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# **Appendix A Distribution List**



# APPENDIX A DISTRIBUTION LIST

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Ms. Laura H. Thielen  
State Historic Preservation Officer  
Department of Land and  
Natural Resources  
Kapolei, HI

Representative Mazie Hirono  
United States Representative District 2  
United States Congress  
Honolulu, HI

Senator Daniel Inouye  
United States Senator  
United States Congress  
Honolulu, HI

Commander Byron G. Chew, USN  
Federal Aviation Administration  
Western Service Area  
Department of the Navy Representative  
Renton, WA

Director  
State of Hawaii Department of Business,  
Economic Development and Tourism Office of  
Planning  
Honolulu, HI

Director  
Hawaii State Department of Health  
Environmental Management Division  
Honolulu, HI

State of Hawaii Department of Land and  
Natural Resources  
Boating & Ocean Recreation  
Honolulu, HI

Council Members  
County of Kauai Council Services Division  
Lihue, HI

U.S. Department of Transportation  
Aliiimoku Building  
Honolulu, HI

Senator Daniel Akaka  
United States Senator  
United States Congress  
Honolulu, HI

Mr. Loyal Mehrhoff  
Field Supervisor  
U.S. Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
Honolulu, HI

U.S. Department of Energy, NEPA  
Compliance Officer  
Kirtland Area Office  
Albuquerque, NM

Sanctuary Manager  
Hawaiian Islands Humpback Whale National  
Marine Sanctuary Oahu Office  
Honolulu, HI

State of Hawaii Office of Hawaiian Affairs  
Kaua`i and Ni`ihau  
Lihue, HI

Mr. Benjamin Lindsey  
Burials Program Manager  
Hawaiian Islands Burial Council  
Kapolei, HI

Mr. William Robinson  
National Marine Fisheries Service Pacific  
Islands Office  
Honolulu, HI

*Appendix A Distribution List*

Mayor Bernard P. Carvalho, Jr.  
County of Kauai Office of the Mayor  
Lihue, HI

Diane Tom  
Honolulu Control Facility - Air Traffic  
Honolulu, HI

Hawaii State Library  
Hawaii and Pacific Section Document Unit  
Honolulu, HI

Waimea Public Library  
Waimea, HI

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## **Appendix B**

### **Correspondence**





## DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:

5090  
Ser N01CE/023  
15 Jan 2010

Mr. William Robinson  
Regional Administrator  
National Marine Fisheries Service  
Pacific Islands Regional Office  
1601 Kapiolani Blvd, Suite 1110  
Honolulu, HI 96814-4700

Dear Mr. Robinson:

In accordance with the National Environmental Policy Act (NEPA) and on behalf of the Commander, U.S. Pacific Fleet (CPF), the Department of the Navy is in the early stages of preparing an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) in order to update range capability in support of future intercept tests at the Pacific Missile Range Facility (PMRF), Kauai, HI. The updates at PMRF are needed to evaluate the operational effectiveness of the Ballistic Missile Defense (BMD) System against future threats through realistic testing in simulated hostile environments. PMRF leadership believes that greater flexibility in developing test scenarios will also ensure maximum utilization of PMRF, given testing requirements by other agencies and PMRF's environmental and safety requirements. The U.S. Army Space and Missile Defense Command (SMDC) is assisting CPF with preparation of the EA/OEA.

This PMRF Intercept Test Support EA/OEA will provide an evaluation of the No-action Alternative and the Proposed Action. The No-action Alternative is the continuation of training operations, research, development, test, and evaluation (RDT&E) activities, and ongoing base operations and maintenance of the technical and logistical facilities that support these operations and activities. The Proposed Action would include all components of the No-action Alternative. Existing range and land-based operations and training, and the ongoing maintenance of the technical and logistical facilities would continue.

The Proposed Action is to enhance the capability of PMRF to support realistic intercept missions that would involve longer engagement distances, higher altitudes, and longer-range targets and interceptors (e.g., Terminal High Altitude Area Defense and Standard Missile-3). Missiles responding to more realistic threat scenarios would be launched from fixed or mobile launchers and flown on trajectories that emulate the threat missile flight paths. Intercepts at higher altitudes would not necessarily generate more debris, but the greater altitude would cause the low-energy, lighter debris to be spread more thinly over a larger area. Since smaller debris still has the potential to damage jet engine and high-speed aircraft, PMRF in coordination with the Federal

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15 Jan 2010

including the Papahānaumokuākea Marine National Monument and thus cause some low-energy debris to land on one or more islands. This debris is not likely to affect biological resources.

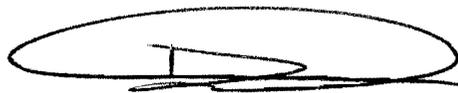
The Proposed Action would also include the addition of future missile programs such as the Aegis BMD Ashore program. These programs could involve the placement of additional land-launched systems at PMRF, including missile launchers, radars, an Aegis Ashore Test Center and support facilities. PMRF identified a list of available sites for the Aegis BMD Ashore program. These sites have been or are currently used for range activities. A siting study narrowed the potential sites to the following: four proposed locations for new launch pads and launch-related components; six potential sites for the land-based AN/SPY-1 radar system; and four sites for support facilities. Other programs, such as Early Intercept BMD, would use PMRF for future communication and sensor testing.

Proposed activities would vary by location; however, in general there may be ground disturbance from construction and utility installation, personnel and heavy equipment movement, and intercept tests. The EA/OEA addresses the potential for impacts to species at the PMRF Main Base and PMRF ancillary support locations on Kauai including Kauai Test Facility, Makaha Ridge, Kokee, and Port Allen, and on the island of Niihau. Some actions could occur in the upper atmosphere and exoatmosphere above the Northwestern Hawaiian Islands and the Papahānaumokuākea Marine National Monument and open ocean areas north and west of Kauai.

Enclosure (1), Figure 1 and enclosure(2), Figure 2, depict the geographical locations of the proposed activities. Enclosure (3), Tables 1 through 3, provides what we believe to be the current federal proposed, candidate and listed threatened and endangered marine reptiles and mammals that could or do occur in the locations mentioned above and, thus, could potentially be affected by proposed activities. Please let me know if any species has been overlooked and needs to be added to the tables or if you agree that the tables are complete. We intend to forward a copy of the coordinating draft EA/OEA within the next two weeks.

If either you or staff in your Habitat Conservation or Protected Resources programs have any questions, my point of contact for this project is Neil Sheehan, (808) 471-7836, email: [neil.a.sheehan.ctr@navy.mil](mailto:neil.a.sheehan.ctr@navy.mil).

Sincerely,

A handwritten signature in black ink, appearing to read 'D. A. McNair', is enclosed within a hand-drawn oval. The signature is written in a cursive style with a prominent initial 'D'.

D. A. MCNAIR  
Captain, CEC, U.S. Navy  
Deputy Fleet Engineer  
By direction

Encl: (See page 3)

5090  
Ser N01CE/023  
15 Jan 2010

Encl:

- (1) Figure 1, Pacific Missile Range Facility  
and Support Locations
- (2) Figure 2, Papahānaumokuākea (Northwestern  
Hawaiian Islands) Marine National Monument
- (3) Tables 1 thru 3

Copy to:

COMNAVREG HI

PACMISRANFAC Kauai

NMFS Protected Resources

(Messers. Patrick Opay and Lance Smith)

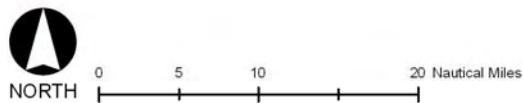
NMFS Assistant Administrator for Habitat

Conservation (Mr. Gerry Davis)



**EXPLANATION**

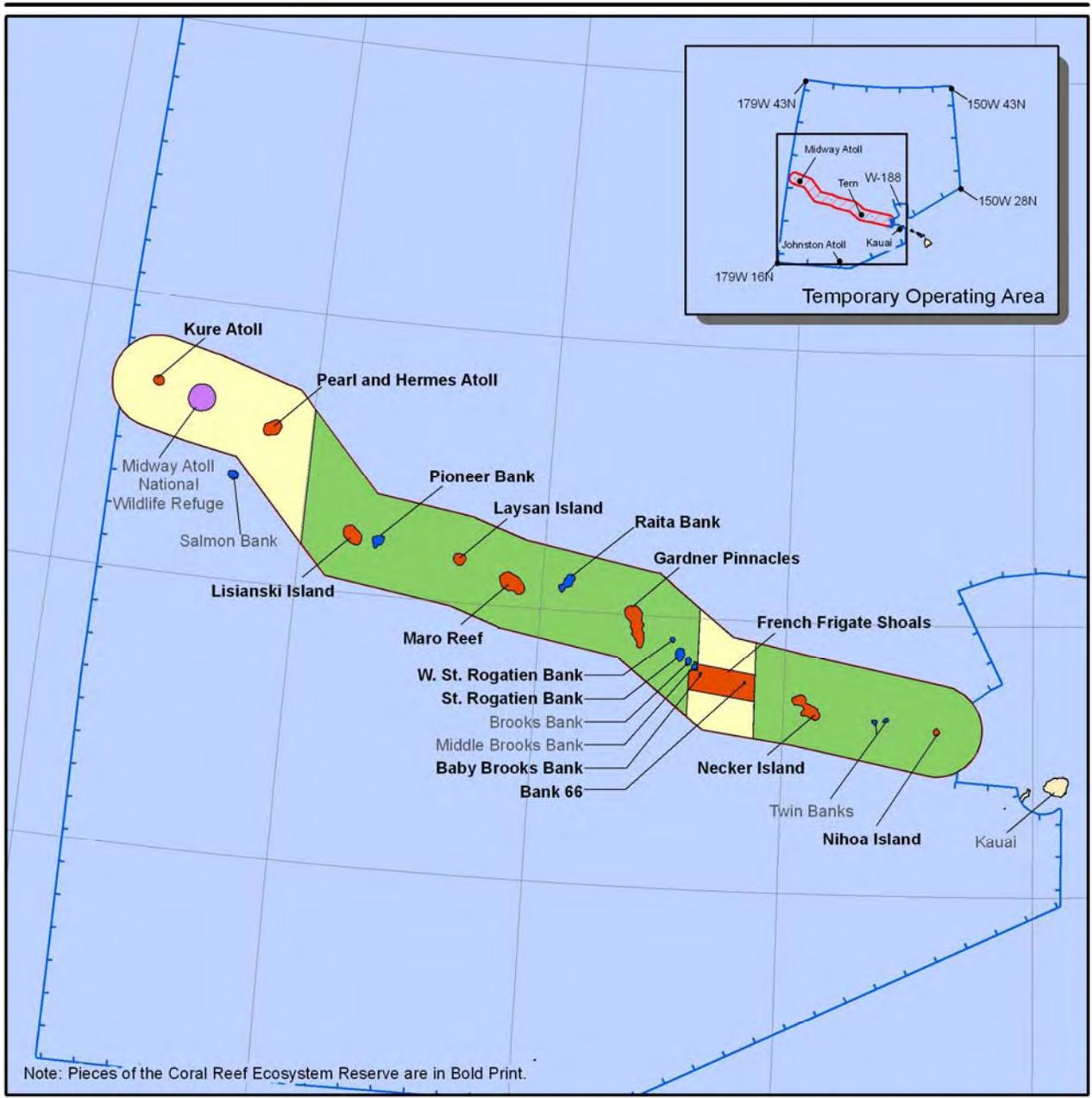
-  Road
-  12-Nautical Mile Line
-  Installation Area
-  Land



**Pacific Missile Range Facility and Support Locations**

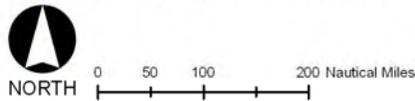
Kauai, Niihau, and Kaula, Hawaii

**Figure 1**



**EXPLANATION**

- Bank
- Commercial Fishing Phase-Out Area
- Ecological Reserve
- Hawaiian Islands National Wildlife Refuge
- Midway Atoll National Wildlife Refuge
- Temporary Operating Area (TOA)
- Papahānaumokuākea Marine National Monument
- Land



**Papahānaumokuākea  
(Northwestern  
Hawaiian Islands)  
Marine National  
Monument**

Hawaiian Islands

**Figure 2**

**Table 1: Federal Proposed, Candidate, and Listed Species Known or Expected to Occur on or Offshore of the Pacific Missile Range Facility, Kauai and Niihau**

Scientific Name	Common Name	Federal Status
<b>Plants</b>		
<i>Brighamia insignis</i>	Alula (Niihau)	E
<i>Panicum niihauense</i>	Lau`ehu (PMRF, KTF)	E
<i>Sesbania tomentosa</i>	Ohai (PMRF, KTF)	E
<i>Wilkesia hobyi</i>	Dwarf iliau (Makaha Ridge)	E
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle (PMRF)	T
<i>Chelonia mydas</i>	Green sea turtle (PMRF, KTF, Niihau)	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle (PMRF)	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle (PMRF)	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle (PMRF)	T
<b>Birds</b>		
<i>Anas wyvilliana</i>	Koloa maoli (Hawaiian duck) (PMRF, KTF, Niihau)	E
<i>Branta sandvicensis</i>	Nene (Hawaiian goose) (PMRF, KTF, Kokee)	T
<i>Fulica americana alai</i>	`Alae ke`oke`o (Hawaiian coot) (PMRF, KTF, Niihau)	E
<i>Gallinula chloropus sandvicensis</i>	Alae ula (Hawaiian common moorhen) (PMRF, KTF, Niihau)	E
<i>Himantopus mexicanus knudseni</i>	Ae`o (Hawaiian black-necked stilt) (PMRF, KTF, Niihau)	E
<i>Oceanodroma castro</i>	Band-rumped storm-petrel	C
<i>Phoebastria nigripes</i>	Black-footed albatross	P
<i>Pterodroma phaeopygia sandwichensis</i>	`Ua`u (Hawaiian dark-rumped petrel) (PMRF, KTF)	E
<i>Puffinus auricularis newelli</i>	`A`o (Newell's Townsend's shearwater) (PMRF, KTF, Kokee)	T
<b>Mammals</b>		
<i>Balaenoptera borealis</i>	Sei whale (PMRF Offshore)	E
<i>Balaenoptera musculus</i>	Fin whale (PMRF Offshore)	E
<i>Balaenoptera physalus</i>	Blue whale (PMRF Offshore)	E
<i>Lasiurus cinereus spp. semotus</i>	Hawaiian hoary bat (PMRF, KTF, Kokee)	E
<i>Megaptera novaeangliae</i>	Humpback whale (PMRF and Niihau Offshore)	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal (PMRF, Niihau)	E

NOTES:

C Candidate                      P Proposed  
E Endangered  
T Threatened

**Table 2. Federal Proposed, Candidate, and Listed Species Known or Expected to Occur On and Offshore of the Northwestern Hawaiian Islands**

Scientific Name	Common Name	Federal Status
<b>Plants</b>		
<i>Amaranthus brownii</i> <sup>1</sup>	No common name	E
<i>Cenchrus agrimoniodes var laysanensis</i>	Kamanomano	E
<i>Mariscus pennatiformis ssp bryanii</i>	No common name	E
<i>Pritchardia remota</i> <sup>1</sup>	Loulu (Nihoa fan palm)	E
<i>Schiedea verticillata</i> <sup>1</sup>	No common name	E
<i>Sesbania tomentosa</i> <sup>1</sup>	`Ohai	E
<b>Birds</b>		
<i>Acrocephalus familiaris kingi</i>	Nihoa Millerbird	E
<i>Anas laysanensis</i>	Laysan duck	E
<i>Phoebastria albatrus</i>	Short-tailed albatross	E
<i>Telespyza cantans</i>	Laysan finch	E
<i>Telespyza ultima</i>	Nihoa finch	E
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle	T
<i>Chelonia mydas</i>	Green sea turtle	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	T
<b>Mammals</b>		
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E
<i>Balaenoptera borealis</i>	Sei whale	E
<i>Balaenoptera musculus</i>	Blue whale	E
<i>Balaenoptera physalus</i>	Fin whale	E
<i>Eubalaena japonica</i>	North Pacific right whale	E
<i>Megaptera noveangliae</i>	Humpback whale	E

<sup>1</sup> The entire island of Nihoa other than manmade features has been designated as critical habitat for these plants.

NOTES:

T Threatened  
E Endangered

**Table 3: Listed Species Known or Expected to Occur in the Open Ocean Area near the Hawaiian Islands**

Scientific Name	Common Name	Federal Status
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle	T
<i>Chelonia mydas</i>	Green sea turtle	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	T
<b>Mammals</b>		
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<i>Eubalaena japonica</i>	North Pacific right whale	E
<i>Megaptera novaeangliae</i>	Humpback whale	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E
<i>Physeter macrocephalus</i>	Sperm whale	E

NOTES:

- T Threatened
- E Endangered



## DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:

5090  
Ser N01CE/024  
15 Jan 2010

Mr. Loyal Mehrhoff  
Field Supervisor  
US Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
300 Ala Moana Blvd., Room 3-122  
Honolulu, HI 96850

Dear Mr. Mehrhoff:

In accordance with the National Environmental Policy Act (NEPA) and on behalf of the Commander, U.S. Pacific Fleet (CPF), the Department of the Navy is in the early stages of preparing an Environmental Assessment/Overseas Environmental Assessment (EA/OEA) in order to update range capability in support of future intercept tests at the Pacific Missile Range Facility (PMRF), Kauai, HI. The updates at PMRF are needed to evaluate the operational effectiveness of the Ballistic Missile Defense (BMD) System against future threats through realistic testing in simulated hostile environments. PMRF leadership believes that greater flexibility in developing test scenarios will also ensure maximum utilization of PMRF, given testing requirements by other agencies and PMRF environmental and safety requirements. The U.S. Army Space and Missile Defense Command (SMDC) is assisting CPF with preparation of the EA/OEA.

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the Papahānaumokuākea Marine National Monument and thus cause some low-energy debris to land on one or more islands. This debris is not likely to affect biological resources.

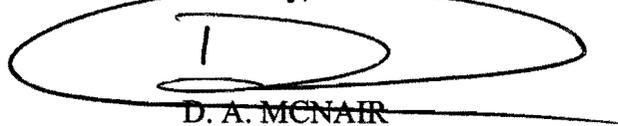
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If either you or staff in your Habitat Conservation or Endangered Species programs have any questions, my point of contact for this project is Neil Sheehan, (808) 471-7836, email: [neil.a.sheehan.ctr@navy.mil](mailto:neil.a.sheehan.ctr@navy.mil).

Sincerely,

A handwritten signature in black ink, appearing to be "D. A. McNair", is written over a large, hand-drawn oval scribble.

D. A. MCNAIR  
Captain, CEC, U.S. Navy  
Deputy Fleet Engineer  
By direction

Encl: (See page 3)

5090  
Ser N01CE/024  
15 Jan 2010

**Encl:**

- (1) Figure 1, Pacific Missile Range Facility  
and Support Locations**
- (2) Figure 2, Papahānaumokuākea (Northwestern  
Hawaiian Islands) Marine National Monument**
- (3) Tables 1 thru 3**

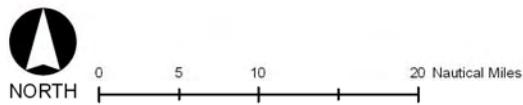
**Copy to:**

**COMNAVREG HI  
PACMISRANFAC Kauai  
Assistant Field Supervisor for Habitat  
Conservation (Mr. Jeff Newman)  
Marilet Zablan, Assistant Field Supervisor  
for Endangered Species (Ms. Marilet Zablan)  
Project Leader for the Hawaiian and Pacific  
Remote Refuges (Mr. Barry Stieglitz)**



**EXPLANATION**

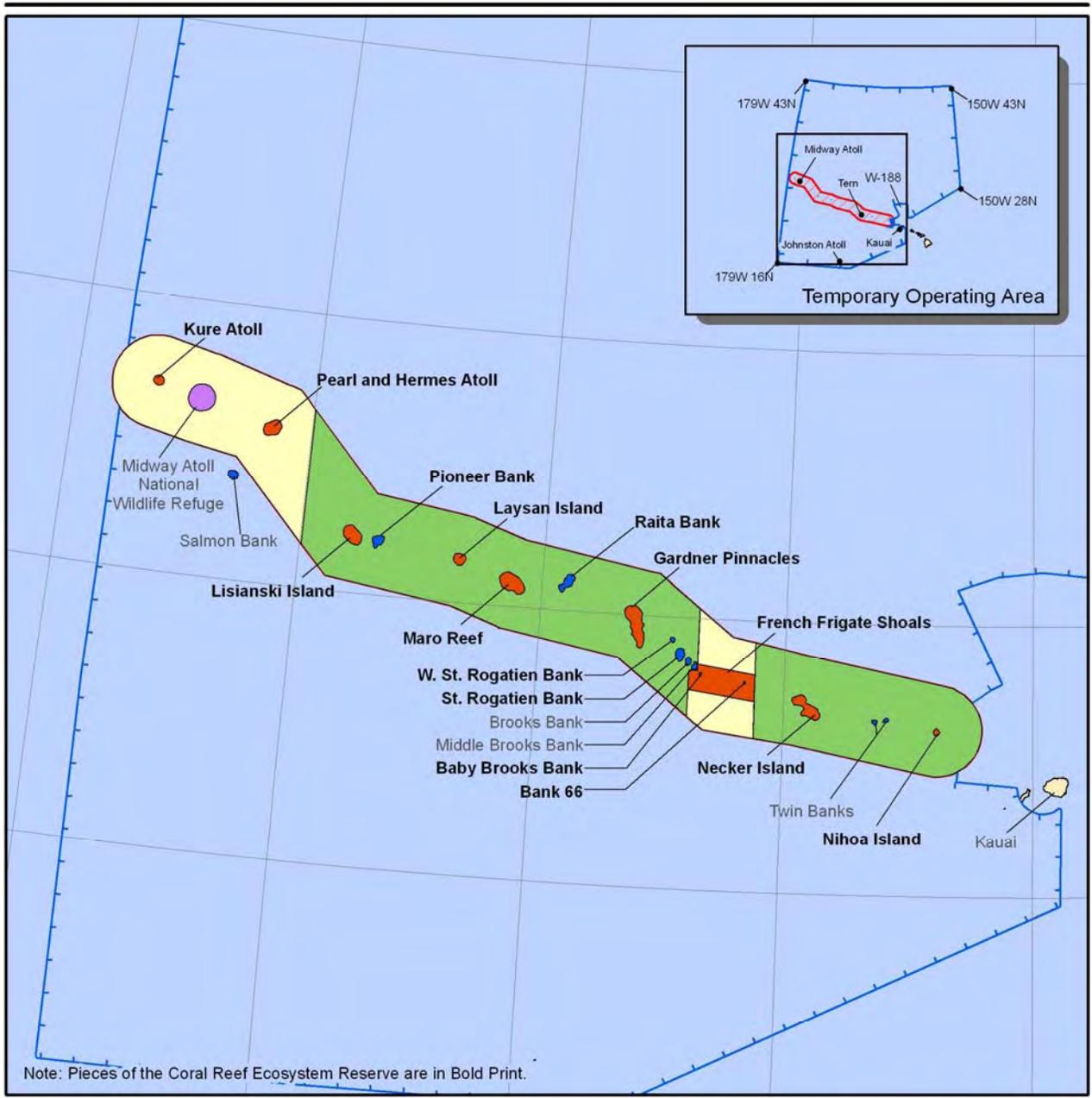
-  Road
-  12-Nautical Mile Line
-  Installation Area
-  Land



