U.S. Marine Corps Recommended Findings
April 2014

On January 24, 2008, the U.S. District Court (Court) for the District of Northern California issued an order that called for the Department of Defense to take into account the effects of the Futenma Replacement Facility (FRF) on the dugong located in the waters around Okinawa[1] as required under Section 402 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. § 470a-2). In the absence of any implementing regulations for the conduct of an impacts analysis under Section 402, the Court found that the "basic components" of a section 402 process must include: (1) identification of the protected property, (2) generation, collection, consideration, and weighing of information pertaining to how the Undertaking will affect the historic property, (3) a determination as to whether there will be adverse effects or no adverse effects, (4) development and evaluation of alternatives or modifications to the Undertaking that could mitigate the adverse effects, and (5) engaging with the host nation and other relevant private organizations and individuals in a cooperative partnership. Okinawa Dugong v. Gates, 543 F.Supp.2d 1082, 1104 (N.D. Cal. 2008).

In response to the Court Order, the DOD filed a Proposed Final Remand Order with the Court proposing its approach to complying with each of the five "basic components" in the Court Order. DOD Proposed Order, Center for Biological Diversity v. Gates, No. 03-4350, (N.D. Cal. December 22, 2008). The U.S. Marine Corps (USMC), as the action proponent, has conducted an analysis of the Undertaking (FRF construction and operation) in accordance with the DOD's Proposed Order. This report (USMC Findings, or Findings) consolidates and summarizes information from the USMC's analysis, and identifies what information the USMC has considered and accepted as the best available information as well as where gaps in knowledge exist despite the USMC's best efforts to gather that information. To date, the Court has not issued an order directing DOD to take any particular action, nor has the Court spelled out the specific requirements that it believes are required to comply with Section 402 of the NHPA beyond identifying the "basic components" listed above.

These Findings present this information in two parts: (1) an overview discussion that addresses each of the Court's basic components along with a description of our outreach efforts to the Japanese, and (2) a table that lists the specific elements outlined in the DOD Proposed Order that identifies the primary information source used to address each element, and provides a brief summary of how the USMC addressed each element.

The current situation presents unique diplomatic, legal and scientific circumstances. The USMC considers the analytical framework and process used in this case to be unique and specifically tailored to the circumstances of this case and this Court's ruling. It is not intended to be utilized in other situations involving the application of NHPA section 402 overseas.

[1] For the sake of efficiency, this document will refer to the dugong sighted in the waters around Okinawa as "Okinawa dugong." Use of this term is not intended to imply that there is a distinct species or sub-species or population segment known as the "Okinawa dugong."

1. Identification of the protected property

In a typical NHPA analysis, identification of historic properties would be preceded by a determination by the federal agency that the proposed action was an Undertaking that is a type of activity that could affect historic properties. After making that determination, the federal agency would then define the Area of Potential Effects (APE) for the Undertaking, or the geographic area or areas within which the Undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. Defining an APE looks at those aspects of the activity that could potentially affect a historic property if such a property were present and does not assume an effect. The APE is influenced by the scale and nature of an Undertaking and may be different for different kinds of effects caused by the Undertaking. Definition of the APE is a crucial step in the "take into account" process, because the APE provides the boundaries within which the federal agency conducts its identification of historic properties and assessment of effects.

In this instance, the Court has found (1) that the USMC's interactions with the Government of Japan (GoJ) regarding its operational requirements for the FRF met the definition of an Undertaking subject to review under Section 402 of the NHPA; (2) that the Undertaking, as defined by the Court, was of a type that could affect historic properties, specifically defined for the purposes of Section 402 as properties "on the World Heritage List or on the applicable country's equivalent of the National Register;" and (3) that the Okinawa dugong is the historic property of concern for the USMC's effects assessment. The Court did not define an APE for the Undertaking.

Given the identification of the Okinawa dugong as the historic property on which the effects of the Undertaking must be assessed, the USMC herein defines the APE for the Undertaking as the geographic area or areas within which FRF construction or operation activities would directly or indirectly affect the Okinawa dugong. Specifically, the USMC defines the APE for the Undertaking as follows: during construction, the APE would include the construction footprint (inclusive of work yards and sea yards) and those portions of Henoko and Oura Bays around the construction site subject to vessel traffic, acoustic disturbance, runoff, or turbidity associated with the construction effort. For operations, the APE would include those portions of Henoko Bay subject to vessel traffic to/from the FRF, acoustic disturbance from FRF operations, and discharge of effluent and stormwater runoff from the FRF.

1.1 Identification of the Okinawa dugong as a cultural property

In 1972, the Japanese Minister of Education, Culture, Sports, Science and Technology designated the Okinawa dugong a national monument, a class of protected cultural property under Law Number 214 (*Protection of Cultural Properties*). Previously, the dugong was protected as a cultural monument (revered and sacred animal) by Ryukyu Prefecture. According to the English translation of Law Number 214 (http://www.tobunken.go.jp/~kokusen/ENGLISH/DATA/Htmlfg/japan/japan01.html, accessed on 1/29/2008), national monuments are animals (including their habitats, breeding places and summer and winter resorts), plants (including their habitats), and geological features and

minerals (including the grounds where peculiar natural phenomena are seen) that possess a high scientific value in and for the nation of Japan.

The Court has found that the protected property under consideration in this instance is limited to the Okinawa dugong itself and not its habitat because it is "the dugong itself, not its habitat which is listed." The Court decision noted that "Japanese law did not name Henoko Bay, or any part thereof, for any form of cultural protection." While it is recognized that the habitat that supports the Okinawa dugong is essential to its survival, no particular sea grass beds in Japan or in the waters around Okinawa are specifically identified for protection as habitat for the species.

The Court made a factual finding as to why the Okinawa dugong is culturally important and that finding governs the USMC's analysis: "The Law for the Cultural Protection of Properties lists the Okinawa dugong for protection because the animal has special importance in native Okinawa mythology and culture." Accordingly, the term "Okinawa dugong," as used in this Finding, refers to the population of dugong that inhabits the waters around Okinawa and is protected as a cultural property under Japanese law.

Finally, the Court made a factual finding that the Okinawa dugong has been found in and traverses Henoko Bay. Surveys conducted by the GoJ between January 2008 and December 2013 have observed routine use of seagrass beds off Kayo, an area north of Henoko Bay. Dugongs have been intermittently observed in the waters of Oura Bay (9/10, 6/11, 5/12, 5/13, and 11/13) and feeding trails have been intermittently observed in the seagrass beds within the footprint of the FRF (6/9, 4/12, 5/12, 6/12, 3/13, 5/13, and 11/13). These observations suggest that Okinawa dugongs intermittently traverse this section of Henoko Bay, and occasionally feed on the seagrass beds immediately adjacent to or included within the footprint of the FRF. Therefore, the USMC has identified the protected property of the Okinawa dugong as being found, at least intermittently, within the APE for the Undertaking.

2. Generation, collection, consideration, and weighing of information pertaining to how the Undertaking will affect the historic property

To determine what information must be collected as part of the study, the USMC examined the Court's findings for guidance. As noted above, the Court made a factual and legal finding that the undertaking "may affect" the Okinawa dugong in the following ways:

> These potential adverse effects include physical destruction of the Okinawa dugong resulting from contamination of seagrass feeding grounds and collisions with boats and vessels, as well as long-term immune and reproductive damage resulting from exposure to toxins and acoustic pollution.

The Court required the U.S. to gather and assess information to determine if these listed factors will actually affect the Okinawa dugong:

> That the actual consequences may be currently unknown is precisely the reason the NHPA requires defendants to gather, examine and assess information. Doing so allows the agency to determine, early in the process of an undertaking, whether potential

> consequences may crystallize into actual effects and whether the actual effects will exceed a de minimis threshold.

In addition, the Court found that the Undertaking "may directly and adversely affect" the Okinawa dugong. To reach this conclusion, the Court found the NHPA domestic regulations informative as to defining an adverse effect:

> The term "adverse effect" is not defined in the statute, but regulations implementing section 106 domestic undertakings set forth a meaning of adverse effect that is instructive in this case. Under the domestic regulations, "an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property [that make it eligible for listing on the National Register].... Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative." 36 C.F.R. § 800.5(a)(1). An example of an adverse effect includes "physical destruction of or damage to all or part of the property." 36 C.F.R. § 800.5(a)(2)(I).

