Report No. DODIG-2024-100

~~CUI~~

INSPECTOR GENERAL

U.S. Department of Defense

JUNE 21, 2024

(U) Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California

~~Controlled by: DoD OIG~~
~~Controlled by: Audit~~
~~CUI Category: Operations Security~~
~~Distribution/Dissemination Control: FEDCON~~
~~POC: Assistant Inspector General for Audit, Readiness and Global Operations,~~ [redacted]

INDEPENDENCE ★ INTEGRITY ★ EXCELLENCE ★ TRANSPARENCY

~~CUI~~


INSPECTOR GENERAL
INTEGRITY
EFFICIENCY
DEPARTMENT OF DEFENSE

(U) Results in Brief

(U) Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California

June 21, 2024

(U) Objective

(U) The objective of this audit was to determine whether the Military Services assessed facility resilience and planned for adaptation needed to address climate change and extreme weather events at installations in California. Specifically, we determined whether four installations in California assessed facility resilience and planned for adaptation needed to address the effects of wildfires, drought, and recurrent flooding.

(U) Findings

(U) Installation officials at Fort Irwin, Marine Corps Base (MCB) Camp Pendleton, Naval Air Station North Island (NASNI), and Beale Air Force Base (AFB) have not fully assessed facility resilience or plan for adaptation needed to address the effects of wildfires, drought, and flooding. Specifically, installation officials at the four California installations did not incorporate climate-related environmental risks, infrastructure vulnerabilities, and risk-reduction measures into their Master Plans as required by DoD guidance. In addition, while Beale AFB prepared climate assessments as required by Air Force guidance, Fort Irwin, MCB Camp Pendleton, and NASNI officials did not prepare climate assessments as required by Army and Navy guidance, respectively.

(U) Officials at all four installations have not updated Master Plans, and officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not prepare climate assessments in accordance with policy because they were unfamiliar with climate resilience planning requirements, processes, and tools.

(U) Findings (cont'd)

(U) As a result, officials at the four installations may not adequately assess the potential effects of climate change that could adversely impact mission readiness. Until officials at the four installations complete climate assessments and update Master Plans that address both current and future risks and threats from climate change and extreme weather events, the officials may overlook implementing adaptive measures that could protect critical facilities from previously unexperienced extreme weather events.

(U) Although installation officials at Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB did not fully plan for climate resiliency or prepare climate assessments in accordance with policy, officials at the installations implemented adaptive measures to protect facilities from the effects of climate change and extreme weather events, including wildfires, droughts, and flooding. As a result, the installations are well postured to react to climate change for the near future.

(U) Recommendations

(U) We made 11 recommendations to address the findings in this report, including recommendations for preparing climate assessments, ensuring that updates to the installations' Master Plans include applicable requirements, and incorporating training for preparing climate assessments and updating the Master Plan.

(U) Management Comments and Our Response

(U) Installation officials, and representatives on behalf of installation officials, agreed with 10 of the recommendations. Their comments addressed these recommendations; therefore, these 10 recommendations are resolved but will remain open. We will close these recommendations once management provides documentation showing that the actions are complete.

(U) Results in Brief

(U) Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California

(U) Comments (cont'd)

(U) The Deputy Assistant Secretary of Defense for Infrastructure Modernization and Resilience, responding for the Under Secretary of Defense for Acquisition and Sustainment, partially agreed with one recommendation, and as a result of the management comments, we revised the recommendation. We consider the recommendation unresolved until the Under Secretary of Defense for Acquisition and Sustainment reviews and provides comments on the revised recommendation. Therefore, we request that the Under Secretary of Defense for Acquisition and Sustainment provide comments on the final report within 30 days. Please see the Recommendations Table on the next page for the status of the recommendations.

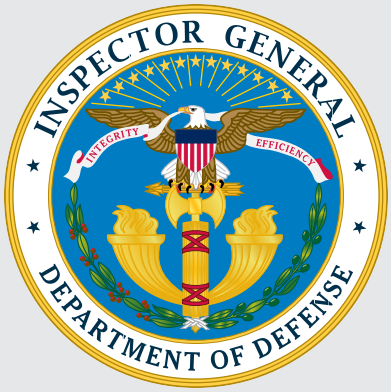
(U) Recommendations Table

(U) Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Under Secretary of Defense for Acquisition and Sustainment	A.6		
Garrison Commander, Fort Irwin		A.1, A.2, A.4	
Commanding General, Marine Corps Base Camp Pendleton		A.1, A.2, A.5	
Commanding Officer, Naval Base Coronado		A.1, A.2	
Vice Commander, 9th Reconnaissance Wing, Beale Air Force Base		A.1, A.3	(U)

(U) Please provide Management Comments by July 22, 2024

(U) Note: The following categories are used to describe agency management's comments to individual recommendations.

- **(U) Unresolved** – Management has not agreed to implement the recommendation or has not proposed actions that will address the recommendation.
- **(U) Resolved** – Management agreed to implement the recommendation or has proposed actions that will address the underlying finding that generated the recommendation.
- **(U) Closed** – The DoD OIG verified that the agreed upon corrective actions were implemented.


INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
INTEGRITY
EFFICIENCY

OFFICE OF INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
4800 MARK CENTER DRIVE
ALEXANDRIA, VIRGINIA 22350-1500

June 21, 2024

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION, AND SUSTAINMENT
AUDITOR GENERAL, DEPARTMENT OF THE ARMY
AUDITOR GENERAL, DEPARTMENT OF THE NAVY
AUDITOR GENERAL, DEPARTMENT OF THE AIR FORCE

SUBJECT: (U) Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California (Report No. DODIG-2024-100)

(U) This final report provides the results of the DoD Office of Inspector General's audit. We previously provided copies of the draft report and requested written comments on the recommendations. We considered management's comments on the draft report when preparing the final report. These comments are included in the report.

(U) This report contains one recommendation that we consider unresolved until the Under Secretary of Defense for Acquisition and Sustainment reviews and provides comments on the revised recommendation. Therefore, the recommendation remains open. We will track this recommendation until management has agreed to take actions that we determine to be sufficient to meet the intent of the recommendation and management officials submit adequate documentation showing that all agreed-upon actions are completed.

(U) This report contains 10 recommendations that we consider resolved and open. We will close these recommendations when management provides us documentation showing that all agreed-upon actions to implement the recommendations are completed.

(U) DoD Instruction 7650.03 requires that recommendations be resolved promptly. For the unresolved recommendation, within 30 days please provide us your response concerning specific actions in process or alternative corrective actions proposed on the recommendations. For the resolved recommendations, please provide us documentation showing you have completed the agreed-upon actions within the estimated completion dates. Please send your response as a PDF to followup@dodig.mil.

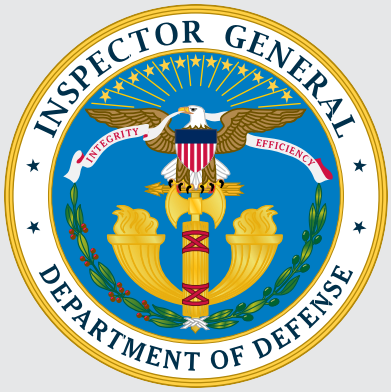
(U) If you have any questions, please contact me at [redacted].

FOR THE INSPECTOR GENERAL:

Richard B. Vasquez
Assistant Inspector General for Audit
Readiness and Global Operations

(U) Contents

Contents (cont'd)


INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
INTEGRITY
EFFICIENCY

(U) Introduction

(U) Objective

(U) The objective of this audit was to determine whether the Military Services assessed facility resilience and planned for adaptation needed to address climate change and extreme weather events at installations in California.[1] Specifically, we determined whether four installations in California assessed facility resilience and planned for adaptation needed to address the effects of wildfires, drought, and recurrent flooding. See the Appendix for the scope and methodology and prior coverage related to the objective.[2]

(U) We focused on the preparation of Master Plans during this audit because the requirement to prepare Master Plans that include climate considerations has existed since August 2018.[3] A Master Plan is an installation document that evaluates factors affecting the present and future physical development and operation of an installation. However, the FY 2020 National Defense Authorization Act introduced elements that must be included in an installation's Master Plan.[4] These elements include an Installation Climate Resilience Plan that outlines planned efforts to ensure mission sustainment over the intended lifespan of infrastructure and assets. The FY 2022 National Defense Authorization Act tasked each Military Department with completing an Installation Climate Resilience Plan for at least two installations and providing the plans to Congress.[5] The Military Departments did not prepare an Installation Climate Resilience Plan for any of the four installations we visited during this audit. As a result, we focused on the requirement for Master Plans. For a discussion of Installation Climate Resilience Plan requirements and the installations selected to complete these plans, see Report No. DODIG-2023-061.[6]

---

1 (U) U.S. Army Corps of Engineers: Washington, D.C., "DoD Installation Exposure to Climate Change at Home and Abroad," April 19, 2021, describes extreme weather events as large-scale events such as tornado frequency, hurricane winds greater than 50 knots, hurricane maximum precipitation, hurricane frequency, ice storms, historic drought frequency, and ice jams. The Naval Facilities Engineering Systems Command Climate Change Planning Handbook defines climate as the weather of a place averaged over a period of time, often 30 years. Climate phenomena include components such as sea level, precipitation, annual average temperature, and extreme temperatures.

2 (U) This report contains information that has been redacted because it was identified by the Department of Defense as Controlled Unclassified Information (CUI) that is not releasable to the public. CUI is Government-created or owned unclassified information that allows for, or requires, safeguarding and dissemination controls in accordance with laws, regulations, or Government-wide policies.

3 (U) Public Law 115-232, "The National Defense Authorization Act for Fiscal Year 2019," section 2805, "Updates and modifications to Department of Defense Form 1391, Unified Facilities Criteria, and military installation master plans," August 13, 2018.

4 (U) Public Law 116-92, "The National Defense Authorization Act for Fiscal Year 2020," section 2801, "Military installation resilience plans and projects," December 20, 2019. Installation personnel complete a Master Plan primarily at the installation level.

5 (U) Public Law 117-81, "The National Defense Authorization Act for Fiscal Year 2022," section 2833, "Prompt completion of military installation resilience component of master plans for at-risk major military installations," December 27, 2021.

6 (U) Report No. DODIG-2023-061, "Audit of Military Department Climate Change Assessments and Adaptation Plans in the Southeastern Continental United States," March 28, 2023.

(U) Background

(U) The DoD defines climate change as variations in average weather conditions that persist over multiple decades or longer that encompass increases and decreases in temperature, shifts in precipitation, and changing risk of certain types of severe weather events.[7] Resilience is the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. Adaptation is the adjustment in natural or human systems in anticipation of or in response to a changing environment in a way that effectively uses beneficial opportunities or reduces negative effects.[8]

(U) In July 2021, the DoD's senior climate adviser stated, "Climate change is going to cost us [the DoD] in resources and readiness."[9] The 2021 DoD Climate Risk Analysis states that climate change has significant implications for U.S. national security and defense.[10] According to the 2021 DoD Climate Risk Analysis, increasing temperatures; changing precipitation patterns; and more frequent, intense, and unpredictable extreme weather conditions caused by climate change are increasing existing risks and creating new security challenges for U.S. interests. The 2021 DoD Climate Risk Analysis also stated that the risks of climate change to DoD strategies, plans, capabilities, missions, and equipment, as well as those of U.S. allies and partners, are growing. Global efforts to address climate change, including actions to address the causes as well as the effects, will influence DoD strategic interests, relationships, competition, and priorities. The 2021 DoD Climate Risk Analysis further states that to train, fight, and win in this increasingly complex environment, the DoD will consider the effects of climate change at every level of the DoD enterprise.

(U) According to the 2021 DoD Climate Risk Analysis, extreme weather events may affect an installation's mission and readiness, cause damage to infrastructure, and reduce an installation's ability to conduct training. According to the U.S. Army Corps of Engineers' (USACE) report "DoD Installation Exposure to Climate Change at Home and Abroad," as the costs and consequences for failing to adapt to climate

[7] (U) According to the "Naval Facilities Engineering [Systems] Command Climate Change Planning Handbook: Installation Adaptation and Resilience," January 2017, weather is the day-to-day state of the atmosphere in a particular place, and its short-term variation is in minutes to weeks. Weather phenomenon examples include a snowfall or rainfall event, storm surge, thunderstorms, tornado, and heat or cold waves.

[8] (U) DoD Directive 4715.21, "Climate Change Adaptation and Resilience," January 14, 2016.

[9] (U) Defensenews.com, "Climate Change is Going to Cost Us: How the U.S. Military is Preparing for Harsher Environments," August 9, 2021.

[10] (U) Office of the Under Secretary for Policy (Strategy, Plans, and Capabilities), "Department of Defense Climate Risk Analysis," October 2021.

(U) change increase, the DoD should consider how to assess, respond to, and improve resiliency to these threats.[11] The report addressed the following climate hazard categories and assessed the threat of each to DoD facilities.

- (U) Drought
- (U) Coastal Flooding
- (U) Riverine Flood Risk[12]
- (U) Heat
- (U) Energy Demand
- (U) Wildfire
- (U) Land Degradation
- (U) Historical Weather Events

(U) Climate Hazards Selected for Review

(U) To determine whether the Military Services assessed facility resilience and planned for adaptation needed to address climate change and extreme weather events at installations in California, we selected climate hazards that affect California—wildfires, droughts, and flooding.

(U) Wildfires

(U) According to the USACE report, wildfires are uncontrolled fires that originate on or cross onto undeveloped areas, regardless of the cause (human or natural). Wildfires pose a significant and increasing threat to structures and communities intermingled with or immediately adjacent to vegetated areas (termed "wildlands," which encompass all undeveloped areas, including military ranges, grasslands, shrub lands, barren lands, woodlands, and forests). Wildfire has three key components—weather conditions favorable for ignition and spread; the presence of wildland vegetation, especially dense vegetation; and a natural or human source of ignition.

(U) The USACE report stated that wildfires may pose a significant risk to military bases; can affect training and testing activities, such as live-fire training, on an installation; and can divert military resources to firefighting activities. The USACE report stated that there are numerous examples of live-fire training and testing activities igniting wildfires during dry conditions with both on- and off-base impacts. Finally, the USACE report stated that managing smoke from wildfires both on and off

[11] (U) U.S. Army Corps of Engineers: Washington, D.C., "DoD Installation Exposure to Climate Change at Home and Abroad," April 2021.

[12] (U) The DoD report, "Report on Effects of a Changing Climate to the Department of Defense," January 2019, identifies recurrent flooding as one of the climate-related events to impact military installations. The report identifies that recurrent flooding comprises coastal and riverine flooding. Riverine flooding occurs when streams and rivers exceed their capacity to accommodate water flow and as a result, water overflows their banks onto dry land.

(U) base is a significant concern because exposure to smoke outdoors (or even indoors if building air is unfiltered) can cause or exacerbate existing health problems (for example, asthma, bronchitis, and cardiovascular problems).

(U) Droughts

(U) According to the USACE report, drought represents a drier climate condition than is typical for a given location and time of year. Drought may be the result of a lack of precipitation (such as rain or snow), a temperature-driven increase in evapotranspiration, or some combination of both factors.[13] These changes may have an acute onset, and may last months to years (sometimes many decades). Droughts may end gradually or suddenly with large precipitation events.

(U) The effects of drought can vary regionally and include reduced water supplies for municipal, industrial, or agricultural purposes; decreased stream flows for navigation and energy generation; decreased water quality; loss of soil moisture and therefore, vegetation stress and die-off; and increased wildfire risk. Because droughts can result in widespread vegetation die-off, the ground surface may be exposed to increased erosion by wind and water when it rains.

(U) Drought may affect installation mission and readiness by reducing surface water supply quantity and quality. Drought-induced drying and killing of vegetation can make the land surface vulnerable to erosion when disturbed, potentially limiting vehicle maneuvers, low-level rotary-wing flight operations, and other training and testing activities, while also making the landscape more susceptible to wildfire. Droughts often correlate with clear skies and higher temperatures, increasing the likelihood of heat-related injuries during field activities and escalating energy demand for cooling.

(U) Flooding

(U) There are several types of flooding, including recurrent and riverine flooding. Recurrent flooding is the flooding effects of rain events, storm surges, and tidal flooding that occur on a regular or frequent basis. Riverine flooding can occur as a consequence of recurrent flooding. Riverine floodplains range from narrow, confined channels (as in steep river valleys in hilly and mountainous areas) to wide, flat areas (as in much of the Midwest and in many coastal areas). In the steep narrow valleys, flooding usually occurs quickly and is of short duration,

[13] (U) Evapotranspiration is the process by which water is transferred from the land to the atmosphere by evaporation from open bodies of water, wetlands, bare soil, and snow cover and by transpiration from the surface of living plants.

(U) but is likely to be rapid and deep. In relatively flat floodplains, areas may remain inundated for days or even weeks, and floodwaters are typically slow moving and shallow.

(U) According to the National Oceanic and Atmospheric Administration, coastal inundation is the covering of normally dry land with water.[14] This refers to the long-term result of sea level rise, as well as the shorter and more variable effects of high tide and storm surge flooding.[15] Longer-term causes are related to relative changes in local or global sea level. Short-term causes of inundation include storm surge and high-tide flooding.