**Pacific Missile Range Facility and Support Locations**

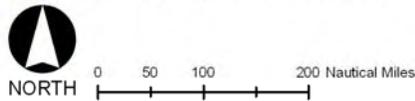
Kauai, Niihau, and Kaula, Hawaii

**Figure 1**



**EXPLANATION**

- Bank
- Commercial Fishing Phase-Out Area
- Ecological Reserve
- Hawaiian Islands National Wildlife Refuge
- Midway Atoll National Wildlife Refuge
- Temporary Operating Area (TOA)
- Papahānaumokuākea Marine National Monument
- Land



**Papahānaumokuākea  
(Northwestern  
Hawaiian Islands)  
Marine National  
Monument**

Hawaiian Islands

**Figure 2**

**Table 1: Federal Proposed, Candidate, and Listed Species Known or Expected to Occur on or Offshore of the Pacific Missile Range Facility, Kauai and Niihau**

Scientific Name	Common Name	Federal Status
<b>Plants</b>		
<i>Brighamia insignis</i>	Alula (Niihau)	E
<i>Panicum niihauense</i>	Lau`ehu (PMRF, KTF)	E
<i>Sesbania tomentosa</i>	Ohai (PMRF, KTF)	E
<i>Wilkesia hobyi</i>	Dwarf iliau (Makaha Ridge)	E
<b>Reptiles</b>		
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<i>Chelonia mydas</i>	Green sea turtle (PMRF, KTF, Niihau)	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle (PMRF)	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle (PMRF)	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle (PMRF)	T
<b>Birds</b>		
<i>Anas wyvilliana</i>	Koloa maoli (Hawaiian duck) (PMRF, KTF, Niihau)	E
<i>Branta sandvicensis</i>	Nene (Hawaiian goose) (PMRF, KTF, Kokee)	T
<i>Fulica americana alai</i>	`Alae ke`oke`o (Hawaiian coot) (PMRF, KTF, Niihau)	E
<i>Gallinula chloropus sandvicensis</i>	Alae ula (Hawaiian common moorhen) (PMRF, KTF, Niihau)	E
<i>Himantopus mexicanus knudseni</i>	Ae`o (Hawaiian black-necked stilt) (PMRF, KTF, Niihau)	E
<i>Oceanodroma castro</i>	Band-rumped storm-petrel	C
<i>Phoebastria nigripes</i>	Black-footed albatross	P
<i>Pterodroma phaeopygia sandwichensis</i>	`Ua`u (Hawaiian dark-rumped petrel) (PMRF, KTF)	E
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<b>Mammals</b>		
<i>Balaenoptera borealis</i>	Sei whale (PMRF Offshore)	E
<i>Balaenoptera musculus</i>	Fin whale (PMRF Offshore)	E
<i>Balaenoptera physalus</i>	Blue whale (PMRF Offshore)	E
<i>Lasiurus cinereus spp. semotus</i>	Hawaiian hoary bat (PMRF, KTF, Kokee)	E
<i>Megaptera novaeangliae</i>	Humpback whale (PMRF and Niihau Offshore)	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal (PMRF, Niihau)	E

NOTES:

C Candidate                      P Proposed  
E Endangered  
T Threatened

**Table 2. Federal Proposed, Candidate, and Listed Species Known or Expected to Occur On and Offshore of the Northwestern Hawaiian Islands**

Scientific Name	Common Name	Federal Status
<b>Plants</b>		
<i>Amaranthus brownii</i> <sup>1</sup>	No common name	E
<i>Cenchrus agrimoniodes var laysanensis</i>	Kamanomano	E
<i>Mariscus pennatiformis ssp bryanii</i>	No common name	E
<i>Pritchardia remota</i> <sup>1</sup>	Loulu (Nihoa fan palm)	E
<i>Schiedea verticillata</i> <sup>1</sup>	No common name	E
<i>Sesbania tomentosa</i> <sup>1</sup>	`Ohai	E
<b>Birds</b>		
<i>Acrocephalus familiaris kingi</i>	Nihoa Millerbird	E
<i>Anas laysanensis</i>	Laysan duck	E
<i>Phoebastria albatrus</i>	Short-tailed albatross	E
<i>Telespyza cantans</i>	Laysan finch	E
<i>Telespyza ultima</i>	Nihoa finch	E
<b>Reptiles</b>		
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<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	T
<b>Mammals</b>		
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E
<i>Balaenoptera borealis</i>	Sei whale	E
<i>Balaenoptera musculus</i>	Blue whale	E
<i>Balaenoptera physalus</i>	Fin whale	E
<i>Eubalaena japonica</i>	North Pacific right whale	E
<i>Megaptera noveangliae</i>	Humpback whale	E

<sup>1</sup> The entire island of Nihoa other than manmade features has been designated as critical habitat for these plants.

NOTES:

T Threatened  
E Endangered

**Table 3: Listed Species Known or Expected to Occur in the Open Ocean Area near the Hawaiian Islands**

Scientific Name	Common Name	Federal Status
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle	T
<i>Chelonia mydas</i>	Green sea turtle	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	T
<b>Mammals</b>		
<i>Balaenoptera borealis</i>	Sei whale	E
<i>Balaenoptera musculus</i>	Blue whale	E
<i>Balaenoptera physalus</i>	Fin whale	E
<i>Eubalaena japonica</i>	North Pacific right whale	E
<i>Megaptera novaeangliae</i>	Humpback whale	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E
<i>Physeter macrocephalus</i>	Sperm whale	E

NOTES:

- T Threatened
- E Endangered



DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:  
5090  
Ser N01CE/0147  
10 Feb 10

Dr. Loyal Mehrhoff  
Field Supervisor, US Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
300 Ala Moana Blvd., Room 3-122  
Honolulu, HI 96850

Dear Dr. Mehrhoff:

The Department of the Navy has prepared the Coordinating Draft Pacific Missile Range Facility (PMRF) Intercept Test Support Environmental Assessment/Overseas Environmental Assessment (EA/OEA) in order to update or enhance range capability in support of future tests of missile intercept technologies at the PMRF, Kauai, HI. The updates are needed to evaluate the operational effectiveness of Ballistic Missile Defense (BMD) systems against future threats in simulated hostile environments.

The enhancements include modifying some existing PMRF facilities and constructing new facilities on PMRF to test new land-based interceptor systems, such as the Aegis Ashore Missile Defense program, and conducting more complex intercept tests at PMRF.

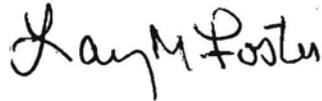
The enclosed Coordinating Draft EA/OEA is being distributed to various agencies, including your office for review and comment prior to preparing the Final EA and draft Finding of No Significant Impact for public review. We desire to ensure that any concerns you might have about our efforts to identify issues of concern and assess potential impacts are fully addressed. Please review the Coordinating Draft EA and provide your comments by March 15, 2010 using the enclosed comment form. You can e-mail your comments to Mr. David Hasley at [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) or Mr. Edd Joy at [joye@kayacorp.com](mailto:joye@kayacorp.com).

Please note that this document is a pre-decisional draft for preliminary agency review and as such is not intended for dissemination to the public at this time.

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Ser N01CE/ 0147  
10 Feb 10

If you or your staff have any questions, my point of contact for this project is Neil Sheehan, (808) 474-7836, email: neil.a.sheehan@navy.mil.

Sincerely,



L. M. FOSTER  
Director, Fleet Environmental  
By direction

Copy to:

Commander, Navy Region Hawaii

Commander, Pacific Missile Range Facility

Assistant Field Supervisor for Habitat Conservation,

ATTN: Jeff Newman

Assistant Field Supervisor for Endangered Species,

ATTN: Marilet Zablan,

Project Leader for the Hawaiian and Pacific Remote Refuges,

ATTN: Barry Stieglitz,



**DEPARTMENT OF THE NAVY**

**COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131**

**IN REPLY REFER TO:  
5090  
Ser N01CE/  
10 Feb 10**

Mr. William Robinson  
Regional Administrator  
National Marine Fisheries Service  
Pacific Islands Regional Office  
1601 Kapiolani Blvd, Suite 1110  
Honolulu, HI 96814-4700

Dear Mr. Robinson:

This letter supersedes our letter to you on 15 January 2010 in order to correct an error in that correspondence, and also to forward the enclosed Coordinating Draft Environmental Assessment/Overseas Environmental Assessment (EA/OEA). This EA/OEA is being distributed to various agencies, including your office for review and comment prior to preparing the Final EA/OEA and draft Finding of No Significant Impact for public review.

In accordance with the National Environmental Policy Act (NEPA) and on behalf of the Commander, U.S. Pacific Fleet (CPF), the Department of the Navy is in the early stages of preparing an EA/OEA in order to update range capability in support of future intercept tests at the Pacific Missile Range Facility (PMRF), Kauai, HI. The updates at PMRF are needed to evaluate the operational effectiveness of the Ballistic Missile Defense (BMD) System against future threats through realistic testing in simulated hostile environments. PMRF leadership believes that greater flexibility in developing test scenarios will also ensure maximum utilization of PMRF, given testing requirements by other agencies and PMRF's environmental and safety requirements. The U.S. Army Space and Missile Defense Command (SMDC) is assisting CPF with preparation of the EA/OEA.

This PMRF Intercept Test Support EA/OEA provides an evaluation of the No-action Alternative and the Proposed Action. The No-action Alternative is the continuation of training operations, research, development, test, and evaluation (RDT&E) activities, and ongoing base operations and maintenance of the technical and logistical facilities

that support these operations and activities. The Proposed Action includes all components of the No-action Alternative. Existing range and land-based operations and training, and the ongoing maintenance of the technical and logistical facilities would continue.

The Proposed Action is to enhance the capability of PMRF to support realistic intercept missions that would involve longer engagement distances, higher altitudes, and longer-range targets and interceptors (e.g., Terminal High Altitude Area Defense and Standard Missile-3). Missiles responding to more realistic threat scenarios would be launched from fixed or mobile launchers and flown on trajectories that emulate the threat missile flight paths. Intercepts at higher altitudes would not necessarily generate more particulates, but the greater altitude would cause the low-energy, lighter particulates to be spread more thinly over a larger area. Since smaller particulates still has the potential to damage jet engine and high-speed aircraft, PMRF in coordination with the Federal Aviation Administration would need to identify airspace where such particulates could occur. Planned and future trajectories could result in overflight of the Northwestern Hawaiian Islands, including the Papahānaumokuākea Marine National Monument and thus cause some low-energy particulates to land on one or more islands. These particulates will not affect biological resources.

The Proposed Action would also include the addition of future missile programs such as the Aegis BMD Ashore program. These programs could involve the placement of additional land-launched systems at PMRF, including missile launchers, radars, an Aegis Ashore Test Center and support facilities. PMRF identified a list of available sites for the Aegis BMD Ashore program. These sites have been or are currently used for range activities. A siting study narrowed the potential sites to the following: four proposed locations for new launch pads and launch-related components; six potential sites for the land-based AN/SPY-1 radar system; and four sites for support facilities. Other programs, such as Early Intercept BMD, would use PMRF for future communication and sensor testing.

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Ser N01CE/  
10 Feb 10

Proposed activities would vary by location; however, in general there may be ground disturbance from construction and utility installation, personnel and heavy equipment /movement, and intercept tests. The EA/OEA addresses the potential for impacts to species at the PMRF Main Base and PMRF ancillary support locations on Kauai including Kauai Test Facility, Makaha Ridge, Kokee, and Port Allen, and on the island of Niihau. Some actions could occur in the upper atmosphere and exoatmosphere above the Northwestern Hawaiian Islands and the Papahānaumokuākea Marine National Monument and open ocean areas north and west of Kauai.

Figures 1 and 2 depict the geographical locations of the proposed activities. Tables 1 through 3 provide what we believe to be the current federal proposed, candidate and listed threatened and endangered marine reptiles and mammals that could or do occur in the locations mentioned above and, thus, could potentially be affected by proposed activities. Please let me know if any species has been overlooked and needs to be added to the tables or if you agree that the tables are complete. We intend to forward a copy of the coordinating draft EA/OEA within the next two weeks.

Please review the Coordinating Draft EA/OEA and provide your comments by March 15, 2010 using the enclosed comment form. You can e-mail your comments to [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) and [joye@kayacorp.com](mailto:joye@kayacorp.com).

Please note that this document is a pre-decisional draft for preliminary agency review and as such is not intended for dissemination to the public at this time.

If either you or staff in your Habitat Conservation or Protected Resources programs have any questions, my point of

5090  
Ser N01CE/  
10 Feb 10

contact for this project is Neil Sheehan, (808) 471-7836,  
email: neil.a.sheehan@navy.mil.

Sincerely,



L. M. FOSTER  
Director, Fleet Environmental  
By direction

Enclosure: 1. Coordinating Draft Environmental Assessment/  
Overseas Environmental Assessment (EA/OEA)

Copy to:

CNO WASH DC (N45)

CNIC Norfolk VA

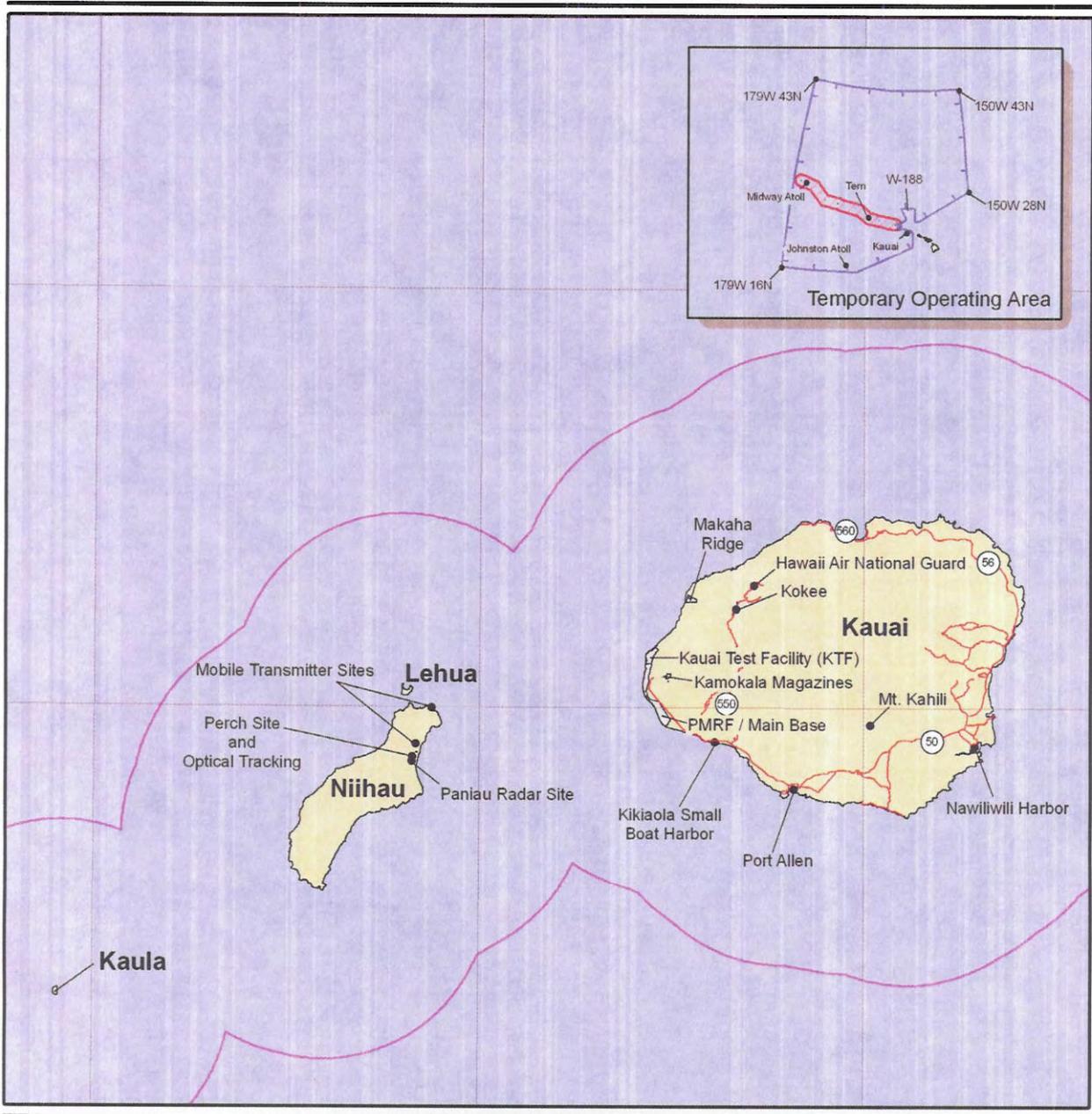
COMNAVREG HI

PACMISRANFAC HAWAREA BARKING SANDS HI

NMFS PROTECTED RESOURCES, (PATRICK OPAY AND LANCE SMITH)

NMFS ASSISTANT ADMINISTRATOR FOR HABITAT CONSERVATION

(GERRY DAVIS)

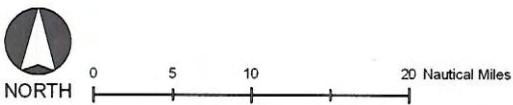


**EXPLANATION**

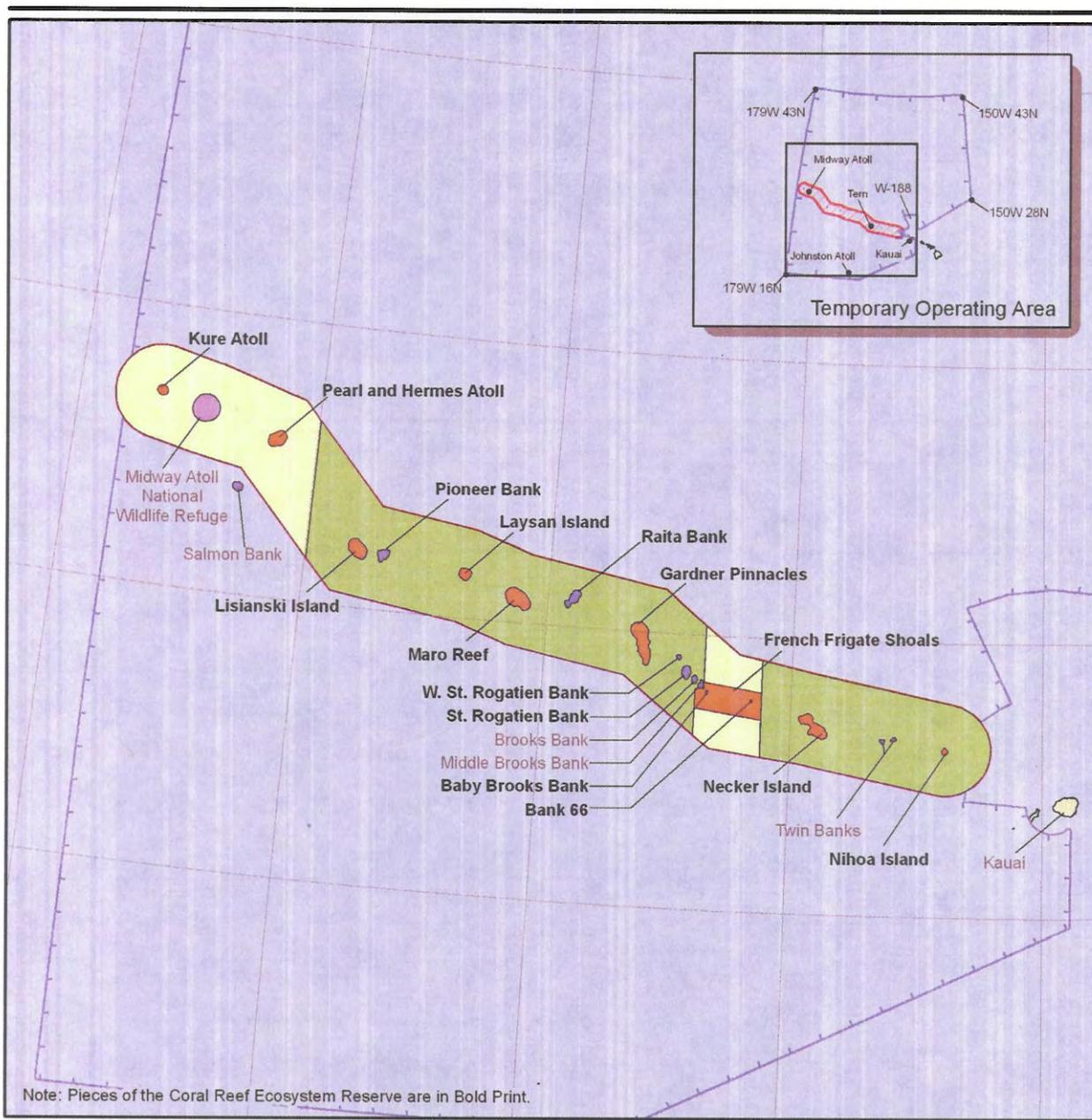
-  Road
-  12-Nautical Mile Line
-  Installation Area
-  Land

**Pacific Missile Range Facility and Support Locations**

Kauai, Niihau, and Kaula, Hawaii

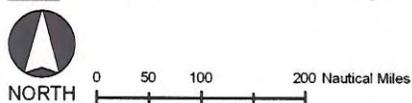


**Figure 1**



**EXPLANATION**

- Bank
- Commercial Fishing Phase-Out Area
- Ecological Reserve
- Hawaiian Islands National Wildlife Refuge
- Midway Atoll National Wildlife Refuge
- Temporary Operating Area (TOA)
- Papahānaumokuākea Marine National Monument
- Land



**Papahānaumokuākea  
(Northwestern  
Hawaiian Islands)  
Marine National  
Monument**

Hawaiian Islands

**Figure 2**

**Table 1: Federal Proposed, Candidate, and Listed Species Known or Expected to Offshore of the Pacific Missile Range Facility, Kauai and Niihau**

Scientific Name	Common Name	Federal Status
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle (PMRF)	T
<i>Chelonia mydas</i>	Green sea turtle (PMRF, KTF, Niihau)	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle (PMRF)	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle (PMRF)	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle (PMRF)	T
<b>Mammals</b>		
<i>Balaenoptera borealis</i>	Sei whale (PMRF Offshore)	E
<i>Balaenoptera musculus</i>	Fin whale (PMRF Offshore)	E
<i>Balaenoptera physalus</i>	Blue whale (PMRF Offshore)	E
<i>Lasiurus cinereus</i> spp. <i>semotus</i>	Hawaiian hoary bat (PMRF, KTF, Kokee)	E
<i>Megaptera novaeangliae</i>	Humpback whale (PMRF and Niihau Offshore)	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal (PMRF, Niihau)	E

NOTES:

- E Endangered
- T Threatened

**Table 2. Federal Proposed, Candidate, and Listed Species Known or Expected to Occur Offshore of the Northwestern Hawaiian Islands**

Scientific Name	Common Name	Federal Status
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle	T
<i>Chelonia mydas</i>	Green sea turtle	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	T
<b>Mammals</b>		
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E
<i>Balaenoptera borealis</i>	Sei whale	E
<i>Balaenoptera musculus</i>	Blue whale	E
<i>Balaenoptera physalus</i>	Fin whale	E
<i>Eubalaena japonica</i>	North Pacific right whale	E
<i>Megaptera noveangliae</i>	Humpback whale	E
<i>Physeter macrocephalus</i>	Sperm whale	E

NOTES:

T Threatened  
E Endangered

**Table 3: Federal Proposed, Candidate, and Listed Species Known or Expected to Occur in the Open Ocean Area near the Hawaiian Islands**

Scientific Name	Common Name	Federal Status
<b>Reptiles</b>		
<i>Caretta caretta</i>	Loggerhead sea turtle	T
<i>Chelonia mydas</i>	Green sea turtle	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Eretmochelys imbricata</i>	Hawksbill sea turtle	E
<i>Lepidochelys olivacea</i>	Olive ridley sea turtle	T
<b>Mammals</b>		
<i>Balaenoptera borealis</i>	Sei whale	E
<i>Balaenoptera musculus</i>	Blue whale	E
<i>Balaenoptera physalus</i>	Fin whale	E
<i>Eubalaena japonica</i>	North Pacific right whale	E
<i>Megaptera novaeangliae</i>	Humpback whale	E
<i>Monachus schauinslandi</i>	Hawaiian monk seal	E
<i>Physeter macrocephalus</i>	Sperm whale	E

NOTES:

- T Threatened
- E Endangered



DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:

5090

Ser N01CE/0144

10 Feb 10

Federal Aviation Administration Western Service Area  
Department of the Navy Representative  
ATTN: Commander Byron G. Chew, USN  
1601 Lind Ave. SW  
Renton, WA 98057

Dear Commander Chew:

The Department of the Navy has prepared the Coordinating Draft Pacific Missile Range Facility (PMRF) Intercept Test Support Environmental Assessment/Overseas Environmental Assessment (EA/OEA) in order to update or enhance range capability in support of future tests of missile intercept technologies at the PMRF, Kauai, HI. The updates are needed to evaluate the operational effectiveness of Ballistic Missile Defense (BMD) systems against future threats in simulated hostile environments.

