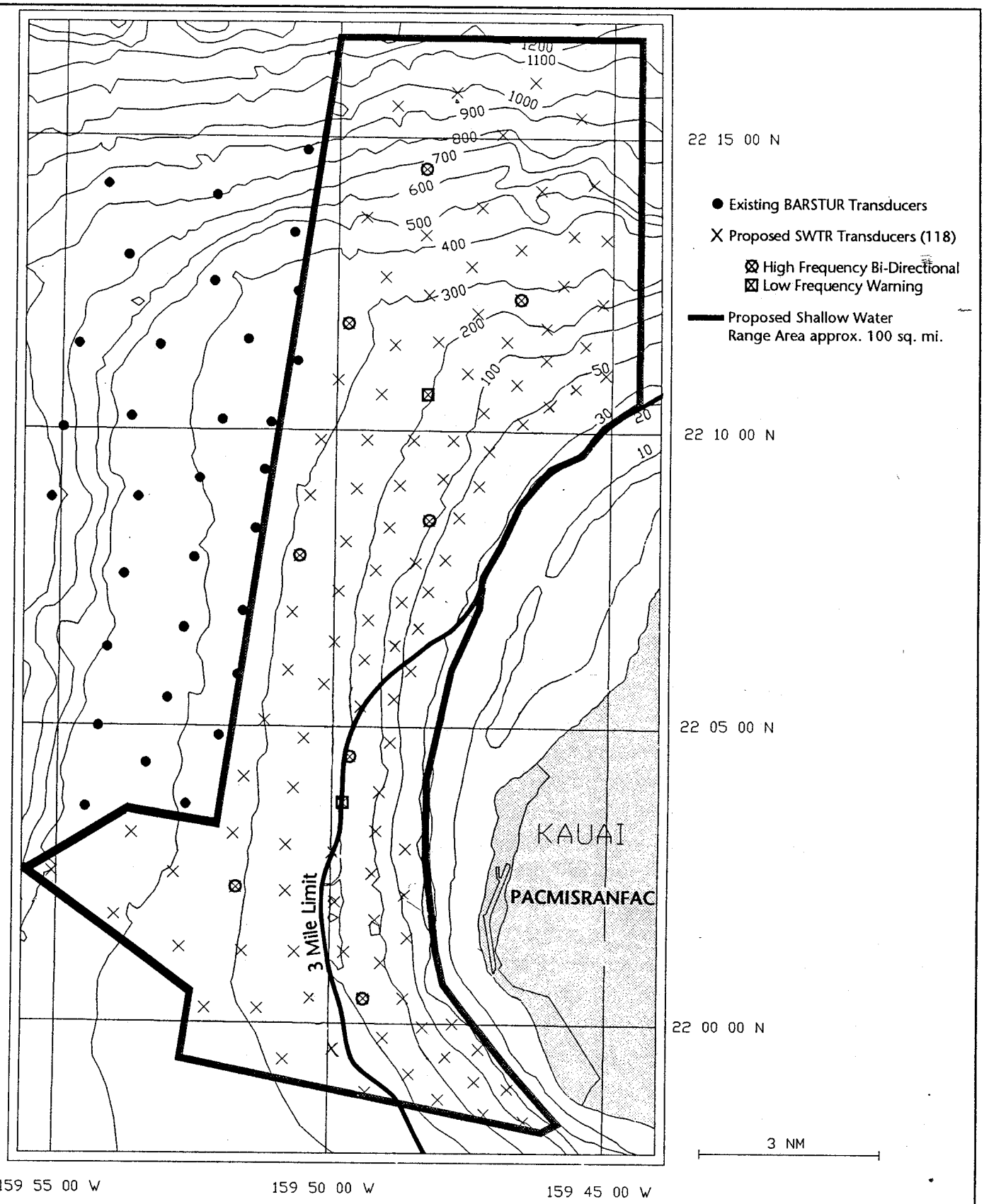
2.2 DESCRIPTION OF THE PROPOSED ACTION

The location of the SWTR in relation to PACMISRANFAC is shown in Figure 3. Hardware to be installed includes 118 nodes (hydrophones and projectors), interconnection cable and cable to existing shore facilities. The proposed action also includes operation of the monitoring equipment. Training operations to be conducted within the range, including undersea warfare (USW) and anti-surface warfare (ASUW) training, are presently ongoing. The EA addresses the environmental impacts of equipment deployment and installation, as well as the operation of the underwater instrumentation. Shallow water surface and aircraft ASW training operations conducted at the range are continuing actions, and are not part of the scope of this document. The proposed action will provide the capability to monitor and evaluate these ongoing operations for maximum training effectiveness.

2.2.1 Description of SWTR System Hardware

The SWTR hardware consists of three subsystems:

- Ocean Instrumentation Subsystem (OIS)



Source: Frontier Engineering Inc., August 1996

Note: Depths in fathoms

Project Vicinity

Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Figure 3

- Sea-Shore Interface (SSI) Subsystem
- Shore Electronics Subsystem (SES)

The OIS consists of 118 nodes installed near the ocean bottom over an approximately 100 square mile area offshore of PACMISRANFAC. During training exercises, the sensor nodes will receive in-water acoustic signals from submarine, target and torpedo pingers or submarine underwater communication device transmitters which will be cabled to the existing shore-based operations center for processing and display. The SSI consists of the pipe or conduit which protects the OIS cables as they come ashore through the surf zone. Two existing conduits at PACMISRANFAC will be used for the project.

Figure 4 provides a schematic illustration of the SWTR in-water instrumentation relative to the western end of Kauai.

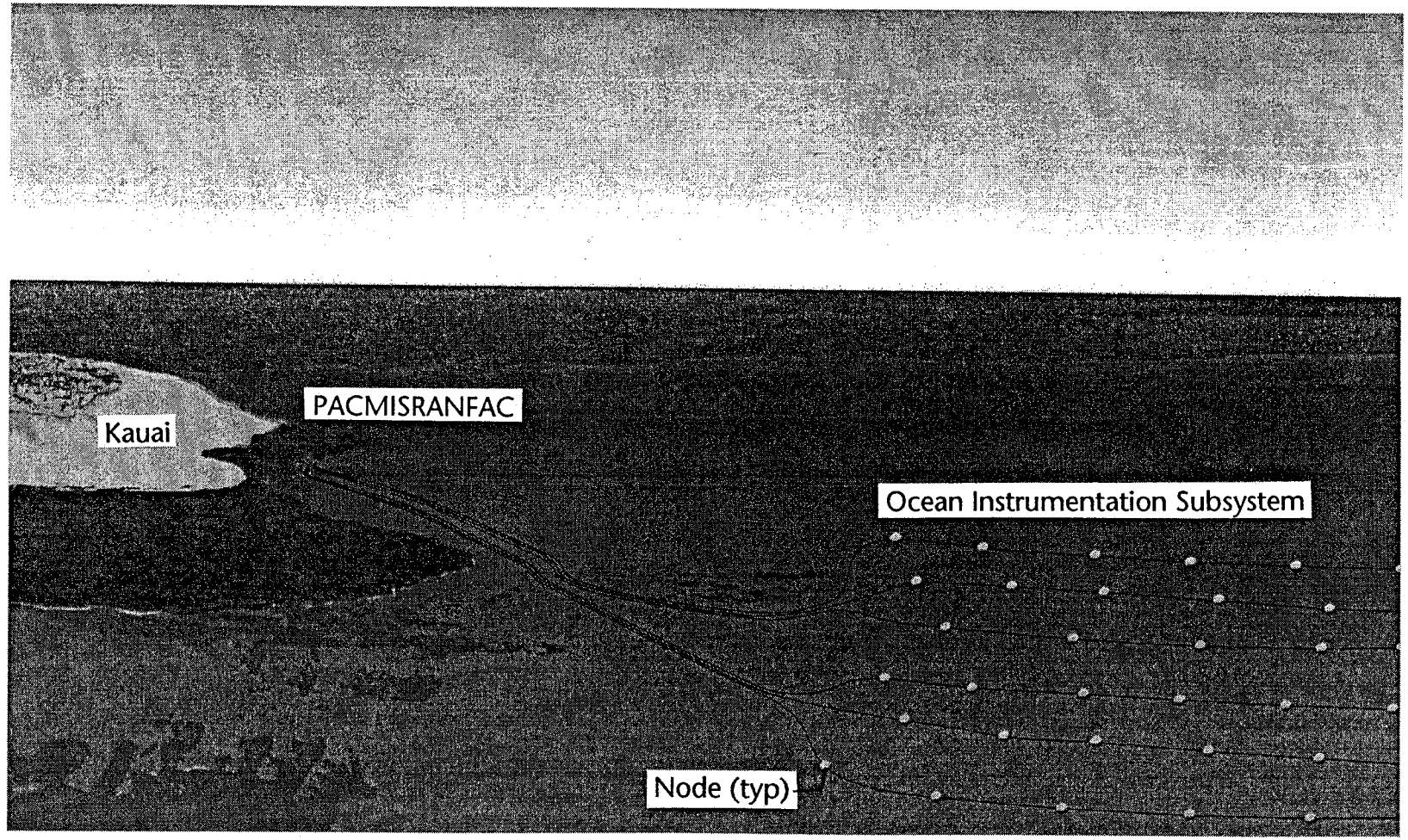
The SES includes all the necessary equipment and circuitry to power the OIS and to receive, transmit and process acoustic data. The SES includes equipment in the cable termination hut (Bldg. 410) and the Range Operations Center (Bldg. 105).

The location of the SWTR shoreside facilities is shown in Figure 5. The functional relationship between the SES components is illustrated in Figure 6. The OIS, SSI and SES components are described in more detail below.

Ocean Instrumentation Subsystem (OIS)

Description

The OIS includes 118 nodes: 108 uni-directional nodes and 10 bi-directional nodes (i.e., projectors) with transmission capability. The nodes will be connected by two to six continuous cables or arrays, installed over an approximately 100 square mile (259 km^2) ocean area extending from one to eight miles (1.6 to 13 km) off of PACMISRANFAC. The nodes will be deployed on the ocean bottom at depths from 160 to 6,200 feet (49 to 1,890 m). Each node will be coupled to the cable (multi-plexed) and supplied power and signal conditioning by a pressure housing which weighs about 130 pounds (60 kg) and is about eight feet long, one and a half feet tall and about eight inches wide (2.5 m x 0.5 m x 0.2 m). During training exercises, each of the multi-plexed nodes will be able to receive in-water acoustic signals, which will then be transferred to the shoreside cable hut, Bldg. 410, via an electrical mechanical optical cable (EMOC), hereafter

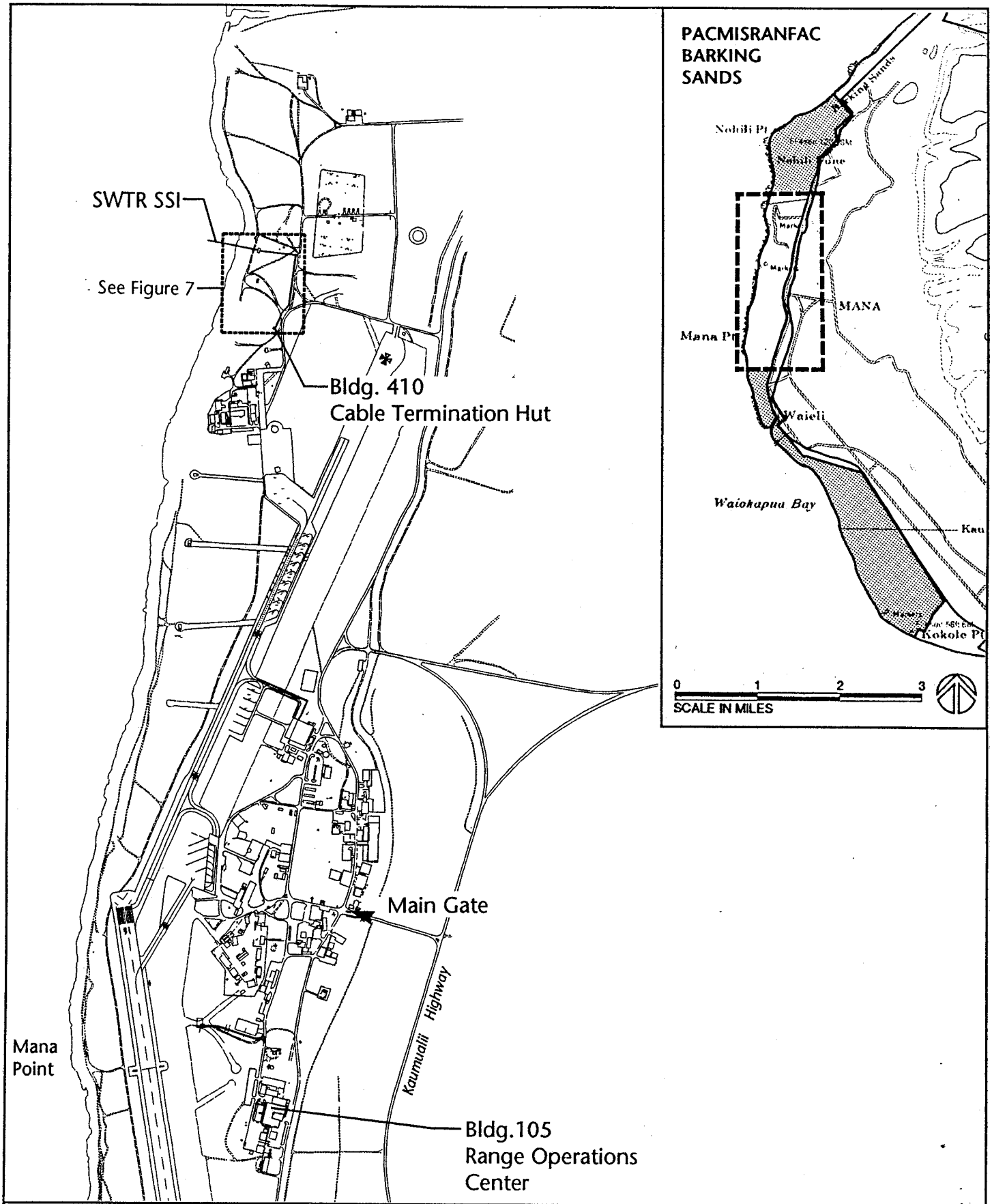


Source: NUWC Division Newport

SWTR In-Water Instrumentation

Shallow Water Training Range
Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Figure
4



Shoreside Facilities

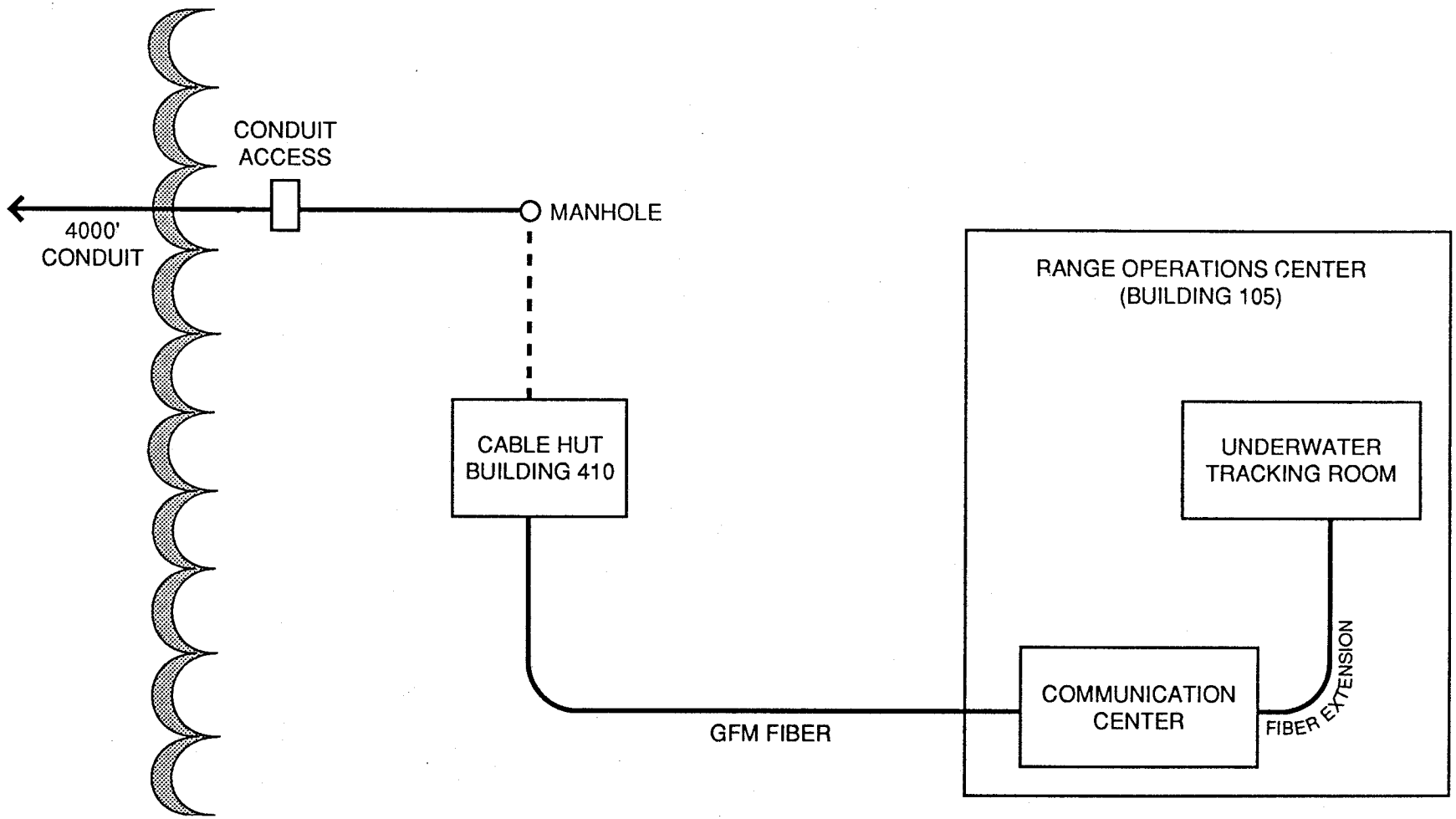
Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

0 Feet 1200

0 Meters 400

Figure 5



SWTR Shore Electronics Subsystem

Shallow Water Training Range
Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

Figure
6

referred to as "cable." The signal will be amplified and conditioned and then sent out in digital form to the Range Operations Center, Bldg. 105 via an existing fiber optic cable. Other equipment to be installed as part of the OIS includes fiber optic telemetry, a shallow water pressure housing for the electronics, optics and acoustics, the interfaces (terminations) from the cable to the pressure housing, and an anode.

The ten bi-directional nodes include eight high frequency (HF) and two low frequency (LF) nodes, which will be capable of both transmitting and receiving data. The eight HF nodes will be used for underwater communication with submarines, as currently conducted at the existing underwater range. The HF projectors will have a transmitting frequency between 8 and 11 kHz, and will be capable of generating a sound pressure level (SPL) of +190 dB ref a micropascal at 1 meter at 10 kHz. The projectors will enable underwater communication with the submarines. Actual field operation will be approximately 10 to 30 hours per year. Only one projector will transmit at any one time.

The two LF nodes will be used solely as an emergency alarm, in the event that a submarine moves into waters too shallow (less than 500 ft/152 m deep) and does not respond to normal communications. The node will transmit at 3 kHz, at 190 dB source level, with a 50 percent duty cycle. The signal will last for up to several minutes, or until the submarine transits back to a safe water depth. The safety alarm will be tested regularly for approximately 30 seconds prior to each exercise, or less than two hours per year, barring emergency operation. The alarm amplitude will be gradually increased (ramped) during testing to avoid startling marine mammals.