In accordance with the Court's findings, the USMC has gathered and assessed information on those aspects of the proposed construction and operation of the FRF identified by the Court as having the potential to affect the Okinawa dugong, information on the Okinawa dugong population (population size, known vulnerabilities or threats to the population, behavior patterns within Henoko Bay, distribution of seagrass beds in the waters around Okinawa), and information on cultural practices related to the Okinawa dugong that occur within the APE for the Undertaking. In addition, because assessment of effect is based on the extent to which the Undertaking would alter the characteristics of the Okinawa dugong that make it a cultural property, the USMC collected and analyzed additional information to identify the historic and modern significance of the dugong in Okinawa culture, as well as the rationale for designating it for protection as a natural monument under GoJ law. Finally, the USMC collected information on potential measures that could be implemented to mitigate (avoid or minimize) any effects.

2.1 Sources of information

The process of analyzing the potential effects of the Undertaking on the Okinawa dugong as a historic property involved considering the declarations submitted by Plaintiffs and by the United States in the litigation, reviewing the information and documentation prepared by the GoJ, generating and collecting information through a study commissioned by the USMC, and completing an independent evaluation of that study and its conclusions. Specifically, the USMC contracted a team of experts, including an ethnographer, an archaeologist, archival researchers, and a marine biologist. The team gathered information and engaged relevant and knowledgeable persons and institutions in investigating the cultural significance of the Okinawa dugong in Okinawa culture. The study was initiated in July 2009. A draft report was completed in March 2010. Consultation between the contracted experts and USMC staff occurred between the period of December 2009 and April 2010, at which point the USMC accepted the study from the contractors (Encl 1). That report contains several appendices, including an annotated bibliography of all the literature collected by the consultants, summaries of the interviews of Japanese cultural experts, and texts and translations of historical documents and folk songs. The

USMC performed an independent evaluation of the consultants' research and found additional literature and informative data that is summarized in Encl. 2. Finally, the GoJ has continued its surveys for dugongs around Okinawa. Data from these surveys has been incorporated into the USMC findings.

2.2 Information on the construction of the FRF

As identified in the GoJ Draft Environmental Impact Statement (DEIS)(Okinawa Prefecture 2009, translated into English by USMC contractors),[2] the FRF will be constructed within Camp Schwab, a USMC base under the management of Marine Corps Forces Japan. In addition to the land area within the south portion of the Camp, reclamation of approximately 160 hectares (ha) of publicly-owned water body will be required to construct new land areas to support two V-shaped runways, air station facilities, and the aprons. Before these areas in Japan become part of the base, the Joint Committee would need to provide them to the U.S. under Art. II.1(a) of the June 23, 1960 Status of Forces Agreement between the United States and Japan ("SOFA"). The two runways, each with a total length of 1,800 meters (m) (includes overrun) will be 30 m in width with 7.5 m-wide shoulders. The FRF will have a total area of approximately 205 ha, including both land and reclaimed land areas. Major air station facilities to be constructed include two lines of approach lights, one extending approximately 920 m southwest of the northern runway and one approximately 430 m northeast of the southern runway (with approximately 30-m intervals between lights); a fuel pier and fuel-related facility; up to 8 hangars; a 240,000 m^2 apron; an air traffic control tower; communications facilities; a vehicle repair and maintenance shop; an electronic and communications equipment repair and maintenance shop; warehouses; aircraft washing areas; aircraft warning lights; an ammunition loading area; an engine test cell; a firefighting training facility; four helipads; a sewage treatment plant; and a vessel berth along the bank protection structure.

Major reclamation construction work includes bank protection, involving creation of a caisson breakwater, a sloping breakwater and double-wall sheet-pile cofferdam; dredging and reclamation for the main body of the FRF; construction of work and temporary sea yards; collection of earth and sand from a borrow area to provide them for reclamation; construction of the temporary roads for the construction work; and changing the course of the Mija River. To provide material for the reclamation effort, a 30 ha area around Henoko Dam will be mined for approximately 2 million m^3 of earth and sand. No dredging work will be conducted for a new channel or anchorage because the current water depth is adequate for ship navigation. Major construction work related to construction of the air station and its facilities includes paving the air station, work for rainwater drainage, building operations, construction of approach lights and construction of a fuel pier.

[2] The GoJ issued its final EIS in December 2012. USMC reviewed translations of summaries of changes made to the FEIS after publication of the DEIS, including translations of the Abstract, Executive Summary, Chapter 9 (Responses to comments from Okinawa Prefectural Government), and Chapter 10 (Summaries of Changes to FEIS) to ensure USMC findings reflected the latest information. Unless otherwise noted, specific references to the EIS are from the DEIS. The USMC also translated portions of particular chapters of the FEIS where noted.

Construction methods for the bank protection, work yard, sea yard, and reclamation efforts include use of dump trucks, barges, and land-based or floating cranes to move and deposit construction materials (sand, rubble, armor blocks, wave dissipating blocks, levee widening materials, caissons, steel plates, etc.); use of pile-driving barges or truck-mounted hydraulic hammers to drive pilings; use of concrete mixers and concrete plant ships to mix and pour concrete into forms; use of divers to help position and install sand prevention sheets on breakwaters; and construction of gantries and scaffolds. A range of land-based construction equipment, floating vessels, and transport vessels of various sizes will be used.

With respect to the Undertaking, construction activities would result in excavations into the sea floor and some seagrass beds to anchor pilings for various facilities, as well as burial of 78.1 ha of seagrass beds beneath the fill lands created to support the runways. This amounts to the loss of 7.3% of the seagrass beds in the sea area in front of Henoko Bay and 37.7% of the beds on the side of Oura Bay. Construction could also lead to increased red soil runoff into Henoko and Oura Bays, visual disturbance related to use of nighttime lighting, as well as acoustic disturbance related to vessel traffic and construction noise. Further discussion of the anticipated likelihood of these effects and whether they constitute direct adverse effects is provided below in Section 3.

2.3 Information on FRF operations

Approximately 58 aircraft would be located at the FRF. This number includes all Marine Corps Air Station (MCAS) Futenma aircraft except the KC-130 squadron, which is being relocated to MCAS Iwakuni on mainland Japan. The aircraft located at the FRF would include a mix of light, medium, and heavy lift helicopters, tilt-rotor aircraft, along with operational support fixed wing aircraft (C-12 and UC-35).

The current proposed traffic patterns for helicopter and tilt-rotor training presume takeoff and landing to/from the sea, away from the surrounding residential areas and avoiding instrument flights of helicopters/tilt-rotor aircraft and flights by fixed-wing support aircraft over the surrounding residential areas as much as possible to reduce aircraft and helicopter noise. Any adjustment to traffic patterns outside U.S. facilities and areas would be negotiated with GoJ. Visual flight of helicopters will be conducted primarily using the main runway, with the other runway used exclusively for takeoffs when the wind is blowing from the northeast and for landings when the wind is blowing from the southwest. Both cases avoid flying over the surrounding residential areas. Based on best available data, fixed wing aircraft will follow the same flight paths and rules.

At MCAS Futenma, based on the current tempo of operations, the average number of flights per day is 86. Approximately 64% of these flights are by fixed-wing aircraft, while flights of aircraft that are capable of short takeoffs and landings account for approximately 9%; remaining flights are by rotary wing aircraft. At the FRF, it is anticipated that the mix of rotary and fixed wing flight patterns will be comparable to that at MCAS Futenma. Flights will occur during both daytime and nighttime hours; night flights will use the approach lights described in Section 2.2.

Vessel traffic will include periodic visits by T1 tanker vessels carrying aircraft fuel to come alongside the fuel pier to load and unload fuel, as well as vessels such as a T-AVB4 that

occasionally moor at the bank protection berth to transport personnel or helicopters when there are helicopter or other problems. Based upon current projections, the ships would approach the area at 7 knots and then reduce speed to 3-5 knots as they approach the pier and then be assisted by tug boats into docking. There is no plan for regular vessel traffic as part of training or regular operations at the FRF.