The enhancements include modifying some existing PMRF facilities and constructing new facilities on PMRF to test new land-based interceptor systems, such as the Aegis Ashore Missile Defense program, and conducting more complex intercept tests at PMRF. During some of these flight tests, small, light particles resulting from the missile intercept could potentially leave current PMRF-controlled areas necessitating the request for altitude reservations for airspace not previously required. PMRF would continue to ensure the protection of the public through the application of standard range safety procedures and risk standards, including Range Commanders Council Standard 321.

The enclosed Coordinating Draft EA/OEA is being distributed to various agencies, including your office for review and comment prior to preparing the Final EA/OEA and draft Finding of No Significant Impact for public review. We desire your assistance in identifying issues of concern to ensure that potential impacts are fully addressed. Please review the Coordinating Draft EA/OEA and provide any comments you may have by March 15, 2010 using the enclosed comment form. You can e-mail your comments to Mr. David Hasley at [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) or Mr. Edd Joy at [joye@kayacorp.com](mailto:joye@kayacorp.com).

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Ser N01CE/0144  
10 Feb 10

Please note that this document is a draft and as such is not intended for dissemination to the public at this time.

If you or your staff have any questions, my point of contact for this project is Neil Sheehan, (808) 474-7836, email: neil.a.sheehan@navy.mil.

Sincerely,



L. M. FOSTER  
Director, Fleet Environmental  
By direction

Copy to:  
Commander, Navy Region Hawaii  
Commander, Pacific Missile Range Facility



DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:

5090

Ser N01CE/0145

10 Feb 10

Federal Aviation Administration  
Western Service Area, ANM-903  
Department of the Navy Representative  
ATTN: LtCol D.K. Switzer, USMC  
1601 Lind Ave. SW  
Renton, WA 98057

Dear LtCol Switzer:

The Department of the Navy has prepared the Coordinating Draft Pacific Missile Range Facility (PMRF) Intercept Test Support Environmental Assessment/Overseas Environmental Assessment (EA/OEA) in order to update or enhance range capability in support of future tests of missile intercept technologies at the PMRF, Kauai, HI. The updates are needed to evaluate the operational effectiveness of Ballistic Missile Defense (BMD) systems against future threats in simulated hostile environments.

The enhancements include modifying some existing PMRF facilities and constructing new facilities on PMRF to test new land-based interceptor systems, such as the Aegis Ashore Missile Defense program, and conducting more complex intercept tests at PMRF. During some of these flight tests, small, light particles resulting from the missile intercept could potentially leave current PMRF-controlled areas necessitating the request for altitude reservations for airspace not previously required. PMRF would continue to ensure the protection of the public through the application of standard range safety procedures and risk standards, including Range Commanders Council Standard 321.

The enclosed Coordinating Draft EA/OEA is being distributed to various agencies, including your office for review and comment prior to preparing the Final EA/OEA and draft Finding of No Significant Impact for public review. We desire your assistance in identifying issues of concern to ensure that potential impacts are fully addressed. Please review the Coordinating Draft EA/OEA and provide any comments you may have by March 15, 2010 using the enclosed comment

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Ser N01CE/0145  
10 Feb 10

form. You can e-mail your comments to Mr. David Hasley at [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) or Mr. Edd Joy at [joye@kayacorp.com](mailto:joye@kayacorp.com).

Please note that this document is a draft and as such is not intended for dissemination to the public at this time.

If you or your staff have any questions, my point of contact for this project is Neil Sheehan, (808) 474-7836, email: [neil.a.sheehan@navy.mil](mailto:neil.a.sheehan@navy.mil).

Sincerely,



L. M. FOSTER  
Director, Fleet Environmental  
By direction

Copy to:  
Commander, Navy Region Hawaii  
Commander, Pacific Missile Range Facility



DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:  
5090  
N01CE/0146  
10 Feb 10

Mr. John Nakagawa  
Hawaii Coastal Zone Management Program  
Department of Business, Economic Development and Tourism  
PO Box 2359  
235 Beretania Street  
State Office Tower, 6th Floor  
Honolulu, HI 96813

Dear Mr. Nakagawa:

The Department of the Navy is preparing a Pacific Missile Range Facility (PMRF) Intercept Test Support Environmental Assessment/Overseas Environmental Assessment (EA/OEA) in order to update or enhance range capability in support of future tests of missile intercept technologies at the PMRF, Kauai, HI. The updates at PMRF are needed to evaluate the operational effectiveness of Ballistic Missile Defense (BMD) systems against future threats in simulated hostile environments.

The enhancements include modifying some existing PMRF facilities and constructing new facilities on PMRF to test new land-based interceptor systems, such as the Aegis Ashore Missile Defense program and conducting more complex intercept tests at PMRF. All proposed activities will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the Hawaii Coastal Zone Management Program.

The enclosed review document is being distributed to your office for review prior to preparing the Final EA/OEA and draft Finding of No Significant Impact for public review. The Navy requests your review of the enclosed document by March 15, 2010. Should you have any comments concerning the proposed action you can e-mail Mr. David Hasley at [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) or Mr. Edd Joy at [joye@kayacorp.com](mailto:joye@kayacorp.com).

5090  
N01CE/0146  
10 Feb 10

If you or your staff have any questions, my point of contact for this project is Neil Sheehan, (808) 474-7836, email: neil.a.sheehan@navy.mil.

Sincerely,



L. M. FOSTER  
Director, Fleet Environmental  
By direction

Copy to:  
Commander, Navy Region Hawaii  
Commander, Pacific Missile Range Facility



DEPARTMENT OF THE NAVY

COMMANDER  
UNITED STATES PACIFIC FLEET  
250 MAKALAPA DRIVE  
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:

5090

Ser N01CE/0153

11 Feb 10

Ms. Laura H. Thielen  
State Historic Preservation Officer  
Department of Land & Natural Resources  
601 Kamokila Boulevard, Suite 555  
Kapolei, HI 96707

Subject: Section 106 Compliance Review - Pacific Missile  
Range Facility Intercept Test Support Coordinating  
Draft Environmental Assessment/Overseas  
Environmental Assessment (EA/OEA)

Dear Ms. Thielen:

In accordance with the National Environmental Policy Act and the National Historic Preservation Act, and on behalf of the Commander, U.S. Pacific Fleet (CPF), the Department of the Navy has prepared the attached coordinating draft EA/OEA. The U.S. Army Space and Missile Defense Command (SMDC) is assisting CPF with preparation of the EA/OEA. The coordinating draft EA/OEA evaluates a continuation of activities assessed in the May 2008 Hawaii Range Complex (HRC) Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) in which the Navy examined the environmental effects of increased naval training at locations within the HRC. The HRC EIS/OEIS also examined increased and enhanced Research, Development, Testing and Evaluation (RDT&E) activities at the Pacific Missile Range Facility (PMRF). Potential effects from the activities in the HRC EIS/OEIS were coordinated with your office and concurrence was received on September 21, 2007. A summary of the potential effects identified in the Final HRC EIS/OEIS, and relevant to this EA/OEA, is provided at Enclosure 1.

The actions assessed in the attached coordinating draft EA/OEA consider updates at PMRF that are needed to evaluate the operational effectiveness of Ballistic Missile Defense (BMD) systems against future threats through complex testing in simulated hostile environments. PMRF leadership believes that greater flexibility in developing test scenarios will

Subject: Section 106 Compliance Review - Pacific Missile  
Range Facility Intercept Test Support Coordinating  
Draft Environmental Assessment/Overseas  
Environmental Assessment (EA/OEA)

also ensure maximum utilization of PMRF, given testing requirements by other agencies and PMRF environmental and safety requirements.

The Proposed Action is to further enhance the capability of PMRF to support the same types of complex intercept missions assessed in the HRC EIS/OEIS; however, the intercepts would involve longer engagement distances, higher altitudes, and longer-range targets and interceptors (e.g., Terminal High Altitude Area Defense and Standard Missile-3). Intercepts at these higher altitudes would generate small, light particles that could be dispersed over a larger area that could encompass Kauai, Niihau, part of the channel between Kauai and Oahu, and the Northwestern Hawaiian Islands, including Papahānaumokuākea Marine National Monument. The particles would not pose a hazard to people on the ground, but could affect high speed jet aircraft routes and will require coordination with the Federal Aviation Administration.

The Proposed Action would also include the addition of future missile programs such as the Aegis Ashore Missile Defense program. These programs could involve the placement of new land-launched systems at PMRF, including missile launchers, radar, and support facilities. The activities would vary by location; however, in general there may be ground disturbance from construction and utility installation, personnel and heavy equipment movement, and intercept tests.

As described in the attached coordinating draft EA/OEA, the area of potential effects (APE) for the assessment of any potential cultural resources impacts includes locations at PMRF Main Base, Niihau, the Northwestern Hawaiian Islands, and areas of open ocean.

A review of cultural resources survey and testing reports and sensitivity maps within the APE indicates that there are no recorded historic properties, or other prehistoric or historic archaeological or traditional Native Hawaiian sites at the proposed locations documented in the coordinating draft EA/OEA. However, areas within the APE are sensitive for these types of resources. Therefore, to ensure that any unexpectedly encountered subsurface cultural materials are protected during project activities, the following measures will be undertaken: archaeological monitoring during ground disturbing activities, the

Subject: Section 106 Compliance Review - Pacific Missile  
Range Facility Intercept Test Support Coordinating  
Draft Environmental Assessment/Overseas  
Environmental Assessment (EA/OEA)

restriction of equipment and vehicular traffic to existing roadways and other paved areas, and cultural resources sensitivity training for personnel working in the affected areas. In the remote chance that subsurface remains are unexpectedly encountered, activities would stop in the immediate vicinity of the find and, in accordance with 36 CFR Sec. 800.13, all appropriate actions will be taken and notifications made in accordance with the PMRF Integrated Cultural Resources Management Plan (ICRMP) and appended COMNAVREG Programmatic Agreement. These protective measures have been incorporated into the text of the coordinating draft EA/OEA; therefore, no adverse effects are expected, even if historic properties were to be discovered subsequent to implementation of this undertaking.

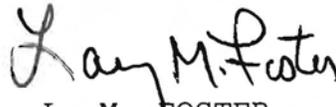
The Northwestern Hawaiian Islands, including the Papahānaumokuākea Marine National Monument are within the APE for high-altitude dispersed intercept debris. The islands of Nihoa and Mokumanamana (Necker) are listed in the National Register of Historic Places and there are a number of National Register properties on Midway Atoll; however, given the small size, light weight, and dispersion of the particles, the potential for them to significantly affect any onshore or off shore cultural resources within these areas is extremely remote. As a result, no adverse effects on historic properties are expected.

In accordance with the Section 106 project review process, the Navy is requesting your concurrence with a finding of no historic properties affected from the No Action and Proposed Action activities described within the PMRF Intercept Test Support coordinating draft EA/OEA. Our assessment is based on the known status of cultural resources within the APE; the previous assessment of similar activities assessed within the HRC EIS/OEIS, with which your office concurred; the preventative measures that will be undertaken and the protocols to be followed if unexpected resources are encountered; and, after consultation with members of the Kauai Burial Council. Please review this information and the Coordinating Draft EA/OEA and provide your comments by March 15, 2010 using the enclosed comment form. Please e-mail your comments to Mr. Davis Hasley at [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) or Mr. Edd Joy at [joye@kayacorp.com](mailto:joye@kayacorp.com). For your convenience, a concurrence signature block has been affixed to the bottom of this letter.

Subject: Section 106 Compliance Review - Pacific Missile  
Range Facility Intercept Test Support Coordinating  
Draft Environmental Assessment/Overseas  
Environmental Assessment (EA/OEA)

If you or your staff have any questions, my point of  
contact for this project is Mr. Neil Sheehan, (808) 474-  
7836, email: [neil.a.sheehan@navy.mil](mailto:neil.a.sheehan@navy.mil) .

Sincerely,



L. M. FOSTER  
Director, Fleet Environmental  
By direction

Copy to:  
Commander, Navy Region Hawaii  
Commander, Pacific Missile Range Facility

Concur:  
No Adverse Effects, PMRF ITS Draft EA/OEA

---

Hawaii State Historic Preservation Officer  
Department of Land and Natural Resources

FINAL HRC EIS/OEIS CULTURAL RESOURCES EFFECTS SUMMARY  
KAUAI, NIIHAU, NORTHWESTERN HAWAIIAN ISLANDS, AND OPEN OCEAN  
(Chapters 4.0 and 5.0 of the Final HRC EIS/OEIS discuss  
potential impacts in detail.)

**Pacific Missile Range Facility (PMRF), Kauai**

**No-action:** Activities occur in designated areas and sensitive areas are avoided. Any potential for impacts on cultural resources are offset through compliance with the PMRF Integrated Cultural Resources Management Plan (ICRMP) and standard operating procedures.

**Alternatives 1, 2, and 3:** Any potential impacts from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative.

**Niihau**

Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2 and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.

**Northwestern Hawaiian Islands**

**No-action:** Missile defense activities, including THAAD, have the potential to generate debris that falls within areas of the Papahānaumokuākea Marine National Monument. Debris analyses of the types, quantities, and sizes associated with the PMRF missile activities indicate that the potential to impact land resources of any type on Nihoa or Necker is extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. Future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwestern Hawaiian Islands are not expected.

**Alternatives 1, 2, and 3:** There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; the potential for impacts from ongoing activities would be minimized as described above in the No-action Alternative.

**Open Ocean**

**No-action:** Cultural resources that occur in the Open Ocean Area are generally deeply submerged and inherently protected from the effect of all types of activity. Both the probability of encountering submerged resources and the probability of causing adverse effect on those resources are

FINAL HRC EIS/OEIS CULTURAL RESOURCES EFFECTS SUMMARY  
KAUAI, NIIHAU, NORTHWESTERN HAWAIIAN ISLANDS, AND OPEN OCEAN  
(Chapters 4.0 and 5.0 of the Final HRC EIS/OEIS discuss  
potential impacts in detail.)

extremely low regardless of the action alternative being considered. To even further lower the probability of effect, areas where known submerged cultural resources exist will be avoided for operational activities involving expended material, debris dispersion, or underwater detonation. Procedures are in place to minimize any effects on underwater cultural resources. In accordance with Section 106 of the National Historic Preservation Act (36 CFR Part 800), cultural resources mitigation measures as described in various sections of Chapter 4.0 would be implemented.

**Alternative 1, 2, and 3:** Impacts on cultural resources from increased training activities, RDT&E activities, and Major Exercises (e.g., RIMPAC) would be minimized as described above in the No-action Alternative.



DEPARTMENT OF THE NAVY

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UNITED STATES PACIFIC FLEET  
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2010 FEB 17 P 1:10

Ms. Laura H. Thielen  
State Historic Preservation Officer  
Department of Land & Natural Resources  
601 Kamokila Boulevard, Suite 555  
Kapolei, HI 96707

Subject: Section 106 Compliance Review - Pacific Missile Range Facility Intercept Test Support Coordinating Draft Environmental Assessment/Overseas Environmental Assessment (EA/OEA)

Dear Ms. Thielen:

In accordance with the National Environmental Policy Act and the National Historic Preservation Act, and on behalf of the Commander, U.S. Pacific Fleet (CPF), the Department of the Navy has prepared the attached coordinating draft EA/OEA. The U.S. Army Space and Missile Defense Command (SMDC) is assisting CPF with preparation of the EA/OEA. The coordinating draft EA/OEA evaluates a continuation of activities assessed in the May 2008 Hawaii Range Complex (HRC) Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) in which the Navy examined the environmental effects of increased naval training at locations within the HRC. The HRC EIS/OEIS also examined increased and enhanced Research, Development, Testing and Evaluation (RDT&E) activities at the Pacific Missile Range Facility (PMRF). Potential effects from the activities in the HRC EIS/OEIS were coordinated with your office and concurrence was received on September 21, 2007. A summary of the potential effects identified in the Final HRC EIS/OEIS, and relevant to this EA/OEA, is provided at Enclosure 1.

The actions assessed in the attached coordinating draft EA/OEA consider updates at PMRF that are needed to evaluate the operational effectiveness of Ballistic Missile Defense (BMD) systems against future threats through complex testing in simulated hostile environments. PMRF leadership believes that greater flexibility in developing test scenarios will

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Subject: Section 106 Compliance Review - Pacific Missile Range Facility Intercept Test Support Coordinating Draft Environmental Assessment/Overseas Environmental Assessment (EA/OEA)

also ensure maximum utilization of PMRF, given testing requirements by other agencies and PMRF environmental and safety requirements.

The Proposed Action is to further enhance the capability of PMRF to support the same types of complex intercept missions assessed in the HRC EIS/OEIS; however, the intercepts would involve longer engagement distances, higher altitudes, and longer-range targets and interceptors (e.g., Terminal High Altitude Area Defense and Standard Missile-3). Intercepts at these higher altitudes would generate small, light particles that could be dispersed over a larger area that could encompass Kauai, Niihau, part of the channel between Kauai and Oahu, and the Northwestern Hawaiian Islands, including Papahānaumokuākea Marine National Monument. The particles would not pose a hazard to people on the ground, but could affect high speed jet aircraft routes and will require coordination with the Federal Aviation Administration.

The Proposed Action would also include the addition of future missile programs such as the Aegis Ashore Missile Defense program. These programs could involve the placement of new land-launched systems at PMRF, including missile launchers, radar, and support facilities. The activities would vary by location; however, in general there may be ground disturbance from construction and utility installation, personnel and heavy equipment movement, and intercept tests.

As described in the attached coordinating draft EA/OEA, the area of potential effects (APE) for the assessment of any potential cultural resources impacts includes locations at PMRF Main Base, Niihau, the Northwestern Hawaiian Islands, and areas of open ocean.

A review of cultural resources survey and testing reports and sensitivity maps within the APE indicates that there are no recorded historic properties, or other prehistoric or historic archaeological or traditional Native Hawaiian sites at the proposed locations documented in the coordinating draft EA/OEA. However, areas within the APE are sensitive for these types of resources. Therefore, to ensure that any unexpectedly encountered subsurface cultural materials are protected during project activities, the following measures will be undertaken: archaeological monitoring during ground disturbing activities, the

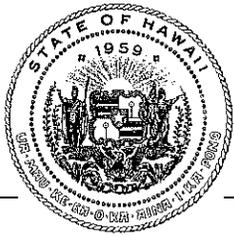
Subject: Section 106 Compliance Review - Pacific Missile Range Facility Intercept Test Support Coordinating Draft Environmental Assessment/Overseas Environmental Assessment (EA/OEA)

restriction of equipment and vehicular traffic to existing roadways and other paved areas, and cultural resources sensitivity training for personnel working in the affected areas. In the remote chance that subsurface remains are unexpectedly encountered, activities would stop in the immediate vicinity of the find and, in accordance with 36 CFR Sec. 800.13, all appropriate actions will be taken and notifications made in accordance with the PMRF Integrated Cultural Resources Management Plan (ICRMP) and appended COMNAVREG Programmatic Agreement. These protective measures have been incorporated into the text of the coordinating draft EA/OEA; therefore, no adverse effects are expected, even if historic properties were to be discovered subsequent to implementation of this undertaking.