Installation

The nodes will be installed by cable laying vessel, within a pre-determined area. Each node will be mounted no lower than 30 inches (75 cm) above the ocean bottom. The node will be self-righting once installed.

Sea-Shore Interface (SSI)

Description

The purpose of the SSI is to protect the cables as they come ashore through the surf zone. Two existing spare conduits, installed as part of a recent BSURE repair project, will be used. The two conduits are 4-inch (10 cm) diameter

throughway pipes, 4,000 feet long (1,219 m). At a water depth of about 90 feet (27 m), the two to six cables will enter the protective SSI conduits. As shown in Figure 7, once on shore, the conduits run about 580 feet (177 m) inland to a manhole located adjacent to an unpaved access road. From the manhole, the SWTR cables will run within an existing utility corridor to the BARSTUR cable termination hut (Bldg. 410), located approximately 700 feet (213 m) to the south. At Bldg. 410, the cables will be passed through a hole in the six-inch concrete floor for termination within the building.

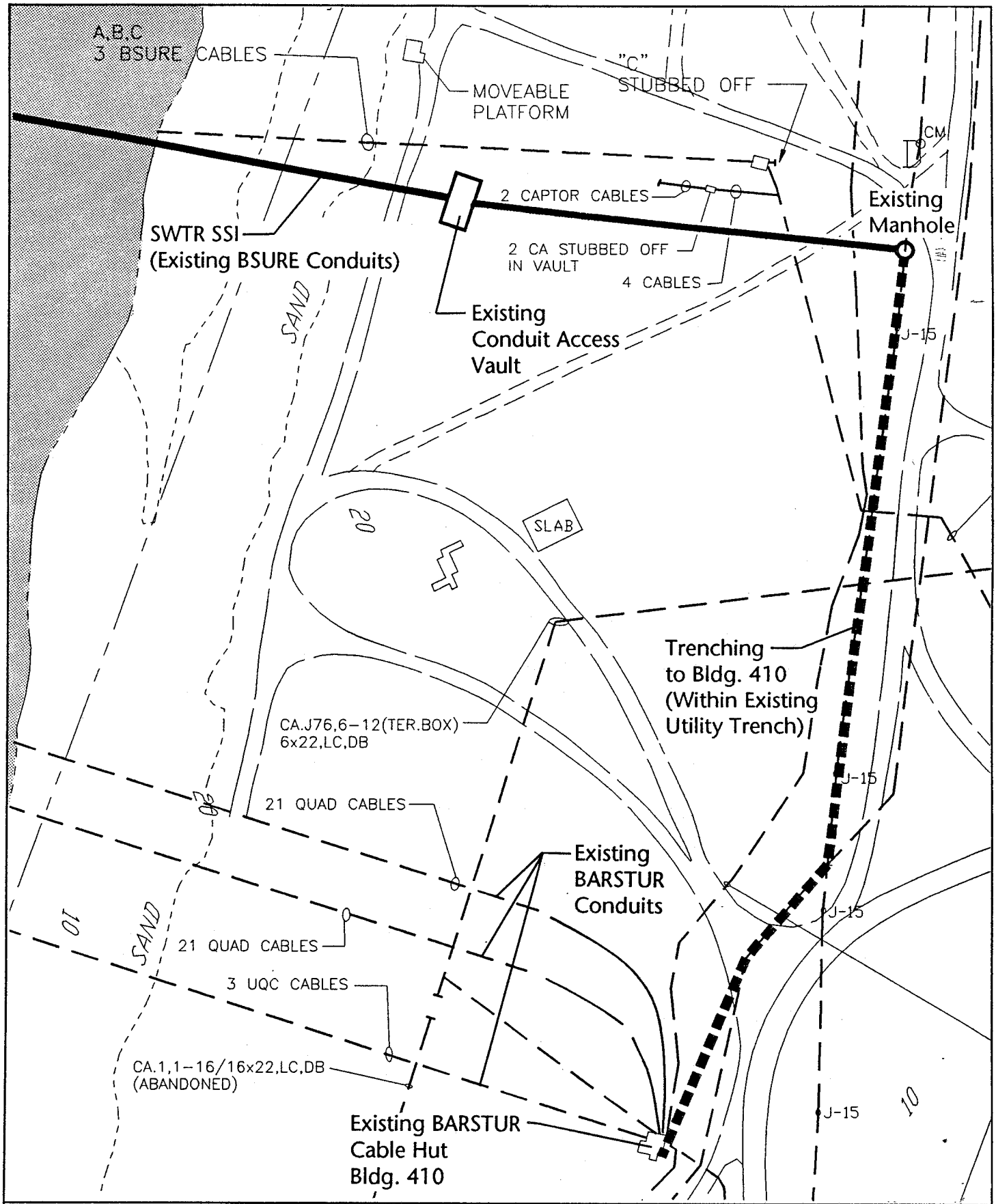
Installation

As noted, the SWTR cables will come ashore within existing SSI conduits. Therefore, no new construction or excavation is required in the beach areas or sand dune. Existing offshore moorings may be used by the cable laying vessel when the cable is pulled through. Additional anchors and moorings may also be required. Trenching between the manhole and Bldg. 410 will be required to install the SWTR cable. The trenching will occur within an existing utility corridor.

Shore Electronics Subsystem (SES)

Description

The SES comprises all the necessary equipment and circuitry to provide electrical power to the OIS, driving its in-water acoustics, electronics and optics, as well as mechanically, electrically and optically terminating the trunk cables. All SES equipment will be designed for operation on shore in a climate controlled environment. The SWTR's shoreside facilities include cable hut Bldg. 410, where the cable will terminate and where power supplies will be located. The remaining SES equipment and communications center will be in the Range Operations Center, Bldg. 105. The connection to the Range Operations Center, located about two miles (3 km) south of the cable hut, will be via existing underground fiber optic lines. No new construction or trenching is required between the cable hut and the Range Operations Center. At the Range Operations Center, the signals will provide tracking information used during the training exercises.



SWTR Shoreside Conduit Location

Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

0 Feet 100

0 Meters 30

Figure 7

Installation

Building 410 Installation. At Bldg. 410, the electrical portions of the cable will be terminated in a rack, placed adjacent to existing racks. Any necessary power conditioning equipment or monitoring equipment will be installed in the rack.

Building 105 Installation. An existing underground fiber optic cable will connect Bldg. 410 to Bldg. 105, the Range Operations Center, approximately two miles away. No new construction is required.

2.2.2 Operation of the SWTR

The SWTR instrumentation will provide users of the existing underwater range with a shallow water warfare training capability. The project will allow shallow water surface ship and aircraft ASW training exercises to be tracked and monitored. The installation of the SWTR instrumentation will not increase the number of range users, frequency or duration of training activity at PACMISRANFAC. This is because PACMISRANFAC range training activity generally depends on the budgets and funding of its users, rather than the training assets available. For example, the number of MK-30 targets available to the Navy is fixed in a Naval Sea Systems Command (NAVSEA) budget; the number of torpedoes available is fixed by the torpedo Intermediate Maintenance Activity (IMA) budget; and the number of training days that a ship or sub can utilize on the range is fixed by its training budget. None of these will be changed by the installation of the SWTR instrumentation. The only change to current conditions is that existing shallow water ASW training will be monitored and evaluated during normal exercises.

Based on current PACMISRANFAC range utilization data and the ratio of the size of the SWTR to the total range area, PACMISRANFAC has estimated that the SWTR portion of the range will be used for approximately 242 hours annually, or about 20 hours per month. (Communication between J. Mobley and PACMISRANFAC Range Operations, September 1996).

Shallow water surface and aircraft ASW is conducted at the SWTR. This may include undersea warfare (USW) and anti-surface warfare (ASUW) operations. Only one submarine is used within the SWTR at any given time. The types of training are described further in Chapter 3.

Prior to range training, submarines, targets and retrievable torpedoes are outfitted with training range pingers (acoustic transmitters), which acoustically transmit short pings with a low repetition rate during the exercise. The acoustic signals are received on those nodes within hearing radius and cabled back to the Range Operations Center. At the Range Operations Center, the relative reception times from the different nodes are used to calculate the target position.

For the great majority of training time, the SWTR nodes will be utilized in their passive, receive-only mode. Acoustic transmissions to submarines via the projectors will occur infrequently, averaging a total of 30 minutes over an 8-hour day. The 30 minutes of transmission time will occur in short intervals, occurring at the beginning and end of an exercise, and during torpedo firings. Only one SWTR projector will transmit at any given time.

The two low frequency alarm projectors will only be used in an emergency situation. The alarm will also be test activated for approximately 30 seconds prior to each operation, to ensure it is working properly. Alarm signal strength will be ramped up gradually during testing to minimize the startling of marine species. In the rare instance of a real emergency, the signal will not be ramped.

2.3 NO-ACTION ALTERNATIVE

The no-action alternative would preserve the status quo, with no installation of SWTR instrumentation. However, ongoing training operations would still continue at the existing underwater range at the same tempo, with or without the SWTR instrumentation. Shallow water operations would still occur in the SWTR area, just without the tracking and underwater communication capabilities. This may have the negative result of an increased safety risk to submarines. The no-action alternative would also fail to meet the Congressional appropriation to provide shallow water training facilities in Hawaii, which could jeopardize Pacific Fleet readiness.

2.4 CONSTRUCT SWTR AT PENGUIN BANK, MAUI COUNTY

A second alternative to the proposed action is the construction of the SWTR at Penguin Bank, Maui County. Penguin Bank is located adjacent to the west side of Molokai Island. The bank is the most extensive submarine shelf of the main islands, and stretches 30 miles (50 km) to the southwest of Molokai. The average water depth over the bank is approximately 200 feet (60 meters), and at the edge of the bank there is a shear submarine cliff that extends to water

depths of 2,000 to nearly 4,000 feet (600 to 1,200 meters). Penguin Bank was initially considered as a location for the SWTR, as the site has the necessary geographic depth characteristics.

The Penguin Bank alternative has several disadvantages compared to the proposed action. Surface ship and air training potential is limited due to the high commercial air traffic and commercial fishing in the area. Four commercial air routes crisscross the Penguin Bank area, in addition to heavy recreational air traffic. Penguin Bank lies in the approach path controlled by the Honolulu International Airport (HIA), and its airspace is not within PACMISRANFAC control. As a result, the integration of tactical and support aircraft in training operations may be restricted by HIA controllers (e.g., helicopters attempting to recover torpedoes, and P-3 aircraft and Lamps helicopters conducting exercises may be restricted, greatly complicating and limiting training operations).

Penguin Bank is also used extensively for commercial fishing and recreational fishing and whale watching industries, which could limit surface ship training. The Penguin Bank area is located within the proposed Hawaii Humpback Whale National Marine Sanctuary, which could limit training activities. Another disadvantage is that this alternative would expand training into a geographic area where training does not presently occur on a large scale. Penguin Bank does not have an existing deep water instrumented training range, conduits to shore or shoreside support facilities which could be utilized. Establishment of the SWTR at Penguin Bank would require the construction of a sea-shore interface and shoreside support facilities on Molokai, greatly increasing project cost. Also, PACMISRANFAC may not have available aircraft and boats to support the exercise at Penguin Bank. The Penguin Bank alternative does not satisfy the purpose and need for the capability to evaluate surface ship and aircraft shallow water ASW training.

Training logistics and coordination would not be as easily accomplished as with the PACMISRANFAC alternative, where there is already an operating training range. BARSTUR users would have a slightly greater travel time to the Penguin Bank SWTR than with the proposed action.

Finally, the Penguin Bank area is characterized by rough seas and strong, often unpredictable currents, which could limit training range availability and affect training safety.

2.5 ENVIRONMENTAL EFFECTS OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

Overall, there are no significant environmental impacts of the proposed action that cannot be mitigated. The increased water turbidity when the underwater cables are secured will be temporary and minimal compared to normal conditions. There will be no negative long-term impact to the marine environment.

The Navy has determined that the operation of the SWTR projectors will have no adverse effect on threatened and endangered marine mammals. The frequencies used, low duty cycles and the fact that no more than one node will transmit at a time will minimize the acoustic impact on marine mammals. Ramping the low frequency emergency alarm during test deployment will also reduce the potential to startle marine mammals. An informal Section 7, Endangered Species Act consultation with the National Marine Fisheries Service has been completed. The NMFS has concurred with the Navy that installation and operation of the underwater nodes and low frequency alarm are not likely to adversely affect threatened or endangered marine species.

The Navy has determined that the project will have no effect on historic sites. No excavation will be required within the beach area, and shoreside trenching will be limited to an existing utility corridor. A Section 106, National Historic Preservation Act consultation for the SSI was conducted as part of another project, BSURE Repair. Archeological monitoring from the surf to the manhole, across the berm, will be done as part of that project. The State Historic Preservation Officer has concurred with the Navy's determination of no effect on significant historic sites. Temporary air quality and noise impacts will occur during construction. Dust will be controlled by proper construction and erosion control techniques. The project site does not have soil contamination, and no hazardous materials will be generated during construction. All necessary permits for equipment installation and construction will be obtained. The project has been reviewed for environmental justice, and there will be no adverse impact to minority or low-income communities.

Two alternatives to construction of the SWTR at PACMISRANFAC were analyzed. The no-action alternative would result in no shallow water warfare training range. This alternative would have the fewest environmental impacts, particularly construction-related impacts. Because there will be no new equipment installed, there would be no installation-period impacts related to

water quality, marine biology, air quality, noise or archeological/historic resources. However, shallow water ship and aircraft ASW operations would continue in the area, just without tracking and the capability to evaluate the operational effectiveness.

The construction of the SWTR at Penguin Bank, Maui County could have construction and installation period impacts greater than the proposed project, since new shoreside facilities would need to be constructed on the west shore of Molokai. Impacts to the nearshore marine environment and shoreside archeological and historic resources are not known, as the area of Molokai where cables would come ashore has not been previously excavated. Further studies would be needed to determine impacts to archeological and historic resources.

Operational period activities would be similar to the proposed alternative, but unlike PACMISRANFAC, there are no training operations presently occurring in the Penguin Bank area. The presence of a SWTR would introduce new ship, aircraft and submarine activity to the region.

Table 1 provides a comparison of the alternatives, and whether the various operational criteria area met.

Table 1:
Summary of Alternatives

Operational Need	Site Requirement	Do the following alternatives meet operational needs?		
		No Action	Alternative: Penguin Bank	Proposed Action: PACMISRANFAC
Evaluate Aircraft ASW Training Proficiency	No/minimal commercial and recreational air traffic.	No. Aircraft would continue to operate over PACMISRANFAC area but would not be able to evaluate proficiency in shallow water ASW.	No. Four commercial air routes crisscross proposed area as well as heavy recreational air traffic.	Yes. Restricted airspace out to 3 nautical miles from shore. Warning area 188 covers entire proposed SWTR area from the surface to unlimited elevation.
Evaluate Surface Ship ASW Training Proficiency	No/minimal commercial recreational vessel traffic.	No. Surface ships would continue to operate within the PACMISRANFAC area but would not be able to evaluate proficiency in shallow water ASW.	No. The proposed area is extensively utilized for commercial fishing. The area is also within the Hawaii Humpback Whale National Marine Sanctuary and utilized for commercial whale watching activities.	Yes. Surface traffic is not restricted by PACMISRANFAC. However, PACMISRANFAC does have an established working relationship with local vessels and requests vessels to leave the area during the launching of air targets. There is minimal commercial fishing/whale watching in the proposed area.
Utilize Existing Department of the Navy Infrastructure	Proximity to existing Department of the Navy infrastructure.	No. Existing infrastructure at PACMISRANFAC would continue to be used for deep water ASW evaluation but shallow water evaluation would not be available.	No. No Department of Navy facilities available on Molokai Island.	Yes. Proposed area adjacent to PACMISRANFAC.
Evaluate Aircraft and Surface Ship Shallow Water ASW Training Proficiency	Extensive shallow water less than 300 fathoms.	No. Aircraft and surface vessels would continue to operate in shallow water but ASW training proficiency could not be evaluated.	Yes. Water depth in proposed area varies from 25 to 220 fathoms, with the majority of the area within 50 fathoms.	Yes. Water depth in proposed area varies from 20 to 500 fathoms, the majority of the area within 300 fathoms.

CHAPTER THREE
AFFECTED ENVIRONMENT

3.1 LOCATION AND PHYSICAL CONDITIONS

3.1.1 Location

The Pacific Missile Range Facility (PACMISRANFAC) Barking Sands is located on the west side of the island of Kauai, the fourth largest of the eight major Hawaiian Islands. The Barking Sands facility is the primary site of the Pacific Missile Range Facility, Hawaii Area, as shown previously in Figure 1. PACMISRANFAC Barking Sands will operate the proposed Shallow Water Training Range (SWTR).

3.1.2 Regional Geology

The seabed offshore PACMISRANFAC is predominantly basalt, sand and hard coral. The Kauai island terrace, which extends to depths of 3,000 feet (915 m), is primarily composed of basalt outcrops with carbonate sands in the depressions and channels and minor carbonate reef development.

The zone near the seashore interface, from about 90 feet (30 m) water depth to the shore, is a turbid, high energy surf zone. It is a very shallow and broad underwater plain which extends about a mile offshore, and is exposed to winter storms. The nearshore zone is characterized by high energy surf with submerged beachrock and pockets of sand. Algae covers approximately 50 percent of the area. From 20 to 50-foot (6 to 15 m) depth, the bottom consists of connecting rocky spurs and plateaus with sand accounting for 30 to 60 percent of the bottom. The sandy area gradually increases with depth and beyond the 60-foot (18 m) depth, the bottom is primarily a sandy plane.

3.1.3 Topography/Soils

The island of Kauai, the oldest in the Hawaiian islands, is 33 miles long and 25 miles wide (53 by 40 km). The island began as a huge shield volcano, and still retains its roughly circular shape. The highest point on the island is Kawaikini Peak, at the center of the island, which rises 5,170 feet (1,575 m) above sea level. The northern portion of the island is characterized by high cliffs formed by

wave action. The low lands along the island's perimeter comprise most of the potentially usable land.

PACMISRANFAC Barking Sands is located on a low lying coastal plain on the west coast of Kauai. Elevations vary from sea level to +25 feet (8 m) over most of the Mana Plain, with some sand dunes in the north rising to over 100 feet (30 m) above sea level.

The soils on Kauai are primarily volcanic in origin. Most of the soil underlying the PACMISRANFAC Barking Sands is in the *Jaucas-Mokuleia* soil association.

3.1.4 Climate

The climate of Kauai is generally mild throughout the year. The west side of Kauai is generally leeward of the northeasterly tradewinds. Accordingly, a calm or light variable wind prevails between the Mana Plain and Makaha Point, south and north of PACMISRANFAC, respectively. Strong wind conditions at PACMISRANFAC generally only occur during the winter season as a result of Kona storms, consisting of strong southerly winds and intense rainfall. Due to the marine influence and the prevailing northeast tradewinds, there is very little diurnal or seasonal variation in temperature. At PACMISRANFAC Barking Sands, long, hot dry periods are common. The mean annual temperature range is 70 to 78 degrees Fahrenheit (21 to 26 degrees Celsius). Mean annual rainfall over a 34-year period is 22.9 inches (58 cm), with 75 percent of this occurring during the period between October and March.