(U) Installations differ in terms of their existing infrastructure and potential vulnerabilities due to flooding. Several installations already routinely experience high-tide flooding. In addition, storm surges from recent hurricanes have intensified flooding, disrupted operations, and caused extensive damage to infrastructure. All areas of California are subject to some form of flooding. Since 1992, every county in the state has been declared a Federal disaster area at least once for a flooding event. However, some portions of California, such as parts of the Sacramento Valley, are more prone to flooding than others. This is because some portions of the state are closer to possible flood risks, such as major rivers.

(U) Flooding may degrade installation mission and readiness by causing infrastructure loss or damage, degradation of mission capabilities, loss of training and testing lands, and salinization of shallow aquifers. In addition, floodwaters may disrupt access to and from installations, cause utility closure, contribute to land degradation, and damage off-base housing and support systems.

(U) Installations in California Selected for Review

(U) To select installations to review, we evaluated current drought conditions, fire danger index, flooding, and sea level rise occurring at the 26 Army, Marine Corps, Navy, and Air Force installations in California.[16] We then selected one installation for each Military Service in California for review. We considered the location of each installation to cover all areas of the state and factored in the size of each installation

[14] (U) According to the National Oceanic and Atmospheric Administration, inundation is the amount of water that occurs above normally dry ground as a result of flooding. Along the coast, there are a few common sources of inundation, including abnormally high tides, storm surge, persistent onshore winds, and waves. In rivers and tidal estuaries, runoff from excessive rainfall can provide another source of inundation. The combination of all of these potential factors makes up the total water level.

[15] (U) According to the National Oceanic and Atmospheric Administration, storm surge is the abnormal rise in seawater level during a storm, measured as the height of the water above the normal astronomical (caused by the gravitational pull of the sun and the moon) tide. The surge is caused primarily by a storm's winds pushing water onshore.

[16] (U) The fire danger index is a continuous reference scale for estimating the potential for a fire to start and require suppression action on any given day.

(U) The 26 military installations we evaluated are 4 Army installations, 6 Marine Corps installations, 10 Navy installations, and 6 Air Force installations.

(U) to select one of the larger installations for each Military Service—Fort Irwin, Marine Corps Base (MCB) Camp Pendleton, Naval Air Station North Island (NASNI), and Beale Air Force Base (AFB).

(U) Fort Irwin

(U) Fort Irwin is located approximately 37 miles northeast of Barstow, California, midway between Las Vegas, Nevada, and Los Angeles, California. The Mojave Desert's hills and mountains surround the installation. Natural vegetation is sparse and mainly consists of mesquite, creosote, yuccas, and other low-growing plants. As a part of the U.S. Army Forces Command, Fort Irwin is the only U.S. military training facility that supports brigade-level (3,000 to 5,000 Soldiers) live-fire exercises.

(U) Flash floods in the Mojave Desert in 2013 swamped Fort Irwin, causing $160 million in damage to Fort Irwin and an additional $60 million to $75 million to "The Box," the nickname for the 1,200 square miles of desert used as a training area for thousands of Service members from all branches every year. More than 155 buildings were damaged by water, mud, and gravel moved by the flood. Three buildings were total losses. Fort Irwin personnel stated that they have been working to mitigate damage from future storms, including repairing existing flood channels and retention areas.

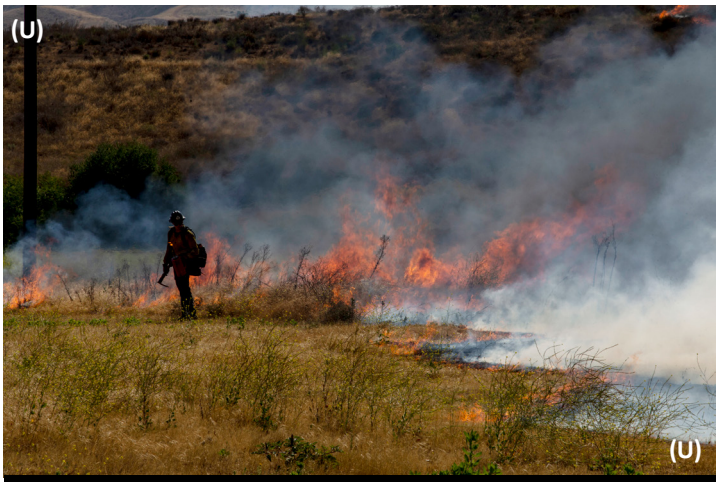
(U) Marine Corps Base Camp Pendleton

(U) MCB Camp Pendleton is located in North San Diego County in Southern California. The installation occupies approximately 125,000 acres, with less than 20 percent of the land developed, and contains more than 17 miles of coastline. MCB Camp Pendleton stands as an ecological buffer between the heavily urbanized areas adjacent to the northern and southern borders of the installation. Within MCB Camp Pendleton, tidal estuaries, riparian corridors, coastal plains, rolling hills and canyons, and mountains that rise in elevation to 2,700 feet above sea level provide essential habitat for more than 1,100 plant and animal species, including 18 federally listed threatened and endangered species and a free-roaming herd of bison.[17] MCB Camp Pendleton provides housing, training facilities, and logistical support for the Fleet Marine Force elements and other units assigned there. In addition, the installation conducts specialized schools and other such training.

(U) MCB Camp Pendleton has suffered from wildfires and remains at risk for flooding, rising sea levels, and severe and moderate drought. During the summer months and during periods of extreme drought, the frequency of extremely low flows

[17] (U) A tidal estuary is the part of the wide lower course of a river where its current is met by the tides. A riparian corridor is a unique plant community consisting of the vegetation growing near a river, stream, lake, lagoon, or other natural body of water.

(U) in unregulated streams is particularly high throughout the installation.[18] Though prone to flooding, it is common for the San Mateo, San Onofre, and Las Flores Creeks, which run through MCB Camp Pendleton, to be dry from July through October. MCB Camp Pendleton officials raised concerns that installations could experience more frequent and damaging flood events because of the effects of increased upstream urbanization in the Santa Margarita Watershed. In addition to flooding, several range fires occur each year on MCB Camp Pendleton. Lightning, wildfires, and ordnance used in training activities are the most common causes of these fires. Figure 1 is an image of a 2021 wildfire on MCB Camp Pendleton.



(U) Figure 1. 2021 Wildfire on MCB Camp Pendleton
(U) Source: MCB Camp Pendleton.

(U) Naval Air Station North Island

(U) Naval Base Coronado is located in Coronado, California. It comprises eight separate naval installations, including NASNI, and inhabits more than 48,830 acres.

(U) Naval Base Coronado provides infrastructure in the form of runways, piers, training ranges, and facilities for the fleet operating forces. NASNI is located at the north end of the Coronado peninsula and is the homeport of two aircraft carriers, along with 23 fixed-wing and helicopter squadrons, the Navy's only two Deep-Submergence Vehicles, and other Navy ships.

(U) NASNI is vulnerable to the effects of storm surge, given its proximity to the Pacific Ocean and relatively flat topography. Portions of NASNI lie within a 100-year flood zone. According to NASNI's Installation Development Plan, water (both seawater and rainwater) is anticipated to reach the flood level only when a 100-year storm event, an extremely high tide, and a seismic sea wave occur simultaneously.[19] Naval Base Coronado, including NASNI, has experienced isolated and flash flooding from tropical storm events, particularly when sea surface temperatures are above average. The installation is also at risk for coastal inundation, flooding, rising sea levels, and moderate drought.

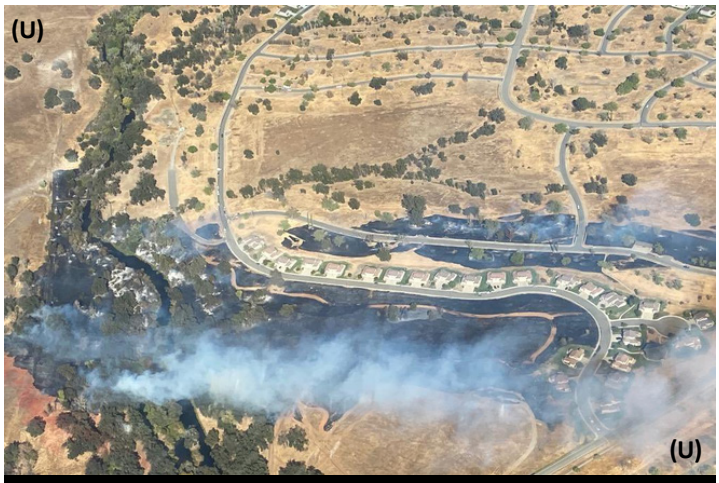
[18] (U) An unregulated stream is a river, stream, or other watercourse whose flow is not regulated by artificial structures such as dams, weirs, offtakes, or storages.

[19] (U) Naval Base Coronado Installation Development Plan, October 11, 2017.

(U) Beale Air Force Base

(U) Beale AFB is located in Yuba County, 15 miles from Marysville, California, and approximately 25 miles from Yuba City, California. The installation is surrounded by rice fields and grazing land. Beale AFB's mission is to deliver reconnaissance capability and combat power in support of national objectives. The installation also maintains a high state of readiness in its combat support and combat service support forces for potential deployment in response to theater contingencies.

(U) Beale AFB installation officials identified major wildfire as a current risk and assessed that risk with a probability of "frequent" and a severity of "catastrophic." Wildfires created negative effects on the installation in 2001, 2004, 2009, 2010, 2018, and 2021, with impacts affecting training areas and ranges, environmental restoration sites, historic and cultural resources, and military housing. Figure 2 is an image from a 2021 wildfire on Beale AFB.



(U) Figure 2. 2021 Wildfire on Beale AFB
(U) Source: Beale AFB.

(U) Wildfires are an annual occurrence on Beale AFB, with most occurring between May and September. Beale AFB's records show that there were 131 wildfires and several controlled burns between 1998 and 2015 on the installation. Nearly half (59) of the wildfires had an unknown cause. Of those with known causes, wildfires started by power lines (34) were most common. For example, when a large bird takes off from a power line and the bird's wings touch two power lines simultaneously, completing an electric circuit, the burning bird ignites the vegetation near the power lines. Additional causes for wildfires included Air Force mission (12), miscellaneous (12), cigarettes (9), escaped prescribed fire (3), Army mission (1), and fireworks (1). Activity in the Explosive Ordinance Disposal area is responsible for frequent wildfires.

(U) Criteria Related to Installation Climate Resiliency

(U) The DoD and the Military Departments issued criteria pertaining to installation climate resiliency. Unified Facilities Criteria (UFC) 2-100-01, "Installation Master Planning," September 30, 2020, outlines a complete process for the development of

(U) a Master Plan, including energy and climate resilience requirements and military installation resilience components. Each Military Department issued guidance to help installations develop their Master Plans and climate assessments.

(U) Unified Facilities Criteria 2-100-01

(U) UFC 2-100-01 sets the standards for the development of military installation Master Plans.[20] The processes, products, tools, and strategies in UFC 2-100-01 apply to the preparation of Master Plans for all U.S. Army, Marine Corps, Navy, and Air Force major military installations and Reserve Component locations in the United States. The September 2020 update to UFC 2-100-01 amended the master planning processes and products to incorporate climate change effects. Specifically, the UFC update requires Master Plans to include an installation military resilience component to discuss severe weather and other changing environmental factors.

(U) The UFC states that severe weather and climate change considerations in planning should include, as applicable to the installation, storm surge flooding, non-storm surge (riverine or surface) flooding, hurricanes/typhoons, high winds, tornados, drought, wildland fires/wildfires, permafrost, desertification, volcanic, seismic, tsunamis, subsidence, sea level change, precipitation change, annual average temperature increases, and extreme heat/cold. The UFC also recognizes that not all extreme weather events are applicable to all installations. The September 2020 update to UFC 2-100-01 also added the requirement for DoD installations to document the extreme weather events applicable to their installations in their climate assessments. However, in Report No. DODIG-2023-061, the DoD OIG stated that UFC 2-100-01 did not adequately define the climate hazards that installations should address. The report included recommendations to update policy. In a response to a draft of that report, the Deputy Assistant Secretary of Defense for Construction agreed that the UFC did not adequately define the climate hazards installations should address but stated that the definitions should be included in a DoD Instruction rather than in the UFC. See Report No. DODIG-2023-061 for a discussion of the climate hazard definitions.

(U) For the purpose of this report, we defined wildfire, drought, and recurrent flooding as stated above.

[20] (U) UFC 2-100-01, "Installation Master Planning," September 30, 2020, states that installation Master Plans are primarily completed at the installation level and include factors affecting the present and future physical development and operation of an installation. UFC 2-100-01 also states that DoD guidance requires Master Plans to be updated every 5 years.

(U) According to UFC 2-100-01, to address the installation military resilience component, installations are to complete an Installation Climate Resilience Plan, which includes the following seven topics.[21]

- (U) Risks and threats to installation resilience that exist at the time the plan is developed and that are projected for the future, including from extreme weather events, mean sea-level fluctuation, wildfires, flooding, and other changes in environmental conditions.
- (U) Assets or infrastructure located on the installation vulnerable to the risks and threats described in the first bullet.
- (U) Lessons learned from the impacts of extreme weather events, including changes made to the installation to address such impacts, since the prior Master Plan was developed.
- (U) Ongoing or planned infrastructure projects or other measures at the time the plan was developed to mitigate the impacts of the risks and threats described in the first bullet.
- (U) Community infrastructure and resources located outside the installation (such as medical facilities, transportation systems, and energy infrastructure) that are necessary to maintain mission capability or the resilience of the installation and vulnerable to the risks and threats described in the first bullet.
- (U) Agreements in effect or planned with public or private entities for the purpose of maintaining or enhancing installation resilience or resilience of the community infrastructure and resources described in the fifth bullet.
- (U) Projections from recognized governmental and scientific entities such as the U.S. Census Bureau, the National Academies of Sciences, the U.S. Geological Survey, and the U.S. Global Change Research Office with respect to future risks and threats (including the risks and threats described in the first bullet above) to the resilience of any project considered in the installation Master Plan during the 50-year lifespan of the installation.

(U) UFC 2-100-01 states that Master Plan updates should be done in accordance with DoD Instruction 4165.70.[22] The DoD Instruction establishes the requirement for all installations to develop a Master Plan and states that Master Plans should:

- (U) be developed by the DoD Component having management responsibility for the installation,

[21] (U) These seven topics were incorporated into the September 2020 update to UFC 2-100-01 from Public Law 116-92, "National Defense Authorization Act for FY 2020," section 2801, "Military Installation Resilience Plans and Projects," December 20, 2019.

[22] (U) DoD Instruction 4165.70, "Real Property Management," April 6, 2005.

- (U) be based on a strategic assessment of the operational mission and expected use of the installation, and
- (U) cover at least a 10-year period and be updated every 5 years (more often if necessary).

(U) Military Department Criteria Related to Installation Climate Resiliency

(U) Each Military Department issued guidance to help installations develop their Master Plans and climate assessments. UFC 2-100-01 instructs the Military Services to use either the Naval Facilities Engineering Systems Command (NAVFAC) Climate Change Planning Handbook or other Military Service Climate Resiliency Handbooks to identify hazards and evaluate adaptation strategies applicable at the installation level.[23] The UFC provides the structure and process to guide climate resilience and adaptation for the Military Departments to develop climate assessments.[24] Additionally, the UFC states that the Military Departments can use their own handbooks to complete a climate assessment.

(U) Army Handbook

(U) The "Army Climate Resilience Handbook" (Army Handbook), published by USACE in August 2020, provides the analytical framework and methodology to help Army installation planners understand how to consider climate change in their installation planning processes, such as Master Plans. Upon completion of the Army Handbook's steps for assessing climate exposure hazard risk, the Army planner should have developed a climate vulnerability assessment that identifies how exposed the installation is to current extreme weather and projected future climate hazards; how sensitive infrastructure, assets, mission, and readiness are to these hazards; and how difficult it may be to adapt to these threats. Finally, the planner should have developed a list of potential measures that the installation can use to improve installation preparedness and resilience.

(U) Army Directive 2020-08

(U) Army Directive 2020-08, "U.S. Army Installation Policy to Address Threats Caused by Changing Climate and Extreme Weather," September 2020, details Army installation policy to address threats caused by climate change and extreme weather

[23] (U) UFC 2-100-01, section 2-2.17.1, directs installation personnel to reference the Navy Handbook or other Military Service-specific guidance to conduct scenario planning for climate change resilience. Section 3-10.2 of UFC 2-100-01 instructs installation personnel to use the Navy Handbook or other Military Service-specific handbook to identify hazards and evaluate adaptation strategies applicable at the installation or district level.

[24] (U) Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks.

(U) events. The Directive establishes requirements for Army installations to protect critical assets and ensure mission resilience against threats caused by climate change and extreme weather.

(U) Army Directive 2020-08 requires Army installation commanders to assess, plan for, and adapt to the projected impacts of climate change and extreme weather by adding the results of climate change analysis tools into all facility and infrastructure-related plans, policies, and procedures. The Directive also directs master planners to use the Army Handbook and Army Climate Assessment Tool to identify a range of potential impacts from climate change and other extreme weather that could affect the installation, assess their likelihood, and identify preparedness and resilience measures to mitigate their effects. The Directive also instructs garrison commanders to incorporate the results of the Army Climate Assessment Tool into all appropriate plans, such as Master Plans.

