NOAA FISHERIES

Pacific Islands Regional Office

Enhancing Protections for Hawaiian Spinner Dolphins To Prevent Disturbance

Draft Environmental Impact Statement and Regulatory Impact Review

AUGUST 2016

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and
Regulatory Impact Review

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Responsible Agency:

Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
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Abstract: The National Marine Fisheries Service is proposing to adopt regulations to enhance protections for Hawaiian spinner dolphins from various forms of take from human activities that cause harassment or disturbance and reduce the impact of viewing and interaction on these animals. This action is being undertaken pursuant to the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq*., and its implementing regulations. Alternatives to the proposed action and potential environmental impacts are discussed in this Draft Environmental Impact Statement (DEIS). The alternatives, or the actions considered as part of the alternatives, are not expected to have measurable negative impacts on spinner dolphin populations, but may have socio-economic impacts on commercial tour operators operating in certain geographic locations. The actions considered are not expected to result in irreversible or irretrievable commitments of resources.

This DEIS is a stand-alone document and does not supplement an earlier National Environmental Policy Act document. Comments on this DEIS must be received by October 25, 2016.

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Executive Summary

The National Marine Fisheries Service (NMFS) is proposing to adopt regulations to reduce the threat of take to Hawaiian spinner dolphins, including harassment and disturbance caused by dolphin-directed activities that are concentrated in coastal waters (within 2 nautical miles (nm) (3.7 kilometers (km) of shore) and in designated waters between Lanai, Maui, and Kahoolawe), and to reduce the impact of viewing and interaction on resident stocks. This action is being undertaken pursuant to the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq*., and its implementing regulations. These regulations are necessary to address chronic interaction and viewing impacts on Hawaiian spinner dolphins. Proposed regulatory measures would help prevent take from occurring, including harassment and disturbance, and would include approach regulations (for persons and vessels) for Hawaiian spinner dolphins in marine areas where viewing pressures are most prevalent, including 2 nm (3.7 km) of the Hawaiian Islands and the waters between the islands of Lanai, Maui, and Kahoolawe. Proposed approach regulations would help ensure public compliance by providing clear notice of prohibited conduct that results in take, including harassment and disturbance.

NMFS has prepared this Draft Environmental Impact Statement (DEIS) in accordance with the National Environmental Policy Act (NEPA). The document considers the environmental consequences of alternative actions to enhance protections for Hawaiian spinner dolphins from forms of "take" when spinner dolphins are engaged in important daytime fitness-enhancing behaviors. Under the MMPA, it is unlawful for any person, vessel, or other conveyance to "take" any marine mammal in waters under the jurisdiction of the United States (16 U.S.C. 1372). The term "take" means to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal (16 U.S.C. 1362). Thus the prohibition against take of marine mammals includes acts that "harass" the marine mammal (16 U.S.C. 1362(13)). Harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild or has the potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [16 U.S.C. 1362 (18)(a); see also 50 C.F.R. 216.3 (Level A and B Harassment)]. NMFS' regulations implementing the MMPA further describe the term "take" to include "the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal" (50 CFR 216.3) (hereinafter referred to as "disturbance").

To reduce take resulting from human activities, NMFS is proposing to adopt regulations implementing the preferred alternative to do the following: prevent people and vessels (including motorized, non-motorized, and self-propelled vessels) from swimming with and approaching within 50 yards (approximately 46 meters (m)) of Hawaiian spinner dolphins within 2 nautical miles (nm) (3.7 kilometers (km)) of each of the main Hawaiian Islands (MHI) and in designated waters between the islands of Lanai, Maui, and Kahoolawe. The analysis of alternatives and consequences will inform NMFS' decisions on actions taken under the MMPA to reduce the take of Hawaiian spinner dolphins and to prevent long-term adverse impacts to resident spinner dolphin populations in Hawaii as a result of viewing and interaction. The public is invited to

comment on the information contained in the DEIS and provide any additional information that may assist the agency to make an informed decision.

In 2010, NMFS recognized five island-associated stocks and one pelagic (open sea) stock of Hawaiian spinner dolphins, and identified genetic distinctions and unique geographic residency patterns as a reason to separately manage the stocks located throughout the Hawaiian Islands (Carretta *et al*. 2011). Three of the five island-associated stocks (Kauai-Niihau stock, Oahu-Maui County stock, and the Hawaii Island stock) are found near the main Hawaiian Islands (MHI) and thus considered resident stocks. These three stocks reside in waters surrounding their namesake island(s) out to approximately 10 nm (18.5 km) (Hill *et al*. 2010) and, although none of the stocks are depleted or strategic, population estimates for each stock are small. Island-associated spinner dolphins, such as the three stocks in the MHI, have adapted complex social structures and behavioral patterns linked to specific habitats that support their high energetic demands. People often characterize the daily pattern of spinner dolphins as "working the night shift" because the energetically demanding task of foraging is accomplished nightly when spinner dolphins move offshore in large groups to feed. During the day, spinner dolphins routinely return to areas closer to shore to socialize, nurture their young, and rest in preparation for nightly foraging. Throughout the day, these dolphin groups visit specific habitats that are located along the coastlines of the MHI. NMFS refers to these areas as "essential daytime habitats" because the areas offer physical characteristics, such as close proximity to foraging areas and sand bottom habitat, which support spinner dolphin ecology by decreasing the travel distance necessary for nightly foraging bouts and increasing the dolphins' ability to visually detect predators during daytime resting behaviors. The spinner dolphins' regular and predictable use of essential daytime habitats in near-shore locations makes these dolphins easily accessible to people seeking wildlife viewing and interaction opportunities, and some essential daytime habitats have become targets for spinner dolphin-directed activities.

In 2001, the International Fund for Animal Welfare (IFAW) reported an emerging dolphin-watching industry in Hawaii as whale-watch operators looked for a year-round tour option (O'Connor *et al*. 2009). As of 2014, NMFS estimated that upward of 70 tour operators provide tours that enable direct interactions with spinner dolphins in the MHI, such as swim-with tours, and over 100 commercial boat tour and kayak tour operations may opportunistically view these animals. In addition to commercial tour operations, visitors, local residents, and participants in dolphin-associated retreats may also independently access Hawaiian spinner dolphin populations from shore by swimming, kayaking, paddle boarding, or using other watercraft. Viewing marine mammals in their natural habitat can be an educational and enriching experience if conducted safely and responsibly from a distance. However, within Hawaii's near-shore waters and especially within essential daytime habitats, spinner dolphin-directed activities, such as those that closely approach, swim-with, pursue, interact, or attempt to interact with the dolphins, have the potential to disturb the dolphins by disrupting daytime behaviors. Response to disturbance varies among individuals, but diverts time and energy from fitness-enhancing activities and may, over time, result in negative impacts to the fitness of individuals and/or resident populations. For example, lack of consistent, undisturbed resting periods can reduce the amount of energy available for a spinner dolphin to engage effectively in foraging activities at night. Over time, this can result in overall poor body condition, which reduces the dolphin's ability to fight off disease, successfully reproduce, protect itself from predators, or successfully rear its young.

Scientific literature documents disturbance to individual spinner dolphins by swimmers and vessels (Forest 2001; Courbis and Timmel 2009), as well as changes in spinner dolphin groups' behavioral patterns in essential daytime habitats over time (Courbis 2004, 2007; Timmel *et al*. 2008; Östman-Lind 2007; Danil *et al*. 2005; Forest 2001). Dolphin-directed activities concentrate daily viewing and interaction pressures by following the MHI resident spinner dolphins' predictable patterns of distribution and daytime behaviors. In other small cetacean populations studied at various places around the world, chronic disturbance to normal behavior patterns has been linked to biologically significant impacts, such as habitat abandonment and reduced female reproductive success (Bejder 2005, Bejder *et al*. 2006a, 2006b; Lusseau and Bejder 2007).

Currently, long-term Hawaiian spinner dolphin residency and population monitoring data is insufficient to clearly identify whether individual dolphins are already showing long-term fitness impacts from disturbances within essential daytime habitats. However, short-term changes in behavior and habitat use that is documented in the scientific literature indicate that population-level effects may already be occurring. NMFS is particularly concerned given that these are small, closed or isolated populations, where disturbance effects may be amplified (Bejder 2005), indicating a need for more effective management under the MMPA.

Although unpermitted take of marine mammals, including spinner dolphins, is illegal wherever it occurs, NMFS is proposing these regulations to manage the threat of take to Hawaiian spinner dolphins, including harassment and disturbance caused by dolphin-directed activities that are concentrated in coastal waters (within 2nm of shore and in designated waters between Lanai, Maui, and Kahoolawe), and to reduce the impact of increased viewing and interaction on resident stocks. NMFS does not expect that these same impacts are prevalent in the outer portions of the resident stocks' range because the dolphins are not easily accessed when they are offshore during the evening hours while engaged in foraging behaviors. Therefore, in the alternatives listed below, NMFS proposes enhancing protections within 2 nm from shore of each of the MHI and including the designated waters between the islands of Lanai, Maui, and Kahoolawe. NMFS developed the proposed action and alternative actions analyzed in this DEIS to address concerns for spinner dolphins, and the potential impacts of each alternative on the human environment are discussed in this document. The following is a summary of each of the alternatives and their potential impacts.

Alternative 1 – No Action

Under NEPA, NMFS must describe the No Action Alternative to provide a baseline with which to compare the impacts of each action alternative, and to disclose the potential impacts of making no changes to the current management strategy. The No Action Alternative involves doing nothing additional to protect Hawaiian spinner dolphins from the effects of disturbance caused by dolphin-directed activities. The current MMPA take regulations would continue to provide legal protection for these animals. Although education and outreach efforts, such as the Dolphin SMART program, would continue under this alternative, spinner dolphins are expected to continue to experience regular and increased disturbance in Hawaii's waters and especially within essential daytime habitats. This disturbance is likely to affect habitat use and/or energetic

costs for individual spinner dolphins. Over time, the levels of disturbance may result in habitat abandonment and/or declines in spinner dolphin fitness.

Under Alternative 1, local communities adjacent to essential daytime habitats that are targeted by people interacting with Hawaiian spinner dolphins are expected to continue to see negative impacts to their community structure, and social and cultural resources. Over time, if habitat abandonment or declines in local spinner dolphin populations develop, businesses that depend upon spinner dolphin-based tourism will find it difficult to continue to profit, as competition may increase and spinner dolphin groups may be displaced further from harbors, becoming more difficult to locate.

Alternative 2 – Swim-With Regulation

Under Alternative 2, NMFS would prohibit swimming with Hawaiian spinner dolphins, including attempting to swim towards spinner dolphins. Swimmers who inadvertently find themselves within 50 yards (approximately 46 m) of a spinner dolphin, or swimmers approached by spinner dolphins, must make no effort to engage or pursue the animals and must take immediate action to move away from the animals. This rule is applicable within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe. Compared with the No Action Alternative, Alternative 2 is expected to decrease the number of disturbances that spinner dolphins experience in Hawaii's waters from swimmers closely approaching the dolphins. However, spinner dolphins may still be at risk of chronic disturbance in Hawaii's waters, and especially within essential daytime habitats, because close approaches by vessels or watercraft are not prohibited, and this alternative provides limited protection from the intensity of spinner dolphin-directed behavior in essential daytime habitats targeted by people interacting with spinner dolphins.

Alternative 2 may reduce the impacts of shore-based swimmers on some local communities currently affected by Hawaiian spinner dolphin-directed activities (see Alternative 1), because swimmers may choose not to engage in spinner dolphin-directed activities in those bays. Still, some shore-based swimmers may choose to engage in dolphin-directed activities in a different way in the same areas. The degree to which impacts on local communities are reduced will vary based on the prevailing spinner dolphin-directed activities in the bay. For example, bays where shore swimming is common may experience relief from this alternative; however, use of other platforms, such as kayaks and stand-up paddleboards (SUPs), may increase in frequency, which may negate any relief provided by this alternative.

For businesses that specifically offer swim-with-dolphin tours, eliminating the option to swim with Hawaiian spinner dolphins may result in a reduction in revenue; however, other activities could be substituted to offset these potential losses. Scuba, SUP, and other businesses that do not offer spinner dolphin-directed activities but may sometimes opportunistically swim with dolphins would be less affected, although they would still not be able to swim with the dolphins if they came across them while engaging in their activity.

Alternative 3 – Swim-With and Approach Regulations

Under Alternative 3, NMFS would prohibit swimming with and approaching Hawaiian spinner dolphins within a specified minimum distance; two distance options are evaluated in this document under Alternative 3(A) and Alternative 3(B) below. These alternatives would be applicable within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe.

(Preferred Alternative) Alternative 3(A) – Swim-With and 50-Yard Approach Regulations

Under Alternative 3(A), NMFS would prohibit swimming with and approaching a Hawaiian spinner dolphin within 50 yards (approximately 46 m) by any means. The prohibitions apply to all forms of swimming-with and approach in water and air. Forms of approaching spinner dolphins include, but are not limited to, swimming, operating a manned or unmanned motorized, non-motorized, self-propelled, human-powered, or submersible vessel; operating an unmanned aircraft system (UAS) or drone; and swimming at the water surface or underwater (*i.e.*, SCUBA or free diving). This also includes approach by interception; in other words, placing a vessel or person in the path of an oncoming spinner dolphin so that the dolphin surfaces within 50 yards of the vessel or person (also known as leap frogging). This alternative is consistent with Dolphin SMART program criteria and NMFS guidelines, which advise boaters to stay 50 yards away from marine mammals to prevent disturbance.

This alternative prevents a range of human activities that occur in close proximity to Hawaiian spinner dolphins including swimming with, touching or attempting to touch, corralling or herding into small areas, enticing or attempting to entice a spinner dolphin to approach a human closer than 50 yards by offering an object of interest to the dolphin, and leap frogging, all of which have the potential to disturb spinner dolphins.

The following exceptions are provided for this prohibition: (1) any person who inadvertently comes within 50 yards of a Hawaiian spinner dolphin or is approached by a spinner dolphin, provided the person makes no effort to engage or pursue the animal and takes immediate steps to move away from the animal; (2) any vessel that is underway and is approached by a spinner dolphin, provided the vessel continues normal navigation and makes no effort to engage or pursue the animal; (3) any vessel transiting to or from a port, harbor, or in a restricted channel when a 50-yard distance will not allow the vessel to maintain safe navigation; (4) vessel operations necessary to avoid an imminent and serious threat to a person or vessel; (5) activities authorized through a permit or authorization issued by the NMFS to take spinner dolphins; and (6) Federal, State, or local government vessels, aircraft, personnel, and assets when necessary in the course of performing official duties.

Compared with the No Action Alternative, Alternative 3(A) is expected to decrease the number of disturbance events that Hawaiian spinner dolphins experience in Hawaii's waters due to vessels or persons closely approaching spinner dolphins. NMFS anticipates that the decrease in disturbance will benefit spinner dolphin health and fitness. The intensity of spinner dolphin-directed activities may still remain high in essential daytime habitats targeted by people interacting with the dolphins, and this alternative may not fully address disturbance problems in

bays where resting behaviors consist of spinner dolphins moving back and forth across the resting area because approach may be difficult to enforce in these areas.

Under Alternative 3(A), shore-based swimmers will not have the option to seek close viewing opportunities through other platforms and will be limited to viewing Hawaiian spinner dolphins from a 50-yard minimum distance. Similar to Alternative 2, NMFS expects this alternative to reduce the impacts on local communities from Hawaiian spinner dolphin-directed activities, but the degree to which they may be affected may vary. Alternative 3(A) may also impact some human activities that are not spinner dolphin-directed because this alternative prohibits all types of vessels from approaching spinner dolphins within 50 yards.

Implementing this alternative would necessitate operators that currently offer the opportunity to swim with Hawaiian spinner dolphins to cease this activity, although they may choose to continue to provide other services such as dolphin watching to their clientele provided that it is done at more than 50 yards away from the dolphins. It is difficult to determine if these distance restrictions will negatively influence ticket sales for dolphin viewing tours, because viewing opportunities will still exist at 50 yards or greater. Some tour operators may be able to offer alternative recreational opportunities as part of a tour to help offset the potential loss in demand for tours. Generalized commercial tour boat operators may still view the dolphins from the minimum prescribed distance, and because these tour boat operators are taking passengers to enjoy being out on the water and for general wildlife viewing rather than having the specific goal of viewing spinner dolphins, the economic impact to this group of tour operators is likely to be minimal.

Alternative 3(B) – Swim-With and 100-Yard Approach Regulations

Under Alternative 3(B), NMFS would prohibit swimming with and approaching a Hawaiian spinner dolphin within 100 yards (approximately 92 m) by any means. The prohibitions apply to all forms of swimming-with and approach in water and air. Forms of approaching spinner dolphins include, but are not limited to, swimming, operating a manned or unmanned motorized, non-motorized, self-propelled, human-powered, or submersible vessel; operating an unmanned aircraft system (UAS) or drone; and swimming at the water surface or underwater (*i.e.*, SCUBA or free diving). This also includes approach by interception; in other words, placing a vessel or person in the path of an oncoming spinner dolphin so that the dolphin surfaces within 100 yards of the vessel or person (also known as leap frogging).

Similar to Alternative 3(A), this Alternative would prevent the same range of human activities that occur in close proximity to Hawaiian spinner dolphins discussed above. However, the increased distance is expected to provide spinner dolphins more protections from disturbance.

The following exceptions are provided for this prohibition (matching those provided for Alternative 3(A)): (1) any person who inadvertently comes within 50 yards of a Hawaiian spinner dolphin or is approached by a spinner dolphin, provided the person makes no effort to engage or pursue the animal and takes immediate steps to move away from the animal; (2) any vessel that is underway and is approached by a spinner dolphin, provided the vessel continues normal navigation and makes no effort to engage or pursue the animal; (3) any vessel transiting

to or from a port, harbor, or in a restricted channel when a 50-yard distance will not allow the vessel to maintain safe navigation; (4) vessel operations necessary to avoid an imminent and serious threat to a person or vessel; (5) activities authorized through a permit or authorization issued by the NMFS to take spinner dolphins; and (6) Federal, State, or local government vessels, aircraft, personnel, and assets when necessary in the course of performing official duties.

Compared with the No Action Alternative, Alternative 3(B) is expected to decrease the number of disturbance events that spinner dolphins experience in Hawaii's waters due to vessels or persons closely approaching a group of Hawaiian spinner dolphins, and is expected to provide more protection from disturbance than Alternative 3(A) by increasing the minimum approach distance. NMFS anticipates the decrease in disturbance will benefit spinner dolphin health and fitness. The intensity of spinner dolphin-directed activities may still remain high in essential daytime habitats targeted by people interacting with the dolphins, and approach regulations may not fully address disturbance problems in bays where resting behaviors consist of spinner dolphins moving back and forth across the resting area because approach may be difficult to enforce in these areas.

Under Alternative 3(B), shore-based swimmers will not have the option to seek close viewing opportunities through other platforms and will be limited to viewing Hawaiian spinner dolphins from a 100-yard minimum distance. Similar to Alternative 2, NMFS expects this alternative to reduce the impacts on local communities from Hawaiian spinner dolphin-directed activities, but the degree to which they may be affected may vary. Alternative 3(B) may also impact some human activities that are not spinner dolphin-directed because this alternative prohibits all types of vessels from approaching spinner dolphins within 100 yards.

Implementing this alternative would necessitate operators that currently offer the opportunity to swim with Hawaiian spinner dolphins to cease this activity, although they may choose to continue to provide other services, including dolphin watching, to their clientele, provided that it is done at more than 100 yards away from the dolphins. It is difficult to determine if these distance restrictions will negatively influence ticket sales for dolphin viewing tours because viewing opportunities will still exist at 100 yards or greater. Some tour operators may be able to offer alternative recreational opportunities as part of a tour to help offset the potential loss in demand for tours. Generalized commercial tour boat operators may still view the dolphins from the minimum prescribed distance, and because these tour boat operators are taking passengers to enjoy being out on the water and for general wildlife viewing rather than having the specific goal of viewing spinner dolphins, the economic impact to this group of tour operators is likely to be minimal.

Alternative 4 – Mandatory Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 4 would prohibit people from using five mandatory time-area closures (*i.e.*, closures that are required by law) during specific resting times and prohibit swimming with and approaching Hawaiian spinner dolphins within a minimum prescribed distance. Under Alternative 4, the proposed action would create the following two components within 2 nm (3.7

km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe:

1. **Mandatory time-area closure component:** Implement mandatory time-area closures in five selected essential daytime habitats. NMFS would close a small subset of Hawaiian spinner dolphin essential daytime habitats every day from 6 AM to 3 PM. The areas chosen for mandatory time-area closures are Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), and Makako Bay on the Island of Hawaii; and La Perouse Bay on the Island of Maui.
2. **Swim with and approach regulations component:** Implement swim-with and minimum distance approach regulations. NMFS would prohibit swimming with or approaching Hawaiian spinner dolphins within a minimum prescribed distance (between 50 and 100 yards). Similar to Alternatives 3(A) and 3(B), a minimum approach regulation would prevent a range of human activities that occur in close proximity to spinner dolphins that result in take.

The areas considered for this alternative are five essential daytime habitats that have been identified as having high levels of human disturbance and which meet the criteria established in the selection process outlined in Section 2.7 and Appendix A of this document. To reduce the likelihood of impacts to human activities that are not Hawaiian spinner dolphin-directed, closure areas were carefully delineated to include the areas where the dolphins rest, and when possible, to exclude areas used for other activities. At all locations, activities occurring in the intertidal zone, such as shore-based fishing and subsistence gathering, would not be affected during any time of day. In addition, all ocean-based recreational, fishing, subsistence gathering, and/or cultural activities would continue in those parts of the bays that are not designated as mandatory closure zones (subject to existing State regulations).

All exceptions for the approach regulations described above for Alternatives 3(A) and 3(B) would apply to these regulations and as appropriate to the time-area closures. In addition the following exceptions would also apply to the time-area closure prohibitions: (1) vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure, (2) vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure, and (3) outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use.

Under Alternative 4, the reduction in behavioral disturbance to spinner dolphins from the approach regulations and the creation of time-area closures provides dolphins with more time and space to engage in fitness-enhancing behaviors, which is likely to increase the fitness of individual spinner dolphins and the population as a whole. Enhanced protection associated with this alternative is expected to prevent long-term impacts to the resident stocks.

Faced with the swimming with and approach prohibitions and mandatory closures under Alternative 4, shore-based swimmers may choose to participate in different recreational activities (similar to Alternative 2), or view the dolphins from the minimum prescribed distance outside of the time-area closures. Additional impacts to human activity include the loss of access to the

closed areas during the closed times by other ocean users, such as snorkelers, divers, kayakers, canoe paddlers, and/or cultural practitioners, as well as subsistence and recreational fishers. To minimize impacts to human activities that are not Hawaiian spinner dolphin-directed, closure areas were carefully delineated to include the areas where spinner dolphins rest and, when possible, to exclude areas used by humans for specific, non-dolphin-directed activities.

This alternative would prohibit all commercial swim-with-wild-dolphin activity through the prohibition on approaching within the minimum prescribed distance of Hawaiian spinner dolphins. Although spinner dolphins may still approach swimmers and snorkelers who enter the water, these swimmers may not engage with the dolphins and would need to reopen the space between themselves and the dolphins. Therefore, implementing this alternative would lead to operators that currently offer the opportunity to swim with spinner dolphins to cease this activity, although they may choose to continue to provide other services, such as dolphin watching, among their menu of options to their clientele.

Impacts to the tour industry under this alternative are expected to be largely similar to those described for Alternatives 3(A) and 3(B) for most of the MHI where only approach regulations would apply; however, time-area closures are expected to affect tour operators differently in areas surrounding the closures. Dolphin-viewing tour operators using these areas may choose to view dolphins from outside the closures or experience increased costs to travel to alternative sites (without closures) to allow more flexibility in viewing the dolphins from the prescribed approach distance. Similarly, generalized commercial boat tour operators may continue to use areas outside of the closures for their tours or may choose alternative locations that set fewer restrictions on boat operators. Those individuals or companies that conduct kayak tours or other non-motorized vessel tours in or near time-area closures may see a slight reduction in revenues relative to their dependence on dolphin-directed customers. Additionally, due to the closed areas, these tour companies may choose to offer alternative tour locations that set fewer restrictions on kayakers.

The loss in overall revenue to the swim-with-wild-dolphins operators is uncertain. Within the time-area closures, the economic impact on generalized commercial tour boat operators is likely to be minimal while non-motorized vessel tour operators may see a slight reduction in revenues, and there should be little to no impact on these operators outside of the time-area closures.

The cultural impacts within the five time-area closures may include limited access to some traditional fishing areas. However, the closures were designed to allow for continued shoreline access for gathering of resources such as limu, opihi, and paakai, and exceptions are allowed for transiting through the closures for the purposes of subsistence fishing and canoe paddling.

Alternative 5 – Voluntary Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 5 would create five voluntary time-area closures (*i.e.*, closures that are required by law) and prohibit swimming with and approaching Hawaiian spinner dolphins within a minimum prescribed distance. Under Alternative 5, the proposed action would create the following two

components within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe:

1. **Voluntary time-are closure component:** Implement voluntary time-area closures in five selected essential daytime habitats. NMFS would close a small subset of Hawaiian spinner dolphin essential daytime habitats every day from 6 AM to 3 PM. The areas chosen for mandatory time-area closures are Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), and Makako Bay on the Island of Hawaii; and La Perouse Bay on the Island of Maui.
2. **Swim-with and approach regulations component:** Implement a no swimming with and minimum distance approach rule. NMFS would prohibit swimming with or approaching Hawaiian spinner dolphins within a minimum prescribed distance (between 50 and 100 yards). Similar to Alternatives 3(A) and 3(B), a minimum approach regulation would prevent a range of human activities that occur in close proximity to spinner dolphins that result in take.

The areas considered for this alternative are the same five essential daytime habitats that have been identified as having high levels of human disturbance described for Alternative 4 above and which meet the criteria established in the selection process outlined in Section 2.7 and Appendix A of this document. To reduce the likelihood of impacts to human activities that are not Hawaiian spinner dolphin-directed, closure areas were carefully delineated to include the areas where the dolphins rest, and when possible, to exclude areas used for other activities. At all locations, intertidal zones are not part of the closures, and activities such as shore-based fishing and subsistence gathering are not affected during any time of day. All ocean-based recreational, fishing, subsistence gathering, and/or cultural activities would be requested to carry out activities in those parts of the bays that are not designated as voluntary closure zones (subject to existing State regulations) to support Hawaiian spinner dolphin protections. All exceptions for the approach regulations described above for Alternatives 3(A) and 3(B) would apply to these regulations and as appropriate to the time-area closures. The additional three transit exceptions described for the time-area closures in Alternative 4 (above) would not be subject to the voluntary closures as well.

Alternative 5 would provide a set of protections to address ongoing activities that cause disturbance in close proximity to spinner dolphins by setting minimum approach distances (described by Alternative 3). NMFS anticipates the decrease in disturbance to benefit spinner dolphin health and fitness similar to Alternative 3. NMFS does not anticipate that participation will be high for voluntary time-area closures, because resource users' motivations and beliefs vary widely within the five closure areas and voluntary compliance measures have had limited success in the past. Therefore, the intensity of spinner dolphin-directed activities may still remain high in essential daytime habitats with voluntary time-area closures in place, and spinner dolphins may receive no additional benefit.

Faced with the swimming with and approach prohibitions and voluntary closures under Alternative 5, shore-based swimmers may choose to participate in different recreational activities (similar to Alternative 2), or view the dolphins from the minimum prescribed distance. Participation in the voluntary closures will limit ocean-use activities (*e.g.*, snorkelers, divers,

kayakers, canoe paddlers, and/or cultural practitioners, as well as subsistence and recreational fishers) to areas outside of the closures during closed periods. To minimize impacts to human activities that are not Hawaiian spinner dolphin-directed, closure areas were carefully delineated to include the areas where spinner dolphins rest and, when possible, to exclude areas used by humans for specific, non-dolphin-directed activities.

This alternative would eliminate all commercial swim-with-wild-dolphin activity through the prohibition on approaching within the minimum prescribed distance of Hawaiian spinner dolphins. Therefore, implementing this alternative would lead to operators that currently offer the opportunity to swim with spinner dolphins to cease this activity, although they may choose to continue to provide other services, such as dolphin watching, among their menu of options to their clientele.

Impacts to the tour industry under this alternative are expected to be largely similar to those described for Alternatives 3(A) and 3(B) for most of the MHI where only approach regulations would apply. Impacts of the time-area closures will be localized to areas surrounding the five closures and effects on tour operators may vary, depending on their willingness to comply with the closure requests and whether they choose to alter their operations in response. Accordingly, effects for tour operators in areas surrounding the closure may range from the effects described by the approach regulations under Alternative 3 (if they do not participate) and the effects described by Alternative 4 (if they do participate).

Alternatives		Time in Effect	Area in effect	Prohibitions or Restrictions
1	**No Action**	24 hours	Worldwide - Subject to the jurisdictional limits of the MMPA	Current MMPA Prohibitions*
All Alternatives below also include Current MMPA Prohibitions				
2	**Swim-With Regulation**	24 hours	All waters within 2 NM of shore and designated waters between Lanai, Maui, and Kahoolawe	Swimming with Hawaiian spinner dolphins
3(A)	**Swim-With and 50-Yard Approach Regulations [Preferred]**	24 hours	All waters within 2 NM of shore and designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or dolphin group closer than 50 yards
3(B)	**Swim-With and 100-Yard Approach Regulations**	24 hours	All waters within 2 NM of shore and designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or dolphin group closer than 100 yards
4	**Five Mandatory Time-Area Closures and**	6 AM to 3 PM Daily	Delineated areas within five essential daytime habitats	All activities prohibited within closures from 6 AM to 3 PM
	Swim-With and Approach Regulations	24 hours	All waters within 2 NM of shore and designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or dolphin group closer than a prescribed distance (between 50 and 100 yards)
5	**Five Voluntary Time-Area Closures and**	6 AM to 3 PM Daily	Delineated areas within five essential daytime habitats	Request no activities within closures from 6 AM to 3 PM
	Swim-With and Approach Regulations	24 hours	All waters within 2 NM of shore and designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or dolphin group closer than a prescribed distance (between 50 and 100 yards)

***See Section 1.3.1 Marine Mammal Protection Act: Statutory Requirements, Authorities, and Prohibitions for current MMPA prohibitions related to take.**

NMFS welcomes public participation in this process as it determines the most appropriate methods by which to enhance protections for Hawaiian spinner dolphins and/or their essential daytime habitats from the impacts of daily human disturbance. NMFS is seeking to enhance protections for the dolphins while taking into account other ocean uses and impacts to the human environment. NMFS therefore asks the public to comment on the alternatives proposed in the DEIS and to provide any additional information that may be considered useful to assist NMFS in developing appropriate regulations

Although not currently part of the Preferred Alternative, NMFS is considering whether other management measures may be necessary and appropriate to protect Hawaiian spinner dolphins from take, especially in essential daytime habitats targeted by humans for dolphin-directed activities. Accordingly, NMFS is soliciting public comment on alternative management options that would promulgate both minimum approach (and thus no swim with) regulations and create either mandatory (Alternative 4; Section 2.5) or voluntary (Alternative 5; Section 2.6) time-area closures in five essential daytime habitats. The time-area closures in this document address the areas where human interactions with these dolphins are most problematic. NMFS recognizes that there are ongoing human interactions with spinner dolphins in other areas (see Table 1), and there is a possibility of expanding the enhanced protections to spinner dolphins in these areas if necessary and appropriate.

Exceptions

NMFS considered specific categories of exceptions that would apply to the various alternatives (see Table 4 for application of exceptions):

- Any person who inadvertently comes within 50 yards of a Hawaiian Spinner dolphin or is approached by a spinner dolphin, provided the person makes no effort to engage or pursue the animal and takes immediate steps to move away from the animal;
- Any vessel that is underway and is approached by a spinner dolphin, provided the vessel continues normal navigation and makes no effort to engage or pursue the animal;
- Any vessel transiting to or from a port, harbor or in a restricted channel when a 50-yard distance will not allow the vessel to maintain safe navigation;
- Vessel operations necessary to avoid an imminent and serious threat to a person or vessel;
- Activities authorized through a permit or authorization issued by the NMFS to take spinner dolphins; and
- Federal, State, or local government vessels, aircraft, personnel, and assets when necessary in the course of performing official duties.

In addition to the above exceptions, the following exceptions would apply to both alternatives 4 and 5:

- Vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure;
- Vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure; and

- Outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use.

Activities occurring in the intertidal zone (the area between tidemarks, or above water at low tide and under water at high tide), including shore-based fishing and subsistence gathering, are not included in the time-area closures and will continue during any time of day.

The last three exceptions are designed to accommodate the needs of local landowners and ongoing, traditional activities within the time-area closures, and are expected to have a very low level of impact to the dolphins. The exception for government vessels, aircraft, personnel, and assets operating in the course of official duty avoids disruption of ongoing government business, including enforcement activities and those critical to national security. The exception for vessels engaged in an activity authorized through a permit or other authorization issued by NMFS to take spinner dolphins — which may closely approach spinner dolphins to obtain photographs, collect samples, and observe behavior under NMFS permits — is considered necessary to carry out ongoing research and studies needed to inform management and conservation of the dolphins. Further, permit terms and conditions are expected to reduce the potential impacts to dolphins. The exception for vessels avoiding an imminent and serious threat to a person or vessel is necessary for safety of human life and property. The exception relating to vessels transiting to and from harbors and restricted channels is necessary to ensure the needs of safe navigation, and recognizes that approaching spinner dolphins closer than 50 yards while doing so may be unavoidable in some cases.

The burden would be on the vessel operator to prove the exception applies, and vessel operators would not be exempt from other take prohibitions under the MMPA.

List of Acronyms

ACOE	Army Corps of Engineers
ANPR	Advance Notice of Proposed Rulemaking
CORAL	Coral Reef Alliance
DEIS	Draft Environmental Impact Statement
DLNR	Department of Lands and Natural Resources
DOCARE	Division of Conservation and Resources Enforcement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act
ETP	Eastern Tropical Pacific
FEP	Fishery Ecosystem Plan
HAPC	Habitat Areas of Particular Concern
IDCPA	International Dolphin Conservation Program Act
IFAW	International Fund for Animal Welfare
KUPA	Kamaaina United to Protect the Aina
LOA	Letter of Authorization
MHI	Main Hawaiian Islands
MLCD	Marine Life Conservation District
MMC	U.S. Marine Mammal Commission
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MUS	Management Unit Species
NELHA	Natural Energy Laboratory of Hawaii Authority
NEPA	National Environmental Policy Act
NHP	National Historical Park
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent to Prepare an EIS
NMFS	National Marine Fisheries Service
NWHI	Northwestern Hawaiian Islands
OLE	Office of Law Enforcement
ORMA	Ocean Recreation Management Area
OSP	Optimal Sustainable Population
PIRO	Pacific Islands Regional Office
RIR	Regulatory Impact Review
SAR	Stock Assessment Report
WHVS	West Hawaii Voluntary Standard

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Definition of Hawaiian Words

ahupuaʻa land division usually extending from the mountains to the sea
ʻā*kia* shrubs and trees whose bark is used for fish poisoning
akua god
akule bigeye scad (Trachurops crumenophthalmus)
aliʻi chief, ruler, royalty
ʻauhuhu slender, shrubby legume used for poisoning fish
ʻaumakua family or personal god, deified ancestor; ʻaumākua (plural)
hale mua men's eating house
hāhālua manta ray
hāʻukeʻuke sea urchin
heiau place of worship
hoe waʻa canoe paddling
hōlua sled course built from lava rock or on grass; or, the sled itself
hukilauseine; to fish with the seine
kapu taboo, prohibition
koʻa fishing grounds; fishing shrine
iʻa fish
iwi bone
lāʻau lapaʻau medicine
leina a ke akua leaping-off points from which a departing spirit enters the next world
limu seaweed
loko iʻa fish pond
loko kuapā fish pond made by building a wall on a reef
loli sea slug or sea cucumber
makai towards the sea
moʻi king, ruler
moʻolelo story
naiʻa dolphin
ʻōʻio bonefish (Albula vulpes)
ʻōpelu mackerel scad (Decapterus pinnulatus and D. maruadsi)
ʻopihi limpet (Cellana sp.)
paʻakaisalt
pāhoehoe smooth lava
palu bait
puʻuhonua place of refuge
puʻuone pond near the shore connected to the sea by a stream or ditch
waʻa canoe
wana sea urchin
wahi pana storied place

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Chapter 1 – Purpose and Need for Action/Background

1.1 Purpose and Need

The National Marine Fisheries Service (NMFS) is proposing to adopt regulations to reduce the threat of take to Hawaiian spinner dolphins, including harassment and disturbance caused by dolphin-directed activities that are concentrated in coastal waters (within 2 nautical miles (nm) (3.7 kilometers (km)) of shore and in designated waters between Lanai, Maui, and Kahoolawe) and to reduce the impact of viewing and interaction on resident stocks. This action is being undertaken pursuant to the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq*., and its implementing regulations. These regulations are necessary to address chronic and interaction and viewing impacts on Hawaiian spinner dolphins. Proposed regulatory measures would help prevent take from occurring, including harassment and disturbance, and would include approach regulations (for persons and vessels) for Hawaiian spinner dolphins in marine areas where viewing pressures are most prevalent, including 2 nm (3.7 km) of the Hawaiian Islands and the waters between the islands of Lanai, Maui, and Kahoolawe. Proposed approach regulations would help ensure public compliance by providing clear notice of prohibited conduct that results in take, including harassment and disturbance.

Under the Marine Mammal Protection Act, it is unlawful for any person, vessel, or other conveyance to "take" any marine mammal in waters under the jurisdiction of the United States (16 U.S.C. 1372). The MMPA defines "take" (or taking) as meaning, "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal," (16 U.S.C. 1362). The prohibition against take of marine mammals includes acts that "harass" the marine mammal [16 U.S.C. 1362(13)].

HARASSMENT includes any act of pursuit, torment or annoyance that has the potential to:

> *Level A:* injure a marine mammal in the wild or
>
> *Level B:* disturb a marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (16 U.S.C. 1362 (18)(a); see also 50 C.F.R. 216.3).

The National Marine Fisheries Service (NMFS) regulations implementing the MMPA further describe the term "take" to include "the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal" (50 CFR 216.3) (herein referred to as disturbance).

NMFS has prepared this Draft Environmental Impact Statement (DEIS) in accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.). The document considers the environmental consequences of alternative actions to enhance protections for Hawaiian spinner dolphins from various forms of take from human activities that cause harassment or disturbance and reduce the impact of increased viewing and interaction on these animals. The

analysis of alternatives and consequences will inform NMFS' decisions on actions to enhance protections for spinner dolphins under the MMPA and its implementing regulations.

1.2 Background

Viewing wild marine mammals in Hawaii has been a popular recreational activity for both tourists and residents over the past several decades. Historically, most efforts focused on viewing humpback whales (*Megaptera novaeangliae*) during the winter months when the whales migrate from their feeding grounds off the coast of Alaska to Hawaii's warm and protected waters to breed and calve. However, in 2001, the International Fund for Animal Welfare (IFAW) reported an emerging dolphin watching industry in Hawaii, as whale watch operators looked for a year-round tour option (O'Connor *et al*. 2009). In 2014, NMFS estimated that upward of 70 tour operators provide tours that enable direct interactions with Hawaiian spinner dolphins in the MHI, and that over 100 commercial boat tour and kayak tour operations may opportunistically view these animals (L. McCue, PIRO, personal communication, May 24, 2014). Tours operate out of various harbors along most of the coasts of the main Hawaiian Islands, bringing guests to well-known locations for spinner dolphin viewing. Researchers have observed up to thirteen tour boats at a time in some locations, with vessels jockeying for position on a single spinner dolphin group and more than 60 swimmers in the water to closely interact with the dolphins at once (Heenehan *et al*. 2015). In addition, a number of residents and visitors venture on their own, apart from commercial operators, to view and interact with spinner dolphins. The expectation for close interactions with wild dolphins has been encouraged by some operators and various media outlets, which routinely promote close vessel or in-water encounters with the dolphins and contradict established wildlife viewing guidelines.

In 2010, NMFS recognized five island-associated stocks and one pelagic (open sea) stock of Hawaiian spinner dolphins, and identified genetic distinctions and unique geographic residency patterns as a reason to separately manage the stocks located throughout the Hawaiian Islands (Carretta *et al*. 2011). Three of the five island-associated stocks (Kauai/Niihau stock, Oahu/4 Islands (*i.e.*, Maui County) stock, and the Hawaii Island stock) are found near the MHI and thus considered resident stocks. These three stocks reside in waters surrounding their namesake island(s) out to approximately 10 nm (18.5 km) (Hill *et al*, 2010) and population estimates for each stock are small. Island-associated spinner dolphins, such as the three stocks in the MHI, have adapted complex social structures and behavioral patterns linked to specific habitats that support their high energetic demands. The daily pattern of spinner dolphins is sometimes characterized as "working the night shift," because the energetically demanding task of foraging is accomplished nightly when spinner dolphins move offshore in large groups to feed. During the day, spinner dolphins routinely return to areas closer to shore to socialize, nurture their young, and rest in preparation for nightly foraging (Norris *et al*. 1994). Throughout the day these dolphin groups visit specific habitats that are located along the coastlines of the MHI. NMFS refers to these areas as "essential daytime habitats," throughout this document, because the areas offer physical characteristics, such as close proximity to foraging areas and sand bottom habitat, which support spinner dolphin ecology by decreasing the travel distance necessary for nightly foraging bouts and increasing the dolphins' ability to visually detect predators during daytime resting behaviors.

In April 2000, the Marine Mammal Commission (MMC) released a literature review pertaining to swimming with wild dolphins. In this review, the authors noted that spinner dolphins in Hawaii are being disturbed by tourist activities in areas that are critical for their well-being, and recommended that precautions be taken to protect these animals within areas critical for rest (Samuels *et al*. 2000). NMFS has received many complaints that spinner dolphins are being routinely disturbed by people attempting to closely approach and interact with the dolphins by boat or other watercraft (*e.g.*, kayaks), or in the water (*e.g.*, snorkel, or "swim-with-wild-dolphins" activities). Concerns over human-dolphin interactions have been expressed by officials from the Hawaii Department of Land and Natural Resources and the U.S. Marine Mammal Commission (MMC), as well as various members of the public, including representatives of the Native Hawaiian community, scientific researchers, wildlife conservation organizations, public display organizations, and some commercial tour operators. These concerns about disturbance to spinner dolphins prompted NMFS to raise the topic of enhancing protections for these animals in an Advance Notice of Proposed Rulemaking (ANPR) (70 FR 73426, December 12, 2005). In the public comment period, many of the public comments reiterated the concerns expressed by the MMC.

Essential daytime habitats have been increasingly targeted by commercial operators and individuals interested in viewing or interacting with Hawaiian spinner dolphins because the likelihood of encounters with dolphins in these areas are virtually guaranteed. These essential daytime habitats have attracted people interested in experiencing close interactions with wild dolphins. Some interactions with people in essential daytime habitats disrupt the spinner dolphins' behavior patterns, resulting in disturbance to individual dolphins and/or resting groups.

Peer reviewed scientific literature has documented disturbance responses by individual spinner dolphins, as well as changes to spinner dolphin group behavior patterns over time. Individual dolphin responses include changes to aerial displays when closely approached by vessels and swimmers (Forest 2001; Courbis and Timmel 2009), avoidance behaviors including moving around and away from swimmers and vessels, or leaving the bay in response to human pursuit (Ostman-Lind *et al*. 2004; Courbis 2004, Courbis and Timmel 2009); and aggressive behaviors directed at people, including charging or threat displays (Norris *et al*. 1985; Norris *et al*. 1994). Effects have also been documented in the form of changes to spinner dolphins' behavior patterns in essential daytime habitats including changes to patterns associated with aerial behaviors, residence times, and distribution within the habitat (Courbis 2004, 2007; Timmel *et al*. 2008, Östman-Lind 2007, Danil *et al*. 2005, Forest 2001). Human-caused disturbances to daily behaviors may be incidents of take, as defined (and prohibited) under the MMPA and its implementing regulations, and the chronic nature of these problems in Hawaii and the observed changes to behavioral patterns overtime are a cause for concern for this wildlife population.

Animal response to disturbance is influenced by multiple variables, including, but not limited to, the health of the individual at initial response and the severity of the disturbance; however, the principle issue of concern regarding disturbance events is whether the source of disturbance is capable of altering the animal's ability to exploit important resources that are essential to the health and well-being of the population (Gill 2007). Disturbances that are especially intense or chronic may prevent an animal from benefiting from the environmental characteristics that made

the animal select the habitat in the first place or cause the animal to flee the habitat thereby abandoning those benefits.

For Hawaiian spinner dolphins, like many other wildlife species, repeated disturbance throughout the day in essential daytime habitat may have several outcomes (Frid and Dill 2002). If a spinner dolphin remains in the area of disturbance, the incidents of disturbance interrupt normal behaviors and detract from the dolphins' abilities to engage in fitness-enhancing activities, such as rest, nurturing young, or socializing, for normal periods. Deficits in these behavioral and energetic budgets over time are likely to negatively affect the fitness of the individual dolphins. For example, the lack of consistent, undisturbed resting periods can reduce the amount of energy available for a spinner dolphin to effectively engage in foraging activities at night. Over time, this may result in overall poor body condition, which reduces the dolphin's ability to fight off disease, successfully reproduce, protect itself from predators or successfully rear its young. Spinner dolphins may also choose to leave or avoid an area due to chronic disturbance because the energetically beneficial resources found in that area no longer outweigh the energetic costs of responding to continued disturbances. Spinner dolphins fleeing to less-optimal habitat may additionally be at risk of impacts to individual fitness if energetic expenditure within these new habitats outweighs the energetic gain from surrounding resources.

Hawaiian spinner dolphins rely on group dynamics to support their individual fitness needs as they forage, travel, rest, socialize, and care for their young (Norris *et al*. 1994, Au and Benoit-Bird 2008). Within small resident populations, where individuals are reliant on group efficiency and effectiveness, activities negatively affecting multiple individuals can have group-level impacts. In other dolphin populations, chronic disturbance to normal behavior patterns has been linked to biologically significant impacts, such as habitat abandonment and reduced female reproductive success (Bejder 2005, Bejder *et al*. 2006a, 2006b; Lusseau and Bejder 2007). Hawaiian spinner dolphins experiencing chronic disturbance are at risk and may experience similar effects. Further, these types of impacts may be amplified in closed, or isolated, resident populations (Bejder 2005) because the impacts to multiple individuals' health and fitness are quickly reflected in the overall fitness of these closed populations. Accordingly, the small resident spinner dolphin populations of the MHI may be more vulnerable to negative impacts from human disturbance.

Long-term data sets tracking the animals' individual residency patterns or reproductive success are not available for resident stocks of Hawaiian spinner dolphins; therefore, it is not known if resident Hawaiian spinner dolphin populations already show signs of long-term fitness impacts from this increase in spinner dolphin-directed activities. However, the growing body of evidence demonstrates spinner dolphins are exhibiting responses to chronic disturbance within essential daytime habitats (Courbis 2004, 2007; Timmel *et al*. 2008, Östman-Lind 2007, Danil *et al*. 2005, Forest 2001). NMFS is particularly concerned given that these are small, closed or isolated populations, where disturbance effects may be amplified (Bejder 2005), indicating a need for more effective management under the MMPA.

The NEPA defines scoping as an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action (40 CFR 1501.7). Based on internal and external scoping, and gathering of scientific information, NMFS

determined that additional regulations are necessary to prohibit certain activities (including swim-with and approach within 50-yards, as discussed below) that result in take of Hawaiian spinner dolphins, and that current MMPA regulations have not provided sufficient protections for this species. MMPA prohibitions do not identify specific human activities that have the potential to disturb spinner dolphins. Response to disturbance varies among individual dolphins but, in most cases, their responses divert time and energy from fitness-enhancing activities that supports the animals' health. Therefore, NMFS deems it necessary and appropriate to adopt regulations to enhance protections for Hawaiian spinner dolphins from these forms of take. By taking measures to prevent take during important resting periods in essential daytime habitats and allowing spinner dolphins to engage in normal fitness-enhancing behaviors, NMFS will be able to prevent long-term negative impacts to the population, as well as meet the statutory requirements of the MMPA.

1.3 Current Protective Measures in Place

1.3.1 Marine Mammal Protection Act: Statutory Requirements, Authorities, and Prohibitions

The MMPA enacts policy and provisions to protect and preserve marine mammals as functioning parts of the marine ecosystem. In doing so, the MMPA acknowledges the importance of protecting species and stocks, as well as their essential habitats, from the adverse effects of human activity (16 U.S.C. 1361). Under the MMPA, the National Oceanic and Atmospheric Administration (NOAA), under the Secretary of Commerce, is given the responsibility, authority, funding and duties for the order Cetacea, which includes Hawaiian spinner dolphins.

One of the key policies for marine mammal protection established by the MMPA is a moratorium on taking and importing marine mammals and marine mammal products (16 U.S.C. 1371). The MMPA defines "take" (or taking) as meaning, "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. 1362). The term "harassment" is defined as "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B Harassment]" (16 U.S.C. 1362).

In addition, NMFS' regulations implementing the MMPA further describe the term "take" to include "the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; and feeding or attempting to feed a marine mammal in the wild" (50 CFR 216.3). The MMPA provides limited exceptions to the prohibitions on take for activities such as scientific research, public displays, and incidental take in commercial fisheries. These activities require a permit or authorization that may only be issued after a thorough agency review.

Adherence to prohibitions on take is intended to provide protection to marine mammals from human activities; however, these prohibitions do not prohibit specified actions. Instead, the MMPA confers the responsibility to the Secretary of Commerce to prescribe regulatory measures deemed "necessary and appropriate" regarding the taking of marine mammals to insure that

species and population stocks are protected in accordance with the Act (16 U.S.C. 1373 (a)). In doing so, the Secretary conducts appropriate analyses on the basis of the "best scientific evidence available" in consultation with the Marine Mammal Commission (16 U.S.C. 1373 (a)).

The MMPA requires that people and organizations conduct wildlife viewing in a manner that does not cause take. However, for certain species in specific locations, NMFS recognizes a need for additional protections from human activities that result in take (including wildlife viewing) and has promulgated regulations to reduce these activities to ensure the conservation of specific species. NMFS based each rule on the biology of the marine mammals and the available information on the nature of the threats. Examples of these types of regulations include: a 100-yard (91.4-m) approach limit for humpback whales in Hawaii (60 FR 3775, January 19, 1995); a 100-yard approach limit for humpback whales in Alaska, which included a speed restriction in the vicinity of the whale (66 FR 29502, May 31, 2001); prohibitions against approaching a North Atlantic right whale within 500 yards (457.2 m) (62 FR 6729, February 13, 1997); size-specific vessel speed restrictions within specific areas along the east coast of the U.S. Atlantic to protect North Atlantic right whales (73 FR 60173; October 10, 2008); and a 200-yard (182.9-m) approach limit for killer whales and prohibitions against vessels intercepting a killer whale or positioning the vessel in its path in the inland waters of Washington state (76 FR 20870; April 14, 2011). The specificities of these regulations convey to the public details necessary to better protect these populations, thereby enhancing the protections for these populations under the MMPA.

1.3.2 Current Viewing Guidelines for Hawaiian Marine Wildlife

As noted above, the MMPA requires marine mammal viewing be conducted in a manner that does not cause take. To assist the public in meeting these requirements, as well as to meet obligations for protecting endangered and threatened wildlife listed under the Endangered Species Act (ESA), NMFS has provided general guidance for conducting responsible wildlife viewing that avoids causing disturbance or harassment of protected wildlife species (http://www.nmfs.noaa.gov/pr/pdfs/education/viewing_wildlife.pdf). In addition, each of the five NMFS Regions has developed recommended viewing guidelines, which are relevant to protected species within the region, to educate the public on how to responsibly view these animals in the wild. These guidelines are available online at: http://www.nmfs.noaa.gov/prot_res/MMWatch/MMViewing.html. Although aimed at assisting the public in meeting their obligations under the MMPA and ESA, the suggested practices provided in guidelines are not binding or enforceable.

These NMFS guidelines are consistent with the philosophy of responsible wildlife viewing advocated by many agencies and national advocacy groups to unobtrusively observe the natural behavior of wild animals in their habitats without causing disturbance (see http://www.watchablewildlife.org/ and http://www.watchablewildlife.org/publications/marine_wildlife_viewing_guidelines.htm).

1.3.3 Existing Supplemental Non-Regulatory Management Measures

In addition to the guidance provided to the public regarding protected wildlife viewing, NMFS initiated industry-specific tour programs in various NMFS regions to support protection of marine mammals that are targeted for wildlife viewing. In Hawaii, this includes employing the Dolphin SMART voluntary program.

Dolphin SMART is a partnership program developed by NOAA's Office of National Marine Sanctuaries and NMFS, the Whale and Dolphin Conservation Society, and the Dolphin Ecology Project, as well as local businesses and members of the public, who teamed up and developed a unique, multifaceted program encouraging the responsible viewing of wild dolphins, recognizing businesses that participated in the process. The partnering groups launched the program in 2007 in Key West, Florida and expanded to Alabama, the Central and Southwest Florida coast and most recently to Hawaii in 2011.

The NMFS Pacific Islands Regional Office (PIRO) continues to develop the Dolphin SMART program in Hawaii to aid in educational and outreach efforts for Hawaiian spinner dolphin management and conservation. PIRO held an introductory meeting in December 2008 for spinner dolphin tour operators on Oahu to gauge the level of interest in participation, and held the first Dolphin SMART training on Oahu in September 2011. The Dolphin SMART program has currently recognized businesses on Oahu, Kauai, and Maui.

The Dolphin SMART program goals are to minimize the potential of wild dolphin harassment caused by commercial viewing activities, reduce expectations of close interaction with wild dolphins in a manner that may cause harassment, address advertising that creates expectations of engaging in activities that may cause harassment and promote responsible stewardship of dolphins in local coastal waterways. The “SMART” acronym stands for:

Stay back 50 yards from dolphins
Move cautiously away if dolphins show signs of disturbance
Always put your engine in neutral when dolphins are near
Refrain from feeding, touching, or swimming with wild dolphins
Teach others to be Dolphin SMART

More information on the Dolphin SMART program can be found at the following websites:
www.dolphinsmart.org or www.facebook.com/OfficialDolphinSmart

1.4 Scientific Evidence of Impacts to Small Cetaceans Caused by Human Interactions

Providing evidence for long-term impacts to populations as a result of human activities can be challenging for long-lived species without a robust data set that incorporates a detailed knowledge of individuals and population dynamics. These obstacles are particularly difficult to overcome when studying cetaceans due to the logistical challenges of observing aquatic species in the wild. Despite these constraints, there are a growing number of scientific research studies that have documented the effects of human disturbance on small cetaceans that point to the potential for long-term population impacts. These studies recorded short-term behavioral

avoidance and disturbance responses to human-activities and compare spinner dolphin behavioral patterns to data from previous studies to assess the occurrence of changes or trends in the species' ecology and in the population. This section reviews scientific evidence indicating increases in human disturbance or disruption to Hawaiian spinner dolphin behaviors, discusses observed spinner dolphin responses to human disturbances and describes additional studies that indicate that chronic disturbances may have long-term impacts on individual dolphins and populations. This body of evidence provides ample cause for concern and indicates a need for precautionary measures to prevent long-term impacts to Hawaiian spinner dolphins.

1.4.1 Spinner Dolphin Studies

Comparisons of short-term studies that have evaluated spinner dolphin behavior and human interaction in resting habitats in Hawaii indicate an increase in human use of these areas and changes in the dolphins' behavioral patterns over time. Researchers evaluated the differences in human use of Hawaiian spinner dolphin resting habitat, and the effects that vessels and swimmers had on spinner dolphins within Kealakekua Bay, Honaunau Bay, and Kauhako Bay (Courbis 2007; Courbis and Timmel 2009). These studies compared observations between bays and compared these observations to past studies within these areas. Courbis (2007) examined whether spinner dolphin presence in the bays had the potential to attract swimmers and vessels. Results demonstrated that the mean number of swimmers was significantly higher in Kauhako Bay when spinner dolphins were present, suggesting that either more swimmers were in the bay on days with the dolphins, or swimmers spent more time in the water on those days. At Kealakekua Bay, the mean numbers of vessels and swimmers were higher per scan when spinner dolphins were present. In Honaunau Bay, the mean number of kayaks was significantly higher when spinner dolphins were present. Although swimmers were the dominant category of human activity recorded, the study demonstrated that each bay had different levels, types, patterns, and numbers of swimmers and vessels present that may cause disturbance to resting spinner dolphins. This study also compared the general vessel and swimmer patterns in Kealakekua Bay to past studies by Doty (1968), Norris and Dohl (1980) and Forest (2001), and found an increase in the presence of vessels and traffic over time. During the evaluation of Kealakekua Bay, Courbis never observed an absence of vessels when spinner dolphins were present. Additionally, residents living near Honaunau and Kauhako bays reported an increase in swimmer and vessel traffic in these bays over the past decade.

In examining Hawaiian spinner dolphin behavior in response to increased vessels and swimmers at these same sites, Courbis and Timmel (2009) found differences in spinner dolphin aerial behavior patterns throughout the day compared with earlier studies. Past studies indicated higher aerial behavior upon spinner dolphins' entry to Kealakekua Bay in early to mid-morning and as the dolphins exit from the bay in late afternoon, and less aerial activity during midday (Norris and Dohl 1980, Forest 2001); these patterns appear consistent with other sites in the islands (Lammers 2004, Danil *et al*. 2005). In contrast, Courbis (2007) did not record peaks in aerial activity upon entry to and exit from Kealakekua or Honaunau Bay. Observations indicated an increase in midday aerial behavior during what had previously been observed as resting time, and/or a decrease in aerial behavior in the morning and afternoon. Courbis suggested that increases in human use at these sites may be affecting the daytime behavior patterns of the dolphins, and that spinner dolphins may have altered aerial behaviors in an attempt to enter and

exit the bays undetected by people. Forest (2001) also recorded these decreases in aerial behavior during entry or exit from the bays when comparing sighting records of spinner dolphins in Kealakekua Bay from 1979–1980 and 1993–1994. She suggested human disturbance was a cause of the behavior change.

After comparing Hawaiian spinner dolphin aerial behaviors across the sites, Courbis (2007), found aerial behavior to be significantly higher at Kauhako Bay during historic resting times. She found that human behavior at this bay was mostly spinner dolphin-directed, with swimmers most often seeking to approach and attempting to interact with the dolphins, suggesting that spinner dolphins at this site may be experiencing enough disturbance to elicit a stronger behavioral response. This idea is supported by specific instances in the study sites in which aerial behavior appeared closely correlated with approaches from vessels and swimmers. Within Kauhako Bay, Courbis (2004), also recorded spinner dolphin avoidance of swimmers and observed the dolphins leaving the bay in response to being followed. Additionally, Courbis (2007) reported changes in the location of resting spots within Kealakekua Bay from previous studies by Doty (1968) and Norris and Dohl (1980), and warned that changes in location could be a precursor to abandonment of the bay with future increases in traffic.

In addition, Timmel *et al*. (2008), reported avoidance behavior while examining the effects of human traffic on the movement patterns of Hawaiian spinner dolphins within Kealakekua Bay. When approached, spinner dolphins remained in the same location for several minutes, but then moved in a directed manner away from the pursuing swimmers and kayakers. These recorded responses suggested that spinner dolphins might tolerate the close presence of swimmers and vessels for a time, but that the dolphins were intolerant of prolonged interactions. Additionally, the dolphins' direction of travel was observed to alter more frequently as the number of nearby swimmers and/or vessels increased. In comparing these responses to other dolphin-response studies, Timmel and colleagues indicated that dolphin populations at different locations might have evolved different strategies for avoiding vessels.

Behavior changes were also documented at Kealakekua Bay by Östman-Lind *et al*. (2004), who found that human disturbance was highest in mid-morning when Hawaiian spinner dolphins begin their rest period. Observed behavior changes included spinner dolphins being displaced from primary resting areas by vessel and swimmer presence, and the dolphins were observed using secondary resting areas to avoid areas of high human traffic. Later, Östman-Lind (2009) documented a change in spinner dolphin behavior as a result of a public closure of Kealakekua Bay. Following a 2006 earthquake and subsequent landslide, Kealakekua Bay was closed due to safety concerns. During the 3-week closure period, Östman-Lind recorded an increase in spinner dolphin use of the bay and a decrease in frequency of both acrobatic and lower-energy slaps and splashes displayed by the dolphins. Following the reopening of the bay, both the dolphins' use of the bay and frequency of acrobatic behaviors returned to pre-closure levels. Östman-Lind (2009) suggested that spinner dolphin behavior is highly affected by human presence and that the closure of resting areas may reverse impacts to these populations.

Research conducted on Hawaiian spinner dolphins off the Waianae coast of Oahu at Makua Bay also provides some specific findings regarding the potential effects of swimmers on spinner dolphins' daytime behaviors. According to a study by Danil *et al*. (2005), this area of Oahu is a

well-known resting habitat for spinner dolphins and is a popular area for swimmers to visit with the intention to encounter the dolphins. The study confirmed the significance of this area as a resting habitat for spinner dolphins, with the dolphins' presence recorded on 98% of observed days. Within this period, the researchers documented a greater number of swimmers in the morning and a general absence of swimmers in the afternoon. In the morning, the researchers often saw swimmers in close proximity to or in pursuit of spinner dolphins, with 65% of the swimmers within 100 m of the dolphins. As the number of swimmers increased, the dolphins departed the area at earlier times during the day, possibly indicating reduced rest periods in response to swimmer presence.

Danil *et al*. (2005) noted that on several occasions smaller spinner dolphin groups (fewer than 25 animals) refrained from entering Makua Bay when swimmer presence was high. The authors suggested that the observed spinner dolphin rest patterns were altered in order to accommodate and adapt to the swimmers' occurrence. The authors predicted that swimmer presence keeps the dolphins in a constant state of alertness and vigilance, and that delayed diving behavior (in the morning during swimmers' presence) may indicate a diminished quality of rest. The authors further suggested that spinner dolphins may ameliorate the potential for this disturbance by choosing to use alternate rest areas or by remaining offshore, and that some schools may have already selected these strategies to avoid swimmers.

Spinner dolphin responses to human interactions have been observed in other resting locations globally. In French Polynesia, in a bay of Tahiti similar to Kealakekua Bay, spinner dolphin residence times were negatively influenced by boat presence (Gannier and Petiau 2006). Researchers observed spinner dolphins leaving the bay earlier when there was an increase in boat pressure during peak weekend boating times, and some of the results suggested that maximum boat disturbance during the weekend might deter the dolphins from entering the bay the next day.

Additionally, in Samadai Reef, Egypt, spinner dolphins were reported by the researchers as appearing noticeably distressed from excessive numbers of visitors and people attempting to interact with the dolphins (Notarbartolo-di-Sciara *et a*l. 2009). The spinner dolphin group abandoned this preferred resting area, presumably to avoid the disturbance from vessels and visitors (Nature Conservation Sector 2006) and did not returned to the site until after management measures were put in place to prevent human entry into the core resting area, and authorities established restrictions in areas surrounding the core resting area to prevent further disturbance (Nature Conservation Sector 2006, Notarbartolo-di-Sciara *et al*. 2009).

1.4.2 Spinner Dolphin Acoustic Population Parameters and Human Impact Research (SAPPHIRE)

During the initial scoping period, NMFS received comments that acknowledged the importance of gathering additional information on Hawaiian spinner dolphins, including monitoring local populations to determine impacts to the numbers and overall health of the resident spinner dolphins. NMFS acknowledged that these comments are important to address, regardless of any initiative to move forward with management measures. To answer this need, NMFS and the Marine Mammal Commission provided funding to the Spinner Dolphin Acoustics, Population Parameters and Human Impact Research (SAPPHIRE) program, which is run jointly by Duke

University and Murdoch University. SAPPHIRE's objective was to provide baseline data on the local abundance, distribution, and behavior of spinner dolphins in Kealakekua Bay, Honaunau Bay, Kauhako Bay, and Makako Bay, as well as in the near-shore, shallow-water environments outside these resting bays of Hawaii Island. This intensive study integrated a suite of visual and acoustic sampling techniques, using boat- and land-based surveys, and acoustic recording devices to assess the following:

- Spinner dolphin daytime habitat use and resting behavior in study areas and surrounding waters
- Residency and fidelity patterns of spinner dolphins during the day in near-shore habitats in both the study areas and surrounding waters
- Spinner dolphin exposure to human activities within the studied resting bays and surrounding waters
- Spinner dolphin demographic response to human activities within resting bays and surrounding waters

Research in the four bays and near-shore waters began in August 2010 and ended in May 2013.

Although data from the SAPPHIRE project continues to be analyzed, recent publications and reports using past information and information collected throughout this project provide new insight into the ecology of resident spinner dolphins and the pressures that these populations face.

Two recent studies used spinner dolphin sightings and behavioral observations to identify ecological characteristics that support resident spinner dolphin ecology. The first, by Thorne *et al*. (2012), used a series of dolphin sightings from recent surveys in the MHI collected between 2000 and 2010 to quantitatively test environmental factors that contribute to spinner dolphin resting habitats and predict the locations of resting habitat in the MHI. Environmental variables included in the model reflected factors that Norris and Dohl (1980) and Norris *et al*. (1994) described as important to resting spinner dolphins based on detailed observations. These earlier studies describe spinner dolphins selecting shallow, calm, flat, protected, sandy bays that provide easy access to deep water foraging areas for resting habitat, and preferring areas with depths of less than 50 m with sufficient bay area for their resting behaviors. Thorne *et al*. (2012) characterized habitat relationships and generated spatial predictions by modeling spinner dolphin resting habitat in the MHI. The model results indicated that proximity to deep water foraging areas, depth, the proportion of bays with shallow depths and rugosity were important predictors of spinner dolphin habitat. The strongest predictors of spinner dolphin resting habitat were 1) proximity to the 100 m depth contour and 2) depth - with spinner dolphin resting habitat generally occurring in shallow depths that were close to the 100 m depth contour. The importance of the distance to the 100 m depth contour variable indicated that proximity to deep water was an important factor in predicting spinner dolphin habitat. The model identified only a small number of bays (21 of 99) as providing suitable habitat for resting spinner dolphins. These bays overlap well with known spinner dolphin resting habitat and include those areas proposed for time-area closures.