3.2 EXISTING FACILITIES AND UTILITIES

3.2.1 Facilities

The existing underwater range includes receiving and transmitting nodes and provides nearly 1,000 square miles of underwater tracking coverage. The proposed project will provide another approximately 100 square miles of shallow water monitoring capability. Existing shoreside facilities to be used for the SWTR include an existing sea-shore interface, Bldg. 410, the cable hut, where the cables will terminate, and Bldg. 105, Range Operations Center, south of the base main gate.

3.2.2 Utilities

Electrical System

Kauai Electric Company provides commercial power to PACMISRANFAC Barking Sands from the Mana substation. Power to the main base is supplied at 12.5 kV, reduced to 4.16 kV for distribution by a 2,000 kVA transformer serving the Operations Building area and by a bank of three 167 kVA transformers which serve the remainder of the base.

Because Kauai Electric Company has historically provided unreliable service (i.e., intermittent power outages), electricity for Range Operations is provided by the PACMISRANFAC main base power plant, with commercial power used as a back-up. PACMISRANFAC Barking Sands operates diesel generators to support range operations. (PACNAVFACENGCOM, January 1996).

Potable Water System

Potable water is supplied to main base PACMISRANFAC from the County of Kauai Water Department and Kekaha Sugar Company. The main base area, where the SWTR's shoreside facilities will be located, is supplied by the Mana Well, owned and maintained by Kekaha Sugar Company and County Water Department. Water is delivered from the well to one 100,000 gallon storage tank and one 420,000 gallon storage tank, both located near the main gate of the base and two 126,000 gallon storage tanks at Kokole Point. From there, it is distributed through a network of six and eight-inch pipes.

Wastewater System

PACMISRANFAC has two wastewater treatment facilities: a treatment plant which serves the main base area, and an oxidation/leach pond serving the southern family housing and community support areas. The SWTR's shoreside facilities are within the area served by the extended aeration package treatment plant, located a half mile south of the main gate. The sewage treatment plant has a capacity of 30,000 gallons per day (gpd), and handles about 29,000 gpd. Effluent from the package plant is discharged into a leaching field, between the runway and the coast, where percolation and infiltration occur.

3.3 FLEET TRAINING OPERATIONS

PACMISRANFAC is the largest instrumented deep water, surface and air and undersea training range in the world. Its mission is to provide major range, operational and base support for fleet users and other DoD and government agencies, as assigned by Commander in Chief Pacific Fleet (CINCPACFLT). The range is used by the Pacific Fleet, Air Force, Army, Marine Corps, allied and other research, development, test and evaluation programs for undersea warfare, air warfare and surface warfare. PACMISRANFAC advertises an 8-hour range day for Navy training, 0730 to 1600, Monday through Friday. Operations peak during specific exercises such as the biennial Rim of the Pacific (RIMPAC) exercise.

The following are the number of ship, aircraft and submarine days the range was in use during FY94 and FY95. The figures include both U.S. and foreign military sales.

	FY94	FY95
Ship Days	161	132
Aircraft Days	324	360
Submarine Days	179	203

The SWTR is used for shallow water surface ship and aircraft anti-submarine warfare (ASW). This type of training generally involves only one submarine in the SWTR at any given time, and may include variations of undersea warfare and anti-surface warfare operations, as described below.

3.3.1 Undersea Warfare

Undersea warfare (USW), includes a variety of operations involving detecting and engaging a submarine or submarine surrogate (small diameter unmanned undersea vehicles). USW may be conducted by surface ships and aircraft, either individually or as a coordinated force, against a submarine target. The submarine may either be acting as a target for searching surface ships and aircraft or may be practicing shallow water maneuvers. The operations may involve the use of airplane sonobuoys, active and passive sonar, and towed acoustic arrays and retrievable inert "practice" torpedoes.

Passive and/or active sonar is used for search and detection and any training exercise using inert torpedoes. Inert "practice" torpedoes are launched against targets during training. Since 1967, at least 17,000 torpedoes have been fired in the PACMISRANFAC ranges, and no interactions with marine mammals have been reported (PACNAVFACENGCOM, 1996). Established range procedures are closely followed by all range users.

All USW targets and inert training torpedoes are recovered following training use. Sonobuoys dropped into the ocean by aircraft scuttle themselves after a pre-set period and sink to the bottom, where they are abandoned in place. No hazardous substances are released.

3.3.2 Anti-Surface Warfare

Anti-Surface Warfare (ASUW) involves a submarine and surface vessels engaging ships or targets simulating ships, inert torpedo operations and ship maneuvers. No live ordnance is fired during ASUW for safety reasons, although some inert training variants may be used such as smoke bomb to simulate "hits." These devices are recovered after use.

3.4 TERRESTRIAL FLORA AND FAUNA

3.4.1 Flora

Vegetation at PACMISRANFAC is sparse, particularly in the sandy central and coastal areas where the SWTR cables will come ashore. Vegetation consists of kiawe (*Prosopis pallida*), *koa haole* and grasses. Native species present in various areas of the base include *'ilima*, *nama*, *'uhaloa*, *naupaka*, and *a'ali'i* shrub. The project area includes grasses and shrubs, with naupaka and creeping vines (e.g., beach morning glory) near the sand berm. The only potentially threatened or endangered plant species near PACMISRANFAC is the *'ohai* (*Sesbania tomentosa*), a federally listed endangered species found at a state park adjacent to PACMISRANFAC. The plant has not been found on the base or within the project area.

3.4.2 Fauna

The most sensitive biological habitats at PACMISRANFAC are the Nohili dunes north of the project area, and remnants of the Mana wetland inland of the project area, preserved as irrigation ditches and small reservoirs. A proposed Kawaiele

State Wildlife Sanctuary is under construction. Ponds and ditches on the Mana Plain will continue to provide critical waterbird habitat. None of these areas are adjacent to the proposed project.

A total of 39 bird species have been observed at PACMISRANFAC, including four federally listed endangered species and one state listed endangered species. The federally listed endangered species include the non-migratory, endemic Hawaiian duck (*koloa*), Hawaiian or American coot (*alaeke'oke'o*), Hawaiian or black-necked stilt (*ae'o*) and Hawaiian gallinule or moorhen (*alae'ula*). The state-listed endangered Hawaii owl (*pueo*) has also been observed at PACMISRANFAC. Newell's shearwater (*Puffinus newelli*), a federally listed threatened species, is believed to fly over PACMISRANFAC at night. No nesting species have been observed in the project vicinity.

Other migratory and indigenous birds observed at PACMISRANFAC include the golden plover (*kolea*), black-crowned night heron (*auku'u*), wandering tattler (*ulili*), brown booby (*'a*), wedge-tailed shearwater and Laysan albatross. (PACNAVFACENGCOM, January 1996).

3.5 MARINE ENVIRONMENT

3.5.1 Physical Structure

The majority of the shoreline fronting the cable landing area is comprised of sandy beaches. From the shoreline seaward, the bottom is composed of a flat, calcium carbonate (limestone) platform with a few low depressions and channels filled with coarse white sand. Beyond the 60-foot (18 m) depth, the bottom is primarily a sandy plane.

Overall, the nearshore area is subject to extreme stress from wave impact and scouring of sediment from wave action. As in many locations in the Hawaiian Islands, the composition of coral reef communities has been structured in response to these physical forces.

3.5.2 Nearshore Water Quality

Marine water offshore PACMISRANFAC is considered Class A, open coastal water and oceanic water by the State of Hawaii (Chapter 54, Hawaii Administrative Rules). Water quality in the area is affected by silt and nutrients

from Nohili and Kawaiele Ditches, which discharge agricultural drainage. This discharge is permitted under a National Pollutant Discharge Elimination System (NPDES) permit granted by the State Department of Health. (PACNAVFACENGCOM, 1996).

3.5.3 Biological Community

In general, coral cover offshore is relatively low, and decreases with distance from shore. Shallower areas appear to be a more favorable habitat for coral reef growth because of the lower percentage of bottom sand, which inhibits the settlement of the coral and abrades their tissues. The only benthic invertebrates occurring in any frequency are unidentified green and black sponges. Sea urchins, generally common in nearshore areas, are conspicuously absent.

Benthic algae is common throughout the offshore area, particularly on the reef platforms that were low in coral cover, with the most abundant being the red calcareous algae.

The abundance of fish appears to mirror the abundance of coral, with large populations of both groups in shallower waters. In general, the number of species of fish, the number of individuals and species diversity decrease with increasing depth. Commonly found fish include algae-feeding acanthurids, brown surgeonfish and goldring surgeonfish. Other reef fish include wrasses, damselfishes and goatfish (Marine Research Consultants, April 1996).

3.5.4 Threatened and Endangered Species

Several species that occur in Hawaiian waters have been declared threatened or endangered by federal jurisdiction. The threatened green sea turtle (*Chelonis mydas*) occurs commonly along the coastlines of all major islands, including Kauai, and is known to feed on selected species of macroalgae. The endangered hawksbill turtle (*Eretmochelys imbricata*) is known infrequently from waters off the Hawaiian Islands. Several green sea turtles were sighted on the surface and under water during the marine baseline surveys.

The endangered Hawaiian monk seal (*Monachus schauinslandi*) occurs occasionally in the waters off Kauai, and has been known to haul out on the beaches of west Kauai, including the beaches near the project area.

The endangered humpback whale (*Megaptera novaeangliae*) frequents Hawaiian coastal waters from December to April, with peak abundance from mid-February to mid-March. The proposed Hawaiian Islands Humpback Whale National Marine Sanctuary does not include the waters off the western end of Kauai, including PACMISRANFAC's underwater ranges. During the winter breeding season, the whales are found primarily within 600 feet (183 m) and shallower waters around the main Hawaiian Islands. The areas of greatest use are the shallow waters surrounding Maui, Molokai, Lanai, Kahoolawe, Penguin Bank and certain areas offshore the Big Island. Kauai, Oahu and most areas of the Big Island receive substantially less usage. (Nitta and Naughton, 1989 in PACNAVFACENGCOM 1996).

3.6 CULTURAL RESOURCES

There is substantial evidence that PACMISRANFAC and surrounding areas were used extensively by Hawaiians. A number of archeological surveys of Kauai's west coast and the Mana Plain have been conducted over the last 60 years. PACMISRANFAC has been found to contain a number of archeological resources, particularly human burials, some of which have been encountered during construction. Human skeletal remains have been found in the coastal sand dunes. The previously identified burials have been mapped and recorded by the base Public Works Office.

The SWTR cables will come ashore within two conduits which are being installed as part of a separate BSURE repair project. The conduits will connect to a manhole, about 580 feet (177 m) inland. A Section 106, National Historic Preservation Act consultation for the BSURE Repair project with the Hawaii State Historic Preservation Officer (SHPO) has already been completed (Navy consultation letter 11019, Ser 7031.5A/0285 of 3 April 1996 and SHPO review letter LOG NO. 17156, DOC NO. 9605SC07 of 15 May 1996). Archeological monitoring is required during excavation between the shore and the manhole.

3.7 AESTHETIC AND VISUAL ENVIRONMENT

The BSURE cable landing where the SWTR cables will come ashore and the cable hut (Bldg. 410) are located north of the main operations area of the base, and are mostly undeveloped and open. In general, the inland areas (i.e., near the cable hut) are grassy, with vegetation sparser closer to the sand dune fronting the ocean. The terrain slopes steeply downward from the dune, toward the white, sandy beach. The nearshore area is characterized by a layer of beach

rock, which forms a ledge paralleling the coastline. The beachrock is generally exposed during the winter and covered by sand during the summer.

3.8 SOCIO-ECONOMIC ENVIRONMENT

3.8.1 Employment and the Economy

The Pacific Missile Range Facility is located on the west side of the island of Kauai, and is a major contributor to the island's overall economy. As the largest industrial employer on the island, PACMISRANFAC provides almost 900 jobs.

In 1989, PACMISRANFAC had 135 permanently stationed military personnel. Base personnel are housed either in family housing, located in the southern area of PACMISRANFAC, or in private off-base housing. The operation and maintenance of the training ranges and non-operational facilities are managed by base contractors.

3.8.2 Commercial/Recreational Fishing and Boating

The offshore waters of PACMISRANFAC are fished by both commercial skipjack tuna pole and line vessels and longline vessels fishing for larger tuna and billfish. The inshore areas are used by commercial *akule* (bigeye scad) fishermen, as well as bottom-handline and kona crab fishermen. There is deep sea shrimping offshore, using shrimp traps. The majority of ocean craft within the project area are small fishing boats within one-mile of the shoreline. Tour boats from Port Allen also pass PACMISRANFAC on their way to the Na Pali coast.

Since the inception of the underwater training range in 1967, extensive efforts have been made to ensure minimal inconvenience to recreational and commercial boating and fishing activities. Commercial and recreational vessels are not restricted within the waters used for training, as PACMISRANFAC has no authority over surface traffic. The only restriction is on anchoring within the triangular prohibited area, due to a previous incident where a fishing anchor caught on a cable and had to be cut. However, trolling and bottom fishing are not restricted. Incidents of cable entanglement or damage from anchors have occurred in the past, but have not been a significant problem at the range.

If ongoing training involves launching of air targets, the range users conduct radar and/or an aircraft searches for boating or fishing activity prior to the operation. Any vessels in the area are requested to leave, and if they do not, the

training operation is altered to accommodate both the private vessel and the range user. If both parties cannot be accommodated, the exercise is postponed. In the mid 1970's when the range was expanded, a joint meeting of fishermen, State and Navy personnel was held to discuss the range's impacts on the fishing industry. At that time, it was mutually agreed that the range operations would not adversely affect fishing activity. Tour boat operators are required to comply with Range Safety Instructions as a condition of their commercial license from the State of Hawaii. PACMISRANFAC's established procedures for ensuring compatibility with other ocean users have proved successful for over 30 years. These procedures are identical to those followed at the Pacific Missile Test Center, Point Mugu, California, where the private and commercial boating activity is many times greater.

3.9 EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE

In accordance with Executive Order 12898 dated 11 February 1994, and Secretary of the Navy Notice 5090 dated 27 May 1994, the Navy is required to identify and address, as appropriate, the potential for disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations. This is discussed further in Chapter 4.

3.10 AIR QUALITY

The prevailing northeast tradewinds result in light and variable surface winds at PACMISRANFAC, and generally good air quality. Strong, gusty northerly or south-southeasterly winds with speeds up to 30 knots can result from weather patterns creating a tight pressure gradient along the cliff line northeast of the base.

The State of Hawaii is in attainment of the National Ambient Air Quality Standards (NAAQS) established for carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM-10), lead and ozone. Section 176(c) of the federal Clean Air Act (CAA) prohibits any federal agency from engaging in, supporting, providing financial assistance for, licensing, permitting or approving any activity that does not conform to an applicable State Implementation Plan or Federal Implementation Plan.

Air emissions at PACMISRANFAC occur from stationary and mobile sources; however, only the operation of stationary sources are regulated by the CAA. All

stationary sources at the main base, including the generators in the power plant Bldg. 112, are included in covered source permit P-806-1305 from the State Department of Health. PACMISRANFAC has submitted an application for renewal of its covered source permit to the State Department of Health and is awaiting its approval. Electrical power to the project will be provided by existing generators in Bldg. 112.

CHAPTER FOUR
ENVIRONMENTAL CONSEQUENCES

4.1 DIRECT EFFECTS AND THEIR SIGNIFICANCE

4.1.1 Location and Physical Conditions

The project will install an interconnected system of 118 nodes (hydrophones and projectors) over an approximate 100 square mile (259 km^2) ocean area extending from one to eight miles (1.6 to 13 km) off of PACMISRANFAC at depths ranging from 160 to 6,200 feet (49 to 1,890 m). Most of the nodes will be located beyond the limits of the State of Hawaii's territorial sea, which extends three miles from Kauai's shore. The remainder of the 118 nodes, as well as the cables to shore, will be located within the three-mile territorial limit. Navy authority to use submerged lands within the three-mile territorial limits of the State of Hawaii for installation and operation of the SWTR at PACMISRANFAC Barking Sands is found in Section 6 of the Submerged Lands Act, 43 U.S. Code 1314, which reserves to the United States the necessary rights to use the submerged lands for purposes of commerce, navigation, national defense and international affairs.

The ocean bottom where the 118 nodes will be installed is characterized by hard basalt outcrops and carbonate sands. It is unlikely that there will be damage to the ocean floor by deployment of the OIS system. Disturbance to the ocean bottom sediments during node installation will be temporary. No dredging or filling will be required. Once installed, the equipment will have no further impact on the physical conditions of the ocean bottom.

Existing offshore moorings may be used by the cable laying vessel when the cables are pulled through the existing conduits, or new mooring and anchorages may be required. The moorings will not adversely affect the physical conditions of the nearshore bottom.

The trench corridor between the manhole and Bldg. 410 has been previously excavated for utility lines. No new shoreside facilities will be constructed. The project will have no long-term impact on shoreside physical conditions.

4.1.2 Utilities

The operation of the SWTR instrumentation will not significantly increase demand on existing utility systems at PACMISRANFAC. The project will not increase base population which could in turn increase utility demand. The existing electrical facilities at the base will adequately provide for the project's power requirements, and no upgrades are required. The project will not require wastewater services, potable water or other utility support.

4.1.3 Fleet Training Operations

All training operations which will occur at the SWTR are continuing actions which are presently ongoing, and are not within the scope of this environmental assessment. The SWTR will not change the operational tempo or increase the number of ship, aircraft or submarine days at the range. A brief overview of training activities conducted at PACMISRANFAC was provided in Chapter 3.

4.1.4 Terrestrial Flora and Fauna

The project is not anticipated to have any significant impact on terrestrial flora or fauna. No trenching or construction is required in the shoreline or dune areas. The area between the manhole and Bldg. 410 (where trenching will occur) is sparsely vegetated and is an existing utility corridor which has been disturbed by previous trenching. Shoreside trenching will not impact any threatened or endangered bird species or habitats. The project site has been surveyed, and there is no evidence that the *'ohai* (*Sesbania tomentosa*), a federally listed endangered species, is present. The shoreside project areas are not adjacent to any critical bird or other wildlife habitat.

4.1.5 Marine Environment

The installation of the SWTR equipment has the limited potential for short and long-term impacts to marine water quality and biology. Construction period marine activities include laying the nodes and associated cable on the ocean bottom over an approximately 100 square mile (259 m^2) area, and landing the cables by pulling them through two existing conduits at the sea-shore interface. Operational period activities involve monitoring acoustical signals via the nodes and occasional transmission through one of the bi-directional nodes. The underwater transmission of sound will not result in any adverse effect on marine life, including threatened or endangered marine mammals.

Construction-Period Impacts

Deployment of Nodes

Deployment of the nodes and their associated cables will not have a significant impact on the physical marine environment or on threatened and endangered species. The equipment will not be installed during the months when humpback whales are typically in peak abundance, from mid-February to mid-March. During deployment, visual surveillance for marine mammals will be conducted from the cable laying ship, and if any are present, work will be delayed until they have departed the area. During cable deployment, the boat operators will comply with 50 CFR Section 222.31, which forbids vessels from approaching within 100 yards (91 m) of any humpback whale.

Once installed, the nodes and cables will remain in place, with no further effect on the physical environment.

Cable Landing

Because two existing conduits will be used, no new construction or trenching is required at the sea-shore interface or along the beach or sand dune. Pulling the cables through the existing sea/shore interface conduits may generate temporary increases in suspended sediment at the ocean terminus of the conduits (approximately 4,000 feet (1,220 m) offshore). However, these small increases in sediment are unlikely to have an impact on the biotic assemblages. A dominant feature of the nearshore area is high wave energy with high levels of resuspended sediment. Because of these normally turbulent conditions, the biotic community is well adapted to extremes in sediment stress, and organisms in the area are capable of withstanding large natural sediment loads. The temporary, incremental increase in sediment that may occur during landing the cables will be insignificant compared to natural processes. (Marine Research Consultants, April 1996).

