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LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 11, 2014

Director Wooley
Office of Environmental Quality Control
Department of Health, State of Hawaii
235 S. Beretania Street, Room 702
Honolulu, HI 96813

Dear Director Wooley:

With this letter, the Department of Land and Natural Resources hereby transmits the final environmental assessment and finding of no significant impact (FEA-FONSI) for the Hawaii Fish Aggregating Device situated Statewide for publication in the next available edition of the Environmental Notice.

The Department of Land and Natural Resources has included copies of comments and response that it received during the 30-day public comment period on the draft environmental assessment and finding of no significant impact (FEA-FONSI).

Enclosed is a completed OEQC Publication Form, two copies of the FEA-FONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Mr. Alton Miyasaka, Division of Aquatic Resources, at 587-0092.

Sincerely,

William J. Aila

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (FEBRUARY 2013 REVISION)

Project Name Hawaii Fish Aggregating Device System FEA-FONSI
Island: Statewide offshore
District:
TMK:
Permits:
Proposing/Determination Agency:
Division of Aquatic Resources; Department of Land and Natural Resources; State of Hawaii; 1151 Punchbowl Street, Room 330; Honolulu, HI 96813; Mr. William Aila, Jr., Chairperson; 587-0100; contact Mr. Alton Miyasaka 587-0092 or email Alton.K.Miyasaka@hawaii.gov.
Accepting Authority:
(for EIS submittals only)
Consultant:
Kim N. Holland Ph.D.; Hawaii Institute of Marine Biology; PO Box 1346; Kaneohe, HI 96744; (808) 236-7410
Status (check one only):

__DEA-AFNSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.
_**x**_FEA-FONSI	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__FEA-EISPN	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
__DEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
__FEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__ Section 11-200-23 Determination	The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.
__Section 11-200-27 Determination	The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously

accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page)**:**

This Environmental Assessment (EA) was prepared in response to concerns that the previous PEA (which was submitted and approved under State of Hawaii regulations in 2012), did not sufficiently address the issue of the impact of drifting, grounded or beached FAD buoys. This EA expands on the 2012 EA by specifically focusing on the issues of FAD mooring longevity and frequency of stranding of FAD buoys and presenting the possible environmental impacts of these events and ways of mitigating them. This EA describes assessment and mitigation options regarding Hawaii FADs that break loose and/or become grounded. FAD floats occasionally break free from their moorings and some of these drift onshore. Over the past 10 years, the number of recovered FAD floats has averaged about 5 per year. Of these, 2 to 4 FADs per year become grounded or beached on Hawaii's shorelines while the others are recovered while still adrift. This EA determines that, based on current data and past performance, the 54 FADs in waters around the main Hawaiian Islands will have no significant negative impact on the quality of the environment or cultural resources.

FINAL

ENVIRONMENTAL ASSESSMENT

Hawaii Fish Aggregating Device System

December 2014

Lead agency: **State of Hawaii Department of Land and Natural Resources**

Responsible department: **Division of Aquatic Resources**

Prepared by: **Kim N. Holland Ph.D.**

Senior Research Fellow, Joint Institute for Marine and Atmospheric Research, University of Hawaii at Manoa

Researcher, Hawaii Institute Marine Biology

Point of Contact: **Kim N. Holland Ph.D.**

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Cover Sheet

Proposed Action: Continuation of Hawaii's Fish Aggregation Device System (state-wide, Hawaii)

Type of Statement: Environmental Assessment (EA)

Contact:

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CHAPTER ONE: PURPOSE AND NEED FOR ACTION AND IMPETUS FOR ENVIRONMENTAL ASSESSMENT

1.1 Project Summary and Rationale for Environmental Assessment

This Environmental Assessment (EA) was prepared in response to concerns that the previous EA (which was submitted and approved under State of Hawaii regulations in 2012), did not sufficiently address the issue of the impact of drifting, grounded or beached FAD buoys. This EA expands on the 2012 EA by specifically focusing on the issues of FAD mooring longevity and frequency of stranding of FAD buoys and presenting the possible environmental impacts of these events and ways of mitigating them. As described in a January 2014 memorandum from the U.S. Council on Environmental Policy concerning mitigation options under NEPA, PEAs must consider “means to mitigate adverse environmental impacts” and provides examples of the ways in which mitigation can be achieved. Thus, as required under federal guidelines, this EA describes assessment and mitigation options regarding Hawaii FADs that break loose and/or become grounded.

The 2012 Programmatic Environmental Assessment (PEA) was prepared in accordance with National Environmental Policy Act of 1969 (42 U.S.C. §4321, *et seq.*), as implemented by the Council of Environmental Quality regulations (40 C.F.R. §1500-1508); and NOAA Administrative Order Series (NAO) 216-6, *Environmental Review Procedures for Implementing the National Environmental Policy Act*, of May 20, 1999.

The objective of the Proposed Action of the 2012 PEA and this EA is to continue to facilitate recreational fishing opportunities in the State and help perpetuate traditional Hawaiian activities by maintaining a FAD network to help fishers increase their catch and reduce time and fuel spent searching for fish schools. The establishment of an array of offshore FADs also serves to redirect recreational fishing effort away from near-shore reefs that are susceptible to overfishing and physical damage from boat anchors and fishing gear. The proposed action is based on the successful long-term performance of a network of 54 fish aggregating devices (FADs) currently deployed in waters around the main Hawaiian Islands and the desire to promote continued fishing success in an economic environment where prices for fuel and other commodities are rapidly increasing.