To take a closer look at how key ecological characteristics support spinner dolphin resting behavior, Tyne *et al*. (2014) used spinner dolphin behavioral observations collected from inside and outside of bays and used a model to identify those habitat features that contribute to the occurrence of resting behavior. These coastal models indicated that spinner dolphins along Hawaii's coast were unlikely to rest outside sheltered bays and that spinner dolphins spend a significant proportion of time resting inside bays. Looking at two models from data inside Kauhako Bay and Kealakekua Bay, they found that spinner dolphin resting behavior occurred throughout daytime hours (6 AM to 6 PM), with most rest occurring between 10 AM and 2 PM. Although habitat variables, such as depth and distance from shore, have been indicated in past research as important environmental characteristics for predicting resting habitat, they were not important predictors of rest; this evaluation revealed that dolphins' presence within a bay was the most important factor contributing to the likelihood of rest. Beyond this important factor, the authors noted that the interaction between substrate type and in-bay presence suggests that substrate, particularly sand, is partially influential in predicting resting behavior. In general, spinner dolphins spent disproportionately more time over sandy substrates in and out of bays; however, outside of bays, the researchers observed that spinner dolphins mostly travelled. In conclusion, this work indicates that management efforts to support rest must take into account the role that habitat areas play in supporting important fitness enhancing behaviors.

Hawaiian spinner dolphin resting habitats are often popular areas that draw people for a variety of activities; therefore, the bays that are an important resource for spinner dolphins may also be an important resource for other users. Heenehan *et al*. (2015) assessed differences in resource use of Makako Bay and Kealakeua Bay and explored how community-based conservation may support management efforts for these important habitats. In reviewing differences between the bays, they found that Makako Bay showed a higher amount of human use when spinner dolphins were present, similar to Courbis' results for Kauhako Bay (Courbis 2007). However, activities in Kealakekua Bay were not driven by dolphin presence and the bay had an overall higher diversity of human use and activity. When comparing the presence or absence of specific attributes that may support community-based conservation, the researchers found that Kealakekua Bay had a higher number of these attributes present, suggesting that this bay may have a higher potential for the emergence of a community-based conservation regime (Heenehan *et al*. 2015). However, they warned that the higher human-use of this bay also may be an obstacle for a community-based regime to be successful. This study points out that the variation between the use of the bays is important to consider as management efforts move forward for Hawaiian spinner dolphins, and that stakeholder input may create a more effective regulation, especially in certain areas. Additionally, the team noted that a common understanding of the nature of the problem is an important attribute to cultivate in moving forward with management efforts.

Johnson *et al*. (2013) assessed the influence of human activity on the energy budget of Hawaiian spinner dolphins using a theoretical model of the daily activity cycle of the dolphins off Hawaii Island and compared predictions from the model to data collected in Kealakekua Bay. The best fitting model predicted that in the absence of human activity within 300 m dolphins spent more time resting. Notably, results from this study may suggest that dolphins may perceive the risk associated with swimmers and vessels differently, as swimmers within 150 m resulted in significant decreases in the likelihood to rest. In contrast, the likelihood of rest was higher when vessels were present between 50 and 150 m in comparison to the presence of swimmers.

Researchers suggest that these results may demonstrate a difference in perceived risk between swimmers and vessels, or a lack of perceived risk associated with vessels, but note that a high frequency of observations with vessels present between 50-300 m during rest may be influencing the positive relationship between vessels and resting spinner dolphins. Under the theoretical model, individual dolphins need to spend at least 60% of the 11 hours spent inshore in a resting state in order to be at a positive daily energetic balance and were estimated to spend 82 % of their time resting during the day under this model. In contrast, groups were observed in a resting state 66 % of the time in direct observations (Johnson *et al*. 2013). While this information suggests that dolphins are meeting their daily requirements for rest, increases in disturbance could leave individuals at a deficit. Further, some individuals may already be faced with a deficit, because this model was unable to take into consideration times when energetic demands may be increased, such as during lactation or juvenile growth.

1.4.3 Small Cetacean Studies

The negative effect of human-induced disturbance or disruptions to dolphin behaviors has not only been documented with spinner dolphins, but also appears to be a worldwide concern with other small cetaceans that are subject to wildlife viewing activities. Studies in New Zealand examined bottlenose dolphin response to tourism activities in Milford Sound. Lusseau and Bejder (2007) found that dolphins demonstrated increased time spent travelling and decreased time spent resting while avoiding boats. Avoidance strategies took on a longer-term response during high tourism traffic seasons (Lusseau 2004, Lusseau and Bejder 2007), and the dolphins avoided Milford Sound at these times. Lusseau (2004) examined this avoidance strategy and determined that the dolphins appear to be maintaining boat interactions below a certain level. The threshold that seemed to elicit the longer-term response in Milford Sound was dolphin-boat interactions that occurred less than 68 minutes apart, according to his study. He hypothesized that this threshold likely represents the point at which it is too energetically costly for the dolphins, causing them to switch from short-term displacement (*i.e.* avoidance) to longer-term responses of habitat abandonment.

To examine long-term impacts, studies in Shark Bay, Western Australia compared short-term behavioral responses of bottlenose dolphins to disturbance from vessels — especially dolphin tourism vessels — with long-term population data. These studies documented not only immediate behavioral responses to vessel traffic, but also declines in the relative abundance of dolphins and decreases in female reproductive success at the higher traffic study site (Bejder 2005, Bejder *et al*. 2006a, 2006b). Two sites, one low-vessel (control) and one high-vessel, were studied in Shark Bay, where long-term population studies of the dolphins provided long-term individual residency and reproductive data. At both sites, dolphin groups approached by vessels became more compact, had higher rates of change in membership, and had more erratic speeds and directions of travel; however, dolphin responses to vessels were more pronounced at the control site (Bejder *et al*. 2006b). After comparing the two sites over time, researchers found a decline in relative abundance of dolphins at the high-vessel site, which equated to a loss of 1 in every 7 individuals (Bejder *et al*. 2006a). They suggested that the more pronounced reactions at the control site, coupled with the decline information, indicates that vessel traffic may have exceeded the sensitive animals' tolerance threshold prior to commencement of the study, and that

these dolphins abandoned the habitat, resulting in the observed decline in relative abundance, at least in part (Bejder *et al*. 2006a, 2006b).

Other investigations examined the relationship between cumulative vessel exposure and female bottlenose dolphins' reproductive success at these sites, and found decreased reproductive success in individuals with greater cumulative vessel exposure (Bejder 2005). Specifically, the study indicated that female dolphins with increased cumulative vessel exposure were still giving birth to calves, but that these calves were not surviving to weaning. The stress from increased vessel exposure may have lowered the mothers' ability to adequately feed and care for their calves resulting in decreased calf survival due to malnutrition, increased disease susceptibility, or increased predation. Bejder (2005, 2006a) cautioned that dolphin tourism activities that are often presumed to be low-impact should not be ignored given the potential for long-term consequences, and that the impacts may be amplified for small, closed or isolated, resident cetacean populations. While not specifically mentioned by Bejder in this study, it is important to note here that Hawaiian spinner dolphins fit this description of small, closed or isolated, resident cetacean populations.

In summary, scientific studies have shown that human activities, particularly those involving viewing or interacting with cetaceans, can result in disturbance or disruptions to the cetaceans' behavioral patterns and result in changes to the cetaceans' habitat use. These activities may initially appear to be relatively benign and dolphin responses may appear relatively short-term; however, comparison of studies over time demonstrates that small cetacean populations that are exposed to chronic disturbances may experience cumulative stress that can result in longer-term impacts to individuals and populations. Hawaiian spinner dolphins are demonstrating responses to disturbance by people within essential daytime habitats (Courbis 2004, 2007; Östman -Lind *et al*. 2004, Danil *et al*. 2005, Östman -Lind, 2007, Timmel *et al*. 2008) and disturbance is occurring on a regular basis, especially in well-known resting areas. Given the small, closed or isolated nature of the resident populations, Hawaiian spinner dolphins have the potential to exhibit amplified long-term impacts — habitat displacement or abandonment, adverse impacts to reproductive fitness, and population declines — from these chronic disturbances, which presents a need for enhancing protections to prevent these long-term impacts.

1.5 Creating Effective Protections

Despite existing protections, research indicates that Hawaiian spinner dolphins' behaviors are being altered by dolphin-directed activities. To enhance protections for these resident dolphins from the long-term impacts that have been observed in other species of dolphins, NMFS reviewed the limitations in current protective measures as well as literature regarding the effectiveness of other conservation measures taken by countries facing similar disturbance issues. The following sections review this information and the initial stages for this proposed rulemaking.

1.5.1 Limitations in Current Viewing Guidelines and in Enforcing MMPA Prohibitions

Compliance with the take prohibitions and adherence to current viewing guidelines is intended to provide marine mammal populations and stocks protections from human activities that may be

detrimental to their overall health and well-being. However, disturbance to Hawaiian spinner dolphins within resting habitats, as indicated in the scientific literature and communication with enforcement personnel, indicates that compliance with current take prohibitions and adherence to viewing guidelines is poor. This section reviews information from the scoping process that identifies factors that limit protections for spinner dolphins, or influence people's compliance with the current prohibitions under the MMPA and voluntary viewing guidelines. The deficiencies in current compliance were evaluated while formulating the regulatory alternatives in Chapter 2 in an attempt to create more effective protections for Hawaiian spinner dolphins.

Most people engaged in dolphin viewing activities in Hawaii are aware of the existence of the MMPA and the general protections that are provided to marine mammals under the MMPA (C. Wiener, researcher, personal communication, April 29, 2014). People easily understand the meaning of hunt, capture and kill, and understand the importance of prohibiting these activities to help conserve marine mammals. However, members of the public without scientific expertise on spinner dolphins may be unaware that their activities (including swimming with or approaching within 50 yards) disturbs or has the potential to disturb a marine mammal such that the activity amounts to a "take" under the MMPA.

In many cases, people may not understand that deviations from normal daytime spinner dolphin behaviors in response to human activities can be a disturbance. For example, people unfamiliar with spinner dolphin behavior and biology may not realize that spinner dolphins moving in specific patterns within essential daytime habitats are resting. Therefore, they may not recognize that moving towards spinner dolphins in these habitats disrupts dolphins' patterned rest behavior and elicits a disturbance response, such as displays of aerial behavior and/or subtle avoidance responses like swimming away. Some people may perceive the change in activity to be a welcoming response by the dolphins rather than as a departure from daytime fitness-promoting behaviors with other dolphins. For instance, comments received during scoping suggest that people interpreted aerial behaviors as dolphins demonstrating joy at being around people. Public comments received throughout the scoping period reflected a large range in knowledge regarding normal spinner dolphin behavior and in the understanding of what human activities cause disturbance to spinner dolphins' natural behavior. Many comments reflected a lack of understanding of spinner dolphin behavior. NMFS has also received inquiries from members of the public and commercial tour operators requesting clarification of NMFS' policy on what activities constitute harassment. This rule clarifies for the public human activities that result in take of Hawaiian spinner dolphins that include harassment or other forms of disturbance as currently defined by statute and regulation.

Regulations that are consistently and fairly enforced are more effective in motivating people to comply (May 2004, 2005). Distance regulations are in place for other marine mammals and the NOAA Office for Law Enforcement has experience enforcing this type of regulation. In general, promulgation of specific mandatory regulations is likely to increase enforcement capability and compliance.

In summary, Hawaiian spinner dolphins need enhanced protections from forms of take that include harassment or disturbance of spinner dolphins throughout the day and within essential daytime habitats, because people do not adhere to current viewing guidelines and/or comply with

take prohibitions. Promulgation of specific mandatory regulations for spinner dolphins is likely to increase people's ability to comply and is likely to increase compliance, which will result in fewer incidents of take of Hawaiian spinner dolphins caused by swimmers and/or vessels than occurs under the current regime.

1.5.2 Measures Taken Internationally to Protect Marine Mammals Subject to Wildlife Viewing

Multiple countries, including the United States, have recognized the need for management measures to protect marine mammal populations that are subject to wildlife viewing and interaction. Impacts to wild populations have caused concern for the health of local marine mammal populations and the sustainability of wildlife viewing activities. In response, some areas have taken regulatory and/or voluntary measures to prevent disturbance to small cetaceans targeted for wildlife viewing with the intent of sustaining healthy local populations. In preparation for this DEIS and in accordance with recommendations received during scoping, NMFS reviewed several international management measures aimed at protecting small cetaceans. The effectiveness of these various methods and/or the recommendations provided from these management efforts was considered during the preparation, modification, and analysis of alternatives for this DEIS.

New Zealand's Marine Mammals Protection Act (1978) and Marine Mammals Protection Regulations (1992) provide protection and management measures to conserve marine mammals within their waters. Measures include, but are not limited to, issuing permits for commercial operations; implementing distance, speed, and number of vessel measures within specific proximity to marine mammals; and identifying prohibited activities that may result in movement or behavioral changes of marine mammals in the wild. More information on this may be found at: http://www.doc.govt.nz/sharingcoasts.

Despite these regulations, local bottlenose dolphins in the Doubtful Sound Complex of New Zealand have experienced a serious decline in population estimated to be between 34% and 39% in over 12 years (Currey *et al*. 2007). Multiple anthropogenic activities likely contribute to this decline in population, including tour boat activities that frequent these remote areas (Currey 2011). The Department of Conservation has implemented a voluntary Code of Management (COM) as one part of an overall strategy to better protect this population (Department of Conservation 2008). The COM implements a 200 m Dolphin Protection Zone (DPZ) out from shore within specific areas of the fjords. Boats are not permitted to enter the DPZs when dolphins are present (Department of Conservation 2008). Additionally, the COM instructs that encounters with dolphins are to be left to chance for all vessels touring the fjords (Department of Conservation 2008). Research, monitoring, and increased public awareness through education are additional parts of this management strategy.

In some areas, reviews of the effectiveness of voluntary measures revealed that the adherence to these measures is not consistent, despite communities' willingness and support for the measures (Allen *et al*. 2007, Wiley *et al*. 2008). Port Stevens, Australia, commercial operators adopted a voluntary code of conduct in 1996 to reduce perceived impacts on local dolphins (Allen *et al*. 2007). Allen and colleagues investigated the adherence to these codes, and found that one in six interactions involved a breach in conduct by operators. The commercial operators' code failed to account for the influence recreational boaters might have on operators' behavior, and failed to

address consecutive viewing efforts on the same group of dolphins, according to the review. In the New England area of the United States, noncompliance with voluntary speed restrictions occurred throughout the commercial tour industry, which supported speed restriction measures, according to Wiley *et al*. (2008). The review found that operators attributed noncompliance during the study period to intense pressures to meet industry demands due to an unusually low number of whales. Both reviews indicate that, even with support from communities, participants in voluntary agreements may not hold themselves strictly to measures when adherence is inconvenient (Allen *et al*. 2007, Wiley *et al*. 2008).

In Victoria, Australia, regulations were implemented to protect a small resident population of bottlenose dolphins in Southern Port Phillip Bay. These regulations focused on "swim-with-dolphin" tours by prescribing the way dolphins may be approached, the amount of time swimmers may be in the water, the number of swimmers allowed to be in the water at a time and the amount of time that vessels may be within a certain distance of dolphins. Total compliance was limited to the regulation that clearly indicated the number of swimmers that tours place in the water at once (Scarpaci 2004). Scarpaci noted that poor compliance with the other three regulations may be the result of unclear wording in the regulations, which also made these regulations difficult to enforce. Scarpaci recommended that writing regulations in a manner that is easy to comprehend by all operators and are easy to enforce could help resolve these problems.

Samadai Reef in Egypt has a resting area similar to the essential daytime habitats on the Island of Hawaii, where resident spinner dolphins use the lagoon daily for rest, caring for their young, and avoiding predators. Characterized as the "Dolphin House," the reef became a popular tourist destination for dolphin interactions, drawing upwards of 800 visitors a day to the small lagoon (Notarbartolo-di-Sciara *et al*. 2009). Researchers reported that the dolphins became noticeably distressed in response to the excessive number of visitors and the behavior of swimmers in the area (Notarbartolo-di-Sciara *et al*. 2009). Due to this increased disturbance from people, local spinner dolphins left this resting area (Nature Conservation Sector 2006). In December 2003, local governing authorities closed the area to all visits until management measures were in place (Notarbartolo-di-Sciara *et al*. 2009). Spinner dolphins subsequently returned to the resting area, and local authorities began implementing provisional management measures in January 2004 (Notarbartolo-di-Sciara *et al*. 2009). These measures created a no-entry zone for swimmers in one area of the lagoon, with a second controlled zone where swimming was restricted by time of day. Studies following implementation of the measures found spinner dolphins more in the no-entry zone than the other zones of the bay in which swimmers were allowed (Notarbartolo-di-Sciara *et al*. 2009). The events of Samadai Reef indicate that spinner dolphins may be displaced from resting habitat due to increased human disturbance, and that area closures may effectively prevent disturbance to resting spinner dolphins.

1.5.3 Advance Notice of Proposed Rulemaking and Notice of Intent to Prepare an EIS

NMFS began the process to enhance protections for Hawaiian spinner dolphins from human disturbance in 2005 by convening a Spinner Dolphin Working Group. This group consisted of representatives from the Marine Mammal Commission (MMC) and state and federal agencies that participate in spinner dolphin research and conservation. NMFS used deliberations from this working group to inform an Advance Notice of Proposed Rulemaking (ANPR) that was

published in the Federal Register in December 2005 (70 FR 73426, December 12, 2005). A Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) (71 FR 57923, October 2, 2006) followed, in which NMFS identified five preliminary alternatives for consideration and comment:

1. Partial (time-area based) closures for certain spinner dolphin resting habitats
2. A No Action Alternative
3. Establishing a minimum distance limit
4. Regulation of human behavior while in NMFS-identified spinner dolphin resting areas
5. Complete closure of all known spinner dolphin resting areas in the MHI

This notice invited information from the public on the scope of the issues that should be addressed in the DEIS, the issues of concern regarding practical considerations involved in applying the proposed regulations, and the identification of environmental and socioeconomic concerns to be addressed in the analysis. The notice also sought to determine whether NMFS is addressing the appropriate range of alternatives.

The public submitted comments through e-mail, postal mail and the regulations.gov website. The comment period for the ANPR closed on January 11, 2006; the comment period for the NOI closed on November 24, 2006. NMFS held five public scoping meetings that occurred on the Islands of Kauai, Oahu, Maui, and Hawaii, providing an overview of the information in the NOI. Additionally, NMFS provided individuals with the opportunity to record oral statements. In total, NMFS received 4,641 public comments in response to the ANPR and the NOI, which were submitted by concerned citizens; tour operators; research, conservation and education groups; and Federal, State, and other government entities.

Comments from both of the public comment periods ranged widely and recommended a variety of actions for NMFS to consider, ranging from no regulations to permanent closure of areas the dolphins use for rest and shelter. Additionally, public comments raised concerns about various topics that should be addressed in the DEIS or proposed action. The final scoping report groups these concerns into various topics as follows:

- Hawaiian spinner dolphin biology and behavior
- Cultural issues
- Cumulative effects
- Data/data gaps
- Direct and indirect effects
- Education /education outreach
- Enforcement
- The Endangered Species Act
- Guidelines/solutions for other species or from other countries
- Human-dolphin interactions
- Medical benefits associated with swimming with dolphins
- The MMPA
- Monitoring

- NEPA
- Public and stakeholder involvement
- Regulatory regime
- Social and economic issues
- Spiritual and religious issues
- Take and harassment
- Hawaiian traditional knowledge
- Welfare of the dolphins

Although comments varied greatly and some expressed opposition to developing new regulations, a theme stood out in several topic areas: the need for effective and enforceable regulations. A complete analysis of scoping comments may be found in the Spinner Dolphin Human Interaction Environmental Impact Statement Public Scoping Summary Report (April 2007) online at: http://www.fpir.noaa.gov/PRD/prd_spinner_EIS.html.

As a result of stakeholder concerns expressed through these public comment periods, and for the preparation of this document, NMFS made multiple site visits to various areas where concerns have been raised regarding Hawaiian spinner dolphin disturbance in the MHI. During these visits, NMFS met with concerned members of the public, including those with opposing and conflicting viewpoints, to gather information relevant to this analysis.

NMFS also coordinated with State and federal agencies that would be affected or whose constituents might be affected by any rulemaking. This includes coordinating with several divisions of the Hawaii Department of Land and Natural Resources (DLNR), the Office of Hawaiian Affairs, the National Ocean Service's Hawaiian Islands Humpback Whale National Marine Sanctuary, the U.S. Fish and Wildlife Service's Kilauea National Wildlife Refuge, and the National Park Service's Koloko-Honokohau National Historical Park (NHP), Puu Honua o Honaunau NHP, and Kaluapapa NHP.

Since the publication of the ANPR in 2005 and the NOI in 2006, NMFS has continued building upon the scoping process by engaging with community members at the sites of concern. For example, NMFS participated in the development of the Coral Reef Alliance's West Hawaii Voluntary Standards for Marine Tourism in 2008 and 2009 (see Section 2.10.5) to encourage a community response to the on-going problem of spinner dolphin harassment and disturbance. In response to scoping comments regarding the lack of baseline information on the status of Hawaiian spinner dolphins, NMFS provided three years of grant funding for research from 2010 through 2013. Research was conducted at four bays on the Island of Hawaii where human interactions with dolphins are known to occur and baseline information about population abundance, behaviors, habitat use, and human/vessel interaction was collected (the SAPPHIRE Project, Section 1.4.2).

Throughout this time, NMFS explored other non-regulatory opportunities to address the harassment and disturbance problems and introduced the Dolphin SMART program to the Hawaiian Islands (Section 1.3.3). While introducing this program to tour operators in meetings held throughout the State (since 2010), the utility of codified regulations was often discussed and

operators were able to share information about concerns with and/or support for various types of regulations.

In addition to the NEPA process, NMFS also began a separate scoping process to determine if historic properties may be affected by alternatives under consideration for Hawaiian spinner dolphin conservation in accordance with the National Historic Preservation Act (NHPA). Native Hawaiian organizations, communities, and individuals were contacted upon recommendation from Hawaii's State Historic Preservation Division and four community-scoping meetings were held in 2012 with those who expressed interest in our inquiry for information. Following these scoping meetings (in 2013), NMFS employed a consultant to conduct interviews with three lineal descendants from each of the five bays (that were identified for potential time-area closures) to assist in providing additional information about historic properties or practices that may be affected by proposed actions (Honua Consulting 2013). While information for the NHPA process focuses on impacts to historic properties, communities also shared information about potential social and cultural impacts further informing this NEPA evaluation process. NMFS will complete a separate evaluation for the NHPA process, as necessary, prior to any final agency action. However, this document discusses impacts to social and cultural impacts gathered during this process as it applies to NEPA.

The information gathered from the above ongoing activities, as well as the public comments generated from the ANPR and NOI, has informed and been incorporated into the development of the various alternatives and analyses under NEPA.

1.6 Description and Scope of the Proposed Action

NMFS is proposing to adopt regulations implementing the preferred alternative that would prohibit swimming with and approaching within 50 yards of Hawaiian spinner dolphins within 2 nm (3.7 km) from shore of the Hawaiian Islands and in designated waters between Lanai, Maui, and Kahoolawe.

The proposed regulations will be published in the Federal Register. NMFS will be accepting public comments on the proposed regulations and DEIS. The following discussion describes the basis for the scope of all of the proposed alternatives and the proposed action.

Hawaiian spinner dolphin-directed activities focus on the four MHI island-associated stocks of spinner dolphins, because these stocks are easily accessed by people in near-shore waters during the daytime. NMFS currently describes the range for these island-associated stocks as 10 nm (18.5 km) offshore of the islands, based on the best available sighting and tracking data (Hill *et al*. 2010). NMFS staff compiled information regarding activities of human disturbance of Hawaiian spinner dolphins in the MHI based on site visitations and stakeholder input provided through interviews and focus groups (Sepez 2006). NMFS combined this information with information from published literature, coordination with officials and stakeholders, and comments gathered through the scoping period to identify where the majority of unauthorized take may be concentrated. Table 1displays Hawaiian spinner dolphin daytime habitats identified through literature review, stakeholder coordination, and scoping efforts. The scope of areas identified in Table 1 demonstrates that Hawaiian spinner dolphins' daytime habitats are

geographically dispersed, and that the need for enhanced protections may exist in various areas throughout the near-shore waters of the MHI stocks' range.

Table 1: Hawaiian spinner dolphin essential daytime habitats

Island	Location of Spinner Daytime Habitat Area		
Kauai	Hanalei	Lihue	Secret Beach
	Hanapepe and Kaumakani	Napali Coast	Waimea Coast
	Kahala Point	Poipu Beach	
Oahu	Kahana Bay	Pokai Bay	Waianae Coast
	Kahe Point (Electric Beach)	Portlock	Waimea Bay
	Makua Bay	South Shore	Yokohama Bay
Molokai	Ahihi Bay (off Cape Kinau)	Hana Coast	Kalaupapa
	Cape Halawa	Honolua Bay	
Lanai	Hulopoe Bay	Manele Bay	Southeast Coast of Lanai
Maui	Kaanapali	Lahaina	Makena
	La Perouse Bay	Lipoa Point	Pauwela
Hawaii (Big Island)	Ailia Point	Kapua Bay	Mahaiula and Makalawena
	Apua Point	Kauhako Bay (Hookena)	Mahukona (just South)
	Cape Kumakahi	Kawaihae Harbor (from Kawaihae to Honoipu)	Makako Bay (including Hoona Bay)
	Honaunau Bay	Kawili	Manuka Bay
	Honokoa Bay	Keahole Point	Milolii
	Honokohau Harbor	Kealakekua Bay	Okoe Bay
	Honomalino Bay	Keauhou Cove	Opilukao Cove
	Honuapo	Kehena Beach	Puako
	Kailua Bay	Kiholo Point	Puu Kuili
	Kalapana	Kua Bay	South Point
	Kaloli Point	Laupahoehoe	Waikoloa Beach
	Kamoi Point	Leleiwi	Waipio Valley Bay

When considering the scope of potential regulations, NMFS recognized that spinner dolphin-directed activities generally occur in daylight hours (which vary throughout the year) and in near-shore areas. Due to variation in the bathymetry around the MHI, the distance from shore where spinner dolphins are found throughout the resting periods varies along and between the islands' coastlines. Because activities requiring regulatory action are less likely to occur at

depths and distances where these stocks are feeding, NMFS proposes to apply the regulations for spinner dolphin-directed activities within 2 nm from shore around each island, and in designated waters between Lanai, Maui, and Kahoolawe. NMFS is thereby restricting the scope of the swim and approach regulations to those areas where spinner dolphins are most likely to be engaged in resting activities and where dolphin-directed activities are most likely to occur (see Geographic Scope Section 2.1.1.1). However, it is important to stress that unpermitted take of all marine mammals remains prohibited under section 102 of the MMPA.

The action alternatives may vary in the methods used to enhance protections for spinner dolphins from disturbance effects. Some alternatives considered in Chapter 2 focus on restricting human activities around spinner dolphins to prevent disturbance throughout the stocks' range, while other alternatives attempt to protect the quality of essential daytime habitats by preventing disturbance during resting periods, limiting access to areas where human activities are spinner dolphin-directed, and limiting access where chronic disturbance may result in adverse impacts to the dolphins over time.

Although not currently part of the Preferred Alternative, NMFS is also considering whether other management measures may be necessary and appropriate to protect Hawaiian spinner dolphins from take, especially in essential daytime habitats targeted by humans for dolphin-directed activities. Accordingly, NMFS is soliciting public comment on alternative management options that would similarly promulgate minimum approach regulations and additionally include creating either mandatory (Alternative 4; Section 2.5) or voluntary (Alternative 5; Section 2.6) time-area closures in five essential daytime habitats. The time-area closures in this document address the areas where human interactions with these dolphins are most problematic. NMFS recognizes that there are problems with human interactions and resting spinner dolphins in other areas (see Table 1), and there is a possibility of expanding the enhanced protections to resting spinner dolphins in these areas if necessary and appropriate. In addition to comments on the time-are closures, NMFS will be soliciting comments for suggestions on other areas that should be considered for time-area closures.

1.7 Future Research and Management

Knowledge regarding human-induced impacts to natural populations is often fragmentary because of the complex and dynamic nature of ecosystems and the variation in individual species response. Attempts to understand the detailed, long-term impacts of human induced disturbance on a long-lived species would require extensive data — including long-term reproductive data — that is not currently available for Hawaiian spinner dolphins. Irreversible impacts to resident populations could arise while waiting for this necessary data to be collected and analyzed. Therefore, some management measures must be taken even in the absence of long-term data.

In several scoping comments, people raised concerns requesting that NMFS use research and monitoring to ensure compliance and management effectiveness of regulatory efforts. NMFS recognizes these concerns and the uncertainties associated with selecting a management policy or practice that will be most effective at enhancing protections for the spinner dolphin populations from the effects of disturbance impacts. In accordance with these requests, NMFS is considering continued research and monitoring along the Kona coast of Hawaii. The SAPPHIRE research

program's design — Before-After-Control-Impact (BACI) design — are conducive to a follow-up management approach; if regulations are implemented, additional research may be funded to measure the effectiveness of the implemented regulations and to continue monitoring efforts of this resident population (any research carried out after the 3-year period is contingent upon available funding). Further information about the SAPPHIRE Project may be found at the following website: http://superpod.ml.duke.edu/johnston/portfolio/sapphire-project/.

Due to the uncertainties associated with managing dynamic biological systems, there is the potential that information gathered during research and monitoring may indicate the need for revisions to the management approach. These revisions may include site-specific adaptations, amendments to the management approach as a whole, removal of ineffective regulatory measures, or the implementation of an entirely new management regime.

Future revisions to the implemented regulations would be subject to the same regulatory processes as the proposed action associated with this DEIS. Any future rulemakings would be held to the same NEPA standards, analyzed for compliance with the MMPA, and would require the same public involvement as outlined in the Administrative Procedure Act (5 U.S.C. 500 et seq.). Therefore, NMFS would analyze any future regulatory actions to determine the impacts on the environment, either in a supplemental environmental assessment (EA), an individual EA, or an EIS. The analysis and proposed action would again be subject to public review and comment.

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Chapter 2 - Alternatives Considered

2.1 Introduction

In the NOI, NMFS provided a preliminary list of alternative regulations to enhance protections for Hawaiian spinner dolphins from take (71 FR 57923, October 2, 2006). The notice requested public comment on the alternatives, as well as any other reasonable alternatives. NMFS received information on the preliminary alternatives, including suggestions for new alternatives, modifications to the alternatives, exceptions, potential resource impacts, and enforcement and education issues associated with the alternatives. NMFS recognizes that the best-suited alternatives would be those that meet the purpose and needs of the action, and in some way overcome the limitations that have been identified with the current compliance with MMPA prohibitions or the viewing guidelines, while still attempting to address other concerns that were raised internally or through the scoping process. To select alternatives for this analysis, NMFS identified evaluation criteria. NMFS then evaluated the alternatives raised in the NOI, identified internally, or suggested through the scoping process to determine to what extent the potential regulation would meet the criteria. NMFS split the evaluation criteria into primary criteria that must be met and secondary criteria that should be met if possible.

2.1.1 Criteria for Selecting Alternatives

To meet the purpose and need effectively, alternatives must do the following (primary criteria):

- Reduce harassment and disturbance resulting in take of Hawaiian spinner dolphins in Hawaii's waters
- Enhance protections for Hawaiian spinner dolphins from disturbances causing take within essential daytime habitats that are targeted for spinner dolphin-directed activities
- Reduce the likelihood of long-term impacts from disturbance in essential daytime habitats, including habitat displacement and/or negative impacts to fitness of resident spinner dolphin populations
- Be logistically feasible in terms of the cost of implementation and administration
- Be easy to understand, allowing people to easily recognize activities that are prohibited
- Be enforceable
- Minimize conflicts with traditional indigenous community and cultural practices to the extent practicable

If possible, alternatives should also do the following (secondary criterion):

- Take into consideration stakeholder group needs (other activities occurring in the areas) as long as they are not in conflict with MMPA protections.

The alternatives analyzed in this document are those that reduce the threat of take occurring (including harassment and disturbance) to Hawaiian spinner dolphins in Hawaii's waters in order to prevent take. This DEIS considers one no-action and four action alternatives described in this

chapter. Alternatives that did not meet all or most of the criteria are discussed briefly at the end of this chapter, but are not analyzed in detail.

2.1.2 Elements Common to All Action Alternatives

All regulations considered in the six action alternatives include these common elements:

- Regulations are aimed at enhancing protections for Hawaiian spinner dolphins from harassment and disturbance (take)
- Regulations would apply to activities and or areas within 2 nm (3.7 km) of the MHI (See Geographic Scope, below)
- Regulations would not exempt any vessel operators from the take prohibitions that already exist under the MMPA
- Enforcement of the chosen alternative would be completed by NOAA's OLE and, subject to the availability of personnel and resources, Hawaii's Department of Land and Natural Resources (DLNR), Division of Conservation and Resources Enforcement (DOCARE)
- Activities occurring in the intertidal zone of closures areas, such as shore-based fishing and subsistence gathering, would be able to continue during any time of day.

In addition to the above, exceptions to prohibitions are described in the following sections that describe each Alternative and in Table 3.

2.1.3 Action Area and Geographic Scope (Distance from Shore)

These proposed regulations are designed to address dolphin-directed human activities that are resulting in various forms of take of Hawaiian spinner dolphins, including harassment and disturbance. Dolphin-directed activities are concentrated in the near-shore portion of the MHI island-associated Hawaiian spinner dolphin stocks' range, because these stocks are easily accessed in coastal waters during the day when most people seek out marine recreational activities. While developing the alternatives that addressed dolphin-directed activities on the water NMFS considered whether prohibitions should apply to all waters within Hawaii's Exclusive Economic Zone, the range of the MHI stocks— within 10 nm (18.5 km) from shore — or only to a limited area where spinner dolphins are facing intense pressure from dolphin-directed activities and where most take from dolphin-directed activities is likely to occur, such as within 2 nm (3.7 km) or 1 nm (2.4 km) from shore. To encompass the range of dolphin-directed activities that are likely to result in take we focused on where people are most likely to encounter Hawaiian spinner dolphin groups, in other words where dolphins are known to occur during the day. We reviewed information from scientific literature about Hawaiian spinner dolphin daytime habitat preferences and information from over 400 sightings of spinner dolphins collected around the MHI since 1992 from various members of the Pacific Islands Photo Identification Network (PIPIN).

Daytime habitat for Hawaiian spinner dolphins varies across the MHI, because the bathymetry, or depths and shapes of underwater terrain, are different for each island and spinner dolphins seek out areas with physical and biological characteristics that complement their ecological needs. On the Island of Hawaii, Norris and colleagues (1994) indicated that spinner dolphins

generally prefer engaging in daytime activities in waters less than 50 m deep, and Thorne *et al*. (2012) note that resting habitats generally occur in close proximity to the 100 m contour (close to the inshore extent of prey species at night). Spinner dolphins are also known to transit along Hawaii Island's coastline moving between essential daytime habitats during the day. Lammers (2004) indicated that Oahu's spinner dolphins show a strong affinity for 10-fathom (18.3 m) isobath (depth contour) and note that approximately 93 percent of sightings off Waianae and 81 percent of sightings off the south shore of Oahu occurred at depths shallower than 17 fathoms (32 m). Lammers (2004) also noted that foraging activities begin by evening around the 100-fathom isobath (182 m) off Oahu. Information received from PIPIN indicate that approximately 89 percent of spinner sightings were within 100 m depth and that 95 percent were within 200 m depth across the MHI, still spinner dolphins have been observed in depths out to almost 3000 m during the day (NMFS 2016).

In reviewing this information, NMFS identified that selecting a boundary based on depth in any particular area may be difficult for people to determine without proper instrumentation available (especially for kayaks, SUPs and swimmers) and that distance from shore may provide a more easily estimated boundary. Although spinner daytime habitat may be located at various distances from shore off of the different islands and even coastlines, differences in the prohibitions from location to location (*e.g.*, having restrictions out to 1 or 2 nm from shore depending on the island) would apply an additional layers of detail, creating potential confusion for the public and complicating enforcement and compliance with these regulations. This could be particularly difficult in areas where multiple islands are visible and the restrictions apply at different distances from different islands. Therefore, NMFS evaluated consistent distances from shore across the MHI.

NMFS reviewed the habitat preferences and sighting information as it relates to distance from shore to identify a boundary that would be easier for people to recognize and would incorporate the best available information about spinner dolphin habitat preferences and sighting information. Along the west coast of Hawaii Island, habitats that are 50 m or less in depth and where dolphin-directed activities are prevalent, are encompassed within 1–1.5 miles (1.6–2.4 km) from shore and habitats within 100 m depth fall almost entirely within 2 miles of shore and at 3 miles these areas are entirely included. Off the west coast of Oahu, where most dolphin-directed activities on this island occur, the 10-fathom isobath is largely captured within 1 mile (1.6 km) of shore, while 17 fathoms (32 m) is largely captured at 1.5 miles. Habitats of these depths extend out farther on the south shore where spinner dolphins are also known to rest and are largely captured within 1.5 and 2 miles from shore respectively. The 100-fathom (182 m) contour is largely captured by 1.5 miles on the west side of the Island, but the contour extends out past 3 miles on the south shore. Little information is available from the other MHI regarding specific depth preferences, but there are areas where the 50 and 100m depth contour extends past 4 miles, and dolphin-directed activities are prevalent in these areas. Off most of the MHI a large majority of the PIPIN sighting information is captured within 2 miles from shore. A key area where the depth contour extends out past 4 miles and where spinner dolphins are sighted during the day is between the islands of Maui, Lanai, and Kahoolawe. This area is traveled by many recreational and commercial tour vessels in search of marine mammal viewing opportunities throughout the day. Consequently, spinner dolphins also require protections in this area. To ensure that dolphins are protected throughout the day where they may transit between islands and

encounter dolphin-directed activities, we delineated an area around all three islands that includes the 2 nm buffer around the outside of each island and the channels and waters between these islands. This delineated area includes 96 percent of all PIPIN sighting information across the MHI.

Although unpermitted take of marine mammals, including spinner dolphins, is illegal wherever it occurs, NMFS is creating regulations to reduce the threat of take to Hawaiian spinner dolphins, including harassment and disturbance caused by dolphin-directed activities that are concentrated in coastal waters (within 2nm of shore and in designated waters between Lanai, Maui, and Kahoolawe) and to reduce the impact of increased viewing and interaction on resident stocks. Therefore, in the proposed regulation (Alternative 3(A)), as well as Alternatives 2-5, NMFS determined that enhanced protections within 2 nm from shore of the MHI, consistently applied to all islands, and the channels and in designated waters between the islands of Lanai, Maui, and Kahoolawe would encompass the majority of the resident stocks' daytime habitat around all of the islands where human interactions cause take of Hawaiian spinner dolphin, and thus promote spinner dolphin conservation.

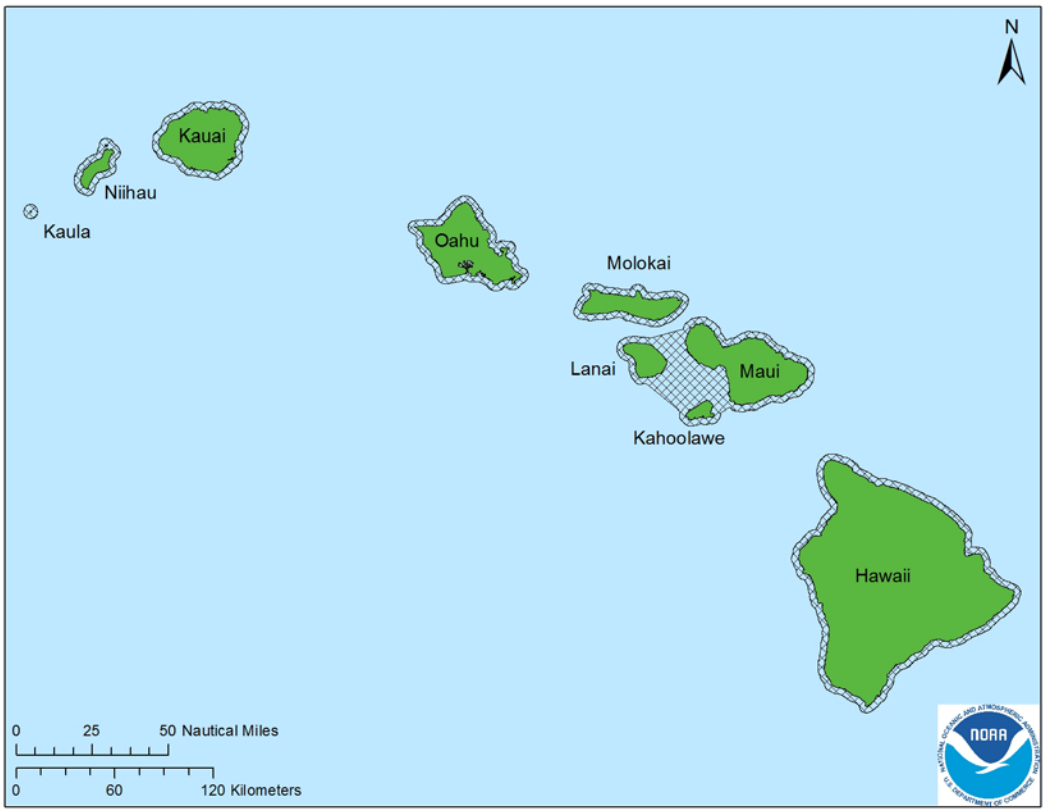

Figure 1: Boundary for geographic scope

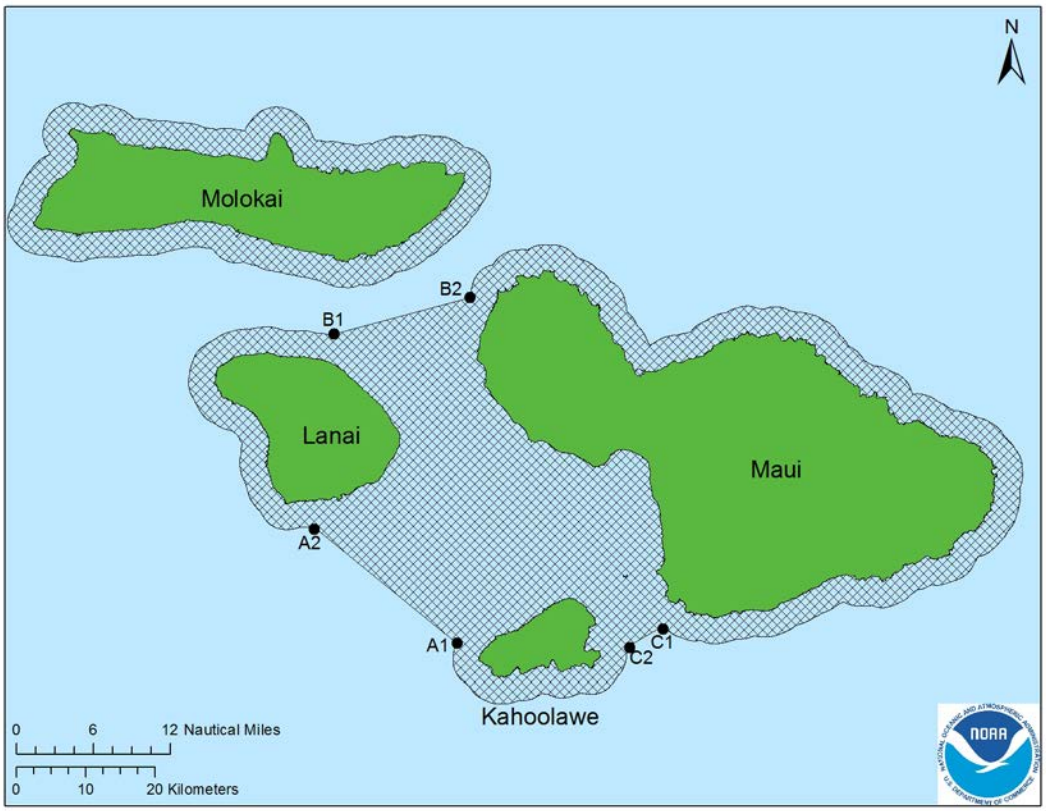

Figure 2: Geographic scope - designated waters between Lanai, Maui, and Kahoolawe

Table 2: Coordinates for the extent of the designated waters between Lanai, Maui, and Kahoolawe

Line Segment Between Islands	Label	Latitude	Longitude
Kahoolawe and Lanai	A1	20° 32’ 51” N	156° 43’ 50”W
	A2	20° 42’ 04” N	156° 55’ 34”W
Lanai and Maui	B1	20° 51’ 01” N	156° 54’ 00”W
	B2	20° 59’ 48” N	156° 42’ 28”W
Maui and Kahoolawe	C1	20° 33’ 55” N	156° 26’ 43”W
	C2	20° 32’ 15” N	156° 29’ 51”W

2.1.4 Exceptions to Prohibitions

Alternatives that identify prohibitions on activities or closures for specific sites would apply to motorized, non-motorized and self-propelled vessels, and swimmers. However, throughout the NEPA scoping period, several activities were identified that are not dolphin-directed, limit a

private landowner's ability to access their property, put lives or vessels at risk, or restrict a community from engaging in important cultural activities. Due to these concerns, NMFS identified several exceptions to various prohibitions because the likelihood of these activities having long-term impacts on spinner dolphins is low and the potential adverse effects involved in regulating these activities may be avoided.

NMFS identified the following exceptions to the prohibitions. Each exception is also specifically discussed under the relevant alternatives and applicability to each alternative is identified in Table 4.:

- Any person who inadvertently comes within 50 yards of a Hawaiian spinner dolphin or is approached by a spinner dolphin, provided the person makes no effort to engage or pursue the animal and takes immediate steps to move away from the animal;
- Any vessel that is underway and is approached by a spinner dolphin, provided the vessel continues normal navigation and makes no effort to engage or pursue the animal;
- Any vessel transiting to or from a port, harbor or in a restricted channel when a 50-yard distance will not allow the vessel to maintain safe navigation;
- Vessel operations necessary to avoid an imminent and serious threat to a person or vessel;
- Activities authorized through a permit or authorization issued by the NMFS to take spinner dolphins; and
- Federal, State, or local government vessels, aircraft, personnel, and assets when necessary in the course of performing official duties.

In addition to the above exceptions, the following exceptions would apply to both alternatives 4 and 5:

- Vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure;
- Vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure; and
- Outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use.

The exception related to vessels transiting to and from harbors is necessary to allow traffic for ongoing recreational and commercial activities. Near harbor entrances and restricted channels, approaching spinner dolphins closer than 50 yards may be unavoidable in some cases. Several exceptions accommodate the needs of local landowners and ongoing, traditional activities within the time-area closures. These exceptions are expected to cause minimal impact to the dolphins. The exception of government vessels, aircraft, personnel, and assets avoids disruption of ongoing government business, including enforcement activities and those critical to national security. The exception for vessels operating pursuant to a NMFS permit or other authorization is considered necessary to allow management and conservation activities to continue, and terms and conditions associated with the permit or authorization reduce the potential impacts to

dolphins. The exception of vessels being used to avoid an imminent and serious threat to a person or vessel is necessary for safety of human life and property

The burden would be on the vessel operator or swimmer to prove the exception applies, and vessel operators and swimmers would not be exempt from other take prohibitions under the MMPA.

2.2 Alternative 1 – No Action

Under the No Action Alternative, which is required by Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14), NMFS would take no additional regulatory action to enhance protections for Hawaiian spinner dolphins from forms of take that include harassment or intentional disturbance during important resting periods. Under this alternative, current prohibitions established under the MMPA regarding take of all marine mammals, including spinner dolphins, would continue to apply (see Section 1.3.1). In addition, NMFS would continue to promote responsible wildlife viewing through regional guidelines (see Section 1.3.2) and the Dolphin SMART program, which includes a set of voluntary guidelines designed to help boaters avoid harassment (see Section 1.3.3).

2.3 Alternative 2 – Swim-With Regulation

Under Alternative 2, NMFS would prohibit swimming within 50 yards (approximately 46 m) of Hawaiian spinner dolphins, including attempting to swim towards spinner dolphins. Swim-with activities are associated with disruption to the behavioral patterns of cetaceans targeted by people wanting interactions with them; in the case of Hawaiian spinner dolphins, this includes interruptions to daily resting, nurturing of young, and socializing (see review by Samuels *et al*. 2000). This rule is applicable within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe.

Prohibitions would include swimming activities that are spinner dolphin-directed at any time and from any platform, such as from shore; a commercial vessel, kayak, or stand up paddleboard (SUP); or any other means. This measure is aimed at preventing human activities that disturb spinner dolphins during the daytime, which includes closely swimming or attempting to closely swim with spinner dolphins. It is consistent with the current regional viewing guidelines and the Dolphin SMART program criteria, which discourages attempting to swim with, pet, touch or elicit a reaction from the animals.

NMFS recognizes that circumstances may occur where swimmers inadvertently find themselves within 50 yards of a spinner dolphin; an exception is provided for this prohibition provided the swimmer makes no effort to engage or pursue the animals, and takes immediate steps to move away from the animals. Additionally, an exception exists for persons engaged in an activity that is authorized through a permit or authorization issued by the National Marine Fisheries Service to take spinner dolphins, because some research and enhancement activities may require close approach of Hawaiian spinner dolphins (*e.g.*, health assessment work) (see Table 4).

2.4 Alternative 3 –Swim-With and Approach Regulations

Under Alternative 3 NMFS would prohibit swimming with and approaching Hawaiian spinner dolphins within a specified distance; two distance options Alternative 3(A) and Alternative 3(B) are provided for evaluation below.

2.4.1 Alternative 3(A) – Swim-With and 50-Yard Approach Regulations (Preferred Alternative)

Under Alternative 3(A), NMFS would prohibit the following activities:

- Approaching or remaining within 50 yards of a Hawaiian spinner dolphin by any means;
- Swimming within 50 yards of a Hawaiian spinner dolphin;
- Causing a vessel, person, or other object to approach or remain within 50 yards of a Hawaiian spinner dolphin; or
- Intercepting or placing a vessel, person, or other object on the path of a spinner dolphin so that the dolphin approaches within 50 yards of the vessel, person, or object.

The prohibitions apply to all forms of swimming-with and approach in water and air. Forms of approaching spinner dolphins include, but are not limited to, swimming, operating a manned or unmanned motorized, non-motorized, self-propelled, human-powered, or submersible vessel; operating an unmanned aircraft system (UAS) or drone; and swimming at the water surface or underwater (i.e., SCUBA or free diving).

This alternative prohibits a range of human activities that occur in close proximity to spinner dolphins including swimming with, touching or attempting to touch, corralling or herding into small areas, and leap frogging (placing a vessel or person in the path of an oncoming spinner dolphin so that the dolphin surfaces within 50 yards of the vessel or person), all of which have the potential to disturb Hawaiian spinner dolphins in the wild.

Similar to the minimum approach rules for humpback whales in Hawaii (50 CFR 224.103(a)) and Alaska (50 CFR 224.103(b)) and for right whales in the North Atlantic (50 CFR 224.103(c)), the approach limit accommodates a reasonable level of spinner dolphin viewing while minimizing potential detrimental impacts from close human interactions. This alternative is consistent with Dolphin SMART program criteria and NMFS guidelines, which advise boaters to stay 50 yards away from marine mammals to prevent disturbance. This rule is applicable within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe.

NMFS recognizes that circumstances may occur where vessels or swimmers find themselves within 50 yards of a spinner dolphin and the following exceptions are provided for this prohibition:

- Any person who inadvertently comes within 50 yards of a Hawaiian Spinner dolphin or is approached by a spinner dolphin, provided the person makes no effort to engage or pursue the animal and takes immediate steps to move away from the animal;

- Any vessel that is underway and is approached by a spinner dolphin, provided the vessel continues normal navigation and makes no effort to engage or pursue the animal;
- Any vessel transiting to or from a port, harbor or in a restricted channel when a 50-yard distance will not allow the vessel to maintain safe navigation;
- Vessel operations necessary to avoid an imminent and serious threat to a person or vessel;
- Activities authorized through a permit or authorization issued by the NMFS to take spinner dolphins; and
- Federal, State, or local government vessels, aircraft, personnel, and assets when necessary in the course of performing official duties.

2.4.2 Alternative 3(B) – Swim-With and 100-Yard Approach Regulation

Under Alternative 3(B), NMFS would prohibit swimming with and approaching a Hawaiian spinner dolphin within 100 yards (approximately 92 m) by any means. The prohibitions apply to all forms of swimming-with and approach in water and air. Forms of approaching spinner dolphins include, but are not limited to, swimming, operating a manned or unmanned motorized, non-motorized, self-propelled, human-powered, or submersible vessel; operating an unmanned aircraft system (UAS) or drone; and swimming at the water surface or underwater (i.e., SCUBA or free diving). This also includes approach by interception (*e.g.*, leap-frogging, or placing a vessel or person in the path of an oncoming spinner dolphin so that the dolphin surfaces within 100 yards of the vessel or person).

Similar to Alternative 3(A), this Alternative would prohibit the same range of human activities that occur in close proximity to Hawaiian spinner dolphins discussed above. However, the increased distance is expected to provide spinner dolphins more protections from disturbance. The exceptions described above under Alternative 3(A) also apply to this option, when vessels or swimmers are within 100 yards of the dolphins.

2.5 Alternative 4 – Mandatory Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 4 would prohibit people from using five mandatory time-area closures (*i.e.*, closures that are required by law) during specific resting times and prohibit swimming with and approaching Hawaiian spinner dolphins within a minimum prescribed distance. Under Alternative 4, the proposed action would create the following two components within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe:

1. **Mandatory time-area closure component:** Implement mandatory time-area closures in five selected essential daytime habitats. NMFS would close a small subset of Hawaiian spinner dolphin essential daytime habitats every day from 6 AM to 3 PM. The areas chosen for mandatory time-area closures are Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), and Makako Bay on the Island of Hawaii; and La Perouse Bay on the Island of Maui.

2. **Swim-with and approach regulations component:** Implement swim-with and minimum distance approach regulations. NMFS would prohibit approaching Hawaiian spinner dolphins within a minimum prescribed distance (between 50 and 100 yards). Similar to Alternatives 3(A) and 3(B) swim-with and minimum approach regulations would prevent a range of human activities that occur in close proximity to spinner dolphins that result in take.

NMFS identified the essential daytime habitats chosen for time-area closures through the procedures described in Section 2.7 below. At all locations, activities occurring in the intertidal zone, such as shore-based fishing and subsistence gathering, are not prohibited and will be able to continue during any time of day. The exceptions described for Alternative 3(A) in Section 2.4.1 would apply to the approach regulations of this Alternative; in addition, because the following activities are temporary and are not expected to result in long-term impacts to the fitness of spinner dolphins, the following exceptions would apply to the time-area closures:

- Vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure;
- Vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure; and
- Outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use.

2.6 Alternative 5 – Voluntary Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 5 would create five voluntary time-area closures (*i.e.*, closures that are required by law) and prohibit swimming with and approaching Hawaiian spinner dolphins within a minimum prescribed distance. Under Alternative 5, the proposed action would create the following two components within 2 nm (3.7 km) of each of the MHI and in designated waters between the islands of Lanai, Maui, and Kahoolawe:

1. **Voluntary time-are closure component:** Implement voluntary time-area closures in five selected essential daytime habitats. NMFS would close a small subset of Hawaiian spinner dolphin essential daytime habitats every day from 6 AM to 3 PM. The areas chosen for mandatory time-area closures are Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), and Makako Bay on the Island of Hawaii; and La Perouse Bay on the Island of Maui.
2. **Swim-with and approach regulations component:** Implement swim-with and minimum distance approach regulations. NMFS would prohibit swimming with and approaching Hawaiian spinner dolphins within a minimum prescribed distance (between 50 and 100 yards). Similar to Alternatives 3(A) and 3(B) swim-with and minimum approach regulations would prevent a range of human activities that occur in close proximity to spinner dolphins that result in take.

NMFS identified the essential daytime habitats chosen for time-area closures through the procedures described in Section 2.7 below. At all locations, activities occurring in the intertidal zone, such as shore-based fishing and subsistence gathering, will be able to continue during any time of day. The exceptions described for Alternative 3(A) in Section 2.4.1 would apply to the approach regulations of this Alternative. Regulatory exceptions need not be prescribed for a voluntary management measure; however, NMFS expects that, similar to the mandatory time-area closures, a need to enter or transit a voluntary time-area may arise. Accordingly, the exceptions identified for the mandatory time-area closures also apply to voluntary time-area closures.

2.7 Time-Area Closures Considered Under Alternatives 4 and 5

2.7.1 Method for Identifying Closure Areas within Hawaiian Spinner Dolphin Essential Daytime Habitats

To address the practical aspects of available resources and effectively implement management with limited resources under Alternative 4 and 5, NMFS selected five areas for closure. NMFS identified these areas using a step-down process in which NMFS identified important habitats in need of enhanced protection and then considered additional criteria that may promote or obstruct the effectiveness of the closure (see Appendix A, “Selection Process for Time-Area Closures”). As proposed, sites identified represent essential daytime habitats where human activities are largely Hawaiian spinner dolphin-directed and where regulatory measures can be balanced most effectively with human ocean use to enhance protections for these dolphins. Once NMFS identified the sites, additional consideration was given to each site to delineate the closure area. NMFS delineated the proposed closure areas in a way that would enhance protections for the spinner dolphins' core resting areas, including frequently used sand bottom areas, while taking into consideration stakeholder needs, such as leaving a narrow swim lane close to shore if the dolphins are less likely to rest in that area. The methods NMFS used to identify and then delineate the areas identified in Alternative4 and 5 were as follows.

1. NMFS identified known Hawaiian spinner dolphin essential daytime habitats based on current knowledge by doing the following:

- Reviewing scientific literature regarding Hawaiian spinner dolphin use of areas throughout MHI
- Requesting and reviewing information from scientists working in the MHI
- Coordinating with State of Hawaii and current stakeholders to identify any additional spinner dolphin resting areas
- Coordinating with stakeholders for additional information
- Reviewing scoping comments for additional information

NMFS identified 67 areas during this process, however not all areas may be Hawaiian spinner dolphin essential daytime habitats. This information is found in Appendix A.

2. NMFS identified essential daytime habitats where people most often interact or attempt to interact with Hawaiian spinner dolphins by doing the following:

- Reviewing scientific literature for information regarding Hawaiian spinner dolphin disturbance
- Coordinating with NOAA OLE to identify areas where spinner dolphin disturbance has been recorded, reported or observed
- Coordinating with the State of Hawaii to identify additional areas where disturbance to spinner dolphins may occur
- Coordinating with other concerned stakeholders for additional information on dolphin-human interactions
- Reviewing scoping comments for additional information

From those 67 areas, NMFS identified 12 areas as essential daytime habitats in which Hawaiian spinner dolphins exhibit signs of chronic disturbance and intense dolphin-directed activities. This information is found in Appendix A.

3. NMFS identified areas (from those identified in the second step) where closures are likely to be most effective based on the following criteria:

- Environmental conditions support a discrete closure site for resting Hawaiian spinner dolphins
- Enforcement is logistically feasible based on resources and accessibility
- The site may be easily accessible for scientific monitoring purposes
- Closure of the area does not restrict major harbors, Ocean Recreation Management Areas (ORMAs) or transit zones
- Nearby areas are still accessible for activities that are not spinner dolphin-directed

This information is found in Appendix A.

4. NMFS delineated closures to maximize protection of core Hawaiian spinner dolphin daytime habitat and minimize restrictions to ocean users.

NMFS considered what is known about how Hawaiian spinner dolphins use an area for their resting behaviors, as well as how people use the area for activities that are not spinner dolphin-directed. If closed areas could ensure spinner dolphin protection and still allow for human use of the area that is not spinner dolphin-directed, then NMFS delineated the closed area to accommodate these human uses.

2.7.2 Areas Considered for Time-Area Closures

Based on the methods and factors identified in 2.7 above, NMFS identified the following Hawaiian spinner dolphin essential daytime habitat sites to be considered for time-area closures on the islands of Hawaii and Maui (reviewed in more detail in Appendix A):

Hawaii Island

- Kealakekua Bay
- Honaunau Bay
- Kauhako Bay
- Makako Bay

Maui

- La Perouse Bay

In the Notice of Intent to prepare an Environmental Impact Statement (71 FR 57923, October 2, 2006), NMFS provided an example of potential closure times from 9 AM to 2 PM. However, after reviewing available literature, NMFS has considered closure times under Alternative 4 and 5 from 6 AM to 3 PM. Historically, Hawaiian spinner dolphins would generally enter the bays in the MHI shortly after dawn, generally between 6 AM and 9:50 AM (Norris and Dohl 1980), and rest and inhabit the bay for the majority of the day with a peak in activity between 7 AM and 9 AM as they descend into rest (Östman-Lind 2009). They would then exit the bay to feed in the late afternoon or early evening, usually by 6 PM (Benoit-Bird 2003), but generally between 3 PM and 7 PM (Danil *et al*. 2005). Depending on the season, the average time spent at a resting bay off the Kona coast was between 5.1 and 9 hours (Norris *et al*. 1994).

Recent research indicates that Hawaiian spinner dolphins spend the majority of time resting between 10:00 AM and 2 PM (Tyne *et al*., 2014). The closure times considered not only encompass those hours, but also attempt to reflect those of historic resting periods before human interactions may have been a factor in the dolphins' resting habits. Historic spinner dolphin resting times ranged throughout the day from shortly after dawn (between 6 AM and 9:50 AM) to nearly dusk (Norris and Dohl, 1980). NMFS selected the closure time of 6 AM to 3 PM for the following reasons:

- Encourage Hawaiian spinner dolphin resting patterns similar to those that occurred in the past (before the influence of spinner dolphin-directed tourism)
- Encompass the dolphins' historic resting hours as closely as possible
- Discourage human activities that may deter spinner dolphins from entering the bays in the early morning hours
- Minimize disruptions to human activities at the sites as much as possible

NMFS plans to place informational signs on shore at all sites to educate the public about the closure areas. The signs will be located to maximize visibility, while still accommodating cost and environmental constraints. The following sections describe the area and time of each Hawaiian spinner dolphin essential daytime habitat site considered for closure in more detail. The map seen below (Figure 3) provides an overall view of the locations of the four closure areas considered on Hawaii Island for reference.

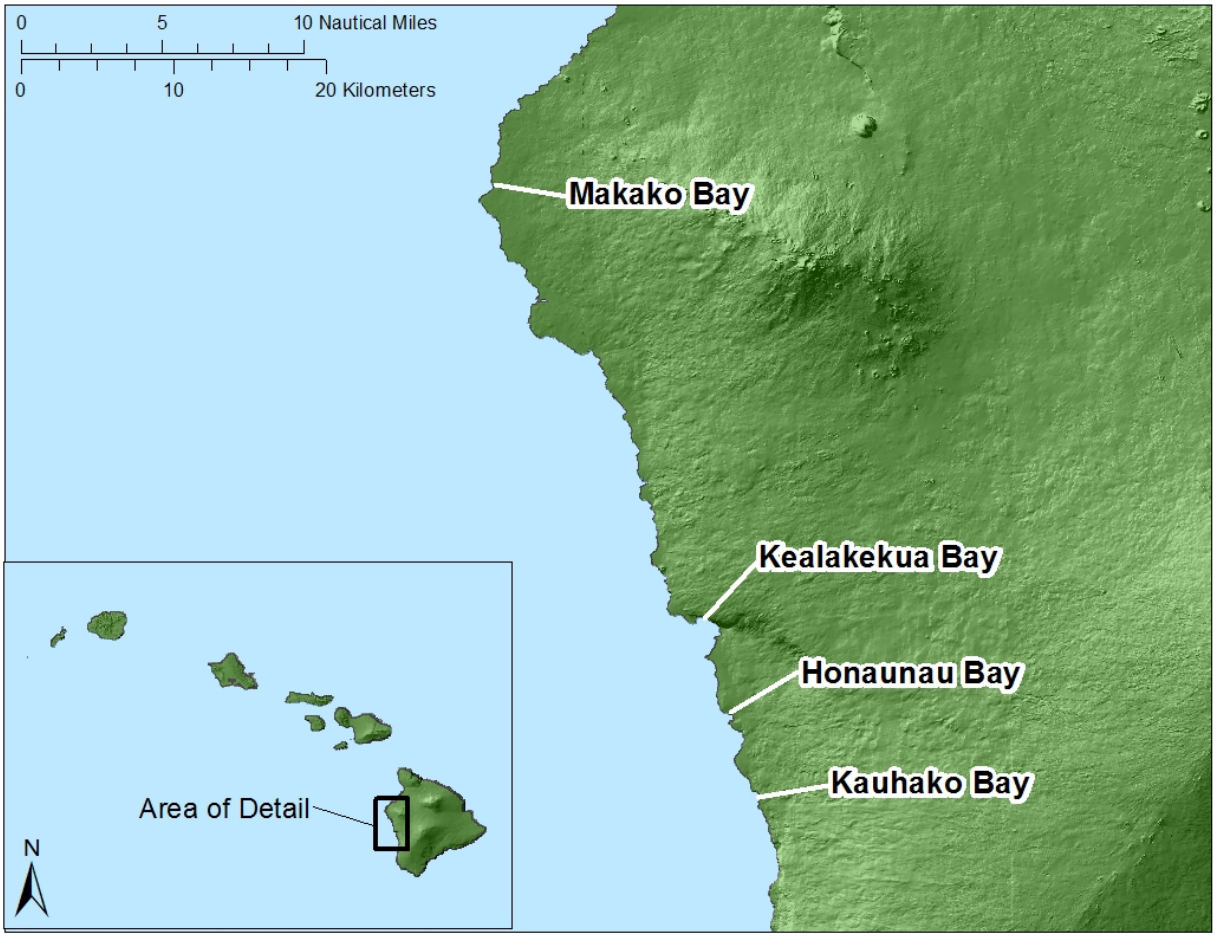

Figure 3: Hawaii Island – Sites with Areas Considered for Time-Area Closure

2.7.2.1 Kealakekua Bay

The red box between points A, B, C, and D shown in Figure 4 illustrates the closure area considered for Kealakekua Bay. Approximate segment lengths A-B and C-D are 1,005 m (0.62 mi), and segment lengths A-D and B-C are 220 m (0.14 miles). The total area of closure is 0.09 mi^2. This area would be closed from 6 AM until 3 PM, while the rest of the bay would remain open for other ocean uses such as swimming, kayaking, snorkeling, and dive activities. The County of Hawaii identifies two public access points on Boulder Beach and Napoopoo Landing at Kealakekua Bay (http://www.hawaiicounty.gov/pl-s-kona-map2); both points would remain open for access. The closure area would be delineated by means of six marker buoys — one located at each corner and one located at the middle of each of the lengthwise boundaries. The closure encompasses approximately 0.082 mi^2 (0.213 km^2) of resting habitat used by Hawaiian spinner dolphins. The white line on the map shows the route used by kayakers to access the Captain Cook Monument at Kaawaloa from Napoopoo Pier (the route is located outside of the area closure).

