



REPORT TO CONGRESS

2017 SUSTAINABLE RANGES

Submitted by the Secretary of Defense
Under Secretary of Defense
(Personnel and Readiness)

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Table of Contents

Executive Summary	1
1 Military Service Updates	3
1.1 Army	3
1.2 Marine Corps.....	9
1.3 Navy.....	15
1.4 Air Force	20
2 Special Operations Forces Training Requirements	25
3 Military Service Range Assessments	27
4 DoD’s Comprehensive Training Range Sustainment Plan ...	29
4.1 Goals and Milestones	29
4.2 Funding	44
4.3 The Readiness and Environmental Protection Integration Program	47
4.4 Office of Economic Adjustment Compatible Use and Joint Land Use Studies Program	49
4.5 DoD Natural Resources Program	51
4.6 DoD Climate Change Adaptation Initiatives.....	52
5 Evolving SRI Activities and Emerging Issues	53
5.1 New SRI-Related Influences and Actions.....	53
5.2 Budget Reductions Impacting Range Capability.....	53
5.3 Foreign Investment and National Security	54
5.4 Threatened and Endangered and Candidate Species.....	54
5.5 Demand for Electromagnetic Spectrum.....	54
5.6 Continued Growth in Domestic Use of Unmanned Aircraft Systems	55
5.7 Offshore Energy.....	56
5.8 DoD’s Long-Term SRI Outlook.....	57
A Range Inventory Updates	59
B Abbreviation List	71

List of Figures and Tables

Figure 1-1 Associated Units Pilot	5
Table 4-1 Encroachment Actions and Milestones	30
Table 4-2 Electromagnetic Spectrum Actions and Milestones	33
Table 4-3 Airspace Actions and Milestones	34
Table 4-4 Range Space Actions and Milestones	36
Table 4-5 Energy Actions and Milestones	39
Table 4-6 Climate Actions and Milestones	41
Table 4-7 Environmental Stewardship Actions and Milestones	43
Table 4-8 DoD SRI Funding Requirements Categories	44
Table 4-9 Service Training Range Sustainment Funding (\$M)	45
Table 4-10 Funding Fluctuation Explanation	46
Table A-1 Army Training and Testing Range Complex Inventory Updates.....	60
Table A-2 Marine Corps Training and Testing Range Complex Inventory Updates.....	69
Table B-1 Abbreviation List	71

Executive Summary

This is the fourteenth Sustainable Ranges Report (SRR) to Congress, summarizing relevant Department of Defense (DoD) actions intended to ensure the long-term sustainability of its training ranges. The SRR responds to Section 366 of the fiscal year (FY) 2003 National Defense Authorization Act (NDAA). The 2003 NDAA requires DoD to develop and submit to Congress a comprehensive plan to address training constraints caused by limitations on the use of available military lands, sea space, and airspace in the United States and overseas. Section 311 of the FY2013 NDAA extended the reporting requirement through FY2018.

While this report focuses on DoD training ranges only, it also touches on test and evaluation (T&E) ranges to the extent that these ranges support training activities. Training and testing activities increasingly share range resources, as the scale and variety of readiness events grows and DoD's land, air, sea, and spectrum resources become increasingly constrained. For example, Operational Test and Evaluation increasingly relies on training venues and often "piggy-backs" on existing events and exercises to meet operational testing requirements. Conversely, and as elaborated on elsewhere in this report, training is an increasingly common activity on test ranges with instrumentation required to support more complex training events. The DoD test community separately reports on encroachment factors affecting research, development, test, and evaluation activities in their Strategic Plan for DoD T&E Resources. The training and testing communities share a strong interest in continued access to capable and sustainable military ranges and operating areas and continue to work in close cooperation, with the support of the installations and environment community, to ensure mission access to these vital resources and to address encroachment issues under the Sustainable Ranges Initiative (SRI).

Although DoD has been proactively addressing the many challenges related to range capabilities and encroachment, those challenges continue to grow, new ones emerge, and dynamic conditions and events exacerbate the original challenges. These challenges are common themes that resonate throughout this year's report and are highlighted below.

Summary of Identified Training Range Capability Issues

Fiscal constraints continue to affect DoD, including the Military Services, through changes in force structure and significant reductions in funding for operation and maintenance (O&M), military construction (MILCON), research, development, test, and evaluation (RDT&E) investments, as well as acquisition programs. These limitations affect training range capabilities both for conventional forces as well as Special Operations Forces (SOF). The Department anticipates that funding reductions will affect both training range capability and the Department's ability to respond to encroachment challenges in the future. The Military Services also identified significant challenges they face with both insufficient resources (e.g., training range lands, special use airspace [SUA], and electromagnetic spectrum) and inadequate equipment and systems that require updates in order to complete current training requirements. Lastly, DoD is facing the challenge of unmanned aircraft systems (UAS) training in the United States with their unique airspace requirements.

Summary of Identified Training Range Encroachment Issues

The Military Services continue to face encroachment challenges. These challenges include resident threatened and endangered species and species-at-risk management; incompatible development and land use adjacent to DoD training areas, to include foreign investment located in proximity to military training areas; effects related to the reallocation of electromagnetic spectrum as a result of the National Broadband Plan; and effects related to climate change.

The 2017 SRR provides Congress with updates to the 2016 SRR, to include the following:

- ▶ Revalidates the 2015 SRR individual range capability and encroachment assessments
- ▶ Revalidates current and future Military Service training range requirements
- ▶ Identifies critical range and training issues raised by the Military Services
- ▶ Identifies SOF training capabilities, issues related to meeting training requirements, and future capabilities necessary for ranges supporting SOF training, per the request in Senate Report 114-49
- ▶ Updates Congress on DoD's comprehensive training range sustainment plan
- ▶ Provides updates to the range inventory

This year's report again follows the shortened format that validates the individual range capability and encroachment assessments, but does not include them. The decision to follow a three-year cycle for conducting full range assessments was based on the analysis that range capability and encroachment do not change significantly from year to year. The next full range assessment will take place in FY2017, and will be reported as part of the 2018 SRR.

1

Military Service Updates

1.1 Army

The Army's 2015 range capability and encroachment assessments are valid and current with the exception of issues highlighted in this section.

General Issues Related to Range Capability and Encroachment

The Army manages training land requirements through its Army Training Land Strategy (ATLS). This strategy outlines current guidance and future vision for the management of ranges and training lands. Long-term stewardship of Army training lands is critical to train a ready and resilient force. The ATLS addresses the need to maximize the availability, accessibility, and capability of Army ranges and training lands. The strategy outlines the importance of coordination and prioritization, both within the Army and with external stakeholders, to optimize and maintain mission capable training lands. The ATLS aligns programs, systems, and processes for installations and commanders to leverage in order to meet the challenges of supporting the Soldier with ranges and training land enablers, now and into the future.

Critical Issues: Range Capability

United States Army Pacific has emerging land actions in Hawaii. Land leases with the state of Hawaii include much of the north area of Pohakuloa Training Area, ~22,971 acres, on the Island of Hawaii, and additional parcels on the Island of Oahu, ~7,371 acres. These leases are set to expire in 2029. These state-leased parcels were initiated at no cost in 1964; it is anticipated that the state will no longer consider a 'no cost' lease and will pursue fair market value for future leases. In addition, the Army expects to hear objections from some members of the Native Hawaiian community when the state initiates the negotiation process. United States Army Hawaii does not wish to expand the leased parcels; however, securing a lease extension, acquisition, or other solution will be crucial to the continued access to training facilities and training lands. The estimated timeline for lease negotiation is seven to eight years.

Summary of Major Changes in Range Capability

The Army has adopted the Army Total Force Policy as its plan to integrate the Army National Guard and Army Reserve with the Active Army to create a total force. In the last five years, requirements on the United States Army for the conflicts in Iraq and Afghanistan have decreased, as have the budget and overall size of the Army. This environment of budget and size reduction, along with the rise of new conflicts in the world, have created new demands upon Active Army.

The Department of the Army will conduct a multi-year pilot that creates "Associated Units" by combining battalions, brigades, and divisions of one component with battalions, brigades, and divisions of another component, to create cohesive teams. This will expand the One Army

concept for generating Reserve Component (RC) readiness. It will also place changing demands on the Army's range and training land assets. In order to provide commanders of the formations the ability to ensure readiness, the Secretary of the Army has "associated" selected units, which requires sharing of specified training and readiness authorities between commanders of the Active Component (AC) and RC associated units. The Associated Units pilot is one of several Army pilots to implement Army Total Force Policy to address Army capability challenges. It also includes RC augmentation of AC Divisions and Corps, Total Force Partnership, One Army School System, and others. Under initial guidance, 27 units will participate in the pilot (13 AC, 12 ARNG, and 2 USAR), as follows:

- ▶ 3rd Brigade Combat Team, 10th Mountain Division, stationed at Fort Polk, Louisiana, will be associated with the 36th Infantry Division, Texas Army National Guard.
- ▶ 86th Infantry Brigade Combat Team, Vermont Army National Guard, will be associated with the 10th Mountain Division, stationed in Fort Drum, New York.
- ▶ 81st Armored Brigade Combat Team, Washington Army National Guard, will be associated with the 7th Infantry Division stationed at Joint Base Lewis-McChord, Washington.
- ▶ 48th Infantry Brigade, Georgia Army National Guard, will be associated with the 3rd Infantry Division stationed at Fort Stewart, Georgia.
- ▶ Task Force 1-28th Infantry, stationed at Fort Benning, Georgia, will be associated with the 48th Infantry Brigade Combat Team, Georgia Army National Guard.
- ▶ 100th Battalion, 442nd Infantry Regiment, U.S. Army Reserve unit, will be associated with the 3rd Brigade Combat Team, 25th Infantry Division stationed at Schofield Barracks, Hawaii.
- ▶ 1st Battalion, 143rd Infantry Regiment, Texas Army National Guard, will be associated with the 173rd Airborne Brigade Combat Team stationed in Vicenza, Italy.
- ▶ 1st Battalion, 151st Infantry Regiment, Indiana Army National Guard, will be associated with the 2nd Brigade Combat Team, 25th Infantry Division stationed at Schofield Barracks, Hawaii.
- ▶ 5th Engineer Battalion, stationed at Fort Leonard Wood, Missouri, will be associated with the 35th Engineer Brigade, Missouri Army National Guard.
- ▶ 840th Engineer Company, Texas Army National Guard, will be associated with the 36th Engineer Brigade, stationed at Fort Hood, Texas.
- ▶ 824th Quartermaster Company, a North Carolina-based United States Army Reserve unit, will be associated with the 82nd Sustainment Brigade stationed at Fort Bragg, North Carolina.
- ▶ 249th Transportation Company, Texas Army National Guard, and the 1245th Transportation Company, Oklahoma Army National Guard, will be associated with the 1st Cavalry Division Sustainment Brigade, stationed in Fort Hood, Texas.
- ▶ 1176th Transportation Company, Tennessee Army National Guard will be associated with the 101st Sustainment Brigade stationed at Fort Campbell, Kentucky.
- ▶ 2123rd Transportation Company, Kentucky Army National Guard, will be associated with the 101st Sustainment Brigade stationed at Fort Campbell, Kentucky.

The Army's ranges must accommodate these associations and provide the capabilities that these unique associations will require. Figure 1.1 illustrates the Associated Unit concept.