The Northwestern Hawaiian Islands, including the Papahānaumokuākea Marine National Monument are within the APE for high-altitude dispersed intercept debris. The islands of Nihoa and Mokumanamana (Necker) are listed in the National Register of Historic Places and there are a number of National Register properties on Midway Atoll; however, given the small size, light weight, and dispersion of the particles, the potential for them to significantly affect any onshore or off shore cultural resources within these areas is extremely remote. As a result, no adverse effects on historic properties are expected. *minor*

In accordance with the Section 106 project review process, the Navy is requesting your concurrence with a finding of no historic properties affected from the No Action and Proposed Action activities described within the PMRF Intercept Test Support coordinating draft EA/OEA. Our assessment is based on the known status of cultural resources within the APE; the previous assessment of similar activities assessed within the HRC EIS/OEIS, with which your office concurred; the preventative measures that will be undertaken and the protocols to be followed if unexpected resources are encountered; and, after consultation with members of the Kauai Burial Council. Please review this information and the Coordinating Draft EA/OEA and provide your comments by March 15, 2010 using the enclosed comment form. Please e-mail your comments to Mr. Davis Hasley at [david.hasley@smdc.army.mil](mailto:david.hasley@smdc.army.mil) or Mr. Edd Joy at [joye@kayacorp.com](mailto:joye@kayacorp.com). For your convenience, a concurrence signature block has been affixed to the bottom of this letter.





## DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

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Ref. No. P-12960

April 5, 2010

Mr. Larry M. Foster  
Director, Fleet Environmental  
Department of the Navy  
Commander  
U.S. Pacific Fleet  
250 Makalapa Drive  
Pearl Harbor, Hawaii 96860-3131

Dear Mr. Foster:

Subject: Hawaii Coastal Zone Management (CZM) Program Federal Consistency Review for Pacific Missile Range Facility (PMRF) Intercept Test Support Facility, Kekaha, Kauai

The proposal to construct and operate the PMRF Intercept Test Support Facility has been reviewed for consistency with the Hawaii CZM Program. We concur with the Navy's determination that the activity is consistent to the maximum extent practicable with the enforceable policies of the Hawaii CZM Program, based on the following conditions:

1. This conditional concurrence applies to the following alternative facility sites presented in the Coastal Zone Management Act (CZMA) Review Document: EDX Candidate Interceptor Launch Site; KTF Pad 1 Candidate Interceptor Launch Site; Aegis (Flexible Target Family) Candidate Interceptor Launch Site; Calibration Lab Site East Candidate Test Center Site; Hawaii Air National Guard (HIANG) PMRF Candidate Test Center Site; Golf Candidate Communications Support Complex; and THAAD Admin Area Candidate Mission Support Site. Additional sites will require separate CZM federal consistency review.
2. This conditional concurrence applies to the proposed maximum of four launches per year associated with the PMRF Intercept Test Support program. Additional launches will require separate CZM federal consistency review.
3. Operation of the PMRF Intercept Test Support Facility shall not result in additional temporary closures of public access to Polihale Beach Park beyond the maximum 30 PMRF ground hazard area closures per year, previously approved by the Hawaii CZM Program in 1999, and also required by the State of Hawaii restrictive easement.
4. To protect the Newell's shearwater and other night-flying migratory birds and bats, full cutoff, shielded exterior lighting shall be installed in accordance with U.S. Fish and Wildlife guidelines, as represented in the CZMA Review Document (p. 4-22). Hawaii CZM Program

enforceable policies, Hawaii Revised Statutes (HRS), Chapter 195D - Conservation of Aquatic Life, Wildlife, and Land Plants, and Hawaii Administrative Rules (HAR), Chapter 13-124 - Indigenous Wildlife, Endangered and Threatened Wildlife, and Introduced Wild Birds, protect State endangered, threatened, or indigenous species of aquatic life and wildlife.

5. To protect endangered, threatened, or indigenous species that are foraging, resting, or hauled out, such as the green sea turtle, launch activities shall incorporate procedures and instructions to personnel and delay of testing if listed species are present within the ground and launch hazard areas, as represented in the CZMA Review Document (pp. 4-26, 4-43). Hawaii CZM Program enforceable policies, HRS, Chapter 195D - Conservation of Aquatic Life, Wildlife, and Land Plants, and HAR, Chapter 13-124 - Indigenous Wildlife, Endangered and Threatened Wildlife, and Introduced Wild Birds, protect State endangered, threatened, or indigenous species of aquatic life and wildlife.
6. Representations made in the CZMA Review Document indicate that the low energy, small particles (up to 0.03 ounce in size) expected as a result of successful high altitude intercepts will not affect wildlife (p. 4-24), ocean resources and ocean uses because of the very small size and quantity of the particles which would not be measurable or discoverable (p. 4-40), and would not present a toxicity problem (p. 4-24). Should additional information become available indicating that the particles may have an impact on coastal resources and uses, or that particles are detectable on the ground or ocean at levels greater than anticipated, then mitigating measures shall be developed and submitted to the Hawaii CZM Program for review.

CZM consistency concurrence is not an endorsement of the project nor does it convey approval with any other regulations administered by any State or County agency. Thank you for your cooperation in complying with the Hawaii CZM Program. If you have any questions, please call John Nakagawa of our CZM Program at 587-2878.

Sincerely,



Abbey Seth Mayer  
Director

c: Mr. David Hasley, SMDC  
Mr. Michael Molina, SMDC  
Ms. Rebecca Hommon, Navy Region Hawaii  
Department of Land and Natural Resources  
Department of Planning, County of Kauai

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**Appendix C**  
**Resource Descriptions Including Laws and**  
**Regulations Considered**



# APPENDIX C

## RESOURCE DESCRIPTIONS INCLUDING LAWS AND REGULATIONS CONSIDERED

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This appendix provides a general description of each resource and addresses the Federal, State, and local environmental review programs that do, or may, apply to the No-action Alternative and Proposed Action. Project facilities and activities will be implemented in accordance with applicable Federal laws and regulations and with State and local laws, regulations, programs, plans, and policies as applicable.

This Environmental Assessment (EA)/Overseas EA (OEA) has been prepared and provided for public review in accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (40 Code of Federal Regulations [CFR] Part 1500-1508).

### C.1 Air Quality

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in parts per million or micrograms per cubic meter, or as a pollution standard index. Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to Federal and State ambient air quality standards (AAQS).

The Federal **Clean Air Act** (42 United States Code [U.S.C.] 7401) requires the adoption of national ambient air quality standards (NAAQS) to protect the public health, safety, and welfare from known or anticipated effects of air pollution. Seven air pollutants have been identified by the U.S. Environmental Protection Agency (USEPA) as being a nationwide concern: carbon monoxide, ozone, nitrogen dioxide, particulate matter equal to or less than 10 microns in size (PM-10) (also called respirable particulate and suspended particulate), fine particulate matter equal to or less than 2.5 microns in size (PM-2.5), sulfur dioxide, and lead. The USEPA has established NAAQS for these pollutants, which are collectively referred to as criteria pollutants, as shown in Table C-1. Amendments to the Clean Air Act require the USEPA to describe the health and welfare impacts of a pollutant as the “criteria” for inclusion in the regulatory regime.

Hawaii has established State AAQS. Ambient conditions in each State are limited to the more restrictive standard. Table C-1 compares the NAAQS and the Hawaii AAQS.

According to USEPA guidelines, an area with air quality equal to or better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation for a particular pollutant is given to a region if the primary NAAQS for that criteria pollutant is exceeded at any point in the region for more than 3 days during a 3-year period. An air basin may be designated as unclassified when there is insufficient data for the USEPA to determine attainment status.

**Table C-1. Federal and Hawaiian Ambient Air Quality Standards**

Pollutant	Averaging Time	Hawaii State Standard	National Primary Standard	National Secondary Standard
Carbon Monoxide	8-hour	5 mg/m <sup>3</sup> (4.5 ppm)	10 mg/m <sup>3</sup> (9 ppm)	None
	1-Hour	10 mg/m <sup>3</sup> (9 ppm)	40 mg/m <sup>3</sup> (35 ppm)	None
Nitrogen Dioxide	Annual <sup>(1)</sup>	70 mg/m <sup>3</sup> (0.037 ppm)	100 µg/m <sup>3</sup> (0.053 ppm)	Same as Primary
Ozone	8-hour <sup>(2)</sup>	None	147 µg/m <sup>3</sup> (0.075 ppm) <sup>(1)</sup>	Same as Primary
	1-Hour	100 µg/m <sup>3</sup>	235 µg/m <sup>3</sup> (0.12 ppm) <sup>(7)</sup>	Same as Primary
	Quarterly <sup>(1)</sup>	1.5 mg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>	Same as Primary
Lead	Rolling 3-month Average	None	0.15 µg/m <sup>3</sup>	Same as Primary
PM-2.5	Annual <sup>(3)</sup>	None	15.0 µg/m <sup>3</sup>	Same as Primary
	24-hour <sup>(4)</sup>	None	35 µg/m <sup>3</sup>	Same as Primary
PM-10	Annual (arithmetic mean)	50 mg/m <sup>3</sup>	Revoked <sup>(8)</sup>	
	24-hour <sup>(5)</sup>	150 mg/m <sup>3</sup>	150 µg/m <sup>3</sup>	Same as Primary
Sulfur Dioxide <sup>(6)</sup>	Annual <sup>(1)</sup>	80 µg/m <sup>3</sup> (0.03 ppm)	80 µg/m <sup>3</sup> (0.03 ppm)	None
	24-hour	365 µg/m <sup>3</sup> (0.14 ppm)	365 µg/m <sup>3</sup> (0.14 ppm)	None
	3-hour	1,300 µg/m <sup>3</sup> (0.5 ppm)	None	1,300 µg/m <sup>3</sup> (0.5 ppm)
Hydrogen Sulfide	1-hour	35 µg/m <sup>3</sup> (0.025 ppm)	None	None

Source: 40 CFR Part 50

(1) Calculated as the arithmetic mean

(2) Calculated as the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year (effective 27 May 2008)

(3) Calculated as the 3-year average of the arithmetic means

(4) Calculated as the 98th percentile of 24-hour PM-2.5 concentration in a year (averaged over 3 years) at the population oriented monitoring site with the highest measured values in the area (effective 17 December 2006).

(5) Calculated as the 99th percentile of 24-hour PM-10 concentrations in a year (averaged over 3 years).

(6) Measured as sulfur dioxide

(7) As of 15 June 2005 the USEPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact Areas(8) USEPA revoked the annual PM<sub>10</sub> standard in 2006 (effective 17 December 2006)mg/m<sup>3</sup> = milligrams per cubic meterµg/m<sup>3</sup> = micrograms per cubic meter

PM-2.5 = fine particulate matter equal to or less than 2.5 microns in size

PM-10 = particulate matter equal to or less than 10 microns in size (also called respirable particulate and suspended particulate)

ppm = parts per million

The Clean Air Act Amendments of 1990 (Public Law [PL] 101-549, 104 Statute 2399) required USEPA to promulgate rules to ensure that Federal actions in areas classified as nonattainment or maintenance areas (geographic areas that had a history of nonattainment, but are now consistently meeting NAAQS) conform to the appropriate State implementation plan. These rules, known together as the General Conformity Rule (40 CFR 51.850-860 and 40 CFR 93.150-160), require any Federal agency responsible for an action to determine if its action conforms to pertinent guidelines and regulations. Certain actions are exempt from conformity determinations if the projected emission rates would be less than specified emission rate thresholds, known as *de minimis* limits.

### De Minimis Emissions and Applicability Thresholds

*De minimis* emissions are the annual net total of direct and indirect emissions of a criteria pollutant caused by a Federal action in a nonattainment or maintenance area at levels less than specified applicability thresholds. The six criteria pollutants are PM-10 and PM-2.5, sulfur dioxide, carbon monoxide, nitrogen oxides, 8-hour ozone, and lead. Ozone is measured by emissions of volatile organic compounds and nitrogen oxides. Table C-2 lists the *de minimis* level of pollution.

Federal regulations designate the State of Hawaii as an attainment area for all six criteria pollutants. Since this project is located in an attainment area, the *de minimis* levels in Table C-2 would not apply. However, for the purpose of evaluating the impact of the Navy's actions, the emissions from this project have been compared to these general conformity requirements.

**Table C-2. General Conformity Applicability Thresholds for Nonattainment Areas**

Criteria Pollutants	De Minimis Levels (Tons Per Year)
<b>Ozone (Volatile Organic Compounds or Nitrogen Oxides)</b>	
Serious Non-attainment Areas	50
Severe Non-attainment Areas	25
Extreme Non-attainment Areas	10
Other ozone Non-attainment Areas outside an ozone transport region	100
Other ozone Non-attainment Areas inside an ozone transport region	50 (volatile organic compound) 100 (nitrogen oxides)
<b>Volatile Organic Compounds</b>	50
<b>Nitrogen Oxides</b>	100
<b>Carbon Monoxide</b> —All Non-attainment Areas and maintenance areas	100
<b>Sulfur Dioxide or Nitrogen Oxides</b> —All Non-attainment Areas	100
<b>PM-10</b>	
Moderate Non-attainment Areas and maintenance areas	100
Serious Non-attainment Areas	70
<b>PM-2.5 (Direct PM-2.5, Nitrogen Oxides, Volatile Organic Compounds, Sulfur Dioxide)</b>	100
<b>Lead</b> —All Non-attainment Areas	25

Source: 40 CFR §51.853

Notes:

PM-10 = particulate matter equal to or less than 10 microns in size

PM-2.5 = particulate matter equal to or less than 2.5 microns in size

### Regionally Significant

The conformity regulation defines “regionally significant” emissions as the total direct and indirect emissions of a Federal action that represents 10 percent or more of an area's total emissions for a criteria pollutant. A general conformity determination would be required if emissions were regionally significant, even if they were *de minimis*. Ten percent of Kauai County's annual air emission budget for each criteria pollutant would apply in the case of the

construction at the Pacific Missile Range Facility (PMRF). However, because Hawaii is in attainment for all six criteria pollutants, regionally significant emissions are not applied.

*Criteria Pollutants Emissions Calculations*

Although Hawaii is in attainment for all criteria pollutants under the Clean Air Act, applicability analysis is a useful tool to estimate and compare major Navy air emissions. The Air Conformity Applicability Model, Version 4.5 was developed by the Air Force to screen for compliance with the General Conformity Rule requirements (U.S. Air Force, 2010). Air Conformity Applicability Model was used for the Proposed Action emissions estimates that follow. Below is a description of the inputs used to complete the air emissions analysis.

Analysis for the construction assumed a total of 32,500 square feet of office space starting construction in the second quarter of 2011 and completed by the third quarter of 2012. Emission-causing activities included grading, and contraction activities including architectural coating, construction equipment, and worker commuting emissions. Site grading was assumed to be 5 acres. Asphalt paving was not estimated because the extent of paving is not known at this time. The Proposed Action does not include any demolition.

Operational (post-construction) air emissions included space cooling, emergency generators, and added personnel. The number of added personnel was assumed to be 500 temporary (4 days/month) and 100 permanent (22 days/month). They were assumed to commute one-way for 25 miles and assumed to start work in fourth quarter 2012. Each permanent employee was assumed drive a Government owned vehicle 334 miles per year.

Emissions from the use of five large generators was estimated assuming four launches of the Aegis Ashore missiles per year and a 500-kilowatt (kW) generator at the Launch Area and two 2,500-kW generators at the Aegis Ashore Test Center, and two 438-kW generators at the transportable Ballistic Missile Defense System Communications Support Complex. The 500-kW generator and the two 2,500-kW generators were assumed to operate for 336 hours per year each, and the two 438-kW generators were assumed to operate for 1,344 hours per year each.

Table C-3 shows the estimated annual emissions for small construction projects and ongoing operations for the Proposed Action. None of the emissions would exceed the *de minimis* or “conformity threshold” found in Table C-2.

**Table C-3. Air Emissions Summary by Proposed Activity**

Year	Source Type	Carbon Monoxide (Tons/Yr)	Nitrogen Oxides (Tons/Yr)	Sulfur Dioxide (Tons/Yr)	VOC (Tons/Yr)	PM-10 (Tons/Yr)	PM-2.5 (Tons/Yr)
<b>2011</b>							
2011	Construction—Phase I Grading Ops.	0.00	0.00	0.00	0.00	0.00	0.00
2011	Construction—Phase I Mobile and Stationary Equipment	0.05	0.01	0.00	0.00	0.00	0.00
2011	Construction—Phase II Mobile and Stationary Equipment	0.06	0.01	0.00	0.00	0.00	0.00

**Table C-3. Air Emissions Summary by Proposed Activity (Continued)**

Year	Source Type	Carbon Monoxide (Tons/Yr)	Nitrogen Oxides (Tons/Yr)	Sulfur Dioxide (Tons/Yr)	VOC (Tons/Yr)	PM-10 (Tons/Yr)	PM-2.5 (Tons/Yr)
2011	Construction— Phase II Arch. Coatings	0.00	0.00	0.00	0.19	0.00	0.00
2011	Construction— Phase II Workers Trips	0.03	0.00	0.00	0.00	0.00	0.00
<b>TOTAL FOR 2011</b>		<b>0.14</b>	<b>0.01</b>	<b>0.00</b>	<b>0.20</b>	<b>0.00</b>	<b>0.00</b>
<b>2012</b>							
2012	Construction—Phase II Mobile and Stationary Equipment	0.06	0.01	0.00	0.00	0.00	0.00
2012	Construction— Phase II Arch. Coatings	0.00	0.00	0.00	0.19	0.00	0.00
2012	Construction— Phase II Workers Trips	0.03	0.00	0.00	0.00	0.00	0.00
2012	Operations—Emergency Generators	3.02	13.55	0.53	0.71	0.65	0.65
2012	Operations—Facility Space Cooling	0.05	0.11	0.00	0.00	0.00	
<b>TOTAL FOR 2012</b>		<b>3.16</b>	<b>13.66</b>	<b>0.53</b>	<b>0.91</b>	<b>0.66</b>	<b>0.65</b>
<b>2013</b>							
2013	Operations—Base Employee Commute (VMT)	0.18	0.01	0.00	0.01	0.00	0.00
2013	Operations—On-Road Government VMT	1.08	0.14	0.00	0.07	0.00	0.00
2013	Operations—Emergency Generators	12.09	54.20	2.12	2.86	2.60	2.60
2013	Operations—Facility Space Cooling	0.10	0.22	0.00	0.01	0.01	0.00
<b>TOTAL FOR 2013</b>		<b>13.44</b>	<b>54.56</b>	<b>2.12</b>	<b>2.95</b>	<b>2.61</b>	<b>2.60</b>

Source: Calculated using US Air Force Air Conformity Applicability Model, Version 4.5, 2010

Notes:

VMT= Vehicle Miles Traveled

PM-10 = particulate matter equal to or less than 10 microns in size

PM-2.5 = particulate matter equal to or less than 2.5 microns in size

VOC = Volatile organic compounds

Emissions displayed as fixed decimal numbers. Total calculated using full numbers.

### Greenhouse Gas Emissions

In 2007, a Supreme Court ruling allowed USEPA to regulate greenhouse gas (GHG) as pollutants under the existing Clean Air Act. This has set the stage for additional regulation of GHG in the future. Most recently, USEPA published guidance on use of low GHG emitting vehicles by Federal vehicle fleets.

At the same time that USEPA is working on GHG regulation, President Obama issued Executive Order 13514 in 2009: *Federal Leadership in Environmental, Energy, and Economic Performance*. This Executive Order sets sustainability goals for Federal agencies to inventory and report their direct and indirect GHG emissions. The Executive Order requires Federal agencies to set a 2020 GHG emissions reduction target within 90 days; increase energy efficiency; reduce fleet petroleum consumption; conserve water; reduce waste; support

sustainable communities; and leverage Federal purchasing power to promote environmentally-responsible products and technologies. And finally, the Council on Environmental Quality recently issued draft National Environmental Policy Act guidance for addressing GHG emissions in EAs and environmental impact statements (EISs) that states that emissions greater than 25,000 metric tons (27,557 short tons) annually of carbon dioxide-equivalent GHG emissions meets the test of “meaningful” GHG. Emissions above this level warrant at least some qualitative or quantitative discussion in an EA/EIS.

Potentially more significant than Federal requirements are Hawaii’s renewable energy initiatives. The “Global Warming Solutions Act 234.” Act 234 established the State’s policy framework and requirements to address Hawaii’s GHG emissions. The State law calls for the reduction of greenhouse emissions in Hawaii, caused mostly by oil and coal-based electricity generation and transportation, to the 1990 inventory levels or below by 2020. Future implementing regulations will address the following greenhouse air contaminants and most common sources:

- Carbon dioxide: gasoline and electric power
- Methane: landfills and livestock
- Nitrous oxide: fossil fuel and biomass burning, fertilizer use
- Perfluorocarbons
- Hydrofluorocarbons
- Sulfur hexafluoride

Hawaii’s 2007 Inventory of GHG emissions has been published. The Department of Health rulemaking for the Act is due in 2011 and will go into effect January 2012.

*GHG Emissions Calculations*

The long-term use of fossil fuel burning generators during the Aegis Ashore Missile Defense interceptor tests will be the largest contributor to GHG emissions from the Proposed Action. Using the estimated generator size and hours of operation for four Aegis Ashore Missile tests shown in Table 4.2.1.1.1-3, and U.S. Environmental Protection Agency’s GHG Equivalencies Calculator (<http://www.epa.gov/RDEE/energy-resources/calculator.html#results>), the generators are estimated to produce 2,173 metric tons/year (2,395 short tons/year) of carbon dioxide equivalent GHG emissions as shown in Table C-4.

**Table C-4. Greenhouse Gas Emissions Summary for Onsite Generators used During Four Aegis Ashore Missile Tests**

	Launch Area	Test Center	BCSC	Total Annual
<b>GENERATORS (kW)</b>	500	2,500	438	
Number of generators	1	2	2	
Horsepower	670.5118	3352.5591	587.3683	
Hours/year (total)	336	672	2,688	
Annual kWh	168,000	1,680,000	1,177,344	3,025,344
Annual CO <sub>2</sub> equivalent in metric tons/yr				2,173
Annual CO <sub>2</sub> equivalent in short tons/yr				2,395

Source: CO<sub>2</sub> calculated using U.S. Environmental Protection Agency’s Greenhouse Gas Equivalencies Calculator, 2010 (<http://www.epa.gov/RDEE/energy-resources/calculator.html#results>)

## C.2 Airspace

Airspace, or that space which lies above a nation and comes under its jurisdiction, is generally viewed as being unlimited. However, it is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes.

Under Public Law 85-725, **Federal Aviation Act of 1958**, the Federal Aviation Administration (FAA) is charged with the safe and efficient use of our nation's airspace, and has established certain criteria for and limits to its use. The method used to provide this service is the National Airspace System. This system is "...a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information and manpower and material."