(U) Navy Handbook

(U) The "Naval Facilities Engineering [Systems] Command Climate Change Planning Handbook: Installation Adaptation and Resilience" (Navy Handbook), published in January 2017, provides the analytical framework and methodology to help Navy and Marine Corps master development planners understand how to consider climate change in their plans and projects.[25] A series of stages helps planners identify and assess adaptation action alternatives to manage potential impacts to current and planned infrastructure. The Navy Handbook is a tool used throughout the planning process, especially during the analysis phase of the Navy and Marine Corps processes for developing Installation Development Plans. The intended output of the analytical framework and methodology in the Navy Handbook is a portfolio of possible adaptation action alternatives that can be incorporated into alternative courses of action, along with other considerations, in the Installation Development Plan and other decision support processes. The Navy Handbook's focus is the development of potential adaptation action alternatives that address the physical effects of climate change to both built and natural infrastructure at the installation level.

(U) Air Force Playbook

(U) The "Air Force Civil Engineering Severe Weather/Climate Hazard Screening and Risk Assessment Playbook" (Air Force Playbook), published in April 2020, provides a consistent and systematic framework for screening and assessing severe weather and climate hazards and their associated current and future risks at an Air Force installation, and incorporating the information into the Installation Development Plan

[25] (U) On November 3, 2020, NAVFAC changed its name from the Naval Facilities Engineering Command to the Naval Facilities Engineering Systems Command to more accurately reflect its mission.

(U) and facility projects. The Air Force Playbook establishes a minimum list of severe weather and climate phenomenon to be screened and provides methods to help installation personnel determine whether an installation is exposed or susceptible to these severe weather and climate hazards and assess their relative risk. The Air Force Playbook also details how to integrate the screening and risk assessment outputs into existing processes, such as planning products, building projects, emergency management plans, and mission sustainment risk reports. Throughout this report, the term "climate assessment" includes the Air Force screening and risk assessment.

(U) The Navy Handbook and the Air Force Playbook refer to a Master Plan as an Installation Development Plan. Throughout this report, we will use the term "Master Plan" for each of the Military Services.

(U) Finding A

(U) Military Installations in California Have Not Conducted Assessments or Fully Planned for Climate Resiliency

(U) Installation officials at the four California installations we visited (Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB) have not fully assessed facility resilience or planned for adaptation needed to address the effects of wildfires, drought, and flooding. Specifically, installation officials at the four California installations have not incorporated current and projected climate-related environmental risks, infrastructure vulnerabilities, and risk-reduction measures into their Master Plans. In addition, while Beale AFB officials prepared climate assessments as instructed in the Air Force Playbook, officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not prepare climate assessments as instructed in the Army and Navy handbooks.

(U) Officials at the four installations have not updated their Master Plans to incorporate current and projected risks, vulnerabilities, and measures, and officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not prepare climate assessments because installation officials were either unaware of or needed clarification on climate change guidance and planning requirements. In addition, officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not update their Master Plans because they were unsure of what level of detail met the qualifications of a Master Plan update in accordance with DoD guidance. Finally, officials at Beale AFB did not incorporate training on the electronic tool (Comprehensive Planning Platform) used to update the Master Plan as a requirement in their training plan.[26]

(U) As a result, officials at the four installations may not have adequately assessed the potential effects of continued climate change on mission readiness. Until officials at Fort Irwin, MCB Camp Pendleton, and NASNI complete climate assessments and officials at the four installations update Master Plans that address both current and future risks and threats from climate change and extreme weather events, the installation officials may overlook implementing adaptive measures that could protect critical facilities from future extreme weather events.[27]

[26] (U) The Air Force implemented an electronic tool known as the Comprehensive Planning Platform in 2020 to enable installation personnel to continuously update their Master Plan electronically.

[27] (U) For the purpose of this audit, the term "critical facilities" refers to the facilities each installation identified as both critical to the mission and difficult to move or replace because of the facilities' operations to ensure the continuance of the mission.

(U) Installations Have Not Updated Master Plans to Include Adaptations Needed to Maintain Climate Resiliency

(U) Installation officials at the four California installations we visited (Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB) have not fully assessed facility resilience or planned for adaptation needed to address the effects of wildfires, drought, and flooding. Specifically, officials have not incorporated current and projected climate-related environmental risks, infrastructure vulnerabilities, or risk-reduction measures into their Master Plans. UFC 2-100-01 requires installation Master Plans to include an installation military resilience component to discuss severe weather and other changing environmental factors. The UFC update also requires DoD installations to document the extreme weather events applicable to their installations in their climate assessments. Additionally, the UFC states that Master Plans should cover at least a 10-year period and be reviewed and updated at least every 5 years. Officials at the four installations we visited have begun to update their Master Plans to include the UFC 2-100-01 climate requirements.

(U) Fort Irwin officials last updated their Master Plan in September 2015. In June 2021, Fort Irwin's permanent master planner departed Fort Irwin for Germany and did not return to the installation until May 2022. During the master planner's absence, an architect was assigned as the temporary master planner, but did not have the expertise required to update the Master Plan.

(U) Although Fort Irwin's Master Plan lists flooding as a threat and states that drainage channels address the installation's substantial flood hazard, the plan has not been updated to include climate change effects and installation resilience as required by UFC 2-100-01. Specifically, Fort Irwin installation officials did not identify how:

- exposed the installation is to current extreme weather and projected future climate hazards;
- sensitive infrastructure, assets, mission, and readiness can be affected by these hazards; and
- difficult it may be to adapt to these threats.

(U) A Fort Irwin official stated that they have started updating the Master Plan and would tentatively have it completed by 2025. The official explained that the updates would include climate change effects and an installation resilience component to document the installation's risks and threats to extreme weather events, such as wildfires, droughts, and flooding.

(U) MCB Camp Pendleton officials last updated their Master Plan in December 2010. The Master Plan identified drought and flooding as potential risks for the installation. The Master Plan also states that periodic conditions have created water supply problems in the Southern California region, such as extended years of drought. Additionally, the Master Plan states that there have been several independent flood assessments conducted that identify flood potential on the installation. MCB Camp Pendleton officials stated that they did not update their Master Plan to include climate change effects and installation resilience as required by UFC 2-100-01 because they did not have the personnel or funding to update the Master Plan. MCB Camp Pendleton officials awarded a contract to update the Master Plan in September 2022, and the update is to be completed by March 2026. An MCB Camp Pendleton official stated that the updates to the Master Plan would include information on climate change effects and installation resilience.

(U) NASNI officials updated their Master Plan in October 2017.[28] The current Master Plan predates the UFC 2-100-01 requirements; however, the October 2017 Master Plan did incorporate relevant climate change information from the City of San Diego Climate Protection Action Plan, which identified the effects of climate change on San Diego.[29] The Master Plan stated that the Climate Protection Action Plan identified potential climate impacts to the San Diego area, such as increased temperatures, reduction in air quality, increased rate of wildfires, and rising sea levels. The Master Plan also stated that, of the impacts identified in the Climate Protection Action Plan, the impacts on coastal property had one of the greatest potentials to negatively affect mission operations at NASNI. Since the issuance of the 2017 Master Plan, NASNI officials have not updated their Master Plan to include climate change effects and installation resilience as required by UFC 2-100-01. However, according to a NAVFAC Headquarters official, they intend to issue a contract to update the Master Plan in FY 2026.

(U) Beale AFB officials updated their Master Plan in August 2015 and updated the Flightline section of the Master Plan in 2018. The Beale AFB 2018 Master Plan did not include the climate change effects and installation resilience requirements as outlined by UFC 2-100-01. The UFC 2-100-01 was not updated to include the new requirements related to climate change effects and installation resilience until September 2020. Beale AFB officials were required to update the Master Plan in 2023. A Beale AFB official stated that the updated Master Plan should be

[28] (U) NASNI's Master Plan is part of Naval Base Coronado's Master Plan. For the purposes of this report, we will refer to NASNI's sections as NASNI's Master Plan.

[29] (U) The City of San Diego, "City of San Diego Climate Action Plan," December 2015. The Climate Action Plan identified five strategies to achieve attainable greenhouse gas reduction targets for 2020 and 2035, including a climate resiliency strategy. Successful implementation of the Climate Action Plan includes assisting the City of San Diego prepare for anticipated climate change impacts in the coming decades.

(U) completed by December 2023; however, as of January 2024, the Master Plan has not been updated. We confirmed that the next update would include climate change effects and installation resilience as required by the updated UFC 2-100-01.

(U) Because officials at Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB have not updated their installation Master Plans as required by UFC 2-100-01, the installation commanders should direct their master planners to update the installation Master Plans to include UFC 2-100-01 climate change requirements, using information from the completed climate assessment.

(U) Three of Four Installations Did Not Prepare Climate Assessments in Accordance with Policy

(U) In accordance with UFC 2-100-01 and Military Department-specific guidance, Beale AFB officials prepared a DoD-required climate assessment; however, Fort Irwin, MCB Camp Pendleton, and NASNI officials did not prepare DoD-required climate assessments. UFC 2-100-01 requires DoD installations to document the extreme weather events applicable to their installations in their climate assessments. Each Military Department issued guidance to implement the requirements outlined in UFC 2-100-01. Instead of completing the DoD-required climate assessments, Fort Irwin, MCB Camp Pendleton, and NASNI officials completed actions to begin addressing climate change.

(U) Beale AFB Prepared a Climate Assessment in Accordance with Policy

(U) Beale AFB planners prepared a climate assessment in accordance with UFC 2-100-01 and the Air Force Playbook. The Air Force Playbook provides the framework Air Force planners should use to screen and assess severe weather, climate hazards, and their associated current or future risks to an installation. The Air Force Playbook describes three phases in the Severe Weather/Climate Hazard Screening and Risk Assessment process. Each phase describes how a user can complete the corresponding section in the Screening Worksheet, which comprises the climate assessment. Beale AFB's community planner completed the first two phases of the climate assessment—screening climate hazards and assessing the risks of the climate hazards.

- (U) Phase 1 (screening climate hazards), Beale AFB planners identified the severe weather hazards, the hazard description, and the impact, then determined whether those hazards are current or future risks.
- (U) Phase 2 (assessing the risks of the climate hazards), Beale AFB planners determined the probability and severity of current and future risks.

(U) Specifically, for phases 1 and 2, Beale AFB planners identified critical current hazards, including non-storm surge flooding (riverine/inland, heavy precipitation) and wildland fires. Non-storm surge events, such as flooding due to large amounts or extended duration of heavy precipitation, onsite or upstream events that cause non-tidal river overflow (precipitation or melting), or excessive weight of snow or ice, can cause:

- (U) undercutting, erosion, or failure of facility or road foundation;
- (U) temporary or permanent loss of access to structures or roads;
- (U) loss of lower floor contents;
- (U) damaged utilities;
- (U) limited access to base, roads, runway, resources; and
- (U) structure collapse due to excessive weight of snow or ice.

(U) The impacts of wildland fires, uncontrolled fire in an area of combustible vegetation that occurs in the wilderness or countryside, or uncontrolled fire that rapidly and vastly sweeps across combustible vegetation, include:

- (U) changes to timing and type of training activities;
- (U) downed or damaged power lines;
- (U) burned facilities;
- (U) scorched fiber lines;
- (U) floods, mudslides, landslides, and avalanches;
- (U) limited access to base, roads, and resources; and
- (U) potential impacts to critical habitat for endangered/threatened species.

(U) Additionally, poor air quality associated with wildfires has become a regular occurrence during summer months and into the fall, to the extent that both outdoor and indoor missions are degraded.

(U) In phase 3 of the assessment, the planners are to determine the next steps to mitigate the effect of each severe weather hazard identified in phases 1 and 2. Beale AFB planners completed phase 3 for each applicable severe weather hazard, and they were completing phase 3 for the inapplicable severe weather hazards. A Beale AFB official stated that applicable severe weather hazards are routinely addressed in the Master Plan, as well as other future development planning mechanisms.

(U) Fort Irwin Did Not Prepare Climate Assessments in Accordance with Policy

(U) Fort Irwin planners did not prepare climate assessments in accordance with UFC 2-100-01 and the Army Handbook. The Army Handbook provides the analytical framework and methodology to help Army installation planners understand how to consider climate change in their installation planning processes, such as Master Plans. The Army Handbook divides the process for installation climate resilience planning into four steps, with the desired output being a climate vulnerability assessment. To complete the process, Army planners should use the Army Handbook to execute the following four steps.

1. (U) Determine the goals and objectives of the assessment.
2. (U) Identify how and where the installation is exposed to current extreme weather events and projected future climate hazards.
3. (U) Combine the information from the first two steps with installation-specific data on facilities, infrastructure, mission, and other factors to assess the degree to which these exposures make an installation vulnerable to climate and climate change.
4. (U) Review and choose relevant climate preparedness and resilience measures that will add to the installation's climate resilience.

(~~CUI~~) Fort Irwin officials stated that they had not prepared any climate assessments to identify impacts to assets or infrastructure that are vulnerable to climate change and extreme weather events. Despite not having prepared any climate assessments, Fort Irwin personnel have still applied lessons learned and implemented adaptive measures based on previous extreme weather events to protect the installation. Following flash floods in 2013 and 2015 that caused more than $225 million in damages, installation personnel and contractors repaired existing stormwater channels and constructed new stormwater channels to protect Fort Irwin against future flooding. According to a Fort Irwin official, the biggest lesson learned from the 2013 flash flood was to consider stormwater and flooding in the design of new buildings. [redacted] [30] According to Fort Irwin's planning documents, installation personnel have considered flood risk in the design of multiple facilities, such as a library and a hospital. During our visit to Fort Irwin, we observed stormwater channels constructed to protect Fort Irwin facilities. However, Fort Irwin personnel should prepare a climate assessment in accordance with UFC 2-100-01

[30] (~~CUI~~) [redacted]

(~~CUI~~) and the Army Handbook in order to be better prepared to address climate change and extreme weather events such as wildfires, drought, and flooding. Fort Irwin's lack of a climate assessment could negatively affect the installation's ability to respond to climate change and to carry out its mission.

(U) MCB Camp Pendleton and Naval Air Station North Island Did Not Prepare Climate Assessments in Accordance with Policy

(U) MCB Camp Pendleton and NASNI planners did not prepare climate assessments in accordance with UFC 2-100-01 and the Navy Handbook. The Navy Handbook directs master planners to complete a climate assessment that addresses the impacts of climate change on infrastructure of concern, identifies and screens action alternatives, and calculating the benefits and costs of the action alternatives. The Navy Handbook includes worksheets that comprise the climate assessment. The worksheets direct installation planners to:

- (U) assess current and future impacts of climate change on the infrastructure of concern;
- (U) identify and screen action alternatives;
- (U) calculate the benefits and costs of the action alternatives; and
- (U) summarize the assessments into a final worksheet.

(U) MCB Camp Pendleton Did Not Prepare Climate Assessments in Accordance with Policy

(~~CUI~~) While MCB Camp Pendleton planners prepared climate assessments, those climate assessments did not comply with the requirements in UFC 2-100-01 or the Navy Handbook. Specifically, MCB Camp Pendleton planners did not complete the Navy Handbook climate assessment worksheets to assess the impacts of climate change on the infrastructure of concern, identify and screen adaptation action alternatives to address the impacts, or calculate the benefits and costs of the action alternatives. [redacted]. The AHTA is designed to be a part of the overall installation planning process. It summarizes the analysis of threats and hazards that may occur or have occurred on an installation, provides a baseline of the threats and hazards, and assists with identifying vulnerabilities. The threats and hazards analyzed for MCB Camp Pendleton include:

- (U) insider threats;
- (U) cyberattack threats;
- (U) terrorist (transnational and domestic/homegrown violent extremists) threats;
- (U) narcotic threats; and

- (U) natural hazards, including geological hazards (such as earthquakes), meteorological hazards (such as floods, fires, and drought), and biological hazards (such as infectious diseases and pandemic influenza).

(U) When assessing threats and hazards as part of preparing the AHTA, installation personnel are to identify the likelihood or probability of occurrence of each threat and hazard.

(~~CUI~~) MCB Camp Pendleton officials completed the installation's most recent AHTAs in 2017 and 2021. In both assessments, [redacted], were among the threats and hazards MCB Camp Pendleton officials analyzed.

- (~~CUI~~) [redacted]
- (~~CUI~~) In addition, the 2021 AHTA included an evaluation of the impacts of climate change on the hazard events identified as affecting MCB Camp Pendleton, [redacted]. The 2021 AHTA states that [redacted]. Furthermore, the 2021 AHTA projected a continuation or worsening of fire events across California because of climate change.

(~~CUI~~) [redacted][31]

Additionally, MCB Camp Pendleton officials did not assess the impacts of climate change on the infrastructure of concern, identify and screen adaptation action alternatives to address the impacts, or calculate the benefits and costs of the action alternatives in the 2021 AHTA as required by the Navy Handbook.

(U) Although MCB Camp Pendleton officials did not complete the 2021 AHTA in accordance with the Navy Handbook, according to the MCB Camp Pendleton Special Projects Manager, the AHTAs are evaluated each year during an annual assessment conducted as a part of the Critical Infrastructure Program.[32] According to the

[31] (U) Infrastructure includes buildings; utilities (power, water); roads; coastlines; communication systems; and fuel distribution systems.