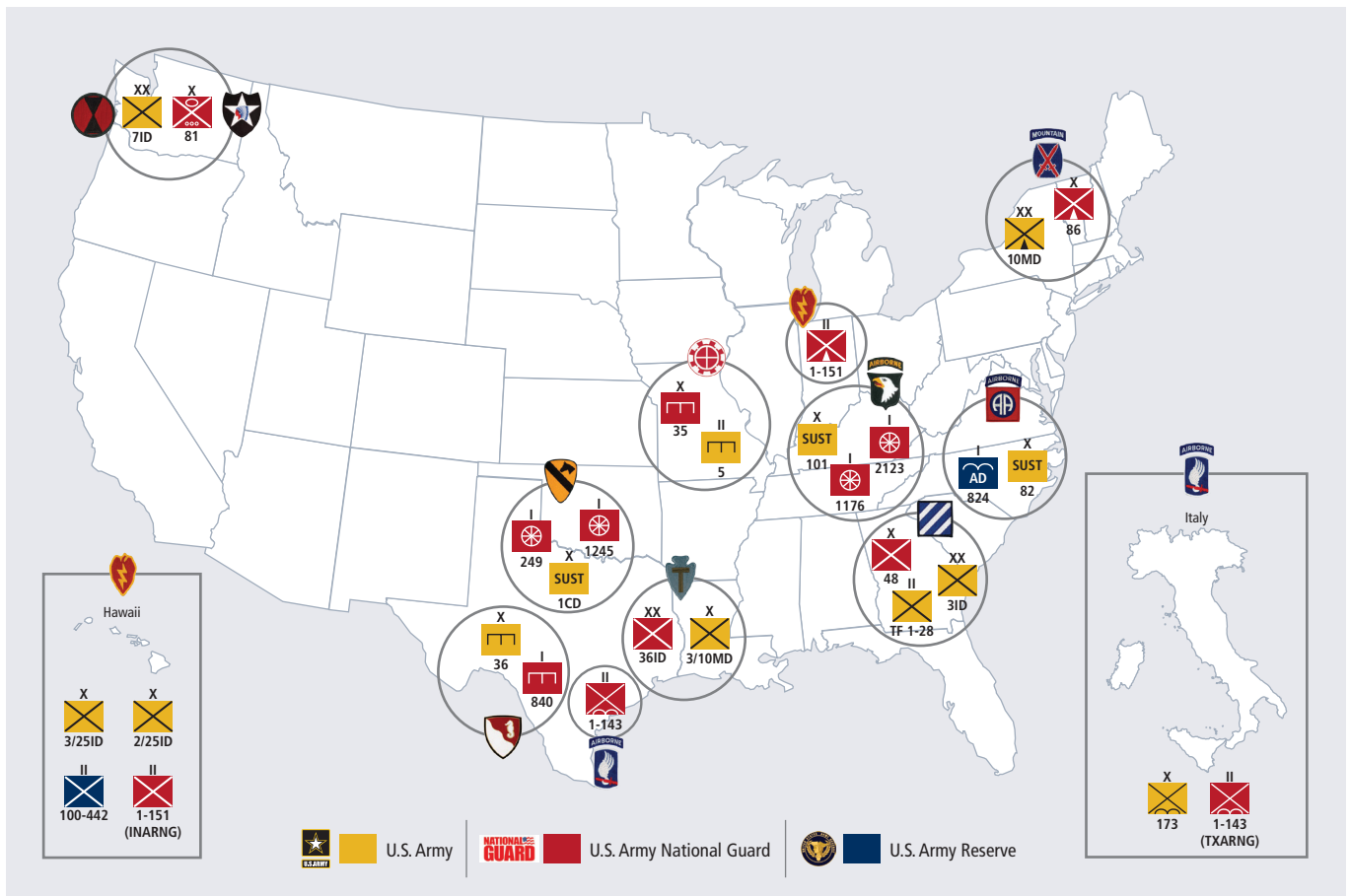
Although there may not be a change in the capability at each of the range locations, the Army will need to assess any throughput gaps that may emerge because of these associations. The Army will focus future investments to eliminate or mitigate these gaps; if any are identified.

Summary of Emerging Capability Issues

The Army is currently conducting a number of capability assessments that will direct future facility investments. Two of these are highlighted below:

- ▶ "Mega City" Training Facilities: Replication of a density-rich environment that consists of urban complexity, cyber considerations, and cultural variation. Urban complexity involves the density within buildings, neighborhoods, maneuver area, and airspace. Cyber considerations are composed of security/traffic cameras, access to personal electronic devices, control of infrastructure from remote site,

Figure 1-1 Associated Units Pilot



and the human dimension. Cultural variation entails socio-economic concerns, patterns of life, atmospheric, terror events, and migration.

- Facilities to Support Objective Training Readiness (live fire gates): In order to achieve the highest level of readiness at the Battalion echelon, units must demonstrate collective live-fire and maneuver proficiency at the Company level. In order to support this process, the necessary facilities, products, and services must be prepared to meet the training requirements of current doctrine and training strategies. The use of Unspecified Minor Military Construction (UMMCA) and Operation and Maintenance, Army (OMA) funds to update or modify existing collective live training environments to match these gated training requirements will allow the Training Support Systems (TSS) Facility Master Plan to respond to changes and maintain relevancy. Where a range cannot meet the gated training requirements with UMMCA or OMA, a MILCON project will be programmed in the TSS Facility Master Plan.

Future Capability Outlook

The Army is assessing range capability in a variety of operational environments and will consider these environments when making future facility investments. The operational environment is a composite of the conditions, circumstances, and influences that affect the employment of capabilities and inform the decisions of the commander. No two operational environments are identical, even within the same theater of operations, and every operational environment changes over time. Three environments that reflect current and/or potential future theaters of operation for the Army are desert, jungle, and arctic.

Desert

Successful desert operations require adaptation to the environment and to the limitations its terrain and climate impose. Equipment and tactics must be modified and adapted to a dusty and rugged landscape, where temperatures vary from extreme highs to freezing and where visibility may change from 30 miles to 30 feet in a matter of minutes. Deserts are arid, barren regions of the

earth incapable of supporting normal life due to lack of water. Temperatures vary according to latitude and season, from over 136 degrees Fahrenheit in the deserts of Mexico and Libya to the bitter cold of winter in the Gobi (East Asia). In some deserts, day-to-night temperature fluctuation exceeds 70 degrees Fahrenheit. Some species of animal and plant life have adapted successfully to desert conditions where annual rainfall may vary from 0 to 10 inches. The Army considers the following sites to support desert training operations:

- ▶ National Training Center (NTC), Fort Irwin, California
- ▶ Fort Bliss, Texas
- ▶ White Sands Missile Range, New Mexico
- ▶ Desert Warrior Course – Fort Bliss, Texas (20-day course that trains desert survival and leadership training)
- ▶ Yakima Training Center (Rocky Plateau), Washington

Jungle

The climate in jungles varies with location. Close to the equator, all seasons are nearly alike, with rains throughout the year; farther from the equator, especially in India and Southeast Asia, jungles have distinct wet (monsoon) and dry seasons. Both zones have high temperatures (averaging 78 to 95+ degrees Fahrenheit), heavy rainfall (as much as 400+ inches annually), and high humidity (90 percent) throughout the year. The Army considers the following sites to support jungle training operations:

- ▶ Jungle Operation Training Course, Oahu, Hawaii
- ▶ U.S. Army Ranger course and Tactical Air Control Party conducts limited Jungle training near Eglin Air Force Base, Florida

Arctic

For military purposes, cold regions are defined as any region where cold temperatures, unique terrain, and snowfall significantly affect military operations for one month or more each year. About one quarter of the earth's land mass may be termed severely cold. In these areas, mean annual air temperatures stay below freezing, maximum snow depths exceed 23 inches, and ice covers lakes and rivers. Its mean temperatures during the coldest month are below freezing. The Army considers the following sites to support arctic training operations:

- ▶ Alaska Northern Warfare Training Center (near Fort Wainwright, Alaska)
- ▶ Army Mountain Warfare School, Camp Ethan Allan, Vermont

Critical Issues: Encroachment

The lands, airspace, and waters that comprise the Army ranges are the critical elements required to support Army missions for training and testing. DoD has recognized 12 encroachment factors, last detailed in the 2015 SRR, that impact military mission readiness. Threatened and endangered species, as well as other wildlife and habitat concerns, continue to be a primary encroachment factor affecting Army ranges.

Compliance with the Endangered Species Act (ESA) is required on the majority of Army training and testing ranges due to the presence of one or more federal and/or state-listed species populations. Endangered species protection and recovery may result in restrictions to training activities and may require workarounds to avoid or minimize species impacts. The Army continues to be stewards of the land and manages the sometimes delicate balance between training Soldiers and supporting critical species. One such example is at Fort Irwin, California. The Army has revitalized efforts to open up the Western Training Area at Fort Irwin, formerly known as the Western Expansion Area, in order to expand training opportunities and scenarios at the National Training Center. The 70,000-acre training area contains many desert tortoises, a species federally listed as Threatened. The existing Biological Opinion requires tagging, monitoring, and translocating the species, which is projected to be completed in 2024. Until then, training will be restricted to approved trails and a limited number of predesignated training sites.

At Fort Hood, Texas, sustainment activities are prohibited on 132,608 acres of training lands by endangered species restrictions from March through August, and the presence of migratory birds from February through August. Maintenance and land improvement projects are limited to September through January, reducing the work accomplished annually and resulting in degraded training due to vegetation growth blocking miles of maneuver lanes and unserviceable trails. Maintenance and land improvement projects are limited to September through January, resulting in less work being accomplished to support training annually. This results in degraded training

due to vegetation growth blocking miles of maneuver lanes and unserviceable trails. While there is no relief for endangered species nesting, work may proceed during migratory bird season if biologists are funded and present to conduct surveys in front of work crews resulting in significantly higher project costs.

Summary of Major Changes in Encroachment Limitations

The Army completed its Fort Hunter Liggett (FHL), California Total Force Training Environmental Assessment (EA) in June 2016. With the signing of the Finding of No Significant Impact (FNSI), FHL will now be able to support increased frequency of brigade-level collective training exercises and incorporate off-road vehicle maneuver training of company-sized units. This will improve the integration of the Army's AC and RC, as well as allow more efficient use of assets between FHL and Camp Roberts, California. In addition to the EA, FHL has responsibilities under Section 106 of the National Historic Preservation Act and the regulations of the Advisory Council on Historic Preservation (ACHP). A Section 106 Programmatic Agreement, between FHL, the ACHP, and the California State Historic Preservation Office, allows for a phased approach to evaluate historic properties within the Area of Potential Effects, approximately 56,000 acres. This will allow FHL to avoid, minimize, and resolve identified adverse effects on historic properties in conjunction with the establishment of off-road vehicle maneuver training areas. The completion of the EA and the Section 106 Programmatic Agreement are successes for the Army, but also benefit the U.S. Marine Corps and U.S. Navy units that frequently utilize FHL for similar training purposes, and correspondingly enhance the integration of their Active and Reserve components. The FHL EA aligns with the Army Total Force Policy, as well as DoD's requirement to maintain readiness of AC and RC units.

In FY2011, Fort Polk, Louisiana, one of the Army's Combat Training Centers, began a land acquisition that currently totals over 42,000 acres of additional training lands that will support maneuver, live fire, and air operations. In conjunction with this land acquisition, the Department of the Army is currently undertaking a restricted airspace EA that will allow combat units assigned to Fort Polk and the Rotational Training Units at the Joint Readiness Training Center (JRTC) to enhance the duration and intensity of military training exercises. The

proposed action in the EA is to request that the Federal Aviation Administration (FAA) establish new restricted airspace overlaying the recently acquired land in support of future training activities. The EA determined that only two valued environmental components (VECs), airspace and noise, would be analyzed further for potential effects on the implementation of the proposed action. Both VECs had minor to moderate impacts on the proposed action; therefore, Fort Polk will continue to implement existing protection measures and proposed mitigations for the restricted access expansion. Existing protective measures at Fort Polk include the maintenance of a 24-hour hotline for noise complaints associated with military training operations. The range will also continue to operate a noise abatement program, designed to increase pilot awareness of noise issues and encourage practices that reduce aircraft noise in sensitive areas. Fort Polk is in the process of establishing a firebreak that will serve as a visual reference by pilots to delineate between the newly acquired lands and the existing private property landholdings as an airspace operational mitigation measure. It is anticipated that U.S. Army Garrison Fort Polk will sign a FNSI for the restricted airspace EA once all land acquisition parcels are acquired.

Summary of Emerging Encroachment Issues

The Army identified atypical weather events and climate change as emerging encroachment issues in the 2016 SRR. Climate change continues to be an area of concern as it relates to training and ranges. The Army is focused on the near-term atypical weather events that impact the range infrastructure and maneuver lands. In January 2016, DoD Directive (DoDD) 4715.21, *Climate Change Adaptation and Resilience*, was published. This Directive established policy for the DoD to assess and manage risks associated with the impacts of climate change, and it implements the 2014 Climate Change Adaption Roadmap. To meet some of the goals and objectives within both issuances, Army has implemented an Installation Status Report – Mission Capacity (ISR-MC) metric aimed at capturing the cost of repair to ranges and training lands due to extreme/atypical weather events. This metric was introduced in FY2016, and in FY2017 an additional metric will be implemented that aims to capture the impact of atypical weather events on loss of training days. Climate change is a long-term focus but the current approach is to capture the short-term atypical weather impacts with goals of identifying vulnerabilities and making sound decisions for future planning.

The Army continues to experience the impacts of atypical weather events in regions across the country. The 2016 SRR highlighted the devastating impacts of excessive rainfall on range and training infrastructure at Fort Jackson, South Carolina. In December 2015, another rainfall event impacted Fort Benning, Georgia, when it experienced over a foot of precipitation in one week. The deluge resulted in excessive damages to buildings, infrastructure, maneuver training lands, and range facilities with preliminary monetary damage estimates upwards of \$13 million as well as impacts to unit training schedules. In mid-March 2016, flooding caused damage at Fort Polk, Louisiana, with repairs estimated at \$2.2 million for road and culvert repairs and \$2.5 million for real property building repairs. By far the most tragic weather related event occurred in June 2016, when nine Soldiers were killed at Fort Hood, Texas, during a routine training mission. The severe storms caused high waters that overflowed road networks, some in areas not typically prone to flooding. The powerful floodwaters overturned the tactical vehicle transporting the Soldiers during their training mission. The erratic nature of atypical weather events can affect the critical infrastructure of installations, but as seen in Texas, it can also have catastrophic human impact. The challenges with atypical weather events are the inability to predict their impacts or to program for repair costs due to the unpredictable time, duration, severity, location, and nature of each event.

