
3.12 Socioeconomic Resources

TABLE OF CONTENTS

3.12 SOCIOECONOMIC RESOURCES 3.12-1

3.12.1 INTRODUCTION AND METHODS 3.12-1

3.12.2 AFFECTED ENVIRONMENT 3.12-3

3.12.2.1 Commercial Transportation and Shipping 3.12-3

3.12.2.2 Commercial and Recreational Fishing..... 3.12-14

3.12.2.3 Subsistence Use 3.12-23

3.12.2.4 Tourism 3.12-25

3.12.3 ENVIRONMENTAL CONSEQUENCES 3.12-28

3.12.3.1 Accessibility (to the Ocean and Airspace)..... 3.12-29

3.12.3.2 Airborne Acoustics..... 3.12-39

3.12.3.3 Physical Disturbance and Strike Stressors 3.12-40

3.12.3.4 Secondary Impacts from Availability of Resources..... 3.12-44

3.12.4 SUMMARY OF POTENTIAL IMPACTS (COMBINED IMPACTS OF ALL STRESSORS) ON SOCIOECONOMICS..... 3.12-45

LIST OF TABLES

TABLE 3.12-1: WARNING AREAS, RESTRICTED AIRSPACE, AND AIR TRAFFIC CONTROL ASSIGNED AIRSPACE IN THE MARIANA ISLANDS TRAINING AND TESTING STUDY AREA..... 3.12-10

TABLE 3.12-2: GUAM COMMERCIAL FISHERY LANDINGS 3.12-17

TABLE 3.12-3: COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS COMMERCIAL FISHERY LANDINGS 3.12-22

TABLE 3.12-4: NOTICES TO MARINERS ISSUED FOR MILITARY ACTIVITIES OCCURRING AT FARALLON DE MEDINILLA AND WARNING AREA 517 FROM 2010 THROUGH 2012 3.12-32

LIST OF FIGURES

FIGURE 3.12-1: SHIPPING LANES WITHIN THE MARIANA ISLANDS TRAINING AND TESTING STUDY AREA 3.12-5

FIGURE 3.12-2: MARIANA ISLANDS TRAINING AND TESTING STUDY AREA AIRSPACE 3.12-9

FIGURE 3.12-3: COMMERCIAL AIRWAYS WITHIN THE MARIANA ISLANDS TRAINING AND TESTING STUDY AREA..... 3.12-12

FIGURE 3.12-4: FARALLON DE MEDINILLA RESTRICTED AREA AND PENDING 12 NM DANGER ZONE 3.12-13

FIGURE 3.12-5: GUAM PUBLIC BOAT LAUNCH LOCATIONS AND FISH AGGREGATING DEVICES..... 3.12-16

FIGURE 3.12-6: GALVEZ BANK AND SANTA ROSA REEF ADJACENT TO W-517 3.12-19

FIGURE 3.12-7: MARINE PRESERVES ON GUAM..... 3.12-21

FIGURE 3.12-8: POPULAR DIVE SITES WITHIN THE MARIANA ISLANDS TRAINING AND TESTING STUDY AREA..... 3.12-26

This Page Intentionally Left Blank

3.12 SOCIOECONOMIC RESOURCES

SOCIOECONOMIC RESOURCES SYNOPSIS

The United States Department of the Navy considered all potential stressors, and the following have been analyzed for socioeconomic resources:

- Accessibility (limiting access to the ocean and the air)
- Physical disturbance and strike (aircraft, vessels, in-water devices, and military expended materials)
- Airborne acoustics (weapons firing, aircraft, and vessel noise)
- Secondary (availability of resources)

Preferred Alternative (Alternative 1)

- Accessibility: Accessibility stressors may result in impacts on commercial and recreational fishing, subsistence use, or tourism when areas of co-use are made temporarily inaccessible to ensure public safety during military training and testing activities. No impacts on commercial transportation and shipping are anticipated. The military will continue to collaborate with local communities to enhance existing means of communication with the public that are intended to reduce the potential effects of limiting accessibility to areas designated for use by the military.
- Physical Disturbance and Strike: Physical disturbance and strike stressors are not expected to result in impacts on commercial and recreational fishing, subsistence use, or tourism because the vast majority of military training and testing activities would occur in areas of the Study Area far from the locations of these socioeconomic activities. Furthermore, the large size of the Study Area over which these types of military activities would be distributed, and adherence to the Navy's standard operating procedures, would further reduce any potential for impacts.
- Airborne Acoustics: Airborne acoustic stressors are not expected to result in impacts to tourism or recreational activities, because the vast majority of military training and testing activities would occur in areas of the Study Area that are far out to sea and far from tourism and recreation locations.
- Secondary: Secondary stressors are not expected to result in impacts to commercial or recreation fishing, subsistence use, or tourism, based on the level of impacts described in other resources sections.

3.12.1 INTRODUCTION AND METHODS

This section provides an overview of the characteristics of socioeconomic resources in the Mariana Islands Training and Testing (MITT) Study Area and describes in general terms the methods used to analyze potential impacts on these resources from the Proposed Action.

Regulations from the President's Council on Environmental Quality implementing the National Environmental Policy Act (NEPA) state that "when an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the Environmental Impact Statement will discuss all of these effects on the human environment" (40 Code

of Federal Regulations [C.F.R.] 1508.14). The Council on Environmental Quality regulations state that the “human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.” To the extent that the ongoing and proposed United States (U.S.) military training and testing activities in the MITT Study Area could affect the economic or social and natural or physical environment, the socioeconomic analysis evaluates how elements of the human environment might be affected. The U.S. Department of the Navy (Navy) identified four broad socioeconomic elements based on their association with human activities and livelihoods in the MITT Study Area (Chapter 2, Description of Proposed Action and Alternatives, and Figure 3.12-1). Each of these socioeconomic resources is an aspect of the human environment that involves economics (i.e., employment, income, or revenue) and social conditions (i.e., enjoyment and quality of life) associated with the marine environment of the MITT Study Area. This evaluation considered potential impacts on four socioeconomic elements in the MITT Study Area:

- Commercial transportation and shipping
- Commercial and recreational fishing
- Subsistence use
- Tourism

These four elements were chosen as the focus of the analysis in this chapter because of their importance to the local economy and the way of life on the Commonwealth of the Northern Mariana Islands (CNMI) and the potential for these elements to be impacted from military activities. As described below, the ports in the CNMI and Guam serve as an important link for commercial transit between Japan, Asia, and the United States. Fishing continues to be both a way of life and a source of revenue, either directly or indirectly, for many if not most residents of the CNMI and Guam (Kerr 2011; Western Pacific Regional Fishery Management Council 2009). In addition, tourists visiting the Marianas archipelago also take part in recreational fishing activities. Being dependent on the resources of the marine environment to obtain the necessities of life (e.g., food, shelter) is what is meant by subsistence use in this section. Although, resources (e.g., fisheries) of the marine environment were essential to the ancestors of the Chamorro for survival, other sources of income mitigate the dependence on harvesting natural resources (Amesbury and Hunter-Anderson 2003; van Beukering et al. 2007). The military recognizes the cultural and economic value of these activities and their dependence on having access to areas of the marine environment essential to preserving local culture and sustaining the local economy. Access to marine areas important to fishers, both for commercial and recreational use, is, and has been, a concern of the local population. Access to the same or other areas is also important for subsistence as well as tourism (e.g., fishing and whale watching). The Navy strives to address these concerns in this chapter.

With the collapse of the garment industry from approximately 2006 to 2009, tourism is widely recognized as the major industry in the Marianas archipelago (Aldan-Pierce 2011; First Hawaiian Bank 2011). As indicated in Chapter 2 (Description of Proposed Action and Alternatives), implementation of the Proposed Action would have no impact on land-based agricultural activities or on lease back areas. The baseline for identifying the socioeconomic conditions in the MITT Study Area was derived using relevant published information from sources that included federal, state, regional and local government agencies and databases, academic institutions, conservation organizations, technical and professional organizations, and private groups. Previous environmental studies were also reviewed for relevant information.

The alternatives were evaluated based upon the potential and the degree to which training and testing activities could impact socioeconomics. The potential for impacts depends on the likelihood that the training and testing activities would interface with public activities or infrastructure. The analysis considered both temporal and spatial scales when evaluating potential interfaces between the public or infrastructure and military training and testing. To estimate the degree to which interface could impact socioeconomics, the potential for impacts on livelihood, quality of experience, resource availability, income, or employment are considered. If there is no expected potential for the public to interface with an activity, the impacts would be considered negligible.

3.12.2 AFFECTED ENVIRONMENT

The area of interest for assessing potential impacts on socioeconomic resources is the international waters south of Guam to north of Pagan and from the Pacific Ocean east of the Mariana Islands to the Philippine Sea to the west. This section describes the four most relevant socioeconomic topics associated with human activities and livelihoods in the MITT Study Area.

3.12.2.1 Commercial Transportation and Shipping

Commercial transport is a vital part of the economy of Guam and the CNMI and includes the shipping of goods as well as the transport of residents and tourists. Current military and civilian use of the offshore sea space and air space is compatible. Navy ships account for 6 percent of the total ship presence out to 200 nautical miles (nm) (Mintz and Filadelfo 2011). The military conducts training and testing activities in operating areas away from commercially used waterways and inside special use airspace (SUA). Scheduled activities are published for access by all vessels and operators by use of Notices to Mariners issued by the U.S. Coast Guard and Notices to Airmen issued by the Federal Aviation Administration (FAA). In addition, the U.S. Navy Hydrographic Office in the Pacific will issue a HydroPac, which is a warning of navigational danger, prior to conducting an activity requiring such an announcement (e.g., training activity using explosives).

The Department of Defense (DoD) also publishes separate Notices to Airmen about runway closures, missile launches, special traffic management procedures, and malfunction of navigational aids. The U.S. Coast Guard retains publication of Notices to Mariners, which advises mariners of important matters affecting navigational safety, including new hydrographic discoveries, changes in channels and navigational aids, hazards to navigation, and other items of marine information of interest to mariners on the waters of the United States.

3.12.2.1.1 Ocean Traffic

Ocean traffic is the transit of commercial, private, or military vessels at sea, including submarines. The ocean traffic flow in congested waters, especially near coastlines, is controlled by the use of directional shipping lanes for large vessels, including cargo, container ships, and tankers. Traffic flow controls are also implemented to ensure that harbors and ports-of-entry remain as uncongested as possible. There is less control on open-ocean traffic involving recreational boating, sport fishing, commercial fishing, and activity by naval vessels. In most cases, the factors that govern shipping or boating traffic include the following: adequate depth of water, weather conditions (primarily affecting recreational vessels), availability of fish, and water temperature. Higher water temperatures are correlated with an increase in recreational boat traffic, jet skis, and scuba diving activities. Most shipping lanes are located close to the coast but those that are trans-oceanic start and end to the northwest of Guam.

Areas of surface water within the MITT Study Area are designated as danger zones and restricted areas as described in the C.F.R., Title 33 (Navigation and Navigable Waters), Part 334 (Danger Zone and Restricted Area Regulations) and established by the U.S. Army Corps of Engineers (USACE). Danger zones are areas used for target practice, bombing, rocket firing, or other especially hazardous training operations. A danger zone may be closed to the public full-time or on an intermittent basis, as stated in the regulations. A restricted area is designated for the purpose of prohibiting or limiting public access to an area. Restricted areas generally provide security for government property and protection to the public from risks of damage or injury arising from government activities occurring in the area (33 C.F.R. 334.2). A detailed discussion of danger zones and restricted areas located in the MITT Study Area is provided in Chapter 2 (Description of Proposed Action and Alternatives, Figure 2.7-1 and Table 2.7-1).

3.12.2.1.1.1 Guam

In the western Pacific Ocean, four waterways used by commercial vessels link Guam and the CNMI with major ports to both the east and west (Figure 3.12-1). Guam contains one commercial port located within Apra Harbor. The Port of Guam is the largest U.S. deepwater port in the Western Pacific and handles approximately 2 million tons (1,814,369,480 kilograms [kg]) of cargo a year (Port Authority of Guam 2011). The United States provides some 60 percent of Guam's imported goods, with the balance of Guam's trade coming from the Asian and Pacific markets of Japan, Taiwan, the Philippines, Hong Kong, and—to a lesser extent—Australia, New Zealand, and the islands of Micronesia (Port Authority of Guam 2011). Apra Harbor also provides economical transshipment services from the United States, Hawaii, and East Asia to the entire western Pacific.

Federally regulated nearshore areas in Guam waters include Danger Zones, Restricted Areas, Safety Zones, and Anchorages. These areas are established to maintain security, public and maritime safety.

- The Orote Point Small Arms Range danger zone extends west of Orote Point and is located south of the entrance to Apra Harbor (33 C.F.R. 334.1420) (see Chapter 2, Description of Proposed Action and Alternatives, Figure 2.1-5).
- The USACE has designated a restricted area in the waters of Inner Apra Harbor and adjacent waters of Outer Apra Harbor prohibiting all swimmers, vessels, and other craft except public vessels of the United States from entering the area without prior permission (33 C.F.R. 334.1430).
- The U.S. Coast Guard has designated two safety zones (Safety Zone A for commercial Wharf H, and Safety Zone B for Naval Wharf Kilo) in Apra Harbor (33 C.F.R. 165.1401). During times when these safety zones are in effect, entry into these zones is prohibited unless authorized by the Captain of the Port, Guam.
- The U.S. Coast Guard has designated Naval anchorage areas in Apra Harbor (33 C.F.R. 110.238) (see Chapter 2, Description of Proposed Action and Alternatives, Figure 2.1-5).

In these areas, the military may request that the USACE and the U.S. Coast Guard enforce these rules by requesting that unauthorized personnel leave the area.

Surface exclusion zones are defined as temporary hazard areas associated with explosive ordnance disposal (EOD) activities. The U.S. Coast Guard may establish temporary safety zones around exclusion zones in nearshore waters. Training and testing sites with exclusion zones in nearshore waters located within 3 nm of Guam include the Piti Floating Mine Neutralization Site, the Agat Bay Mine Neutralization Site, the Outer Apra Harbor Underwater Detonation Site, and the Pati Point EOD Range (see Chapter 2, Description of Proposed Action and Alternatives, Figures 2.1-9 and 2.7-1). Exclusion zones that are

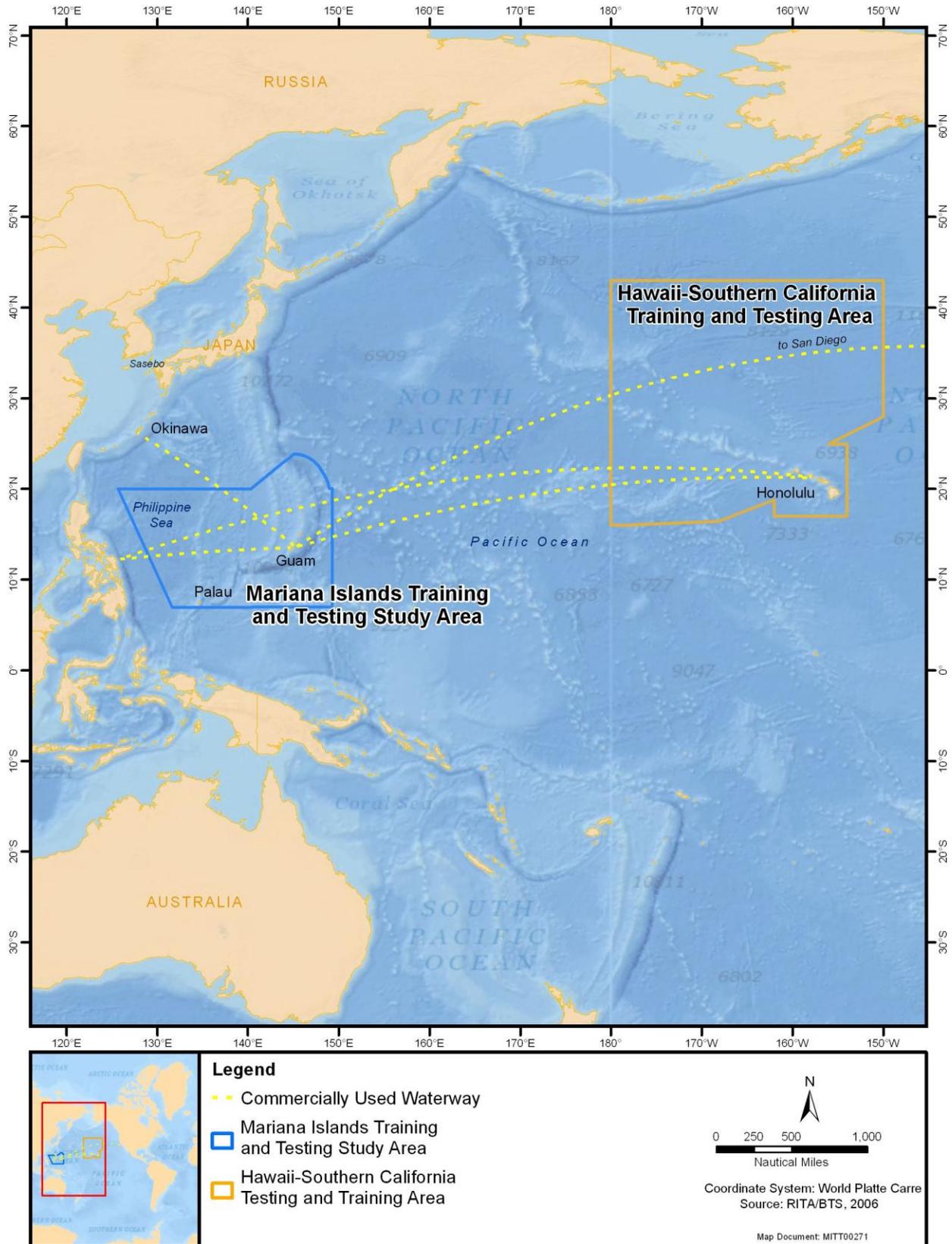


Figure 3.12-1: Shipping Lanes within the Mariana Islands Training and Testing Study Area

associated with divers conducting underwater detonations will have a minimum surface exclusion zone radius of 2,100 feet (ft.) (640 meters [m]); however, the final determination of exclusion zone size is made prior to each event and is dependent of the specifics of the event. The public is notified by local Notices to Mariners of events using danger zones, nearshore exclusion zones, and U.S. Coast Guard designated temporary safety zones.

3.12.2.1.1.2 Commonwealth of the Northern Mariana Islands

The CNMI is a 14-island chain that features the three main islands of Saipan, Tinian, and Rota. There are three ports within the CNMI. The Port of Rota, or Rota West Harbor, is located on the southwestern tip of the island. It is classified as a very small port by the World Port Source which also describes the harbor as small and poorly sheltered (World Port Source 2012a). The port includes a jetty or wharf with a pierside water depth of 6 to 10 ft. (2 to 3 m) which limits the size of vessels that can access the pier. The Port of Rota is mainly used as a port for ferry boats transporting tourists and residents from its sister island, Tinian. The Commonwealth Ports Authority is seeking funding to dredge the harbor and upgrade the port facilities in preparation for possible future development on the island (Commonwealth Ports Authority 2005). The Port of Tinian is described by the World Port Source as a small port offering excellent shelter, which is provided by a coastal breakwater. Three finger piers and a small boat ramp are available at the port. Pierside water depth ranges from 26 to 30 ft. (7.1 to 9 m), allowing relatively large vessels to dock. Mobile Oil operates a fuel plant at the port, and a ferry service transports tourists from Saipan to the hotel and casino, which is one of the main attractions on Tinian (Commonwealth Ports Authority 2005; World Port Source 2012b).