The locations of the 54 FADs are based on recommendations from fishers throughout the State and are designed to accommodate as many types of angler as possible (from small non-motorized vessels to large offshore sport fishing boats) and to reduce competition at any one site. Deployment sites range from 2 to 15 miles offshore. The proposed action will maintain and improve recreational and economic benefits for Hawaii's fishers. The preponderance of scientific data indicates that fish caught around Hawaii’s FADs are a combination of fish spawned locally and fish that arrive from other regions of the Pacific. The harvest of fishes from Hawaii’s is thought to have an insignificant impact on the overall status of fish stocks – especially when compared with the commercial harvest of these species throughout the Pacific region. During the previous 25 years of operation of the existing system, there have been no reports of deleterious interactions with any protected species. Based on this fact and the design of the FAD components, it can reasonably be stated that the proposed action will not affect the various marine mammals and turtles known to frequent Hawaiian waters. Hawaii FADs have supported cutting edge research into pelagic fish biology and cooperative federal-state-private research into FAD technology and the management of pelagic fisheries will continue. Alternatives to the proposed action, such as termination of the Hawaii FAD System, no action, deployment of unanchored or subsurface FADs were considered, but none of these can provide a cost-effective means of enhancing fishing opportunities in the state or redirecting fishing effort away from coastal reefs. The FAD network will continue to comply with all federal, state and US Coast Guard requirements.

FAD floats occasionally break free from their moorings and some of these drift on shore. Over the past 10 years, the number of recovered FAD floats has averaged about 5 per year. Of these, 2 to 4 FADs per year become grounded or beached on Hawaii’s shorelines while the others are recovered while still adrift. Based on an evaluation of these events by reviewing current data and past performance and based on the overall characteristics of the FAD array, the 2012 PEA and this EA both determine that the 54 FADs in waters around the main Hawaiian Islands will have no significant negative impact on the quality of the environment or cultural resources.

1.2 Project Background

The deep clear waters surrounding the Hawaiian Islands are the habitat of several species of tuna and other pelagic fishes such as dolphinfish (mahimahi) and billfishes that are economically important and which are also the key species in the local sport fishery. These fishes are often widely distributed and some are migratory. Their high mobility and patchy distribution (both in space and in time) can make them difficult to locate. Because of this, fishers must often resort to trolling techniques that cover large areas of ocean in order to locate the target species. However, these pelagic species are attracted to floating objects and exploiting this behavior can make it easier for fishers to find and catch their target species. Fish aggregating devices (FADs) are used to "hold" pelagic fishes in an area to enhance fishing. Further, recreational fishing and boat ownership have increased dramatically with a concomitant increase in fishing pressure on Hawaii’s coastal reefs. The establishment of offshore FAD arrays offers a viable strategy to divert fishing pressure from reef species to offshore resources that are better able to withstand this pressure. Physical damage to the reef from boat anchors and fishing gear is also reduced. FAD arrays have been established in many regions of the Pacific to assist with coastal resource conservation.

Fishers have long known that tunas and other pelagic fishes are attracted to and congregate around natural floating objects, such as logs, abandoned cargo nets, water heaters and cargo pallets. In fact, all around the world, fisheries have been developed based on the tendency of certain pelagic fishes to aggregate around floating objects. These fisheries range from subsistence and sport fishing to industrial methods that use pole-and-line and purse seining techniques. In Hawaiian waters, commercial and recreational fishers watch for floating objects and eagerly fish around any log or flotsam encountered by chance.

FADs were introduced to Hawaiian waters in 1977 when the Honolulu Laboratory (Southwest Fisheries Center) of the National Marine Fisheries Service, with funds from the Pacific Tuna Development Foundation (later, the Pacific Fisheries Development Foundation), installed a few experimental fish aggregators off Oahu, Lanai, and West Hawaii. Skipjack tuna (aku) catches of 5-10 tons were reported frequently around these FADs; the largest catch was over 15 tons. Also, the aku pole-and-line fishing vessels reported using less than the usual amount of bait thereby enabling them to make more fishing trips per week. Sport fishers experienced large daily catches of mahimahi at these FADs (Matsumoto et al. 1981).

In 1979, following the Honolulu Laboratory's successful experiment on FADs in Hawaiian waters, Governor George Ariyoshi proposed establishing a system of fish aggregators as part of the State's fisheries development effort that would help revitalize our fishing industry and increase sport fishing opportunities. Subsequently, the State Legislature appropriated funds to the Department of Land and Natural Resources (Division of Aquatic Resources) for planning and implementing a Hawaiian fish aggregating device program. Additional funding for the program was sought and obtained from the Federal Aid in Sport Fish Restoration (Dingell-Johnson) Marine Development Program administered by the U.S. Fish and Wildlife Service. The FAD locations were recommended by Hawaii's fishers through statewide public meetings held in October 1979 and in April 1980, the Division of Aquatic Resources (DAR) constructed 26 FADs and installed them in waters around the main Hawaiian Islands at distances of 2.4-25 miles offshore and in depths of 80 - 1,510 fathoms.

The success of the expanded array of FADs resulted in increased demand for an even larger network to provide greater geographical coverage of Hawaii’s coastline and to reduce competition at the existing sites. This increase in the size of the array began in 1985. Currently, there are 54 approved sites around the state. These sites were selected based on input from the fishing community and on avoidance of high traffic zones. The FAD array is heavily used by the sport fishing community of all of the main Hawaiian Islands and research activities that have focused on this array have made significant contributions to understanding the pelagic resources that support Hawaii’s fisheries.

Starting in October 1982, a single sphere design has been used in the construction of all FADs in the system. The single sphere produces minimum drag and causes the least rotation of the buoy thereby reducing wear on the mooring components. In line with the desire to keep strain on the mooring to a minimum, no additional components (e.g., plastic streamers or netting) are attached to the FAD. A diagram of the design used for the past 25 years is included in Figure 2. Since the mid 1990’s, funding has come exclusively from the Federal Aid in Sport Fish Restoration (Dingell-Johnson) program with matching support from the University of Hawaii at Manoa.

CHAPTER TWO: ALTERNATIVES TO THE PROPOSED PROJECT AND THE PREFERED ALTERNATIVE

2.1 Preferred Alternative: Continued Operation and Maintenance of a FAD Network in Hawaiian Waters

Because of the great popularity of FADs with Hawaii's fishing community and because of the rapidly rising costs associated with fishing, the Division of Aquatic Resources, in collaboration with the University of Hawaii, proposes to continue to operate a network of 54 FADs in coastal Hawaiian waters. The project will continue to foster collaborative federal-state-private research into FAD technology and the biology of fishes found in association with FADs. The FAD network also functions to support conservation of Hawaii's near-shore reefs by diverting fishing effort from those areas to offshore regions. Detailed descriptions of the FAD network and its operation and maintenance and associated research can be found in the 2012 PEA.