Because there are no plans for construction, excavation or blasting in the nearshore region, there is little or no potential of affecting behavior of turtles, whales and other marine mammals in the water or on the beach areas.

Operational-Period Acoustic Impacts

A study of the potential effects of the project on marine mammals was conducted by Marine Mammal Research Consultants (October 1996). The study, included in Appendix 3, investigated the acoustic impact of the SWTR projectors on marine mammals or *Cetacea*, including Mysticete species (Baleen whales), such as humpback whales, and Odontocete species (toothed cetaceans), including dolphins, porpoises and sperm whales. These two suborders of *Cetacea* were differentiated in the study because of the divergent characteristics of their acoustic behavior. The study concluded that the project would have minimal potential effect on these two classes of species. The study findings are discussed below.

Introduction

During operation of the SWTR, acoustic transmissions from the projectors have the potential to affect the behavior of marine mammals. Concern over the effects of anthropogenic (human-made) noise on marine mammals has centered on three issues: a) increasing ambient (background) noise levels, thus interfering with detection of social vocalizations; b) behavioral disturbance (e.g. animals vacating preferred habitat to avoid adverse sounds; and c) temporary or permanent shifts in hearing sensitivity.

The SWTR will include eight high frequency (HF) and two low frequency (LF) nodes. The eight HF nodes will be used for underwater communication with submarines. The two LF nodes will be used solely as an emergency alarm.

Based on the results of other studies involving Mysticete species, the sound field associated with the potential for impact on marine mammals (based on evidence of behavioral change) lies within the 120 decibel (dB) (re: 1 microPascal at 1 meter) isopleth for a given sound source. As part of the study, the proposed locations of the eight HF nodes and two LF alarms were plotted, and the 120-dB isopleth around each were calculated.

Mysticete Species (e.g., Humpback Whales)

The only Mysticete that appears regularly in Hawaiian waters is the humpback whale (*Megaptera novaeangliae*). Based on recent surveys of marine mammal distribution in Hawaiian waters, humpback whales predominantly reside in waters less than 100 fathoms (600 ft or 182 m) deep. The potential for impact is

due to the proposed introduction of anthropogenic sound in the vicinity of the whale's preferred habitat (i.e., waters less than 100 fathoms). Among the vocalization repertoire of humpback whales, the winter song contains the greatest variety of frequencies, between 30 Hz and 8 kHz, with principal energy lying below 4 kHz.

High Frequency (HF) Bi-Directional Nodes. The bulk of the evidence for disturbing effects of noise on Mysticete species supports concern for the effects of low frequency sound (less than 1 kHz). Existing evidence on the effects of varying frequencies indicates that for at least one species (gray whales), signals above 1.9 kHz resulted in no overt signs of detection. It is therefore unlikely that signals produced by the high frequency bi-directional nodes (8-11 kHz) would have significant impact on whales within the areas of ensonification (i.e., within 120 dB isopleth). Additionally, given the low duty cycle (i.e., less than 1 percent) and the fact that no more than one node will be activated at any one time, any possible effect would be minimized.

Low Frequency (LF) Alarm Transmitters. The LF alarms will be used in an emergency capacity for small amounts of time with a conservative maximum of 90 minutes per year. The alarm will be used more frequently in a test mode, for relatively short duration (30 seconds) prior to each exercise or less than two hours per year, barring emergency operation. The primary frequency of the low frequency alarm (3 kHz), is well within the range of humpback whale vocalizations, and it is likely that animals within the 120 dB isopleths of the LF signals would hear them.

The LF nodes have a greater potential for disturbance to humpback whales, since their frequencies overlap the whale's vocalization range (30 Hz to 8 kHz) and their ensonification area overlaps the whale's shallow water habitat. However, because the primary use of the LF alarms will be in test situations for relatively short duration, they are not likely to produce any adverse effect.

Additionally, potential impact will be mitigated by ramping up the amplitude of the LF transmitters during deployment tests (i.e., gradually increasing it) even over a relatively short period (10 seconds), to diminish the potential of startling the animals. In the rare instance of a real emergency, the signal will not be ramped up.

Odontocete Species (e.g., sperm whales)

Potential effects on Odontocete species, including dolphins and endangered sperm whales (*Physeter macrocephalus*), was also judged to be minimal.

HF Bi-Directional Nodes. Transmission frequencies of the HF bi-directional nodes overlap with the frequencies favored by Odontocete species, and it is likely that Odontocetes within the 120 dB isopleth would hear the signals. However, because the Odontocete species habitat is more diffused than that of the humpback whale, there is less potential for disturbance of the former's preferred habitat. Impact is also anticipated to be minimal because there will be no increase in training operations tempo beyond current levels, and only one transmitter will be used at a time.

Only one of the HF bi-directional nodes will project to depths where sperm whales have been sighted (i.e., 565 to 2,252 fathoms), and most sperm whale sightings have occurred substantially north of the range. In all, operation of the bi-directional nodes will result in no adverse effect to sperm whales.

LF Alarm Transmitters. The LF alarm is of less concern with the Odontocetes than for humpback whales, since their hearing sensitivities tend to be at higher frequencies. The low duty cycle and recommended ramping of the signal will further reduce the potential for any impact.

Study Conclusions

Overall, the Marine Mammal Research Consultants study concluded that the operation of the eight HF nodes and two LF alarm nodes had no adverse effect on Mysticete and Odontocete species, including endangered humpback whales.

The eight HF bi-directional nodes will operate outside the frequency range normally used by humpback whales, and will operate at a low duty cycle. No more than one node will transmit at a time. The HF frequencies do overlap those favored by Odontocete species. However, since the Odontocete habitat is more diffused, and given the fact that training will not increase over current operations, there is no increase in probability of an Odontocete being exposed to these signals over present conditions.

The LF alarm, while within the range of humpback whale vocalizations, will be used infrequently, mostly in a test situation for relatively short periods of time (30 seconds). Ramping the signal during testing will further mitigate potential impact.

Other Threatened and Endangered Species

The threatened green turtle (*Chelonia mydas*) is commonly found in Kauai coastal waters, and the endangered hawksbill turtle (*Eretmochelys imbricata*) is known infrequently in Hawaiian waters. It has been suggested by some scientists that hearing may play a role in sea turtle navigation, and that the giant green sea turtle has a reasonable degree of acoustic sensitivity, particularly to low-frequency sounds (Environment Hawaii, April 1996). The projectors are not anticipated to adversely impact turtle navigation, as they will be located in waters deeper than the nearshore areas which are the primary turtle habitat.

The endangered Hawaiian monk seal (*Monachus schlauslandi*) occurs occasionally in the waters off Kauai. Both the monk seal and sea turtles are known to haul out on the beaches of west Kauai, including the project area. However, there will be no construction or excavation in the beach areas associated with this project which could impact these animals. There will be no physical changes to the monk seal habitat.

There is the possibility that Hawaiian monk seals will at some time pass through offshore waters within the 120-db isopleth of the HF and LF transmitters. Assuming monk seals are sensitive to these frequencies, there will be no adverse impact, due to the transmitter's low duty cycles.

Informal Section 7, Endangered Species Act Consultation

An informal Section 7, Endangered Species Act consultation with the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) has been completed for the project (Appendix 2). The NMFS has concurred with the Navy's determination that the installation and operation of the 108 passive, uni-directional nodes, the eight bi-directional HF nodes and two LF alarms are not likely to adversely affect endangered humpback whales, sperm whales, Hawaiian monk seals, hawksbill turtles or threatened green sea turtles that might be found within or near the project area. NMFS also noted that critical habitat has not been proposed or designated for any of these species within or near the proposed project site.

The NMFS identified the following recommendations to further ensure that operation of the SWTR does not result in adverse effects to the above-listed species:

- To the extent possible, exercises involving torpedo firings on the SWTR should be limited to the period April through December.
- Both range operators and users should monitor the range for presence of humpback whales both acoustically (passive listening) and visually (by qualified observers aboard surface ships and aircraft).
- Studies to investigate the behavioral and physiological responses of large whales and listed sea turtles to high intensity, low frequency sounds should be sponsored and/or funded by the Navy, possibly through the Office of Naval Research. This will provide better information on which to evaluate this and future projects.

4.1.6 Cultural Resources

The SWTR cables will come ashore through existing conduits and there will be no new excavation in the shoreline area. As a result, no impact to cultural resources is expected. Trenching between the manhole and Bldg. 410, as illustrated in Figure 7, will be within an existing utility corridor which has been extensively disturbed and there is very low potential for subsurface cultural remains.

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to consider the effects of their actions on "historic properties," as defined by the National Historic Preservation Act. In Hawaii, the Section 106 review process is implemented by the State Historic Preservation Officer (SHPO) in the Hawaii Department of Land and Natural Resources, State Historic Preservation Division (DLNR-SHPD). A Section 106 consultation has been completed and the SHPO has reviewed the project and concurred with the Navy's determination that it will have "no effect on significant historic sites" (Appendix 1).

4.1.7 Aesthetic and Visual Environment

The project will have no significant aesthetic or visual impact at PACMISRANFAC. The nodes and cables will be placed on the ocean floor and will not be visible. The SSI conduits are buried in a trench backfilled with

concrete through the beachrock, which is only visible at low tide during winter months or when the waves recede. Between the manhole and Bldg. 410, the conduits will be buried below ground. No new buildings or building additions will be constructed for the project.

All training operations to be conducted at the SWTR are continuing actions, already occurring at PACMISRANFAC. The project will not increase the number of fixed wing aircraft or helicopters or increase their visual impact.

4.1.8 Socio-Economic Environment

General

The operation of the SWTR will not expand training into a new geographical area or increase range use. By providing monitoring hardware in the shallow water area, the project will enhance the capability of the existing range. No new PACMISRANFAC personnel are anticipated to support operation of the SWTR.

Economic Impact

The establishment of the SWTR will enhance PACMISRANFAC's overall training facilities, furthering PACMISRANFAC's value to national defense. The base, in turn, will continue to play a vital role in the overall economic well-being of the island of Kauai. The project will not require a commitment of County services or resources.

Interaction with Commercial/Recreational Activity

The nodes, cables and equipment associated with the SWTR will not impact commercial or recreational boaters or fishing activity. Other than the continuation of the "no anchor zone," there will be no additional restrictions on boating or commercial and recreational fishing.

The SWTR nodes and associated cables will be located on the ocean floor at depths well below the keel of fishing ships and trolling lines, which run close to the surface of the water. The commercial deep sea shrimping offshore utilizes shrimp traps; bottom trawling is not conducted. Cable entanglement with fishing lines have occasionally occurred in the past during bottom fishing. Damage to cables may occur from lead fishing weights being dropped rapidly or from hooks snagging the cables and nodes. There would be no hazard to fishermen if this

were to occur, and the Navy has historically taken responsibility for repairing and maintaining any cable lines which are damaged.

The SWTR acoustic transmissions will not interfere with ship navigation or communication transmissions. There will be no increase in ships, aircraft, and submarines which could interact with commercial/recreational activity.

Specific rules (72 COLREGS) have been established under the International Navigation Rules governing the operation of vessels to minimize any danger of collision. Submarines also take great care to ensure that they remain clear of all surface craft, and are not expected to impact commercial or recreational boats. These navigational rules will continue to be followed, as they are at the existing underwater range.

In conclusion, the SWTR will not alter the PACMISRANFAC danger zone or operating areas, or result in additional restrictions on fishing or boating in the area. Since most boat traffic is limited to coastal areas, because there is no bottom trawling conducted, and the "no anchor zone" covers most of the area where anchors could damage or become entangled with cables, there is only a minimal chance of entanglement due to small boat anchors or fishing hooks.

Commercial Aircraft

PACMISRANFAC controls the air space over two different air warning areas to the north and west of Kauai, denoted as W-186 and W-188. All commercial aircraft are required to keep out of the warning area, unless specific authority has been granted to enter it. The SWTR training activities will not modify the air warning areas or existing procedures.

4.1.9 Executive Order 12898, Environmental Justice

The installation and operation of the SWTR instrumentation and associated mitigation measures will not result in any significant or adverse environmental impacts, including human health, economic or social effects to minority or low-income communities. For the proposed project, the Navy has not directly or indirectly used criteria, methods, or practices that discriminate on the basis of race, color or national origin. There will be no known significant or adverse environmental impacts, including human health, economic or social effects, to minority or low-income communities from the proposed SWTR or from the mitigation measures as outlined in the EA.

4.1.10 Noise

Construction-Period Impacts

Temporary noise will be generated by the cable laying vessel and equipment during cable landing and trenching from the manhole to Bldg. 410. The construction contractor will be responsible for ensuring that applicable occupational safety and health noise regulations are followed. Because the area to be trenched is open, undeveloped and not adjacent to occupied buildings, noise impacts to other PACMISRANFAC personnel will be minimal. Construction activity will be limited to normal working hours unless otherwise directed by the PACMISRANFAC Public Works Officer.

Operational-Period Impacts: Shoreside Noise

Operation of the SWTR instrumentation will not increase shoreside noise. Frequency of aircraft flights and flight patterns will not be altered due to the SWTR. Because the range is located more than one mile (1.6 km) offshore, noise impacts to shoreside land uses are not expected to be significant. Aircraft noise impacts to PACMISRANFAC family housing and community support areas will not increase beyond current levels. Moreover, these facilities are located in the southern portion of the base, away from the training ranges.

Operational-Period Impacts: Underwater Noise

A few of the underwater nodes will be capable of transmitting acoustic signals. The potential noise impact to marine mammals has been judged to be minimal. These impacts were discussed in Section 4.1.5, Marine Environment.

4.1.11 Ground and Nearshore Water Quality

Construction-Period Impacts

There will be no construction-related impact to the brackish water aquifers beneath PACMISRANFAC. No dewatering will be required during shoreside trenching and installation of the SWTR cable conduits.

There is the potential for temporary increases in water turbidity during cable landing, when cables are bolted to the sea floor, and when the cable is pulled

through the conduits. However, turbidity in the nearshore region is already high due to heavy wave action, and the installation is expected to result in only minor temporary additional increase to overall turbidity.

In-water work is regulated by the Department of the Army (DA). The installation of the nodes is authorized under the DA's Nationwide Permit 5, Scientific Measuring Devices. A Section 401 Water Quality Certification (WQC) from the State Department of Health is not required.

Operational-Period Impacts

The capability to monitor training in shallow water areas will not result in any new range users, new training uses, or increased frequency of duration of training. Ongoing training is a continuing action, and potential impacts are currently mitigated through the correct implementation of standard training procedures, required by Navy instructions and/or federal regulations. These procedures will continue to be followed during use of the SWTR.

4.1.12 Vehicle Traffic

The SWTR will not increase traffic at the base or on off-base roadways. The SWTR will not increase the number of PACMISRANFAC support personnel or range users who could increase on-base traffic flow.

4.1.13 Solid Waste/Hazardous Waste Management

Construction-Period Impacts

Aside from the fuel used in the cable laying vessel, there are no expected hazardous materials or wastes associated with installation of the SWTR.

The only subsurface construction will occur in an area previously excavated for utility lines, and there has been no indication of contaminated soils or materials in the area. Shoreside areas which are trenched will be backfilled.

Construction period debris may include concrete and other debris generated during installation of the cables in Bldg. 410. All construction debris will be disposed of by the contractor. There will be no demolition or other construction work within Bldgs. 410 or 105 which could release asbestos or other hazardous materials. If such construction is planned, the construction contractor will

conduct appropriate testing and verification in accordance with 40 CFR 61, National Emissions Standards for Hazardous Air Pollutants. No hazardous debris is anticipated.

Operational-Period Impacts

All training activity at the SWTR are continuing actions, which have been reviewed and approved by the PACMISRANFAC Public Works Department and range operators. Potential impacts of hazardous waste and materials and mitigation actions have been identified and are being followed.

Standard operating procedures for training will continue to be followed to minimize the inadvertent release of hazardous materials, and to reduce risks to personnel and the environment. Hazardous materials are handled and disposed in accordance with federal and state regulations. Use of the SWTR will not increase the likelihood of encountering or generating hazardous materials.

In 1995, PACMISRANFAC updated its Spill Prevention, Control and Countermeasure Plan. The plan identifies best management practices to minimize the potential for accidental release of hazardous substances and outlines cleanup procedures if an accidental spill were to occur. These procedures will be followed.

4.1.14 Air Quality

Construction-Period Impacts

During the cable deployment, there will be diesel exhaust from surface support craft. Shoreside trenching will result in temporary increases in airborne sand and fugitive dust in the area. The construction contractor will be responsible for dust control, and proper construction and erosion control techniques will be used to mitigate these temporary impacts. There are no inhabited structures within the project vicinity which would be adversely impacted by construction period dust. Exhaust emissions from the cable laying vessel, on-site mobile and stationary construction equipment will be temporary. The construction contractor will be responsible for obtaining any necessary permits associated with construction equipment.

Operational-Period Impacts

Because the State of Hawaii is in conformance with the National Ambient Air Quality Standards (NAAQS), the proposed action is in conformance with Section 176(c) of the CAA (Interim Guidance on Compliance with the Clean Air Act General Conformity Rule, OPNAVINST 5090 Ser N457/4U596107 of 26 April 1994).

The operation of the SWTR electronic hardware and equipment will not result in significant increases in emissions or other air quality impacts. Power will be provided by generators in the power plant, Bldg. 112, which is covered by an operating permit from the State Department of Health. No new air quality permits will be required.

4.2 RELATIONSHIP BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF FEDERAL AND LOCAL LAND USE POLICIES, PLANS AND CONTROLS

This section provides an overview of the project's consistency with major federal and state land use policies, plans and controls. A listing of environmental permits and approvals obtained is included in Chapter 1.

4.2.1 PACMISRANFAC Master Plan and Hawaii Military Land Use Plan

The *Master Plan for the Pacific Missile Range Facility Hawaii Area* (PACNAVFACENGCOM, October 1990) provides guidelines for land use and facility development at PACMISRANFAC over a five to eight year time frame. The areas where the SWTR cables will come ashore and where the shoreside facilities are located are designated as "operationally constrained land" in the proposed land use plan. The general area is used as a cable landing for the BSURE and BARSTUR cables from the existing underwater range. Landing the SWTR cables and connection to the existing shoreside facilities is a compatible use. The project is consistent with the PACMISRANFAC Master Plan.

The project is also consistent with the *Hawaii Military Land Use Master Plan* (PACNAVFACENGCOM, July 1995) which identifies the project area for continued operational use.

4.2.2 Coastal Zone Management Act

The purpose of the Coastal Zone Management Act (CZMA) is to encourage states to manage and conserve coastal areas as a unique, irreplaceable resource.

The CZMA states that Federal property is excluded from the State's coastal zone. However, Federal activities (within or outside the State's coastal zone) that affect any land, water use or natural resources of the coastal zone are subject to a State "consistency determination." The consistency determination is intended to determine whether the Federal activity is "consistent to the maximum extent practicable" with the enforceable policies of the State's CZM program.

The Navy has determined that the SWTR project will affect the State's coastal zone. Under the Department of the Army's (DA) recently revised (11 February 1997) nationwide permit system, Nationwide 5 permits have been granted a blanket CZM consistency determination by the Hawaii Office of Planning, the state's CZM program office. As a result, the SWTR project will not require a separate CZM consistency determination. The Corps of Engineers has notified the State's CZM program of the project as part of its permit review process (Appendix 4).