Areas beyond the territorial limit are defined as international airspace. Therefore, the procedures of the International Civil Aviation Organization (ICAO) outlined in ICAO Document 4444, *Rules of the Air and Air Traffic Services*, are followed (International Civil Aviation Organization, 1996; 1997). ICAO Document 4444 is the equivalent air traffic control manual to FAA Handbook 7110.65, *Air Traffic Control*. The ICAO is a specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

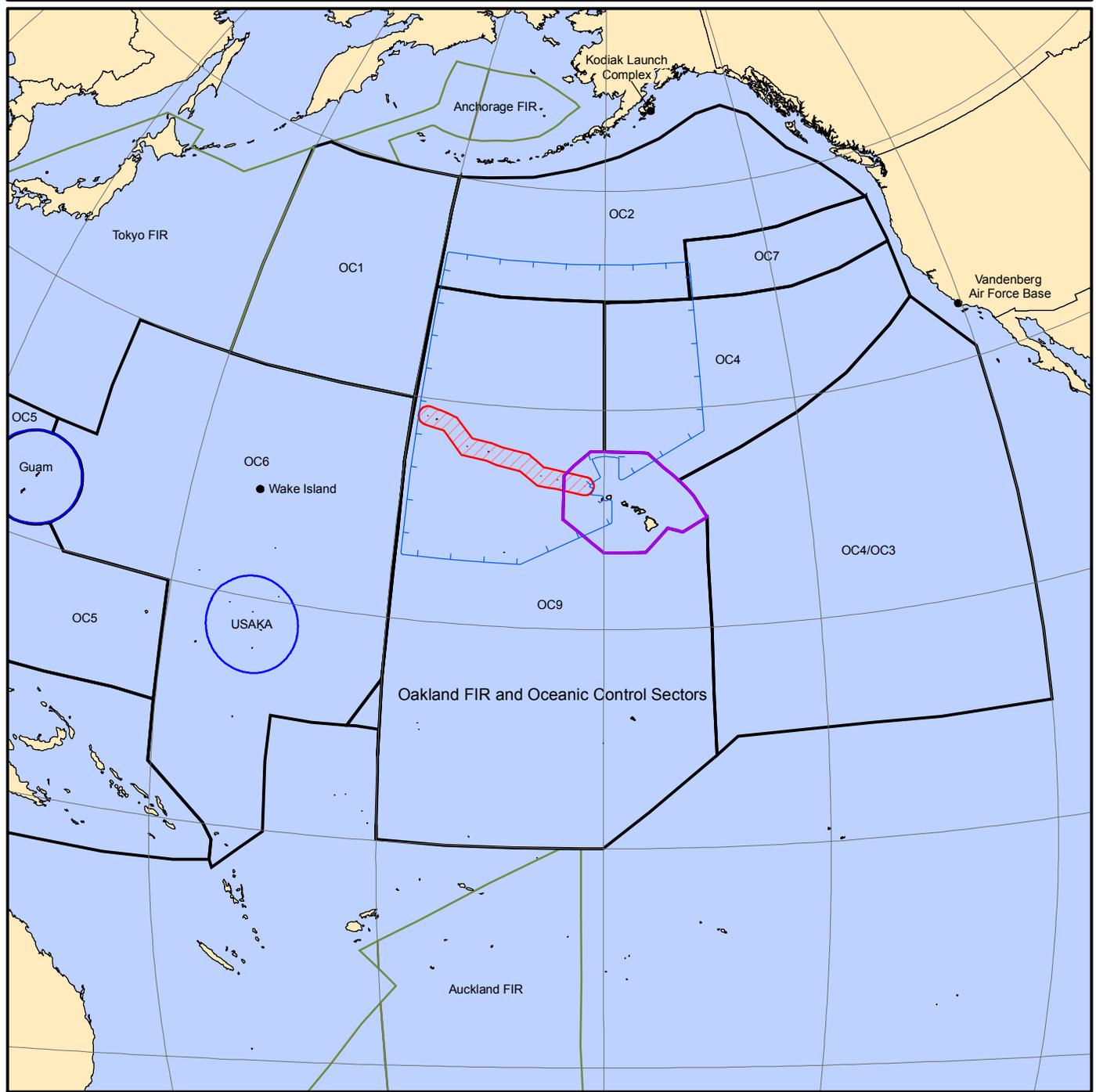
The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the Central Pacific is managed by the Oakland Air Route Traffic Control Center within several Oceanic Control Sectors, the boundaries of which are shown in Figure C-1. The Honolulu Combined Radar Approach Control manages the Radar Control Area that surrounds the Hawaiian Islands.

### Types of Airspace

#### *Controlled and Uncontrolled Airspace*

As part of the National Airspace System, controlled and uncontrolled airspace is divided into six classes, depending on location, use, and degree of control. Pilots are also subject to certain qualification requirements, operating rules, and equipment requirements. Figure C-2 depicts the six classes of non-military airspace. A brief description of each class follows:

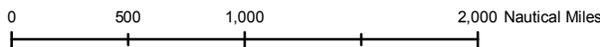
- The Open Ocean Area does not include Class A airspace, which includes airspace overlying the waters within 12 nautical miles (nm) of the coast.
- Class B airspace is generally that airspace surrounding the nation's busiest airports in terms of Instrument Flight Rules (IFR) operations or passengers boarding an aircraft. An air traffic control clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace.
- Class C airspace is generally that airspace surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger boardings.
- Class D airspace is generally that airspace surrounding those airports that have an operational control tower.



**EXPLANATION**

-  Temporary Operating Area (TOA)
-  Radar Control Area
-  Oakland FIR and Oceanic Control (OC) Sector
-  Flight Information Region (FIR)
-  Honolulu Control Facility
-  Papahānaumokuākea Marine National Monument
-  Land

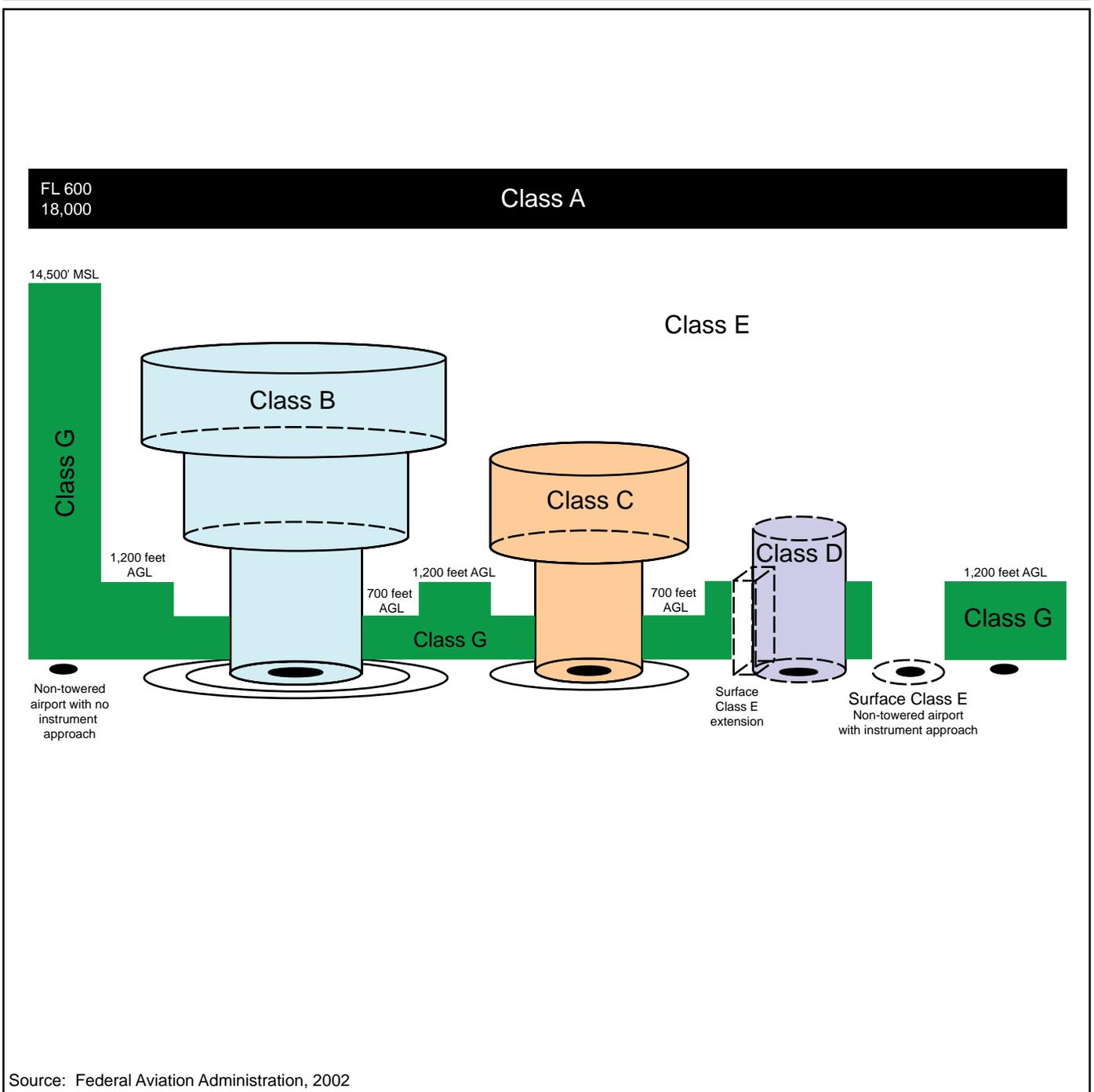
Note:  
 USAKA = U.S. Army Kwajalein Atoll  
 ARTCC = Air Route Traffic Control Center



**Airspace Managed by Oakland Air Route Traffic Control Center and Honolulu Control Facility**

Pacific Ocean

**Figure C-1**



**EXPLANATION**

AGL = Above Ground Level  
 FL = Flight Level  
 MSL = Above Mean Sea Level

**The Six Classes of Non-Military Airspace**

**Figure C-2**

- Class E airspace is controlled airspace that is not Class A, Class B, Class C, or Class D airspace.
- Class G or uncontrolled airspace has no specific definition but generally refers to airspace not otherwise designated and operations below 1,200 feet above ground level. No air traffic control service to either IFR or Visual Flight Rules (VFR) aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

### *Special Use Airspace*

Complementing the classes of controlled and uncontrolled airspace are several types of special use airspace used by the military to meet its particular needs. Special use airspace consists of that airspace where activities must be confined because of their nature, or where limitations are imposed on aircraft operations that are not a part of these activities, or both. Except for controlled firing areas, special use airspace areas are depicted on aeronautical charts, IFR or visual charts, and include hours of operation, altitudes, and the controlling agency. Only the special use airspace found in the region of influence is described. For the Open Ocean Area this includes Warning Areas, which are airspace that may contain hazards to non-participating aircraft in international airspace. Warning Areas are established beyond the 3-nm limit. Although the activities conducted within Warning Areas may be as hazardous as those in Restricted Areas, Warning Areas cannot be legally designated as Restricted Areas because they are over international waters (Federal Aviation Administration, no date). For areas over and surrounding land and offshore areas this includes:

- Restricted Areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Activities within these areas must be confined, because of their nature, or limitations imposed upon aircraft operations that are not a part of these activities, or both. Restricted Areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Restricted Areas are published in the Federal Register and constitute Federal Aviation Regulation (FAR) Part 73.
- Warning Areas are airspace that may contain hazards to non-participating aircraft in international airspace. Warning Areas are established beyond the 3-nm limit. Although the activities conducted within Warning Areas may be as hazardous as those in Restricted Areas, Warning Areas cannot be legally designated as Restricted Areas because they are over international waters (Federal Aviation Administration, no date). By Presidential Proclamation No. 5928, dated 27 December 1988, the U.S. territorial limit was extended from 3 to 12 nm. Special FAR 53 establishes certain regulatory warning areas within the new (3- to 12-nm) territorial airspace to allow continuation of military activities.

### *Other Airspace Areas*

Other types of airspace include airport advisory areas, temporary flight restrictions areas, flight limitations and prohibitions areas, published VFR routes, and terminal radar service areas (Federal Aviation Administration, 2006).

### Special Airspace Use Procedures

Other types of airspace, and special airspace use procedures used by the military to meet its particular needs, include air traffic control assigned airspace, altitude reservation (ALTRV) procedures, and Notices to Airmen (NOTAMs):

- Air Traffic Control Assigned Airspace (ATCAA), or airspace of defined vertical and lateral limits, is assigned by air traffic control to provide air traffic segregation between specified activities being conducted within the assigned airspace and other IFR air traffic. Air Traffic Control Assigned Airspace is usually established in conjunction with Military Operations Areas, and serves as an extension of Military Operations Area airspace to the higher altitudes required. These airspace areas support high altitude operations such as intercepts, certain flight test operations, and air refueling operations.
- ALTRV procedures are used as authorized by the Central Altitude Reservation Function, an air traffic service facility, or appropriate Air Route Traffic Control Center, under certain circumstances, for airspace use under prescribed conditions. An ALTRV receives special handling from FAA facilities. According to FAA Handbook 7610.4H, Chapter 3, ALTRVs are classified as either moving or stationary, with the latter normally defining the fixed airspace area to be occupied as well as the specific altitude(s) and time period(s) the area will be in use. ALTRVs may encompass certain rocket and missile activities and other special operations as may be authorized by FAA approval procedures.
- The NOTAM System is a telecommunication system designed to distribute unanticipated or temporary changes in the National Airspace System, or until aeronautical charts and other publications can be amended. This information is distributed in the NOTAM Publication. The NOTAM Publication is divided into four parts: (1) NOTAMs expected to be in effect on the date of publication, (2) revisions to Minimum En Route Instrument Flight Rules Altitudes and Changeover Points, (3) international—flight prohibitions, potential hostile situations, foreign notices, and oceanic airspace notices, (4) special notices and graphics such as military training areas, large scale sporting events, air shows, and airport specific information—Special Traffic Management Programs. Notices in Sections 1 and 2 are submitted through the National Flight Data Center, ATA-110. Notices in Sections 3 and 4 are submitted and processed through Air Traffic Publications, ATA-10. Air Traffic Publications, ATA-10 issues the NOTAM Publication every 28 days.

## C.3 Biological Resources

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by Federal or State agencies, to assess their sensitivity to the effects of the No-action Alternative, Alternative 1, or Alternative 2.

The **Endangered Species Act** of 1973 (ESA) (16 U.S.C. 1531-1544, 87 Stat. 884, as amended) applies to Federal actions in two separate respects. First, Section 7 of the ESA requires that Federal agencies ensure that proposed actions are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of designated critical habitat. Regulations implementing the ESA require that to avoid this situation of jeopardizing the species' existence, the Federal agency is required to

determine if threatened or endangered species are present in the area affected by the Proposed Action and consult with either or both of the appropriate resource agencies (National Marine Fisheries or U.S. Fish and Wildlife Service) when the agency proponent determines that a Proposed Action may adversely affect a threatened or endangered species. Secondly, Section 9 of the ESA requires Federal agencies to obtain an incidental take statement from the responsible resource agency should a take (including harm or harassment) result from implementing the Proposed Action.

The **Migratory Bird Treaty Act** (16 U.S.C. 703-712) protects many species of migratory birds. Specifically, the act prohibits the pursuit, hunting, taking, capture, possession, or killing of such species or their nests and eggs. The Armed Forces, pursuant to 50 CFR Section 21.15, may take migratory birds incidental to military readiness activities provided that, for those ongoing or proposed activities that the Armed Forces determine may result in a significant adverse effect on a population of a migratory bird species, the Armed Forces must confer and cooperate with the Service to develop and implement appropriate conservation measures to minimize or mitigate such significant adverse effects. Military readiness activities are defined as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Routine installation operation, industrial activities, and construction or demolition of facilities used for these purposes are not considered military readiness activities. Migratory bird conservation relative to non-military readiness activities is addressed in a Memorandum of Understanding (signed 31 July 2006) developed in accordance with Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (10 January 2001).

The final rule authorizing the Department of Defense (DoD) to take migratory birds during military readiness activities (50 CFR Part 21) was published in the Federal Register on 28 February 2007. The rule states that the Armed Forces must confer and cooperate with the USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a significant adverse effect on a population of a migratory bird species.

An activity will be determined to have a significant adverse effect when it is found within a reasonable period of time to diminish the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

The **Marine Mammal Protection Act** (16 U.S.C. 1361, et seq.) gives the USFWS and National Marine Fisheries Service (NMFS) co-authority and outlines prohibitions for the taking of marine mammals. A take means to attempt as well as to actually harass, hunt, capture, or kill any marine mammal. Subject to certain exceptions, the Act establishes a moratorium on the taking and importation of marine mammals. Exceptions to the taking prohibition allow USFWS and NMFS to authorize the incidental taking of small numbers of marine mammals in certain instances.

The **Magnuson-Stevens Fishery Conservation and Management Act** (Public Law 94-265) (16 U.S.C. 1801-1882, 13 April 1976, as amended) requires that Federal agencies consult with NMFS on activities that could harm Essential Fish Habitat areas. Essential Fish Habitat refers to “those waters and substrate (sediment, hard bottom) necessary to fish for spawning, breeding, feeding or growth to maturity.”

**Executive Order 13089 Coral Reef Protection** (63 FR 32701) and subsequent guidance documents from the DoD and the Navy were issued in 1998 “to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment.” It is DoD policy to protect the U.S. and International coral reefs and to avoid impacting coral reefs to the maximum extent possible. No concise definition of coral reefs has been promulgated, with regard to regulatory compliance of Executive Order 13089. In general, coral reefs consist of tropical reef building Scleractinian and Hydrozoan corals, as well as calcified Octocorals in the families Tubiporidae and Helioporidae, non-calcified Octocorals (soft corals) and Gorgonian corals, all growing in the 0 to 300 foot depth range. Deep water (300 to 3,000 foot depth range) precious corals and other deep water coral communities will only be considered in the case of a Sinking Exercise, where a vessel might ultimately land on a deep water coral community.

## C.4 Cultural Resources

Cultural resources include prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings and structures, and traditional resources (such as Native American and Native Hawaiian religious sites). Cultural resources of particular concern include properties listed in or eligible for inclusion in the National Register of Historic Places. Section 106 of the **National Historic Preservation Act** (16 U.S.C. 470 et seq.) requires Federal agencies to take into consideration the effects of their actions on significant cultural properties. Implementing regulations (36 CFR 800) specify a process of consultation to assist in satisfying this requirement. To be considered significant, cultural resources must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register. The term “eligible for inclusion in the National Register” includes all properties that meet the National Register listing criteria specified in Department of Interior regulations at 36 CFR 60.4. Resources not formally evaluated may also be considered potentially eligible and, as such, are afforded the same regulatory consideration as listed properties. Whether prehistoric, historic, or traditional, significant cultural resources are referred to as historic properties.

Numerous laws and regulations require that possible effects on important cultural resources be considered during the planning and execution of Federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the Federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Historic Preservation Officer, the Advisory Council on Historic Preservation). In addition to National Environmental Policy Act, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act, especially Sections 106 and 110; the **Archaeological Resources Protection Act** of 1979 (16 U.S.C. 470aa-470mm), which prohibits the excavation or removal of items of archaeological interest from Federal lands without a permit; the **Antiquities Act** of 1906 (16 U.S.C. 431); and the **Native American Graves Protection and Repatriation Act** (25 U.S.C. 3001 et seq.), which requires that Federal agencies return “Native American cultural items” to the Federally recognized native groups with which they are associated, and specifies procedures to be followed if such items are discovered on Federal land.

## C.5 Hazardous Materials and Waste

### Hazardous Materials

The U.S. Department of Transportation defines a hazardous material as a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and that has been designated as hazardous under Section 5103 of the Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions (49 CFR 173).

### Hazardous Wastes

Solid waste materials are defined in 40 CFR 261.2 as any discarded material (i.e., abandoned, recycled, or “inherently waste-like”) that is not specifically excluded from the regulatory definition. This waste can include materials that are solid, liquid, or gaseous (but contained). Hazardous waste is further defined as any solid waste not specifically excluded which contains specified concentrations of chemical constituents or has certain toxicity, ignitability, corrosivity, or reactivity characteristics.

### *Federal Regulations*

The **Oil Pollution Act** of 1990 required oil storage facilities and vessels to submit to the Federal government plans detailing how they will respond to large discharges. In 2002, however, the USEPA amended the Oil Pollution Prevention regulation. The Oil Pollution Prevention and Response; Non-Transportation-Related Onshore and Offshore Facilities; Final Rule (40 CFR 112) requires Spill Prevention, Control, and Countermeasure Plans and Facility Response Plans. These plans outline the requirements to plan for and respond to oil and hazardous substance releases. Chapter 12 (2003) of Chief of Naval Operations Instruction (OPNAVINST) 5090.1B also describes the Navy’s requirements for oil and hazardous substance spills.

The **Clean Water Act** prohibits discharges of harmful quantities of hazardous substances into or upon U.S. waters out to 200 nm. Environmental compliance policies and procedures applicable to shipboard operations afloat are defined in OPNAVINST 5090.1B (2002), Chapter 19. These instructions reinforce the Act’s discharge prohibition. The Navy’s Consolidated Hazardous Materials Reutilization and Inventory Management Program (CHRIMP) Manual also contains information to provide to the chain of command, afloat and ashore, to assist in developing and implementing hazardous materials management. Hazardous materials on Navy vessels afloat are procured, stored, used, and disposed in accordance with CHRIMP and related guidance.

In 1999, USEPA adopted a final rule intended to establish **Uniform National Discharge Standards** for 25 discharge sources on U.S. military vessels. The rule exempted 14 additional sources (40 CFR Part 1700). Pursuant to this legislation, State and local governments are prohibited from regulating the 14 discharges exempted from control, but may establish no-discharge zones for them. The discharge standards legislation amended the Clean Water Act to exclude from the definition of “pollutant” a discharge incidental to the normal operation of a vessel of the Armed Forces.

The Environmental and Natural Resource Program Manual, **OPNAVINST 5090.1B** provides Navy policy, identifies key statutory and regulatory requirements, and assigns responsibility for Navy programs, including pollution prevention, clean up of waste disposal sites, and compliance with current laws and regulations for the protection of the environment and natural resources.