The Port of Saipan is the largest and most advanced of the three ports, but is nevertheless described as a small seaport with poor shelter by the World Port Source. A number of facilities and services are available at the port, including a cargo terminal with pierside water depth ranging from 16 to 20 ft. (4.9 to 6.1 m) and an oil terminal with a 21 to 25 ft. (6.4 to 7.6 m) depth range (World Port Source 2012c). In addition, approximately 2,600 linear ft. (790 m) of berthing space, cranes and lifts capable of handling loads over 100 tons, and a 22-acre (ac.) (8.9-hectare [ha]) container yard enabled the port to transfer over 338,000 tons of cargo in 2009 (Commonwealth Ports Authority 2005, 2010).

There are two sections to the Port of Saipan; one is the Garapan Anchorage which is located in the outer harbor, and the other is the Puetton Tanapeg harbor which is sheltered by a barrier reef to the north and considered the inner harbor. The port of Saipan is on the southwest shore and houses commercial ships, small local boats or ferries, and military vessels.

Farallon de Medinilla (FDM) and the nearshore waters have been leased to the United States for military purposes since 6 January 1983 (U.S. Department of the Navy 2009), specifically for use as a live-fire naval gunfire and air warfare air strike training range. FDM and nearshore waters extending to 3 nm from the island are restricted to all personnel both civilian and military due to safety concerns over unexploded ordnance. The lease agreement between the CNMI and the United States notes in Article 12 of the lease: "FDM: Public access to FDM Island and the waters of the Commonwealth immediately adjacent thereto shall be permanently restricted for safety reasons." The restriction around FDM and nearshore areas prohibits the entry of all personnel, civilian and military, to the island without specific permission from Commander, Joint Region Marianas (Commonwealth of the Northern Mariana Islands 1983).

The Mariana Islands Range Complex Airspace Environmental Assessment (EA)/Overseas EA (OEA) analyzed establishing a 12 nm danger zone surrounding FDM, congruent with restricted area airspace

R-7201A discussed in Section 3.12.2.1.2 (Air Traffic) (U.S. Department of the Navy 2013). The analysis supports the establishment of the Danger Zone under the authority of the USACE (C.F.R., Title 33 Part 334) to restrict all private and commercial vessels from entering the area during hazardous training and testing activities. Additional information on danger zones and restricted areas in the MITT Study Area is provided in Chapter 2 (Description of Proposed Action and Alternatives).

3.12.2.1.1.3 Transit Corridor

Major commercial shipping vessels use the shipping lanes for shipping goods between Hawaii, the continental United States, and Asia. However, there are no direct routes between Guam and the United States; stops are made in Asia, and usually Japan or Korea, before continuing on to either Hawaii or the continental United States. Vessels using shipping lanes are outside of military training areas and typically follow all U.S. Coast Guard maritime regulations. The total number of vessels transiting through the Port of Guam has steadily decreased from 2,924 in 1995 to 1,022 in 2008 (U.S. Department of the Navy 2010a). The decrease is most pronounced in the number of barges and fishing vessels that transit through the Port. From 1995 to 2008 the number of barges decreased from a high of 169 to a low of 17, and the number of fishing vessels decreased from 2,161 to 586. However, the number of container ships has increased from a low of 103 in 2003 to a high of 165 in 2008. The Port of Guam handled over 99,000 containers in fiscal years (FY) 2007 and 2008. FY 2009 through 2011 saw a decrease in the number of containers to 96,000 (Port Authority of Guam 2012). Most other types of cargo passing through the Port of Guam, including break-bulk cargo (e.g., cargo packed in cases, drums, and bales, etc.), bulk cargo, and roll-on-roll-off cargo (e.g., automobiles) has decreased substantially from a high of 477 in 1995 to 171 (the second-lowest annual total) in 2008 (U.S. Department of the Navy 2010a).

3.12.2.1.2 Air Traffic

Air traffic refers to movements of aircraft through airspace. Safety and security factors dictate that use of airspace and control of air traffic be closely regulated. Accordingly, regulations applicable to all aircraft are promulgated by the FAA to define permissible uses of designated airspace, and to control that use. These regulations are intended to accommodate the various categories of aviation, whether military, commercial, or general aviation.

The system of airspace designation uses various definitions and classifications of airspace in order to facilitate control. Airspace can be generally categorized as “controlled airspace” or “uncontrolled” airspace.

- “Victor Routes” are the networks of airways serving commercial aviation operations up to 18,000 ft. (5,486 m) above mean sea level (MSL).
- Class A is controlled airspace extending from 18,000 ft. (5,486 m) above MSL up to and including 60,000 ft. (18,288 m) above MSL and includes designated airways for commercial aviation operations at those altitudes.
- Class B is controlled airspace extending from the surface to 10,000 ft. (3,048 m) above ground level surrounding the nation’s busiest airports.
- Class C and D airspace are controlled areas around certain airports, tailored to the specific airport.
- Class E is controlled airspace not included in Classes A, B, C, or D.
- Class F airspace is not used in the United States.
- Class G is uncontrolled airspace (i.e., not designated as Class A–E).

Special use airspace consists of both controlled and uncontrolled airspace and has defined dimensions where flight and other activities are confined because of their nature and the need to restrict or prohibit non-participating aircraft for safety reasons. Special use airspace is established under procedures outlined in 14 C.F.R. Part 73.1. The majority of SUA is established for military flight activities and, with the exception of prohibited areas (e.g., over the White House) may be used for commercial or general aviation when not reserved for military activities. There are multiple types of SUA, including prohibited, restricted, warning, alert, and military operations areas (Federal Aviation Administration 2009). One type of SUA of particular relevance to the MITT Study Area is a warning area, which is defined in 14 C.F.R. Part 1 as follows:

“A warning area is airspace of defined dimensions, extending from 3 nm outward from the coast of the United States that contains activity that may be hazardous to non-participating aircraft. The purpose of such warning areas is to warn non-participating pilots of the potential danger. A warning area may be located over domestic or international waters or both.”

Warning areas are established to contain a variety of hazardous aircraft and non-aircraft activities, such as aerial gunnery, air and surface missile firings, bombing, aircraft carrier operations, and naval gunfire. When these activities are conducted in international airspace, the FAA regulations may warn against, but do not have the authority to prohibit, flight by non-participating aircraft. A restricted area, such as R-7201, is a type of SUA within which nonmilitary flight activities are closely restricted.

3.12.2.1.2.1 Guam

Military Air Transit

Military aircraft originating from Guam would most often transit to one of the three warning areas located south of Guam (Figure 3.12-2). Warning Area (W)-517 overlays deep ocean waters and is located south-southwest of Guam. The northernmost boundary of W-517 is approximately 8 nm from the southern tip of Guam (Figure 3.12-2). W-517 provides a large SUA area extending from surface to unlimited altitude (Table 3.12-1). W-517 is constrained by commercial air traffic lanes to the east and west. W-11A/B is located east of W-517 and also overlays deep ocean waters. The northernmost boundary of W-11 is approximately 30 nm south-southeast of the southern tip of Guam. W-12 is adjacent to the southern boundary of W-517 and extends SUA approximately 30 nm farther south. The northernmost boundary of W-12 is approximately 120 nm from southern Guam.

Open ocean Air Traffic Control Assigned Airspace (ATCAA) within the MITT Study Area is used for military training and testing activities, from unit-level training to major joint exercises. ATCAAs 5 and 6, as depicted in Figure 3.12-2, have been pre-assigned in agreements between Guam Air Route Traffic Control Center; Commander, U.S. Naval Forces Marianas (COMNAVMAR); and 36th Operations Group. COMNAVMAR is designated as the scheduling and using agency for W-517 and ATCAAs 5 and 6. Guam Air Route Traffic Control Center is designated as the Controlling Agency. The Guam Air Route Traffic Control Center works with COMNAVMAR and 36th Wing to modify or configure new ATCAAs as required for training and testing activities. Preconfigured ATCAAs 5 and 6 encompass 25,800 square nautical miles (nm²), extending from south of Guam to north of Saipan, and to the east of Guam (Table 3.12-1).

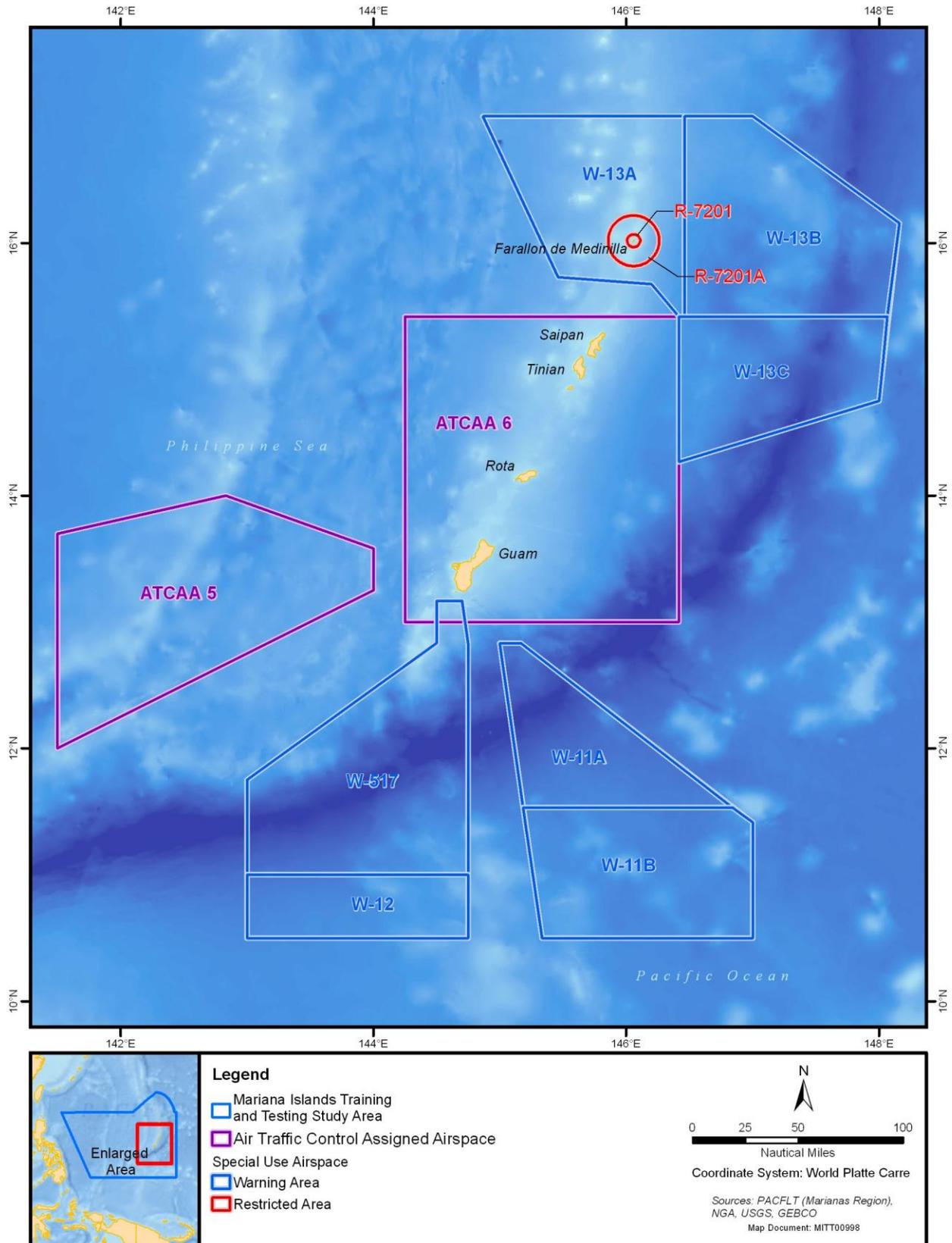


Figure 3.12-2: Mariana Islands Training and Testing Study Area Airspace

Table 3.12-1: Warning Areas, Restricted Airspace, and Air Traffic Control Assigned Airspace in the Mariana Islands Training and Testing Study Area

MITT Study Area Airspace				
Airspace	Surface Area (nm ²)	Lower Altitude Limit (ft.)	Upper Altitude Limit (ft.)	Over Land?
W-11A	4,165	Surface	30,000	No
W-11B	6,306	Surface	30,000	No
W-517	8,353	Surface	Unlimited	No
W-12	3,093	Surface	Unlimited	No
W-13A Low	5,940	Surface	35,000	No, except for FDM
W-13A High		35,000	60,000	
W-13B Low	7,724	Surface	30,000	No
W-13B High		30,000	60,000	
W-13C Low	5,064	Surface	30,000	No
W-13C High		30,000	60,000	
R-7201	28	Surface	60,000	No, except for FDM
R-7201A	424	Surface	60,000	No
ATCAA 5	10,394	Surface	30,000	No
ATCAA 6	18,271	39,000	43,000	No, except for Guam, CNMI ¹

¹ ATCAA 6 is primarily over water, but Guam, Rota, Tinian, and Saipan lie beneath it.

Notes: ATCAA = Air Traffic Control Assigned Airspace, ft. = feet, nm² = square nautical miles, R = Restricted Area, W = Warning Area

ATCAAs are activated for short periods to cover the time frames of training and testing activities. COMNAVMAR coordinates ATCAA requests with the FAA and 36th Wing. If the preconfigured ATCAA 5 or 6 do not meet the need for a special event, then event-specific ATCAAs in the location, size, and altitude for the time frame needed may be requested contingent on agreement of the FAA and coordination with COMNAVMAR and 36th Wing.

Andersen Air Force Base contains one airfield, Main Base, which is approximately 4,500 ac. (1,821.1 ha). Airspace over Main Base supports takeoffs and landings of all types of aircraft up to and including the C-5. Andersen Air Force Base airspace is controlled by Air Force air traffic control.

Commercial and General Aviation

Guam International Air Terminal is the only civilian air transportation facility on Guam. It is operated by Guam International Airport Authority, a public corporation and autonomous agency of the Government of Guam. Guam International Air Terminal contains two runways and facilities that are part of the now-closed Naval Air Station Agana. Eight major airlines operate out of Guam International Air Terminal, making it a hub of air transportation for Micronesia and the Western Pacific (Figure 3.12-3).

3.12.2.1.2.2 Commonwealth of the Northern Mariana Islands

Military Air Transit

ATCAA 6 overlies both the Guam and the CNMI (see Figure 3.12-2). On Tinian, the military conducts aviation training in the military lease area by delivering personnel and cargo to maneuver areas, and providing various support functions to forces already on the ground, such as cargo delivery, firefighting, and search and rescue. An important feature in the Exclusive Military Use Area is North Field, a large abandoned World War II era airfield. Although improvements are needed to ensure that the facilities on North Field meet safety and operational requirements, the airfield can be used as a contingency land airfield to support fixed-wing and helicopter training activities. North Field's four runways, taxiways, and parking aprons provide various tactical scenarios without interfering with commercial and community activities south of the military lease area. The remote area is suitable for a variety of aviation support training. Use of North Field would also reduce or eliminate the need to share West Tinian Airport with commercial flight activity.

W-13A/B/C is located approximately 20 nm north-northeast of the northern tip of Saipan. W-13 extends from the surface to an upper altitude of 60,000 ft. (18,288 m) (see Table 3.12-1). W-13A overlays FDM and surrounds R-7201 and R-7201A (see Figure 3.12-2). On FDM, R-7201 is a restricted airspace with a 3 nm radius surrounding the island, and R-7201A is an adjacent restricted airspace extending from 3nm out to 12 nm from FDM (Figure 3.12-4). The surface area defined by the 3 nm radius encompasses 28 nm², and the surface area defined by the 12 nm radius encompasses 452 nm². Published Notices to Mariners and Notices to Airmen will occasionally advise out to and beyond a 12 nm radius depending on the nature of the training activities being conducted. The altitude limits for both R-7201 and R-7201A are surface to 60,000 ft. (18,288 m). The FDM range supports live-fire and inert training activities such as surface-to-ground and air-to-ground gunnery exercises, bombing exercises, missile exercises, Fire Support, and Precision Weapons. Additional information on restricted airspace in the MITT Study Area is provided in Chapter 2 (Description of Proposed Action and Alternatives).

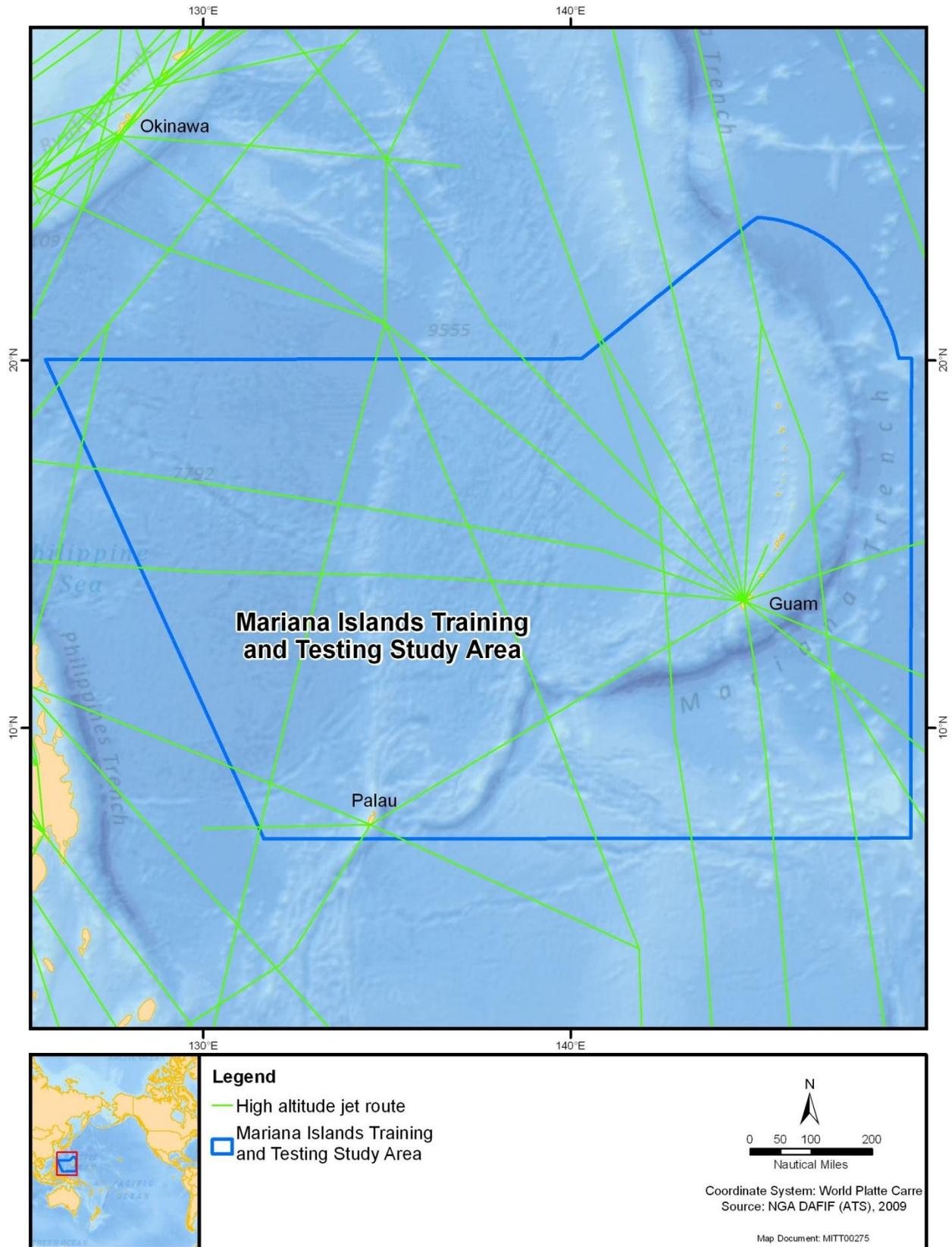


Figure 3.12-3: Commercial Airways within the Mariana Islands Training and Testing Study Area