4.2.3 Chapter 343, Hawaii Environmental Policy Act

Up to approximately 32 of the SWTR nodes (hydrophones and projectors) and the cabling to shore will be located inside the State of Hawaii's three-mile territorial limit. Navy authority to use submerged lands within the three-mile territorial limits of the State of Hawaii for installation and operation of the SWTR at PACMISRANFAC Barking Sands is found in Section 6 of the Submerged Lands Act, 43 U.S. Code 1314, which reserves to the United States the necessary rights to use the submerged lands for purposes of commerce, navigation, national defense and international affairs. Accordingly, the federal processing of this project is not subject to the provisions of the Hawaii Environmental Policy Act, Chapter 343, Hawaii Revised Statutes.

4.2.4 State and Local Land Use Policies

State and local (County of Kauai) land use policies are preempted for areas of the project located 1) entirely on federal property at the Pacific Missile Range Facility; or 2) within submerged lands beyond the State's three-mile territorial

limit. The area of the SWTR on submerged lands within the territorial limits of the State of Hawaii is subject to State land use policies.

4.3 CUMULATIVE IMPACTS

In addition to this proposed action, there are four other independent Navy programs that will likely occur in the near future: PACMISRANFAC 'Kingfisher' Surface Ship Training Minefield, Hawaiian Area Shallow-Water Submarine Sonar Training Area, Hawaiian Islands Shallow-Water Training Range, and the PACMISRANFAC Enhanced Capability Environmental Impact Statement.

- PACMISRANFAC 'Kingfisher' Surface Ship Training Minefield is proposed to be located in the vicinity of the existing PACMISRANFAC training ranges offshore Barking Sands, Kauai. Operations in the area will include surface ship defensive training in mine field detection and avoidance. An Environmental Assessment has been initiated for this proposed action.
- Hawaiian Area Shallow-Water Submarine Sonar Training Area is proposed for installation in the shallow waters west of Kahoolawe Island. The small, three square nautical mile training area will provide the Pearl Harbor submarine force with the capability to conduct shallow-water sonar proficiency training and readiness exercises. An Environmental Assessment has been initiated for this proposed action.
- Hawaiian Island Shallow-Water Training Range will provide submarines stationed in or transiting to and from the Hawaiian Islands with the capability to monitor and evaluate shallow-water submarine ASW training operations. The range needs to be located at a site with extensive shallow water and minimal submerged navigation hazards. The preferred site is an existing 'Submerged Submarine Operating Area' south of Maui. An Environmental Assessment has been initiated for this proposed action.
- PACMISRANFAC Enhanced Capability Environmental Impact Statement addresses enhancement of PACMISRANFAC's existing baseline activities to allow testing and evaluation of Navy Theater Ballistic Missile Defense and DoD Theater Missile Defense Systems under development.

Each of the above proposed actions is mutually exclusive as no one program will benefit from the existence/operation of another. Assessment of the potential for environmental impact is in progress for each of the above actions. Navy operations are currently conducted throughout the Hawaiian Islands involving surface ship, aircraft, and submarine ASW and mine warfare. Humpback whales

have extensive inter-island movement although studies are not conclusive as to the distribution or pattern of this movement. Humpback whales and other marine species traversing the area are already exposed to these activities at various locations in the Hawaiian Islands. Implementation of the above proposed actions would not result in any net increase in exposure to these activities, but may change the location of the specific area in which they are exposed. At this time, it is difficult to assess the potential for cumulative environmental impact as a whole as many of these projects are in developmental stages, with major design considerations still in the decision making process. All of the above proposed actions may or may not occur depending on future Department of the Navy funding.

4.4 MEANS OF MITIGATING POTENTIALLY ADVERSE EFFECTS

The project will not induce increases in training and ship or submarine activity beyond current levels. The project will not add any additional restrictions to navigation, recreational boating, or fishing activities. Temporary construction related impacts such as noise, dust and erosion will be mitigated through proper construction techniques and other measures. All occupational safety and health guidelines will be followed during equipment installation and training operations.

The SWTR cables will come ashore through existing shoreside conduits, avoiding new construction in the beach zone. The only ground-disturbing activity involves trenching and installation of the cables between the manhole and Bldg. 410. This will be contained within a previously excavated and backfilled utility trench corridor. The State Historic Preservation Officer has determined that there will be "no effect" on significant historic sites (Appendix 1).

The SWTR nodes and cables will not be installed during mid-February to mid-March, peak months when humpback whales are typically in Hawaiian waters. During deployment of the equipment, visual scans for marine mammals will be conducted, and ships will maintain a minimum 100 yard (91 m) distance from humpback whales encountered. All necessary approvals for the project have been obtained from the Department of the Army.

Acoustic transmission from the eight HF bi-directional projectors will have no adverse effect on Mysticete species (e.g., humpback whales) due to the frequencies to be used, the low duty cycle and the fact that no more than one node will transmit at any one time. The two LF alarms will operate within the range of humpback whale vocalizations. However, the alarms will only be used

infrequently and for relatively short duration. During alarm testing, the acoustic impact will be further reduced by ramping the signal to avoid startling marine mammals. The effect of the acoustic transmissions on Odontocete species (e.g., dolphins, endangered sperm whales) was also judged to be minimal. This is because the habitat of Odontocetes is more diffused, no more than one node will transmit at a time, and the fact that training operations will not increase over current conditions.

Additional mitigation recommended by National Marine Fisheries Service during its Section 7, Endangered Species Act consultation include limiting torpedo firings on the range to the period April through December, to the extent possible; acoustical and visual monitoring of the range for humpback whales; and Navy-sponsored and/or funded studies to investigate behavioral and physiological responses of large whales and sea turtles to high intensity, low frequency sounds.

It is the conclusion of this document that the proposed action and alternatives will have no effect on air or water quality, aesthetics, recreation, noise, cultural resources, marine resources and marine biology which cannot be adequately mitigated. No significant adverse environmental impacts have been identified as likely to result from the proposed project.

A summary of potential impacts and mitigation is included in Table 2.

Table 2:
Summary of Potential Impacts and Mitigation

Potential Impact	Mitigation	Responsible Agency
Water quality impact during cable deployment and landing	• Comply with Department of Army conditions for Nationwide 5 permit.	• PACMISRANFAC Public Works and construction/installation contractor.
Impacts to marine species during installation of nodes and associated cables	• Scan for whales, turtles and seals during cable deployment; Cable laying vessels to keep minimum 100 yds. (91 m) from humpback whales. • Cable deployment to avoid peak humpback whale season (mid-February to mid-March).	• PACMISRANFAC Public Works and construction/installation contractor • PACMISRANFAC Public Works and construction/installation contractor
Acoustic impact on marine mammals during training operations	• No increase in training beyond present levels. • Only one transmitter used at a time. • Low transmitter duty cycles. • Ramping of low-frequency alarm during testing. • To the extent possible, exercises using torpedo firings to be limited to period April through December. • Range operators/users to monitor for presence of humpback whales acoustically and visually. • Studies to investigate behavioral and physiological responses of large whales and sea turtles to high intensity, low frequency sounds to be sponsored and/or funded by Navy.	• Range operations staff • Range users • Range users • Range users • Range ops staff, range users • Range ops staff, range users • Office of Naval Research
Historic Properties (Cultural Resources)	• Use of existing shoreside conduits; trenching limited to an existing utility corridor. • Contractor/supervisor with archeological awareness training.	• PACMISRANFAC • Construction contractor

	• If human skeletal remains discovered during excavation, stop work and consult with DLNR-SHPD.	• Construction contractor; PACMISRANFAC; DLNR-SHPD
Commercial/Recreational Boating and Fishing	• No increase in ship or subs beyond current levels. • Range users to follow established procedures re interaction with private/commercial vessels. • No additional restrictions on fishing or boating.	• Range operations staff • Range users • Range operations staff
Construction period noise and dust	• Use muffled construction equipment. • Comply with OSH regulations for construction employees. • Limit construction to normal working hours. • Proper construction techniques to minimize fugitive dust and erosion.	• PACMISRANFAC Public works and construction contractor

CHAPTER FIVE
LIST OF PREPARERS

This Environmental Assessment (EA) was prepared for Pacific Missile Range Facility (PACMISRANFAC), Barking Sands and the Pacific Division Naval Facilities Engineering Command (PACNAVFACENGCOM) by Helber Hastert & Fee, Planners, Inc. The following identifies individuals who were involved in the preparation of the EA.

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Subconsultants:

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Bioacoustic Impact Analysis	Joseph Mobley, Ph.D. Marine Mammal Research Consultants

CHAPTER SIX
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Robert Inouye, Environmental Engineer

PACNAVFACENGCOM, Environmental Planning Division
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Army Corps of Engineers, Pacific Ocean Division
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Lolly Silva, Regulatory Branch

National Marine Fisheries Service
John Naughton
Eugene Nitta

Office of State Planning, Coastal Zone Management
John Nakagawa

CHAPTER SEVEN
REFERENCES

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APPENDICES

APPENDIX 1

Section 106, National Historic Preservation Act Correspondence

DEPARTMENT OF THE NAVY
PACIFIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
(MAKALAPA, HI)
PEARL HARBOR, HAWAII 96860-7300

5750.3P
Ser 233/ 4540

22 OCT 1996

Mr. Michael D. Wilson
State Historic Preservation Officer
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Dear Mr. Wilson:

The Navy plans to install instrumentation to monitor shallow water training range (SWTR) activities at the Pacific Missile Range Facility (PACMISRANFAC), Barking Sands, Kaua'i (enclosure (1)). The project includes the deployment of 118 underwater transducers (i.e., receiving hydrophones and transmitting projectors), interconnected via cable, over a 100 square mile area offshore of PACMISRANFAC. The transducer array will be connected to existing shoreside facilities by an electro-mechanical optical cable (EMOC) that will come ashore through a conduit provided by the repair BSURE sea/shore interface project. Section 106 consultation for the BSURE repair project is currently being conducted (consultation letter 11019, Ser 7031.5A/0285 of April 3, 1996; and review letter LOG NO: 17156, DOC NO: 9605SC07 of May 15, 1996).

The SWTR project also involves trench excavation along an existing water/communication line corridor from the BSURE manhole to Building 410 (enclosure (2)). This corridor has been extensively disturbed and there is very low potential for subsurface cultural remains.

In accordance with the National Historic Preservation Act of 1966, as amended and 36 CFR Part 800, we have determined that the undertaking will have "no effect" on historic properties. We would greatly appreciate your concurrence and review of the project. Should you have any questions regarding this matter, the point of contact is Ms. Elizabeth Gordon, Archaeologist (Code 233EG) at (808) 471-9338 or by facsimile transmission at (808) 474-4890.

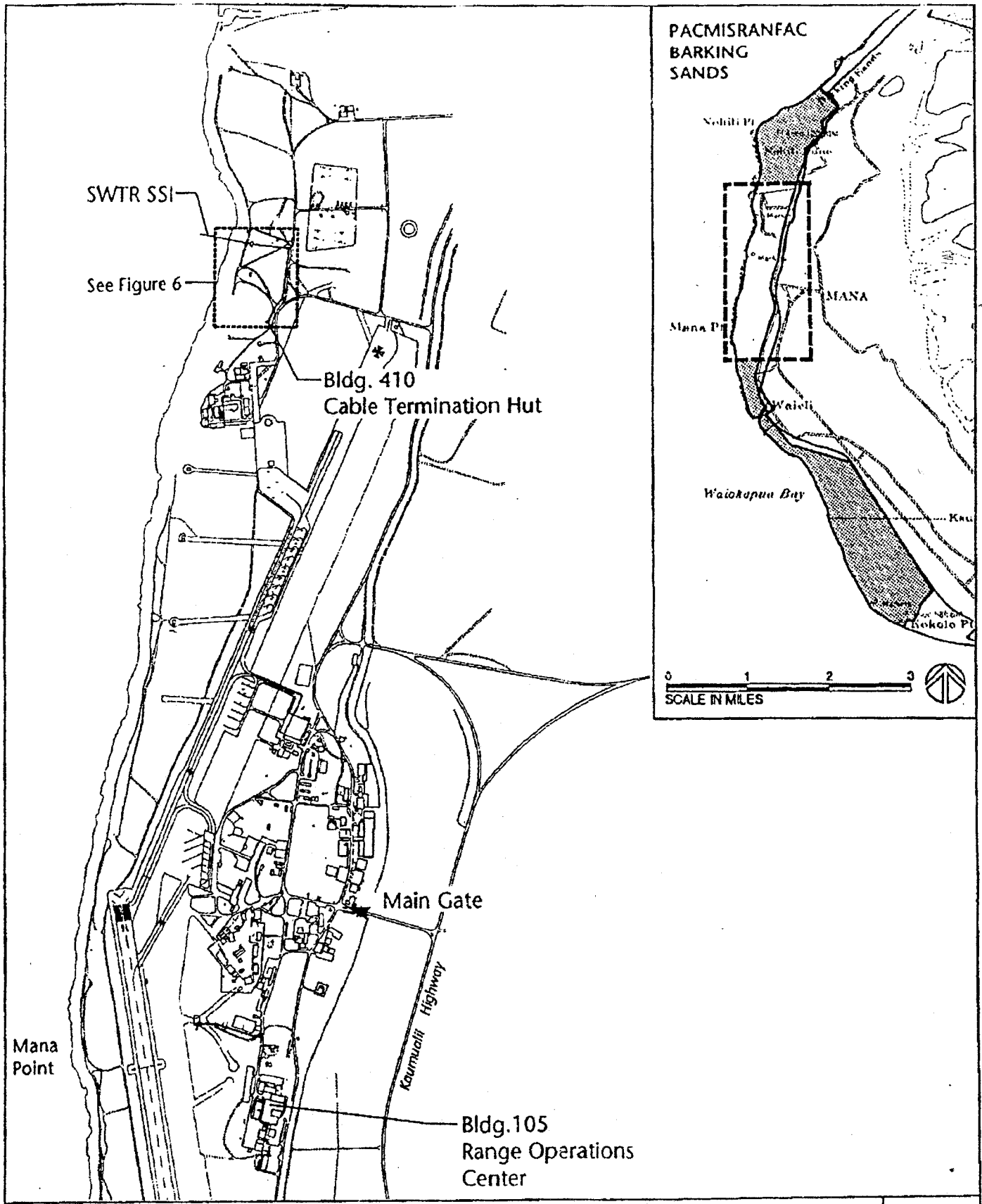
Sincerely,

MELVIN N. KAKU
Director
Environmental Planning Division

Encl:
(1) Location Map
(2) Project Plan

Copy to:
Commanding Officer
Pacific Missile Range Facility
Attn: PWO
P.O. Box 128
Kehaka, HI 96752-0128

Blind copy to:
231GG



Shoreside Facilities

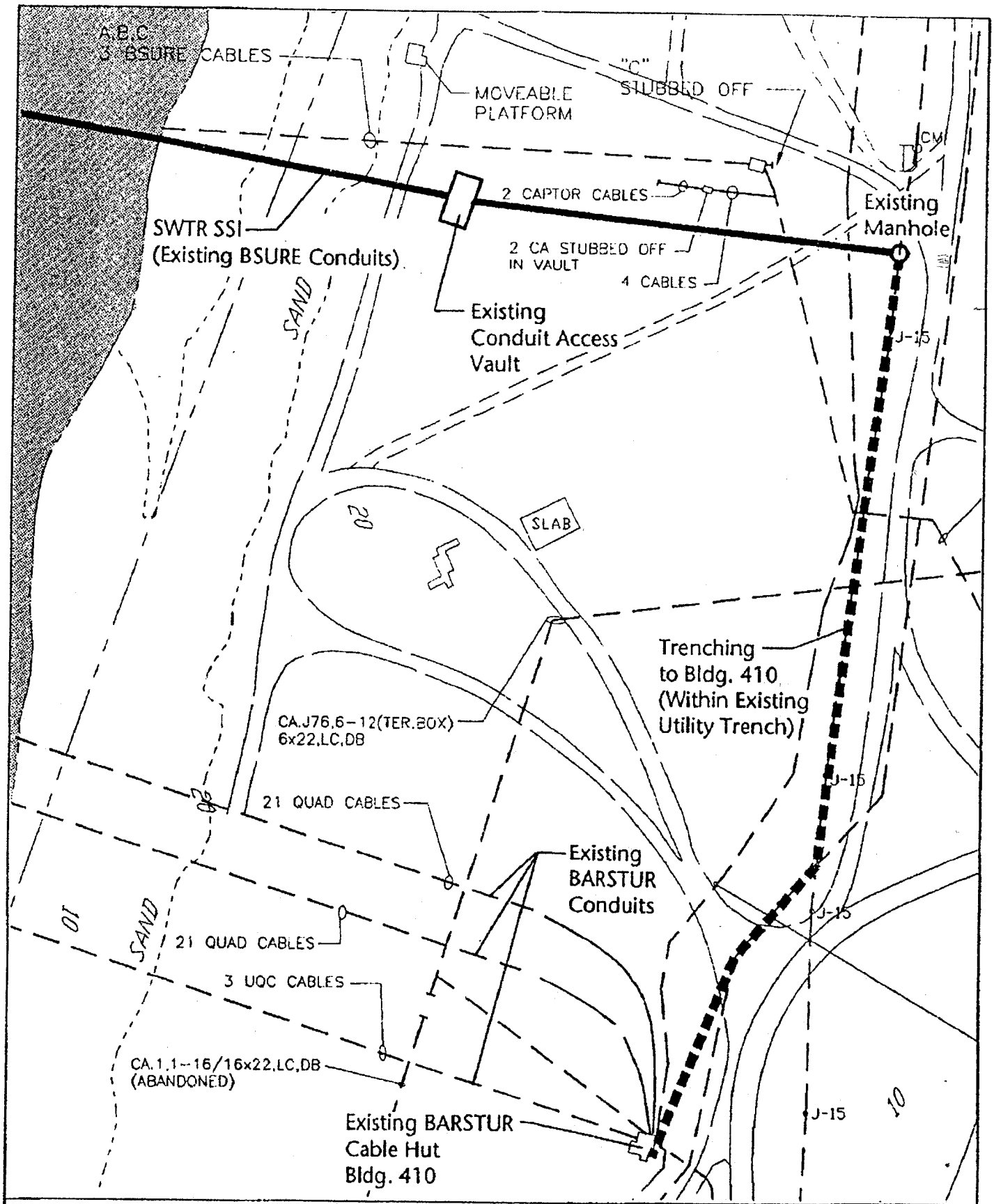
Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

0 Feet 1200

0 Meters 400

ENCLOSURE(1)



SWTR Shoreside Conduit Location

Shallow Water Training Range

Pacific Missile Range Facility, Barking Sands, Kauai, Hawaii

0 Feet 100

0 Meters 30

ENCLOSURE(2)

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
Gilbert Coloma-Agaran

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

REF:HP-AMK

DEC - 2 1996

Mr. Melvin Kaku, Director
Environmental Planning Division
Department of the Navy/Pacific Division
Naval Facilities Engineering Command
Pearl Harbor, Hawaii 96869-7300

LOG NO: 4485
DOC NO: 9611NM12

Dear Mr. Kaku:

SUBJECT: **National Historic Preservation Act Review, Section 106 Compliance - Install Instrumentation to Monitor Shallow Water Training Range (SWTR) activities at Pacific Missile Range Facility (PMRF) Barking Sands, Waimea, Kauai**

Thank you for the opportunity to review this project. The project area next to Building 410 is extensively disturbed. No significant historic sites or burials were found in this location. We concur with your determination that this project will have "no effect" on significant historic sites.