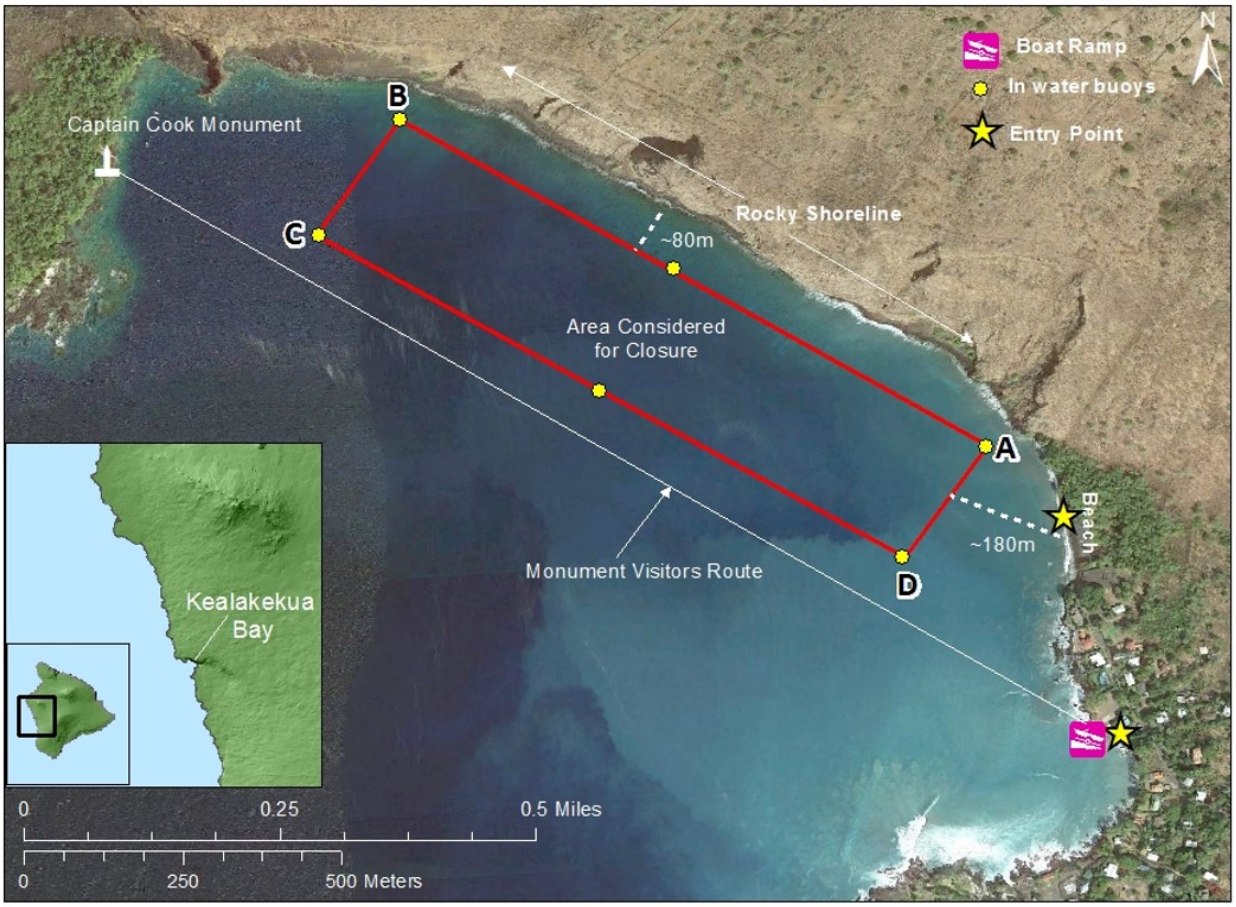

Figure 4: Kealakekua Bay Area Considered for Closure

Approximate Latitude/Longitude Coordinates

A – 19°28’37.82”N, 155°55’15.03”W
B – 19°28’54.23”N, 155°55’44.90”W
C – 19°28’48.42”N, 155°55’49.04”W
D – 19°28’32.19”N, 155°55’19.20”W

2.7.2.2 Honaunau Bay

The red lines between points A, B and C in Figure 5 illustrate the marine boundaries for the closure area considered for Honaunau Bay; the shoreline boundary is at the mean lower low water line between points A and C. The approximate segment length of A–B is 440 m (0.27 mi) and the segment length of B–C is 330 m (0.21 miles). Total area of closure is 0.04 mi^2. The closure site at Honaunau would be delineated by means of a single marker buoy and be aligned with site line markers on shore at points A and C (Figure 3) to minimize impacts to known Native Hawaiian cultural sites while also accomplishing the objective of the regulation. The closure encompasses approximately 0.04 mi^2 (0.093 km^2) of resting habitat used by Hawaiian spinner dolphins. TheCounty of Hawaii identifies the Honaunau Bay boat ramp as a public access area (http://www.hawaiicounty.gov/pl-s-kona-map3). The boat ramp and the popular access point for swimming and snorkeling known as Two-Step are located outside of the closure area and remain open for everyday use.

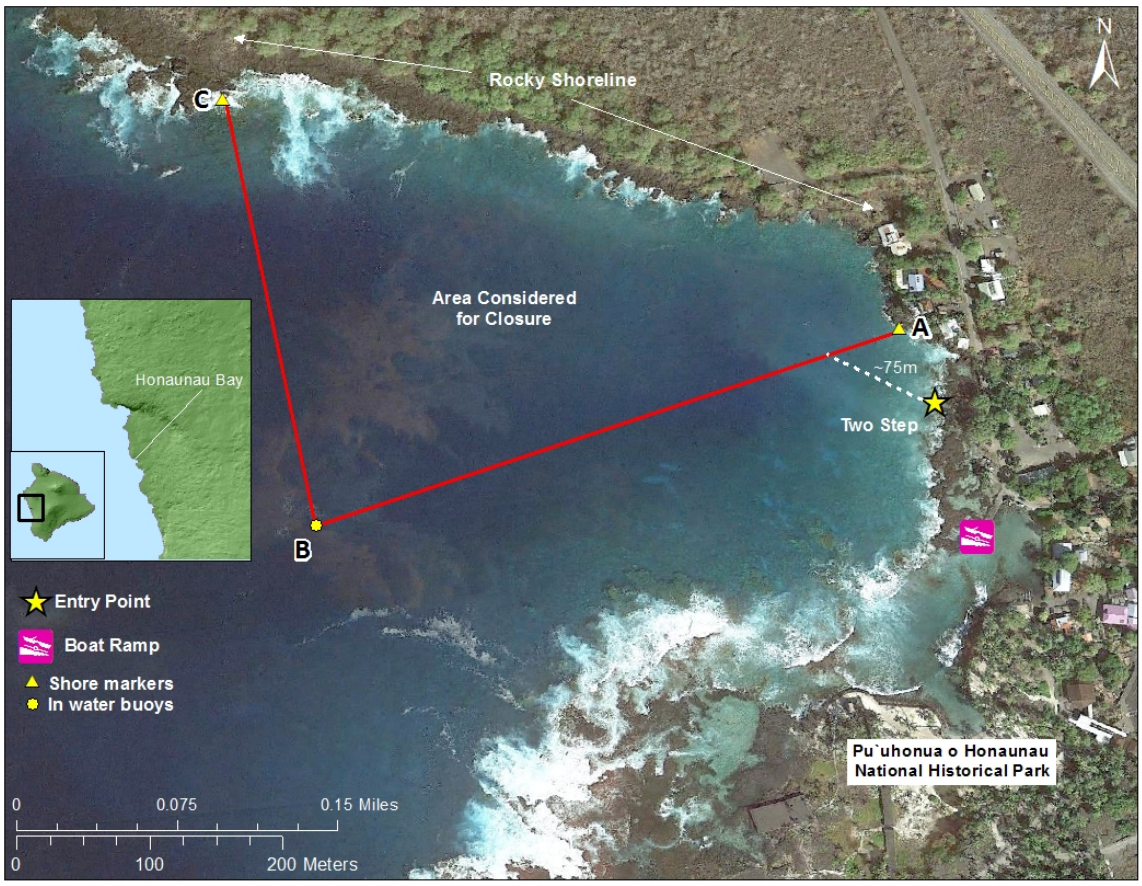

Figure 5: Honaunau Bay Area Considered for Closure

Approximate Latitude/Longitude Coordinates

A – 19°25’27.13”N, 155°54’41.65”W
B – 19°25’22.400”N, 155°54’57.00”W
C – 19°25’31.99”N, 155°54’58.24”W

2.7.2.3 Kauhako Bay

The red lines between points A, B and C in Figure 6 illustrate the marine boundaries for the closure area considered for Kauhako Bay; the shoreline boundary is at the mean lower low water line between points A and B. The approximate segment length of A–B is 330 m (0.21 mi), and the segment length of B–C is 1,035 m (0.64 miles). The total area of closure is 0.07 mi^2. The County of Hawaii identifies Hookena Beach Park as a public access point for this area (http://www.hawaiicounty.gov/pl-s-kona-map3). The near-shore area located inshore of the line between points A and B is open for everyday use, including swimming, snorkeling and free diving. NMFS would place a single marker buoy approximately 35 m from shore to delineate the inner bay closure boundary. Site line markers at each of the points A, B and C (Figure 4), and two buoys placed along the offshore boundary (line B–C) delineate the closure area at this bay.

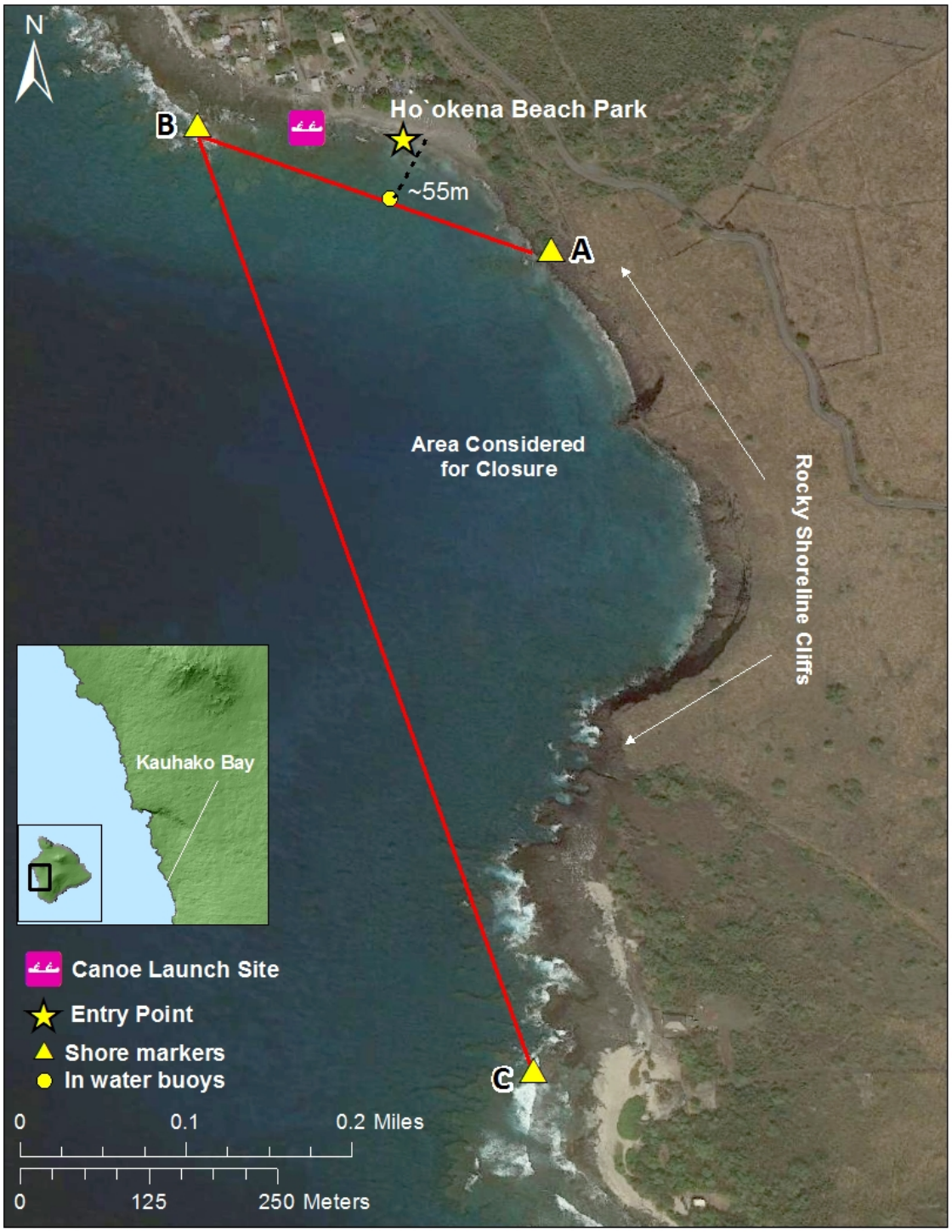

Figure 6: Kauhako Bay Area Considered for Closure

Approximate Latitude/Longitude Coordinates

A - 19°22’43.01”N, 155°53’48.52”W
B - 19°22’45.04”N, 155°53’58.55”W
C - 19°22’13.45”N, 155°53’49.35”W

2.7.2.4 Makako Bay

The red lines between points A, B, C and D in Figure 7 illustrate the marine boundaries for the closure area considered for Makako Bay; the shoreline boundary is at the mean lower low water line between points A and D. The approximate segment length of A–B is 315 m (0.20 mi), the segment length of B–C is 758 m (0.47 miles) and the segment length of C–D is 372 m (0.23 mi). Total area of closure is 0.14 mi^2. Dive moorings on the north and south ends of the bay are not within the closure and would remain available for everyday use. NMFS would place two buoy markers at points B and C, aligned with site line markers on the shore at points A and D (Figure 5) to delineate the closure area. The County of Hawaii does not identify any public access point for Makako Bay from the shore. The closest access point is just south at Wawaloli Beach, with another access point to the north at Keahole Point (http://www.hawaiicounty.gov/pl-n-kona-map2; http://www.hawaiicounty.gov/pl-n-kona-map1).

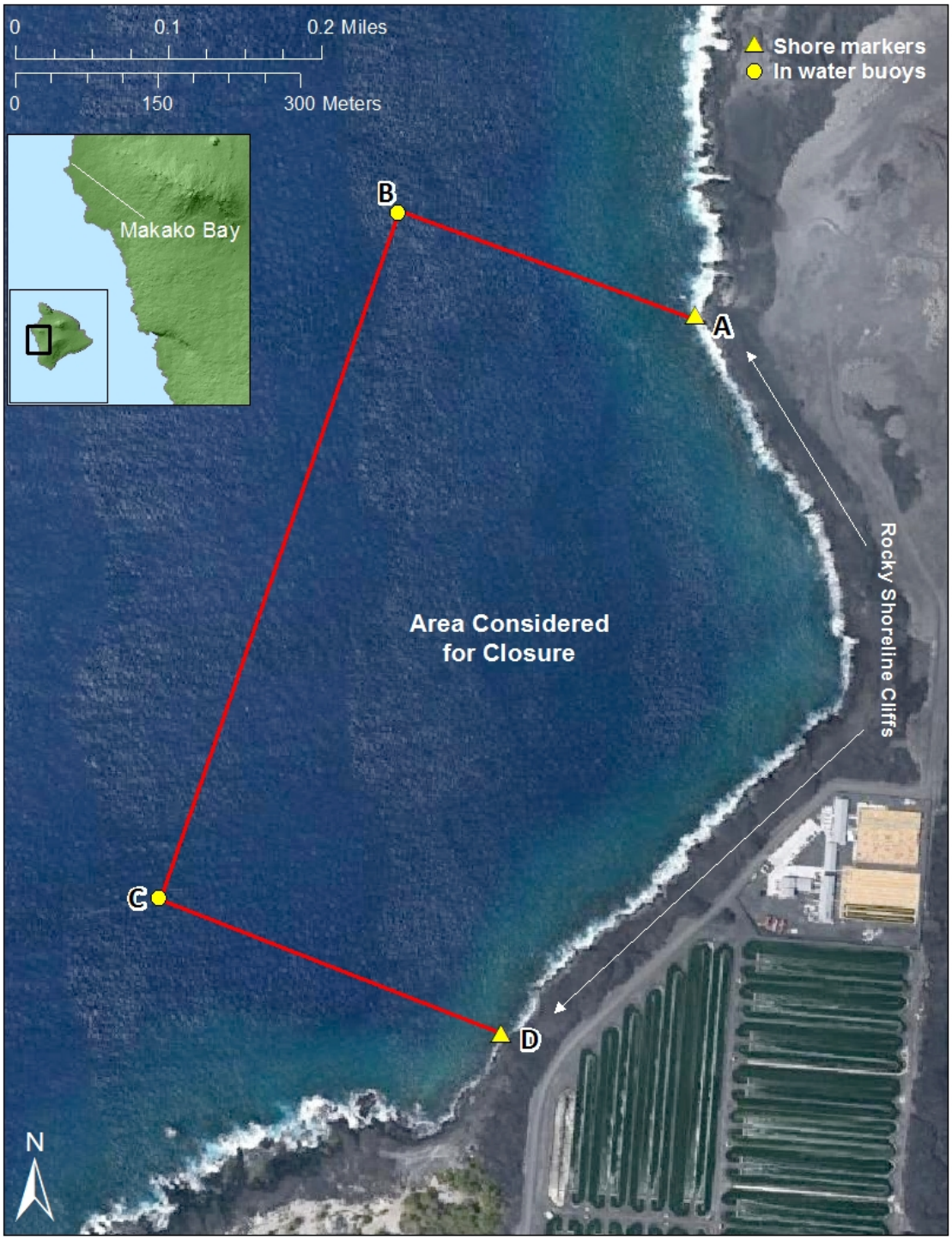

Figure 7: Makako Bay Area Considered for Closure

Approximate Latitude/Longitude Coordinates

A – 19°44’21.61”N, 156°3’16.37”W
B – 19°44’25.18”N, 156°3’26.07”W
C – 19°44’2.00”N, 156°3’36.00”W
D – 19°43’57.31”N, 156°3’23.04”W

2.7.2.5 La Perouse Bay

The red lines between points A and B and C and D in Figure 8 illustrate the marine boundaries for the closure area considered for La Perouse Bay; the shoreline boundary is at the mean lower low water line between points A and C, and between B and D. The approximate segment length of A–B is 1,340 m (0.83 mi), and the segment length of C–D is 1,515 m (0.94 mi). Total area of closure is 0.32 mi^2. Maui County identifies La Perouse Bay as a public access point for this area. The area inshore of the line between A and B, which includes this access point, would remain open for everyday uses, such as surfing, snorkeling and free diving. NMFS would place a single marker buoy approximately 80 m offshore of the most popular snorkeling entry point to delineate the near-shore boundary line, and three buoys along the offshore boundary line (line C–D) to delineate the outer closure boundary. Shore-based markers at points A, B, C and D would provide a sightline.

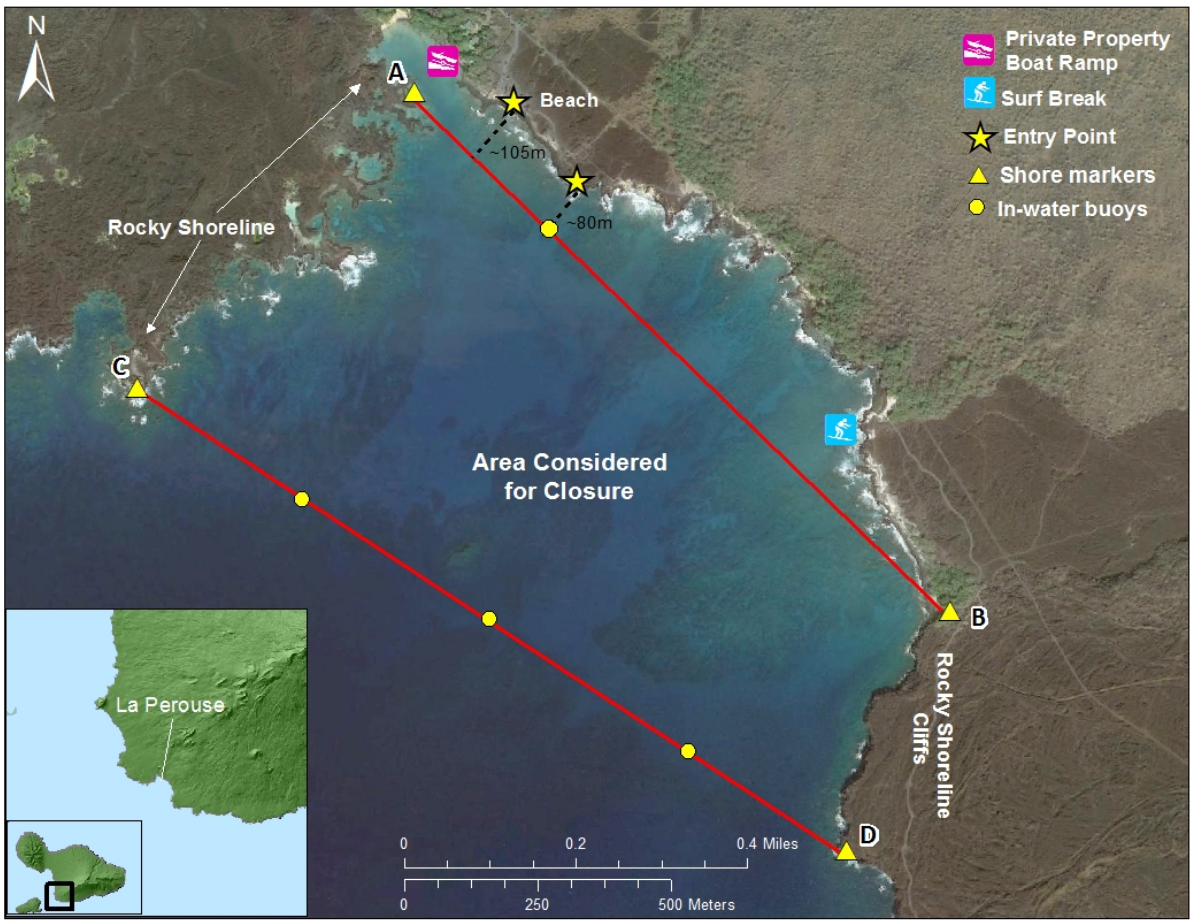

Figure 8: La Perouse Bay Area Considered for Closure

Approximate Latitude/Longitude Coordinates

A – 20°35’56.90”N, 156°25’17.04”W
B – 20°35’25.68”N, 156°24’44.72”W
C – 20°35’39.30”N, 156°25’33.85”W
D – 20°35’10.98”N, 156°24’50.90”W

2.7.3 Exceptions/Allowances for Time-Area Closures Under Alternatives 4 and 5

NMFS expects that circumstances presenting a need to enter or transit a time-area closure would be the same under Alternatives 4 and 5. Regulatory exceptions described in this section for mandatory time area closures (under Alternative 4) also describe appropriate allowances to enter voluntary time-area closures (under Alternative 5). All closures would allow exceptions for Federal, State, and local government vessels, aircraft, personnel, and assets; vessels or persons engaged in an activity that is authorized through a permit or authorization issued by the National Marine Fisheries Service to take spinner dolphins; and vessel operations necessary to avoid an imminent and serious threat to a person or vessel. In addition, special categories of exception are proposed for the alternative that would allow certain categories of vessels to traverse closed areas. Categories of proposed exception specific to these closed areas include:

- Vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure;
- Vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure; and
- Outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use.

2.7.4 Signage

As described in the previous sections, NMFS will install signs at each site where possible to clearly inform the public of the closure areas and times, as well as the goals of the closures with regard to the need to enhance protection of Hawaiian spinner dolphins' essential daytime habitat. The signs' locations will be chosen to maximize visibility, thus increasing public awareness of the proposed closures. NMFS will supplement these signs with additional means to inform the public via media, tour operators, brochures and other outreach programs to enhance communication of the closures.

In addition to signs, site-line markers will be installed at specific areas on shore (outlined in discussions of the time-area closures for specific bays) to delineate the closure areas when the boundaries intersect with the shoreline. These markers will be brightly colored to be visible from a great distance to alert people of the closure boundary. Additionally, buoys will be marked to alert people in/on the water of the time and access restrictions for the areas.

2.7.5 Buoy Installation

NMFS will install buoys at each of the proposed closure sites to demarcate the restricted areas as described in Section 2.7.1. Each buoy will meet the standards for U.S. Coast Guard regulatory buoys and will illustrate that people and vessels are prohibited from use of the areas between the hours designated under the selected alternative. These regulatory buoys will meet all standards established by the USCG, and all elements of the buoy system will be in accordance with the environmental conditions and in concert with one another (see Appendix B). In addition, NMFS

will obtain all necessary permits for the installation of buoys in State waters and the installation of signs.

Demarcation buoy systems consist of three parts: an anchoring system; a floating buoy at the surface; and attaching elements, such as line or chains. Sea-bottom characteristics dictate the type of anchor system used for mooring buoys. NMFS is considering the use of the following systems because they are most conducive to the sandy-bottom substrates found at the closure sites: the Manta Ray anchor system, the Helix system, and the traditional anchor/block system. NMFS will select the buoy anchoring system after taking into consideration the best available data on which type of buoy is most appropriate for each of the sites, the costs associated with each system, and any additional impacts identified.

The Manta Ray anchor is a utility pole anchoring system adapted for underwater use. This system embeds the anchor into the sea floor, allowing for secure positioning. The first Manta Ray underwater systems were installed in 1990 in Florida's Key Largo National Marine Sanctuary. The Manta Ray anchoring system can be used in mixed bottoms of clay, sand, gravel, broken bedrock, coral rubble and soft substrate. It consists of a utility anchor attached to an anchor rod that is driven under the sea bottom using a hydraulic underwater jackhammer or other conventional hydraulic equipment. A thimble eye nut is screwed into the end of the anchor rod for attachment of the buoy line (see Appendix B). Installation time varies with sea-bottom characteristics, but in most cases, the Manta Ray can be installed in less than 30 minutes, reducing time and labor costs (International PADI 2005) compared with other anchoring systems.

The Helix System is an embedment anchor installed using a hydraulic torque motor to screw the anchor into the substrate. It can be installed from a surface barge using drive tools to reach to the bottom or by a diver using an underwater torque motor and supported by a surface vessel. A 6–10 inch diameter helix is attached to a round or square shaft anchor inserted into the substrate, which is connected to the buoy line and buoy (see Appendix B). The installation process can be accomplished entirely from the surface if necessary. This system has the strongest holding power compared with the other anchoring systems, and is intended to withstand both upward and downward force (International PADI 2005).

The traditional anchor/block system consists of a mooring block of cast concrete, with metal rings set into the concrete attached to the anchor line (see Appendix B). This system works best in shallow mud, sand or gravel substrates. The weighted blocks keep these systems in place, but ocean movements (such as storm events) may cause some blocks to drag along the floor. Consequently, these traditional anchoring systems are not recommended for areas where block movement has the potential to cause severe damage to coral reefs or sea grass beds. However, at the proposed locations, this system is expected to only minimally impact the sandy-bottom habitat. These anchoring systems are not attached to the bottom; therefore, these blocks are placed on level bottoms to avoid shifting from their intended locations. Deployment of heavy blocks will require a stable workboat with adequate deck space. This design may require frequent inspections and overall maintenance than the Helix and Manta Ray systems (International PADI 2005).

Overall maintenance of these buoy systems will require regular monitoring and visual inspections at each site, including deploying divers into the water for general maintenance, such as replacement or repairs of any part of the system that may be weathered or worn. If unforeseen damages occur, such as the destruction of or displacement of buoys, NMFS will ensure that buoys are returned to the intended boundary position and will inspect for damage and replace buoys as necessary.

The maps for each location in Section 2.7.2 show the approximate buoy and shore marker locations at each proposed closure area.

2.8 Summary of the Alternatives

Table 3 (below) summarizes the alternatives under consideration. Table 4 identifies the exceptions that apply to each alternative. NMFS evaluated all environmental impacts from the proposed actions separately, and those assessments are presented in Chapter 4.

Table 3: Summary of the Alternatives

Alternatives		Time in Effect	Area in effect	Prohibitions or Restrictions
1	**No Action**	24 hours	Worldwide - Subject to the jurisdictional limits of the MMPA	Current MMPA Prohibitions*
All Alternatives below also include Current MMPA Prohibitions				
2	**Swim-With Regulation**	24 hours	All waters within 2 NM of shore and including designated waters between Lanai, Maui, and Kahoolawe	Swimming with Hawaiian spinner dolphins
3(A)	**Swim-With and 50-Yard Approach Regulations [Preferred]**	24 hours	All waters within 2 NM of shore and including designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or a spinner dolphin group closer than 50 yards
3(B)	**Swim-With and 100-Yard Approach Regulations**	24 hours	All waters within 2 NM of shore and including designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or a spinner dolphin group closer than 100 yards
4	**Five Mandatory Time-Area Closures and**	6 AM to 3 PM Daily	Delineated areas within five essential daytime habitats	All activities prohibited within closures from 6 AM to 3 PM
	Swim-With and Approach Regulations	24 hours	All waters within 2 NM of shore and including designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or a spinner dolphin group closer than a prescribed distance (between 50 and 100 yards)
5	**Five Voluntary Time-Area Closures and**	6 AM to 3 PM Daily	Delineated areas within five essential daytime habitats	Request no activities within closures from 6 AM to 3 PM
	Swim-With and Approach Regulations	24 hours	All waters within 2 NM of shore and including designated waters between Lanai, Maui, and Kahoolawe	Swimming with and approaching a Hawaiian spinner dolphin or a spinner dolphin group closer than a prescribed distance (between 50 and 100 yards)

***See Section 1.3.1 Marine Mammal Protection Act: Statutory Requirements, Authorities, and Prohibitions for current MMPA prohibitions related to take.**

Table 4: Exceptions applicability to each Action Alternative

	Exceptions	Alternatives				
		2. Swim-With	3(A). Swim-With and 50-Yard Approach [Preferred]	3(B). Swim-With and 100-Yard Approach	4. Mandatory Closures and Swim-With and Approach	5. Voluntary Closures and Swim-With and Approach
1	Vessels that are underway and approached by a spinner dolphin, provided the vessel continues normal navigation *		x	x	x	x
2	People who inadvertently come within 50 yards of a Hawaiian spinner dolphin or are approached by a spinner dolphin, provided the person makes no effort to engage or pursue the animal *	x	x	x	x	x
3	Any vessel transiting to or from a port, harbor or in a restricted channel when a 50-yard distance will not allow the vessel to maintain safe navigation		x	x	x	x
4	Federal, State, or local government vessels, aircraft, personnel, and assets when necessary in the course of performing official duties		x	x	x	x
5	Activities authorized through a permit or authorization issued by the NMFS to take spinner dolphins	x	x	x	x	x
6	Vessel operations necessary to avoid an imminent and serious threat to a person or vessel		x	x	x	x
7	Vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure				x	**
8	Vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure				x	**
9	Vessels that transit straight through the time-area closure for the purpose of traditional subsistence fishing*				x	**

Note: *exceptions are abbreviated see Section 2.1.1.2 for full descriptions.
**Exceptions are not necessary for voluntary measures, but describe activities/allowances that may be appropriate.

2.9 Alternatives Considered but Eliminated from Detailed Analysis

2.9.1 Increased Enforcement of Current Prohibitions

NMFS considered and eliminated from further analysis the alternative of increasing the enforcement of current MMPA prohibitions. Increased enforcement activity under the existing regulatory regime is not expected to prevent close, concentrated, and chronic viewing pressure that has the potential for long-term disruptive impacts to the health and fitness of spinner dolphins, and therefore does not meet the purpose and need of the action. Although increased enforcement action against observed violations may result in additional penalties and can modify individual behavior on a case-by-case basis, it cannot prevent the population-level effects of take that has already occurred. This is because disturbances to spinner dolphin populations cannot be prevented so long as chronic and concentrated viewing practices continue.

2.9.2 Permit System

NMFS considered and eliminated from further analysis the alternative of licensing and permitting of swim-with-wild-dolphin commercial tour operators due to the high cost of implementation. In addition, because a permit system involves a case-by-case determination, it would be inappropriate for addressing chronic and concentrated viewing practices that have the potential to cause long-term impacts to spinner dolphin populations. Accordingly, this alternative would not meet the purpose and need of the action and was rejected from further consideration.

2.9.3 Outreach/Education Only

NMFS considered and eliminated from further analysis the alternative of outreach and education as the sole approach to preventing human disturbance to Hawaiian spinner dolphins. NMFS has used outreach and education efforts and the Dolphin SMART program to address responsible wildlife viewing in Hawaii, and found that voluntary conservation support to be insufficient to address the problem with intense dolphin-directed activities. While education and outreach will continue to be conducted in conjunction with any chosen regulatory alternative, this action by itself is not likely to result in a significant, immediate prevention of take, including harassment and disturbance to spinner dolphins.

2.9.4 Full Closure of All Identified Hawaiian Spinner Dolphin Daytime Habitats

NMFS considered and eliminated from further analysis the alternative of implementing a full closure of all NMFS-identified Hawaiian spinner dolphin essential daytime habitats to all human uses because implementing this alternative was not logistically feasible. Closures for this considered alternative would include all NMFS-identified spinner dolphin essential daytime habitats that are listed in Table 1, which would have prohibitive associated costs, and also have the potential to disrupt human activities that do not result in take, such as when spinner dolphins are not present. In addition, a full closure does not allow for the consideration of human activities such as economic, cultural, subsistence, and recreational use of these areas, that have minimal impact on spinner dolphins.

2.9.5 Human and Vessel Activity Regulations with Time-Area Closures Based on the West Hawaii Voluntary Standards for Marine Tourism

NMFS considered and eliminated from further analysis the alternative of regulations based upon the West Hawaii Voluntary Standards for Marine Tourism (WHVS). With stakeholder input and consensus by a wide variety of Hawaii Island community members, the Coral Reef Alliance (CORAL) developed the WHVS. In 2008, CORAL began working with members of the local community of the Kona Coast to develop voluntary standards for marine tourism activities. As part of this effort, the involved parties produced a set of standards for wildlife interactions, including interactions with Hawaiian spinner dolphins. They also formed a working group for this purpose, which consisted of representatives of local spinner dolphin tour companies, dive companies and kayak rental businesses, as well as representatives from Hawaii DLNR, NMFS and the Hawaiian Islands Humpback Whale Sanctuary, among others. The process was completed in 2009 and the standards published online at the following website: http://www.coral.org/west_hawaii_standards.

The WHVS standards were created to apply to all wildlife viewing and interactions in West Hawaii and includes viewing and interaction guidelines for marine mammals, including Hawaiian spinner dolphins, in Section 4.6 of these standards, titled: Wildlife interactions with marine mammals unprotected by the Endangered Species Act (dolphins, pilot whales, toothed whales etc.) (WHVS 2009). Measures under this section of the document include educational information about prohibitions already outlined in the MMPA; detailed boating courtesy, etiquette, recommendations and safety measures around marine mammals and swimmers; and detailed human activities to avoid when viewing and interacting with marine mammals. In addition, in Section 4.7, standards specific to spinner dolphins were put forth, including spinner dolphin exclusion areas at Kealakekua Bay, Honaunau Bay, Kauhako Bay and Makako Bay, where boat operators are strongly encouraged not to enter the areas between 9 AM and 3 PM. The areas identified in these four bays on the west coast of Hawaii Island are slightly smaller than those areas identified in Alternatives 4 and 5.

While considering codifying these standards, NMFS noted that the measures addressed in the WHVS were narrowly focused on activities and areas only on the west coast of Hawaii Island (although some of the standards could be adapted to apply to waters throughout the State of Hawaii), and did not meet the criteria identified in Section 2.1. The standards are mainly adapted for marine recreational providers (tour operators); therefore, most measures do not convert well to all user groups and may not be easily understood by other resource users. In addition, the complexity of certain measures makes them difficult to enforce. For example, one measure requests that boat operators stay within radio contact on the same side of a group of Hawaiian spinner dolphins while viewing. This measure would be difficult to enforce because recreational vessels viewing spinner dolphins may not have or require a radio, and enforcement personnel may have difficulty identifying the non-compliant parties that were not on the same side of the dolphins as those parties that were first to arrive for viewing. The combination of these factors led to the decision to eliminate this alternative from further analysis.

Some measures in the WHVS are similar in nature to other alternatives under consideration in this DEIS and the preferred alternative, and may therefore still be addressed. For example,

measures that prohibit leap-frogging or promote time-area closures are under consideration and are incorporated into the preferred alternative and Alternatives 4 and 5. Notably, the closures in the Alternatives 4 and 5 encompass somewhat larger areas for longer timeframes, thus providing similar but greater protections for the spinner dolphins.

NMFS recognizes the value of community-based programs and codes of conduct such as the WHVS, which help promote responsible behaviors among marine recreational providers. Voluntary participation programs such as this and Dolphin SMART are valuable in helping to promote spinner dolphin conservation as regulations are implemented for all user groups, and NMFS hopes to continue to work with the community of West Hawaii and CORAL.

2.9.6 Limiting the Time, Number, and Distance of Vessels Approaching Hawaiian Spinner Dolphin Groups

To address disturbance issues associated with close approach and the intensity of Hawaiian spinner dolphin-directed activities, NMFS considered and eliminated from further analysis an alternative that would prohibit close approach and place limitations on the time and number of vessels allowed to view a group of spinner dolphins. Restrictions under consideration included prohibiting approaching a spinner dolphin group closer than 50 yards, limiting the number of vessels that are within 100 yards of the spinner dolphin group to three, and placing a 30-minute viewing cap on boats within that 100-yard radius. This alternative is consistent with regional guidelines and Dolphin SMART program criteria that recommend limiting your time around spinner dolphins to 30 minutes, and limiting the number of vessels around a spinner dolphin group.

NMFS eliminated this alternative from further analysis due to the complexity and resource demands associated with complying with and/or enforcing this regulation. Under this measure, it would be technically infeasible to maintain a three-boat minimum in a radius of 50–100 m around a moving group of spinner dolphins, because it would require that all viewing parties inside and outside the 100-m radius are aware of the dolphins' location at all times to maintain the proper distance from the animals and other boats. Enforcing this regulation would require knowledge or evidence regarding the amount of time that each boat spent within proximity of a group of spinner dolphins. In addition, this alternative may encourage other activities that result in disturbance, such as corralling, as vessels compete for proximity to a group of spinner dolphins.

2.9.7 Alternative Geographic Scopes for Implementing Regulations for Hawaiian Spinner Dolphins

NMFS considered and eliminated from further analysis implementing regulations that would encompass the entire range of the three MHI island-associated stocks of Hawaiian spinner dolphins, which has been determined to be within 10 nm (18.5 km) from shore, in order to provide comprehensive protection for all resident spinner dolphin behaviors and habitats. However, we have no information to suggest that these three stocks face intense exposure to wildlife viewing activities that cause take in the outer portions of their range, while these stocks are feeding at night.

However, the predictable pattern of the resident spinner dolphins' geographic distribution, their daytime behaviors, and the relative ease of access to the population during the day in relatively calm waters, concentrates these viewing and interaction pressures nearshore. These same impacts are not expected to be prevalent in the outer portions of the resident stocks' range, because the dolphins are not easily accessed when they are offshore during the evening hours. Therefore, NMFS determined that a restricted boundary (2 nm from shore and the designated waters between Lanai, Maui, and Kahoolawe) would be sufficient to provide protections for the MHI resident stocks, and would meet the purpose and need for this action. See Section 2.1.1.1 for a further discussion of how this boundary was determined

NMFS also considered and eliminated from further analysis implementing regulations throughout all waters within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands, which would extend protections to all Hawaiian spinner dolphin stocks within Federal jurisdiction. This would include the five island-associated stocks and the Pelagic stock. As with the 10 nm alternative, the best available information does not indicate that dolphin-directed activities are occurring out to the boundary of EEZ, nor do spinner dolphins engage in important daytime behaviors this far offshore. Moreover, the purpose and need for this action is geared toward offering further protections for the island-associated stocks, and best available science indicates these stocks do not range beyond 10 nm.

Accordingly, NMFS selected the 2 nm and designated waters because best available information indicates that the selected range encompasses the areas where most dolphin-directed activities are likely to be concentrated, and where dolphins engage in important daytime behaviors. NMFS has no information to suggest that these three stocks face exposure to wildlife viewing activities that cause take in the outer portions of their range. The preferred, narrowly tailored, scope thus meets the purpose and need for this action.

We further note that because almost all viewing and interaction pressures occur within 2 nm from shore and the designated waters between Lanai, Maui, and Kahoolawe, implementing these same regulations throughout the entire range of the spinner dolphin stocks, or within the entire U.S. EEZ, would have substantially similar consequences as under alternatives 2-5 that have been analyzed in this DEIS. For this reason as well, these alternatives have been eliminated from consideration.

Chapter 3 - Affected Environment

3.1 Hawaiian Spinner Dolphins

3.1.1 Description

Spinner dolphins received their common name due to their display of aerial leaping behaviors and vertical spins. The species name, Stenella, is Latin for "long beak," referring to the slender shaped rostrum, or beak, of these animals. Generally, the spinner dolphin is a slender species, with thin, recurved flippers, and dorsal fins usually range from slightly falcate to erect and triangular (Jefferson *et al*. 2008).

Spinner dolphins are relatively small compared with other species in the Delphinidae family (oceanic dolphins), Among Gray's spinner dolphins (the subspecies that includes Hawaiian spinner dolphins), adult females range in size from 1.39–2.04 m long and adult males are 1.60–2.08 m long; the dolphins may reach weights of a least 82 kg (Jefferson *et al*. 2008). There is a great deal of color variation in spinner dolphins across the globe, depending on the region and subspecies of dolphin; however, Gray's spinner dolphins exhibit a tripartite color pattern with countershading from dark to light (Jefferson *et al*. 2008). The three-part color region consists of a dark gray dorsal/top cape, a light gray side and a white ventral/bottom field (Reeves *et al*. 2002; Perrin and Gilpatrick Jr. 1994).

Spinner dolphins are found throughout the world in tropical and warm-temperate waters (Perrin and Gilpatrick Jr. 1994). Four subspecies of spinner dolphins have been described worldwide: *Stenella longirostris longirostris* (also known as Gray's spinner dolphin), which includes the Hawaiian spinner dolphin, in the tropical Atlantic, Indian and western and central Pacific Oceans; *S. l. orientalis* in the eastern tropical Pacific Ocean; *S. l. centroamericana* near Central America; and *S. l. rosiventris*, the dwarf spinner dolphin, in southeast Asia to northern Australia (Reeves *et al*. 2002). The Gray's spinner dolphin is the typical form of spinner dolphin found in most areas of the world (Jefferson *et al*. 2008).

3.1.2 Distribution and Geographic Range

Spinner dolphins are common and abundant throughout the entire Hawaiian Archipelago (Shallenberger 1981, Norris and Dohl 1980, Norris *et al*. 1994) and up until 2010, NMFS managed Hawaiian spinner dolphins as a single stock within the U.S. EEZ of the Hawaiian Islands (Carretta *et al*. 2009). Data now indicates genetic distinctions between spinner dolphins throughout the islands and atolls (Andrews 2009, Andrews *et al*. 2010, Hill *et al*. 2009), and these distinctions are supported by photo identification and animal movement data (Karczmarski *et al*. 2005). NMFS 2010 Stock Assessment Report (SAR) (Carretta *et al*. 2011) recognized these distinctions between groups by describing six newly defined stocks of spinner dolphins within the U.S. EEZ of the Hawaiian Islands (Fig. 9):

1. Kure/Midway
2. Pearl and Hermes Reef
3. Kauai/Niihau
4. Oahu/4 Islands (*i.e.*, Maui County) Region
5. Hawaii Island
6. A pelagic stock, which includes French Frigate Shoals.

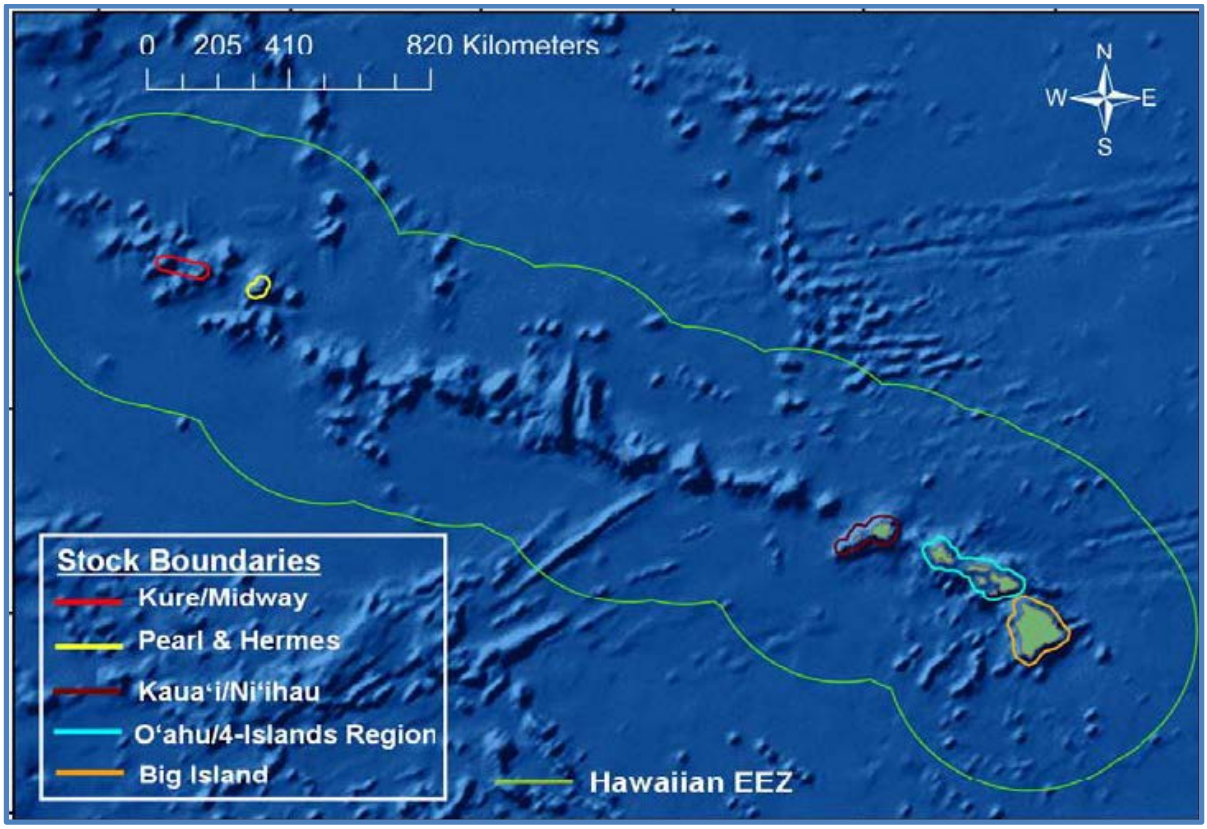

Figure 9: Hawaiian Spinner Dolphin Stock Boundaries in the U.S. EEZ

Five of the described stocks are island-associated and exhibit distribution and daytime behavior patterns linked to their namesake areas. These island-associated stocks are generally described as having a coastal distribution, resting in bays and protected areas near shore during the day and then fusing into larger groups to feed in deeper offshore waters on fish, shrimp and squid at night. In 2003, Benoit-Bird and Au noted that, based on tracking data of Hawaiian spinner dolphins by Norris and colleagues in 1994, spinner dolphins followed the horizontal migration of prey species from 1 km to 8 km offshore of this coastline. NMFS currently describes the boundary for the five Hawaiian island-associated stocks as 10 nm (18.5 km) offshore, based on the best available sighting and tracking data (Hill *et al*. 2010). Spinner dolphins found beyond 10 nm (18.5 km) from shore are part of the Hawaii pelagic stock (Hill *et al*. 2010).

3.1.3 Reproduction

Like all marine mammals, spinner dolphins are slow reproducers, and live for about 20 years, with some individuals living for at least 25 years (Marten and Psarakos 1999). Spinner dolphin mating may occur year-round, with multiple males mating with one female (Perrin and Gilpatrick 1994). Gestation is similar to other dolphin species, and lasts approximately 11 months. Calving occurs year-round, with calving intervals averaging 3 years, and lactation often occurring for 1 to 2 years (Perrin and Gilpatrick 1994). Sexual maturity occurs at around 7 years of age (Perrin and Gilpatrick 1994).

3.1.4 Ecology and Behavior

3.1.4.1 Aerial Behavior

Regarded as one of the most acrobatic of dolphins, spinner dolphins are well known for their habit of leaping from the water and spinning up to seven times on their axis before falling back to the water (Jefferson *et al*. 2008). These behaviors are common in immature and mature spinner dolphins of both sexes (Norris *et al*. 1994). Experts believe that dolphins use these behaviors primarily for acoustic signaling or communication (Norris *et al*. 1994, Perrin and Gilpatrick 1994). Such signals could provide information about the behavior of nearby conspecifics and allow for localization or detection from a distance (Norris *et al*. 1994). These cues could assist with coordination of group formations and group movements, as well as help groups prepare to travel in and off shore (Norris *et al*. 1994). Researchers have also postulated that aerial spinning may serve a secondary function in removing ectoparasites, such as remoras (Fish *et al*. 2006).

3.1.4.2 Social Behavior and Habitat Use

Spinner dolphins, in general, are gregarious in nature. Worldwide, spinner dolphins show variation in dispersal, genetic structure and social structure (Andrews *et al*. 2010). Much of this variation appears to be largely driven by environmental conditions and resource availability. For example, offshore spinner dolphins are known to congregate in large groups of hundreds to thousands of animals, sometimes creating aggregations containing other species, such as spotted dolphins (Jefferson *et al*. 2008). These large groups travel over wide geographic distances, and the group size is thought to both promote foraging efficiency in pelagic areas where prey may be more unpredictable in nature and provide for additional protection from predators (Andrews *et al*. 2010).

Island-associated dolphins, including five of the Hawaiian spinner dolphin stocks, use the shelter and resources available in and adjacent to near-shore marine habitats. The waters near island slopes often provide a substantial amount of nutrients to concentrate prey species, making prey resources more predictable and available. For example, spinner dolphins in Hawaii feed on the mesopelagic prey layer, which migrates towards the surface and inshore at night. Spinner dolphin behavior in these habitats reflects that of preferred prey species. Accordingly, these dolphins are nocturnal foragers that capitalize on the horizontal and vertical migration of prey species at night.

During daytime hours, island-associated Hawaiian spinner dolphins seek sanctuary in near-shore waters, where they return to certain areas to socialize, rest and nurture their young (Norris and Dohl 1980). These areas are typically in clear, calm and relatively shallow waters, usually with a sandy bottom that presumably provides an environment in which the dolphins are able to visually monitor for predators, as they cease echolocation while they rest (Norris *et al*. 1994). Spinner dolphins use a variety of bays throughout their range, but seem to prefer certain bays. As referred to earlier in this document, these essential daytime habitats are thought to have specific environmental characteristics that make them more favorable to the dolphins. This idea is strengthened by recent results of a habitat model assessment for spinner dolphin resting habitat. Thorne and colleagues, in 2012, used dolphin surveys from the MHI and predictive habitat modeling to identify environmental factors that may make spinner dolphins favor these areas for rest. The study found that proximity to deep water foraging areas, depth, the proportion of bays with shallow depths and low rugosity were important predictors of spinner dolphin habitat. The bays that were predicted by the model to be optimal resting habitats are consistent with spinner dolphin resting habitats that are recognized as preferred from field observations.

In the Hawaiian Archipelago, spinner dolphins exhibit two different grouping behaviors or social structures. In 1980, Norris and Dohl described spinner dolphin groups in the MHI as being small to moderate in size. Spinner dolphins in the MHI form "fission-fusion" grouping patterns: that is, smaller groups "fuse" together at night to feed in large groups offshore, and then break into small groups again while resting and socializing near shore in the day (Norris and Dohl 1980, Würsig *et al*. 1994). Researchers have observed this fission-fusion behavior on the island of Oahu as well, and grouping patterns may be more fluid at this location (Lammers 2004, Andrews *et al*. 2010). This behavior is likely reflective of the availability of multiple areas for sheltered resting habitats along the coastlines of the high volcanic islands in the MHI (Norris and Dohl 1980, Karczmarski *et al*. 2005, Andrews *et al*. 2010, Thorne *et al*. 2012).

In the northwestern atolls of Kure and Midway, on the other hand, island-associated Hawaiian spinner dolphins form large, long-term, stable groups. These groups are composed of long-term associates that use each atoll lagoon on a daily basis for rest periods, and offshore waters of the atolls at night for foraging (Karczmarski *et al*. 2005, Andrews *et al*. 2010). Karczmarski *et al*. (2005) found very little interchange between the spinner dolphin populations at remote atolls in the Northwestern Hawaiian Islands (NWHI), whose group dynamics are more structured and closed. They suggested this finding may be influenced by restricted and limited resting habitats that are separated by large distances, which is in sharp contrast to the several suitable and closely located resting habitats of the MHI.

3.1.4.3 Resting Behavior

The rigid, cyclical and patterned behavior of a Hawaiian spinner dolphin's day is well documented from observations of spinner dolphins off the Kona coast on the Island of Hawaii. The day begins with a descent into rest around sunrise, when the dolphins return from nocturnal foraging grounds (Norris *et al*. 1994). Larger groups, comprised of multiple synchronized subgroups, are the first to return to the resting areas from offshore (Norris *et al*. 1994). Upon arrival, the dolphins exhibit a high degree of social interactions and acoustic communication (Norris *et al*. 1994, Lammers 2004). As the dolphins enter the more shallow resting areas,

subgroups become less evident and the larger group moves more synchronously as a tight unit (Norris *et al*. 1994). Movements of the dolphins become slower and the animals begin their rest behaviors; the use of echolocation and acoustic communication quickly and dramatically reduces (Norris *et al*. 1994). Beyond the normal functions of rest, the prolonged periods of near-silence may play an important role for tissue regeneration in the sound-producing structures that are heavily used for echolocation during nightly foraging activities (Norris *et al*. 1994).

Norris *et al*. (1994) noted that there is no spinner dolphin behavioral pattern that is more distinct than rest; resting behavior has been characterized as un-dolphin-like because individuality is suppressed in favor of group action (much like schooling fish). When resting, spinner dolphins move back and forth slowly as a single unit, with animals in tight formation but spaced just out of contact with one another (Norris *et al*. 1994). Resting behaviors may occur for about four to five hours daily, but may vary seasonally, coinciding with the shifts in day length. During rest, spinner dolphins rely on vision rather than echolocation for scanning their environment; therefore, group movements during rest are restricted to open sand bottom areas where predators are more visible (Norris *et al*. 1994).

The end of the spinner dolphin rest period is usually indicated by an abrupt and sudden increase in activity level; swim speeds, aerial behaviors, short dives and vocalizations all significantly increase (Norris *et al*. 1994, Lammers 2004). Norris *et al*. (1994), described a “zig-zag” swim pattern following the rest period, consisting of the dolphins swimming toward the open waters and then doubling back into shallower waters. This back-and-forth swimming repeats a zig-zag formation over most of the area, possibly functioning as a social cue for the entire group to coordinate their movement into the deeper seas. The acoustic behaviors likewise rise and fall synchronously with the zig-zag swimming patterns. When these patterns subside, there is a swift and rapid race to the offshore waters as the spinner dolphins head toward the 100-fathom isobath, where they are sometimes joined by bottlenose or spotted dolphins. At this point, spinner dolphins’ dive times are extended and the dolphins begin their foraging movements (Norris *et al*. 1994).

Resting behavior in all of the island-associated Hawaiian spinner dolphins is generally similar; spinner dolphin groups come into shallow waters during the day to rest, nurture their young, and socialize then move offshore later in the day to forage. Recent research on the Island of Hawaii found that the most important factor contributing to the likelihood of rest was whether they were within a bay or not (Tyne *et al*., 2014), suggesting that essential daytime habitats play an important role in the daily resting periods. However, differences in resting strategies do exist based on the type of habitat available and the number of animals present, as is evident along Oahu's coastline. Along Oahu's western (leeward) shore, sheltered bays at Makua Beach, Kahe Point and Pokai Bay are described as gathering sites where multiple groups of spinner dolphins meet after foraging at night (Lammers 2004). These sites have large stretches of white sand bottom and are usually more sheltered from prevailing trade winds (Lammers 2004).
The somewhat more exposed habitat of the south shore of Oahu has no sites with large stretches of white sand bottom and no specific aggregation sites, and spinner dolphin groups using this side appear in much larger groups throughout the resting period (Lammers 2004). Lammers hypothesized that these higher group numbers were maintained to achieve adequate vigilance for predators and accommodate for reduced visibility in these areas. He documented that spinner

dolphins are not restricted to specific sites on the western and southern shores of Oahu, but that they spend much of the day traveling, showing a strong affinity for the 10-fathom isobath. Resting behavior for these spinner dolphins coincides mostly with the time of day (midday to late afternoon) and the dolphins are able to use more than one strategy to attain rest (Lammers 2004). Aside from using sheltered areas with light bottom substrate for rest, spinner dolphins also use a secondary approach, which Lammers described as "rest while on the move." Using this strategy, groups of spinner dolphins maintain a preference for shallow water (10-fathom isobath) to detect predators, but also maintain large numbers, where vigilance responsibilities may alternate between subgroups in order to accomplish rest during daytime hours. The strategy employed by resting spinner dolphins along Oahu's coast is likely determined by habitat available to them and the number of animals present in the group (Lammers 2004).

3.1.4.4 Foraging and Diet

Spinner dolphins feed predominately at night (Norris and Dohl 1980). Hawaiian spinner dolphin prey is primarily composed of species found in the mesopelagic boundary community, which is a land-associated assemblage of small fish, shrimp and squid found in waters beyond the island slopes (Benoit-Bird *et al*. 2001). An examination of Hawaiian spinner dolphins' stomach contents revealed that myctophid fish represented 50% of animal remains in the dolphins' stomachs (Benoit-Bird 2004). Additionally, contents revealed large proportions of mesopelagic squid (including Abralia trigonura and A. astrosticta) as well as large amounts of sergestid crustacean (Sergia lucens, also known as Sakura shrimp), both of which are components of the mesopelagic boundary community. This community predictably and consistently migrates vertically from 400–700 m in the day to less than 400 m at night; and horizontally from about 2 km offshore to about 1 km, at which point these animals reach their maximum density (Benoit-Bird *et al*. 2001).

The mesopelagic community provides substantially more energy than what was predicted to support the Hawaiian spinner dolphin populations, and dolphin foraging patterns are most likely constrained by time and efficiency rather than prey availability (Benoit-Bird 2004). The mesopelagic abundance in the waters off Oahu's Waianae coast was estimated to be significantly higher (1,800 organisms per m^3) than the abundance off Hawaii Island's Kona coast (700 organisms per m^3) (Benoit-Bird *et al*. 2001). However, the mesopelagic layer in Kona waters covered a larger area vertically and horizontally, as it was visible for about 30 km, thereby covering a greater area than the 10-km-wide layer in Waianae waters (Benoit-Bird *et al*. 2001).

The complex foraging patterns of Hawaiian spinner dolphins include temporal and spatial overlaps with their prey species (Benoit-Bird and Au 2003). Spinner dolphins do not feed offshore all night, instead following the migration of their mesopelagic prey horizontally as the prey move close to shore (about 2 km) around midnight, and then return offshore by 3 AM (Benoit-Bird *et al*. 2001). During this same time period, spinner dolphins simultaneously track the vertical migration of their prey from about 100 m deep to less than 50 m around midnight, and then descend back to depths greater than 100 m at about 3 AM (Benoit-Bird *et al*. 2001).

Hawaiian spinner dolphins forage cooperatively, forming consistent pairs in structured patterns within the groups, seemingly a direct response to the migrations of the prey species (Benoit-Bird

and Au 2003). Research describes the Hawaiian spinner dolphins actively altering the features of their prey species by breaking up the prey into smaller groups and concentrating the prey into discrete patches (Benoit-Bird and Au 2003). It is plausible that this dynamic foraging behavior evolved to allow spinner dolphins to efficiently exploit the highest densities of their prey species (Benoit-Bird and Au 2003). A study by Benoit-Bird (2004) predicted the Hawaiian spinner dolphins required a minimum consumption rate of 1.25 prey items (each about 10 centimeters long) per minute throughout the foraging period to meet their daily energetic needs.

3.1.4.5 Hawaiian Spinner Dolphin Resident Populations

Norris *et al*. (1994) suggested that the Island of Hawaii and its surrounding waters may have a large, relatively stable "resident" population of Hawaiian spinner dolphins. They based this observation on re-sightings of particular animals in essential daytime habitats off the Kona Coast — photo-identification catalogs from this area date back to 1979. Periodic surveys have re-sighted several individual animals, indicating that some components of this population include long-term residents (Norris *et al*. 1994, Östman-Lind *et al*. 2004). In particular, Norris *et al*. (1994) identified one individual from the same catalog 24 years prior, while Östman-Lind *et al*. (2004) positively matched up to 8 individuals from the photos dating back 14 years. Studies in the NWHI likewise recognized high geographic fidelity to resident atolls with relatively infrequent group movement (Karczmarski *et al*. 2005, Andrews *et al*. 2005).

While scientists acknowledged the residency patterns of the dolphins, prior to genetic research that was published in 2009 they knew little about Hawaiian spinner dolphin movement between the Islands and throughout the chain. Since spinner dolphins have the capacity for high mobility and high rates of movement, interbreeding between areas was unclear until more recent genetic information began to uncover distinctions between stocks in the Hawaiian Archipelago. Recent studies on the genetic structure of spinner dolphins in Hawaii support previous conclusions that there is a significant differentiation between dolphins found in Hawaiian waters and other spinner dolphins globally (Galver 2002, Andrews 2009). In particular, Andrews (2009) found low genetic diversity of Hawaiian spinner dolphins compared with most spinner dolphins from other geographic regions, suggesting the existence of strong barriers to gene flow, both geographically and ecologically. This low diversity also indicates that spinner dolphin populations in Hawaii may be particularly vulnerable to environmental change, compared with spinner dolphins in other locations (Hill *et al*. 2010).

Researchers have also examined the spinner dolphin genetic structure within the Hawaiian Islands. In studies published in 2006, 2009 and 2010, Andrews and colleagues found genetic distinctions between spinner dolphins sampled at different islands in the Hawaiian Archipelago. They sampled 350 individual dolphins from a variety of locations: Kure Atoll, Midway Atoll, Pearl and Hermes Reef, French Frigate Shoals, Niihau, Oahu, Maui, and Lanai and the Island of Hawaii. The research revealed genetic distinctions between spinner dolphins sampled along the Kona Coast of the Island of Hawaii and spinner dolphins sampled at all other Hawaiian islands (Hill *et al*. 2010). Spinner dolphins sampled at Midway and Kure were not found to be genetically distinct from one another; however, these groups together are genetically distinct from all other islands sampled (Hill *et al*. 2010). Spinner dolphins at Pearl and Hermes showed significant genetic differentiation from all islands to the southeast and additional distinctions

from dolphins sampled at Midway and Kure that are supported by photo-identification and movement studies (Hill *et al*. 2010). Further genetic distinctions are seen between other groups in the MHI; however, there appears to be some overlap between areas. While there is a clear genetic distinction between Maui and Lanai, and Niihau and Kauai, Oahu is undifferentiated from either. NMFS grouping of Oahu dolphins with Maui and Lanai dolphins for the purposes of stock assessment is based on Andrews' 2009 genetic findings, and on the geographic proximity of these islands (Hill *et al*. 2010).

Andrews (2009) suggested that the variability in gene flow across the range of the Hawaiian spinner dolphin is strongly influenced by habitat. Specifically, observed genetic patterns may be a reflection of available resources (Andrews *et al*. 2010). The highest levels of gene flow were seen at the smallest islands (the far NWHI, French Frigate Shoals, Niihau, Kauai and Oahu). Whereas the Island of Hawaii, with expansive resources along the coast, demonstrated a population genetically distinct from the other islands. Andrews *et al*. (2010) suggested that the high level of gene flow at the smaller areas might be driven by increased pressures of resource competition, and by inbreeding around the resource-limited small islands.

They cautioned that the Hawaiian spinner dolphins' high site fidelity indicates the need for site-specific management at each island. Additionally, small populations and genetically isolated populations may be particularly vulnerable to human-caused disturbance, especially those populations that remain genetically distinct from other areas in the chain, such as the Hawaii Island population and those small populations of the far NWHI. This information about the stock structure has provided more impetus to the efforts to enhance protections for spinner dolphins, as the threats to these isolated populations from human disturbance has become increasingly clear and concerning.

3.1.5 Population Size

Prior to 2011, most Hawaiian spinner dolphin stock assessments were based on shipboard surveys and assessments of the spinner dolphins across the entire archipelago (because the five stocks had not been recognized as genetically differentiated until 2010). The Pacific Islands Photo Identification Network (PIPIN), which identifies individual cetaceans by their unique dorsal fin patterns, has recently begun to analyze spinner dolphin photo-data to provide information about the populations within the MHI. Using information collected from various studies in distinct time sets, NMFS has calculated abundance for populations on Kauai, Oahu and the Island of Hawaii; these estimates were presented in the 2012 SAR (Caretta *et al*. 2012). Although limited by data available in 2010, these estimates reflect small resident stocks. Table 5 (below) presents these estimates and identifies the limited periods over which information was captured to inform the population numbers. Using data from 132 days of photo-identification surveys of spinner dolphins off the Kona coast taken over a full year, Tyne *et al*. (2014) provide a more thorough and recent estimate of the Hawaii Island stock. This information represents the best available estimate for this resident stock and, as a relatively small stock; these residents may be particularly vulnerable to threats that may affect the group's fitness.