Army Service Special Interest Section

In April 2016, the Readiness and Environmental Protection Integration (REPI) Program announced that two Army installations were recipients of 2016 REPI Challenge awards; Fort Huachuca, Arizona (\$2.6M) and Fort Hood, Texas (\$1.5M). REPI award funds at each installation will be leveraged with over \$12 million in partner funding for protection of approximately 4,500 acres. Fort Hood will protect over 1,000 acres directly adjacent to the installation's western border where heavy maneuver training and live-fire exercises take place. These lands will protect against suburban sprawl development and associated complaints due to noise, dust, and vibrations from training activities. Fort Huachuca will use REPI funding to permanently restrict development on 3,500 acres of historic working ranch lands under the R2303 military airspace and the Buffalo Soldier Electronic Test Range. Protection of these lands will reduce

electromagnetic interference with electronic testing and will support the installation's 160,000 annual air operations.

In July 2016, the Sentinel Landscape Partnership announced the designation of Camp Ripley, Minnesota, a National Guard Training Center supporting units from seven states, as one of the newest Sentinel Landscapes. The Sentinel Landscape Partnership was established in 2013 *via* a memorandum of understanding (MOU) among the U.S. Department of Agriculture (USDA), the Department of the Interior (DOI), and DoD. The Partnership aims to preserve working and natural lands important to the Nation's defense missions. By working in collaboration with other federal agencies, the Sentinel Landscape Partnership is able to pull funds from numerous resources and programs. The priorities for working land preservation are mutually shared by each of the three federal agencies and strengthened by their combined effort to protect national defense. Camp Ripley is the third Army installation to be designated as a Sentinel Landscape, preceded by Fort Huachuca, Arizona, and Joint Base Lewis-McChord, Washington. The Sentinel Landscape designation will afford Camp Ripley the continued ability to conduct air, maneuver, and live-fire training with limited restrictions, while preserving the rural character of the surrounding area. This synergy between the military mission and local land use preservation supports the vital resources of the natural landscape while ensuring the continued success of military training at Camp Ripley.

Special Operations Forces Training Requirements

Although the Army supports SOF training, there are several challenges related to training ranges, their associated facilities, maneuver space, and airspace that are common throughout the U.S. Special Operations Command (USSOCOM) Component Commands. During the past decade, U.S. Army Special Operations Command (USASOC) has experienced an increased growth in force structure and operational training requirements. While home-station training capacity has seen improvement, many ranges lack the space and resources required by SOF to conduct Mission Essential Task List (METL), Pre-Mission Training, and Task Force Training as required by the Defense Readiness Reporting System.

Due to insufficient training capacity at most home stations, SOF units are forced to travel to use facilities suited to conduct their METL tasks and Full Mission Profile (FMP) exercises. To mitigate this challenge, the Army is planning to establish regionally oriented, fully operational SOF training venues at four regional collective training centers (RCTCs) (Fort Bliss, Texas; Fort Knox, Kentucky; Fort A.P. Hill, Virginia; and Yakima Training Center, Washington). This is dramatically reducing the overall cost of pre-mission and sustainment training, and is realizing significant efficiencies that directly support USSOCOM. RCTCs with unique combinations of facilities and SOF-specific resources allow Army SOF (ARSOF) warfighters to focus solely on meeting training requirements while reducing planning efforts and funding necessary to create an adequate training environment. RCTCs accommodate training for up to a battalion-sized element and provide priority of use for the site's ranges, training areas, and facilities. The deployment requirements for ARSOF are not decreasing, requiring the Army to sustain and expand the capabilities of the four ARSOF RCTCs.

Critical Issues: Special Operations Forces Training Requirements

Army-wide civilian manning reductions are currently creating challenges at select installations. Installations are reducing range operating hours and/or requiring active duty "augmentees" from assigned units. Cuts to the level of range operations support funded and manned by Installation Management Command (IMCOM) at all installations have forced range officers to discontinue 24-hour range operations. ARSOF primarily fights during the hours of limited visibility, and, therefore, are required to train accordingly. To receive after hours range support, the bill-paying burden has been placed on USASOC. These funds are currently coming out of USASOC's Other Contingency Operations and baseline funding, which is unsustainable and potentially contrary to the policies outlined in Army Policy AR 37-49, *Budgeting, Funding, and Reimbursement for Base Operations Support of Army Activities*.

Limited MILCON is also affecting improvements and future upgrades to facilities at these locations. USASOC units compete for O&M and Other Procurement funds with all other Major Army Commands in order to complete small refurbishment projects, use USASOC Facilities, Sustainment, Restoration and Modernization

funds to modify existing ranges, or seek SOF specific funding through USSOCOM to construct new SOF specific ranges to meet emerging operational requirements.

Future Capability Needs to Meet SOF Training Requirements

The Army's SOF has requested a new sniper training facility at Fort Knox, Kentucky, home of the United States Army John F. Kennedy Special Warfare Center and School (USAJFKSWCS), in order to meet new doctrinal combat and training requirements. The USAJFKSWCS Special Forces Sniper Course requires SOF snipers to engage targets at multiple distances, both known and unknown, with multiple caliber weapon systems. The ranges at Fort Knox and other SOF unit home stations cannot accommodate the required distances and/or calibers to enable the necessary training. The proposed project will cost an estimated \$19 million and will be considered for FY2024.

1.2 Marine Corps

The Marine Corps' 2015 range capability and encroachment assessments are valid and current with the exception of issues highlighted in this section.

General Issues Related to Range Capability and Encroachment

The Mission Capable Ranges Program (MCRP) is designed to meet the guidance of the *Marine Corps Service Campaign Plan (MCSCP)*. It supports the concepts published in the latest Commandant of the Marine Corps' Planning Guidance (CPG) Fragmentary Order (FRAGO) 2016 and in Expeditionary Force 21. The Program provides the Marine Corps with a comprehensive, fully developed range program that defines current, emerging, and future range requirements.

The MCRP executes range modernization and sustainment initiatives focused on the diverse training needs of Marine Air Ground Task Forces (MAGTF). The Program has four cornerstones:

- ▶ **Sustain Range and Training System Capabilities.**

The Marine Corps has made significant investments in range and training area infrastructure in the past decade and sustaining the capabilities these investments provide is the foundation of the MCRP.

- ▶ **Maximize Training Capacity.** The Marine Corps' greatest challenge in supporting live training is the provision of sufficient land and air space to accommodate the requirements of modern weapons, tactics, and force structure. Effectively managing and operating Marine Corps Ranges is the key to maximizing capacity and training quality of its limited range resources.
- ▶ **Modernize Ranges.** Range modernization focuses on providing capabilities to address currently identified gaps in range capability that have a negative impact on training and providing capabilities to address emerging requirements resulting from the introduction of new systems or mission requirements.
- ▶ **Preserve the Natural Environment and Mitigate Encroachment.** Marine Corps ranges, located in littoral areas and sensitive desert environments, are among the most heavily encroached upon in the DoD. With a real estate portfolio that is already challenged to support the training requirements of modern weapons, tactics, and organizations, encroachment issues pose a significant challenge to the Marine Corps training areas. Encroachment management seeks to prevent, repair, and mitigate these mission constraints to enhance the overall mission readiness of the Marine Corps while still meeting the requirements to preserve and sustain the natural environment.

A substantial, ongoing commitment of resources and portfolio of capabilities is required to address each of these categories. Despite the currently constrained fiscal climate, the Marine Corps has prioritized funding to ensure the sustainment of current range capability and capacity and selectively permit some level of modernization to meet emerging operational requirements. The CPG 2016, Expeditionary Force 21, and MCSCP advance the post-Operation Enduring Freedom requirements to train scalable MAGTFs and their component units in an expanding number of essential missions. The broad spectrum of training requirements and greater capability of weapons systems increase the demand for ranges to support multiple training missions. This results in more intensive use of Marine Corps ranges for individual and unit-level training, as well as concentrated maneuver, live-fire engagements, and amphibious operations and training areas that support the sea-basing concept and provide MAGTF-level training.

Concurrently, the requirements of a 21st century battlespace will increase the demand for extensive training areas and airspace that exceed the limitations of a single installation. The lack of adequate training lands and SUA will require range managers, the supporting establishments, and Operating Force trainers to address training capability shortfalls with a mix of off-base solutions and regional training range capabilities. Moreover, as Marine Corps forces are re-deployed from contingency operations to home stations, the training load on installations has increased. The Marine Corps currently conducts training on Marine Corps ranges, other DoD ranges, and non-DoD lands and airspace. Notwithstanding reductions in the size of the force, Marines will continue to conduct bridging operations and Marine Corps Expeditionary Unit training off site in accordance with Department of Defense Instruction (DoDI) 1322.28, *Realistic Military Training (RMT) Off Federal Real Property*. Any decrease in range demands due to force reductions will be more than offset by expansion in the spectrum of training requirements and the increase in overall training areas necessary to execute them.

In summary, Marine Corps installations will be required to support training of Marines and Marine Corps units in an expanding array of mission-essential tasks that require ever-increasing amounts of training space and increasingly sophisticated range resources. To that end, the Marine Corps views ranges and training area resources as an interdependent system of Marine Corps, DoD, and non-DoD resources, with the Marine Corps providing core ranges for live-fire and maneuver training, amphibious access, and mobility corridors for the projection of sea-based forces inland.

Critical Issues: Range Capabilities

The Marine Corps has previously identified Service-level deficits in its ability to train for the many missions linked to maintaining a well-trained force in readiness. Continued analysis and the fielding of new systems may cause other requirements to surface in the future, but today, the projected operational range requirements at the Service-level focus on the following critical deficiencies:

- ▶ Marine Corps ranges have lacked the capability to exercise a large MAGTF fully in a realistic, doctrinally appropriate training scenario. Specifically, the Marine Corps Air Ground Combat Center (MCAGCC) at Twentynine Palms, as the center of excellence for

developing and executing combined arms live-fire training of the MAGTF, has not been able to accommodate a full-scale, live-fire Marine Expeditionary Brigade exercise. The expansion of MCAGCC, made possible with significant congressional support, will correct this training and readiness deficiency and significantly enhance the Marine Corps' ability to continue providing fully capable MAGTFs in pursuit of national security objectives. Land acquisition efforts are ongoing and nearly complete. The FY2014 NDAA withdrew approximately 150,928 acres. Acquisition of approximately 13,600 acres of non-federal land, funded *via* Military Construction (MILCON) in FY2012 and FY2013, is nearing completion. Airspace required to support the land expansion continues to be negotiated with the FAA. Use of the land for training will "phase in" over the next several years as policies and procedures are put in place to manage the land. Several terrain mobility exercises have been held. Initial operational capability is planned for August 2017. The first large scale, live-fire Marine Expeditionary Brigade (MEB) exercise involving the acquired lands is scheduled for August 2017.

- ▶ Inadequate live-fire and maneuver training opportunities exist for the Marine Corps units stationed in the Western Pacific and Hawaii. Marine Corps ranges in Hawaii and Okinawa lack sufficient capabilities to fully support training for their assigned units. Consequently, these units must satisfy their training requirements on other Military Service facilities, particularly U.S. Army ranges in Hawaii or U.S. Air Force and Japanese ranges in Okinawa and Japan. It is a constant challenge to de-conflict the various Military Service missions to ensure Marines receive adequate training opportunities. This problem will be exacerbated in coming years as some Okinawa-based forces relocate to Hawaii as part of the Defense Policy Review Initiative (DPRI). DPRI also includes relocating deploying units from Okinawa to Guam and developing associated basic training ranges and infrastructure. On Guam, individual Marine skills ranges are part of the Guam Supplemental Environmental Impact Statement (EIS). In a separate action, U.S. Pacific Command (USPACOM), with the Marine Corps as executive agent, has sponsored the Combined Joint Military Training (CJMT) EIS to address existing and future training deficiencies in the Western Pacific, specifically the Mariana Islands. The CJMT EIS effort is studying the possibility of developing new unit and combined arms training range capability and capacity in the Commonwealth of the Northern Mariana Islands (CNMI). These ranges and their associated airspace will provide additional training opportunities for Marines stationed in Okinawa and forward deployed to the Western Pacific. Efforts to establish training opportunities in Australia are also underway to address Rotational Force training requirements in the Northern Territory.
- ▶ The Marine Corps has identified the need for an aviation training range on the East Coast of the United States capable of supporting precision guided munitions (PGM) training. To address this requirement, the Marine Corps has assessed potential alternatives, including expanding the Townsend Bombing Range in Georgia. Based on a thorough assessment of area capabilities, a Final EIS for the Proposed Modernization and Expansion of Townsend Bombing Range was publicly distributed in March 2013, selecting the expansion of Townsend Bombing Range as the best alternative for securing this East Coast capability. A Record of Decision (ROD) to expand Townsend was signed in January 2014 to expand the range from 5,183 acres to 33,619 acres. As part of this decision, acquisition of 28,436 acres of non-federal land, which was funded *via* MILCON in FY2014 and FY2016, has been initiated. The first parcel was acquired (17,772 acres) and acquisition of the remaining parcels is on track. A formal airspace proposal supporting the land expansion has been submitted to the FAA. This proposal lowers the floor of existing airspace to the surface of acquired land. Full operational capability is now planned for December 2019.
- ▶ As affirmed in the CPG 2015 and Expeditionary Force 21, the ability to fight from the sea and to operate within the littorals is a core Marine Corps competency. The Marine Corps, as an innovative, relevant, naval, expeditionary force in readiness, is committed to preserving and enhancing the capabilities of its primary amphibious training bases at Camp Pendleton and Camp Lejeune, and to developing opportunities for increased littoral training in Hawaii. These installations lack fully developed maneuver corridors, training areas, and airspace to adequately support ground and air maneuver inland from landing beaches. Addressing these deficits is a priority and is currently under study.