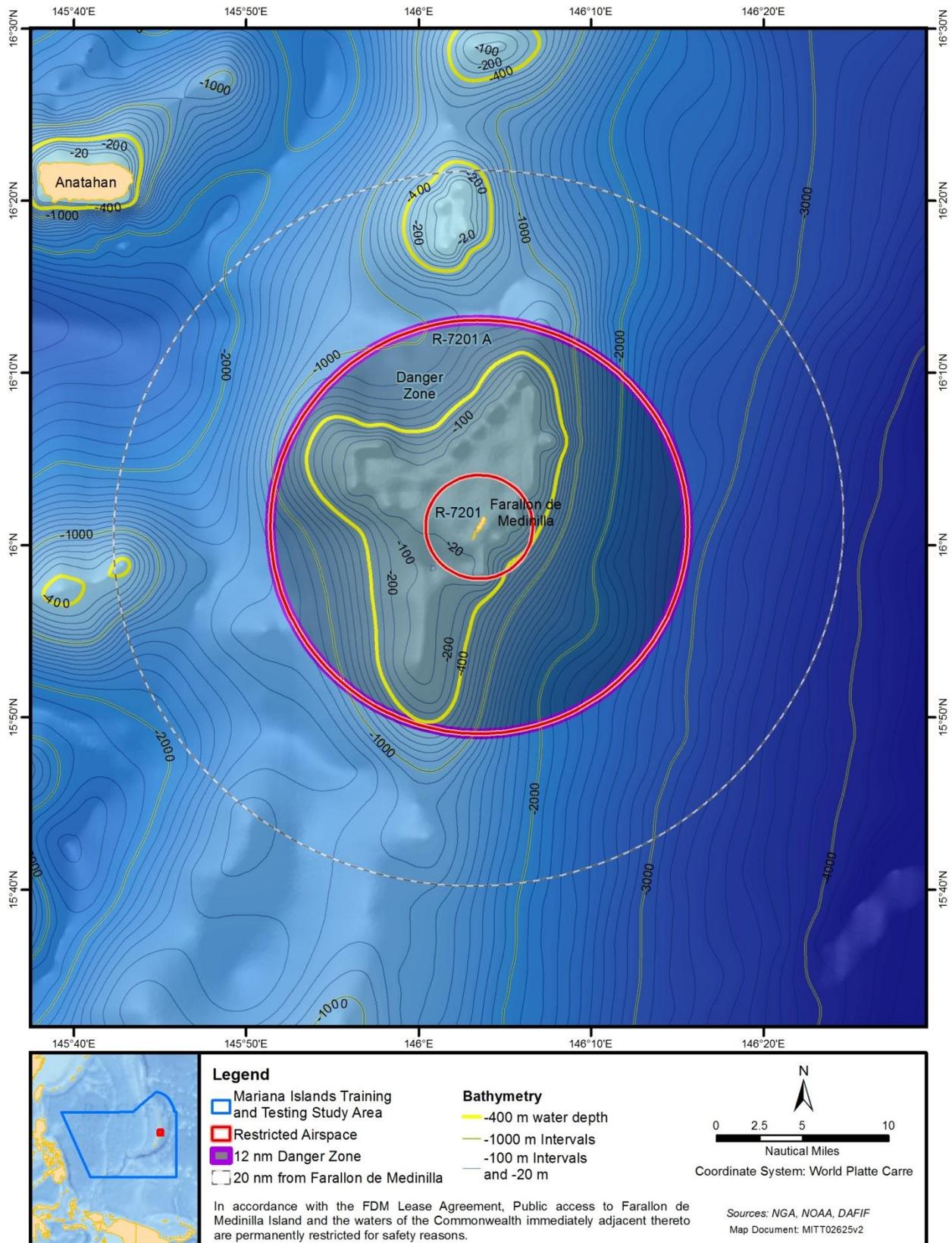


Figure 3.12-4: Farallon de Medinilla Restricted Area and Pending 12 nm Danger Zone

Commercial and General Aviation

Saipan International Airport is the largest commercial airport in the CNMI, and is the main gateway for commercial air traffic into the CNMI (Commonwealth Ports Authority 2005). The airport has an 8,700 ft. (approximately 2,700 m) runway with adjacent taxiways and can accommodate wide-body aircraft. Direct flights are available from major cities in Japan, Korea, China, and Guam. A commuter terminal services Tinian and Rota islands. On Tinian, all commercial flights fly into West Tinian Airport (or Tinian International Airport). The airport has one runway that is 8,600 ft. (approximately 2,600 m) by 150 ft. (46 m). Renovations to a departure terminal in support of direct flights to China are planned (Commonwealth Ports Authority 2005). The airport is equipped with a navigational light system for nighttime operations, but has no control tower or additional navigational aids. Rota International Airport has a 6,000 ft. (approximately 1,800 m) runway capable of handling Boeing 757 or 727 aircraft, but with load restrictions. Tinian and Rota airports primarily support inter-island flights between Tinian, Saipan, Rota, and Guam. All three airports are FAA certified.

On FDM, there is no civilian use of airspace around the island because it is a restricted area and available only to military traffic. Notices to Airmen usually advise of a 12 nm radius around FDM to be used exclusively by the military (Figure 3.12-4).

3.12.2.1.2.3 Transit Corridor

There are commercial air routes over the MITT transit corridor. However, commercial aircraft typically fly above 30,000 ft. (9,144 m) in this area. These air routes are controlled by the FAA.

3.12.2.2 Commercial and Recreational Fishing

Fishing is an integral part of the culture and way of life in the CNMI and Guam. Most fishers do not fish exclusively for commercial, recreational, or subsistence benefit but rather for some combination of the three (Hospital and Beavers 2012; Tibbats and Flores 2012). Commercial fishing takes place throughout the MITT Study Area from nearshore waters adjacent to Guam and the CNMI, offshore banks, and pelagic waters. Sportfishing peaks in summer (June through August) when popular sport fish, including blue marlin and yellowfin tuna, are most abundant. Skipjack tuna are present year round, but are also most abundant in summer.

Mahi-mahi arrive in January and reach peak abundance in February or March, while wahoo typically have two peak abundances during the year in spring and fall. Jacks, snapper, and grouper are fished for off of reef flats surrounding the island (Schultz 2000).

Fishers in the CNMI typically fish in waters that are less than 500 ft. (152 m) deep and target the red-gilled emperor (Western Pacific Regional Fishery Management Council, n.d.). Fishing peaks in summer, but occurs year round in some locations (e.g., leeward side of the islands) where conditions are usually calmer. Some small-scale commercial fishing takes place in waters deeper than 500 ft. (152 m) and focuses on snapper and grouper species (Western Pacific Regional Fishery Management Council 2009).

3.12.2.2.1 Guam

Commercial and recreational fishing on Guam is typically divided into three types: bottom fishing, coral reef fishing, and pelagic fishing. A 2011 survey of 147 small boat fishers on Guam revealed the traditional and cultural importance of fishing to the people of Guam. Fishers responding to the survey reported having fished from boats for an average of 20 years (Hospital and Beavers 2012). Although 70 percent of fishers reported selling a portion (on average 24 percent) of their catch, the motivation was not to supplement their income, but mainly to defray some of the costs associated with fishing trips

(e.g., fuel costs). Even though fishing is no longer the primary source of income for many fishers, it is an important part of the social and cultural history of the people of Guam, and it remains a vital part of local communities. This point is illustrated by the manner in which fishers distribute their catch. Respondents to the survey (Hospital and Beavers 2012) reported consuming 29 percent of their catch at home, giving away 42 percent of their catch, and selling 24 percent of their catch. The remaining balance was either released or used to barter for other goods.

Shore-based fishing accounts for most of the fish and invertebrate harvest from coral reefs. More than 100 species of fish are available in the waters around Guam. Fishing by hook and line is the most popular method of shore-based fishing, but other methods, including thrown net, gill net, drag net, and snorkel spear fishing are also used (Tibbats and Flores 2012). Reef fishing from small boats included bottom fishing and trolling as well as the use of nets and spear fishing. Eight-two percent of the fish caught on reefs were a combination of atulai (or bigeye scad), emperors, trevallys (members of the jack family), rabbitfish, surgeon fish, and miscellaneous reef fish (Tibbats and Flores 2012). However, many of the nearshore reefs around Guam appear to have been badly degraded due to sedimentation, tourist overuse, and overharvesting (Western Pacific Regional Fishery Management Council 2009).

According to the Western Pacific Regional Fishery Management Council, charter fishing has accounted for 15–20 percent of all bottomfishing trips from 1995 through 2004 (Western Pacific Regional Fishery Management Council 2009). These trips are generally to the same areas, 2–4 hours per day, with as many as 35 patrons per trip, and the majority of the catch is released back to the ocean (Western Pacific Regional Fishery Management Council 2009). Guam fishing for the crustacean fishery occurs for subsistence and recreation in inshore territorial waters.

Both commercial and recreational fishing activities generally originate from one of the three principal harbors located on the west coast and southern tip of the island. However, the following public boat launch sites are available (Figure 3.12-5):

- Agana Boat Basin – centrally located on the western leeward coast. Used for fishing areas off the central and northern leeward coasts and the northern banks
- Merizo Boat Ramp – provides access to the southern coasts, Cocos Lagoon, and the southern banks
- Seaplane Ramp in Apra Harbor – provides access to the southern coasts, Apra Harbor, Cocos Lagoon, and the southern banks
- Agat Marina – provides access to the southern coasts, Apra Harbor, Cocos Lagoon, and the southern banks
- Ylig Bay – provides access to the east (Pacific Ocean) side of the island
- Umatac Boat Ramp – located just north of Merizo Boat Ramp along the southwestern coast. Provides access to the Umatac Bay and the southern banks

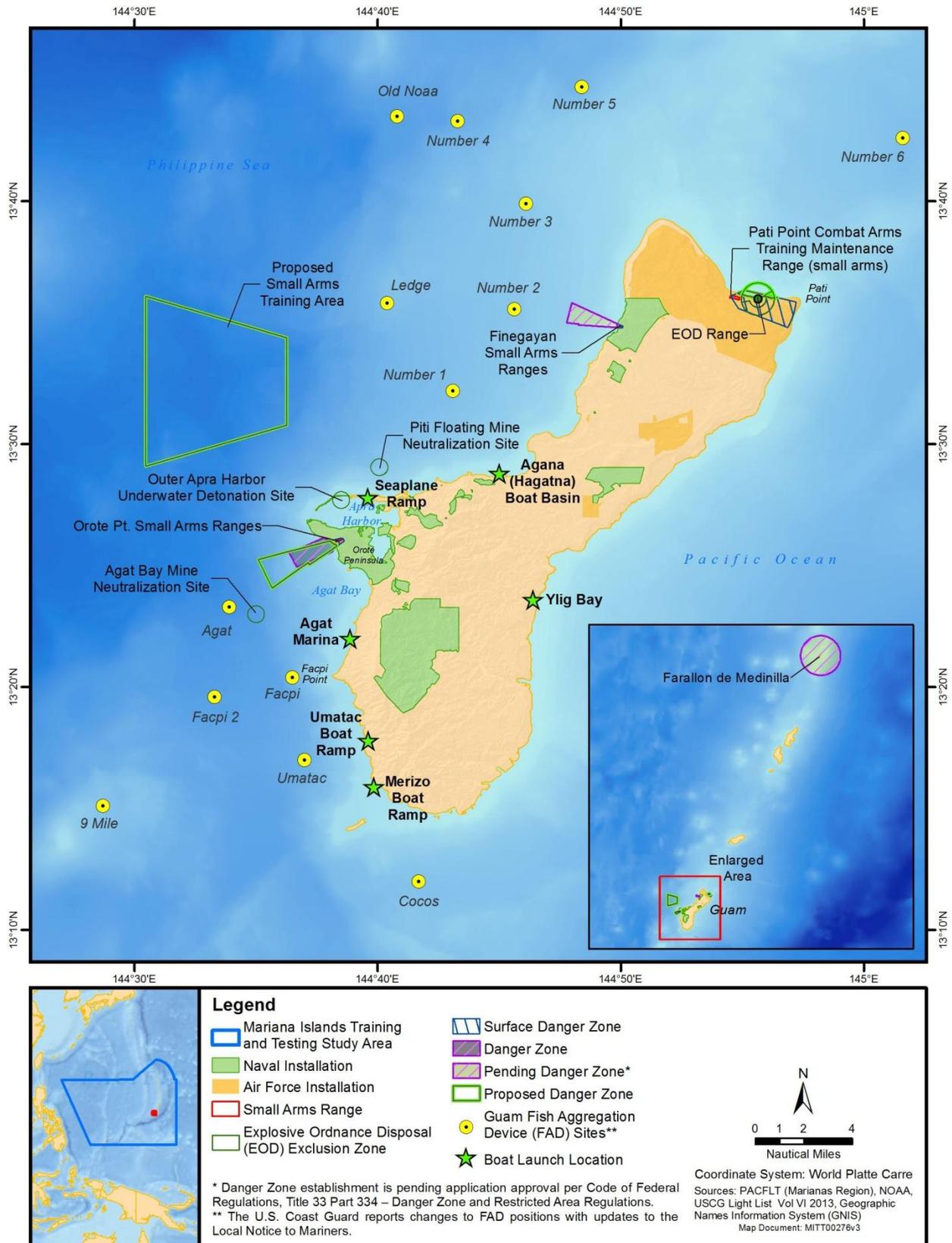


Figure 3.12-5: Guam Public Boat Launch Locations and Fish Aggregating Devices

The Guam bottomfish fishery is a combination of subsistence, recreation, and commercial fishing. The majority of vessels used for bottom fishing are less than 25 ft. (7.6 m) long and operate in shallow waters (< 500 ft. [152 m]) (Hospital and Beavers 2012). Bottom fishing on Guam is conducted in two areas: shallow water (< 500 ft. [152 m]) and deep water (> 500 ft. [152 m]). Smaller operator-owned boats tend to target shallow water, while the commercial fishers tend to target the deeper water. Less than 20 percent of shallow water harvests are taken beyond 3 nm from shore. This is largely due to deeper water and stronger currents farther out to sea (Western Pacific Regional Fishery Management Council 2009). Bottom fishing charters account for 15–20 percent of bottom fishing trips since 1995 and they have increasingly become catch-and-release activities (Western Pacific Regional Fishery Management Council 2009). Fish aggregating devices (FADs) are located off the western coast of Guam and are popular bottom fishing sites (Figure 3.12-5).

Pelagic fishing started on Guam during the 1950s along with the growth of the tourist industry. The five most common pelagic fish caught on Guam waters are mahi-mahi, wahoo, skipjack tuna, yellowfin tuna, and Pacific blue marlin. From year to year, there have been large fluctuations in the number of these species caught. Pelagic fish tend to be highly migratory and at the top trophic level of oceanic predators. The pelagic fishing fleet numbered 386 boats in 2006 (Allen and Bartram 2008). Approximately 7 percent of this fleet is comprised of charter boats with the remainder comprised of Guam residents using owner-operated boats, mostly towed to launch sites, as opposed to semi-permanent marina docking (Allen and Bartram 2008). The charter industry is most widely used by tourists and U.S. military personnel. Pelagic charter trips totaled roughly 2,000 in 2006, with an estimated 67,000 pounds (lb.) (30,400 kg) of catch with mahi-mahi, skipjack, and wahoo accounting for the top three species (Allen and Bartram 2008).

Annual commercial landings data for all fish types in Guam from 2005 to 2009 shows a fluctuation in the amount of pounds caught, and subsequently the revenue generated from these commercial fishing activities (Table 3.12-2). The 2008 Pacific Islands Fisheries Science Center released an administrative report titled *Guam as a Fishing Community* that notes that, although in some cases commercial fishing contributes substantially to household income, nearly all of Guam's domestic fishers hold jobs outside the fishery (Hospital and Beavers 2012; Allen and Bartram 2008; Myers 1993). Commercial fisheries have made a relatively minor contribution to Guam's economy. According to the Western Pacific Fisheries Information Network (WPacFIN), between 1980 and 2009, the ex-vessel value of domestic commercial landings ranged from about \$179,000 in 1980 to \$1.33 million in the year 2000 (Western Pacific Fisheries Information Network 2011). Since the late 1970s, the most important commercial fisheries activity in Guam has been the territory's role as a major regional fish transshipment center and resupply base for domestic and foreign tuna fishing fleets.

Table 3.12-2: Guam Commercial Fishery Landings

Year	Annual Total (lb.)	Value
2005	357,965	\$748,036
2006	334,729	\$726,296
2007	422,153	\$889,221
2008	287,213	\$692,809
2009	270,922	\$711,463
TOTAL	1,672,982	\$3,767,825

Note: lb. = pounds

Sources: Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network 2007, 2008, 2009, 2010, 2011

In Guam, lobster is harvested out to 3 nm from shore and primarily for personal consumption. The commercial trade is relatively low with only 1,168 lb. (529.8 kg) caught and sold for \$4,329 in 2008 (Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network 2010). Shrimp and crab harvests have been attempted commercially, but are not of a reportable volume. Strong currents, rough bottom topography, and water depth where species occur result in high fishing gear loss when attempting to harvest these species. Four permits have been issued for crustacean harvest in the exclusive economic zone (EEZ) around Guam, but the results of the harvest are unknown.

Three prime, offshore fishing areas are located south-southwest of Guam along the northwestern boundary of W-517: Galvez Bank, Santa Rosa Reef, and White Tuna Banks (Figure 3.12-6). Galvez Bank is the closest of the three areas, located approximately 15 nm from the southern tip of Guam. Its greater accessibility (fishers from Guam would pass Galvez Bank in order to reach the other two areas) make Galvez Bank the most popular of the three areas. Galvez Bank is outside of W-517; however, the most direct route from Guam would cross the northernmost tip of W-517. Santa Rosa Reef is located on the western boundary of W-517 approximately 25 nm from Guam. As with Galvez Bank, Santa Rosa Reef is outside of W-517, but the most direct transit route would require transiting through W-517. White Tuna Banks is the farthest of the three fishing areas, located approximately 28 nm from Guam.

Trolling and bottomfishing are used at all three offshore fishing areas (Allen and Bartram 2008). At the Galvez Bank and Santa Rosa Reef, bottomfish are caught by a combination of recreational vessels (< 25 ft. [7.6 m]) and larger commercial vessels (> 25 ft. [7.6 m]) (Moffitt et al. 2007). Galvez Bank is fished most heavily because it is closest to shore, while Santa Rosa Reef and White Tuna Banks are fished only during the most favorable weather conditions, which usually occur between May and September. In 2005, personnel from the Coral Reef Ecosystem Division, Pacific Islands Fisheries Council, and National Marine Fisheries Service (NMFS) conducted coral reef assessments and monitoring at Galvez Bank and Santa Rosa Reef as part of the National Oceanic and Atmospheric Administration's (NOAA's) Coral Reef Conservation Program (Pacific Islands Fisheries Science Center 2006). The survey revealed the presence of very few large (> 50 centimeters total length) fish at Santa Rosa Reef. Only 39 individual large fish were seen during 5 days of surveys. Fish species diversity and abundance were also low at the bank. The most abundant species was the twin-spot snapper (Pacific Islands Fisheries Science Center 2006). Surveys at Galvez Bank were inhibited by strong currents, preventing divers from conducting in-water surveys. Steep drop-offs in bottom topography limited the use of underwater cameras. Additional surveys of Galvez Bank, Santa Rosa Reef, and White Tuna Banks are needed to better characterize species abundance and diversity.