2.2 Withdrawal

This alternative calls for a withdrawal from the current statewide FAD system. No replacement of FADs in Hawaiian waters would take place, and the operation of the present 54 FADs would be terminated. The environmental impacts of the FAD system would be eliminated. This action would severely retard State's effort to develop and improve recreational fisheries in Hawaii, prevent optimum use of marine resources and importantly, reduce the redirection of fishing effort away from coastal reefs. There would be negative economic consequences both from reduced activity in the sport fishing sector and reduction in federal and international grants in support of FAD-related research.

2.3 New Project

Drifting (unanchored) expendable FADs could be deployed instead of the proposed anchored types. Although free-floating FADs may initially be less costly than the anchored FADs that are currently used, maintaining a functional system would actually be more expensive because of the need to continually replace FADs that drift out of Hawaii waters. Also, it is probable that many more of these FADs would drift ashore than the 2 to 4 annual events under the current system. Further, most fishers would still need to depend on chance encounters with the free-floating aggregators and this would require larger fuel consumption.

CHAPTER THREE: EFFECTED ENVIRONMENT

Because the existing FAD locations are between two and 15 miles offshore and in depths of 200 - 1,500 fathoms, the setting is considered to be "oceanic" rather than "coastal." Detailed descriptions of the physical, biological and socio-economic and cultural settings of the proposed action can be found in the 2012 PEA.

CHAPTER FOUR: ENVIRONMENTAL CONSEQUENCES

4.1 Physical Effects of Drifting, Grounded and Beached FAD Buoys.

For the purposes of this SEA, “drifting” refers to FAD buoys that have broken away from their moorings but have not made contact with the sea floor, “grounded” refers to buoys that have become lodged on the sea bed but are still floating and “beached” refers to buoys that have washed up on sandy or rocky shore lines. FAD buoys occasionally break free from their moorings and some of these drift on shore. Over the past ten years of the program, the longevity of the FAD moorings has remained quite stable at an average of approximately 32 months. There are some differences in longevity between windward and leeward locations (Holland et al, 2000).

Over the past 10 years, the number FAD buoys that have broken free and been recovered has averaged about 5 per year. Of these, 2 to 4 FADs per year become grounded on Hawaii’s shorelines while the others are recovered while still adrift. The most common cause of mooring failure is either the swivel where the buoy is attached to the chain or the swivel where the chain is attached to the mooring rope (Figure 1). Consequently, over 90% of drifting or grounded FADs consist of just the float or the float plus 100’ of chain. Research on Hawaii FADs has identified weak components and allowed for instituting corrective measures. For example, the swivels used today are more robust than in the earlier years of the program and the ropes now used are more resistant to abrasion. The fate of FAD buoys that break free from their moorings but do not drift on shore and are not recovered at sea is not known although there are anecdotal reports of these floats being re-purposed or re-used in other locations around the Pacific.

It is unlikely that drifting FAD buoys have any additional physical environmental impact than when they are attached to their moorings. The possible physical effects of the FAD system are covered in detail in the 2012 PEA. FADs with chain attached usually become lodged off shore on low-relief substrate typical of Hawaii’s high energy shorelines. Potential impacts of these grounded buoys include abrasion of substrate and damage to encrusting algae and coral. On sandy beaches, FADs typically are washed up to the high tide line or lodge behind the calcareous bench until they are recovered. On rocky shoreline they become wedged among rocks. We have no reports of significant physical shoreline damage resulting from grounded or beached FADs. An inspection of a recent beaching event (Laie, Oahu) by program staff revealed no discernable physical damage to the fore-reef, littoral calcareous bench or beach.

4.2 Biological Effects of Drifting, Grounded and Beached FAD Buoys.

For the purposes of this EA, the following section will focus exclusively on the possible impacts of FAD floats that have broken free from their moorings and have become grounded or beached. FADs that are recovered while afloat (drifting) have no environmental impacts as they are safely brought ashore at a harbor facility. An overview of the possible biological effects of the FAD Array can be found in the 2012 PEA.

Drifting FADs continue to aggregate pelagic fish species in the same way as when they were moored. In fact, drifting FADs probably closely emulate the circumstances under which the floating object aggregative behavior of pelagic fish species first evolved (Dagorn et al. 2012). Assemblages of pelagic species probably leave drifting FADs when they enter waters that are too shallow for their normal habitat. Natural floating objects that aggregate pelagic species while in deep water do not retain these assemblages when they drift into shallow waters.

Rafting of corals attached to natural (e.g. pumice, logs) and man made objects (fishing net floats) may contribute to long distance dispersal of corals and other sessile organisms. In fact, some rafting coral colonies may make several circuits of the ocean before drifting ashore. Given Hawaii's extreme isolation and location at the northern edges of suitable reef coral habitat, this rafting may have played a significant role in coral colonization of Hawaii (Jokiel, 1984). These preexisting natural mechanisms for the dispersal of sessile organisms, combined with the large amounts of plastic debris currently found in the oceans, strongly suggest that drifting FAD floats will not introduce a significant new mechanism for dispersal of sessile organisms from Hawaii to other regions of the Pacific (P. Jokiel, Personal Communication, 06/14)

Grounded FADs may cause physical damage to encrusting algae and coral in depths less than 100’. Damage to these organisms could result in habitat loss for fish and invertebrates that use this environment. FAD floats that reach very shallow water and become stranded on sandy or rocky shores could also damage algae beds growing on intertidal shoreline calcareous benches. Because most FADS have the 100’ of chain below them when drifting, many buoys become lodged on sandy bottoms or low-relief, bare substrate outer reefs and do not contact shallow substrate or end up on the beach. We have received reports from the public regarding groundings and requesting removal for aesthetic reasons but these were not associated with complaints regarding reef or terrestrial damage. There have been no reports of physical or biological damage resulting from FAD floats coming ashore. This is possibly a combination of the fact that strandings are few and that Hawaii’s shallow water reefs are typically comprised of low relief formations that have evolved to withstand a high degree of physical abrasion (Meyer and Holland, 2009). During the public comment and agency review process of the 2012 Programmatic Environmental Assessment (PEA) no comments were received concerning the grounded or drifting FAD buoys.