Summary of Major Changes in Range Capability

Changes in range capabilities tend to be incremental; therefore, any year-to-year changes in capability are generally minor and the Marine Corps has no specific changes to report at this time. Major changes are likely to be apparent only in trends measured over multi-year periods or at the completion of major initiatives, such as the range expansions at MCAGCC Twentynine Palms and Townsend Bombing Range.

Emerging Issues: Range Capabilities

An uncertain and declining fiscal environment may affect the ability of the Marine Corps to invest in required training infrastructure and to effectively manage its required existing resources in support of training. In particular, fiscal constraints may well restrict investment in new ranges needed to support training in advanced weapon systems. For example, in addition to expanding Townsend Bombing Range and establishing new SUA at MCAGCC Twentynine Palms, the Marine Corps is engaged in developing airspace access, landing zones, and range support requirements to accommodate MV-22 Osprey and UAS capabilities, and in confirming range and airspace needs for the Joint Strike Fighter. The Chocolate Mountain Aerial Gunnery Range (CMAGR), the subject of a transfer of administrative jurisdiction from DOI to the U.S. Department of the Navy (DON) in the FY2014 NDAA, will enhance range and airspace capabilities in support of Marine Corps and Special Operations unit training. The ability to support these acquisitions with the appropriate range infrastructure will be challenged if the current fiscal profile is diminished. The MCRP is also planning to support increased immersive training opportunities that promote critical decision-making in realistic environments. Such fielding of advanced range systems technologies may include reactive targets, video/audio capture to provide more accurate and responsive after-action review and an update of the combat marksmanship programs. The Marine Corps has also initiated planning and coordination activities with the Air Force on the renewal and extension of the the Barry M. Goldwater Range (BMGR) land withdrawals, further sustaining current and future Marine Corps range capabilities.

With congressional support, the Marine Corps has invested over \$800 million in range capabilities over the past decade. An ongoing challenge, the provision of modern, capable training ranges remains a Service priority as articulated in the CPG 2015 and the MCSCP.

Programming to support new range-related investments, however, may be threatened in an uncertain funding climate. Funding priority will remain focused on the sustainment and recapitalization of existing capabilities. The FY2017 Budget Request will meet the basic requirements of sustaining current capabilities. Future fiscal reductions may adversely affect the Marine Corps' ability to maintain range resources. Without sufficient commitments focused at a minimum on maintenance and re-capitalization, today's range capabilities will become tomorrow's liabilities, with adverse impacts on the ability of Marine Corps installations to support required training with mission-capable ranges.

Future Capability Outlook

The Marine Corps expects its range capabilities to continue to evolve in support of the tenets of the 2015 National Military Strategy, the CPG, Expeditionary Force 21 and the MCSCP. Meeting the demands of the Operating Forces for ranges will require predictable and consistent funding for range sustainment and successful completion of critical expansions to correct for known training and readiness deficiencies. Where possible, coordination and integration of USMC/MAGTF training capabilities and requirements on key ranges managed by other Services, such as the U.S. Navy for San Clemente Island and the U.S. Army for Fort Hunter Liggett, will be important to meeting the training mission. Failure to realize the objectives of key initiatives, including the expansion of Townsend Bombing Range, the inclusion of airspace over newly acquired lands in the Johnson Valley, the establishment of Guam/CNMI ranges, the further development of installation-level combined arms live-fire and maneuver space, and the reduction of constraints on amphibious landing beaches would introduce risks to the training enterprise that would require reevaluation of the adequacy of range capabilities.

Critical Issues: Encroachment

Encroachment that constrains the use of Marine Corps ranges for realistic military training remains a significant concern. Marine Corps installations and ranges face continued population growth, increased levels of environmental regulation and ESA compliance, and expanding development coupled with emphasis on renewable energy generation and development. These elements generate pressure on scarce resources (land, airspace, water space, electromagnetic spectrum) critical to current and future military training, testing, and

general mission activities. The Marine Corps programmatically assesses and addresses encroachment issues.

The most significant encroachment issues at Marine Corps range complexes include effects on maneuver combined with live-fire training from the presence of species listed under the ESA, restrictions on allowed munitions, degraded access to the electromagnetic spectrum, noise-based restrictions on training, incompatible adjacent land use, and crowded adjacent airspace. Encroachment also impacts Marine Corps installations that do not provide significant range resources, but which are home to operational forces that utilize nearby training areas. Encroachment at these installations also affects training and mission readiness.

The Marine Corps effort to mitigate the impacts of encroachment on training while still complying with applicable regulations, requires substantial resource commitment. Carefully monitoring both federal and local legislation and ensuring strong community partnerships, the Marine Corps continues to address all areas of encroachment aggressively with focused programs, such as Encroachment Control Plans (ECPs), Encroachment Partnering (through the REPI Program), Joint Land Use Studies (JLUS), Integrated Natural Resource Management Plans (INRMPs), Air Installation Compatible Use Zone studies, and Range Compatible Use Zone studies, achieving notable successes. In order to fully realize the mitigation value of land proposed for protection under the REPI program, the full extent of present and future training, testing, and conservation land values should be considered in real estate appraisals conducted by the Military Services. Nevertheless, the Marine Corps remains concerned that encroachment continues to present a substantial threat to the capability of ranges to perform their military missions.

Another ongoing encroachment issue is the increasing rate of renewable energy development in the vicinity of installations and training space. Development of wind, solar, and geothermal power and associated transmission infrastructure both on- and off-shore will require close attention, creative planning, and proactive effort to ensure the Marine Corps' access to training areas in the air, on land, at sea, and within the electromagnetic spectrum is not degraded. This has been problematic in the desert southwest, but also poses a particular threat to operations in eastern North Carolina and Hawaii. The nature of Hawaii's location, geography, and the needs of

its citizens combine to make competing land uses increasingly attractive. The Marine Corps' ability to train in Hawaii, especially on and around Oahu, could be critically threatened, particularly by wind energy development unless close partnerships with key stakeholders are sustained in support of solutions that accommodate renewable energy initiatives without negative impacts to essential training space. This concern is not limited to Hawaii. The Marine Corps will have to remain attuned to similar encroachment challenges at its other Pacific installations.

Summary of Major Changes in Encroachment Limitations

Changes in encroachment impacts tend to be incremental. Major changes are likely to be apparent only in trends measured over multi-year periods or as the result of new regulatory initiatives, such as renewable energy or listing of additional species as threatened or endangered.

Summary of Emerging Encroachment Issues

Within Marine Corps Installations Command (MCICOM), the G-7, Government and External Affairs Directorate, is responsible for encroachment management in support of mission requirements. This role is critical to Marine Corps operations and training as ongoing and emerging types of encroachment continue to challenge the capability of Marine Corps ranges to accomplish their mission. Climate change has potentially wide-ranging impacts from increased restrictions on training munitions due to greater risk to wildland fire, attendant risk to cross-range utility infrastructure, off-installation vulnerabilities, and long-term risk upon the coastal areas where the Marine Corps trains and operates. The Marine Corps is concerned that such impacts could alter the capabilities of ranges over time; therefore, these risks must be analyzed, monitored, and addressed in installation planning.

Emerging encroachment issues have the potential to be exacerbated as new weapon systems enter the inventory and/or re-deploy from combat. For example, the F-35, MV-22, KC-130J, and the burgeoning UAS inventory bring new capabilities to the Marine Corps that require greatly expanded training areas. Encroachment not only impacts access to existing training space, but also affects the ability of the Marine Corps to access the extended training areas and airspace necessary to train to standards using new systems and associated tactics and procedures.

Realistically, there are insufficient resources to acquire, through real estate and easement actions, adequate range availability for the Marine Corps' combined arms training needs. Range availability will, therefore, rely on mutually beneficial partnerships that support access to air, land, sea, and electromagnetic spectrum beyond range boundaries. As manned and unmanned warfighting platforms require increasing standoff distances, a more flexible approach to range planning must be developed. An impact area's use is diminished if it does not have tactical air, land, and sea approaches. A complete range capability requires maneuver space to ingress and egress the range proper; tactical approach corridors to training venues such as Military Operations in Urban Terrain (MOUT) and amphibious assault objectives/training venues; and air routes that support maneuverability and evasive actions, and munitions trajectory routes from significant distances away from their points of impact. Appropriate partnering that provides access to these critical spaces beyond range boundaries is needed and will be a significant challenge in the years ahead.

Special Operations Forces Training Requirements

The information provided below outlines the SOF training capabilities, critical issues related to meeting training requirements, and future capabilities necessary to meet SOF training requirements for the Marine Corps.

General Special Operations Forces Capabilities

The Marine Corps SOF units are generally able to conduct individual and collective training on Marine Corps ranges. This training includes small arms, heavy weapons, demolitions, sniper ranges, collective training, close quarters battle, urban, mounted and dismounted maneuver, call for fire, riverine and littoral training, aerial gunnery, and unmanned aerial vehicle (UAV) platforms.

The Marine Corps has ensured that Marine Corps Forces Special Operations Command (MARSOC) has the same range access as Operational Forces on ranges where it is a tenant unit. Additionally, MARSOC and Naval Special Warfare (NSW) have priority status on specific ranges on the east and west coast.

Service specific training capabilities include direct action, special reconnaissance, counter terrorism, foreign internal defense, and preparation of the environment. These skills require significant training and refresh to maintain proficiency.

Critical Issues: Special Operations Forces Training Requirements

MARSOC identified no critical issues related to SOF training requirements.

Future Capability Needs to Meet SOF Training Requirements

All Marine Corps ranges are built for conventional Operating Forces to maximize safety and training and readiness tasks. SOF elements are able to train on Marine Corps ranges, and may request deviations from the installation commander for specific training requirements. For instance, the Marine Corps worked extensively with Naval Special Warfare Command (NSWC) to redesign the CMAAGR Camp Billy Machen training ranges in California to better meet NSWC training requirements. This range redesign allows NSWC ground range use to occur consistent with safety requirements associated with adjacent aviation range and associated high hazard impact areas. The Marine Corps is continuing to work with NSWC to configure range use for Operating Forces and SOF.

Summary of Special Operations Forces Training Requirements

The Marine Corps has continued to provide ranges and training areas to SOF elements as they are requested. Since the completion of the USSOCOM Range Study of 2012, the Marine Corps has provided support in the form of role players, target support, and range improvements.

Additionally, Marine Corps base personnel ensure the safety of ranges by providing range certification and safety oversight. SOF elements are able to train on Marine Corps ranges and may request deviations from the installation commander for specific training requirements.

SOF units will continue to use Marine Corps ranges in the future, and the Marine Corps looks forward to shared opportunities to hone the precision and lethality of conventional and non-conventional forces.

1.3 Navy

The Navy's 2015 range capability and encroachment assessments are valid and current with the exception of issues highlighted in this section.

General Issues Related to Range Capability and Encroachment

Training ranges are adequately funded to support operational readiness qualifications and pre-deployment certifications. Operations and sustainment requirements, capability gaps, and mitigation of particular encroachment issues are prioritized yearly and compete for funding during the Planning, Programming, Budgeting, and Execution (PPBE) process. Training range issues are prioritized in accordance with the Office of the Chief of Naval Operations (OPNAV) guidance.

Critical Issues: Range Capabilities

As stated in the 2016 SRR, two issues continue to present the greatest challenge to Navy range capabilities. The first is insufficient training space, to include both SUA and land space for supporting new generation aircraft and weapons. This is most critically apparent at Naval Air Warfare Development Command (NAWDC—formerly known as the Naval Strike and Air Warfare Center) at Fallon, Nevada. Training space for new generation aircraft and weapons is also a concern for the Marianas Islands Range Complex (MIRC), where Forward Deployed Naval Forces (FDNF), based in Japan, increasingly train. The second issue involves undersea range instrumentation. The Time Space Position Information (TSPI) instrumentation at the Pacific Missile Range Facility (PMRF) is deteriorating and limiting anti-submarine warfare (ASW) training opportunities. This instrumentation will require replacement.

Restrictive Airspace and Impact Area Size

Training requirements for strike warfare have outgrown the available training space at all Navy air-to-ground training ranges; especially at NAWDC, Fallon, Nevada. This is driven by real-world threats and the need for longer range stand-off release for training with PGM that have substantially larger release envelopes. The range space limitations at NAWDC restrict tactical weapon training employment to 30–40 percent of advanced weapons' employment capability. This inhibits the tactics exercised and impacts carrier air wing combat training.

