Ground-Based Midcourse Defense (GMD)
Sea-Based X-Band Radar (SBX)
Placement and Operation
Adak, Alaska

Environmental Assessment

3 August 2005

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U.S. Army Space and Missile Defense Command
P.O. Box 1500
Huntsville, Alabama 35807-3801

GROUND-BASED MIDCOURSE DEFENSE
SEA-BASED X-BAND RADAR (SBX) PLACEMENT AND OPERATION
ENVIRONMENTAL ASSESSMENT

AGENCY: Missile Defense Agency (MDA)

ACTION: Draft Finding of No Significant Impact

BACKGROUND: MDA proposes to establish the necessary infrastructure to position, secure, and operate the Sea-Based X-Band Radar (SBX) at the Primary Support Base (PSB) at Adak Island, Alaska.

Within the Department of Defense (DoD), the MDA is responsible for developing, testing, and deploying the Ballistic Missile Defense System (BMDS). The BMDS is designed to intercept threat missiles during all phases of their flight: boost, midcourse, and terminal. The Ground-Based Midcourse Defense (GMD) is an element of the BMDS; the purpose of the GMD element is to intercept and destroy long-range missiles in the ballistic (midcourse) phase of flight before their reentry into the Earth's atmosphere. GMD system testing, SBX operations, and the establishment of a PSB at Adak were analyzed in the *Ground-Based Midcourse Defense* (*GMD) Extended Test Range Environmental Impact Statement (EIS).* The subsequent Record of Decision for the GMD Extended Test Range EIS selected Adak as the location to establish a PSB for the SBX. Due to inherent capabilities of the X-band radar (XBR) system, the SBX may also be used for related missions such as space surveillance.

DESCRIPTION OF THE PROPOSED ACTION: The Proposed Action at or near Adak is to support, position/secure, and operate the SBX.

The Proposed Action would include the following activities:

- A means of positioning the SBX in the waters of Kuluk Bay near Adak:
  - Alternative 1—Permanent Mooring System
  - Alternative 2—Loitering in Kuluk Bay
  - Alternative 3—Temporary Anchoring

  Alternative 1 is the preferred alternative for positioning the SBX in Kuluk Bay.

- SBX operations while at Kuluk Bay
  - Daily SBX activities
  - Designation and enforcement of a security zone in U.S. territorial waters surrounding the SBX while moored, anchored, or loitering, which could include the installation and use of a floating security boom/fence around the SBX and/or operation of a security patrol boat
  - Use of onshore PSB assets and infrastructure to support SBX operations
  - Operation of one or more SBX support vessels

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- SBX loitering and operations while in the Bering Sea or Sitkin Sound
  - Daily SBX activities
  - Designation and enforcement of a security zone surrounding the SBX while in U.S. territorial waters
  - Use of onshore PSB assets and infrastructure to support SBX operations
  - Operation of one or two SBX support vessels

ALTERNATIVES TO THE PROPOSED ACTION

No-Action

The No-action Alternative that was previously analyzed in the GMD Extended Test Range EIS discussed the potential environmental impacts if the SBX were not built and there were not a need for a port facility in the Pacific Region to support the SBX. No environmental impacts were identified for the No-action Alternative.

Alternative Sites Not Carried Forward for Analysis

Construction and Use of a Pier

The construction and use of a pier was initially considered for docking the SBX at Adak. Existing piers at Adak are currently not suitable for SBX requirements. The construction of a pier would incur substantially higher costs when compared to the installation of a permanent mooring system. The construction of a pier would not meet schedule demands for the overall development/deployment of the BMDS. The use of a pier for docking the SBX at Adak would also involve an increased potential for hull damage to the SBX during docking/undocking procedures. Furthermore, a pier would provide less tolerance to adverse weather, especially high wind and wave conditions that are very prevalent in Adak.

Mooring in Finger Bay

Finger Bay is a relatively deep and protected fjord located south of the main port at Adak. Previous analysis in the GMD Extended Test Range EIS considered Finger Bay as a potential mooring location for the SBX. However, detailed investigation has found that Finger Bay is not large enough to moor the SBX securely.

Other Anchoring/Mooring Systems

Pile Clusters

A pile can be metal, reinforced concrete, or timber with various cross sections that is installed into the seabed by means of a piling hammer or vibrator. Driven pile clusters to create a mooring was not feasible because of the great water depth at the mooring site in Kuluk Bay.

Suction Pile Anchor

A suction pile anchor is a hollow steel pipe with a diameter that is much larger than that of a pile. The suction pile anchor is forced into the seabed by means of a pump connected to the top of the pipe, creating a pressure difference. The friction of the soil

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along the suction anchor and the lateral soil resistance generates the holding capacity of the suction anchor. The geophysical surveys performed in Kuluk Bay indicated that the seafloor consists mainly of a layer of dense sand that would be too hard for the proper installation of suction pile anchors. In addition, suction pile anchors were removed from consideration because of the marine industry's lack of experience in their use. Suction pile anchors are a new technology, and published data on long-term performance is lacking.

ENVIRONMENTAL EFFECTS

Methodology

Thirteen areas of environmental consideration were evaluated to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. These areas included air quality, airspace, biological resources, cultural resources, geology, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, socioeconomics, water resources, and environmental justice. Because the Proposed Action is narrowly focused, many of the resource areas are not expected to be affected sufficiently to warrant further discussion in this section or are already adequately analyzed in previous documents, including the GMD Extended Test Range EIS.

ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

Only those activities for which a potential environmental concern was determined are described within each resource summary.

Air Quality

Alternative 1 of the Proposed Action would include the installation of multiple (8 to 12) drag-embedment anchors and mooring legs. Although minor short-term impacts typically associated with construction activities may occur, no exceedances of the national or state ambient air quality standards would be anticipated. Alternatives 2 and 3 would require no permanent mooring installation. Operational emissions onboard the SBX would be limited to the exhaust produced by generators and to maintenance activities. For Alternative 1, the SBX would be moored over 2.5 miles from any sensitive receptor in the built-up area at Adak and over 3 miles from the Maritime National Wildlife Refuge. The prevailing wind direction is from the southwest and out to the Bering Sea. With the combination of wind speed, distance from receptors, and the prevailing wind direction from the southwest, it is anticipated that dispersion of emissions would limit any impact to air quality from the operation of the SBX in Kuluk Bay. Based upon air quality modeling for Alternative 1, it is expected that emissions would not exceed National Ambient Air Quality Standards (NAAQS) or Alaska ambient air quality standards (AAQS) at Adak. For Alternatives 2 and 3, it is anticipated that NAAQS and AAQS levels would be exceeded for oxides of nitrogen. For all Kuluk Bay Alternatives, the SBX would be considered a mobile source; therefore, neither a Prevention of Significant Deterioration review nor a Title V permit would be required.

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Airspace

Operation of the SBX radar has a potential for interference with commercial aircraft out to a distance of 11.8 miles, and with military aircraft out to a distance of 2.1 miles. Surveillance radar onboard the SBX would be utilized to identify any aircraft approaching the airspace region of influence. This would include aircraft operating along the high and low altitude air routes as well as aircraft on approach to Adak airport and other aircraft that may be flying in the vicinity of Adak. In the event an aircraft enters the region of influence during test operations, XBR RF emissions would be limited until the aircraft is clear. SBX test operations would be coordinated with the Federal Aviation Administration (Notice to Airmen) and the U.S. Coast Guard (Notice to Mariners), and would be scheduled if possible to occur during hours of minimal aircraft operations. A Memorandum of Agreement would establish the required scheduling and coordination process between the SBX operators and the Federal Aviation Administration.

Biological Resources

Alternative 1 of the Proposed Action would include positioning of the SBX in Kuluk Bay with a permanent mooring system. Installation of this system would include dragging an anchor assembly for each mooring leg along the seafloor in order for it to be buried up to 15 feet deep in the seafloor subsurface. Removal of obstructions on the seafloor that would hamper mooring installation would implement technologies to minimize marine habitat disruption. In addition, Alternative 1 could also include the installation and use of a floating security boom/fence around the SBX. Initial disturbance of the seafloor and its inhabitants during installation of the security boom/fence anchoring system is anticipated to be minimal, and lateral dragging of the anchor lines would be limited once installed. Alternative 2 of the Proposed Action for positioning the SBX in Kuluk Bay would include the SBX operating its engines to maintain its position in the bay by using its own thrusters. This alternative could produce cavitations on the thruster blades when operating, potentially producing intensive air bubble implosions underwater as well as intermittent noise while the vessel is at the PSB, which could startle marine wildlife in the immediate area. Under Alternative 3 for positioning the SBX in Kuluk Bay, the SBX would deploy one of its two anchors upon each arrival at the PSB, and it would then weigh anchor upon each departure from the PSB. Use of this alternative would result in repeated disturbance to the seafloor and its inhabitants.

Operation of the SBX, under Alternative 1, 2, or 3, would include daily testing and calibration of the SBX radar system to monitor and improve radar performance. During these tests, the XBR would transmit a series of full-power radio frequency pulses for short time periods several times a day. The radar beam would normally be in motion, making it extremely unlikely that a bird would remain within the most intense area of the beam for any considerable length of time. The angular spread of the radar beam is small, which further reduces the probability of bird species remaining within this limited region of space, even if the beam were motionless. The SBX radar main beam would not be directed toward the ocean's surface. Since marine mammals would normally be found below the surface of the water, the radar beam would be safely above any surfacing mammals. The SBX vessel would incorporate marine pollution control devices such as keeping decks clear of debris, cleaning spills and residues, and engaging in spill and

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pollution prevention practices in compliance with the Uniform National Discharge Standards provisions of the Clean Water Act. The potential for impacts to marine mammals due to an accidental release of diesel fuel is considered low. The relatively slow speed of the SBX platform would greatly reduce the potential for collision with a free-swimming marine mammal. The noise level from the SBX vessel at water level would be approximately 43 A-weighted decibels, which would be similar to or less than noise from other vessels frequenting the area. Overall, no adverse impacts to marine mammals are anticipated. The amount of light coming from the platform would be minimized to the extent practicable to reduce the potential for bird strikes. An onboard procedure for responding to bird strikes would be developed and implemented based on U.S. Fish and Wildlife Service guidance. Wastewater would be discharged above water level when at transit draft, and underwater when the vessel is at operational draft. Solid waste would be kept in covered containers until offloaded for onshore disposal. Installation and use of a floating security boom/fence around the SBX is not anticipated to restrict free movement of marine mammals in the area.

Cultural Resources

Although there are no previously identified cultural resources within the region of influence at the mooring site, a recent geophysical survey of Kuluk Bay resulted in the identification of World War II submarine netting as part the seafloor debris. The removal and/or disposal of submarine netting during the mooring installation would not impact the existing historical standing of the Adak National Historic Landmark and Cultural Landscape Historic District. Personnel would be informed of the sensitivity of cultural resources on Adak and the types of penalties that could be incurred if sites are damaged or destroyed. In addition, onshore PSB facilities would not be located in historic buildings, nor would they be near any historic resources. No impacts to cultural resources are anticipated during operation of the SBX.

Health and Safety

Activities involved with the positioning of the SBX in Kuluk Bay would occur in accordance with existing safety protocol/procedures and applicable state and federal requirements. No adverse effects to health and safety of personnel or the public are anticipated. During operations, the SBX systems would have the appropriate safety exclusion zones established before operation, and warning procedures to inform personnel when the system is in operation and transmitting a radio frequency (RF). Mechanical and software stops would be used to prevent the main beam from being directed in specified sectors where it may present a hazard. Ground-based, airborne, and ship-based systems have been evaluated for in-band, adjacent band, and harmonic band interference in a detailed RF interference survey. Results of the survey indicate emissions from the SBX may potentially degrade the overall system performance of in-band airborne and ship-based radar systems. Based on analysis performed by the Joint Spectrum Center, the interference would most likely result in reduced range of the radars. For example, surface search radar with a range of 60 nautical miles would only be able to see targets at 50 nautical miles. This would apply to shipboard radars operating within 20 nautical miles of the SBX. This reduction in range of the radar would result in minor impacts to ships operating in the vicinity of Adak.

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Socioeconomics

While the SBX is at the Adak PSB, most personnel would reside on the SBX platform. A permanent cadre of approximately three dozen people would utilize permanent housing in direct support of SBX operations. An additional temporary contingent would utilize local hotels or guesthouses in Adak during SBX operations. Generally, by spending money in the local economy mainly via the normal procurement of goods and services, the additional SBX related personnel would represent a positive economic impact to the local community. The SBX is not expected to interfere with subsistence and commercial fishing areas, and would not have any impacts on current shipping schedules, ship-borne commerce, recreational boating, or general transit. In addition, SBX test operations would be coordinated with the Federal Aviation Administration and would be scheduled, if possible, to occur during hours of minimal aircraft operations. There would be no reduction in the amount of available airspace, almost no disruption of existing aircraft operation, and no resultant economic impacts are expected to the Adak Airfield or any air traffic in the area.

Water Resources

Implementation of Alternative 1, 2, or 3 of the Proposed Action would result in the SBX being located in Kuluk Bay. The limited increase in the number of personnel at Adak would not affect the water supply or wastewater systems at Adak. Potable water would be produced onboard the SBX by a set of three Reverse Osmosis systems. The existing water supply at Adak would not be affected by the consumption onboard the SBX. An onboard marine sanitation device would be used to treat the wastewater produced onboard the SBX prior to discharge while moored in Kuluk Bay. The SBX would operate seawater cooling pumps to cool mechanical equipment and radar systems on the SBX. The SBX mooring site would have high flushing conditions, deep water, and high wind velocities. Based on these factors at the SBX mooring site in Kuluk Bay, thermal effects from cooling water are expected to be minimal.

Cumulative Impacts

Cumulative impacts are those that result when impacts of an action are combined with the impacts of past, present, and reasonably foreseeable future actions at a location. Cumulative impacts were considered for each resource area and each alternative for positioning the SBX in Kuluk Bay, as well as for operation in the Bering Sea or Sitkin Sound, and support activities on Adak. No other projects in the region of influence have been identified that would have the potential for incremental, additive cumulative impacts to the air quality, airspace, biological resources, cultural resources, health and safety, socioeconomics, or water resources in the region of influence.

CONCLUSION: The environmental analysis shows that no significant impacts would occur from the Proposed Action to support, position/secure, and operate the SBX at or near Adak, Alaska. Preparation of an Environmental Impact Statement, therefore, is not required. A follow-up action list will be developed and completed by the Executing Agent to ensure compliance with the actions described in the EA.

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While MDA plans to implement the preferred alternative of mooring the SBX in Kuluk Bay, the funding to install the mooring is currently not available. Therefore, the SBX would primarily loiter and operate in the Bering Sea or Sitkin Sound. The SBX may also loiter and operate in Kuluk Bay.

DEADLINE FOR RECEIPT OF WRITTEN COMMENTS: TBD, 2005

POINT OF CONTACT: Submit written comments or requests for a copy of the Ground-Based Midcourse Defense Sea-Based X-Band Radar Placement and Operation Adak, Alaska Environmental Assessment to:

U.S. Army Space and Missile Defense Command
Attention: SMDC-EN-V (Mr. David Hasley)
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GROUND-BASED MIDCOURSE DEFENSE
SEA-BASED X-BAND RADAR (SBX) PLACEMENT AND OPERATION
ENVIRONMENTAL ASSESSMENT

AGENCY: Missile Defense Agency (MDA)

ACTION: Finding of No Significant Impact

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APPROVED:

MISSILE DEFENSE AGENCY

_____ DATE: _____

CHRIS T. ANZALONE
Brigadier General, USAF
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The Missile Defense Agency proposes to establish the necessary infrastructure to support and put into placement and operation the Sea-Based X-Band Radar (SBX) at the Primary Support Base (PSB) at Adak Island, Alaska. The Proposed Action would include the following: (1) A means of positioning the SBX in the waters of Kuluk Bay near Adak; (2) SBX operations while at the PSB; (3) Designation and enforcement of a security zone and a slow speed zone in the waters surrounding the SBX, which could include the installation and use of a floating security boom/fence around the SBX; (4) Use of onshore PSB assets and infrastructure to support SBX operations; (5) Operation of an SBX support vessel.

The purpose of the Proposed Action is to provide a safe, effective means of positioning the SBX at its PSB, along with providing adequate infrastructure, security, and support operations so that the SBX can maintain a high state of readiness for missile defense test missions and Limited Defensive Operations support.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

Within the Department of Defense, the Missile Defense Agency is responsible for developing, testing, and deploying the Ballistic Missile Defense System (BMDS). The BMDS is a multi layered system designed to intercept threat missiles during all phases of their flight: boost, midcourse, and terminal. The Ground-Based Midcourse Defense (GMD) is an element of the BMDS; the purpose of the GMD element is to intercept and destroy long-range missiles in the ballistic (midcourse) phase of flight before their reentry into the Earth's atmosphere. GMD system testing, Sea-Based X-Band Radar (SBX) operations, and the establishment of a Primary Support Base (PSB) at Adak, Alaska were analyzed in the *Ground-Based Midcourse Defense (GMD) Extended Test Range Environmental Impact Statement (EIS)*. The subsequent Record of Decision for the GMD Extended Test Range EIS selected Adak as the location to establish a PSB for the SBX. Due to inherent capabilities of the X-band radar (XBR) system, the SBX may also be used for related missions such as space surveillance.

Proposed Action

The Proposed Action at Adak, Kuluk Bay, the Bering Sea, or Sitkin Sound is to support, position/secure, and operate the SBX. The Proposed Action would include the following activities:

- A means of positioning the SBX in the waters of Kuluk Bay near Adak:
  - Alternative 1—Permanent Mooring System
  - Alternative 2—Loitering in Kuluk Bay
  - Alternative 3—Temporary Anchoring

  Alternative 1 is the preferred alternative for positioning in Kuluk Bay.

- SBX operations while at Kuluk Bay:
  - Daily SBX activities
  - Designation and enforcement of a security zone in U.S. territorial waters surrounding the SBX, while moored, anchored, or loitering, which could include the installation and use of a floating security boom/fence around the SBX and/or operation of a security patrol boat
  - Use of onshore PSB assets and infrastructure to support SBX operations
  - Operation of one or more SBX support vessels
- SBX loitering and operations while in the Bering Sea or Sitkin Sound
  - Daily SBX activities
  - Designation and enforcement of a security zone in U.S. territorial waters surrounding the SBX
  - Use of onshore PSB assets and infrastructure to support SBX operations
  - Operation of one or two SBX support vessels

No-Action Alternative

The No-action Alternative was previously analyzed in the GMD Extended Test Range EIS. The GMD Extended Test Range EIS analyzed the establishment of a PSB for the SBX at Adak with Finger Bay as the potential mooring location. Following the Record of Decision that selected Adak as a PSB, Kuluk Bay was identified as the potential mooring location. Under the No-action Alternative, the SBX would not be built and put into operation and interceptor and target launch scenarios would not require the SBX for testing or Limited Defensive Operations (LDO) under operationally realistic conditions. Consequently, there were no impacts identified for the No-action Alternative at Adak. This conclusion is incorporated by reference into this Environmental Assessment.

Methodology

Thirteen areas of environmental consideration were evaluated to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. These areas included air quality, airspace, biological resources, cultural resources, geology, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, socioeconomics, water resources, and environmental justice.

Because the Proposed Action is narrowly focused, many of the resource areas are not expected to be affected sufficiently to warrant further discussion in this section or are already adequately analyzed in previous documents, including the GMD Extended Test Range EIS and the National Missile Defense Deployment Final EIS. The following paragraph summarizes the resource areas that were eliminated from further analysis.

Geology—Alternative 1 of the Proposed Action for positioning the SBX in Kuluk Bay would include the installation of a permanent mooring system. While the permanent mooring system would include multiple (8 to 12) drag–embedment-type anchors and security boom/fence would include multiple anchors, installation is not expected to create an adverse effect to geology or seafloor sediments. Infrastructure and Transportation—The few additional personnel would not affect transportation. Shipping of project related materials, as well as transportation of personnel, would utilize existing air and marine shipping routes. While cargo space is limited for transportation to and from Adak, planning would be implemented to ensure cargo space is available. Hazardous Materials and Waste—Any hazardous wastes generated onboard the SBX would be disposed of onshore according to Alaska Department of Environmental Conservation and U.S. Environmental Protection Agency regulations. No upgrades or modifications of existing onshore treatment/disposal systems would be required to support the SBX program. Land Use—Land use would be minimal since the majority of the Proposed Action would occur on the water in Kuluk Bay. A tidelands lease would be obtained for the mooring location and all activities would be in accordance with an approved Alaska Coastal Consistency Determination. Land utilization in surrounding areas would not change. Noise—No sensitive noise receptors would be disturbed by the proposed mooring installation, and noise levels during mooring installation and SBX operations would not exceed Occupational Safety and Health Administration workplace standards. Environmental Justice—An environmental justice impact would be a long-term health, environmental, cultural, or economic impact that has a disproportionately high and adverse effect on a nearby minority or low-income population. No adverse long-term impacts have been identified; as such, there would be no disproportionately

high and adverse health or environmental effects on the minority or low-income populations that may be present in the vicinity of the Proposed Action.