Under USFWS NEPA guidelines, violations of federal, state or local law must be considered in the PEA process. Sections 13-95-70 and 13-95-71, Hawaii Administrative Rules (HAR), respectively, prohibit damage to any stony coral or live rock within the Hawaiian Islands. Damage of less than ½ meter squared of stony corals and less than one meter squared of live rock is not a violation if such damage was unintentional or accidental. The FAD program will obtain Special Activity Permits to cover damage greater than ½ meter square. Details of this process are available in Appendix A of this document.

4.3 Cumulative Effects of Drifting, Grounded and Beached FAD Buoys.

The low frequency of FAD buoys becoming grounded or beached and the limited impact of each of these events indicate that cumulative impacts are not expected to be significant. Impacts on living coral or algae on near shore reefs will be repaired through natural processes and beaches undergo continual modification from the effects of waves and wind. Further, grounding and beaching events occur at widely separated locations so that it is improbable that additive or cumulative impacts will occur at a specific area of reef or section of beach.

CHAPTER FIVE: ENVIRONMENTAL IMPACT PREVENTATIVE AND MITIGATING MEASURES.

Current operation of the FAD program includes specific actions to reduce the impact of drifting, grounded or beached FAD buoys. These measures include the use of high durability mooring components (swivels, ropes) and mechanisms to quickly receive information regarding failed moorings and to initiate recovery operations as quickly as possible. All FADs are equipped with solar powered warning lights which continue to function if the buoys break free. FADs that are confirmed as missing are immediately reported to the US Coast Guard as required by Aids to Navigation protocols and the licensing requirements of the FAD system. However, in addition to these existing practices, the following sections describe new or enhanced measures to prevent and mitigate the impacts of FAD buoys that break free from their moorings.

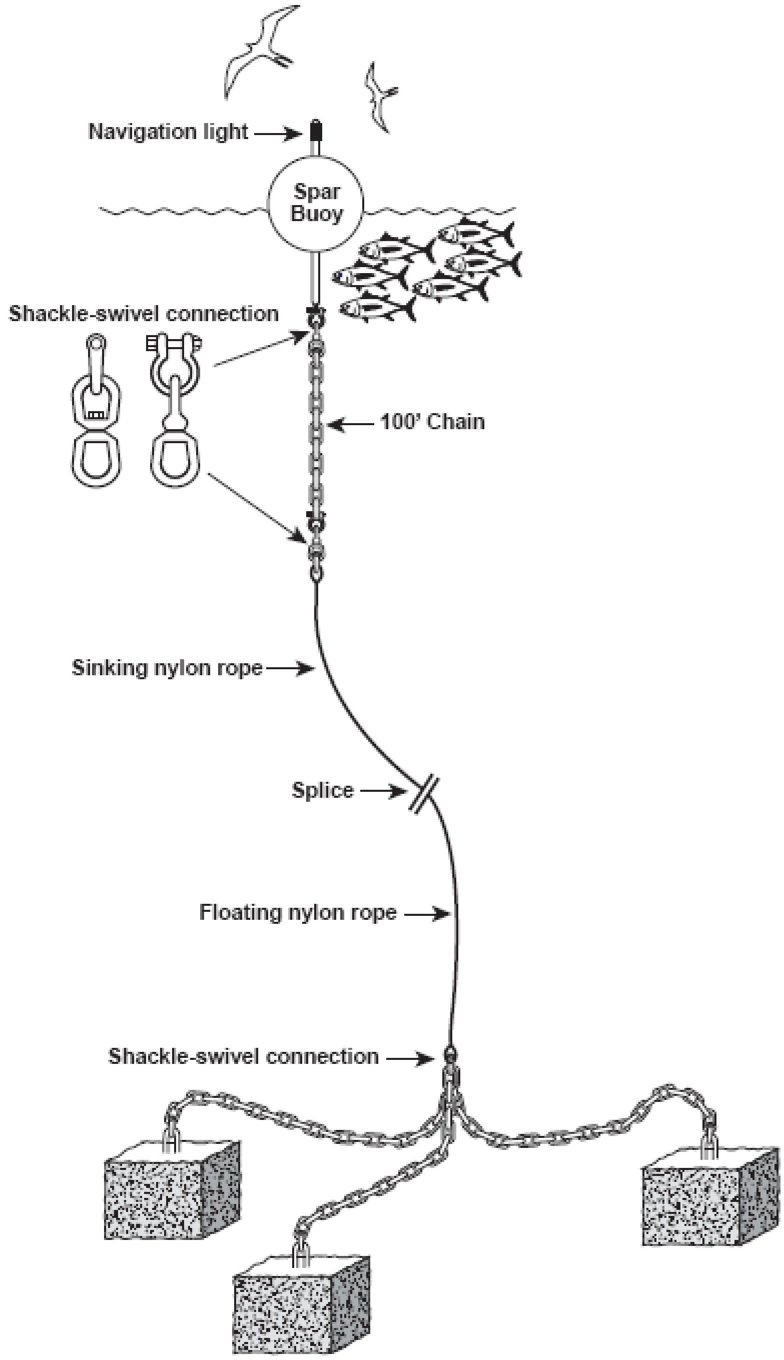

Figure 1. FAD mooring schematic

5.1 Current Practice.

The spherical design of the FAD floats, the heavy and taught mooring system and the absence of additional appendages such as netting or plastic mesh reduce the chances of whales, turtles or monk seals becoming entangled to virtually zero. No entanglement incidents have been reported for the entire history of the FAD program. In the specific case of drifting FADs that have broken free from their moorings, entanglement becomes even less probable than when the floats were moored because there is no longer any rope attached to the buoy.