Additional SUA volume is required to accommodate employment of the latest weapons and improved tactics. An increase in restricted or limited access ground surface area is also required to ensure public safety with expanded weapon danger zones (WDZs). NAWDC has developed a range space improvements plan that includes expanding land to encompass accommodating WDZs and the enabling airspace. Discussions have been initiated with local, state, and Federal agencies, including Congressional liaison. National Environmental Policy Act (NEPA) compliance and appropriate budget programming are in progress.

The 204,953-acre land withdrawal comprising the Fallon Training Range Complex (FTRC) expires in November 2021. Extension of the withdrawal is essential for naval aviation. An expansion of the range, however, is also required to accommodate PGM training. One of FTRC's ranges included in the withdrawal expansion will accommodate NSWC ground mobility training. The Navy proposes to extend the withdrawal of the 204,953 acres, withdraw an additional 604,789 acres and purchase 65,100 acres of non-federal lands. Coupled with existing land under the administrative jurisdiction of the Navy, this would expand FTRC from 235,476 acres to 905,365 acres. The Navy initiated an EIS for FTRC expansion on August 26, 2016.

The 46,600-acre land withdrawal, comprising the El Centro Training Range Complex (ECTRC), will also expire in 2021. Though there is no requirement to expand El Centro, renewing the existing withdrawal is essential for naval aviation training. The Navy has informed the Secretary of the Interior of the requirement to extend the El Centro withdrawal and will formally start the withdrawal process in 2017.

Significant growth in exercise volume and frequency usage in the MIRC by Navy, Marine Corps, and Air Force combatant assets led to a USPACOM sponsored SUA plan submittal. All three Services await FAA determination and approval of the proposed plan. Additionally, DoD has received expressions of interest from partners in the Asia-Pacific region regarding training at MIRC. The first phase of USPACOM's plan that adds SUA is projected to be implemented in the third quarter of 2017.

Ocean Systems—Underwater TSPI Instrumentation

TSPI instrumentation provides ASW training event ground truth and tactical feedback to operators. The current legacy system is aging and there is a requirement for additional portable instrumentation to train pre-deployment strike groups and FDNF.

The Hawaii Range Complex's permanent underwater range, designated as Barking Sands Tactical Underwater Range (BARSTUR), is operating beyond its expected service life. Accumulated wear and tear on trunk cables running through and beyond the surf zone has damaged connectivity between deep water hydrophones and the PMRF range control spaces. More than 10 percent of range coverage area has been lost. An investment will be required to refurbish the system and restore range capability. Currently, the refurbishment is not funded.

Portable Underwater Training Range (PUTR) ASW range requirements in the Pacific and U.S. Fleet Forces Command (USFF) areas of responsibility are growing in importance. Fleets have training requirements to FDNF that do not have access to permanent or portable underwater instrumentation capability. A PUTR system is deployed today; however, there is an unfunded requirement for additional PUTR.

Summary of Major Changes in Range Capability

The Navy noted no major changes in range capability to report in the 2017 SRR.

Summary of Emerging Capability Issues

Because of the strategic significance of FDNF, building overseas range training capability is becoming more important to the Navy's air, surface, and submarine communities. Adding PUTRs, target, and threat presentation capability as resources will provide broader availability of readiness training in the Mariana Islands, Okinawa, and Rota, Spain.

Future Capability Outlook

The Navy's range capabilities will continue to support readiness training for deploying units. However, existing fiscal trends are placing pressure on sustaining resources for instrumentation, range operation, and manpower. The resulting long-term impact is that ranges' ability to support training events will degrade just as demand to train to near-peer opposing force capabilities is increasing.

In assessing training range complex capabilities as a whole, encroachment mitigation actions associated with specific encroachment factors are likely to result in either restrictions or limitations on training range capability. Post mitigation training invariably reduces realism, and restrains freedom of operational maneuver, or in some cases weapon system or platform use in training, thereby reducing the value of on-range training.

Critical Issues: Encroachment

Critical issues identified in the 2016 SRR are still current and include alternative energy development; candidate species management; competition for electromagnetic spectrum; foreign investment in the United States; and proliferation of ocean observing systems (OOS).

The Navy is developing guidance for conducting risk assessments to identify mission critical areas that may be susceptible to encroachment based on foreign investment. The purpose of this guidance will be to identify appropriate mitigations for at-risk locations. This guidance will not override any existing security processes and will be an internal planning tool to focus Navy efforts.

Alternative and Conventional Energy Development

Alternative energy development and associated infrastructure present several compatibility issues to Navy activities performed undersea, on the water's surface, and in low altitude airspace. For alternative energy projects ashore, the Navy follows applicable law regarding energy siting negotiations with developers to help ensure energy development does not cause significant impacts to readiness. Navy remains concerned with the potential for wind turbine development to impact low-altitude airspace and airport surveillance radar used in support of readiness activities.

Conventional energy development, such as offshore oil/gas development, can interfere with at-sea training by placing obstacles in areas where they impede ship freedom of movement, which is required to launch and recover aircraft and exercise tactical options during warfare training events. Infrastructure related to geothermal development can lead to training impacts by placing obstacles and obstructions such as steam, dust, and artificial infrared signals in paths of aircraft and maneuvering ground forces.

In some areas, conventional and alternative energy development is not compatible with Navy operations and training. In other areas, the Navy is working to mitigate the effects of conventional and alternative energy development on Navy training and testing activities. Ongoing efforts to develop offshore energy continues to be a compatibility concern that could adversely impact Navy's ability to execute required training.

Candidate Species Management

Costs to implement conservation measures for basic species management at Naval Weapons Systems Training Facility (NWSTF) Boardman include a minimum of \$1 million to date and approximately \$580,000 per year thereafter, with additional costs to be incurred (approximately \$2.76 million) when the Oregon National Guard implements their range enhancement and training activities. Range enhancements that will require additional conservation measures include the construction of a UAS airfield and maintenance facility, multipurpose machine gun range, and two convoy live fire ranges. In September 2016, the USFWS published a "not warranted" listing decision under the Endangered Species Act for the Washington ground squirrel based on Navy's Record of Decision for proposed military readiness activities at NWSTF Boardman, Oregon. The Washington ground squirrel was added to the USFWS's Multiple District Litigation Plan to address the listing needs of many candidate species as part of a court-ordered settlement agreement. Some of the best remaining habitat of the Washington ground squirrel is located on NWSTF Boardman, and non-governmental organizations (NGOs) expressed concerns that any increase in ground-disturbing activities on the range will cause adverse effects to the species. The USFWS evaluated Navy's proposed conservation efforts for the Washington ground squirrel under the USFWS' *Policy for Evaluation of Conservation Efforts When Making Listing Decisions* and determined there is a high level of certainty that the conservation efforts (i.e., best management practices, mitigation, monitoring, and adaptive management) will be effective.

Electromagnetic Spectrum Encroachment

The Navy faces challenges related to electromagnetic spectrum on multiple fronts. The National Broadband Plan seeks to reallocate spectrum for commercial uses, potentially impacting frequencies used by the military for training and testing. Additionally, individual projects have the potential to interfere with sensitive instrumentation and equipment used during training operations.

Foreign Investment in the United States

Foreign acquisition of resources or land/sea based activity in proximity to Navy ranges presents significant encroachment and range capability issues. Any development or investment near a critical training asset provides an opportunity for persistent visual and electronic observation of tactics, techniques, and procedures (TTP) training. Existing statutory mechanisms do not cover all categories of proposed transactions or projects required to protect training activities.

Proliferation of Ocean Observing Systems (OOS)

Non-military uses of OOS are increasing, such as marine mammal and weather research, climate research, tsunami warning/verification, and seismic/earthquake monitoring. The littoral nature of Navy training ranges and the unique environment make these areas valuable for data gathering. The open nature of the high seas makes it possible for data gathered under innocent circumstances to be ultimately exploited as an operational vulnerability.

When Navy range complexes are encroached by OOS, Navy and national security interests are negatively impacted. The three training ranges of immediate concern are (1) the Northwest Training Range Complex, (2) the Southern California Offshore Range Complex (SOCAL), and (3) the Hawaii Range Complex. In the future, the East Coast Shallow Water Training Range will be vulnerable to similar challenges.

The Navy created an OOS Situational Awareness Office to improve knowledge about systems entering the water. Through this effort, the Navy will cooperate and consult with civilian agencies, foreign navies, academic institutions, and industry to build on current agreements and allow for additional negotiated agreements as appropriate on the placement of sensors and shared data management.

Summary of Major Changes in Encroachment Limitations

The Navy noted no major changes in encroachment impacts on individual ranges for the 2017 SRR. However, pressures related to offshore renewable energy development, threatened and endangered species, munitions restrictions, electromagnetic spectrum encroachment, airspace restrictions, and adjacent land use continue and are expected to continue into the future.

Summary of Emerging Encroachment Issues

Climate Change

The Navy is approaching the climate change challenge by modifying existing planning processes to include consideration of potential future impacts. These impacts have a potential to significantly affect Navy training, as well as range infrastructure. Maintaining range resiliency in response to severe weather events is essential. For example, Hurricane Matthew caused severe damage to the Atlantic Undersea Test and Evaluation Center, Bahamas in 2016. Submarine readiness training and command courses were impacted due to damage of critical facilities and loss of torpedo maintenance capabilities. Helicopter training, fixed wing training, and ship qualifications are partially mission capable, and support facilities require extensive repair.

The Navy is evaluating risks to infrastructure, space, and capabilities. As more scientific data on climate change is made available and further guidance is developed, potential impacts on training ranges will inform strategic planning and budget requirements.

Navy Special Interest Areas

The Navy and National Marine Fisheries Service (NMFS) have developed science-based protective and mitigation measures that protect marine species while accommodating military readiness activities. The Navy continues to work with NMFS and other stakeholders to allow at-sea training while minimizing adverse effects to marine mammals.

Endangered species/critical habitat designation for the North Atlantic right whale has created avoidance areas that resulted in reduced training days and certain training event exclusions. This current physical area is relatively small. Future designations or expansions of critical habitat in offshore waters, however, may result in additional reductions in training days and training activities.

The Navy will continue to invest in marine mammal research, develop marine mammal mitigation based upon scientifically-valid empirical data, and factor mitigation effectiveness into permit requests. Fleet training units will adhere to the maritime protective and mitigation measures and the Navy will conduct outreach efforts for public education. The Navy's authorizations under the

Marine Mammal Protection Act (MMPA) and ESA include an adaptive management approach to continually evaluate existing mitigation measures for their potential effects on training. If impacts on training from mitigation measures are identified and documented, the Navy will raise these impacts with NMFS for resolution during an annual adaptive management review process.

Special Operations Forces Training Requirements

SEAL and Special Warfare Combatant Crewman (SWCC) conduct live-fire training on Navy, Marine Corps, and Army ranges as well as property of other federal government agencies (e.g., U.S. Coast Guard, NASA, Bureau of Land Management [BLM]), as detailed in the *Report to Congress: Study on Training Range Infrastructure for Special Operations Forces* (2012). Critical SOF live-fire capabilities include the ability to provide assaults/urban operations ranges; land warfare static ranges/realistic live-fire and maneuver ranges; tactical ground mobility fire and maneuver ranges to support SOF vehicle platform mounted live-fire; ship to shore live-fire; over the beach (OTB) live-fire capability; advanced training ranges to support sniper/breaching; special operations craft-riverine live-fire ranges; and small arms/demolition/underwater demolition ranges to support basic underwater demolition/SEAL training.

Unique Navy SOF capabilities include the need for ranges capable of performing underwater demolition and combat swimmer training, SEAL Delivery Vehicle Operations, Unmanned Underwater Systems (UUS), and coastal and riverine combatant craft operations and live-fire training. These unique Navy SEAL/SWCC range capabilities are integrated into the NSW MILCON plan designed to provide primacy and security in proximity to the primary NSWC home stations of Little Creek, Virginia; Coronado, California; Pearl City, Hawaii; and Stennis Space Center, Mississippi. Although these installations provide the required administrative support to the force structure of NSWC, they are limited in being able to provide adequate battlespace for maneuver, restricted airspace needed to support UAS and/or Joint Terminal Attack Controller (JTAC) air/ground close air support (CAS), indirect fire systems, anti-armor live-fire, and ship to shore live-fire.

Critical Issues: Special Operations Forces Training Requirements

Individual Training Range Issues

As with the Marine Corps, the places where it is possible to do OTB operations are constrained by coastal urban development, private property, and environmental issues. Due to incompatible development, much of the remaining coastal environment for species to inhabit is land owned by DoD. Habitat constraints from endangered birds like the snowy plover affect virtually every Southern California operational area at which OTB can be conducted. The presence of snowy plover habitat at Silver Strand and San Clemente Island can impact Special Operations in Urban Combat (SOUC) training. Through Navy's successful efforts to improve the status of these species on Naval Base Coronado, the Navy has been able to retain training capacity at Silver Strand and was able to decrease future training encumbrances by ensuring that the recovery of the plover population would not lead to ever-increasing off-limits areas on the training beaches. This was accomplished through the creative solution of installing sand dune moguls to naturally drive the snowy plover to beaches not utilized in training activities.