The USMC finds that activities conducted entirely on land within the FRF will have minimal effect on the Okinawa dugong. The GoJ came to a similar conclusion in the Final EIS (GoJ 2012, Sections 6.16.2.2 and 6.16.3.2). In addition, as will be discussed in Section 4.2, GoJ has committed to post-construction monitoring surveys and other mitigation measures to ensure protection of any Okinawa dugongs that visit or inhabit the waters around Kayo, Oura, and Henoko bays.

The Court has ruled that operation of the FRF involves activities that could affect individual Okinawa dugongs traversing or feeding in the waters of Henoko Bay. Examples of activities that could affect individual Okinawa dugong are vessel traffic that could lead to collisions with individual dugongs; use of lighting for night operations on the runway that could lead to visual disturbance; or aircraft and vessel operations that could introduce acoustic disturbances. Further discussion of the anticipated likelihood of these effects, the intensity of effects, and whether they constitute direct and adverse effects is provided below (Section 3).

2.4 Information on the Okinawa dugong

The dugong is a marine species occurring throughout the Western Pacific and Indian Oceans. The dugong historic range has been much reduced by hunting, habitat loss/degradation, and by-catch losses. Other than in Northern Australia and the Persian Gulf/Red Sea region, dugongs are mostly found as relict populations separated by large areas of low-abundance or no presence, with no clear evidence of migration or mixing of relict populations. There is anecdotal evidence that some dugongs travel thousands of miles while others stay within small areas. The Okinawa dugong population is the northernmost remnant population in the world. Researchers have concluded that dugongs are already extinct or exist in very low numbers in the Sakishima area, and that Okinawa (especially the middle and northern part of the east coast between Katsuren Peninsula and Ibu Beach) is the last remaining area with dugongs in Japanese waters. The Okinawa dugong population was estimated at fewer than 50 by the Mammalogical Society of Japan in 1997.

The Okinawa dugong, once considered common, declined in numbers primarily in response to pressures from traditional hunting. Population levels reached precariously low-levels by the early 1900s and, due to bycatch/incidental catch rates through that century, have not substantially recovered. There is very little regional information available on the life history of the Okinawa dugong; however, a pair considered to be a cow and calf were observed in 2008 and 2009 by the GoJ. These observations, despite being qualitative and limited in scope, suggest that some reproduction is still occurring in the Okinawa dugong population.

Dugong distribution has historically coincided with the tropical seagrass ecosystem. Dugongs significantly influence species composition of their habitat as well as the nutritional content of

their primary food source. When dugongs leave an area, the quality of seagrass meadows subsequently degrades, such that lesser used seagrass meadows become less attractive as dugong habitat. Dugongs are known to rotate through feeding areas. Damage to seagrass habitat from events such as floods or typhoons can seriously impact dugong numbers, either by forcing movement out of the area, depressing breeding rates, or causing mass die-offs. Some researchers estimate that as many as 25 years are required for dugong to re-establish presence in an area following a catastrophic storm or flood.

Dugongs eat mostly seagrass, leaving long tracks or trails in the seagrass meadows. They prefer seagrass that has a low fiber, high nutrient content. Usually dugongs eat the entire plant, including the root system. They have been known to occasionally consume invertebrates (especially in high latitudes during winter) and marine algae on rocky reefs. Very little is known about the feeding habits of the Okinawa dugong population.

Other than general movement information, very little is known about the behavior of dugongs in Okinawa waters. Researchers have documented movement offshore in deep waters during the day and feeding over the reef and in shallow waters at night. Some site fidelity has been documented as evidenced by repeated sightings of three individuals off Kayo and Abu Ohru Island (immediately north and east of Camp Schwab) between 2003 and 2009. Local, small-scale movements are probably normal for this population.

The GoJ surveyed Okinawa in 2000-2003 (Ministry of the Environment 2004; Yoshida and Trono 2004) and observed a total of 19 dugongs as well as dugong feeding trails off both the east and west coasts. Between 129 and 139 dugong feeding trails were observed in the different years, indicating that dugongs were still active in the area. Notably, Henoko Village was a reported "hotspot" for dugongs during this time-frame (Shirakihara et al., 2007; Yoshida and Trono 2004).

More recently, surveys conducted for the GoJ DEIS (Okinawa Defense Bureau 2009) resulted in 17 sightings of singles and one sighting of a pair between August 2008 and February 2009, mostly off Kayo. From March 2008 to February 2009, 57 sightings of single individuals, 27 sightings of pairs, and a single observation of a trio were recorded, again, mostly off Kayo and Kouri Islands. Despite these results, no systematic surveys (i.e., using methods currently accepted by marine mammal biologists and incorporating an uncertainty factor, such as a coefficient of variation, for the point estimate) specifically designed for dugongs have been conducted in the areas considered part of the traditional range of dugongs in Japan. However, the available work does confirm that dugongs are still found in the waters off Okinawa.

Since June 2009, the GoJ has conducted monthly surveys of the bays. The graphics in the reports show that feeding trails have been observed every month off Kayo in the period between June 2009 and December 2013. Feeding trails were documented in Oura Bay proper in August 2009 in the area immediately adjacent to the FRF site.[3] Feeding trails were observed directly on the FRF site in June 2009, April 2012, May 2012, June 2012, March 2013, May 2013, and November 2013. An individual dugong was photographed traversing the FRF area in May 2010 (transit; no associated feeding trails). In essence, since June 2009 steady and routine Okinawa

[3] The Oura Bay seagrass beds are not routinely surveyed by the Japanese team.

dugong activity has been documented off Kayo (north of the FRF), with sporadic dugong activity observed directly in Henoko and Oura bays.

In general, the USMC's analysis of available data shows that individual dugongs, worldwide, are vulnerable to human-caused threats for a variety of reasons, to include late and limited reproduction, dependence on seagrass beds, and the coastal location of their main habitats. Specific threats to the dugong throughout its range include: (1) hunting; (2) bycatch/incidental catch; (3) vessel strikes; (4) acoustic disturbance resulting in injury to hearing systems, interference with acoustic communication signals, or causing behavioral changes; (5) habitat loss/degradation; and (6) chemical pollution.

Of these threats, the USMC found that bycatch represents the most significant threat to the Okinawa dugong population, followed by habitat destruction from coastal development and, finally, red soil run-off. The nature and severity of impacts related to acoustic disturbance on Okinawa dugongs has not been well documented. Based on studies of other species of marine mammals, such as the closely-related manatees, the USMC found that certain types and levels of noise, such as pile driving during construction and over flights during operation, could adversely affect dugong if dugongs are present within the detrimental range of such noises. In order to determine whether there is any adverse effect, the USMC recommends that GoJ expand its monitoring program (monthly trackline surveys to include Oura Bay (especially the sea grass beds off the northeast shore of the base and those between the base and Kayo)).

2.5 Information on the cultural significance of the Okinawa dugong

The USMC reviewed the GoJ's official designation forms, as well as the nomination forms in order to fully understand the rationale for designating the Okinawa dugong as a natural monument. These designation and nomination documents indicate that the Okinawa dugong was designated because of its increasing rareness after World War II and its scientific value. The designation language makes it clear that the intrinsic elements of the dugong's cultural significance are biological; the only reference to cultural significance is a cursory note that the dugong might be the source of mermaid myths. Informants interviewed on this topic suggested that cultural rationale may have been left out of the nomination because the cultural value of the dugong was commonly understood or perceived by society at large. It is equally plausible that, in the absence of national laws at the time enabling the protection of endangered species, the dugong was declared a cultural resource as a substitute for other means of protecting the local population from possible extinction. Regardless of the reasoning, the dugong's status as a natural monument could be affected if the dugong itself is harmed. In the current context, the obligation is to ensure that the Undertaking does not harm individual dugongs or prevent the survival of the Okinawa dugong as a local population.

In an effort to determine how the Okinawa dugong has cultural as well as biological significance to modern Okinawans, the USMC also evaluated the results of archival and ethnographic research. Historically, the dugong was featured in myths and songs, and had a traditional role in Okinawa culture that included use of its meat for consumption and its bones for tool-making. In modern times (post-World War II), hunting of dugongs was outlawed and the associations have largely faded; many of the practices - and much of the information related to the dugong's

cultural significance - is possessed by only very small segments of the Okinawa population rather than society as a whole. These segments can generally be grouped as follows:

- Researchers and scholars – There are segments within the Okinawa and Japanese academic community that perceive the Okinawa dugong as having cultural significance related to its historical role and its inclusion in Okinawa mythology, songs, and oral traditions.