Table 5: Abundance estimates for populations of Hawaiian spinner dolphins

Island	Month/Year	Abundance	Standard Error	Source
Kauai/Niihau	Oct- Nov, 2005	601	121	NMFS 2012 SAR
Oahu	Jun – Jul, 2002	160	23	NMFS 2012 SAR
	Jul – Sep, 2007	355	31	NMFS 2012 SAR
Hawaii	May – Jul, 2003	790	132	NMFS 2012 SAR
	Jan – Mar, 2005	280	59	NMFS 2012 SAR
	Jan – Mar, 2006	205	33	NMFS 2012 SAR
	Sep 2010 – Aug 2011	631	60.1	Tyne *et al*. (2014)

3.1.6 Conservation Concerns

The main threat to spinner dolphins in Hawaii arises from human interactions in the form of vessels (motorized and non-motorized) and individuals in the water with these dolphins in their resting habitats. However, other concerns exist such as fishery-related mortality and the emerging concern of the effects of the increasing use of Unmanned Aircraft Systems (UAS). There have been no other documented sources of injury or mortality to spinner dolphins, including vessel strikes or fishery-related intentional take.

3.1.6.1 Human Interactions with Dolphins in Essential Daytime Habitats

As described in Chapter 1 of this document, human interactions with spinner dolphins in the MHI have been chronically high in recent years. Hawaiian spinner dolphins are being targeted in essential daytime habitats for both wildlife viewing and swim-with-wild-dolphin activities, which sometimes result in spinner dolphin disturbance and may be influencing changes in behavioral patterns overtime (Forest 2001; Courbis 2004, 2007; Lammers 2004; Danil *et al*. 2005; Östman-Lind 2009). While this is acknowledged as a conservation concern for spinner dolphins because these chronic dolphin-directed activities could result in long-term impacts to the population, the potential for additional conservation concerns exists throughout Hawaiian waters. These are discussed below, along with the conservation efforts that are in place to protect Hawaiian spinner dolphins.

3.1.6.2 Fishery Related Mortality

Information on fishery-related mortality of cetaceans in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries have been a cause of marine mammal mortality and serious injury in other fisheries throughout U.S. waters. Research shows that entanglement in gillnets and hooking and entanglements in various hook-and-line fisheries occurs for small cetaceans in Hawaii (Nitta and Henderson 1993). Between 2007 and 2011, two spinner dolphins were reported hooked or entangled by fishing gear in the MHI (Bradford and Lyman 2015). Based on photographs and descriptions of the dolphins, both injuries are considered serious under the most

recently developed criteria for assessing serious injury in marine mammals (NMFS 2012). It is not possible to attribute either interaction to a specific fishery given insufficient details about the gear involved.

According to Bradford and Lyman (2015), there were six additional reports between 1991 and 2006 of spinner dolphins found entangled, hooked or shot. No estimate of annual human-caused mortality and serious injury is available for near-shore fisheries because these fisheries are not observed or monitored for protected species interactions. In Hawaii, there are currently two distinct longline fisheries; the deep-set longline (targeting tuna) and the shallow-set longline (targeting swordfish). Both fisheries operate in U.S. waters and on the high seas, but the fisheries are closed in areas where the island-associated stocks occur (Carretta *et al*. 2013). Between 2007 and 2011, no spinner dolphins were observed hooked or entangled in either longline fishery (McCracken 2013, Bradford and Forney 2014). After 2011, there have been no observed interactions with spinner dolphins (NMFS Pacific Islands Regional Office Observer Program annual reports).

NMFS has anecdotal reports of increasing dolphin interactions with baited hooks and catch. It is not known whether these interactions result in serious injury or mortality of dolphins, or whether Hawaiian spinner dolphins are involved.

3.1.6.3 Use of Unmanned Aircraft Systems

The use of non-military small UAS, or drones, has increased throughout the world in recent years (Choi-Fitzpatrick *et al.* 2016). UAS can offer a new method for scientific researchers and emergency responders to obtain important information about marine mammals (Chabot and Bird 2015; Christie *et al.* 2016), and can allow photographers and videographers to capture the beauty of marine mammals. Despite these benefits, UAS have the potential to be disruptive to marine mammals if not used safely, appropriately, or responsibly.

3.1.7 Conservation Efforts

Worldwide, spinner dolphins are designated as "Data Deficient" in Version 3.1 of the International Union for Conservation of Nature (IUCN) Redlist. A taxon is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required.

NMFS has published marine mammal viewing guidelines for watching spinner dolphins (and other marine mammals) in Hawaii to protect them from excessive disturbance by people. These guidelines can be found at http://www.nmfs.noaa.gov/pr/education/viewing.htm. NMFS staff also regularly attend community outreach events to promote dolphin conservation.

In 2011, NMFS launched Dolphin SMART in Hawaii, a program aimed at encouraging voluntary conservation among tour operators and supporters (see Section 1.3.3.1 for a complete

description of the program). More information on the Dolphin SMART program can be found at the following websites: www.dolphinsmart.org and www.facebook.com/OfficialDolphinSmart.

A community-based conservation effort, the West Hawai‘i Voluntary Standards for Marine Tourism (WHVS) was developed by the Coral Reef Alliance (CORAL) with stakeholder input and consensus by a wide variety of Hawai‘i Island community members. In 2008, CORAL began working with members of the local community of the Kona coast towards development of voluntary standards for marine tourism activities. As part of this effort, a set of standards was developed for wildlife interactions, including interactions with Hawaiian spinner dolphins. The measures were developed by a working group that included representatives of local dolphin tour companies, dive companies, and kayak rental businesses, as well as representatives from the State of Hawaii DLNR, NMFS, and the Hawaiian Islands Humpback Whale Sanctuary, among others (see Section 2.10.5 for a complete description of the WHVS). The process was completed in 2009 and the standards published online at the following website: http://www.coral.org/west_hawaii_standards.

3.1.8 Hawaiian Spinner Dolphin Daytime Habitat Site Descriptions

The following section describes those essential daytime habitats sites that NMFS identified in Appendix A where human interactions with Hawaiian spinner dolphins are known to occur. Although there may be many other locations used by spinner dolphins in the MHI that are not described here, NMFS focused the discussion on those areas where spinner dolphin use is considered regular and where dolphin-directed activities are most likely to be affected by the identified action alternatives. The areas discussed below are those 12 areas identified in Section 2.7.1 where spinner dolphin essential daytime habitats are found and where spinner dolphins exhibit signs of chronic disturbance as a result of human activities. These areas may also be found in Table A-3 of Appendix A.

3.1.8.1 Oahu

Leeward Coast

The western coastline of the island of Oahu is herein referred to collectively as the Leeward Coast. It stretches from Kaena Point on the far northwestern tip of Oahu, to Barbers Point at the southwest. Along this coast there is an abundance of the type of habitat preferred by spinner dolphins for daytime resting — relatively shallow, sandy-bottom habitat that is sheltered from winds and swells. Although certain sites appear to be used frequently, including Pokai Bay, Makua Bay and Kahe Point (Electric Beach), these are not distinctly delineated bays such as those found on the Island of Hawaii; instead, the dolphins slowly transit along the entire coastline. Spinner dolphins at these sites are found traveling and “milling” (a back-and-forth swimming pattern close to the bottom of the water or along the coasts) during the daytime rest period, and they appear to have a strong affinity for the 10-fathom isobath (Lammers 2004). This route was nicknamed the “spinner expressway,” describing the consistent occurrence of spinner dolphins traveling in different directions and often interacting briefly (Lammers 2004). Spinner dolphins that researchers first identified in 1978–79 were seen again in 1995–1998 surveys, suggesting that this coastline may be an important habitat for spinner dolphins (Marten and Psarakos 1999). Spinner dolphins off this coast are considered to be more skittish than

dolphins in other areas (the Kona coast), and act more evasively around people (C.Wiener, PhD. Candidate, personal communication, April 2014).

Off this coastline, Hawaiian spinner dolphin-directed activities include approximately 10 to 12 commercial dolphin-watching tour operations that are based at Waianae Boat Harbor and Ko Olina Boat Harbor, three of which are Dolphin SMART businesses (L. McCue, PIRO, personal communication, May 24, 2014). Commercial tour boats in this area tend to be larger to accommodate more passengers. Sepez (2006) noted that commercial tours tend to target Makua Bay first and Kahe Point second. Commercial operators also communicate with each other on the location of the dolphins. Congregations of tour vessels on one group of animals are common. Shore-based swimming, stand-up paddle boarding and/or kayaking with the dolphins occurs at Kahe Point, Makua Bay and Pokai Bay on an almost daily basis. As identified in Section 1.4.1., Danil *et al*. (2005) described swimmer presence in Makua Bay as highest in the morning and noted that morning swimmers were often observed in close proximity to or in pursuit of the dolphins, with 65% of the swimmers within 100 m of the dolphins. The majority of swim-with-wild-dolphin activities are conducted from the tour boats on this coast.

3.1.8.2 Maui

La Perouse Bay

La Perouse Bay is located adjacent to the Ahihi-Kinau Natural Area Reserve, on the south coast of the island of Maui east of Kihei and Wailea. Hawaiian spinner dolphins are reported as common at this site, though noted by most not to occur daily (Sepez 2006, Hawaii Wildlife Fund 2008). Ahihi-Kinau is protected by the State of Hawaii, which prohibits any commercial boating activity within the bay; however, La Perouse does not have this protection and is open to commercial use. Approximately four spinner dolphin-watching tour companies operate from Maalaea Harbor and the Kihei boat ramp, and visit La Perouse Bay. In addition, guidebooks discuss the site and direct visitors there to experience swimming with wild dolphins. La Perouse typically has very rough waters and some visitors are deterred by these conditions; however, some do still make the choice to swim there when spinner dolphins are sighted. There is also a group of local residents who swim with the dolphins on a regular basis at this site. In the past, a DLNR ranger was usually present and made an effort to educate visitors about the risks to themselves and to the dolphins, but the success of this effort is limited (J. McDonald, DLNR ranger, personal communication, November, 2007), and participation has ceased in the last several years as resources have become limited. NOAA OLE reports that 25 complaints of human approaches to spinner dolphins are received from this area per year, on average (T. Tomson, NOAA OLE, personal communication, July 2011).

3.1.8.3 Hawaii Island

Honaunau

Norris *et al*. (1994) observed Hawaiian spinner dolphins using this bay across eight months of aerial surveys, and saw groups in the 1–50 and 51–100 size ranges. Courbis and Timmel (2009) reported observing spinner dolphins in the bay 5 out of 23 days, with a mean group size of 19.3 animals. A recent report recorded an average group size of 24 in this bay (Johnston *et al*., 2014). Passive acoustic monitoring of the bay from June 2011 to Feb 2012 detected spinner dolphins in

the bay 43% of the days monitored, with the average time of entry to the bay around 10:28 AM (Johnston *et al*. 2014). Residents of the area have indicated that spinner dolphins may be using the area less frequently than in years past, as well as entering the bay later in the day (see Appendix A).

Hawaiian spinner dolphin-directed activity in this bay is centered on swimmers (Sepez 2006, Courbis 2007, Courbis and Timmel 2009, Östman-Lind 2009) with easy entrance to the water and relatively calm waters, swimmers are able to easily access the dolphins in this area. Tour vessels, often zodiacs, are found in the area and allow passengers to enter the water to snorkel and swim with the dolphins (Sepez 2006, Courbis 2007). These vessels may operate out of Honokohau harbor to the far north, or from the less distant Keauhou Bay boat ramp. Courbis (2007) found that the number of kayaks increased in this area with the presence of spinner dolphins, but that the number of motorboats decreased; she also noted that boaters may be deterred from using the area when the boat channel is congested with spinner dolphins and swimmers in the water. Residents indicate that large groups of people come to the bay to swim with the dolphins and that people bring toys to engage the animals in play (see Appendix A). For example, people engage the animals in the "leaf game" (see description in Section 2.4).

Honokohau Harbor

Norris and colleagues (1994) note that the largest groups of Hawaiian spinner dolphins were found from Honokohau to Kiholo Point. Spinner dolphins can be found resting just outside the main commercial harbor entrance. In the past, swimming with the dolphins in this area appeared limited due to harbor traffic; however, recent accounts from researchers indicate that people do occasionally get in the water to swim with the dolphins (C. Wiener, researcher, personal communication, April, 2014). Additionally, spinner dolphin tour boats frequently stop here on their way out of the harbor to allow customers to view the dolphins from the boat. There are currently over 20 spinner dolphin tour companies that depart from Honokohau Harbor.

Kailua Bay

Although there is a high level of boating activity occurring in this bay because it is designated by the State of Hawaii as an Ocean Recreation Management Area ORMA (see Section 3.4), Hawaiian spinner dolphins also attempt to use this bay for resting. Norris and Dohl (1980) noted that spinner dolphins are found in the Kailua Bay area, but that dolphins in this area do not appear to reach quiescence at this site. They hypothesized that this may be due to the increased traffic in the area. Sepez (2006) noted that tour vessels often depart from the area and head north to Makako Bay, Makalawena Beach and Kua Bay, but they frequently come to Kailua Bay and will drop snorkelers into the water to swim with the dolphins, regardless of the safety issues presented by the level of boating activity that occurs at this bay.

Kauhako Bay (Hookena)

Norris *et al*. (1994) noted observing Hawaiian spinner dolphins, ranging in groups of 1–50 and 51–100 animals, during aerial surveys across 9 months of the year. Courbis (2007) and Courbis and Timmel (2009) later reported observing spinner dolphins on 11 out of 16 days and 11 out of 18 days, respectively, with an average group size of 25 animals. A recent report recorded an average group size of 29 in this bay (Johnston *et al*. 2014). Community members report that the dolphins' use of the bay has decreased over the years, and some believe that this decrease in

spinner dolphin use is due to the pressures from human interactions in the bays (D. Kennison, Hookena resident, personal communication, October 2007). The primary source of interactions in the bay is largely attributed to swimmers from shore (C. Wiener, researcher, personal communication, April 2014). Passive acoustic monitoring of the bay from June 2011 to Feb 2012 detected spinner dolphins in the bay 55% of the days monitored, with the average time of entry to the bay around 9:46 AM (Johnston *et al*. 2014).

Hawaiian spinner dolphin-directed activity in this bay is centered on swimmers from shore (Sepez 2006, Courbis 2007, Courbis and Timmel 2009, Östman-Lind 2009). Along with Honaunau and Kealakekua bays, Kauhako Bay is part of the three-bay complex that Sepez (2006) noted draws both resident and visitor beach-based swimmers. Courbis and Timmel (2009) described swimmer activity in the bay as directed at approaching and interacting with the dolphins, and Courbis (2007) noted that the number of swimmers in the area was significantly higher when spinner dolphins were present. Some local residents also come here on an almost daily basis to swim with the dolphins.

Kealakekua Bay

Studies in this bay indicate that Hawaiian spinner dolphins regularly use Kealakekua Bay for rest (Doty 1968, Norris and Dohl 1980, Norris *et al*. 1994, and Forest 2001). Group size in this bay range at a maximum of 50–90 animals, but reported averages are around 30 animals (Doty 1968, Norris and Dohl 1980, Norris *et al*. 1994, Forest 2001, Timmel 2005). A recent report recorded an average group size of 41 in this bay (Johnston *et al*. 2014). Recent passive acoustic monitoring of the bay from June 2011 to Feb 2012 detected spinner dolphins in the bay 63% of the days monitored, with the average time of entry to the bay around 8:38 AM.

Kealakekua Bay is perhaps the most well-known and popular site in the Hawaiian Islands for swimming and kayaking from shore to interact with Hawaiian spinner dolphins. Kealakekua is part of the aforementioned three-bay complex. People are known to bring toys and leaves to the area to engage the dolphins (as described in the previous section on Honaunau Bay). There is a fairly large contingency of local residents who come to this site on a daily basis to swim with the dolphins. There are also several “bed-and-breakfast” establishments that are rented by groups who hold retreats and seminars regarding the spiritual aspects of swimming with wild dolphins. Sepez (2006) reported that there may be up to 30–50 kayaks transiting the bay every day, with more on holidays. She also reported that 15–20 local residents swim from shore with the dolphins regularly, and that 5–10 additional visitors may swim from shore as well; these numbers do not include swimmers who may enter the water from the various vessels.

Commercial activities include boat tours (both motorized and kayaks) of the bay to view the wildlife, including Hawaiian spinner dolphins. Local businesses also offer guided kayak tours. While other activities (such as visiting the monument) may attract kayakers to the area, the presence of spinner dolphins in the bay often results in kayakers changing course to get a closer look, and even jumping into the water to swim with them. To address the proliferation and use of unpermitted kayak rentals in the area, the State of Hawaii’s DLNR placed a moratorium prohibiting operating, launching, transiting, beaching or landing kayaks and other vessels from Napoopoo within the waters of Kealakekua Bay and at Kaawaloa Flats starting January 2, 2013 (Hawaii DLNR 2012). Consequently, the Bay reopened to two permitted commercial kayak

businesses on April 1, 2013 (Hawaii DLNR 2013a), and on May 30, 2013 DLNR began to issue special-use permits for recreational activities in the Bay (Hawaii DLNR 2013b). The closure should have reduced vessel activity around spinner dolphins; however, researchers found that there was no visible difference in the impact of human presence to spinner dolphin behavior or use of the bay during this closure (J. Tyne, researcher, personal communication, March 2014).

Courbis and Timmel (2009) noted that the swimmers and vessels were always present when Hawaiian spinner dolphins were in this busy bay, and researchers (Forest 2001, Courbis and Timmel 2009) noted that the spinner dolphins altered their aerial behavior patterns compared with earlier behaviors reported in studies by Norris and Dohl (1980). Östman-Lind (1980) also noted significantly more aerial behavior when people were within 100 m of the dolphins in this bay, as well as changes in the areas used by the dolphins for rest. Researchers (Forest 2001, Timmel 2005, and Johnston *et al*. 2014) also note that spinner dolphin behavior often changed in other ways due to human disturbance, such as exhibiting increased tail slaps or leaving resting bays prematurely. Johnston and colleagues performed focal follows on spinner dolphins at Kealakekua Bay for 23 days and found that swimmers or vessels were present within 300 m of a group of spinner dolphins for 90.3% of sampling events, and were present within 150 m of a group for 75.5% of sampling events (Johnston *et al*. 2014).

Kehena Beach

Known to local residents as "Dolphin Beach," Kehena Beach is located in the Puna District on the east side of Hawaii Island. This is one of the only sites on the east coast of the Island of Hawaii where Hawaiian spinner dolphins are known to come to rest. The water here is usually very rough and the entry and exit can be dangerous, so it is not a place where tourists typically go to swim with the dolphins; however, a sizable group of local residents swim with the dolphins here on a regular basis.

Mahaiula and Makalawena

The beaches of Mahaiula and Makalawena are part of the Kekaha Kai State Park, located north of the Keahole Airport. Hawaiian spinner dolphins are frequently seen at this site, moving south on their way to Makako Bay. Some swimming from shore to the dolphins occurs here, but the waters are usually fairly rough and most people do not attempt it at this site. Spinner dolphin tour boats come here from nearby Honokohau Harbor and typically follow the dolphins as they travel south to Makako Bay, “leap-frogging” to intercept the dolphins as they pass by.

Makako Bay/Hoona Bay

Norris *et al*. (1994) noted that Makako Bay is an area used by dolphins in group sizes ranging from 1–50, 51–100 and more than 100 animals (frequently 180–200 animals). A recent report recorded an average group size of 102 in this bay (Johnston *et al*. 2014). Passive acoustic monitoring of the bay from June 2011 to Feb 2012 detected Hawaiian spinner dolphins in the bay 85% of the days monitored, with the average time of entry to the bay around 8:48 AM. The bay can be viewed from shore by walking from a parking area north on a trail that leads through the ancient Hawaiian village site of Hoona.

Within a short distance of Honokohau Harbor, this bay is considered the first stop for tour boats to check for Hawaiian spinner dolphins, and has one of the highest levels of tour interactions

with spinner dolphins (C. Wiener, researcher, personal communication, April 2014). There is no shore-based swimming with the dolphins at this location due to the very rough waters, rocky cliffs and a lack of an easy exit point once someone has entered the water.

3.1.8.4 Kauai

Na Pali Coast

The Na Pali coast is recognized as an area that Hawaiian spinner dolphins use for resting. Norris and Dohl (1980) indicated that the largest group sizes in this area were along this coastline with estimates of 150 animals. This coastline provides very few protected bays; however, the sandy habitat along the coastline may provide areas for near-shore resting (Sepez 2006).

Sepez (2006) noted that the Na Pali coast is one of the areas where people interact with Hawaiian spinner dolphins. Sightseeing, diving and snorkeling tours may depart from Port Allen, Waimea and Hanalei, heading to the Na Pali coast for the dramatic scenery, and spinner dolphins may be encountered along the route. There are currently approximately 12 commercial operators that conduct tours along the coast and advertise opportunities to view wild dolphins, one of which is a Dolphin SMART operator. Currently, there is only one known tour operator that publicly advertises swimming with spinner dolphins in this area. Additional interactions may occur with kayakers who utilize the area for sightseeing purposes but these activities do not appear to be spinner dolphin-directed along this coast.

3.1.8.5 Lanai

Hulopoe Bay

This site is a well-known Hawaiian spinner dolphin resting area that is located adjacent to a privately owned park and the Four Seasons Manele Bay Hotel. The dolphins are known to use the west end of the bay, closest to the hotel. Residents of the area indicated that spinner dolphins may be using the area less frequently than in years past (see Appendix A). In the past, the hotel promoted swimming with the dolphins to their guests and on their website; however, residents raised concerns during the scoping period about regulatory measures closing the only easily accessible beach recreation area, prompting an end to these promotions. The hotel is now a Dolphin SMART Proud Supporter, which provides educational materials on the dolphins' use of the site as a resting area while encouraging guests to view the dolphins from shore rather than swimming out and disturbing them. Although the bay is a state-designated Marine Life Conservation District (MLCD) and is closed to boats (except for permitted use by the Trilogy Excursions catamaran tours), some concern remains about spinner dolphin disturbance at this site because spinner dolphin tour boats from Maui transport passengers to the outside edges of the bay, allowing passengers to access this site by swimming or snorkeling.

3.2 Protected Marine Species and Habitats

Certain species and habitat are protected under the MMPA, ESA, and Magnuson-Stevens Fishery Conservation and Management Act (MSA), whose range or location may overlap with the proposed action area (within 2 nm from shore in the MHI). As noted in Chapter 1, all marine mammals are protected under the MMPA. Species receiving these protections that occur in

Hawaii's waters include multiple species of cetaceans and the Hawaiian monk seal (see Table 6 below). Several of these species of marine mammals also receive protections under the ESA. In addition to these listed marine mammals, the ESA also provides protection for several species of sea turtle within Hawaii's waters (see Table 6 below). A full list of marine species that are protected throughout Hawaiian waters can be found in Appendix E. This DEIS only discusses those protected species — as identified in Table 6 below — that are likely to be present within the relatively shallow or near-shore coastal waters of the project area.

Table 6: Protected marine species

Common Name	Scientific Name	ESA Listing Status
Marine Mammals (all MMPA protected)		
False Killer Whale – Hawaiian Insular DPS	*Pseudorca crassidens*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered*
Pygmy Killer Whale	*Feresa attenuata*	NA
Short-finned Pilot Whale	*Globicephala macrorhynchus*	NA
Bottlenose Dolphin	*Tursiops truncatus*	NA
Pantropical Spotted Dolphin	*Stenella attenuata*	NA
Rough-toothed Dolphin	*Steno bredanensis*	NA
Hawaiian Monk Seal	*Neomonachus schauinslandi*	Endangered
Sea Turtles (ESA protected)		
Green Turtle (Central North Pacific DPS)	*Chelonia mydas*	Threatened
Hawksbill Turtle	*Eretmochelys imbricata*	Endangered

*Indicates proposed changes to the listing status of these species. See species info below.

3.2.1 ESA-Protected Marine Species

ESA-protected marine species include those species that are listed as either threatened or endangered under the ESA. Only those species that may be affected by the proposed action are discussed in this section.

3.2.1.1 Humpback Whales

Humpback whales are listed as endangered under the ESA. On April 21, 2015, NOAA Fisheries proposed to divide the globally listed species into 14 distinct population segments (DPSs), remove the current species-level listing and, in its place, list 2 DPSs as endangered and 2 as threatened (80 FR 22304). Whales using Hawaii's waters as a wintering ground were identified as a DPS in this proposal, but were not identified as a group requiring the protections of the ESA. If finalized, Hawaiian humpback whales will not receive protections under the ESA, but will continue to be protected under the MMPA.

The humpback whale (Megaptera novaeangliae) is present around the MHI during the winter breeding and calving season (typically from October through May). They are known to come quite close to shore and may be present within certain Hawaiian spinner dolphin essential daytime habitats. As noted in Section 1.3.1, there are 100-yard approach regulations — promulgated under the ESA and the National Marine Sanctuaries Act — in Hawaiian waters to protect humpback whales from human disturbance by any means. Despite these regulations, people are sometimes reported swimming with or closely approaching humpback whales in areas where these animals are found close to shore, such as spinner dolphin essential daytime habitats. For example, while observing spinner dolphin activity in Kealakekua Bay, researchers observed humpback whales on 39 of 59 days, and saw people swimming with the whales on seven occasions (Tyne *et al*. 2014). Additional information, including the whale's range, abundance, status and threats, can be found in the recovery plans for the species, available on the NMFS website, and is herein incorporated by reference:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_humpback.pdf.

3.2.1.2 Hawaiian Monk Seals

The Hawaiian monk seal (Neomonachus schauinslandi) is found throughout the MHI, where the population is thought to number approximately 150 individuals (Carretta *et al.* 2014). Hawaiian monk seals are found in near-shore waters and resting bays because they use adjacent coastal beaches and shorelines throughout the MHI to rest, molt, give birth, nurse, and avoid predators. In the marine areas that border these coastal habitats, and throughout the areas where spinner dolphins are found during the day, monk seals may be found foraging, traveling or socializing with other seals. Additional information, including the seal's range, abundance, status and threats, can be found in the recovery plans for the species, available on the NMFS website, and is herein incorporated by reference:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf.

3.2.1.3 False Killer Whales

The MHI insular population of false killer whales (Pseudorca crassidens) is found in the near-shore waters throughout the MHI, and was listed as an endangered DPS under the ESA on November 28, 2012 (77 FR 42082). Similar to resident stocks of Hawaiian spinner dolphins the insular stock of false killer whales exhibits island-associated movement patterns that indicate adaptation to the local habitat. Insular stocks' boundaries are described as a minimum convex polygon bounded around a 72-km radius of the MHI (Bradford *et al.* 2015), which overlaps and exceeds the range of resident Hawaiian spinner dolphin stocks. Areas heavily used by insular false killer whales, tracked throughout the MHI, generally occur at deeper depths than those used by Hawaiian spinner dolphins for resting (Baird *et al.* 2012). However, overlap is likely in other portions of the spinner dolphins' daytime range and is likely to vary by island and by time of day. These overlaps in range may occur as spinner dolphin move towards or return from deeper foraging habitats and in areas where spinner dolphins traverse deeper habitats during the day. For example in the Maui County area, spinner dolphins travel between islands during the day and may be found in these deeper habitats where insular false killer whales are also found. Additional information about the ecology and management of this species is available on the NMFS website, and is herein incorporated by reference:

http://www.fpir.noaa.gov/PRD/prd_false_killer_whale.html.

3.2.1.4 Sea Turtles

Both the green sea turtle (Chelonia mydas) and the hawksbill sea turtle (Eretmochelys imbricata) are known to occur within the project area. The hawksbill sea turtle is listed as endangered throughout its range, and was listed in 1978. The green turtle was also listed under the ESA in 1978 and the listing was recently revised to recognize the differences in status between 11 different DPSs; 8 DPSs were listed as threatened and 3 DPSs were listed as endangered (81 FR 20058; April 6, 2016).Turtles found in waters of the Hawaiian Archipelago and Johnston Atoll were identified as the Central North Pacific DPS and the status was proposed as threatened.

Additional information, including the turtles' range, abundance, status and threats for each species is available on the NMFS website, and is herein incorporated by reference:
Green turtle: http://www.fpir.noaa.gov/PRD/prd_green_sea_turtle.html

Hawksbill: http://www.fpir.noaa.gov/PRD/prd_hawksbill.html

3.2.2 MMPA-Protected Species

As noted in Chapter 1, the MMPA provides protections for marine mammals. In addition to those marine mammals that are listed under the ESA and described in the subsections above, other protected whales and dolphins may occur in near-shore waters of Hawaii and are listed in Table 6 above. Of the species listed in Table 6, the bottlenose dolphin may be found throughout the Hawaiian spinner dolphins' essential daytime habitats and throughout the range of the resident populations of spinner dolphins (Carretta *et al*. 2014). Pantropical spotted dolphins, short-finned pilot whales, pygmy killer whales, and rough toothed dolphins may overlap with the range of the Hawaiian spinner dolphin. Information from across the MHI indicates that these four species may be more commonly sighted in deeper depth ranges (Baird *et al.* 2013). Overlap in range may vary by island and by time of day, similar to insular false killer whales. As evident from online videos, people do seek out other marine mammal species for viewing and swim-with opportunities; this includes the species listed above in Table 6. Further information on these species can be found in NMFS' annual stock assessment reports and is herein incorporated by reference: http://www.nmfs.noaa.gov/pr/sars/species.htm.

3.2.3 Protected Habitat

In addition to protecting species, the ESA and MSA protect certain areas or habitats. Under the ESA, areas that are protected for listed species are designated as critical habitat and Federal agencies consult with NMFS to ensure the effects of their activities are minimized and do not adversely modify the habitat. In accordance with the MSA, NMFS and the Fishery Management Councils identify Essential Fish Habitat (EFH) that supports every life stage of each federally managed fish species; within these areas, habitat areas of particular concern may also be identified for conservation, management, or research reasons. Through EFH consultations, NMFS recommends ways that Federal agencies can avoid or minimize the adverse effects of their action on the habitat that supports federally managed fisheries. Areas designated as EFH

surrounding Hawaii can be mapped at the following address:
http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html

3.2.3.1 Critical Habitat

Critical habitat is defined by the Endangered Species Act (ESA) and refers to areas that are important to the recovery of ESA listed species. Each designation describes physical and/or biological features found in the habitat that are essential for the conservation of the listed species, and that may require special management and protection. Under the ESA, Federal agencies must take precautions to insure that activities that they fund, authorize (permit) or carry out do not destroy or adversely modify designated critical habitat.

The Hawaiian monk seal is the only ESA listed species with critical habitat designated within the geographic scope of this action. Hawaiian monk seal critical habitat was recently revised in 2015 (80 FR 50925), expanding the designation in the NWHI and adding new areas in the MHI. In the marine environment of the MHI, Hawaiian monk seal critical habitat includes the seafloor and marine habitat to 10 m above the seafloor from the 200 m depth contour through to the shoreline. The essential features of Hawaiian monk seal critical habitat include: preferred pupping and nursing areas (including terrestrial and marine habitat), significant haul-out areas (in terrestrial areas) and foraging areas (in marine areas) out to 200 m in depth. There are no preferred pupping areas found adjacent to the areas proposed for time-area closures; accordingly, areas selected for proposed closures do not support the marine aspect of this essential feature. Time-area closures identified in Alternatives 4 and 5 would be located within the critical habitat designation in areas that may support Hawaiian monk seal foraging. More information describing this designation can be found at http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm.

3.2.3.2 Essential Fish Habitat

EFH is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The EFH guidelines under 50 CFR 600.10 further interpret the EFH definition as follows:

> Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

EFH has been designated for all of the federally managed fish species, referred to as the Management Unit Species (MUS), in the Pacific Islands Region. Under the MSA, EFH must be identified and conserved. Designations for each MUS varies in water depth and by life stage, but the areas are bounded by the shoreline, and the seaward boundary of the EEZ. All five time-area closures would be located within areas of EFH. Additionally, Habitat Areas of Particular Concern (HAPC) have been identified within EFH. EFH and HAPC are summarized in

Appendix D and described in further detail in the Fishery Ecosystem Plan (FEP) for Hawaii, which can be found at the following website: http://www.fpir.noaa.gov/SFD/pdfs/feps/Hawaii_FEP.pdf.

3.3 Benthic Habitats

The primary benthic habitat that is found within the Hawaiian spinner dolphins' near-shore resting habitat is a white sand bottom, bordered by darker rock and coral. Experts think that resting spinner dolphins prefer the sandy-bottomed habitats because it provides a light-colored background, against which it is easier to detect predators, such as sharks. Researchers have observed that spinner dolphins restrict their rest periods along shore to locations of patches of open sandy bottom sufficiently large enough to support their rest patterns (Norris *et al*. 1994). Spinner dolphins rely solely on vision to detect predators while resting, as they change from acoustical cueing of behavior to the use of vision (Norris *et al*. 1994).

The sandy benthic habitat found within Hawaiian spinner dolphin resting sites may include many different organisms, such as clams, worms or crabs. Of particular note is the presence of garden eels in the sand-bottom habitat at Makako Bay; hence the local name for the bay "Garden Eel Cove."

3.4 Social and Cultural Resources

The following section describes human activities that are not dolphin-directed within the dolphin resting areas discussed in Section 3.1.7. For bays not selected for time-area closures, discussion focuses on activities that may be affected in some manner by the various alternatives under consideration that focus on regulating human activities. For the five bays where time-area closures are being proposed for implementation, NMFS discusses additional information gathered throughout the scoping period concerning the historical, cultural and religious significance.

3.4.1 Dolphins and Native Hawaiians

There are certain cultural associations with the dolphin, or nai'a in the Hawaiian language. For example, the following verse from the Hawaiian story of creation chant, the Kumulipo, describes the first fish to appear (or being born), swimming into the ocean of the sun:

> Hānau ka I'a, hānau ka Nai'a
> I ke kai lā holo.
>
> Born is the I'a (fish), born the Nai'a
> Swimming into the ocean of the sun
> (from http://www.sacred-texts.com/pac/lku/lku03.htm)

Some Native Hawaiians may consider the nai'a an 'aumakua (personal or family god, deified ancestor). Hawaiian culture is deeply rooted in their dependence on and knowledge of their natural environment, and each Native Hawaiian family may have many 'aumakua (Honua

Consulting 2013). Accordingly, some Hawaiian fishermen see the nai‘a as a good omen or a protector.

3.4.2 Traditional and Cultural Practices

Traditional and cultural practices occur throughout the MHI including in places within the action areas. These traditional activities include fishing; subsistence gathering of ocean resources by cultural practitioners, such as limu (seaweed) and pa‘akai (salt); hoe wa‘a (canoe paddling); gathering of cultural resources for spiritual and cultural protocols; lā ‘au lapa‘au (medicine or medicinal plant usage); ancestral caretaking and worship; worship of akua (god) and ali‘i; care of burial sites; and care of historical sites (Honua Consulting 2013). Section 3.4.5 discusses the particular activities occurring at each site, as identified in interviews with local residents.

3.4.3 Traditional Historic Properties

Examples of culturally significant historic properties that may be found within or adjacent to the Hawaiian spinner dolphin resting areas are described in the following paragraphs.

3.4.3.1 Onshore Traditional Historic Properties

Traditional Hawaiian sites can be found along the shorelines of all of the MHI. They occur in a range of natural environments from rocky headlands to sandy beaches. An excellent example of this is Puuhonua O Honaunau, adjacent to Honaunau Bay, which is listed on the National Register of Historic Places.

The types of historic properties found near the shoreline include the following:

> Canoe landings and canoe sheds: While canoe landings are often natural features such as small sand beaches or areas of gently sloping shingles where a canoe could easily be brought ashore, canoe sheds were long, narrow, stone-walled enclosures that were originally roofed with thatch.
>
> Fishing shrines and other religious sites: Small fishing shrines (ko‘a) were often built near the shoreline, usually on low promontories overlooking the sea. It was at these ko‘a that the first fish of the catch was left as an offering to Kū‘ulakai or one of the other patron gods of fishing. Larger religious structures (heiau) were usually set further back from the shore, but at times they can be found just above the high tide line.

3.4.3.2 Inter-Tidal Traditional Historic Properties

Very little archaeological evidence of past human activities has survived in the turbid environment of the surf zone. Some traditional features, however, have been documented within more gentle intertidal areas. These inter-tidal sites may include:

> Fishing-related features: Along the shoreline where low promontories and fingers of lava extend out into the sea, it is not unusual to encounter depressions of various sizes and shapes

that have been battered or ground into the surface of pāhoehoe (smooth lava). Hawaiians who fished the tidal pools and the shallow offshore waters created and used these depressions for a range of purposes, including as bait cups (mortar-like depressions used in grinding palu, or bait) and fish poison basins (shallow depressions where plants like ʻauhuhu and ʻakia were pounded to extract their juices, which were then used to stun fish in tidal pools).

Salt pans: Some of the shallow depressions pecked and ground into the pāhoehoe lava at or just above the high tide line were used for the manufacture of salt. These basins were filled with seawater, which was then allowed to evaporate. Hawaiians collected the resulting salt crystals used them to season food and for ceremonial purposes.

Rock art: Some traditional Hawaiian petroglyphs were carved into the surface of level lava or sandstone benches that extend out into the intertidal zone.

3.4.3.3 Off-Shore Traditional Historic Properties

While there are a substantial number of pre-contact historic properties located within the shoreline zone, there are relatively few located in the offshore waters. The sites that do exist are for the most part stacked stone structures.

Fishponds and fish traps: Stone-walled fishponds (and, to a lesser extent, fish traps) were traditionally constructed in the shallow offshore waters that fringe the leeward coasts (and sheltered portions of the windward coasts) of several of the MHI. The largest concentrations of traditional loko iʻa (fishponds) are located along the southern coastlines of Oahu and Molokai and the west coast of Hawaii Island, though loko iʻa can be found on almost all of the main islands. Traditional fishponds are most commonly of two types, either loko kuapā (walled shoreline ponds) or puʻuone (inland ponds connected to the sea). While many ancient ponds are long abandoned (the walls of some having been damaged or destroyed, others silted in), some ponds have been restored and are actively used for aquaculture.

Ceremonial sites: There is archaeological evidence that some traditional ceremonial structures were located within the offshore zone, but such sites are relatively rare. The most well-known of these is the heiau (place of worship) of Hale o Kapuni located in Pelekane bay on the Kohala coast of the island of Hawaii. This shrine is submerged just offshore below the larger heiau of Mailekini and Puʻukoholā and near the former royal compound within Puʻukoholā National Historic Site.

3.4.3.4 Traditional Cultural Properties

Traditional Cultural Properties (TCPs) are more difficult to recognize than most archaeological sites since their significance often depends less on a physical structure and more on a religious, cultural, some mythical or historic event or ritual associated with the place. At present, there has been no TCP identified within the action area; however, it is likely that wahi pana (storied places) or leina a ke akua (leaping-off points from which a departing spirit enters the next world) may be present. Bays and beaches, stretches of shoreline and other natural landmarks may be associated with mythic or historic figures, traditional activities, or historic events.

3.4.4 Areas Not Considered for Time-Area Closure Implementation

The following areas were not considered for time-area closures based upon the selection criteria used in Appendix A; however, they would still be subject to any other measures regulating human activities that may be included in the proposed regulations.

3.4.4.1 Oahu

Leeward Coast
Stretching the length of the western coastline of Oahu, the waters of the leeward coast are used by a variety of vessels or watercraft for a variety of activities including fishing, military training activities, recreational boating, recreational touring (snorkeling tours others that are not Hawaiian spinner dolphin-directed), diving, kayaking, canoeing and other watersport activities. Subsistence and quasi-commercial fishing for akule (bigeye scad, *Selar crumenophthalmus*) and ʻōpelu (mackerel scad, *Decapterus macarellus*) is often described as a major activity along this coast, and conflicts have arisen between the spinner dolphin tours and the fishermen as a result of this overlap of activity (DOBOR 2009). Additionally, waters along this coastline are commonly used for recreational swimming.

3.4.4.2 Hawaii Island

Honokohau Harbor
The main recreational and commercial harbor on the Kona coast, Honokohau Harbor is located between the Kona Airport and the town of Kailua-Kona. With over 200 moorings, three ramps and several piers, the small boat harbor is a hub for commercial tour boats including fishing charters, whale and dolphin tour boats and dive and snorkel charters. The harbor is also used for recreational boating activities.

Kailua Bay
Kailua Bay is located in the town of Kailua-Kona and is the site of many ocean-based activities. The State of Hawaii designated Kailua Bay as an ORMA, which allows the use of personal watercraft, parasailing and other recreational boating activities in the bay. There is even an "island" in the middle of the bay equipped with recreational rentals (jet skis, kayaks, paddleboards and other items). This bay has a popular swim lane, and is used frequently by locals interested in swimming activities that are not Hawaiian spinner dolphin-directed, and where the swimming portion of the Ironman Triathlon is held. The annual Hawaiian International Billfish Tournament is held at the pier at this bay.

Kehena Beach
Kehena Beach is located in the Puna District on the east side of Hawaii Island. The beach is used by local residents as a "clothing-optional" beach and is also listed in many tourist guidebooks. The typically rough waters in this area limit swimmers, and there are no other activities commonly described for this stretch of area.

Mahaiula and Makalawena
As part of the Kekaha Kai State Park, Mahaiula, the southernmost beach in the park, is used for swimming, snorkeling and diving. In addition, the beach offers Kawili Point, an area that surfers frequent. Makalawena (to the north) additionally offers swimming, snorkeling, surfing and diving opportunities.

3.4.4.3 Kauai

Na Pali Coast
The Na Pali coast is a 15-mile stretch of undeveloped cliffs along Kauai's northwest coastline. This area is a popular sightseeing attraction for visitors, but remains accessible only to those that hike or boat into the area. Commercial boat tours, recreational boaters and kayaks often tour this area to observe the scenery and wildlife.

3.4.4.4 Lanai

Hulopoe Bay
Residents and visitors use this bay for recreation, particularly for snorkeling and swimming, and it remains the easiest accessible beach recreation area on the island (other locations on island may require four-wheel drive to access). The bay is considered subzone A of a two-part Marine MLCD that also includes nearby Manele Bay (subzone B). With the MLCD status, the area has State-enforced regulations regarding fishing, removal of marine life and anchoring.

3.4.5 Areas Considered for Time-Area Closure Implementation

3.4.5.1 Hawaii Island

Kealakekua Bay
Kealakekua Bay is located approximately 13 miles south of Kailua-Kona. The name Kealakekua means "pathway of the gods." Described as one of the most important historical and archaeological areas in Hawaii, Kealakekua Bay was registered as the Kealakekua Bay Historic District on the National Register of Historic Places in 1973. The national significance of the area was described by the State of Hawaii in four general areas: the preservation of material remains; abundance of written sources; continuity of cultural tradition through time; and occurrence of significant cultural and historical events (http://pdfhost.focus.nps.gov/docs/NRHP/Text/73000651.pdf). The historical integrity preserved at this site is linked in part to the sheltered and isolated nature of the bay, which may have allowed for the preservation of materials, and to its distinction as being one of the first areas where Native Hawaiians engaged in lengthy contact with Westerners. Thus, early written accounts describe the uses and some of the significance of the sacred sites — including fishponds, burial caves, lava tubes, heiau, and shrines — found in this area.

Notorious as the location where Captain Cook was received and then later killed, Kealakekua's rich history describes villages that were major centers of political and religious power along the Kona coast (http://dlnr.hawaii.gov/dsp/files/2014/09/hsp_kealakekua_shp.pdf). The villages at Kaawaloa and Kekua (later known as Napoopoo), located along Kealakekua's shores, were well

established and supported by extensive agricultural fields and the surrounding ocean resources prior to first European contact. Sites of historic and cultural significance located in and around Kealakeua include the Hikiau heiau, and the burial caves known as pali-kapu-o-keōua. The Hikiau heiau was a religious center located at Kealakekua, which was dedicated to the Hawaiian deity (Honua Consulting 2013). Pali-kapu-o-keōua is considered another sacred site located at the bay because the burial caves are thought to hold the iwi (bones) of many of the ancient Hawaiian aliʻi (royalty).

Beyond the landing site of Cook and the monument for his death, the bay also became the backdrop for historical events and patterns that describe the struggles of Hawaiian history post-contact. Kealakekua includes the site of the battle of Mokuohai during the war of succession between the forces of Kamehameha (the first King of all the islands) and those of the sons of Kalaniopuʻu (the last old ruling chiefs of Hawaii Island) (http://focus.nps.gov/pdfhost/docs/NRHP/Text/73000651.pdf). From 1800 to 1819, Kealakekua was declared a commercial and political center. Kamehameha used Kealakekua as a naval yard for war ships and established royal apartments at Napoopoo. The bay area became a shipping and provisioning port for explorers, whalers and traders, and in 1824 became the site of the first Protestant mission on Hawaii Island (Belt Collins 1997). Following this period, the population moved from Kaawaloa to Napoopoo. The first government-built wharf was established at Kaawaloa in 1863. The wharf at Napoopoo was constructed in 1922, and included the Hackfield and Co. general store and pineapple cannery (Belt Collins 1997).

The State of Hawaii recognized the historic and recreational significance of Kealakekua Bay and began acquiring lands around the bay to protect it from further encroachment. In 1969, Kealakekua Bay State Historical Park became the second area listed as a Marine Life Conservation District (MLCD) due to the historical significance, aesthetic appeal and academic and scientific values of the bay (DLNR 2009). The MLCD is divided into two subzones (A to the north and B to the south). In subzone A, all fishing, taking or injuring of marine life is prohibited, as is the anchoring or mooring of boats, except at locations or moorings designated by DLNR. The County of Hawaii identifies two public access points on Boulder Beach and Napoopoo landing at Kealakekua Bay (http://www.hawaiicounty.gov/pl-s-kona-map2). Interviews with lineal and cultural descendants from the area indicated that some traditional activities continue to take place in the area. These traditional activities include fishing; subsistence gathering of ocean resources by cultural practitioners, such as limu and paʻakai; hoe waʻa ; gathering of cultural resources for spiritual and cultural protocols; lā ʻau lapaʻau; ancestral caretaking and worship; worship of akua and aliʻi; care of burial sites; and care of historical sites (Honua Consulting 2013).

Currently, the bay attracts many users for recreation, commercial and traditional uses or purposes. Recreational uses include swimming, kayaking, snorkeling, scuba diving, standup paddleboarding, boating and visiting the Captain Cook Monument.

Honaunau Bay

Honaunau Bay was included with Puʻuhonua O Hōnaunau National Park as a Historic District on the National Register of Historic Places in 1966 (http://pdfhost.focus.nps.gov/docs/NRHP/Text/66000104.pdf). With 15 significant remains

described throughout the area and a partial inventory of 321 sites, the archaeological remains in this district are described as representing nearly every aspect of Polynesian culture. The archeological structures and features represent a timespan of over 700 years, the most famous of the features being the Puʻuhonua (place of refuge), which is enclosed by the Great Wall, a massive 965-foot long masonry wall (http://www.nps.gov/puho/historyculture/index.htm). Warriors, noncombatants and those who violated the kapu (taboo or prohibition) once used the refuge. Puʻuhonua O Hōnaunau remains a sacred ceremonial site in Hawaiian culture.

Significant archaeological remains also include a temple mausoleum for the ruling chiefs of Kona (Hale-o-Keawe), several heiau, royal houses, hōlua (a sled course built from lava rock), graves, fishponds, midden, and cave shelter sites. The many archaeological remains indicate that this area was a political and religious focal point on the West Hawaii coast and many moʻolelo (stories) mention Honaunau as a famous launching/landing area for waʻa (canoes) and fishing. The ancient village of Honaunau was home to chiefly retainers and commoners, and was the ancestral home of the Kamehameha dynasty. However, when trading began, Honaunau Bay was considered too shallow for ships and the aliʻi moved to locations more conducive to trade (http://www.nps.gov/puho/historyculture/index.htm).

The City of Refuge National Historical Park was first established on July 1, 1961. Now called Puʻuhonua O Hōnaunau National Historical Park, it includes the refuge, palace grounds, royal fishponds, royal canoe landing area, stone-house platforms and temple structures. The National Park Service works to preserve and maintain sites within the 420 acres of park that abuts the bay. Additional information about the history of the area, remains found in the park and the preservation of the site may be found on their website (http://www.nps.gov/puho/historyculture/index.htm).

Because the Puʻuhonua O Hōnaunau and related sites are immediately adjacent to Honaunau Bay, many Native Hawaiians consider the entire bay to be a sacred cultural site (L. Navas-Loa, Honaunau resident, personal communication, October 2007), which requires protection from activities that may degrade, destroy or detract from that sacred nature. Cultural events occur biannually in the park and the events often include canoe rides.

Outrigger canoe paddling has been a common practice in the history of Honaunau Bay, which continues to present day (http://www.nps.gov/puho/historyculture/index.htm). When this area became a National Historical Park in 1961, training and racing here ended. However, paddling began again in the 1970s with Hale o Hooponopono, a school teaching Hawaiian language, history and culture. Paddling, fishing, ʻopihi (limpet) picking, and canoe maintenance were taught at the school. In this bay, Keoua Honaunau Canoe Club hosts the Calvin Kelekolio long distance race annually, which starts in Honaunau Bay and heads north towards Kealakekua Bay. Every Labor Day weekend since 1971, Kai Opua Canoe Club has hosted the Queen Liliuokalani Long Distance Canoe Race (https://www.kaiopua.org/history.asp), which stretches from Kailua Bay to Honaunau Bay at the boat ramp. Approximately 3,000 people attend to watch or participate in the race each year. In addition, canoe rides are offered in the Bay twice a year during cultural festivals associated with the National Park; rides are generally offered between 10 AM and 3 PM.

The bay currently supports launches of recreational fishing boats from a small boat ramp used by local fishermen on a regular basis. It is also a popular dive and snorkel site, with a highly diverse coral ecosystem that provides for spearfishing opportunities and viewing the many colorful fish species that live there. A group of local residents, Ka Ohana O Honaunau, formed to address the extensive use of this site by educating visitors on its importance to Native Hawaiian culture and the fragile nature of the coral reef, as well as its importance as a Hawaiian spinner dolphin resting area. The County of Hawaii identifies Honaunau Bay boat ramp as a public access area for this bay (http://www.hawaiicounty.gov/pl-s-kona-map3).

Interviews with lineal and cultural descendants from the area indicated that some traditional activities continue to take place in the area (Honua Consulting 2013). These traditional activities include fishing; subsistence gathering of ocean resources by cultural practitioners; canoe activities, including fishing from canoes; gathering of cultural resources for spiritual and cultural protocols; medicinal plant usage; ancestral caretaking and worship; worship of akua and ali‘i; and care of burial sites.

Kauhako Bay (Hookena)

Kauhako Bay and the village of Hookena are located in the South Kona district. The name Kauhako means "the dragged large intestines" and refers to a mo‘olelo about a chief who was killed by his people out of revenge; the name Hookena means, "to quench thirst" and is the name of the ahupua‘a that surrounds the bay (UH Department of Urban and Regional Planning, 2008).

Historic information gathered on this bay focuses on the late 19th century, when the bay was used as a thriving landing area and a village, churches, a store, and schools surrounded the landing area. In 1889, King Kalakaua advised the author Robert Louis Stevenson to visit Hookena, as it was the best example of a typical Hawaiian village. The landing was the heart of the village with a store owned by Henry Cooper, called Cooper Landing. The bay supported interisland steamers landing until the mid-1930s, when trucks replaced steamships for cattle transportation, and surf and storms demolished the landing. After that time, occupancy shifted towards the highway where more activity could be found.

In 1999, the State DLNR, State Historic Preservation Division (SHPD) conducted a field inspection around the beach park area in conjunction with the construction of the restroom facilities and the accompanying septic tank and leach field. Staff archaeologists identified a rock wall about two feet high and 110 feet long that stands as a built historic resource between the Hookena Beach Park parking lot and the restrooms and showers. However, modernizations (concrete to stabilize the rocks) made to a section of the wall compromised the significance and integrity of the wall, and the area did not qualify for inclusion in the National Registry.

The native Hawaiian fishing village of Hookena is located on Kauhako Bay. People use a variety of fishing methods in this traditional fishing area, the most popular being trolling and spearfishing with the Hawaiian spear; the least utilized include spearfishing with a spear gun, spearfishing on SCUBA and hukilau (seine) fishing. During a Hookena community-based meeting held on September 10, 2012, residents indicated that fishing occurs at different times of the day throughout the year, depending on the species that may be in season. Of particular concern were those fisheries that occur over sandy-bottom habitat during the fall and winter

months, such as lobster and Kona crab. Community members also indicated that the tradition of feeding the koʻa (fishing grounds), a traditional Hawaiian practice whereby fishermen take care of the fishery and the near-shore ecosystem, is practiced in the bay year round at various times. Residents indicated that fishing was a family practice and stated that families sometimes troll in boats and kayaks as shallow as 6–10 ft. of water while fishing in the area. People conducted traditional fishing practices mainly for ʻōpelu and akule. This is one of the only places remaining in Hawaii where fishing is performed in the traditional manner using nets from Hawaiian three-board outrigger canoes, and the only place on the island where these canoes are launched from the beach (G. Oamilda, KUPA, personal communication, June 2007).

Community efforts in this area focus on passing this knowledge to the youth to maintain and promote cultural and community ties. Hookena's community places great significance on the care of their marine resources, and local fishermen identify that the community members' lifestyle, cultural practice and physical health are connected to the marine resources (Hookena community meeting, September 10, 2012). Community representatives have been working with the State DLNR toward protecting their marine resources by creating a proposed Community-Based Subsistence Fishing Area in the bay.

Hookena has a popular County beach park where visitors can swim, snorkel, camp overnight and fish. It is a very small bay but has many ocean users competing for the area, including subsistence fishers, scuba divers, canoe paddlers and snorkelers. In agreement with the County of Hawaii, the Friends of Hoʻokena Beach Park (FOHBP), a branch of the non-profit group Kamaʻaina United to Protect the ʻAina (KUPA), manages the area's cultural and economic resources, as well as its daily operations. KUPA has an onsite booth where they also provide free educational materials. The County of Hawaii identifies Hoʻokena Beach Park as a public access point for this area (http://www.hawaiicounty.gov/pl-s-kona-map3).

Interviews with lineal and cultural descendants from the area indicated that some traditional activities continue to take place in the area. These traditional activities include fishing; subsistence gathering of ocean resources by cultural practitioners; canoe activities, including fishing from canoes; gathering of cultural resources for spiritual and cultural protocols; medicinal plant usage; and ancestral caretaking and worship, including care of burial sites.

Makako Bay/Hoona Bay

Makako Bay and Hoona Bay comprise an adjacent two-bay complex, located south of the Keahole Airport and north of the Natural Energy Laboratory of Hawaii Authority (NELHA) aquaculture facilities. When seen on the USGS map, Hoona Bay is located to the south and Makako Bay is to the north, but they are both frequently referred to simply as Makako Bay, as it is difficult to distinguish where one ends and the other begins. The area of Makako Bay/Hoona Bay is located within the ahupuaʻa of Kalaoa, makai (towards the sea) of Amanamana, north of Keahole Point.

This area was once surrounded by a coastal fishing village, which sat on the edge of a several mile long fishpond named Paaiea. Ancient Hawaiians navigated through the pond and used it as a protected passageway. The area was severely impacted when the volcano Hualalai last erupted in 1801 — the entire Amanamana area was covered by a pāhoehoe flow emanating

from Puhi a Pele (often misspelled as Puhia Pele), the crater located on the north side of Hualalai's summit area. This crater is also known as Pele's Pit, reflecting the depth of the vent. With the fishpond covered from the lava flow and a barren landscape left behind, only a sprinkling of settlements arose afterwards at Hoona. Fishing continued to provide a livelihood and food for the village of Hoona and traditional practices included fishing, feeding the koʻa, as well as harvesting of limu, ʻopihi, wana (sea urchin), hā ʻukeʻuke (sea urchin) and loli (sea slug or sea cucumber). Remnants of ancient structures, burial sites and a hōlua course associated with this settlement can be found on the trail just to the south of the bay in the State of Hawaii Hoʻona Historic Preserve. This preserve contains graves, houses, and other sites of a late 1800s–1900s Hawaiian settlement. Restoration of this site is underway under sponsorship of NELHA and the Department of Land and Natural Resources Historic Preservation Division.

Presently, properties surrounding Makako Bay include Cellana, Cyanotech, the State of Hawaii Hoʻona Historic Preserve, Keahole Airport, open plots owned by NELHA and other aquaculture businesses. Fishing and ʻopihi gathering still occurs in the area. The limited access to the area is thought to help to keep the fishery healthy, because historically the only access was by boat, or permission to enter was given by someone who worked on the surrounding ranch. Cultural activities taking place in this area described by a local practitioner includes shoreline fishing, throw nets, canoes and catching ʻōpelu (Honua Consulting 2013). Additionally, the diving in the area is described as excellent and many people come to the area to view manta rays. Access to the bay is critical for these activities, not just for fishing, which includes extraction, but also for feeding the koʻa. The County of Hawaii has not identified any public access points for Makako Bay from shore. Wawaloli Beach, just south of the Bay, and Keahole Point, just north of the Bay, are identified as the closest public access points to Makako Bay (http://www.hawaiicounty.gov/pl-n-kona-map2, http://www.hawaiicounty.gov/pl-n-kona-map1).

This bay, known locally as "Garden Eel Cove," is a popular boat dive site due to the garden eels that are found in the sandy substrate. Dive boats also come here in the late afternoon and evening to dive with manta rays. The Kona Bluewater Farms aquaculture pens are located directly offshore from this site and their operations can be observed from shore. There are also other activities that occur here, including capturing fish to sell to the tropical fish aquarium industry.

The recreational activities currently taking place at Makako Bay include fishing; subsistence gathering of ocean resources by cultural practitioners; canoe activities, including fishing from canoes; use of the view plane; swimming/snorkeling; kayaking; worship of ancestral guardians (specifically hāhālua, or manta ray); and lā ʻau lapaʻau.

3.4.5.2 Maui

La Perouse Bay

La Perouse Bay is referred to as Keoneʻōʻio in the Native Hawaiian language. The name Keoneʻōʻio refers to the ʻōʻio, or bonefish (*Albula vulpes*), which was once abundant in the bay (DLNR 2012). References to fishing in ancient Hawaiian stories often describe the Moʻi (king or ruler) of Hawaii Island, Kauhalanuimahu, building a fishpond at Keoneʻōʻio, while he was

residing in Honuaula, Maui. The French explorer, Francois de Galaup, Comte de la Perouse, was the first European to land on Maui in Keone‘ō‘io (later called La Perouse Bay) on May 30, 1786. Accounts of his landing indicate that there were five villages along the La Perouse Bay shoreline, which likely describe the cluster of villages found in the Keone‘ō‘io Archeological District that is registered on the State Register of Historic Places. This district includes two heiau; a ko‘a; a possible hale mua (men’s eating house); a large water well with two sections; as many as five long, narrow enclosures that may have served as canoe sheds; and several possible graves (http://www.nps.gov/pwro/piso/laperos/laperos5.htm#append).

In 2001, the National Park Service studied the suitability and feasibility of including lands extending along the southwestern coast of Maui from Keone‘ō‘io to Kanaloa Point in the National Park System. This included an evaluation of the area applying the National Historic Landmarks process contained in 36 CRF Part 65. The study found that the resources available within the area did not meet the test of national significance; however, it also found that the Hawaiian archeological and coral reef resources in the study area do appear to be of statewide significance. The National Park Service identified throughout the report that the sheer number of visitors to the site compromised the Hawaiian archeological resources, and recommended that the State take measures to protect these resources (http://www.nps.gov/pwro/piso/laperos/laperos5.htm#append).

As noted in the name, Keone‘ō‘io is known most prominently for its bountiful fishing sites. Traditional activities include fishing, subsistence gathering of ocean resources by cultural practitioners, canoe activities, traditional recreation, gathering of cultural resources for spiritual and cultural protocols, lā‘au lapa‘au, healing and cleansing rituals, ancestral caretaking and worship, worship of akua and ali‘i, care of burial sites and care of historical sites (Honua Consulting 2013). In addition, there are also regular navigation practices, collection of limu, pa‘akai, ‘ōpihi and other cultural resources, and educational activities. The northwest shoreline of the bay is privately owned, and a native Hawaiian family has lived in their home there for several generations. The home has a small boat ramp that is used primarily for ingress and egress to access traditional fishing grounds located outside of the bay (J. McDonald, DLNR ranger, personal communication, November 2007). Maui County identifies La Perouse Bay as a public access point for this area (http://www.co.maui.hi.us/documentcenter/view/8198) (lat/long: 20.602683 and -156.422910). In addition to the cultural uses described above, surfing, fishing, free diving and spearfishing are other ocean uses occurring at this site. Surf breaks include Laps, Carters, and Voodoos.

3.5 Description of Affected Industries

This section provides general information about businesses potentially affected, either directly, or indirectly, through the implementation of any of the action alternatives. For a more thorough description, see the 2007 Economic Data Report, found online at http://www.fpir.noaa.gov/Library/PRD/Spinner%20Dolphin/EIS/FinalSpinnerDolphinEconomicDataReportIAI.pdf as well as the Regulatory Impact Review (RIR) found in Chapter 5.

The 2007 Economic Data Report compiled information about business operations for commercial boat tours, dolphin spiritual retreat tours, and kayak businesses operating in 2006

and 2007. The researchers who developed the report collected the information through background research and interviews with persons operating many of these businesses on Kauai, Oahu, Maui, and Hawaii and the report contains considerable information on the industry in operation at that time. The RIR provides some updates to this industry, particularly with regard to the composition of the industry and updated estimated numbers of businesses.

Whale and dolphin watching businesses, dolphin swim spiritual retreats, snorkel tours, SCUBA companies and kayak tours/rentals are likely to see a greater effect on their businesses, since they are the most dolphin-directed. Other ocean recreation companies (jet ski, SUP, outrigger and others) may be affected because there is an opportunity to see dolphins while on these platforms, but they are not as focused on the dolphins as the other businesses listed, so they will be affected to a lesser extent.

In recent years, tourist-dependent industry involving direct human interaction with Hawaiian spinner dolphin groups (also referred to as "swimming with dolphins" operations) has emerged on four of the seven inhabited MHI: Kauai, Oahu, Maui, and Hawaii.

Depending on the activity, location and anticipated degree and proximity of interaction with dolphins, the revenue earned from those possibilities of interactions may vary. These include dive and snorkeling boats that can charge a fee per head or charter fee for use of the vessel, some of which enable opportunities to swim with dolphins; general tour boats that charge a fee per head; and spiritually linked tour operations that charter vessels to transport customers as part of an overall per person package consisting of airfare, lodging, swimming with Hawaiian spinner dolphins and other activities. The majority of the general tour boats also derive revenue from whale watching and sightseeing operations, while a number of the dive/snorkel vessels offer snorkeling or diving trips to prospective customers. Spiritual tours, in many cases, offer yoga, meditation, whale watching and other activities, in addition to swimming with the dolphins.

Most motorized vessels bringing clients to swim with dolphins range from approximately 22 to 42 feet in length and may carry between 6 and 81 people, according to the 2007 Economic Data Report (Impact Assessment, Inc. 2007). By comparison, tour vessels that offer more generalized wildlife viewing tend to be larger than those that focus on close interactions with spinner dolphins. Based on the 2007 Economic Data Report, these generalized tour vessels might range between 27 and 130 feet in length with a maximum carrying capacity ranging between 25 and 400 people, with an average maximum capacity of 99 passengers. Kayaks are smaller and can carry only one or two passengers, on average. The spiritual tours often charter known spinner dolphin viewing tour company vessels, which tend to be smaller. Swimming- from-shore guides generally drive or walk customers to locations where spinner dolphins are known to inhabit and may or may not enter the water with them. At least one of the spiritual-linked firms offers encounters of this type.

The researchers who compiled the information in the 2007 Economic Data Report estimated the number of businesses potentially enabling tourists and local residents to interact with Hawaiian spinner dolphins. NOAA has also maintained an ongoing list of companies that enable interaction with spinner dolphins to some degree. It appears that in the time between when the 2007 Economic Data Report came out and early 2015, there has been an overall gain in the

number of dolphin tour companies. For example, Oahu numbers have nearly doubled in the past 10 years, and the number of companies on Hawaii Island has increased. This increase includes companies whose primary activity was not dolphin-directed in the past, such as SCUBA companies, but have added swimming with or watching dolphins to their current menu of activities offered. Table 7 presents the estimated number of these dolphin-related businesses in Hawaii in 2015. Tables 8, 9, 10, and 11 provide a snapshot of industries that allow for spinner dolphin interactions.

Table 7: Estimated dolphin-related businesses in Hawaii in 2015

Type of Business	Hawaii	Maui	Oahu	Kauai
Commercial Tour Boat:				
Swim-with Dolphin Tour	22	2	10	1
Dolphin-watch tour	3	21	3	11
Generalized Tour	10	19	36	12
Spiritual Retreat	22	7	1	2+
Kayak Tour or Rental	6	9	6	13
Total	63	58	56	39+

Source: NOAA Fisheries PIRO

Table 8: Summary information for tour operations reporting direct interactions (2006–2007)

Industry Information	Hawaii	Maui	Oahu	Kauai
Mean number of employees	2.6	not available	10	not available
Range of trip fees ($)	90-175 (106–207)[1]	not available	95-148 (112–175)[1]	not available

Source: 2007 Economic Data Report (Impact Assessment, Inc.) [1]Converted to 2014 dollars

Table 9: Summary information for tour operations reporting indirect interactions (2006–2007)

Industry Information	Hawaii	Maui	Oahu	Kauai
Mean number of employees	20	20	16	20
Range of trip fees ($)	95-130 (112–130)[1]	70-119 (83–141)[1]	41-109 (48–129)[1]	92-127 (109–150)[1]

Source: 2007 Economic Data Report (Impact Assessment, Inc.) [1]Converted to 2014 dollars

Note: The information included in this table does not likely include tour operations that focus on dolphin viewing.

Table 10: Summary information for spiritual retreat businesses (2006–2007)

Industry Information	Hawaii	Maui	Oahu	Kauai
Mean number of employees	not available	not available	not available	not available
Range of trip fees ($)	160-260 (189–307)[1]	not available	not available	not available

Source: 2007 Economic Data Report (Impact Assessment, Inc.) [1]Converted to 2014 dollars

Table 11: Summary information for kayak tour businesses (2006–2007)

Industry Information	Hawaii	Maui	Oahu	Kauai
Mean number of employees	3	4	25	8
Range of trip fees ($)	50–460 (59–544)[1]	50–300 (59–355)[1]	59–300 (70–355)[1]	168–175 (199–207)[1]

Source: 2007 Economic Data Report (Impact Assessment, Inc.) [1]Converted to 2014 dollars

Chapter 4 - Environmental Consequences

4.1 Introduction

This chapter describes the potential impacts on those resources identified in Chapter 3 (Affected Environment) from implementing the identified alternatives described in Chapter 2 (Alternatives 1–5). Specifically, the analyses describe the expected conditions under the various alternatives when compared to existing baseline conditions described in Chapter 3, Affected Environment.