The impact of the desert tortoise on training is minimal. Future re-configuration of ground ranges is planned to occur before 2025. Measures to ensure minimal potential effects from training on the desert tortoise are outlined in the Environmental Assessment/FNSI signed in March 2016 and the Amendment to the 1996 Biological Opinion for the Chocolate Mountain Aerial Gunnery Range. Mountain Warfare Training Camp Michael Monsoor is a former NASA tracking station with surrounding BLM land that has been acquired/withdrawn by the DON for NSW training range use. Mountain Warfare Training Camp Michael Monsoor is challenged with potential Surface Danger Zone issues extending into neighboring property. Most of the NSW West Coast assault-related training takes place at this installation.

Expansion of Fallon Training Range Complex (FTRC) B-16 is essential so that NSWC has sufficient ground space for tactical mobility training. The FTRC land withdrawal effort includes expansion of B-16 to provide sufficient ground range area. In addition, expansion of NSWC ranges adjacent to Stennis Space Center is underway. Acquisition of additional land through an approved MILCON land acquisition purchase is underway. When successful, this will expand the range to about 5,000 acres. The expanded area will provide sufficient range space for riverine and associated training.

May 2017

Infrastructure Sustainment

NSWC is dependent upon Commander Naval Installations Command (CNIC) and Marine Corps Installations Command (MCICOM) to provide maintenance and sustainment for facilities infrastructure (berthing, classroom, galley, armory, and storage) to support NSW range complexes on Navy and Marine Corps Installations. Additionally, NSWC operates range complexes on non-Navy and Marine Corps installations, specifically Army, National Guard, Coast Guard, and NASA properties. As such, NSWC is the only SOF component of USSOCOM that maintains a Base Operating Support (BOS) budget to pay for support at these non-Navy and Marine Corps Installations. Due to the unique and diverse sustainment capabilities available at each installation, NSWC requires flexibility to provide BOS funding in order to maintain/sustain infrastructure.

Major Advancements/Shortfalls

Since the *Report to Congress: Study on Training Range Infrastructure for Special Operations Forces* (2012), NSWC has built and constructed new assault training facilities at Joint Expeditionary Base Fort Story Little Creek, Virginia, and Mountain Warfare Training Camp Michael Monsoor, California. These ranges consist of indoor close quarters combat (CQC) facilities. These ranges were constructed to meet training and readiness objectives, provide NSWC with training locations closer to home station, and provide NSW with the required primacy in range scheduling in order to support deployment schedules. The collective benefit of achieving those objectives is closer ownership and control of training schedules and providing less time away from home station during inter-deployment turn around.

Construction on an additional Special Operations Urban Combat facility at Fort Pickett, Virginia, is planned in the near future.

Future Capability Needs to Meet SOF Training Requirements

Unmanned Aircraft Systems

NSWC will work with the Navy to identify areas where UAS and UUS can be employed. Airspace over littoral, river, and estuary environments are critical to parallel areas in which NSW doctrinally operates. Given typical encroachment constraints on the west coast, finding such usable airspace is challenging.

Cyber

The ability to challenge a unit's cyber and counter-cyber capability is necessary to prepare for the future. Ranges and OPAREAs must support cyberspace operations with the ability to develop tactics, techniques, and procedures (TTPs), as well as test and evaluate cyberspace capabilities particular to SOF operational environments.

Realistic Fire and Maneuver

The battlefield is an asymmetrical environment. Units must be capable of conducting full 360 degree live-fire events. NSWC will work with appropriate base staffs to ensure this training is safe and meets Operational Risk Management/Operational Risk Assessment guidelines.

Ship to Shore Live-fire Capability

Ship to shore live-fire capability in continental United States (CONUS) is limited. NSWC Special Boat Teams must employ platform weapon systems in a littoral environment to maintain readiness. Limited areas that do exist must be protected from encroachment.

Over the Beach (OTB)

OTB capacity in the CONUS for live-fire training is limited. Since World War II, this capacity has been degraded because of urban encroachment, environmental and wildlife presence, and noise concerns to surrounding areas. One of the primary areas of this capability exists at Fort Story, Virginia (the other at San Clemente Island, California). These areas must be maintained as key OPAREAs for SOF units.

1.4 Air Force

The Air Force's 2015 range capability and encroachment assessments are valid and current with the exception of issues highlighted in this section.

General Issues Related to Range Capability and Encroachment

The Air Force is addressing several critical and emerging issues with regard to operational training infrastructure. Those issues include posturing for the current defense strategy, providing integrated, full spectrum training, enhancing the capability to support 5th generation aircraft and associated weapons systems, and integrating virtual and constructive entities into live training.

Critical Issues: Range Capability

Posture for the Current Defense Strategy

The current Defense Strategic Guidance requires refocusing operations to counter a more technologically advanced peer adversary. These potential adversaries possess complex air defenses and highly sophisticated electronic countermeasures, including global positioning system (GPS) and radar jamming capabilities. The current Air Force range enterprise does not adequately replicate this environment. To provide the realistic training required for combat-ready aircrews, the Air Force is seeking to significantly upgrade range infrastructure at a few select ranges to accurately reflect the complex, dense combat environment crews will likely encounter during operations. These upgrades include realistic integrated air defenses, target arrays that challenge advanced sensors, high fidelity moving targets, and capabilities that simulate a contested and/or degraded environment.

Provide Integrated Full Spectrum Training

Full spectrum Air Force operations increasingly involve space and cyber capabilities and threats; however, current ability to conduct cross-domain training does not reflect this increasing prominence of space and cyber capability. Air Force operations rely on integrated air, space, and cyber capabilities; therefore, the training enterprise must also evolve to incorporate full spectrum training. It is not currently feasible to provide this level of training at all ranges so the Air Force is evaluating enterprise options for locations that will meet this need and resource those ranges appropriately.

Enhance Capability to Support 5th Generation Aircraft and Associated Weapon Systems

The technological advances incorporated in 5th generation and 4th generation-plus aircraft and associated weapons represent an unprecedented leap in combat capability. These advances enable crews to identify and engage multiple targets from greater distances with improved accuracy. The technology of PGM has generally shifted the focus of training from weapon employment to target identification, subsequently increasing the complexity of the targets required to accomplish realistic training. The greater employment distances of these weapon systems add another stressor to range management as individual sorties require larger portions of the range and airspace to train safely and effectively.

Consequently, the Air Force believes these advances will change the nature and balance of training. There will be diminishing requirements to drop live sub-scale and heavy weight munitions and a greater need to practice target identification. Additionally, the most advanced mission sets will likely take place in the simulator, further reducing the need for local range access. While TTPs for 5th generation aircraft are still evolving, the current trend indicates the focus of live training will move away from dropping sub-scale practice munitions on low-altitude ranges to medium- to high-altitude sorties that will require larger volumes of airspace.

Integrate Virtual and Constructive Entities to Enhance Live Training

Historically, units used virtual capabilities to accomplish basic training tasks while accomplishing all complex training in the live environment. The complexities of new weapon systems and operational security concerns have driven the most complex training into the virtual environment. As the Air Force develops programs of record for virtual and constructive training, it is imperative for the range enterprise to incorporate these abilities into the live domain.

A Summary of Major Changes in Range Capability

In 2016, Air Education and Training Command (AETC) submitted a Test and Training Space Needs Statement (T/TSNS) for the Holloman Ranges because they currently do not have any threat emitters to meet F-16 syllabus requirements for surface-to-air threat reactions. AF/A3O approved the requirement for three threat emitters. This is just the first step to getting threat emitters on the Holloman Ranges; however, the process may take years to complete due to the environmental and infrastructure requirements that must be met before the assets can be moved.

In 2015, the Air Force began issuing interim range certifications to operate the F-35 electro optical targeting system (EOTS) in combat mode. Due to the high power of the laser and the stray laser energy it generates, a large airspace volume is needed to ensure that hazardous laser energy is contained within the controlled airspace. In order to contain the stray laser energy in the controlled airspace, operational constraints such as bank angle and altitude restrictions were imposed, which reduces the realism and value of the training. Additionally, some of the smaller training ranges cannot safely accommodate

F-35 EOTS combat mode training at all. The initial laser hazard evaluation was conducted in 2006 using an extremely conservative model; therefore, the DoD Laser Systems Safety Working Group directed that the evaluation be updated in 2016. The updated laser hazard evaluation defines smaller hazard zones, which, if adopted, will ease the operational constraints and may safely allow this training on more ranges. No matter the outcome of the DoD Laser Systems Safety Working Group, all the interim range certifications will need to be re-accomplished, as they expired in August 2016.

Future Capability Outlook

The outlook for future range capability is mixed. The Air Force is currently pursuing several programs of record that will expand training capabilities. These programs include procurement of new advanced threat radars/simulators, upgrades of legacy threat systems, and development of a realistic constructive-to-live capability. These investments in advanced technology will greatly enhance the ability to provide relevant and realistic training to ensure combat ready crews. As Air Force ranges advance technologically, however, they are increasingly constrained geographically. The largest ranges and blocks of airspace are no longer sufficient for the demands of the increased combat capability. The physical constraints of the current range enterprise necessitate adjustments to training profiles, which detract from the realism of the training.

Critical Issues: Encroachment

The airspace database employed by the FAA's Obstruction Evaluation process does not contain some major revisions to range airspace implemented within the last two years; however, the FAA contractor is working to remedy the gaps. Until the database is updated, wind turbine development projects proposed for FAA approval with DoD reviews for mission impacts adjacent to Air Force ranges run the risk of FAA approval with inadequate Air Force reviews.

As the number and size of wind turbines in the United States is expected to grow significantly over the next half century, so could their effect on range flight safety, mission execution, and supporting weather forecasting. The next generation of taller wind turbines, with turbine tip heights over 600 feet, has begun to arrive near installations and underneath low-level training routes that Air Force aircraft transit into the ranges. Air Force operations and training leaders are at preliminary stages in assessing the impact of this new challenge.

To address the continuing degradation of airport surveillance radar coverage (AF ASR-11) caused by construction of wind turbines within the radar line of sight, the Air Force is partnering with the FAA to conduct an analysis of alternatives. The analysis is being constructed as a Pilot Mitigation Project (PMP) with funding from the Interagency Wind Turbine Radar Interference Mitigation Senior Steering Group.

A Summary of Major Changes in Encroachment Limitations

The Air Force has no major changes in encroachment factors on individual ranges for the 2017 SRR. The Air Force is actively involved with the Office of the Secretary of Defense (OSD) and the Military Services in addressing impacts and mitigation options for development-related encroachment issues near both Air Force and joint-use ranges.

A Summary of Emerging Encroachment Issues

The introduction of unknown levels of risk from foreign owned or foreign controlled projects in proximity to Air Force ranges presented itself in 2016 with a proposed purchase by a corporation adjacent to Nellis AFB, Nevada. Although the corporation in question is nominally U.S.-owned, the main financial backing rests with a foreign nation. There is no Committee on Foreign Investment in the United States investigation for this particular case and the plant is currently under construction. If there is foreign influence over the financial backer, Air Force/Nevada Test and Training Range missions could be exposed to persistent monitoring by a foreign government.

Future Encroachment Outlook

Proactive engagement with industry, community, and military stakeholders; enhanced electromagnetic spectrum cohabitation technologies; and mitigation of the effects of renewable energy projects on Air Force ground and airborne sensors will enable ranges to provide a safe and realistic training environment well into the future.

Air Force Special Interest Section

The Air Force is working in support of the OSD/Chief Information Officer's task to review L-Band spectrum for potential auction for sharing with commercial industry.

Among other spectrum tasked for review, the L-Band 1300–1350 bandwidth is critical for testing and operational training on Air Force ranges. In-depth studies will support a follow-on determination within OSD as to the risk to joint missions, including ranges.

Special Operations Forces Training Requirements

While many Air Force ranges may have some limited capability to provide SOF-related training, Melrose Range is the only one that is designated to provide SOF-specific training and is managed and funded by Air Force Special Operations Command (AFSOC). For example, the Barry M. Goldwater Range, an AETC range, does not support resident SOF units, but it does have rudimentary MOUT areas that are used by special tactics units. Melrose Range provides training support for the following missions: precision strike, specialized mobility, and Intelligence, Surveillance, and Reconnaissance (ISR) and special tactics.

General Special Operations Forces Capabilities

Melrose Range consists of 70,978 acres in east-central New Mexico. SUA, primarily military operations areas (MOAs), overlies lands around Melrose Range. Most of the land below the MOAs, restricted areas, and military training routes (MTRs) is used as rangeland and for crop agriculture.

Melrose Range is the primary training range for the 27th Special Operations Wing (27 SOW) and the 26th Special Tactics Squadron (26 STS) and supports AC-130, MC-130, C-146, U-28, MQ-9, MQ-1, and special tactics mission training. Additionally, the 27 SOW hosts a USASOC, Joint Ground Liaison Office (JGLO) at Cannon AFB. The JGLO conducts classes supporting advanced training for SOF with AFSOC precision strike, specialized mobility, ISR, and special tactics missions.