Environmental Consequences of the Proposed Action

Only those activities for which a potential environmental concern was determined are described within each resource summary.

Air Quality

Alternative 1 of the Proposed Action would include the installation of multiple (8 to 12) drag-embedment anchors and mooring legs. Although minor short-term impacts typically associated with construction activities may occur, no exceedances of the National Ambient Air Quality Standards (NAAQS) or State Ambient Air Quality Standards (AAQS) would be anticipated. Alternatives 2 and 3 would require no permanent mooring installation. Loitering and operation of the SBX in the Bering Sea or Sitkin Sound would require no permanent mooring installation similar to those described for Alternatives 2 and 3.

Operational emissions onboard the SBX would be limited to the exhaust produced by generators and to maintenance activities. For Alternative 1 the SBX would be moored over 2.5 miles from any sensitive receptor in the built-up area at Adak and over 3 miles from the Maritime National Wildlife Refuge. The prevailing wind direction is from the southwest and out to the Bering Sea. Based upon air quality modeling for Alternative 1, it is expected that emissions would not exceed NAAQS or Alaska AAQS at Adak. For Alternatives 2 and 3, it is anticipated that NAAQS and AAQS levels would be exceeded for oxides of nitrogen. For all Kuluk Bay alternatives, based on the likely scenario that the SBX would be underway several times per year to support test events and operational readiness, the SBX would be considered a mobile source; therefore, neither a Prevention of Significant Deterioration review nor a Title V permit would be required. During loitering and operation of the SBX in the Bering Sea or Sitkin Sound, the hours of generator operation would vary. However, due to average annual wind speeds of 15.6 to 23.3 knots in the open areas of the Bering Sea, emissions would be dispersed with limited impact to air quality.

Airspace

Positioning of the SBX in Kuluk Bay would have no impacts on airspace. Operation of the SBX radar has a potential for interference with commercial aircraft out to a distance of 11.8 miles, and with military aircraft out to a distance of 2.1 miles. Surveillance radar onboard the SBX would be utilized to identify any aircraft approaching the airspace region of influence. This would include aircraft operating along the high and low altitude air routes as well as aircraft on approach to Adak airport and other aircraft that may be flying in the vicinity of Adak. In the event an aircraft enters the region of influence, XBR RF emissions would be limited until the aircraft is clear. Potential impacts during loitering and operation of the SBX in the Bering Sea or Sitkin Sound would be similar to those described above for operations in Kuluk Bay. However, for Sitkin Sound, the high energy RF transmission area notice that would be published on the appropriate aeronautical charts would include a larger area notifying aircraft of a general RF transmission area for Sitkin Sound.

SBX test operations would be coordinated with the Federal Aviation Administration and the U.S. Coast Guard (Notice to Airmen) and the Local Notice to Mariners and would be scheduled if

possible to occur during hours of minimal aircraft operations. A Memorandum of Agreement would establish the required scheduling and coordination process between the SBX operators and the Federal Aviation Administration.

Biological Resources

Alternative 1 of the Proposed Action would include positioning of the SBX in Kuluk Bay with a permanent mooring system. Installation of this system would include dragging an anchor assembly for each mooring leg along the seafloor in order for it to be buried up to 15 feet deep in the seafloor subsurface. Removal of obstructions on the seafloor that would hamper mooring installation would implement technologies to minimize marine habitat disruption. In addition, Alternative 1 could also include the installation and use of a floating security boom/fence around the SBX. Initial disturbance of the seafloor and its inhabitants during installation of the security boom/fence anchoring system is anticipated to be minimal, and lateral dragging of the anchor lines would be limited once installed. Alternative 2 of the Proposed Action for positioning the SBX in Kuluk Bay would include the SBX operating its engines to maintain its position in the bay by using its own thrusters. This alternative could produce cavitations on the thruster blades when operating, potentially producing intensive air bubble implosions underwater as well as intermittent noise while the vessel is at the PSB, which could startle marine wildlife in the immediate area. Under Alternative 3 for positioning the SBX in Kuluk Bay, the SBX would deploy one of its two anchors upon each arrival at the PSB, and it would then weigh anchor upon each departure from the PSB. Use of this alternative would result in repeated disturbance to the seafloor and its inhabitants. Loitering of the SBX in the Bering Sea or Sitkin Sound would not include the installation of embedment-type anchors and mooring legs or the use of the SBX anchors due to the prohibitive water depths.

Operation of the SBX, under Alternative 1, 2, or 3, would include daily testing and calibration of the SBX radar system to monitor and improve radar performance. During these tests, the XBR would transmit a series of full-power radio frequency pulses for short time periods several times a day. The radar beam would normally be in motion, making it extremely unlikely that a bird would remain within the most intense area of the beam for any considerable length of time. The angular spread of the radar beam is small, which further reduces the probability of bird species remaining within this limited region of space, even if the beam were motionless. The SBX radar main beam would not be directed toward the ocean's surface. Since marine mammals would normally be found below the surface of the water, the radar beam would be safely above any surfacing mammals. Impacts of daily testing and calibration of the SBX's radar system would be the same as those described above for loitering in Kuluk Bay. No impacts are anticipated to fish or marine mammals in the Bering Sea or Sitkin Sound as a result of RF emissions.

The SBX vessel would incorporate marine pollution control devices such as keeping decks clear of debris, cleaning spills and residues, and engaging in spill and pollution prevention practices in compliance with the Uniform National Discharge Standards provisions of the Clean Water Act. The potential for impacts to marine mammals due to an accidental release of diesel fuel is considered low. The relatively slow speed of the SBX platform would greatly reduce the potential for collision with a free-swimming marine mammal. The noise level from the SBX vessel at water level would be approximately 43 A-weighted decibels, which would be similar to or less than noise from other vessels frequenting the area. Overall, no adverse impacts to marine mammals are anticipated. The amount of light coming from the platform would be minimized to the extent practicable to reduce the potential for bird strikes. An onboard procedure for responding to bird strikes would be developed and implemented based on U.S.

Fish and Wildlife Service guidance. Points of contact with the SBX operator and the U.S. Fish and Wildlife Service, as well as type and frequency of reports would be established. Wastewater would be discharged above water level when at transit draft, but underwater when the vessel is at operational draft. Solid waste would be kept in covered containers until offloaded for onshore disposal. Installation and use of a floating security boom/fence around the SBX is not anticipated to restrict free movement of marine mammals in the area.

Cultural Resources

Although there are no previously identified cultural resources within the region of influence at the mooring site, a recent geophysical survey of Kuluk Bay resulted in the identification of World War II submarine netting as part the seafloor debris. The removal and/or disposal of submarine netting during the mooring installation would not impact the existing historical standing of the Adak National Historic Landmark and Cultural Landscape Historic District.

Loitering of the SBX in the Bering Sea or Sitkin Sound would not include the installation of multiple (8 to 12) embedment-type anchors and mooring legs or the utilization of the SBX anchors due to the prohibitive depths of the ocean in the Bering Sea and Sitkin Sound. As such, impacts to cultural resources would be avoided.

Personnel would be informed of the sensitivity of cultural resources on Adak and the types of penalties that could be incurred if sites are damaged or destroyed. In addition, onshore PSB facilities would not be located in historic buildings, nor would they be near any historic resources. No impacts to cultural resources are anticipated during operation of the SBX.

Health and Safety

Activities involved with the positioning of the SBX in Kuluk Bay, the Bering Sea or Sitkin Sound would occur in accordance with existing safety protocol/procedures and applicable state and federal requirements. No adverse effects to health and safety of personnel or the public are anticipated.

During operations, the SBX systems would have the appropriate safety exclusion zones established before operation, and warning procedures to inform personnel when the system is in operation and transmitting a radio frequency (RF). Mechanical and software stops would be used to prevent the main beam from being directed in specified sectors where it may present a hazard. Ground-based, airborne, and ship-based systems have been evaluated for in-band, adjacent band, and harmonic band interference in a detailed RF interference survey. Results of the survey indicate emissions from the SBX may potentially degrade the overall system performance of in-band airborne and ship-based radar systems. Based on analysis performed by the Joint Spectrum Center, the interference would most likely result in reduced range of the radars. For example, surface search radar with a range of 60 nautical miles would only be able to see targets at 50 nautical miles. This would apply to shipboard radars operating within 20 nautical miles of the SBX. This reduction in range of the radar would result in minor impacts to ships operating in the vicinity of Adak, the Bering Sea or Sitkin Sound.

Socioeconomics

While the SBX is at the Adak PSB, most personnel would reside on the SBX platform. A permanent cadre of approximately three dozen people would utilize permanent housing on Adak

in direct support of SBX operations. An additional temporary contingent of approximately one dozen personnel would utilize local hotels or guesthouses in Adak during SBX operations. These personnel would be a mixture of military, government civilian, and contractors.

Generally, by spending money in the local economy mainly via the normal procurement of goods and services, the additional SBX related personnel would represent a positive economic impact to the local community for the duration of time spent at the mooring location throughout the year. The result would represent a small positive economic impact to the Adak economy. The proposed project would not cause any population growth.

Coordination with marine traffic would be adequately coordinated to prevent any conflicts with subsistence and commercial fishing areas, and to prevent any impacts on current shipping schedules, ship-borne commerce, recreational boating, or general transit. In addition, SBX operations would be coordinated with the Federal Aviation Administration and would be scheduled, if possible, to occur during hours of minimal aircraft operations. There would be no reduction in the amount of available airspace, almost no disruption of existing aircraft operation, and no resultant economic impacts are expected to the Adak Airfield or any air traffic in the area.

Water Resources

Implementation of Alternative 1, 2, or 3 of the Proposed Action would result in the SBX being located in Kuluk Bay. The limited increase in the number of personnel at Adak would not affect the water supply or wastewater systems at Adak. Potable water would be produced onboard the SBX by a set of three Reverse Osmosis systems. The existing water supply at Adak would not be affected by the consumption onboard the SBX. An onboard marine sanitation device would be used to treat the wastewater produced onboard the SBX prior to discharge while moored in Kuluk Bay. The wastewater would undergo maceration and disinfection (chlorination) treatments before being discharged.

It is anticipated that the largest discharge for the SBX would come from seawater cooling overboard discharge. The SBX would operate seawater cooling pumps that would be used to cool mechanical equipment and radar systems on the SBX. The SBX mooring site in Kuluk Bay would have high flushing conditions, deep water, and high wind velocities. Based on these factors at the SBX mooring site in Kuluk Bay, thermal effects from cooling water are expected to be minimal. The SBX seawater cooling discharge would also contain some elevated levels of heavy metals, although the quantity would be less than on typical armed forces vessels. Since specific performance standards and potential pollution control device requirements have not been determined, specific requirements for the SBX, if any, can not be developed at this time. However, the U.S. Environmental Protection Agency and U.S. Navy are still in the process of evaluating the Nature of Discharge Reports. Continued U.S. Environmental Protection Agency and U.S. Navy analysis will include determining appropriate marine pollution control devices and establishing performance standards for each discharge.

The potential for impacts due to sewage, oily water, and seawater cooling discharge associated with the loitering and operation of the SBX in the Bering Sea or Sitkin Sound would be similar but less than that described for Kuluk Bay due to the deeper water and open ocean environment.

Cumulative Impacts

Cumulative impacts are those that result when impacts of an action are combined with the impacts of past, present, and reasonably foreseeable future actions at a location. Cumulative impacts were considered for each resource area at each site. No other projects in the region of influence have been identified that when added to the Proposed Action of positioning in Kuluk Bay (any alternative), or operating in Sitkin Sound or the Bering Sea, would have the potential for incremental, additive cumulative impacts to the air quality, airspace, biological resources, cultural resources, health and safety, socioeconomics, or water resources in the region of influence.

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ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

AAQS	ambient air quality standards
ABS	American Bureau of Shipping
AHTS	Anchor Handling Tug Supply
ANILCA	Alaska National Interest Land Conservation Act
BMDS	Ballistic Missile Defense System
CFR	Code of Federal Regulations
dBA	A-weighted decibels
DoD	Department of Defense
EA	Environmental Assessment
EED	electroexplosive devices
EMR	electromagnetic radiation
EIS	Environmental Impact Statement
ºF	Fahrenheit degrees
FAA	Federal Aviation Administration
FL	flight level
GBR	Ground Based Radar
GMD	Ground-Based Midcourse Defense
ICAO	International Civil Aviation Organization
IDT	In-flight Interceptor Communication System Data Terminal
IEEE	Institute of Electrical and Electronics Engineers
IFR	instrument flight rules
kW	kilowatt
LDO	Limited Defensive Operations
MDA	Missile Defense Agency
MOA	Memorandum of Agreement
μg/kg	micrograms per kilogram
$\mu g/m^3$	micrograms per cubic meter
MHz	megahertz
MW	megawatt
mW/cm^2	milliwatts per square centimeter
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl

PM-2.5	particulate matter with a diameter less than or equal to 2.5 micrometers
PM-10	particulate matter with a diameter less than or equal to 10 micrometers
ppm	parts per million
PSB	Primary Support Base
RBAL	risk-based action level
RF	radio frequency
RFI	radio frequency interference
RO	Reverse Osmosis
ROI	region of influence
SBX	Sea-Based X-Band Radar
SHPO	State Historic Preservation Office
UNICOM	universal communication—a radio service that provides for air-ground communications primarily between general aviation aircraft and airport facilities
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VFR	visual flight rules
V/m	volts per meter
W	watt(s)
XBR	X-band radar

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1.0
PURPOSE AND NEED FOR THE PROPOSED ACTION

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The Missile Defense Agency (MDA) proposes to establish the necessary infrastructure to position, secure, and operate the Sea-Based X-Band Radar (SBX) at the Primary Support Base (PSB) at Adak Island, Alaska (figure 1-1). The Proposed Action would include the following:

- A means of positioning the SBX in the vicinity of Adak, in the waters of Kuluk Bay, the Bering Sea, or Sitkin Sound
- SBX operations while at the PSB
- Designation and enforcement of a security zone in U.S. territorial waters surrounding the SBX, which could include the installation and use of a floating security boom/fence around the SBX and/or operation of a security patrol boat while moored, anchored, or loitering
- Use of onshore PSB assets and infrastructure to support SBX operations
- Operation of one or more SBX support vessels

The MDA has determined that an Environmental Assessment (EA) is required to assess the potential environmental impacts of this Proposed Action. This EA has been prepared in accordance with the following guidelines:

- The National Environmental Policy Act (NEPA) of 1969
- The Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508)
- Department of Defense (DoD) Instruction 4715.9, *Environmental Planning and Analysis*
- Applicable service environmental regulations that implement these laws and regulations, and direct DoD officials to consider environmental consequences when authorizing and approving federal actions.

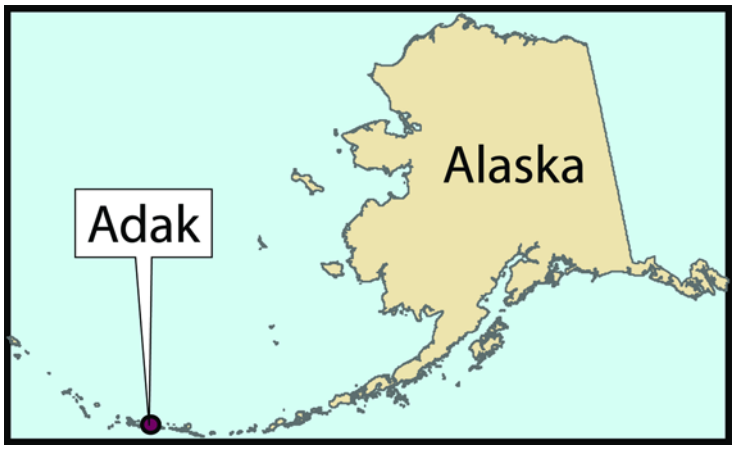


Figure 1-1: Adak Island General Location

1.2 BACKGROUND

1.2.1 BALLISTIC MISSILE DEFENSE SYSTEM

Within the DoD, the MDA is responsible for developing, testing, and deploying the Ballistic Missile Defense System (BMDS). The BMDS is designed to intercept threat missiles during all phases of their flight: boost, midcourse, and terminal. The Ground-Based Midcourse Defense (GMD) is an element of the BMDS; the purpose of the GMD element is to intercept and destroy long-range missiles in the ballistic (midcourse) phase of flight before their reentry into the Earth's atmosphere. GMD system testing, SBX operations, and the establishment of a PSB at Adak, were analyzed in the *Ground-Based Midcourse Defense* (*GMD) Extended Test Range Environmental Impact Statement (EIS)* (Missile Defense Agency, 2003). The subsequent Record of Decision for the GMD Extended Test Range EIS selected Adak as the location to establish a PSB for the SBX. Due to inherent capabilities of the X-band radar (XBR) system, the SBX may also be used for related missions such as space surveillance.

1.2.2 SEA-BASED X-BAND RADAR

The mission of the SBX, a component of the BMDS, is two-fold. It will support BMDS testing in order to improve the system. In addition, the SBX would serve as a component of the BMDS Limited Defensive Operations (LDO).

The SBX consists of a converted semi-submersible mobile oil-drilling platform on which an XBR and other GMD system components have been mounted (figure 1-2). The self-propelled vessel is 238 feet wide and 398 feet long. At transit draft, the SBX will have a height of approximately 250 feet. When conducting mission activities, the SBX vessel would ballast down to operational draft and position itself in Kuluk Bay, the Bering Sea, or Sitkin Sound. At operational draft, the SBX would have a height of approximately 200 feet above the water's surface. The main deck of the SBX would house living quarters, workspaces, storage, power generation, bridge and control rooms, and the floor space and infrastructure necessary to support the 2,000-ton XBR antenna array; command, control, and communications suites; and an In-flight Interceptor Communication System Data Terminal (IDT). Once integrated into the BMDS, the SBX would be able to track, discriminate, and assess incoming missiles. The SBX would greatly increase the MDA's ability to conduct more strenuous and operationally realistic testing of the BMDS, and enhance the BMDS's ability to intercept incoming missiles. Because of its mobility, the SBX can be repositioned to provide operational forward-based coverage or relocated for optimum coverage of various scenarios in the BMDS test program.

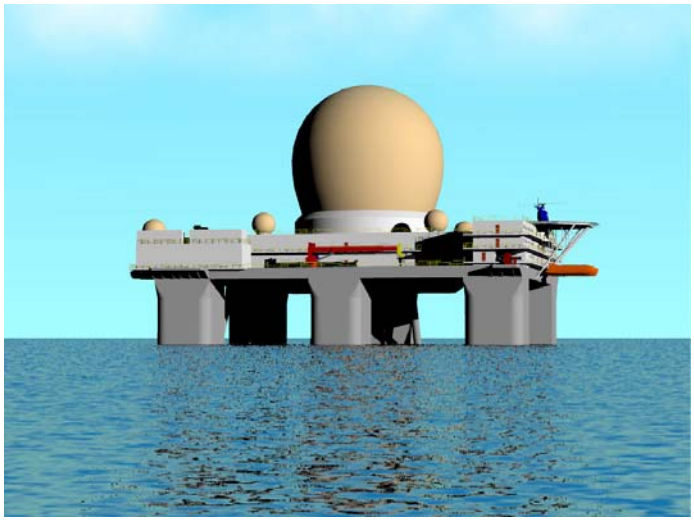


Figure 1-2: SBX Conceptual Drawing

1.2.3 ADAK ISLAND, ALASKA

Adak is located approximately 1,300 miles southwest of Anchorage, Alaska, in the Aleutian Island chain (figure 1-1). At 280 square miles, it is the largest of the Andreanof group of the Aleutian Islands. The U.S. Fish and Wildlife Service (USFWS) manages the southern portion of the island, which is a designated wilderness area within the Alaska Maritime National Wildlife Refuge system. The developed area of Adak is limited to the northern portion of the island, which is the area historically designated as the military reservation. Current land use in the developed ”downtown” area of the island includes the airfield, port facilities, and light industrial, administrative, commercial/recreational, and residential areas. The City of Adak is classified as a second-class city incorporated under the state laws for municipalities in Alaska. The city limits include most of Kuluk Bay (including the proposed mooring location). The Port of Adak facilities are primarily used by research ships, station work vessels, cruise ships, factory trawlers, and fishing boats. The Port of Adak maintains three cargo and petroleum piers.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to provide a safe, effective means of positioning the SBX at its PSB, along with providing adequate infrastructure, security, and support operations so that the SBX can maintain a high state of readiness for missile defense test missions and LDO support.

The actions described in the Proposed Action are needed to provide the capabilities to operate and maintain the readiness of the SBX and its crew. The SBX is needed to support the MDA’s plans to conduct more operationally realistic testing of the BMDS and to support LDO.

1.4 DECISION(S) TO BE MADE

Supported by the information in this EA, the Director of the MDA will decide how best to implement the previous decision to establish Adak as the PSB for the SBX.

1.5 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The GMD Extended Test Range EIS analyzed the establishment of a PSB for the SBX at Adak with Finger Bay as the potential mooring location. Following the Record of Decision that selected Adak as a PSB, Kuluk Bay was identified as the potential mooring location. This EA documents the environmental analysis of the proposed actions at Kuluk Bay, the Bering Sea, or Sitkin Sound to support, position/secure, and operate the SBX.