- Ritual practitioners – Priestesses, shamans, other ritual specialists, and those who maintain past traditions in Okinawa villages and towns, possess some specialized knowledge about the role of dugong in traditional myths, oral histories, rituals, and songs. For some of these individuals living in coastal communities near where dugongs were once more common, dugongs are perceived as intermediaries between the world of humans and the world of the supernatural. The dugong and seagrass beds are noted as part of place names in several communities, and festivals and rituals still occur in some of these communities, such as Henoko Village (Welch et al. 2010: 89).

- Aragusuku-jima Island community – Aragusuku-jima Island is one of the outer islands in the Okinawa island chain. A review of historical records and oral traditions reflects that there are specific elements of Aragusuku-jima Island culture connected to the dugong. The people of Aragusuku have oral traditions and records documenting the past requirement that they hunt the dugong and furnish dugong meat in lieu of paying taxes to the Kingdom. Oral traditions include stories about the hunt, rituals related to the hunt, and special places for conducting those rituals. Although dugong hunting is prohibited, the rituals, traditions, and places remain a part of their culture.

- Popular culture – The dugong has recently become a symbol around which some Okinawans have rallied to protest the continued use of areas on Okinawa by the U.S. military. Because of this political development, the level of basic knowledge about the dugong's cultural and historical significance has increased in segments of the local population who formerly may not have had interest in the dugong. The dugong's use as a political symbol relates to public perception of the animal as an endangered species having special ties to Okinawa.

To address the question of whether the proposed Undertaking (construction and operation of the FRF) will have an effect on the Okinawa dugong as a cultural property, it is necessary to first identify the character-defining features of the dugong as a cultural property. Doing so requires the identification of those aspects of the dugong that are intrinsic to its cultural significance, both with respect to how it is defined as a natural monument and then as to its significance to the specific segments of Okinawa society listed above.

- For the academic community, it is cultural knowledge, or data available for conducting research on the dugong, that is significant. That knowledge is contained in archives, archaeological deposits, and within the memories of people who practice the rituals and pass on the oral traditions.

- For the ritual practitioners, intrinsic elements appear, from the information gathered in the study, to include the cultural and historical knowledge embodied in songs, oral traditions, myths, and rituals. The places where dugong-related rituals are conducted and the timing of those rituals are also elements of the significance for this group; however, the secretive nature of this group has limited the ability of the study researchers to obtain detailed information concerning the locations, times and activities of most such rituals. Places with names associated with the dugong, such as the *Jangusanumii* (dugong's bed; seagrass beds) could also be viewed as important features; however, information obtained as part of the study indicated that no rituals actually occur within the various named seagrass bed areas.

- For the people of Aragusuku-jima Island, the cultural significance of the dugong is tied to their oral traditions and written records regarding hunting dugong during the Ryuku Kingdom Period to specific cultural practices, such as hunting practices and conduct of dugong-related rituals; and to the shrines where the annual rituals are conducted.

- For those members of modern Okinawa society who have made the dugong a political symbol, the intrinsic elements of the dugong's significance are its image and, arguably, its continued survival as a local population. In general, symbols are more effective if they are tied to something tangible and able to be seen periodically by the community that uses the symbol.

As summarized below, the USMC finds that the Undertaking has little or no potential to affect the repositories housing the cultural knowledge of the dugong, either those utilized by the academic community or those reflected in the practices or knowledge of ritual practitioners or the people of Aragusuku-jima Island. The USMC also finds that the Undertaking has no potential to directly affect Aragusuku-jima Island or the various coastal communities in Okinawa and the outer islands where rituals and festivals are performed. Finally, the proposed Undertaking has minimal potential to result in extinction or significant degradation of the species. Therefore, the Undertaking would have no potential to affect the use of the dugong as a political symbol.

3. <u>Make a determination as to whether there will be adverse effects or no adverse effects</u>

The USMC performed an independent analysis of adverse effects on the dugong's status as a cultural property of Japan. For the purpose of this analysis, an activity is deemed to have an adverse effect either on the dugong as a natural monument, or on an intrinsic element of the dugong from a cultural perspective, if the activity destroys, harms, or alters either the dugong or its intrinsic elements.

Under the NHPA, an assessment of effect can result in one of three potential determinations: (1) no historic properties affected; (2) no adverse effect on historic properties; or (3) adverse effect on historic properties. To come to the first conclusion, the USMC would need to establish that there are no historic properties (i.e., Okinawa dugong) present in the APE. For the second, the USMC would need to establish either that, although Okinawa dugongs may be present within the APE, the Undertaking does not involve any activities that would have an adverse effect (e.g., physical harm) on individual Okinawa dugong; or that the likelihood of Okinawa dugongs being

present in the APE during the period in which those activities that could adversely affect dugong are occurring is extremely low. As noted above, in order for the Undertaking to have an adverse effect on the Okinawa dugong, dugongs would have to be present in the APE and subject to activities that could destroy, harm or alter those intrinsic characteristics that make the Okinawa dugong a natural monument.

3.1 Effects on individual dugongs in Okinawa or the Okinawa dugong population

The USMC has reviewed all available studies regarding the distribution of the Okinawa dugong in waters around Okinawa. Observations include at least one mother-calf pair, which indicates that reproduction is still occurring in the population. Estimates made over the past thirteen years of the Okinawa dugong population range between 3 to 50 individuals. The available data are sufficient to conclude that a remnant population of dugongs exists around Okinawa. However, the data are not sufficient to establish population size, status, and viability.

In the immediate vicinity of the FRF, seagrass beds are found to the north at Kayo and south of the FRF, in Henoko Bay. As noted in Section 2.4, dugongs have been sighted in the vicinity of the FRF or FRF footprint only sporadically since June 2009. During that time, steady and routine dugong activity has been documented off Kayo (north and east of the FRF), with only sporadic dugong activity observed directly in Henoko and Oura Bays (6/09, 4/12, 5/12, 6/12, 3/13, 5/13, and 11/13).

The USMC below presents its findings in two categories: construction effects and operational effects. The overall determination of effect for the Undertaking is "no adverse effect" on the Okinawa dugong, because of the extremely low probability of Okinawa dugongs being in the APE; or should dugongs in fact be present, the construction and operational activity is primarily of the type that would not have an adverse effect. The exception to this, as discussed in Section 3.2.4, is construction noise; however, the GoJ has committed to noise minimization and monitoring efforts that the USMC finds likely to be effective in avoiding or minimizing impacts on dugongs if they are present during construction.

3.2 Construction effects

Section 2.2 of these Findings provided a summary of construction events and methods as presented in the GoJ DEIS (Okinawa Defense Bureau 2009). Specific aspects of the proposed construction considered by the Court to be potentially harmful to the Okinawa dugong included vessel strikes, destruction or contamination of seagrass beds by land reclamation and/or red soil runoff, and acoustic or visual disturbance from vessel traffic or construction activities.

3.2.1 Vessel impacts

Potential adverse effects from boats and vessels collisions are highly unlikely given the observed low presence numbers of individual dugong in Henoko and Oura bays. With regards to ship noise having some adverse effect, further insight into this question can be gained by recent work done in Australia with controlled exposure studies on dugong using approaching boats. Hodgson and Marsh (2007) found that dugong interrupt feeding 0.8 - 6% of the time, concluding that these

interruption rates would not affect survivorship. The report also found that vessel presence may affect dugong at the population level by reducing reproductive rates due to lowered nutrition[4]; however, due to the very small and infrequent presence of Okinawa dugong in the APE, there would be no adverse effect on reproductive rates. Monitoring and mitigation measures such as standoff and speed limits, as proposed in the GoJ DEIS (Okinawa Defense Bureau 2009) would result in no adverse effect. Private fishing vessels could be a source of harm to the dugong in Henoko and Oura bays, but such activity is unrelated to construction or operation of the FRF. According to the GoJ DEIS, access to fishing around Henoko Fishing Port will be restricted during the construction period. Accordingly, operation of boats and vessels for the purposes of FRF construction will have no adverse effects on the Okinawa dugong.