The terms "effects" and "impacts" are used synonymously under NEPA; therefore, throughout this chapter both terms will be used interchangeably. Effects include direct effects, which are caused by the action and occur at the same time and place; indirect effects, which are later in time or farther removed in distance or location (but still reasonably foreseeable); and cumulative effects, which are those impacts that result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions (regardless of what agency or person undertakes such actions). Over time, individually minor actions may collectively affect a resource. A cumulative effects analysis attempts to consider the full range of consequences of an action in order to ensure better long-term planning of potential impacts. A discussion of cumulative effects appears in Section 4.5.

Under the No Action Alternative, existing general prohibitions under the MMPA would continue, and NMFS would continue to promote responsible wildlife viewing under the voluntary guidelines through the Dolphin SMART program (Section 1.3.3.1) and through additional methods of education and outreach. Under all of the action alternatives, NMFS would promulgate enforceable regulations; the anticipated impacts of these regulations are discussed in comparison to the No Action Alternative. The analysis also discusses how the various alternatives compare with each other where that comparison is relevant and informs decision-making.

NMFS anticipates that each action alternative has some potential to prevent or reduce the threat of take occurring (including harassment and disturbance), though the magnitude of the reduction will vary based on type and number of activities that the measure is capable of addressing. NMFS anticipates that a reduction in disturbance will have a positive impact on the spinner dolphins. NMFS described the observed levels of compliance qualitatively in Chapter 3; actual estimates of harassment and/or intentional disturbance that could be prevented by implementing each alternative cannot be calculated at this time. However, under current conditions, Hawaiian spinner dolphins are disturbed regularly by vessels and swimmers that seek interactions with wild dolphins (Forest 2001, Östman-Lind 2004, Danil *et al*. 2005, Courbis 2007, Timmel *et al*. 2008, Milette *et al*. 2011).

4.2 Impacts to Hawaiian Spinner Dolphins

Throughout Section 4.2, dolphin-directed activities that cause take are categorized into three human threat types (listed below) that have been found to cause disturbance to spinner dolphins

or disruptions to spinner behavioral patterns. Each alternative is then evaluated qualitatively to describe the degree to which the prohibitions may change disturbance associated with each type of threat, and the overall impacts of this change to Hawaiian spinner dolphin behaviors, habitat use and the overall population.

Threat Types:

- **Swim-with** interactions - human activities that involve closely pursuing or approaching spinner dolphins to swim near the animals or activities that include people floating in the water with the intent of having the animals swim nearby.
- **Vessel/watercraft** interactions – all vessel and watercraft that are engaged in activities that involve closely approaching spinner dolphins or activities that include placing vessels or watercraft on a path to cause a close encounter with spinner dolphins.
- **Intensity of activity in targeted essential daytime habitats** – all activities in or on the water inside essential daytime habitats, especially those that are dolphin-directed, that reduce the quality of the habitat by diminishing the dolphins' ability to use the resources in these areas for daytime behaviors including resting, nurturing young, socializing, and avoiding predators.

4.2.1 Alternative 1 – No Action

Under the No Action Alternative, NMFS would take no new regulatory action to enhance protections for Hawaiian spinner dolphins from dolphin-directed activities that cause take, including harassment or disturbance to spinner dolphins. NMFS would continue supporting existing education and outreach programs through PIRO and the NMFS-sponsored Dolphin SMART program (Section 1.3.3.1). Existing laws under the MMPA would continue to prohibit take and NMFS would continue to enforce those prohibitions. It is likely that the amount of disturbance to spinner dolphins from people seeking to swim-with, and closely approach on vessels and watercraft will continue.

Since the emergence of this dolphin-focused tourism industry in Hawaii, both the number of operators and the number of people participating in wild dolphin excursions have increased (Boehle 2007, O'Connor *et al*. 2009, Hu *et al*. 2009). O'Connor *et al*. (2009) reported 120,000 tourists participating in dolphin-directed tours per year, and 390,000 tourists per year participating in other tours (kayaking and snorkeling tours, for example) that opportunistically watch dolphins. In addition, residents and visitors seek out these opportunities unassisted by tour operators. Hu *et al*. (2009) described a 50% increase in the dolphin excursion business compared to and predicted industry increases to continue. With the recent implementation of the Dolphin SMART program on Oahu, Kauai, and Maui, five commercial tour businesses have pledged compliance to voluntary standards for responsible dolphin viewing, operating and advertising. However, with the increased interest in wild dolphin encounters, it is unlikely that there will be a net decrease in disturbance resultant from this program alone. Further, one Dolphin SMART operator left the program in 2015 because the business felt they could not compete with operators who advertise close encounters and even "swim with dolphin" programs. In the absence of specific regulations, it is likely that incidents of disturbance will continue at least at current levels and could continue to increase based on recent trends.

4.2.1.1 Behavioral Response

Under the No Action Alternative, disturbance to Hawaiian spinner dolphins in and around essential daytime habitats is expected to continue; thus, NMFS expects spinner dolphin behavioral responses and changes to group behaviors to continue. As noted in Section 1.4.2, behavioral studies of Hawaiian spinner dolphins do not span several generations, therefore, information is lacking to determine if long-term impacts to fitness are already occurring. However, studies demonstrate disturbance of individual spinner dolphins as well as changes to spinner dolphin group behavior patterns over time (Forest 2001; Ostman-Lind *et al*. 2004; Courbis 2004, Danil *et al*. 2005, Courbis and Timmel 2009). Individual responses indicate that spinner dolphins are diverting time and energy from fitness-enhancing behaviors or activities, such as socializing, resting and parental care to respond to swimmers and vessels. In addition, changes to overarching behavioral patterns within essential daytime habitats demonstrate that resident populations are altering group behaviors to avoid these threats. Changes to these patterns results in longer-term impacts that include the reduction of overall time spent in resting areas, reductions in dive periods (which are indicative of resting behavior), reductions in group sizes using resting areas, and habitat displacement within and among resting areas (Forest 2001, Danil *et al*. 2005, Östman-Lind *et al.* 2004). Current levels of tourism exposure were evaluated in a spinner dolphin energetic modeling study to determine if the costs associated with these stressors may leave Hawaii's spinner dolphins' energetic budget at a deficiency (Symons 2013, Johnston *et al*. 2014). Although the study indicated that resident populations are likely meeting their daily requirements for rest, it noted that any increase in exposure could result in a deficit that could affect the fitness of individuals. It further notes that energetic costs, such as growth and lactation, were not factored into the model and that these types of activities are known to increase energetic needs (ranging from 10-100%) in other species; therefore, some individual dolphins, including reproductively active females and young, may already be at risk (Symons 2013).

The nature of Hawaiian spinner dolphin viewing is such that tour companies repeatedly single out specific populations of animals for close-up encounters due to the animals' predictable occurrence in essential daytime habitats. Spinner dolphins using essential daytime habitats targeted by people wanting to interact with the dolphins are often subject to intense spinner dolphin-directed activity, putting them at high risk for cumulative stress and disturbance events throughout daytime hours when they would normally be resting, nurturing young or socializing. Under the No Action Alternative, long-term behavioral changes are likely to be expressed the most by spinner dolphins using these essential daytime habitats. Cumulative impacts from these shifts in behavioral and energetic budgets are discussed below (see Section 4.2.1.3).

4.2.1.2 Habitat Use

As noted above, specific essential daytime habitats have become targets for close-up encounters with Hawaiian spinner dolphins because these areas are predictably used by these dolphins and convenient to access for such activities. NMFS anticipates that, at a minimum, the current levels of disturbance within these essential daytime habitats would continue under the No Action Alternative; incidents of disturbance may also increase based on predicted trends.

Behavioral ecologists often compare animals faced with disturbance stimuli to those making decisions in terms of predation risk (Frid and Dill 2002, Bejder 2006a). This is similar to a cost/benefit analysis in which the costs of disturbance (or repeated disturbance) within a habitat are weighed against the benefits the animal receives from the resources within that habitat. The decision to flee is influenced by other factors that the animal faces, including the availability, distance and quality of suitable habitat elsewhere, and the animal's current body condition (weak individuals may not have the energetic resources available to flee) (Frid and Dill 2002, Bejder 2006a). If the animal is constrained in the availability of other suitable habitat or it is in poor condition, then it may remain within the habitat that has become costly to its overall health and fitness (see Section 4.2.1.3).

Additionally, tolerance to disturbance of particular individuals varies by individual; some individuals may be more sensitive to disturbance and more likely or able to flee disturbed habitats. Researchers previously reported that some Hawaiian spinner dolphins might have already met their threshold of disturbance within essential daytime habitats, resulting in changes to group size and habitat use for spinner dolphins using Kealakekua Bay (Forest 2001, Östman-Lind *et al.* 2004). Other researchers have reported similar responses in other well-studied dolphin populations, including documented habitat displacement from preferred resting and near-shore areas (Bejder *et al*. 2006a, Lusseau 2004, Nature Conservation Sector 2006, Lusseau and Bejder 2007). Over time and under the No Action Alternative, individuals and/or entire groups of spinner dolphins could be displaced from essential daytime habitats if their disturbance thresholds are met. Fleeing from optimal habitats may place higher energetic demands on animals if they have to work harder to sustain themselves in the new habitat. The impacts on individuals and the overall population from habitat displacement are discussed below.

4.2.1.3 Overall Effects on Individuals and Effects on the Population

When Hawaiian spinner dolphins respond to disturbance events, they incur an energetic cost, which may be in the form of the energy expended to respond to the disturbance event, or energy that was not restored due to lack of rest. At this time, there is insufficient information to quantify the total amount of time or energy expended by spinner dolphins due to short-term disturbance because NMFS lacks the detailed data necessary to determine impacts to individuals' behavioral and energetic budgets. Johnston *et al*. (2014) used a theoretical model to calculate the resting requirements for spinner dolphins based on their estimated energy consumption requirements. This model predicts spinner dolphins that spend less than 40% of their time resting while in bays faced an energetic debt for the day. At the same time, Johnston *et al*. (2014) actual observations in Kealakekua Bay demonstrate that the dolphins using this bay face intense activity, with vessels and/or swimmers present within 150 m of dolphins for over 75% of the sampling events, putting these dolphins at high risk for disturbance. Under the No Action Alternative, this level of spinner dolphin-directed activity and associated disturbance is expected to continue, and spinner dolphins are expected to continue to experience the energetic costs associated with changes to their behaviors both in short-term (disturbance responses) and long-term responses (changes to behavior patterns and fitness).

Important fitness-enhancing behaviors occur daily within essential daytime habitats, and disruptions (from human disturbance) to these behaviors result in deficiencies in an animal's

ability to rest, socialize, and nurture its young. Similar to most animals, inadequate amounts of rest over time could affect a dolphin's growth, reproduction, and health. For example, disruptions to rest or reduced resting periods may affect an animal's foraging efficiency. This could result in impacts to the overall body condition and health of the animal. Animals in poor body condition may be subject to decreased growth and development, reduced reproductive fitness, reduced ability to nurture or to provide adequate nutrition for their young, poor immune response, and/or reduced vigilance for predators. Additionally, individuals or groups of Hawaiian spinner dolphins could be displaced from important habitat when disturbance levels exceed their tolerance thresholds. Displacement to less optimal habitat may also result in negative physiological effects, such as poor health and reduced reproductive rates, on individuals and the population.

The above range of physiological impacts is predicted for animals that remain in disturbed habitats. Alternatively, some Hawaiian spinner dolphins may be displaced from essential daytime habitats due to the continued levels of disturbance or the potential increase of disturbance under the No Action Alternative. Dolphins appear to prefer essential daytime habitats because of the favorable environmental conditions for resting and the close proximity to prey resources (Norris and Dohl 1980, Thorne *et al*. 2012). The energetic costs of foraging could increase if displaced dolphins are forced to travel farther from new resting areas to reach prey aggregations at night. Additionally, environmental conditions in other areas may not be as suitable for predator detection, and spinner dolphin populations may need to increase vigilance for predators or may experience increased rates of predation. Increases in travel distances or increased need for vigilance could affect the energetic budget of these dolphins.

Group functioning in spinner dolphins is evident in multiple components of daytime behavior including foraging, resting, and nurturing; therefore, disturbance impacts to the group as a whole should also be considered. Norris *et al*. (1994) described the schooling behavior of Hawaiian spinner dolphins as a *supraindividual* system where individual spinner dolphins benefitted from the use of group patterns to effectively deal with predators. Daily disruptions to group behaviors (due to disturbance events or changes in behavioral or energetic budgets) could leave some individuals, especially the young, more susceptible to predation. Additionally, disruptions of bonds through displacement of specific individuals could have repercussions to the overall foraging success and health of the group.

Because human interest in activities associated with participating in wild dolphin tours has been steadily increasing (Boehle 2007, OConnor 2009, Hu *et al*. 2009), NMFS anticipates that human interactions with Hawaiian spinner dolphins will increase with time rather than remain at the status quo under the No Action Alternative. As indicated above an increase in disturbance threats could leave individuals at an energetic deficit affecting the fitness of those animals and some mothers and juveniles may already be at risk of reduced fitness (Johnston *et al*. 2014). NMFS anticipates that impacts to resident Hawaiian spinner stocks will reflect those of other small cetaceans, either through habitat displacement and/or in further deficits to the behavioral and energetic budgets of these dolphins, and that impacts will be reflected in the overall fitness of these small resident populations.

4.2.2 Alternative 2 – Swim-With Regulation

Swimming with Hawaiian spinner dolphins has become a popular activity in many of the dolphins' essential daytime habitats. It is likely that implementation of this measure would appreciably reduce the threat of take (including harassment and disturbance) associated with people swimming within close proximity to spinner dolphins, compared to the No Action Alternative. The implementation of this regulation would not directly address other activities that additionally cause disturbance to spinner dolphins, including spinner dolphin-directed vessel activities or other spinner dolphin viewing-related recreational activities on other watercrafts. With swimming prohibited, some essential daytime habitats may experience an appreciable reduction in the intensity of activities in the areas; however, some people may seek other opportunities to closely interact with spinner dolphins, such as by vessel. This could result in a slight increase in disturbance associated with close approach of vessels in some areas, although it is difficult to determine to what degree activities may be displaced from one platform to another or in which areas this type of displacement is most likely to occur. Reductions or increases in the intensity of disturbance may vary from location to location and may be related to the areas ease of accessibility for vessels. For these reasons prohibitions on swimming activities may not appreciably lessen the intensity of disturbance in essential daytime habitats overall.

In some circumstances, Hawaiian spinner dolphins may approach a person in the water. An exception is proposed for swimmers that are approached by spinner dolphins at distances closer than 50 yards. Swimmers who inadvertently find themselves within 50 yards of a spinner dolphin, or who are approached by spinner dolphins, must make no effort to engage or pursue the animals, and must take immediate steps to move safely away from the animals. Disturbance effects from these types of activities are expected to be less common and have little impact on the long-term fitness of resident populations.

4.2.2.1 Behavioral Responses

Research has shown that the behavior of Hawaiian spinner dolphins changes with the presence of swimmers (Forest 2001, Courbis 2004, Danil *et al*. 2005, Johnston *et al*. 2014). Spinner dolphins often show avoidance behaviors around swimmers and are intolerant of prolonged interactions (Timmel 2008). Spinner dolphins that do interact with swimmers do so at an energetic or behavioral cost, and the time for restorative or fitness-enhancing behaviors — particularly rest — is lost due to these disruptions. NMFS anticipates that Alternative 2 will appreciably reduce the threat of take (including harassment and disturbance) caused by shore-based swimmers and vessel-based swimmers, compared to the No Action Alternative. With reduced disturbance from swimmers, the energetic costs associated with these disturbance responses will be lessened, and energy spent reacting to this type of threat may be redirected to fitness-enhancing behaviors. Nonetheless, this regulation does not directly address disturbance from other threats, such as close approach by vessel, which may cause disturbance resulting in behavioral responses by spinner dolphins and could continue to result in changes to daytime behavior patterns. Accordingly, under Alternative 2, spinner dolphins will still experience some disruptions to their energetic budgets and only small benefits are expected as a result of implementing this alternative alone.

4.2.2.2 Habitat Use

Hawaiian spinner dolphin resting habitat, especially essential daytime habitats, are likely to remain the target for close viewing opportunities via vessels and other platforms, and NMFS expects activities within easily accessible essential daytime habitats to remain high. Boater interactions in important habitats also cause avoidance of those habitats in other resident populations of dolphins (Lusseau 2004, Gannier and Petiau 2006). It is difficult to determine to what degree the reduction in swimmer-related disturbance alone will influence spinner dolphins' use of essential daytime habitats in Hawaii because of the continuation of other dolphin-directed activities in those areas, the potential for swim-with activities to be displaced to vessel activities in some areas, and the variation in tolerance thresholds among individual spinner dolphins. The reduction in swimmer-related disturbance in some areas may encourage some individuals to remain in essential daytime habitats or encourage individuals to return to resting habitats that they had previously abandoned. Increases in vessel activities in certain areas are expected to result in impacts similar to those anticipated under the No Action Alternative, with weaker individuals remaining in the area, and some fleeing because the cost of obtaining resources in the bay have exceeded the benefits.

4.2.2.3 Overall Effects on Individuals and Effects on the Population

As noted in the discussion above, the implementation of this alternative may have different outcomes in different areas. Prohibiting people from swimming with Hawaiian spinner dolphins is likely to have benefits to spinner dolphin individuals and the population in some areas in comparison with the No Action Alternative. NMFS anticipates the costs of disturbance and associated behavioral responses to lessen and the dolphins to spend more time engaged in important fitness-enhancing behaviors. This may benefit spinner dolphins' individual health, and even contribute to the health of the population because individuals influence the success of group activities, such as foraging and vigilance during resting periods. NMFS expects Alternative 2 to alleviate some of the disturbance that threatens the long-term health of resident populations, however it is uncertain to what degree the elimination of this one threat will protect spinner dolphins from the impacts associated with long-term disturbance caused by intense activity in essential daytime habitats or other activities, such as close approach by vessels. Resident populations may remain at risk if these other factors are not adequately addressed and long-term impacts may include habitat displacement and reduced fitness leading to population declines.

4.2.3 Alternative 3 –Swim-With and Approach Regulations

Seeking out Hawaiian spinner dolphins for close approach opportunities, including swimming with the animals, has become a popular activity in many of the dolphins' essential daytime habitats. Considering the effectiveness, enforceability, and the clarity of an approach rule, it is likely that implementation of either Alternative 3(A) or 3(B) would appreciably reduce the threat of take (including harassment and disturbance) associated with close approach activities to Hawaiian spinner dolphins, and would allow the dolphins a reprieve from close human interactions. Compared with the No Action Alternative, both Alternative 3(A) and Alternative 3(B) are expected to be effective at preventing disturbance within close proximity to spinner

dolphins. In comparison with Alternative 2, they provide a greater reduction in disturbance because they also enhance protections for spinner dolphins from disturbance associated with close approach by vessels engaged in spinner dolphin-directed activities.

Exceptions exist for the approach prohibitions (see Section 2.1.1.2). Federal, State, or local government vessels, aircraft, personnel, and assets operating in the course of official duty and vessel operations necessary to avoid an imminent and serious threat to a person or vessel may inadvertently approach spinner dolphins closer than the minimum prescribed distance. Dolphins may exhibit short-term or temporary responses to avoid vessels that closely approach in these types of circumstances; however, the risk of long-term behavioral responses or habitat abandonment is unlikely because the events are expected to occur infrequently and are unlikely to reoccur in the same location over an extended period.

In Appendix A NMFS identified three harbor areas where Hawaiian spinner dolphins are known to rest near the harbor entrances. Vessels will not be prohibited from transiting to and from harbors to allow for regular navigation; however, vessels will not be allowed to idle or stop near spinner dolphins unless necessary for the safe operation of the vessel. While these activities may allow for close approach of spinner dolphins and some level of disturbance may occur from these activities, the idling limitations attempt to mitigate circumstances that would prolong close interactions or stress on these animals.

In some circumstances, Hawaiian spinner dolphins may approach a vessel or person in the water. Exceptions are proposed for vessels and swimmers that are approached by spinner dolphins at distances closer than the minimum prescribed distance to alleviate the regulatory burden on ocean users that are not engaged in dolphin-directed activities. Vessels that are underway and approached by spinner dolphins (*e.g.*, for bow riding) must continue normal navigation and make no effort to engage or pursue the animals. Swimmers who inadvertently find themselves within the minimum prescribed distance of a spinner dolphin, or who are approached by spinner dolphins, must make no effort to engage or pursue the animals, and must take immediate steps to move safely away from the animals. Although a close interaction in these circumstances could inadvertently result in a disturbance to an individual spinner dolphin, if for example the swimmer or vessel were to quickly change directions, these situations are dolphin-initiated and generally unlikely to cause a disturbance to important daytime behaviors that support rest. Disturbance effects from these types of activities are expected to be rare and have little impact on the long-term fitness of resident populations.

An exception will exist for vessels engaged in an activity authorized through a permit or authorization issued by NMFS to take Hawaiian spinner dolphins. This exception is necessary to collect biological data to inform management and conservation decisions regarding dolphins. Further, terms and conditions associated with the permit or other authorization would seek to minimize the potential impacts to dolphins.

4.2.3.1 Behavioral Responses

4.2.3.1.1 Alternative 3(A) –Swim-With and 50-Yard Approach Regulations

As noted in Section 4.2.2, close approach by swimmers disrupts spinner dolphin natural behaviors at an energetic cost to these animals. Similarly, vessels approaching spinner dolphins have been shown to elicit disturbance responses, which interrupt natural fitness-enhancing behaviors (Forest 2001, Ross 2001). This alternative would reduce the amount of disturbance experienced by Hawaiian spinner dolphins, compared to the No Action Alternative. With close swimmer and vessel activities prohibited, NMFS expects this alternative to greatly reduce the amount of disturbance to spinner dolphins and reduce the amount of time and energy that spinner dolphins expend on those reactions. Under Alternative 3(A), spinner dolphins will be able to focus more time and energy towards fitness-enhancing activities (*e.g.*, resting, socializing, and nurturing of young), which support the health of individuals and resident populations providing appreciable benefits to the spinner dolphins.

4.2.3.1.2 Alternative 3(B) –Swim-With and 100-Yard Approach Regulations

The beneficial effects of Alternative 3(B) on the behavioral responses of Hawaiian spinner dolphins are expected to be greater than those described under 3(A) above, because the increased distance will provide a greater buffer from human activities that result in take and dolphins will have more space to engage in natural behaviors.

4.2.3.2 Habitat Use

NMFS anticipates the reduction in disturbance associated with both Alternative 3(A) and Alternative 3(B) will slightly improve the quality of the resting habitat in comparison with the No Action Alternative, because disturbance events related to close approach by either swimmers or vessels are expected to decrease. However, under Alternatives 3(A) and 3(B) daytime habitats will likely remain targets for spinner dolphin-directed viewing activities, and both dolphin-directed activities and other recreational activities in some areas will remain high, even if outside of the minimum prescribed distance. Thus, habitat-related impacts may still occur to some degree under these alternatives.

4.2.3.3 Overall Effects on Individuals and Effects on the Population

4.2.3.3.1 Alternative 3(A) –Swim-With and 50-Yard Approach Regulations

NMFS expects the reduction of swim with and other close approach activities within 50 yards of Hawaiian spinner dolphins to benefit spinner dolphin individuals and the population in comparison with the No Action Alternative. NMFS anticipates the costs of disturbance and associated behavioral responses to lessen appreciably and the dolphins to spend more time engaged in important fitness-enhancing behaviors. This would likely benefit spinner dolphins' individual health, and contribute to the health of the population because individuals influence the success of group activities, such as foraging and vigilance during resting periods. NMFS expects

Alternative 3(A) to alleviate more disturbance than Alternative 2, which only alleviates disturbance from one activity but allows for other intense activities such as close approach by vessels.

While NMFS expects Alternative 3(A) to alleviate a large portion of the disturbance that is considered to threaten the long-term health of resident populations, it is uncertain to what degree the elimination of these activities will alleviate the intense dolphin-directed activity and other recreational activities in essential daytime habitats or disturbance by activities that do not include approaching closer than 50 yards. While this alternative may be sufficient to prevent long-term impacts to Hawaiian spinner dolphins, some individuals may remain at risk due to the intense activity in essential daytime habitats not being adequately addressed.

4.2.3.3.2 Alternative 3(B) –Swim-With and 100-Yard Approach Regulations

NMFS expects the reduction of swim with and other close approach activities within 100 yards of Hawaiian spinner dolphins to benefit spinner dolphin individuals and the population in comparison with the No Action Alternative, and to also provide incremental benefits compared to Alternative 3(A). NMFS anticipates the costs of disturbance and associated behavioral responses to lessen appreciably and the dolphins to spend more time engaged in important fitness-enhancing behaviors. This would likely benefit spinner dolphins' individual health, and contribute to the health of the population because individuals influence the success of group activities, such as foraging and vigilance during resting periods. NMFS expects Alternative 3(B) to alleviate more disturbance than Alternative 3(A), which only alleviates disturbance from close approach within 50 yards by vessels or swimmers.

While NMFS expects Alternative 3(B) to alleviate a large portion of the disturbance that is considered to threaten the long-term health of resident populations, it is uncertain to what degree the elimination of these activities will alleviate the intense dolphin-directed activity and other recreational activities in essential daytime habitats or disturbance by activities that do not include approaching closer than 100 yards. While this alternative may be sufficient to prevent long-term impacts to Hawaiian spinner dolphins, some individuals may remain at risk due to the intense activity in essential daytime habitats not being adequately addressed.

4.2.4 Alternative 4 –Mandatory Time-Area Closures in Specified Spinner Dolphin Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 4 would combine the protections associated with swim-with and approach regulations discussed under Alternative 3 (Section 4.2.3) and include additional protections as a result of prohibiting the use of five Hawaiian spinner dolphin essential daytime habitats in the MHI during important daytime periods (described in Section 2.7). Closure sites under this alternative include four essential daytime habitats off the Kona Coast of Hawaii Island: Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), and Makako Bay; and one essential daytime habitat off the coast of Maui: La Perouse Bay (see Section 2.7 for selection discussion). Although spinner dolphins use many locations within their range during the day, these particular bays are considered preferred habitat due to regular spinner dolphin use, and are recognized as essential daytime habitats in this document because they support vital dolphin behaviors, such as

resting, socializing and nurturing. These proposed sites selected for closure represent areas where information from the scientific literature, NOAA OLE, State of Hawaii and scoping indicates that human interactions at these locations are disturbing spinner dolphins on a regular and ongoing basis (see Section 2.7 for selection process or Appendix A). It is likely that spinner dolphins using these particular areas are subjected to the highest amount of disturbance, putting these dolphins at the highest risk for long-term physiological impacts from chronic disturbance to behavioral patterns and/or loss of optimal habitat. Alternative 4 would provide a comprehensive set of protections to address ongoing activities that cause disturbance in close proximity to spinner dolphins, as well as provide enhanced protection for spinner dolphins during historic resting times in five essential daytime habitats that are targeted by people wanting to interact with the dolphins (time-area closures). The combination of approach rule protections and time-area closures are expected to appreciably reduce the threat of take (including harassment and disturbance) associated with swim-with and vessel activities as well as reduce the intensity of activity within core areas of essential daytime habitats. This reduced disturbance to spinner dolphins would allow for increased time spent engaging in fitness-enhancing activities, and ultimately, improvements to the fitness of individuals could lead to improved status of local populations.

Exceptions exist for approach prohibitions, some of which also apply to the time-area closures as well (see Section 2.1.1.2 and Table 4). The evaluation of impacts to Hawaiian spinner dolphins being from activities that are exceptions from the approach regulations are discussed in Section 4.2.3. In addition to the exceptions discussed above regarding approach regulations, some activities are excepted from the prohibitions associated with the time-area closures. These exceptions include (1) vessels participating in organized community-based outrigger canoe races that transit straight through a time-area closure, (2) vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure, and (3) outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use. Each one occurs on an infrequent basis, and is not dolphin-directed. In the discussion of the relevant bays (Section 3.4.5) NMFS identifies each exception type of activity that may occur. Although dolphins may exhibit short-term or temporary responses to avoid vessels engaged in these activities, the risk of long-term behavioral responses or habitat abandonment is unlikely because the events are expected to occur infrequently and are unlikely to reoccur in the same location over an extended period.

4.2.4.1 Impacts from Buoy Installation

The installation and maintenance of buoys for the delineation of the five time-area closures may present some risk of entanglement to Hawaiian spinner dolphins using these resting areas. To prevent the risk of entanglement, NMFS will use the minimum amount of line necessary to account for fluctuations in water depth due to tides and waves for securing the buoys. This precaution will ensure that lines are vertical and as taut as possible to avoid the formation of loops and prevent entanglement, while not compromising the efficacy of the anchoring system. In addition, NMFS will implement a maintenance schedule to inspect the lines and buoy system to ensure that parts are maintained and replaced as necessary, maintaining the integrity of the system and minimizing the risk to marine wildlife.

Additional impacts to Hawaiian spinner dolphins from the demarcation buoys may occur for short time periods during the installation and maintenance processes, including disturbance from human activity and equipment operation, vessel collision, separation or group scattering in response to vessels while equipment is being deployed or during maintenance procedures, and exposure to vessel wastes and discharge. Exposure to buoy installation activities has the potential to startle spinner dolphins due to increased noise or activity, which may cause spinner dolphins to avoid the source of the noise or activity during installation. Since these activities will be temporary and relatively short-lived, no chronic long-term impacts are anticipated.

Spinner dolphins are highly sensitive to movement within their environment and are capable of rapid movements. The likelihood of vessel collisions with this species is lower than for slower moving species; however, boats moving through a resting area have the potential to cause group separation or scattering, which may place separated individuals at a higher risk of predation and disrupt those behaviors that may have been occurring before group separation occurred. Vessel operators conducting installation and maintenance activities will be required to take appropriate measures — decreasing speeds within the resting bays and maintaining a minimum prescribed distance from spinner dolphin groups — to avoid this type of impact. Exposure to wastes and discharge from vessels used to deploy or maintain buoys could diminish the quality of resting habitat for spinner dolphins, but NMFS will take measures to avoid these types of exposures in accordance with Appendix C.

NMFS will employ the *NMFS Protected Resources Division Best Management Practices for General In-Water Work Including Boat and Diver Operations* to reduce the potential for all of the identified adverse effects on protected marine species while the buoys are being installed or maintained. These practices are described in Appendix C and are intended to promote watchfulness to prevent disturbance and unintentional harm to protected species, while also protecting the environment from any source of contamination during operations. NMFS expects that practicing these measures during buoy installation and maintenance will minimize any potential impacts to spinner dolphins using these areas.

4.2.4.2 Behavioral Responses

Under Alternative 4, Hawaiian spinner dolphins are expected to experience an appreciable reduction in disturbance associated with swim-with and vessel activities as well as the intensity of activity in essential daytime habitats in comparison with the No Action Alternative, because this alternative combines the protective measures of an approach rule under Alternative 3, and decreases human use of five essential daytime habitats creating space for dolphins to engage in fitness-enhancing behaviors undisturbed throughout the day. Activity budgets of spinner dolphins using time-area closures would more closely resemble an undisturbed state during closure times and outside of closure areas spinner dolphins will receive protections associated with approach regulations. Overall reductions in disturbance would appreciably benefit spinner dolphins behavioral and energetic budgets because time and energy spent reacting to disturbance may be redirected to fitness-enhancing activities. As a result, NMFS anticipates that this alternative will support and/or improve spinner dolphin health and fitness. Improvements to the fitness of individuals could lead to improved status of local populations.

4.2.4.3 Habitat Use

Implementation of Alternative 4 will provide the habitat protections associated with Alternative 3 and include protections associated with time-area closures. Time-area closures implemented under Alternative 4 would apply only to five bays: Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), Makako Bay, and La Perouse Bay. Hawaiian spinner dolphins using these five areas would receive enhanced protections from human disturbance during historic resting hours. As discussed under the No Action Alternative (Section 4.2.1.2), dolphins using essential daytime habitats targeted by people seeking interactions are likely to experience the highest amount of disturbance. Although Alternative 4 would not reduce the overall number of resource users attempting to view spinner dolphins throughout the MHI, reductions in behavioral disturbance within these five essential daytime habitats would reduce the likelihood that spinner dolphins would flee these areas of optimal resources, compared to the No Action Alternative. As discussed earlier, researchers reported some spinner dolphins may have already met their threshold of disturbance within essential daytime habitats, and have observed changes to group size and habitat use for spinner dolphins using Kealakekua Bay (Forest 2001 and Östman-Lind *et al*. 2004). In Samadai Reef, Egypt, spinner dolphins returned to abandoned resting habitat when authorities removed and controlled the pressures of human disturbance through management measures (Nature Conservation Sector 2006, Notarbartolo di Sciara *et al*. 2009). Reductions in the levels of disturbance and appreciable improvements to the quality of habitat in the time-area closures may similarly encourage spinner dolphins to return to the time-area closures, potentially improving both the fitness of these individuals and the local populations.

Implementing time-area closures at only these five locations could displace some Hawaiian spinner dolphin-directed activities to new locations; however, the protections associated with approach regulations discussed under Alternative 3, and provided under this Alternative, would provide protections from disturbance for spinner dolphins using these other habitats. NMFS anticipates the reduction in disturbance associated with this alternative would improve the quality of the resting habitat in comparison with the No Action Alternative, because disturbance related to close approach by swimmers and vessels is expected to decrease and disturbance within time-area closures is expected to cease during historic resting hours. The increase in the quality of essential daytime habitats is expected to provide spinner dolphins with opportunities to optimize the use of resources within their resting habitats.

4.2.4.4 Overall Effects on Individuals and Effects on the Population

As described above, the implementation of measures under Alternative 4 is likely to reduce the amount of Hawaiian spinner dolphin behavioral responses associated with human disturbance. Additionally, Alternative 4 would provide a daytime shelter within five essential daytime habitats targeted by people wanting to interact with spinner dolphins, where disturbance is known to regularly occur. Under Alternative 4, the reduction in behavioral disturbance to spinner dolphins and the creation of time-area closures will provide spinner dolphins with more opportunities and space to engage in fitness-enhancing behaviors, which are likely to increase the fitness of individual spinner dolphins and the population as a whole. Enhanced protection associated with this alternative is expected to prevent long-term impacts to the resident stocks.

4.2.5 Alternative 5 –Voluntary Time-Area Closures in Specified Spinner Dolphin Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 5 would combine the protections associated with swim-with and approach regulations discussed under Alternative 3 (Section 4.2.3) and include additional protections associated with people voluntarily not using five Hawaiian spinner dolphin essential daytime habitats in the MHI during prescribed periods (described in Section 2.7). Closure sites under this alternative include the same five essential daytime habitats discussed above for Alternative 4: Kealakekua Bay, Honaunau Bay, Kauhako Bay (Hookena), and Makako Bay, Hawaii; and La Perouse Bay, Maui (see Section 2.7 for selection discussion). These proposed sites selected for closure represent areas where information from the scientific literature, NOAA OLE, State of Hawaii and scoping indicates that human interactions at these locations are disturbing spinner dolphins on a regular and ongoing basis (see Section 2.7 for selection process or Appendix A). It is likely that spinner dolphins using these particular areas are subjected to the highest amount of disturbance, putting these dolphins at the highest risk for long-term physiological impacts from chronic disturbance to behavioral patterns and/or loss of optimal habitat.

Alternative 5 would provide a set of protections to address ongoing activities that cause disturbance in close proximity to spinner dolphins (described by Alternative 3). Additionally, Alternative 5 may offer some protections in five essential daytime habitats if communities are able to establish support for the closures locally and persuade visitors to comply. May (2005) indicates that compliance is higher for enforced regulations, in comparison to voluntary measures, but that compliance with management measures may be strengthened by social motivations (from peer and other social pressures). Community support for voluntary closures in some of these Bays may motivate more people to comply with voluntary closures. However, each area identified for closures has a wide variety of resource users (see Section 3.4) and conflicts in beliefs, motivations, and resource needs among these resource users may make it particularly difficult for some areas to reach a common understanding with regard to protecting Hawaiian spinner dolphins' essential daytime habitats. Heenehan *et al*. (2014) used Ostrom's attributes to evaluate management methods that may be favorable for Makako and Kealekekua Bay, the evaluation indicated limited potential for community-based conservation and favored a more ecosystem-based approach where managers (*e.g.*, the federal government) would use stakeholder input to determine appropriate mandates for the management of the areas. Based on the lack of success observed with other voluntary measures to protect Hawaiian spinner dolphins (*e.g*., wildlife viewing guidelines, NMFS guidelines, and the CORAL West Hawaii Voluntary Standards), NMFS anticipates that voluntary closures will have limited success in reducing the overall intensity of dolphin-directed activities in most areas due to low compliance and that this Alternative will offer protections for Hawaiian spinner dolphins largely similar to Alternative 3 (see Section 4.2.3).

Exceptions exist for approach prohibitions some of which also apply to the time-area closures as well (see Section 2.1.1.2 and Table 4). Section 4.2.3 contains a discussion of the impacts of these exceptions. In addition to the exceptions discussed above regarding approach regulations, additional activities have been described as exceptions from voluntary time-area closures. These are the same as the regulatory exceptions described for the mandatory time-area closures and include (1) vessels participating in organized community-based outrigger canoe races that transit

straight through a time-area closure, (2) vessels that transit the time-area closure for the sole purpose of ingress and egress to privately owned shoreline residential property located immediately adjacent to the time-area closure, and (3) outrigger canoes used for traditional subsistence fishing with harvested resources intended for personal, family, or community consumption or traditional use. Each of these activities occurs on an infrequent basis, is not dolphin-directed, and is unlikely to have long-term effects or result in habitat abandonment. In the discussion of the relevant bays (Section 3.4.5) NMFS identifies each exception type of activity that may occur. However, due to the infrequency of the activity and because the exception only allows for transit, NMFS expects that impacts to spinner dolphins from these activities are likely to be low.

The installation and maintenance of buoys at the five closures sites may affect Hawaiian spinner dolphins, as discussed above in Section 4.2.4.1. The number and placement of buoys installed under Alternatives 4 and 5 are the same for each bay (a total of 16 buoys would be installed to implement closures under these alternatives); therefore, the impacts associated with buoy installation and maintenance are considered the same for these two alternatives.

4.2.5.1 Behavioral Responses

As noted in Section 4.2.2 close approach by swimmers disrupts spinner dolphin natural behaviors at an energetic cost to these animals. Similarly, vessels approaching spinner dolphins have been shown to elicit disturbance responses, which interrupt natural fitness-enhancing behaviors (Forest 2001, Ross 2001). This alternative would reduce the amount of disturbance experienced by Hawaiian spinner dolphins, compared to the No Action Alternative. With close swimmer and vessel activities prohibited, NMFS expects this alternative to greatly reduce the amount of disturbance to spinner dolphins and reduce the amount of time and energy that spinner dolphins expend on those reactions. Under Alternative 5, spinner dolphins will be able to focus more time and energy towards fitness-enhancing activities, which supports the health of individuals and resident populations providing appreciable benefits to the spinner dolphins. If people and vessels participate in voluntary time-area closures, spinner dolphins may also receive the benefits associated with providing a refuge for these animals; these benefits are discussed above in Section 4.2.4.2.

4.2.5.2 Habitat Use

NMFS anticipates the reduction in disturbance associated with Alternative 5 will slightly improve the quality of the resting habitat in comparison with the No Action Alternative, similar to Alternative 3, because disturbance events related to close approach by either swimmers or vessels are expected to decrease. If communities are able to establish support for the closures locally and persuade visitors to comply with the closed periods Hawaiian spinner dolphins would experience benefits similar to those described under Alternative 4 in Section 4.2.4.3. However, NMFS anticipates that participation in voluntary time-area closures will be limited and that these daytime habitats will likely remain targets for spinner dolphin-directed viewing activities. Thus, habitat-related impacts may still occur to some degree under this alternative.

4.2.5.3 Overall Effects on Individuals and Effects on the Population

As described above, the implementation of measures under Alternative 5 is likely to reduce the amount of Hawaiian spinner dolphin behavioral responses associated with human disturbance due to prohibitions associated with an established approach prohibition. While NMFS expects approach regulations to alleviate a large portion of the disturbance that threatens the long-term health of resident populations, NMFS expects that participation with voluntary time-area closures will be low and that these management measures will be unable to provide much benefit to spinner dolphins without complete community support. As discussed under Alternative 3, it is uncertain to what degree the elimination of close approach activities will alleviate the intense dolphin-directed activity and other recreational activities in essential daytime habitats or disturbance by activities that do not include closely approaching these animals. While, approach regulations may be sufficient to prevent long-term impacts to Hawaiian spinner dolphins some individuals may remain at risk due to the intense activity in essential daytime habitats not being adequately addressed.

4.2.6 Summary of Impacts to Hawaiian Spinner Dolphins

Table 12 (below) describes Impacts to Hawaiian Spinner Dolphins under the No Action alternative. Table 13 (below) provides symbols to summarize expected changes to disturbance levels and the anticipated responses in spinner dolphins' behaviors, habitat and overall population level impacts associated with the implementation of the various alternatives. Table 14 below) uses the established symbols to describe the anticipated impacts of each alternative in comparison to the No Action alternative.

Table 12: Summary of No Action Impacts to Hawaiian Spinner Dolphins

Alternative	Disturbance Threats	Disturbance	Impacts to Hawaiian Spinner Dolphins		
			Behaviors	Habitat Use	Anticipated Population Level Impacts
1. No Action	**Swim-with**	Spinner dolphins experience disturbance and disruptions to behaviors from close approach activities, including swim-with and vessels. In addition, spinner dolphin groups are under intense pressure from dolphin-directed activities in targeted essential daytime habitats.	Spinner dolphins exhibit individual disturbance behaviors and changes to group behavior patterns from described threats. Changes to natural behaviors result in a cost to the energetic and behavioral budget of these animals.	Spinner dolphins exhibit changes in essential daytime habitat use including: habitat avoidance during high human use, decreased residence times, changes to distribution within the area, and changes to the number of dolphins using these areas.	Energetic models predict that increases in disturbance threats could leave individuals at an energetic deficit and warn that lactating mothers and juveniles may already be at risk. Other cetaceans facing similar pressures from wildlife viewing industry activities demonstrate long-term impacts such as habitat abandonment and reduced reproductive success.
	Vessels				
	Intensity in targeted essential daytime habitats				

Table 13: Symbols for Hawaiian Spinner Dolphins Impacts

Impact Level Symbols	Disturbance Levels	Impacts to Hawaiian Spinner Dolphins		
		Behaviors	**Habitat Use**	**Anticipated Population Level Impacts**
++	Appreciable reductions in disturbance are expected because prohibitions directly address the disturbance threat(s)	Appreciable benefits to behavioral and energetic budgets are expected because time and energy spent reacting to disturbance may be redirected to fitness-enhancing behaviors	The quality of essential daytime habitats are appreciably improved and optimal use of habitat resources are expected	Enhanced protections are expected to prevent long-term impacts
+	Small reductions in disturbance are expected because indirect benefits may accumulate from other prohibitions	Small benefits to behavioral and energetic budgets are expected because some time spent on disturbance may be redirected to fitness-enhancing behaviors	The quality of essential daytime habitats may improve slightly	Enhanced protections may be sufficient to prevent long-term impacts
0	No appreciable change is expected	No appreciable change is expected	No appreciable change is expected	Long-term impacts to resident populations are anticipated and may include habitat displacement and reduce fitness that may lead to population declines
-	Small increases in disturbance are expected from activities or in areas that have less specific prohibitions	Small increased costs are expected to behavioral and energetic budgets	Further reductions in the quality of habitat is expected	Long-term impacts to resident populations are anticipated and may include habitat displacement and reduce fitness that may lead to population declines

Table 14: Summary of Impacts to Hawaiian Spinner Dolphins

Alternatives		Types of Interactions	Disturbance Levels	Impacts to Hawaiian Spinner Dolphins		
				Behaviors	Habitat Use	Anticipated Population Level Impacts
1.	No Action	Swim-with	0	0	0	0
		Vessel/watercraft	0	0	0	0
		Intensity of activities	0	0	0	0
Relative to the No Action Alternative						
2.	Swim-With Regulation	Swim-with	++	+	0	0
		Vessel/watercraft	0			
		Intensity of activities	0			
3(A).	Swim-With and 50-Yard Approach [Preferred]	Swim-with	++	++	+	+
		Vessel/watercraft	++			
		Intensity of activities	+			
3(B).	Swim-With and 100-Yard Approach	Swim-with	++*	++*	+	+
		Vessel/watercraft	++*			
		Intensity of activities	+			
4.	Mandatory Time-Area Closures and Swim-With and Approach Regulations	Swim-with	++	++	++	++
		Vessel/watercraft	++			
		Intensity of activities for five closures	++			
		Intensity activities outside closures	+			
5	Voluntary Time-Area Closures and Swim-With and Approach Regulations	Swim-with	++	++	+*	+
		Vessel/watercraft	++			
		Intensity of activities for five closures	+*			
		Intensity activities outside closures	+			

***Further distances or voluntary closures may amplify benefits, however increases are not expected to be sufficient to reach the next higher criteria.**

4.3 Impacts to Other Protected Marine Species and Habitats

"Other Protected Marine Species and Habitats" refers to those species other than spinner dolphins (see Table 6, Section 3.2), and habitats that are protected under the MMPA, ESA, and MSA, and whose range may overlap with the proposed action area as discussed in Chapter 3.

4.3.1 Impacts to Protected Marine Species and Habitats under the Various Alternatives

Under the No Action Alternative, protected species using habitat overlapping with Hawaiian spinner dolphins range may experience some disturbance from swimmer and vessel interactions; however, the way in which people interact with these species and the regularity is different from Hawaiian spinner dolphins based on differences in the species' behavioral ecologies. MHI resident stocks of Hawaiian spinner dolphins are unique because their behavioral ecology involves groups of these animals regularly using areas that are easily accessed by people from shore. Many of the species listed in Table 5 are seen in nearshore waters, however several of the cetaceans are seen further from shore and with less predictability; these species include false killer whales, pygmy killer whales, short-finned pilot whales, and pantropical spotted dolphins. Commercial tours and individuals opportunistically engage in activities that cause disturbance to these gregarious species, such as swimming-with or closely approaching the animals. However, the frequency of disturbance to these species from these activities is lower due to the less regular nature of these encounters. Additionally, the demand to swim-with these larger species may be less due to the customers' safety concerns associated with swimming with animals in deeper and less protected waters.

Protected species that are likely to be found within essential daytime habitats used by spinner dolphins include the Hawaiian monk seal, green turtle, bottlenose dolphin, humpback whale and potentially the hawksbill turtle (see Section 3.2). These species' behavioral ecologies are more solitary in nature and species may be seen but with less predictably and/or in fewer numbers in comparison to resident spinner dolphins. Under the No Action Alternative, protected species using spinner dolphin essential daytime habitats may be disturbed or stressed by the intensity of activity drawn to these areas for dolphin-directed reasons. Similar to spinner dolphins, protected species in these areas could be displaced from preferred habitats (to avoid the increased disturbance or human use in the areas) and protected species remaining within these habitats may be disturbed by individuals who divert their attention away from the dolphin-directed activity to view or interact with these other protected species. For example, people sometimes swim with humpback whales within or just outside of Kealakekua Bay (Tyne *et al*. 2014). Disturbance to any of the protected species noted in Table 6(Section 3.2) may interrupt a number of behaviors, such as resting, socializing, nursing, or foraging, which support the fitness and conservation of these protected species. Based on the available information it is difficult to determine if spinner dolphin-related disturbance is having detrimental or population level impacts on protected species in Hawaii's waters.

Under Alternatives 4 and potentially 5, sea turtles, humpback whales, bottlenose dolphins and Hawaiian monk seals that use the five time-area closures may experience protection from disturbance during the closed times. However, the installation and maintenance of buoys at these five sites may affect these species, as discussed below in Section 4.3.2. The number and

placement of buoys installed under Alternatives 4 and 5 are the same for each bay (a total of 16 buoys would be installed to implement closures under these alternatives); therefore, the risk associated with buoy installation and maintenance is considered the same for these two alternatives. The number of buoys varies from bay to bay and this could mean slight differences for risk to certain protected species between the various bays. For instance, bays with higher numbers of buoys may slightly increase the risk of entanglement. The locations of buoys are discussed in Section 2.7.1 for each proposed time-area closure area, but the exact locations will be determined during installation to avoid impacts to corals.

Outside of the habitat-associated impacts in the daytime areas targeted by people wanting to interact with Hawaiian spinner dolphins, there is the potential for commonly sighted near-shore cetaceans to be affected by the implementation of measures to enhance protections for the dolphins, including both swim-with and approach regulations (Alternatives 2-5), because tour vessels may redirect their attention to a cetacean species that is considered less regulated. As noted in Chapter 3, people do closely approach and swim with other cetacean species, and the frequency of these interactions are assumed less than with spinner dolphins, which are easily accessible due to their daily routines in near-shore waters. MMPA take prohibitions apply to all marine mammal species, and vessel operators must comply with those prohibitions. Because people are motivated to engage in close marine mammal encounters for various reasons, it is difficult to determine to what degree this behavior may increase with the various protective measures in place.

The features that support the various federally managed fish species vary widely over a large amount of habitat. Within Hawaii's waters where spinner dolphin disturbance is most prevalent, near-shore EFH may be impacted by increased human use of the area. For example, Rodgers and Cox (2002) found that coral survivorship decreased along an increasing gradient of human use. Accordingly, coral habitats surrounding the sandy-bottom resting areas preferred by spinner dolphins may experience higher visitation rates due to the dolphin-directed activities in the area and increased damage may result to the surrounding reefs. As mobile components of the coral and sandy- bottom habitats, fish may be deterred from using the areas due to the high human activity (this has been identified as an impact by local community members in some areas). Thus, under the No Action Alternative, some protected species and habitats may continue to be affected by the increasing human use of essential daytime habitats and alternatives offering time-area closures (4 and 5) may offer some relief from habitat degradation.

4.3.2 Impacts to Protected Marine Species and Habitats from Buoy Installation and Maintenance under Alternatives 4 and 5

The buoy systems may affect organisms that use the marine environment as well as Hawaiian monk seal foraging areas that are an essential feature of the monk seal's critical habitat designation. However, the anchoring system will be placed in sandy substrate and NMFS does not expect that EFH, coral reefs and marine species living in the coral reefs will be directly affected. Hawaiian monk seal prey species could be hidden in sandy habitat in these areas and could flee the areas where buoys are installed. However, impacts are expected to be temporary in nature and prey species are likely to inhabit areas surrounding the buoys shortly after the

initial disturbance. Impacts to the bottom will be focused at the point of anchoring for the buoys and the overall area affected will be very small compared to the surrounding habitat.

Other species of concern using this habitat include endangered and threatened species protected under the ESA, such as green and hawksbill sea turtles, Hawaiian monk seals, MHI insular false killer whales and humpback whales, as well as other commonly sighted marine mammals protected under the MMPA (see Section 3.2.2). The precautions taken for these protected species will also apply to all other marine species that inhabit this environment, including Hawaiian spinner dolphins that rest in these areas, as discussed earlier.

Entanglement with loose buoy mooring lines is the primary risk to protected marine species throughout the lifetime of buoy systems. To prevent this risk, the minimum amount of line necessary to account for fluctuations in water depth due to tides and waves will be used for securing the buoys. NMFS will employ this precaution to ensure that lines are vertical and as taut as possible, to avoid the formation of loops and to prevent entanglement, while not compromising the efficacy of the anchoring system. In addition, NMFS will implement a maintenance schedule to inspect the lines and buoy system and ensure that parts are maintained and replaced as necessary, maintaining the integrity of the system and minimizing the risk to marine wildlife.

Installation of the buoy system may create temporary noise pollution in the area, which NMFS expects to be minimal since installation time will likely be short in duration. Additional concerns to protected species during the installation and maintenance processes may include disturbances from human activity and equipment operation; collision with vessels while deploying equipment or during maintenance procedures; exposure to vessel wastes and discharge; and the potential for impact by sinking anchor blocks during deployment (if the traditional anchor/block system is selected).

While surfacing to breathe, rest, or bask at the surface, sea turtles or marine mammals may be at risk of being struck by deployment or maintenance vessels or their propellers. A boat strike could cause potentially serious injuries to the animal, depending on the size, speed, and part of the vessel that strikes the animal, as well as what part of the animal's body is struck. Sustained injuries from boat strikes may include bruising, broken bones or carapaces, and lacerations. The separate recovery plans for green sea turtles and humpback whales identify vessel collisions as a threat to the two species (NMFS and USFWS 1998a, NMFS 1991). Monk seals seem to be at much lower risk of collision due to their agility and situational awareness (NMFS 2007). Sea turtle research indicates that turtles rely mostly on visual cues to avoid threats, and vessel avoidance has been found to be most consistent with vessels moving at slower speeds (less than 2 knots) (Hazel *et al*. 2007). Additionally, Vanderlaan and Taggart (2007) report evidence that as vessel speed falls below 15 knots, there is substantial decrease in the probability that a vessel strike to a large whale will prove lethal. While vessel speed appears to indicate a decrease in severity of injury, collisions with large whales have been documented for both slow and fast moving vessels. This indicates that vessel operators must actively watch for and avoid both sea turtles and marine mammals while operating in project areas. During installation and maintenance of the buoys, personnel will adjust vessel speed in accordance with environmental conditions and animal proximity to maximize animal detection and avoidance.

Similar to Hawaiian spinner dolphin response, disturbance from human activity and equipment operation may startle sea turtles or marine mammals while the buoys are installed or maintained. Typically, sea turtles and marine mammals will avoid human activity; installation or buoy maintenance may cause protected species to avoid the source of the noise or activity during installation. Since these activities will be temporary and relatively short-lived, NMFS does not anticipate any chronic long-term impacts from the disturbances.

Vessel waste, such as trash or discarded materials, could create entanglement risks for protected species. Additionally, vessel discharge, including fuel and other toxicants, could expose protected species and EFH to toxic chemicals. These types of intentional discard and discharge are prohibited in the marine environment and care is necessary to prevent accidental release of such materials and to appropriately respond to the release of any waste or discharge.
If anchor blocks are selected for the buoy system, protected species may be at risk of strike as the blocks are deployed, potentially cause injury. Although animals will likely avoid human activity associated with deployment activities, having deployment crews watch for sea turtles and marine mammals both at and below the surface of the water during deployment may further minimize the risk to marine animals.

To reduce the potential for adverse effects on protected marine species while the buoys are being installed or maintained, NMFS will employ the *NMFS Protected Resources Division Best Management Practices for General In-Water Work Including Boat and Diver Operations*. Management practices, which include avoiding protected species and reducing vessel speed, are available in Appendix C. They are intended to promote watchfulness to prevent disturbance and unintentional harm to protected species, while also protecting the environment from any source of contamination during operations.

4.3.3 Summary of Impacts to Protected Marine Species and Habitats

Table 15 and Table 16 (below) describes impacts under the No Action Alternative as impacts pertain to protected species using spinner dolphin essential daytime habitats and protected species found further from shore within spinner dolphins' daytime range respectively. Table 17 and Table 18 (below) provides symbols to summarize expected changes to disturbance levels and the anticipated responses in protected species' behaviors, habitat and overall population level impacts associated with the implementation of the various alternatives to enhance protections for Hawaiian spinner dolphins. Table 19 (below) uses the established symbols to describe the anticipated impacts of each alternative in comparison to the No Action alternative.

Table 15: No Action Impacts to protected species using spinner dolphin essential daytime habitats

Alternative	Disturbance Levels	Protected Species using spinner dolphin essential daytime habitats (turtles, monk seals, humpback whales, bottlenose dolphins)		
		Behaviors	Habitat Use	Anticipated Population Level Impacts
1. No Action	Protected species using targeted spinner dolphin essential daytime habitats are likely to experience some disturbance from dolphin-directed activities in these areas.	Marine mammals and turtles may exhibit individual disturbance behaviors and changes to individual behavior from described threats. Changes to natural behaviors result in a cost to the energetic and behavioral budget of these animals.	Protected species using spinner dolphin essential daytime habitats may be disturbed or stressed by the intensity of dolphin-directed activity in targeted essential daytime habitats and may be displaced.	There is no information to indicate that dolphin-directed activities that cause disturbance are having or are likely to have detrimental or population level impacts to other protected species.

Table 16: No Action Impacts to protected species found further from shore within spinner dolphins' daytime range

Alternative	Disturbance Levels	Protected Species found further from shore within spinner dolphins' daytime range (false killer whales, pygmy killer whales, short-finned pilot whales, and pantropical spotted dolphins)		
		Behaviors	Habitat Use	Anticipated Population Level Impacts
1. No Action	Commercial tours and individuals opportunistically engage in activities that cause disturbance to the above species, such as swimming-with or closely approaching the animals. However, the frequency of disturbance to these species is believed to be low due to the ecology of the species and the lower demand for these types of interactions.	Individual marine mammals or groups may exhibit disturbance behaviors from described threats. Changes to natural behaviors result in a cost to the energetic and behavioral budget of these animals.	There is no information to indicate that disturbance levels are impacting habitat use for the above species.	There is no information to indicate that dolphin-directed activities that cause disturbance are having or are likely to have detrimental or population level impacts to other protected species.

Table 17: Symbols for Protected Species Impacts in Spinner Dolphin Essential Daytime Habitat

Impact Level Symbols	Protected Species using spinner dolphin essential daytime habitats (turtles, monk seals, humpback whales, bottlenose dolphins)			
	Disturbance Levels	**Behaviors**	**Habitat Use**	**Anticipated Population Level Impacts**
+	Small reductions in disturbance are expected because indirect benefits may accumulate from spinner dolphin time-area closures	Small benefits to behavioral and energetic budgets are expected because some time spent on disturbance may be redirected to fitness-enhancing behaviors	The quality of essential daytime habitats may improve slightly	Protections may be sufficient to prevent long-term impacts
0	No appreciable change is expected	No appreciable change is expected	No appreciable change is expected	No appreciable change is expected
–	Small increases in disturbance are expected for species using habitats with displaced dolphin-directed activities	Small increased costs are expected to behavioral and energetic budgets	Further reductions in the quality of habitat is expected	It is difficult to determine to what degree changes will result in population level impacts

Table 18: Symbols for Protected Species Impacts found further from shore within spinner dolphins' daytime range

Impact Level Symbols	Protected Species found further from shore within spinner dolphins' daytime range (false killer whales, pygmy killer whales, short-finned pilot whales, and pantropical spotted dolphins)			
	Disturbance Levels	**Behaviors**	**Habitat Use**	**Population Level Impacts**
+	Small reductions in disturbance are expected because indirect benefits may accumulate from spinner dolphin prohibitions	Small benefits to behavioral and energetic budgets are expected because some time spent on disturbance response may be redirected to fitness-enhancing behaviors	The quality of essential daytime habitats may improve slightly	Protections may be sufficient to prevent long-term impacts
0	No appreciable change is expected	No appreciable change is expected	No appreciable change is expected	No appreciable change is expected
–	Small increases in disturbance are expected for species with less specific prohibitions	Small increased costs are expected to behavioral and energetic budgets	Habitats that are more accessible for wildlife-viewing may reduce in quality	It is difficult to determine to what degree changes will result in population level impacts

Table 19: Impacts to Protected Species

Alternatives		Protected Species using spinner dolphin essential daytime habitats (turtles, monk seals, humpback whales, bottlenose dolphins)				Protected Species found further from shore within spinner dolphins' daytime range (false killer whales, pygmy killer whales, short-finned pilot whales, and pantropical spotted dolphins)			
		Disturbance Levels	Behaviors	Habitat Use	Population Level Impacts	Disturbance Levels	Behaviors	Habitat Use	Population Level Impacts
1.	No Action	0	0	0	0	0	0	0	0
Relative to the No Action Alternative									
2.	Swim-With Regulation	0	0	0	0	-	-	0	0
3(A).	Swim-With and 50-Yard Approach [Preferred]	0	0	0	0	-	-	0	0
3(B).	Swim-With and 100-Yard Approach	0	0	0	0	-	-	0	0
4.	Mandatory Closures and Swim-With and Approach Regulations	+/0/-	+/0/-	+/0/-	0	0/-	0/-	0	0
5.	Voluntary Closures and Swim-With and Approach Regulations	+/0/-	+/0/-	+/0/-	0	0/-	0/-	0	0

4.4 Socioeconomic Impacts and Impacts on Cultural Resources

4.4.1 Alternative 1 – No Action

Under the No Action Alternative, NMFS would implement no new or additional regulations to enhance protections for Hawaiian spinner dolphins. Under this alternative, all activities (both spinner dolphin-directed and not) discussed under Section 3.4 are anticipated to continue unabated.

As discussed under Hawaiian spinner dolphin impacts (Section 4.2.1), unrestricted spinner dolphin-directed activities may result in displacement of the dolphins from essential daytime habitats or complete habitat abandonment, as seen in Samadai Reef (Nature Conservation Sector 2006, Notarbartolo-di-Sciara *et al*. 2009). Gradual declines in spinner dolphin numbers or habitat abandonment could affect the ability of dolphin-directed and wildlife related activities to locate the dolphins. For example, those people who are engaged in spinner dolphin-directed activities may need to travel farther or engage in these activities in areas where travel conditions are less optimal for recreational passengers, such as from choppy water. For tour operators, this could result in increased travel time, higher fuel costs and reduced satisfaction of customers, which may ultimately compromise their ability to operate at current profit margin (NMFS discusses this further in the Regulatory Impact Review (RIR) in Chapter 5). Impacts to industry are described further in Chapter 5, but are expected to be felt most strongly by those activities that actively seek out dolphins rather than those that incidentally view or interact with them.

Under current conditions, some local communities have expressed the opinion that unrestricted Hawaiian spinner dolphin-directed activities are negatively impacting their local community and natural resources (NMFS 2007, Honua Consulting 2013). The influx of people and vessels in these small, essential daytime habitats targeted by people wanting to interact with the dolphins puts a strain on local communities, including public facilities, services and/or parking areas. Many local bays served as a gathering place for the subsistence harvests of local communities and, as a result, these areas supported social and cultural activities that bring these communities together. During scoping, some community members indicated that spinner dolphin-directed activities could amplify competition between visitors and local residents for access to marine resources, creating conflict between these two groups (NMFS 2007). Community members at certain bays identified that the increased visitation to the bays drives some community members away (Hookena community meeting, August 1, 2012). In addition, community members in various areas expressed concerns that the intense activity in the essential daytime habitats targeted by people wanting to interact with the dolphins are negatively affecting fisheries, and that visitors who are not mindful of the environment may be degrading other marine and coastal resources (NMFS Scoping Report: http://www.fpir.noaa.gov/PRD/prd_spinner_EIS.html). As spinner dolphin-directed activities are expected to continue or increase under the No Action Alternative, the above impacts are likely to continue and the strain on local communities and natural resources may increase.

4.4.2 Alternative 2 – Swim-With Regulation

Under Alternative 2, Hawaiian spinner dolphin-directed swimming activities would be prohibited, but NMFS does not expect this alternative to impact other activities that are unrelated to swimming with spinner dolphins, such as boaters and other watercraft, other recreational users, fishing, Native Hawaiian practices, and gathering and subsistence harvest. NMFS anticipates that this alternative will affect dolphin-directed and wildlife related activities including tour operations and those who engage in spinner dolphin-directed swimming from shore or watercraft. It is difficult to measure to what degree the implementation of this alternative will affect tour operations, compared with the No Action Alternative, as tour operations may have varying degrees of dependence on swim-with activities and may choose to engage in an alternative type of tour if prohibitions are applied to swim-with activities. Generally, prohibitions against swimming with spinner dolphins is expected to appreciably reduce sales for tour operators that engage in these activities if an alternative activity is not offered by these tours. Dolphin-watch, generalized tours and kayak tours are expected to be largely unaffected by this regulation, but may experience positive or negative indirect impacts associated with changes to the swim-with tours (more or less operators) or people seeking other platforms to experience spinner dolphins (discussed below). NMFS describes the economic impacts of this alternative on commercial entities further in the RIR found in Chapter 5.

Shore-based swimmers are motivated to swim with Hawaiian spinner dolphins for multiple reasons — recreation, curiosity, and spiritual beliefs, among others — and NMFS anticipates that impacts to this group from Alternative 2 will vary. Some individuals may be largely unaffected by this alternative and choose a different form of recreation once aware of the prohibitions. Other individuals who seek a spiritual or healing experience from closely interacting with the dolphins will be limited in their ability to experience the dolphins up close, but will continue to be able to view the dolphins from greater than 50 yards. Under Alternative 2, individuals may choose to view the dolphins from a different platform, such as a vessel or kayak, for an up-close experience and/or from a greater distance.

Alternative 2 may decrease the impacts of shore-based swimmers on some local communities currently affected by Hawaiian spinner dolphin-directed activities (see Alternative 1), because swimmers may no longer access those areas from shore to interact with the dolphins. Still, some shore-based swimmers may choose to do so from a different platform in the same areas and more vessels could use these areas than in the past. The degree to which these impacts on local communities are affected will vary based on the prevailing spinner dolphin-directed activities in the bay and the accessibility of that area for other watercrafts. For example, bays where shore swimming is common may experience more relief from this alternative; however, use of other platforms, particularly kayaks and SUPs, may increase in frequency, which may negate any relief provided by this alternative. Recreational swimmers (not dolphin-directed) may need to have increased vigilance in areas with spinner dolphins as a result of this regulation.

4.4.3 Alternative 3 – Swim-With and Approach Regulations

4.4.3.1 Alternative 3(A) – Swim-With and 50-Yard Approach Regulations

Alternative 3(A), the swim-with and 50-yard approach regulations, is expected to affect a wide variety of activities in Hawaii's waters because it prohibits people and vessels from closely approaching Hawaiian spinner dolphins. NMFS anticipates that this alternative will affect tour operators similarly to Alternative 2, because prohibitions on close approach includes swim-with activities. However, dolphin-watch tours and dolphin-directed kayak tours may experience decreases in ticket sales among individuals who are seeking an opportunity to approach spinner dolphins closer than 50 yards. Still, viewing opportunities may still be had from the 50-yard distance and these tours and businesses could experience indirect impacts associated with changes to swim-with tours and independent swimmers' choices (see above). NMFS describes the economic impacts of this alternative on commercial entities further in the RIR found in Chapter 5.