The No-action Alternative that was previously analyzed in the GMD Extended Test Range EIS discussed the potential environmental impacts if the SBX were not built and there were not a need for a port facility in the Pacific Region to support the SBX. No environmental impacts were identified for the No-action Alternative (Missile Defense Agency, 2003).

1.6 RELATED ENVIRONMENTAL DOCUMENTATION

As appropriate, the information and analyses contained in the following NEPA studies were used in the development of this EA:

- *Ground-Based Midcourse Defense* (*GMD) Extended Test Range Final Environmental Impact Statement (EIS)*, July 2003
- *National Missile Defense Deployment Final Environmental Impact Statement*, July 2000
- Record of Decision for Site Preparation Activities at the Missile Defense System Test Bed at Fort Greely, Alaska, 2001
- Record of Decision to Establish a Ground-Based Midcourse Defense Initial Defensive Operations Capability at Fort Greely, Alaska, 2003

These documents are available at the MDA Environmental Information website, http://www.acq.osd.mil/mda/mdalink/html/enviro.html.

2.0
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action, which consists of three alternatives for positioning the SBX in Kuluk Bay, and one additional alternative for loitering and operation of the SBX in the Bering Sea or Sitkin Sound. This chapter also describes alternatives that were eliminated from further consideration. The No-action Alternative was previously analyzed in the GMD Extended Test Range EIS (Missile Defense Agency, 2003). Under the No-action Alternative, the SBX would not be built and put into operation and the BMDS would not require the SBX for testing under operationally realistic conditions. Consequently, there were no impacts identified for the No-action Alternative at Adak. This conclusion is incorporated by reference into this EA, and therefore the No-action Alternative will not be evaluated further.

2.1 PROPOSED ACTION

The Proposed Action at Adak, Kuluk Bay, the Bering Sea, or Sitkin Sound is to support, position/secure, and operate the SBX. The Proposed Action would include the following activities:

- A means of positioning the SBX in the waters of Kuluk Bay near Adak
  - Alternative 1—Permanent Mooring System
  - Alternative 2—Loitering in Kuluk Bay
  - Alternative 3—Temporary Anchoring
- SBX operations while at Kuluk Bay
  - Daily SBX activities
  - Designation and enforcement of a security zone in U.S. territorial waters surrounding the SBX while moored, anchored, or loitering, which could include the installation and use of a floating security boom/fence around the SBX and/or operation of a security patrol boat
  - Use of onshore PSB assets and infrastructure to support SBX operations
  - Operation of one or more SBX support vessels
- SBX loitering and operations while in the Bering Sea or Sitkin Sound
  - Daily SBX activities
  - Designation and enforcement of a security zone in U.S. territorial waters surrounding the SBX
  - Use of onshore PSB assets and infrastructure to support SBX operations
  - Operation of one or two SBX support vessels

2.1.1 SBX POSITIONING IN KULUK BAY

As part of the Proposed Action, the SBX could be positioned in Kuluk Bay near Adak. Figure 2-1 shows the approximate location for the SBX at the Adak PSB. The SBX could be positioned in Kuluk Bay by one of the following alternatives:

- Alternative 1—Permanent Mooring System
- Alternative 2—Loitering in Kuluk Bay
- Alternative 3—Temporary Anchoring

Alternative 1—Permanent Mooring System

Alternative 1 is the preferred alternative for positioning the SBX in Kuluk Bay. It would include the installation of a permanent mooring system to secure the SBX in Kuluk Bay. A geophysical survey was conducted in an unobtrusive manner (i.e., by taking depth soundings, using side scan sonar to produce images of the seafloor, using seismic reflection systems, taking sediment samples, and recording video images of the seafloor at selected locations). The seabed at the mooring location consists of a thin layer of mud and then dense sand. Based on the geophysical surveys performed in the Mooring Study Area (figure 2-1), a catenary mooring system that uses drag-embedment-type anchors was determined to be the most suitable type of anchoring system for the seafloor conditions. Fish were occasionally observed in the mooring location (200-foot depth) during the geophysical survey, but no sensitive marine habitat, such as clam beds, was observed. A summary of the geophysical survey is included as appendix D.

The permanent mooring system would include multiple (8 to 12) drag–embedment-type anchors. Each anchor would weigh approximately 77,000 pounds and would be up to 30 feet wide. Attached to each anchor would be a preinstalled segment of the mooring chain, clump weights, and a pickup buoy that would enable the end of the preinstalled segment of the mooring chain to be available on the surface of the water during mooring connection operations (figure 2-2). Once installed, the mooring legs and their anchors would encompass a circular area of approximately 3,400 feet in diameter, with the SBX mooring location in the center. The installation of each mooring leg would include dragging the anchor assembly approximately 50 to 100 feet along the seafloor. Each anchor would be buried up to 15 feet deep in the seafloor subsurface. A marine contractor would install the permanent mooring system. Installation would take 2 to 4 months and involve 20 to 100 people. It is anticipated that these personnel would be housed onboard installation vessels or in existing facilities on Adak.

Upon each arrival of the SBX into Kuluk Bay, an accompanying support vessel would assist in connecting the SBX to the mooring system and then remain to provide other support functions such as transferring personnel, material, and fuel to the SBX. The support vessel would also assist in mooring disconnect operations during each departure of the SBX from Kuluk Bay.

Existing unused submarine cables cross the floor of Kuluk Bay. The SBX mooring location would attempt to avoid the areas where the location of the cables is known. The MDA has determined that the composition of the cables does not pose any environmental hazard. The mooring installers would develop a plan to avoid any cable disturbance during the mooring installation.

EXPLANATION

- Water
- Land
- Roads
- SBX Mooring Study Area
- Proposed SBX Mooring Site

NORTH

Scale

0 2.2 4.4 miles

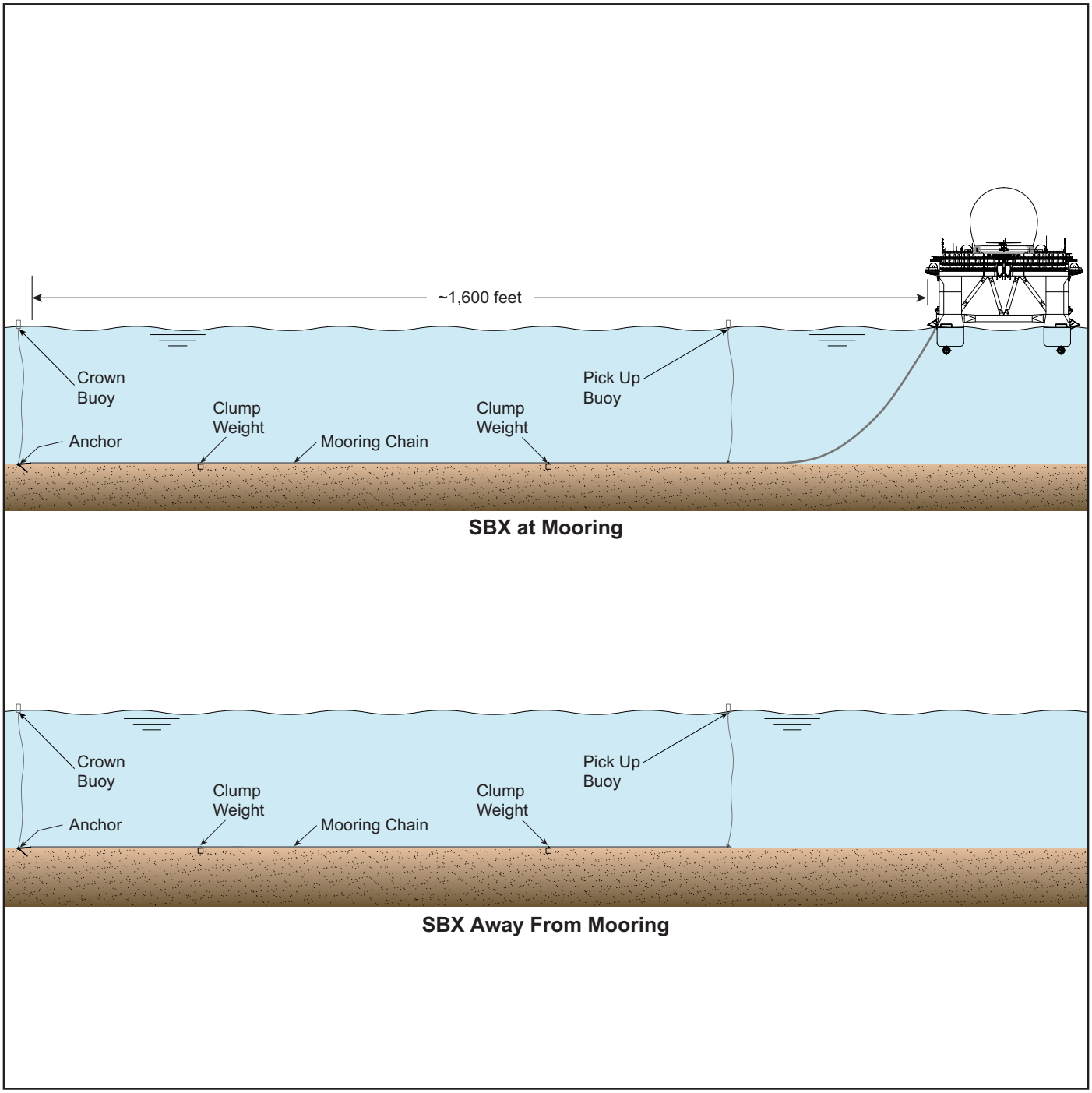
0 3.6 7.1 kilometers

050805 SBX Mooring at Adak

SBX Mooring Study Area and Proposed Mooring Site

Adak, Alaska

Figure 2-1



EXPLANATION

Note: Each leg of the SBX mooring would consist of an anchor to hold the outer end of the leg and two clump weights that act as energy absorbers during severe weather.

SBX Platform Mooring

Scale

0 133 265 feet

0 40.5 80.8 meters

050805 SBX Mooring Transit

Figure 2-2

A debris field was identified during a preinstallation geophysical survey of the SBX mooring area. Obstructions identified in the preinstallation survey that lie within a 50-foot radius of the mooring spread, or are deemed to be a hazard by the onsite project technical representative, would be moved out of the way or removed by the mooring installation contractor before installation of the mooring system. The contractor would employ technologies previously approved through consultation with the Alaska Office of History and Archaeology and the National Park Service to move or remove the obstructions with minimal disruption of the surrounding marine habitat. Acceptable methods would include video guided clamshells and video guided mechanical grapples. Additional methods for the secure, minimally invasive removal of debris may also be identified.

A portion of the debris field was identified as World War II submarine net fragments. These nets were strung across Sweeper Cove in 1943 to deter submarine entry. Based on consultation with the Alaska State Historic Preservation Office (SHPO) (appendix C), debris removal and installation of the mooring system should not adversely impact the Adak Naval Operating Base National Historic Landmark ADK-128, provided that video guided and minimally invasive methods are employed. In the event that a significant historic artifact is discovered, the SHPO recommends leaving it in place, or if necessary, moving the artifact to a different underwater location. In either case, the SHPO would be contacted immediately. Provided that these conditions are followed, the SHPO concurred that no historic properties would be adversely affected by this project.

Alternative 2—SBX Loitering in Kuluk Bay

Alternative 2 for positioning the SBX in Kuluk Bay would include the SBX operating its engines to maintain position in Kuluk Bay via the use of its own thrusters. The SBX would be underway, and would select a station-keeping point or would change position as desired. The SBX would remain at operational draft for the majority of its time, limiting its speed. The SBX could operate in Sitkin Sound (east–northeast of Adak) to provide more sea room for safety in case of very high winds.

In this alternative, the SBX would use the same support vessel for transferring personnel, material, and fuel from the Port of Adak to the SBX. Replenishment would occur in the protected waters of Kuluk Bay whenever possible. When in Kuluk Bay, the SBX would remain clear of airfield airspace restrictions to the north and west, but also be able to operate to the south, north, and east if weather conditions make that advantageous.

Alternative 2 includes greater watch standing requirements for the SBX crew since the vessel remains underway, but the overall number of crew required would not increase. Additional diesel generator operations would be required to provide power for thrusters to keep the SBX in position.

Alternative 3—Temporary Anchoring

Alternative 3 for positioning the SBX in Kuluk Bay would use the installed anchors onboard the SBX. On reaching the anchoring position, one of the two anchors on the SBX would be deployed. The anchoring position would likely be near the center of the area shown in figure 2-1, but the position of successive anchor drops would only be approximately the same. The

approach to anchoring position would be upwind, and the anchor set by pulling downwind—resulting in a different direction of plowing each time the anchor embeds itself. During a wind shift, the anchor may come loose and reset itself, creating bottom disturbance in yet another direction.

The deployment of both installed anchors onboard the SBX would have less holding power than a single leg of the permanent mooring system described in Alternative 1. Therefore, the SBX would be in a higher state of readiness to get underway against the possibility the anchor would drag. When high winds are expected, the SBX would weigh anchor and maintain its position using the thrusters. As with Alternative 2, the SBX could operate in Sitkin Sound to provide more sea room for safety during high winds.

2.1.2 OPERATIONS IN KULUK BAY

Operations include SBX activities, the security zone surrounding the SBX, PSB facilities on Adak, and the support vessel.

SBX Activities

The GMD Extended Test Range EIS included analysis of Adak as the PSB for the SBX, in which the SBX was to be in port at the Adak PSB for 9 months of the year. For the remaining 3 months of the year, the SBX was expected to be in transit or located at one of the SBX operating areas in the Pacific Ocean for participation in up to five GMD test events per year. Since that time, the mission of the SBX has been expanded to include LDO support. Accordingly, the Proposed Action could, depending on threat conditions, include the SBX being located at the Adak PSB for up to 12 months per year. However, the SBX is likely to depart Adak several times per year to support GMD testing and operational readiness exercises. Current plans include up to 20 years of SBX operations for the Adak PSB.

The XBR transmit/receive radiofrequency (RF) emission pattern would be a narrow beam with most of the energy contained within the main beam. The SBX radar transmits a series of electromagnetic pulses via its main beam. The SBX radar would not point its main beam toward the ground or water surface and would be programmed to avoid illuminating ground obstructions such as the local terrain, buildings, and antenna towers. During calibration and maintenance testing, the XBR beam would normally be directed at least 10 degrees above horizontal. In the open ocean, the main beam would be directed at least 2 degrees above horizontal. Because the bottom of the XBR main beam will always be at least 100 feet above the water surface (height of the bottom of the XBR antenna to the water surface at submerged draft), neither a beam at 2 or 10 degrees elevation would illuminate the sea surface. Lesser amounts of energy would be emitted in the form of grating and side lobes in the area around the main beam; however, as shown in table 2-1 the energy level would not exceed permissible exposure limits. SBX RF transmissions could result in potential interference issues related to aircraft, electroexplosive devices (EEDs), communication and electronics equipment, and personnel safety. Table 2-1 lists the potential SBX RF interference distances.

Table 2-1: Radio Frequency Interference Distances for SBX

	Interference Distance (miles)
Main beam (average field intensity) on a civilian aircraft (air)	11.8
Main beam (average field intensity) on a military aircraft (air)	2.1
Main beam on an EED presence/shipping (ground and air) such as a missile mounted on an aircraft wing or an EED in a shipping container	4.7
Grating lobe on an EED handling (ground) where an EED is in an exposed position	1.4
Grating lobe on an EED presence/shipping (ground and air) such as a vehicle airbag or an EED in a shipping container	<33 feet
Military communications/electronics	4.4
Commercial communications/electronics	13.9
Grating or side lobe personnel hazard (exceeds Permissible Exposure Limit within)	493 feet[a] (0 feet[b])

Source: Sages, 2003
Notes:

a Personnel Hazard distance worst case—without software controls (SBX will not operate without software controls)

b Personnel Hazard distance with software controls

EED = Electroexplosive Device—a device in which electrical energy is used to initiate an enclosed explosive, propellant, or pyrotechnic material

While located at the PSB, daily testing and calibration of the SBX's radar system would be performed to maintain and optimize radar performance. During tests, the SBX XBR would transmit full-power RF for short periods several times a day, which could result in total full-power RF transmission time of up to an average of 5 hours per day. Satellites and calibration devices would be used as radar targets during testing. The calibration devices would be launched from the main deck of the SBX. There is a balloon storage room on the main deck of the SBX. SBX test schedules would be coordinated with Federal Aviation Administration (FAA) and/or military air traffic control personnel as appropriate. Low power, diagnostic testing would not result in potential interference issues.

The SBX vessel would be classed/certificated by the American Bureau of Shipping (ABS) and would have a Certificate of Inspection issued by the United States Coast Guard (USCG). All onboard systems and operations would meet all ABS and USCG attendant regulatory and environmental requirements. External lighting on the SBX would include the following approximate number of lights:

- 03 Level—20 red lights around the helideck and a 10-foot high mast with 4 white lights and 4 red lights
- 02 Level—85 bulkhead-mounted compact fluorescent lamps (17 watts [W]) and 15 conventional fluorescent lamps (60 W) along the inside and outside walkways
- 01 Level—70 bulkhead-mounted compact fluorescent lamps (17 W) along the inside and outside walkways and 12 trainable floodlights (500 W)

- Main Deck Level—135 bulkhead-mounted compact fluorescent lamps (17 W) along the inside and outside walkways, 12 trainable incandescent floodlights (500 W), and 8 trainable incandescent floodlights (300 W) at the mooring stations
- XBR radome—all around white masthead light and red flashing aircraft obstruction light on top, interior lights would illuminate the somewhat translucent radome

Approximately 100 people, including permanent or temporary personnel would be on board the SBX at any given time.

Resupply materials would arrive at Adak by either commercial or charter aircraft and ships. Holding time on Adak would be expected to be minimal, as a support vessel would transfer materials to the SBX as soon as possible after arrival.

Potable water would be produced onboard the SBX by a set of Reverse Osmosis (RO) systems. While moored at the PSB, the SBX would utilize seawater cooling pumps with a typical flow of 7,044 gallons per minute to cool mechanical equipment and radar systems. When loitering, the cooling water from the thrusters would have a typical total flow of 1,600 gallons per minute. The cooling water would be expected to incur a temperature rise of approximately 6 degrees Fahrenheit (°F), with a maximum temperature rise of 10°F. Cooling water would be discharged at four points at pontoon-level and three at upper hull locations.

A USCG approved onboard marine sanitation device would be used to treat wastewater. Wastewater would undergo maceration and disinfection (chlorination) before being discharged overboard. The discharge locations for the treated wastewater would be just above the pontoon deck. An oil–water separator would also be used onboard to treat oily bilge water before its discharge overboard. The discharge locations for the treated bilge water would all be above the water line while the SBX is at operational draft in Kuluk Bay. The SBX vessel would meet all USCG, International Maritime Organization, and DoD standards for sewage and oily water discharge.

Solid waste would be stored onboard for transportation by the support vessel to shore for disposal by a United States Environmental Protection Agency (USEPA) and/or State of Alaska licensed disposal contractor.

Security Zone Surrounding SBX

A security zone would be established in accordance with 33 CFR Part 165, around the SBX in U.S. territorial waters while moored, anchored, or loitering in Kuluk Bay or Sitkin Sound under Alternatives 1, 2, and 3. This security zone of approximately 500 yards would be required to ensure the physical protection of the SBX while positioned at the PSB. This security zone would prevent recreational and commercial craft from interfering with operations involving the SBX and could include the installation and use of a floating security boom/fence for Alternative 1 mooring in Kuluk Bay around the SBX, and/or operation of a security patrol boat. Transit through, or anchoring within, this security zone would be prohibited unless authorized by the appropriate SBX official.

At least one patrol boat could be tasked for continuous patrol in the vicinity of the SBX when it is within U.S. territorial waters. Several such boats would be needed for rotating patrol duty

assignment and periods of required maintenance. The “relieving” boat would operate for a period before getting underway, and the boat to be relieved would operate for a short period at the pier after relief. Between maintenance periods it is likely all such boats would rotate through patrol shifts.” Each patrol boat would be approximately 40 feet in length, and powered by two diesel engines of approximately 500 horsepower (or less). The patrol boat would use an approved Marine Sanitation Device to process sanitary waste generated onboard. Any hazardous wastes transported by or generated onboard the patrol boat would be disposed of onshore according to Alaska Department of Environmental Conservation and USEPA guidelines. No upgrades or modifications of existing onshore treatment/disposal systems would be required.

The patrol boats could be government owned or leased. The patrol boats would operate from existing facilities at the Port of Adak. Existing cranes could be used to set boats on cradles when necessary for maintenance.

A total of approximately 30 personnel (patrol crew and support personnel) would be required to fulfill the patrol mission. Personnel would be berthed ashore in existing leased housing in Adak.

The security zone around the SBX would require vessels to contact the USCG Captain of the Port designated representative, official patrol, or the appropriate SBX official on VHF-FM channel 16 to request authorization to enter the security zone. Additionally, fishing or anchoring may be restricted within the radius of the proposed SBX mooring legs and their anchors described in Alternative 1 (see section 2.1.1).

The USCG would normally issue Notices to Mariners, VHF-FM radio broadcast announcements, and internet postings (at Adak and Anchorage) concerning the SBX security zone. The security zone would also be listed on updated navigational charts for the Adak area.