[32] (U) The Critical Infrastructure Program, which identifies actions to prevent, remediate, or mitigate the risks resulting from vulnerabilities of critical infrastructure assets, uses the Critical Asset Identification Process to determine criticality and potential cascading effects to these assets from the AHTA. The Critical Asset Identification Process provides a standardized methodology for identifying assets that are critical to the execution of a command's missions, functions, or core capabilities.

(U) MCB Camp Pendleton Special Projects Manager, the Mission Assurance Assessment Team conducts an assessment of assets and the AHTA every 3 years.[33] Information from these assessments is then documented and stored in the Marine Corps – Critical Asset Management System.[34] MCB Camp Pendleton personnel use this process to identify impacts to installation critical infrastructure.

(U) Naval Air Station North Island Did Not Prepare Climate Assessments in Accordance with Policy

(U) NASNI planners did not prepare climate assessments in accordance with UFC 2-100-01 and the Navy Handbook. According to the Asset Management Branch Head, whose responsibilities include overseeing the NASNI Master Planners, the NASNI Master Planners completed 2 of the 13 worksheets identified in the Navy Handbook. The two completed worksheets relate to assessing current and future impacts of climate change on the infrastructure of concern. The Asset Management Branch Head stated, and the Strategic/Facility Planning Division Director, NAVFAC Pacific, confirmed, that they did not complete all 13 worksheets because master planning personnel at NASNI lacked the expertise to complete the Navy Handbook worksheets.

(U) To initially assist NASNI master planners in preparing climate assessments, the Asset Management Branch Head developed a guide detailing the initial steps from the Navy Handbook.[35] The guide focuses on collecting data from historical events to create scenarios to aid in the installation's ability to view and plan for climate change. The guide identified the following methods and tools to plan how to assess critical facility assets for climate change vulnerability.

- (U) "Methodology for Assessing the Impact of Sea Level Rise on Representative Military Installations in the Southwestern United States." NASNI officials determined that this methodology would provide a more complete component-level assessment and would allow the installation planners to predict structural vulnerabilities and potential damages to specific assets.
- (U) The Flood Inundation and Surge Hazard tool. A tool that offers a more advanced geospatial technology platform. The map application within the tool provides Navy users with a view of flooding and storm impacts on Navy assets, as well as tools for planning and operational response.

[33] (U) The Mission Assurance Assessment Team is a group of subject matter experts established to conduct an all-threats/all-hazards risk assessment to provide installation commanders with a clear understanding of risk exposure.

[34] (U) The Marine Corps – Critical Asset Management System is the primary database for managing Marine Corps critical asset and infrastructure data, including Critical Infrastructure Program data, for risk management and risk assessment activities.

[35] (U) NASNI, "Climate Change Facilities Assessment Methodology and Draft Assessment," undated.

(U) This tool can be used to identify vulnerable facilities and categorize them by risk and severity. The two risk severity categories identified were functional needs and ease of replacement. Functional needs relate to the use of a particular facility being increasingly imperative to mission readiness. Ease of replacement relates to the difficulty of relocating operations from one site to another, increasing the risk to maintaining mission readiness.

(U) However, according to the Asset Management Branch Head, updates to the guide were suspended because NAVFAC Headquarters decided to issue a contract to prepare the climate assessment for NASNI. NAVFAC Southwest awarded the contract to complete the installation's climate assessment on July 3, 2023, with a delivery date of December 24, 2024.

(U) Because officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not prepare DoD-required climate assessments in accordance with UFC 2-100-01 and Military Service-specific guidance, these installation commanders should direct their master planners to prepare a climate assessment in accordance with UFC 2-100-01 requirements and Military Service-specific guidance.

(U) Installation Personnel Were Unfamiliar with Climate Resilience Planning Requirements, Processes, and Tools to Complete Climate Assessments and Update Master Plans

(U) Officials at the four installations did not update their Master Plans to incorporate current and projected risks, vulnerabilities, and measures, and officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not prepare climate assessments because installation officials were either unaware of or needed clarification on climate change guidance and planning requirements. In addition, officials at Fort Irwin, MCB Camp Pendleton, and NASNI did not update their Master Plans because they were unsure of what level of detail met the qualifications of a Master Plan update in accordance with DoD guidance. Finally, officials at Beale AFB did not incorporate training on the Comprehensive Planning Platform in their training plan.

(U) Beale Air Force Base Personnel Lacked Requirements to Complete Training for the Tool Required to Update the Master Plan

(U) When we started the audit, personnel at Beale AFB did not have the training required to update their installation Master Plan. In order for Air Force installations to update Master Plans, the Air Force developed the Comprehensive Planning Platform and implemented the platform in 2020. The Comprehensive Planning Platform is a system designed to allow installation master planners to continuously update Master Plans electronically. The Beale AFB official responsible for updating Beale AFB's Master Plan completed training on the Comprehensive Planning Platform in March 2023; however, as of January 2024, the Beale AFB official has not updated the Master Plan. However, according to the official, there is no requirement in Beale AFB's training plan to complete the training on the Comprehensive Planning Platform.

(U) Therefore, we recommend that the Commander of the 9th Reconnaissance Wing at Beale AFB incorporate training on the Comprehensive Planning Platform as a training requirement for all Beale AFB personnel responsible for developing and updating the Master Plan.

(U) Fort Irwin, Marine Corps Base Camp Pendleton, and Naval Air Station North Island Personnel Were Unaware or Needed Clarification on Guidance and Planning Requirements

(U) Personnel at Fort Irwin, MCB Camp Pendleton, and NASNI either were unaware of or needed clarification on guidance and the planning requirements regarding climate assessments and installation Master Plan updates.

(U) **Fort Irwin.** Fort Irwin personnel did not prepare a climate assessment or update the Master Plan because officials, including the person assigned as the installation master planner, were not aware of the updated UFC 2-100-01 requirements or the guidance in the Army Handbook regarding climate assessments. Due to the absence of a permanent master planner from June 2021 to May 2022, an architect was assigned as Fort Irwin's temporary master planner, but they did not have the expertise required to update the Master Plan. Specifically, the temporary master planner stated that they were not aware of climate change planning guidance such as Army Directive 2020-08 or tools such as the DoD Climate Assessment Tool and the Army Climate Assessment Tool. A Fort Irwin official stated that they were not aware of any Army-specific training related to climate assessments, and Fort Irwin does not include training covering climate resilience and related work in their training plans. Therefore, we recommend that the Garrison Commander, Fort Irwin, identify training on the requirements for

(U) preparing climate assessments and updating the Master Plan and direct all Fort Irwin personnel responsible for preparing climate assessments and updating the Master Plan to take the training.

(U) **MCB Camp Pendleton.** MCB Camp Pendleton personnel did not prepare a climate assessment or update the Master Plan because they were not aware of the requirements to plan for climate hazards or prepare climate assessments. Specifically, the MCB Camp Pendleton Planning Director, who oversees the installation's master planners, stated that those at MCB Camp Pendleton who prepared the AHTAs were not aware of the Navy Handbook. Therefore, MCB Camp Pendleton personnel did not include information pertaining to impacts of climate change on the installation's infrastructure or action alternatives when updating the installation's Master Plan or climate assessments.

(U) The Navy Handbook directs master planners to consider climate change in the development of Master Plans and projects. In addition, the Navy Handbook outlines a series of stages to help planners identify and assess adaptation action alternatives to manage potential impacts to current and planned infrastructure. For example, the Navy Handbook directs master planners to calculate the benefits and costs of action alternatives identified for current and future impacts of climate change on infrastructure. To assist with this analysis, the Navy Handbook includes 13 worksheets that comprise the climate assessment. These worksheets direct installation planners to:

- (U) assess current and future impacts of climate change on the infrastructure of concern,
- (U) identify and screen action alternatives,
- (U) calculate the benefits and costs of the action alternatives, and
- (U) summarize the assessments into a final worksheet.

(U) The intended output of the Navy Handbook is a portfolio of possible adaptation action alternatives that master planners can incorporate into alternative courses of action, along with other considerations, in the Master Plan and other decision support processes. According to a MCB Camp Pendleton official, there have been two NAVFAC training sessions on the Navy Handbook, which includes preparation of climate assessments. However, due to a potentially late training request submission initially and lack of availability for the second session, the official has not taken the training. The MCB Camp Pendleton official also stated that the training plans do not include the requirement for climate assessments. Therefore, we recommend that the Commanding General, MCB Camp Pendleton, incorporate training on preparing climate assessments as a requirement in their training plan for all MCB Camp Pendleton personnel responsible for preparing climate assessments and updating the Master Plan.

(U) **NASNI.** When we started the audit, NASNI officials had not prepared a climate assessment in accordance with UFC 2-100-01 and the Navy Handbook because the personnel responsible for preparing climate assessments did not have the expertise to accomplish the task. According to a NASNI official, NAVFAC Headquarters offered training related to the preparation of climate assessments. The NASNI official further explained that training is typically created and scheduled by NAVFAC, and this training is a requirement in the NAVFAC training plan. As a result, the NASNI senior master planner completed the necessary training during the course of this audit.

(U) Furthermore, NASNI personnel did not update their Master Plan because they require clarification on guidance for updating Master Plans. NASNI's Deputy Public Works Officer stated that, the installation needed clarification of UFC requirements. The Deputy Public Works Officer explained that the installation needed guidance describing what constitutes a Master Plan update and establishing Master Plan due dates in accordance with UFC requirements. NASNI's Asset Management Branch Head clarified that installation master planners do not know whether they need to update the entire Master Plan every 5 years or limit themselves to updating sections, as needed, to meet the 5-year requirement. We reviewed UFC 2-100-01 and determined that it did not provide clarification regarding the specifics of what constitutes a Master Plan update to meet the 5-year requirement needed for installation personnel to update the installation Master Plans in accordance with DoD Instruction 4165.70.

(U) DoD Guidance Should Define Master Plan Currency and Completeness

(U) DoD guidance does not define what constitutes a current and complete Master Plan. The UFC and DoD Instruction 4165.70 state that installation Master Plans are required to be updated every 5 years. However, neither the UFC nor DoD Instruction 4165.70 defines what constitutes a current and complete Master Plan. The UFC does not clearly state whether a current and complete Master Plan consists of the installation updating the entire Master Plan or updating a section of the Master Plan. A Headquarters, Department of the Army official from the Office of the Deputy Chief of Staff for Installations involved in updating DoD Instruction 4165.70 explained that, to meet the requirement to update the Master Plan every 5 years, master planners were required to review the Master Plan and complete one of the following actions.

1. (U) Confirm that all of the information is correct and current, and make no changes.
2. (U) Identify where changes are required and make the changes.
3. (U) Prepare a new Master Plan.

(U) According to the Director of Joint Basing for the Office of the Deputy Assistant Secretary of Defense for Real Property, DoD Instruction 4165.70 was being updated.[36] The updates to DoD Instruction 4165.70 include incorporating and refining requirements for installation master planning. For example, the proposed Installation Planning section includes planning activities and plan development at the installation level, such as facility and infrastructure resilience, maintenance, and investment planning.

(U) Therefore, we recommend that the Under Secretary of Defense for Acquisition and Sustainment clearly define what constitutes a current and complete Master Plan, as part of the update to DoD Instruction 4165.70, "Real Property Management," April 6, 2005.

(U) The DoD OIG also identified additional concerns related to climate change guidance; however, we did not make recommendations in this report to address those concerns. Two prior DoD OIG reports made recommendations to modify DoD climate change guidance that, when implemented, will address the concerns found during this audit. The recommendations detailed in these reports include modifying DoD guidance, such as UFC 2-100-01 and the Military Department handbooks. See the Appendix for a brief discussion of these reports.

(U) Officials May Have Missed Aspects of Climate Change That Could Adversely Impact Mission Readiness

(U) Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB officials have not incorporated current and projected climate-related environmental risks, infrastructure vulnerabilities, and risk-reduction measures into their Master Plans to address climate change. As a result, officials may not have adequately assessed the potential effects of climate change on mission readiness and installation resiliency.

- (U) Unplanned climate events require contingency planning for training and testing events. These events also require contingency planning to minimize the use of ranges and facilities during certain seasons where the climate conditions have historically been adverse conditions.
- (U) Projects designed in response to climate change and extreme weather events to protect infrastructure may not receive funding.

[36] According to the Director for Real Property Policy and Data in the Office of the Under Secretary of Defense for Acquisition and Sustainment, there is not a timeframe for finalizing the updates to DoD Instruction 4165.70 or issuing the updated DoD Instruction.

(U) Until Fort Irwin, MCB Camp Pendleton, and NASNI officials complete climate assessments and officials from all four installations update Master Plans that address both current and future risks and threats from climate change and extreme weather events, the officials at the installations may overlook implementing adaptive measures that could protect critical facilities from previously unexperienced extreme weather events. According to the 2021 DoD Climate Risk Analysis, analyses based on historical frameworks will not be sufficient to prepare for future risks complicated by a changing climate. Additionally, without a climate assessment, the installations may not be prepared for current and future risks and threats due to climate change and extreme weather events not previously experienced at the installation.

(U) Recommendations, Management Comments, and Our Response

(U) Revised Recommendation

(U) As a result of management comments, we revised the sixth recommendation (Recommendation A.6 in the draft report) to focus on the Under Secretary of Defense for Acquisition and Sustainment clearly defining what constitutes a current and complete Master Plan.

(U) Recommendation A.1

(U) We recommend that the following officials direct master planners to update installation Master Plans to include Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020 climate change requirements, using information from the completed climate assessment:

a. (U) Garrison Commander, Fort Irwin

(U) Deputy Commanding General, Installation Management Command Comments

(U) The Deputy Commanding General, Installation Management Command, responding for the Garrison Commander, Fort Irwin, agreed with the recommendation, stating that the installation Master Plan would be updated in accordance with the climate change requirements from UFC 2-100-01 and information from the climate assessment. The Deputy Commanding General also stated that Fort Irwin's Installation Energy and Water Plan would also be updated to reflect these changes and incorporated into the Master Plan as an annex. The Deputy Commanding General stated that these changes are estimated to be completed by January 31, 2025.

(U) Assistant Secretary of the Army for Installations, Energy, and Environment Comments

(U) Although not required to comment, the Assistant Secretary of the Army for Installations, Energy, and Environment stated that they endorsed the Deputy Commanding General's response.

(U) Executive Deputy to the Commanding General, U.S. Army Materiel Command Comments

(U) Although not required to comment, the Executive Deputy to the Commanding General, U.S. Army Material Command stated that they endorsed the Deputy Commanding General's response.

(U) Our Response

(U) Comments from the Deputy Commanding General addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the updated Fort Irwin Master Plan and the completed climate assessment and verify that the Master Plan complies with UFC 2-100-01 requirements and includes information from the completed climate assessment.

b. (U) Commanding General, Marine Corps Base Camp Pendleton

(U) Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton Comments

(U) The Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton, agreed with the recommendation, stating that an installation Master Plan support contract was issued in September 2022 and is scheduled for completion in 2026.

(U) Commander, Marine Corps Installations Command/ Assistant Deputy Commandant for Installations and Logistics (Facilities) Comments

(U) Although not required to comment, the Commander, Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities) endorsed the Commanding General's response.

(U) Our Response

(U) Comments from the Commanding General addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the updated MCB Camp Pendleton Master Plan and the completed climate assessment and verify that the Master Plan complies with UFC 2-100-01 requirements and includes information from the completed climate assessment.

c. (U) Commanding Officer, Naval Base Coronado

(U) Commanding Officer, Naval Base Coronado Comments

(U) The Commanding Officer, Naval Base Coronado, agreed with the recommendation, stating that the installation's climate assessment will adhere to UFC 2-100-01 requirements and is estimated to be completed in December 2024. The Commanding Officer stated that the climate assessment will be used in the development of the installation's updated Master Plan, which is planned to be awarded in FY 2026.

(U) Our Response

(U) Comments from the Commanding Officer addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the updated Naval Base Coronado Master Plan and the completed climate assessment and verify that the Master Plan complies with UFC 2-100-01 requirements and includes information from the completed climate assessment.

d. (U) Commander, 9th Reconnaissance Wing, Beale Air Force Base

(U) Mobilization Assistant, Deputy Chief of Staff for Logistics, Engineering, and Force Protection Comments

(U) The Mobilization Assistant to the Deputy Chief of Staff for Logistics, Engineering, and Force Protection, responding for the Commander, 9th Reconnaissance Wing, Beale AFB, agreed with the recommendation, stating that master planners at Beale AFB are in the process of updating the installation's Master Plan in accordance with applicable requirements.

(U) Our Response

(U) Comments from the Mobilization Assistant addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the updated Beale AFB Master Plan and verify that the Master Plan complies with UFC 2-100-01 requirements and includes information from the completed climate assessment.

(U) Recommendation A.2

(U) We recommend that the following officials direct master planners to prepare a climate assessment in accordance with Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020 requirements and Military Service-specific guidance:

a. (U) Garrison Commander, Fort Irwin

(U) Deputy Commanding General, Installation Management Command Comments

(U) The Deputy Commanding General, Installation Management Command, responding for the Garrison Commander, Fort Irwin, agreed with the recommendation, stating that Fort Irwin personnel would prepare a climate assessment in accordance with requirements from UFC 2-100-01 and Military Service-specific guidance. The Deputy Commanding General stated that this task is estimated to be completed by January 31, 2025.