Shore-based swimmers may be affected similarly to Alternative 2 (Section 4.4.2), as this alternative prevents these swimmers from close approach in the water. However, under Alternative 3(A), shore-based swimmers will not have the option to seek close-up viewing opportunities through other platforms (kayaks, SUPs) and will be limited to viewing Hawaiian spinner dolphins from a 50-yard minimum distance.

NMFS anticipates that this alternative will reduce the effects on local communities from spinner dolphin-directed activities more than Alternative 2; however, the degree to which they will be affected may vary and intense activity may still exist in small areas. Alternative 3(A) may also affect some human activities that are not spinner dolphin-directed because this alternative prohibits all types of vessels from approaching spinner dolphins within 50 yards. Therefore, swimmers and operators of a variety of vessels will need to be vigilant about the distance between themselves and/or their vessel (or watercraft) and spinner dolphins. In some cases, vessel operators may need to alter their course to avoid close proximity to the dolphins. The 50 yard approach rule may not be easily maintained in all circumstances because dolphin behaviors may put them in close proximity to swimmers or vessels. NMFS has created six exceptions to this prohibition specifically to address situations where vessels are underway or transiting a harbor, or when vessels and swimmers are approached by dolphins (see Section 2.4.1).

4.4.3.2 Alternative 3(B) – Swim-With and 100-Yard Approach Regulations

Under Alternative 3(B), the swim-with and 100-yard approach regulations, is expected to have more of a negative effect on dolphin-watch and dolphin-directed kayak tours ticket sales than Alternative 3(A), because the greater distance of 100 yards is expected to decrease guests ability to view and connect with wild spinner dolphins. Further, untrained viewers may have difficulty spotting animals engaged in natural behaviors without using visual aids such as binoculars. Accordingly, this greater distance may diminish both the experience of dolphin watching and opportunities to participate in dolphin watching. NMFS describes the economic impacts of this alternative on commercial entities further in the RIR found in Chapter 5.

Although it could be argued that humpback whale-watching tours are restricted to a 100 yard distance, those animals are much larger and easier to spot from a distance than are dolphins. In contrast, spinner dolphins are small animals that do not normally display aerial behaviors throughout the day when they are undisturbed in their daytime resting period. At 100 yards spinner dolphins surfacing for air as their dorsal fins break the water's surface may be difficult to detect.

Shore-based swimmers may be affected similarly to Alternative 3(A), as this alternative prevents these swimmers from close approach in the water; however, they will be limited to viewing Hawaiian spinner dolphins from a 100-yard minimum distance.

NMFS anticipates that this alternative will reduce the effects on local communities from spinner dolphin-directed activities more than Alternative 2; however, the degree to which they will be affected may vary and intense activity may still exist in small areas. Alternative 3(B) may also affect some human activities that are not spinner dolphin-directed more than 3(A) because this alternative prohibits people and vessels from approaching spinner dolphins at a greater distance. Increasing the distance between spinner dolphins and people or vessels may diminish the threat of disturbance; however, this increased distance also has the potential to prohibit some human activities that are not likely to result in take of spinner dolphins. Swimmers and operators of a variety of vessels will need to be even more vigilant about the distance between themselves and/or their vessel (or watercraft) and spinner dolphins. In some cases, vessel operators may need to alter their course to avoid close proximity to the dolphins. The 100-yard distance may be more difficult to judge and maintain for people that are inexperienced with dolphin behaviors. Additionally, in some small areas maintaining this distance with multiple vessels and people around may be particularly difficult. As in Alternative 3(A), the same three exceptions apply to this prohibition specifically to address situations where vessels are underway or transiting a harbor, or when vessels and swimmers are approached by dolphins. (see Section 2.7.3).

4.4.4 Alternative 4 –Mandatory Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 4 combines the prohibitions associated with Alternatives 3 with mandatory time-area closures within five bays that are targeted for spinner dolphin viewing activities.

Faced with the prohibitions under Alternative 4, shore-based swimmers may choose to participate in different recreational activities (similar to Alternative 2), or view the dolphins from the prescribed distance outside of the time-area closures within the designated bays (similar to Alternative 3). Additional impacts from human activity include the loss of access to the closed areas during the closed times by other ocean users, such as snorkelers, divers, kayakers, canoe paddlers, cultural practitioners, and subsistence and recreational fishers. To minimize impacts to human activities that are not Hawaiian spinner dolphin-directed, NMFS carefully delineated closure areas to include the areas where spinner dolphins rest but, when possible, to exclude areas used for other activities. At all locations, activities occurring in the intertidal zone, such as shore-based fishing and subsistence gathering, are not prohibited and will be able to continue during any time of day. In addition, all ocean-related recreational, fishing, subsistence gathering,

and/or cultural activities that are currently ongoing would still be able to continue in those parts of the bays that are not designated as closure zones.

Because Alternative 4 would restrict swimming with Hawaiian spinner dolphins, close approach by vessel, and viewing in the time-area closures, tour operators may experience economic impacts from loss of ticket sales, or increased costs associated with altering routes and/or times (see RIR for economic information). Still, similar to Alternatives 2 and 3, some tour operators may choose to offer alternative recreational opportunities as part of the tour to maintain or minimize impacts from reductions in ticket sales. NMFS describes the economic impacts of this alternative on commercial entities in detail in the RIR found in Section 5.

Impacts to shore-based swimmers are expected to be most similar to Alternative 3 because it is the most restrictive to this user group. The impacts (both positive and negative) to other ocean users include all impacts discussed above for Alternative 3. Additionally, this alternative introduces impacts that are specific to the five closure areas. The five areas are Makako Bay, Kealakekua Bay, Honaunau Bay, and Kauhako Bay on Hawaii Island, and La Perouse Bay on Maui. Under this alternative, NMFS anticipates that the prohibitions for time-area closures from 6 AM until 3 PM will affect both Hawaiian spinner dolphin-directed activities and non-dolphin-directed activities. The magnitude of the impact will largely depend on where the activity takes place, whether alternative areas are available for the activity to continue or whether the activity may occur outside of the closure times.

Additional impacts to human activity include the loss of access to the closed areas during the closed times by other ocean users, such as snorkelers, divers, kayakers, canoe paddlers, cultural practitioners, and subsistence and recreational fishers; during some time periods these impacts may occur when spinner dolphins are not present in the bay. Thus, restrictions on entry could apply when there is reduced likelihood of take occurring. To minimize the likelihood of impacts to human activities that are not Hawaiian spinner dolphin-directed, NMFS carefully delineated closure areas to include the regions where spinner dolphins rest but, when possible, to exclude areas used for other activities. At all locations, activities occurring in the intertidal zone, such as shore-based fishing and subsistence gathering, are not prohibited and will be able to continue during any time of day. In addition, all ocean-related recreational, fishing, subsistence gathering, and/or cultural activities that are currently ongoing would still be able to continue in those parts of the bays that are not designated as closure zones.

4.4.4.1 Hawaii Island

This regulation will affect commercial dolphin tour operators on the Island of Hawaii that regularly visit the four time-area closures to encounter Hawaiian spinner dolphins. The magnitude of these impacts may vary based on the tour operators' response to the prohibitions. Some tour operators may choose to alter the route or locations that are visited to encounter spinner dolphins, some may alter the times associated with visiting certain areas and others may choose to continue to visit the bays where time-area closures are implemented and allow their guests outside of the designated closure zones. These alterations could result in additional fuel costs and/or decreased ticket sales; NMFS discusses the economic impacts further in the RIR (Section 5).

Kealakekua Bay
Within Kealakekua Bay, the resting area for Hawaiian spinner dolphins is delineated primarily over the sandy area at the center of the bay. Outside of the delineation, activities such as recreational swimming, kayaking, and using SUPs can continue, and the closure does not prevent people from accessing the Captain Cook Monument.

Interviews with Native Hawaiian lineal and cultural descendants from Kealakekua Bay indicated that traditional activities continue to occur in the bay, including fishing; subsistence gathering of ocean resources by cultural practitioners, such as limu and paʻakai; hoe waʻa (canoe paddling); gathering of cultural resources of spiritual and cultural protocols; gathering of lāʻau lapaʻau (medicines); ancestral caretaking and worship; worship of akua and aliʻi; care of burial sites; and care of historical sites (Honua Consulting 2013).

The closure was delineated in such a way that it would not affect a majority of these activities. Fishing could still occur outside of the closure area at all times of day, while fishing within the closure area can also occur in the early morning and late afternoon hours outside of the closure period. The closures will not affect subsistence gathering of limu and paʻakai, as well as gathering of terrestrial plants used for lāʻau lapaʻau. Hoe waʻa may be limited to areas outside of the closure or to times when the area is not prohibited; however, exceptions may apply (see Section 2.7.3).

Cultural practices, such as feeding the koʻa and collecting limu, are identified as occurring in the bay; however, NMFS does not have information indicating where these activities may occur and whether they might occur in the closure. Therefore, it is not clear from the information obtained during scoping how this alternative would affect activities associated with cultural practice or worship. NMFS has also found no information to indicate that there are any cultural sites located within the proposed closure area that may be affected by this action.

Honaunau Bay
Within Honaunau Bay, the time area closures may affect fishing on the water, canoe activities, traditional/cultural rituals, swimmers, and boaters. Traditional canoe activities in this bay generally coincide with cultural festivals occurring twice a year, when canoe rides are offered as part of the celebration and educational experience. The closure of the bay may affect the route used for these rides, such that rides may need to be offered outside the closure area. Prohibitions will not apply to canoe races that occur twice a year in the Bay, providing that racing boats maintain their course and transit straight through the closed area and do not stop.

Community members indicated that the local canoe club's paddling practice occurs after 3 PM when the bay would be re-opened, so it would not be affected. They also indicated that the closure may affect boaters and swimmers, because the closure may force swimmers into areas near the boat ramp where boats may be attempting to come in and out of the Bay (Captain Cook community meeting, August 1, 2012). NMFS expects the time-area closure in this area to minimally affect diving and snorkeling activities, as popular snorkeling access areas would remain open for use outside of the closure area, and diving would mainly occur over the reefs and not over the sand.

Interviews with Native Hawaiian lineal and cultural descendants from Honaunau Bay indicated that traditional activities continue to occur in the bay. These traditional activities include fishing; subsistence gathering of ocean resources by cultural practitioners; canoe activities, including fishing from canoes; gathering of cultural resources for spiritual and cultural protocols; medicinal plant usage; ancestral caretaking and worship; worship of akua and aliʻi; and care of burial sites (Honua Consulting 2013).

The closure was delineated in such a way that it would not affect a majority of these activities. Fishing could still occur outside of the closure area at all times of day; fishing within the closure area can also occur in the early morning and late afternoon hours outside of the closure period. The closures will not affect subsistence gathering of limu and paʻakai, or the gathering of terrestrial plants used for lāʻau lapaʻau. Hoe waʻa may be limited to areas outside of the closure or to times when the area is not prohibited.

Cultural practices, such as feeding the koʻa and collecting limu, are identified as occurring in the bay; however, NMFS does not have information indicating where these activities may occur and whether they might occur in the closure. Therefore, it is not clear from the information obtained during scoping how this alternative would affect activities associated with cultural practice or worship. NMFS has also found no information to indicate that there are any cultural sites located within the proposed closure area that may be affected by this action.

Kauhako Bay

Within Kauhako Bay, the time-area closures may affect fishing on the water, traditional recreation, and traditional/cultural rituals. During community meetings, local communities expressed concerns regarding restrictions on fishing activities. Although shore-based fishing would be permitted throughout these areas, community members indicated that the closures might affect other fishing activities (Hookena community meeting, September 10, 2012).

Lobster, Kona crab, or trolling fishing activities would need to occur outside of the closure area or times. NMFS identified an exception for traditional fishing activities, and in this particular place, canoes are generally known to launch from the beach in an area that is located adjacent to the time-area closure. Community members expressed concern that without an exception for transit through the area, the canoes would have to be launched before or after the closure time periods or from sections of the coastline that may be more difficult or less safe (Hookena community meeting, September 10, 2012). The exception allows this traditional activity to continue in the area by allowing the boats to transit through the closed areas to practice the activities.

Interviews with Native Hawaiian lineal and cultural descendants from the area indicated that some traditional activities continue to take place in the area. These traditional activities include fishing; subsistence gathering of ocean resources by cultural practitioners; canoe activities, including fishing from canoes; gathering of cultural resources for spiritual and cultural protocols; medicinal plant usage (lāʻau lapaʻau); and ancestral caretaking and worship, including care of burial sites.

The closure was delineated in such a way that it would not affect a majority of these activities. Fishing could still occur outside of the closure area at all times of day; fishing within the closure area can also occur in the early morning and late afternoon hours outside of the closure period. The closures will not affect subsistence gathering of limu and paʻakai, or the gathering of terrestrial plants used for lāʻau lapaʻau. Hoe waʻa may be limited to areas outside of the closure or to times when the area is not prohibited.

Cultural practices, such as feeding the koʻa and collecting limu, are identified as occurring in the bay; however, information is scarce as to where these activities may occur and whether they might occur in the closure. Therefore, it is not clear from the information obtained during scoping how this alternative would affect activities associated with cultural practice or worship.

Makako Bay
Within Makako Bay, the popular Garden Eel Cove dive spot will be unavailable from 6 AM to 3 PM (see Section 3.4.5 for site description), but popular afternoon and evening dives in this area will not be affected and therefore can continue to occur. As a result of the closures, daytime divers, kayakers, and aquarium-trade collectors may need to visit this site outside of the closure times, continue activities outside of the delineation area or select an alternate site to continue activities.

Interviews with Native Hawaiian residents with ties to the area indicated the following activities currently taking place at Makako Bay include fishing; subsistence gathering of ocean resources by cultural practitioners; canoe activities, including fishing from canoes; swimming/snorkeling; kayaking; worship of ancestral guardians (ʻaumākua, specifically hāhālua, or manta ray); and lāʻau lapaʻau.

NMFS does not anticipate the implementation of this alternative to affect subsistence gathering in the intertidal areas and shoreline fishing, or the gathering of terrestrial plants used for lāʻau lapaʻau. Canoe activities, including fishing from canoes, will need to occur outside of the delineated closures or outside of the closure times. Information regarding where and at what times ancestral worship may occur (including for hāhālua) at this bay was scarce; therefore, it is difficult to determine to what degree these activities may be affected.

4.4.4.2 Maui

On the Island of Maui, impacts from the single time-area closure may affect the tour operators that use this site to encounter Hawaiian spinner dolphins in a similar way as on the Island of Hawaii. However, as the only time-area closure implemented on Maui, tour operators will have multiple other areas to encounter spinner dolphins. NMFS describes the economic impacts of this alternative on commercial entities here and in detail in the RIR found in Section 5. Boaters that visit the closure to encounter spinner dolphins will similarly be faced with decisions to visit other locations, return at different times, or to view the dolphins from outside of the closure areas. Impacts may include increased fuel costs.

La Perouse Bay
Within La Perouse Bay, the time-area closure may affect fishing from watercraft, canoe activities, recreation, and traditional/cultural rituals. As a result of the closures, water-based fishing activities and canoe activities may take place outside of the closure times, or outside of the delineation area. In addition, some people may choose to move these activities to other areas. NMFS has identified an exception to the closure that allows the transit into and out of a small boat ramp located on private property abutting the northwest end of the bay. Additional information regarding where and at what times traditional/cultural rituals, recreation, or other activities may occur is scarce; therefore, it is difficult to determine to what degree these activities may be affected.

In contrast to the No Action Alternative, Alternative 4 may alleviate some of the pressures (noted above) that Hawaiian spinner dolphin-directed activities place on the five local communities and their natural resources. Habitats that are used by spinner dolphins but not commonly targeted for spinner dolphin-directed activities may experience an increase in spinner dolphin-directed activities. For example, tour operators or shore-based swimmers could choose to frequent a different area to closely access the dolphins, and these areas may experience increased pressures as a result. It is difficult to determine which areas may receive more attention; generally, those that are still reasonably accessible and are frequented by spinner dolphins may experience this increase.

Interviews with Native Hawaiian residents with ties to the area indicated cultural activities have taken place at La Perouse Bay. Traditional activities identified by the residents include fishing, subsistence gathering of ocean resources by cultural practitioners, canoe activities, recreation, gathering of cultural resources for spiritual and cultural protocols, lāʻau lapaʻau, healing and cleansing rituals, ancestral caretaking and worship, worship of akua and aliʻi, care of burial sites, and care of historical sites (Honua Consulting 2013). In addition, there are also regular navigation practices; gathering of limu, paʻakai, ʻōpihi, and other cultural resources; and educational activities.

The closure was delineated in such a way that it would not affect a majority of these activities. Fishing could still occur outside of the closure area at all times of day; fishing within the closure area can also occur in the early morning and late afternoon hours outside of the closure period. The closures will not affect subsistence gathering of limu, paʻakai and ʻōphihi, or the gathering of terrestrial plants used for lāʻau lapaʻau. Hoe waʻa may be limited to areas outside of the closure or to times when the area is not prohibited.

Cultural practices, such as feeding the koʻa and gathering limu, are identified as occurring in the bay; however, NMFS does not have information indicating where these activities may occur and whether they might occur in the closure. Therefore, it is not clear from the information obtained during scoping how this alternative would affect activities associated with cultural practice or worship. NMFS have also found no information to indicate that there are any cultural sites located within the proposed closure area.

4.4.5 Alternative 5 –Voluntary Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 5 combines the prohibitions associated with Alternative 3 with voluntary time-area closures within five bays that are targeted for spinner dolphin viewing activities. Impacts associated with this alternative would be largely similar to those discussed under Alternative 3 (see Section 4.4.4) and may include some additional impacts related to the voluntary time-area closures. To minimize impacts to human activities that are not Hawaiian spinner dolphin-directed, NMFS carefully delineated closure areas to include the areas where spinner dolphins rest but, when possible, to exclude areas used for other activities. At all locations, the intertidal zone is not included in the closures and activities occurring in these areas, such as shore-based fishing and subsistence gathering, are not prohibited and will be able to continue during any time of day. Still, people participating in the voluntary closures will be called upon to limit their ocean-use activities to areas outside the closures or move to new areas where dolphin habitat conservation concerns are lower.

The five area closures all have various user groups that would need to participate in the voluntary closures for this conservation effort to be effective. The five areas are Makako Bay, Kealakekua Bay, Honaunau Bay, and Kauhako Bay on Hawaii Island, and La Perouse Bay on Maui. Under this alternative, NMFS anticipates that the prohibitions for time-area closures from 6 AM until 3 PM will affect both Hawaiian spinner dolphin-directed activities and non-dolphin-directed activities differently in each bay. The magnitude of the impact will largely depend on where the activity takes place, whether alternative areas are available for the activity to continue, whether the activity may occur outside of the closure times and whether the people engaged in the activity are willing to comply with voluntary closures. If communities are able to gather support for time-area closures and participation is consistent, the impacts discussed under Section 4.4.4 above would apply for each bay. However, differing motivations among resource users in the different areas could lead to inconsistent participation in the time-area closures and lead to conflict between ocean-users with differing beliefs.

4.4.6 Summary of Impacts to Social and Cultural Resources

Table 20 (below) describes impacts to social and cultural resources under the No Action Alternative. Table 21and Table 22 (below) provide symbols to summarize expected changes to the social and cultural resources including dolphin-directed and wildlife related activities, and recreational and community-based activities (described throughout Section 4.4) associated with the implementation of the various alternatives. Table 23 (below) uses the established symbols to describe the anticipated impacts of each alternative in comparison to the No Action alternative. As some impacts are expected to vary among groups two symbols may be used to describe potential impacts. For example, impacts to independent dolphin-directed individuals for Alternative 2 are expected to vary with some individuals choosing an alternative platform to engage in dolphin-directed activities and other individuals choosing to engage in an alternative recreational activity.

Table 20: Summary of No Action impacts

Groupings	Types of Activities/Users	No Action Description
Dolphin-directed and wildlife related activities	Swim-with wild dolphin tours	With no prohibitions directly addressing dolphin-directed activities, activities are expected to continue and increase. Over time, impacts from viewing and interaction are expected to adversely impact spinner dolphins causing habitat displacement and declines in local populations (see Table 12). These changes may influence the industry's ability to locate large groups of dolphins in the same areas. This may impact the cost of business either in costs of travel or sales.
	Spiritual retreats with dolphin-oriented swim	
	Dolphin-watch tour operators	
	Generalized commercial boat tour operators	
	Non-motorized vessel tour operators	
	Rental companies (boat, watercraft, and equipment)	
	Non-commercial dolphin-directed activities (Independent individuals including residents and tourists)	
Recreational and community-based activities	Swimmers	All activities in the bays are expected to continue under this alternative. Communities adjacent to targeted essential daytime habitats report competition with dolphin-directed activities and adverse impacts to local community resources including: reduced dolphin numbers and use of the bays, disturbance to fisheries and fishery related activities, degradation to the marine and coastal resources, strains on public facilities and services, and displacement of community members and activities. Overtime these impacts may increase.
	Boaters and other watercraft	
	Fishers	
	Other recreational users	
	Native Hawaiian (gathering and practices)	
	Local Communities	

Table 21: Symbols for Dolphin-directed and wildlife related activities

Impact Level Symbols	Dolphin-directed and wildlife related activities					
	Swim-with wild dolphin tour	**Spiritual retreat (with dolphin oriented swim)**	**Dolphin-watch tour**	**Generalized tour**	**Kayak tours or rental companies**	**Independent (*i.e.*, not part of a tour or retreat) dolphin-directed individuals**
+	This type of tour activity may see slight increases in sales due to prohibitions on other types of activities			This type of tour activity may see slight increases in sales due to prohibitions on other types of activities		Individuals choose an alternative recreational activity
0	No appreciable change is expected			No appreciable change is expected		No appreciable change is expected
-	Close approach prohibitions cause a small reduction in sales			Tours may experience a small reduction in sales relative to their dependence on dolphin-directed customers		No swim-with regulations cause individuals to seek another platform for close approach
- -	Prohibitions directly impact activities offered by tour and may appreciably reduce sales if an alternative activity is not offered			Scenario not described		Prohibitions directly impact all close approach activities

Table 22: Symbols for Recreational and community-based resources and activities

Impact Level Symbols	Recreational and community-based resources and activities					
	Swimmers	Boaters and other watercraft	Other recreational users	Fishers	Native Hawaiian practices	Local Communities
++	Appreciable reductions in dolphin viewing and interaction may enhance the quality of marine and coastal resources, allowing for enhanced use of available resources			Appreciable reductions in dolphin viewing and interaction may enhance the quality of marine and coastal resources, allowing for enhanced use of available resources		
+	Small reductions in dolphin viewing and interaction may slightly reduce competition for space in targeted essential daytime areas			Small reductions in dolphin viewing and interaction may slightly reduce competition for space in targeted essential daytime areas		
0	No appreciable change is expected			No appreciable change is expected		
-	Closures create space and time limitations in five bays and/or prohibitions may require increased vigilance around spinner dolphins			Closures create space and time limitations in five bays for those activities not excepted and/or prohibitions cause a displacement of activities		

Table 23: Summary of Social/Cultural Impacts (refer to Tables 21 and 22 for definitions of symbols)

Alternatives		Dolphin-directed and wildlife related activities (refer to criteria in Table 21)							Recreational and community-based activities (refer to criteria in Table 22)					
		Swim-with Dolphin tour	Spiritual Retreat (with dolphin swim)	Dolphin-watch tour	Generalized tour	Non-motorized vessel tour operators	Rental companies	Independent dolphin-directed individuals	Swimmers	Boaters and other watercraft	Other recreational users	Fishers	Native Hawaiian (gathering and practices)	Local Communities
1.	No Action	0	0	0	0	0	0	0	0	0	0	0	0	0
Relative to the No Action														
2.	Swim-with Regulation	- -	- -	0	0	0	0	+/--/-	-	0	0	0	0	+/-
3(A).	Swim-With and 50-Yard Approach [Preferred]	- -	- -	-	0	-	-	+/--	-	-	0	0	0	+
3(B).	Swim-With and 100-Yard Approach	- -	- -	--	0	-	-	+/--	-*	-*	0	0	0	+
	Mandatory Closures and Swim-With and Approach Regulations	--	--	--	0	-	-	+/--	-*	-*	-	++/-	++/-	++/-
4	Areas Outside Closures	--	--	--	0	-	-	+/--	-*	-*	0	0	0	+
	Voluntary Closures and Swim-With and Approach Regulations	--	--	--	0	-	-	+/--	-*	-*	0/-	++/0/-	++/0/-	++/+/-
5	Areas Outside Closures	--	--	--	0	-	-	+/--	-*	-*	0	0	0	+

4.5 Cumulative Effects

NEPA defines the cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Section 3.0, Affected Environment, describes the status of each resource, which reflects the effects of past and current actions. Chapter 4, Environmental Consequences, evaluated the effects of no action and six action alternatives on the status of potentially affected resources. This section now considers the cumulative effects of the alternatives on the resources identified as potentially affected in preceding sections of Chapter 4: Hawaiian spinner dolphins; other protected marine species; protected marine habitats; and social and cultural resources located within the time-area closures — where such effects might occur in the context of the effects of past actions, current conditions, and reasonably foreseeable future actions and conditions. Cumulative effects to other resources identified in Chapter 3, Affected Environment, including the protected marine habitats and social and cultural resources located outside of the time-area closures, would likely be negligible because no changes are anticipated to occur to these areas; therefore, they are not discussed further in this chapter.

4.5.1 Cumulative Effects on Hawaiian Spinner Dolphins

4.5.1.1 Cumulative Effects of External Factors

External factors or actions that have affected, may be affecting, or may have future impacts on Hawaiian spinner dolphins include interactions with recreational or commercial fisheries, military training exercises in the Hawaii Range Complex, marine debris, coastal and in-water development, increased human populations, increased vessel traffic and future conservation efforts.

The NMFS 2010 Stock Assessment Report (SAR) provides limited information regarding fishery interactions with island-associated Hawaiian spinner dolphins; however, the gear types used in Hawaiian waters are responsible for mortality and serious injury of marine mammals in other U.S. waters (Carretta *et al.* 2011). One concern in Hawaiian waters is inshore gillnets: limited records indicate spinner dolphins taken in nets or net fragments, and an eyewitness account of a dead spinner dolphin removed from an inshore gillnet on Oahu was recorded in 1990 (Nitta and Henderson 1993). The State of Hawaii has implemented regulations (HAR 13-75) for lay gillnets in efforts to minimize this threat to protected species, such as Hawaiian spinner dolphins. However, near-shore fisheries, such as inshore gillnet fisheries, are not observed or monitored and some incidents may go unreported. The 2013 SAR reports that no spinner dolphins were observed hooked or entangled in Hawaii's longline fisheries between 2006 and 2010, and the likelihood of interactions between these fisheries and island-associated spinner dolphins is reduced due to the 50–75 nm MHI longline Prohibited Area zone established under 50 C.F.R. § 229.37 (Carretta *et al.* 2013). Interactions with other types of fishing gear, including shortlines, are largely unknown.

The Hawaii Range Complex encompasses certain large marine areas around the MHI. Within this area, the Department of Defense conducts various training and testing activities, including

the use of low- and mid-frequency active sonar for detecting simulated enemy submarines; live-fire weapons training; detonating torpedoes, mines, and grenades underwater; and simulated anti-submarine warfare. These training and testing exercises can affect marine mammals by disrupting their hearing capabilities and causing behavioral changes resulting in Level B harassment as defined under the MMPA. Some of the testing activities also have the potential to injure marine mammals (Level A harassment). The U.S. Navy consults with NMFS on these exercises to minimize harm to protected resources, such as Hawaiian spinner dolphins. Through this consultation process, mitigation measures, procedural protocols, and research efforts are determined to allow for essential training and testing activities.

The U.S. Navy has received two Letters of Authorization (LOAs) from NMFS to take a specific number of marine mammals under the U.S. Navy Training and Testing Activities in the Hawaii-Southern California Training and Testing Study Area. The LOA for training allows for 11,060 (approximately 2,212 per year) spinner dolphins to be taken by Level B harassment over the 5-year period from 2013 to 2018 (NMFS 2013a), and no spinner dolphins to be taken by Level A harassment. The LOA for testing allows for 835 (approximately 167 per year) spinner dolphins to be taken by Level B harassment, and 5 (approximately 1 per year) to be taken by Level A harassment over the same 5-year period (NMFS 2013b). These authorizations include both the Hawaii Range Complex and the Southern California Range Complex and are also subject to a stipulated settlement agreement in *Conservation Council for Hawaii v. National Marine Fisheries Service* (D. Haw); 14-cv-00153. However, it is not specified how many of the spinner dolphin takes may be resident Hawaiian spinner dolphins. Execution of military training activities is expected to continue in the foreseeable future to ensure troop preparedness for matters of national security.

Marine debris is a growing concern within the marine environment, as it poses multiple threats to the marine ecosystem. For instance, marine debris poses a risk of entanglement (see the SARs information reported above for Hawaiian spinner dolphins) or ingestion (either directly or through prey items) to cetaceans. Impacts associated with these threats include drowning; debilitation; limited predator avoidance, internal or external wounds, skin lesions or sores; blockage of the digestive tract, resulting in starvation that often leads to death; reductions in quality of life and/or reproductive capacity; impairment of feeding capacity; and the introduction and/or concentration of damaging or toxic compounds to the animal (Derraik 2002). Confirmation of fatal debris interactions for cetaceans is likely to be lost at sea in many cases and as a result, the severity of the effects of debris interactions on cetacean populations remains unclear (Baulch and Perry 2014). However, Baulch and Perry (2014) report that 58% of cetacean species have been documented either ingesting or becoming entangled in debris, and note that debris ingestion may vary among and between species, depending on geographic differences in debris abundance and feeding habits. The researchers did not provide any specific information regarding regard Hawaiian spinner dolphin debris ingestion.

While there is insufficient information available to determine the severity of the threat of direct ingestion of macro (large) debris to Hawaiian spinner dolphins, some information indicates that spinner dolphin prey species may be consuming micro (very small) plastics. Boerger *et al.* (2010) examined plastic ingestion by fish in the North Pacific Central Gyre and found that 35% of mesopelagic fish analyzed (many of which were myctophids, or lantern fishes, which are

spinner dolphins' main prey) had ingested plastic and that larger fish generally had more pieces of plastic in their guts than smaller fish. The effects of this plastic consumption on the myctophids or the potential for accumulation in their predators are not well understood and warrant further research. Of particular concern is the ability for plastic debris to absorb organic pollutants that may be toxic to marine organisms. Takahashi *et al*. (2000) found high levels of butyltin and organochlorine (chemical compounds found in some plastics) in migrating myctophid species sampled from the Western North Pacific, which may indicate a cause for concern for predators such as spinner dolphins.

The shallow, sheltered bays that Hawaiian spinner dolphins use to rest often overlap with areas that are popular for recreation and development. Increased human traffic and development in these near-shore areas often degrades the quality of these habitats. Activities that contribute to the degradation of the habitat and which may have additive impacts on these areas or animals include those that alter the quality, quantity, or availability of resting habitats for spinner dolphins, such as pollution and/or run-off from coastal and in-water development, increased vessel use in marine areas, in-water construction of structures (such as piers and aquaculture), and increased recreational use of essential daytime habitats. NMFS expects these types of human influences to continue to influence the quality of habitat into the future with continued human population growth and development.

Activities that encroach into Hawaiian spinner dolphin essential daytime habitats could include newly building or expanding near-shore aquaculture facilities, constructing renewable energy development projects, or creating or expanding harbors. The construction of new, improved or expanded harbors, both recreational and commercial, may be of particular concern for spinner dolphins because they would add to the existing boat traffic in Hawaii, increase the number of available slips and possibly become a new operation base for Hawaiian spinner dolphin-focused tour boats. In addition, acoustic disturbance and the potential for vessel strikes would increase as vessel traffic increases in these areas. Harbor expansion or improvement projects that are planned or already in the works include Honolulu Harbor, Kawaihae Harbor, Kalaeloa Barbers Point Harbor and Lahaina Small Boat Harbor.

Blue Ocean Mariculture (formerly known as Kona Blue) has proposed the expansion of their existing aquaculture site off the Kona coast, and a Final EA for the project has been released (Blue Ocean Mariculture LLC 2014). This site is located immediately offshore of the Hawaiian spinner dolphin essential daytime habitat at Makako Bay. The proposal includes the expansion of production capacity from 24,000 to 64,000 fish; increasing the number of pens from 5 to 8; and increasing the maximum pen size from 7,000 to 8,000 fish. The expansion of the site may affect the dolphins due to the noise disturbance from increased vessel traffic; however, it is unknown whether this may cumulatively affect the animals in combination with the existing tourism vessel traffic, or whether this may cause avoidance of this site in the future.

The State of Hawaii has pursued plans to expand Honokohau Harbor on the island of Hawaii in response to public demand for a larger facility that increases the number of slips. In 2007, the state proposed the Kona Kai Ola development plan, which included blasting out the lava rock harbor basin to increase the size to accommodate an 800-slip marina, as well as constructing new developments such as shopping areas and condominiums (Oceanit 2007). Although the State did

not follow through with this expansion proposal, it is still possible — and even likely — that the harbor will be expanded at some future date. Impacts to Hawaiian spinner dolphins would occur in the short term from the blasting during the construction phase, as well as over the long term from the increase in boat traffic passing through the spinner resting area at the mouth of the harbor.

Increased development along Hawaii's shoreline also affects water quality in Hawaii's waters that Hawaiian spinner dolphins use as essential daytime habitat. Although spinner dolphins aren't feeding in these areas, changes to the local water quality may affect the local ecosystem, altering the clarity of the water and potentially reducing the dolphins' ability to detect predators. In addition, land-based pollution, such as herbicides, pesticides, and fertilizers, can transfer to marine environments in run-off and become widely distributed in Hawaii's waters. These pollutants could compromise the health and fitness of spinner dolphins and/or their prey species. Local, State, and/or Federal measures taken to minimize non-point source pollution and run-off may minimize some water quality impacts in the future; however, developed areas still present risks to the quality of Hawaii's waters. More information on these measures can be found on the following website: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/polluted-runoff-control-program/.

Point-source water pollution can also be a major concern for marine life. Higher risk areas for Hawaiian spinner dolphins include locations where essential daytime habitat overlaps with shipping routes and/or oil refineries, such as on Oahu. For example, the potential for oil spills could result from shipments of crude oil and refined oil products by oil tankers sailing into and out of the Kalaeloa Barbers Point Harbor on Oahu. There are currently two refineries located at Campbell Industrial Park, which are interconnected by pipelines to this harbor — the Chevron refinery, which processes 55,000 barrels per day, and the Par Petroleum refinery (formerly owned by Tesoro), which processes 94,000 barrels per day. Most of this oil remains on Oahu for use at the electric generation facility at Kahe Point and for local vehicle use, and some of it is refined on Oahu and then shipped to neighbor islands for use. Fuel products, such as jet fuel, are also shipped into Honolulu Harbor. Harbors on the neighbor islands used by incoming fuel tankers include Hilo and Kawaihae harbors on Hawaii Island Kahului Harbor on Maui and Nawiliwili and Port Allen harbors on Kauai. More information on current use and future development of Hawaii's fuel processing facilities can be found at the following website: http://hidot.hawaii.gov/harbors

Oil spills from commercial vessels are uncommon but still possible. Although there are emergency equipment and plans in place to address this should it occur, the impacts of any oil spill at Kalaeloa Barbers Point Harbor could be distributed northward by prevailing currents (http://oos.soest.hawaii.edu/pacioos/focus/modeling/ROMS_compare_variable.php) to areas along the Waianae coast, where spinner dolphins are known to transit and rest.

Future increases in human population in the Hawaiian Islands will inevitably lead to increases in vessel traffic. Potential impacts to Hawaiian spinner dolphins from vessel traffic include acoustic disturbance from vessel noise that can disrupt dolphins' hearing, prey detection, and communication capabilities; and vessel strikes that may injure or kill dolphins. Dolphins may also temporarily move away from an area that is disrupted by heavy vessel traffic (Lusseau

2004). Many species of marine mammals have been observed with what appear to be injuries or scars from propeller strikes, which may debilitate or reduce the animal's capacity to cope with other increased stressors in the environment. Spinner dolphins that are known to rest in high vessel traffic areas, such as Kailua Bay, Honokohau Harbor, and the Waianae Coast, are more susceptible to these vessel impacts.

While many human-influenced activities may result in negative impacts to Hawaiian spinner dolphin populations, conservation efforts sometimes beneficially affect these resident populations.

The State of Hawaii has proposed a management plan for Kealakekua Bay to protect the significant biological, cultural, and historical resources found within the park's boundaries. Some management strategies suggested in the Kealakekua Bay State Historical Park Master Plan (http://www.beltcollins.com/kealakekua/plans_reports.html) include, but are not limited to, reducing the use of the entire area, reducing the use of problem areas, changing the location of use within problem areas, changing the timing or type of use, and changing visitor behavior and expectations, among others. The Division of State Parks is currently reviewing this proposal and may implement some or all of its recommendations in the future. Should the state adopt this plan, it may provide additional protection to Hawaiian spinner dolphins within the bay by limiting human access. However, a potential negative impact has also been identified — usage spillover that could occur to the adjacent area of Honaunau — if these measures are implemented at Kealakekua Bay.

4.5.1.2 Cumulative Effects of the Alternatives on Hawaiian Spinner Dolphins

Under the No Action Alternative, NMFS would continue to promote the Dolphin SMART guidelines and enforce mandatory MMPA prohibitions, but would not adopt regulations to reduce human-caused disturbance of Hawaiian spinner dolphins. Under this alternative, the current levels of disturbance described in Chapter 3 would likely continue and, as described in Section 4.2.1, could increase. These increasing levels of disturbance may interact with the factors described above to harm the fitness of individual Hawaiian spinner dolphins and the population as a whole. Continuation of these risks, in combination with the other discussed negative effects, could have negative cumulative effects on resident Hawaiian spinner dolphins.

Under the various proposed action alternatives, NMFS would implement approach regulations and/or time-area closures in an effort to enhance protections for Hawaiian spinner dolphin to prevent disturbance within Hawaii's waters. Potential benefits to spinner dolphins from each of these alternatives may help offset the negative cumulative effects described above. For example, Alternatives 2 and 3 propose various approach restrictions, which may reduce stresses from human disturbance on spinner dolphin populations throughout their essential daytime habitat. Alternative 4 would provide the maximum amount of relief from human disturbance by not only restricting swimming with and closely approaching the dolphins, but also ensuring that the five bays, which are considered essential daytime habitats, would be free from all manner of human disturbance during the closure period. Alternative 5 is expected to provide similar benefits to the dolphins as Alternative 3.

4.5.2 Cumulative Effects on Protected Marine Species and Habitats

4.5.2.1 Cumulative Effects of External Factors

Protected marine species and habitats face multiple threats within their environment, including interactions with fisheries, interactions with people, and actions that degrade habitats (pollution, run-off, and encroachment by in-water development). The specific details of these threats are discussed in the recovery plan for green sea turtles (http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_green_pacific.pdf), hawksbill sea turtles (http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_hawksbill_pacific.pdf), Hawaiian monk seals (http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf), and humpback whales (http://www.fisheries.noaa.gov/pr/pdfs/recovery/whale_humpback.pdf). Threats to false killer whales are discussed in detail in the Final Rule to list the MHI Insular False Killer Whales Distinct Population Segment as endangered under the ESA (77 FR 70915, November 2012). More specific threats to other potentially affected marine mammals are discussed within the most recent Stock Assessment Reports for these species (http://swfsc.noaa.gov/publications/TM/SWFSC/NOAA)

Protected marine species and habitats are susceptible to many of the same cumulative impacts as those affecting Hawaiian spinner dolphins (discussed in Section 4.5.1). For example, non-point source pollution from runoff can affect the health of marine protected species and habitats in many ways. For Hawaii's green sea turtles, recent studies have shown a link between runoff that is high in nitrogen, such as from agriculture and land development, and the disease fibropapillomatosis (Van Houtan *et al*. 2014). Cumulative impacts to protected marine species and habitats from recreational or commercial fisheries, military training exercises in the Hawaii Range Complex, marine debris, coastal and in-water development, increased human populations, and increased vessel traffic would likely be similar to those experienced by spinner dolphins.

Conservation efforts for protected marine species and habitats are often driven by responsibilities given to NMFS under the ESA, MMPA, and MSA; however, multiple stakeholders play roles in advancing conservation for these resources, including Federal agencies, State and County agencies, and non-profit organizations. These range in effort from educational information supplied to the public, to regulatory measures that address specific threats. Despite these efforts, protected resources, such as sea turtles, marine mammals, and EFH, continue to face many challenges in the marine environment, and the additional impacts within their environment from this action must be considered in combination with the other threats the species currently face to ensure the health and survival of these species.

Federal conservation actions to benefit protected marine species and habitats that are planned or currently underway include the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) Management Plan revision, and recovery planning efforts for various protected species. While the conservation actions are designed to reduce the threats and stressors experienced by the species, it is unknown if the negative cumulative effects caused by increasing human populations and activities may be reduced over the long term by these actions.

4.5.2.2 Cumulative Effects of the Alternatives on Protected Marine Species and Habitats

Species that have been identified as having the potential to be affected by the alternatives include green and hawksbill sea turtles, Hawaiian monk seals, humpback whales, and other near-shore species that may be sighted, such as short-finned pilot whales, pantropical spotted dolphins, rough-toothed dolphins, common bottlenose dolphins, and false killer whales.

Under the No Action Alternative, NMFS would continue to promote the Dolphin SMART guidelines and enforce mandatory MMPA prohibitions, but would not adopt regulations to reduce human-caused disturbance of Hawaiian spinner dolphins. As a result, the current levels of disturbance described in Chapter 3 would continue and could increase. Protected species using habitat overlapping with spinner dolphin essential daytime habitats targeted by people wanting to interact with the dolphins may subsequently be disturbed by the increased number of people drawn in by spinner dolphin-directed activities, leading to increased stress levels or displacement from these habitats. In combination with the other negative effects discussed in Section 4.5.2, the No Action Alternative could have negative cumulative effects on marine protected species.

Under the various proposed action alternatives, NMFS would implement approach regulations and/or time-area closures in an effort to enhance protections for Hawaiian spinner dolphin and prevent disturbance within 2 nm from the MHI shoreline. Protected species may be affected by these regulations in multiple ways. NMFS does not anticipate the approach regulations under Alternatives 3, 4, and 5 to affect sea turtles, Hawaiian monk seals, or humpback whales. Under Alternative 4 and to a lesser extent under Alternative 5, sea turtles and Hawaiian monk seals that use essential daytime habitats closed for enhanced spinner dolphin protection may experience protection from disturbance in these areas during the closed times. Despite the risks inherent with buoy installation, maintenance and existence, NMFS anticipates the enhanced protection provided by time-area closures will benefit these species over time, which may in turn offset some of the cumulative impacts that threaten them.

Other commonly sighted near-shore marine mammal species, as described above, may experience some negative cumulative impacts from the action alternatives when added to the stressors discussed in Section 4.5.2, because tour vessels may redirect their attention to a cetacean species that is considered less regulated. Although MMPA take prohibitions apply to all marine mammal species and vessel operators must comply with those prohibitions, the potential for displacement of the Hawaiian spinner dolphin-focused tour activities to other cetacean species is possible.

The educational benefits provided by the regulations implemented to enhance protections for Hawaiian spinner dolphins, in combination with the voluntary Dolphin SMART program, may aid in ameliorating negative cumulative impacts discussed above. For example, if tour operators recognize that the behaviors that can cause negative impacts to spinner dolphins could affect other cetacean species similarly, they may feel a social responsibility to voluntarily provide the same protections for these species by providing viewing options at a safe distance. In contrast, but with similar results, some operators may be motivated by a fear of future regulations to provide protection to other cetacean species by viewing these species at a respectful distance.

The exact response tour operators may have to these types of regulations is still uncertain; therefore, it is uncertain if the action alternatives, in combination with other impacts on these protected species, could result in a negative or positive cumulative effect on these species.

Cumulative effects to EFH under action Alternatives 4 and 5 would be minimal because of the mitigation measures that would be employed to avoid any adverse effects caused by buoy installation. All other alternatives would not cumulatively affect EFH.

4.5.3 Cumulative Effects on Social and Cultural Resources

4.5.3.1 Cumulative Effects of External Factors

Past, present and reasonably foreseeable future actions that may affect social, cultural, and traditional practices and cultural and historic properties are discussed in this section. Among the primary past human activities that have affected social and cultural resources and traditional cultural practices within the affected environment is the extensive coastal development (residential, commercial, and governmental) that has taken place within the MHI since the 1950s. Areas of native coastal vegetation have been disturbed and shoreline access has been restricted. Overfishing from commercial, recreational, and even subsistence fishing has also resulted in a depletion of traditional marine subsistence resources (PIFSC 2011, Moffitt *et al*. 2006). Significant storm events, such as hurricanes and tsunami events, have affected traditional cultural resources in the MHI due to storm damage or debris. Continued development, overfishing, and future climate change (discussed in Section 4.5.5) have the potential to further affect these resources.

A variety of cultural and historical properties are present within the project area (the entire geographic scope of the actions). Past actions on cultural and historic properties within the project area that may have caused impacts include, but are not limited to, coastal human settlements or extensive coastal development (residential, commercial, and governmental) that has taken place within the MHI since the 1950s; earth-moving activities for residential, commercial, government or transportation projects; military operations or warfare; looting or other deleterious activities; and significant storm events, such as a hurricanes or tsunamis. Both surface structures and buried cultural deposits have been disturbed or destroyed. While awareness and protection of cultural and historic resources throughout Hawaii is supported through legislation such as the NHPA and State regulations, potential impacts to these resources could still occur as a result of the same activities and events listed as past actions.

4.5.3.2 Cumulative Effects of the Alternatives on Social and Cultural Resources

Cumulative effects of the alternatives on social and cultural resources would likely only occur under Alternative 4 due to implementation of the mandatory time-area closures. Activities such as subsistence fishing; canoe, stand-up paddleboard (SUP), and kayak paddling; gathering of marine resources; swimming, snorkeling, and diving; and surfing will not be affected by alternatives 2 and 3 because these alternatives do not limit the time or place that these activities can occur, except to prohibit interactions with spinner dolphins. Under Alternative 5, cumulative

impacts to social and cultural resources are likely to be similar to Alternative 3 due to the voluntary nature of the time-area closures and the probability of non-compliance.

Closing areas under Alternative 4 may cumulatively add to the impacts on the cultural practices of fishing and gathering of traditional marine subsistence resources at these sites by further reducing the availability of already limited resources. Alternative 4 may incrementally add to any cumulative impacts occurring to these activities because access will be restricted during the closure times. However, the activities can still take place in the areas outside of the time-area closures at the five bays. Fishing can be done from shore, and limu, opihi, and paakai can be gathered from the shoreline. Vessels used for traditional subsistence fishing will be allowed to travel through the closure areas to fishing grounds located outside of the time-area closures, as described in the exceptions to the regulations (Sect. 2.7.3), which would lessen the cumulative impact on these activities. Cultural activities related to canoe races that simply transit through the closed areas will be protected under the exception provided in the regulation. Much of the closure area at Kealakekua Bay already has restrictions on fishing under the State of Hawaii's designation as an MLCD. In subzone A, all fishing, taking, or injuring of marine life is prohibited, as is the anchoring or mooring of boats, except at locations or moorings designated by DLNR.

Closing areas will also affect when and where local residents as well as tourists will be able to access the ocean for activities such as swimming, snorkeling, diving, and canoe, SUP, and kayak paddling. Although Kealakekua and Honaunau bays are popular sites for these types of activities, there are many other access points along the Kona coast of the Island of Hawaii where people can go to enjoy ocean activities.

Buoy installation may cumulatively affect cultural practices by detracting from the view plane at some of the proposed time-area closure sites, where it is already affected by the sight of both onshore and offshore development, such as housing, mooring buoys, and aquaculture facilities. Vessel anchoring during buoy installation also has the potential to directly affect historic underwater properties, and may cumulatively add to the impacts from storm events or tsunamis, and to the impacts from potential Hawaiian monk seal recovery actions. However, the location and numbers of underwater historic properties is currently unknown; therefore, the extent to which they may be affected is undeterminable.

NMFS will further consider, and attempt to minimize, any cumulative impact to historic properties through Section 106 consultation under the NHPA.

4.5.4 Cumulative Effects on Economics

4.5.4.1 Cumulative Effects of External Factors

Cumulative effects on the economics of the action area include changes in the tourism industry, operational costs for Hawaiian spinner dolphin-focused tour operators and resident population numbers and/or distribution. For example, increases or decreases in the numbers of visitors coming to the islands may affect the tour businesses' profits, either positively or negatively. A rise in fuel prices may require spinner dolphin-focused tour operators to raise prices to cover

higher fuel costs or to operate with smaller profit margins. Communities may also experience cumulative impacts to cultural resources from increased numbers of visitors and/or new residents, as they compete with local residents for availability of limited ocean recreational opportunities and resources.

The most recent Annual Report from the State of Hawaii Department of Business, Economic Development and Tourism (State of Hawaii 2014) suggests that the State's economy is growing, and tourism is on the rise. In 2014, from the tourism sector, Hawaii experienced a record number of visitor arrivals, and this is projected to remain strong in 2015.

The State's population is growing and the distribution of the population is also changing, with the most recent census data from 2010 showing an increase in population of 1.2% over the previous census in the year 2000. The total population on the Island of Hawaii in 2010 was 185,079 people, which accounted for 13.6% of the State's population. At 24.5%, Hawaii Island had the highest population growth rate across the state between 2000 and 2010. The total population on Maui in 2010 was 144,444, and the island had the second highest growth rate in the state between 2000 and 2010 (22.8%). The total population on Kauai was 66,921 in 2010, which amounts to an increase of 14.8 percent from 2000. The total population on the island of Oahu in 2010 was 953,207. Oahu's population grew by 8.8% between 2000 and 2010, but its share of the state population dropped from 72.3% in 2000 to 70.1% in 2010. These numbers reflect major shifts in resident populations from Oahu to the neighbor islands. More information can be found at the following website:
http://files.hawaii.gov/dbedt/census/Census_2010/Info_release/2010_Census_Report_3_Informational_Release.pdf

4.5.4.2 Cumulative Effects of the Alternatives on Economics

Under action Alternatives 2 through 5, NMFS would impose mandatory restrictions on vessels, Hawaiian spinner dolphin-directed human activities, and/or time-based site restrictions. Alternatives 2, 3, 4, and 5 would place restrictions on approaching spinner dolphins that would be more restrictive than current guidelines, and Alternatives 4 and 5 would place restrictions (either mandatory or voluntary) on entering or remaining in spinner dolphin essential daytime habitat. The impacts of the restrictions could have cumulative effects when considered with other current and potential future events that affect the tour vessel industry. For Alternatives 4 and 5, provided they are operating in accordance with all applicable law, tour operators could select alternative areas to visit for clients to experience spinner dolphin groups. Raised prices in fuel coupled with increased travel time could result in cumulative effects on tour profits; however, any long-term projection of world oil prices and effects on fuel costs is highly uncertain.

Some of the action alternatives may result in cumulative impacts to communities, when coupled with changes in tourism and resident population numbers and distribution, by reducing the numbers of both local residents and visitors that have been coming to these small villages and cultural sites looking for close encounters with Hawaiian spinner dolphins. These could be considered either positive or negative: positive cumulative impacts may result from reduced competition for limited cultural resources and recreational opportunities, but some local residents

and companies may experience a loss of income from the reduced demand for close encounters with the dolphins, including, kayak rentals and companies offering spinner dolphin-focused spiritual retreats. In particular, Alternative 4, and to a lesser extent Alternative 5, may provide a positive cumulative impact to the communities of Honaunau and Hookena by reducing the number of visitors to these sites and the impacts on their cultural resources.

4.5.5. Impacts of Climate Change

4.5.5.1 Cumulative Effects of External Factors

Over the period of 1880 to 2012, the global mean temperature has increased by approximately 0.85°C (1.5°F) (IPCC 2013). Climate change affects all of Earth's ecosystems, both terrestrial and marine. There is widespread scientific agreement that the primary cause of climate change is the rapid increase in emissions of carbon dioxide (CO_2) and other greenhouse gases (GHG) into the atmosphere since the beginning of the industrial era (IPCC 2013). Greenhouse gases in the atmosphere trap heat, which raises air and water temperatures, causing ecological consequences. Increases in air and sea surface temperatures have led to increases in the rate of melting of polar ice caps and resulting increases in sea level. The oceans are also affected as they absorb increasing concentrations of CO_2; the ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide (IPCC 2013). As the CO_2 level in the ocean increases, oxygen levels decrease, leading to ocean anoxia (Draper 2010). An additional consequence of increasing CO_2 in the ocean is increased ocean acidity. Acidification of ocean waters can affect various species by inhibiting exoskeleton and shell growth. All of these effects of climate change are projected to continue and increase into the future. Many species may not be able to acclimate or adapt quickly enough to survive these changing conditions. However, consequences are difficult to predict in many cases because, in general, there are several major sources of uncertainty associated with the most recent projections of global climate change, including the projected rate of increase for GHG concentrations, the strength of the climate's response to GHG concentrations, large natural variations, and ecosystem responses to changes in the climate.

Marine mammals and other highly mobile species can respond more rapidly to effects of climate change than their terrestrial counterparts (Harwood 2001). The most likely impact of climate change on cetaceans will be changes in the area populations currently occupy, due to factors such as the distribution of prey species with particular thermal requirements. The ranges of 88% of cetaceans may be affected by changes in water temperature resulting from global climate change (McLeod 2009). Although oceanic cetaceans are unlikely to be directly affected by rises in sea levels, important habitats for coastal species and species that require coastal bays and lagoons for resting or breeding, such as spinner dolphins, could be adversely affected in the future (Simmonds and Elliot 2009).

The effects climate change will have specifically on Hawaiian spinner dolphins are unclear. There have not yet been any scientific studies directed at answering this question. Based on existing information, however, NMFS anticipates that climate change is most likely to affect spinner dolphins indirectly, by affecting the abundance and distribution of their prey, their community structure, and their susceptibility to disease and contaminants (Learmonth *et al.*

2006). These impacts may, in turn, affect the reproductive success and survival of individual spinner dolphins, which has larger consequences for the success of the population.

Hawaiian spinner dolphin abundance and distribution are determined by the abundance and distribution of their prey species. Spinner dolphins follow both the horizontal and vertical diel migrations of their prey (Benoit-Bird and Au 2003) to feed on the mesopelagic boundary community of fish, shrimp, and squid (Norris *et al.* 1994). These organisms feed on plankton, the primary producers responsible for photosynthesis found in the epipelagic zone (Benoit-Bird *et al.* 2001). Because rising sea surface temperatures and increases in ocean acidity affect primary producers, the availability of planktonic food for fish larvae may change, thus affecting the success of the fish populations (Walther *et al.* 2002) and ultimately the predators feeding upon them, including spinner dolphins. The metabolic function and, therefore, growth and reproduction of spinner dolphin prey species may be altered because an increase in CO_2 will affect the ability of blood to carry oxygen — one of the spinner dolphins' main prey items, squid, has high sensitivity to changes in CO_2 levels (Learmonth *et al.* 2006). Prey species of spinner dolphins may also respond directly to a rise in sea temperatures with changes in their distribution, abundance and composition. Many spinner dolphin prey species have limited thermal tolerances and can only survive within certain temperature ranges. These species would thus be affected if ocean temperatures change (Learmonth *et al.* 2006). Changes in temperature may also affect the different developmental stages and phenology — embryonic development, timing of spawning — of spinner dolphin prey species, leading to potential consequences for their survivability and abundance.

If climate change affects the abundance, distribution, and movement patterns of Hawaiian spinner dolphin prey species, spinner dolphins are likely to suffer resulting consequences. The fitness of spinner dolphins with reduced food supply will suffer due to lower energy reserves, which will affect their ability to locate and capture food, avoid predators due to decreased vigilance, and care for young effectively. As a result of decreased fitness and health, spinner dolphins may also have an increased risk of disease, starvation, and susceptibility to environmental contaminants (Learmonth *et al.* 2006).

Another potential consequence of climate change for Hawaiian spinner dolphins is an increase or shift in their geographic range. If ocean temperature continues to rise, the geographic range for spinner dolphins may change to follow their prey species or simply maintain a certain optimal environment for survival. Range shifts may increase the potential to encounter predators and competitors, which may affect their survival. In addition, a shift in range may result in an increased risk of the spread of viruses and the introduction of novel pathogens (Learmonth *et al.* 2006).

Hawaiian spinner dolphins are unlikely to be directly affected by a rise in sea levels, although their essential daytime habitat may be altered. Spinner dolphins utilize coves and bays with sandy bottoms, and shallow, calm waters. An increase in sea level may alter the physical parameters of these habitats. How these changes may affect spinner dolphins, whether positively or negatively, is currently unknown.

Climate change also has the potential to affect Hawaiian spinner dolphins' predators and competitors. The primary predators of spinner dolphins in Hawaii are sharks (Norris *et al.* 1994), but other cetacean species (killer whales) are also potential predators (Perrin 1998). Spinner dolphins primarily compete for resources with other species that feed on the mesopelagic boundary community. These predators and competitors may be affected by climate change directly or indirectly in ways that are currently unknown.

4.5.5.2 Impacts of the Alternatives on Climate Change

There are no anticipated measurable impacts on global climate change from any of the alternatives analyzed in this document. The preferred alternative proposes to implement approach restrictions and time-area closures of essential daytime habitats for Hawaiian spinner dolphins at five bays in the MHI. Although some spinner dolphin-based tour boat activities may be displaced to other locations as a result of the proposed time-area closures, it is likely that the majority of operators would not choose to travel farther than they currently are, due to the extra time and cost constraints on fuel and labor. It is also likely that most people who swim from shore to reach the dolphins would not decide to travel farther by vehicle to reach remote areas not affected by the time-area closures, as they would still be subject to the approach restrictions under the preferred alternative. Therefore, based on the project parameters, NMFS does not expect the action alternatives to have measurable impacts on climate change due to changes in vehicle or vessel usage. The nature of this project does not include any harmful impacts to the environment, and NMFS does not expect CO_2 and other greenhouse gas emissions to measurably increase due to the approach restrictions or time-area closure implementation.

In summary, although effects of climate change on Hawaiian spinner dolphins are possible, they are still uncertain and it is therefore not possible to determine at this time how these effects may be influenced by the various alternatives. The impacts of climate change have been concluded to be long-term processes that will manifest over a timescale that exceeds the scope of this project. Conversely, this project is not expected to have any measurable impact on climate change because the parameters of this project do not include any of the major threats thought to impact climate change.

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Chapter 5 – Regulatory Impact Review

5.1 Introduction and Background

The RIR is developed, in part, to comply with the requirements of Executive Order (E.O.) 12866. The regulatory philosophy of E.O. 12866 is summarized in the following statement from the order:

> Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, and public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

This RIR summarizes the effects of a proposed action and other alternative actions that NMFS is considering to prohibit activities that disturb Hawaiian spinner dolphins during daytime resting, nurturing, and socializing periods. The MMPA and its implementing regulations prohibit forms of take including harassment and intentional disturbance of spinner dolphins and other marine mammals. NMFS PIRO has published and implemented the Marine Mammal Viewing Guidelines to assist vessel operators in learning about and adopting voluntary measures to view marine mammals in a minimally disruptive manner. Interactions between people and spinner dolphins continue to occur in near-shore waters despite prohibitions, guidelines, and outreach efforts currently in place, and are prevalent in essential daytime habitats that have been targeted for dolphin-directed activities. Disturbance occurs through vessel approach and individuals swimming in close proximity to dolphins, and often occurs within essential daytime habitats that provide an important role in supporting spinner dolphin behaviors. Therefore, PIRO is proposing action that limits this disturbance.

5.2 Description of the Alternatives Considered

Chapter 2 of the DEIS describes each management alternative in detail. The alternatives are as follows:

Alternative 1: No Action
Alternative 2: Swim-With Regulation
Alternative 3: Swim-With and Approach Regulations
Alternative 3(A): Swim-With and 50-Yard Approach Regulations

Alternative 3(B): Swim-With and 100-Yard Approach Regulations
Alternative 4: Mandatory Time-Area Closures and Swim-With and Approach Regulations
Alternative 5: Voluntary Time-Area Closures and Swim-With and Approach Regulations

The alternatives 2, 3, 4, and 5 are all applicable within 2 nm of each main Hawaiian Islands and in designated waters between the islands of Lanai, Maui, and Kahoolawe.

5.3 Benefits and Impacts of Management Alternatives

5.3.1 Description of Affected Parties and Types of Impacts

Alternatives vary in terms of which parties are affected. This section provides background on entities that are potentially affected by the preferred alternative as well as the non-preferred alternatives.

In recent years, a tourist-dependent industry involving direct human interaction with Hawaiian spinner dolphin groups (also referred to as "swimming with dolphins" operations) has emerged on four of the seven inhabited MHI: Kauai, Oahu, Maui, and Hawaii.

The businesses that will likely be most affected by the implementation of any of the action alternatives will be the whale and dolphin watching businesses, dolphin swim spiritual retreats, snorkel tours, SCUBA companies, and kayak tours/rentals, since they are the most dolphin-directed. Other ocean-recreation companies, such as Jet Ski, SUP, and outrigger companies, may also be affected because there is an opportunity to see dolphins while on these platforms, but they are less focused on the dolphins, so they will be affected to a lesser extent.

Most of the directly affected parties, particularly in the commercial sector, cater to the tourists visiting the MHI. Approximately 8.2 million people visited the state of Hawaii in 2013 by air or cruise ships: 8,003,474 by air, and 170,987 by cruise ships (Department of Business, Economic Development and Tourism – State of Hawaii (2013)). Based on recent information from the Hawaii Tourism Authority, 8.65 million people visited the state of Hawaii in 2015: 8,533,978 by air and 115,378 by cruise ships (http://www.hawaiitourismauthority.org/default/assets/File/research/monthly-visitors/December%202015%20%28FINAL2%29.pdf).

Much of the background information for potentially affected entities and analysis in this RIR is based on a 2007 report that summarized survey and other information collected in 2006 with regard to participants within these industries that potentially interact with Hawaiian spinner dolphins to varying degrees in the MHI (Impact Assessment, Inc. 2007). To learn more about the dolphin-tour industry, the authors sought to identify as many of the dolphin-tour companies as possible through informal contact. The report developed an estimate of the number of businesses involved with dolphin tourism by reviewing archival materials and asking business owners and operators to identify tours that typically encounter dolphins. NOAA has also maintained an ongoing list of companies that potentially enable interaction with spinner dolphins to some degree. It appears that in the time between when the 2007 Economic Data Report came

out and early 2015, there has been an overall gain in the number of dolphin-tour companies. For example, Oahu numbers have nearly doubled in the past 10 years, and the number of companies on Hawaii Island has increased. This increase includes some companies whose primary activity was not dolphin-directed in the past, such as SCUBA companies, but have added swimming with or watching dolphins to their current menu of activities offered.

With respect to demand for activities potentially involving some degree of interaction with Hawaiian spinner dolphins, a study estimated what consumers were willing to pay for boat trips with varying attributes such as swimming with dolphins, wildlife viewing and snorkeling with dolphins (Hu *et al*. 2009). The authors developed these estimates through surveys administered on the island of Oahu, near harbors suitable for dispatching excursion boats. They found that respondents generally prefer swimming and diving with spinner dolphins to viewing the dolphins from a boat. How much more money people were willing to pay to swim with dolphins instead of just viewing dolphins from a boat varied depending on a wide range of factors, such as respondent's demographic information (for example, age and state residency) or vessel-based characteristics (for example, vessel size or whether the tour operator offered a guarantee to see at least one dolphin) offered along with the activity. These results suggest that many consumers typically would be willing to pay a premium to interact closely with dolphins in the water.

The information provided in the 2007 Economic Data Report will provide the basis for the description of the industries with some updated information collected by NOAA whenever possible. The parties potentially affected by some or all of the action alternatives are as follows:

Swim-with-wild-dolphins tour operators (including spiritual retreats and dolphin-oriented swim/snorkel tours)

Swim-with-wild-dolphin tour operators are those that bring clientele within close proximity to Hawaiian spinner dolphins. These include dolphin-oriented swim/snorkel tours as well as spiritual retreat operations.

Swim-with-wild-dolphin tour operators include generalized commercial boat tours that advertise the intent to enable clientele to swim in close proximity with Hawaiian spinner dolphins. Boats transport passengers toward spinner dolphins, including in essential daytime habitats. Operators provide facemasks, fins and snorkels to enhance viewing abilities.

Most motorized vessels bringing clients to swim with Hawaiian spinner dolphins range from approximately 22 to 42 feet in length and may carry between 6 and 81 people, based on the 2007 Economic Data Report by Impact Assessment, Inc.

There are several businesses, most of which operate on the island of Hawaii, that offer spiritual retreats enabling customers to swim with wild dolphins. These businesses provide opportunities for persons wishing to interact with Hawaiian spinner dolphins for physical, mental, and/or spiritual well-being enhancement. To that end, the intent of these operations is to provide close interaction between people and dolphins. Spiritually linked tour operations may charter vessels through other established dolphin-swim companies to transport customers as part of an overall per person package consisting of lodging, swimming with dolphins, and other activities. It

appears that these chartered trips are folded into the daily trip schedule, rather than as an additional trip (Laura McCue, NMFS PIRO PRD, personal communication, January 2015). In many cases, the spiritual tours offer yoga, meditation, whale watching, and other forms of relaxation, in addition to swimming with dolphins.

According to Impact Assessment, Inc. (2007), there were an estimated five spiritual retreat businesses on Hawaii Island and one on Maui that reportedly provided direct Hawaiian spinner dolphin interaction in 2006. No numbers were provided for those businesses operating on Oahu and Kauai. The gross revenues for this industry generally did not exceed $500,000, according to the report. The report also reported six tour operators on Hawaii and four on Oahu that enabled direct interactions with spinner dolphins (numbers for Maui were not provided and this activity did not seem to occur on Kauai). More recent information compiled by NMFS suggests there are 22 swim-with-dolphin tour companies on Hawaii Island, two on Maui, 10 on Oahu, and one on Kauai operating as of early 2015. NMFS estimates 22 spiritual retreats offer dolphin swims on Hawaii Island, as well as seven on Maui, one on Oahu and two on Kauai.

Dolphin-watch tour operators

Dolphin-watch tours involve taking clients out to specifically view wild dolphins, compared with the generalized wildlife viewing tour boats described below, which offer other activities and are not dolphin-focused. The 2007 Economic Data Report did not report any information on this specific industry, which may have been included or captured in other categories listed in the report. NMFS believes three businesses operate dolphin-watch tours on Hawaii Island, 21 on Maui, three on Oahu and 11 on Kauai.