If a floating security boom/fence is used under Alternative 1, it would be installed approximately 500 yards from the SBX as a measure to prevent small watercraft from maneuvering close to the SBX. The security boom/fence would use its own anchoring systems to maintain position in Kuluk Bay. The anchoring system would include approximately 40 to 120 20-ton anchors, equally spaced around the perimeter of the boom. Chain would be used to connect the anchors to the boom/fence.

Support Vessel

A dedicated support vessel would transport fuel, cargo, and passengers to and from the SBX. A support vessel would also perform SBX mooring connect and disconnect operations (for a permanent mooring system as described in Alternative 1). When not underway to support the SBX, the support vessel would be either anchored in Sweeper Cove, Kuluk Bay, Finger Bay, or docked pier-side at the Port of Adak. No modifications to the existing piers at Port Adak are planned as part of the Proposed Action.

A crew of approximately nine personnel, who would normally reside on the vessel, would man the support vessel. The vessel would be approximately 260 feet long, 60 feet wide, and 25 feet deep, and it would be outfitted with a stern roller, winches, and a crane (for loading/offloading supplies). The support vessel would obtain potable water from an existing pier “shore-tie” connection in Sweeper Cove. The support vessel would use an approved Marine Sanitation

Device to process sanitary waste generated onboard. Any hazardous wastes transported by or generated onboard the support vessel would be disposed of onshore according to Alaska Department of Environmental Conservation and USEPA guidelines. No upgrades or modifications of existing onshore treatment/disposal systems would be required.

Procedures would be in place to minimize impacts of a potential fuel spill during fueling operations. Spill response equipment would be in place onboard the SBX and support vessel, and a Shipboard Oil Pollution Emergency Plan would also be in place with the USCG. In addition, spill clean up resources are maintained in Sweeper Cove because of the refueling pier, and could be used for support in the event of a spill.

PSB Facilities

Approximately three dozen people would be permanently assigned to the PSB in direct support of SBX operations. During SBX operations an additional temporary contingent of approximately a dozen personnel could be onshore at Adak for short periods. Existing administrative and storage space at Adak would be leased for PSB functions, as needed. Existing facilities at Adak would also be leased to house the permanent and temporary personnel No new facilities would need to be constructed to support SBX or security operations.

2.1.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Loitering and operation of the SBX in the Bering Sea or Sitkin Sound would include the SBX operating its engines to maintain position via the use of its own thrusters. The SBX would be underway, and would select a station-keeping point or would change position as conditions dictate. The SBX would remain at operational draft for the majority of its time, limiting its speed.

No mooring system would be required in order to secure the SBX in the Bering Sea. This alternative would not include a floating security boom/fence around the SBX and/or operation of a security patrol boat. However, a security zone could be established in accordance with 33 CFR Part 165, around the SBX if it is within U.S. territorial waters while loitering.

In this alternative, the SBX would use the same support vessel for transferring personnel, material, and fuel from the Port of Adak to the SBX. Procedures would be in place to minimize impacts of a potential fuel spill during fueling operations. Equipment would be in place onboard the SBX and support vessel in the event of a fuel spill, and a Shipboard Oil Pollution Emergency Plan would also be in place with the USCG. In addition, spill clean up resources are maintained in Sweeper Cove because of the refueling pier, and could be used for support in event of a spill. Replenishment would typically occur in the Bering Sea, but if inclement weather conditions exist then the SBX could move to the more protected waters of Kuluk Bay or Sitkin Sound when necessary.

Loitering and operation of the SBX in the Bering Sea would include greater watch standing requirements for the SBX crew since the vessel remains underway, but the overall number of crew required would not increase. Additional diesel generator operations would be required to provide power for thrusters to keep the SBX in position.

2.2 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

The following alternatives were also considered as mooring options for the SBX at the PSB. These alternatives were eliminated from further consideration because of safety and economic factors.

Construction and Use of a Pier

The construction and use of a pier was initially considered for docking the SBX at Adak. Existing piers at Adak are currently not suitable for SBX requirements. A pier would provide an easy means of loading supplies, personnel, and fuel onto the SBX. However, the construction of a pier would incur substantially higher costs when compared to the installation of a permanent mooring system. The construction of a pier would not meet schedule demands for the overall development/deployment of the BMDS. The use of a pier for docking the SBX at Adak would also involve an increased potential for hull damage to the SBX during docking/undocking procedures. Furthermore, a pier would provide less tolerance to adverse weather, especially high wind and wave conditions that are very prevalent in Adak.

Mooring in Finger Bay

Finger Bay is a relatively deep and protected fjord located south of the main port at Adak. Previous analysis in the GMD Extended Test Range EIS considered Finger Bay as a potential mooring location for the SBX. However, detailed investigation has found that Finger Bay is not large enough to moor the SBX securely.

Other Anchoring/Mooring Systems

Pile Clusters

A pile can be metal, reinforced concrete, or timber with various cross sections that is installed into the seabed by means of a piling hammer or vibrator. The holding capacity of the pile is generated by the friction of the soil along the pile and the lateral soil resistance. Driven pile clusters to create a mooring was not feasible because of the great water depth at the mooring site in Kuluk Bay.

Suction Pile Anchor

A suction pile anchor is a hollow steel pipe with a diameter that is much larger than that of a pile. The suction pile anchor is forced into the seabed by means of a pump connected to the top of the pipe, creating a pressure difference. When the pressure inside the pipe is lower than the pressure outside the pipe, the pipe is drawn down into the seabed. After installation, the pump is removed. The friction of the soil along the suction anchor and the lateral soil resistance generates the holding capacity of the suction anchor.

The geophysical surveys performed in Kuluk Bay indicated that the seafloor consists mainly of a layer of dense sand that would be too hard for the proper installation of suction pile anchors. In addition, suction pile anchors were removed from consideration because of the marine industry's lack of experience in their use. Suction pile anchors are a new technology, and published data on long-term performance is lacking.

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3.0
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental characteristics that may be affected by the Proposed Action. The information provided serves as a baseline from which to identify and evaluate environmental changes resulting from conducting SBX operations at the Adak PSB. To provide a baseline point of reference for understanding any potential impacts, the affected environment is briefly described; any components of concern are described in greater detail.

Available reference materials, including EAs and EISs, were acquired to assist in the description of the affected environment. To fill data gaps (questions that could not be answered from the literature) and to verify and update available information, installation and facility personnel; federal, state, and local regulatory agencies; and private individuals were contacted.

Environmental Resources

Thirteen areas of environmental consideration were evaluated to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. These areas included air quality, airspace, biological resources, cultural resources, geology, hazardous materials and waste, health and safety, infrastructure and transportation, land use, noise, socioeconomics, water resources, and environmental justice.

Because the Proposed Action is narrowly focused, many of the resource areas are not expected to be affected sufficiently to warrant further discussion in this section or are already adequately analyzed in previous documents, including the GMD Extended Test Range EIS and the National Missile Defense Deployment Final EIS. The following paragraphs summarize the resource areas that were eliminated from further analysis.

Geology

Alternative 1 of the Proposed Action for positioning the SBX in Kuluk Bay would include the installation of a permanent mooring system. Although the permanent mooring system would include multiple (8 to 12) drag-embedment-type anchors and the security boom/fence would include multiple anchors, installation and minor disturbance to the seafloor are not expected to create an adverse effect to geology or seafloor sediments.

Infrastructure and Transportation

The few additional personnel would not affect transportation. Shipping of project related materials, as well as transportation of personnel, would utilize existing air and marine shipping routes. While cargo space is limited for transportation to and from Adak, planning would be implemented to ensure cargo space is available. Infrastructure that provides power, water, wastewater treatment, and the collection and disposal of solid waste are all sufficient at Adak and no upgrades are required to support the additional personnel associated with the SBX program.

Hazardous Materials and Waste

Any hazardous wastes generated onboard the SBX would be disposed of onshore according to Alaska Department of Environmental Conservation and USEPA regulations. No upgrades or

modifications of existing onshore treatment/disposal systems would be required to support the SBX program.

Land Use

The land use would be minimal as the Proposed Action would occur on the water in Kuluk Bay, the Bering Sea, or Sitkin Sound. A tidelands lease would be obtained for the mooring location, and all activities would be in accordance with an approved Alaska Coastal Consistency Determination. Land utilization in surrounding areas would not change.

Noise

No sensitive noise receptors would be disturbed by the proposed intermittent and short-term activity, and noise levels on the SBX and during mooring installation would not exceed Occupational Safety and Health Administration (OSHA) workplace standards.

Environmental Justice

An environmental justice impact would be a long-term health, environmental, cultural, or economic impact that has a disproportionately high and adverse effect on a nearby minority or low-income population. No adverse long-term impacts have been identified; as such, there would be no disproportionately high and adverse health or environmental effects on the minority or low-income populations that may be present in the vicinity of the Proposed Action.

3.1 AIR QUALITY

Air quality in a given location is described by the concentrations of various pollutants in the atmosphere, expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Pollutant concentration is determined by the type and amount of pollutants emitted into the atmosphere; the physical characteristics, including size and topography of the affected air basin; and meteorological conditions related to prevailing climate. The significance of a pollutant concentration is determined by comparison with National Ambient Air Quality Standards (NAAQS) and state ambient air quality standards (AAQS) that establish limits on the maximum allowable concentrations of six pollutants to protect public health and welfare. These pollutants include carbon monoxide, lead, oxides of nitrogen, ozone, particulate matter (with a diameter less than or equal to 10 micrometers [PM-10] and with a diameter less than or equal to 2.5 micrometers [PM-2.5]), and sulfur dioxide.

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

Alaska has established AAQS, which include additional standards for reduced sulfur and ammonia. Emissions of air pollutants from operations in Alaska are limited to the more restrictive standard (federal or state). Table 3-1 compares NAAQS and Alaska AAQS.

Table 3-1: Alaska Ambient Air Quality Standards

		National Standards	Alaska Standards
Ozone	8-hour average	0.08 ppm	None
	1-hour average	0.12 ppm	0.12 ppm
Carbon Monoxide	8-hour average	9.0 ppm	9.0 ppm
	1-hour average	35.0 ppm	35.0 ppm
Nitrogen Dioxide	Annual average	0.053 ppm	0.053 ppm
Sulfur Dioxide	Annual average	0.03 ppm	0.02 ppm
	24-hour average	0.14 ppm	0.10 ppm
	3-hour average	0.5 ppm	0.5 ppm
Lead	Calendar quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
PM-10	Annual average	50 $\mu g/m^3$	50 $\mu g/m^3$
	24-hour average	150 $\mu g/m^3$	150 $\mu g/m^3$
PM-2.5	Annual average	15 $\mu g/m^3$	None
	24-hour average	65 $\mu g/m^3$	None
Reduced Sulfur (1)	30-minute average	None	0.02 ppm
Ammonia	8-hour average	None	3.0 ppm

Source: Alaska Department of Environmental Conservation, 2004
(1) Measured as sulfur dioxide
$\mu g/m^3$ = micrograms per cubic meter
PM-2.5 = particulate matter with a diameter less than or equal to 2.5 micrometers
PM-10 = particulate matter with a diameter less than or equal to 10 micrometers
ppm = parts per million

Region of Influence

The region of influence (ROI) includes areas that may be affected by the use of Port Adak, including Kuluk Bay, the Bering Sea, and Sitkin Sound.

Affected Environment

Climate

Adak's climate is characterized as polar maritime with persistent overcast skies, fog, high winds, and frequent and often violent storms. Weather patterns can vary locally. Fog, low cloud ceilings, precipitation, and clear weather are all possible within a distance of a few miles. Storms occur during all seasons; the most frequent and severe storms occur during the winter. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2003)

The majority of the 60 inches of annual precipitation at Adak occurs as rain, with November and December being the wettest months. These months average 7 to 8 inches. Snowfall averages over 100 inches a year. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2003)

Monthly average temperature varies from a low of 33°F in February to a high of 51°F in August; however, wind chill factors can be severe. Wind speeds average 12 knots and gusts range from 50 knots in the summer months to over 100 knots during winter storms. The prevailing wind direction is from the southwest. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2003)

Regional Air Quality

The entire area in and around the Aleutian chains is designated as an attainment area for ambient concentrations of air pollutants. Although there is little actual ambient air quality monitoring in the Aleutians, the meteorological conditions of the islands is conducive to good air quality, except in times of very high winds and dry weather when blowing dust can occur. The generally wet conditions help to reduce windblown dust. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2001)

Existing Emission Sources

The Alaska Department of Environmental Conservation Division of Air Quality does not maintain air monitoring activities in the area. Existing emissions surrounding Port Adak stem primarily from regional volcanic activity.

3.2 AIRSPACE

Region of Influence

The ROI for airspace at Port Adak includes the airspace over and surrounding the potential SBX interference areas that extend from the mooring location at Kuluk Bay out to a distance of 11.8 miles (figure 3-1). The ROI also includes Sitkin Sound and the Bering Sea north of Adak. The Sitkin Sound ROI would be similar to the Kuluk Bay ROI but located 2 to 8 miles northeast of the Kuluk Bay mooring site. The Bering Sea ROI would be located approximately 50 miles north of Adak.

Affected Environment

Controlled and Uncontrolled Airspace

As part of the national airspace system, controlled and uncontrolled airspace is divided into six classes, dependent upon location, use, and degree of control. The Kuluk Bay and Sitkin Sound ROI includes three of these airspace classes:

- Class A airspace, which is not specifically charted, includes airspace above 18,000 feet including airspace overlying the waters within 12 nautical miles of the coast. Unless otherwise authorized, all aircraft must be operated under instrument flight rules (IFR).
- Class E airspace is controlled airspace that is not Class A, Class B, Class C, or Class D airspace.
- Uncontrolled airspace, or Class G airspace, has no specific definition but generally refers to airspace not otherwise designated and operations below 1,200 feet above ground level. No air traffic control service to either IFR or visual flight rules (VFR)

EXPLANATION

- Water
- Land
- Roads
- SBX Mooring Study Area
- Proposed SBX Mooring Site
- Representative Sitkin Sound Loitering Site
- Low altitude air routes (V,G)
- High altitude air routes (J,R)
- SBX airspace Kuluk Bay region of influence
- SBX airspace Sitkin Sound region of influence
- Class E airspace with floor 1,200 feet above surface (Service times M-F, 0800-1600)*
- Class E airspace with floor 700 feet above surface (Service times M-F, 0800-1600)*

* Other times Class G airspace

NORTH

Scale

0 2.2 4.4 miles

0 3.6 7.1 kilometers

Airspace and the SBX Region of Influence

Adak, Alaska

Figure 3-1

050805 Adak Air Routes

aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established (Federal Aviation Administration, 2004).

The airspace in the Kuluk Bay ROI is composed of Class A airspace from 18,000 feet mean sea level up to and including flight level (FL) 600 (60,000 feet). Below 18,000 feet, the airspace is composed largely of Class E airspace as shown in figure 3-1. The Class E airspace extends upward from 700 feet above the surface within a 7.5-mile radius of Adak (extending 13 miles to the northeast), and also includes that airspace extending upward from 1,200 feet above the surface within a 12.3-mile radius (extending to 18 miles to the northeast) of Port Adak. The service time for the Class E airspace is Monday through Friday 1800 to 0300 Greenwich Mean Time (8 a.m. to 5 p.m. local time). At other times the airspace is Class G, uncontrolled airspace. (U.S. Department of Transportation, 2004a) The airspace in the Sitkin Sound ROI would be similar to that described for Kuluk Bay.

The Bering Sea ROI airspace is beyond the 22.2-kilometer (12-nautical-mile) limit and is in international airspace. For this reason, the procedures of the International Civil Aviation Organization (ICAO), outlined in ICAO Document 4444-RAC/501, *Rules of the Air and Air Traffic Services,* are followed in this airspace (International Civil Aviation Organization, 1996; 1997). ICAO Document 4444-RAC/501 is the equivalent air traffic control manual to the FAA Handbook 7110.65, *Air Traffic Control.* However, the ICAO is not an active air traffic control agency, and has no authority to allow aircraft into a particular sovereign nation's Flight Information Region or Air Defense Identification Zone, and does not set international boundaries for air traffic control purposes. Rather, the ICAO is a specialized agency of the United Nations, whose objective is to develop the principles and techniques of international air navigation, and to foster planning and development of international air transport. FAA Air Traffic Service outside U.S. airspace is provided in accordance with Article 12, *Rules of the Air,* and Annex 11, *Air Traffic Regulations and Air Traffic Services,* of the ICAO Convention. The FAA acts as the United States' agent for aeronautical information to the ICAO.

The airspace in the Kuluk Bay, Sitkin Sound, and Bering Sea ROI lies within the Anchorage Oceanic Control Area/Flight Information Region and within the U.S. Alaskan Air Defense Identification Zone. Aircraft separation and safety advisories are provided by air traffic control, the Anchorage Air Route Traffic Control Center.

En Route Airways and Jet Routes

Enroute airways and jet routes within the Kuluk Bay ROI are listed in table 3-2.

Table 3-2: Enroute Airways and Jet Routes

Route	Min Altitude (feet above mean sea level)	Max Altitude (feet above mean sea level or Flight Level [FL])[1]	West To	Adak	East To
Low Altitude					
G1	8,000	17,999	--	x	HORTH
G8	9,000	17,999	Shemya	x	Dutch Harbor
V480	5,900	17,999	--	x	St Paul Island
High Altitude					
J115	18,000	FL 450	Shemya	x	Dutch Harbor
J618	18,000	45,000	--	x	Cold Bay
J120	28,000	FL 600	--	x	St Paul Island
R336	18,000	FL 600	LYYLE	x	--
R451	18,000	FL 600	CHIKI	x	--
125	18,000	FL 600	--	x	King Salmon

Source: U.S. Department of Transportation, 2004c

Note: (1) FL is x100 to get elevation in feet

Adak is located on the southern edge of the great circle route from North America to the Far East. As shown in table 3-2 and figure 3-1, there are three low altitude airways. One airway crosses from Dutch Harbor to Shemya (G8), and two airways end at Adak (G1 and V480) (U.S. Department of Transportation, 2004b). There are also five high altitude jet routes within the ROI. Three routes (J115, J618, and J120) enter Adak from the east, and three routes (J115, R451, and R336) enter Adak from the west. (U.S. Department of Transportation, 2004c)

As described in the Extended Test Range EIS, as an alternative to following the published jet Routes the FAA is gradually permitting aircraft to select their own routes when flying above 29,000 feet. This Free Flight program is an innovative concept designed to enhance the safety and efficiency of the National Airspace System. The concept moves the National Airspace System from a centralized command-and-control system between pilots and air traffic controllers to a distributed system that allows pilots, whenever practical, to choose their own route, and file a flight plan that follows the most efficient and economical route (Federal Aviation Administration, 1998).

Free Flight is already underway, and the plan for full implementation will occur as procedures are modified, and technologies become available and are acquired by users and service providers. This incremental approach balances the needs of the aviation community and the expected resources of both the FAA and the users. Advanced satellite voice and data communications are being used to provide faster and more reliable transmission to enable reductions in vertical, lateral, and longitudinal separation, more direct flights and tracks, and faster altitude clearances (Federal Aviation Administration, 1998). With full implementation of this program, the amount of airspace in the ROI that is likely to be clear of traffic will decrease as pilots, whenever practical, choose their own route and file a flight plan that follows the most efficient and economical route, rather than following the published jet routes.

Airports/Airfields

Adak Airport is the only airport in the Kuluk Bay, Sitkin Sound, and Bering Sea ROI. It includes two runways, 7,790 feet and 7,605 feet in length. Duty hours are 0800 to 1600, and the airport is unattended after duty hours. All aircraft must contact universal communication (UNICOM), the radio service that provides communication between aircraft and the airport facilities, 30 minutes prior to landing. No air traffic control service is available. (U.S. Department of Transportation, 2004d)

3.3 BIOLOGICAL RESOURCES

Native or naturalized wildlife and the habitats in which they occur are collectively referred to as biological resources. Marine biology of the ocean surrounding Adak consists of the animal and plant life that lives in and just above the surface waters of the sea and its fringes.

Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the range of SBX alternatives identified in section 2.1, including Kuluk Bay, Sitkin Sound, and the Bering Sea.

Affected Environment

Adak is located approximately 1,300 miles southwest of Anchorage in the Aleutian Islands. Kuluk Bay is about 4 miles long by 4 miles wide and is one of the best natural harbors in the Aleutians (National Oceanic and Atmospheric Administration, 2004a). An endangered plant, the Aleutian shield-fern (*Polystichum aleuticum*), is found only on Adak.

Adak is part of the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge and is within one of the world's richest fishing regions. The refuge was established to conserve marine mammals, seabirds, other migratory birds, and their habitat.