(U) Assistant Secretary of the Army for Installations, Energy, and Environment Comments

(U) Although not required to comment, the Assistant Secretary of the Army for Installations, Energy, and Environment stated that they endorsed the Deputy Commanding General's response.

(U) Executive Deputy to the Commanding General, U.S. Army Materiel Command Comments

(U) Although not required to comment, the Executive Deputy to the Commanding General, U.S. Army Material Command stated that they endorsed the Deputy Commanding General's response.

(U) Our Response

(U) Comments from the Deputy Commanding General addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the climate assessment and verify that the climate assessment complies with UFC 2-100-01 requirements and Military Service-specific guidance.

b. (U) Commanding General, Marine Corps Base Camp Pendleton

(U) Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton Comments

(U) The Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton, agreed with the recommendation, stating that an installation Master Plan support contract was issued in September 2022 and scheduled for completion in 2026.

(U) Commander, Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities) Comments

(U) Although not required to comment, the Commander, Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities) endorsed the Commanding General's response.

(U) Our Response

(U) Comments from the Commanding General addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the updated MCB Camp Pendleton Master Plan and the climate assessment and verify that the climate assessment complies with UFC 2-100-01 requirements and Military Service-specific guidance.

c. (U) Commanding Officer, Naval Base Coronado

(U) Commanding Officer, Naval Base Coronado Comments

(U) The Commanding Officer, Naval Base Coronado, agreed with the recommendation, stating that the installation's climate assessment is undergoing development and will adhere to UFC 2-100-01 requirements. The Commanding Officer stated that the climate assessment is estimated to be completed in December 2024.

(U) Our Response

(U) Comments from the Commanding Officer addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of Naval Base Coronado's Master Plan and the climate assessment and verify that the climate assessment complies with UFC 2-100-01 requirements and Military Service-specific guidance.

(U) Recommendation A.3

(U) We recommend that the Commander of the 9th Reconnaissance Wing at Beale Air Force Base incorporate training on the Comprehensive Planning Platform as a training requirement for all Beale Air Force Base personnel responsible for developing and updating the Master Plan.

(U) Mobilization Assistant, Deputy Chief of Staff for Logistics, Engineering, and Force Protection Comments

(U) The Mobilization Assistant to the Deputy Chief of Staff for Logistics, Engineering, and Force Protection, responding for the Commander, 9th Reconnaissance Wing, Beale AFB, agreed with the recommendation, stating that the Air Force Civil Engineer Center provides training on the Comprehensive Planning Platform to all Air Force installation master planners on a semiannual basis.

(U) Our Response

(U) Comments from the Mobilization Assistant addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the training plan and verify that the training plan includes a requirement for training on the Comprehensive Planning Platform.

(U) Recommendation A.4

(U) We recommend that the Garrison Commander, Fort Irwin, identify training on requirements for preparing climate assessments and updating the Master Plan and direct all Fort Irwin personnel responsible for preparing climate assessments and updating the Master Plan to take the training.

(U) Deputy Commanding General, Installation Management Command Comments

(U) The Deputy Commanding General, Installation Management Command, responding for the Garrison Commander, Fort Irwin, agreed with the recommendation, stating that Fort Irwin personnel would identify training requirements for preparing the climate assessment and updating the Master Plan, and would direct responsible personnel to complete the training. The Deputy Commanding General stated that this task is estimated to be completed by October 31, 2024.

(U) Assistant Secretary of the Army for Installations, Energy, and Environment Comments

(U) Although not required to comment, the Assistant Secretary of the Army for Installations, Energy, and Environment stated that they endorsed the Deputy Commanding General's response.

(U) Executive Deputy to the Commanding General, U.S. Army Materiel Command Comments

(U) Although not required to comment, the Executive Deputy to the Commanding General, U.S. Army Material Command stated that they endorsed the Deputy Commanding General's response.

(U) Our Response

(U) Comments from the Deputy Commanding General addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the training plan and verify that the training plan includes requirements for training to prepare climate assessments and update Master Plans.

(U) Recommendation A.5

(U) We recommend that the Commanding General, Marine Corps Base Camp Pendleton incorporate training for preparing climate assessments as a requirement in their training plan to all personnel responsible for preparing climate assessments and updating the Master Plan.

(U) Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton Comments

(U) The Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton, agreed with the recommendation, stating that corrective actions are taking place with the award of an installation Master Plan support contract in September 2022 and scheduled for completion in 2026. The Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton also stated that training for MCB Camp Pendleton staff would be incorporated into preparations for Master Plan updates.

(U) Commander, Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities) Comments

(U) Although not required to comment, the Commander, Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities) endorsed the Commanding General's response.

(U) Our Response

(U) Comments from the Commanding General addressed the specifics of the recommendation; therefore, the recommendation is resolved but will remain open. We will close the recommendation once we receive a copy of the training plan and verify that the training plan includes a requirement for training to prepare climate assessments and update Master Plans.

(U) Recommendation A.6

(U) We recommend that the Under Secretary of Defense for Acquisition and Sustainment clearly define what constitutes a current and complete Master Plan, as part of the update to DoD Instruction 4165.70, "Real Property Management," April 6, 2005.

(U) Deputy Assistant Secretary of Defense for Infrastructure Modernization and Resilience Comments

(U) The Deputy Assistant Secretary of Defense for Infrastructure Modernization and Resilience, responding for the Under Secretary of Defense for Acquisition and Sustainment, partially agreed with the recommendation. The Deputy Assistant stated that they concurred with the intent of the recommendation, but noted that the wording of the recommendation did not focus on the "currency" and "completeness" of a Master Plan, which are aspects that could be addressed by an update in DoD policy. They suggested that the recommendation be revised to recommend that the Under Secretary of Defense for Acquisition and Sustainment clearly define what constitutes a current and complete Master Plan.

(U) Our Response

(U) We agreed with the Deputy Assistant's comments and as a result, we revised our recommendation to the Under Secretary of Defense for Acquisition and Sustainment to recommend that they clearly define what constitutes a current and complete Master Plan as part of the updates to DoD Instruction 4165.70, "Real Property Management," April 6, 2005. However, this recommendation will remain unresolved until the Under Secretary of Defense for Acquisition and Sustainment reviews and provides comments on the revised recommendation. Therefore, we request that within 30 days of the final report, the Under Secretary of Defense for Acquisition and Sustainment provide comments on planned actions to implement the revised recommendation and completion dates.

(U) Finding B

(U) Installations Implemented Adaptive Measures to Protect Facilities from the Effects of Climate Change and Extreme Weather Events

(U) Officials at Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB implemented adaptive measures to protect facilities from the effects of climate change and extreme weather events, including wildfires, droughts, and flooding.

- (U) Fort Irwin, MCB Camp Pendleton, and Beale AFB completed projects to mitigate the impact of wildfires, drought, and flooding. Personnel at Fort Irwin, MCB Camp Pendleton, and Beale AFB identified wildfires or flooding as the highest risks and implemented measures intended to enhance the installation's resilience to climate change in these areas.
- (U) NASNI completed projects to mitigate the impact of flooding. NASNI personnel identified flooding as the highest risk and implemented measures intended to enhance the installation's resilience to climate change in this area.

(U) Personnel at these installations implemented adaptive measures to protect facilities against the effects of climate change and extreme weather events. As a result, the installations are better postured to react to climate change for the near future.

(U) Installations Implemented Adaptive Measures to Protect Facilities

(U) Officials at Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB implemented adaptive measures to protect facilities from the effects of climate change and extreme weather events. The adaptive measures the installation officials implemented included constructing concrete buildings to better withstand wildfires, reducing water demand during droughts, and improving stormwater drainage systems to mitigate impacts from flooding. Table 1 summarizes adaptive measures officials at the four installations implemented to protect facilities and infrastructure.

(U) Table 1. Adaptive Measures Implemented at the Four Installations

(U) Installation	Adaptive and Natural Mitigation Measures for Wildfire	Adaptive and Natural Mitigation Measures for Drought	Adaptive and Natural Mitigation Measures for Flooding
Fort Irwin	• Firebreaks[1] • Setbacks[2] • Fencing • Concrete buildings • Rock/asphalt surroundings • Low amounts of vegetation	• Water storage • Local water sources • Reducing water demand • New water treatment plant	• Stormwater channels • Drains • High elevation • Small walls around buildings
MCB Camp Pendleton	• Firebreaks[1] • Prescribed burns[4] • Concrete buildings • Metal roofs	• Xeriscaping[5] • Low flow shower heads and toilets • Emergency water supply pipeline • Reducing water demand	• Flood detection system • Repair and maintenance of culverts and storm drains[6]
NASNI	N/A	N/A	• Drainage systems • Elevated buildings • Retention ponds[3]
Beale AFB	• Firebreaks[1] • Concrete buildings • Steel roofs • Grazing program[7]	• Xeriscaping[5] • Reducing water demand • Increasing production wells • New water treatment plant	• High elevation • Culverts[6] • Storm drains • Widening channels • Repair dams • Bridge replacement

(U)

[1] (U) A firebreak is a permanent or temporary strip of ground cleared to bare soil or planted with fire-resistant vegetation.

[2] (U) A defensible space, or setback, is the buffer created between a building and any fire hazards that surround it in order to create a space to slow or stop the spread of wildfire and help protect the building from catching fire.

[3] (U) Retention ponds are water-filled pools that change in reaction to rainfall and runoff. They gather water and release it slowly and steadily, preventing flooding and erosion.

[4] (U) A prescribed burn is a controlled fire intentionally set by fire experts under specified weather conditions. These types of fires are used to manage the health of ecosystems, including the reduction of the risk of unwanted wildfires in the future by reducing hazardous fuels.

[5] (U) Xeriscaping is the practice of designing landscapes to reduce or eliminate the need for irrigation, needing little or no water beyond what the natural climate provides. Xeriscaping uses vegetation that is appropriate for the climate, typically replacing grassy lawns with drought-tolerant native plant species as well as soil, rocks, and mulch.

[6] (U) A culvert is a structure that allows water to flow under a road or a railroad.

[7] (U) The grazing program at Beale AFB is an arrangement where the base leases approximately 12,000 acres to ranchers for their cattle to graze from November to May. The grazing program provides Beale AFB with a way to assist fire suppression by reducing the height of vegetation.

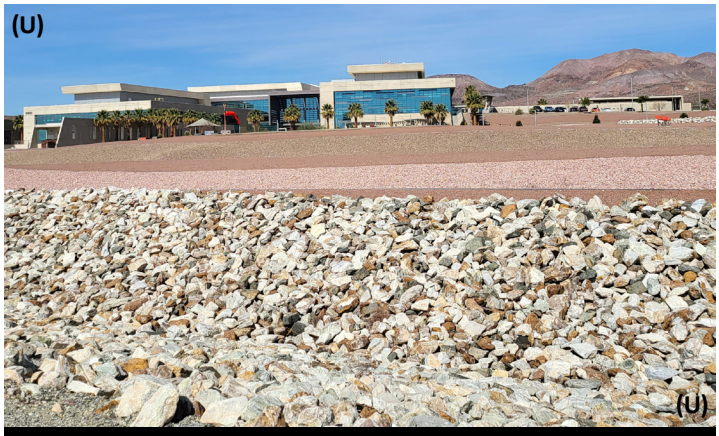
(U) Source: The DoD OIG.

(U) Fort Irwin Implemented Adaptive Measures to Address Climate Change

(U) Fort Irwin personnel identified and implemented adaptive measures to address the impacts of wildfires, drought, and flooding on the installation. Personnel at Fort Irwin determined that Fort Irwin's highest risk was the impact of flooding because of the installation's low elevation. Because of the elevated risk of flooding, Fort Irwin personnel:

- (U) added more stormwater channels;
- (U) erected walls around some buildings;
- (U) created drainage systems for flooding; and
- (U) incorporated higher elevation into some of the newer construction projects for flooding.

(U) For example, following a flash flood in 2015, a team from USACE determined that the stormwater channel system helped to reduce damage to the installation by 92 percent. According to Fort Irwin personnel, the installation's mission would likely continue even if some of the critical facilities were not operating. However, events such as a flood could still cause degradation to Fort Irwin's mission. Figure 3 shows an example of a rock stormwater channel built on Fort Irwin in front of facilities.



(U) Figure 3. Stormwater Channel Protecting Fort Irwin Facilities
(U) Source: The DoD OIG.

(U) In addition to implementing adaptive measures to address the risk of flooding, Fort Irwin personal identified and implemented adaptive measures to address the risk of wildfires and droughts. The adaptive measures to address wildfires and droughts included:

- (U) setbacks, fencing, and constructing buildings with concrete for wildfires and;[37]
- (U) readily available access to water for droughts.

[37] (U) A defensible space, or setback, is the buffer created between a building and any fire hazards that surround it in order to create a space to slow or stop the spread of wildfire and help protect the building from catching fire.

(U) During our site visit to Fort Irwin, we physically observed several of Fort Irwin's adaptive measures, including concrete buildings, readily available access to water, and stormwater channels. We also observed firebreaks for wildfires, water storage and water conservation efforts for drought, and drainage systems for flooding.[38]

(U) MCB Camp Pendleton Implemented Adaptive Measures to Address Climate Change

(~~CUI~~) MCB Camp Pendleton officials identified and implemented adaptive measures to address the impacts from wildfires, drought, and flooding.[39] [redacted] Because of the risks from wildfires and flooding, MCB Camp Pendleton personnel:

- (U) conducted prescribed burns and Defensible Space Planning;
- (U) implemented Fire Danger Rating Systems;[40]
- (U) developed agreements with other fire departments; and
- (U) installed bridges and a flood detection system along the Santa Margarita River.

(U) MCB Camp Pendleton officials recognized the need for assistance from state and Federal agencies to fight major wildland fires and developed agreements with Federal, state, and county fire departments. According to an MCB Camp Pendleton official, MCB Camp Pendleton has 14 mutual aid agreements to support the installation, including fire support with Federal, state, county, and city fire departments. Examples of agreements that MCB Camp Pendleton officials developed and entered into with Federal, state, county, or city fire departments include the following.

- (U) A mutual aid agreement with a state fire department in 2023 to last for 7 years (ending in 2030). Under this agreement, MCB Camp Pendleton officials agreed to provide fire equipment response to alarms of fire or other emergencies to the state fire department when these officials request such assistance. Similarly, the state fire department officials agreed to

[38] (U) A firebreak is a permanent or temporary strip of ground cleared to bare soil or planted with fire-resistant vegetation.

[39] (~~CUI~~) Marine Corps Base/Marine Corps Air Station Camp Pendleton, [redacted]. Marine Corps Base/Marine Corps Air Station Camp Pendleton, [redacted].

[40] (U) The Fire Danger Rating System is a system that allows fire managers to estimate current or future fire danger for a given area, taking into consideration fuels, weather, topography, and risks. The fire danger ratings determined through this system describe conditions that reflect the potential, over a large area, for a fire to ignite, spread, and require suppression action.

(U) provide fire equipment response to alarms of fire or other emergencies to MCB Camp Pendleton or other military or defense establishments protected by the installation's fire services.

- (U) An interagency agreement in 2023 to last for 5 years (ending in 2028) with a Federal department. Under the agreement, the parties will coordinate their efforts for the prevention, detection, and suppression of wildfires, and fuel treatments and prescribed burns in and adjacent to their areas of responsibility and each party will provide resources to the other through mutual aid periods.

(U) Entering into these agreements to obtain assistance from Federal and state organizations allowed MCB Camp Pendleton to better fight major wildland fires.

(U) MCB Camp Pendleton officials also developed a firebreak/fuelbreak system to further address the risk of wildfires.[41] As part of the firebreak/fuelbreak system, MCB Camp Pendleton officials cut 165 miles of firebreaks on the installation. In 2016, MCB Camp Pendleton officials started a heavy equipment training school and began using the students to cut the firebreaks to reduce flammable vegetation as a way to decrease the spread of wildfires and to reduce the likelihood of wildfires.

(U) In addition to the bridges and flood detection system installed, MCB Camp Pendleton officials:

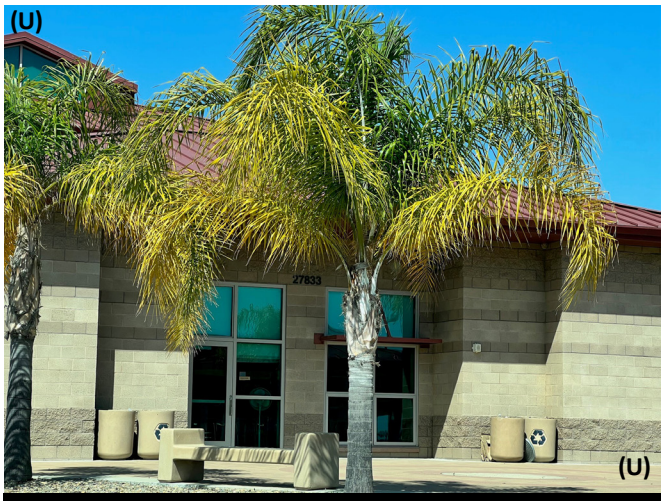
- (U) relocated the training operations of the damaged rifle range to another range, and
- (U) conducted condition assessments and designs for all culverts on primary roads in order to conduct repairs, which is only partially complete as the work competes for Facilities Sustainment, Restoration, and Modernization funding.