Generalized commercial boat tour operators

More generalized commercial boat tours offer a range of ocean activities, which may include sightseeing, snorkeling, diving, viewing various forms of sea life from a vantage point in and/or above the water, or just generally spending time on the ocean. Operators of these vessels may charge either a fee per head or a charter fee for the use of the vessel. The majority of the general tour boats derive revenue from whale-watching and sightseeing operations, while a number of the dive/snorkel vessels offer snorkeling or diving trips. As mentioned earlier, these boat tours do not specialize in viewing or interacting with dolphins, although they might approach closer to dolphins if the opportunity unexpectedly arises.

The 2007 Economic Data Report (Impact Assessment, Inc.) estimated that there are nine generalized commercial boat tour businesses reportedly involving indirect dolphin interaction operating on Hawaii Island, 20 on Maui, four on Oahu, and 11 on Kauai. More recent estimates by NMFS identify 10 generalized tour operators on Hawaii, 19 on Maui, 36 on Oahu and 12 on Kauai

Tour vessels that offer more generalized wildlife viewing, rather than focusing on interacting closely with Hawaiian spinner dolphins, tend to be larger than vessels used by swim-with-dolphin tour operators. Based on the 2007 Economic Data Report, these might range between 27 and 130 feet in length, with a maximum capacity ranging between 25 and 400 people.

In addition to the business categories described above, other parties that may be affected by the proposed rulemaking and/or the non-preferred action alternatives include those below.

Non-motorized vessel tour operators

Numerous kayak tour businesses around the MHI provide a general wildlife viewing experience, and a very small number of operators advertise direct or intentional interactions with Hawaiian spinner dolphins. NMFS estimates there are six companies advertising interactions with dolphins that either operate kayak tours or rent out kayaks on Hawaii Island, nine on Maui, six on Oahu and 13 on Kauai.

Operators of commercial vessels used for purposes other than wildlife tourism

Examples include commercial fishing vessels, charter fishing boats, barges and cruise ships.

Rental companies (boat, watercraft, and equipment)

This includes businesses in all locations that rent out boats and personal watercraft, as well as those that rent out non-motorized ocean recreational equipment, such as kayaks, SUPs, and surfboards. These businesses take the form of beach concession stands, surf schools, kayak shops, and dive shops. NMFS does not have approximate numbers for these businesses.

Non-commercial ocean users

This category includes kayakers, private boaters/personal watercraft users, stand-up paddle boarders, surfers, and swimmers.

5.3.2 Economic Benefits

Under current conditions, Hawaiian spinner dolphins suffer frequent disturbances from vessels and swimmers seeking interactions with wild dolphins (Forest 2001, Östman-Lind 2004, Danil *et al*. 2005, Courbis 2007, Timmel *et al*. 2008, Milette *et al*. 2011). Each action alternative has some potential to prevent or reduce the threat of take occurring (including harassment and disturbance), though the magnitude of the reduction will vary based on type and number of activities that the measure is capable of addressing. NMFS anticipates that a reduction in disturbance will have a positive impact on the spinner dolphins, and help increase their population-level fitness over time.

The economic benefits of enhancing protections for Hawaiian spinner dolphins in their natural habitat include the value associated with the non-consumptive use, such as watching dolphins from boats, kayaks, and the shore. Some of the action alternatives would reduce the non-consumptive "use" value from the group of people who wish to interact closely with dolphins by swimming or approaching dolphins closely; however, for the many more who participate in more general wildlife viewing, which could occur from greater distance, this value could be enhanced by greater potential for encountering dolphin groups on a tour, albeit at a greater distance.

Taking measures to enhance spinner dolphin populations also provides other non-market economic benefits, such as option value (value gained if people would like to be able to view dolphins in the future), bequest value (value of being able to protect spinner dolphin populations as a resource for future generations) and existence value (value people gain from simply knowing that spinner dolphins exists, even if they never intend to visit Hawaii to view dolphins).

As no estimated economic non-market values have been quantified in the context of enhancing protections for Hawaiian spinner dolphin populations through these various action alternatives, it is not possible to quantify the total value of economic benefit from taking any of the action alternatives. However, most of the action alternatives would provide economic benefits that would accrue to Hawaii residents and to citizens throughout the U.S.

5.3.3 Economic Impacts of Each of the Alternatives

NMFS assesses the potential economic impacts for each of the alternatives qualitatively since NMFS does not have data that would allow a quantitative analysis. NMFS believes each of the action alternatives provides some degree of benefit to the MHI spinner dolphin populations, since the reduction in disturbance to the dolphins is thought to support the long-term sustainability of this species. As disturbance declines, spinner dolphin populations should increase due to increased fecundity and survival to reproductive age.

Alternative 1: "No Action" Alternative

The No Action Alternative would likely allow the current — and potentially increasing — frequency and intensity of human interactions with Hawaiian spinner dolphins to continue. Wildlife viewing and interactive wildlife excursions, including spinner dolphin-related tourism, have become increasingly popular in recent years (Hoyt 2001, Boehle 2007, OConnor *et al.* 2009, Hu *et al*. 2009). This suggests that the number of companies offering dolphin tours is likely to increase and the existing companies that remain may expand the number of daily trips. If disturbance to spinner dolphins continues unabated, impacts to the resident spinner dolphin population are anticipated to occur either in the form of habitat displacement and/or eventual declines in the dolphin population levels. Gradual declines to spinner dolphin numbers or habitat abandonment could, in turn, affect the ability of tour operators and spinner dolphin-directed recreational boaters or swimmers to locate dolphins, both in known spinner dolphin essential daytime habitat and in open waters outside of those areas. For example, those people who are engaged in spinner dolphin-directed activities may need to travel farther or engage in those activities in areas where travel conditions are less than optimal for recreational passengers because of, for instance, choppy water. For tour operators, this could result in increased travel time, higher fuel costs and reduced client satisfaction, which may ultimately compromise business abilities at the margin.

Alternative 2: Swim-With Regulation

Compared with the No Action Alternative, prohibiting people from swimming with Hawaiian spinner dolphins is likely to have positive benefits to spinner dolphin individuals and the larger population. While Alternative 2 is expected to alleviate some of the disturbance considered to threaten long-term health of resident populations, it is uncertain to what degree the elimination of

this one activity will enhance protections for spinner dolphins that still may face impacts from other activities, such as close approach by vessels. Resident populations may remain at risk if these other factors are not adequately addressed.

Under Alternative 2, Hawaiian spinner dolphin-directed swimming activities would be prohibited both from shore and from vessels. NMFS does not expect this alternative to directly affect other activities that are unrelated to swimming with spinner dolphins, although it may indirectly affect them.

The potential direct impacts to various parties are described below:

Swim-with-wild-dolphins tour operators (including spiritual retreats and shore-based tours)
The prohibition on swim with Hawaiian spinner dolphin activities would eliminate virtually all commercial swim-with-wild-dolphin activities. If dolphins approach swimmers and snorkelers who enter the water, these swimmers will need to reopen the space between themselves and the dolphins by moving away. Therefore, implementing this alternative would lead to operators that currently offer the opportunity to swim with wild dolphins to cease this particular activity, though they may choose to continue to provide other services among their menu of options to their clientele. For example, a spiritual retreat may continue to provide yoga and meditation; swim-with-wild-dolphins tour operators may choose to transition to operate as strictly a dolphin-watch tour operation; generalized tour vessel operation, or operators of either of these swim-with-wild-dolphin business categories, may choose to transition to activities that involve swimming with other marine wildlife. For these businesses, eliminating the option to swim with wild dolphins may result in a reduction in revenue, which could come from the reduction in the number of customers (specifically those who sought the experience of swimming with wild dolphins), as well as possible reduced trip or package prices with the reduced menu of options available for each trip. The loss in overall revenue to the swim-with-wild-dolphins operators is uncertain.

As described above, swim-with-wild-dolphin tour operators who choose to transition to generalized commercial boat tour operators may face a loss in revenue, which may be offset by increase in demand for vessel-based up close encounters. Information is not available about how their operating costs would differ if they were to transition to generalized commercial boat tour operations, compared with current operating costs.

Dolphin-watch tour operators, generalized commercial boat tour operators and non-motorized vessel tour operators
Alternative 2 does not prohibit close approach by vessels. As a result, Hawaiian spinner dolphin-directed tour operators may gain customers by offering an up-close viewing opportunity on a vessel or other watercraft. Furthermore, the conservation of spinner dolphins gained through Alternative 2 may maintain the ability of generalized tour operators to find spinner dolphins, especially if the level and types of close interactions between these vessels and spinner dolphins remains about the same.

Non-commercial ocean users
Non-commercial ocean users, such as swimmers, scuba divers, and snorkelers, would all be restricted from swimming with Hawaiian spinner dolphins. Most swimmers, snorkelers, and scuba divers may be largely unaffected by this prohibition. For those swimmers who seek a spiritual or healing experience from closely interacting with spinner dolphins, they may choose to view dolphins from a kayak or vessel and/or from a greater distance.

Indirect impacts
Firms that provide services and supplies to swim-with-wild dolphin tour operators and spiritual retreats may be adversely affected, depending on the extent to which they depend on the businesses that enable dolphin-swim activities. Generalized commercial boat tour operators may also be adversely affected indirectly, if some swim-with-dolphin operators transition to more generalized wildlife viewing.

Alternative 3(A) (Preferred): Swim-With and 50-Yard Approach Regulations

For the most part, the Hawaiian spinner dolphin-viewing tour industry may see a long-term economic benefit that comes through protecting the resource on which the spinner dolphin-focused tourism industry depends, relative to the No Action Alternative. However, operators that enable direct interaction with wild spinner dolphins through spiritual retreats or advertise the opportunity to swim or interact directly with wild spinner dolphins, or view them up close by any means, would be adversely affected by the implementation of the preferred alternative, since this alternative prohibits activities that are conducted in close proximity to wild dolphins.

NMFS anticipates Alternative 3(A) to directly affect a wide variety of activities because it prohibits all people and vessels from approaching Hawaiian spinner dolphins. Section 2.4.1 of the DEIS identifies a few exceptions to the 50 yard prohibition. The economic impacts to the various affected parties are as follows:

Swim-with-wild-dolphins tour operators (including spiritual retreats and shore-based tours)
The 50-yard approach limit would eliminate virtually all commercial swim-with-wild-dolphin activity, and if swimmers and snorkelers find themselves within 50 yards of spinner dolphins, they would need to reopen the space between themselves and the dolphins by moving away. Implementing this alternative would require operators that currently offer the opportunity to swim with wild dolphins to cease this activity, although they may choose to continue to provide other services among their menu of options to their clientele. For example, a spiritual retreat may continue to provide yoga and meditation, or swim-with-wild-dolphins tour operators may choose to transition to operate as strictly a generalized tour vessel operation. For these businesses, eliminating the option to swim with wild dolphins is likely to result in a reduction in revenue. The revenue drop could come from the reduction in the number of customers, specifically those who specifically sought the experience of swimming with wild dolphins, as well as reduced trip or package prices with the reduced menu of options available for each trip. The loss in overall revenue to the swim-with-wild-dolphins operators is uncertain.

Swim-with-wild-dolphin tour operators who choose to transition to generalized commercial boat tour operators would still face impacts as described under the industry of generalized commercial

boat tour operators. Information is not available about how their operating costs would change if they were to transition to generalized commercial boat tour.

Dolphin-watch tour operators, generalized commercial boat tour operators and non-motorized vessel tour operators

Commercial boat tour operators would no longer be able to take customers to view Hawaiian spinner dolphins from closer than 50 yards. Removing this viewing option may reduce demand for vessel-based tours among customers who specifically hope to see the dolphins from a vessel at closer range, particularly dolphin-watch tours that advertise close-viewing opportunities. Some tour operators may be able to offer alternative recreational opportunities as part of a tour to help offset the loss in demand for tours.

Operators of commercial vessels used for purposes other than wildlife tourism, personal watercraft and private boats

All boats and personal watercraft would be restricted from approaching within 50 yards of Hawaiian spinner dolphins, possibly resulting in a slight increase in travel time, which might cause a slight increase in operating costs.

Personal watercraft users and private boaters are less likely to be engaging in their water-based activity daily. Although Alternative 3(A) would increase private watercraft users' operating costs, these costs are not likely to increase by a substantial amount over the course of the year.

Rental companies (boat, watercraft, and equipment)

All persons would be restricted from approaching Hawaiian spinner dolphins within 50 yards by any means. Rental companies that rent out charter boats or recreational equipment, such as watercraft, kayaks, surfboards, and SUPs, and that currently attract customers by advertising or promoting their rentals as providing the possibility of directly interacting with spinner dolphins, will no longer be able to promote this activity. As a result, these rental companies may see a drop in demand for rentals from those customers who are renting solely to interact closely with dolphins, resulting in a decrease in revenue.

Non-commercial ocean users

Non-commercial ocean users, such as swimmers, scuba divers, snorkelers, surfers, and stand-up paddleboarders, would all be restricted from deliberately approaching Hawaiian spinner dolphins within 50 yards by any means. This will reduce the quality of ocean experience for those persons who specifically seek to engage in those activities.

Indirect impacts

Firms that provide services and supplies to swim-with-wild dolphin tour operators, spiritual retreats, and dolphin-watch tour operators may be adversely affected, depending on the extent to which they depend on the businesses that enable dolphin-swim and close-viewing activities. Generalized commercial boat tour operators may also be adversely affected indirectly, if some swim-with-dolphin or dolphin-watch tour operators transition to more generalized wildlife viewing.

Alternative 3(B): Swim-With and 100-Yard Approach Regulations

The types of impacts to all affected entities in implementing Alternative 3(B) would be similar to those that would results as a result of implementing the 50 yard approach rule (Alternative 3(A)). But the impacts are expected to be more severe under Alternative 3(B), with potentially greater loss in customers and revenue, particular for businesses whose revenues depend to any extent on opportunity to view dolphins from close and somewhat close (between 50 and 100 yards) range. This alternative is expected to have a greater conservation benefit to spinner dolphin populations, but may prohibit some human activities that are not likely to result in take.

Alternative 4 : Mandatory Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 4 combines the restrictions associated with an approach rule (see Alternative 3) and calls for implementing time-area closures in the following five identified Hawaiian spinner dolphin essential daytime habitats: Makako Bay, Kealakekua Bay, Honaunau Bay, and Kauhako Bay on Hawaii Island and La Perouse Bay on Maui. The minimum prescribed distance under consideration is between 50 and 100 yards. Alternative 4 would be the most restrictive in terms of impacts to directly affected parties, including swim-with-wild dolphins tour operators, generalized wildlife tour operators, non-motorized vessel tour operators, and other commercial and non-commercial ocean users, particularly if the minimum distance is set at 100 yards. Alternative 4 would restrict all activities associated with close approach to Hawaiian spinner dolphins, including swimming and close approach by vessel, as well as create time-area closures in five Hawaiian spinner dolphin essential daytime habitats. Sections 2.4.1 and 2.7.3 identify exceptions to the general prohibition on close approach and entry into the time-area closures.

For the most part, the wildlife-viewing tour industry may see a long-term economic benefit that results from protecting the resource on which the Hawaiian spinner dolphin-focused tourism industry depends relative to the No Action Alternative and the other action alternatives. However, operators that enable direct interaction with spinner dolphins through spiritual retreats or advertise the opportunity to swim or interact directly with spinner dolphins or view dolphins up close by any means would be adversely affected, since these activities that are purposefully conducted in close proximity to wild spinner dolphins would cease under this alternative.

NMFS anticipates Alternative 4 to directly affect a wide variety of activities because it prohibits all people and vessels from approaching Hawaiian spinner dolphins. The economic impacts to the various affected parties are as follows:

Swim-with-wild-dolphins tour operators (including spiritual retreats and shore-based tours)
Alternative 4 would eliminate virtually all commercial swim-with-wild-dolphin activity, through the prohibition of swimming with Hawaiian spinner dolphins or approaching them within the minimum prescribed distance. If spinner dolphins approach swimmers and snorkelers who enter the water, these swimmers will need to reopen the space between themselves and the dolphins by moving away. Therefore, implementing this alternative would lead to operators that currently offer the opportunity to swim with spinner dolphins to cease this activity, although they may choose to continue to provide other services among their menu of options to their clientele. For

example, swim-with-wild-dolphins tour operators may choose to transition to operate as strictly a generalized tour vessel operation or a spiritual retreat may continue to provide yoga and meditation. For these businesses, eliminating the option to swim with spinner dolphins is likely to result in a reduction in revenue. The revenue drop could come from the reduction in the number of customers, specifically those who sought the experience of swimming with spinner dolphins, as well as reduced trip or package prices with the reduced menu of options available for each trip. The loss in overall revenue to the swim-with-wild-dolphins operators is uncertain.

Swim-with-wild-dolphin tour operators who choose to transition to generalized commercial boat tour operators would still face impacts as described under the industry of generalized commercial boat tour operators. NMFS cannot determine how their operating costs would change if they were to transition to generalized commercial boat tour operations.

Dolphin-watch tour operators, generalized commercial boat tour operators and non-motorized vessel tour operators

Commercial boat tour operators would no longer be able to take customers to view Hawaiian spinner dolphins from closer than the minimum prescribed distance. Removing the option of approaching within the minimum prescribed distance to spinner dolphins may reduce demand for vessel-based tours among customers who specifically hope to view the dolphins from a vessel at closer range. Some tour operators may be able to offer alternative recreational opportunities as part of a tour to help offset the loss in demand for tours.

In addition, boats would not be allowed to use the time-area closures during the specified times (for exceptions see Section 2.7.3). Generalized commercial boat tour operators may still view Hawaiian spinner dolphins from outside the closed areas and from at least the minimum prescribed distance. Because these tour boat operators are taking passengers to enjoy being out on the water and for general wildlife viewing instead of having the specific goal of viewing spinner dolphins, the economic impact to this group of tour operators is likely to be minimal.

Dive tours operating at Makako Bay will face some adverse economic impact from the implementation of the time-area closure. The closure at Makako Bay would eliminate the use of the inner bay dive mooring during the closure period of 6 AM until 3 PM, but would still allow use of dive moorings that are on the north and south ends of the bay. The elimination of the daytime use of the inner bay mooring would require those companies offering dives at that location to find suitable alternatives, possibly increasing operating expenses to reach the alternative location and/or loss in revenues from loss in customers who specifically seek to dive in Makako Bay. The inner bay dive mooring can still be used for nighttime manta ray dives after the closure period ends.

No person would be allowed to use the time-area closures during the specified times unless covered under the exceptions listed in Section 2.7.2 of the DEIS. There is the possibility that boaters will be subject to this restriction even when spinner dolphins are not present; *i.e.*, when there is no possibility of take occurring. Those individuals or companies that conduct kayak tours or other non-motorized vessel tours in or near time-area closures, and promote the opportunity of close interactions with Hawaiian spinner dolphins within the time-area closures would have to scale back on their promotion of these activities. These particular operators may

see a reduction in revenues as a result compared to the no action alternative. Kayak tour companies that operate near bays with closed areas are expected to continue their operations with minimal modifications, as the closed areas are generally designed to allow other uses, including kayaking, at each of the bays. For instance, the closure in Kealakekua Bay has been designed so that the popular route used by kayakers to the Captain Cook Monument from Napoopoo Pier would be unaffected.

Operators of commercial vessels used for purposes other than wildlife tourism; personal watercraft and private boats; non-commercial ocean users

All boats and personal watercraft would be restricted from approaching within the minimum prescribed distance of Hawaiian spinner dolphins. This could result in a slight increase in travel time, which might cause a slight increase in operating costs for boats.

Personal watercraft users and private boaters are less likely to be engaging in their water based activity daily, so Alternative 4 is not likely to increase by a substantial amount over the course of the year.

All boats must detour around the time-area closures during specified times; however, as the closed areas are fairly small and/or not along boat traffic routes, this is not likely to affect most boat traffic patterns.

Personal watercraft are not currently allowed within the five specified bays targeted for time-area closures, so they would not be affected by the time-area closures.

Non-commercial ocean users, such as swimmers, scuba divers, snorkelers, surfers and stand-up paddleboarders, would all be restricted from deliberately approaching Hawaiian spinner dolphins within the minimum prescribed distance by any means. This will reduce the quality of ocean experience for those persons who specifically seek to engage in those activities. Additionally, no person would be allowed to use the closure areas by any means during the specified times. However, the closure areas at each of the five bays have generally been designed so that the bays can continue to accommodate various user groups. For instance, in La Perouse Bay, the inner shoreline of the bay would remain open for uses such as swimming and surfing. In Honaunau Bay, the boat ramp and Two Step would remain open.

Rental companies (boat, watercraft, and equipment)

All persons would be restricted from approaching Hawaiian spinner dolphins within the minimum prescribed distance by any means. Rental companies that rent out charter boats or recreational equipment, such as watercraft, kayaks, surfboards, and SUPs, and that also currently attract customers by advertising or promoting their rentals by encouraging the capability of directly interacting with spinner dolphins, will no longer be able to promote this activity. As a result, these rental companies may see a drop in demand for rentals from those customers who are renting solely to interact closely with the dolphins, resulting in a decrease in revenue.

Customers can still use rental equipment within those bays, as the closed areas have been designed to allow user groups ample space to engage in activities outside the closed areas. The

time-area closures should not affect this demand among renters who do not intend to encounter closely with Hawaiian spinner dolphins.

Indirect impacts
Firms that provide services and supplies to swim-with-wild dolphin tour operators, spiritual retreats, and dolphin-watch tour operators may be adversely affected, depending on the extent to which they depend on the businesses that enable dolphin-swim and close viewing activities. Generalized commercial boat tour operators may also be adversely affected indirectly, if some swim-with-dolphin or dolphin-watch tour operators transition to more generalized wildlife viewing.

Alternative 5 : Voluntary Time-Area Closures in Five Selected Essential Daytime Habitats and Swim-With and Approach Regulations

Alternative 5 is similar to Alternative 4, except that the requirement to stay outside of the time-area closures would be voluntary under Alternative 5. The minimum prescribed distance under consideration is between 50 and 100 yards, as was the case for Alternative 4. If no one were to comply with the voluntary time-area closures, the impacts to all entities would be the same as those described under Alternative 3(A) when the minimum distance for approach is set at 50 yards. Under the same scenario of no compliance to voluntary time-area closures, when the minimum distance for approach is set at 100 yards, then the impacts would be the same as if Alternative 3(B) were to be implemented. If all entities were to comply with restrictions set by the time-area closure, then impacts would be the same as under Alternative 4. Most likely the impacts would be somewhere in between, as NMFS expects some would comply with the voluntary restrictions, but not all (and expected compliance rate is unknown).

5.3.4 Distributional Changes in Net Benefits

NMFS expects the preferred alternative (Alterntive 3(A)) to primarily adversely affect businesses whose revenues rely on interacting with Hawaiian spinner dolphins in close proximity or individuals who ordinarily would choose to interact closely with spinner dolphins. With an indeterminate change in operating costs (if these firms do remain operating), spiritual retreats and dolphin swim tour companies, as well as those that conduct spinner dolphin-viewing from close proximity, will likely see a greater adverse impact on net revenues, compared with generalized commercial tour operators.

5.3.5 Changes in Income and Employment

NMFS expects the preferred alternative to have negative impacts on the income and regional employment for those in the tourism sector who enable swimming with or close interaction with Hawaiian spinner dolphins. The non-preferred action alternative 2 will adversely affect these employees to a lesser degree, whereas Alternatives 3(B) and 4 would likely have a greater adverse impact on income and employment. Alternative 5 would likely have similar impacts to the preferred alternative.

5.3.6 Impacts to Government

NMFS expects the preferred alternative to incur incremental impacts to the Federal government in terms of costs and staff resources relative to the no action alternative. Materials related to public outreach with regard to the rule once it is implemented, and training of local enforcement officers, may also require additional money, staff time and resources. The preferred alternative would have a lower impact to Federal government compared with Alternatives 4 and 5, which would incur costs associated with establishing and maintaining the markers for the closed areas as well as creating additional signage at each site.

5.4 Summary of the Significance Criteria

E.O. 12866 requires that the Office of Management and Budget review regulatory programs that are considered to be "significant." The RIR also serves as a basis for determining whether a proposed action is a "significant regulatory action" under the criteria provided in E.O. 12866. A "significant regulatory action" is one that is likely to:

- Have an annual effect on the economy of $100 million or more, or adversely affect, in a material way, the economy or a sector of the economy; productivity; competition; jobs; the environment; public health or safety; or State, local or tribal governments or communities
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency
- Materially alter the budgetary impact of entitlements, grants, user fees or loan programs, or the rights and obligations of recipients thereof
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this E.O.

A regulatory program is "economically significant" if it is likely to result in any of the effects described above. In part, the RIR is designed to provide information to determine whether the regulation is likely to be economically significant. While the impacts described in this RIR are largely qualitative, NMFS does not believe that the impact from implementing the preferred alternative would exceed $100 million per year, or adversely affect the economy or sector of the economy in any material way.

Chapter 6 - Other Applicable Laws

6.1 Federal Laws Applicable to this Action

The following sections describe the Federal laws that are applicable to the proposed action and alternatives. The proposed action or alternatives may require these permits and/or authorizations:

- Section 10 Permit (under the Rivers and Harbors Act) obtained from the Army Corps of Engineers.

6.1.1 National Environmental Policy Act

NEPA (42 U.S.C 4321 *et seq*.) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. NEPA is applicable to "major" Federal actions affecting the quality of the human environment. A major Federal action is an activity that is fully or partially funded, regulated, conducted or approved by a Federal agency. NMFS is considering the environmental impacts of the proposed Federal action and reasonable alternatives under NEPA in this DEIS.

6.1.2 Marine Mammal Protection Act

The MMPA prohibits "taking" of marine mammals (16 U.S.C. § 1372). The MMPA defines "take" (or taking) as meaning, "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal," (16 U.S.C. § 1362(13)). The term "harassment" is defined as "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B Harassment]" (16 U.S.C. § 1362(18)).

The MMPA confers the responsibility to the Secretary of Commerce to prescribe regulatory measures deemed "necessary and appropriate" to carry out the purposes of the MMPA," including preventing against take. *See* 16 U.S.C. § 1382.

Alternative 3(A) (Preferred) is consistent with the MMPA and would establish regulatory measures that NMFS expects will enhance protections for Hawaiian spinner dolphins from dolphin-directed activities that harass and/or disturb spinner dolphins during important daytime activities.

6.1.3 Endangered Species Act

The ESA (16 U.S.C. § 1531 *et seq*.) was established to conserve and protect threatened and endangered species. It is the policy of the ESA that all federal agencies must seek to conserve threatened and endangered species and use their authorities to further the purposes of the ESA.

Section 7 of the ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of any species listed as threatened or endangered or result in the destruction or adverse modification of the critical habitat of listed species. The ESA requires the "action" agency to consult with the applicable Service agency to evaluate the effects a proposed agency action may have on a listed species. If the action agency determines through preparation of a biological assessment or informal consultation that the Preferred Alternative is "not likely to adversely affect" listed species or critical habitat, formal consultation is not required as long as the Service agency concurs. If, however, the action agency determines that the proposed action may affect listed species or critical habitat, formal consultation will be required. 50 C.F.R. § 402.

Pursuant to ESA section 7(a)(2), NMFS will complete informal consultation with the Protected Resources Division to evaluate the effects of the final actions on ESA-listed species prior to the implementation of any regulation.

6.1.4 National Historic Preservation Act

The goal of the NHPA (16 U.S.C. 470 *et seq*.) is to have federal agencies act as responsible stewards of our nation's resources when their actions affect historic properties. The NHPA established the Advisory Council on Historic Preservation (ACHP), an independent federal agency that promotes the preservation, enhancement, and productive use of our nation's historic resources and advise the President and Congress on national historic preservation policy. Section 106 of the NHPA requires Federal agencies to take into account the effects of undertakings they carry out, assist, fund, or permit on historic properties. Federal agencies meet this requirement by completing the Section 106 process set forth in the implementing regulations, "Protection of Historic Properties," 36 C.F.R Part 800. The goal of the Section 106 process is to identify and consider historic properties (or sites eligible for listing) that might be affected by an undertaking and to attempt to resolve any adverse effects through consultation. The process provides for participation by the State Historic Preservation Officer, Tribal Historic Preservation Officer, tribal, state and local governments, Indian tribes and Native Hawaiian organizations, applicants for Federal assistance, permits, or licenses, representative from interested organizations, private citizens and the public. Federal agencies and consulting parties strive to reach agreement on measures to avoid, minimize, and mitigate adverse effects on historic properties and to find a balance between project goals and preservation objectives.

Under the NHPA an "effect" means an alteration to the characteristics of a historic property qualifying it for inclusion or eligibility for the National Register. The preferred Alternative, 50-yard approach regulation for Hawaiian spinner dolphins, does not have the potential to cause effects on or alterations to the characteristics of historic properties and Section 106 consultation is not required.

The delineated time-area closures for Kealakekua Bay and Honaunau Bay are located within National Historic Districts identified in the National Register of Historic Places. If NMFS selected an alternative course of action that includes mandatory time-area closures (Alternative 4), the potential effects on these historic properties would be considered in accordance with Section 106 of the NHPA. Additionally, NMFS would need to evaluate the action area to

determine if other areas may be eligible for listing under the National Register. Under this scenario, consultation requirements under Section 106 of the NHPA would be completed prior to the publication of the final rule and final EIS.

6.1.5 Magnuson-Stevens Fishery Conservation and Management Act

The EFH provisions of the MSA require NMFS to provide recommendations to Federal and state agencies for conserving and enhancing EFH if a determination is made that an action may adversely impact EFH. NMFS policy regarding the preparation of NEPA documents recommends incorporating EFH assessments into NEPA analyses; therefore, this DEIS will also serve as an EFH assessment.
Pursuant to these requirements, Chapter 2 of this document provides a description of the alternatives considered to enhance protections for Hawaiian spinner dolphins. Chapter 3 provides a description of the affected environment, including the identification of areas designated as EFH and HAPC (see Appendix D). As detailed in Section 4.3.2, NMFS does not expect that EFH, coral reefs, and marine species living in the coral reefs will be directly affected by the proposed action.

6.1.6 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) requires authorization by the Secretary of the Army to build any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States; and to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States.

Installation of marker buoys to delineate the time-area closures under Alternatives 4 and 5 may require a Section 10 permit. NMFS will apply for the necessary permits and work with the Army Corps of Engineers (ACOE) to mitigate any impacts to the waters of the United States, as necessary.

6.1.7 Clean Water Act

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation.

As part of the ACOE Section 10 permit, Federal agencies must also satisfy the requirements of Section 404 of the Clean Water Act to minimize impacts to the waters of the United States. If an alternative course of action is taken that includes buoy installation (under either Alternative 4 or 5), NMFS will comply with all pertinent regulations.

6.1.8 Data Quality Act

Section 515 of Public Law 106-554, the Data Quality Act, directs that all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of the information (including statistical information) disseminated by or for federal agencies.

The proposed rule package that is accompanying this DEIS has undergone a pre-dissemination review by the Protected Resources Division of PIRO, completed on [INSERT DATE], which determined this information product complies with applicable information quality guidelines implementing the Data Quality Act.

6.1.9 Coastal Zone Management Act

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 requires that all Federal activities that affect any land or water use or natural resource of the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The preferred alternative (50-yard approach regulation) is consistent to the maximum extent practicable with the enforceable policies of the approved Coastal Zone Management Program of Hawaii. This determination, a copy of this document, and the draft environmental impact statement will be submitted for review by the Hawaii Coastal Zone Management Program. If time-area closures (under Alternatives 4 or 5) are found to be necessary and appropriate to protect Hawaiian spinner dolphins, a new determination will be made and submitted to the Hawaii Coastal Zone Management Program.

6.1.10 Regulatory Flexibility Act

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency publishes a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis describing the effects of the rule on small entities — that is, small businesses, small organizations, and small government jurisdictions. The initial regulatory flexibility analysis (IRFA) pursuant to Section 603 of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq*.; IEC, 2014) is available in the proposed rule, which may be accessed at ww.regulations.gov.

6.1.11 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to minimize the paperwork burden for individuals, small businesses, educational and nonprofit institutions, and other persons resulting from the collection of information by or for the Federal government. The Preferred Alternative includes no new collection of information, so further analysis is not required.

6.2 Executive Orders

An Executive Order (EO) is an order having the force of law issued by the President of the United States to the Executive branch of the Government. An EO directs Federal agencies in the execution of congressionally established laws or Executive policies. The following Presidential EOs are relevant to this analysis.

6.2.1 EO 12630 – Takings

Under EO 12630, Federal agencies must consider the effects of their actions on constitutionally protected private property rights and avoid unnecessary takings of property. A taking of property includes actions that result in physical invasion or occupancy of private property, and regulations imposed on private property that substantially affect its value or use.
In accordance with EO 12630, the proposed regulations to enhance protections for spinner dolphins do not pose significant takings implications.

6.2.2 EO 12866 – Regulatory Planning and Review

EO 12866 requires agencies to provide to the Office of Management and Budget significant regulatory actions for review. "Significant regulatory action" is defined as those actions that do the following:

- Have an annual effect on the economy of $100 million or more, or adversely affect, in a material way, the economy or a sector of the economy; productivity; competition; jobs; the environment; public health or safety; or State, local or tribal governments or communities
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency
- Materially alter the budgetary impact of entitlements, grants, user fees or loan programs, or the rights and obligations of recipients thereof
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities or the principles set forth in this EO.

Section 5 of this DEIS includes the RIR, which includes an assessment of the costs and benefits of the Proposed Action, in accordance with the guidelines established by EO 12866. This rule has been determined to be not significant under EO 12866.

6.2.3 EO 12898 – Environmental Justice

EO 12898 requires Federal agencies to consider the impacts of their actions on minority and low-income populations with the goal of achieving environmental protection for all communities. The EO directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The EO also directs each agency to develop a strategy for implementing environmental justice. The EO is also intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as

provide minority and low-income communities' access to public information and public participation.

- The EO defines these groups as 1) **Minority** — all people who are of African American, Asian, American Indian and Alaskan Native, Native Hawaiian, Other Pacific Islander, or Hispanic origin; and **Low Income** — persons whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

NMFS has determined, through the analysis of the impacts of this action, that there are no disproportionately high and adverse health or environmental effects on minority or low-income populations.

6.2.4 EO 12988 – Civil Justice Reform

In accordance with EO 12988, the Department of Commerce has determined that this final rule does not unduly burden the judicial system and meets the requirements of Section 3(a) and 3(b)(2) of the Order.

6.2.5 EO 13089 – Coral Reef Protection

EO 13089 requires Federal agencies whose action may affect U.S. coral reef ecosystems to do the following:

- Identify their action that may affect U.S. coral reef ecosystems;
- use their programs and authorities to protect and enhance the conditions of such ecosystems; and
- to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

Under the time-area closure alternatives (4 and 5), the installation of buoys has the potential to affect nearby coral reef habitat; however, NMFS would minimize any potential impacts to nearby coral reefs by using best management practices outlined by the ACOE.

6.2.6 EO 13132 – Federalism

EO 13132 requires agencies to take into account any federalism impacts of regulations under development. It includes specific consultation directives for situations in which a regulation will preempt state law, or impose substantial direct compliance costs on state and local governments (unless required by statute). The preferred action, for a 50-yard approach regulation, does not implicate federalism concerns. Accordingly, the Department of Commerce provided notice of the action to the appropriate official(s) of the affected State government. However, Alternative 4, also being considered by NMFS, would include mandatory time-area closures and contains policies with federalism implications that are sufficient to warrant preparation of a federalism assessment under EO 13132. If time-area closures (under Alternatives 4 or 5) are found to be necessary and appropriate to protect Hawaiian spinner dolphins, a an assessment will be made and submitted to the appropriate official(s) of the affected State government.

6.2.7 EO 13158 – Marine Protected Areas

EO 13158 requires Federal agencies to identify actions that affect natural or cultural resources that are within a marine protected area (MPA). It further requires Federal agencies, in taking such actions, to avoid harm to the natural and cultural resources that are protected by an MPA. An MPA is defined under this EO as any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.

MPAs are located at Kealakekua Bay (designated by the State of Hawaii as a MLCD and as a National Historic Site), Honaunau Bay (designated as a National Historic Site), and at Makako Bay (included within the boundaries of the HIHWNMS). NMFS will endeavor, to the maximum extent possible, to avoid or mitigate potential harm to the natural and cultural resources at these sites.

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References

Allen, S., H. Smith, K. Waples, and R. Harcourt. 2007. The voluntary code of conduct for dolphin watching in Port Stephens, Australia: is self-regulation an effective management tool? Journal of Cetacean Resource Management 9(2): 159-166.

Andrews, K.R., L. Karczmarski, W.W.L. Au, S.H. Rickards, C.A. Vanderlip, and R.J. Toonen. 2006. Patterns of genetic diversity of the Hawaiian spinner dolphin (Stenella longirostris). Atoll Research Bulletin 543:65-73.

Andrews, K.R. 2009. Barriers to gene flow in the spinner dolphin (Stenella longirostris). PhD. University of Hawaii at Mānoa.

Andrews, K.R., L. Karczmarski, W.W.L. Au, S.H. Rickards, C.A. Vanderlip, B.W. Bowen, E.G. Grau, and R.J. Toonen. 2010. Rolling stones and stable homes: Social structure, habitat diversity, and population genetics of the Hawaiian spinner dolphin (Stenella longirostris). Molecular Ecology, 19:732-748.

Au, W.W.L., and K.J. Benoit-Bird. 2008. Broadband backscatter from individual Hawaiian mesopelagic boundary community animals with implications for spinner dolphin foraging. Journal of the Acoustical Society of America 123:2884.

Baulch, S. and C. Perry. 2014. Evaluation the impacts of marine debris on cetaceans. Marine Pollution Bulletin 80: 210-221.

Baird, R. W., D. L. Webster, J. M. Aschettino, G. S. Schorr and D. J. McSweeney. 2013. Odontocete cetaceans around the main Hawaiian Islands: habitat use and relative abundance from small-boat sighting surveys. Aquatic Mammals 39:253-269.

Baird, R. W., M. B. Hanson, G. S. Schorr, D. L. Webster, D. J. McSweeney, A. M. Gorgone, S. D. Mahaffy, D. Holzer, E. M. Oleson and R. D. Andrews. 2012. Range and primary habitats of Hawaiian insular false killer whales: informing determination of critical habitat. Endangered Species Research 18:47-61.

Bejder, L. 2005. Linking short and long-term effects of nature-based tourism on cetaceans. PhD, Dalhousie University, Halifax.

Bejder, L., A. Samuels, H. Whitehead, N. Gales, J. Mann, R. Connor, M. Heithaus, J. Watson-Capps, C. Flaherty, and M. Krutzen. 2006a. Decline in Relative Abundance of Bottlenose Dolphins Exposed to Long-Term Disturbance, Conservation Biology.

Bejder, L., A. Samuels, H. Whitehead, and N. Gales. 2006b. Interpreting Short-term Behavioural Responses to Disturbance Within a Longitudinal Perspective, Journal of Animal Behaviour, doi.10. 1016/j.anbehav. 2006.04.003

Belt Collins. 1997. Kealakekua Bay State Historical Park: Conceptual Plan. Prepared for the Hawaii Department of Land and Natural Resources.

Benoit-Bird, K.J. 2003. Echo strength and density structure of Hawaiian mesopelagic boundary community patches. Journal of the Acoustical Society of America, 114(4):1888-1897.

Benoit-Bird, K.J. 2004. Prey caloric value and predator energy needs: foraging predictions for wild spinner dolphins. Marine Biology, 145(3):435-444.

Benoit-Bird, K.J., and W.W.L. Au. 2003. Prey dynamics affect foraging by a pelagic predator (Stenella longirostris) over a range of spatial and temporal scales. Behavioral Ecology and Sociobiology 53:364-373.

Benoit-Bird, K.J., W.W.L.Au, R.E. Brainard, and M.O. Lammers. 2001. Diel horizontal migration of the Hawaiian mesopelagic boundary community observed acoustically. Marine Ecology Progress Series 217:1-14.

Blue Ocean Mariculture LLC. 2014. Final Environmental Assessment for a Production Capacity Increase at the Existing Open Ocean Mariculture Site off Unualoha Point, Hawaii. 98pp.

Boehle, K. 2007. Valuation of spinner dolphin excursions in Hawaii. Master Thesis, University of Hawaii. 104pp.

Bradford, A. L., and K.A. Forney. 2014. Injury determinations for cetaceans observed interacting with Hawaii and American Samoa longline fisheries during 2008-2012. NOAA technical memorandum NMFS-PIFSC-41.

Bradford, A.L. and E. Lyman. 2015. Injury determinations for humpback whales and other cetaceans reported to NOAA response networks in the Hawaiian Islands during 2007-2013. NOAA Technical Memorandum NMFS-PIFSC-45.

Bradford, A. L., E. M. Oleson, R. W. Baird, C. H. Boggs, K. A. Forney, and N. C. Young. 2015. Revised stock boundaries for false killer whales (Pseudorca crassidens) in Hawaiian waters. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-47, 29p. doi 10.7289/V5DF6P6J

Carretta, J.V., K.A. Forney, M.S. Lowry, J. Barlow, J. Baker, D. Johnston, B. Hanson, R.L. Brownell Jr., J. Robbins, D.K. Mattila, K. Ralls, M.M. Muto, D. Lynch, and L. Carswell. 2009. U.S. Pacific Marine Mammal Stock Assessments: 2009. U.S. Department of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-453. 341 pp.

Carretta, J.V., K.A. Forney, E. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D. Lynch, L. Carswell, R.L. Brownell Jr., J. Robbins, D.K. Mattila, K. Ralls, and M.C. Hill. 2011. Draft U.S. Pacific Marine Mammal Stock Assessments: 2010. U.S. Department of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-xxx. 307 pp.

Courbis, S. S. 2004. Behavior of Hawaiian Spinner Dolphins (Stenella longirostris) in Response to Vessels/Swimmers, Master's Thesis, San Francisco State University, San Francisco, California, 209 pp.

Courbis, S. 2007. Effect of Spinner Dolphin Presence on Level of Swimmer and Vessel Activity in Hawaiian Bays. Tourism in Marine Environments 4(1):1-14.

Courbis, S. and G. Timmel. 2009. Effects of vessels and swimmers on behavior of Hawaiian spinner dolphins (Stenella longirostris) in Kealake ʻakua, Honaunau, and Kauhako bays, Hawai ʻi. Marine Mammal Science, 25(2): p. 430-440.

Currey, R.J.C. 2011. Inferring causal factors for a declining population of bottlenose dolphins via temporal symmetry capture-recapture modeling. Marine Mammal Science 27.3: 554-566.

Currey, R.J.C., Dawson, S.M., and E. Slooten. 2007. New abundance estimates suggest Doubtful Sound bottlenose dolphins are declining. Pacific Conservation Biology 13.4: 274-282.

Danil, K., D. Maldini, and K. Marten. 2005. Patterns of Use of Makuʻa Beach, Oʻahu, Hawaiʻi, by Spinner Dolphins (Stenella longirostris) and Potential Effects of Swimmers on Their Behavior, Aquatic Mammals, 31(4):403-412.

Department of Conservation. 2008. Te Papa Atawhai. Marine Mammal (and other wildlife) Code of Management. Doubtful Sound marine mammal (and other Wildlife) code of Management. New Zealand govt.nz, published 2008. Web. <http://www.doc.govt.nz/about-us/science-publications/conservation-publications/native-animals/marine-mammals/doubtful-sound-marine-mammal-and-other-wildlife-code-of-management/>.

DLNR. 2009. State of Hawaii Department of Land and Natural Resources Kealakekua Stewardship Area Management Plan. January 2009.

Derraik, J.G.B. 2002. The pollution of the marine environment by plastic debris: a review. Marine pollution bulletin 44.9: 842-852.

Division of Boating and Ocean Recreation (DOBOR). 2009. Waianae Baseline Environmental Study. State of Hawaii Department of Lands and Natural Resources, Honolulu, HI. 145 pp.

Doty, M.S. 1968. Biological and physical features of Kealakekua Bay, Hawaiʻi. University of Hawaii Botanical Science Paper 8:1-34.

Draper, H.M. 2010. Keeping below the tipping point: A literature review of climate change with attention to NEPA. Journal of the National Association of Environmental Professionals: Environmental Practice 12(2):144-157.

Fish, F.E., A.J. Nicastro, and D. Weihs. 2006. Dynamics of the aerial maneuvers of spinner dolphins. Journal of Experimental Biology 209:590-598.

Forest, A. 2001. The Hawaiian Spinner Dolphin, Stenella longirostris: Effects of Tourism. Master's Thesis, Texas A and M University, College Station, Texas. 91 pp.

Frid, A. and L. Dill. 2002. Human-caused Disturbance Stimuli as a Form of Predation Risk. Conservation Ecology 6(1): 11-26.

Galver, L. 2002. The molecular ecology of spinner dolphins (Stenella longirostris): Genetic diversity and population structure. Ph.D. thesis, Scripps Institute of Oceaanography, University of California, San Diego, CA. 192 pp.

Gannier, A. and E. Petiau. 2006. Environmental variables affecting the residence of spinner dolphins (Stenella longirostris) in a bay of Tahiti (French Polynesia). Aquatic Mammals, 32 (2): 202-211.

Gill, J.A. 2007. Approaches to measuring the effects of human disturbance on birds. IBIS, The International Journal of Avian Science 149, 9-14.

Harwood, John. 2001. Marine mammals and their environment in the twenty-first century. Journal of Mammology 82(3): 630-640.

Hawaii DLNR. 2012. State Gears Up for New Management Action at Kealakekua Bay State Historical Park: Moratorium on Kayaks, Other Vessels. News Release, December 26, 2012.

Hawaii DLNR. 2013a. State Authorizes Two Kayak Companies to Resume Operations at Kealakekua Bay. News Release, March 30, 2013.

Hawaii DLNR. 2013b. State Parks Takes Next Management Step to Balance Resource Protection and Public Recreation Use at Kealakekua Bay. News Release, May 29, 2013.

Hazel, J., I.R. Lawler, H. Marsh, and S. Robson. 2007. Vessel speed increases collision risk for the green turtle *Chelonia mydas*. Endangered Species Research 3(2): 105-113.

Heenehan, H., X. Basurto, L. Bejder, J. Tyne, J.E.S. Higham, and D. Johnston. 2015. "Using Ostrom's common-pool resource theory to build toward an integrated ecosystem-based sustainable cetacean tourism system in Hawaii." *Journal of Sustainable Tourism* 23.4 (2015): 536-556.

Hill, M.C., E.M. Oleson, and K. Andrews. 2010. New island-associated stocks for Hawaiian spinner dolphins (Stenella longirostris longirostris): rationale and new stock boundaries. Pacific Islands Fisheries Science Center Administrative Report H-10-04, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, Honolulu, Hawaii. 12 pp.

Honua Consulting. 2013. Attitudes and responses from community members about NMFS' proposed spinner dolphin protections. Final interview report for the Draft Environmental Impact Statement for spinner dolphin human interaction. Honua Consulting, contract AB133F-13-SE0837.

Hoyt, E. 2001. Whale watching 2001: worldwide tourism numbers, expenditures and expanding socioeconomic benefits. International Fund for Animal Welfare, Yarmouth Port, U.K. 158 pp.

Hu, W., K. Boehle, L. Cox, M. Pan. 2009. Economic values of dolphin excursions in Hawaii: A stated choice analysis. Marine Resource Economics 24, 61-76.

Impact Assessment, Inc. 2007. Economic Data Report for the NOAA Fisheries Spinner Dolphin - Human Interaction EIS, August 2007, Honolulu, HI.

International PADI, Inc. 2005. Mooring Buoy Planning Guide, Version 1.2, revised March, 2005, Rancho Santa Margarita, CA, pp.2-6 to2-7.

IPCC, 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Jefferson, T.A., M.A. Webber, and R.L. Pitman. 2008. Marine mammals of the world: a comprehensive guide to their identification. Academic Press, London, U.K.

Johnston, D.W., L. Bejder, J. Tyne and J. Symons. 2014. Quantifying the effects of human interactions on spinner dolphins in resting bays in Hawaii, and assessing the effectiveness of time area closures as a proposed mitigation approach (NA09NMF4540254): March 2014. Final Report to NMFS.

Karczmarski, L., B. Würsig, G. Gailey, K.W. Larson, and C. Vanderlip. 2005. Spinner dolphins in a remote Hawaiian atoll: social grouping and population structure. Behavioral Ecology (July/August 2005) 16(4):675-685.

Lammers, M.O. 2004. Occurrence and Behavior of Hawaiian Spinner Dolphins (Stenella longirostris) Along Oahu's Leeward and South Shores. Aquatic Mammals, 30(2):237-250.

Learmonth, J.A., C.D. Macleod, M.B. Santos, G.J. Pierce, H.Q.P. Crick, and R.A. Robinson. 2006. Potential effects of climate change on marine mammals. Oceanography and Marine Biology: An Annual Review 44:431-464.

Lusseau, D. 2004. The hidden cost of tourism: detecting long-term effects of tourism using behavioral information. Ecology and Society, 9(1): p. 2.

Lusseau, D. and L. Bejder. 2007. The Long-term Consequences of Short-term Responses to Disturbance Experiences from Whalewatching Impact Assessment. International Journal of Comparative Psychology, 20(02).

Marine Mammal Commission. 2000. Letter to National Marine Fisheries Service Regarding Regulations Related to In-Water Interactions Between Humans and Dolphins in the Wild. May 23, 2000. Bethesda, Maryland.

Marten, K. and S. Psarakos. 1999. Long-term site fidelity and possible long-term associations of wild spinner dolphins (Stenella longirostris) seen off Oahu, Hawaii. Marine Mammal Science, 15(4):1329-1336.

Milette, A.J., A.A. Pack, L.M. Herman, A. Estes, L.M. McCue, and V. Greenwood. 2011. The frequency of encounters between individual Hawaiian Spinner dolphins and dolphin directed human activity along Leeward Oahu. Poster presented as part of the Society for Marine

Mammalogy's 19th Biennial Conference on the Biology of Marine Mammals, 28 Nov- 2 Dec, 2011.

McCracken, M. 2013. Assessment of incidental interactions with marine mammals in the Hawaii deep and shallow set longline fisheries from 2007 through 2011. NOAA NMFS PIFSC Internal Report IR-13-009.

McLeod, Colin D. 2009. Global climate change, range changes and potential implications for the conservation of marine cetaceans: a review and synthesis. Endangered Species Research 7: 125-136.

Moffitt, R. B., Kobayashi, D. R., & DiNardo, G. T. 2006. Status of the Hawaiian bottomfish stocks, 2004. NOAA Administrative Report H-06-01.

National Marine Fisheries Service (NMFS). 1991. Final recovery plan for the humpback whale, (*Megaptera noveaengliae*). US DOC NOAA NMFS OPR.

National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS). 1998. Recovery plan for the U.S. Pacific populations of the green turtle (*Chelonia mydas*). US DOC NOAA NMFS and US DOI USFWS.

National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. 2002. Preventing Harassment from Human Activities Directed at Marine Mammals in the Wild, Advance Notice of Proposed Rulemaking, Federal Register, 67(20):4379-4382.

National Marine Fisheries Service (NMFS). 2006. Protection of Marine Mammals – Notice of Intent to Prepare an Environmental Impact Statement, Federal Register, 71(190):57923-57926.

National Marine Fisheries Service (NMFS). 2007. Spinner Dolphin Human Interaction Environmental Impact Statement – Public Scoping Summary Report. April 2007, Pacific Islands Regional Office, Honolulu, Hawaii.

National Marine Fisheries Service (NMFS). 2012. Protected Resource Management. Process for Distinguishing Serious from Non-Serious Injury of Marine Mammals. Process for Injury Determinations. National Marine Fisheries Service Instruction 02-238-01, January 27, 2012.

National Marine Fisheries Service (NMFS). 2013a. 2013-2018 U.S. Navy's Hawaii Southern California Training and Testing, Training Letter of Authorization. 78 FR 78105.

National Marine Fisheries Service (NMFS). 2013b. 2013-2018 U.S. Navy's Hawaii Southern California Training and Testing, Testing Letter of Authorization. 78 FR 78105.

National Marine Fisheries Service (NMFS) 2016. Memo from Jean Higgins, Pacific Islands Regional Office, to the Spinner Dolphin Proposed Rule File re: Spatial comparison for PIPIN data and main Hawaiian Islands depth contours and distances under consideration.

Nature Conservation Sector. 2006. Protected areas of Egypt: Towards the future. Nature Conservation Sector, Egyptian Environmental Affairs. 68pp.

Nitta, E.T., and J.R. Henderson. 1993. A review of interactions between Hawaii's fisheries and protected species. Marine Fisheries Review 55:83-92.

Norris, K. S., and T.P. Dohl. 1980. Behavior of the Hawaiian Spinner Dolphin, Stenella longirostris. Fishery Bulletin, 77(4):821-849.

Norris, K.S., B. Würsig, R.S. Wells, and M. Würsig. 1994. The Hawaiian Spinner Dolphin. Berkeley: University of California Press.

Notarbartolo-di-Sciara, G., M.H. Hanafy, M.M. Fouda, A. Afifi, and M. Costa. 2009. Spinner dolphin (Stenella longirostris) resting habitat in Samadai Reef (Egypt, Red Sea) protected through tourism management. Journal of the Marine Biological Association of the United Kingdom, 89(1): 211-216.

Oceanit. 2007. Kona Kai Ola FEIS. Prepared for Jacoby Development, Inc., Atlanta, GA.

O'Connor, S., Campbell, R., Cortez, H., and T. Knowles. 2009. Whale watching worldwide: tourism numbers, expenditures and expanding economic benefits, a special report from the International Fund for Animal Welfare, Yarmouth MA, USA, prepared by Economists at Large.

Östman-Lind, J. 2009. Impacts of Human Activities on Spinner Dolphins (Stella longirostris) in Their Resting Areas. Report to the National Marine Fisheries Service, Pacific Islands Regional Office. 27pp.

Östman-Lind, J., A. Driscoll-Lind, and S.H. Rickards. 2004. Delphinid Abundance, Distribution, and Habitat Use Off the Western Coast of the Island of Hawai'i, Administrative Report No. LJ-04-02C, National Marine Fisheries Service, Southwest Fisheries Science Center, La Jolla, California, 28 pp.

Pacific Islands Fisheries Science Center (PIFSC). 2011. Pacific Islands Regional Landings. Retrieved from http://www.pifsc.noaa.gov/wpacfin/central/Pages/central_data.php.

Perrin, W.F. 1998. Stenella longirostris. Mammalian Species 599:1-7.

Perrin, W. F. and J.W. Gilpatrick, Jr. 1994. Spinner dolphin Stenella longirostris (Gray, 1828). In: S. H. Ridgway and R. Harrison (eds.) Handbook of Marine Mammals, Vol. 5: The first book of dolphins. pp. 99–128. Academic Press, London.

Reeves, R.R., B.S. Stewart, P.J. Clapham, and J.A. Powell. 2002. National Audubon Society Guide to Marine Mammals of the World. Alfred A. Knopf, New York, NY, pp. 374-377.

Samuels, A., L. Bejder, and S. Heinrich. 2000. A Review of the Literature Pertaining to Swimming with Wild Dolphins, April, 2000, report prepared for the Marine Mammal Commission, Bethesda, Maryland.

Scarpaci, C. 2004. No detectable improvement in compliance to regulations by “swim-with-dolphin” operators in Port Phillip Bay, Victoria, Australia. Tourism in Marine Environments, 1(1): 41-48.

Sepez, J. 2006. Human Interactions with Spinner Dolphins (Stenella longirostris) in the Main Hawaiian Islands: Description and Analysis of Activities of Concern and Management Options, Internal NOAA Draft Report, September 8, 2006, Pacific Island Regional Office and Alaska Fisheries Science Center, Seattle, Washington.

Simmonds, M.P. and W.J. Eliott. 2009. Climate change and cetaceans: concerns and recent developments. Journal of the Marine Biological Association of the United Kingdom 98(1): 203-210.

State of Hawaii. 2014. Department of Business, Economic Development and Tourism 2014 Annual Report. DBEDT.

Symons, J. 2013. *The Influence of Human Activity on the Spinner Dolphin's (Stenella longirostris) Energy Budget*. Masters thesis, University of Aberdeen. 29pp.

Timmel, G. 2005. Effects of human traffic on the movement patterns of Hawaiian spinner dolphins, *Stenella longirostris*, in Kealakekua Bay, Hawaii. Master thesis, San Francisco State University. 77pp.

Timmel, G., S. Courbis, H. Sargeant-Green, and H. Markowitz. 2008. Effects of human traffic on the movement patterns of Hawaiian spinner dolphins (*Stenella longirostris*) in Kealakekua Bay, Hawaii. Aquatic Mammals, 34(4): 402-411.

Thorne, L., D.W. Johnston, D.L. Urban, J. Tyne, L. Bejder, R.W. Baird, S. Yin, S.H. Rickards, M.H. Deakos, J.R. Mobely, Jr., A.A. Pack, and M.C. Hill. 2012. Predictive modeling of spinner dolphin (*Stenella longirostris*) resting habitat in the main Hawaiian Islands. PlosOne 7(8): e43167. doi:10.1371/journal.pone.0043167.

Tyne, J.A., K.H. Pollock, D.W. Johnston, and L. Bejder. 2014. Abundance and Survival Rates of the Hawai‘i Island Associated Spinner Dolphin (Stenella longirostris) Stock. PLoS ONE 9(1): e86132. doi:10.1371/journal.pone.0086132.

UH Department of Urban and Regional Planning, 2008. The Trail to Ho‘okena: Connecting communities, resources, past, present, and future. Ala Kahakai National Historic Trail National Park Service.

Vanderlaan, A.S.M. and C.T. Taggart. 2007. Vessel collisions with whales: the probability of lethal injury based on vessel speed. Marine Mammal Science 23(1): 144-156.

Van Houtan, K. S., C.M. Smith, M. L. Dailer, and M. Kawachi. 2014. Eutrophication and the dietary promotion of sea turtle tumors. PeerJ, 2014; 2: e602 DOI: 10.7717/peerj.602

Walther, G., E. Post, P. Convey, A. Menzel, C. Parmesan, T.J.C. Beebee, J. Fromentin, O. Hoegh-Guldberg, and F. Bairlein. 2002. Ecological Responses to recent climate change. Nature 416:389-395.

West Hawaii Voluntary Standards (WHVS). 2009. Voluntary standard for recreational wildlife interactions in West Hawaii waters. West Hawaii community and Coral Reef Alliance.

Wiley, D. N., Moller, J. C., PACE, R. M., & Carlson, C. 2008. Effectiveness of voluntary conservation agreements: case study of endangered whales and commercial whale watching. *Conservation Biology*, *22*(2), 450-457.

Würsig, B., R.S. Wells, K.S. Norris, and M Würsig. 1994. A spinner dolphin's day. Pp 65-102 in K. Norris, B. Würsig, R.S. Wells and M. Würsig, eds. The Hawaiian Spinner Dolphin. University of California Press, Berkeley and Los Angeles, CA.

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Appendices

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Appendix A – Selection Process for Time-Area Closures

NMFS identified those resting areas used regularly or preferred by island associated spinner dolphins for resting, socializing and nurturing young as "essential daytime habitats." In addition to providing an environment for the important daytime behaviors, these essential daytime habitats are believed to be preferred by dolphins because the areas provide environmental conditions that maximize predator detection and reduce the energetic demands of traveling to nightly foraging areas (Norris *et al*. 1994, Thorne *et al*. 2012).

In the MHI, human activities have begun to focus on close interactions with wild spinner dolphins. The essential daytime habitats of resident populations have become primary targets for dolphin-directed activities because spinner dolphins may be predictably found in relatively accessible near-shore waters on a daily basis. The increase in human use of these areas for dolphin-directed activities puts resting spinner dolphins at increased risk of disturbance. Additionally, recurring disturbance to spinner dolphins within these areas diminishes the quality of the habitat because spinner dolphins may not be able to gain optimal rest due to the intensity of dolphin-directed activities. Degradation of these habitats may result in either increased energetic demands to resident spinner dolphins (because more energy may be needed to avoid or respond to disturbance factors within the habitat, or dolphins staying within the habitat may experience a decrease in resting opportunities) or in habitat displacement, both of which could lead to decreased individual fitness and/or negative population level impacts.

While reviewing the need for regulatory actions to enhance protections for Hawaiian spinner dolphins, NMFS recognized that the majority of unauthorized take is likely to occur in those essential daytime habitats that have already been targeted for dolphin-directed activities. Thus, certain actions to enhance protections for dolphins within those essential daytime areas targeted by people wanting to interact with them may serve to reduce the incidents of unauthorized take.

NMFS sought to identify those essential daytime areas throughout the MHI that may be targeted for dolphin-directed activities. Once NMFS identified those areas, NMFS focused on identifying areas where limited resources may be put to the best use in creating effective management measures for spinner dolphin habitats while using an adaptive management approach. NMFS established criteria based on enforcement resources, logistical feasibility and human considerations to select areas where regulations would be most effective in providing enhanced protections for spinner dolphin essential daytime habitat.

NMFS used the following step-down process to select the five areas identified for time-area closures from Alternative 4 and 5. The tables in this appendix review the information NMFS gathered throughout this process. NMFS identified the sources of information used throughout this review in the bullets under Steps 1 and 2. The bulleted items under Step 3 review the criteria that NMFS used to evaluate areas for potential closure; NMFS established a description of these criteria following Step 3. All information gathered throughout this process is summarized in the tables that follow, which are color-coded to identify various differences between the sites evaluated.

1. NMFS identified known Hawaiian spinner essential dolphin daytime habitats based on current knowledge by:

- Reviewing scientific literature regarding Hawaiian spinner dolphin use of areas throughout MHI
- Requesting and reviewing information from scientists working in the MHI
- Coordinating with State of Hawaii and current stakeholders to identify any additional spinner dolphin resting areas
- Coordinating with stakeholders for additional information
- Reviewing scoping comments for additional information

NMFS identified 67 areas during this process, but not all areas were essential Hawaiian spinner dolphin resting areas.

2. NMFS identified essential daytime habitats where people most often interact or attempt to interact with Hawaiian spinner dolphins by:

- Reviewing scientific literature for information regarding Hawaiian spinner dolphin disturbance
- Coordinating with NOAA OLE to discuss areas where spinner dolphin disturbance has been recorded, reported or observed
- Coordinating with the State of Hawaii; discussion points included identifying additional areas where disturbance to spinner dolphins may occur and areas closed by state regulations
- Coordinating with other concerned stakeholders for additional interaction information.
- Reviewing scoping comments for additional information

From those 67 areas, NMFS identified 12 areas as essential daytime habitats where Hawaiian spinner dolphins exhibit signs of disturbance as a result of human activities. Table A-2 (below) compiles information about spinner dolphin use and human disturbance (step 1 and 2) for all 67 areas. Areas highlighted in light blue on Table A-2 are the 12 essential daytime habitats where spinner dolphins exhibit signs of disturbance as a result of human activities and which may be considered to be targeted for dolphin-directed activities. Those areas that are not highlighted either have too little information to determine if the area is an essential daytime habitat or there is not enough information to indicate that the area is targeted for dolphin-directed activities.

3. NMFS identified areas (from those identified in the second step) where closures are likely to be most effective based on the following criteria:

- Environmental conditions support a discrete closure site for resting Hawaiian spinner dolphins
- Enforcement is logistically feasible based on resources and accessibility
- The site may be easily accessible for scientific monitoring purposes

- Closure of the area does not restrict major harbors, Ocean Recreation Management Areas (ORMAs) or transit zones
- Nearby areas are still accessible for activities that are not spinner dolphin-directed

Description of Evaluation Criteria

Environmental conditions support a discrete closure site. This criterion establishes whether or not the site in question may be reasonably identified as a closed site, either through demarcation or by using easily identifiable environmental boundaries. For example, a small bay may be considered easy to demarcate for closure either using buoys or environmental markers, whereas a large extended area that is not surrounded by any specific environmental features may not easily support a closure site.

Enforcement availability. Current limitations in enforcement resources and the remote nature of some sites make these areas logistically more difficult to effectively enforce regulation measures. Prohibitions that are not enforced may be less effective in accomplishing the protective efforts for spinner dolphin habitat.

Accessibility for monitoring. Areas that are accessible for monitoring may best fit into an adaptive management approach and will best demonstrate the effectiveness of any implemented enhanced protective efforts.

Closure does not restrict major harbors or transit zones. Closure of some identified resting habitats could completely restrict boating access to major harbor or transit zones creating additional human impacts.

Availability of nearby and accessible alternative areas for human use. Some coastlines of the MHI may be limited in the amount of available recreation and fishing areas for ocean users, thus closure of these sites may severely impact local populations.

NMFS reviewed the above criteria for the 12 areas identified in step 2 (and highlighted in light blue in Table A-2); these areas are referred to as targeted essential daytime habitats. Table A-3 (below) summarizes the information gathered for the five criteria under step 3 for each of the 12 targeted essential daytime habitats. The five bays selected for time-area closures (and highlighted in light blue in Table A-3) were areas where we could answer “yes” to a majority of the established criteria and where we did not answer “no” to any of the established criteria. For example, Makako Bay was selected for a time-area closure site because environmental conditions support a discrete closure, the closure would not obstruct a major harbor or transit zone, there are alternative areas nearby that are accessible for human use, enforcement may access this site easily, and the areas could be accessed for research. For further example, Honokōhau Harbor was not selected because a closure would obstruct a harbor and there is limited access to harbor space along this coastline for sizable boats to use.

Table A-1. Spinner dolphin daytime habitat areas, as identified through literature review, stakeholder coordination and scoping efforts. Colors correspond with Island location.