“Pollution prevention,” as defined by the **Pollution Prevention Act** of 1990 (PL 101-508, 42 U.S.C. 13101, *et seq.*) and **Executive Order 12856** (Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, 3 August 1993), is “any practice which reduces the amount of a hazardous substance, pollutant or contaminant entering any waste stream or otherwise released to the environment (including fugitive emissions) prior to recycling, treatment or disposal; and any practice that reduces the hazards to public health and the environment associated with the release of such substances, pollutants or contaminants.” The Pollution Prevention Act of 1990 requires the USEPA to develop standards for measuring waste reduction, serve as an information clearinghouse, and provide matching grants to State agencies to promote pollution prevention. Facilities with more than 10 employees that manufacture, import, process, or otherwise use any chemical listed in and meeting threshold requirements of the Emergency Planning and Community Right-to-Know Act must file a toxic chemical source reduction and recycling report.

The **Toxic Substances Control Act** of 1976 (PL 94-469, 15 U.S.C. 2601, *et seq.*) establishes that the USEPA has the authority to require the testing of new and existing chemical substances entering the environment, and, subsequently, has the authority to regulate these substances. The Toxic Substances Control Act also regulates polychlorinated biphenyls.

The **Emergency Planning and Community Right-to-Know Act** of 1986 (EPCRA) as part of the Superfund Amendments and Reauthorization Act Title III establishes the emergency planning efforts at State and local levels and provides the public with potential chemical hazards information. There are two key concepts to understanding EPCRA: (1) EPCRA’s intent to inform the public and (2) a facility has four reporting requirements, defined in part by hazardous substance lists and exemptions, for emergency planning, emergency notification, community right-to-know, and toxic chemical release inventory.

The **Federal Insecticide, Fungicide, and Rodenticide Act** of 1972 regulates the labeling requirement and disposal practices of pesticide usage.

The **Hazardous Materials Transportation Act** of 1975 gives the U.S. Department of Transportation authority to regulate shipments of hazardous substances by air, highway, or rail. These regulations, found at 49 CFR 171–180, may govern any safety aspect of transporting hazardous materials, including packing, repacking, handling, labeling, marking, placarding, and routing (other than with respect to pipelines).

#### *State Regulations*

In 2001, Hawaii was authorized by the USEPA to administer **Resource Conservation and Recovery Act** under the Hawaii’s Hazardous Waste Rules. These rules apply to hazardous waste generators; transporters; owners, and operators of treatment, storage, and disposal facilities; handlers of universal wastes; and handlers of used oil. Hawaii’s Hazardous Waste Rules are modeled after the Federal hazardous waste rules. Hawaii’s Department of Health is

responsible for hazardous waste management. Title 11 of the Hawaii Administrative Rules (HAR) describes the requirements for hazardous waste management.

**Hawaii's Hazardous Waste Law** (Hawaii Revised Statutes [HRS] 342J) authorizes the Department of Health to regulate hazardous waste. Under the Hawaii Hazardous Waste Management Act (HRS Title 19, Health, Chapter 342J), the State hazardous waste management program provides technical assistance to generators of hazardous waste to ensure safe and proper handling. The hazardous waste management program promotes hazardous waste minimization, reduction, recycling, exchange, and treatment as the preferred methods of managing hazardous waste, with disposal used only as a last resort when all other hazardous waste management methods are ineffective or unavailable. The State program is coordinated with Hawaii's counties, taking into consideration the unique differences and needs of each county.

## C.6 Health and Safety

Regulatory requirements related to the **Occupational Safety and Health Act** of 1970 have been codified in 29 CFR 1910, *General Industry Standards*, and 29 CFR 1926, *Construction Industry Standards*. The regulations contained in these sections specify equipment, performance, and administrative requirements necessary for compliance with Federal occupational safety and health standards, and apply to all occupational (workplace) situations in the United States. Requirements specified in these regulations are monitored and enforced by the Occupational Safety and Health Administration, which is a part of the U.S. Department of Labor.

With respect to ongoing work activities, the primary driver is the requirements found in 29 CFR 1910, *Occupational Safety and Health Standards*. These regulations address such items as electrical and mechanical safety and work procedures, sanitation requirements, life safety requirements (fire and evacuation safety, emergency preparedness, etc.), design requirements for certain types of facility equipment (such as ladders and stairs lifting devices), mandated training programs (employee Hazard Communication training, use of powered industrial equipment, etc.), and recordkeeping and program documentation requirements. For any construction or construction-related activities, additional requirements specified in 29 CFR 1926, *Safety and Health Regulations for Construction*, also apply.

**PMRF Instruction 8020.16**, Missile/Rocket Flight Safety Policy, contains safety regulations directed at preventing the occurrence of potentially hazardous accidents and minimizing or mitigating the consequences of hazardous events. This is accomplished by employing system safety concepts and risk assessment methodology to identify and resolve potential safety hazards. PMRF Instruction 8020.16 includes specific appendices for both tracking systems and for flight termination systems.

**OPNAVINST 5100.23G**, Navy Safety and Occupational Health Program Manual, contains policy statements and outlines responsibilities for the implementation of the total safety and occupational health program for the Navy. The Navy's policy is to provide a safe and healthful working place for all personnel.

All work activities undertaken or managed by the U.S. Army Corps of Engineers, which can include many types of Federal construction projects, must comply with the requirements of Engineer Manual 385-1-1, **U.S. Army Corps of Engineers Safety and Health Requirements Manual**. In many respects the requirements in this manual reflect those in 29 CFR 1910 and 1926, but also include U.S. Army Corps of Engineers-specific reporting and documentation requirements.

The **Range Commanders Council (RCC) Standard 321**, *Common Risk Criteria for National Test Ranges*, sets requirements for minimally-acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. Methodologies for determining risk are also set forth.

**RCC 319-92**, *Flight Termination System Commonality Standards*, specifies performance requirements for flight termination systems used on various flying weapons systems.

Requirements pertaining to the safe shipping and transport handling of hazardous materials (which can include hazardous chemical materials, radioactive materials, and explosives) are found in the **Department of Transportation Hazardous Materials Regulations and Motor Carrier Safety Regulations** codified in 49 CFR 107, 171-180 and 390-397). These regulations specify all requirements that must be observed for shipment of hazardous materials over highways (truck shipment) or by air. Requirements include specific packaging requirements, material compatibility issues, requirements for permissible vehicle/shipment types, vehicle marking requirements, driver training and certification requirements, and notification requirements (as applicable).

**Marine Terminals**, 29 CFR 1917, applies to employment within a marine terminal (as defined in 29 CFR 1917.2) including the loading, unloading, movement or other handling of cargo, ship's stores, or gear within the terminal or into or out of any land carrier, holding or consolidation area, and any other activity within and associated with the overall operation and functions of the terminal, such as the use and routine maintenance of facilities and equipment. Cargo transfers accomplished with the use of shore-based material handling devices are also regulated.

#### *Air Installation Compatible Use Zones and Aircraft Safety*

The DoD established the Air Installation Compatible Use Zone (AICUZ) program in 1973 to plan for land use compatibility in areas surrounding military air installations. The purposes of the AICUZ program are to minimize public exposure to safety hazards associated with aircraft operations and to protect the operational capability of an air installation. In addition to noise, the AICUZ program includes analyses of airfield Accident Potential Zones (APZs) and height and obstruction criteria. An AICUZ study has not been prepared specifically for this program.

Guidelines for establishing aviation safety zones around helicopter landing zones include clear zones and APZs. Infrequent helicopter operations require designation of a clear zone, but not APZs. The clear zone for VFR aircraft is the same as the takeoff safety zone. The takeoff safety zone constitutes the area under the approach/departure surface until that surface is 50 to 100 feet above the landing zone elevation. This zone is required to be free of obstructions.

Fleet Area Control and Surveillance Facility Pearl Harbor (FACSFACPH) is responsible for area containment to preclude conflicts with other air traffic under FAA control. FACSFACPH is not responsible for safe separation of aircraft operating under VFR in the Warning Areas. Commanding Officers will ensure that firing exercises and other hazardous operations have been approved and scheduled by the Scheduling Authority. In all live-fire exercises and those involving hazards to other units, final responsibility for ensuring the range is clear rests with the Commanding Officer of the firing unit.

### **Electromagnetic Radiation**

Communications and electronic devices such as radar, electronic jammers, and other radio transmitters produce electromagnetic radiation (EMR). Equipment that produces an electromagnetic field has the potential to generate hazardous levels of EMR. An EMR hazard exists when transmitting equipment generates electromagnetic fields that induce currents or voltages great enough to trigger electro-explosive devices in ordnance, cause harmful effects to people or wildlife, or create sparks that can ignite flammable substances in the area. EMR can pose a health hazard to people or pose an explosive hazard to ordnance or fuels. Hazards are reduced or eliminated by establishing minimum distances from EMR emitters for people, ordnance, and fuels.

### **Explosive Safety Quantity Distance Arcs and Explosives**

The types and amounts of explosives materials that may be stored in an area are determined by the quantity-distance requirements established by the DoD Explosives Safety Board. Explosive Safety Quantity-Distance (ESQD) arcs are defined by the Naval Sea Systems Command, and are used to establish the minimum safe distance between munitions storage areas and habitable structures. To ensure safety, personnel movements are restricted in areas surrounding a magazine or group of magazines.

### **High-Velocity Air**

To a lesser extent than hovercraft operations, high-velocity air also is created near helicopters when they land or take off, or hover within about 50 feet of the water surface. Depending on the ground conditions, a 50- to 100-foot diameter safety zone is required when helicopters take off or land. Military personnel are trained in the correct procedures for approaching helicopters at landing zones, and these areas are generally restricted to military personnel, so the potential for high-velocity air from helicopters to affect public safety is very low.

Most of the naval training operations that take place in the vicinity occur in international waters and airspace. Non-participating aircraft and surface vessels may be present. Notices-to-Airmen and Notice to Mariners are published to inform the public of training activities and exercises in the area that may pose a public safety hazard. In general, if non-participating aircraft or ships are present, hazardous operations are suspended until the range is clear.

## C.7 Land Use

Land use is described as the human use of land resources for various purposes, including economic production, natural resources protection, or institutional uses. Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of uses that are allowable or protect specially designated or environmentally sensitive uses. Potential issues typically stem from encroachment of one land use or activity on another or an incompatibility between adjacent land uses that leads to encroachment.

In the **Federal Coastal Zone Management Act** of 1972 as amended (16 U.S.C. 1651 et seq.), Congress noted a national interest in the effective management, beneficial use, protection, and development of the coastal zone. While areas under the control of the Federal government are, by definition, excluded from a state's coastal zone, Federal agency activities within or outside the zone that affect any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of an approved State Coastal Zone Management (CZM) program. If the Federal agency proponent determines that an effect on coastal resources is reasonably foreseeable, a consistency determination is submitted to the State of Hawaii's CZM Program.

In 2009, the Navy and the Hawaii CZM program developed an updated list of de minimis activities which are expected to have insignificant direct or indirect coastal effects. Those activities are not subject to further review by the Hawaii CZM program.

## C.8 Noise

The **Noise Control Act** (PL 92-574, 42 U.S.C. 4901, et seq.) directs all Federal agencies, to the fullest extent within their authority, to carry out programs within their control in a manner that promotes an environment free from noise that jeopardizes the health or welfare of any American. The act requires a Federal department or agency engaged in any activity resulting in the emission of noise to comply with Federal, State, interstate, and local requirements respecting control and abatement of environmental noise. Federal and State governments have established noise regulations and guidelines for the purpose of protecting citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with noise. The Federal government preempts the State on control of noise emissions from aircraft, helicopters, railroads, and interstate highways.

Noise is typically described as any sound that is undesirable because it interferes with communication. Characteristics of sound include amplitude, frequency, and duration. Sound can vary over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for the measurement of the amplitude of sound because it accounts for the large variations in amplitude and reflects the way people perceive changes in sound amplitude. Sound pressure levels are easily measured, but the physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation by subjective terms such as "loudness" or "noisiness."

Sound also varies with frequency and pitch. When describing sounds and its effects on humans, weighted sound levels, measured in A-weighted decibels (dBA), are typically used to account for the response of the human ear. The term “A-weighted” refers to a filtering of the sound signal to emphasize frequencies in the middle of the audible spectrum and to deemphasize low and high frequencies in a manner corresponding to the way the human ear perceives sound. The American National Standards Institute established this filtering network.

The dBA noise metric describes noise levels in a static way, whereas noise levels are rarely steady and unchanging. Therefore, methods to describe and evaluate changing noise levels over time have been developed. One way of describing fluctuation sound is to describe the fluctuating noise heard over a specific period as if it has been a steady, unchanging sound. To this effect, a descriptor called the equivalent sound level ( $L_{eq}$  or  $Leq$ ) can be computed. The  $Leq$  descriptor is the constant sound level that, in a given situation and time period (e.g., 1-hour  $Leq$ , or 24-hour  $Leq$ ), conveys the same sound energy as the actual time-varying sound.

Alternatively, it is often useful when measuring noise levels to take into account the difference in perception and response between daylight, waking hours and nighttime, sleeping hours. To this end, USEPA has developed a descriptor called the day-night noise level ( $L_{dn}$ , or DNL). DNL is defined as the A-weighted average sound level during a 24-hour period, with a 10-dBA penalty weighting applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) to account for the increased annoyance that is generally felt during normal sleep hours. Many agencies, including the FAA, the Federal Transit Administration, USEPA, the Department of Housing and Urban Development (HUD), and the DoD use DNL as their principal noise descriptor.

The Community Noise Equivalent Level (CNEL) is similar to the A-weighted  $Leq$ , but includes a penalty of 5 dB during evening hours (7:00 p.m. to 10:00 p.m.), while nighttime hours (10:00 p.m. to 7:00 a.m.) are penalized by 10 dB. For outdoor noise, the DNL noise descriptor is usually 0.5 to 1 dB less than CNEL in a given environment.

CNEL and DNL values can be useful in comparing noise environments and indicating the potential degree of adverse noise impact. However, averaging the noise event levels over a 24-hour period tends to obscure the periodically high noise levels of individual events and their possible adverse effects. In recognition of this limitation of the CNEL and DNL metrics, USEPA uses single-event noise impact analyses for sources with a high noise level and short duration.

The maximum sound level ( $L_{max}$ ) is a noise descriptor that can be used for high-noise sources of short duration, such as space vehicle launches. The  $L_{max}$  is the greatest sound level that occurs during a noise event. The term “peak” defines peak sound over an instantaneous time frame for a particular frequency.

The HUD has developed noise standards for determining the acceptability of a project that is assisted by HUD. The HUD generally prohibits projects with “unacceptable” noise exposure as defined in Table C-5. If the DNL exceeds 75 dB, this site is considered unacceptable for residential use. Although these guidelines are not mandatory, they provide the best means of determining noise impacts.

**Table C-5. HUD Site Acceptability Standard**

Noise	Day/Night Sound Level (DNL)
Acceptable	Not exceeding 65 dB
Normally Unacceptable	Above 65 but not exceeding 75 dB
Unacceptable	Above 75 dB

Source: U.S. Department of Housing and Urban Development, 2004

Many agencies, including the DoD, have adopted a DNL of 65 dBA as a criterion that still protects those most impacted by noise and would amount to an annoyance in less than 15 percent of the population (U.S. Department of the Army, 1997). In general, residential land uses are not compatible with an outdoor DNL above 65 dBA, and the extent of land areas and populations exposed to a DNL of 65 dBA or higher provides one of the means for assessing and comparing the noise impacts of proposed actions.

Tables C-6 and C-7 provide common source noise levels and typical construction noise levels respectively. The Occupational Safety and Health Administration has established noise limits for workers. For an 8-hour workday, workers should not be exposed to a continuous noise level greater than 90 dBA. In addition, personnel should not be exposed to noise levels higher than 115 dBA for periods longer than 15 minutes (29 CFR 1910.95, table G-16). For the general public, USEPA recommends a 24-hour average noise level not to exceed 70 dBA in order to prevent measurable hearing loss. Likewise, a 24-hour average noise level of 55 dBA would prevent any activity interference or annoyance.

**Table C-6. Noise Levels of Common Sources**

Source	Noise Level (dBA)	Comment
Air raid siren	120	At 50 feet (threshold of pain)
Rock concert	110	
Airplane, 747	102.5	At 1,000 feet
Jackhammer	96	At 10 feet
Power lawn mower	96	At 3 feet
Football game	88	Crowd size: 65,000
Freight train at full speed	88 to 85	At 30 feet
Portable hair dryer	86 to 77	At 1 foot
Vacuum cleaner	85 to 78	At 5 feet
Long range airplane	80 to 70	Inside
Conversation	60	
Typical suburban background	50	
Bird calls	44	
Quiet urban nighttime	42	
Quiet suburban nighttime	36	
Library	34	
Bedroom at night	30	

Source: Cowan, 1994

**Table C-7. Typical Construction Noise Levels**

Source	Noise level (peak)	Distance from Source			
		50 feet	100 feet	200 feet	400 feet
Heavy Trucks	95	84-89	73-83	72-77	66-71
Dump Trucks	108	88	82	76	70
Concrete Mixer	105	85	79	73	67
Jackhammer	108	88	82	76	70
Scraper	93	80-89	74-82	68-77	60-71
Dozer	107	87-102	81-96	75-90	69-84
Generator	96	76	70	64	58
Crane	104	75-88	69-82	63-76	55-70
Loader	104	73-86	67-80	61-74	55-68
Grader	108	88-91	82-85	76-79	70-73
Dragline	105	85	79	73	67
Pile Driver	105	95	89	83	77
Fork Lift	100	95	89	83	77

Source: Golden et al., 1980

## C.9 Socioeconomics

Socioeconomics describes the social and economic character of a community through the review of several metrics including population size, employment characteristics, income generated, and the type and cost of housing. This section presents a socioeconomic overview of the region.

## C.10 Transportation

### Ground Transportation

Traffic circulation refers to the movement of ground transportation vehicles from origins to destinations through a road and rail network. Roadway operating conditions and the adequacy of the existing and future roadway systems to accommodate these vehicular movements usually are described in terms of the volume-to-capacity ratio, which is a comparison of the average daily traffic volume on the roadway to the roadway capacity. The volume-to-capacity ratio corresponds to a Level of Service (LOS) rating, ranging from free-flowing traffic conditions (LOS A) for a volume-to-capacity of usually less than 30 percent of the roadway capacity to forced-flow, congested conditions (LOS F) for a volume-to-capacity of 100 percent of the roadway capacity (Department of Defense, 2004).

### Waterways

Water traffic is the transportation of commercial, private, or military vessels at sea, including submarines. Sea traffic flow in congested waters, especially near coastlines, is controlled by the use of directional shipping lanes for large vessels (cargo, container ships, and tankers). Traffic flow controls also are implemented to ensure that harbors and ports-of-entry do not become congested. There is less control on ocean traffic involving recreational boating, sport

fishing, commercial fishing, and activity by naval vessels. However, Navy vessels follow military procedures and orders (e.g., Fleet Forces Command) as well as Federal, State, and local marine regulations. In most cases, the factors that govern shipping or boating traffic include adequate depth of water, weather conditions (primarily affecting recreational vessels), the availability of fish of recreational or commercial value, and water temperature (higher water temperatures will increase recreational boat traffic and diving activities) (Department of Defense, 2004).

## **Airways**

Air transportation is the movement of aircraft through airspace. Airspace is described above.

## **C.11 Water Resources**

### **Regulatory Context**

#### *Federal*

The objective of the **Clean Water Act** and its amendments is to “restore and maintain the chemical, physical and biological integrity of the nation’s waters.” The overall goal of the Clean Water Act is to produce waters of the United States that are “fishable and swimmable.” Under the Clean Water Act, the Federal government delegated responsibility for establishing water quality criteria to each State, subject to approval by the USEPA.

A primary means of evaluating and protecting water quality is establishing and enforcing water quality standards. Water quality standards consist of:

- Designated beneficial uses of water (for example, drinking, recreation, aquatic life);
- Numeric criteria for physical and chemical characteristics for each type of designated use;
- An “antidegradation” provision to protect uses and water quality.

In accordance with the Clean Water Act, States define the uses of waters within their borders, and each water body must be managed in accordance with its designated uses. Water quality standards are established for each designated use. Standards must be at least as stringent as those established by the USEPA. Most States have adopted the USEPA standards.

Under Section 313 of the Clean Water Act, Federal agencies must comply with all Federal, State, interstate, and local requirements to control and abate water pollution. Compliance includes managing any activity that may result in the discharge or runoff of pollutants. The Clean Water Act does not apply, however, to Navy operations more than 3 nm from the shoreline of the United States.

Water bodies that do not meet designated minimum quality standards are listed as “impaired” waters. For impaired water bodies, States are expected to develop Total Maximum Daily Loads, which are the amounts of pollutants that can be delivered to a body of water without exceeding the water quality standards. Based on the Total Maximum Daily Loads that are

developed, the State can limit discharges of pollutants to achieve the minimum water quality standards. Hawaii has identified 70 streams and 174 coastal stations as impaired waters.

In accordance with Executive Order 11988 (Floodplain Management), each Federal agency shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

#### *State*

**HAR Chapter 11-54** authorizes the Hawaii Department of Health to regulate the existing uses and level of State water quality necessary to protect and maintain the existing uses. State waters are classified as either inland waters or marine waters.

**HRS Section 339** authorizes the Hawaii Department of Health to regulate and control litter. Littering means placing, throwing, or dropping litter on public or private property or in any public or private waters except:

1. In a place which is designated by the department or the county for the disposal of garbage and refuse;
2. Into a litter receptacle; or
3. Into a litter bag, provided that the bag is disposed of properly into a litter receptacle or in a place designated by the department or the county for disposal of garbage and refuse.

“Waters of the State” means any stream, river, ocean, canal, harbor, bay, or the like located within the territorial limits of the State.

**HRS Chapter 342D** authorizes Hawaii's Department of Health to regulate water quality in Hawaii. Hawaii's water quality regulations are found in HAR Title 11, Chapters 54, 55 (Water Pollution Control), 62 (Wastewater Systems), and 64 (Water Quality Standards). The Department of Health Clean Water Branch protects coastal and inland water resources; its Safe Drinking Water Branch safeguards Hawaii's potable surface and ground waters; and its Wastewater Branch regulates water pollution control and wastewater treatment plants. The Clean Water Branch administers the Federal National Pollutant Discharge Elimination System program and issues State water quality certifications under Section 404 of the Clean Water Act.

The **Non-Point Source Pollution Management and Control Law** (HRS 342E) authorizes the Department of Health to regulate the runoff of polluted water into lakes, streams, and coastal waters. This program was established pursuant to portions of the Federal Water Pollution Control Act and Coastal Zone Act Reauthorization Amendments.

Water quality is evaluated relative to criteria established under **State Water Quality Standards (HAR 11-54)**. A water body may be polluted by a point source (e.g., sewage or industrial plant outfall) or by non-point-source pollution, which is caused by precipitation moving over and through the ground, picking up and carrying pollutants and depositing them in water bodies. Examples of non-point-source pollution are runoff from agricultural fields and urban streets.