3.2.2 Land reclamation

As shown in Table 6.15.2.3.3 of the GoJ DEIS (Okinawa Defense Bureau 2009), the total area of seagrass beds with 5% coverage or more that would disappear due to FRF construction is 78.1 ha: 35.6 ha in the sea area in front of Henoko Bay and 42.5 ha on the side of Oura Bay. This amounts to the loss of 7.3% of the seagrass beds in the sea area in front of Henoko Bay and 37.7% of the beds on the side of Oura Bay (13% of the 600.4 hectares in both bays combined). Based on an independent evaluation of the data provided in the GoJ DEIS and the data collected and presented in the USMC's experts report (Encl 1), the USMC finds that, while the seagrass beds in Henoko and Oura bays are a potential natural habitat and food source for the Okinawa dugong, because these seagrass beds are not consistently or routinely used by resident dugong and there are other seagrass beds sufficient to maintain the current population of Okinawa dugong,[5] the loss of some of the seagrass beds in Henoko and Oura bays is not considered an adverse effect on the Okinawa dugong as a natural monument. Accordingly, loss of seagrass beds from FRF construction will have no adverse effects on the Okinawa dugong.

3.2.3 Red soil runoff

Red soil runoff, in general, is an ongoing problem with coastal development in Okinawa and is subject to local regulation. Red soil runoff has the potential to carry toxins, such as pesticides, into the sea, where it could bio-accumulate in seagrass beds. For wildlife in general, long term immune and reproductive damage from exposure to toxins has been documented. The USMC literature review indicates mixed findings regarding whether or not dugong are susceptible to toxin bio-accumulation. While the USMC's expert study did not reveal specific contaminant loads for the Okinawan dugong, and the Marine Corps has no evidence that red soils at Camp Schwab contain such toxins, the GoJ has plans to implement a number of measures to reduce runoff to include[6]:

[4] Hodgson A.J. and H. Marsh 2007. Response of dugong to boat traffic: The risk of disturbance and displacement. J. Exp Bio and Ecol 340(1): 50-61

[5] To see a map of other available seagrass habitats, see DEIS Figure 3.1.5.4.

[6] GoJ DEIS (Okinawa Defense Bureau 2009), Section 6.15.1, pages 6-15-246 and 6-15-247

- Installation of contamination prevention covers and frameworks. Contamination prevention covers would be monitored throughout construction and, if damage is detected, construction work would be suspended until the damaged covers are repaired.
- In land reclamation work, outer seawalls would be built first to create closed waters separated from the open sea, thereby creating a barrier between the fill area and waters of the bays. In the construction areas after reclamation work has been completed, bare ground would be rolled and compacted and then earth will be laid around the ground so that muddy water from bare ground does not flow into the surrounding sea areas due to rain or other weather conditions allowing storm water to soak into the reclaimed land; the back of the seawalls will be covered with sheets of waterproof canvas to prevent earth and sand from leaching out of the fill area; and storm water from culverts and other drainage areas will be filtered to include installation of treatment plants.
- Stone materials used for fill or breakwaters will be washed before putting them into the water.

Despite these measures, some runoff is possible[7] that could contribute to decline in the health of local seagrass beds. The GoJ DEIS (Okinawa Defense Bureau 2009) recognizes this potential and the GoJ has committed to establishing a monitoring system that enables swift implementation of environmental protection measures. The GoJ has also committed to conducting ongoing surveys of seagrasses and, based on the results of these surveys, will take appropriate action such as consulting with experts to identify methods for expanding the habitat of seagrasses and implementing those measures deemed to be feasible. With implementation of these avoidance, minimization and mitigation efforts, combined with very low and infrequent presence of Okinawa dugong in the APE, the USMC finds there will be no adverse effects to the Okinawa dugong.

3.2.4 Acoustic or visual disturbance

Studies of other species of marine mammals, such as the closely-related manatees, suggest that noise from pile-driving could adversely affect dugong if they are present within the detrimental range of such noises for extended periods of time. The GoJ FEIS (Okinawa Defense Bureau 2012) included an analysis of the noise levels and sound pressure levels likely to be produced during different construction activities, such as pile-driving. The USMC reviewed this analysis and concurs with GoJ's conclusions. Specifically, in the water areas from Abu to the west of Kayo Bay, the impact of underwater sound is not expected to cause physical damage to dugongs, should they be present while construction noise occurs. Similarly, although sound pressure levels during stage 1 of construction could cause impacts to dugong behavior (if dugongs are present during stage 1), cumulative sound exposure is not expected to significantly affect dugong behavior in this area. In Oura Bay, underwater sound is not expected to cause physical damage to dugongs (if present during construction), but could cause impacts to dugong behavior during all three phases of construction. In all cases, dugongs would have to be present in the bay to be affected.

[7] Existing satellite photographs indicate current high sediment loads at the stream outlets from existing stormwater infrastructure.

As has been noted previously, survey data collected by the GoJ since June 2009 indicates only occasional use of Henoko and Oura bays by dugongs. When exposed to human activities, dugongs are known to seek deeper waters away from that activity. Should dugongs be present when construction activities are initiated, it is anticipated that they will vacate the area while construction noise is occurring. GoJ has indicated that it will implement the following best management practices to avoid or minimize impacts on dugongs, if dugongs are found to be present in the area during construction (Okinawa Defense Bureau 2012):

- Use a pile driving method that generates the least amount of noise.
- Measure the sound levels at the first stage of pile driving, and reduce the number of simultaneous pile driving locations based on the measurement results. (Forecast showed that reduction of simultaneous pile driving locations from 5 to 2 led to a noise reduction of 5 dB.)
- Monitor for changes in dugong activity ranges. If changes are observed and if it is determined that the change is caused by construction noise, GoJ will immediately re-examine its construction methods.
- Monitor dugong locations during construction. When dugongs are observed inside the construction zone, construction activity will cease until the dugongs leave the construction zone. When dugongs are observed to be approaching the construction zone, construction workers will be notified so that all sound-generating activity can be suspended.
- Since sudden pile driving sound can impact dugong behavior, GoJ will use weak strikes at the start of pile driving activity, and gradually increase the striking force to mitigate the impact of underwater sound on the dugongs.

In addition to these measures, DoN recommends the use of bubble curtains to further minimize underwater piling noise during construction.

The USMC finds that no adverse effects will occur due (1) to the limited use of Henoko and Oura bays by dugongs, (2) the implementation by GoJ of noise minimization techniques during construction, (3) the suspension by GoJ of noise-generating activities when Okinawa dugongs are present, and (4) the tendency for Okinawa dugongs to move to deeper waters when exposed to such noise.

Lighting for any evening work could also make the area undesirable to feeding dugongs due to visual disturbance. Dugongs tend to enter feeding areas during the early morning hours, when there are no human activities, including artificial light. To mitigate impacts of night lighting, the GoJ does not intend to conduct any marine construction at night hours with the possible exception of runway paving over a three month period (Okinawa Defense Bureau 2012). In addition, the USMC recommends that should GoJ require evening work, they place lighting cones to direct lighting up and away from the water so that light pollution is reduced in the water column. Based on the infrequent use of the APE by the Okinawa dugong and these mitigation measures, no adverse effect is anticipated from visual disturbance.

3.3 Operations

Section 2.3 of these Findings provided a summary of anticipated operations at the FRF. Specific aspects of the proposed operations considered by the Court to be potentially harmful to the Okinawa dugong included vessel strikes, contamination of seagrass beds by stormwater runoff, and acoustic or lighting disturbance from vessel traffic or aircraft overflights.

3.3.1 Vessel impacts

Potential adverse effects from vessels collisions with dugong are highly unlikely for two reasons: the infrequency of individual dugong in Henoko and Oura Bays, and the minimal vessel traffic in and out of the FRF with most vessels being large, slow-moving support vessels. While increased vessel traffic has been known to cause behavioral changes such as interruption of feeding, the single detailed study conducted on the impacts of boat traffic on dugongs concluded that dugongs were more likely to interrupt feeding activity only when vessels passed within 50 m of their location, and any disruptions were short-term. In total, such interruptions decreased dugong feeding time by less than six percent. Given these factors, the USMC finds there would be no adverse effect on the Okinawa dugong within the APE. Should the frequency of dugong sitings increase, the USMC would evaluate mitigation measures such as putting dugong spotters on US ships transiting in and out of the FRF.