The failure of a mooring is typically first known when fishers report to the FAD program office that they cannot find the buoy in its normal position or by fishers who encounter drifting buoys. Typically, fishers report drifting or missing FADs via the FAD program "hotline" that was specifically established for exchanging information with user groups. Because FADs can "swing" large distances on their mooring lines, they can be reported missing when in fact they are still "on station". Because of this, it is usually necessary to receive multiple reports to confirm that a FAD is missing.

When drifting buoys are reported with reliable coordinates and in "real time", efforts are made to recover the FADs before they come ashore. This occurs through deployment of University of Hawaii vessels or through contracting private vessel owners to conduct the recovery. Grounded FADs are recovered as soon as feasible either by FAD program staff and UH vessels or through contracting private companies or individuals. In the frequent cases when FADs become grounded before actually washing up on the beach, recovery is conducted by towing the FADs out to sea, not by bringing them into the beach. High priority is given to these recoveries so that they can be conducted before the FAD becomes dislodged or is washed up on the beach. Aesthetic impacts of grounded or beached FADs are considered to be legitimate triggers for a response by the FAD program and removal and recovery are initiated as soon as possible.

Beached FAD buoys are recovered as soon as feasible after they are reported to the FAD program office. To shorten response times and reduce further impacts, initial response sometimes takes the form of dispatching program personnel to move the buoy further up the beach prior to making arrangements for actual recovery and recycling of the buoy. When beached FAD buoys are recovered, care is taken to avoid damage to shoreline vegetation. The method of recovery usually involves manual manipulation (rolling or lifting) of the buoy to the nearest vehicular access point. The recovery is made along a path with fewest natural features that might be vulnerable to damage and care is taken not to impact these features. On occasion, buoys are moved to where they can be floated out to sea without coming into contact with vulnerable substrate. Recovered buoys (whether drifting or grounded) are refurbished and re-used.

5.2 Enhanced or New Mitigation Measures

In order to further mitigate any possible damage to reef and shoreline features the following measures will be established:

- Construction of a "contact list" of pre-approved vessels on all major islands to facilitate rapid response to reports of drifting so that they can be recovered before drifting ashore or as soon as possible after grounding or beaching
- Identification of specific budget line item to underwrite recovery operations – both at sea and from shorelines
- Assessment of possible preventative maintenance options for FADs. A cost/benefit analysis will be conducted to evaluate any candidate maintenance activities that are identified (e.g., prophylactic replacement of mooring swivels).
- Assessment, documentation (e.g., photographic) and archiving of impacts of beached or grounded FADs.
- If damage to the substrate is observed during FAD recovery, any loose material will be collected and disposed of in deep water. In the event that damage is observed, these findings will be reported to pertinent federal and state agencies.
- Monitoring of grounding sites where damage has been observed. If FADs are responsible for damage to the substrate or shoreline, annual monitoring will be conducted to document the recovery of the area. A specific budget item will include travel to conduct monitoring activities.
- A Special Activity Permit (SAP) will be obtained through appropriate state agencies to cover incidental damage caused by grounded or beached FADs and which will require specific responses should damage be documented. The specifics of the SAP process are contained in Appendix A.

CHAPTER SIX: UNAVOIDABLE ENVIRONMENTAL IMPACTS

Fringing reefs and littoral zones may incur temporary damage due to strikes from grounded or beached FAD buoys. This may also result in localized and temporary alteration of habitat used by fishes and invertebrates. However, over the duration of the program, we have received no reports of significant damage. This is probably due to the low frequency of these events, the small physical size of each impact and the high resiliency of Hawaii's shallow water reefs that are typically comprised of low relief formations that have evolved to withstand a high degree of physical abrasion (Meyer and Holland, 2009). However, in the future, specific efforts will be directed at documenting and archiving the impacts of grounded and beached FAD buoys. If significant damage is detected, appropriate agencies will be consulted concerning options for mitigation of damage.

CHAPTER SEVEN: CONCLUSION

The continued operation of anchored FADs in waters around the main Hawaiian Islands will not result in significant adverse environmental impacts. As discussed in this document and the 2012 PEA, potential environmental impacts resulting from the project will be minimal, amenable to mitigation, or entirely prevented. None of the alternatives considered can provide better or more cost-effective fishing opportunities for Hawaii's sport fishers – whether residents or visitors – or a better way of directing sport fishing effort away from Hawaii’s coastal reefs and shoreline.

The proposed project will provide substantial recreational benefits to Hawaii fishers without jeopardizing the marine environment or other established ocean activities. In fact, by reducing fishing pressure on reef and benthic ecosystems, the FAD program enhances environmental quality of coastal areas and recreational fishing in those areas. Continued support of successful offshore recreational fishing will result in continued economic benefits derived from this activity and will help perpetuate offshore fishing activities that are an important part of Hawaii’s cultural heritage. In addition to the recreational value of sport fishing, this component is a major contributor to the local economy. In a study entitled "The Economic Impact of Fish Aggregating Devices on Hawaii's Charter Boat Fishing Industry," Samples and Schug (1984) found that approximately one-third of the charter boat skippers in Hawaii used the FADs if only for a brief visit during a trip. The amount of use by this fleet has certainly increased since that report was published. Furthermore, the project will maintain the opportunities for cooperative federal-state-private research into fish aggregating device technology and the management of pelagic fisheries. Hawaii has established itself as a leader in these fields.

The project will not affect fishery management prerogatives of the Western Pacific Regional Fishery Management Council. Required federal permits (U.S. Army Corps of Engineers, U.S. Coast Guard), approval (U.S. Navy), and state permit (Department of Land and Natural Resources) and approval (Department of Transportation) are already in hand or will be obtained prior to initiation of the project.