Commercial vessels, which are generally longer than 25 ft. (7.6 m), often concentrate their efforts in deeper waters (> 500 ft. [152 m]), such that Galvez Bank is fished more often by commercial vessels than nearshore areas with similar bathymetric features. White Tuna Banks, Santa Rosa Reef, and Rota Banks are fished less often than Galvez Bank, because they are more remote requiring longer transit times, greater fuel costs, and because of concerns over safety, particularly for smaller boats, should there be a need to reach shore quickly. The offshore banks are subject to strong currents and are only accessible during exceptionally good weather. Local fishers have reported that up to 10 commercial boats use these banks when the weather permits. Less than 20 percent of the total shallow-water marine resources harvested in Guam are located beyond 3 nm from shore. (Western Pacific Regional Fishery Management Council 2009).

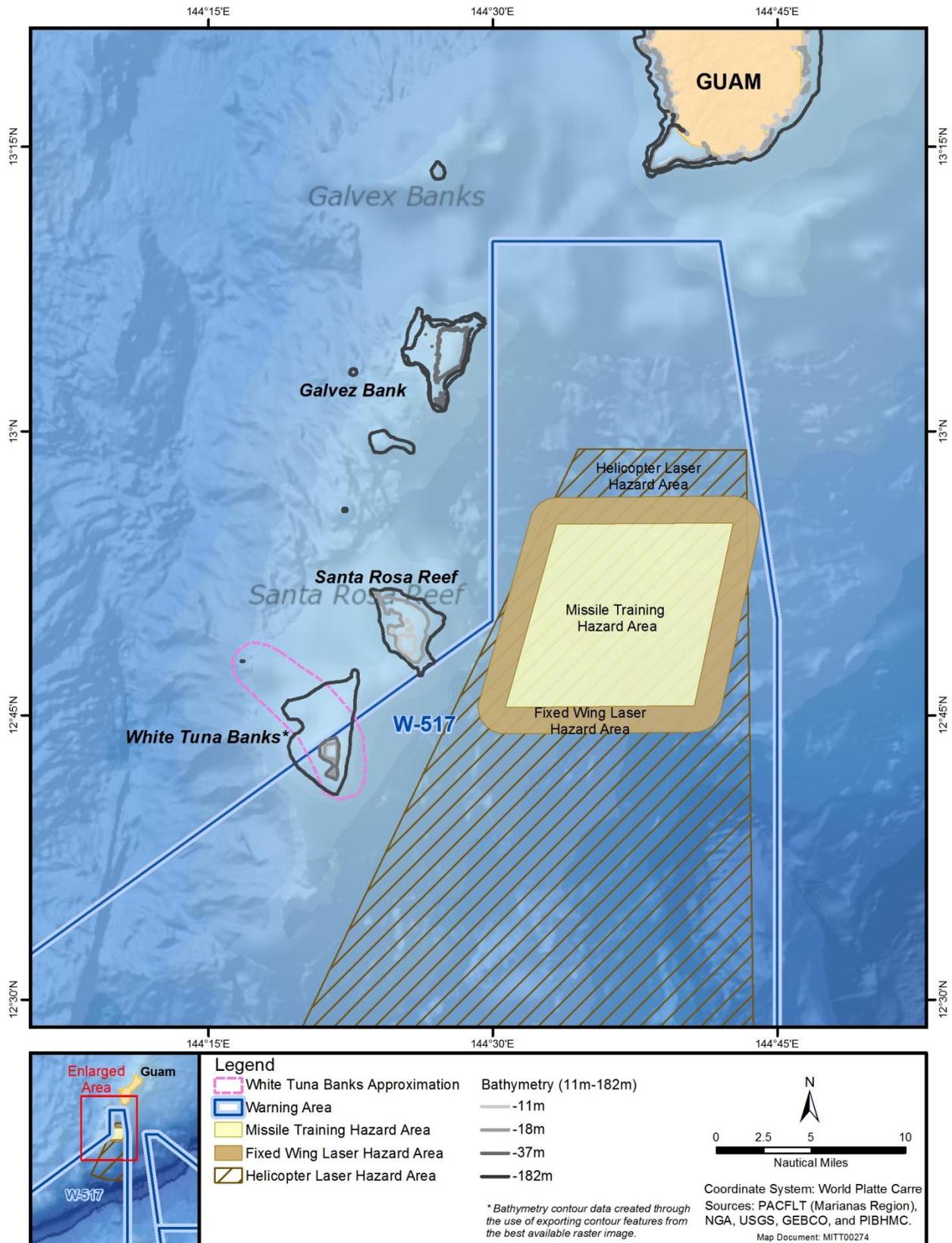


Figure 3.12-6: Galvez Bank and Santa Rosa Reef Adjacent to W-517

Guam has five marine preserves: Pati Point, Tumon Bay, Piti Bomb Holes, Sasa Bay, and the Achang Reef Flat Preserves (Figure 3.12-7). Public Law 24-21 was implemented to create the preserves and make changes to Guam's fishing regulations in an effort to preserve the fisheries (Guam Legislature 1997). Within the preserves, the taking of aquatic animals is restricted. All types of fishing, shell collecting, use of gaffs, and the removal of sand and rocks are prohibited unless specifically authorized. Limited inshore fishing is allowed within the Pati Point and Tumon Bay Preserves. Limited offshore fishing is also allowed in all the preserves.

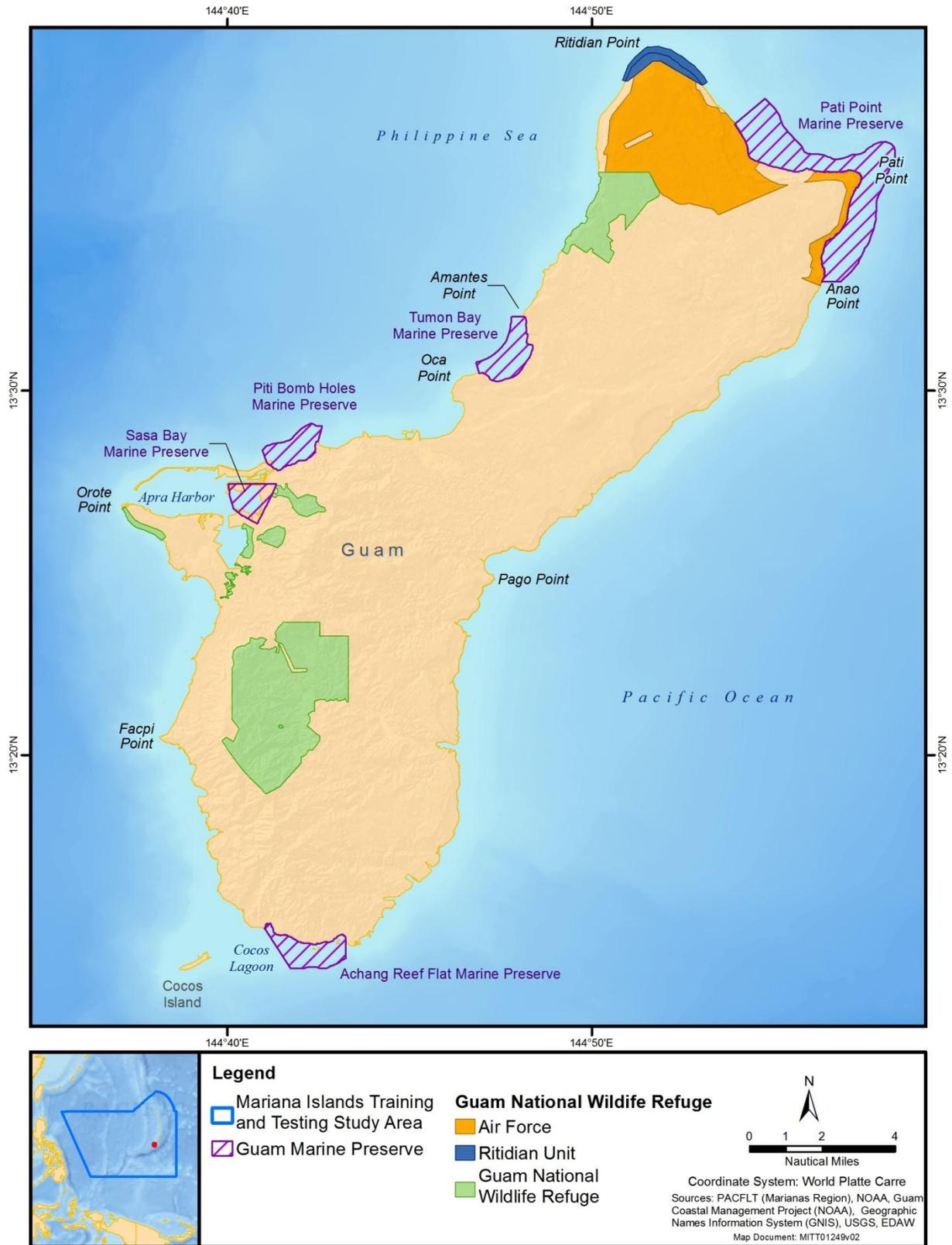
3.12.2.2.2 Commonwealth of the Northern Mariana Islands

Fishing is part of the traditional and cultural heritage for the people of the CNMI and is practiced as much as a way of life than it is for recreation or a primary source of income (MacDuff and Roberto 2012). Both finfish and invertebrates are caught using a variety of techniques, including hook and line, cast netting, spear fishing, trolling, and bottom fishing. Shore-based and boat-based reef fishing is both popular on the CNMI. From boats, emperor fish make up the majority of the catch, and from shore, jacks, followed by emperor fish, comprise the majority of the catch (MacDuff and Roberto 2012).

For the CNMI, the Pacific Islands Fisheries Science Center published data for 2008 that was then compiled by the CNMI Division of Fish and Wildlife and the Western Pacific Fisheries Information Network in August 2010. The Division of Fish and Wildlife collected data through a dealer invoicing system on a monthly basis. Estimates since 1982 indicate that more than 90 percent of the commercial landings have been recorded in Saipan, although the data represents 100 percent coverage (Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network 2010). In order to commercially fish in the CNMI's EEZ in a 25–50 ft. (7.6–15 m) boat (over 5 net tons), a commercial fishing license is required and issued annually. The NOAA Pacific Islands Fisheries Science Center issues approximately four commercial fishing licenses on an annual basis (Pacific Islands Fisheries Science Center 2011). There has been a relatively stable catch from 2005 through 2009; however, associated revenues have been steadily decreasing. In 2009, the CNMI produced a low of 331,506 lb. (150,369 kg) of fish worth \$709,985. The 5-year high of 536,724 lb. (247,453.9 kg) of fish worth \$1,058,804 was recorded in 2006 (Table 3.12-3). The resultant average over this 5-year period was 440,025 lb. (199,592 kg) of fish worth an average of \$891,314.

The CNMI bottomfish fishery occurs around the islands and banks from Rota Island to Zealandia Bank north of Sarigan in both the shallow water (100–500 ft. [30–152 m]) and the deep water (> 500 ft. [152 m]) fishing zones (MacDuff and Roberto 2012). Fishing in deeper waters is mainly conducted by larger, commercial vessels. Subsistence and recreational fishing occurs in the shallower waters. In 2004, the CNMI's Department of Fish and Wildlife reported 43 vessels recorded commercial landings in the bottomfish fishery (Western Pacific Regional Fishery Management Council 2005). Only eight of these vessels were reported to be larger commercial vessels, ranging in length from 29 to 70 ft. (8.8 to 21 m), and the remaining vessels were among the smaller, approximately 150 skiffs, measuring less than 24 ft. (7.3 m). The skiffs are generally restricted to use during daylight hours and within a 40 nm radius of Saipan because of their size (Western Pacific Regional Fishery Management Council 2005; MacDuff and Roberto 2012).

A study conducted by the Pacific Islands Fisheries Science Center on fishing activity in the Islands Unit of the Marianas Trench Marine National Monument reports that fishers have historically traveled from the southern Mariana Islands to the northern islands (now referred to as the Islands Unit) to fish for both commercial benefit and subsistence (Kotowicz and Richmond 2013). Between 1979 and 2009, an average of 3.8 trips were made annually to the Islands Unit. Out of the 117 trips, fishing was the primary



On May 16, 1997, Guam Public Law 24-21 was implemented creating 5 marine preserves and making changes to Guam's fishing regulations. These marine preserves were set up to restrict certain activities such as fishing to protect coral reef habitats and aquatic animals such as fish.

Figure 3.12-7: Marine Preserves on Guam

purpose for 73 trips; however, fishing took place on 98 percent of all trips. Other primary purposes for trips to the Islands Unit were research, transport of supplies, exploration, and chartered trips.

The waters surrounding FDM have been and continue to be an important area for local fishers. The pending establishment of a 12 nm danger zone coincident with the existing 12 nm restricted airspace (R-1701 A) and the associated potential restrictions on accessibility is a concern expressed by the public; however, the specific locations of popular fishing sites that may be encompassed by the danger zone are not available. To conduct a more meaningful analysis of potential impacts on accessibility to these fishing sites, areas where the water depth is less than 400 m are considered as potential fishing sites (Figure 3.12-4).

Fishing gear used by recreational and subsistence fishers in the CNMI bottomfish fishery includes hand lines, home fabricated hand reels, and electric reels. Larger commercial vessels commonly use electric reels and hydraulics. There are no known commercial vessels with ice-making or freezer capabilities (Western Pacific Regional Fishery Management Council 2005). Bottomfishing is the most productive boat-based fishing method in the CNMI (MacDuff and Roberto 2012). Little information is available on the CNMI precious coral fishery. The steep topography around the islands limits the available habitat for precious coral (i.e., black, pink, gold, and bamboo corals). Some species of precious corals prefer shallow (30 to 100 m [approximately 90 to 300 ft.]), nearshore habitat, while other species are known to grow in deeper waters (300 to 1,500 m [approximately 1,000 to 4,900 ft.]) farther from shore. Since World War II, no known harvests of precious corals have occurred in the CNMI EEZ (Western Pacific Regional Fishery Management Council 2009). In September 2008, NMFS issued a 5-year moratorium on harvesting gold corals (*Gerardia* spp., *Callogorgia gilberti*, *Narella* spp., *Calyptrophora* spp.) to protect against the threat of overharvesting (50 C.F.R. 665.469). On 29 May 2013, NMFS extended the moratorium through 30 June 2018 to encourage continued research on gold corals, which are long-lived and grow slowly, and, consequently, are vulnerable to overharvesting (78 Federal Register [FR] 32181). The NMFS has also proposed quotas for harvesting other species of precious corals (77 FR No. 1, Tuesday 3 January 2012). In Guam, a limit of 700 kg (1,543 lb.) of black coral can be harvested annually, and all other precious corals are limited to a combined total of 1,000 kg (2,205 lb.). In the CNMI, the limit on black corals is 2,100 kg (4,630 lb.) per year, and the limit on all other corals is 1,000 kg (2,205 lb.) (MacDuff and Roberto 2012).

Table 3.12-3: Commonwealth of the Northern Mariana Islands Commercial Fishery Landings

Year	Annual Total (lb.)	Value (\$)
2005	432,790	\$911,059
2006	536,724	\$1,058,804
2007	510,680	\$952,903
2008	388,426	\$823,821
2009	331,506	\$709,985
TOTAL	1,868,620	\$4,456,572

Note: lb. = pound

Sources: Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network (2007, 2008, 2009, 2010, 2011)

The CNMI bottomfish fishery gear for recreational and subsistence fishers include hand lines, home fabricated hand reels, and electric reels. Larger commercial vessels commonly use electric reels and

hydraulics. There are no known commercial vessels with ice-making or freezer capabilities (Western Pacific Regional Fishery Management Council 2005). Trolling is the most common fishing method.

3.12.2.2.3 Transit Corridor

There is no data on commercial or recreational fishing within the transit corridor area because of the distance from land. Due to the distance from land and lack of rich fishing grounds within the corridor, there is limited to no commercial and recreational fishing activity within the transit corridor.

3.12.2.3 Subsistence Use

The U.S. Environmental Protection Agency (USEPA) considers subsistence fishers to be people who rely on noncommercial fish as a major source of protein. Subsistence fishers tend to consume noncommercial fish or shellfish at higher rates than other fishing populations, and for a greater percentage of the year, because of cultural or economic factors. There are very few studies in the United States that have focused specifically on subsistence fishers. The United States has issued no regulations to determine what or who would be considered a subsistence fisher. However, on 3 July 2013 a final rule proposed by the NMFS went into effect allowing non-commercial fishers who are residents of Guam or the CNMI to fish within the boundaries of the Marianas Trench National Monument and to “exchange” their catch for goods and services (78 FR 32996). Within the terms of the final rule, an “exchange” is defined as,

“[T]he non-market exchange of marine resources between fishermen and community residents for goods, and/or services for cultural, social, or religious reasons, and which may include cost recovery through monetary reimbursements and other means for actual trip expenses (ice, bait, food, or fuel) that may be necessary to participate in fisheries in the western Pacific.”

Concerns over potential abuse of the non-market exchange leading to commercial market sales and competition for commercial fishers has been voiced by Global Ocean Legacy and Pew Charitable Trusts (The Samoa News 2013).

In addition, in the United States, there are no particular criteria or thresholds (such as income level or frequency of fishing) that definitively describe subsistence fishers. The USEPA issued guidance to state that at least 10 percent of licensed fishers in any area will be subsistence fishers (U.S. Environmental Protection Agency 2002). Because the 10 percent estimate is not based on actual subsistence fishing data, the number may be an overestimate or underestimate.

Subsistence fishing is an important part of the cultural and historical identity of indigenous peoples and Asian immigrant communities living in Guam and in the CNMI. Lower income communities are also more likely to engage in subsistence fishing (Allen and Bartram 2008; Office of Environmental Health Hazard Assessment 1997). An important part of the cultural heritage of local communities practicing subsistence fishing is sharing the catch. An estimated 96 percent of fishers share their catch with immediate family and close friends. Fifty-three percent of fishers do not typically share their catch outside of this close social circle, with the notable exception of contributing to church functions (e.g., fiestas) (Allen and Bartram 2008).

The fishing gear and larger vessels needed for offshore fishing are considerably more expensive than the smaller boats and fishing gear appropriate for nearshore fishing. Low-income populations would have limited means and opportunity to travel offshore into federal waters for fishing. Thus, it is assumed that the majority of subsistence fishing would occur in waters close to the coastline. Traditional fishing

customs are also associated with fishing on nearshore reefs. Inshore fishing usually occurs within sight of the shoreline in bays, flats, and marshes or under piers, bridges, or near the jetties (Allen and Bartram 2008; Orange Beach Fishing Charters 2011). The water is usually less than 100 ft. (30 m) deep.