3.3.2 Stormwater runoff

As noted in Section 3.2.2, increased sedimentation from stormwater runoff presents an indirect threat to the Okinawa dugong due to potential decline of seagrass habitat. To address this concern, rainwater in the FRF area will be released to the sea areas south and east of the FRF through storm sewers that avoid the seagrass areas in Henoko and Oura Bays. Once the FRF is turned over to the USMC for operation, the USMC will update its standard operating procedures for stormwater pollution prevention for Camp Schwab to include the FRF, which will include ongoing management of stormwater systems to minimize unfiltered/untreated stormwater runoff. With the use of treatment plants and best management practices there should be no operational adverse effects from stormwater runoff on the Okinawa dugong. Examples of best management practices include personnel training, preventive maintenance, routine inspections, monitoring, removal of sediment from storm drain trenches, lining the bottom of slopes with silt fencing to prevent further deposition of sediment into the drainage channels, using concrete trench covers and sandbags at the bottom of the cliff face, and installing geo-textile matting on the slopes to mitigate further erosion.

3.3.3 Acoustic or lighting disturbance

In contrast to construction noise, which is likely to include high decibel percussive sounds (piling) below the water line, operational noise will largely consist of aircraft operations and relatively infrequent vessel traffic. As detailed in the Adam Frankel declaration[8], a dugong would have to be directly under the flight path of an aircraft to receive any significant sound

[8] Dr. Adam S. Frankel Declaration, 28 June 2007, Keahou HI.

exposure, and even this exposure would vary according to sea state; e.g., in flat seas, almost no acoustic energy enters the water. Evidence of this low risk is found in the low altitude dugong aerial surveys (in which a helicopter trails individuals for several hours at a time) the GoJ conducts to determine the presence and frequency of dugongs in the bays. Several such surveys were conducted in support of the GoJ DEIS (Okinawa Defense Bureau 2009) with no reported behavioral effects. Considering the above, there are no operational adverse noise effects to Okinawa dugong in Henoko and Oura Bays.

Lighting at night on the FRF will be limited to approach lights along the runway. This lighting is generally low wattage and typically points upward and away from the water to facilitate viewing by aircraft conducting night operations. The absence of any direct lighting into the bays ensures that FRF night operations will not have adverse effects on the Okinawa dugong.

3.4 Effects of FRF construction and operation on entire Okinawa dugong population

Plaintiffs' declarants argue that the Undertaking will substantially contribute to the extinction of the Okinawa dugong population. In 1997, the Mammalogical Society of Japan estimated that fewer than 50 Okinawa dugong remained in the wild. The USMC's contracted experts concluded that the 1997 population estimate is not scientifically valid (i.e., it is not based on a systematic survey scheme using state-of-the-art methods and incorporating an uncertainty factor, such as a coefficient of variation, for the point estimate); however, there is no more recent survey data. The USMC finds it would be beneficial for GoJ to conduct new systematic surveys or modeling using methods currently accepted by marine mammal biologists to confirm current estimates about the overall size and status of the dugong population in Okinawa and the viability of a population of this size. Notwithstanding the absence of recent total population data, we do have current and valid population data for Henoko and Oura bays. As described in this Findings analysis, the construction and operation of the FRF will not have adverse effects on the local Okinawa dugong population and consequently will not substantially contribute to the extinction of the entire Okinawa dugong. See also GoJ DEIS (Okinawa Defense Bureau 2009).

3.5 Effects on the intrinsic cultural elements of the Okinawa dugong

The USMC finds that the proposed Undertaking has no potential to affect the repositories identified in Section 2.5 housing the cultural knowledge of the dugong. The USMC also concludes that the Undertaking has no potential to directly affect Aragusuku-jima Island or the various coastal communities in Okinawa and the outer islands where rituals and festivals are performed.

The USMC recognizes that the proposed Undertaking has a potential to cause indirect effects on the performance of dugong-related rituals in Henoko Village adjacent to the southern boundary of Camp Schwab as a result of noise or visual intrusions during construction and operation of the FRF. The secretive nature of the ritual practitioners has prevented the USMC from acquiring information important to determining the affect, if any, that FRF construction and operations will have on these rituals. Without access to the nature, location and timing of these rituals, it is impossible to assess the potential effects the undertaking will have on the rituals. Should this information become available, the USMC will make an affects determination.

4. Development and evaluation of alternatives or modifications to the undertaking that could mitigate the adverse effects

Section 3 summarizes the USMC finding that construction and operation of the FRF will not adversely affect the Okinawa dugong as a historical resource. In addition to the limited nature of construction and operational affects in the bay, the infrequent use by individual dugongs is a principal factor in concluding no adverse effect. For similar reasons, a similar finding was reached with regards to acoustic and visual disturbance, stormwater, and intrinsic values such as rituals, festivals, shrines, or repositories of cultural knowledge.

Section 402 requires that the agency take into account the effect of the undertaking for purposes of avoiding or mitigating any adverse effects. While the USMC does not find any adverse effects, USMC has identified measures that could further reduce the likelihood of an adverse effect.

4.1 Mitigation measures – construction

A number of measures to mitigate for potential construction impacts on individual dugongs and/or the Okinawa dugong population were discussed in the GoJ DEIS (Section 6.16.2).

On April 11, 2011, as part of our engagement strategy, the DoN submitted a draft of this findings report to GoJ in advance of their completing their EIS. The draft report suggested the following mitigation measures to avoid possible adverse impacts to the Okinawa dugong:

- Use of a bubble curtain around noisy construction activities, such as percussive piling
- Restricting construction activities to daytime hours or, if that is not feasible, placing lighting cones to direct lighting up and away from the water so that light pollution is reduced during the night hours in the water column
- Active monitoring of surrounding waters to alert construction personnel if an Okinawa dugong enters Henoko Bay while any potentially harmful activities are taking place
- Adoption of Low Impact Development (LID) bests management practices for construction (particularly to minimize impacts from red soil runoff)
- Lookouts from vessels (including floating cranes and other floating construction equipment) during construction
- Establishment of no-wake zones for vessels during construction
- Use of silt curtains during construction
- Engaging in adaptive management during construction

In addition, the USMC recommended that GoJ expand its current dugong monitoring program (monthly trackline surveys) to include Oura Bay (especially the seagrass beds off the northeast shore of the base and those between the base and Kayo)).

Finally, the USMC finds and recommended to the GoJ that adaptive management principles such as those outlined in *Adaptive Management: A Tool for Conservation Practitioners* (Salafsky et al. 2001) may assist the GoJ in ensuring no adverse impacts on the dugong. Adaptive management is predicated on the idea that impacts and mitigation can be fluid over a large

project with an extended schedule. The heart of adaptive management is monitoring of construction and mitigation. If unforeseen impacts occur, they are quickly spotted and correspondingly quickly addressed. Adaptive management is an iterative approach that involves implementing an action, monitoring the results of the action, and then adapting construction processes and mitigation to account for any new information. In the context of the Okinawa dugong, as GoJ construction progresses and they evaluate the impact of their actions on the dugong, this finding report identifies additional mitigation measures GoJ may consider in ensuring no adverse effects on the Okinawa dugong as a natural resource. The GoJ EIS already incorporates some elements of adaptive management related to monitoring and post-construction surveys of the seagrass beds.

For mitigation of impacts on the cultural aspects of the dugong, if noise complaints by local residents reveal that construction activities are affecting the performance of dugong-related festivals or rituals in coastal villages, such as Henoko Village, DoD recommended that construction activities in close proximity to such established traditional activities could potentially be managed to minimize the impacts on such festivals, such as halting construction on the day of a festival.

The December 2012 FEIS evidenced GoJ's sensitivity to the dugong by adding additional analysis and new mitigation measures for dugong impacts to include:

- Additional analysis of the impact of underwater construction noise
- Addition of underwater monitoring for construction noise off Kayo and commitment to reconsider construction techniques if noise exceeds projections made in FEIS
- Commitment to not conduct nighttime construction in the marine environment except for runway paving construction during evening hours for three months
- Affirmation that visual monitoring will occur during construction for dugongs, and a commitment to cease noise-generating activities if a dugong is observed in the area
- Vessel speed restrictions in construction area and navigation restrictions to avoid dugong.