Marine biological communities can be divided into two broad categories: pelagic and benthic. Pelagic species live in the water column of the open ocean, while benthic species live on or at the bottom of the sea or ocean. The organisms living in pelagic communities may be plankton or nekton. Plankton consists of plant-like organisms (phytoplankton) and animals (zooplankton) that drift with the ocean currents, with little ability to move through the water on their own. Nekton consists of animals that can swim freely in the ocean and includes fish, squids, and marine mammals. Most species of nektonic animals live near the sea surface, where food is plentiful, but many others live in the deep ocean. Nektonic mammals include dolphins and whales, which remain in the ocean for their entire lives. Other marine mammals, such as sea lions, sea otters, seals, and walruses, spend time on land. The greatest known diversity of marine species exists in benthic communities, especially in coral reefs and on the deep-ocean floor. Benthic communities are composed of marine organisms that live on or near the seafloor. Among the common animals that live on the seafloor are clams, crabs, lobsters, starfish, and several types of worms. Halibut and sole are among some fish that have adapted to life on the ocean floor.

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) of 1976 authorized the United States to manage its fishery resources in an area of 3 to 200 nautical miles (the Economic Exclusion Zone) off its coast (National Marine Fisheries Service, 2004). The Magnuson-Stevens Act requires that federal agencies consult with the National Marine Fisheries Service on activities that could adversely affect Essential Fish Habitat areas. Essential Fish Habitat includes those waters and substrate (sediment, hard bottom) necessary to the complete life cycle of fish, from spawning to maturity. Essential Fish Habitat has been designated in all water around Adak, including Kuluk Bay, for anadromous salmon and certain life stages of marine fish under the jurisdiction of the National Marine Fisheries Service (National Oceanic and Atmospheric Administration, 2004b). Habitat Areas of Particular Concern in Alaskan waters have also been identified. The closest of these areas to the proposed mooring site are located in Adak Canyon off the southwest portion of Adak and Cape Moffett off the northwest coast of the island (North Pacific Fishery Management Council, 2004), which are outside the ROI.

Coho salmon, pink salmon, and Dolly Varden are known to spawn in most streams that drain into Kuluk Bay, north of the proposed SBX mooring location (Alaskan Command, 1996). Currently the Adak Fisheries Development Council processes cod, crab, halibut, and other bottom fish (Alaska.net, 2002). Norquest-Adak Seafood Co. processes species such as Pacific cod, Pollock, mackerel, halibut, albacore, and brown king crab. Four residents hold commercial fishing permits, mainly for groundfish. (Welcometoalaska.com, 2005)

Appendix G of the 2004 Draft Essential Fish Habitat EIS (National Marine Fisheries Service, 2004) provides a discussion of non-fishing impacts to essential fish habitat and recommended conservation measures. These sources include water intake structures/discharge plumes; vessel traffic; physical alterations to habitat from the construction and presence of offshore oil and gas platforms; waste discharges; oil spills; and vessel anchoring. Anticipated impacts from similar sources as a result of the Proposed Action are discussed below in section 4.3.

More than 200 species of birds live in or migrate through the Bering Sea ecoregion during the year (World Wildlife Fund, 2005). Sitkin Sound is a notable feeding area for the whiskered auklet and other seabirds (World Wildlife Fund and The Nature Conservancy of Alaska, 1999; Pacific Coast Joint Venture, 2003). Millions of shearwaters occur regularly in the southern Bering Sea during Alaskan summers. The area also provides important wintering habitat for emperor geese, eiders, and other sea ducks. (Pacific Coast Joint Venture, 2003)

Various seabirds and water fowl overwinter around Adak. The recently delisted Aleutian Canada goose can frequent the area during migration. A few seabird nesting colonies are located in Clam Lagoon (figure 2-1), north of the proposed SBX mooring location. Gulls, fork-tailed petrels, and whiskered auklets (endemic to the Aleutians) are commonly observed in Kuluk Bay. Several bird species that nest on Adak are the mallard, pelagic and red-faced cormorant, common eider, bald eagle, Arctic and Aleutian tern, marbled murrelet, and tufted puffin (U.S. Fish and Wildlife Service, 1987).

The ranges of the federally threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and endangered short-tailed albatross (*Phoebastria albatrus*) include the Aleutian Islands.

More than 25 marine mammal species live in or migrate through the Bering Sea ecoregion during the year (World Wildlife Fund, 2005). Several species of listed whales, such as the sei (*Balaenoptera borealis*), finback (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), right (*Balaena glacialis*), humpback (*Megaptera novaeangliae*), and sperm (*Physeter macrocephalus*) whales are found in the Bering Sea. Killer whales, Minke and gray whales, and fur seals are also found in the area. (World Wildlife Fund and The Nature Conservancy of Alaska, 1999; Pacific Coast Joint Venture, 2003)

Marine mammals are present in the bays and harbors of Adak either year-round or during migration. These include non-listed species such as the harbor seal, orca (killer whale), northern harbor porpoise, and Dall's porpoise, as well as listed species such as Steller sea lions (*Eumetopias jubatus*), sea otters (*Enhydra lutris kenyoni*), and whales. Minke whales are often seen around the Central Aleutians and inside Kuluk Bay. Listed whales that have been observed include the endangered sperm whale, fin whale, and humpback whale. (Naval Facilities Engineering Command, Engineering Field Activity, Northwest, 2003) A Steller sea lion (federally endangered) rookery is located on the southwestern portion of the island at Lake Point (figure 2-1) and a haulout area is located at Cape Moffett (figure 2-1), northwest of the proposed SBX mooring location (Alaskan Command, 1996) and outside the ROI. The numbers of sea otters in southwest Alaska have declined by at least 56 to 68 percent since the mid-1980s and thus the southwest Alaska Distinct Population Segment of northern sea otters has been proposed for listing as threatened (U.S. Fish and Wildlife Service, 2004). Sea otter numbers have also declined in Kuluk Bay recently, due perhaps to increased predation by killer whales although the cause of the population decline is not clear (U.S. Fish and Wildlife Service, Region 7-Alaska, 2004; U.S. Fish and Wildlife Service Marine Mammals Management, 2004; Federal Register, 2004).

The Year 2000 Record of Decision related to Superfund clean up activities conducted by the U.S. Navy at Adak includes information on sediment samples in a near shore location in Kuluk Bay. The document concluded that no chemicals pose significant ecological risks to benthic biota exposed to sediments. Elevated chromium and copper concentrations in blue mussels were limited to a single sample immediately offshore from a landfill. Cadmium concentrations in rock sole had a small potential to pose ecological risks. (Naval Facilities Engineering Command, 2003)

3.4 CULTURAL RESOURCES

Cultural resources include prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason.

. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., SHPO, the Advisory Council on Historic Preservation).

Region of Influence

In general, the ROI for cultural resources encompasses areas requiring ground disturbance (e.g., areas of new facility/utility construction) and all buildings or structures requiring modification, renovation, demolition, or abandonment. The ROI for cultural resources relative to SBX mooring at Adak is limited to underwater areas at the proposed SBX mooring site in Kuluk Bay (figures 2-1 and 2-2).

Affected Environment

There are no previously identified cultural resources within the ROI. However, cultural resources that have been identified on Adak provide a background for the analysis presented in section 4.4. The Historic and Archeological Resources Protection Plan for the Adak Naval Complex inventoried and evaluated all existing and potentially historically and archeologically significant resources on or near the Adak Naval Complex. Included in these resources are three National Register resources; the Adak Army Base and Adak Naval Operating Base National Historic Landmark (listed on the National Register), the Old Chapel (eligible for the National Register), and the Adak World War II Cultural Landscape Historic District (eligible for the National Register). Also included are approximately 29 historic facilities, sites, or objects that contribute to the historic character of a National Historic Landmark, the potential National Register Historic District, or both. (Engineering Field Activity Northwest, 1996)

One of the historic objects that contribute to the Cultural Landscape Historic District is submarine netting that was used during World War II to keep submarines out of the harbor. Historic site number ADK-153, located along the shore of Finger Bay, includes some of the submarine netting. Within the ROI on the ocean floor of Kuluk Bay, similar submarine netting has been identified. The distribution of the debris suggests that the debris was deposited by ocean dumping, most probably in the post World War II era. The debris are individual discreet artifacts and do not represent an intact World War II "site" or the original location of the submarine netting. This is further suggested by the only site-specific record of submarine netting installation that has been identified. Most mentions of the net only say the net was installed at Kuluk Bay. However the history of the USS UTE says specifically that anti-submarine nets were installed at Sweepers Cove, an inlet of the much larger Kuluk Bay. The entrance to Sweepers Cove lies approximately 2.5 nautical miles southwest of the ROI.

3.5 HEALTH AND SAFETY

Health and safety includes consideration of any activities, occurrences, or operations that have the potential to affect the well-being, safety, or health of personnel or members of the general public. Personnel are considered to be persons directly involved with the operation producing the effect or who are physically present at the operational site. Members of the public are considered to be persons not physically involved in the operation.

Existing environmental documents were reviewed to determine if public and occupational health and safety concerns are an issue. Applicable safety regulations were also reviewed with regard to hazardous materials.

Region of Influence

The ROI includes areas that may potentially be affected by the use of Port Adak for the SBX, including the mooring site and loitering areas identified in section 2.1. The ROI for health and safety is based on the area where the SBX may have an effect on humans, navigation and communication facilities/equipment, fuels, and the existing RF environment at Adak.

Table 2-1 lists the maximum potential interference distances that define the ROI based on various subjects that could interact with the XBR. Included below are a general description of the health and safety resource area and standards concerning maritime safety and existing RF environment.

Affected Environment

The USCG 17th District provides marine inspections, casualty investigations, fishing vessel inspections, harbor patrol, pollution response and facility contingency planning for Port Adak. The Sweeper Cove Terminal maintains an Oil Spill Prevention and Response Plan in compliance with State of Alaska and federal requirements.

Although there are no previously identified health and safety concerns within the ROI, health and safety concerns that have been identified on Adak provide a background for the analysis presented in section 4.4. Over a 40-year period, hazardous substances were disposed of in areas on the island, including landfills, storage areas, drum disposal areas, spill sites, and pits for waste oil and fire-fighting training. Environmental restoration projects began on Adak under the Navy Assessment and Control of Installation Pollutants program with an initial assessment study in 1986. (U.S. Environmental Protection Agency, 2002) An initial assessment study identified 32 sites on Adak that could be a potential threat to human health and the environment. In 1997, a risk assessment was completed for Kuluk Bay to quantitatively evaluate the potential human and ecological risks from contaminants in marine sediment, surface water, and biota. This assessment determined that although antimony and polychlorinated biphenyls (PCBs) were slightly elevated at 1 out of 20 samples, no chemicals pose significant ecological risks to benthic biota exposed to sediments. Elevated chromium and copper concentrations in blue mussels were limited to a single sample immediately offshore from a landfill. Cadmium concentrations in rock sole had a small potential to pose ecological risks. Cancer risks and non-cancer hazards were below a level of concern for a recreational seafood harvester consuming fish and shell fish from Kuluk Bay. Cancer risks and non-cancer hazards were above a level of concern for the subsistence seafood harvester consuming fish and shell fish from Kuluk Bay. However, the report also noted that due to the use of upper bound intake assumptions, the risk may be overestimated. (AdakUpdate.com, 2004)

The existing RF environment on Adak was evaluated by conducting an EMR/EMI survey. In this survey, databases were accessed to find all transmitters and receivers within 200 nautical miles for equipment operating in the same frequency band as the SBX. Additionally, equipment operating on the 2nd or 3rd harmonic of the SBX frequency within 25 nautical miles was also listed. A total of 531 frequency assignment records including communications and navigational aids were checked. Only four records exceeded the interference threshold. Those four records were looked at specifically to include attenuation due to frequency dependent rejection, and antenna coupling between the two systems. The result of the RF/radio frequency interference (RFI) survey was that no interference would be expected between the SBX and existing transmitters on Adak.

3.6 SOCIOECONOMICS

Socioeconomics describes a community by examining its social and economic characteristics. Several demographic variables are analyzed to characterize the community, including the means and amount of employment, and income creation. In addition, socioeconomics analyzes the allocation of the assets of the community, such as its schools and housing.

Many families living in rural areas of Alaska are partially or wholly dependent on the harvesting of natural resources for food and other living necessities. To ensure the existence of these resources, the Alaska National Interest Land Conservation Act (ANILCA) was passed by Congress in 1980. ANILCA provides continued opportunity for customary and traditional uses of fish and wildlife resources for subsistence purposes. In accordance with ANILCA, the Federal Government manages these subsistence resources on federal Public Lands.

The importance of subsistence harvesting varies among individuals and communities depending on the local culture and customs. To evaluate the effects of the Proposed Action, the significant subsistence use areas must first be identified, after which the impacts on those resources can be identified.

Region of Influence

The ROI includes areas that may potentially be affected including subsistence and commercial fishing in the vicinity of Kuluk Bay, Sitkin Sound, and the Bering Sea.

Affected Environment

The northern portion of Adak was occupied by the Department of the Navy; however, the military facility was ordered to close under the Defense Base Closure and Realignment Act of 1990, as amended. In March 1997, Naval Station Complex Adak was closed and ceased to operate as a military facility. On 17 March 2004, the United States, through the Department of Interior and the Department of the Navy, entered into a land exchange agreement with the Aleut Corporation, an Alaska Native Claims Settlement Act authorized Native Regional Corporation. The Aleut Corporation acquired approximately 46,000 acres of real property plus certain personal property on Adak. The southern portion of Adak, as well as most of the other islands in the Aleutian Island chain, is part of the Alaska Maritime National Wildlife Refuge. The southern portion is uninhabited. (Adak Island Update, 2004)

Population

The City of Adak has shown a significant population decline since March 1997, when Naval Station Complex Adak was closed and ceased to operate as a military facility.

The U.S. Bureau of the Census reported that the City of Adak, as of 2000, showed a population of 316 persons, of which approximately 111 are Alaska Native and American Indian (U.S. Census Bureau, 2000)

There is one school located in the community, attended by 18 students. The local health clinic is the Adak Medical Clinic. Adak Medical Clinic is a qualified Emergency Care Center. The clinic is staffed by a physician's assistant and provides emergency care, family practice and referral

services. Lab, pharmacy, and public health services are available. Auxiliary health care is provided by Adak Volunteer Fire Department (WelcometoAlaska.com, 2004).

Income and Employment

The U.S. Bureau of the Census reported in 2000 that the City of Adak showed a per capita income of $31,747. Similarly, as of 2000, the median household income of Adak was $52,727. (U.S. Census Bureau, 2000)

Adak currently provides a fueling port and crew transfer facility for foreign fishing fleets; an airport, docks, housing facilities, restaurant, grocery and ship supply store are available. The Norquest–Adak Seafood Company and the Adak Fisheries Development Council process Pacific cod, pollock, mackerel, halibut, albacore, and brown king crab. Currently Adak does not have an established residential fishing fleet. However, it is the intent of the Aleut Corporation to turn the village into a fishing center. In 2000, four Adak residents held commercial fishing permits, primarily for ground fish. Generally most fish processed at Adak come from larger boats from outside the area. The community of Adak has been identified to receive a direct allocation of the Western Aleutian Islands golden king crab fishery and has recently submitted for allocation of the Aleutian Islands pollock harvest. (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, 2004). The Bering Sea north of Adak contains one of the most productive marine ecosystems in the world. U.S. commercial fisheries in the Bering Sea approach $1 billion per year and account for more than half of all annual domestic fish landings.

The Adak Airport, at an elevation of 19 feet, includes two paved runways, 7,790 feet and 7,606 feet in length, and a control tower. Alaska Airlines operates passenger and cargo jet service on Thursdays and Sundays. Three deep water docks and fueling facilities are also present on Adak. (WelcometoAlaska.com, 2004)

Subsistence

In order to have the right to harvest subsistence wildlife, fish, and shellfish on federal lands, a status of rural must be granted by the National Park Service. Rural status has been requested by Adak, but has not been granted to-date. Therefore, residents of Adak are not allowed to harvest subsistence resources on federal lands. However, Adak is considered rural by the State of Alaska, and residents are eligible to harvest subsistence resources on state lands. Based on the island's location, history, isolation, and ethnic make-up, it can be presumed that Adak residents are engaging in a variety of subsistence harvesting. (National Oceanic and Atmospheric Administration, National Marine Fisheries Service, 2004) However, the Alaska Department of Fish and Game, Division of Subsistence Community Profile Database, does not currently monitor subsistence harvesting in Adak. (Alaska Department of Fish and Game, Division of Subsistence, 2004)

3.7 WATER RESOURCES

Water quality and the consumption and diversion of water are regulated by a number of federal and state agencies. The USEPA has the primary authority for implementing and enforcing the Clean Water Act. The USEPA, along with state agencies (including Alaska) to which the USEPA has delegated some of its authority, issues permits under the Clean Water Act to maintain and restore the quality of our nation's water resources. The Clean Water Act requires permits for activities that result in the discharge of pollutants to water resources or the placement of fill material in waters of the United States.

Alaska Administrative Code 18 AAC 70.015 describes the Antidegradation Policy for waters of Alaska. The policy maintains that existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. If the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected.

Region of Influence

The ROI includes areas on Adak that may potentially be affected by the use of Port Adak for the SBX, the mooring site and loitering area in Kuluk Bay, and the loitering areas in Sitkin Sound and the Bering Sea, as identified in section 2.1.

Affected Environment

Water Supply

Currently and historically, all Adak water supplies (including potable water) have been obtained from surface water. Previously, potable water was available to accommodate as many as 5,000 people via two water systems from three different sources. In March 1997, Naval Complex Adak was closed and ceased to operate as a military facility, reducing the overall population of the Island from 2,500 to approximately 316 people by the year 2000. This reduction in population permitted the closure of certain portions of the public water system. (Missile Defense Agency, 2003)

Water from the Lake Bonnie Rose water system is stored in several water tanks throughout the community, and piped to facilities and housing units. (WelcometoAlaska.com, 2004) The current system is capable of producing over 1.0 million gallons per day, with an average demand of about 300,000 gallons per day (Missile Defense Agency, 2003).

Wastewater

Adak Wastewater Utility maintains a wastewater treatment system which discharges its treated water through a marine outfall line to Kuluk Bay. Up to approximately 800,000 gallons of wastewater per day run through this system. (Missile Defense Agency, 2003) Most of the flow is due to leakage into the current wastewater system. As leaks are found and, when possible, repaired, the wastewater levels should decrease. In addition, Adak has completed a sewer/water system downsizing feasibility study and has applied for funding under the Village Safe Water Projects with the Alaska Department of Environmental Conservation. (Rural Utility Business Advisor Program, 2004, Alaska Department of Environmental Conservation, 2005)

Water Quality

Based on the results of a 5-year baseline marine monitoring effort, PCB concentrations in rock sole from Sweeper Cove and Kuluk Bay exceed the USEPA's risk-based action level (RBAL) of 6.5 micrograms per kilogram (μg/kg). Total PCB concentrations in blue mussel from Sweeper Cove slightly exceed the RBAL of 31 μg/kg but are trending downward. Total PCB concentrations in blue mussel from Kuluk Bay are trending upward but remain below the RBAL. (Naval Facilities Engineering Command, 2004) However, the Kuluk Bay samples are taken within 1,000 feet of the shore, in an area adjacent to a closed landfill. Although specific data is not available, the quality of the water in the vicinity of the SBX mooring site, approximately 2.5 miles from shore, is expected to be very good. Although specific data is not available, water quality in Sitkin Sound and the Bering Sea is also expected to be very good.

4.0
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental consequences of implementing the Proposed Action by comparing the effects of these activities on the potentially affected environment. To assess the potential for and significance of environmental impacts from the proposed SBX activities, a list of activities was developed (chapters 1.0 and 2.0) and the environmental setting was described, with emphasis placed on any special environmental sensitivities (chapter 3.0). SBX activities were then compared with the potentially affected environmental resource areas to determine the impacts of the Proposed Action.

Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such action. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Consistent with Council on Environmental Quality regulations, the scope of the analysis presented in this section was defined by the range of potential environmental impacts that could result. Resources that have a potential for impacts were considered in the analysis to provide the decision makers with sufficient evidence and analysis for evaluation of potential effects of the actions.

Sections 4.1 through 4.7 provide discussions of the potential environmental consequences of the proposed SBX activities. The amount of detail presented in each section is proportional to the potential for impacts. Sections 4.8 through 4.15 discuss the following with regard to proposed SBX activities: adverse environmental effects that cannot be avoided; conflicts with federal, state, and local land use plans, policies, and controls for the area concerned; energy requirements and conservation potential; irreversible or irretrievable commitment of resources; relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; natural or depletable resource requirements and conservation potential; Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; Executive Order 13045, Federal Actions to Address Protection of Children from Environmental Health Risks and Safety Concerns*.

4.1 AIR QUALITY

4.1.1 SBX POSITIONING IN KULUK BAY

Alternative 1 would include the installation of multiple (8 to 12) drag-embedment-type anchors and mooring legs. Approximately 20 to 100 persons would be involved in the installation activities, and would be housed onboard installation vessels for the period of the installation. Installation activities would be conducted in accordance with all appropriate regulations and permits. Although minor short-term impacts typically associated with construction activities, such as the installation activities, may occur, no exceedances of the NAAQS or Alaska AAQS would be anticipated. Alternatives 2 and 3 would require no permanent mooring installation.

4.1.2 OPERATION IN KULUK BAY

Operational emissions onboard the SBX would be limited to the exhaust produced by generators and to maintenance activities. Maintenance-related emissions from paints, lubricants or solvents would include minimal levels of volatile organic compound emissions that would not have an impact on air quality.