3.12.2.3.1 Guam

Most shallow water fishing out to 3 miles (mi.) (4.8 kilometers [km]) from shore is recreational and subsistence fishing typically conducted by vessels less than 25 ft. (7.6 m) long. Crustacean harvest occurs in inshore territorial waters also for recreational and subsistence purposes. The native Chamorros fish for a combination of recreational, subsistence, and cultural purposes. Sales of fish may occur to cover expenses, but the primary purpose is subsistence and cultural activities that include donations to assist each other and celebration of life events. A high value is placed on sharing one's fish catch with relatives and friends. The social obligation to share one's fish catch extends to part-time and full-time commercial fishers (Amesbury and Hunter-Anderson 1989). In 2005, Guam households purchased 51 percent of the fish consumed at a store or restaurant, approximately 24 percent was caught by a family member, 14 percent was caught by a family friend or extended family member, and 9 percent was purchased at a flea market or from a roadside stand (van Beukering et al. 2007). Domestic fishing on Guam supplements family subsistence, which is not just limited to fishing but is a combination of small-scale gardening, ranching, and wage work as well (Allen and Bartram 2008; Amesbury and Hunter-Anderson 1989).

3.12.2.3.2 Commonwealth of the Northern Mariana Islands

Both the CNMI and Guam are categorized as "fishing communities" by the Western Pacific Regional Fishery Management Council. This designation is given due to considerations such as the portion of the population that is dependent upon fishing for subsistence, the economic importance of fishery resources to the islands, and the geographic, demographic, and cultural attributes of the communities (Western Pacific Regional Fishery Management Council 2009). Recreational and subsistence fishing activities on CNMI primarily occur in the shallow water (< 500 ft. [< 152 m]) and are limited to daylight hours within a 30 mi. (48.2 km) radius of Saipan. These limitations are associated with the distances to nearby ports and the typical size of the vessels (usually less than 24 ft. [7.3 m] in length) (Western Pacific Regional Fishery Management Council 2005). This type of fishing is conducted without fathometers or nautical charts as the fishers rely on land features for guidance to a fishing area (Pacific Islands Fisheries Science Center 2011). In 2005, Division of Fish and Wildlife reported 150 vessels were being used for subsistence fishing (Western Pacific Regional Fishery Management Council 2005).

The lobster harvest occurs exclusively within 3 nm from shore. This harvest is for personal consumption, and volume is not reported. There is no information available regarding the subsistence or recreational harvest of coral reef resources inshore; however, a survey program is being established. Saipan Lagoon is thought to be heavily harvested by subsistence and recreational fishers; however, coral reefs are not believed to be used with any frequency by subsistence or recreational fishers. Poaching by foreign boats is believed to occur on coral reefs (Western Pacific Regional Fishery Management Council 2005).

3.12.2.3.3 Transit Corridor

It is assumed that there is limited to no subsistence fishing activity within the transit corridor because of the distance from land to the transit corridor and because the majority of subsistence use occurs nearshore.

3.12.2.4 Tourism

Coastal tourism and recreation can be defined as the full range of tourism, leisure, and recreationally oriented activities that take place in the coastal zone and the offshore coastal waters. These activities include coastal tourism development (e.g., hotels, resorts, restaurants, food industry, vacation homes, second homes, etc.), and the infrastructure supporting coastal development (e.g., retail businesses, marinas, fishing tackle stores, dive shops, fishing piers, recreational boating harbors, beaches, recreational fishing facilities, etc.). Also included is ecotourism and recreational activities such as recreational boating, cruises, swimming, recreational fishing, snorkeling and diving (National Oceanic and Atmospheric Administration 1998).

3.12.2.4.1 Guam

Visitors to Guam enjoy clear waters with excellent visibility extending out as far as 150 ft. (46 m), depending on the season. Diving and snorkeling are popular activities that may also include underwater photography, spear fishing, and exploring wrecks and reefs. Jet skiing, wind surfing, sea kayaking, water tours, dolphin watching, and submarine and semisubmersible tours are also available to tourists (and locals) on Guam.

In 2003, according to the Guam Economic Development Authority, the major revenue sources in Guam were tourism (60 percent), military and federal spending (30 percent), and “other” revenue (10 percent) (Guam Economic Development Authority 2008). In 2010, Guam welcomed approximately 1.2 million visitors. Japan accounted for approximately 76 percent of Guam’s visitors, people traveling from Korea accounted for 10 percent, the United States accounted for 5 percent, and the smaller markets of Hong Kong, China, Australia, the Philippines, Micronesia, and Russia made up approximately 5 percent of visitors (Guam Visitors Bureau 2010). In 2006, Guam supported an estimated 20,000 tourism related jobs, approximately 35 percent of the total number of jobs available on the island (Allen and Bartram 2008).

Tumon Bay, halfway between Apra Harbor and the northern part of the island, is the premier resort destination on Guam. Luxury hotels line the beachfront with access to white sand and crystal clear, warm waters ideal for swimming and snorkeling. A few hotels are also located in the southern and central parts of the island.

Guam’s warm waters offer dives for all skill levels with numerous opportunities for the uncertified diver as well as the most skilled. Diving is available from either a boat or the shore. Guam boasts that it is the only site in the world that has shipwrecks from both World War I and World War II, from two different countries, which can be visited at the same time: the Tokai Maru and the SMS Cormoran (Guam Visitors Bureau 2006). Figure 3.12-8 shows many of the popular dive sites in nearshore waters of Guam and the CNMI. The vast majority of mapped dive sites are not located in close proximity to military danger zones.

3.12.2.4.2 Commonwealth of the Northern Mariana Islands

The CNMI is a 14-island chain that features the three main islands of Saipan, Tinian, and Rota. With an average temperature of 84 degrees Fahrenheit (°F) and average humidity of 79 percent, these islands offer an attractive climate for a variety of tourism activities including sky diving, jungle tours, venues that offer dances of the Pacific Islanders, resort stays, golf, scuba diving (including historic ship and aircraft wrecks), touring historic sites, music, arts and crafts, Eurobungy trampoline, climbing walls, and gambling. With the ocean temperature averaging 82°F, other tourist activities include snorkeling, parasailing, water skiing, submarine tours, and sea walker tours (a 3 m [10 ft.]) dive for the non-scuba

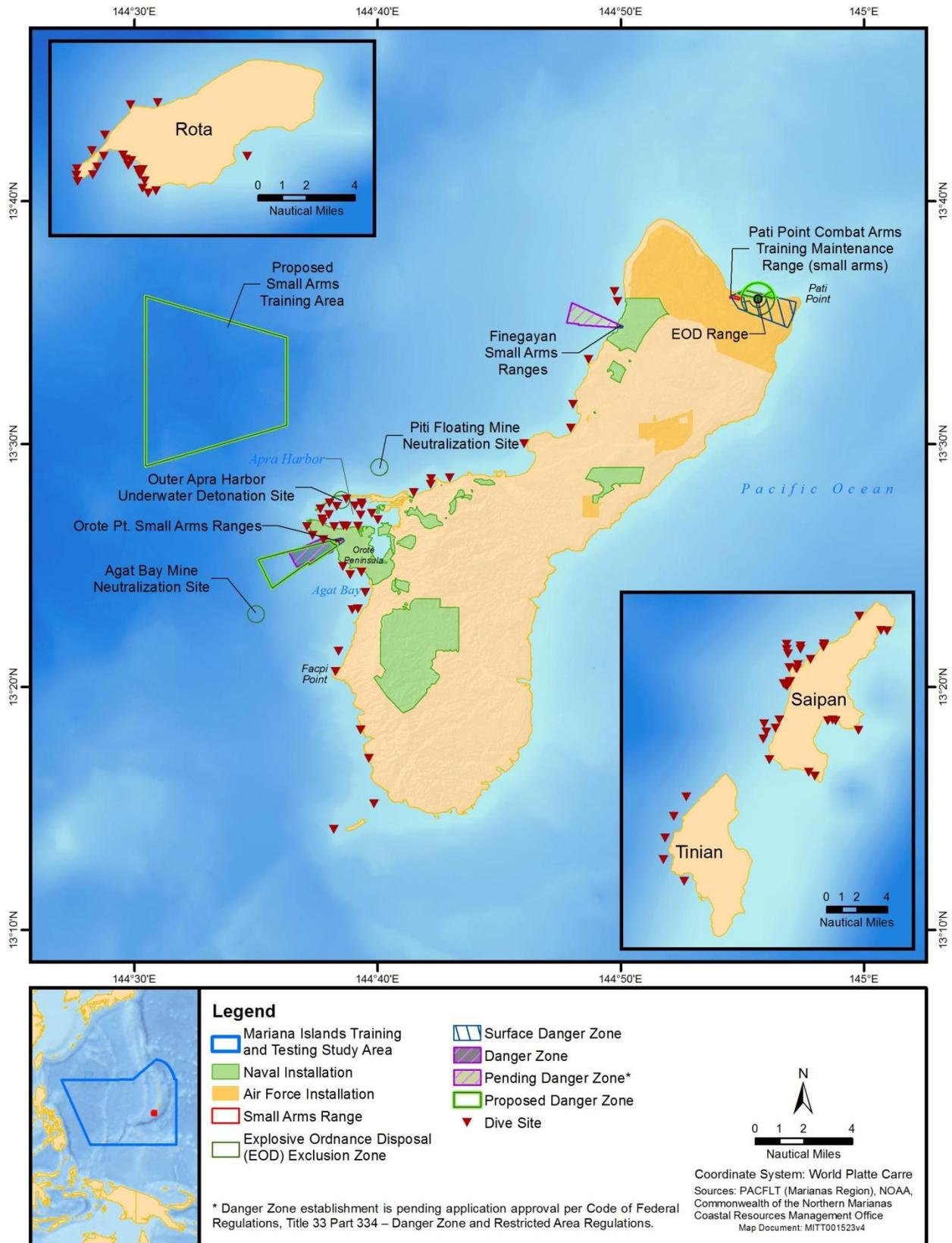


Figure 3.12-8: Popular Dive Sites Within the Mariana Islands Training and Testing Study Area

certified tourist), banana boat rides (a non-motorized boat pulled by a motor boat), bird watching, deep sea fishing, flora and fauna tours, glass bottom boats, and cultural festivals featuring native food, arts, and crafts.

Tourism is the largest industry in the CNMI. There have been serious declines in tourism due to the Asian financial crisis, Severe Acute Respiratory Syndrome, and the 9/11 attacks on the United States (Cohen 2006). Between 1988 and 1996, the tourism industry grew by 15 percent annually. After a sharp decline in 1997 and 1998, a modest recovery had begun before the 11 September 2001 terrorist attacks. After the 2001 attacks, the tourism trade declined by 1.4 percent (Pacific Business Center Program – University of Hawaii 2008). Tourism continues to face economic difficulties, including increased labor costs associated with the \$2 per hour increase in the CNMI minimum wage standards (from \$3.05 an hour in 2007 to \$5.05 an hour in 2010), with proposed subsequent wage increases of \$0.50 a year until the CNMI reaches the federal minimum wage standards of \$7.25 an hour (Eugenio 2010). The result is a short-term imbalance in the economy caused by the increased operating costs in the tourism industry and exacerbated by lagging tourist numbers.

The withdrawal of Japan Air Lines from scheduled flights between Japan and Saipan reduced the CNMI Japanese tourist population from 40 percent of the total tourism to 29 percent in 2005 (Cohen 2006). In July 2011, the Marianas Visitors Authority reported 27,203 visitors traveled to the CNMI, which is down by 23 percent compared with the total for July 2010 (Tenorio 2011). Visitor arrivals from Japan continue to fall, with a 17 percent decrease in fiscal year 2011, and there has been no growth in the Korean tourism market from 2010 to 2011 because of reductions in direct flights by airlines in Japan and Korea. However, the CNMI has seen an increase in tourism from secondary markets. While Japanese and Korean tourism has decreased or remained flat, Chinese tourism has increased by 9 percent over 2010 totals, and Russian tourism is up by 19 percent compared with 2010. In addition, with direct flights from Hong Kong, the CNMI has experienced a 9 percent increase in visitors from Hong Kong between July 2010 and July 2011 (Tenorio 2011).

The island of Tinian has a total land area of approximately 39 square miles (mi.²) (101.01 square kilometers [km²]), but only about 13 mi.² (33.7 km²) of the island is outside the DoD-leased lands. Local government and the accommodation (e.g., hotel) industry are the island's largest employers (U.S. Department of the Navy 2010b). Tinian is the only populated island in the Mariana Islands that has not experienced dramatic economic development over the last 15 years. Most retail establishments are located in San Jose, and include a large hotel and casino, nightclubs, convenience stores, gas stations, small restaurants, bakeries, and banks (National Park Service 2001). The accommodations industry, including the Tinian Dynasty Casino Hotel, employs approximately 670 people, or about 40 percent of the island's total employed population. Local government has approximately 270 employees, or about 17 percent of the total employed, and the education industry employs approximately 130 people, which is about 8 percent of the total number of employed people. In 2008, Tinian's unemployment rate was approximately 17 percent (U.S. Department of the Navy 2010b). Although gambling is the most profitable tourist attraction, the World War II historic sites and wildlife viewing also attract tourists to the island and encourage longer stays. Most of the historic sites are located within the exclusive military use area.

The island of Rota is the smallest of the three major islands in the CNMI with a land area of approximately 33 mi.² (85.5 km²). The island primarily offers outdoor recreation and sightseeing, including a famous swimming hole on the western side of the island, a limestone quarry used by ancient Chamorros, and a seabird sanctuary providing habitat for thousands of seabirds.

3.12.2.4.3 Transit Corridor

It is assumed that there is limited to no tourism activity within the transit corridor because of the distance from land to the transit corridor and because the majority of tourism activity occurs nearshore.

3.12.3 ENVIRONMENTAL CONSEQUENCES

This section presents the analysis of potential impacts on socioeconomic resources, from implementation of the project alternatives, including the No Action Alternative, Alternative 1, and Alternative 2. In the sections below, each socioeconomic resource stressor (i.e., an external stimulus or multiple stimuli that causes stress to a resource) is introduced, analyzed by alternative, and analyzed for training and testing activities.

Potential impacts to socioeconomic resources are not analyzed beyond 12 nm from shore, because EO 12114, which establishes environmental policy beyond 12 nm, does not apply to socioeconomics. Table F-3 in Appendix F (Training and Testing Activities Matrices) shows the warfare areas and associated stressors that were considered for analysis of socioeconomic resources.

The stressors vary in intensity, frequency, duration, and location within the MITT Study Area. The stressors applicable to socioeconomic resources in the MITT Study Area and analyzed below include the following:

- Accessibility (limiting access to the ocean and the air)
- Airborne acoustics (weapons firing, aircraft, and vessel noise)
- Physical disturbance and strike (aircraft, vessels and in-water devices, military expended materials)
- Secondary (availability of resources)

Secondary stressors resulting in indirect impacts to socioeconomic resources are discussed in Section 3.12.3.4 (Secondary Impacts from Availability of Resources). A secondary stressor, as used in this section, is a stressor that has the potential to affect a socioeconomic resource as a result of a direct effect on another non-socioeconomic resource. For example, if a training activity has the potential to affect certain species of fish, and those species also constituted an economically important fishery, then the effect of the stressor on those fish species could have an indirect, or secondary, effect on the socioeconomic resource of recreational fishing.

Analysis of economic impacts evaluates the impacts of the alternatives on the economy of the region of influence, while analysis of social impacts considers the change to human populations and how the action alters the way individuals live, work, play, relate to one another, and function as members of society. Because the proposed training and testing activities take place predominantly offshore, socioeconomic impacts would be associated with economic activity, employment, income, and social conditions (i.e., livelihoods) of industries or operations that use the ocean resources within the MITT Study Area. Although there are no permanent population centers in the region of influence and the typical socioeconomic considerations such as population, housing, and employment are not applicable, this section will analyze the potential for fiscal impacts on marine-based activities and coastal communities. When considering impacts on recreational activities such as fishing, boating, and tourism, both the economic impact associated with revenue from recreational tourism and public enjoyment of recreational activities is considered.

The proposed training and testing activities were evaluated to identify specific components that could act as stressors by having direct or indirect effects on the resources of commercial transportation and shipping, commercial and recreational fishing, subsistence use, and tourism. For each of the three stressors listed above, a discussion of impacts on the relevant resources is included for each alternative. All five resources are not affected by each of the three stressors. For example, the resource of air traffic is not impacted by the stressors of physical disturbance and strike. Potential impacts to air traffic are addressed under the accessibility stressor.

3.12.3.1 Accessibility (to the Ocean and Airspace)

Military training and testing activities have the potential to temporarily limit access to areas of the ocean for a variety of human activities associated with commercial transportation and shipping, commercial recreation and fishing, subsistence use, and tourism in the MITT Study Area.

Danger zones and restricted areas located within 12 nm from shore in the MITT Study Area are well established and clearly marked on navigational charts used by commercial and recreational vessels. These areas do limit access to fishing grounds potentially of interest to commercial, recreational, and subsistence fishers and to dive sites that may be of interest to residents and tourists.

When training or testing activities are scheduled that require specific areas to be free of non-participating vessels to ensure public safety, the military requests that the U.S. Coast Guard issue Notices to Mariners.

As specified in Title 33 C.F.R. Subpart 72.01, Notices to Mariners, the U.S. Coast Guard issues information to the public concerning maritime navigation. There are three categories of Notices to Mariners: the Local Notice to Mariners (LNM), the Notice to Mariners (NTM), and the maritime Broadcast Notice to Mariners (BNM).

The LNM is published weekly by each U.S. Coast Guard district or more often if there is a need to notify mariners of local waterway information. The LNM reports changes to and deficiencies in aids to navigation that are established or maintained and operated by or under the authority of the U.S. Coast Guard, and any other information pertaining to the waterways within each U.S. Coast Guard district that is of interest to the mariner, to include advisories for public safety. The LNM is available for viewing on the Coast Guard Navigation Center website.¹ Any person may apply to the Coast Guard Navigation Center to receive automatic notices via e-mail when new editions of the LNM are available.

The NTM is published weekly by the National Geospatial-Intelligence Agency, and is prepared jointly by the U.S. Coast Guard, the National Ocean Service, and the National Geospatial-Intelligence Agency. The NTM is intended to advise mariners of new hydrographic discoveries, changes in channels and navigational aids, and information concerning the safety of navigation. The NTM contains updates to the latest editions of charts and publications of the National Geospatial-Intelligence Agency, National Ocean Service, USACE, and U.S. Coast Guard; selected information from the LNM issued and published by the Coast Guard districts; and information compiled from foreign notices to mariners, ship reports, and similar cooperating observer reports. The NTM may be accessed through the National Geospatial-Intelligence Agency's website² under "Notice to Mariners."

¹ <http://www.navcen.uscg.gov/?pageName=lnmMain>

² <http://msi.nga.mil/NGAPortal/MSI.portal>

The maritime BNM is a radio broadcast issued by the U.S. Coast Guard using its own radio stations. These stations broadcast warnings within naval areas defined by the Worldwide Navigational Warning Service. Within the Mariana Islands naval area, the approved method for receiving these warnings are from the U.S. Coast Guard Guam's Global Maritime Distress and Safety System (GMDSS) broadcast service. The GMDSS broadcast service provides rapid dissemination of information critical to navigation and the safety of life at sea. BNM are issued regularly and contain information about persons in distress, or objects and events that pose an immediate hazard to navigation.