CHAPTER EIGHT: LIST OF AGNECIES AND PERSONS CONSULTED

8.1 Federal Agencies

8.1.1 Western Pacific Fisheries Management Council

Mr. Eric Kingma, Coordinator of WESPAC’s FAD programs

8.1.2 NMFS PIRO

8.1.3 US Fish and Wildlife Service

Mr. Edward Curren, USFWS liaison, Hawaii Division of Aquatic Resources

8.2 State Agencies

8.2.1 State of Hawaii Division of Aquatic Resources

Mr. Michael Fujimoto, State FAD program liaison
Mr. Alton Miyasaka, permitting specialist

8.2.2 University of Hawaii

Mr. Warren Cortez, FAD program lead technician
Dr Paul Jokiel, HIMB

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9 List of agencies and persons consulted

9.1 Federal Agencies

9.1.1 Western Pacific Fisheries Management Council

Mr. Eric Kingma, Coordinator of WESPAC's FAD programs

9.1.2 NMFS PIRO

Mr. Donald Hubner, Endangered Species Biologist, NMFS PIRO

9.1.3 US Fish and Wildlife Service

Mr. Edward Curren, USFWS liaison, Hawaii Division of Aquatic Resources

9.2 State Agencies

9.2.1 State of Hawaii Division of Aquatic Resources

Mr. Michael Fujimoto, State FAD program liaison
Mr. Alton Miyasaka, permitting specialist

9.2.2 University of Hawaii

Mr. Warren Cortez, FAD program lead technician

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APPENDIX I

Scientific Literature Arising from Hawaii FAD research

Refereed Publications

Adam, S.M., J.R. Sibert, D. Itano and K.N. Holland. 2002. Dynamics of bigeye and yellowfin tuna in Hawaii's pelagic fisheries: analysis of tagging data using a bulk transfer model incorporating size specific attrition. **Fish.Bull.**101(2):215-228

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Holland, K.N and J.R. Sibert. 1994. Physiological thermoregulation in bigeye tuna (Thunnus obesus). **Environ. Biol. Fish.** 40:319-327.

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Sibert, J.R., K.N. Holland and D. G. Itano. 2000. Exchange rates of yellowfin and bigeye tunas and fishery interaction between Cross Seamount and nearshore FADs in Hawaii. **Aqua. Liv. Res** 13(4) 225-232.

<u>Technical Reports</u>

Grubbs, R.D., K.N. Holland and D. Itano. 2001. Food Habits and trophic dynamics of structure-associated aggregations of yellowfin and bigeye tuna in the Hawaiian Islands: Project description, rationale and preliminary results. Technical Report to the 14th meeting of the Standing Committee on Tuna and Billfish. Noumea, New Caledonia

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Itano, D., K Holland, L. Dagorn, D.G. Grubbs and Y. Papastamatiou. 2004. Monitoring movement patterns, residence times and feeding ecology of tuna, billfish and oceanic sharks within a network of anchored FADs. Technical Report to the 17th meeting of the Secretariat of the Pacific Community (SPC) Standing Committee on Tuna and Billfish, Majuro, Marshal Islands.

APPENDIX A

Sections 13-95-70 and 13-95-71, Hawaii Administrative Rules (HAR), respectively, prohibit damage to any stony coral or live rock within the Hawaiian Islands. Damage of less than ½ meter squared of stony corals and less than one meter squared of live rock is not a violation if such damage was unintentional or accidental.

During the period of a year, up to four FADs may be involved in events where they either become grounded or beached. In those cases where the FADs cause damage to stony corals or live rocks, in excess of the stated minimum amounts described previously, such damages would be in violation of state laws. To mitigate the FAD program from these potential violations, a State special activity permit will be required.

The Department will seek the approval of an annual special activity permit (SAP) that would exempt the project from stony coral or live rock damage up to twice the stated minimum thresholds (one meter squared of stony corals and two meters squared of live rock) per FAD grounding or beaching for up to four FADs per year. If any damage in excess of this amount occurs per grounding or beaching, another separate SAP would be sought to cover the damage.

In the unlikely event that a FAD grounds or beaches in a sensitive area, a separate SAP would be sought. In those rare cases where the FAD grounds or beaches in a sensitive area, and/or continues to cause damage, the Department has an internal emergency process that enables quick action to reduce or prevent further damage from occurring without having to wait for the required permits.

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SEA GRANT HAWAII

State of Hawaii´s
Fish Aggregation Device Program

F A D s

LAST UPDATED December 10, 2014.

Recently Deployed: MM, LL, R, BO, CK, WK, and PP.

Missing FADS: Maui - N, LA, MC, JJ and GG.

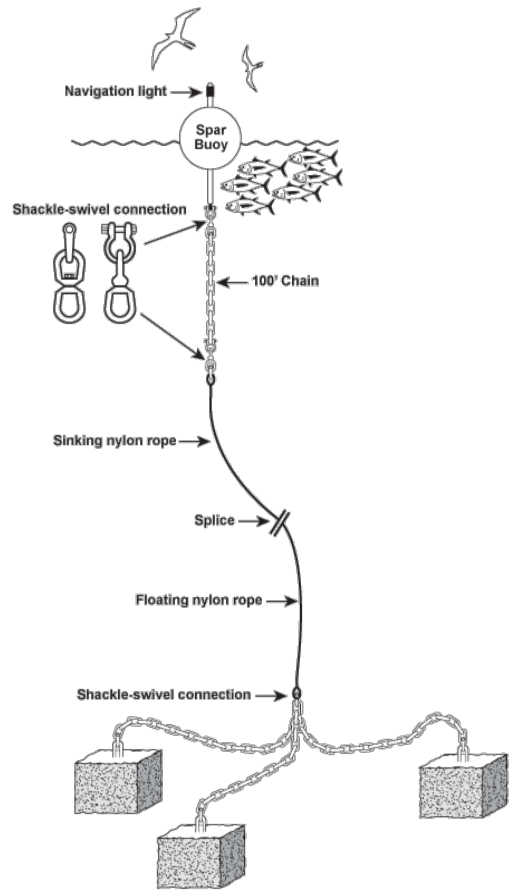
Hawaii - G, C, VV, A, and HK

Oahu - T, P, and V.

Kauai - AA, KK, and Z.

Discontinued: Hawaii - QQ.

The State of Hawaii has placed Fish Aggregating Devices (FADs) in the waters surrounding the main Hawaiian Islands. These buoys attract schools of tuna and other important pelagic fishes, such as dolphinfish (Mahimahi), wahoo (Ono), and billfish. FADs allow fishermen to easily locate and catch these species.