(U) Bridges provide MCB Camp Pendleton personnel with all-weather access to training ranges and emergency access to an operational area during periods of increased creek flow and flooding. The flood detection system provides real-time river flow levels, and MCB personnel use the system in conjunction with off-installation gauges to predict water flows and flooding. Repairs and maintenance to the culverts include annual installation-wide vegetation clearing around inlets and outlets; and maintaining storm drains, roads, and low-water crossings throughout the year. Relocating training allows MCB Camp Pendleton personnel to conduct marksmanship training and meet qualification requirements.

[41] (U) A fuelbreak is a man-made area, constructed in anticipation of future fires, with a reduced fuel load that acts as a barrier to stop or slow down fire spread. A fuelbreak is also designed to provide firefighters access and to act as a retreat for personnel and equipment to escape injury.

(U) Although the risk of drought does not currently present as the highest risk to MCB Camp Pendleton, MCB Camp Pendleton officials developed several initiatives to address the risk of drought. To maintain and increase water supply, the installation's responses are to exercise and defend water rights, maintain connections to emergency water supplies, and recharge aquifers. MCB Camp Pendleton personnel, as part of increasing their water supply through connections to emergency water supplies, installed a pipeline that can be used to provide emergency water from the San Diego County Water Authority's system by moving water through the town of Fallbrook onto the installation, and providing water to the installation's central and northern sections. Furthermore, MCB Camp Pendleton officials initiated a pilot project to assess the best methodology to purify reclaimed wastewater to use to recharge the Santa Margarita River aquifer.

(U) In addition to maintaining and increasing the water supply, MCB Camp Pendleton officials are also working to manage demand for water through the Commanding General's Drought Policy, which establishes tiers for water use curtailment and actions to be taken.[42] The installation officials have also developed MCB Camp Pendleton requirements, which require xeriscape (drought-tolerant landscape) and the installation of low-flow showerheads and toilets for all new and renovated facilities. Figure 4 is an example of using xeriscaping with drought-tolerant plants on MCB Camp Pendleton.



(U) Figure 4. Xeriscaping on MCB Camp Pendleton
(U) Source: The DoD OIG.

(U) During our site visit to MCB Camp Pendleton, we physically observed several of MCB Camp Pendleton's adaptive measures, including concrete buildings and firebreaks in response to wildfires and above sea-level construction to address the impacts of flooding. We also observed the use of xeriscaping throughout the installation to address the impacts of drought.

[42] (U) "Marine Corps Installations West - Marine Corps Base Camp Pendleton Drought Response Policy," May 28, 2015.

(U) NASNI Implemented Adaptive Measures to Address Climate Change

(U) NASNI personnel identified and implemented adaptive measures to address the impacts of flooding on the installation. Personnel at NASNI have determined that NASNI's primary risk is flooding due to rising sea levels and storm surges.[43] Because of the risk of flooding, NASNI personnel:

- (U) added drainage systems,
- (U) constructed buildings with elevated foundations,
- (U) built riprap along the shoreline,[44] and
- (U) located important facilities inland.

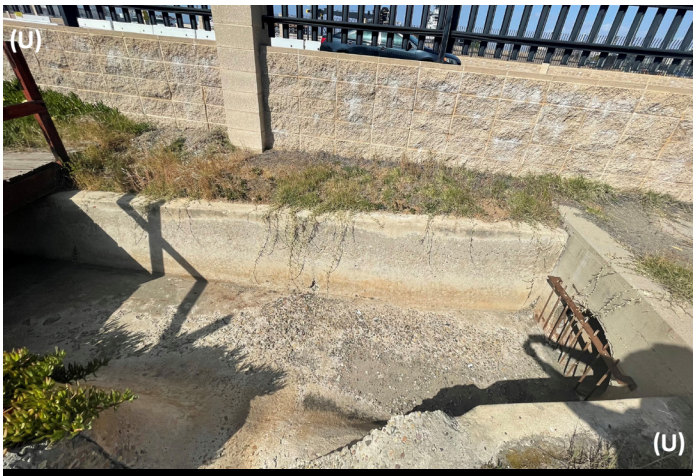
(U) NASNI officials also implemented the requirement for master planners to assess flood plains when designing facility projects and the requirement for master planners to include low-impact development area details and flood maps in the designs.[45] Planners use low-impact development planning (a stormwater strategy designed to protect natural resources from continuing degradation) and the Naval Base Coronado Site Approval Request checklist as additional adaptive measures. According to the Naval Base Coronado Site Approval checklist, categories such as the suitability of site conditions and topography; adherence to the Master Plan; and known subsurface foundations, structures, and utilities that could adversely affect the project or existing conditions are recorded. According to the NASNI Asset Management Branch Head, planners reviewed the 100-year flood predictions as well as local knowledge and research and took this information and sea level rise into account when developing designs. Planners used the Flood Inundation and Surge Hazard tool to identify facilities at risk from sea level rise.

[43] (U) The abnormal rise in seawater level during a storm, measured as the height of the water above the normal astronomical tide. (National Oceanic and Atmospheric Administration, "What is Storm Surge?" March 18, 2022)

[44] (U) Riprap is a permanent layer of large, angular stone, cobbles, or boulders typically used to armor, stabilize, and protect the soil surface against erosion and scour in areas of concentrated flow or wave energy.

[45] (U) Low-impact development is an approach to stormwater management that mimics a site's natural hydrology as the landscape is developed. Stormwater is managed onsite, and the rate and volume of predevelopment stormwater reaching receiving waters is unchanged. Low-impact development principles complement, and sometimes replace, traditional stormwater management systems that historically emphasized moving stormwater offsite with curbs, pipes, ditches, and ponds.

(U) During our site visit to NASNI, we observed several of NASNI's adaptive measures, including the use of storm drains, elevated foundations, and surface drains. We also observed the use of retention ponds, which are water-filled pools that change in reaction to rainfall and runoff, gathering and slowly releasing water to prevent flooding and erosion. Figure 5 shows an example of a storm drain installed on NASNI to help prevent flooding.



(U) Figure 5. Storm Drain to Control Flooding
(U) Source: The DoD OIG.

(U) Beale AFB Implemented Adaptive Measures to Address Climate Change

(U) Beale AFB personnel identified and implemented adaptive measures to address the impacts of wildfires, drought, and flooding on the installation. Personnel at Beale AFB determined that the installation's biggest concern is wildfires, which, among other concerns, produce poor air quality. Because of the elevated risk of wildfires, Beale AFB personnel:

- (U) established a six-person embedded wildfire fighting team and conducted prescribed burns;
- (U) created firebreaks;
- (U) built concrete facilities;
- (U) developed a grazing program;
- (U) replaced wooden poles with steel poles;
- (U) installed air quality sensors at three locations on base; and
- (U) replaced heating, ventilation, and air conditioning filters with Minimum Efficiency Reporting Value filters.

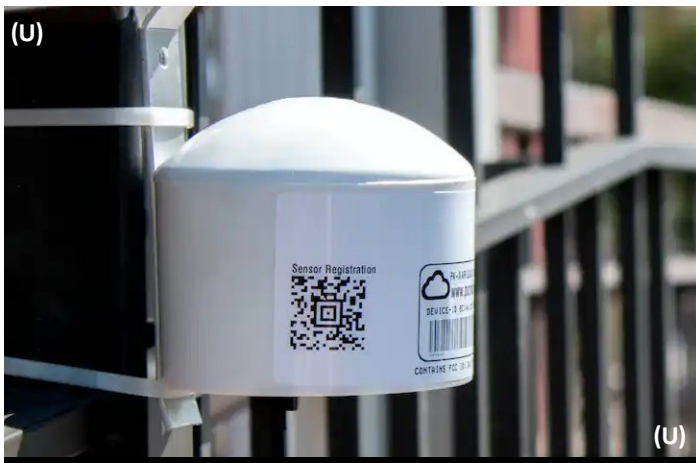
(U) Beale AFB's wildfire fighting team supports prescribed burns and local base fires as a way to reduce the number of and intensity of wildfires and to be able to rapidly respond to wildfires on or near the installation. The grazing program was created to reduce flammable fuels, reduce non-native plant species, maintain vernal pools with threatened and endangered species present, and generate revenue for natural resource projects.[46]

[46] (U) Vernal pools are seasonal wetlands that are covered by shallow water from winter to spring but may be completely dry for most of the summer and fall. Vernal pools range in size from small puddles to shallow lakes.

(U) Additionally, Beale AFB has more than 2,000 electric poles on the installation, and personnel have been working to replace the wooden poles with steel poles in phases. As installation personnel replace the wooden poles, they have also increased the height of the electric poles to prevent smoke from tripping the circuits. As of November 2022, approximately 40 percent of the more than 2,000 electric poles are still wooden poles. In 2022, Beale AFB personnel replaced approximately 70 wooden poles. Beale AFB personnel also have several projects in the design phase to replace an additional 50 wooden poles, with the first phase of replacing the additional 50 poles to be completed by December 2024.

(U) Beale AFB occupies approximately 23,000 acres of land and is situated between the Great Valley and Sierra Nevada geologic provinces. California, surrounding states, and areas on the installation are susceptible to wildfires during warmer and drier months of the year (May through November). The wildfires have the potential to carry varying amounts of smoke onto the installation and local area. During the 2020 wildfire season (August through October), outdoor air quality concentrations reached all-time highs, and the air quality index was often 500+, which is considered "very hazardous" to all individuals and exceeds existing Air Quality Index categories (Good through Hazardous).

(U) In an effort to streamline air quality index monitoring and provide near-real-time monitoring of Beale AFB, Beale AFB engineers installed air quality sensors at three locations on base—the flight line, main base, and base housing. Beale AFB personnel have replaced heating, ventilation, and air conditioning filters with Minimum Efficiency Reporting Value filters.[47] For newer buildings under construction, Beale AFB personnel designed the heating, ventilation, and air conditioning systems to use the higher-rated filters. Beale AFB personnel also developed an Air Quality Concept of Operations to prescribe policies and establish responsibilities and procedures pertaining to poor outdoor air quality due to high concentrations of air pollutants. Figure 6 shows an example of an air quality sensor Beale AFB engineers installed on the installation.



(U) Figure 6. Air Quality Sensor
(U) Source: Beale AFB.

[47] (U) The Minimum Efficiency Reporting Value measures how effectively the filter stops dust and other contaminants from passing through the filter and into the air stream. Filters with higher Minimum Efficiency Reporting Value ratings trap small particles more effectively than filters with lower Minimum Efficiency Reporting Value ratings.

(U) In addition to the adaptive measures implemented to address the risk of wildfires, to address the risk of flooding and drought, Beale AFB personnel:

- (U) completed the Basin-Wide Hydrology and Hydraulic Study to develop concepts for flood damage reduction and removal of dams;[48]
- (U) reduced the number of dams on the base by removing a failing dam that was no longer needed and repaired the ones that have a chance of dam failure and risk of flooding;
- (U) rebuilt two dams;
- (U) completed channel widening, culvert and bridge replacement, flood easement, and reservoir flood storage projects;
- (U) installed production wells;
- (U) used a 5 million gallon-per-day water treatment plant; and
- (U) incorporated xeriscaping around the installation.

(U) During our site visit to Beale AFB, we observed several of Beale AFB's adaptive measures, including the use of firebreaks, concrete buildings, and steel poles in place of wooden poles to address the impacts of wildfires, and the use of air quality monitors to address the impacts of poor air quality resulting from wildfires. We also observed culverts and storm drains in place to address the impacts of flooding, and xeriscaping to address the impacts of drought.

(U) Conclusion

(U) Officials at Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB took measures to enhance facility resiliency and implement adaptive measures to protect facilities from the impacts of climate change and extreme weather events that currently affect them, including wildfires, drought, and flooding. Installation personnel recognized the need to implement adaptive measures in response to the effects of prior extreme weather events and potential future effects of climate change. As a result, installation officials implemented adaptive measures that they believe have resulted in the installations being well postured to react to current climate change and extreme weather events. However, if officials at these installations do not continue to implement adaptive measures to enhance facility resiliency against climate change and extreme weather events, there may be negative impacts to mission readiness. If installation personnel implement the recommendations in Finding A as well as continue to plan for and implement

[48] (U) U.S. Army Corps of Engineers Sacramento District, "Beale Air Force Base "Comprehensive Hydraulic Modeling Study," 2017.

(U) adaptive measures in accordance with DoD and Service-specific guidance, then these installations will be better prepared to mitigate the future impacts of climate change and extreme weather events. Additionally, continuing to implement the appropriate guidance may allow these installations to ensure that climate preparedness practices persist and be more adaptable to evolving priorities and climate conditions.

(U) Appendix

(U) Scope and Methodology

(U) We conducted this performance audit from December 2021 through February 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

(U) This report was reviewed by the DoD Components associated with this oversight project to identify whether any of their reported information, including legacy FOUO information, should be safeguarded and marked in accordance with the DoD CUI Program. In preparing and marking this report, we considered any comments submitted by the DoD Components about the CUI treatment of their information. If the DoD Components failed to provide any or sufficient comments about the CUI treatment of their information, we marked the report based on our assessment of the available information.

(U) Criteria and Guidance Reviewed

(U) We reviewed the following criteria to gain an understanding of the requirements governing the climate change resiliency and adaptation plan for U.S. military installations.

- (U) DoD Directive 4715.21, "Climate Change Adaptation and Resilience," effective January 14, 2016, and updated on August 31, 2018
- (U) Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020

(U) In addition, we reviewed the guidance established by the DoD and each Military Department to identify the processes and procedures for assessing the climate change resiliency and adaptation for U.S. military installations located in California. Guidance reviewed included the following documents.

- (U) DoD Climate Risk Analysis, October 2021
- (U) DoD Installation Exposure to Climate Change at Home and Abroad, April 19, 2021
- (U) Army Climate Resilience Handbook, August 2020
- (U) Naval Facilities Engineering Command Climate Change – Installation Adaptation and Resilience Planning Handbook, January 2017
- (U) Air Force Civil Engineer Severe Weather/Climate Hazard Screening and Risk Assessment Playbook, April 24, 2020

(U) Who We Contacted

(U) To answer the audit objective, we met with personnel in the Office of the Assistant Secretary of Defense (Sustainment), Arlington, Virginia.

- (U) Office of the Deputy Assistant Secretary of Defense for Environment and Energy Resilience, Arlington, Virginia
- (U) Office of the Deputy Assistant Secretary of Defense for Construction, Arlington, Virginia

(U) In addition, we met with and obtained supporting documentation from personnel from each Military Service and installation listed in the following table to understand the approach the Military Services and installations used to improve climate resilience and adaptation.

(U) Table 2. Military Service Organizations Contacted

(U) Military Service	Organizations Contacted
Army Organizations	Deputy Chief of Staff, G-9
	Assistant Secretary of the Army (Installations, Energy, and Environment)
	U.S. Army Corps of Engineers
	U.S. Army Corps of Engineers Engineer Research and Development Center, Vicksburg, Mississippi
	U.S. Army Materiel Command, Redstone Arsenal, Alabama
	U.S. Army Installation Management Command, San Antonio, Texas
	Fort Irwin Garrison, Fort Irwin, California
	Environmental Division
	Engineering Division
	Public Works
	Energy Management
	Master Planning
	Plans, Training, Mobilization, and Security Directorate
	Emergency Services Directorate
	Integration Division
	Utility Management **(U)**

(U) Table 2. Military Service Organizations Contacted (cont'd)

(U) Military Service	Organizations Contacted
Marine Corps Organizations	Headquarters Marine Corps, Plans, Policies, and Operations
	Office of the Director, Marine Corps Staff
	Headquarters Marine Corps, Installations and Logistics, Marine Corps Installations Command
	Marine Corps Installations West, Camp Pendleton, California
	Marine Corps Base Camp Pendleton, California
	Assistant Chief of Staff
	Facility Management
	Community Plans and Liaison Officer
	Deputy Fire Chief
	Public Works Officers
	Facilities Asset Management and Engineering Division
	Office of Water Resources
Navy Organizations	Deputy Assistant Secretary of the Navy for Installations, Energy, and Facilities
	Commander, Navy Installations Command, Facilities Division
	NAVFAC Headquarters
	NAVFAC - Southwest, San Diego, California
	NASNI
	Facility Planners
	Environmental Division
	Utilities Division
	Facility Division
	Community Plans and Liaison
Air Force Organization	Air Force Civil Engineer, Facilities Division, San Antonio, Texas
	Air Force Civil Engineer, Strategy and Plans Division, San Antonio, Texas
	Office of the Secretary of the Air Force
	Deputy Assistant Secretary of the Air Force for Environment, Safety, and Infrastructure
	Air Combat Command 9th Reconnaissance Wing, Beale AFB, California
	Air Combat Command 9th Civil Engineer Squadron, Beale AFB, California
	Beale AFB, California
	Energy Management
	Utilities Division
	Flood Mitigation personnel
	Environmental Division
	Fire personnel
	Community Planner **(U)**

(U) Source: The DoD OIG.