The U.S. Coast Guard Guam GMDSS broadcast service issues BNM warnings using multiple radio broadcast systems and frequencies. Local and coastal BNM warnings are broadcast out to 20 nm on VHF-FM radio channel 16. After a preliminary safety signal is broadcast on VHF-FM channel 16, broadcast stations are shifted to VHF-FM channel 22A for warning information. Out to 100 nm, the Coast Guard NAVTEXT broadcast system provides BNM warnings that are received by NAVTEXT radios using the MF frequency 518 kilohertz. For broadcast coverage beyond 100 nm, BNM warnings are issued via HydroPac using HF radio frequencies.

The military also requests that the FAA issue Notices to Airmen to warn the public of upcoming military activities requiring the exclusive use of airspace. Military training and testing areas and SUA are identified on nautical and aeronautical charts to inform surface vessels and aircraft that military activities occur in the area.

The restricted airspace, R-7201, overlays FDM and the waters surrounding the island out to a distance of 3 nm. Airspace R-7201A extends from 3 nm out to 12 nm measured from the center of FDM (Figure 3.12-2 and Figure 3.12-4). R-7201 and R-7201A support live-fire and inert engagements such as surface-to-ground and air-to-ground gunnery, bombing, and missile exercises, all of which require that access to the area be permanently restricted to ensure the safety of the public. Even when live-fire or other potentially hazardous activities are not occurring at FDM, the threat of unexploded ordnance is always present. No commercial or recreational activities occur or are permitted on or near the island, and aircraft and marine vessels are restricted from entering within 3 nm of FDM. Notices to Airmen and Notices to Mariners are issued at least 72 hours in advance of potentially hazardous training or testing activities. Notices to Airmen and Notices to Mariners may also advise restrictions out to 12 nm as needed for certain training or testing events to ensure the safety and protection of the public and the military during some training and testing activities.

The 2013 Mariana Islands Range Complex Airspace EA/OEA analyzed the establishment of a 12 nm danger zone surrounding FDM (congruent with restricted airspace R-7201A). The analysis supports the establishment of the Danger Zone under the authority of the USACE (C.F.R., Title 33 Part 334) to restrict all private and commercial vessels from entering the area during hazardous training and testing activities. When no training or testing activities are scheduled, the waters within the pending 12 nm danger zone (but not within 3 nm) are accessible to the public. To help mariners better plan fishing and boating activities that involve accessing the waters around FDM (waters between 3 and 12 nm), the Navy notifies mariners of time periods when FDM will not be in use for several consecutive days. Announcing in advance when FDM will be in use and when it will not be in use for an extended period of time will facilitate the use of waters around FDM by the public for recreational activities.

The Mariana Islands Range Complex EIS/OEIS analyzed the impacts from establishing a small arms danger zone for the existing Finegayan Small Arms Range, located in nearshore waters off of the Naval Base Guam Telecommunications Site and extending seaward from Haputo Point.

In addition to issuing Notices to Airmen and Notices to Mariners to announce scheduled training and testing events, upcoming events are communicated to stakeholders (e.g., local mayors, resources agencies, and fishers) using a telephone tree and e-mail distribution developed by Joint Region Marianas with stakeholder input. Notices are also sent to the NOAA, local cable channels, and emergency management offices.

Establishing two new danger zones and modifying an existing danger zone is proposed under Alternatives 1 and 2 (see Chapter 2, Description of Proposed Action and Alternatives, Section 2.7 and Section 2.8).

- A danger zone would be established over nearshore waters, approximately 0.5 nm seaward of the Pati Point Combat Arms Training and Maintenance Range and Pati Point EOD Range, located at Pati Point on the northeastern tip of Guam, to support existing small arms training and explosives ordnance range activity.
- A danger zone would be established to support small arms training located west of Guam, beyond 3 nm from shore and within the territorial waters of Guam. The danger zone would be located within an existing Navy “Firing Danger Area” charted on NOAA Chart 81048, Guam. The area is currently used by military crews to conduct small arms training.
- The existing danger zone off Orote Point (33 C.F.R. Part 334.1420) would be modified to support .50 caliber sniper training by extending the range to 2.7 miles from shore (see Figure 2.1-5 in Chapter 2, Description of Proposed Action and Alternatives).

Once established, restrictions associated with these zones would be codified in 33 C.F.R. 334, and activities occurring at these locations would be announced in advance through Notices to Mariners to reduce conflicts with recreational, commercial, and subsistence activities. To ensure public safety, access to waters within C.F.R. Part 334, Danger Zones will be controlled in accordance with USACE rule making. Military activities utilizing the danger zone would be halted until the danger zone is cleared of transiting vessels.

Potential impacts to mariners attempting to access a site (e.g., a fishing site) within a temporarily closed danger zone could include incurring additional fuel costs, expending more time transiting to an alternate site, or rescheduling a trip. The extent of the impact would mainly be dependent on the length of the route to an alternate site, but could also include the expense and inconvenience associated with rescheduling a trip. Although accessibility to waters within the proposed danger zones would be restricted during specified times, the restrictions are temporary, and the military will continue to notify the maritime community of scheduled closures. The vast majority of the MITT Study Area, including a number of FADs, would remain accessible to the public.

Data are available on Notices to Mariners issued from 2010 through 2012 for FDM and W-517. An average of 39 Notices to Mariners were issued per year for FDM and 34 for W-517 warning vessels of military activities and temporarily restricting access to waters in these areas to ensure public safety (Table 3.12-4). Over the 3-year period, access to waters around FDM was restricted for an average of 159 days per year (access to waters within 3 nm of FDM is restricted at all times), and access to waters within W-517 was restricted for an average of 95 days per year. When issued, Notices to Mariners specify how long waters are restricted, which can range from a few hours to the entire day.

Table 3.12-4: Notices to Mariners Issued for Military Activities Occurring at Farallon de Medinilla and Warning Area 517 from 2010 through 2012

Year	Location	Number of Notices to Mariners Issued	Number of Days Affected
2010	FDM	32	107
	W-517	34	73
2011	FDM	42	170
	W-517	38	116
2012	FDM	44	201
	W-517	30	97
3-Year Average	FDM	39	159
	W-517	34	95

Notes: FDM = Farallon de Medinilla, W-517 = Warning Area 517

Specifically for FDM, data recorded from October to December 2011 show that Notices to Mariners issued for 14 days in October restricted access for an average of 11.3 hours per day. In November, Notices to Mariners were issued for 15 days, and on those days waters around FDM were restricted for an average of 7.4 hours. Notices to Mariners were issued for 20 days in December, resulting in waters being restricted for an average of 16 hours per day; however, the December average is skewed because for 6 out of the 20 days the waters were restricted for the entire day (i.e., 24 hours). Excluding those 6 days, waters around FDM were restricted for an average of 12.6 hours per day.

The military has also requested that the U.S. Coast Guard issue Notices to Mariners to announce when plans to use an area change (e.g., W-517), and access to the area will no longer be restricted (as previously published) and will now be accessible. Actions like notifying mariners when plans change are intended to reduce potential impacts to accessibility and improve communication between the military and local communities. The Navy also announces time periods when FDM will not be in use for several consecutive days, allowing mariners to plan activities (e.g., fishing) in waters beyond 3 nm from FDM.

A 2011 survey of small boat fishers on Guam attempted to assess the impacts of restricting access to waters within W-517 during military activities (Hospital and Beavers 2012). The fishers were asked if military activities ever affected their fishing trips. Of the 139 respondents, 54 percent reported that in the past 12 months at least one “pelagic fishing” trip was affected in some way by military activities, 42 percent reported that at least one “bottomfishing” trip had been affected, and 31 percent reported that military activities had affected one or more “reef fishing” trips. The data were organized by the type of fishing trip (i.e., pelagic fishing, bottomfishing, and reef fishing). The survey did not ask how the trips were affected by restricting access to W-517.

In response to the question, “In the past 12 months, what percent of your fishing trips were affected by military exercises?” respondents reported that an average of 17 percent of pelagic fishing trips had been affected in the 12 months, 14 percent of bottomfishing trips had been affected, and 10 percent of reef fishing trips had been affected, in some way, by military activities in the past 12 months (Hospital and Beavers 2012). Again, the survey did not ask how the fishing trips were affected.

The researchers speculated that potential effects could include increased travel costs to launch a vessel, increased search costs associated with not fishing in familiar and productive fishing grounds, a change in targeting methods to more fuel-intensive methods such as trolling, and inability to fish at all that day.

Fishers were given an opportunity to provide comments as part of the survey, and although the survey indicates that temporarily restricting access to waters within W-517 can affect fishing activities, the comments mention military activities only twice. One commenter asked if an alternate location for “target practice” was available, and a miscellaneous comment listed “military interference” as a concern. Of the other 49 comments, the majority focused on marine protected areas, FADs (needing more and replacing lost ones), the need for better infrastructure (e.g., boat ramps), and fishing regulations (Hospital and Beavers 2012).

In an effort to respond to local community concerns, the military has been limiting access restrictions only to portions of W-517 needed during certain military training activities (to ensure public safety, some activities would still necessitate restricting access to all of W-517). This allows fishers access to popular fishing areas located adjacent to the northern portion of W-517 while military training activities are being conducted farther south in W-517. If restricting access to only a portion of W-517 is feasible, a Notice to Mariners would be issued specifying the areas (latitudes) within W-517 that would be temporarily restricted for the purpose of ensuring public safety during military training or testing activities. The remaining areas of W-517 would be accessible to the public. This allows areas within W-517 to be open to non-military vessels for fishing and transit to Galvez Bank, Santa Rosa Reef, and White Tuna Banks. Additionally, W-11, W-12, and W-13 provide the military with more flexibility to utilize areas other than W-517 for activities requiring exclusive use of airspace, which would further reduce time periods when the northern portion of W-517 is inaccessible. All warning areas in the MITT Study Area overlie primarily deep ocean waters far from land and the nearshore waters that are most frequently used by the public.

The changes in accessibility to areas of the ocean would be an impact if it directly contributed to loss of income, revenue, or employment. Disturbance to human activities that result in impacts on payrolls, revenue, or employment is quantified by the amount of time the activity may be halted or the amount of time expended for the activity to be rerouted and the ability for the activity to take place in another location. Air Traffic Control Assigned Airspace and warning areas are restricted for short periods of time (typically on the order of hours) to cover the timeframes of training and testing activities. Airspace designated for military use (e.g., R-7201 and R-7201A) is identified on aeronautical charts, and the Navy posts Notices to Airmen when restrictions are in place to accommodate a training or testing activity. Prior to initiating a training or testing activity, the military would follow standard operating procedures to visually scan an area to ensure that non-participants are not present. If non-participants are present, the military delays, moves, or cancels its activity. Public accessibility is no longer restricted once the activity concludes.

Stressors to accessibility, that is restrictions to the availability of ocean space or air space, would be temporary, with the exception of access to C.F.R.-designated permanent danger zones. Mariners have a responsibility to be aware of conditions on the ocean, including when access to military warning areas and danger zones is restricted; however, it is not expected that direct conflicts in accessibility would frequently occur. The locations of restricted areas are published and available to mariners, who typically review such information before boating in any area. Restricted areas are typically avoided by experienced mariners.

The military will continue to engage the public on issues associated with accessibility to the ocean and airspace within the MITT Study Area.

3.12.3.1.1 Socioeconomic Activities

3.12.3.1.1.1 Commercial Transportation and Shipping

The offshore and nearshore areas of the MITT Study Area include the established Mariana Island Range Complex used for military training and testing activities and a transit corridor extending to the east towards the United States. Commercial vessels entering the MITT Study Area, including established restricted areas and danger zones, operate under maritime regulations and are not limited by military activities. Potential disruptions to commercial shipping are limited or avoided by requesting that the U.S. Coast Guard issue Notices to Mariners. Notices to Mariners advise commercial ship operators, commercial fisherman, recreational boaters, and other users of the area that the military will be operating in a specific area, allowing them to plan their activities accordingly. Additionally, for certain activities the Navy Hydrographic office will issue HydroPacs prior to an activity. These temporary limitations on access are established and implemented for the safety of the public and have been employed regularly over time with negligible socioeconomic impacts on commercial shipping activities.

Air Traffic Control Assigned Airspace is activated for short periods of time (typically on the order of hours) to cover the timeframes of training and testing activities. Warning areas and other SUA (e.g., W-517 south of Guam) are established for military use and are identified on aeronautical charts (see Figure 3.12-2 and Figure 3.12-4). The Navy posts Notices to Airmen when restrictions are in place to accommodate training or testing activity. Air traffic routes for commercial and general aviation flights departing and arriving at Guam International Air Terminal, the only commercial or civilian airport on Guam, are established such that overlap with military aircraft activities would be avoided.

Military air traffic in the CNMI takes place in airspace over the island of Tinian. Tinian's North Field has four runways, taxiways, and parking aprons providing various tactical scenarios without interfering with commercial and community activities south of the military lease area. However, North Field is in need of improvements before it can be fully utilized for training activities. Saipan International Airport is the largest commercial airport in the CNMI, and is the main gateway for commercial air traffic into the CNMI (Commonwealth Ports Authority 2005). Direct flights are available from major cities in Japan, Korea, China, and Guam. A commuter terminal services Tinian and Rota islands.

The Navy coordinates use of ATCAA with the Guam FAA and the FAA for international routes beyond the region. The coordinated effort has and will continue to maintain safe separation of military activities from commercial and general aviation flights and to limit times when airspace is temporarily inaccessible.

3.12.3.1.1.2 Commercial and Recreational Fishing

Commercial and recreational fishing activities contribute to the overall economy and cultural heritage in the CNMI and on Guam. The military has conducted training and testing activities within this region in the past and has not barred fishing or recreational uses, except in select nearshore areas, as described above, where the military has published rules in place through the USACE and U.S. Coast Guard. With the exception of these designated areas where published federal rules are in place, commercial and recreational interests such as fishing, boating, and beach use are not restricted. Public access to surrounding areas is not limited.

Training or testing activities requiring a temporary safety zone to prevent non-participating vessels from entering a potentially dangerous area (e.g., during an activity using explosives) have the potential to affect commercial and recreational fishing activities when the location and timing of the activities coincide with planned military activities. In the event this situation arises, a temporary safety zone

would be enforced for a brief period (hours) while the activity takes place. Typically, a zone extends over a circular area with a radius of a couple of miles (depending on the activity). Commercial and recreational fishing activities could occur in the area before and after the temporary restriction. Should the military find non-participants present in a temporary safety zone, the military would halt or delay (and reschedule, if necessary) all potentially hazardous activity until the non-participants have exited the safety zone (Section 3.13, Public Health and Safety).

The public is notified via Notices to Mariners and HydroPacs of upcoming activities requiring a temporary safety zone. These measures provide mariners with advance notice of areas being used by the military for hazardous training and testing activities, and allow mariners to plan accordingly by selecting an alternate destination without appreciable effect to their activities. Furthermore, the military makes every effort to avoid conducting activities requiring a temporary safety zone in areas where non-participating vessels are present or are likely to be present.

The Notices to Mariners and HydroPacs are intended to prevent fishers from expending time and fuel resources transiting to a temporarily closed location. Effective and efficient communication will enable fishers to be better informed of military activities, and will reduce the number of unanticipated scheduling conflicts between fishing activities and military activities. A recent survey conducted by the Navy of fishers who use waters in the Southern California Range Complex off of California resulted in several recommendations that the Navy is or has implemented and would implement within the Marianas Islands Range Complex, including, (1) regular and up to date broadcasts of scheduled closures on Very High Frequency radio, (2) frequent updates to websites on upcoming ranges closures, (3) establishing a single Navy point of contact with the most up to date information on closures for fishers without website access, and (4) specifying whether a scheduled Navy activity requires a complete closure or if fishing can occur simultaneously with the Navy activity (Naval Undersea Warfare Center 2009). The military's intent is to maintain efficient and effective communication with fishers and other non-participants preceding and during military training and testing activities.

Upon completion of training or testing activities, restriction on certain areas (e.g., Apra Harbor small arms firing range) are lifted and fishers would be able to return to fish and transit through the area. To help manage competing demands and maintain public access in the MITT Study Area, the military conducts its offshore operations in a manner that minimizes restrictions to commercial fisherman. Military ships, fishers, and recreational users operate within the area together, and keep a safe distance between each other. Military participants would relocate as necessary to avoid conflicts with non-participants (U.S. Department of the Navy 2007). Only specific areas within MITT Study Area have been designated as danger zones or restricted areas (see Figure 3.12-2, Figure 3.12-4, and Figure 3.12-6).

As described in Section 3.12.2.2.2 (Commonwealth of the Northern Mariana Islands), the specific locations of popular fishing sites around FDM are not available, and areas where the water depth is less than 400 m are used as proxy locations for possible fishing sites. Establishing a 12 nm danger zone around FDM would encompass waters with depths less than 400 m adjacent to the island (Figure 3.12-4). Access to these areas would be restricted during activities requiring a 12 nm danger zone to ensure public safety. At other times, the waters beyond 3 nm from FDM would be accessible to the public, providing access to waters shallower than 20 m. In addition, two shallow water areas (or banks) with water depths less than 400 m are located beyond 12 nm from FDM and would always be accessible. One area is located approximately 15–20 nm north of FDM, and the other area is located approximately 20–23 nm west of FDM (Figure 3.12-4).

Amphibious Warfare training activities proposed for nearshore waters off of Tinian, Rota, and Guam (see Chapter 2, Description of Proposed Action and Alternatives, Table 2.8-1) have the potential to temporarily limit access to nearby fishing sites. The duration of these activities could be from hours to several days (see Appendix A, Training and Testing Activity Descriptions). These activities would occur five or six times per year in waters off of Tinian, Rota, Guam, or elsewhere in the MIRC, limiting the probability for interruptions to fishing activities at any single location.

Transiting to the Islands Unit from Guam, Saipan, Tinian, or other islands located to the south of FDM would potentially be impacted by limiting access to the 12 nm danger zone around FDM. Considering that an average of 3.8 trips per year has occurred over the past 30 years, the probability of military activities interfering with trips to the Islands Unit is low. Furthermore, the military will announce when FDM is not in use in addition to notifying mariners of planned activities at FDM, which will enable mariners to better plan trips to the Islands Unit.

When a temporary safety zone is established, temporarily limiting commercial and recreational fishing in that specific area, other areas in the MITT Study Area would remain open to commercial and recreational fishing. Fish aggregating devices have been deployed around Guam outside of military warning areas and restricted areas to create alternate fishing sites that are not subject to limitations on accessibility associated with military training and testing activities (Figure 3.12-5). A temporary closure of the danger zone at the Finegayan Small Arms Range would restrict public access to fishing sites when activated, but vessels would be permitted to transit through the danger zone. The Navy will request C.F.R. regulations defining the danger zone that would state expeditious transiting through the active danger zone is allowed. For example, a vessel moving along the coast to FADs located northwest of Guam would be permitted to transit through the danger zone while it is temporarily active; however, vessels would not be permitted to anchor or loiter within the danger zone while it is active. Range activities would be halted until all vessels are cleared from the danger zone. Vessels are permitted to use waters within the danger zone for fishing or other activities when the range is not active.

As described in Section 3.12.3.1 (Accessibility [to the Ocean and Airspace]), Notices to Mariners have been issued for R-7201, surrounding FDM, and W-517 temporarily restricting access to these areas. An average of 39 Notices to Mariners were issued per year for FDM and 34 for W-517 to ensure public safety (Table 3.12-4). Over a 3-year period from 2010 through 2012, access to waters around FDM was restricted for an average of 159 days per year (access to waters within 3 nm of FDM is restricted at all times), and access to waters within W-517 was restricted for an average of 95 days per year (Table 3.12-4). When issued, Notices to Mariners specify how long waters are restricted, which can range from a few hours to the entire day.