This site was initially created by [Sea Grant College at the University of Hawaii](). It is currently maintained by the Cooperative Administration of FADs Program located at the [Hawaii Institute of Marine Biology](). Please use the frame on the left to navigate through this site.

For more information call or email:

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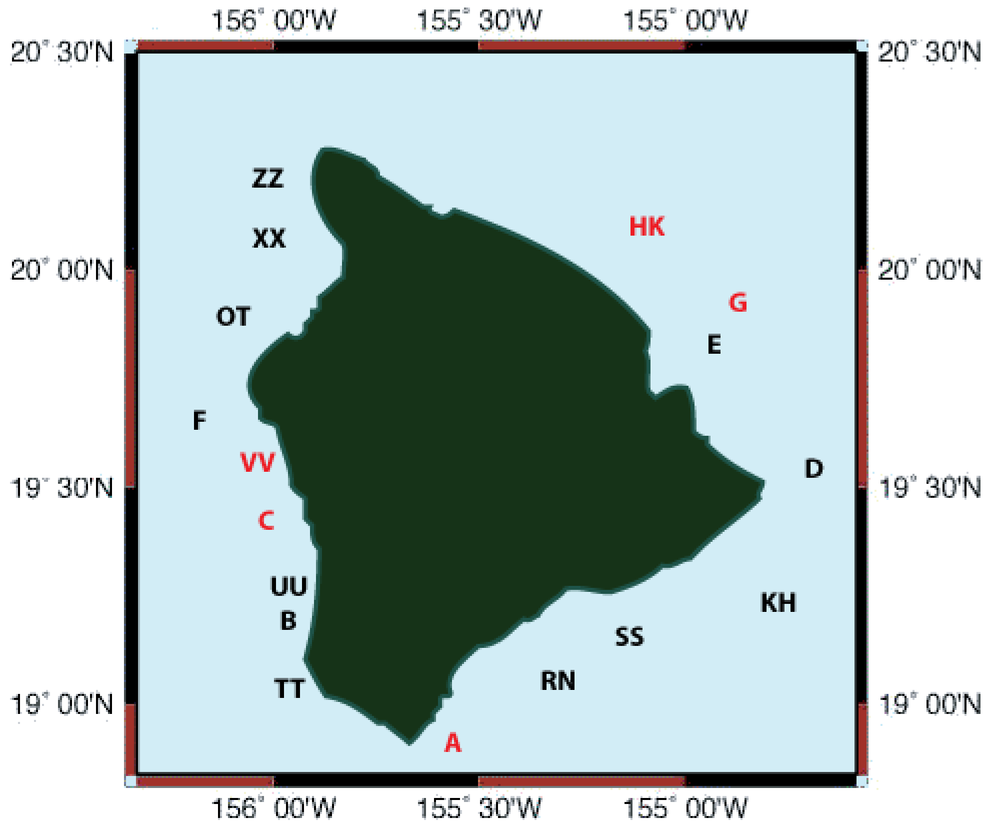
(808) 848-2939

The State of Hawaii FAD program is operated by Hawaii Institute of Marine Biology (HIMB), SOEST, University of Hawaii in cooperation with the State of Hawaii¥s Division of Aquatic Resources (DAR). The program is directed by Dr. Kim Holland of HIMB. Principle funding for the system is derived from the Dingle-Johnson Federal Funds, disbursed through DAR. The daily management of the FAD system is supervised by Mr. Warren Cortez.

Island of Hawaii FADS Buoy Map

Click on any buoy marker to access detailed information on the location, depth, and status of that FAD. **Red Letters** indicate a FAD that is known to be **missing**.

This map is not to be used for navigation.



Maps by E. Hochberg
GMT

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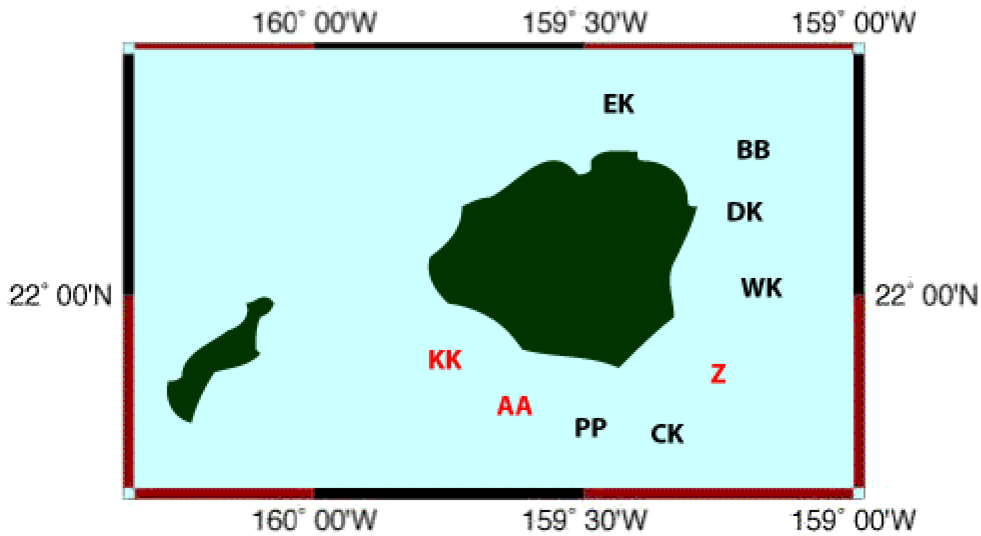
Kauai FADS Buoy Map

Click on any buoy marker to access detailed information on the location, depth, and status of that FAD. **Red Letters** indicate a FAD that is known to be **missing**.

This map is not to be used for navigation.