Island	Location of Spinner Daytime Habitat Area		
Kauai	Hanalei	Lihue	Secret Beach
	Hanapepe and Kaumakani	Napali Coast	Waimea Coast
	Kahala Point	Poipu Beach	
Oahu	Kahana Bay	Pokai Bay	Waianae Coast
	Kahe Point (Electric Beach)	Portlock	Waimea Bay
	Makua Bay	South Shore	Yokohama Bay
Molokai	Ahihi Bay (off Cape Kinau)	Hana Coast	Kalaupapa
	Cape Halawa	Honolua Bay	
Lanai	Hulopoe Bay	Manele Bay	Southeast Coast of Lanai
Maui	Kaanapali	Lahaina	Makena
	La Perouse Bay	Lipoa Point	Pauwela
Hawaii (Big Island)	Ailia Point	Kapua Bay	Mahaiula and Makalawena
	Apua Point	Kauhako Bay (Hookena)	Mahukona (just South)
	Cape Kumakahi	Kawaihae Harbor (from Kawaihae to Honoipu)	Makako Bay (including Hoona Bay)
	Honaunau Bay	Kawili	Manuka Bay
	Honokoa Bay	Keahole Point	Milolii
	Honokohau Harbor	Kealakekua Bay	Okoe Bay
	Honomalino Bay	Keauhou Cove	Opilukao Cove
	Honuapo	Kehena Beach	Puako
	Kailua Bay	Kiholo Point	Puu Kuili
	Kalapana	Kua Bay	South Point
	Kaloli Point	Laupahoehoe	Waikoloa Beach
	Kamoi Point	Leleiwi	Waipio Valley Bay

Table A-2. Step 1 and Step 2 – Table A-2 documents information gathered from various sources on resting areas in the MHI regarding dolphin use and human disturbance. NMFS used this information to determine whether areas could be considered essential daytime habitat and if human disturbance appears to be a chronic problem at these sites.

Table A-2 - Resting Sites on Kauai					
Sites	**Reference**	**Information Regarding Dolphin Use**	**Information Regarding Human Disturbance**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Hanalei	Sepez 2006	Dolphins may be found here, no numbers or frequency given.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Hanapēpē & Kaumakani	Norris & Dohl 1980	Groups of dolphins reported as around 60 animals.		No = Group size indicated as large; however, not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Kahala Point	Norris & Dohl 1980	Group size reported between 70-80 animals. Dolphins tended to be located just north of the point.		No = Group size indicated as large; however, not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Kauai					
Sites	**Reference**	**Information Regarding Dolphin Use**	**Information Regarding Human Disturbance**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Līhuʻe	Sepez 2006	Dolphins may be found here, no numbers or frequency given.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Nāpali Coast (Mentioned as south Napali in Sepez 2006)	Norris & Dohl 1980	Largest groups of dolphins seen at this site, around 150 animals.		Yes = Larger numbers of dolphins using area as resting area reported by Norris & Dohl. Site still indicated as a dolphin resting area in 2006 publication.	Maybe = Tour vessels and kayaks may disturb dolphins while touring the coastline, but activities do not appear to be dolphin directed at this time.
	Sepez 2006	Dolphins may be found here, no numbers or frequency given.	Kayakers and tours vessels are likely to encounter dolphins while touring the area, but activities are not dolphin directed.		
Poʻipū Beach	Sepez 2006	Dolphins may be found here, no numbers or frequency given.	Beach based swimmers may be using this site to interact with dolphins.	No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	Maybe = Not enough information reported regarding human disturbance at this site to determine the intensity of interaction.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Kauai					
Sites	**Reference**	**Information Regarding Dolphin Use**	**Information Regarding Human Disturbance**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Secret Beach	M. Hawkes (Kilauea Point NWR manager), personal communication, August 20, 2007	Volunteers in this area have recorded a presence/absence in this area.	Swimmers from shore reported as interacting with dolphins at this site.	No = Not enough information regarding spinner use of this site to determine that this is an essential daytime habitat for spinner dolphins.	Maybe = Not enough information reported regarding human disturbance at this site to determine the intensity of interaction.
	Sepez 2006		Beach based swimmers reported here, but waters are noted as rough and may be only seasonally accessible.		
Waimea Coast	Sepez 2006	Dolphins may be found here, no numbers or frequency given.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Kauai					
Sites	**Reference**	**Information Regarding Dolphin Use**	**Information Regarding Human Disturbance**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Lehua Crater (Off Niihau)	Sepez 2006	Dolphins may be found here, no numbers or frequency given.	Tour dive vessels from Port Allen are most likely to interact with dolphins.	No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	Maybe = Commercial vessels may disturb dolphins while touring, but activities do not appear to be dolphin directed at this time.
Channel between Lehua and Ni'ihau	Sepez 2006	Dolphins may be found here, no numbers or frequency given.	Tour dive vessels from Port Allen are most likely to interact with dolphins.	No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	Maybe = Commercial vessels may disturb dolphins while touring, but activities do not appear to be dolphin directed at this time.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu						
Sites		**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
South Shore Oahu	Barbers Pt to Koko Head Crater	Lammers 2004	This area was not stated by Lammers as a "primary" site, but it was used frequently (56%). He does state that dolphins did not exhibit a preference for any specific location within this area. Dolphins in this area were reported to have a strong affinity for the 10 fathom isobath. Group sizes were reported largest in the morning with approximately 50-65 individuals. The larges recorded was 110-120 animals.		Maybe = Publications appear to indicate some debate about the importance of this area to local dolphin groups. Although used by dolphins in large numbers the rough waters make dolphin sightings at this site less predictable.	No = Site is not indicated in publications as an area where frequent disturbance occurs.
	Diamond Head to Koko Head	NOAA PIRO PRD outreach at Maunalua Bay Heritage Festival, 2011	People have noted observing dolphins in this area in the past. Dolphins reported near Portlock, the Northeast corner of the bay and off Diamond Head. Dolphin group sizes ranged from 5-100.	Paddling, boating, surfing, and SCUBA common in this area.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu						
	Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
South Shore Oahu (Continued)	Ewa/Honolulu	Lammers 2004	Between Honolulu Harbor and Barbers Point. Lammers states that these dolphins are year-round residents, and were seen with regular occurrence, but does not specifically state this area as "primary." The mean number of animals reported was 34.5 and the frequency of occurrence was recorded as 67%. The dolphins in this area were located close to shore and close to the 10 fathom contour.		Maybe = Publications appear to indicate some debate about the importance of this area to local dolphin groups. Although used by dolphins in large numbers the rough waters make dolphin sightings at this site less predictable.	No = Site is not indicated in publications as an area where frequent disturbance occurs.
	Pearl Harbor to Makapu‘u Pt	Norris & Dohl 1980	Group sizes were reported between 40-250 animals, but occurrence may not be as often as Waianae groups.			
		Sepez 2006		Dive boats may sometimes interact with dolphins, but dolphins are harder to find so tour boats don’t target this area		
	Portlock	J.LeFors pers. observation	Has seen and heard dolphins here while scuba diving.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu						
Sites		**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Wai'anae Coast	Kahe Point (Electric Beach)	Lammers 2004	Area indicated as a primary resting area, dolphin occurrence reported as 52.4% of sightings from this spot.		Yes = Various publications indicate that different regions of the Waianae Coast provide primary resting areas for spinner dolphins.	Yes = Information indicates that dolphins may be disturbed regularly by both vessel interactions and beach based swimmers along this coastline.
		Lammers 2004	Kahe Point indicated as a primary resting area. Dolphins were noted using the northern end of the area near Kahe Point. The mean group size was reported as 43 (+/- 29), but as high as 100 animals at times. Dolphin occurrence at this site was reported as 45% of the time observed.			
		Sepez 2006		This site is the second stop for tour boats from Waianae Harbor and Koolina Marina. Beach based swimmers also use this site to interact with dolphins.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu						
	Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Wai'anae Coast (Continued)	Kalaeloa Barbers Point	Lammers 2004	Area not considered a primary resting area North before Kahe Point and South at Barbers Point.		Yes = Various publications indicate that different regions of the Waianae Coast provide primary resting areas for spinner dolphins.	Yes = Information indicates that dolphins may be disturbed regularly by both vessel interactions and beach based swimmers along this coastline.
	Mākua Bay	Danil 2005 (Makua)	Area indicated as an optimal resting area with a lot of dolphins moving in and out of groups in this area. Group size averaged 67 animals. Spinner dolphins were observed on 52 out of 53 days at Makua beach.	A max of 63 people reported as beach based swimmers at this site. Higher numbers of swimmers were recorded on the weekends. Pursuit of dolphins was commonly observed at this site and dolphins trying to elude swimmers were sometimes confronted with more nearby swimmers. Author suggested dolphin rest was delayed and compressed at this site.		
		Lammers 2004	Area indicated as a primary resting area with dolphins reported 95.2% of the time observed at this site.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu						
	Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Waiʻanae Coast (Continued)	Mākua Bay (Continued)	Sepez 2006		Tours from Waianae Harbor and Koolina use Makua as the first stop to view dolphins. Kayakers used to use bay, but less common now. Beach based swimmers still use the area.	Yes = Various publications indicate that different regions of the Waianae Coast provide primary resting areas for spinner dolphins.	Yes = Information indicates that dolphins may be disturbed regularly by both vessel interactions and beach based swimmers along this coastline.
	Pōkaʻī Bay	Lammers 2004	Indicated as a primary resting area with dolphin occurrence at this site 87.5% of the time.			
	Northwest coast of Oʻahu	Marten & Psarakos 1999	Studied an unspecified "resting area along the Northwest coast of Oahu." 125 dolphins were individually identified in this area over a 4 year study period from 95-98.			
		Delfour 2007	Same area as Marten & Psarakos study. Area described as critical in value and that dolphin habitat use was stable over 3 years. Mean group size ranged from 31.1 - 46.3 through 2001 - 2004.	Study observed changes in dolphin swimming directions with human approaches and an increase in dolphin aerial behavior after encounters. The study observed an increase in dolphin-watch tours, swim-with-dolphin programs, and kayaks.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu						
	Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Waiʻanae Coast (Continued)	Waiʻanae Coast from Barbers Pt to Kaʻena Pt	Lammers 2004	Area indicated as a primary resting area at Makua Beach, Pokai Bay and Kahe Point. Dolphin groups were reported as large in the morning with groups ranging in size from 20-40 animals. The largest group reported ranged from 110-120 animals. Dolphin frequency of occurrence reported as 75.1% (42/63).	Reported possible changes in animal distribution as a result of humans.	Yes = Various publications indicate that different regions of the Waianae Coast provide primary resting areas for spinner dolphins.	Yes = Information indicates that dolphins may be disturbed regularly by both vessel interactions and beach based swimmers along this coastline.
	Waiʻanae Coast - Kahe, Pōkaʻī, Waiʻanae Boat Harbor, Mākua, Yokohama, Kaʻena Point, Mākaha Beach, Nānākuli, Keawa'ula	Sepez 2006	Noted spinner dolphins found in all areas.	Dolphin tours from Koolina and Waianae target Makua Beach first and Kahe second. Some tours put swimmers in the water with dolphins		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Oahu					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Waimea Bay	Norris & Dohl 1980	Small groups of dolphins were reported at this site.		No = small groups mentioned in 1 publication, but no additional information regarding frequency of use to indicate site as a primary resting area.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Maui					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
ʻĀhihi Bay (off Cape Kinau)	Sepez 2006	Dolphins are reported as common at this site.	Dolphin directed activities at this site were once common from commercial tours, but the area is a Natural Areas Reserve System now and closed to commercial activity. Beach based swimming is still possible but access to the site is now prohibited.	Maybe = Limited data on dolphin use; however, since this area was once used by tour operators for dolphin interactions, regular dolphin use of the area is likely.	No = Commercial boating bans in this area seem to have alleviated dolphin disturbance in this area, and recent exclusion from human foot traffic has ended the use of this site.
Hana Coast	Norris & Dohl 1980	Small groups of dolphins are reported at this site.		No = small groups mentioned in 1 publication, but no additional information regarding frequency of use. Therefore, at this time there is not enough information to indicate site as a primary resting area.	No = No information reported regarding human disturbance at this site.
Honolua Bay	Sepez 2006	Dolphins are reported as common at this site.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Maui					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kāʻanapali	Sepez 2006	Dolphins are reported as common at this site.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Lahaina	Norris & Dohl 1980 (Lahaina Roads - Auau Channel)	Reported dolphin presence as seldom seen in these areas.		No = Dolphin presence appears sporadic.	No = Information does not indicate regular human disturbance at this site.
	Sepez 2006	Dolphin use of this area indicated as periodic, though not daily	Commercial tour boats are likely to encounter dolphins, but the harbor traffic does not allow for swimmers to enter water.		
La Perouse Bay	Sepez 2006	Dolphins are reported as common at this site, but also noted to not occur daily.	This area is best known for both beach-based swim with dolphins activity and motor vessel activity. The waters in this area can be challenging and may present some obstacle to swimmers. The area is advertised in a well known Maui guide book as a place to swim with spinner dolphins. Local reports say dolphins do not come as often to this area as in the past. This is believed to be due to human presence in both a negative and positive way.	Yes = Dolphin presence may vary based on time of year. It is difficult to determine if dolphin use of the area is seasonal or if dolphin use of the area has changed over time perhaps due to human presence in the area.	Yes = Area is known to be used for swim-with-wild-dolphin activities. Publicity of site makes it a target for humans wishing to interact with spinner dolphins.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Maui					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
La Perouse Bay (Continued)	Hawaii Wildlife Fund 2008	Dolphins reported as present on average 19% of days surveyed depending on time of day and month of year. High presence was recorded as 50% in August and low presence was recorded as 0% in February. (HWF only records presence or absence at this site and has a low sample size.)		Yes = Dolphin presence may vary based on time of year. It is difficult to determine if dolphin use of the area is seasonal or if dolphin use of the area has changed over time perhaps due to human presence in the area.	Yes = Area is known to be used for swim-with-wild-dolphin activities. Publicity of site makes it a target for humans wishing to interact with spinner dolphins.
	J. Fell-McDonald (DLNR Ranger)pers. communication.	Reported dolphin presence as common at this site.	Mainly swimmers from shore but a few zodiac tour boats also come here with snorkelers. Reports that dolphins try to avoid swimmers, show increased aerial behavior, tail slapping, and increased speed when approached.		
	Take Tompson (NOAA OLE);personal communication		NOAA OLE officers report receiving approximately 25 complaints about dolphin disturbances a year at this site.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Maui					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Lipoa Pt	Norris & Dohl 1980	Small groups of dolphins are reported at this site.		No = small groups mentioned in 1 publication, but no additional information regarding frequency of use. Therefore, at this time there is not enough information to indicate site as a primary resting area.	No = No information reported regarding human disturbance at this site.
Mākena	Sepez 2006	Dolphins are reported as common at this site.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Pa‘uwela	J. Fell-McDonald (DLNR Ranger), personal communication, June 20, 2007	Dolphins are reported as using this site.	Local residents swim from shore. Remote location prevents this from becoming a popular site for swimming with dolphins.	No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	Maybe = Not enough information reported regarding human disturbance at this site to determine the intensity of interaction.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Lāná i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Holupoe Bay	Sepez 2006	Dolphins are reported as common at this site.	Commercial tours drop snorkelers off from Maui to view dolphins here. Activities are not necessarily dolphin directed, but the dolphins entrance to area draws attention from snorkelers. Hotel used to promote beach based swimming.	Yes = Dolphin use of the area has been frequent in the past and the whole southeast portion of Lanai is noted for its importance to spinner dolphins.	Yes = Disturbance of resting dolphins by swimmers regularly occurs here, although the education program started at the hotel appears to be helpful in alleviating some of the problem. It is not known how often outside tour operations may be causing disturbance at this site.
	J. LeFors pers. observation	Has observed dolphins here on several site visits.	Beach based swimming from hotel no longer promoted; however, many people still attempt to interact with dolphins. Tour boats also come from Maui bringing guests to swim with dolphins. Dolphin using the area have been observed avoiding swimmers by moving farther offshore.		
	W. Sarme (Park Manager and lifelong resident), personal communication, June 23, 2008	Dolphins reported as once common at this site, but now infrequent. Dolphins use the West end of the bay (nearest to the hotel).	Beach based swimmers. People come over from Maui to camp and swim with the dolphins. Dolphins no longer come in close to shore and not on a daily basis as they did before the hotel was built.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Lānā i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Mānele Bay	Norris & Dohl 1980	Dolphins are reported as common at this site. Group size reported as large, ranging from 40-100 animals.		Yes = Dolphin use of the area has been frequent in the past and the whole southeast portion of Lanai is noted for its importance to spinner dolphins.	No = While viewing is possible information has not indicated a disturbance problem within the bay because the boat harbor traffic keeps people from swimming here.
	Sepez 2006	Vessel captains reported 80% encounter rates with dolphins at this site.	Vessels may view dolphins in area, but swimmers not launched because its unprotected and due to boat traffic.		
Southeast Coast of Lānā i	Norris & Dohl 1980	Large groups of dolphins reported at this site.		Yes = Dolphin use of the area has been frequent in the past and the whole southeast portion of Lanai is noted for its importance to spinner dolphins.	No = While viewing is possible information has not indicated a disturbance problem.
	Sepez 2006	Dolphins are reported as common at this site.	Vessels may view dolphins in area, but swimmers not launched because its unprotected		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Moloká i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Cape Halawa	Norris & Dohl 1980	Small groups of dolphins reported at this site.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Kalaupapa	Norris & Dohl 1980	Small groups of dolphins reported at this site.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
	E. Brown (Biologist NPS), personal communication, September 21, 2009	Dolphins are reported as infrequent at this site.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites Between Molokaʻi & Lānaʻi					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kalohi Channel	Norris & Dohl 1980	Dolphins are reported as seldom seen at this site.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Penquin Banks (western Molokaʻi & Lānaʻi)	Norris & Dohl 1980	Large groups of dolphins reported at this site.		Maybe = Large groups seem to indicate some importance to spinner dolphins; however, not enough information regarding frequency of use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites Kahoʻolawe					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
South shore of Kahoʻolawe near Hālona Pt.	Norris & Dohl 1980	Large groups of dolphins reported at this site.		Maybe = Large groups seem to indicate some importance to spinner dolphins; however, not enough information regarding frequency of use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Ailia Point	Norris *et al*. 1994	Two groups observed in period of Feb-Apr during a biweekly aerial survey effort that spanned a year. Groups observed ranged in size from 1-50; 51-100.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
‘Āpua Point	Norris *et al*. 1994	One group observed in a 4 month period during biweekly aerial survey efforts that spanned a year. Specific size of group not reported, may range from 1-50 animals.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Cape Kumukahi	Norris & Dohl 1980	Animals noted to use several small irregular bays along the southern edge of the cape, forming the "home bay" in the area. Animals appear to range as far as Opilukao Cove. Group using this area estimated to be around 30 animals.		Maybe = Area acknowledged to be a consistent site for spinner dolphin rest in 1980. 1994 observations indicate that the area may at the least be used seasonally.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Cape Kumukahi (Continued)	Norris *et al*. 1994	Four groups of animals sighted during 2 times of the year, on biweekly aerial surveys conducted throughout a year. Group sizes were reported as large ranging from 1-50 and 51-100. Observations for this site includes areas between Hilo and Cape Kumukahi.		Maybe = Area acknowledged to be a consistent site for spinner dolphin rest in 1980. 1994 observations indicate that the area may at the least be used seasonally.	No = No information reported regarding human disturbance at this site.
Hōnaunau Bay	Norris & Dohl 1980	Less commonly group from Kealakekua may be found here.		Yes = Multiple sources recognize this area as a resting area for spinner dolphins; however, the frequency of dolphin use appears lower than it was historically and lower than at other primary resting locations.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. The density of traffic in the relatively small area of this site may increase the intensity of disturbance.
	Norris *et al*. 1994	Four groups of dolphins noted in and around the Bay across 8 months of the year of biweekly aerial survey efforts. Group size for animals sighted on aerial surveys ranged from 1-50 and 51-100.			
	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.	Part of the 3 bay complex that hosts resident and visitor beach-based swimmers looking for dolphins. Tour vessels do use this area, seldom used by kayaks. The density of humans and vessels said to be highest of all Big Island locations.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Hōnaunau Bay (Continued)	Courbis 2007	Dolphins reported on 5 out of 20 days.	Data indicate marine tourism increased dramatically in last several decades. Observed mostly swimmers in this area but some kayakers too.	Yes = Multiple sources recognize this area as a resting area for spinner dolphins; however, the frequency of dolphin use appears lower than it was historically and lower than at other primary resting locations.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. The density of traffic in the relatively small area of this site may increase the intensity of disturbance.
	Courbis & Timmel 2009	Mean group size indicated as 19.3 and dolphins observed on 5 out of 23 days.	Aerial behavior when entering bay observed once out of 5 days; however, no previous studies to compare for this area. Swimmers and snorkelers were noted as most common.		
	Ostman-Lind 2009	Dolphins observed on 14% of survey days. Groups use the deeper, northern part of the bay.	Frequency of aerial behavior was positively affected by human proximity. Snorkelers were noted for this publication.		
	Ostman-Lind *et al*. 2004	Area identified as critical by researchers.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Hōnaunau Bay (Continued)	J. Medeiros(Lifelong resident on the bay), personal communication, May 15, 2009	Dolphins used to frequently use the bay in the past but rarely come now.	Dolphins used to come in to bay and fish at night, but have not for about a year now. Big groups of people now come to this area several times a week.	Yes = Multiple sources recognize this area as a resting area for spinner dolphins; however, the frequency of dolphin use appears lower than it was historically and lower than at other primary resting locations.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. The density of traffic in the relatively small area of this site may increase the intensity of disturbance.
	L. Navas-Loa (family has lived in area for generations), personal communication, June 27, 2007	Used to come into bay at 6:30-7AM on almost daily basis, now seen infrequently.	People bring toys for the dolphins to swim through and play the "leaf game". Dolphins are using habitat they never used before.		
Honokoa Bay	Ostman-Lind *et al*. 2004	Area identified by researchers as secondary resting habitat.		No = Information indicates that this may be a secondary resting site for spinner dolphins; there is no information to indicate it as a primary resting site.	No = No information reported regarding human disturbance at this site.

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Honu‘apo	Norris *et al*. 1994	One group observed in a 4 month period during biweekly aerial survey efforts that spanned a year. Specific size of group not reported, but may range from 1-50 animals.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Honokōhau Harbor	Norris & Dohl 1980	Largest groups identified as centered at Keahole Point, but ranging from Honokohau to Kiholo Bay. (~200-250 animals). From Honokohau to Kiholo Bay dolphins do not appear to occupy small coves consistently, rather they congregate over the extensive area of shallow water, moving back and forth.		Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Norris *et al*. 1994	Largest groups identified as occurring from here to Kiholo Point. One group sighted specific to this area during biweekly aerial surveys efforts conducted across a year.			
	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.	Tour vessels originate out of the harbor, but little description is paid to dolphin interaction on site.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Honokōhau Harbor (Continued)	Ostman-Lind 2009	Dolphins present in 58% of survey days. Groups located between harbor entrance and green buoy, includes part of boat channel.	Frequency of aerial behavior was positively affected by human proximity. Vessels and few swimmers noted here.	Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Ostman-Lind *et al*. 2004	Researchers identified this area as critical.			
	Take Tompson (NOAA OLE);personal communication		NOAA OLE officers report receiving approximately 2 complaints about dolphin disturbances a year at this site.		
Honomalino Bay	C. Leslie (Local fisherman), personal communication, October 2, 2008	Spinner dolphins were observed here, frequency and numbers were not reported.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
	G. Kahele (Lifelong resident of Miloli‘i), personal communication, June 28, 2007	Spinner dolphins were observed here, frequency and numbers were not reported.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kailua Bay	Norris & Dohl 1980	Not uncommonly part of dolphins from Honokohau to Kiholo Bay area move to this area and are known as the "North Kona School."	Dolphins don't appear to reach quiescence here due to the boat traffic from the harbor.	Yes = Reports from area indicate that this the area and surrounding waters may be used regularly for dolphin resting.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Norris *et al*. 1994	Dolphins most often noted just south of here. Groups observed ranged in size from 1-50; 51-100; and greater than 100. Six groups of dolphins noted in south of the Bay across 8 months of the year of biweekly aerial survey efforts.			
	Sepez 2006		Vessels depart from area and head to Makako Bay, Makalawena Beach and Kua Bay. Swimmers may swim from the pier but unlikely due to vessel traffic.		
	Ostman-Lind *et al*. 2004	Researchers identified this area as critical.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kailua Bay (Continued)	J. LeFors (NMFS Staff) pers. observation	Has observed dolphins here on several site visits.	Several tour boats observed converging on dolphin group, dropping snorkelers in the water. Dolphins swam away to avoid the boats but are followed. Vessels reload swimmers, following the dolphins and then dropping swimmers in the water again.	Yes = Reports from area indicate that this the area and surrounding waters may be used regularly for dolphin resting.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
Kalapana	Norris *et al*. 1994	One group observed in a 4 month period during biweekly aerial survey efforts that spanned a year. Group size not specifically reported, but may range from 51-100 animals.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Kamoi Point	Norris *et al*. 1994	Two sightings of groups observed both within a 4 month period of biweekly survey efforts that spanned a year. Exact group size not indicated may range from 1-50.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kapuʻa Bay	G. Kahele (Lifelong resident of Miloliʻi), personal communication, June 28, 2007	Spinner dolphins were observed here, frequency and numbers were not reported.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
	C. Leslie, personal communication, October 2, 2008	Spinner dolphins were observed here, frequency and numbers were not reported.			
Kauhakō Bay (Hó okena)	Norris & Dohl 1980	Less commonly spinner dolphins from Kealakekua found here.		Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. Swimmer interaction at this site appears to be of greatest concern.
	Norris *et al*. 1994	Six groups of dolphins observed across 9 months of the year of biweekly aerial survey efforts. Groups of dolphins observed ranged from 1-50; and 51-100.			
	Sepez 2006		Part of the 3 bay complex that hosts resident and visitor beach-based swimmers looking for dolphins. No boat launch but kayakers enter here looking for dolphins.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kauhakō Bay (Hó okena) (Continued)	Courbis 2007	Dolphins observed on 11 out of 16 days.	The number of swimmers observed was significantly higher when dolphins were present. Data indicated marine tourism increased dramatically in last several decades. Mostly swimmers at this site.	Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. Swimmer interaction at this site appears to be of greatest concern.
	Courbis & Timmel 2009	Dolphins observed on 11 out of 18 days. Mean group size was recorded as 25.	Observed dolphin aerial behavior when entering bay on only 5 out of 11 days; however, no previous studies to compare this behavior. The number of aerial behaviors per hour was significantly higher at Kauhako than at other 2 bays. Almost all human activity is directed at approaching and interacting with the dolphins. Activity is mostly swimming.		
	Ostman-Lind 2009	Dolphins observed on average 35% of survey days.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kauhakō Bay (Hó okena) (Continued)	Ostman-Lind *et al*. 2004	Researchers identified this area as critical.		Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. Swimmer interaction at this site appears to be of greatest concern.
Kaloli Pt	Norris & Dohl 1980	Largest group seen on the windward side seen here, estimated at approximately 100 dolphins. Dolphins typically found in the bay protected by the point and fringing coral reefs. Appears to be the northern most area of occupancy on the windward side of the island.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Kawaihae Harbor (from Kawaihae to Honoipu)	Norris & Dohl 1980	Dolphins occasionally seen or reported here. Group size reported as 10-30 animals.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kawaihae Harbor (Continued)	Norris *et al*. 1994	Use of area does not appear regular based on year long biweekly aerial survey efforts. Only 1 group sighting of 51-100 animals just north of the Harbor area.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Kāwili	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Keāhole Pt	Norris & Dohl 1980	Largest groups, 200-250 animals, identified as centered at Keahole Point, but ranging from Honokohau to Kiholo Bay. From Honokohau to Kiholo Bay dolphins do not appear to occupy small coves consistently, rather they congregate over the extensive area of shallow water, moving back and forth.		Maybe = Area acknowledged to be a consistent site for spinner dolphin rest in 1980. 1994 observations report use of the area, but consistent use seems to be wide spread across whole area (from Honoko hau to Kiholo) not just at the point.	No = No information reported regarding human disturbance at this site.
	Norris *et al*. 1994	Not clear if dolphin use at this site is regular based on year long biweekly aerial survey efforts. When observed dolphin groups were large with 180-200 animals recorded.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kealakekua Bay	Doty 1968	Refers to dolphin presence as regular with groups ranging from 30-80 animals. Dolphins used area in the vicinity of Manini Beach Point.		Yes = Area acknowledged as a primary resting spot based on several publications and multiple surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Norris & Dohl 1980	Dolphins recorded as present 74% of observed days. Dolphin groups ranged from 2-70 animals with an average group size of 25. Most commonly occupied the deeply indented bay, but sometimes found on the shallow area north of the bay to Keauhou or occasionally nearly to Kailua-Kona.			
	Norris *et al*. 1994	Commonly used by dolphins based on aerial surveys throughout a year. Mean number of dolphins present was 33.5, with a max of 80 animals. Most commonly occupied the deeply indented bay, but sometimes found on the shallow area north of the bay to Keauhou or occasionally nearly to Kailua-Kona.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kealakekua Bay (Continued)	Sepez 2006		Motorized vessels use this area for viewing dolphins, although the author notes that vessels report a code of conduct regarding dolphin approach. Part of the 3 bay complex that hosts resident and visitor beach-based swimmers looking for dolphins. Kayaks also frequent this area due to the Captain Cook Monument. People swimming with dolphins have been noted to bring toys and leaves into water to instigate "playing" behavior from dolphins.	Yes = Area acknowledged as a primary resting spot based on several publications and multiple surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Courbis 2007	Dolphins present 9 out of 13 days.	Data indicates marine tourism increased dramatically in last several decades. Mostly swimmers and kayakers seen here.		

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance?**
Kealakekua Bay (Continued)	Courbis & Timmel 2009	Dolphins present 9 out of 13 days. Mean group size reported as 27.1.	Study documented swimmers or vessels as always present when dolphins were present. Changes in dolphin aerial behavior patterns were recorded compared to previous studies. Dolphin aerial display not observed 6 of 10 times when entering bay and aerial behavior was not observed at all when exiting bay. Additionally dolphins displayed tail slapping, spinning, and leaping when approached by swimmers or vessels. Dolphins never went without aerial behaviors for large portions of the day as compared to Norris & Dohl 1980 study. Interruption of rest frequently observed during this study but rarely observed during 1980 study. Swimmers, snorkelers and kayakers noted in this study.	Yes = Area acknowledged as a primary resting spot based on several publications and multiple surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kealakekua Bay (Continued)	Ostman-Lind 2009	Dolphins presence 42% of survey days. Dolphins used the area against the steep cliffs in the northeastern part of the bay.	Frequency of dolphin aerial behavior was positively affected by human proximity. Significantly more aerial behaviors were recorded when people were within 100 meters of the dolphins. Snorkelers, swimmers, kayakers and tour boats noted.	Yes = Area acknowledged as a primary resting spot based on several publications and multiple surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Ostman-Lind *et al*. 2004	Area reported as critical to dolphins. Mean group size reported at 47.7, with a max of 175 animals.	Mean number of dolphins per group was significantly smaller than documented in studies between 1989 and 1992. Overall a 26% reduction in group size noted.		
	Forest thesis 2001	Dolphins present on 58% of observation days. Mean group size was 33, with a range of 4 - 90 animals. Mean in the winter was reported as less than 20, in the spring as 40.	Dolphins behaviors recorded as changed due to human disturbance including asynchronously surfacing, an increase in frequency of aerial behaviors in afternoon, bow riding, and avoidance behaviors. Swimmers, motorboats and kayaks noted in this area.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kealakekua Bay (Continued)	Timmel *et al* 2008	Dolphins present 67% of the time. Mean group size 30. In a band b/w 50-500m from shore in all but the SE quarter of the bay. Most protected part of the bay. Never near Napoopoo pier, where human presence is high.	Dolphin behavior changes recorded included reorientation- or changes in direction, may swim faster in the presence of faster vessels (weak correlation). May tolerate the close presence of swimmers and vessels for a time, but are intolerant of prolonged interactions with swimmers and/or vessels. Swimming, snorkeling, kayaking, motor-boating noted here.	Yes = Area acknowledged as a primary resting spot based on several publications and multiple surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
	Timmel thesis 2005	Dolphins present 67% of the time and refers to area as critical. Mean group size 30, with a range from 11-50 animals. In a band b/w 50-500m from shore in all but the SE quarter of the bay. Most protected part of the bay. Never near Napoopoo pier, where human presence is high.	Dolphin behavior changes recorded as a result of disturbance including altering course, and dividing into smaller subgroups. Dolphins' reorientation and pod linearity index (directness of travel) were impacted. Swimming, snorkeling, kayaking, and motor boats noted here.		

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Kealakekua Bay (Continued)	Take Tompson (NOAA OLE);personal communication		NOAA OLE officers report receiving approximately 25 complaints about dolphin disturbances a year at this site.	Yes = Area acknowledged as a primary resting spot based on several publications and multiple surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.
Keauhou Cove	Norris & Dohl 1980	Dolphins reported as consistently found here. Small group size reported as 20-25 animals.		Maybe = Area acknowledged to be a consistent site for spinner dolphin rest in 1980; however, recent publications fail to acknowledge area.	No = No information reported regarding human disturbance at this site.
	Norris *et al*. 1994	Use of area does not appear regular, based on year-long biweekly aerial survey efforts. Groups observed ranged from 51-100 animals.			
Kehena Beach	Sepez 2006	Dolphins presence noted as intermittent.	Beach based swims noted here. Road into area is rough and so are water conditions at times.	Maybe = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area, but numbers and presence are not well documented.	Maybe = Intensity of dolphin disturbance at this site is not well known.
	Ostman-Lind *et al*. 2004	Researchers identified this area as critical.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance?**
Kehena Beach (Continued)	J. LeFors (NMFS Staff) pers. observation	Has observed spinner dolphins at this site. Known by locals as "Dolphin Beach".	Swimmers from shore, mainly local residents, come here on regular basis. Water is very rough so tourists probably would not attempt swimming here. Was told that there can be several hundred people here on weekends.	Maybe = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area, but numbers and presence are not well documented.	Maybe = Intensity of dolphin disturbance at this site is not well known.
Kīholo Point	Norris & Dohl 1980	Largest groups, 200-250 animals, identified as centered at Keahole Point, but ranging from Honokohau to Kiholo Bay. From Honokohau to Kiholo Bay dolphins do not appear to occupy small coves consistently, rather they congregate over the extensive area of shallow water, moving back and forth.		Maybe = Area acknowledged to be a consistent site for spinner dolphin rest in 1980.	No = No information reported regarding human disturbance at this site.
Kua Bay	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.	Mentioned as a destination for vessels leaving Kailua-Kona but little information is provided regarding dolphin interaction.	No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = Not enough information regarding human interaction at this site to determine intensity.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Laupāhoehoe	Norris *et al*. 1994	Use of area does not appear regular, based on year long biweekly aerial survey efforts. Specific size of group observed not reported but indicated as greater than 100 animals.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Leleiwi	Ostman-Lind *et al*. 2004	Researchers refer to area as secondary resting habitat.		No = Information indicates that this may be a secondary resting site for spinner dolphins; there is no information to indicate it as a primary resting site.	No = No information reported regarding human disturbance at this site.
Mahai'ula and Makalawena	J. Viezbicke (HIHWNMS), personal communication, September 29, 2008		Tour boats from Honokohau Harbor bring guests here to swim with dolphins.	Maybe = Dolphins are known to use this site but usually continue south to Makako Bay after briefly resting here.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Makako Bay (Hoona Bay)	Norris *et al*. 1994	Eight groups of dolphins observed across a year of biweekly aerial survey efforts. Groups size ranged from 1-50; 51-100 and 100+		Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. This bay is likely the best known area for tour boats bringing snorkelers to interact with spinner dolphins on the Island of Hawaii.
	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.	Dolphin tours from Kailua-Kona head to this spot.		
	Norris *et al*. 1994 (refers to it as Hoona Bay)	Dolphin use of this site appeared regular based on biweekly aerial survey efforts throughout a year. Frequented by the largest schools of spinners on the entire island. Groups size ranged from 1-50, 51-100,and greater; frequently numbered as many as 180-200 animals.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Makako Bay (Hoona Bay) (Continued)	Ostman-Lind *et al*. 2004	Researchers identified this area as critical.	Spinner dolphin displaced to next bay to the north that had only been used occasionally used by dolphins during previous studies.	Yes = Area acknowledged as a primary resting spot based on surveys of dolphin presence in area.	Yes = Multiple sources recognize this site as an area where dolphin disturbance occurs. This bay is likely the best known area for tour boats bringing snorkelers to interact with spinner dolphins on the Island of Hawaii.
	J. LeFors (NMFS Staff) pers. observation	Has observed groups of 50 to 100 dolphins at this site on several site visits.	Observed 4 tour boats converging on dolphin pod and dropping swimmers in the water with dolphins. Dolphins behavior changed as a result; dolphins split into two groups, one group entering deeper into bay while the other group moved farther offshore.		
Māhukona (Just South)	Norris *et al*. 1994	Five dolphins groups observed across a year of biweekly aerial survey efforts. Group size ranged from 1-50; 51-100 and greater than 100.		Maybe = Norris *et al*. report sightings across a year, but current publications do not recognize this area as a resting area specifically.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Manukā Bay	Ostman-Lind *et al*. 2004	Researchers indicated this site as a probable resting site for dolphins.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
	C. Leslie (Local Fisherman), personal communication, October 2, 2008	Dolphins noted as recently using this area. In the past they did not to see dolphins resting this far south.			
Miloli‘i	Norris & Dohl 1980	A single record of 20 animals (not well surveyed because this was a no fly area during part of the study).		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins	No = No information reported regarding human disturbance at this site.
	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.			
	G. Kahele (Lifelong resident of Miloli‘i), personal communication, June 28, 2007	Spinner dolphins have been observed here.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Okoe Bay	Ostman-Lind *et al*. 2004	Researchers indicated this site as a probable resting site for dolphins.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
	G. Kahele (Lifelong resident of Miloli‘i), personal communication, June 28, 2007	Spinner dolphins have been observed here.			
	Norris *et al*. 1994	Four groups observed across 8 months, during a biweekly aerial survey effort that spanned a year. Exact number not recorded but may range from 1-50 animals.			
Opilukao Cove	Norris & Dohl 1980	Sometimes dolphins observed here from "home bay" on southern edge of the cape.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Puakō	Ostman-Lind *et al*. 2004	Researchers identified this area as secondary resting habitat.		No = Information indicates that this may be a secondary resting site for spinner dolphins; there is no information to indicate it as a primary resting site.	No = No information reported regarding human disturbance at this site.

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Pu‘u Kuili (and areas just north)	Norris *et al*. 1994	Six groups observed across 9 months of biweekly aerial survey efforts that spanned a year. Groups size ranged from 1-50; 51-100 and greater than 100.		Maybe = Norris *et al*. report sightings across a year, but current publications do not recognize this area as a resting area specifically.	No = No information reported regarding human disturbance at this site.
South Pt	Norris & Dohl 1980	Small groups of approximately 20 animals observed here. Located in very rough water between Ka Lae and Honu‘apo, over the modestly developed shallow area or occasionally in the deep cove at Ka‘alu‘alu.		No = Area is large and covers multiple inlets. Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
	Norris *et al*. 1994	Eight groups recorded in and around the South Point area in 8 months of the year, during a biweekly aerial survey effort that spanned a year. Groups reported range in size from 1-50 to 51-100 animals.			

Table A-2. Step 1 and Step 2 (continued)

Table A-2 - Resting Sites on Hawai'i					
Sites	**Reference**	**Information Regarding Dolphin Use of Area**	**Information Regarding Human Disturbance in Area**	**Should the area be considered essential daytime habitat?**	**Does this area require enhanced protection from human disturbance for spinner dolphins?**
Waikoloa Beach	Sepez 2006	Dolphins arrival to this spot noted as recent, but no numbers or frequency of occurrence indicated.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.
Waipí o Valley Bay	Sepez 2006	Mentioned as a place spinner dolphins are found, but no numbers or frequency of occurrence indicated.		No = Not enough information regarding spinner use of site to determine that this is an essential daytime habitat for spinner dolphins.	No = No information reported regarding human disturbance at this site.

Table A-3. Step 3 – Summary of evaluation criteria for an effective closure using the 12 highlighted bays from Table A-2 (*i.e.*, targeted essential daytime habitats). The five bays selected for time-area closures (highlighted in light blue) were areas where "yes" was answered for a majority of the criteria and "no" was not answered for any criteria.

Table A-3 - Closure Evaluation Criteria					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logistically feasible)?**
Nāpali Coast (Kauai)	No = Dolphins seem to transit along this coastline resting in various areas, making discrete closure areas difficult to identify.	Yes = No major harbor or transit area is identified for close coastal areas.	No = Area is expansive and a major destination for scenic tours of Kauai.	No = The remote nature of this coastline requires transit out to and along the expansive area. A fulltime staff member would need to be devoted to the area on a regular basis to effectively patrol. Logistically this may not be an option with current staff and resource limitations.	No = Access to dolphin observations are restricted mainly to boating along this coast. The costs of gaining information at this site are not feasible with limited resources.
Waiʻanae Coast (includes Kahe Point, Mākua Bay, Pōkaʻī Bay, and Yokohama Bay) (Oahu)	No = Dolphins are known to transit along this coastline resting in various areas, making discrete closure areas difficult to delineate.	No = Three harbors exist within this stretch: Waiʻanae Small Boat Harbor, Kalaeloa Barbers Point Harbor, and Ko'olina Marina.	No = Area is expansive and includes harbors, recreational fishing area, major transit areas, and areas used by DOD for training.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas. However, an expansive closure may require more enforcement effort to effectively patrol.	Yes = Multiple areas along this coastline provide harbors for launching vessels for research staff and various areas along the coast may provide for land based surveys. However, an expansive closure and the behavior of dolphins along this coastline (moving along the expanse) may present a challenge to research staff.

Table A-3. Step 3 – Summary of evaluation criteria – Continued.

Table A-3 - Closure Evaluation Criteria					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logistically feasible)?**
La Perouse Bay (Maui)	Yes = A discrete area of the bay may be sectioned off to identify the spinner protection zone.	Yes = No major harbor or transit area is identified, but a private boat ramp exists shoreward of the closure.	Yes = Maui's coastline provides multiple areas with accessibility for recreational activities on the water. Additional considerations may be made to allow landowners transit access.	Yes = Enforcement staff may easily access areas frequented by residents and Maui's visitors to provide enforcement of closure areas.	Maybe = Access to this site is feasible; however, the site is not nearby multiple sites for ease of observation. Volunteers at this site may be able to provide data regarding dolphin use of the area as they have done in years past.
Hulopó e Bay (Lāná i)	Maybe = A discrete area of the bay may be sectioned off to identify the spinner protection zone, however more information may be necessary to determine the area used most by dolphins.	Yes = No major harbor or transit area is identified.	No = Residents have identified that the Bay provides the only easily accessible site on Island for ocean recreation since other sites require a 4-wheel drive vehicle.	No = Limited enforcement resources limits the amount of enforcement presence on smaller islands such as Lanai. A fulltime staff member would need to be devoted to the area on a regular basis to effectively patrol. Logistically this may not be an option with current staff and resource limitations.	Maybe = Access for dolphin observations appear to be relatively easy for a researcher that is based on Lanai; however, the costs for these efforts may be higher than other sites and a researcher stationed on Lāna‘i may be limited to just the one site.

Table A-3. Step 3 – Summary of evaluation criteria – Continued.

Table A-3 - Closure Evaluation Criteria					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logistically feasible)?**
Hōnaunau Bay (Hawai'i)	Yes = A discrete area of the bay may be sectioned off to identify the spinner protection zone.	Yes = A boat ramp exists at this site, but the closure area would not infringe on transit to and from the boat ramp.	Yes = Hawaii's coastline provides multiple areas with accessibility for recreational activities on the water. Additionally consideration may be taken to delineate the area to allow for continued use of the boat ramp.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas.	Yes = Bays easily accessible to Hawaii's residents and visitors should be easily accessible for research staff. Proximity of other areas may allow multiple bays to be accessed for research observations.
Honokōhau Harbor (Hawai'i)	No = Observations indicate dolphins are using a discrete area; however, this area overlaps with the harbor entrance and the boat channel.	No = This area is a harbor and a closure might obstruct navigation.	No = There is a limited amount of harbor space available to boaters on the island, and removal of access to this harbor would impact this area.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas.	Yes = Bays easily accessible to Hawaii's residents and visitors should be easily accessible for research staff. Proximity of other areas may allow multiple bays to be accessed for research observations.

Table A-3. Step 3 – Summary of evaluation criteria – Continued.

Table A-3 - Closure Evaluation Criteria					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logistically feasible)?**
Kailua Bay (Hawai'i)	No = Observations indicate dolphins are using a discrete area; however, this area overlaps with the harbor.	No = This area is a harbor and a closure might obstruct navigation.	No = There is a limited amount of harbor space available to boaters on the island, and removal of access to this harbor would impact this area.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas.	Yes = Bays easily accessible to Hawaii's residents and visitors should be easily accessible for research staff. Proximity of other areas may allow multiple bays to be accessed for research observations.
Kauhakō Bay (Hō okena) (Hawai'i)	Yes = A discrete area of the bay may be sectioned off to identify the spinner protection zone.	Yes = No major harbor or transit area is identified, but traditional canoes are launched from shore.	Yes = Hawaii's coastline provides multiple areas with accessibility for recreational activities on the water. Additionally consideration may be taken to delineate the area to allow for continued use of the area for akule fishing.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas.	Yes = Bays easily accessible to Hawaii's residents and visitors should be easily accessible for research staff. Proximity of other areas may allow multiple bays to be accessed for research observations.

Table A-3. Step 3 – Summary of evaluation criteria – Continued.

Table A-3 - Closure Evaluation Criteria					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logisitically feasible)?**
Kealakekua Bay (Hawai'i)	Yes = A discrete area of the bay may be sectioned off to identify the spinner protection zone.	Yes = A boat ramp exists at this site, but the closure area would not infringe on transit to and from the boat ramp.	Yes = Hawaii's coastline provides multiple areas with accessibility for recreational activities on the water. Additionally consideration may be taken to delineate the area to allow recreationalists to swim along the shoreline or to visit the Captain Cook Monument via vessel.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas.	Yes = Bays easily accessible to Hawaii's residents and visitors should be easily accessible for research staff. Proximity of other areas may allow multiple bays to be accessed for research observations.
Kehena Beach (Hawai'i)	Maybe = More information is needed to determine which part of the bay is used for resting. Observations were made of the dolphins resting just off the mouth of the bay.	Yes = No major harbor or transit area is identified.	Yes = Hawaii's coastline provides multiple areas for recreational activities on the water.	No = Remote location far from main town of Hilo and far from other resting sites make enforcement problematic here.	No = Remote location far from main town of Hilo and far from other resting sites make research activities problematic here.

Table A-3. Step 3 – Summary of evaluation criteria – Continued.

Table A-3 - Closure Evaluation Criteria					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logisitically feasible)?**
Mahai'ula and Makalawena (Hawai'i)	No = Dolphins seem to transit through this area, stopping briefly to rest before heading south to Makako Bay. No distinct bay formation to easily delineate.	Yes = No major harbor or transit area is identified.	Yes = Hawaii's coastline provides multiple areas for recreational activities on the water.	Maybe = Access is via a long, rough lava road which is only open after 9AM, followed by a long walk; alternate access road is only accessible to 4-wheel drive vehicles . Enforcement presence would not be possible at all times and would not be able to arrive quickly if violation is reported.	Maybe = Access is via a long, rough lava road which is only open after 9AM, followed by a long walk; alternate access road is only accessible to 4-wheel drive vehicles .
Makako Bay (including Hoona Bay) (Hawai'i)	Yes = A discrete area of the bay may be sectioned off to identify the spinner protection zone.	Yes = No major harbor or transit area is identified.	Yes = Hawaii's coastline provides multiple areas with accessibility for recreational activities on the water. Additionally, manta ray dive sites are popular in early evening and would still be accessible after the 3pm closure time ends.	Yes = Enforcement staff may easily access areas frequented by residents and Hawaii's visitors to provide enforcement of closure areas.	Yes = Bays easily accessible to Hawaii's residents and visitors should be easily accessible for research staff. Proximity of other areas may allow multiple bays to be accessed for research observations.

Table A-4. Areas selected for time-area closures. See Table A-3 for full answers to the questions for each bay.

Table A-4 - Areas Selected for Time-Area Closures					
Sites	**Do environmental conditions support a discrete closure?**	**Closure does not obstruct a major harbor or transit zone**	**Are there alternative areas nearby that are accessible for human use?**	**Is enforcement more readily available for the site?**	**Can the area fit into the Adaptive Management Strategy (Is Monitoring logistically feasible)?**
La Perouse Bay (Maui)	Yes	Yes	Yes	Yes	Maybe
Hōnaunau Bay (Hawai'i)	Yes	Yes	Yes	Yes	Yes
Kauhakō Bay/ Hó okena (Hawai'i)	Yes	Yes	Yes	Yes	Yes
Kealakekua Bay (Hawai'i)	Yes	Yes	Yes	Yes	Yes
Makako Bay (including Hoona Bay) (Hawai'i)	Yes	Yes	Yes	Yes	Yes

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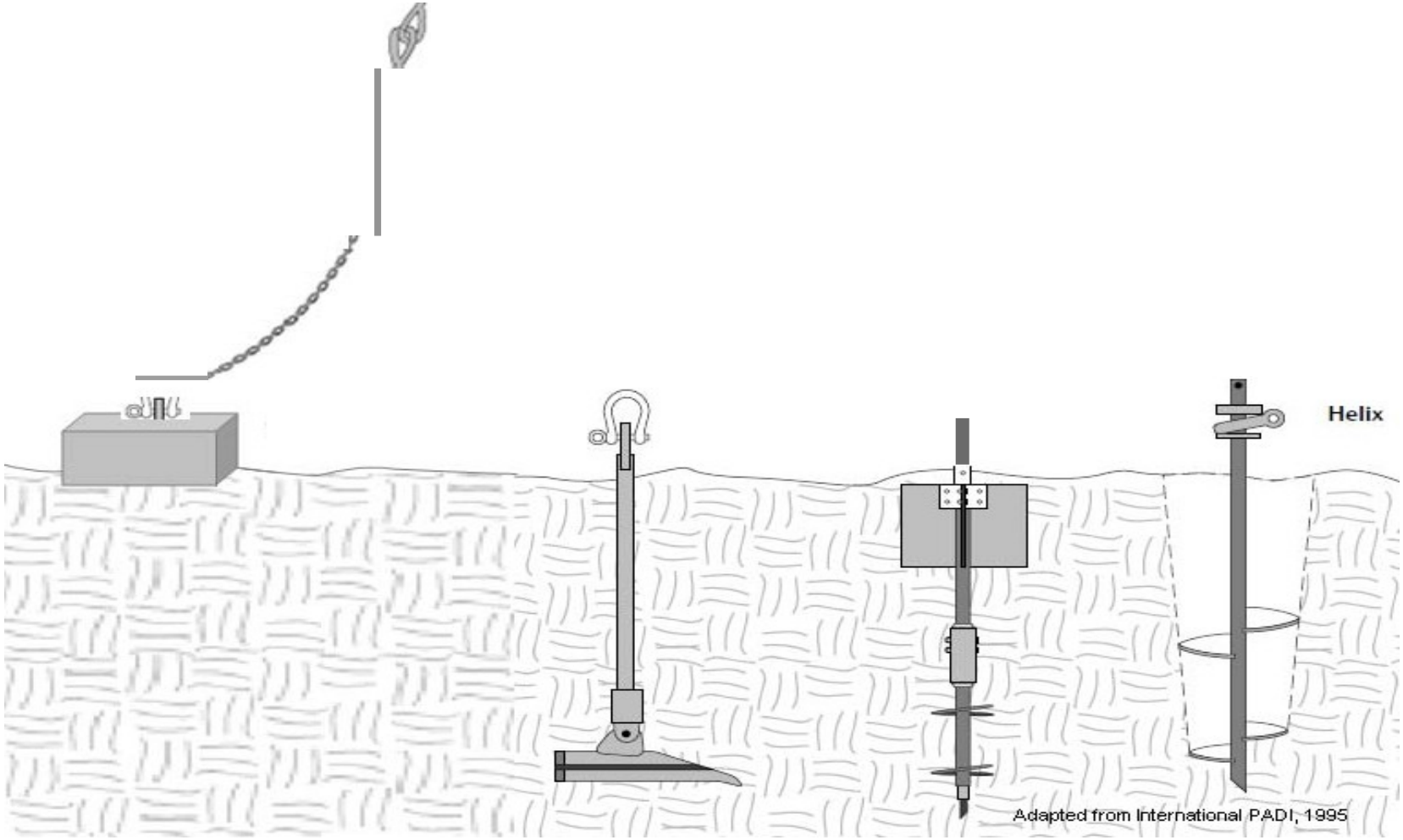
Appendix B – Buoy Depictions


Helix
Adapted from International PADI, 1995

Appendix C – Best Management Practices for In- and Near-Water Work

Best Management Practices (BMPs) for General In- and Near-Water Work Including Boat and Diver Operations

April 2013

NMFS Protected Resources Division recommends implementation of the following BMPs to reduce potential adverse effects on protected marine species. These BMPs are in no way intended to supersede or replace measures required by any other agency including, but not limited to the ACOE, USFWS, USEPA, or NMFS Habitat Conservation Division, and compliance with these BMPs shall always be considered secondary to safety concerns.

All workers associated with this project, irrespective of their employment arrangement or affiliation (*e.g*. employee, contractor, etc.) shall be fully briefed on these BMPs and the requirement to adhere to them for the duration of their involvement in this project.

A. Constant vigilance shall be kept for the presence of ESA-listed marine species during all aspects of the proposed action, particularly in-water activities such as boat operations, diving, and deployment of anchors and mooring lines.

1. The project manager shall designate an appropriate number of competent observers to survey the areas adjacent to the proposed action for ESA-listed marine species.
2. Surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour. Periodic additional surveys throughout the workday are strongly recommended.
3. All work shall be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and shall only begin/resume after the animals have voluntarily departed the area. If ESA-listed marine species are noticed within 50 yards after work has already begun, that work may continue only if, in the best judgment of the project supervisor, there is no potential for the activity to adversely affect the animal(s). For example, divers performing surveys or underwater work would likely be permissible, whereas operation of heavy equipment is likely not.
4. Special attention will be given to verify that no ESA-listed marine animals are in the area where equipment or material is expected to contact the substrate before that equipment/material may enter the water.
5. All objects will be lowered to the bottom (or installed) in a controlled manner. This can include the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that effect positive control over the rate of descent.
6. In-water tethers, as well as mooring lines for vessels and marker buoys, shall be kept to the minimum lengths necessary, and shall remain deployed only as long as needed to properly accomplish the required task.
7. When piloting vessels, operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles.
8. Reduce vessel speed to 10 knots or less when piloting vessels at or within the ranges described above from marine mammals and sea turtles. Operators shall be particularly

vigilant to watch for turtles at or near the surface in areas of known or suspected turtle activity, and if practicable, reduce vessel speed to 5 knots or less.

9. If, despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the vessel, put the engine in neutral until the animal is at least 50 feet away, and then slowly move away to the prescribed distance.
10. Marine mammals and sea turtles shall not be encircled or trapped between multiple vessels or between vessels and the shore.
11. Do not attempt to feed, touch, ride, or otherwise intentionally interact with any ESA-listed marine species.

B. No contamination of the marine environment shall result from project-related activities.

12. A contingency plan to control toxic materials is required.
13. Appropriate materials to contain and clean potential spills shall be stored at the work site and be readily available.
14. All project-related materials and equipment placed in the water shall be free of pollutants.
15. The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and equipment cleaned.
16. Fueling of land-based vehicles and equipment shall take place at least 50 feet away from the water, preferably over an impervious surface. Fueling of vessels shall be done at approved fueling facilities.
17. Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions.
18. A plan shall be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.

Appendix D – Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) Designations for Hawaii

EFH and HAPC Designations for the Hawaii Archipelago Fishery Ecosystem Plan Management Unit Species (MUS)

MUS	Species Complex	EFH	HAPC
Bottomfish and Seamount Groundfish	**Shallow-water species (0–50 fm):** uku (*Aprion virescens*), thicklip trevally (*Pseudocaranx dentex*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), amberjack (*Seriola dumerili*), taape (*Lutjanus kasmira*)	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fm). **Juvenile/adults:** the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm).	All slopes and escarpments between 40–280 m (20 and 140 fm). Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai.
Bottomfish and Seamount Groundfish	**Deep-water species (50–200 fm):** ehu (*Eteliscarbunculus), onaga (Etelis coruscans), opakapaka (Pristipomoides filamentosus), yellowtail kalekale (P. auricilla), kalekale (P. sieboldii), gindai (P. zonatus), hapuupuu (Epinephelus quernus), lehi (Aphareus rutilans)*	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms). **Juvenile/adults:** the water colun and all bottom habitat extending from the shoreline to a depth of 400 meters (200 fm).	All slopes and escarpments between 40–280 m (20 and 140 fm). Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai.
Bottomfish and Seamount Groundfish	**Seamount groundfish species (50–200 fm):**armorhead (*Pseudopentaceros richardsoni*), ratfish/butterfish (*Hyperoglyphe japonica*), alfonsin (*Beryx splendens*)	**Eggs and larvae:** the (epipelagic zone) water column down to a depth of 200 m (100 fm) of all EEZ waters bounded by latitude 29°–35°. **Juvenile/adults:** all EEZ waters and bottom habitat bounded by latitude 29°–35° N and longitude 171° E–179° W between 200 and 600 m (100 and 300 fm).	No HAPC designated for seamount groundfish.

EFH and HAPC Designations for the Hawaii Archipelago Fishery Ecosystem Plan Management Unit Species (MUS) Continued…

MUS	Species Complex	EFH	HAPC
Crustaceans	**Spiny and slipper lobster complex:** Hawaiian spiny lobster (*Panulirus marginatus*), spiny lobster (*P. penicillatus*, *P. spp.*), ridgeback slipper lobster (*Scyllarides haanii*), Chinese slipper lobster (*Parribacus antarcticus*) **Kona crab:** Kona crab (*Ranina ranina*)	**Eggs and larvae:** the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm). **Juvenile/adults:** all of the bottom habitat from the shoreline to a depth of 100 m (50 fm).	All banks in the NWHI with summits less than or equal to 30 m (15 fathoms) from the surface.
Crustaceans	**Deepwater shrimp (***Heterocarpus spp.***)**	**Eggs and larvae:** the water column and associated outer reef slopes between 550 and 700 m. **Juvenile/adults:** the outer reef slopes at depths between 300–700 m.	No HAPC designated for deep-water shrimp.

EFH and HAPC Designations for the Hawaii Archipelago Fishery Ecosystem Plan Management Unit Species (MUS) Continued…

MUS	Species Complex	EFH	HAPC
Precious Corals	**Deep-water precious corals (150–750 fm):** Pink coral (*Corallium secundum*), red coral (*C. regale*), pink coral (*C. laauense*), midway deepsea coral (*C. sp nov*.), gold coral (*Gerardia spp*.), gold coral (*Callogorgia gilberti*), gold coral (*Narella spp*.), gold coral (*Calyptrophora spp*.), bamboo coral (*Lepidisis olapa*), bamboo coral (*Acanella spp*.) **Shallow-water precious corals (10-50 fm):** Black coral (*Antipathes dichotoma*), black coral (*Antipathis grandis*), black coral (*Antipathes ulex*)	EFH for Precious Corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Ka‘ena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank. EFH has also been designated for three beds known for black corals in the MHI between Milolii and South Point on the Big Island, the ‘Au‘au Channel, and the southern border of Kauai. Includes the Makapuu bed, Wespac bed, Brooks Banks bed.	For Black Corals, the ‘Au‘au Channel has been identified as a HAPC.
Coral Reef Ecosystems	**All Currently Harvested Coral Reef Taxa** **All Potentially Harvested Coral Reef Taxa**	EFH for the Coral Reef Ecosystem MUS includes the water column and all benthic substrate to a depth of 50 fm from the shoreline to the outer limit of the EEZ.	Includes all no-take MPAs identified in the CRE-FMP, all Pacific remote islands, as well as numerous existing MPAs, research sites, and coral reef habitats throughout the western Pacific.

Appendix E – List of Protected Marine Species in Hawaii

Species protected under the Endangered Species Act in Hawaii

Species	Scientific Name	ESA Status	Listing Date	Federal Register Reference
Hawaiian monk seal	*Neomonachus schauinslandi*	Endangered	11/23/1976	41 FR 51612
Green Sea Turtle (Central North Pacific DPS) [1]	*Chelonia mydas*	Threatened	7/28/1978 04/06/2016	43 FR 32800 81 FR 20058
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	7/28/1978	43 FR 32800
Loggerhead Sea Turtle	*Caretta caretta*	Threatened	7/28/1978	43 FR 32800
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	Threatened	7/28/1978	43 FR 32800
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	6/2/1970	35 FR 8491
Humpback Whale	*Megaptera novaeangliae*	Endangered	12/2/1970	35 FR 18319
Blue Whale	*Balaenoptera musculus*	Endangered	12/2/1970	35 FR 18319
Fin Whale	*Balaenoptera physalus*	Endangered	12/2/1970	35 FR 18319
Sei Whale	*Balaenoptera borealis*	Endangered	12/2/1970	35 FR 18319
Sperm Whale	*Physeter macrocephalus*	Endangered	12/2/1970	35 FR 18319
MHI Insular False Killer Whale DPS	*Pseudorca crassidens*	Endangered	11/28/2012	77 FR 70915

[1] The 1978 green sea turtle listing was recently revised and green sea turtles were listed as 11 threatened or endangered Distinct Population Segments (DPSs); Hawaii's population falls within the Central North Pacific DPS.

Species Protected under the Marine Mammal Protection Act in Hawaii

Species	Scientific Name
Hawaiian Monk Seal	*Neomonachus schauinslandi*
Rough-Toothed Dolphin	*Steno bredanensis*
Risso's Dolphin	*Grampus griseus*
Common Bottlenose Dolphin	*Tursiops truncatus truncatus*
Pantropical Spotted Dolphin	*Stenella attenuata attenuata*
Spinner Dolphin	*Stenella longirostris longirostris*
Striped Dolphin	*Stenella coeruleoalba*
Fraser's Dolphin	*Lagenodelphis hosei*
Melon-Headed Whale	*Peponocephala electra*
Pygmy Killer Whale	*Feresa attenuate*
False Killer Whale	*Pseudorca crassidens*
Killer Whale	*Orcinus orca*
Short-Finned Pilot Whale	*Globicephala macrorhynchus*
Blainville's Beaked Whale	*Mesoplodon densirostris*
Cuvier's Beaked Whale	*Ziphius cavirostris*
Longman's Beaked Whale	*Indopacetus pacificus*
Pygmy Sperm Whale	*Kogia breviceps*
Dwarf Sperm Whale	*Kogia sima*
Sperm Whale	*Physeter macrocephalus*
Blue Whale	*Balaenoptera musculus*
Fin Whale	*Balaenoptera physalus*
Bryde's Whale	*Balaenoptera edeni*
Sei Whale	*Balaenoptera borealis*
Minke Whale	*Balaenoptera acutorostrata scammoni*
Humpback Whale	*Megaptera novaeangliae*

Appendix F – List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

State and Federal Agencies

HI Department of Business, Economic Development, and Tourism
HI Department of Land and Natural Resources
HI Department of Land and Natural Resources, Division of Aquatic Resources
HI Department of Land and Natural Resources, Division of Aquatic Resources, Hawaiian Islands Humpback Whale National Marine Sanctuary
HI Department of Land and Natural Resources, Division of Boating and Ocean Recreation
HI Department of Land and Natural Resources, Office of Conservation and Coastal Lands
HI Department of Land and Natural Resources, Division of State Parks
U.S. Marine Mammal Commission
NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary
NOAA Office of National Marine Sanctuaries
NOAA Office of National Marine Sanctuaries Pacific Islands Region
HI Office of Environmental Quality Control
HI Office of Hawaiian Affairs
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency - PICO
U.S. Environmental Protection Agency Region IX (CED-2)
U.S. National Park Service Puuhonua O Honaunau National Historical Park
United States Coast Guard
USFWS Hawaiian and Pacific Islands National Wildlife Refuge Complex
USFWS Pacific Islands Ecological Services Field Office
Western Pacific Fishery Management Council

Elected/Appointed Officials

City and County of Honolulu, Office of the Mayor	The Honorable Kirk Caldwell
County of Hawaii, Office of the Mayor	The Honorable William Kenoi
County of Kauai, Office of the Mayor	The Honorable Bernard Carvalho
County of Maui, Office of the Mayor	The Honorable Alan Arakawa

NGOS & Advocacy Groups

Center for Biological Diversity	Hawaii Wildlife Fund
Conservation Council for Hawaii	Whale and Dolphin Conservation
EarthJustice	KAHEA
Earth Trust	Marine Conservation Institute
The Nature Conservancy	National Wildlife Federation
Dolphin Ecology Project	The Marine Mammal Center

Individuals

Gregory Wong	Dore Dokos-Loewenthal	Karen Adams-Thomas
SDK Naluai	DariSann and Michael Ball	Janet Brinkman
Walterbea Aldeguer	Vernon Keawe	Cindy Walsh
Richard A. Davison	Emily Burt	Rachail Baxter
Lara Kozloff	Fred Duerr	Sandiann K. Nago
Nicole Milne	Kit Kelly	Patricia McCarver
Kalei Tringali	Kimo Santos	Kamala Dockstader
Alexia Pihier	Michael and Melainah Yee	Michael Brown
Sam Pae	Margit Mayra Fuchs	Josephine Keliipio
Cynthia K.L. Rezentes	Susan Scott	John Smith
Jo Jordan	Joan Ocean	Mikahala Roy
Lucy Gay	David Shoup	Curt Colby
Carl Jellings	Alex Aquino	Elaine Valois and Les Gall
Lee Kehaulani Harper	Marie Burns	Debra Herring
William and Melva Aila	Kilinahe and Kaliko Grace	Randy Lawrence
Alan E. Nelson	Cynthia Hankins	Kimokeo Kapahulehua
Manuel M. Kuloloio	Elaine Blank	Rebecca Goff
Maureen Kleaver	David and Leinani Loa	Greg Howeth
Steve Burton	Rick Jones	Alastair Hebard
Jimmy Meideros	Iyvie Cooper	Caitlin Kielhorn
Michael Hyson	Lara Mukleburt	Alison Cohan
Kater Bourdon	Bernie Middleton	Joseph Fell-McDonald
Nancy Emery	Jeffrey Cooper	Jean Souza
Janna Shackeroff	Jack Womack	Kawika and Yolanda Cutcher
Linda Dohemann	Stephen Cornacchia	Dave Fletcher
Mark Chesler	Kalani Nakoa	Mimi Olry
Andrew Barfoot		Susan Chapman

U.S. Secretary of Commerce
Penny Pritzker

Administrator of National Oceanic and Atmospheric Administration and Undersecretary of Commerce
Dr. Kathryn Sullivan

Assistant Administrator for Fisheries
Eileen Sobeck

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OFFICIAL BUSINESS

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