If you have any questions, please call Nancy McMahon 742-7033.

Aloha,

Gilbert A. Coloma-Agaran
for MICHAEL D. WILSON, Chairperson and
State Historic Preservation Officer

NM:amk

APPENDIX 2

Informal Section 7, Endangered Species Act Correspondence

Additionally, given the low duty cycle (i.e., less than 1 percent) and the fact that no more than one node will be activated at any one time, any possible effect would be minimized.

Low Frequency (LF) Alarm Transmitters

The primary frequency of the low frequency alarm (3 kHz), is well within the range of humpback whale vocalizations, and it is likely that animals within the 120 dB isopleths of the LF signals would hear them. The LF nodes have a greater potential for disturbance to humpback whales, since their frequencies overlap the whale's vocalization range (30 Hz to 8 kHz) and their ensonification area overlaps the whale's shallow water habitat. However, because the primary use of the LF alarm would be in test situations for relatively short duration, they are not likely to produce significant impact.

Additionally, these impacts can be mitigated by ramping up the amplitude of the LF transmitters during deployment tests (i.e., gradually increasing it) even over a relatively short period (10 seconds), to diminish the potential of startling the animals.

Odontocete Species (e.g., Sperm whales)

Potential effects on Odontocete species, including endangered sperm whales (*Physeter macrocephalus*), was also judged to be minimal.

HF Bi-Directional Nodes

Transmission frequencies of the HF bidirectional nodes overlap with the frequencies favored by Odontocete species, and it is likely that Odontocetes within the 120 dB isopleth would hear the signals. However, because the habitat of Odontocete species is more diffused than that of the humpback whales, there is less potential for disturbance of the former's preferred habitat. Impact is also anticipated to be minimal because there will be no increase in training operations beyond current levels, and only one transmitter will be used at a time.

Only one of the bidirectional nodes will project to depths where sperm whales have been sighted (i.e., 565 to 2,252 fathoms), and most sperm whale sightings have occurred substantially north of the range. In all, it is unlikely that operation of the bidirectional nodes will substantially impact sperm whales.

LF Alarm Transmitters

The LF alarm is of less concern with the Odontocetes than for humpback whales, since their hearing sensitivities tend to be at higher frequencies. The low duty cycle and recommended ramping of the signal will further reduce the potential for any impact.

Other Mitigation

The transducers and cable equipment will not be installed during the months when humpback whales are typically in peak abundance, from mid-February to

mid-March. During cable deployment, visual surveillance for marine mammals will be conducted from the cable laying ship, and if any are present, work will be delayed until they have departed the area. During deployment, the boat operators will retain a minimum 100-yard distance from any humpback whales sighted.

Other Threatened and Endangered Species

The threatened green turtle (*Chelonia mydas*) is commonly found in Kauai coastal waters, and the endangered hawksbill turtle (*Eretmochelys imbricata*) is known infrequently in Hawaiian waters. It has been suggested by some scientists that hearing may play a role in sea turtle navigation, and that the giant green sea turtle has a reasonable degree of acoustic sensitivity, particularly to low-frequency sounds. The SWTR projectors are not anticipated to adversely impact turtle navigation, as they will be located in waters deeper than the near shore areas which are the primary turtle habitat.

The endangered Hawaiian monk seal (*Monachus schlauslandi*) occurs occasionally in the waters off Kauai. Both the monk seal and sea turtles are known to haul out on the beaches of west Kauai, including the project area. There is no proposed construction or excavation in the beach areas which could impact these animals. Likewise, the depth of the SWTR projectors will be greater than the areas normally inhabited by monk seals.

Conclusion

Based on a thorough review of the proposed action, we seek your concurrence that there will be no adverse effects to listed endangered species or marine mammals.

Should you have any questions, please contact Mr. Daniel Moriarty, Natural Resources Management Specialist, at (808) 474-5922.

Sincerely,

MELVIN N. KAKU
Director
Environmental Planning Division

Encl:
(1) Map of Proposed Shallow Water Training Range
(2) Final Report: J.R. Mobley, Jr.,Ph.D.

W:\231GG\SEC7LTR

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213
TEL (310) 980-4000; FAX (310) 980-4018

March 3, 1997 F/SWO33:ETN

Mr. Melvin N. Kaku
Director
Environmental Planning Division
Pacific Division
Naval Facilities Engineering Command
Pearl Harbor, Hawaii 96860-7300

Dear Mr. Kaku:

This responds to your request to initiate consultation regarding the proposed installation and operation of a Shallow Water Training Range (SWTR) at the Pacific Missile Range Facility (PMRF), Barking Sands, Kauai, Hawaii. The SWTR will be located offshore and adjacent to PMRF and will include 118 underwater hydrophone/transducers. Ten of the 118 transducers will have both transmit and receive capability, and eight of these ten bidirectional hydrophones will be used for underwater communication with submarines. These bidirectional nodes will transmit at 8-11kHz at 190dB re 1μPa at one meter and will be located at depths ranging from 100 to 779 fathoms. There will be two "low" frequency alarms to warn submarines of waters shallower than 500 feet. These alarms will transmit at 3kHz at 190dB re 1μPa at one meter, and be located at 229 and 239 fathoms, respectively.

Both mysticete and odontocete cetaceans may hear or sense the signals from the active transducers at the 120dB isopleth (1.37 to 2.72nm radius from the source); however, apparent behavioral or physiological responses are unlikely until the sound levels approach approximately 160dB. The 160dB isopleth for the 10 active transducers was calculated to be approximately 32m from the source. Based on the proposed depths of the transducers and relative distance offshore it is highly unlikely that any individual of a listed species would be found within the 160dB isopleth during a transmission.

After a review of the available information, environmental documentation prepared for the proposed project, and supplemental data provided by PMRF, I have determined that installation and operation of the passive hydrophone array, bidirectional communication nodes and low frequency alarms are not likely to adversely affect endangered humpback whales (Megaptera novaeangliae), sperm whales (Physeter macrocephalus), Hawaiian monk seals (Monachus schauinslandi), hawksbill turtles (Eretmochelys imbricata), or threatened green turtles (Chelonia mydas), that might be found within or near the project area. Critical habitat has not been proposed or designated for any of the listed species above, within or near the proposed project site.

The following recommendations are provided to help ensure that operation of the SWTR does not result in adverse effects to listed species:

1. To the extent possible, exercises involving torpedo firings on the SWTR should be limited to the period April through December.

2. Both range operators and users should monitor the range for the presence of humpback whales both acoustically (passive listening) and visually (by qualified observers aboard surface ships and aircraft).

3. Studies to investigate the behavioral and physiological responses of large whales and listed sea turtles to high intensity, low frequency sounds should be sponsored and/or funded by the Navy, possibly through the Office of Naval Research. This will provide better information on which to evaluate this and future projects.

This concludes the informal section 7 consultation process for the proposed construction and operation of the SWTR at PMRF. Consultation must be reinitiated if new information becomes available revealing effects of the project on listed species that were not previously considered, the project is subsequently modified in a manner that causes an effect to listed species that was not considered, or if a new species or critical habitat is designated that may be affected by this action. Incidental takes of listed species are not authorized for this activity.

If you have any questions concerning this section 7 consultation, please contact Mr. Eugene T. Nitta at (808) 973-2987.

Sincerely,

William T. Hogarth, Ph.D.
Acting Regional Administrator

cc:
F/SWO33 - Nitta

APPENDIX 3

Potential Effects of Proposed PMRF-SWTR Sound Projectors on Marine Mammals (*Cetacea*); Marine Mammal Research Consultants October 1996

Final Report:

Potential Effects of Proposed PMRF-SWTR Sound Projectors on Marine Mammals (Cetacea)

Submitted to:

Helber, Hastert and Fee Planners

Submitted by:

Joseph R. Mobley, Jr., Ph.D.

DBA: Marine Mammal Research Consultants

Date:

October 2, 1996

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Guide to Abbreviations

dB re:1μPa -- decibels measured with reference to one micro-Pascal
ER -- encounter rate
Hz -- Herz
kHz -- kiloherz
km -- kilometer
LFS -- low frequency sound (i.e., <1,000 Hz)
N -- sample size
nm -- nautical mile

I. Background: Acoustic Behavior of Marine Mammals (Cetacea)

The order Cetacea (dolphins and whales), includes the suborders of Mysticeti (baleen whales) which are the true, "great whales," and Odontoceti (toothed cetaceans) which consists of dolphins, porpoises, and the larger toothed whales such as killer whales (*Orcinus orca*) and sperm whales (*Physeter macrocephalus*). Due to the divergent characteristics of their acoustic behavior summarized below, it is useful to discriminate between the mysticetes and the odontocetes.

Over millions of years of evolution, cetaceans (dolphins and whales) have adapted to their aquatic habitat, including a reliance on the propagation characteristics of sound in water. Since water is a relatively non-compressible medium, sound travels through water both faster and more efficiently relative to that in air. As a result, sounds which would normally attenuate in air over relatively short distances can travel considerably greater distances in water.

Cetaceans rely on sound in water in at least three ways relevant to their survival: a) passive detection of predators or prey; b) social communication, using vocalizations referred to as calls, whistles or songs (Clark, 1990); and c) echolocation, using broadband pulses of clicks, thus far demonstrated only among the odontocetes.

Mysticete species generally produce tonal, frequency-modulated (FM) calls that are lower in frequency (with fundamental frequencies in the range of 12-800 Hz, Clark, 1990) and higher in amplitude (source levels approximately 180 dB, re:1 μPa, Clark, 1990) than the communication vocalizations of odontocetes. The exceptions to this characterization are the complex "songs" produced by some mysticete species, including the humpback whale. These songs consist of sequences of notes that show a clear temporal pattern (Clark, 1990). For the humpback, the principal frequencies of song extend from 30 Hz to 8 kHz, with principal energy lying below 4 kHz (Richardson et al., 1995).

The odontocete species produce sounds of three types (Richardson et al., 1995): a) narrowband tonal whistles with principal energy from 1 to 20 kHz; b) broadband clicks and pulsed sounds used in echolocation, with frequencies ranging from 40 to 300 kHz or higher and extremely high source levels, up to 228 dB re: 1 μPa for some species; and c) less distinct pulsed sounds such as cries, grunts, and barks. Thus, we can generally characterize the odontocetes as relying on higher frequencies than those used by the mysticetes.

II. Regulatory Aspects

Concern over the effects of anthropogenic (human-made) noise on marine mammals has been either a direct or indirect result of the U.S. Marine Mammal Protection Act (MMPA) of 1972, as recently amended in 1994. The MMPA applies to all activities regarding marine mammals in U.S. waters, as well as activities by U.S. citizens in international waters. The MMPA provides for a moratorium on the "taking" of marine mammals, either through capture, killing or harassment. The harassment provision is potentially the most far-reaching, and the least clearly-defined of all the regulated activities, and applies to any activity which significantly alters the normal behavior of marine mammals. Exact regulations stemming from these regulations vary by species and by region. In Hawaii, humpback whales are protected by a minimum approach distance of 100 yds. The 1994 MMPA amendments distinguish between "Type A" activities, which represent the potential for injury, vs "Type B" activities, which carry the potential for behavioral disturbance.

Species classified as endangered, such as the humpback whale and the sperm whale, are additionally protected by the Endangered Species Act (ESA) of 1973. It includes some provisions that are more restrictive than those of the MMPA.

Additionally, the National Environmental Policy Act (NEPA) is the U.S. legislative feature which requires environmental assessments and environmental impact statements for certain regulated activities. The state of Hawaii Environmental Policy Act (HEPA) reinforces these provisions for state lands and waters.

The present proposed SWTR facility potentially falls under the purview of all of these regulations including the ESA, given the protected status of the endangered humpback whale and sperm whale. The potential effects of noise on the habitat and behavior of whales in Hawaii has generated considerable attention in the recent past (e.g., ARPA, 1995).

III. Effects of Noise on Cetaceans

A. Mysticete species. Concern over the effects of anthropogenic noise on marine mammals has centered on three issues (Richardson, 1995): a) increasing ambient (background) noise levels, thus interfering with detection of social vocalizations; b) behavioral disturbance (e.g., animals vacating preferred habitat to avoid aversive sounds); and c) temporary or permanent shifts in hearing sensitivity. Most of the attention in the literature has focused on the effects of low frequency sound (LFS, i.e., less than 1kHz) on mysticetes, due to both the long-distance propagation characteristics of LFS as well as the reliance of the great whales on these frequencies for communication.

Research on the effects of LFS on mysticete species has drawn its impetus primarily from concerns over the impact of the off-shore oil industry, as regulated by the U.S. Minerals Management Service. These studies have used experimental playbacks as the method of choice--i.e., playing recordings of sounds to whales via underwater speakers and noting changes in their course of travel, among other behaviors. By knowing the positions of whales and boats as tracked by surveyor's theodolites, the source levels of the sounds used, and the transmission loss characteristics of the surrounding ocean area, the received levels of sound (i.e., the amplitude of sound received at the whale's position) can be calculated. For the three species of mysticetes studied so far, estimated received levels of sound shown to cause changes in baseline behavior have fallen between 115-124 dB re: 1 μPa for gray whales, *Eschrictius robustus* (Malme et al., 1984); bowhead whales, *Balaena mysticetus* (Richardson et al., 1990; Richardson and Malme, 1993); and humpback whales, *Megaptera novaeangliae* (Malme et al., 1985). These investigations have all used anthropogenic noise, including air gun blasts, noise from oil and gas industrial operations, and vessel noise. Based on this work, marine mammals within the 120-dB isopleth surrounding a given LFS source are considered at-risk with respect to potential for disturbance (e.g., ARPA, 1995). It should be stressed, however, that the 120-dB isopleth was based on studies with mysticete species (i.e., baleen whales) and its appropriateness for odontocete species (e.g., dolphins) is not known.

The only mysticete that appears regularly in Hawaiian waters is the humpback whale (*Megaptera novaeangliae*). Most of what we know regarding the

acoustic sensitivities of humpback whales has been inferred from the results of playback studies. Malme et al. (1985) used playbacks of anthropogenic noise such as recordings of oil and gas industrial operations, air gun blasts and vessel noise with migrating humpback whales in southeastern Alaska. They found that 50% of the migrating whales deflected their course of travel at received levels of 115-124 dB re: 1μPa at 1m. However, all of the sounds they used contained principal energy in the low-frequency range (i.e., < 1,000 Hz); thus, these results hold limited relevance to the present case.

Mobley, Herman and Frankel (1988) used playbacks of humpback whale vocalizations and of synthetic sound in experiments conducted in Hawaiian waters. Whales occassionally responded to playbacks of sounds by approaching the playback vessel, primarily in response to feeding call (principal energy: 450-550 Hz). Two whales, however, approached the playback vessel in response to recordings of synthetic sound (principal energy: .5-1.4 kHz). Frankel, Mobley and Herman (1995) analyzed these approach responses in order to derive auditory thresholds of the approaching whales. Using the distances of the approaching whales from the playback boat at the commencement of playback, as well as the transmission loss profiles for waters in that area, received levels were calculated for each sound type. Frankel et al. calculated a median received level of 112.7 dB for biological sound, and 113.3 dB for synthetic sound, i.e., 50% of the whales that approached the vessel responded at these received levels. It is important to note, however, that the frequencies to be used by the proposed PMRF SWTR lie primarily above the frequency range used in these playback studies.

The only playback study involving mysticete whales which examined the effects of frequency was that of Dahlheim and Ljungblad (1990). They projected pure tones while systematically varying frequency (.2 - 2.5 kHz) and source level (70-145 dB re: 1μPa) to gray whales (*Eschrichtius robustus*) wintering in San Ignacio Lagoon, Baja California. The authors noted behavioral responses (startle responses, changes in course or respiration) using signals up to 1.8 kHz.. No responses were noted to signals above 1.9 kHz, even at full intensity (145 dB re:1μPa). When source levels of signals producing behavioral changes were plotted against frequency, the resulting curve suggested a general pattern of decreasing auditory sensitivity with increasing frequency (p. 343).

Since there are no audiograms available for humpback whales we can only assume that their hearing sensitivity corresponds (at least) to the range of their vocalizations. Among the vocalization repertoire of humpback whales, the winter song contains the greatest variety of frequencies (between 30 Hz and 8 kHz, with principal energy lying below 4 kHz, Richardson et al., 1995).

B. Odontocete Species. Though the effects of noise on odontocete species is less clearly defined, their auditory sensitivity is considerably more so. The auditory thresholds of odontocetes have been assessed using standard psychophysical discrimination techniques as well as through measuring evoked potentials. The audiograms of eight species of odontocetes (beluga, *Delphinapterus leucas;* killer whale, *Orcinus orca;* harbor porpoise, *Phocoena phocoena;* Chinese river dolphin or baiji, *Lipotes vexillifer;* bottlenose dolphin, *Tursiops truncatus*; false killer whale, *Pseudorca crassidens*; Risso's dolphin, *Grampus griseus*; and Amazon river dolphin or boutu, *Inia geoffrensis*) are shown in Figure 1. As shown, the hearing curves for all eight species are remarkably uniform and show a maximum sensitivity for frequencies lying between 10,000 to 100,000 Hz. The frequency response of the proposed bi-directional nodes of the PMRF SWTR (i.e., 8 -11 kHz) overlap with the lower end of this range, thus the potential for impact on Odontocete species should be considered.

The largest of the odontocete species, sperm whales, (*Physeter macrocephalus*), are also found in Hawaiian waters (Table 3). Little is known concerning the auditory sensitivity of sperm whales. It is reasonable to infer that their range of hearing overlaps with the frequencies of their clicks which range in frequency from 100Hz to 30 kHz, with the principal energy at 2-4 kHz and 10-16 kHz (Backus and Schevill, 1966; Levenson, 1974; Watkins, 1980). These frequencies also overlap with those of the proposed PMRF SWTR, therefore the potential effects on sperm whales should be considered as well.