(U) Critical Facility Observation

(U) We observed the actions taken by each installation to adapt critical facilities to the identified risks and threats. Specifically, we requested a list of the critical infrastructure at Fort Irwin, MCB Camp Pendleton, NASNI, and Beale AFB to determine whether the Military Services implemented adaptive measures to protect the critical facilities from the effects of climate change and extreme weather events, including wildfires, droughts, and flooding.

(U) Fort Irwin officials provided us with their facility list. We initially planned to use the Mission Dependency Index (MDI) to select the installation's top 15 facilities.[49] However, installation personnel stated that they were unfamiliar with the index; therefore, we used an alternative method to select our nonstatistical sample. After discussion with installation personnel, we decided to use Fort Irwin's Mission Essential Vulnerable Areas list and Critical Asset List as the basis for the sampled facilities to be observed. According to installation personnel, these lists contain assets that are necessary for the installation's mission. We decided to observe all of the facilities on the lists, which gave us a total of 19 facilities. However, after discussion with installation personnel, we excluded two facilities, bringing our sample to a total of 17 facilities. We excluded these two facilities because one was located outside of Fort Irwin and the other would not significantly degrade Fort Irwin's mission if it became nonoperational.

(U) MCB Camp Pendleton officials provided us with their facility and building priority list. We identified the facilities with the greatest MDIs and selected the top 15 facilities to sample. However, because additional facilities were added for the other three installations we visited, we decided to add an additional four facilities, bringing our initial sample up to 19 facilities. During our site visit, we learned that three facilities in our sample no longer existed, and we did not visit a fourth facility due to the facility's classified nature. The MCB Camp Pendleton Facilities Manager added 2 additional facilities deemed appropriate, bringing our nonstatistical sample to a total of 17 facilities.

(~~CUI~~) [redacted].

[49] (U) The MDI is a metric used to evaluate the relative risk and importance of different facility and infrastructure assets as they are used to support mission accomplishment.

(U) An Air Force official provided us with Beale AFB's facility priority list. We initially planned to use the MDI to select the installation's top 15 facilities. However, a Beale AFB official stated that the Tactical MDI provided more input at a tactical level. As a result, we used the Tactical MDI to identify facilities with the greatest MDI ratings and compared this list to Beale AFB's Mission Critical Facilities list to select a nonstatistical sample of 17 common facilities.

(U) Internal Control Assessment and Compliance

(U) We assessed internal controls and compliance with laws and regulations necessary to satisfy the audit objective. Specifically, we assessed the information and communication, and monitoring components related to the four installations we selected assessing facility resilience and planning for adaption needed to address climate change and extreme weather events. However, because our review was limited to these internal control components and underlying principles, it may not have disclosed all internal control deficiencies that may have existed at the time of this audit.

(U) Use of Computer-Processed Data

(U) We did not use computer-processed data to perform this audit.

(U) Prior Coverage

(U) During the last 5 years, the Government Accountability Office (GAO) issued three reports and the DoD Office of Inspector General (DoD OIG) issued three reports discussing climate change and extreme climate events, such as wildfires, droughts, and flooding. Unrestricted GAO reports can be accessed at http://www.gao.gov. Unrestricted DoD OIG reports can be accessed at http://www.dodig.mil/reports.html/.

(U) GAO

(U) Report No. GAO-21-46, "DoD Coordinates with Communities, but Needs to Assess the Performance of Related Grant Programs," December 2020

(U) The GAO determined that domestic military installations were vulnerable to disruptions from climate change and extreme weather. According to the GAO survey:

- (U) 43 of the 63 installations reported past disruptions in the supply of community infrastructure and support services that aid installation functions due to at least one type of climate change or extreme weather event in the last 5 years; and

- (U) 17 installations reported no disruptions for each of the 8 climate change and extreme weather events (recurrent flooding, drought, desertification, wildfire, thawing permafrost, and extreme heat, cold, or precipitation) and 3 installations reported not knowing of any disruptions resulting from any of the 8 events or a combination of no disruptions and not knowing.

(U) The GAO also found that some installations reported taking action to sustain or improve their ability to independently provide commodities and support services, and limit installation exposure to the effects of climate change and extreme weather.

(U) Report No. GAO-20-127, "Climate Resilience: A Strategic Investment Approach for High-Priority Projects Could Help Target Federal Resources," October 2019

(U) The GAO determined that the Government has invested in projects that may enhance climate resilience, but it does not have a strategic approach to guide its investments in high-priority climate resilience projects. In addition, the Federal Government did not strategically identify and prioritize projects to ensure they address the Nation's most significant climate risks.

(U) Report No. GAO-19-453, "Climate Resilience: DoD Needs to Assess Risk and Provide Guidance on Use of Climate Projections in Installation Master Plans and Facilities Designs," June 2019

(U) The GAO determined that DoD installations have not consistently assessed risks from extreme weather and climate change effects or consistently used projections to anticipate future climate conditions. This occurred because of the lack of guidance on how to incorporate climate projections into their Master Plans. Not assessing risks or using climate projections in installation planning may expose DoD facilities to greater-than-anticipated damage or degradation as a result of extreme weather or climate-related effects.

(U) DoD OIG

(U) Report No. DODIG-2024-030, "Audit of Environmental Threats to Naval Dry Docks," November 29, 2023

(U) Navy officials at all four shipyards complied with Federal and DoD guidance when planning for the nine dry docks the DoD OIG reviewed. Navy officials developed weather response plans and considered sea level change and flooding impacts, as required. The DoD OIG also determined that Navy officials at three of the four installations where the shipyards were located did not include an installation resiliency component when the Navy officials updated master plans,

(U) as required by the 2020 updates to section 2864, title 10, United States Code. The DoD OIG found that one regional commander elected to follow the 10-year statutory requirement in section 2864, title 10, United States Code, for their shipyard; another regional commander did not provide funding for one installation's master plan; and a third regional commander suspended master planning at a different installation to avoid duplicating the ongoing shipyard optimization program at the shipyard located on the installation.

(U) Report No. DODIG-2023-061, "Audit of Military Department Climate Change Assessments and Adaptation Plans in the Southeastern Continental United States," March 28, 2023

(U) The Military Departments did not consistently develop climate assessments required by UFC 2-100-01 and the FY 2020 National Defense Authorization Act at the five installations the DoD OIG reviewed. Personnel at the five installations did not use a standardized approach to conduct and document their climate assessment because DoD guidance had not been updated to reflect changes in the law. The DoD OIG also determined that the Military Departments did not update their guidance to identify the seven required elements from the FY 2020 National Defense Authorization Act or require assessments to use specific climate hazards identified in UFC 2-100-01. Furthermore, the DoD found that personnel at three of the five installations proactively identified projects intended to enhance installation climate resilience before enactment of the FY 2020 National Defense Authorization Act requirements. The DoD OIG determined that these projects were completed because the projects were associated with a mission impact as officials believed they could not obtain funding for a climate project without identifying an immediate mission impact.

(U) Report No. DODIG-2022-083, "Evaluation of the Department of Defense's Efforts to Address the Climate Resilience of U.S. Military Installations in the Arctic and Sub-Arctic," April 13, 2022

(U) U.S. military installation leaders at the Arctic and sub-Arctic installations did not conduct installation resilience assessments and planning required by DoD directive and public law. Most of the installation leaders at the six installations were unfamiliar with military installation resilience planning requirements, processes, and tools, and did not comply with requirements to identify current and projected environmental risks, vulnerabilities, and mitigation measures or incorporate these considerations into plans and operations. This occurred because of a lack of DoD and Military Service Component emphasis on installation climate resilience.

(U) Management Comments

(U) Assistant Secretary of the Army for Installations, Energy, and Environment

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
INSTALLATIONS, ENERGY AND ENVIRONMENT
110 ARMY PENTAGON
WASHINGTON DC 20310-0110

SAIE-ACD 27 March 2024

MEMORANDUM FOR Deputy Inspector General for Audit, U.S. Department of Defense, 4800 Mark Center Drive, Alexandria, VA 22350-1500

SUBJECT: DoDIG Draft Report: Climate Change Adaptation and Facility Resilience at Military Installations in California (D2022-D000RL-0044)

1. The Assistant Secretary of the Army Installations, Energy, and Environment ASA(IE&E) concurs with the draft report findings and endorses the U.S. Installation Commands response. Comments in enclosures are consistent with the Army position.

2. ASA(IE&E) point of contact is the undersigned at [redacted] and [redacted].

CRAWFORD.DONALD.EUGENE.II.[redacted]

Encl

DON E. CRAWFORD
GS-15
Deputy, Army Climate Directorate
ASA(IE&E)

(U) U.S. Army Materiel Command

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY MATERIEL COMMAND
4400 MARTIN ROAD
REDSTONE ARSENAL, AL 35898-5000

AMIR

MAR 2 5 2024

MEMORANDUM FOR Department of Defense Inspector General (DoDIG/[redacted]), Program Director for Audit Readiness and Global Operations, 4800 Mark Center Drive, Alexandria, VA 22350-1500

SUBJECT: Command Comments to Department of Defense Inspector General Draft Report: Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California, Project: D2022-D000RL-0044.000

1. The U.S. Army Materiel Command concurs with the subject draft report findings and endorses the U.S. Installation Management Commands response. Our specific comments are included at the enclosure.

2. The U.S. Army Materiel Command point of contact is [redacted] or email: [redacted].

Encl

MARION G. WHICKER
Executive Deputy to the
Commanding General

(U) Installation Management Command

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
2405 GUN SHED ROAD
JOINT BASE SAN ANTONIO FORT SAM HOUSTON, TX 78234-1223

AMIM-IR (36-2c2)

MEMORANDUM THRU Executive Deputy to the Commanding General, U.S. Army Materiel Command, 4400 Martin Road, Redstone Arsenal, AL 35898-5000

FOR THE Deputy Inspector General for Audit, U.S. Department of Defense, 4800 Mark Center Drive, Alexandria, VA 22350-1500

SUBJECT: Draft Report, Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California (Project D2022-D000RL-0044)

1. The U.S. Army Installation Management Command (IMCOM) response to the subject draft report is enclosed. IMCOM concurs with Recommendations A.1, A.2, and A.4.

2. The IMCOM Internal Review Point of Contact for this action is [redacted], who may be reached at [redacted], or by email: [redacted].

RICCIARDI.JOSEPH.A[redacted]
LLEN.[redacted]

Encl

JOSEPH A. RICCIARDI
Brigadier General, USA
Deputy Commanding General

(U) Installation Management Command (cont'd)

Office of Inspector General, U.S. Department of Defense Draft Report
Audit of Climate Change Adaptation and Facility Resilience at
Military Installations in California (Project D2022-D000RL-0044)

Command Reply for Recommendations A.1, A.2, & A.4.

For the Commanding General,
U.S. Army Installation Management Command:

Recommendation A.1. (U) The Inspector General, U.S. Department of Defense recommends that the Garrison Commander, Fort Irwin, direct master planners to update installation Master Plans to include Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020 climate change requirements, using information from the completed climate assessment.

IMCOM Comments to Recommendation A.1

IMCOM Concurs. Fort Irwin Directorate of Public Works will update the installation master plan per climate change requirements from the Unified Facilities Criteria 2-100-01, "Installation Master Planning," dated September 30, 2020, and information from the climate assessment (from recommendation A.2). Many of the concerns identified in the draft report are addressed by Fort Irwin's Installation Energy and Water Plan (IEWP). The IEWP will also be updated to reflect these changes and incorporated into the Master Plan as an annex.

Estimated completion date: 31 January 2025

Recommendation A.2. (U) The Inspector General, U.S. Department of Defense recommends that the Garrison Commander, Fort Irwin direct master planners to prepare a climate assessment in accordance with Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020 requirements and Military Service-specific guidance.

IMCOM Comments to Recommendation A.2

IMCOM Concurs. Fort Irwin Directorate of Public Works will prepare a climate assessment in accordance with requirements from the Unified Facilities Criteria 2-100-01, "Installation Master Planning," dated September 30, 2020 and Military Service-specific guidance.

Estimated completion date: 31 January 2025

Recommendation A.4. (U) The Inspector General, U.S. Department of Defense recommends that the Garrison Commander, Fort Irwin, identify training on requirements for preparing climate assessments and updating the Master Plan and direct all Fort Irwin personnel responsible for preparing climate assessments and updating the Master Plan to take the training.

Enclosure (pg. 1 of 2)

(U) Installation Management Command (cont'd)

Office of Inspector General, U.S. Department of Defense Draft Report
Audit of Climate Change Adaptation and Facility Resilience at
Military Installations in California (Project D2022-D000RL-0044)

IMCOM Comments to Recommendation A.4

IMCOM Concurs. Fort Irwin Directorate of Public Works will identify training requirements for preparing the climate assessment and updating the master plan, and will direct responsible personnel to take the training.

Estimated completion date: 31 October 2024

Enclosure (pg. 2 of 2)

(U) Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities)

DEPARTMENT OF THE NAVY
HEADQUARTERS, UNITED STATES MARINE CORPS
3000 MARINE CORPS PENTAGON
WASHINGTON, DC 20350-3000

IN REPLY REFER TO:
28 Mar 2024

MEMORANDUM FOR DEPARTMENT OF DEFENSE OFFICE OF INSPECTOR GENERAL

SUBJECT: DODIG Draft Audit Report No. D2022-D000RL-0044.000, Audit of Climate Change Adaption and Facility Resilience at Military Installations in California

Pursuant to your February 20, 2024 draft report, the attachments provide Marine Corps management comments to the report and its recommendations. The attached responses were reviewed and approved by [redacted], Commander, Marine Corps Installations Command/Assistant Deputy Commandant for Installations and Logistics (Facilities) and signed for release by [redacted], Chief of Staff, Marine Corps Installations Command/Installations and Logistics (Facilities).

For questions regarding this response, you may contact [redacted] at [redacted] or email [redacted].

Charles K. Dove
Head, Audit Coordination and Response
Office of the Director, Marine Corps Staff

Attachments:
As stated

(U) Marine Corps Installations West-Marine Corps Base Camp Pendleton

DEPARTMENT OF THE NAVY
HEADQUARTERS, UNITED STATES MARINE CORPS
3000 MARINE CORPS PENTAGON
WASHINGTON, DC 20350-3000

IN REPLY REFER TO:
20 Mar 24

MEMORANDUM FOR DEPARTMENT OF DEFENSE OFFICE OF INSPECTOR GENERAL

SUBJECT: DODIG Draft Audit Report No. D2022-D000RL-0044.000, Audit of Climate Change Adaption and Facility Resilience at Military Installations in California

Pursuant to your March 20, 2024, draft report, the attachment provides Marine Corps management comments to the report and its recommendations.

My point of contact for this matter is [redacted], Facilities Planner, who may be reached at [redacted] or [redacted].

J. E. MOYE
Chief of Staff
By Direction

Attachment:
As stated

(U) Marine Corps Installations West-Marine Corps Base Camp Pendleton (cont'd)

DOD OIG DRAFT REPORT DATED 20 FEBRUARY 2024
PROJECT NO. D2022-D000RL-0044.000
"AUDIT OF CLIMATE CHANGE ADAPTATION AND FACILITY RESILIENCE AT MILITARY INSTALLATIONS IN CALIFORNIA"

UNITED STATES MARINE CORPS COMMENTS
TO THE DOD OIG RECOMMENDATIONS

RECOMMENDATION A.1: Department of Defense (DoD) Office of Inspector General (OIG) recommends that the following officials direct master planners to update installation Master Plans to include Unified Facilities Criteria 2-100-01, "Installation Master Planning," 30 September 2020 climate change requirements, using information from the completed climate assessment:

a. Garrison Commander, Fort Irwin

b. Commanding General, Marine Corps Base Camp Pendleton

c. Commanding Officer, Naval Base Coronado

d. Commander, 9th Reconnaissance Wing, Beale Air Force Base.

USMC RESPONSE: Commanding General, Marine Corps Installations West-Marine Corps Base Camp Pendleton (CG MCIWEST-MCB CAMPEN) RESPONSE: Concur with Recommendation A.1. Corrective actions in progress with award of Installation Master Plan support contract in September 2022 and scheduled for completion in 2026.

RECOMMENDATION A.2: DoD OIG recommends that the following officials direct master planners to prepare a climate assessment in accordance with Unified Facilities Criteria 2-100-01, "Installation Master Planning," 30 September 2020 requirements and Military Service-specific guidance:

a. Garrison Commander, Fort Irwin

b. Commanding General, Marine Corps Base Camp Pendleton

c. Commanding Officer, Naval Base Coronado

USMC RESPONSE: CG MCIWEST-MCB CAMPEN RESPONSE: Concur with Recommendation A.2. Corrective actions in progress with award of Installation Master Plan support contract in September 2022 and scheduled for completion in 2026.

Enclosure (1)

(U) Marine Corps Installations West-Marine Corps Base Camp Pendleton (cont'd)

UNITED STATES MARINE CORPS COMMENTS
TO THE DOD OIG RECOMMENDATIONS

RECOMMENDATION A.5: DoD OIG recommends that the CG MCB CAMPEN incorporate training for preparing climate assessments as a requirement in their training plan to all personnel responsible for preparing climate assessments and updating the Master Plan.

USMC RESPONSE: CG MCIWEST-MCB CAMPEN RESPONSE: Concur with Recommendation A.5. Corrective actions in progress with award of Installation Master Plan support contract in September 2022 and scheduled for completion in 2026. Training for MCIWEST-MCB CAMPEN staff will be incorporated into preparations for Master Plan update.