4.2 Mitigation measures - operations

As explained in Section 3.3, the USMC finds that operation of FRF is not expected to result in any adverse effects on the Okinawa dugong as a natural resource. The USMC's findings align with those made by the GoJ in the Final EIS (GoJ 2012; Sections 6.16.2.2 and 6.16.3.2), and the USMC acknowledges the additional commitments made by GoJ to continue monitoring surveys and implement mitigation measures to ensure the ongoing protection of any Okinawa dugongs that frequent Kayo, Oura or Henoko bays. Specifically, GoJ committed to the following post-construction mitigation measures:

- Taking environmental preservation measures to expand seagrass bed areas (transplanting, etc.).
- Conduct monitoring surveys after the facilities are complete and the airfield is in operation to see whether the presence of the new underwater structures or aircraft noise is causing changes to dugong activity. Necessary measures will be taken in accordance

with the survey results. GOJ will also provide instruction manuals to the US Forces to avoid directing lights toward the water as much as possible.

- Take protection measures such as notifying all ships navigating within 5 km of the FRF to place lookouts for dugongs and to navigate at slow speed to prevent collisions.

Construction activities will occur over multiple years, and the USMC feels that it is prudent to request and review monitoring information collected by the GoJ during construction and initial operations. Should the GoJ's monitoring of the area during construction reveal the regular presence of Okinawa dugongs in Henoko Bay, the USMC will consult with GoJ and adaptively manage its operations to minimize any adverse effects on Okinawa dugongs. In general, USMC agrees to implement the best management practices specified in the Japan Environmental Governing Standards (JEGS) for managing endangered or threatened species as additional protection for the Okinawa dugong. The precise nature of these BMPs will be developed as part of the base's Integrated Natural Resources and Cultural Resources Management Plan (INRCRMP), which is a JEGS-mandated plan describing natural and cultural resources management strategies and projects for DoD installations in Japan.

The 2008 INRCRMP and 2014 INRCRMP (in prep) for Marine Corps Base Camp Butler (which includes Camp Schwab) identify the Okinawa dugong as both an endangered species and a natural monument and acknowledge that Okinawa dugong have been reported in the waters of Henoko Bay. The 2014 INRCRMP will include the results of an initial planning-level survey and literature review completed for Camp Schwab in 2007, as well as a marine mammal survey conducted in 2012.

Ultimately, the responsibility of conserving the Okinawa dugong population resides with GoJ. An integrated management plan that examines each of the potential threats with objective scientific data and deals with them accordingly is key to that effort. The USMC recommends that GoJ develop an integrated management plan in partnership with the Japanese, U.S., and international scientific community.

5. Engage the host nation and other relevant private organizations and individuals in a cooperative partnership

The USMC used several methods to engage the host nation and other relevant private organizations and individuals. The USMC's contracted experts contacted a range of interested Japanese and non-Japanese organizations and individuals to solicit input regarding the cultural significance of the dugong and the potential effects of the proposed Undertaking on the dugong as a cultural property. These contacts were made through all phases of the study: contacts were made to identify sources of archival data, to obtain specific reports during the literature review, and as part of the informant interviews conducted for the ethnographic study. Informants included individuals with special expertise related to the historical and archaeological significance of the dugong, as well as specialists on dugong behavior and biology to include many of the experts identified by Plaintiffs.

The study team compiled a list of potential informants from their publications and from recommendations by sources that have knowledge of the role of the dugong in Okinawa culture.

In addition to the study team's collective knowledge of potential sources based on past research efforts in Okinawa and reviewing available literature, the study team consulted with cultural and natural resource specialists at Marine Corps Base Camp Butler on Okinawa. Some of these experts were also identified by Plaintiffs. In addition, interviewees themselves suggested names of persons they thought could provide useful information. In total, 16 knowledgeable informants were interviewed. The 16 consisted of seven archaeologists, two biologists, three archivists/professors, and four folklorists or individuals with local traditional knowledge.

The study team also visited many organizations, including Uruma City Cultural Sea Museum, University of the Ryukyus Museum, Higashi Village Museum, Ishigaki City Yaeyama Museum, Nakijin Village Museum of Culture and History (although it was closed for the week), Nago Museum, Okinawa Churaumi Aquarium, and the Okinawa Prefectural Archaeology Center. The study team visited the Okinawa Prefectural Board of Education and those municipal Boards of Education nearest the proposed project and those that were located along coasts where dugongs have been sighted: Chatan Town, Ginoza Village, Nakijin Village, and Nago City.

During the summer of 2010, the GoJ and U.S. convened a bi-lateral Expert Study Group to examine the FRF, including the impacts of the FRF on the environment. A member of the U.S. negotiating team presented the preliminary results of the Government's findings to that Expert Group for their consideration.

Finally, the U.S. conveyed its draft findings and mitigation measures to the GoJ through the Office of the Secretary of Defense (Policy) in sufficient time for the draft findings to be reviewed by GoJ as part of its environmental impact analysis. DASN(E), the official responsible for making the final decision on the "take into account process," has considered the response received from GoJ and the mitigation measures clarified or added to the GoJ's 2012 EIS as well as this Finding and Summary Report as part of completing the "take into account" process and approving these written findings. In conclusion, DOD has made a good faith effort to engage the host nation and Japanese experts into the determination process and has conducted a thorough investigation and analysis of the potential impacts of the proposed construction and operation of the FRF on the dugong, consistent with the findings in the Court's Order.

SUMMARY OF USMC RECOMMENDED FINDINGS RELATIVE TO DIRECTIVES IN PROPOSED REMAND ORDER

1. In addition to information already in the record before the court, the defendants shall collect and consider information on dugong distribution in waters around Okinawa Island and shall assess the significance of such information with respect to the dugong's status as a cultural and historic property of Japan.

	Welch 2010	**GoJ EIS and Surveys**
Collect & analyze dugong distribution information around Okinawa Island	Chapter 3: 13-15 Maeda interview 147	DEIS 6.16.1 – 6.16.216; GoJ Monthly Dugong Reports
Assess significance of distribution information	Chapter 4: 31-32	DEIS 6.16.217 – 6.16.229; GoJ Monthly Dugong Reports

2. Defendants shall collect and consider information on dugong behavior, migratory movements, feeding patterns, utilization of seagrass habitats, and availability of alternative seagrass habitats around Okinawa and the significance of such information with respect to the dugong's status as a cultural and historic property of Japan.

Dugong behavior	Chapter 3: 17-18	DEIS 6.16.1 – 6.16.2; FEIS 6.16.2.2 and 6.16.3.2
Migratory movements	Report addresses animal movements from an ecological rather than a migratory perspective. See Chapter 3: 13-14, 16, 17-18 and Sasaki interview 150-152	GoJ Monthly Dugong Reports
Feeding patterns	Chapter 3: 13, 15-18	DEIS 6.16.1; GoJ Monthly Dugong Reports
Seagrass habitat utilization	Chapter 3: 13-18	DEIS 6.16.1- 6.16.216; FEIS 6.16.2.2 and 6.16.3.2; GoJ Monthly Dugong Reports
Availability of alternative seagrass habitats	Chapter 9: 97- 98	DEIS 3.1.5, 6.15; GoJ Monthly Dugong Reports
Assess significance of behavior information	Chapter 9: 92	
Assess significance of migratory information	Chapter 3: 21	
Assess significance of feeding pattern information	Chapter 3: 20 Chapter 9: 92	DEIS 6.16.1 – 6.16.2; FEIS 6.16.2.2 and 6.16.3.2
Assess significance seagrass habitat utilization	Chapter 3: 21-22 Chapter 9: 92-93	DEIS 3.1.5, 6.16.1 – 6.16.2; FEIS 6.16.2.2 and 6.16.3.2
Assess significance alternative seagrass habitat availability	Chapter 9: 97-98 (statement does not precisely say where this might be, just says it could be done elsewhere on the Okinawa reef)	DEIS 3.1.5, 6.16.1 – 6.16.2; FEIS 6.16.2.2 and 6.16.3.2

3. Defendants shall request relevant data generated by the GoJ EIS process as soon as the surveys are complete.

The GoJ provided the DEIS (Okinawa Defense Bureau 2009) to the USMC in April 2009. The USMC hired a contractor to translate relevant chapters of the DEIS into English, and the English translations were provided to the contracted experts for review between July and October 2009. Chapters provided to the contracted experts included the Summary, Chapter 2 (Purpose of the Project); Chapter 3 (Project Site and Conditions in the Surrounding Areas), Chapter 4 (Comments to the Scoping Document and Views of the Project Proponent), Chapter 5 (Items Studied Under the DEIS, and Survey, Projection, and Evaluation Methods Applied), Chapter 6 (Overview of Survey, Projection and Evaluation Results), Chapter 7 (Environmental Conservation Measures), and Chapter 8 (References). GoJ issued a Final EIS in December 2012 and the USMC considered English translations of the Executive Summary, portions of Chapter 6, and Chapters 9 and 10.