The Melrose Range Support Complex includes manned target scoring, fire emergency services, range communications, equipment and vehicle maintenance, target construction and storage, and other administrative functions. Melrose Range impact areas support inert practice bombing and inert and live direct-fire gunnery practice. Several manned electronic warfare training facilities are located on Melrose Range. Specifically, Melrose Range contains:

- ▶ Two explosive impact areas for AC-130 live-fire and other SOF air/ground weapons employment
- ▶ Eight additional ranges for ground-ground direct and indirect fires
- ▶ Thirteen discreet training areas
- ▶ Three observation posts
- ▶ Five mortar points
- ▶ Seventeen drop zones
- ▶ Thirty-five helicopter landing zones
- ▶ Three semi-improved landing zones

Critical Issues: Special Operations Forces Training Requirements

In 2007, Melrose Range was transferred from Air Combat Command (ACC) to AFSOC, and in doing so Melrose Range's training mission shifted from supporting fighters and bombers to primarily supporting integrated air-to-ground training for SOF. Melrose's shift to SOF training required that the range infrastructure be reconfigured. AFSOC and USSOCOM have invested \$43 million in Melrose Range since 2007; however, additional enhancements are required to provide high fidelity SOF training. In Melrose's current configuration, the range control tower, administration, maintenance, fire, and assorted storage facilities are located in the middle of the range. This impedes efficient, simultaneous training operations and creates additional residual risk when conducting integrated training.

AFSOC is investing \$15 million in projects that replace and relocate outdated range facilities to the Northwest Development Area (NWDA). NWDA construction began in FY2012 with the fire vehicle storage, mission rehearsal, and latrine facilities; however, these projects were constructed without adequate infrastructure in-place. AFSOC aggressively pursued programming and execution of additional funds to solve the infrastructure deficiencies. Specific efforts are underway to install water wells and distribution lines, and a water treatment plant with a distribution system is planned for FY2017. Two miles of roads were constructed in FY2016 and extension of commercial power lines and installation of communication infrastructure is planned for FY2017.

Replacement or relocation of the range control tower, fuel tank, range O&M facilities, and joint operations planning facility have been funded and construction is scheduled throughout 2016 and 2017. Funding has been requested for a demilitarization facility and land/drop zone equipment storage facility for FY2017 and a firefighter bunkhouse in FY2018.

Future Capability Needs to Meet SOF Training Requirements

There are currently no validated future SOF training requirements for Melrose Range other than those previously mentioned.

Long-term plans for Melrose Range include adding the capability to support training in contested/degraded environments and to provide more realistic training for aircrews employing powered weapons. The specific requirements and range changes/improvements needed to achieve these ends have not yet been developed or validated.

There are currently no known or anticipated delays in completing the planned and funded actions at Melrose Range previously described.

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Special Operations Forces Training Requirements

In response to the 2017 NDAA Senate Report 114-49, DoD is for the first time reporting separately on SOF training capabilities, critical issues related to meeting SOF-specific training requirements, and future capability needs to meet training requirements. The previous chapter showcased the Service-specific issues; this chapter is intended to provide a Department-wide perspective.

SOF Training Capabilities

USSOCOM and the Military Services continue to work together in order to improve the access to and capabilities at training ranges used by SOF. These improvements have been significant and are part of a larger effort to meet both Services and SOF training requirements. The improvements also directly support USSOCOM's Preservation of the Force and Families (POTFF) initiative by providing increased training capability or a consolidated training capability closer to home station thus reducing time away to train. However, service budget continue to threaten this progress. Decreased budgets have forced many of the Services to reduce or eliminate training range modernization and recapitalization programs and to reduce sustainment and operating funds. These budget reductions can negatively affect both Service and SOF's ability to train, thereby affecting overall readiness.

Current SOF training capabilities are designed to support a Full Mission Profile (FMP) training event. In general, this is made up of several conventional and SOF specific capabilities: small arms, mortar, and grenade ranges; live-fire convoy and maneuver training; fixed and rotary wing aerial gunnery ranges; single-story, multi-story, and SOF specific shoot houses; demolition; tactical and non-tactical vehicle driving courses; and others.

There are no training ranges owned by USSOCOM; therefore, SOF rely on Service-owned ranges and training areas to meet their training requirements. The Services' training range infrastructure must support a broad range of mission essential training requirements for both the Services and those of SOF. Operational demands placed on SOF are expected to increase across the next decade, and beyond. To meet this demand, the Services and USSOCOM will continue to work together to maintain and improve the capabilities of training ranges.

With the drawdown associated with post-Operation Enduring Freedom and Iraqi Freedom and the subsequent redeployment of overseas forces, the training requirements of these returning forces have placed an additional strain on existing ranges and training area infrastructure that remain fixed in both venues and availability.

Critical Issues Impacting SOF Capabilities

The greatest challenges affecting the availability and sustainability of the existing training ranges used by SOF units are the continued fiscal constraints DoD is facing. Another issue and challenge related to the support of full spectrum operations is the difficulty in accomplishing

FMP live-fire exercises due to the size of training areas and number of ranges required to support these types of exercises. SOF home stations do not have ranges or maneuver space to support the requirements of FMP live-fire exercises. This results in SOF units traveling to train at the few ranges capable of supporting FMP live-fire exercises. Ranges with adjacent federal lands provide accessibility to non-live fire training. The BLM's policy of "Casual Use" allows for non-live fire training while simultaneously protecting the public and environment.

Military Service training ranges have increased and continue to improve their ability to facilitate SOF training. A lack of adequate maneuver space, however, limits their ability to provide complete and full support for a SOF FMP exercise. Many of the ranges where SOF units prefer to train have reached their limit of expansion and cannot acquire the additional resources necessary to accommodate FMP live-fire exercises that employ UAS, ISR, and live-fire close air support (CAS).

Another issue and challenge that affects SOF's ability to train is the difficulty inherent in training on test ranges. Training ranges and test ranges operate using different business models with competing priorities. Training ranges are funded to support training free of charge while test ranges operate on a fee-for-service business model where use of the range comes at a cost. Additionally, the test range's primary mission is to support weapons testing; therefore, an emergent test requirement often results in the cancellation of scheduled ground and air tactical training events. While Major Range Test Facility Base (MRTFB) activities such as the Eglin Test and Training Complex, Naval Air Weapons Station China Lake, Dugway Proving Grounds, Nevada Test and Training Range, and White Sands Missile Range attempt to minimize impacts to training missions when this occurs, it remains a SOF concern.

Incompatible land use and its impact to Military Service training ranges directly affects SOF training capabilities. Civilian encroachment on installation and range boundaries is a significant challenge to the protection of SOF missions and tactics. USSOCOM continues to work with OSD and the Military Services to address encroachment. The majority of Service ranges are cooperative when it comes to increased security and enhanced Operations Security (OPSEC) measures associated with SOF operations.

Future SOF Capability Requirements

Efforts are on-going to establish ARSOF Regional Collective Training Centers (RCTCs) at selected installations. These efforts enhance existing capabilities with interoperable training facilities, live-fire facilities and maneuver ranges, and advanced urban operations training facilities, and will provide SOF with advanced training opportunities. The Army supports RCTCs at specifically selected installations where SOF will have primacy of use on those ranges. Supporting comprehensive training strategies through the construction of facilities at these select locations carries a heavy price tag and budget reductions threaten progress. RCTCs also support the POTFF initiative by providing turn-key training opportunities that reduce time away from home station by reducing logistical support requirements. The Military Services' continued support of SOF accessibility and primacy of ranges funded by MFP-11 must be transparent to the Service IMCOMs and embedded in future Memorandums of Agreement for those installations in order to ensure success.

USSOCOM continues to explore the use of technology to meet SOF training requirements. The Assistant Secretary of Defense for Special Operations/Low Intensity Conflict and Interdependent Capabilities (ASD/SOLIC-IC) Technical Support Working Group (TSWG) has supported USSOCOM's efforts to simulate the full spectrum of threats and contingencies. TSWG supported research, development, test, and evaluation projects have provided SOF units with state of the art virtual immersion technology to support training requirements. Continued TSWG support will provide additional capability to meet SOF training requirements through virtual simulation.

Other future training requirements and capabilities will be influenced by the operating environment. As deployments to Afghanistan subside, the nation is focusing its attentions to the Asia-Pacific region, as stated in the Chairman of the Joint Chiefs of Staff's National Military Strategy. The operating areas in this region are distinctively different from those experienced in Afghanistan. Because SOF should train in the same environmental conditions for live-fire, tactical movement, and resupply in training as they would on deployment, there will be a shift from utilizing desert ranges to utilizing jungle ranges and ranges bordering water.

3

Military Service Range Assessments

As stated in Chapter 1 of this report, USD(P&R) and the Military Services validated the 2015 range assessments as current for the 2017 reporting period. USD(P&R) intends to conduct a full evaluation of range capabilities and the adequacy of ranges to provide the required training support and current impacts of encroachment every three years. The next range assessment review will be included as part of the 2018 SRR to Congress.

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DoD's Comprehensive Training Range Sustainment Plan

NDAA Section 366(a)(1) required DoD to develop a comprehensive training range sustainment plan. DoD has established a complete range planning and management program under its SRI addressing this requirement. The SRI provides a flexible and adaptive planning framework that guides continuing, cooperative, and coordinated range sustainment efforts between the OSD and the Military Services, as well as mechanisms that facilitate cooperation with local, state, and regional governments; other federal agencies; and NGOs. The program includes policy, programming, outreach, legislative, and related efforts to address training requirements and long-term access to ranges, airspace, and sea space.

This chapter builds upon the information from the 2016 SRR and highlights key aspects to meet FY2013 NDAA Sections 366(a)(4)(c) requirements to report on SRI status.

4.1 Goals and Milestones

DoD has used the following set of seven shared goals and milestones since the 2006 SRR; they have been revalidated and are applicable for this report:

- ▶ Mitigate Encroachment Pressures on Training Activities from Competing Operating Space (land space, airspace, sea space, and cyber issues)
- ▶ Mitigate Electromagnetic Spectrum Competition
- ▶ Meet Military Airspace Challenges
- ▶ Manage Increasing Military Demand for Range Space
- ▶ Address Impacts from New Energy Infrastructure and Renewable Energy Impacts
- ▶ Anticipate Climate Change Impacts
- ▶ Sustain Excellence in Environmental Stewardship

Using these goals as a common framework, each Military Service developed a set of milestones and actions to achieve common objectives. Tables 4-1 through 4-7 show the current status of each milestone. Based on annual assessment data, programmatic goals and milestones are reviewed and updated annually to ensure the SRI continues to effectively address potential future training requirements and constraints.

Table 4-1 Encroachment Actions and Milestones

Goal: Mitigate Encroachment Pressures on Training Activities from Competing Operating Space [landspace, airspace, sea space, and cyber issues]

Army

Actions	Milestones	Status	Additional Service Comment
Review and maintain Installation Range Complex Master Plans (RCMPs).	<ul style="list-style-type: none"> ▶ Review and update RCMPs annually for required installations. 	Updated; ongoing	100% of required installation RCMPs were updated and approved in 4 th Quarter FY2016.
Execute the Army Compatible Use Buffer (ACUB) Zone Program to protect the military mission and offset training restrictions.	<ul style="list-style-type: none"> ▶ Implement ACUBs at installations to protect training, testing, and operations from encroachment effects, permanently protecting acreage of land from incompatible land use. Continue programming validated environmental requirements to support ACUBs. 	Updated; ongoing	Through the end of FY2015, ACUBs have been implemented at 36 locations and more than 300,000 acres of land have been protected from incompatible land use.
	<ul style="list-style-type: none"> ▶ Continue development of a consistent and clearly defined ACUB strategy, including metrics for program success and prioritization measures that build from the ACUB Implementation Guidance issued in FY2012. 	Updated; ongoing	The ACUB strategy is a continuous follow-on effort to ensure synchronization with Army strategies and mission priorities.