IV. Areas Potentially Ensonified by Proposed PMRF SWTR Operations

The focus of this report is on the potential for impact of the operation of the sound projector systems proposed for the PMRF SWTR. As presented in the Draft Programmatic Environmental Analysis, there are two components to the sound projector system: a) eight high-frequency bidirectional nodes (used

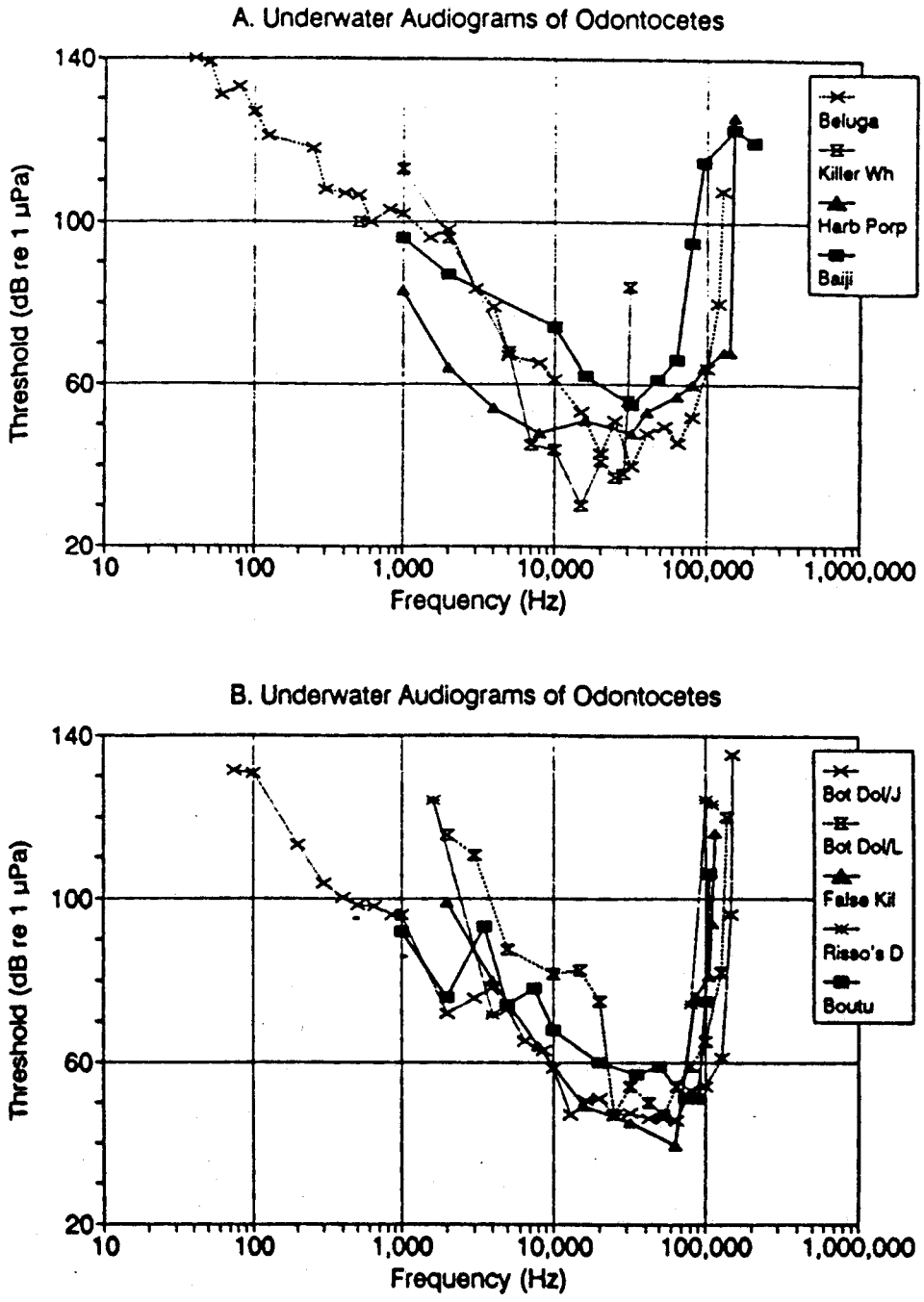

Figure 1. (Taken from Richardson et al. 1995) Underwater audiograms of odontocetes: (A) beluga (n=6--White et al., 1978; Awbrey et al. 1988; C.S. Johnson et al. 1989); killer whale (Hall and Johnson 1972); harbor porpoise (Andersen 1970); Chinese river dolphin or baiji (Ding Wang et al. 1992); (B) bottlenose dolphin (Johnson 1967; Ljungblad et al. 1982); false killer whale (Thomas et al. 1988); Risso's dolphin (Nachtigall et al. 1995); Amazon river dolphin or boutu (Jacobs and Hall 1972). n=1 except where noted.

for communication with submarines); and b) two low-frequency alarm transducers (for alerting submarines of hazardous situations). The specifications of each of these types are summarized below.

Received level estimation. Received levels of sound (i.e., the intensity of sound received at distance R) was estimated using the Marsh & Schulkin model for shallow-water transmission loss (described in Urick, 1983). This model assumes spherical spreading of sound out to water depth, then cylindrical spreading thereafter, with uniform absorption throughout the range. For frequencies greater than 5 kHz, absorption becomes an increasingly important component of transmission loss (Richardson et al., 1995).

Received levels were calculated as follows:

$$Lr = Ls - 20 \log D - 15 \log (R/D) - AR$$

With absorption coefficient calculated as follows:

$$A = 0.1 \frac{f}{1+f^2} + 40 \frac{f^2}{4100+f^2}$$

where: Lr = received level (dB re: 1 μPa)
Ls = source level (dB re: 1μPa)
D = ocean depth (yds)
R = range from source (yds)
A = coefficient of absorption
f = center frequency (Hz)

A. HF Bidirectional nodes--The proposed PMRF SWTR involves installing a total of 118 nodes, including 2 low-frequency alarm projectors and 8 bidirectional (i.e., capable of sending and receiving). The bidirectional nodes allow for voice communication with submarines during operations within the PMRF SWTR. The following is a summary of the critical operating features of the eight proposed bidirectional nodes (see Appendix, Table 1 for coordinates):

Source Level: 190 dB re: 1 μPa
Principal Frequency Range: 8-11 kHz; Center frequency: 9.5 kHz
Bandwidth: 3 kHz (voice);

Signal Type: Amplitude Modulation (AM)
Signal Duration: several seconds
Duty Cycle: less than 1%
Usage: occassional use for voice communication during submarine operations; only one transducer to be used at any one time

The sound field traditionally associated with a potential for impact on marine mammals lies within the 120-dB isopleth (e.g., ARPA, 1995). By plotting the proposed positions of the eight bidirectional nodes (NOAA map no. 19381) to determine approximate depth, and applying the transmission loss model noted above, the range of the 120-dB isopleth around each of the eight bidirectional nodes was calculated. Results are shown below in Table 1:

Table 1. Approximate depths and ranges of 120-dB isopleth for proposed PMRF-SWTR bi-directional nodes

Node No.	Approx. depth (fathoms)	Radius of 120-dB Isopleth (nm)
10	230	1.82
24	294	1.72
46	334	1.67
50	283	1.73
69	100	2.17
87	347	1.65
102	155	1.98
116	779	1.37
	Mean:	1.77 nm

Total combined area within 120-dB isopleths: approx. 60 sq nm
Min-Max depths within 120-dB isopleth: 5 - 1184 fathoms
Min-Max distance offshore (area within 120-dB isopleth): 0.2 - 8.5 nm

B. Low-frequency alarm system--The low frequency alarm (LFA) system is designed to warn of potentially hazardous situations, e.g., when a submarine strays into shallow water. Other than being used in emergencies, the LFA system will be tested prior to scheduled operations to verify its proper

functioning. It is therefore far more likely to be activated in test situations than in emergencies. The alarm projects at a lower frequency (3 kHz) but at the same source level as the HF bidirectional nodes (190 dB re: 1 μPa, see Appendix, Table 2 for coordinates). Radii of the 120-dB isopleths are shown in Table 2 below:

Table 2. Approximate depths and ranges of 120-dB isopleth for low-frequency alarm (LFA) system

Node No.	Approx. depth (fathoms)	Radius of 120-dB Isopleth (nm)
11	221	2.72
60	239	2.66
	Mean:	2.69 nm

Total combined area within 120-dB isopleth: approx. 45.5 sq nm
Min-Max depths within 120-dB isopleth: 0 - 406 fathoms
Min-Max distance offshore (area within 120-dB isopleth): 0 - 7.5 nm

V. Species Potentially Affected

Of all marine mammal species in Hawaii, the greatest attention has been focused on the presence of the endangered humpback whales (*Megaptera novaeangliae*). Attention to this species in terms of research and public interest has grown steadily since the mid-1970s. As a result, whale-watching of humpbacks has become a significant seasonal draw for tourism in Hawaii, with considerable economic implications. Until recently, the information available on the distribution and abundance of marine mammals in Hawaii has focused nearly exclusively on humpback whales (e.g., Herman and Antinoja, 1976; Herman et al., 1980; Baker & Herman, 1981; Mobley and Bauer, 1991). Most of the available information on odontocete species (including sperm whales) in Hawaiian waters has derived from incidental observations by marine scientists (e.g., Shallenberger, 1981; Tomich, 1986), systematic studies of spinner dolphin populations (e.g., Norris & Dohl, 1980), as well as from strandings (e.g., Nitta, 1987). Prior to 1993, there was no systematic censusing of odontocete species available.

During the years 1993-95, the Acoustic Thermometry of Ocean Climate Marine Mammal Research Program (ATOC MMRP) conducted aerial surveys of all marine mammal species in waters adjoining the major Hawaiian Islands (Mobley et al., 1993, 1995). These surveys expanded on earlier surveys performed in Hawaiian waters in three ways: a) increased coverage--north-south transect lines extended beyond the 1000 fathom contour; b) abundance estimation--distance sampling techniques were used consistent with current theory (Buckland et al., 1993; Burnham et al., 1980); and c) inclusion of all marine mammal species--past surveys focused on humpback whales only. These data are the most recent and comprehensive descriptions of marine mammal distribution currently available for Hawaiian waters.

A total of 15 marine mammal species were identified during the 1993-95 surveys across a total of 22 surveys, involving a total of over 25,000 nm of effort. These species are listed from greatest to least relative abundance in Table 3 (Note: ER refers to "encounter rate" based on number of individuals sighted per nautical mile of effort; as a result ER may be used as an index of relative abundance). As shown, the most abundant marine mammal species is clearly the humpback whale for the period studied (Jan-Apr). The next most abundant species, the spinner dolphin, was observed at approximately half the sighting rate of the humpback. The least abundant species is the fin whale (*Balaenoptera physalus*) which was only observed once (Mobley et al., 1996). Since the last confirmed field sighting of a fin whale in Hawaiian waters occurred in 1979 (cited in Shallenberger, 1981) this endangered species is considered to be incidental in occurrence. As a result, the potential for impact on this species is not considered here.

Figures 2 and 3 show the distribution of humpback whales and odontocete species, respectively, for the waters surrounding the islands of Kauai and Niihau. These data represent the combined results of 22 surveys performed primarily during the period February through May across all three years studied (1993-95). As such, areas with higher sighting rates may be interpreted as representing preferred habitat for a given species.

As shown, humpback whales predominantly reside in waters less than 100 fathoms (182 m), whereas odontocetes prefer deeper waters. Sighting

Table 3

1993-95 Hawaiian Aerial Survey Results--ATOC MMRP

1993-95 Data Combined:

Rank	Common name	Scientific Name	No. Indiv.	Pods	ER *
1	Humpback whale	*(Megaptera novaeangliae)*	2318	1369	0.09014
2	Spinner dolphin	*(Stenella longirostris)*	1171	42	0.04554
3	Spotted dolphin	*(Stenella attenuata)*	562	12	0.02185
4	Shortfin pilot whale	*(Globicephala macrorhynchus)*	389	41	0.01513
5	False killer whale	*(Pseudorca crassidens)*	309	20	0.01202
6	Bottlenosed dolphin	*(Tursiops truncatus)*	284	47	0.01104
7	Rough-toothed dolphin	*(Steno bredanensis)*	112	8	0.00436
8	Striped dolphin	*(Stenella coeruleoalba)*	76	2	0.00296
9	Sperm whale	*(Physeter macrocephalus)*	46	16	0.00179
10	Melon headed whale	*(Peponocephala electra)*	21	1	0.00082
11	Risso's dolphin	*(Grampus griseus)*	13	2	0.00051
12.5	Blainville's beaked wh.	*(Mesoplodon densirostris)*	8	3	0.00031
12.5	Cuvier's beaked whale	*(Ziphius cavirostris)*	8	4	0.00031
14	Pygmy sperm whale	*(Kogia breviceps)*	5	2	0.00019
15	Fin whale	*(Balaenoptera physalus)*	1	1	0.00004
Unidentified Species:					
	Stenella Sp.		63	5	0.00245
	Mesoplodon Sp.		13	3	0.00051
	Unidentified Beaked		16	5	0.00062
	Unidentified Dolphin		336	67	0.01307
	Unidentified Whale		31	24	0.00121

* ER = encounter rate, calculated by no. individuals/nautical mile of survey effort

Total survey effort = 25,716 nm

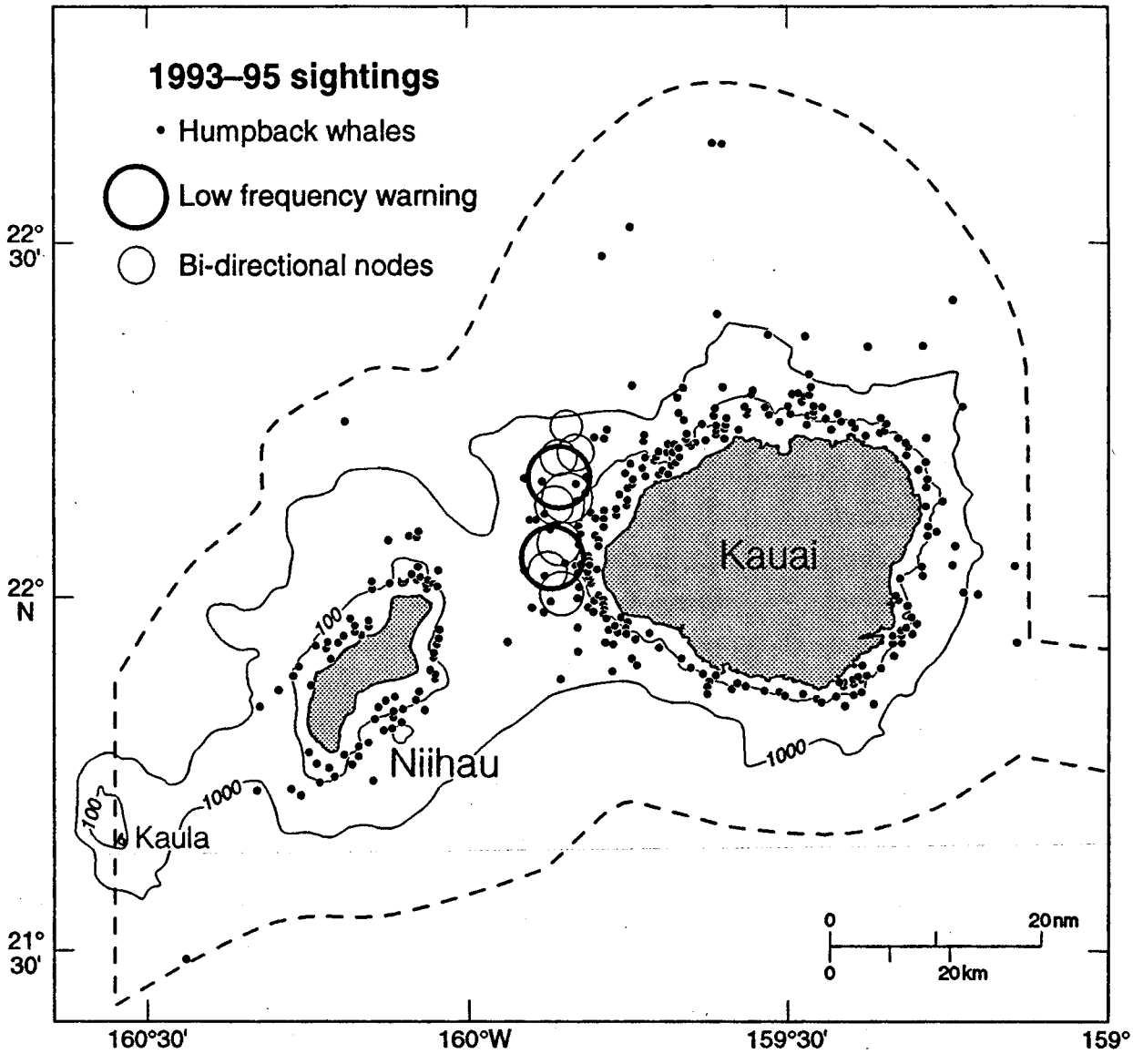

Figure 2. Distribution of humpback whales observed during 1993-95 aerial surveys. Dotted lines indicate the outer boundary of survey effort. Also shown are proposed placement of high-frequency bidirectional nodes and low-frequency alarm projectors with associated 120-dB isopleths.

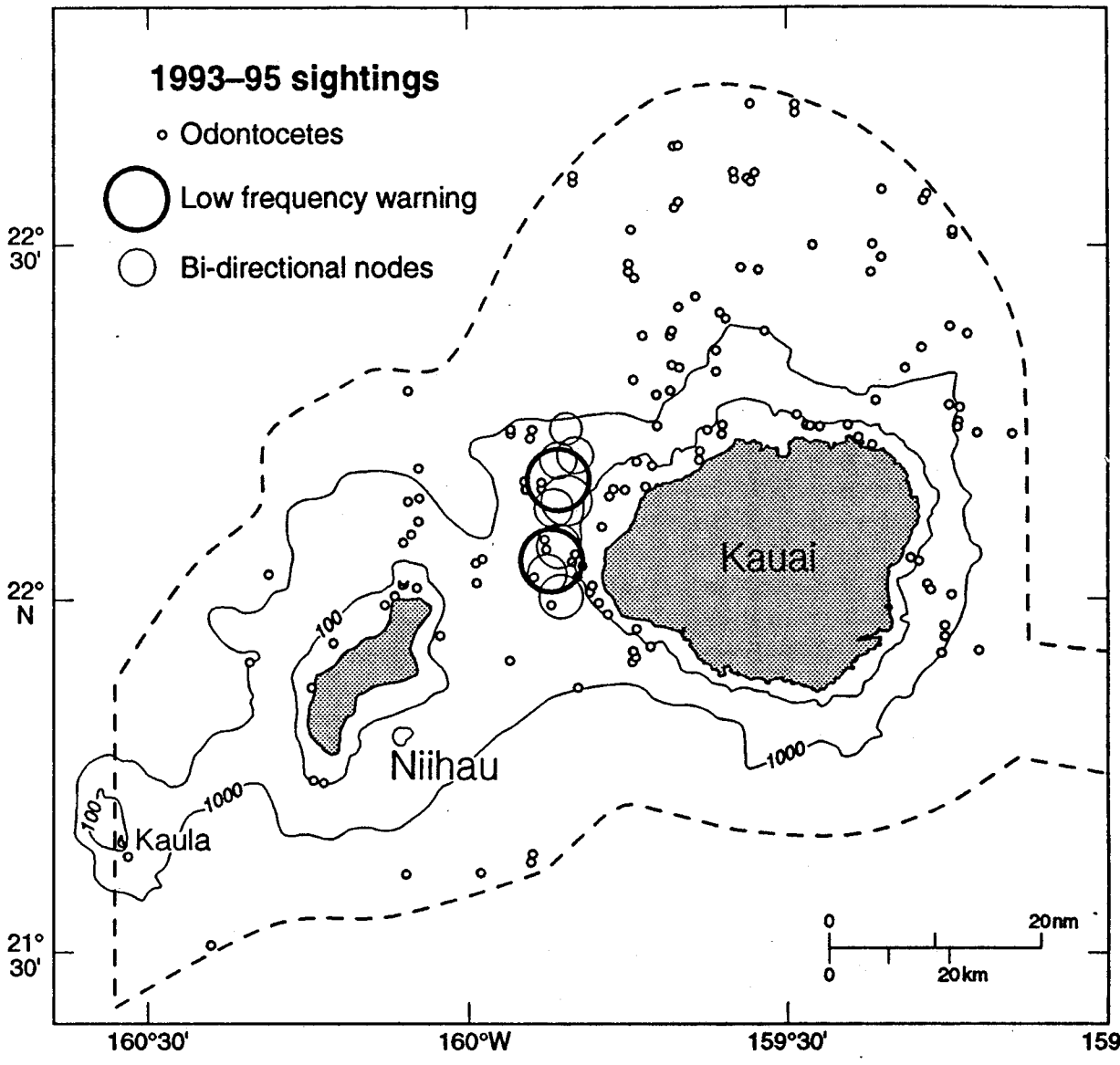

Figure 3. Distribution of odontocete species observed during 1993-95 aerial surveys. Dotted lines indicate the outer boundary of survey effort. Also shown are proposed placement of high-frequency bidirectional nodes and low-frequency alarm projectors with associated 120-dB isopleths.

data by depth is currently only available for the 1993 survey results. During that year, 74% of all statewide humpback whale sightings occurred in waters less than 100 fathoms (Mobley et al., 1994).