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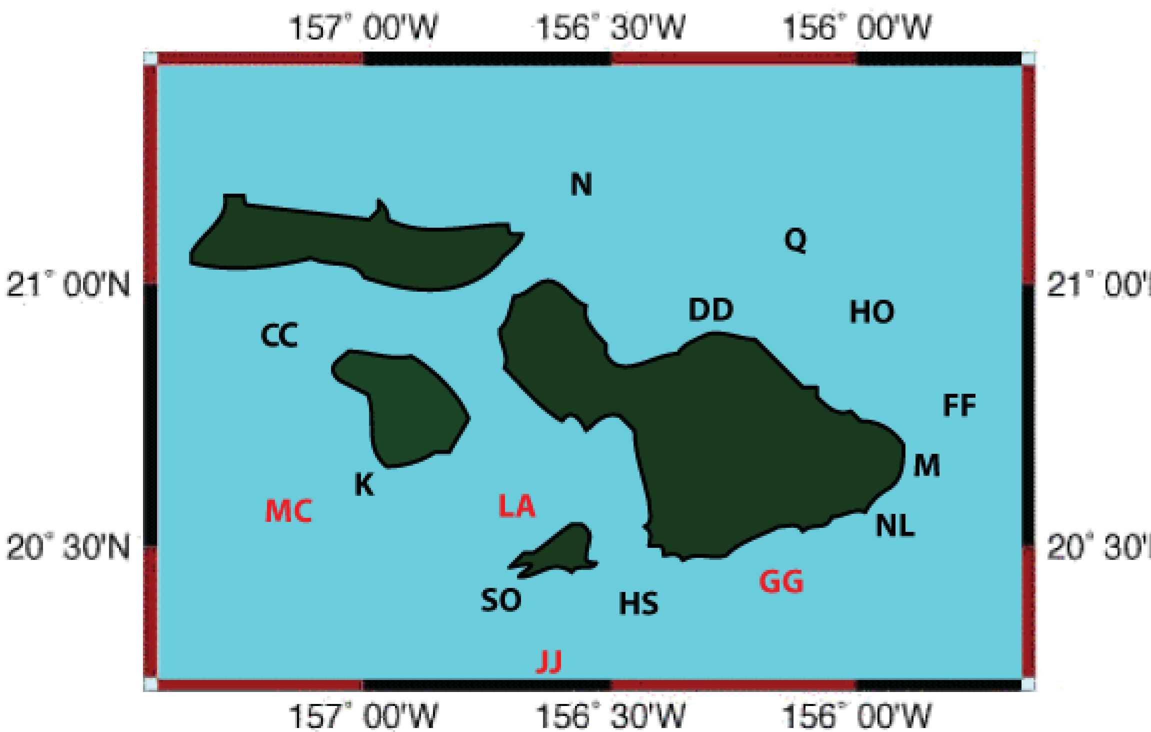
Maui FADS Buoy Map

Click on any buoy marker to access detailed information on the location, depth, and status of that FAD. **Red Letters** indicate a FAD that is known to be **missing**.

This map is not to be used for navigation.



Maps by E. Hochberg
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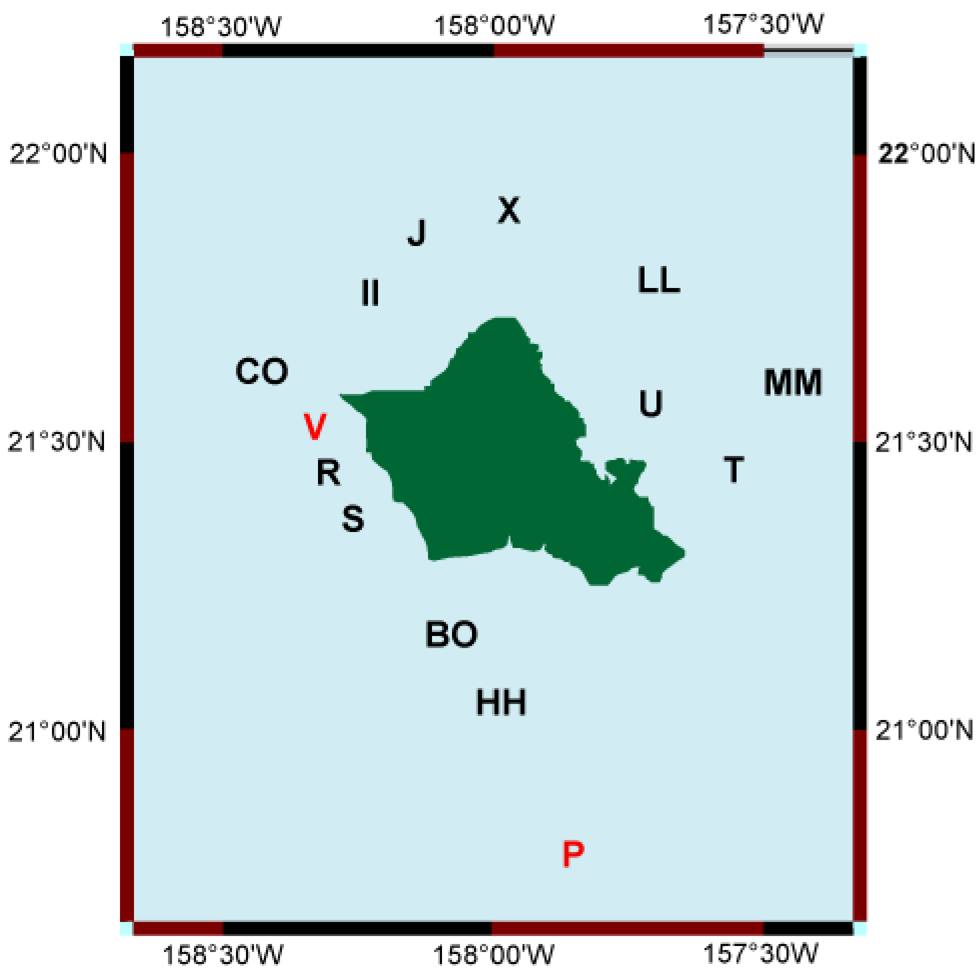
Oahu FADS Buoy Map

Click on any buoy marker to access detailed information on the location, depth, and status of that FAD. **Red Letters** indicate a FAD that is known to be **missing**.

This map is not to be used for navigation.



OahuMap

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