The military has been conducting training and testing activities within the MITT Study Area for decades, and has taken and will continue to take measures to prevent interruption of commercial and recreational fishing activities. The military does not limit fishing activities from occurring in areas of the MITT Study Area that are not being used for training and testing activities. To minimize potential military/civilian interactions, the Navy will continue to publish scheduled operation times and locations on publicly accessible Navy websites and through U.S. Coast Guard issued Notices to Mariners up to 6 months in advance of planned events. When feasible, the military will use these same means of communication to notify the public of changes to previously published restrictions. These efforts are intended to ensure that commercial and recreational users are aware of the military's plans and allow commercial and recreational users to plan their activities to avoid scheduled training and testing activities. Advanced planning on behalf of the military and effective communication of the military's

plans should minimize limits on accessibility to desirable fishing locations and, consequently, have only a minor effect on commercial and recreational fishing activities. The Navy will continue to engage with the public and the local fisherman on issues affecting commercial and recreational fishing in order to limit potential impacts associated with military activities.

3.12.3.1.1.3 Subsistence Use

Subsistence uses typically occur from the shore or from small vessels within 3 nm or closer to shore. The majority of military training and testing activities occur in offshore waters (beyond 3 nm and in many cases beyond 12 nm) where subsistence fishing typically does not occur. Some training activities are proposed in nearshore areas of Apra Harbor on Guam, on selected beaches on Tinian (for Amphibious Warfare activities), Rota (e.g., Rota airport), and Saipan. With the notable exception of Naval Special Warfare training activities, most activities occurring in nearshore waters take place approximately five times per year (see Chapter 2, Description of Proposed Action and Alternatives). The number of Naval Special Warfare activities and “Other Activities” proposed to occur in nearshore waters of Guam and the CNMI varies widely from 3 to 100 times per year. Nevertheless, no impacts on subsistence activities (e.g., fishing) from conducting the proposed training and testing activities in the MITT Study Area are anticipated, because only those federally designated areas would be restricted from public access.

3.12.3.1.1.4 Tourism

Tourism activities make an appreciable contribution to the overall economy within the MITT Study Area. The establishment of temporary exclusion zones, for safety purposes, has the potential to adversely affect some tourism activities. For example, a visitor who is in the CNMI for only a few days may not be able to reschedule an activity if the establishment of an exclusion zone conflicts with the activity and no alternate site for the activity is suitable. An occurrence of this type is anticipated to be low, because displacement would be brief (hours), and the temporary exclusion zones are created in areas where tourism activities do not typically occur. The military temporarily limits public access only to areas where there is a risk of injury or property damage and publishes scheduled activities through the use of Notices to Mariners and Notices to Airmen. The military strives to conduct its operations in a manner that is compatible with tourism by minimizing temporary access restrictions. Published notices allow recreational users to adjust their routes to avoid danger zones and temporary safety zones. If civilian vessels are located within a danger zone or temporary safety zone at the time of a scheduled testing or training activity, the military would suspend operations until the area is cleared of non-participating vessels. Operations would only continue where and when it is safe and possible to avoid the non-participating vessels. If avoidance is not safe or possible, the military activity would be halted and may relocate or be delayed. In some instances where safety requires exclusive use of a specific area, non-participants in the area are asked to relocate to a safer area for the duration of the military activity.

The military may request that the U.S. Coast Guard or USACE enforce restrictions to public access at the designated areas in Apra Harbor, which prohibit public access during certain times (33 C.F.R. 334 and 33 C.F.R. 165).

In addition, the 12 nm Danger Zone surrounding FDM Island restricts all commercial and recreational vessels from approaching the island without permission from the Navy. The island serves as a bombing range for both explosive and non-explosive munitions training and testing. No tourism activities occur on or in the vicinity of the island for safety reasons.

3.12.3.1.2 No Action Alternative

3.12.3.1.2.1 Training Activities

Under the No Action Alternative, potential accessibility impacts to socioeconomic activities would be associated primarily with anti-air warfare, anti-surface warfare, anti-submarine warfare, mine warfare, amphibious warfare, and naval special warfare activities. Training activities would continue at current levels and within established ranges and training locations. There would be no anticipated impacts on commercial transportation and shipping. Some impacts on commercial and recreational fishing, subsistence use, or tourism, may occur when areas of co-use are made temporarily inaccessible to ensure the safety of the public. Considering the military's standard operating procedures, the anticipated infrequent and short-term restrictions on access to areas of co-use, and the large expanse of the MITT Study Area that would be available to the public, significant impacts on accessibility are not anticipated.

The military will continue to collaborate with local communities to enhance existing means of communications with the aim of reducing the potential effects of limiting access to areas designated for use by the military.

3.12.3.1.2.2 Testing Activities

Only one testing activity occurs under the No Action Alternative, the North Pacific Acoustic Lab Philippine Sea 2018–19 Experiment (Deep Water), as shown in Chapter 2 (Description of Proposed Action and Alternatives, Table 2.8-4). No impacts to accessibility are anticipated from this testing activity because it takes place in deep, offshore waters.

3.12.3.1.3 Alternative 1

3.12.3.1.3.1 Training Activities

Training activities and associated stressor components as described under the No Action Alternative would continue and would increase over the No Action Alternative. There would be no changes to the military's current standard operating procedures defining safety precautions and actions taken by the military to protect the public during hazardous training activities on the ocean. Under Alternative 1, potential impacts affecting accessibility to areas of the MITT Study Area would be the same as those associated with the No Action Alternative. Despite the increase in tempo of training activities and the expansion of the MITT Study Area, impacts from Alternative 1 activities on commercial transportation and shipping are not anticipated. Some impacts on commercial and recreational fishing, subsistence use, or tourism may occur when training activities require restrictions on access to areas of co-use to ensure the safety of the public during scheduled training activities. Considering the military's standard operating procedures, the anticipated infrequent and short-term restrictions on access to areas of co-use, and the large expanse of the MITT Study Area that would be available to the public, significant impacts on accessibility are not anticipated.

3.12.3.1.3.2 Testing Activities

Under Alternative 1, testing activities and associated stressor components would increase over the No Action Alternative. As described above for training activities, some impacts on commercial and recreational fishing, subsistence use, or tourism may occur when testing activities require restrictions on access to areas of co-use to ensure the safety of the public during scheduled testing activities. However, the frequency of temporary restrictions on access would be less for testing activities than for training activities, because fewer testing activities are proposed in the EIS/OEIS (see Chapter 2, Description of Proposed Action and Alternatives, Tables 2.8-2 to 2.8-4).

3.12.3.1.4 Alternative 2

3.12.3.1.4.1 Training Activities

Training activities and associated stressor components would continue and would increase over the No Action Alternative and Alternative 1. There would be no changes to the military's current standard operating procedures defining safety precautions and actions taken by the military to protect the public during hazardous training activities on the ocean. Despite the increase in tempo of training activities, impacts from Alternative 2 activities on commercial transportation and shipping are not anticipated. Some impacts on commercial and recreational fishing, subsistence use, or tourism may occur when training activities require restrictions on access to areas of co-use to ensure the safety of the public during scheduled training activities. Considering the military's standard operating procedures, the anticipated infrequent and short-term restrictions on access to areas of co-use, and the large expanse of the MITT Study Area that would be available to the public, significant impacts on accessibility are not anticipated.

3.12.3.1.4.2 Testing Activities

Under Alternative 2, testing activities and associated stressor components would increase over the No Action Alternative and Alternative 1. As described above for training activities, some impacts on commercial and recreational fishing, subsistence use, or tourism may occur when testing activities require restrictions on access to areas of co-use to ensure the safety of the public during scheduled testing activities. However, the frequency of temporary restrictions on access would be less for testing activities than for training activities, because fewer testing activities are proposed in the EIS/OEIS (see Chapter 2, Description of Proposed Action and Alternatives, Tables 2.8-2 to 2.8-4).

3.12.3.2 Airborne Acoustics

As an environmental stressor, loud noises, sonic booms, and vibrations generated from military training and testing activities such as weapons firing, in-air explosions, and aircraft transiting have the potential to disrupt wildlife and humans in the MITT Study Area.

3.12.3.2.1 Socioeconomic Activities

3.12.3.2.1.1 Tourism and Recreational Activities

Noise interference could decrease public enjoyment of recreational activities. These effects would occur on a temporary basis, only when weapons firing, in-air explosions, and aircraft transiting occur. Of these activities, military training and testing activities involving weapons firing and in-air explosions would only occur when the military can confirm the area is clear of non-participants, reducing the likelihood that noise from these activities would disturb tourists. Most naval training would occur well out to sea, while tourism and civilian recreational activities are largely conducted within a few miles of shore. Tourism and recreational activity revenue is not expected to be impacted by airborne noise.

3.12.3.2.2 No Action Alternative

3.12.3.2.2.1 Training Activities

Under the No Action Alternative, potential airborne noise impacts would be associated primarily with anti-air warfare, anti-surface warfare, anti-submarine warfare, mine warfare, and amphibious warfare. Training activities would continue at current levels and within established ranges and training locations. There would be no anticipated impacts on tourism because (1) most military training occurs well out to sea, while most tourism and recreational activities occur near shore; and (2) military training activities producing airborne noise are normally short term and temporary. Therefore, airborne noise impacts on tourism would be negligible.

3.12.3.2.2 Testing Activities

Only one testing activity occurs under the No Action Alternative, the North Pacific Acoustic Lab Philippine Sea 2018–19 Experiment (Deep Water), as shown in Chapter 2 (Description of Proposed Action and Alternatives, Table 2.8-4). No impacts to tourism from airborne acoustics would occur from this testing activity, because no aircraft or other airborne platforms would be used.

3.12.3.2.3 Alternative 1

3.12.3.2.3.1 Training Activities

Under Alternative 1, potential airborne noise would be the same as that associated with the No Action Alternative. Training activities and associated stressor components would continue and would increase over the No Action Alternative. Similar to the No Action Alternative and despite the increase in tempo, there would be no anticipated impacts on tourism because (1) most military training occurs well out to sea, while most tourism and recreational activities occur near shore; and (2) military training activities producing airborne noise are normally short term and temporary. Therefore, airborne noise impacts on tourism would be negligible.

3.12.3.2.3.2 Testing Activities

Under Alternative 1, testing activities and associated stressor components would increase over the No Action Alternative. Impacts associated with airborne acoustics would be negligible for the same reasons stated for training activities above. In addition, far fewer testing than training activities are proposed (see Chapter 2, Description of Proposed Action and Alternatives, Tables 2.8-2 to 2.8-4).

3.12.3.2.4 Alternative 2

3.12.3.2.4.1 Training Activities

Under Alternative 2, potential airborne noise would be the same as that associated with the No Action Alternative. Training activities would continue but with an increase in tempo within the MITT Study Area. Similar to Alternative 1, there would be no anticipated impacts on tourism because (1) most military training occurs well out to sea, while most tourism and recreational activities occur near shore; and (2) military training activities producing airborne noise are normally short term and temporary. Therefore, airborne noise impacts on tourism would be negligible.

3.12.3.2.4.2 Testing Activities

Under Alternative 2, testing activities and associated stressor components would increase over the No Action Alternative and Alternative 1. Impacts associated with airborne acoustics would be negligible for the same reasons stated for training activities above. In addition, far fewer testing than training activities are proposed (see Chapter 2, Description of Proposed Action and Alternatives, Tables 2.8-2 to 2.8-4).

3.12.3.3 Physical Disturbance and Strike Stressors

The evaluation of impacts on socioeconomic resources from physical disturbance and strike stressors focuses on direct physical encounters or collisions with objects moving through the water or air (e.g., vessels, aircraft, unmanned devices, and towed devices), dropped or fired into the water (non-explosive practice munitions, other military expended materials, and ocean bottom deployed devices), or resting on the ocean floor (anchors, mines, targets) that may damage or encounter civilian equipment. Physical disturbances that damage equipment and infrastructure could disrupt the collection and transport of products, which may impact industry revenue or operating costs.

Though highly unlikely, it is possible that military training and testing equipment and vessels moving through the water could collide with non-military vessels and equipment. Most of the training and testing activities involve vessel movement and use of towed devices. However, the likelihood that a military vessel would collide with a non-military vessel is remote because of the prevalent use of navigational aids or buoys separating vessel traffic, shipboard lookouts, radar, and marine band radio communications by both military and civilians. Therefore, the potential to impact commercial transportation and shipping by physical disturbance and strike stressors is negligible and requires no further analysis.

Aircraft conducting training or testing activities in the MITT Study Area operate in designated military SUA (e.g., warning areas). All aircraft, military and civilian, are subject to FAA regulations, which define permissible uses of designated airspace, and are implemented to control those uses. These regulations are intended to accommodate the various categories of aviation, whether military, commercial, or general aviation. By adhering to these regulations, the likelihood of civilian aircraft coming into contact with military aircraft is remote. In addition, military aircraft follow procedures outlined in air operations manuals, which are specific to a warning area or other SUA, and which describe procedures for operating safely when civilian aircraft are in the vicinity.

Military expended materials can physically interact with civilian equipment and infrastructure. Almost all training and testing activities produce military expended materials such as chaff, flares, projectiles, casings, target fragments, missile fragments, rocket fragments, and ballast weights. The vast majority of these expended materials sink to the sea floor after use, and in most cases are used in deep waters located 3 nm from shore and beyond. Training and testing activities occurring in nearshore waters most often use simulated rounds or do not use ordnance (see Chapter 2, Description of Proposed Action and Alternatives, for details).

3.12.3.3.1 Socioeconomic Activities

3.12.3.3.1.1 Commercial and Recreational Fishing/Subsistence Use

The majority of commercial and recreational fishing in the MITT Study Area takes place in nearshore waters (less than 3 nm from shore), where the military conducts limited training and testing activities. Therefore, most recreational fishing would occur away from physical disturbance and strike stressors associated with training and testing activities. Some commercial and recreational fishing occurs beyond 3 nm in areas where the military trains and tests and could be indirectly affected by the proposed activities if physical disturbance and strike stressors were to disrupt fisheries in those areas to such an extent that commercial fishers would no longer be able to find their target species. As described in Section 3.9.3 (Environmental Consequences), the behavioral responses that could occur from various types of physical stressors associated with training and testing activities would not compromise the general health or condition of fish and, therefore, would not result in associated impacts to commercial or recreational fishing resources.

Commercial fishing activities have the potential to interact with equipment placed in the ocean or on the ocean floor for use during proposed military training and testing activities. This equipment could include ship anchors, moored or bottom mounted targets, mines and mine shapes, tripods, and use of towed system and attachment cables. Many different types of commercial fishing gear are used in the MITT Study Area, including gillnets, longline gear, troll gear, trawls, seines, and traps or pots. Commercial bottom fishing activities that use these types of gear have a greater potential to be affected by interaction with military training and testing equipment, resulting in the loss of or damage to both the military equipment and the commercial fishing gear. The military recovers many of the targets (e.g.,

mines and mine shapes) and target fragments used in training and testing activities, and would continue to do so to minimize the potential for interaction with fishing gear and fishing vessels (as well as other vessels). Unrecoverable items are typically small, constructed of soft materials (such as target cardboard boxes or tethered target balloons), or are intentionally designed to sink to the bottom after serving their purpose (such as expended 55-gallon steel drums), so that they would not represent a collision risk to vessels, including commercial fishing vessels.

3.12.3.3.1.2 Tourism

While military training and testing activities can occur throughout the MITT Study Area, most (especially hazardous) activities occur well out to sea. The exception being activities occurring in designated areas of Apra Harbor and at the bombing range on FDM as well as smaller areas described in detail in Chapter 2 (Description of Proposed Action and Alternatives). Most tourist activities engaged in by both visitors and residents take place within a few miles of land. No tourist activities occur on FDM, and the danger zones and restricted areas in Apra Harbor are open to the public except when training or testing activities are scheduled.

Snorkeling and diving take place primarily at known recreational sites, including shipwrecks and reefs. Temporary exclusion zones may be established for safety purposes, and would not adversely affect tourism activities because displacement is brief (hours) and the activity would typically not take place in areas where tourists are common. The military notifies the public of temporary limits on public access to certain areas when there is a risk of injury or property damage through the use of Notices to Mariners, HydroPacs, and Notices to Airmen. Published notices allow recreational users to adjust their routes to avoid temporary exclusion zones. If civilian vessels transit into an exclusion zone at the time of a scheduled activity, military personnel may continue the activity if it is safe and possible to do so. If avoidance is not safe or possible, the activity may relocate or be delayed. In some instances where safety requires exclusive use of a specific area, non-participants in the area are asked to relocate to a safer area for the duration of the activity. Because military training and testing activities vary in location, are typically not coincident with popular tourist areas, and are primarily short-term in duration, impacts on tourism resulting from rerouting or delaying tourist activities, while they may occur, would be negligible.

Other tourism activities such as whale watching, boating, or use of other watercraft may occur farther offshore and are conducted by boat, aircraft, or from land. These activities would be conducted with boats that are typically well marked and visible to military ships conducting training and testing activities. Individual boaters engaged in tourism activities, such as whale watching, plan and monitor navigational information to avoid military training and testing areas. Vessels are responsible for being aware of designated danger zones and restricted areas in surface waters and any Notices to Mariners that are in effect. Operators of recreational or commercial vessels have a duty to abide by maritime requirements as administered by the U.S. Coast Guard. At the same time, military vessels ensure that an area is clear of non-participants prior to testing and training exercises. As a result, conflicts between military training and testing activities in offshore areas and whale watching or other offshore recreational use are unlikely to occur. Changes to current offshore tourism activities in the MITT Study Area would not be expected from the proposed training and testing activities. Therefore, loss of revenue or employment associated with tourism would not occur.

The military would continue to recover many of the targets (e.g., mines and mine shapes) and target fragments used in training and testing activities so that they would not pose a collision risk to vessels. Unrecoverable items are typically small, constructed of soft materials (such as target cardboard boxes or

tethered target balloons), or are intentionally designed to sink to the bottom after serving their purpose (such as expended 55-gallon steel drums), so that they would not represent a collision risk to vessels.

3.12.3.3.2 No Action Alternative

3.12.3.3.2.1 Training Activities

As described in Chapter 2 (Description of Proposed Action and Alternatives, Section 2.6), under the No Action Alternative, potential physical disturbance and strike stressors would be associated primarily with anti-air warfare, anti-surface warfare, anti-submarine warfare, mine warfare, and amphibious warfare. Training activities would continue at current levels and within established ranges and training locations.

There would be no anticipated impacts on commercial and recreational fishing, subsistence use, or tourism because of the large size of the MITT Study Area, the limited areas of operations, and implementation of the military's standard operating procedures, which includes ensuring that an area is clear of all non-participating vessels before training activities take place. In addition, the military provides advance notification of training activities to the public through Notices to Mariners and HydroPacs. Damage to or loss of commercial fishing gear from interaction with military equipment or other expended materials is unlikely. The military recovers many practice munitions (e.g., mines and mine shapes) for reuse following the activity. The military also recovers larger floating objects or materials, such as targets or target fragments, to avoid having them become hazards to navigation. Smaller objects that remain in the water column would be unlikely to pose a risk to fishing gear. Considering the expansive size of the Navy's Operating Areas, the disbursement of Military Expended Materials over these large areas, and the effect of the military's standard operation procedures and mitigation measures (Chapter 5, Standard Operating Procedures, Mitigation, and Monitoring), impacts from physical disturbance and strike stressors on commercial and recreational fishing, subsistence use, or tourism would be negligible.