Water quality is an increasing concern in Hawaii. Hawaii's Department of Health is promulgating contaminant Total Maximum Daily Loads for impaired surface waters, pursuant to Section 303(d) of the Clean Water Act that will further restrict the allowable amounts of pollutants in surface runoff.

Training activities that disturb vegetation or soils can increase sediment concentrations. Training may also result in releases of petroleum products and other pollutants to surface waters. On live-fire ranges, explosive and propellant residues, residues from munitions remnants (e.g., heavy metals), and residues from targets could be a particular concern. At some point, further increases in training operations may conflict with achieving and maintaining Federally mandated Total Maximum Daily Loads.

The State's 1991 **Hawaii Ocean Resources Management Plan (ORMP)** identified strategies for conserving and enhancing ocean resources, and for coordinating the resource management efforts of State agencies. The ORMP was updated in 2006. The September 2006 Draft ORMP focuses on (a) reducing pollutant discharges into the ocean, (b) resolving conflicts between expanded urban development, increased tourism, and resource conservation, (c) addressing a trend toward decreased agricultural runoff and increased urban runoff, and (d) managing increased vessel traffic.

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**Appendix D**  
**Missile Launch Safety and**  
**Emergency Response**



# APPENDIX D

## MISSILE LAUNCH SAFETY AND EMERGENCY RESPONSE

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This appendix discusses in general terms the potential health and safety hazards associated with missile launch operations and the corresponding procedures that are in place to protect people and assets. The information herein focuses on the nature and control of the potential hazards and public risks associated with pre-launch, launch, and emergency response.

While range safety is location, facility, and mission-dependent, the Department of Defense has established standards and protocols to eliminate or acceptably minimize potential health and safety risks/hazards. For missile operations, the safety offices coordinate efforts and standards through the Range Safety Group of the Range Commander's Council (RCC). Three key products of this group are the following documents:

- RCC Standard 319, Flight Termination Systems Commonality Standard
- RCC Standard 321, Common Risk Criteria for National Test Ranges, Subtitle: Inert Debris
- RCC Standard 324, Global Positioning and Inertial Measurements Range Safety Tracking Systems Commonality Standard

The Pacific Missile Range Facility (PMRF) Range Safety Office is an active participant in the Range Safety Group, and the Range mandates specific policies that follow from these guidance documents in *PMRF Instruction 8020.16, Missile/Rocket Flight Safety Policy*.

Safety regulations are directed at preventing the occurrence of potentially hazardous accidents and minimizing or mitigating the consequences of hazardous events. This is accomplished by employing system safety concepts and risk assessment methodology to identify and resolve potential safety hazards.

The range safety process is predicated on managing risk by avoiding hazard-producing situations when possible or limiting the probability of a hazardous release, limiting the consequences of accidents, and limiting the exposure of people to hazards. Risk values related to missile launch activities are categorized in two ways: probability of each event that may produce debris, including all possible failure modes that *could* lead to debris impact events, and the probabilities of the adverse consequences that could result from impact events. The consequence estimation is quantified by two key measures: the probability of individual casualty, defined as the probability of a person at a given location being injured, or the expected number of casualties (collective risk), defined as the average number of persons who may be severely injured or killed in a launch (typically a very small number, such as a few injuries per million launches).

Range safety is accomplished by:

- Establishing requirements and procedures for storage and handling of propellants, explosives, radioactive materials, and toxics
- Evaluating mission plans to assess risks and methods to reduce risk
- Establishing performance and reliability requirements for flight termination systems (FTSs) on the vehicle
- Employing a real-time tracking and control system at the range
- Establishing mission rules that are sufficient to provide the necessary protection to people both on and outside the boundaries of the launch facility

Procedures and analyses to protect the public can be generally divided into five aspects:

- Ground safety procedures—handling of propellants, ordnance, noise, hazardous operations, toxics, etc.
- Pre-flight mission analysis—vehicle, trajectory, etc.
- FTS verification
- In-flight safety actions
- Emergency response

### **Ground Safety Procedures**

Procedures have been established to handle and store all materials (propellants, etc.) which may be a hazard, control and monitor electromagnetic emissions, and govern transportation of materials to and from a facility. Storage of propellants and explosives is controlled by quantity–distance criteria. Failure modes and effects analyses are prepared when necessary for all potentially hazardous activities and devices.

Accidents that occur before launch can result in on-pad explosions, potential destruction of the vehicle, damage to facilities within range of the blast wave, and dispersion of debris in the vicinity of the pad. The types of accidents depend on the nature of the propellants. An accident in handling storable hypergolic propellants could produce a toxic cloud, likely to move as a plume and disperse beyond the boundaries of the facility. The risk to the public would then depend on the concentration of population in the path of this toxic plume and on the ability to evacuate or protect the population at risk until the cloud is dispersed. It is obviously advantageous if the winds generally blow away from populated areas. There are also specific safety requirements and risks associated with ground support equipment. The design and use of this equipment must incorporate safety considerations.

In order to protect personnel and the public from these types of hazards, careful analysis is performed. Each missile is evaluated for the toxic release hazard and explosive potential. When appropriate, more detailed modeling of the transport of the toxic species is performed that incorporates atmospheric effects, such as local winds and turbulence. Where needed, a region may then be cleared of personnel. At PMRF, the amount of toxic substances is sufficiently small that the public is highly unlikely to be exposed to unhealthful levels of toxic chemicals from

a missile accident. However, the range safety community has extensive experience with this type of hazard due to the large amount of toxic chemicals aboard some large space lift vehicles. When considering explosive potential, again each missile is evaluated for the hazard posed. Specific action is then taken to protect personnel within the higher risk region, such as ensuring that they are inside hardened structures (such as block houses) that will protect them from the blast wave. Although large explosions can lead to effects relatively far from the launch pad, the motors proposed at PMRF are small compared to the large space lift vehicles, and the possibility of injury to a person outside the ground hazard area from a missile explosion is extremely remote.

### **Pre-Flight Mission Analysis**

Maximizing the probability of a successful mission while assuring public safety is not compromised is accomplished through careful mission planning, preparation, and approval before launch. Missions may have risk to the public from planned impacts of missile components (e.g., stages), from hit-to-kill intercept produced debris, and from debris resulting from termination of a malfunctioning missile. Falling components or debris can cause hazard to people by kinetic impact and secondary effects. Kinetic impact hazards occur when debris is large enough and falls sufficiently fast to directly injure a person or cause damage to a structure or vehicle with a person inside. Secondary effects can occur from solid propellant pieces or intact components with liquid propellants. These include explosion or fire upon impact and the release of toxic combustion products from the burning propellants.

Planning occurs in two phases:

- Mission definition such that land overflights or other higher risk aspects of launch are avoided and/or minimized
- Development of data that support the real-time decision and implementation of active control and flight termination activities

### *Range Safety Planning*

The actual implementation of operational plans under launch conditions ultimately determines the actual risk exposure levels on and off site. Integral to the analysis are the constraints posed by the following:

- Launch area/range geometry and siting
- Nominal flight trajectories/profiles
- Launch/release points
- Impact limit lines
- FTS and criteria
- Wind/weather restrictions
- Instrumentation for ground tracking and sensing onboard the vehicle
- Essential support personnel requirements

The Range Safety Office typically reviews and approves launch plans, imposes and implements flight termination lines, and verifies that appropriate warning areas have been published.

The launch (normal and failure) scenarios are modeled, and possible system failure modes are superimposed against the proposed nominal flight plan. The hazard to third parties is dependent on the vehicle configuration, flight path, launch location, weather, and many other factors.

A blast danger area around the missile on the launch pad and a launch danger area (typically a circle centered on the pad with tangents extended along the launch trajectory) are prescribed for each missile depending on its type, configuration, amount of propellant and their toxicity, explosive blast wave potential, explosive fragment velocities anticipated in case of an accident, typical weather conditions, and plume models of the launch area.

Each launch is evaluated based on:

- Range user data submission requirements from the hazard analysis viewpoint
- Missile analyses to determine all significant failure modes and their corresponding probability of occurrence
- The vehicle malfunction trajectories which are evaluated to determine debris generating events, such as explosions, structural failure or flight termination, and the resulting impact probability density functions.
- Geometries of proposed hit-to-kill intercepts.
- The vehicle casualty area based on anticipated (modeled) conditions at the time of impact, based on the vulnerability of people, buildings, and vehicles to the hazards to which they may be exposed,
- Computed casualty expectations given the specific launch and mission profile, population data near the range and along the ground track. Shelters may be provided or evacuation procedures adopted, in addition to restricting the airspace along the launch corridor and notifying the air and shipping communities to avoid and/or minimize risks

### *Launch Hazards*

Failures during the launch and ascent can be divided into two categories: on-trajectory failures and malfunction turns. FTSs are employed to control the risk from malfunctioning missiles. This is accomplished by limiting the excursions from the planned flight corridor and/or reducing the possibility of large secondary explosions upon ground impact.

Some FTSs are destructive. On many vehicles that have cryogenics the FTS opens holes on the opposite ends of the fuel tanks. A number of FTS designs are employed for solid rocket motors: For example, linear shaped charges that run the length of the rocket may be used to open the side of the casing like a clam shell, causing an abrupt loss of pressure and thrust. Another example is dome cutter charges that open the top of the motor and thus nullify thrust.

Non-destructive flight termination mechanisms have also been employed. Opening thrust termination ports on missiles with these designed into the domes of the missile is an example of this. Flight termination for small missiles with boosters with short burn times may consist of allowing the active stage to burn until fuel depletion, while jettisoning the upper stages after safing the ignition mechanism. This renders the missile unstable, causing it to tumble and fall to the earth prior to reaching populated areas. Other strategies to cause a vehicle to tumble may also be employed, such as moving control flaps to a hard-over position.

There are a variety of causes of on-trajectory failures; all of these failure modes cause the missile to lose thrust and fall to the ground in the vicinity of the planned flight track. Some failure modes will result in an explosion of the missile or break up under aerodynamic stress loads. Others will allow the missile to impact the ground without breaking up. The debris from these types of failures typically falls on or very near the intended flight track. If the missile falls to the ground intact, the consequences may be similar to those of an explosion on the ground. An explosion leads to a blast wave, which can directly injure people or damage structures with people inside. If there is potential for a significant explosion, a vehicle is destroyed during descent to prevent an impact intact. An example of a propulsion failure is a solid-rocket motor burn-through. Solid rocket motor failures can be due to a burn-through of the motor casing or damage or burn-through of the motor nozzle. In a motor burn-through there is a loss of chamber pressure and an opening is created in the side of the case, frequently resulting in structural breakup. The nozzle burn-through may affect both the magnitude and the direction of thrust. There is no way to halt the burning of a solid rocket once initiated. Hence, a solid rocket motor failure almost inevitably puts the entire missile and mission at risk.

The Range Safety System is critical to control the risk from malfunction turns. The purpose of the Range Safety System is to limit the dispersion of missile debris off-range where it may become capable of causing damage or loss of life. Without an FTS, an errant missile could continue flying toward a population center or other valuable asset. The debris could then injure people or cause considerable damage. The FTS generally is activated either on command or automatically soon after the time of failure.

In addition to complete loss of control, three other early flight guidance and control failures have been observed with missiles: failure to pitch over, pitching over but flying in the wrong direction (i.e., failure to roll before the pitchover maneuver), and having the wrong trajectory programmed into the guidance computer. The likelihood of these circumstances depends on the type of guidance and control used during the early portion of flight. The types are open or closed loop (i.e., no feedback corrections) and programmer or guidance controlled. In the case of vehicles that use programming and open-loop guidance during the first portion of flight, failure to roll and pitch is possible, although relatively unlikely, based on historical flight data. If the vehicle fails to pitch over, it rises vertically until it is destroyed. As it gains altitude, the flight termination debris can spread over an increasingly larger area. Consequently, most ranges watch for the pitch-over, and if it does not occur before a specified time, they destroy the vehicle before its debris pattern can pose significant risk to structures and people outside the launch facility or the region anticipated to be a hazard zone, where restrictions on airspace and ship traffic apply. Failure to halt the vehicle within this time can produce a significant risk to those not associated with launch operations.

The potential for damage to ground sites from a missile generally decreases with time into flight since fuel is consumed as the vehicle gains altitude. If it breaks up or is destroyed at a higher

altitude, the liquid fuels are more likely to be dispersed and lead to lower concentrations on the ground. In addition, if there are solid propellants, they would have been partially consumed during the flight period before the failure and would continue to burn in free fall after the breakup.

### *Risk Modeling*

The evaluation of launch associated hazards is based on range flight termination criteria designed to minimize risk exposure to on- and off-range population and facilities.

Range safety reports, safety analysis reports, and other such probabilistic hazard analyses are prepared by range users for each vehicle. An updated data package is provided for each mission with key unique parameters, such as the flight paths and minor vehicle changes.

Modeling by the Range Safety Office computes risks based on estimating both the probabilities and consequences of launch failures as a function of time into the mission. Input data includes the mission profile, missile specifics, local weather conditions, and the surrounding population distribution. In many cases, the Range works in advance with the user to optimize a launch trajectory to minimize risk while meeting mission objectives. Flight termination lines, which will be implemented in real-time, are established during the risk evaluation process to confine and/or minimize potential public risk of casualty or property damage. The debris impact probabilities and consequences are then estimated for each launch considering the geographic setting, normal jettisons, failure debris, and demographic data.

For all launches, the boosters, sustainers, and other expendable equipment are always jettisoned and fall back to the Earth. Therefore, in planning a mission, care must be taken to keep these objects from impacting on land, aircraft, and shipping lanes. These impact locations are normally quite predictable, so risks can be avoided on a nominal mission.

Flight termination lines are designed to protect the public from launch accident debris and are a key result in the risk modeling. They are offset from populated areas to accommodate:

- Vehicle performance characteristics and wind effects
- The scatter of vehicle debris following an explosion
- The accuracy and safety-related tolerances of the vehicle tracking and monitoring system
- The time delays between the impact point impingement on a flight termination line and the time at which flight termination actually takes place (i.e., human decision time lag)

By proper selection of flight termination lines, the probability of debris impacting inhabited areas can be reduced to extremely small levels.

The first step in modeling debris from failures is to understand the type of failures to which a particular vehicle may be subject. Estimates for failure mode probabilities are typically based on knowledge of a vehicle's critical systems and expert assessment of their reliability combined with historical data, when available.

Then the response of the vehicle to each failure must be modeled. Simulation of the vehicle systems and the resulting vehicle trajectory allow for understanding the effects of a failed component. The modeling is very vehicle-specific until thrust is terminated (by direct result of the failure, automatic on-board termination, flight safety action, or aerodynamic breakup). If the vehicle breaks apart or is destroyed the resulting debris is then characterized by both aerodynamic properties and properties that affect the consequences if it impacts a person or object. There is inherent uncertainty in these parameters, which is included in the risk modeling.

#### *Hit-to-kill Intercept Hazards*

The objective of a hit-to-kill intercept mission is for an interceptor missile to destroy a target missile which simulates a threat. This collision typically occurs at very high speeds and by its very nature produces many (mostly small) pieces of debris. The debris spreads in every direction from the event at high speeds. Therefore, a large field of debris is potentially generated by the intercept. The characteristics of the debris created by the intercept depend on the geometry of the intercept and the properties of the missile components that collide.

For each mission, there is uncertainty in the geometry of the mission, due to performance variability in the interceptor and the target. Therefore, the range safety office interacts with the program to define a Range Safety Support Volume. The Range Safety Support Volume is a region in space where intercepts will be allowed to occur. Risks from engagements at all corners of the Range Safety Support Volume are evaluated (assuming they occur) as part of the mission planning process to ensure that the risk from each corner is acceptable (additional intermediate geometries are evaluated as necessary). If, once a mission begins, the intercept is predicted to occur outside the region (such as due to an unplanned deviation of one of the missiles) termination action is taken to prevent the intercept, thus preventing debris from occurring outside planned areas.

Modeling of the intercept event is performed to determine the characteristics of the debris resulting from the collision. High-energy collisions of two missiles are characterized by complex physics. Computer modeling programs based on physical principles and empirical data are used to predict the size, mass, shape, and velocity of the resulting debris. Characterization of the velocities of the debris pieces is important to determine the spread of the debris after the intercept. Determination of the masses is critical for determining how much of the debris poses a hazard.

#### *Propagation and Consequence Modeling*

A second phase of modeling occurs to propagate the debris to a hazarded object and determine the effects of the impacting debris on the object. Debris propagates ballistically: the only forces are drag, random lift, and gravity. Fragment ballistic coefficient ( $\beta$ ), the ratio of the fragment's weight to the product of its drag coefficient and reference area, is directly related to the effect of winds and the atmosphere on fragment trajectories. Debris that has a high ballistic coefficient is less affected by the atmosphere and will tend to land closer to the vacuum instantaneous impact point than lower ballistic coefficient pieces. High ballistic coefficients can be associated with pumps, other compact metal equipment, etc. Panels or pieces of motor and rocket skin offer a high drag relative to their mass (a low ballistic coefficient) and consequently slow down much more rapidly in the atmosphere. After slowing down they tend to fall and drift with the wind. A piece of debris with a very low ballistic coefficient (e.g.  $\beta < 1$ ) stops its forward flight almost immediately and drifts to impact in the direction of the wind. Pieces having intermediate value ballistic coefficients show a combination of effects. The uncertainties in the wind and

aerodynamics of the pieces are accounted for during this stage, resulting in a dispersion of debris. Debris from events outside the atmosphere fall (or rise, then fall) without lift or drag until they enter the atmosphere (due to gravity).

For each debris piece that may impact, the consequence is then modeled. Impacting missile fragments can be divided into four categories:

- Inert pieces of vehicle structure,
- Pieces of solid propellant (some of which may burn up during free fall),
- Vehicle structures which contain propellant (solid or liquid) that may continue to burn after landing (but are non-explosive), and
- Fragments which contain propellant and which can explode upon impact

The extent of the threat from a single fragment impact is quantified by the “casualty area” (or more generally, the “vulnerable area,” if the consequence being considered is something other than a casualty). For an unsheltered person, the casualty area of an impacting fragment is the area about the fragment impact point within which a person would become a casualty. Fragments which are too small (as typically measured by the kinetic energy of impact) to cause a casualty have zero casualty area. Casualties may result from a direct hit, from a bouncing fragment, from the overpressure pulse created by an explosive fragment, from a fire or toxic cloud produced by the fragment or some combination thereof. The hazard area is increased if a fragment has any significant horizontal velocity component at impact which could result in bouncing or other horizontal motion near ground level. For people in structures, the casualty area is also affected by the building type. Usually structures protect people inside from debris, but impact of a very large fragment may also cause portions of a building to collapse, and the people inside are then also hazarded by the debris from the structure. From a consequence standpoint, the pieces having a higher ballistic coefficient impact at a higher velocity (and usually have larger mass) so can cause more severe injuries and more damage.

Small debris is more hazardous for people in aircraft than it is for people on the ground, for two reasons. First, aircraft move very fast (typically much faster than debris is falling), and thus the kinetic energy of the impact (one half the fragment mass multiplied by the impact *velocity squared*) for the same fragment is much larger when an aircraft collides with a fragment than when a fragment hits a (nearly) stationary person. Second, damage on many locations on an the aircraft may cause a catastrophic crash, which of course leads to casualties of passengers on board, and thus the casualty area is augmented by the area of the aircraft. Studies have been performed to determine the effective casualty area of fragment when impacting with different types of aircraft, and these are incorporated in the modeling of risk to people on aircraft.

In many ways ships are like structures on the ground in that the ship structure typically protects people from small debris. However, a large piece of debris can potentially cause catastrophic damage to a ship. Therefore, the catastrophe scenario, as discussed for aircraft, is also considered when estimating the hazard to people on board ships.

The regions or areas exposed to accident hazards must be identified and the vulnerability to debris quantified. This is called population modeling. A population model includes the location and number of groups of people as well as the types of structures they are in.

The final step is the computation of risk, both individual probability of casualty and collective expectation of casualty. This calculation incorporates the debris dispersion, the consequence determination, and the population model.

#### *Safety Criteria*

Acceptable risk criteria at PMRF are derived from the guidance of RCC 321. RCC 321 is periodically updated, and PMRF criteria are updated, as appropriate, in response to the changes. The primary criteria are currently (RCC 321-07) as follows (per mission):

For Mission-Essential personnel and Critical Operations Personnel,

- probability of casualty for each individual must be less than ten in a million ( $1 \times 10^{-5}$ ),
- total expectation of casualty must be less than three hundred in a million ( $3 \times 10^{-4}$ ),

For the General Public,

- probability of casualty for each individual must be less than one in one million ( $1 \times 10^{-6}$ ),
- total or collective expectation of casualty must be less than one hundred in a million ( $1 \times 10^{-4}$ ).

These criteria apply to people regardless of where they are located (e.g., unsheltered, in buildings, on ships, or in aircraft). RCC 321 also suggests approaches for practically applying these criteria to manage risk to people in different vehicle types and provides conservative guidelines characterizing the vulnerability of people, vehicles, and structures to impacting debris and blast overpressures.

#### *Aircraft and Ship Clearance Procedures*

The criteria above are used to determine clearance area for aircraft and ships. Larger warning areas are also published that include the entire region where a hazard may exist. The hazard region for aircraft from an intercept event may be large as a result of the large dispersion of small pieces (which, as discussed above, are not hazardous to relatively slow moving people, vehicles, and structures).

For aircraft, clearance and warning areas are distributed through the Airmen's Information System and the Notice to Airmen (NOTAM) System. The Airmen's Information System consists of civil aeronautical charts and publications, such as airport/facility directories, published and distributed by the Federal Aviation Administration, National Aeronautical Charting Office. The aeronautical charts and the airport/facility directories contain more permanent data and are the main sources to notify airmen of changes in or to the National Airspace System.

The NOTAM System is a telecommunication system designed to distribute unanticipated or temporary changes in the National Airspace System, or until aeronautical charts and other publications can be amended. This information is distributed in the NOTAM Publication. The NOTAM Publication is divided into four parts: (1) NOTAMs expected to be in effect on the date of publication, (2) revisions to Minimum En Route Instrument Flight Rules Altitudes and Changeover Points, (3) international—flight prohibitions, potential hostile situations, foreign notices, and oceanic airspace notices, (4) special notices and graphics such as military training areas, large scale sporting events, air shows, and airport specific information—Special Traffic Management Programs. Notices in Sections 1 and 2 are submitted through the National Flight Data Center, ATA-110. Notices in sections 3 and 4 are submitted and processed through Air Traffic Publications, ATA-10. Air Traffic Publications, ATA-10 issues the NOTAM Publication every 28 days.