RECOMMENDATION FOR CHANGE: CG MCIWEST-MCB CAMPEN RESPONSE: Change wording on Page 35, last paragraph, second bulletized item stating, "(U) conducted a culvert study and carried out repairs and maintenance." This item is inaccurate. Request the following wording, "The installation has conducted condition assessments and designs for all culverts on primary roads, seeking climate and / or storm funding in order to complete repairs. This work competes for Facilities Sustainment, Restoration and Modernization (FSRM) funding with a myriad of requirements and is only partially complete."

RECOMMENDATION COMMENT ON CLASSIFICATION: CG MCIWEST-MCB CAMPEN acknowledges that MCIWEST-MCB CAMPEN Controlled Unclassified Information (CUI) contained in the audit will be released to Congress.

2

(U) Naval Base Coronado

DEPARTMENT OF THE NAVY
COMMANDING OFFICER
NAVAL BASE CORONADO
BOX 357033
SAN DIEGO, CA 92135-7033

7510
Ser N4/067
19 Mar 24

From: Commanding Officer, Naval Base Coronado
To: Deputy Inspector General, Policy and Oversight, Department of Defense Inspector General

Subj: DRAFT REPORT ON AUDIT OF CLIMATE CHANGE ADAPTATION AND FACILITY RESILIENCE AT MILITARY INSTALLATIONS IN CALIFORNIA PROJECT NO. D2022-D000RL-0044.000

Ref: (a) DODIG Utilization Draft Report D2022-D000RL-0044.000 of 20 Feb 24

1. Per reference (a), the Commanding Officer, Naval Base Coronado (NBC) responds to recommendations A.1 and A.2 respectively. The recommendations from reference (a) are included and followed by the response.

Recommendation A.1. We recommend that the following officials direct master planners to update installation Master Plans to include Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020 climate change requirements, using information from the completed climate assessment.

Management Comments for Recommendation A.1. Concur

NBC began development of an Installation Climate Resilience Plan (ICRP) in July 2023. This ICRP will be incorporated into the Installation Master Plan and adhere to the applicable United Facilities Criteria (UFC). Estimated completion date for the ICRP is December 2024. The ICRP will be used for the development of the updated Installation Master Plan which is planned for award in FY26.

Recommendation A.2. We recommend that the following officials direct master planners to prepare a climate assessment in accordance with UFC 2-100-01 "Installation Master Planning," September 30, 2020 requirements and Military Service-specific guidance.

Management Comments for Recommendation A.2. Concur

As part of the ICRP mentioned above, NBC will conduct a climate assessment in accordance with applicable UFC. Estimated completion date for the ICRP is December 2024.

2. The technical point of contact is [redacted], Real Property Management Branch Head, who can be reached commercial at [redacted], or via email at [redacted]. The NBC Inspector General audit liaison is [redacted], Executive Director, who can be reached commercial at [redacted], or via email at [redacted].

MONTERO.LADISLAO.RODOLFO.[redacted]

L. R. MONTERO

(U) Mobilization Assistant, Deputy Chief of Staff for Logistics, Engineering, and Force Protection

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC

26 March 2024

MEMORANDUM FOR DEPARTMENT OF DEFENSE INSPECTOR GENERAL

FROM: HQ USAF/A4
1030 Air Force Pentagon
Washington, DC 20330

SUBJECT: Department of the Air Force Response to DoD Office of Inspector General Draft Report, "Climate Change Adaptation and Facility Resilience at Military Installations in California" (Project No. D2022-D000RL-0044.000)

1. This is the Department of the Air Force response to the DoDIG Draft Report, "Climate Change Adaptation and Facility Resilience at Military Installations in California" (Project No. D2022-D000RL-0044.000). The DAF concurs with the report as written.

2. The AF/A4 in coordination with AFIMSC & ACC will correct issues identified in this report, and develop and implement a corrective action plan outlined in the following recommendations:

RECOMMENDATION A.1: The DODIG recommends that the Commander, 9th Reconnaissance Wing, Beale Air Force Base direct master planners to update installation Master Plans to include Unified Facilities Criteria 2-100-01, "Installation Master Planning," September 30, 2020 climate change requirements, using information from the completed climate assessment.

DAF RESPONSE: The DAF concurs with this recommendation. At the direction of the Commander of the 9th Reconnaissance Wing, master planners at Beale Air Force Base are in the process of updating the Installation Development Plan in accordance with all applicable requirements.

RECOMMENDATION A.3: The DODIG recommends that the Commander of the 9th Reconnaissance Wing at Beale Air Force Base incorporate training on the Comprehensive Planning Platform as a training requirement for all Beale Air Force Base personnel responsible for developing and updating the Master Plan.

DAF RESPONSE: The Air Force concurs with this recommendation. The Air Force Civil Engineer Center created and maintains the Comprehensive Planning Platform as a centralized resource for enterprise-wide facility planning. The Comprehensive Planning Branch provides semiannual training on the system to all Air Force installation master planners. The centralized provision of training ensures the content is consistent and up-to-date.

3. The AF/A4 point of contact is [redacted] or [redacted].

DORNHOEFER.VAN ESSA.J. [redacted]

VANESSA J. DORNHOEFER, Maj Gen, USAF
Mobilization Assistant, DCS/Logistics, Engineering, & Force Protection (AF/A4)

(U) Deputy Assistant Secretary of Defense for Infrastructure Modernization and Resilience

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3400 DEFENSE PENTAGON
WASHINGTON, DC 20301-3400

ENERGY, INSTALLATIONS, AND ENVIRONMENT

MEMORANDUM FOR DEPARTMENT OF DEFENSE INSPECTOR GENERAL (ATTN: PROGRAM DIRECTOR FOR AUDIT READINESS AND GLOBAL OPERATIONS)

SUBJECT: DODIG Draft Report "DoD IG Draft Report (Project No. D2022-D000RL-0044.000) "Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California" Dated February 20, 2024

The Office of the Assistant Secretary of Defense for Energy, Installations, and Environment (OASD(EI&E)) has reviewed the subject draft report and provides the attached response to recommendation A.6 and a technical comment for a requested modification to the content on page 27 of the report in the section titled, "DoD Guidance Should Define a Master Plan Update".

For additional information or assistance, please contact [redacted], Director, Military Construction, Office of the Deputy Assistant Secretary of Defense (Infrastructure Modernization and Resilience) at [redacted].

HAMMOND.G[redacted]
REGORY.DAVI[redacted]
D[redacted]

Michael McAndrew
Deputy Assistant Secretary of Defense for
Infrastructure Modernization & Resilience

Attachment:
As Stated

(U) Deputy Assistant Secretary of Defense for Infrastructure Modernization and Resilience (cont'd)

DoD IG Draft Report (Project No. D2022-D000RL-0044.000) "Audit of Climate Change Adaptation and Facility Resilience at Military Installations in California Dated February 20, 2024

Recommendation Comments

Recommendation A.6. "(U) We recommend that the Under Secretary of Defense for Acquisition and Sustainment include a clear description of the actions that constitute an update to the Master Plan as part of the updates to DoD Instruction 4165.70, "Real Property Management," April 6, 2005, including:
a. (U) Confirm that all of the information is correct and current and make no changes.
b. (U) Identify where changes are required and make the changes.
c. (U) Prepare a new Master Plan."

OASD(EI&E) Response: Partially Concur. The Department agrees with the intent of the recommendation which is to ensure that master plans are current and complete. However, the recommendation focuses not on the definitional aspect of plan "currency" and "completeness," which can be specifically addressed in policy. The recommendation presents three processes and procedure aspects common to updating any document and doesn't define for planners what constitutes a complete or current plan. Each master plan is unique and thus the process to update each plan will vary and requires installation staff to exercise technical acumen and discernment in doing so. The Department can consistently define in policy what constitutes master plan "currency" and "completeness". The Department recommends the DoD IG recommendation be restated as follows:

"Recommendation A.6. "(U) We recommend that the Under Secretary of Defense for Acquisition and Sustainment clearly define what constitutes a current and complete Master Plan; subject to the requirement to maintain a Master Plan approved within the preceding five years and specify the authority within the chain of command responsible for verifying and approving currency and completeness, as part of the update to DoD Instruction 4165.70, "Real Property Management," April 6, 2005.

Technical Comment

Page 27: The heading "DoD Guidance Should Define a Master Plan Update" and the content in the paragraphs that follow suggests that the Department must define in policy what constitutes a master plan "update." Per the OASD(EI&E) response to Recommendation A.6., the Department recommends that the heading and paragraphs that follow to be reframed to reflect a recommendation that addresses defining Master plan "currency" and "completeness" in policy, not the process and procedures for producing an "update." An "update" is unique to each plan individually and thus cannot be specifically addressed in policy.

(U) Acronyms and Abbreviations

AFB	Air Force Base
AHTA	All-Hazard Threat Assessment
MCB	Marine Corps Base
MDI	Mission Dependency Index
NASNI	Naval Air Station North Island
NAVFAC	Naval Facilities Engineering Systems Command
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers

(U) Glossary

(U) Adaptation. The adjustment in natural or human systems in anticipation of or in response to a changing environment in a way that effectively uses beneficial opportunities or reduces negative effects. (DoD Directive 4715.21, "Climate Change Adaptation and Resilience," January 14, 2016)

(U) Climate. The weather of a place averaged over a period of time, often 30 years. Climate phenomena include components such as sea level, precipitation, annual average temperature, and extreme temperatures. ("Naval Facilities Engineering Command Climate Change Planning Handbook: Installation Adaptation and Resilience," January 2017)

(U) Climate Change. Variations in average weather conditions that persist over multiple decades or longer that encompass increases and decreases in temperature, shifts in precipitation, and changing risk of certain types of severe weather events. (DoD Directive 4715.21, "Climate Change Adaptation and Resilience," January 14, 2016)

(U) Climate Resilience. The ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks.

(U) Coastal Inundation. The covering of normally dry land with water. (National Oceanic and Atmospheric Administration, "Coastal Inundation," October 6, 2020)

(U) Culvert. A structure that allows water to flow under a road or a railroad.

(U) Drought. A drier climate condition than is typical for a given location and time of year. (DoD Installation Exposure to Climate Change at Home and Abroad," April 19, 2021)

(U) Evapotranspiration. The process by which water is transferred from the land to the atmosphere by evaporation from open bodies of water, wetlands, bare soil, and snow cover and by transpiration from the surface of living plants. (Hanson, Ronald, U.S. Geological Survey, "Evapotranspiration and Droughts," 1991)

(U) Extreme Weather Events. Large-scale events such as tornado frequency, hurricane winds greater than 50 knots, hurricane maximum precipitation, hurricane frequency, ice storms, historic drought frequency, and ice jams. (DoD Report, "DoD Installation Exposure to Climate Change at Home and Abroad," April 19, 2021)

(U) Fire Danger Index. A continuous reference scale for estimating the potential for a fire to start and require suppression action on any given day.

(U) Fire Danger Rating System. A system that allows fire managers to estimate current or future fire danger for a given area, taking into consideration fuels, weather, topography, and risks. The fire danger ratings determined through this system describe conditions that reflect the potential, over a large area, for a fire to ignite, spread, and require suppression action. (U.S. Department of Agriculture: Forest Service, "National Fire Danger Rating System")

(U) Firebreak. A permanent or temporary strip of ground cleared to bare soil or planted with fire-resistant vegetation. (U.S. Department of Agriculture: Natural Resources Conservation Service, "Firebreak," November 2022)

(U) Flood Inundation and Surge Hazard Tool. A tool that offers a more advanced geospatial technology platform. The map application within the tool provides Navy users with a view of flooding and storm impacts on Navy assets, as well as tools for planning and operational response.

(U) Fuelbreak. A man-made area, constructed in anticipation of future fires, with a reduced fuel load that acts as a barrier to stop or slow down fire spread. A fuelbreak is also designed to provide firefighters access and to act as a retreat for personnel and equipment to escape injury.

(U) Grazing Program. The grazing program at Beale AFB is an arrangement where the base leases approximately 12,000 acres to ranchers for their cattle to graze from November to May. The grazing program provides Beale AFB with a way to assist fire suppression by reducing the height of vegetation. (Beale Air Force Base 9th Reconnaissance Wing Public Affairs, "Beale Milks Benefits of Grazing Program," November 21, 2016)

(U) Inundation. The amount of water that occurs above normally dry ground as a result of flooding. (National Oceanic and Atmospheric Administration, "Coastal Inundation Dashboard")

(U) Low-Impact Development. An approach to stormwater management that mimics a site's natural hydrology as the landscape is developed. (UFC 3-210-10, "Low Impact Development," November 2010)

(U) Minimum Efficiency Reporting Value. The Minimum Efficiency Reporting Value measures how effectively the filter stops dust and other contaminants from passing through the filter and into the air stream. Filters with higher Minimum Efficiency Reporting Value ratings trap small particles more effectively than filters with lower Minimum Efficiency Reporting Value ratings.

(U) Mission Dependency Index. A metric used to evaluate the relative risk and importance of different facility and infrastructure assets as they are used to support mission accomplishment. (U.S. Air Force, "Mission Dependency Index")

(U) Prescribed Burn. A controlled fire intentionally set by fire experts under specified weather conditions and are used to manage the health of ecosystems, including the reduction of the risk of unwanted wildfires in the future by reducing hazardous fuels. (U.S. Department of Agriculture: Forest Service, "Prescribed Fire")

(U) Recurrent Flooding. The flooding effects of rain events, storm surges, and tidal flooding that occur on a regular or frequent basis. Recurrent flooding comprises coastal and riverine flooding.

(U) Resilience. The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. (DoD Directive 4715.21, "Climate Change Adaptation and Resilience," January 14, 2016)

(U) Retention Ponds. Water-filled pools that change in reaction to rainfall and runoff. They gather water and release it slowly and steadily, preventing flooding and erosion.

(U) Riparian Corridor. A unique plant community consisting of the vegetation growing near a river, stream, lake, lagoon, or other natural body of water, that influences the aquatic ecosystem, near-shore area, or fish and wildlife habitat by providing shade, fine or large woody material, nutrients, and insects.

(U) Riprap. A permanent layer of large, angular stone, cobbles, or boulders typically used to armor, stabilize, and protect the soil surface against erosion and scour in areas of concentrated flow or wave energy.

(U) Riverine Flooding. Occurs when streams and rivers exceed their capacity to accommodate water flow and water overflows their banks. (Federal Emergency Management Agency, "Riverine Flooding")

(U) Setback or Defensible Space. The buffer created between a building and any fire hazards that surround it in order to create a space to slow or stop the spread of wildfire and help protect the building from catching fire.

(U) Storm Surge. The abnormal rise in seawater level during a storm, measured as the height of the water above the normal astronomical tide. (National Oceanic and Atmospheric Administration, "What is Storm Surge?" March 18, 2022)

(U) Tactical Mission Dependency Index. How fast the mission will feel impact from the loss of the facility and how easily the facility functionality could be replicated. (U.S. Air Force, "Mission Dependency Index")

(U) Tidal Estuary. The part of the wide lower course of a river where its current is met by the tides.

(U) Unregulated Stream. A river, stream, or other watercourse whose flow is not regulated by artificial structures such as dams, weirs, off-takes, or storages.

(U) Vernal Pools. Seasonal wetlands that are covered by shallow water from winter to spring but may be completely dry for most of the summer and fall. Vernal pools range in size from small puddles to shallow lakes. (U.S. Environmental Protection Agency, "Vernal Pools," June 2022)

(U) Weather. The day-to-day state of the atmosphere in a particular place, and its short-term variation is in minutes to weeks. Weather phenomenon examples include a snowfall or rainfall event, storm surge, thunderstorms, tornado, and heat or cold waves. ("Naval Facilities Engineering Command Climate Change Planning Handbook: Installation Adaptation and Resilience," January 2017)

(U) Wildfires. Uncontrolled fires that originate on or cross onto undeveloped areas, regardless of the cause (human or natural). (DoD Installation Exposure to Climate Change at Home and Abroad," April 19, 2021)

(U) Xeriscaping. The practice of designing landscapes to reduce or eliminate the need for irrigation, needing little to no water beyond what the natural climate provides.

Whistleblower Protection
U.S. Department of Defense

Whistleblower Protection safeguards DoD employees against retaliation for protected disclosures that expose possible fraud, waste, and abuse in Government programs. For more information, please visit the Whistleblower webpage at www.dodig.mil/Components/Administrative-Investigations/Whistleblower-Reprisal-Investigations/Whistleblower-Reprisal/ or contact the Whistleblower Protection Coordinator at Whistleblowerprotectioncoordinator@dodig.mil

For more information about DoD OIG reports or activities, please contact us:

Congressional Liaison
703.604.8324

Media Contact
public.affairs@dodig.mil; 703.604.8324

www.twitter.com/DoD_IG

LinkedIn
www.linkedin.com/company/dod-inspector-general/

DoD Hotline
www.dodig.mil/hotline

DEPARTMENT OF DEFENSE | OFFICE OF INSPECTOR GENERAL

4800 Mark Center Drive
Alexandria, Virginia 22350-1500
www.dodig.mil
DoD Hotline 1.800.424.9098