Figure 4 shows the distribution of all sperm whales seen in the vicinity of Kauai during the 1993-95 surveys. Throughout the major Hawaiian islands, sperm whales were seen in waters ranging in depth from 565-2252 fathoms (1033-4118 m) with a mean depth of 1529 fathoms (2796 m). These depths overlap with those within the 120-dB isopleth for one of the HF bidirectional nodes (no. 116), but not with those of the LFA projectors. The distribution of sperm whales seen around Kauai, however, tended to be considerably north of the area potentially ensonified by proposed SWTR operations (cf. Figure 3 and Figure 6).

VI. Operating Assumptions

The following operating assumptions were derived from a variety of sources including the Draft Programmatic Environmental Analysis for the PMRF SWTR (Nov. 95) and communications from Jessica DeAlteris (Ocean Systems Branch, NUWC), Jerry Gibbons (PACDIV), Jim Hager and Dave Anderson (PMRF).

A. *Density of operations on PRMF SWTR.* It is assumed that the density of scheduled operations on the PMRF SWTR will not increase beyond what they have been historically on the BARSTUR range. The only change if the SWTR range is approved is that operations will have the possibility of extending into a shallower water area. Based on historical data (adjusted for size of range, see below), it is expected that SWTR operations will average approximately 20 hrs/month or 240 hrs/yr.

B. *Operation of transmitters*--Similarly, it is assumed that the HF bidirectional nodes will be used commensurate with past communication protocols. Specifically, communications with submarines typically occur at the start and end of each exercise, as well as surrounding use of exercise torpedoes, if any. Typically this involves from 20-60 min of communication time per 8-hr exercise. Based on historical data, about 70% of submarine exercises occur on the BSURE range and the remaining 30% on BARSTUR. During FY95 and FY96 there were 201 and 162 "submarine days" on the BSURE/BARSTUR range, respectively. Due to additional submarines assigned to SUBPAC, PMRF

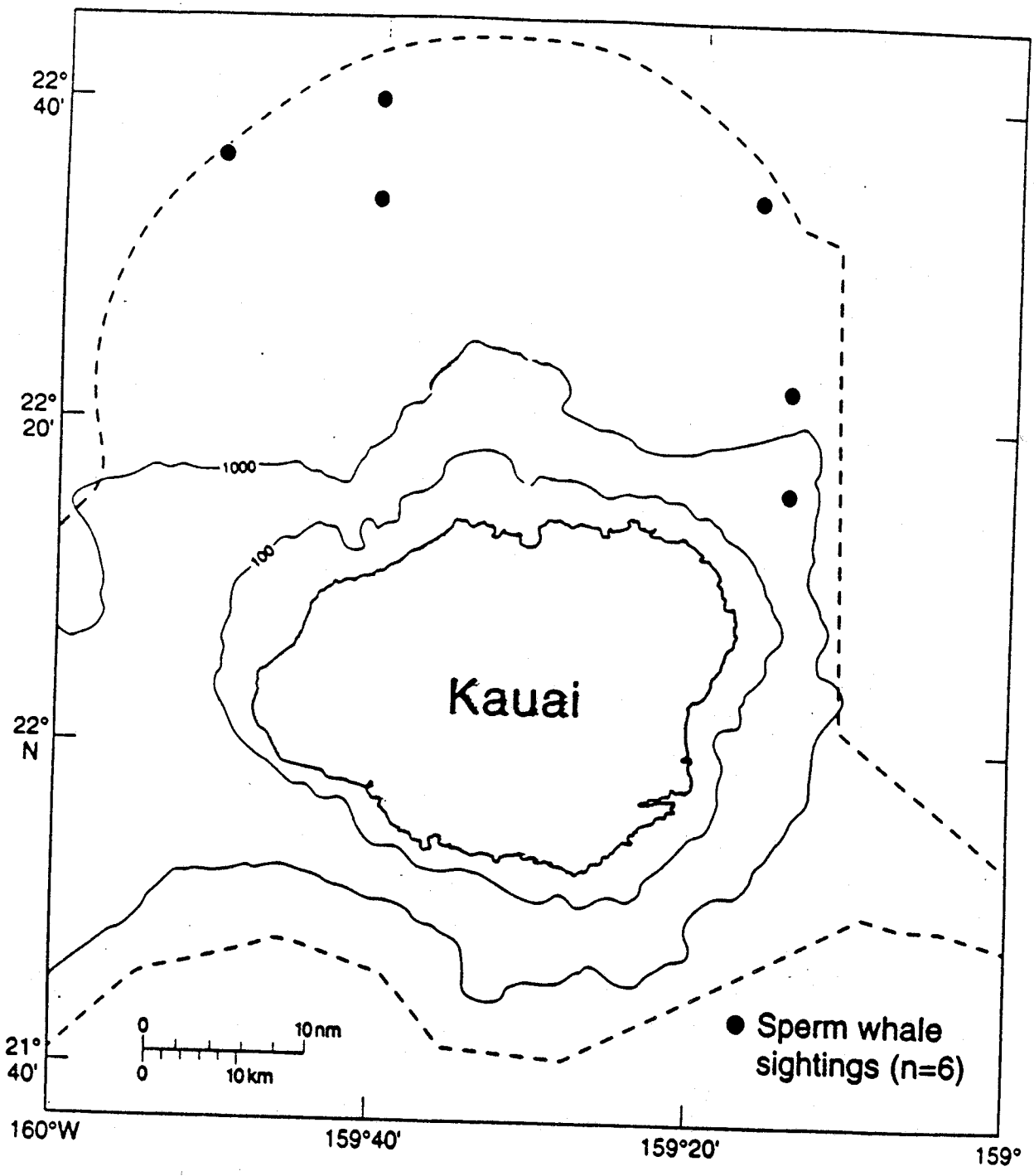

Figure 4. Distribution of sperm whales sighted in vicinity of Kauai during 1993-95 aerial surveys. Dotted lines indicate the outer boundary of survey effort.

projects a conservative estimate of less than 220 submarine days per year for the foreseeable future. If we use the estimate of 20-60 min of "phone" time per exercise, we derive a total estimated sound projector operation of 76-171 hrs on the BARSTUR range for that year. If we assume uniform activity throughout the entire range, and account for the fact that the proposed SWTR represents 45% of the BARSTUR+SWTR area (100 sq mi SWTR/100 sq mi SWTR + 120 sq mi BARSTUR) this results in an estimated 10-30 hrs/yr of sound projector operation for the SWTR [(1/3 to 1 hr/exercise) X (220 exercises/yr) X (30% on BARSTUR) X (45% on SWTR)]. This corresponds to a duty cycle of from 0.1 to 0.3 percent of total time. Additionally, it is also assumed that no more than one sound projector will be operating at any given time.

C. *Operation of low-frequency alarm (LFA) system*--It is assumed that operation of the LFA system will be primarily limited to testing, which will typically occur for approximately 30 sec prior to the start of each exercise. Using the same calculations as above, with 220 exercises per year, this yields a total estimated alarm broadcast time of 110 min for that year. If an emergency situation occurs, however, this total time would increase, depending on how long is required to return to normal operations.

VII. Mitigation to Reduce Potential Effects

All of the following mitigation recommendations refer only to operation of the sound projector systems of the proposed SWTR, not to any other aspects of range operations.

A. *Low duty cycle*--Assuming the above assumptions to be valid, the resultant duty cycle of operation of the eight bidirectional nodes on the SWTR will be considerably less than 1% per year. Since signal duration is one of the key parameters in gauging potential for disturbance (Richardson et al., 1995) the anticipated low duty cycle is in itself a key factor in reducing any potential impact.

B. Ramping of low-frequency alarm (LFA) during operational tests--Sudden loud signals have been shown to produce startle responses in cetaceans (e.g., Dahlheim & Ljunblad, 1990, for gray whales). The lower frequency of the LFA signal (3 kHz) represents a greater potential for disturbance to humpback whales

in particular since it overlaps with their vocalization range (30 Hz - 8 kHz) and its area of ensonification adjoins shallow waters, their preferred habitat (Figure 2). By ramping-up the amplitude of the LFA signal during operational tests (i.e., gradually increasing it) even over a relatively short period (10 sec), the potential for startle responses will be diminished. When used in actual emergencies, the ramping-up feature would have to be eliminated for obvious safety reasons (Note: ramping-up is one of the key mitigation features proposed for the ATOC signal, ARPA, 1995).

VIII. Conclusions

A. Potential effects on endangered humpback whales: Minimal

Given the endangered status of humpback whales, as well as their high densities in Hawaiian waters, any potential for disturbance of this species is of concern. In this case, the potential for impact rests on the fact that the operations of the proposed SWTR involves transmitting anthropogenic sound in the vicinity of their preferred habitat (i.e., waters less than 100 fathoms).

However, the bulk of the evidence for disturbing effects of noise on mysticete species, such as the humpback, supports concern for the effects of low frequency sound (less than 1 kHz). Existing evidence on the effects of varying frequency (Dahlheim & Ljungblad, 1990) shows that for at least one species (gray whales) signals above 1.9 kHz produced no overt signs of detection. It is unlikely, then, that signals produced by the HF bidirectional nodes of the proposed SWTR (8-11 kHz) would have significant impact on whales within the areas of ensonification. Additionally, given the low duty cycle (i.e., less than 1%) and the fact that no more than one node will be activated at any one time, any possible effect would be minimized.

The primary frequency of the low-frequency alarm (LFA) system (3 kHz) is, however, well within the range of their vocalizations (principal energy from 30 Hz to 4 kHz). Given this fact, it is likely that animals within the 120-dB isopleths of the LFA signals (Figure 2) would hear them. Since activation of the LFA signals would occur primarily in test situations for relatively short durations (30 sec) on a relatively infrequent basis (less than 90 min per year), barring their use in actual emergencies, such brief tests are not likely to produce

significant impacts. Additionally, the suggested mitigation feature of ramping the signal during test activations would further decrease the potential for impact.

B. Potential effects on odontocete species (including endangered sperm whales): Minimal

The transmission frequencies of the proposed HF bi-directional nodes (8-11 kHz) overlap with those favored by odontocete species, based on audiogram results (Figure 1). Additionally, these frequencies overlap with the vocalizations of sperm whales, suggesting that sperm whales are also sensitive to this range. Thus it is likely that odontocetes within the 120-dB isopleths of the bidirectional nodes would hear the signals.

However, unlike the case for humpback whales, activation of the bidirectional nodes for the proposed SWTR does not represent the potential for increased disturbance of preferred habitat. Since the habitat of odontocete species is more diffused (Figure 3) and given the operating assumptions of no substantive increases in scheduled operations and activation of only one node at a time, the probability of an odontocete being exposed to such signals is not increased beyond that of previous BARSTUR operations.

Only one of the bidirectional nodes (no. 116) will project to depths overlapping with those corresponding to sperm whales sightings (565-2252 fathoms). Thus the potential for impacting sperm whales is likely limited to the 1.4 nm radius of the 120-dB isopleth surrounding that location. As noted earlier, the six sperm whale pod sightings occurred substantially north of the BARSTUR/SWTR range. Taken together, it is unlikely that operation of the bidirectional nodes will substantively impact sperm whales.

The activation of the LFA system (3 kHz signal) is less of a concern with the odontocetes than for humpbacks, since their hearing sensitivities are shifted in favor of higher frequencies. Certainly, the low duty cycle anticipated with tests of the LFA system in combination with the recommended ramping of the signal would further reduce the potential for any impact.

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X. APPENDIX

Table 1

Positions of Proposed Bi-Directional Nodes (degrees and minutes)

Node No.	Latitude	Longitude
10	22 4.5	159 49.7
24	22 2.28	159 51.7
46	22 11.82	159 49.8
50	22 7.86	159 50.6
69	22 8.46	159 48.3
87	22 12.24	159 46.7
102	22 0.42	159 49.4
116	22 14.46	159 48.4

Table 2

Positions of Low-Frequency Alarm (LFA) Projectors (degrees and minutes)

Node No.	Latitude	Longitude
11	22 3.72	159 49.8
60	22 10.62	159 48.4

Table 3

Positions of UQC projectors (already in place) (positions provided by Jim Hager, PMRF)

Projector	Latitude	Longitude	
UQC1	22 04 52.0	159 56 53.5	
UQC2	22 09 59.2	159 55 56.3	
UQC3*	22 06 55.5	159 53.36.6	* old--operational up to July, 1994
UQC3**	22 18 24.1	159 53 24.7	** new--operational after July, 1994

APPENDIX 4

Department of the Army Permit Approval

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

REPLY TO
ATTENTION OF

March 12, 1997

Operations Branch

Ms. Leslie Kurisaki
Helber Hastert and Fee, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

This responds to your request on the behalf of the Pacific Missile Range Facility (PMRF) for a Department of the Army (DA) permit for work in navigable waters of the United States associated with installation and use of a communication and data transmission cable in PMRF's Shallow Water Training Range, Kekaha, Kauai, Hawaii.

Based on the information provided, we have determined that the proposed work can be authorized by the Corps Nationwide permit (NWP) authority at 33 CFR 230 Appendix A, Paragraph B.5 (NWP #5, Scientific Measuring Devices) and no further Department of the Army processing is necessary. The State Office of Planning, Coastal Zone Management Program Office issued a blanket Coastal Zone Management consistency determination for this NWP.

This authorization takes effect as of the date of this letter and remains valid for two years unless the nationwide permits are modified, reissued, or revoked earlier. If you commence the proposed activity before the modification, reissuance or revocation date, you will have 12 months from that date to complete the activity under the existing terms and conditions.

Enclosed are excerpts from the regulations which include the conditions of the NWP for your information and compliance. Please note that NWP Condition # 14 requires applicants to submit a compliance certification upon completion of the project. A certification is enclosed for your use. In addition, we are adding the following Special Conditions:

1. You must inform this office at least 48 hours prior to the start of work.

2. You must conduct daily visual inspection of the project site and its environs to ensure that the permitted

activities do not result in significant adverse environmental impacts. Visual inspections will be documented with photographs and written descriptions, if necessary.

3. No construction or excavated materials shall be stockpiled in the aquatic environment.

4. You must submit a final written compliance to the Corps within two months of completion of the authorized project. The compliance report must include, as appropriate, description of the in-water activities, discussion(s) of any deviations from the proposed project design and the cause of these deviations, discussion(s) of any necessary corrective action(s), and photographs documenting the progress of the permitted work.

File Number NW 970000045 is assigned to this project. Please refer to this number in any future correspondence with us. Feel free to contact Ms. Kathleen A. Dadey at (808) 438-9258, extension 15 if you have any questions.

Sincerely,

Linda M. Hihara-Endo, Ph.D., P.E.
Acting Chief, Operations Branch

Enclosures

Copy Furnished (w/out encls):
National Marine Fisheries Service, Honolulu, HI
U.S. Fish and Wildlife Service, Honolulu, HI
U.S. Environmental Protection Agency Region IX, San Francisco, CA
Coastal Zone Management Program Office, Honolulu, HI
Department of Land and Natural Resources, Honolulu, HI
Kauai County Planning Department, Lihue, HI
Mr. David Anderson, PMRF

NATIONWIDE PERMIT CONDITIONS

GENERAL CONDITIONS:

The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation: No activity may cause more than a minimal adverse effect on navigation.

2. Proper maintenance: Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. Erosion and siltation controls: Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.

4. Aquatic life movements: No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity s primary purpose is to impound water.

5. Equipment: Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and case-by-case conditions: The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its section 401 water quality certification.

7. Wild and Scenic Rivers: No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

8. Tribal rights: No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water quality certification: In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)).

10. Coastal zone management: In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).

11. Endangered Species: (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the take of Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with incidental take provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal takes of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the

offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at http://www.fws.gov/~r9endspp/endspp.html and http://kingfish.spp.mnfs.gov/tmcintyr/prot_res.html#ES and Recovery, respectively.

12. Historic properties: No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

13. Notification.

(a) Timing: Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified by the District or Division Engineer that an individual permit is required; or

(3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Notification: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs 14, 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f));

(5) For NWP 21 - Surface Coal Mining Activities, the PCN must include an OSM or state approved mitigation plan.

(6) For NWP 29-Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the- entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31- Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site.

(8) For NWP 33-Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources.

(c) Form of Notification: The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) District Engineer's Decision: In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) Agency Coordination: The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(i) For NWPs 14, 21, 26 (between 1 and 3 acres of impact), 29, 33, 37 and 38, the District Engineer will, upon receipt of a notification, provide immediately, e.g., facsimile transmission, overnight mail or other expeditious manner, a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 5 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days (16 calendar days for NWP 26 PCNs) before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(ii) Optional Agency Coordination. For NWPs 5, 7, 12, 13, 17, 18, 27, 31, and 34, where a Regional Administrator of EPA, a Regional Director of USFWS, or a Regional Director of NMFS has formally requested general notification from the District Engineer for the activities covered by any of these NWPs, the Corps will provide the requesting agency with notification on the particular NWPs. However, where the agencies have a record of not generally submitting substantive comments on activities covered by any of these NWPs, the Corps district may discontinue providing notification to those regional agency offices. The District Engineer will coordinate with the resources agencies to identify which activities involving a PCN that the agencies will provide substantive comments to the Corps. The District Engineer may also request comments from the agencies on a case by case basis when the District Engineer determines that such comments would assist the Corps in reaching a decision whether effects are more than minimal either individually or cumulatively.

(iii) Optional Agency Coordination, 401 Denial. For NWP 26 only, where the state has denied its 401 water quality certification for activities with less than 1 acre of wetland impact, the EPA regional administrator may request agency coordination of PCNs between 1/3 and 1 acre. The request may only include acreage limitations within the 1/3 to 1 acre range for which the state has denied water quality certification. In cases where the EPA has requested coordination of projects as described here, the Corps will forward the PCN to EPA only. The PCN will then be forwarded to the Fish and Wildlife Service and the National Marine Fisheries Service by EPA under agreements among those agencies. Any agency receiving the PCN will be bound by the EPA timeframes for providing comments to the Corps.

(f) Wetland Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore; the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) Mitigation: Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(i) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;

(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees" to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a 1 acre loss; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

14. Compliance certification: Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a.) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b.) A statement that any required mitigation was completed in accordance with the permit conditions; c.) The signature of the permittee certifying the completion of the work and mitigation.

15. Multiple use of Nationwide permits: In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the Notification General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

SECTION 404 ONLY CONDITIONS:

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

1. Water supply intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. Shellfish production. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

3. Suitable material. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.,) and material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

5. Spawning areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. Obstruction of high flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. Adverse effects from impoundments. If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. Waterfowl breeding areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. Removal of temporary fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

COMPLIANCE CERTIFICATION

PERMIT NO. 97000045 **DATE OF ISSUANCE** 10 March 1997

Name of Permittee Commanding Officer, Code 7030, Pacific Missile Range Facility

Upon completion of the activity authorized by this permit and any mitigation required by the permit, please sign this certification and return it to the following address:

U.S. Army Corps of Engineers
Honolulu District
Attn: Regulatory Section
Building 230
Fort Shafter, Hawaii 96858-5440

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee Date