3.12.3.3.2.2 Testing Activities

Only one testing activity occurs under the No Action Alternative, the North Pacific Acoustic Lab Philippine Sea 2018–19 Experiment (Deep Water), as shown in Chapter 2 (Description of Proposed Action and Alternatives, Table 2.8-4). No impacts to commercial and recreational fishing, subsistence use, and tourism are anticipated from this testing activity because it takes place in deep, offshore waters.

3.12.3.3.3 Alternative 1

3.12.3.3.3.1 Training Activities

Under Alternative 1, potential physical disturbance and strike stressors would be the same as those associated with the No Action Alternative. Training activities and associated stressor components would increase, and there would be an associated increase in the quantity of Military Expended Materials released within the MITT Study Area. There would be no changes to the military's standard operating procedures for hazardous training activities performed in the MITT Study Area. The expansive size of the MITT Study Area, the disbursement of Military Expended Materials over this large area, and implementation of the military's standard operating procedures and mitigation measures (Chapter 5, Standard Operating Procedures, Mitigation, and Monitoring) ensure that impacts from physical disturbance and strike stressors would be negligible. The advance public release of Notices to Mariners and HydroPacs would inform the public of upcoming activities, and enable them to plan to avoid the area. Therefore, impacts from physical disturbance and strike stressors on commercial and recreational fishing, subsistence use, and tourism would be negligible.

3.12.3.3.3.2 Testing Activities

Under Alternative 1, testing activities and associated stressor components would increase over the No Action Alternative. The impact associated with physical disturbance and strike stressors would be negligible for the same reasons stated for training activities above. In addition, far fewer testing than training activities are proposed (see Chapter 2, Description of Proposed Action and Alternatives, Tables 2.8-2 to 2.8-4).

3.12.3.3.4 Alternative 2

3.12.3.3.4.1 Training Activities

Under Alternative 2, potential physical disturbance and strike stressors would be the same as those associated with the No Action Alternative. Training activities and associated stressor components would continue and would increase over the No Action Alternative and Alternative 1, and there would be an associated increase in the quantity of Military Expended Materials released within the MITT Study Area. There would be no changes to the military's standard operating procedures for hazardous training activities performed in the MITT Study Area. The expansive size of the Navy's Operating Areas, the disbursement of Military Expended Materials over these large areas, and implementation of the military's standard operating procedures and mitigation measures (Chapter 5, Standard Operating Procedures, Mitigation, and Monitoring) ensure that impacts from physical disturbance and strike stressors would be negligible. The advance public release of Notices to Mariners and HydroPacs would inform the public of upcoming activities, and enable them to plan to avoid the area. Therefore, impacts from physical disturbance and strike stressors on commercial and recreational fishing, subsistence use, or tourism would be negligible.

3.12.3.3.4.2 Testing Activities

Under Alternative 2, testing activities and associated stressor components would increase over the No Action Alternative and Alternative 1. The impact associated with physical disturbance and strike stressors would be negligible for the same reasons stated for training activities above. In addition, far fewer testing than training activities are proposed (see Chapter 2, Description of Proposed Action and Alternatives, Tables 2.8-2 to 2.8-4).

3.12.3.4 Secondary Impacts from Availability of Resources

Socioeconomics could be impacted if the proposed activities led to changes to physical and biological resources to the extent that they would alter the way industries (e.g., fishing) can utilize those resources. The secondary stressor of resource availability pertains to the potential for loss of fisheries resources within the MITT Study Area.

Fishing, subsistence use, and tourism could be impacted if the proposed activities altered fish population levels to such an extent that these activities would no longer be able to find their target species. Similarly, disturbances to marine mammal populations could impact the whale watching industry. Analyses in Sections 3.4 (Marine Mammals), 3.8 (Marine Invertebrates), and 3.9 (Fish) determined, however, that no population level impacts on marine species are anticipated from the proposed training and testing activities. For these reasons, there would be no indirect impacts on commercial or recreational fishing, subsistence use, or tourism.

3.12.4 SUMMARY OF POTENTIAL IMPACTS (COMBINED IMPACTS OF ALL STRESSORS) ON SOCIOECONOMICS

Stressors described in this EIS/OEIS that have the potential to impact socioeconomic resources include, accessibility to areas within the MITT Study Area, airborne acoustics, physical disturbance and strike, and secondary stressors resulting from impacts on marine species populations. Under the No Action Alternative, Alternative 1, or Alternative 2, these activities would be widely dispersed throughout the MITT Study Area. Such activities also are dispersed temporally (i.e., few stressors would operate at the same time). Therefore, no greater impacts from the combined operation of more than one stressor are expected. The aggregate impact on socioeconomics would not observably differ from existing conditions.

This Page Intentionally Left Blank

REFERENCES

- Aldan-Pierce, M. (2011). Mrs. Marian Aldan-Pierce, Chairperson of the Board of Directors MARIANAS VISITORS AUTHORITY Testimony on the implementation of PL 110-229, the Consolidated Natural Resources Act of 2008, July 14, 2011 (pp. 17). Commonwealth of the Northern Mariana Islands (CNMI).
- Allen, S. & Bartram, P. (2008). Guam as a Fishing Community. Honolulu, Hawaii: Pacific Islands Fisheries Science Center. (p. 70).
- Amesbury, J. R. & Hunter-Anderson, R. L. (1989). Native Fishing Rights and Limited Entry in Guam. Micronesian Archaeological Research Services. Retrieved from <http://www.wpcouncil.org/indigenous/Limited%20Entry%20Guam.pdf>, September 8.
- Amesbury, J. R. & Hunter-Anderson, R. L. (2003). Review of archaeological and historical data concerning reef fishing in the U.S. flag islands of Micronesia: Guam and the Northern Mariana Islands. Final Report. [Report]. Prepared by N. Western Fishery Management Council.
- Cohen, D. (2006). Statement of David B. Cohen Deputy Assistant Secretary of the Interior for Insular Affairs Before the Senate Committee on Energy and Natural Resources Regarding the State of the Economies and Fiscal Affairs of the Territories of American Samoa, the Commonwealth of the Northern Mariana Island, Guan and the United States Virgin Islands. United States Committee on Energy and Natural Resources. March 1, 2006. Retrieved from http://energy.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=0476d6b4-219c-400b-833e-7d7bd9890fee&Witness_ID=5fd3dbeb-d730-4f7e-bc13-ae4355e6de82 September 9.
- Commonwealth of the Northern Mariana Islands. (1983). Lease Agreement Made Pursuant to the Covenant to Establish a Commonwealth of the Northern Mariana Islands in Political Union with the United States of America. Commonwealth of the Northern Mariana Islands President of the Senate Governor and Speaker of the House, Chairman Board of Directors Mariana Public Land Corporation. DLR 13-1-119: 23.
- Commonwealth Ports Authority. (2005). Commonwealth Ports Authority. Retrieved from <http://www.cpa.gov.mp/default.asp>, 18 January 2012.
- Commonwealth Ports Authority. (2010). COMMONWEALTH PORTS AUTHORITY (A COMPONENT UNIT OF THE COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS) REPORT ON THE AUDIT OF FINANCIAL STATEMENTS IN ACCORDANCE WITH OMB CIRCULAR A-133 YEAR ENDED SEPTEMBER 30, 2009. Retrieved from http://www.cpa.gov.mp/financial/2009_audit_report.pdf, 03 February 2012.
- Eugenio, H. (2010). Obama delays CNMI wage hike for 2011. In *Saipan Tribune*. Retrieved from <http://www.saipantribune.com/newsstory.aspx?newsID=103519&cat=1>, September 9.
- Federal Aviation Administration. (2009). APPENDIX A: NATIONAL AIRSPACE SYSTEM OVERVIEW FAA. Retrieved from http://www.faa.gov/air_traffic/nas_redesign/regional_guidance/eastern_reg/nynjphl_redesign/documentation/feis
- First Hawaiian Bank. (2011). Uncertain Times for Guam's Tourism, Military Build-Up Economic Forecast, 2011-2012 Guam-CNMI Edition.

- Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network. (2007). GUAM 2005 FISHERY STATISTICS. Retrieved from http://www.pifsc.noaa.gov/wpacfin/pdf_file/g_vol22.pdf, 07 August.
- Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network. (2008). GUAM 2006 FISHERY STATISTICS. Retrieved from http://www.pifsc.noaa.gov/wpacfin/pdf_file/g_vol23.pdf, 07 August.
- Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network. (2009). GUAM 2007 FISHERY STATISTICS. Retrieved from http://www.pifsc.noaa.gov/wpacfin/pdf_file/g_vol24.pdf, 07 August.
- Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network. (2010). GUAM 2008 FISHERY STATISTICS. Retrieved from http://www.pifsc.noaa.gov/wpacfin/pdf_file/g_vol25.pdf, 07 August.
- Guam Division of Aquatic and Wildlife Resources and the Western Pacific Fisheries Information Network. (2011). GUAM 2009 FISHERY STATISTICS. Retrieved from http://www.pifsc.noaa.gov/wpacfin/pdf_file/g_vol26.pdf, 07 August.
- Guam Economic Development Authority. (2008). Tourism. Retrieved from <http://www.investguam.com/?pg=tourism>, September 8.
- Guam Legislature. (1997). An Act to Establish Rules and Regulations for the Control of Fisheries by the Department of Agriculture. Bill No. 49 (COR). Twenty-Fourth Guam Legislature. Guam. Public Law 24-21: 10.
- Guam Visitors Bureau. (2006). Dive the exciting waters of Guam the Gateway to Micronesia. Retrieved from <http://visitguam.org/dive/>, September 8.
- Guam Visitors Bureau. (2010). 2010 Annual Report & Membership Directory. Retrieved from <http://www.visitguam.org/runtime/uploads/Files/Annual%20Report/2010/2011%20GVB%20Annual%20Report%20PART%201.pdf>. September 8.
- Hospital, J., and C. Beavers. (2012). Economic and social characteristics of Guam's small boat fisheries. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-12-06, 60 p. + Appendices. Available from: http://www.pifsc.noaa.gov/library/pubs/admin/PIFSC_Admin_Rep_12-06.pdf. February 20, 2013.
- Kerr, A. (2011). Fishing Methods of the Mariana Islands, Micronesia. (Technical Report 132) University of Guam Marine Laboratory.
- Kotowicz, D., and L. Richmond. (2013). Traditional Fishing Patterns in the Marianas Trench Marine National Monument. Pacific Islands Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Honolulu, HI. Pacific Islands Fisheries Science Center Administrative Report H-13-05. 54 p.
- MacDuff, S. & Roberto, R. (2012). Chapter 3: Commonwealth of Northern Mariana Islands Fishery Ecosystem Report. In: M. Sabater (Ed.), *WPRFMC 2012. Archipelagic Fishery Ecosystem Annual Report*. Honolulu, Hawaii Western Pacific Regional Fishery Management Council.
- Mintz, J. & Filadelfo, R. (2011). Exposure of Marine Mammals to Broadband Radiated Noise CNA Analysis & Solutions (Ed.), *Specific Authority N0001-4-05-D-0500*. (CRM D0024311.A2/Final, p. 42). Prepared for DoD Agencies.

- Moffitt, R., Brodziak, J. & Flores, T. (2007). Status of the Bottomfish Resources of American Samoa, Guam, and Commonwealth of the Northern Mariana Islands, 2005 Pacific Islands Fisheries Science Center. Retrieved from http://www.pifsc.noaa.gov/adminrpts/2000-present/PIFSC_Admin_Rep_07-04.pdf on 07 <http://www.pifsc.noaa.gov/adminrpts/2000-present/PIFSC_Admin_Rep_07-04.pdf>, September 7.
- Myers, R. (1993). Guam's Small-Boat-based Fisheries. *Marine Fisheries Review*, 55(2), 117-128. Retrieved from <http://spo.nmfs.noaa.gov/mfr552/mfr55214.pdf> Accessed online September 6, 2011.
- National Oceanic and Atmospheric Administration. (1998). 1998 Year of the Ocean, Coastal Tourism and Recreation (Vol. 2011).
- National Park Service. (2001). Special Study North Field Historic District. In *Tinian National Historical Park Study*. Retrieved from <http://www.nps.gov/pwrh/Tinian/tiniandr.htm>, September 9.
- Naval Undersea Warfare Center. (2009). Southern California (SOCAL) Fisheries Study: Catch Statistics (2002-2007), Fishing Access, and Fishermen Perception Department of the Navy.
- Office of Environmental Health Hazard Assessment. (1997). Consumption of Fish and Shellfish in California and the United States. In *Chemicals in Fish, Report No. 1, Final Draft Report*. Retrieved from http://oehha.ca.gov/fish/special_reports/fishy.html, September 8.
- Orange Beach Fishing Charters. (2011). Orange Beach Fishing Definitions and Terms. Retrieved from <http://www.fishingorangebeach.com/Alabama-Charter-Fishing-Definitions>. Last updated September 6, 2011.
- Pacific Business Center Program – University of Hawaii. (2008). Commonwealth of the Northern Marianas. Retrieved from <http://pbcphawaii.com/commonwealth-of-the-northern-m.asp>, September 8.
- Pacific Islands Fisheries Science Center. (2006). Cruise Report *Oscar Elton Sette*, Cruise 05-12 *Cruise Period: 3-9 October 2005*. (p. 46). Available from: <http://www.pifsc.noaa.gov/library/pubs/cruise/Sette/CR0512-1.RES.pdf>. As Accessed on 20 February 2013.
- Pacific Islands Fisheries Science Center. (2011). Bottom Fishery. Retrieved from http://www.pifsc.noaa.gov/wpacfin/cnmi/Pages/cnmi_fish_2.php, September 7.
- Port Authority of Guam. (2011). Facts and Figures. In Facts and Figures | Facilities | Maritime Operations. Retrieved from <http://www.portguam.com/maritime-operations/facilities/facts-and-figures>, August 31.
- Port Authority of Guam. (2012). Financial Statements and Other Financial Information. Ernst and Young. Retrieved from <http://www.portguam.com/information/financial-information/annual-financial-audits>.
- Schultz, K. (2000). Ken Schultz's Fishing Encyclopedia: Worldwide Angling Guide John Wiley and Sons, Inc.
- The Samoa News. (2013). Fishing Limits Proposed For Protected Pacific Sites U.S. Interior: 'customary exchanges' could complicate regulations. 15 April 2013.

- Tenorio, P. (2011). CNMI July 2011 Visitor Arrivals Down 23% Primary Markets Fall, Secondary Markets Strong. In *News Release Marianas Visitors Authority*. Retrieved from <http://d10280496.a135.angil.net/images/library/PR%20NMI%20July%202011%20Arrival%20Trends%208-26.pdf>
<<http://d10280496.a135.angil.net/images/library/PR%20NMI%20July%202011%20Arrival%20Trends%208-26.pdf>> September 9.
- Tibbats, B. and Flores, T. (2012). Chapter 2: Guam Fishery Ecosystem Report. In: WPRFMC 2012. Archipelagic Fishery Ecosystem Annual Report. Sabater, M. (Ed.) Western Pacific Regional Fishery Management Council. Honolulu, Hawaii 96813 USA. Retrieved on 20 February 2013 from:
http://www.wpcouncil.org/documents/Reports/annualreports/Annual%20Archipelagic%20Fishery%20Ecosystem%20Report%202012_FINAL.pdf
- U.S. Environmental Protection Agency. (2002). Economic and Benefits Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule. 2011: EPA-821-R-802-001. Retrieved 25 February 2013 from:
<http://nepis.epa.gov/Exe/ZyNET.exe/20002R4F.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000+Thru+2005&Docs=&Query=821R02001&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=pubnumber%5E%22821R02001%22&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=pubnumber&IntQFieldOp=1&ExtQFieldOp=1&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C00thru05%5CTxt%5C00000005%5C20002R4F.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=10&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL#>
<<http://nepis.epa.gov/Exe/ZyNET.exe/20002R4F.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2000+Thru+2005&Docs=&Query=821R02001&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=pubnumber%5E%22821R02001%22&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=pubnumber&IntQFieldOp=1&ExtQFieldOp=1&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C00thru05%5CTxt%5C00000005%5C20002R4F.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=10&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL#>>
- U.S. Department of the Navy. (2007). Final Comprehensive Report for the Operation of the Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar Onboard the R/V Cory Chouset and USNS IMPECCABLE (T-AGOS 23) Under the National Marine Fisheries Service Regulations 50 C.F.R. 216 Subpart Q: 100.
- U.S. Department of the Navy. (2009). ASSESSMENT OF NEAR SHORE MARINE RESOURCES AT FARALLON DE MEDINILLA: 2006, 2007 AND 2008 COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS.
- U.S. Department of the Navy. (2010a). Final Environmental Impact Statement (FEIS) for the Guam and the Commonwealth of the Northern Mariana Islands (CNMI) Military Relocation. Volume 2, Chapter 14 Marine Transportation. Retrieved from <http://www.guambuildupeis.us/>, 03 February 2012.

- U.S. Department of the Navy. (2010b). Final Environmental Impact Statement (FEIS) for the Guam and the Commonwealth of the Northern Mariana Islands (CNMI) Military Relocation. Volume 3, Chapter 16 Socioeconomics and General Services. Retrieved from <http://www.guambuildupeis.us/>, 03 February 2012.
- U.S. Department of the Navy. (2013). Environmental Assessment/Overseas Environmental Assessment Mariana Islands Range Complex Airspace.
- van Beukering, P., Wolfgang, H., Longland, M., Cesar, H., Sablan, J., Shjegstad, S., Beardmore, B., Liu, Y., Garces, G. (2007). The economic value of Guam's coral reefs. In *University of Guam Marine Laboratory Technical Report No. 116*. Retrieved from <<http://www.guammarinelab.com/publications/uogmltechrep116.pdf>>, September 8.
- Western Pacific Fisheries Information Network. (2011). WPacFIN Central 1982-2009 Commercial Landings (Millions of Pounds) for CNMI, Guam, Samoa, and Hawaii. In *Chart and tabulated values of the WPacFIN Central 1982-2009 Commerical Landings*. Retrieved from <http://www.pifsc.noaa.gov/wpacfin/central/Data/annual1.htm>, September 7.
- Western Pacific Regional Fishery Management Council. (No Date). Mariana Archipelago: Today's Fisheries Retrieved from <http://www.wpcouncil.org/MarianasFEP-fisheriestoday.html>, 20 April 2012.
- Western Pacific Regional Fishery Management Council. (2005). Fishery Ecosystem Plan for the Mariana Archipelago. Retrieved from <http://www.wpcouncil.org/mariana/MarianasFEP/December12005MarianaFEP.pdf>, 07 August.
- Western Pacific Regional Fishery Management Council. (2009). *Fishery Ecosystem Plan for the Mariana Archipelago*. (p. 231). Honolulu, HI: Western Pacific Regional Fishery Management Council.
- World Port Source. (2012a). Roto West Harbor Port of Call. Retrieved from http://www.worldportsource.com/ports/portCall/MNP_Rota_West_Harbor_1943.php, 03 February 2012
- World Port Source. (2012b). Port of Tinian Port of Call. Retrieved from http://www.worldportsource.com/ports/portCall/MNP_Port_of_Tinian_1942.php, 03 February 2012.
- World Port Source. (2012c). Port of Saipan Port of Call. Retrieved from http://www.worldportsource.com/ports/portCall/MNP_Port_of_Saipan_171.php, 03 February 2012.

This Page Intentionally Left Blank