Previous analysis in the GMD Extended Test Range EIS determined that the mooring of the SBX at the Adak PSB for 9 months per year would not impact the surrounding air quality. Analysis assumed maximum XBR RF emissions for up to 3 hours per day. The Proposed Action now includes the potential for the SBX to be located at the PSB for up to 12 months per year but it is likely the SBX would be underway several times per year to support test events and operational readiness. Total XBR RF transmission time while at the PSB would be up to an average of 5 hours per day.

For Alternative 1, the SBX daily operations and testing would require the use of one 3.64 megawatt (MW) generator 24 hours per day for ship functions, and two additional 3.64 MW generators for 5 hours per day to power the radar. This represents 8,760 hours of operation of one generator and 1,825 hours each of operation for the two additional generators each year.

For Alternatives 2 and 3, positioning of the SBX would require the operation of its generators and thrusters to maintain position. Hours of operation would vary. For analysis purposes it is assumed three 3.64 MW generators would operate 19 hours per day, or 6,935 hours of operation per year for each, and five 3.64 MW generators for 5 hours per day, or 1,825 hours of operation per year for each.

Table 4-1 lists estimated emissions of the limited operation of three generators for Alternative 1 and the limited operation of up to five generators for Alternatives 2 and 3, as described above. In addition, a 910 kilowatt (kW) emergency generator, which would run intermittently (approximately 500 hours per year) for testing and emergencies, is also listed in table 4-1.

Table 4-1: Estimated SBX Generator Emissions

	Criteria Pollutant Emissions				
Type of Positioning in Kuluk Bay	**Oxides of Nitrogen tons/year**	**Total Hydrocarbons tons/year**	**Carbon Monoxide tons/year**	**Oxides of Sulfur tons/year**	**PM tons/year**
Alternative 1—Moored	454.33	45.43	30.29	12.25	21.20
Alternative 2 or 3—Loitering/anchored	1,082.37	108.24	72.16	29.19	50.51
910-kW Emergency Generator (500 hours/year)	7.32	0.22	1.68	0.12	0.21

Source: Calculations based on emission factors from AP-42, Fifth Edition, Volume 1 and from Caterpillar, Diesel Engine Technical Data, 3612.
PM = particulate matter
kW = kilowatt

Wind speeds at Adak average 12 knots and have rapid velocity changes. Wind gusts can reach 50 knots in the summer months and over 100 knots during winter storms. The SBX would be moored over 2.5 miles from any sensitive receptor in the built up area at Adak, and over 3 miles from the Maritime National Wildlife Refuge. The prevailing wind direction in the ROI is from the southwest and out to the Bering Sea. With the combination of wind speed, distance from receptors, and the prevailing wind direction from the southwest, it is anticipated that dispersion of emissions to the Bering Sea would limit any impact to air quality from the operation of the SBX in Kuluk Bay. Based upon air quality modeling for Alternative 1, it is expected that emissions would not exceed NAAQS or Alaska AAQS at Adak. For Alternative 2, generator emissions emitted when the SBX is loitering inside of Kuluk Bay would not impact ambient air quality at Adak. However, as the SBX would be anchored in Kuluk Bay in Alternative 3, it is anticipated that NAAQS and AAQS levels would be exceeded for oxides of nitrogen.

Under Alaska and USEPA air emission regulations, any stationary source that has the potential to emit 250 tons per year or more of a criteria pollutant in an attainment area would trigger a Prevention of Significant Deterioration review. In addition, any stationary source that has the potential to emit greater than 100 tons per year of a criteria pollutant would be required to obtain a Title V operating permit. Based on the likely scenario that the SBX would be underway several times per year to support test events and operational readiness, the SBX would not be considered a stationary source at Adak; therefore, neither a Prevention of Significant Deterioration review nor a Title V permit would be required.

Maintaining a security zone around the SBX and operation of PSB facilities onshore would not result in additional air emissions. The dedicated support vessel, to be used for transportation of fuel, cargo, and passengers to and from the SBX and SBX mooring connect and disconnect operations for Alternatives 1, 2, or 3, would not cause significant impacts to air quality.

4.1.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Activities involved with loitering and operation of the SBX in the Bering Sea or Sitkin Sound would be similar to those described in section 4.1.2. The hours of generator operation would vary; the estimated emissions of up to five generators are listed in table 4-1. However, due to average annual wind speeds in the open areas of the Bering Sea that are 15.6 and 23.3 knots, emissions would be dispersed with limited impact to air quality.

4.1.4 CUMULATIVE IMPACTS

Due to the limited industrialization of Adak and the surrounding environment, the potential cumulative impacts to air quality due to the proposed mooring of the SBX would not be substantial. No other projects in the ROI have been identified that would have the potential for incremental, additive cumulative impacts to the air quality in the ROI.

4.2 AIRSPACE

The Proposed Action related to airspace would be full power XBR RF transmission from the SBX while at the mooring location at Kuluk Bay. The following discussion is taken from the GMD Extended Test Range EIS with additional information added for the Kuluk Bay mooring site.

4.2.1 SBX POSITIONING IN KULUK BAY

The positioning of the SBX in Kuluk Bay would have no impacts on airspace.

4.2.2 OPERATION IN KULUK BAY

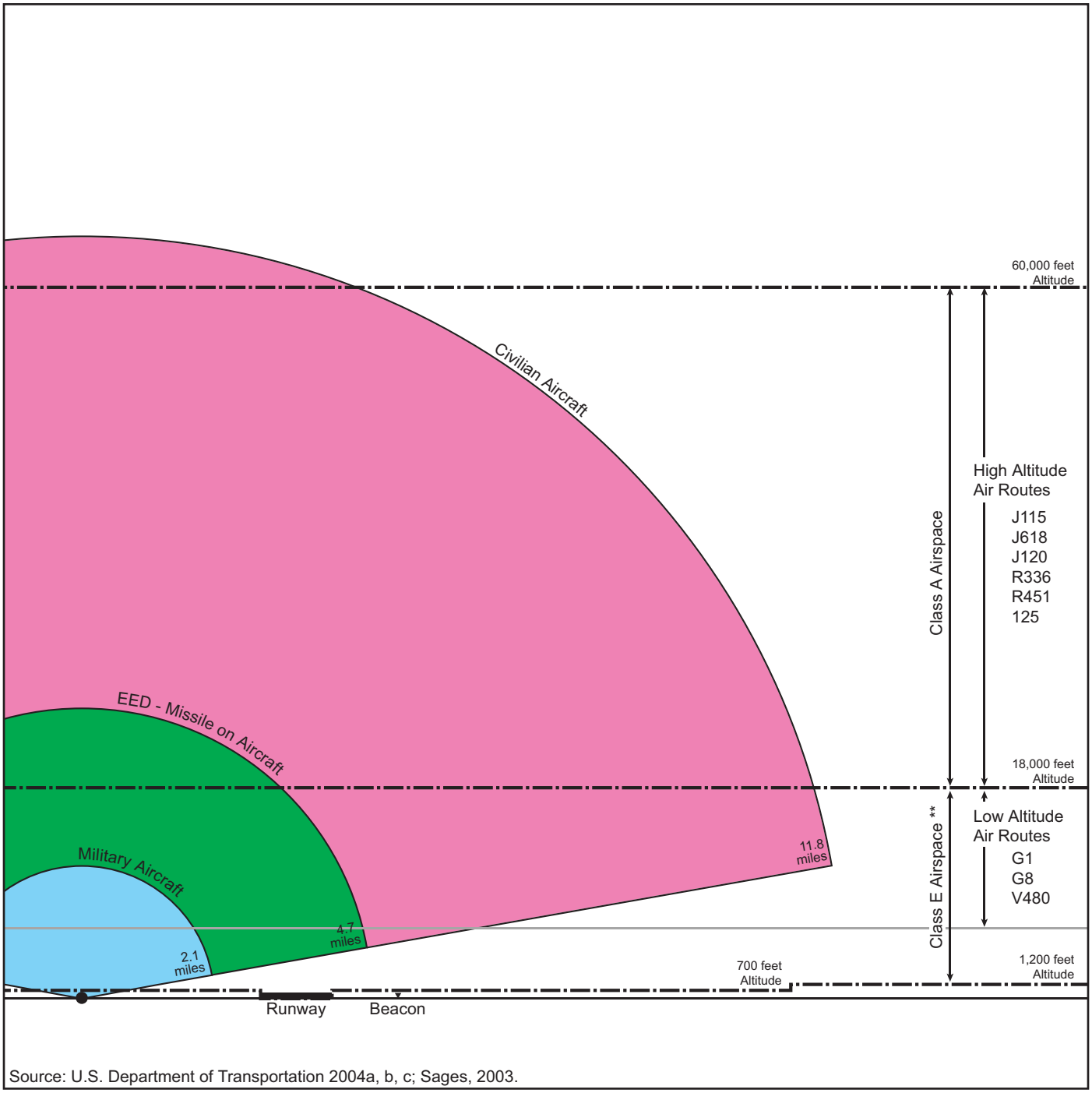
Both the DoD and the FAA have standards for RF interference and damage to aircraft electronics, which should not be exceeded. DoD uses MIL-STD-464 standards; therefore, military aircraft must be hardened or protected from RF with a peak power threshold up to 3,500 volts per meter (V/m) and an average power threshold up to 1,270 V/m. The SBX would not exceed the 3,500 V/m peak power threshold. The SBX could exceed the 1,270 V/m average power threshold.

Commercial aircraft must be hardened or protected from RF levels with a peak power up to 3,000 V/m and an average power threshold up to 300 V/m as mandated by the FAA as published in Notice 8110.71, Guidelines for the Certification of Aircraft Flying through High Intensity Radiated Field Environments. The SBX would not exceed the 3,000 V/m peak power threshold. The SBX would exceed the 300 V/m average power threshold.

The average power thresholds are based on limiting the time of exposure of aircraft avionics (electronic equipment) to High Intensity Radiated Fields in order to preclude shortening the life of the aircraft avionics. Therefore, the concern is not direct interference but is a reduction in life of the aircraft avionics/electronic equipment. As shown in table 2-1 and figure 4-1, the SBX radar has a potential for interference with commercial aircraft out to a distance of 11.8 miles, and with military aircraft out to a distance of 2.1 miles.

To avoid or minimize adverse effects from RF/RFI, a full RF/RFI survey and analysis has been conducted by the Joint Spectrum Center, in coordination with the FAA and other potentially affected users. The level-one analysis identified 531 potential interference interactions between the SBX and existing systems on Adak. Only four of the interactions exceeded the threshold for a level-two analysis. Results of the level-two analysis indicate the SBX would not cause interference to any of the systems identified. (Department of Defense, 2003)

A DD Form 1494 is required as part of the spectrum certification and frequency allocation process. The completed DD Form 1494 must be processed and approved by the appropriate national and international authorities prior to SBX operations. The DD Form 1494s for SBX operations at Kuluk Bay are currently in process with an estimated approval date prior to November 2005.



Source: U.S. Department of Transportation 2004a, b, c; Sages, 2003.

EXPLANATION

Note: Civilian aircraft distances for potential SBX RF interference for X-Band Radar are related to the average power field strength that could shorten the life of aircraft avionics.

** Class E airspace, M-F, 0800-1600. Class G airspace all other times.

Adak Airspace and SBX Interference Areas

Scale

0 1.2 2.4 miles

0 1.9 3.8 kilometers

050805 Adak Airspace 2

Figure 4-1

The results of the EMR/EMI survey and DD Form 1494s would also be used to help define the operating area for the SBX (acceptable azimuths and operating angles). The maximum operating area would be all azimuths (360 degrees), and all angles from 2 degrees up to 90 degrees.

Controlled and Uncontrolled Airspace

The actual SBX operating area at the mooring location would be identified to minimize impacts to aircraft operations, EEDs, and communication equipment. A high energy RF transmission area notice would be published on the appropriate aeronautical charts, notifying aircraft of an RF transmission area. The boundaries of this area would be configured to minimize impacts to aircraft operations and other potentially affected systems. The establishment of this SBX high-energy RF transmission area would not impose any new flight restriction requirements. In addition to charting the SBX high-energy RF transmission area notice, information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued to notify pilots of the high-energy RF transmission area.

SBX operations would be coordinated with the FAA and would be scheduled to occur during hours of minimal aircraft operations. This coordination would minimize potential impacts to high altitude jet routes in Class A airspace and low altitude jet routes in class E and class G airspace. A Memorandum of Agreement (MOA), similar to appendix C, would establish the required scheduling and coordination process between the SBX operators and the FAA.

Surveillance radar onboard the SBX would be utilized to identify any aircraft approaching the ROI. This would include aircraft operating along the high and low altitude air routes as well as aircraft on approach to Adak airport and other aircraft that may be flying in the vicinity of Adak. In the event an aircraft enters the ROI, XBR RF emissions would be limited until the aircraft exits the ROI. Consequently, there would be no reduction in the amount of navigable airspace, and thus no impacts to the controlled and uncontrolled airspace in the ROI would result.

En Route Airways and Jet Routes

The two en route low altitude airways (G8 and G1), three high altitude jet routes (J115, J618, and J120), two great circle routes from North America to the Far East (R336 and R451), and one military route (V 480) are located within the SBX operating area (figure 3-1). There are additional approach and departure routes within the ROI that would also need to be considered. The SBX RF emissions would be limited when aircraft are identified by the aircraft surveillance radar located on the SBX. In the event an aircraft enters the ROI, XBR RF emissions would be limited until the aircraft exits the ROI. Consequently, there would be no impacts to the en route airways and jet routes or free flight operations in the ROI.

In addition, since the radar beam is in constant motion, should an aircraft enter the SBX ROI, it is highly unlikely that the SBX would illuminate an aircraft long enough to affect the onboard electronics. Based on a study of potential RF exposure due to SBX operations, transient aircraft flying along high altitude jet routes within the SBX ROI would receive less than 0.5 second of RF exposure. Those aircraft flying along low altitude airways within the SBX ROI would receive less than 1.5 seconds of RF exposure. However, as stated above, XBR RF emissions would be limited when aircraft are within the ROI.

Airports and Airfields

Adak Airfield is located approximately 3 miles west of the proposed mooring location. With an airspace MOA in place, the required scheduling and coordination process would be implemented and standard approach and departure procedures at the airfield would continue unhindered. All arriving aircraft would continue to contact UNICOM, a radio service that provides for air-ground communications primarily between general aviation aircraft and airport facilities, 30 minutes before landing. Procedures for departing aircraft would be identified in the airspace MOA; thus, there would be no airfield conflicts in the ROI under the Proposed Action, and no impact.

There are a limited number of air navigation facilities within the airspace ROI. However, they operate at lower frequencies (in the megahertz [MHz] range) than the X-band SBX, and based on the results of the RF/RFI survey, they would not experience any interference from the SBX. Emissions from the SBX may also potentially degrade the overall performance of X-band (8 to 12 gigahertz) airborne radar systems. Based on analysis performed by the Joint Spectrum Center, the interference would most likely result in reduced range of the radars. For example, surface search radar with a range of 60 nautical miles would only be able to see objects at 50 nautical miles.

4.2.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Potential impacts would be similar to those described above for operations in Kuluk Bay except as noted in the following paragraphs.

Controlled and Uncontrolled Airspace

For Sitkin Sound, the high energy RF transmission area notice that would be published on the appropriate aeronautical charts would include a larger area notifying aircraft of a general RF transmission area for Sitkin Sound. Coordination with the FAA, use of the on-board radar, and lack of impacts would be as described above in section 4.2.2.

Potential impacts from operations in the Bering Sea would be as described in the GMD Extended Test Range EIS for the broad ocean area, section 4.11.1.3. The airspace in the ROI would be outside territorial limits and in international airspace. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and the air traffic is managed by the Anchorage Air Route Traffic Control Center. As part of the spectrum certification and frequency allocation process, the DD Form 1494s for SBX operations would identify coordination requirements that would be followed by the SBX for all operations.

En Route Airways and Jet Routes

Operation in Sitkin Sound and the resulting potential impacts to airways and jet routes would be similar to that described for Kuluk Bay. For operations in the Bering Sea there would be minimal impacts as there are no airways or jet routes within the ROI.

Airports and Airfields

Operation in Sitkin Sound and potential impacts to airports and airfields would be similar to that described for Kuluk Bay. Adak Airfield is located approximately 9 miles west of the nearest part of Sitkin Sound.

For operations in the Bering Sea there would be no impacts to airports or airfields. Emissions from the SBX may also potentially degrade the overall performance of X-band (8 to 12 gigahertz) airborne radar systems. Based on analysis performed by the Joint Spectrum Center, the interference would most likely result in reduced range of the radars. For example, surface search radar with a range of 60 nautical miles would only be able to see objects at 50 nautical miles.

4.2.4 CUMULATIVE IMPACTS

Because the SBX operates in different frequency ranges than most aircraft radars, there would be limited potential for an incremental, additive cumulative electromagnetic effect on the operation of an air navigation facility or the signal used by aircraft. The use of the required scheduling and coordination process in the airspace MOA and adherence to applicable DoD directives and U.S. Army regulations concerning radar operations would preclude the potential for incremental, additive cumulative impacts.

No other projects in the airspace ROI have been identified that would have the potential for other incremental, additive cumulative impacts to controlled or uncontrolled airspace, en route airways and jet routes, or airfields and airports.

4.3 BIOLOGICAL RESOURCES

Although not directly within the ROI, training for SBX personnel would include awareness of the presence of the Aleutian shield-fern on Adak and the need to avoid its habitat when visiting the island.

4.3.1 SBX POSITIONING IN KULUK BAY

As described in section 1.2.2, the SBX would be mounted on a modified oil-drilling platform. The platform would be slow-moving and self-propelled in open water, but assisted by support vessels while in port. Total height of the SBX above the water line including the radome would be approximately 250 feet at transit draft. At operational draft, the SBX would have a height of approximately 200 feet above the water's surface.

Alternative 1—Permanent Mooring System

Alternative 1 for positioning the SBX in Kuluk Bay would include the installation of a permanent mooring system as described in section 2.1.1. The mooring location was selected to meet design requirements such as holding capacity as well as to avoid submerged debris to the extent possible. The seabed at the mooring location consists of a thin layer of mud and then sand in sufficient depth to provide good holding ground for conventional drag embedment anchors. Fish were occasionally observed in the mooring location (200-foot depth) during the geophysical survey, but no sensitive marine habitat such as clam beds. Nearshore species that have been studied in the area such as mussels and rock sole would be outside the region of influence. Based on geophysical surveys performed in Kuluk Bay, a system that uses drag embedment-type anchors would be the most suitable type of anchoring system for the seafloor condition (mostly dense sand). The installation of each mooring leg would include dragging the anchor assembly along the seafloor in order for it to be buried up to 15 feet deep in the seafloor

subsurface. The amount the anchors would drag during embedment is not known with certainty, but is not expected to exceed a horizontal distance of 100 feet. Removal of obstructions on the seafloor that would hamper mooring installation would implement technologies to minimize marine habitat disruption.

After the embedment-type anchors have been set and the chain lengths have been properly adjusted the first time the SBX uses the moor, lateral dragging of the anchor lines on the seafloor would be very limited. Mooring operations from this alternative are not expected to drastically change the substrate or reduce the quality and/or quantity of the Essential Fish Habitat designated in the waters surrounding Adak. Operations would be conducted in accordance with all applicable permits and regulations to minimize impacts to sensitive marine habitat. The most significant movement along the chain would be vertical. A gentle lifting and lowering of the anchor chain catenaries would occur in response to changes in mooring loads on the SBX.

Mooring operations in Kuluk Bay would not result in disturbance of areas potentially contaminated by PCBs. As stated in the "Technical Memorandum, Evaluation of Adak Island Blue Mussel and Rock Sole Tissue 1999 through 2003", the U.S. Navy would continue to monitor the levels of PCBs in rock sole and blue mussels from Sweeper Cove and Kuluk Bay every other year through 2009. Other than the initial disturbance during installation, impacts to the seafloor and its inhabitants would be minimal. The noise level from the SBX vessel at water level would be approximately 43 A-weighted decibels (dBA), which is not anticipated to significantly affect biological resources since it would be similar to or less than the noise levels from other vessels frequently in the area.

Alternative 1 could also include the installation and use of a floating security boom/fence around the SBX. The security boom/fence would use its own anchoring systems, to maintain position in Kuluk Bay. Although the floating security boom/fence anchoring system has not been selected, it will most likely consist of clump weight anchors that rest on the seafloor. Initial disturbance of the seafloor and its inhabitants during installation of the security boom/fence anchoring system is anticipated to be minimal and lateral dragging of the anchor lines would be limited once installed. Mooring and security system operations are not expected to drastically change the substrate or reduce the quality and/or quantity of the Essential Fish Habitat designated in the waters surrounding Adak. No specific sensitive habitat has been identified that would be impacted by the mooring. A State of Alaska Submerged Land Lease and Corps of Engineers Section 10 Permit are currently in process for the mooring location.