For ship protection, clearance and warning areas are provided to the Coast Guard. The Coast Guard District is responsible for developing and issuing Local Notices to Mariners. Local Notices to Mariners are developed from information received from Coast Guard field units, the General Public, U.S. Army Corps of Engineers, U.S. Merchant Fleet, National Oceanic and Atmospheric Administration, National Ocean Service, and other sources, concerning the establishment of, changes to, and deficiencies in aids to navigation and any other information pertaining to the safety of the waterways within each Coast Guard District. This information includes reports of channel conditions, obstructions, hazards to navigation, dangers, anchorages, restricted areas, regattas, information on bridges such as proposed construction or modification, the establishment or removal of drill rigs and vessels, and similar items.

### **Range Safety System Certification**

In order for mission rules such as flight termination limits to be implemented, the range safety system must work, especially the FTS. For tracking (position and velocity data), multiple reliable, independent sources are required for each vehicle. Extensive effort is applied to the certification of the FTS. PMRF Instruction 8020.16 includes specific appendices for both tracking systems and for FTSs.

Tracking systems include both ground based systems (i.e., radar) and on-board systems (i.e., global positioning systems). Radar systems have been used extensively at PMRF for many years, and have very high reliability, having successfully tracked many vehicles. Radar tracking can either be performed to track a beacon on-board the vehicle or in skin-track mode. On-board data is sent to the ground through telemetry. On-board systems typically have very high accuracy. The standards in *RCC Standard 324, Global Positioning and Inertial Measurements Range Safety Tracking Systems Commonality Standard* provide guidance and specifications for testing of these systems to ensure their reliability.

An FTS consists of several components. The ground unit contains a transmitter, which can send simple tones on a mission-specific radio frequency. On the vehicle there is a radio receiver and a termination system. The termination system may either be a non-destructive thrust-termination action or a destruct charge that breaks apart the vehicle. The choice of the system depends on mission, vehicle, and safety constraints. This system must have high reliability, and numerous tests are performed on each FTS unit to ensure that it will work throughout all conceivable missile flight environments. *RCC Standard 319, Flight Termination Systems Commonality Standard* provides guidance and specifications for testing of these systems to ensure their reliability.

## **In-flight Safety Actions**

In real-time, the impact points of debris are calculated based on the computed current position and velocity of the vehicle. The impact points are computed based on telemetered data from on-board guidance sets or GPS and/or radar measurements of the vehicle position and velocity. These are displayed to the Missile Flight Safety Officer, who monitors them relative to prescribed flight termination lines. If the vehicle encroaches on these lines, a flight termination decision is made or withheld according to clearly formulated flight termination criteria. A backup system during early flight is visual observation, where an observer watches the vehicle through a “skyscreen” with pre-determined boundaries. The observer advises the Missile Flight Safety Officer through handheld radio whether the missile is within the acceptable flight corridor.

Early in the flight the (predicted) instantaneous impact point advances slowly. As the vehicle altitude, velocity, and acceleration increase, the instantaneous impact point change rate also increases from zero to several miles per second. It is the instantaneous impact point that the Range Safety Officer usually observes during a launch. Prior to launch a map with lines indicates the limits of excursion, which, when exceeded, would dictate a command signal to terminate flight.

Generally, the on-board FTS is not activated early in flight (during the first few seconds or so) in order to protect valuable launch assets. Debris from such accidents will land within the ground hazard area.

## **Emergency Response**

PMRF has an Emergency Response Plan that defines the initial response requirements and procedures to be implemented in the event that a missile malfunction and/or flight termination occurs during flight activities. The following paragraphs present a general description of the emergency response process.

Initial response to any areas impacted by flight hardware shall be to secure and render safe the area for follow-on recovery and restoration activities. All areas affected by ground impact of flight hardware shall be cleared of all recoverable debris and environmentally restored. The recovery of launch hardware shall be accomplished in a manner consistent with each launch location’s requirements as set forth in applicable environmental documentation and conditions specified by the appropriate land owner.

In the event of a flight termination or malfunction, Flight Safety would immediately determine the projected impact area(s) for all debris and flight hardware. The Emergency Response Coordinator would be notified, and the Emergency Response Plan would be initiated.

An initial assessment team would be immediately dispatched to the predicted impact area(s) to assess the situation.

Key elements of information to be obtained by the initial assessment team include:

- Exact impact location(s)
- Extent and condition of impact location(s)

- Personnel injuries
- Indications of fires and/or hazardous materials releases
- Extent of property damage

Results would be reported to the Emergency Response Coordinator as expeditiously as possible. Based on this assessment, the Emergency Response Coordinator would call up and dispatch to the impact site(s) the appropriate elements of a contingency team.

The Contingency Team would be designated by the Emergency Response Coordinator and would consist of those elements determined to be required, based on the initial assessment. Elements that may be included on the Contingency Team may include, depending on the situation, communications, logistics, public affairs, staff judge advocate, security, health and safety, Explosive Ordnance Disposal, recovery, fire safety, and civilian agency personnel.

The initial priorities for the Contingency Team are the following:

- Provide emergency rescue and/or emergency medical treatment
- Establish site security
- Contain, control, and extinguish fires
- Confine hazardous materials

All elements of the Contingency Team would be under the control of an On Scene Incident Coordinator, designated by the Emergency Response Coordinator. The On Scene Incident Coordinator would retain on-scene control of all initial response elements until initial response operations are complete and recovery and site restoration activities commence.

The highest priorities during any emergency response operation are the rescue of injured or trapped personnel and the control of any fires produced by a launch or impact event. Rescue of injured and trapped personnel is of the highest priority. Responsibility for emergency rescue is shared among all initial response personnel but most especially by the first-on-scene security personnel and the fire response units (military or civilian). Rescues should be attempted using appropriate safety equipment and protective clothing (i.e., respirators, protective clothing, etc., as necessary). Since rescue may require entry into the impact area, care should be taken to avoid hazards associated with hazardous debris or fires. Under no circumstances shall rescue personnel unnecessarily endanger themselves during rescue activities. Rescue personnel should *never* require rescue by other response personnel.

Emergency response operations are complete once all impact sites have been secured, rescue operations are completed, any fires have been extinguished, and initial site reconnaissance has been performed. Recovery and site restoration activities can then be initiated. Using the results of the initial site reconnaissance, plans would be developed for the recovery of all debris and the restoration of the site(s) to natural conditions.

Additional post-launch recovery and restoration areas may be determined by the launch operator before and throughout mission-specific operations. The recovery of launch hardware would be accomplished in a manner consistent with the launch site procedures, and requirements set forth in applicable environmental documentation and conditions specified in agreements with appropriate land owners.

The launch site operator is responsible for planning, performance, and control of launch activities. This includes:

- Using results of analysis provided by Flight Safety to determine flight hardware impact zones which fully encompass the areas designated in the analysis
- Ensuring that appropriate agreements with all affected landowners are in place and adequately address recovery requirements
- Coordinating with local civilian authorities concerning recovery requirements
- Providing recovery plans to applicable agencies/personnel in accordance with current launch site policies
- Establishing appropriate travel routes (ground/air) prior to launch activities to outline access into recovery areas
- Perform visual inspections and obtain radar data to insure expeditious recovery of the missile
- Ensure complete recovery of missile hardware

The recovery team is responsible for the recovery of all missile debris and restoration of impact areas to their natural condition. Recovery personnel would have overall responsibility for controlling recovery and restoration operations. Air units composed of helicopters and support equipment would transport recovery personnel to road-inaccessible impact sites. Air support equipment would also transport the missile components out of all land and near-shore impact sites and perform quality assurance inspections or sweeps to ensure proper recovery procedures.

Each launch location is subject to all Federal and State regulations involving waste/material handling and disposal, endangered species, and historical resource preservation. Implementation of these regulations may require the assistance of civilian agencies and law enforcement authorities during recovery and restoration activities. Civilian assistance would be requested by each launch location in accordance with existing agreements.

The following is a list of personnel, equipment, transportation, and operational requirements that typically would be necessary to perform recovery activities.

*Personnel*

- Helicopter pilots
- Helicopter co-pilots
- Helicopter crew chief
- Explosive Ordnance Disposal personnel (two)

- Recovery personnel
- Project representative
- Owner representative (if required by controlling agent)
- Environmental representative (if required by controlling agent)

### *Roadblocks*

Roadblocks shall be utilized to limit unauthorized access into recovery areas that include locations in the vicinity of public roadways or thoroughfares. The Recovery Team Coordinator would designate appropriate roadblock locations on roads leading into recovery areas. Roadblocks would be coordinated by the launch site security personnel, augmented as needed by local law enforcement personnel. At each roadblock positive communication would be established and maintained with the Recovery Team Coordinator and other security personnel/roadblocks. This communication would occur using either landlines (telephones), cellular telephone, or military radio systems.

Certain critical response personnel, such as ambulance/medical or fire response units, shall be permitted to pass through "active" roadblocks in the performance of their duties.

### *Debris Recovery*

Personnel would arrive at impact site by appropriate mode. Recovery transportation vehicles would remain at nearest accessible road. Explosive Ordnance Disposal members of the recovery team would be the first on scene and would be responsible for the identification, handling, control, and rendering safe of minor detonating charges and other minor hazardous debris. Other responsibilities include:

- Providing initial impact site control to prevent exposure for recovery personnel (Security personnel would assume this role as impact zone access controls are eased.)
- Maintaining area safety and rendering safe potential explosive materials
- Conducting initial impact site assessments for the identification of debris and the determination of recovery equipment requirements
- Assisting in dismantling of launch hardware prior to recovery and transport activities

Recovery personnel would then handle the next phase of the recovery including:

- Collect small missile parts
- Dismantle larger pieces into manageable sections
- Transport recovered parts by helicopter to recovery vehicles waiting at accessible roads

### **Environmental Restoration**

Recovery operations would be coordinated with the Environmental Office at each launch site. If deemed necessary, an archaeologist and biologist would accompany Explosive Ordnance Disposal personnel during the initial site assessment to determine if cultural or sensitive biological resources are present at the impact site. These resource specialists would assist in the determination of recovery equipment requirements and recovery transport routes.

All recovery and restoration activities would be carried out in accordance with Memorandum of Agreements signed by appropriate state and Federal Agencies and other potentially affected organizations. Impacted areas would be restored to a natural condition in accordance with land-owners' agreements and agency requirements.

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**Appendix E**  
**Restrictive Easement Lease**





hereinafter called the "Facility", to support the Department of Defense and other federal projects involved with the launching, tracking and collection of data associated with guided missile, satellite and space vehicle research, development and evaluation and military training programs; and

WHEREAS, these programs involve rocket launching operations for which the establishment of a ground hazard area, hereinafter called "GHA", for a period of time just prior to, during and continuing shortly after launch is considered essential to limit the exposure of persons and property to potential risks related to these operations; and

WHEREAS, portions of this GHA include lands which are owned by the GRANTOR,

NOW, THEREFORE, the GRANTOR, for and in consideration of the sum of TWELVE THOUSAND FIVE HUNDRED DOLLARS (\$12,500.00), the receipt of which is hereby acknowledged, does hereby grant and convey unto the UNITED STATES and its assigns, for a period of nine (9) years from January 1, 1994 to December 31, 2002, an easement on, over and under the following described lands owned by the GRANTOR for the establishment and maintenance of a GHA in connection with operations of the UNITED STATES:

All that land situated at Mana, Waimea (Kona), Kauai, State of Hawaii, identified as Parcel 1-A, containing 1.324 acres, as more fully described in Exhibit "A", attached hereto and made a part hereof by reference.

The UNITED STATES covenants and agrees with the GRANTOR as follows:

1. Use of the easement area is hereby limited and restricted in favor of the United States as follows:

a. Parcel "1-A" may only be used for agricultural purposes, such as the growing of crops and the grazing of cattle; and

b. No building or structure shall be constructed or permitted within the easement area without the prior written consent of the UNITED STATES, except replacement and existing buildings and structures.

2. Subject to the limitations of paragraph 3 and 4 hereof, the UNITED STATES' use of the easement area shall be limited to use as a GHA for rocket launching operations from the Facility, and for no other purposes, pursuant to which the UNITED STATES shall have the following rights in order that the GHA may be verified clear of all persons twenty (20) minutes before a scheduled launch; namely, the right to:

(a) enter the easement area and notify all persons therein either through personal contact or the posting of warning signs that they will be required to leave at a specific time;

(b) close off all roads leading into the easement area;

(c) prohibit the entry of all persons into the easement area;

(d) evacuate all persons from the easement area; and

(e) post guards within the easement area,

it being the intent of this easement grant to give to the UNITED STATES exclusive control over access to and use of the easement area during said periods described in paragraph 3.

3. The UNITED STATES may exercise the rights provided in paragraph 2 above beginning three (3) hours before a scheduled launch and ending when safety personnel of the UNITED STATES declare the area safe. In the event hazardous conditions exist in the GHA after a launch, said safety personnel may continue to maintain exclusive control over the GHA until it is safe for the general public to reenter the area.

4. The UNITED STATES may exercise the rights conveyed by paragraph 2 above no more than thirty (30) times during each annual period of this indenture, the first such annual period commencing on January 1, 1994.

5. The United States will delay a launch to permit the passage of emergency vehicles and equipment.

6. The United States shall provide procedures and responsibilities for launches and emergencies, including the coordination with County and civil defense agencies.

7. The United States shall develop a protection plan for known historic sites, if any, in the affected area.

8. The UNITED STATES shall also have the right to post permanent warning signs at the edge of and within the easement area advising the general public of the existence of the GHA and that the area is subject to closure during planned rocket launches.

9. The UNITED STATES hereby agrees to remove any debris which may fall in the easement area as a result of missile operations and to control the consequences of such falling debris. The UNITED STATES further agrees to remediate the

effects of and clean up (in accordance with all applicable laws) any release of hazardous substances resulting from a launch from the Facility or from the UNITED STATES' use of the GHA, and the UNITED STATES shall have the right of access to the easement area for this purpose at all times, provided that the UNITED STATES shall provide the GRANTOR with at least twenty-four (24) hours' advance written notice of such entry, whenever possible. The United States shall commence all such removal, remediation, and clean-up as soon as possible.

10. The UNITED STATES will notify the GRANTOR at least seven (7) calendar days prior to each scheduled launch requiring the exercise of the above rights.

11. The GRANTOR reserves to itself and its successors and assigns all such rights and privileges in the easement area as may be used and enjoyed without interfering with or abridging the specific rights granted to the UNITED STATES by this indenture. The GRANTOR, also, hereby reserves the right to maintain, repair or replace in their present condition and at their present locations all existing structures, including but not limited to buildings, roadways, power and telephone poles, now within the easement area.

12. The UNITED STATES shall exercise due care for public and private safety with respect to all persons in the easement area during the periods that the UNITED STATES exercises its rights hereunder. The UNITED STATES shall comply with all applicable laws in connection with its use of the easement area.

13. Subject to any applicable limitations provided in the

Federal Tort Claims Act (62 Stat 869-982; 28 U.S.C. 2671-2680), the UNITED STATES shall be responsible for any and all claims, liabilities, losses, injuries and damages (including without limitation claims for personal injury and death) caused by or resulting from: (a) any launch from the Facility; or (b) any act or omission of the UNITED STATES in connection with the UNITED STATES' exercise of its rights hereunder, or its use of the easement area or the Facility.

14. The Grantor will not be responsible for any loss, liability, claim or demand for property damage, property loss or personal injury including, but not limited to, death arising out of any injury or damage caused by, or resulting from, any act or omission of the United States in connection with the United States' use of the easement area.

15. This easement shall run with the land. Upon the conveyance to another party of the GRANTOR's fee ownership interests in the easement area, the GRANTOR shall be relieved of any and all liabilities and obligations thereafter arising out of this indenture.

16. This easement shall automatically terminate on December 31, 2002, at 11:59 p.m. without the need for any further action on the part of either party. No extension of the term of this easement or modification of the provisions hereof shall be effective unless in writing signed by both parties and duly recorded in the Bureau of Conveyances, State of Hawaii.

IN WITNESS WHEREOF, the parties hereto have executed this indenture on the day and year first above written.

GRANTOR  
KEKAHA SUGAR COMPANY, LIMITED  
Approved as to Form  
By: KKA  
By: [Signature]  
Its VICE PRESIDENT

UNITED STATES OF AMERICA  
By: [Signature]  
MICHAEL KILIAN  
Director, Real Estate Division  
Pacific Division, Naval Facilities Engineering Command  
Real Estate Contracting Officer

By: \_\_\_\_\_

STATE OF HAWAII )  
CITY AND COUNTY OF HONOLULU ) ss

On this \_\_\_\_\_ day of JAN 10 1994, 1994, before me appeared BERT HATTON and \_\_\_\_\_, to me personally known, who, being by me duly sworn, did say that they are the VICE PRESIDENT and \_\_\_\_\_, respectively, of KEKAHA SUGAR COMPANY, LIMITED, a Hawaii corporation, and that the seal affixed to the foregoing instrument is the corporate seal of said corporation and that said instrument was signed and sealed on behalf of said corporation by authority of its Board of Directors; and said officers acknowledged that they executed said instrument as the free act and deed of said corporation.

[Signature]  
Notary Public, State of Hawaii

My commission expires DEC. 29, 1997

PARCEL 1-A

LAND SITUATE AT MANA, WAIMEA (KONA), KAUAI, STATE OF HAWAII

Being the whole of Grant 8153 to Baba Kaiwa, being also Preference Right to Purchase No. 607, presently owned by Kekaha Sugar Company, Limited, and being more particularly described as follows:

Beginning at a stake at the Southeast corner of this lot and on the North side of Government Main Road, the coordinates of said point of beginning referred to Government Survey Triangulation Station "NOHILI" being 2585.7 feet South and 7172.7 feet East, as shown on Government Survey Registered Map No. 2679, and running by true azimuths measured clockwise from South:

1. 66° 53' 36.0 feet along Government Main Road to a stake;
2. 190° 22' 100.7 feet along Nohili Pond to a stake;
3. 111° 09' 321.7 feet along same to a stake;
4. 212° 30' 233.4 feet along same to a stake;
5. 297° 30' 100.0 feet along same to a stake;
6. 21° 09' 75.0 feet along same to a stake;
7. 291° 09' 179.7 feet along same to a stake;
8. 10° 22' 220.5 feet along same to the point of beginning and containing an area of 1.324 acres, more or less, and being and lying entirely within the above-described Parcel 1.

EXHIBIT "A"



No. S-5352) hereinafter "general lease" dated January 1, 1994, covering lands situate at Mana, Waimea, Kauai, Hawaii; and

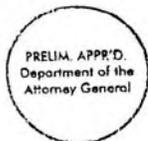
WHEREAS, the Grantee desires that the general lease be amended; and

WHEREAS, the Board of Land and Natural Resources, at its meeting held on November 19, 1999, has approved the amendment to General Lease No. S-5352 for the purposes of:

1. At page 2, item 2, the deletion of reference to "STARS and VANDAL."
2. At page 1, in the "WITNESSETH THAT" section, line 5, deletion of "nine (9)" and replacing it with "thirty-seven (37)."
3. At page 1, in the "WITNESSETH THAT" section, line 6, deletion of "December 31, 2002" and replacing it with: "December 31, 2030 conditioned upon: 1. The Grantee shall not launch more than thirty (30) missiles during each annual period of the general lease; and 2. No missile requiring a GHA exceeding 10,000 feet shall be launched from the facility,".
4. Deletion of the unrecorded Amendment to General Lease No. S-5352 dated October 19, 1998, in its entirety.

NOW, THEREFORE, the Grantor and Grantee covenant and agree that General Lease No. S-5352, is hereby amended as follows:

1. At page 2, item 2, the deletion of reference to "STARS and VANDAL."
2. At page 1, in the "WITNESSETH THAT" section, line 5, deletion of "nine (9)" and replacing it with "thirty-seven (37)."



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DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION  
P.O. BOX 621  
HONOLULU, HAWAII 96809

3. At page 1, in the "WITNESSETH THAT" section, line 6, deletion of "December 31, 2002" and replacing it with: "December 31, 2030 conditioned upon: 1. The Grantee shall not launch more than thirty (30) missiles during each annual period of the general lease; and 2. No missile requiring a GHA exceeding 10,000 feet shall be launched from the facility,".
4. Deletion of the unrecorded Amendment to General Lease No. S-5352 dated October 19, 1998 in its entirety.

The easement area under tax map key no. (4)1-2-02:por. 24 is under the operation of Governor's Executive Order No. 2901 issued to the Division of State Parks and the Board of Land and Natural Resources' approval is conditioned on the concurrence by the Governor, State of Hawaii and the Administrator, Department of Land and Natural Resources, Division of State Parks. Concurrence by the Governor of the State of Hawaii was obtained on December 20, 1999. Concurrence by the Administrator, Department of Land and Natural Resources, Division of State Parks was obtained on January 13, 2000.

The Grantee agrees to pay to the Grantor at the Office of the Department of Land and Natural Resources, Honolulu, Oahu, State of Hawaii for and in consideration of the following sums:

- A. a one time payment of ONE THOUSAND SEVEN HUNDRED SEVENTY-ONE AND NO/100 DOLLARS (\$1,771.00) for the removal of the restriction that limits the different types of missiles allowed to be launched from the Pacific Missile Range Facility; and
- B. a one time payment of ONE THOUSAND SEVEN HUNDRED TWENTY-FIVE AND NO/100 DOLLARS (\$1,725.00) to extend the term of General Lease No. S-5352 to expire on December 31, 2030.

The Grantor and Grantee further agree that this Amendment to Lease of Exclusive Easement is subject to all the covenants and conditions in the General Lease No. S-5352, except as herein provided.



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This Amendment, read in conjunction with the General Lease No. S-5352 sets forth the entire agreement between the Grantor and Grantee; and the general lease as amended and modified hereby shall not be altered or modified in any particular except by a memorandum in writing signed by the Grantor and Grantee.

IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and the parties hereto have caused these presents to be executed the day, month, and year first above written.

STATE OF HAWAII

By *[Signature]*  
Chairperson and Member  
Board of Land and  
Natural Resources

GRANTOR

Approved by the Board of  
Land and Natural Resources  
at its meeting held on  
November 19, 1999.

UNITED STATES OF AMERICA

APPROVED AS TO FORM:

*[Signature]*  
Deputy Attorney General

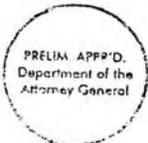
Dated: 8/15/00

By *[Signature]*  
MICHAEL KILIAN  
Head, Real Estate Department  
Pacific Division, ~~Real Estate~~ Engineering Command  
U.S. Real Estate Contracting Officer

GRANTEE

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