In addition, a number of source materials filed with the Court (declarations from Noah, Frankel, Hines, Geitlan,

Yonaha, Takamichi, and Maeda; Plaintiffs exhibits #2 and #3, Defendants Exhibit #6, and the Dec 2005 Marine Resources Assessment for Japan and Okinawa Complexes) were provided to the contracted experts.		
4. Defendants shall consult with a qualified expert biologist or similar expert consultant to analyze available information on the dugong, seagrass beds, and the information received from the GoJ's EIA process as to dugong behavior, migratory movements, and feeding patterns, insofar as those topics are relevant to the dugong's status as a cultural and historic property of Japan.		
GoJ DEIS consultation on behavior, migratory movements, and feeding patterns	Chapter 3, 9	DEIS 6.16.1; FEIS 6.16.2.2 and 6.16.3.2
5. Defendants shall consult with an expert consultant who is familiar with Okinawa culture or has the ability to develop such familiarity expeditiously, including ability to research existing sources in Japanese to collect and analyze information on those aspects of Okinawa culture that relate to the dugong's status as a cultural and historic property of Japan.		
USMC consult with expert consultant	Chapter 1: 2-3	
6. Defendants shall determine what additional information, if any, may be required for an informed assessment and analysis of potential impacts of the FRF undertaking on the dugong's status as a cultural and historic property of Japan.		
USMC perform data gap analysis	Chapter 9: 92-93, 95-98	
7. Defendants shall perform an independent analysis of adverse effects on the dugong's status as a cultural and historic property of Japan.		
Analysis of adverse effects	Chapter 9	
8. Defendants shall analyze potential effects including physical destruction of the Okinawa dugong resulting from possible contamination of seagrass feeding grounds, collisions with boats and vessels, and potential long-term immune and reproductive damage resulting from exposure to toxins and acoustic pollution.		
Potential effects to dugong from contamination to seagrass feeding grounds and exposure to toxins	Chapter 3: 20-21	DEIS 6.16.1 - 6.16.3; 6.16.2 – 6.16.2.2; FEIS 6.16.2.2 and 6.16.3.2
Potential effects to dugong from boat and vessel traffic	Chapter 3: 19- 20	DEIS 6.16.2 – 6.16.2.2; FEIS 6.16.2.2 and 6.16.3.2
Potential long term immune or reproductive damage from exposure to acoustic pollution	Chapter 3: 20 Subject researched by contractor/ Information Not Available	DEIS 6.3, 6.16.2 – 6.16.2.2; FEIS 6.16.2.2 and 6.16.3.2
9. Defendants shall analyze the design, construction materials, and construction techniques for the runway and operation of the FRF that reasonably could be expected to adversely affect the dugong, directly or indirectly, as a cultural and historic property of Japan.		
Analyze direct construction impacts to the dugong at FRF	Chapter 9: 92-93	DEIS 2.4.2, 6.15.2; 6.16.2 .
10. Defendants shall undertake this analysis based on the advice and input provided by the biological and cultural resources experts with whom the defendants will consult.		
Use qualified biological and cultural resource experts	Chapter 1: 2	

11. Defendants shall generate and collect information regarding practical measures and techniques, as demonstrated to be technically and economically feasible, that reasonably could mitigate adverse effects of the FRF, if any are determined to be likely, on the dugong as a cultural and historic property of Japan.		
Generate practical mitigation measures	Chapter 9: 94-98	DEIS 6.15.3; 6.16.3
12. Defendants shall determine whether the operational requirements for the FRF would permit the incorporation of measures to mitigate all or some portion of any identified adverse effects on the dugong as a cultural and historic property of Japan.		
Determine if there are operational mitigation measures that can be implemented at FRF	Chapter 9: 94-98 (language on operational mitigation measures limited but included)	DEIS 6.15.3.2; 6.16.3.2
13. Defendants have advised the court that, under Japan's EIS process, the GoJ is not expected to study specific mitigation measures until after the EIS document is drafted and made available for public comment. As a result, the defendants shall independently study potentially available mitigation measures for construction and operation.		
Generate potential mitigation measures independently of the GoJ EIS process	Chapter 9: 94-98	
14. Defendants shall engage GoJ on potentially available mitigation measures needed for construction and design, as appropriate, before the GoJ makes a final decision. The Defendants shall consider mitigation measures proposed by the GoJ to the extent the Defendants learn of them before completion of our analysis.		
Engage GoJ on independently developed mitigation measures before GoJ makes a final decision.	Not Applicable	FEIS Chapters 6, 9 and 10
15. Defendants shall collect comments from interested Japanese and non-Japanese organizations and individuals with special expertise relevant to the dugong as a cultural and historic property of Japan.		
Informant interview methods	Chapter 2: 8	
Informant interview summaries	Chapters 3-8: quotes and summaries on specific topics	
Informant interview transcripts	Appendix A	
16. Defendants shall determine how and when to solicit comments from these organizations and individuals after discussions with the DoD's retained biological and cultural consultants.		
The USMC used several methods to engage the host nation, including providing the government of Japan the March 7, 2011 draft Findings report, and other relevant private organizations and individuals to solicit input regarding the cultural significance of the dugong and the potential effects of the proposed Undertaking on the dugong as a cultural property. These contacts were made through all phases of the study; contacts were made to identify sources of archival data, to obtain specific reports during the literature review, and as part of the informant interviews conducted for the ethnographic study. Informants included individuals with special expertise related to the historical and archaeological significance of the dugong, as well as specialists on dugong behavior and biology. The study team compiled a list of potential informants who seemed most likely from their publications or who were recommended by a variety of sources to have knowledge of the role of the dugong in Okinawa culture. In total, 16 knowledgeable informants were interviewed, including seven archaeologists, two biologists, three archivists/professors, and four folklorists or individuals with local traditional knowledge. The study team also visited many organizations, including Uruma City Cultural Sea Museum, University of the		

Ryukyus Museum, Higashi Village Museum, Ishigaki City Yaeyama Museum, Nakijin Village Museum of Culture and History (although it was closed for the week), Nago Museum, Okinawa Churaumi Aquarium, and the Okinawa Prefectural Archaeology Center. The study team visited the Okinawa Prefectural Board of Education and those municipal Boards of Education nearest the proposed project and those that were located along coasts where dugongs have been sighted: Chatan Town, Ginoza Village, Nakijin Village, and Nago City.

17. Defendants shall provide the consultant with the list of experts that the plaintiffs filed with the Court on June 6, 2008.

The list of experts that Plaintiffs filed with the Court on June 6, 2008, was provided to the USMC's contracted experts in August 2009. Refer to the response for #16 above for methodology for selecting individuals to interview.

18. With input from the consultants, the defendants shall determine the appropriate stage(s) in the analysis to solicit comments from individuals and organizations with expertise.

See Response #16. Comments were solicited from individuals and organizations with expertise at the following stages of the USMC's analysis: These contacts were made through all phases of the study; contacts were made to identify sources of archival data, to obtain specific reports during the literature review, and as part of the informant interviews conducted for the ethnographic study. As noted in the response to Directive #19, further engagement with the GoJ will occur once the U.S. conveys potentially available mitigation measures from this finding to the GoJ through Office of the Secretary of Defense (Policy).

19. Following the completion of this information-gathering and assessment process, the defendants shall complete the "take into account" process through a written finding approved by the Deputy Assistant Secretary of the Navy for Installations and Environment.

The U.S. conveyed potentially available mitigation measures from this finding to the GoJ through Office of the Secretary of Defense (Policy) in sufficient time for the mitigation recommendations to be reviewed by GoJ while it completed its environmental impact analysis and made final determinations on the FRF. DASN(E), the official responsible for making the final decision on the "take into account process," considered the response received from GoJ and additional mitigation measures adopted by GoJ in the FEIS before he completed the "take into account" process and approved the written findings.