Alternative 2—SBX Loitering in Kuluk Bay

Alternative 2 for positioning the SBX near Adak would include the SBX operating its engines to maintain its position in the bay by using its own thrusters. As described in section 2.1.1, the SBX operators could select a station-keeping point, or could be underway and change position as desired. The SBX would remain at operational draft for the majority of the time at a limited speed. The SBX vessel could also move into Sitkin Sound or the Bering Sea to provide more sea room in case of very high winds. Although this alternative would not result in seafloor disturbance from mooring leg installation, the thrusters could produce intensive air bubble implosions underwater. Operations from this alternative are not expected to reduce the quality and/or quantity of designated Essential Fish Habitat. Operations would be conducted in accordance with all applicable permits and regulations to minimize impacts to sensitive marine habitat. The relatively slow speed of the SBX platform would greatly reduce the potential for

collision with a free-swimming marine mammal. The normal running noise level from the SBX vessel at water level would be approximately 43 dBA, which is not anticipated to significantly affect biological resources.

Alternative 3—Temporary Anchoring

Under Alternative 3 for positioning the SBX in Kuluk Bay, the SBX would deploy one of its two anchors upon each arrival at the PSB, and it would then weigh anchor upon each departure from the PSB. The anchoring position would likely be near the center of the area shown in figure 2-1, but the position of successive anchor drops would only be approximately the same. The approach to anchoring position would be upwind, and the anchor set by pulling downwind, which would result in a different direction of plowing each time the anchor embeds itself. During a wind shift, the anchor may come loose and reset itself, creating bottom disturbance in yet another direction. Although use of this alternative would result in disturbance to the seafloor and its inhabitants during each arrival at the PSB, it should not significantly reduce the quantity of Essential Fish Habitat in the area, nor result in significantly persistent high levels of suspended particulates. The thrusters would also need to be operated to provide additional position holding support since the single SBX anchor would provide less support than just one of the eight mooring lines. The noise level from the SBX vessel at water level would be approximately 43 dBA, which is not anticipated to significantly affect biological resources.

4.3.2 OPERATION IN KULUK BAY

While located at the PSB, daily testing and calibration of the SBX's radar system would be performed to both maintain and optimize radar performance. During these tests, the XBR may transmit for short periods several times a day, which could result in an average RF transmit time of 5 hours a day. The XBR RF transmit/receive pattern would be mostly contained within a narrow main beam. The XBR would not point its main beam toward the ground or water surface and would be programmed to avoid illuminating ground obstructions such as the local terrain, buildings, and antenna towers. During calibration and maintenance testing, the XBR beam would normally be directed at least 10 degrees above horizontal. In the open ocean, the main beam would be directed at least 2 degrees above horizontal. Because the bottom of the XBR main beam will always be at least 100 feet above the water surface (height of the bottom of the XBR antenna to the water surface at submerged draft), neither a beam at 2 or 10 degrees elevation would illuminate the sea surface. Lesser amounts of energy would be emitted in the form of grating and side lobes in the area around the main beam; however, as shown in table 2-1 the energy level would not exceed permissible exposure limits. Therefore, birds sitting on the water or people sitting on open decks of boats would not be adversely affected by the main beam.

A full RF/RFI survey and analysis has been conducted by the Joint Spectrum Center, in coordination with the FAA, Department of Transportation, and other potentially affected users. The survey was used in preparing the DD Form 1494s that are required as part of the spectrum certification and frequency allocation process. The DD Form 1494s for SBX operations at Kuluk Bay are currently in process with an estimated approval date prior to November 2005. Frequency allocations would preclude interference with USFWS radio communication.

In terms of the potential for RF impacts on wildlife, the *Ground Based Radar (GBR) Family of Strategic and Theater Radars Environmental Assessment* (U.S. Army Program Executive Office

Missile Defense, 1993) analyzed potential impacts on wildlife from RF. The GBR Family of Radars EA documented that several factors significantly reduce the potential RF exposure for birds and other wildlife. The GBR main beam would normally be located at least 2 degrees above horizontal, which limits the probability of energy absorption by surface-oriented wildlife. The radar beam would normally be in motion, making it extremely unlikely that a bird would remain within the most intense area of the beam for any considerable length of time. The size of the beam is relatively small, which further reduces the probability of bird species remaining within this limited region of space, even if the beam were motionless. These same factors of beam angle, beam motion, and small beam size would also apply to the SBX.

According to an article published in the Journal of Experimental Biology (Bruderer, et al., 1999), large sets of recordings of nocturnal birds obtained using an X-band tracking radar provided no indication of flight behavior changes between birds flying at low levels toward, away from, or passing beside the radar beam.

The analysis methods used to evaluate potential effects of RF transmissions from the XBR on birds is the Maximum Permissible Exposure Limit, which defines the maximum time-averaged radio frequency power density allowed for uncontrolled human exposure (and by extrapolation, to birds and other species). The Maximum Permissible Exposure Limit method is independent of body size or tissue density being exposed. Analysis conducted during preparation of the GBR Family of Radars EA (U.S. Army Program Executive Office Missile Defense, 1993) was based on a conservative approach of limiting the microwave energy absorption rate on the Aplomado falcon (*Falco femoralis*), a bird listed as endangered by the USFWS and the State of New Mexico. The energy absorption rate was based on the falcon remaining continuously within the main beam of the GBR. The absorption rate was then compared to the bird's resting metabolic rate. The analysis indicated power densities necessary to affect a falcon would have to exceed 42 milliwatts per square centimeter (mW/cm^2). Power densities of 38 to 61 mW/cm^2 have been determined necessary to affect other birds weighing up to 7.7 pounds. Auklets, which can range from 5 to 9 ounces, are close in weight to the primary bird analyzed in the study, the Aplomado falcon (9 to 14.5 ounces), and thus should also not be significantly affected.

Analysis conducted during preparation of the prototype High Power Discrimination Radar at the Pacific Missile Range Facility was based on the potential effects on the Laysan albatross (U.S. Department of the Navy and Missile Defense Agency, 2002). The analyses were based on the conservative assumption that the energy absorption rate of a bird's body was equal to its resting metabolic rate and that this may pose a potential for an adverse effect. Birds in general typically expend energy at up to 20 times their resting metabolic rates during flight. Since birds are not likely to remain continuously within the radar beam and the power density is not expected to exceed levels stated above that could impact birds, the likelihood of harmful exposure is not great. (Ballistic Missile Defense Organization, 2000)

Potential impacts from RF transmissions from the XBR on birds have been compared to the existing Cobra Dane radar operating on Eareckson Air Station on Shemya Island, Alaska. The Cobra Dane operates in the L-band (approximately 1,000 to 2,000 MHz), while the proposed SBX would operate in the X-band (approximately 8,000 to 12,000 MHz). The X-band has less potential to cause thermal heating in biological resources than the L-band. Also, the proposed SBX would only transmit full-power RF emissions for short periods of time several times per day, for a total full-power emissions time of up to 5 hours per day. The main beam would be

constantly moving and would not be stationary over one area. The USFWS has not noticed die-offs of birds below the Cobra Dane radar (Martin, 1999). The Aleutian goose, which was recently de-listed, is a regular visitor to Shemya Island and does not appear to have been affected by operation of the Cobra Dane radar. Rather the Aleutian goose population on Shemya has increased. On Kwajalein Island, where the GBR-P XBR is located, no bird die-offs or other impact to birds have been observed by the on-island environmental staff. Birds in the Kuluk Bay area, such as gulls, whiskered auklets, and cormorants, flying momentarily in the constantly moving XBR beam would receive a similar exposure as the birds on Shemya and Kwajalein and therefore no impacts are expected.

The PAVE PAWS radar operates at 420 to 450 MHz, and has a higher potential to cause thermal heating than the XBR. A recent study on the potential effects from exposure to the PAVE PAWS radar included a discussion of biological studies with short-term continuous exposure times of hours to days, much longer than the momentary exposure from the XBR. The report states that "In numerous short-term exposure studies, no reproducible effects on DNA damage have been observed, as measured by a number of different methods. While some studies have shown significant effects on gene expression due to modulated RF exposure of cells in culture, these do not include end-points traditionally associated with carcinogensis." (National Academy of Sciences, 2005)

The total height of the SBX above the water line including the XBR radome would be approximately 250 feet at transit draft, and the SBX radar main beam would not be directed toward the ocean's surface. Because the bottom of the XBR main beam will always be at least 100 feet above the water surface (height of the bottom of the XBR antenna to the water surface at submerged draft), neither a beam at 2 or 10 degrees elevation would illuminate the sea surface. Lesser amounts of energy would be emitted in the form of grating and side lobes in the area around the main beam; however, as shown in table 2-1 the energy level would not exceed permissible exposure limits. Therefore, any surfacing marine species would not be impacted and no adverse impacts would occur to whales or other marine mammals. It is also highly unlikely that an individual marine mammal would be in the vicinity of the SBX substantially above the surface of the water for a significant amount of time during the 5 hours per day that full-power RF emissions would be emitted. For these reasons, no effects are anticipated on fish and humpback whales or other marine mammals that might be present in the vicinity of the homeport and transit locations. Operation of the SBX would not require delays if whales and other marine mammals are observed. Therefore, no further action regarding whales or other marine mammals is required pursuant to the Endangered Species Act and the Marine Mammal Protection Act.

The SBX vessel would incorporate marine pollution control devices such as keeping decks clear of debris, cleaning spills and residues, and engaging in spill and pollution prevention practices in compliance with the Uniform National Discharge Standards provisions of the Clean Water Act. With these procedures in place, the potential for impacts to fish or marine mammals due to an accidental release of diesel fuel is considered low. The relatively slow speed of the SBX platform would greatly reduce the potential for collision with a free-swimming marine mammal. The noise level from the SBX vessel at water level would be approximately 43 dBA, which would be similar to or less than noise from other vessels frequenting the area. Overall, no adverse impacts to fish or marine mammals are anticipated.

Lighting would be required on the SBX vessel in accordance with navigational rules and OSHA and FAA regulations. Crew performance/maintenance lighting on the SBX platform (17 W

compact fluorescent lamps for safe passage; trainable 500 W incandescent floodlights at lifeboat and raft launching stations; 300 W incandescent floodlights at each of the four mooring stations; and a number of conventional 60 W fluorescent lamps located along inside and outside walkways) are shielded to the maximum degree possible or pointed downward to minimize the attraction to birds. No portholes would be located in crew quarters.

Artificial lighting is one of a suite of human impacts that together are contributing to the downward trend in distribution and abundance of the world's 300 species of seabirds. Many seabirds are nocturnal and move between land and sea at dusk or at night to their feeding grounds at sea and are particularly vulnerable to artificial lighting (Podolsky, 2002). Once seabirds are disoriented they are at risk of colliding with a large vertical structure with a brilliant source of light, in an environment which is otherwise flat and dark at night. Structures with artificial lighting present a conspicuous visual cue and a sharp contrast against nocturnal darkness (Wiese, et al., 2001). Birds are more likely to be attracted to artificial light during cloudy nights enhanced by fog, haze, or drizzle; in the fall as young, inexperienced birds encounter lights for the first time; and during the dark period of the new moon when artificial lights are more obvious to nocturnal birds (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, 2004). The amount of light coming from the platform has been minimized during design of the vessel to the extent practicable and in keeping with crew safety requirements.

The GBR-P radar, located on the tip of Kwajalein Atoll, is similar to the SBX. The GBR-P has a translucent dome similar to the SBX and is illuminated for 4 hours every night. The facility is inspected each day, and damage to the dome from anything that resembles a bird strike has not been observed. An onboard procedure for responding to bird strikes would be developed and implemented based on USFWS guidance. Points of contact with the SBX operator and the USFWS, as well as type and frequency of reports would be established.

Following maceration and disinfection (chlorination) treatments, wastewater would be discharged just above the pontoon deck. Solid waste would be kept in covered containers until offloaded for onshore disposal.

The SBX would utilize seawater in cooling pumps which would be used to cool mechanical equipment and radar systems on the SBX. The cooling system would have a typical flow of 7,044 gallons per minute and would be expected to incur a temperature rise of approximately 6°F, with a maximum temperature rise of 10°F. The cooling water discharge would have four points of discharge at pontoon-level locations and three points of discharge at upper hull locations.

The thermal effects of seawater cooling water overboard discharge were previously modeled using the Cornell Mixing Zone Expert System in the *Technical Development Document for Phase I Uniform National Discharge Standards for Vessels of the Armed Forces*. This system was used to estimate the plume size and temperature rises in the water body receiving the discharge of three vessels in three harbors. Of the five states having a significant presence of Armed Forces' vessels, only Virginia and Washington have established thermal mixing zone dimensions. The models predicted that U.S. Navy aircraft carriers would generate thermal plumes that, under conditions of low harbor flushing, low wind velocities, and maximum cooling water flow rates (120,000 gallons per minute), would exceed the regulatory thermal mixing zone

limits of Washington. (U.S. Environmental Protection Agency and U.S. Department of the Navy, 1999) Thermal plumes from models of destroyers did not exceed regulatory limits.

The SBX cooling water would have a much lower flow rate (7,044 gallons per minute), lower typical temperature rise of 6 to 10 degrees, and the mooring site in Kuluk Bay, when compared to the modeled locations, has higher flushing conditions, much deeper water (230 feet versus 30 feet), and high wind velocities, all of which minimize the potential for thermal effects. Although certain fish and wildlife species may be attracted to warmer water, the SBX thermal plume would be a localized feature. If the number of wildlife in the vicinity of the SBX increases over time, then additional coordination with the USFWS would occur.

Although the SBX seawater cooling discharge would contain some heavy metals, the quantity would be less than on typical armed forces vessels which utilize nickel-copper piping. While the SBX uses some copper-nickel piping, it also uses a composite piping that does not contribute heavy metals. Although specific performance standards and potential pollution control device requirements have not been determined, and specific requirements for the SBX, if any, can not be developed at this time, the use of the composite piping is considered a pollution control device.

Annual underwater hull inspections would be conducted to ensure there is not an excess accumulation of marine organisms. The SBX hulls would be cleaned in dry dock approximately every five years. These actions would help minimize the potential for the SBX to act as an artificial reef, attracting marine organisms.

In order to comply with the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, and the National Invasive Species Act of 1996, as mandated by the Coast Guard, the SBX would employ at least one of the following ballast water management practices as applicable:

- Prior to discharging ballast water in U.S. waters, perform complete ballast water exchange in an area no less than 200 nautical miles from any shore
- Retain ballast water onboard the vessel
- Prior to the vessel entering U.S. waters, use an alternative environmentally sound method of ballast water management that has been approved by the Coast Guard
- Discharge ballast water to an approved reception facility

The use of existing facilities on Adak for PSB activities would not result in impacts to biological resources. Support vessels are commonly present in Sweeper Cove and Kuluk Bay, or docked pier-side at the Port of Adak. The support vessel would be operated in accordance with all applicable rules and regulations, and no significant impacts to marine life are anticipated. In addition, the patrol boat used in the waters in the vicinity of the SBX would use an approved Marine Sanitation Device to process sanitary waste generated onboard. Any hazardous wastes transported by or generated onboard the patrol boat would be disposed of onshore according to Alaska Department of Environmental Conservation and USEPA guidelines, and no significant impacts to marine life are anticipated.

4.3.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Loitering of the SBX in the Bering Sea or Sitkin Sound would not include the installation of embedment-type anchors and mooring legs or the use of the SBX anchors due to the prohibitive water depths.

Impacts of daily testing and calibration of the SBX's radar system would be the same as those described above for loitering in Kuluk Bay. No impacts are anticipated to fish or marine mammals in the Bering Sea or Sitkin Sound as a result of RF emissions.

The potential for impacts to birds and marine species in the Bering Sea or Sitkin Sound area from SBX lighting, solid waste collection and disposal, wastewater discharge, cooling water discharge, and ballast water management would be similar but likely less than those discussed above for Kuluk Bay due to the deeper open ocean environment. As discussed above regarding potential bird strikes, points of contact with the SBX operator and the USFWS, as well as type and frequency of reports, would be established. If the number of strikes exceed agreed upon limits then additional coordination with the USFWS would occur to determine an appropriate plan of action. Overall, no substantial adverse impacts to birds, fish, or marine mammals are expected.

4.3.4 CUMULATIVE IMPACTS

No other projects in the ROI have been identified that would have the potential for incremental, additive cumulative impacts to biological resources in the ROI. As discussed in section 4.3.2, no significant effects are anticipated to Essential Fish Habitat, birds, whales, or other marine mammals that might be present in the vicinity of the homeport and transit locations.

4.4 CULTURAL RESOURCES

4.4.1 SBX POSITIONING IN KULUK BAY

For Alternative 1, positioning of the SBX in Kuluk Bay would include the installation of multiple (8 to 12) embedment-type anchors and mooring legs. This installation would possibly require the relocation of existing debris scattered on the ocean floor in Kuluk Bay. Although there are no previously identified cultural resources within the ROI, a recent geophysical survey of Kuluk Bay resulted in the identification of World War II submarine netting as part of the debris. Similar submarine netting, located on the shore of Finger Bay, is a part of the Adak National Historic Landmark and Cultural Landscape Historic District.

The mooring location was selected to meet design requirements such as holding capacity as well as to avoid submerged debris to the extent possible. However, some debris has been identified within 50 feet of one or more anchors and associated cables. Through consultation with the Alaska Office of History and Archaeology and the National Park Service the following mitigations have been developed. SBX personnel will employ technologies that will enable them to identify and remove obstructions with minimal disturbance of the surrounding marine habitat, or other debris that does not require removal. Acceptable methods of removal include video guided clamshells and video guided mechanical grapples. Additionally, other methods for

the secure, minimally invasive removal of debris may be developed. Removal techniques that will be prohibited include wire drags, grappling hooks, nets, non-video guided clamshells and mechanical grapples, and other bulk removal technologies incapable of target discrimination.

Debris would be removed and disposed of in an approved manner, or if it is an identifiable artifact that potentially contributes to the Adak National Historic Landmark, it could be brought to the surface and deposited on shore at a location desired by the Office of History and Archaeology.

Alternative 2, SBX loitering, would not affect the ocean floor in Kuluk Bay and would have no impact on cultural resources.

Alternative 3, SBX anchoring, would utilize the SBX anchors and would attempt to avoid the debris identified during the geophysical survey. As such impacts to cultural resources should be avoided. If submarine netting were pulled up with the SBX anchor, it would be handled in an appropriate manner, as determined in consultation with the SHPO.

4.4.2 OPERATION IN KULUK BAY

Personnel would be informed of the sensitivity of cultural resources and the types of penalties that could be incurred if sites are damaged or destroyed. In addition, onshore PSB facilities would not be located in historic buildings, nor would they be near any historic resources. No impacts to cultural resources are anticipated during operation of the SBX.

4.4.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Loitering of the SBX in the Bering Sea or Sitkin Sound would not include the installation of multiple (8 to 12) embedment-type anchors and mooring legs or the utilization of the SBX anchors due to the prohibitive depths of the ocean in the Bering Sea and Sitkin Sound. As such, impacts to cultural resources would be avoided. SBX loitering would not affect the ocean floor and would have no impact on cultural resources.

4.4.4 CUMULATIVE IMPACTS

No other projects in the ROI have been identified that, when added to the installation of the proposed embedment-type anchors and mooring legs at Kuluk Bay or loitering in the Bering Sea or Sitkin Sound, would have the potential for incremental, additive cumulative impacts to cultural resources.

4.5 HEALTH AND SAFETY

4.5.1 SBX POSITIONING IN KULUK BAY

Activities involved with the positioning of the SBX in Kuluk Bay would occur in accordance with existing safety protocol/procedures and applicable state and federal requirements. No adverse effects to health and safety of personnel or the public are anticipated.

4.5.2 OPERATION IN KULUK BAY

The SBX operating area would be in the vicinity of the mooring location at Kuluk Bay, as shown in figure 2-1. Configuration and general operation of the SBX would occur as described in section 2.1. A security zone would be established in accordance with 33 CFR Part 165, around the SBX under each alternative. This security zone of approximately 500 yards would be required to ensure the physical protection of the SBX while positioned at the PSB. This security zone would prevent recreational and commercial craft from interfering with operations involving the SBX and could include the installation and use of a floating security boom/fence around the SBX, and/or operation of a security patrol boat. Transit through, or anchoring within, this security zone would be prohibited unless authorized by the appropriate SBX official.

The XBR transmit/receive RF emission pattern would be mostly contained within a narrow main beam. During SBX operations, the total duration of XBR full power RF transmission would average approximately 5 hours per day.

A DD Form 1494 is required as part of the spectrum certification and frequency allocation process. The completed DD Form 1494 must be processed and approved by the appropriate national and international authorities prior to SBX operations. The DD Form 1494s for SBX operations at Kuluk Bay are currently in process with an estimated approval date prior to November 2005.

An RF/RFI survey and analysis completed by the Joint Spectrum Center considered RF hazards to aircraft, personnel, fuels, and ordnance (EEDs) from the SBX radar. The level-one analysis identified 531 potential interference interactions between the SBX and existing systems on Adak. Only four of the interactions exceeded the threshold for a level-two analysis. Results of the level-two analysis indicate the SBX radar would not cause RF interference to any of the systems identified. (Department of Defense, 2003) The analysis also provides recommendations for sector blanking and safety systems to minimize exposures. The SBX systems will have the appropriate safety exclusion zones established before operation, and warning procedures to inform personnel when the system is in operation and emitting RF. Mechanical and software stops would be used to prevent the main beam from being directed in specified sectors where it may present a hazard.

Previous analysis of similar radars in the GBR Family of Radars EA and Finding of No Significant Impact and the *Environmental Assessment for Theater Missile Defense Ground-Based Radar Testing Program at Fort Devens, Massachusetts* considered both program operational requirements and restrictions and range-required safety procedures. The analysis concluded that the required operational safety procedures, including establishment of controlled areas and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce from exposure to significant amounts of RF energy. (U.S. Army Program Executive Office Missile Defense, 1993 and U.S. Army Space and Strategic Defense Command, 1994a)

A summary of the results presented in the GMD Extended Test Range EIS is provided below.

RF Hazards

Human Exposure

The analysis method used to evaluate potential effects of RF transmissions is the Institute of Electrical and Electronics Engineers (IEEE) Maximum Permissible Exposure Limits, which define the maximum time-averaged RF power density allowed for uncontrolled human exposure. At X-band frequencies (8,000 MHz–12,000 MHz), the IEEE standard for human exposure is 5.33 mW/cm^2-8 mW/cm^2, respectively. For the SBX radar (XBR) (exclusive of other RF transmitters) to have an effect on human health, the beam operating at full power would have to come in contact with a person and remain on them for 7.5 minutes (at 8,000 MHz) to 11.25 minutes (at 12,000 MHz).

Other emitters on the SBX include various communication devices and radars. Safe separation distances for general access areas range from several inches up to approximately 13 feet. Deck paint would be used to identify restricted access zones where appropriate. The IDT has a potential safe separation distance of up to 75 feet during a maximum one second calibration run. This area would most likely be controlled through operational procedures rather than painting the deck. Specific procedures for all areas would be contained in the final version of the SBX Electromagnetic Environmental Effects Control Plan.

Electroexplosive Devices

The potential impacts to EEDs from emissions from the XBR are twofold: (1) the EED could be made not to work, or (2) the EED could be inadvertently initiated. The majority of the time, an EED is either installed in its intended application with its leads attached (the presence phase) or is in the shipping/storage phase. Typical EED applications in the presence phase would include fire extinguishers, automotive airbags, a missile attached to the wing of an aircraft, and military aircraft ejection seats. However infrequently, EEDs are sometimes handled without the protection of a storage container (handling/loading phase). Therefore, different susceptibility criteria have been developed for each of these two distinct conditions described above.

As can be seen from table 2-1, EEDs in the handling/loading phase are substantially more susceptible to RF hazards; however, main beam illumination on the ground would not occur. As shown in table 2-1, based on a grating lobe illumination on the ground from the SBX radar, a potential interference distance of 1.4 miles exists for EEDs in the handling/loading phase. It is assumed that the handling/loading of EEDs would not occur when aircraft are airborne. However, main beam illumination of aircraft with EEDs (mainly military aircraft ejection seats) in the presence and shipping phases is possible. There is a potential for EED RF interference for distances up to 4.6 miles in the air. The onboard surveillance radar would be used to determine if an aircraft is approaching the SBX interference area and the SBX radar would then be shut down. These procedures would be used to ensure that aircraft bearing EEDs are not threatened by main beam interference. Based on the RF/RFI/EMI survey results, SBX operating procedures, and coordination with the FAA, Department of Transportation, and others, an SBX operating area would be developed and published on appropriate aeronautical charts to inform pilots of the potential RFI hazard to certain aircraft.

The grating lobes of the SBX could also illuminate EEDs on the ground in the presence/shipping phase. However, the potential RF hazard would exist only 33 feet, in front of the radar, which would be limited to the deck of the SBX. Therefore, EEDs in the presence/shipping phase on the ground would not be affected.

Fuels

Based on the threshold of 5,000 mW/cm^2 from Technical Order 31Z-10-4, the SBX does not present a RF hazard to fuels because the SBX power density does not exceed 5,000 mW/cm^2.

Communications–Electronics Frequency-Related Interference

In-band RF interference occurs when two pieces of communications-electronics equipment are located within the same frequency band. Therefore, equipment with frequencies falling within the X-band (8,000-12,000 MHz) would most likely be affected.

Adjacent band RF interference is similar to in-band RF interference. The adjacent bands for the X-band include all frequencies that are within approximately 5 percent of the operating frequency.

Harmonic band interference refers to interference produced in harmonically related receivers or interference caused by sub-harmonically related transmitters. Harmonic frequencies include those frequencies that are integer multiples of the operating frequencies.

Ground-based, airborne, and ship-based systems have been evaluated for in-band, adjacent band, and harmonic band interference in a detailed RF/RFI survey. Results of the survey indicate emissions from the SBX may potentially degrade the overall system performance of in-band airborne and ship-based radar systems. Based on analysis performed by the Joint Spectrum Center, the interference would most likely result in reduced range of the radars. For example, a surface search radar with a range of 60 nautical miles would only be able to see objects at 50 nautical miles. This would apply to shipboard radars operating within 20 nautical miles of the SBX. This reduction in range of the radar would result in minor impacts to ships operating in the vicinity of Adak. This would include private and commercial fishing vessels, supply delivery ships, and U.S. Navy and USCG ships.

Communications–Electronics Non-Frequency-Related Interference

Non-frequency-related interference from the SBX to the electromagnetic environment is limited to high-power effects. High-power effects typically occur in receivers that are located in proximity to high power transmitters and may be the result of either antenna-coupled signals or equipment case penetration. The accepted levels for high power effects are 1 mW/cm^2 for military equipment and 0.1 mW/cm^2 for civilian equipment. Under proposed SBX operating conditions, full power operation would involve tracking objects in space with the beam pointed up and constantly moving. The beam would not remain stationary for any appreciable period of time, thus the odds of interference from high power effects with any electronic equipment on the ground would be slight, 1/1,000,000 or 0.0001 percent of the time (roughly 1/10 of a second per day). The effects would not damage any electronic equipment and would last for less than a second, should this occur.

Aircraft/Avionics

The potential for RF transmissions from the XBR main beam to adversely affect aircraft avionics systems as discussed in section 4.2. The potential health and safety related impacts to aircraft are a reduction in life of the aircraft avionics, not a direct impact to the aircraft operation.

The implementation of operational safety procedures, including establishment of controlled areas, the use of on-board air-surveillance radar (based on an existing commercial weather radar design), and limiting the SBX operations when aircraft approach the SBX interference area, would preclude any potential safety hazard to either the public or SBX workforce from exposure to SBX RF transmissions. SBX operations would be coordinated with the FAA, USCG, and other groups or agencies as appropriate. Therefore, no health and safety impacts to coastal areas, airspace/aircraft, or mariners are anticipated.

4.5.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Activities involved with loitering and operation of the SBX in the Bering Sea or Sitkin Sound would occur in accordance with existing safety protocol/procedures and applicable state and federal requirements.

A security zone would be established in accordance with 33 CFR Part 165, around the SBX under each alternative. This security zone of approximately 500 yards would be required to ensure the physical protection of the SBX while loitering in the Bering Sea or Sitkin Sound. This security zone would prevent recreational and commercial craft from interfering with operations involving the SBX. Transit through, or loitering within this security zone would be prohibited unless authorized by the appropriate SBX official.

The implementation of loitering and operation of the SBX in the Bering Sea or Sitkin Sound would include all the components, procedures, and safeguards as described for operation of the SBX at Kuluk Bay. Therefore, no increase in potential risk to health and safety of personnel or the public would be expected as a result of loitering and operation in the Bering Sea or Sitkin Sound.

4.5.4 CUMULATIVE IMPACTS

The concept of time averaging is important in consideration of the potential cumulative exposures that might occur near operating radars. Because tracking and search radar beams move rapidly, depending on the particular mission or exercise, it is unlikely that environmental exposures would ever consist of continuous, constant values of power density. Rather, almost universally, exposures would be intermittent and, when the radars are transmitting, the electromagnetic fields would be constantly changing in intensity. No other projects in the ROI have been identified that would have the potential for additive, cumulative impacts to health and safety.

4.6 SOCIOECONOMICS

4.6.1 SBX POSITIONING IN KULUK BAY

For Alternative 1, positioning of the SBX would include the installation of multiple (8 to 12) embedment-type anchors and mooring legs. Approximately 20 to 100 persons would be involved in the installation activities. It is anticipated that the majority of those involved in these activities would be housed onboard installation vessels or in existing facilities ashore for the

period of the installation. The purchase of supplies from local vendors would result in a minor positive socioeconomic impact.

Alternatives 2 and 3 would not require installation of permanent mooring and would result in no socioeconomic impacts during positioning of the SBX.

4.6.2 OPERATION IN KULUK BAY

Implementation of Alternative 1, 2, or 3 would result in a large sea-based platform being located in Kuluk Bay for up to 12 months of the year. While the SBX is at the Adak PSB, most personnel would reside on the SBX platform. A permanent cadre of approximately three dozen people would utilize permanent housing on Adak in direct support of SBX operations. An additional temporary contingent of approximately one dozen personnel would utilize local hotels or guesthouses in Adak during SBX operations. Generally, by spending money in the local economy mainly via the normal procurement of goods and services, the additional SBX related personnel would represent a positive economic impact to the local community for the duration of time spent at the mooring location throughout the year. The result would represent a small positive economic impact to the Adak economy. The proposed project would not cause any population growth.

While at the mooring location in Kuluk Bay, the SBX and mooring lines would occupy approximately 208 acres within Kuluk Bay. This represents less than 4 percent of the surface of Kuluk Bay. In addition, the SBX mooring location would be north of the primary route into Sweeper Cove and Port Adak.

While moored at the PSB, the SBX would be away from the range and channel for transit in or out of Sweeper Cove. The SBX would be located in Kuluk Bay with sea room for transit around its mooring. In transit to and from the mooring, nautical rules of the road and local coordination via bridge-to-bridge radio would be used to prevent any conflicts. The SBX is not expected to interfere with subsistence and commercial fishing areas, have any impacts on current shipping schedules, ship-borne commerce, recreational boating, or general transit. In addition, SBX operations would be coordinated with the FAA and would be scheduled, if possible, to occur during hours of minimal aircraft operations. There would be no reduction in the amount of available airspace, no disruption of existing aircraft operation would be foreseen, and no resultant economic impacts are expected to the Adak Airfield or any air traffic in the area.

Emissions from the SBX may also potentially degrade the overall performance of X-band (8 to 12 gigahertz) airborne and ship based systems. Based on analysis performed by the Joint Spectrum Center, the interference would most likely result in reduced range of the radars. For example, a surface search radar with a range of 60 nautical miles would only be able to see objects at 50 nautical miles. This would apply to shipboard radars operating within 20 nautical miles of the SBX. This reduction in range of the radar would result in minor impacts to ships operating in the vicinity of Adak. This would include private and commercial fishing vessels, supply delivery ships, and U.S. Navy and USCG ships.

4.6.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Activities related to loitering and operation of the SBX in the Bering Sea or Sitkin Sound would not cause any displacement of populations, residences, or businesses within the ROI.

The SBX is not expected to interfere with subsistence and commercial fishing, and would not have any impacts on current shipping schedules, ship-borne commerce, recreational boating, or general transit. The SBX would be in a station-holding position or moving slowly within the area and would avoid primary fishing areas that are in use as well as shipping routes. The security zone of approximately 500 yards would affect a very small area within Sitkin Sound and the Bering Sea.

4.6.4 CUMULATIVE IMPACTS

No other projects in the ROI have been identified that would have the potential for incremental, additive cumulative impacts to economic resources or potential subsistence harvesting in the ROI.

4.7 WATER RESOURCES

As stated in section 3.12, the USEPA and State of Alaska have water quality standards that must be met. The Alaska Antidegradation Policy maintains that existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. If the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected.

4.7.1 SBX POSITIONING IN KULUK BAY

Activities surrounding the positioning of the SBX in Kuluk Bay would include the installation of embedment-type anchors and mooring legs in Alternative 1. Other than minor, short-term impacts to turbidity levels and the potential for accidental spills of petroleum products and other materials used during construction, no impacts would be anticipated. In addition, standard operating procedures would be used to minimize water quality impacts.

Alternative 2, SBX loitering, would not disturb the ocean floor. Alternative 3, using the SBX anchor, would result in minor short-term impacts to turbidity levels each time the anchor is set and released.

4.7.2 OPERATION IN KULUK BAY

Implementation of Alternative 1, 2, or 3 would result in the SBX operating near Adak or in Kuluk Bay. There would be a total of 62 crew members, along with some temporary duty personnel, for a total of up to 100 people onboard the SBX at any given time. Onshore personnel would include 3 to 10 people providing support to the SBX. In addition, a shore staff associated with the security vessels would provide maintenance, logistic and administrative support. The boat crews and shore staff could total up to 30 personnel. This limited increase in the number of personnel at Adak would not affect the water supply or wastewater systems at Adak.

Onboard the SBX, based on an average consumption of 50 gallons per capita per day, the average daily demand for water for a maximum personnel level of 100 on the SBX would be 5,000 gallons. Potable water would be produced onboard the SBX by a set of three RO systems. Each RO unit would have the capacity to produce up to 7,000 gallons of potable water per day. The existing water supply at Adak would not be affected by water consumption onboard the SBX.

Based on an estimated 45 gallons of wastewater per capita per day, the average daily production of wastewater for a maximum 100 personnel would be 4,500 gallons. An onboard marine sanitation device would be used to treat the wastewater produced onboard the SBX prior to discharge while moored in Kuluk Bay. The wastewater would undergo maceration and disinfection (chlorination) treatments before being discharged just above the pontoon deck. An oil–water separator would also be used onboard to treat oily bilge water before its discharge overboard above the water line. The SBX would meet all USGC standards for sewage and oily water discharge.

Equipment would be in place onboard the SBX and support vessel in the event of a fuel spill, and a Shipboard Oil Pollution Emergency Plan would also be in place with the USCG. Procedures would be in place to minimize impacts of a potential fuel spill during fueling operations. In addition, spill clean up resources are maintained in Sweeper Cove because of the refueling pier and could be used to support in the event of a fuel spill.

The Uniform National Discharge Standards for Vessels of the Armed Forces, as detailed in 40 CFR Part 9 and Chapter VII, considers which discharges produced by vessels of the Armed Forces require control, monitoring, and the use of a Marine Pollution Control Device to limit pollution. Included in that list are discharges from clean ballast, deck runoff, distillation and RO brine, seawater cooling, and surface vessel bilge water/oil-water separator effluent. (U.S. Environmental Protection Agency and U.S. Department of the Navy, 1999)

It is anticipated that the largest discharge for the SBX would come from seawater cooling overboard discharge. The SBX would operate seawater cooling pumps which would be used to cool mechanical equipment and radar systems on the SBX. The cooling system would have a typical flow of 7,044 gallons per minute and would be expected to incur a temperature rise of approximately 6°F, with a maximum temperature rise of 10°F. The cooling water discharge would have four points of discharge at pontoon-level locations and three points of discharge at upper hull locations. For analysis purposes it is assumed that the SBX is moored 12 months of the year at Adak.

A Nature of Discharge Report was produced as part of the *Technical Development Document for Phase I Uniform National Discharge Standards for Vessels of the Armed Forces* (U.S. Environmental Protection Agency and U.S. Department of the Navy, 1999). The thermal effects of seawater cooling water overboard discharge were modeled using the Cornell Mixing Zone Expert System. This system was used to estimate the plume size and temperature rises in the water body receiving the discharge. Modeling included the cooling water discharge of three vessels in three harbors. Of the five states having a significant presence of Armed Forces' vessels, only Virginia and Washington have established thermal mixing zone dimensions. The models predicted that U.S. Navy aircraft carriers, with a typical cooling water temperature rise of 10 to 15 degrees, would generate thermal plumes that, under conditions of low harbor flushing, low wind velocities, and maximum cooling water flow rates (120,000 gallons per minute), would

only exceed the regulatory thermal mixing zone limits of Washington. Thermal plumes models from destroyers did not exceed regulatory limits. (U.S. Environmental Protection Agency and U.S. Department of the Navy, 1999) In contrast, the SBX cooling water would have a much lower flow rate (7,400 gallons per minute), lower typical temperature rise of 6 to 10 degrees, and the mooring site in Kuluk Bay, when compared to the modeled locations, has higher flushing conditions, much deeper water (230 feet versus 30 feet), and high wind velocities, all of which minimize the potential for thermal effects.

The Nature of Discharge Report also evaluated metals that enter the cooling water as it moves through the components of the cooling system. These metals include copper, nickel, lead, aluminum, tin, silver, iron, titanium, chromium, and zinc.

The Nature of Discharge Report concluded that seawater cooling discharge from armed forces vessels has a potential to cause an adverse environmental effect due to exceedance of federal water quality criteria for heavy metals and significant heavy metal mass loading (U.S. Environmental Protection Agency and U.S. Department of the Navy 1999). However, the USEPA and U.S. Navy are still in the process of evaluating the Nature of Discharge Reports. Continued USEPA and U.S. Navy analysis will include determining appropriate marine pollution control devices and establishing performance standards for each discharge. (Uniform National Discharge Standards, 2004) Although the SBX seawater cooling discharge would contain some heavy metals, the quantity would be less than on typical armed forces vessels due to the materials that are used in the SBX seawater cooling system. Since specific performance standards and potential pollution control device requirements have not been determined, specific requirements for the SBX, if any, can not be developed at this time. Once defined the regulations would be followed.

4.7.3 LOITERING AND OPERATION IN THE BERING SEA OR SITKIN SOUND

Activities surrounding the operation of the SBX in the Bering Sea or Sitkin Sound would not include the installation of embedment-type anchors and mooring legs or the utilization of the SBX anchors due to the prohibitive depths of the ocean in the Bering Sea and Sitkin Sound. In addition, standard operating procedures would be used to minimize water quality impacts. The potential for impacts due to sewage, oily water, and seawater cooling discharge associated with the loitering and operation of the SBX in the Bering Sea or Sitkin Sound would be similar but less than that described for Kuluk Bay due to the deeper water and open ocean environment.

The number of personnel on the SBX and those providing support from Adak, and their potential impacts on the water supply or wastewater systems at Adak would be the same as those described for operations in Kuluk Bay.

4.7.4 CUMULATIVE IMPACTS

Due to a restricted area that includes most of Kuluk Bay, no other vessels would be anchored in the vicinity of the SBX. Therefore, there would be no other impacts to water resources that, when combined with the minor impacts from SBX activities, would result in cumulative impacts to water resources.

4.8 ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

In general, most known adverse effects resulting from implementation of the Proposed Action would be mitigated through project planning and design measures, consultation with appropriate agencies, and the use of Best Management Practices. As a result, most potential adverse effects would be avoided, and those that could not be avoided would not result in a significant impact to the environment.

Adverse environmental effects that cannot be avoided include disturbance of the ocean floor at the proposed mooring site; the release of small amounts of pollutants into the atmosphere and ocean; and minor increased generation of waste materials on the SBX. Some short-term program-related impacts to water resources may occur. Any hazardous waste generated would be managed in compliance with DoD, and other applicable federal, state, and local regulations.

RF transmission levels would not exceed safety guidance and would not affect the public.

4.9 CONFLICTS WITH FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED

The proposed program activities at Adak would be consistent with the existing land use and would be in accordance with federal, state, and local plans and policies. Kuluk Bay is classified as a Resource Management area by the Alaska Department of Natural Resources. In addition, a Submerged Land Lease and U.S. Army Corps of Engineers Section 10 Permit would be obtained for the mooring location, and all activities would be in accordance with an approved Alaska Coastal Consistency Determination.

4.10 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Anticipated SBX energy requirements would be well within the SBX vessel's energy supply capacity. Alternative 1 is the most energy conserving alternative.

4.11 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible or irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects result primarily from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. For the Proposed Action, most impacts are negligible or short-term and temporary.

The amount of materials required for any program-related activities and energy used during the project would be small. Although the proposed activities would result in some irreversible commitment of resources such as diesel fuel and various metallic materials for mooring installation, none of these activities would be expected to significantly decrease the availability of the resources. Impacts to threatened or endangered species and cultural resources are expected to be negligible and would not result in an irretrievable commitment of resources.

4.12 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Proposed SBX activities would take advantage of existing facilities and infrastructure. The proposed use of existing facilities or locations would not alter the uses of the sites. Therefore, the Proposed Action does not eliminate any options for future use of the environment for the locations under consideration.

4.13 NATURAL OR DEPLETABLE RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL

Other than various structural materials and fuels, the program would require no significant natural or depletable resources.

4.14 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (EXECUTIVE ORDER 12898)

Proposed activities would be conducted in a manner that would not substantially affect human health and the environment. This EA has identified no effects that would result in disproportionately high or adverse effect on minority or low-income populations in the area. The activities would also be conducted in a manner that would not exclude persons from participating in, deny persons the benefits of, or subject persons to discrimination because of their race, color, national origin, or socioeconomic status.

4.15 FEDERAL ACTIONS TO ADDRESS PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS (EXECUTIVE ORDER 13045, AS AMENDED BY EXECUTIVE ORDER 13229)

This EA has not identified any environmental health and safety risks that may disproportionately affect children, in compliance with Executive Order 13045, as amended by Executive Order 13229.

5.0
REFERENCES

5.0 REFERENCES

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