Marine Corps

Actions	Milestones	Status	Additional Service Comment
Continue to analyze and assess encroachment, quantitatively and qualitatively, at the installation, regional, and Service levels.	Execute Encroachment Control Plans (ECPs)	Complete	
	Completed ECPs: <ul style="list-style-type: none"> ▶ Marine Corps Air Station (MCAS) Yuma ▶ Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms ▶ Marine Corps Base (MCB) Quantico ▶ Blount Island Command ▶ Mountain Warfare Training Center (MWTC) Bridgeport ▶ MCB Hawaii ▶ Marine Corps Logistics Base (MCLB) Barstow ▶ MCB Pendleton ▶ Marine Corps Recruit Depot (MCRD) Parris Island ▶ MCAS Iwakuni ▶ Marine Corps Installations (MCI) East 	Complete	
	ECPs In Progress: <ul style="list-style-type: none"> ▶ MCAS Beaufort ▶ MCAS Cherry Point ▶ MCB Camp Lejeune/MCAS New River ▶ MCLB Albany ▶ MCAS Miramar ▶ MCAS Yuma 	Ongoing	

Table 4-1 Encroachment Actions and Milestones (continued)

Goal: Mitigate Encroachment Pressures on Training Activities from Competing Operating Space [landspace, airspace, sea space, and cyber issues]

Marine Corps (continued)

Actions	Milestones	Status	Additional Service Comment
Continue to evaluate, plan for, and execute encroachment partnering opportunities per 10 U.S.C. § 2684a.	Facilitate/support regional inter-agency and inter-governmental partnerships: <ul style="list-style-type: none"> ▶ Western Regional Partnership (WRP) ▶ Southeast Regional Partnership for Planning and Sustainability (SERPPAS) 	Ongoing	
	Execute buffer lands acquisition: <p>MCI National Capital Region</p> <ul style="list-style-type: none"> ▶ Quantico (417 ac.) <p>MCIEAST</p> <ul style="list-style-type: none"> ▶ MCAS Beaufort (3,717 ac.) ▶ Townsend Range (41,176 ac.) ▶ MCAS Cherry Point/Piney Island Range (6,248 ac.) ▶ Camp Lejeune (3,844 ac.) <p>MCIWEST</p> <ul style="list-style-type: none"> ▶ Camp Pendleton (1,700 ac.) ▶ MCAS Miramar (410 ac.) ▶ Twentynine Palms (2,968 ac.) 	Ongoing	
	<ul style="list-style-type: none"> ▶ Establish partnership with U.S. Fish and Wildlife Service, State of North Carolina, and encroachment partners in California to manage endangered species on acquired buffer land to increase species population off-base to reduce training restrictions on-base. 	Ongoing	MCAS Miramar and MCB Camp Pendleton working with partners to manage endangered species on acquired buffer lands.
	<ul style="list-style-type: none"> ▶ Evaluate opportunities in all Continental United States (CONUS) MCI regions. 	Ongoing	
	<ul style="list-style-type: none"> ▶ Participate in Desert Managers Group. 	Ongoing	
	<ul style="list-style-type: none"> ▶ Utilize/implement Readiness and Environmental Protection Integration (REPI). 	Ongoing	

Navy

Actions	Milestones	Status	Additional Service Comment
Employ proactive interaction with all Services to sustain installation and range capabilities.	<ul style="list-style-type: none"> ▶ Continue NSWC and Training and Education Command collaboration and support for establishment of SUA over Navy Special Warfare training space. 	FAA approval is pending	Awaiting FAA approval targeted for June 2017.
Continue to analyze and assess encroachment, quantitatively and qualitatively at the installation and regional levels.	<ul style="list-style-type: none"> ▶ Update Encroachment Action Plans (EAPs) as required. As updated, EAPs are to be published electronically for review by all required Navy stakeholders. 	Ongoing	
	<ul style="list-style-type: none"> ▶ Use the Navy Community Liaison and Plans Officers to continuously engage communities where the potential encroachment of installations and land ranges may arise. 	Ongoing	

Table 4-1 Encroachment Actions and Milestones (continued)

Goal: Mitigate Encroachment Pressures on Training Activities from Competing Operating Space (landspace, airspace, sea space, and cyber issues)

Navy (continued)

Actions	Milestones	Status	Additional Service Comment
Continue to evaluate, plan for, and execute partnering opportunities per 10 U.S.C. Section 2684a.	<ul style="list-style-type: none"> Use existing parallel processes to update applicable EAPs and identify all encroachment partnering opportunities for associated Navy training ranges. 	Ongoing	
Coordinate an integrated approach to address Service-wide, as well as locally isolated, encroachment issues.	<ul style="list-style-type: none"> Establish and use a "task force" approach with representation from Office of the Chief of Naval Operations (OPNAV), System Commands, Commander, Navy Installations Command (CNIC), and Fleet-level Commands to address encroachment challenges. 	Ongoing	

Air Force

Actions	Milestones	Status	Additional Service Comment
Develop the Center Scheduling Enterprise (CSE) system and integrate flight scheduling systems with other scheduling systems.	<ul style="list-style-type: none"> Modify utilization reports to provide a complete and accurate account of airspace and range usage. 	Ongoing	FAA granted the Air Force an exemption for the FY2015–2017 annual utilization report. In the future, CSE will be used to generate the annual utilization reports. HQ ACC is currently developing a CSE User's Guide. Guidance will be provided for MAJCOM/ unit implementation beginning in FY2017. Guidance will be incorporated into an Air Force Manual.
	<ul style="list-style-type: none"> Use enterprise architecture to institute a streamlined version of CSE. 	Ongoing	
	<ul style="list-style-type: none"> Deploy CSE system throughout the Air Force. 	Ongoing	CSE has been deployed throughout the Air Force and use is mandated in Air Force Instruction (AFI) 13-201 and AFI 13-212v1. Current development of a user's guide will assist in developing CSE as the scheduling system of record.
	<ul style="list-style-type: none"> Provide a quantitative basis for defending current requirements and developing future needs. 	Ongoing	
	<ul style="list-style-type: none"> Develop an interface between CSE and the Army/ Marine Corps Range Facility Management Support System (RFMSS). 	Ongoing	CSE development and integration with RFMSS and various Navy scheduling systems is ongoing. Contract support has been funded to assist with CSE integration.

Table 4-2 Electromagnetic Spectrum Actions and Milestones*Goal: Mitigate Electromagnetic Spectrum Competition***Army**

Actions	Milestones	Status	Additional Service Comment
Execute an ACUB to protect spectrum at Fort Huachuca, home of the Electronic Proving Ground.	▶ Continue implementing the Fort Huachuca ACUB proposal.	Ongoing	In April 2016, the REPI program announced that Fort Huachuca was the recipient of a \$2.6 million REPI Challenge Program Award. These funds are combined with \$10.3 million in partner funds.
	▶ Monitor and assess the ACUB at Fort Huachuca through the biennial review process.	Ongoing	
Design new ranges to minimize spectrum competition.	▶ Complete the installation of fiber optic cabling to support a wireless network and control targetry in order to minimize electromagnetic spectrum interference on ranges by FY2017.	Ongoing; delayed	Approximately 20 installations have been completed; however, funding constraints and Army program changes have slipped completion to FY2019.

Marine Corps

Actions	Milestones	Status	Additional Service Comment
Analyze and assess frequency spectrum issues potentially impacting training capabilities at range complexes.	▶ Assess operational impacts of frequency encroachment at the range complex level.	Ongoing	Electromagnetic spectrum encroachment analysis is being incorporated into the ECP processes, ECPs are prepared, reviewed and/or revised. MCICOM is working with OPNAV N45 and Assistant Secretary of the Navy Energy, Environment, and Installations to coordinate review of spectrum effects of renewable energy proposals between all stakeholders.
	▶ Incorporate frequency spectrum encroachment analysis and potential mitigation measures into planned ECPs; incorporate updates to existing ECPs.	Ongoing	

Navy

Actions	Milestones	Status	Additional Service Comment
Analyze and assess electromagnetic spectrum issues potentially impacting training capabilities at the range complex and regional level.	▶ Update the RCMPs and EAPs to identify and assess electromagnetic spectrum conflicts, shortfalls, and the impacts on Navy training as the documents undergo periodic updates.	Ongoing	
	▶ Advocate for the protection of military frequencies used by range capabilities that could be affected by frequency re-allocation and/or the National Broadband Plan.	Ongoing	The Navy's efforts to maintain ranges' access to spectrum as part of Navy-wide action is led by OPNAV N2/N6.

Air Force

Actions	Milestones	Status	Additional Service Comment
No current actions underway			

Table 4-3 Airspace Actions and Milestones*Goal: Meet Military Airspace Challenges***Army**

Actions	Milestones	Status	Additional Service Comment
Develop an EA process to facilitate increased access to restricted airspace in support of UAS training.	<ul style="list-style-type: none"> ▶ Initiate two pilot project EAs to adjust SUA in support of UAS training at major training and testing ranges. 	Updated	Airspace Management Work Group mission to develop problem statement and initial mitigation methodology completed January 2015. Original intent was to initiate follow on Airspace Management Integrated Operations Team in January 2016 to refine Army installation tiered courses of action, develop procedural improvements, and identify needs. Action was delayed due to competing mission requirements. Increasing installation air traffic, airspace complexity, and expressed Range Staff challenges have pushed this effort to high priority. The Work Group will be reenergized 2 nd Quarter FY2017.

Marine Corps

Actions	Milestones	Status	Additional Service Comment
Define future requirements for military airspace, current and projected airspace shortfalls, and possible courses of action to mitigate shortfalls at installation, range complex, regional, and Service levels.	<ul style="list-style-type: none"> ▶ Include airspace analysis in RCMPs. 	Ongoing	
	<ul style="list-style-type: none"> ▶ Assess airspace requirements and shortfalls in preparation of and submission for Regional Airspace Plans (FY2015). MCIEAST efforts were successful in 2014 to acquire 'controlling agency' responsibilities for the airspace above the Cherry Point ranges, as well as airspace over the northern Dare County Ranges extending to FL230 with a capability up to FL290, leading to a more dynamic high altitude training capability over eastern NC. 	Ongoing	Preparing the Regional Airspace Plans is an annual requirement (OPNAVINST 3770.2K) for Marine Corps Regional Airspace Coordinators.
	<ul style="list-style-type: none"> ▶ Complete strategic-level assessment of range requirements and shortfalls regarding training land and airspace. 	Ongoing	Presently in analysis per Commandant of the Marine Corps (CMC) Planning Guidance 2015; Expeditionary Force 21, Marine Corps Strategic Campaign Plan published in 2014. The Marine Corps is currently updating its reference publication that defines training land and airspace requirements based on new systems.
	<ul style="list-style-type: none"> ▶ Continue to track airspace issues and FAA initiatives potentially affecting military activities. 	Ongoing	Proposals to establish new airspace, modify existing airspace supporting newly acquired lands delivered to the FAA in April 2014 for processing.

Table 4-3 Airspace Actions and Milestones (continued)*Goal: Meet Military Airspace Challenges***Marine Corps (continued)**

Actions	Milestones	Status	Additional Service Comment
(continued) Define future requirements for military airspace, current and projected airspace shortfalls, and possible courses of action to mitigate shortfalls at installation, range complex, regional, and Service levels.	▶ Continue to track and evaluate energy development proposals potentially affecting military airspace and training routes.	Ongoing	See Table 4-5 for details.
	▶ Continue airspace expansion planning for Townsend Bombing Range.	Ongoing	Proposals to expand existing airspace supporting newly acquired lands delivered to the FAA in December 2014 for processing and remain in negotiation.
	▶ R2507 Expansion. The expansion will establish military restricted airspace over the entire range boundaries. It will support range de-confliction of aviation and ground training activities occurring simultaneously within the airspace expansion area as well as support airspace shortfalls for aviation training requirements.	Ongoing	Proposal to establish new airspace anticipated in September 2016.

Navy

Actions	Milestones	Status	Additional Service Comment
Define future requirements for military training air space and propose possible courses of action to mitigate or solve air space shortfalls at Navy range complexes.	▶ U.S. Pacific Fleet and USFF will continue to annually identify and assess future Navy training air space requirements. Requirements will be based on force structure change, changes in training and readiness standards, and introduction of new weapon systems and missions.	Ongoing	The Fleets identify, validate, and budget for new training air space requirements annually, as well as trigger associated change input to land withdrawal requirements.

Air Force

Actions	Milestones	Status	Additional Service Comment
Initiate and develop a comprehensive analysis of all the current Air Force missions, airspace, and ranges within specific FAA Air Traffic Control (ATC) Centers in order to determine the requirements to meet new missions and to support current operations. This analysis will enable the Air Force to identify requirements and optimal regional airspace configuration to support current missions with significant consideration for NAS efficiency and thoughtful concern for a broad range of stakeholder interests.	<ul style="list-style-type: none"> ▶ Conduct strategic level assessment of regional airspace requirements and shortfalls. ▶ Develop Major Commands (MAJCOMs) comprehensive plan of regional airspace use. ▶ Report on airspace use (ensure optimization of airspace). 	Ongoing	<p>AF/A3OT (previously A3OJR) has met with military and civilian stakeholders within the FAA's Albuquerque Center (ZAB) ATC responsibility. A3OT began initial coordination in February 2016 to initiate the National Environmental Protection Act (NEPA) analysis for ZAB. Due to funding constraints, a Regional SUA Optimization Project (RSOP) will be conducted in two phases.</p> <p>Phase one will examine the airspace needed for F-16 formal training unit training at Holloman.</p> <p>Phase two will build upon phase one and optimize the remainder of ZAB airspace.</p>

Table 4-4 Range Space Actions and Milestones*Goal: Manage Increasing Military Demand for Range Space***Army**

Actions	Milestones	Status	Additional Service Comment
Field Live, Virtual, Constructive-Integrating Architecture (LVC-IA) to enable the Integrated Training Environment (ITE).	<ul style="list-style-type: none"> ▶ Field LVC-IA to 15 AC installations supporting the operational unit training. 	Ongoing	Training General Officers Steering Committee reduced to 12. All 12 have been fielded, two of which are version 2 (SIPR capable).
Validate the Regional Collective Training Capability (RCTC) sites.	<ul style="list-style-type: none"> ▶ Review and re-validate the RCTC sites (installations) following future stationing announcements. 	Ongoing	An Execute Order was issued at the end of FY2016 that validated the RCTC sites across the Army.
Enable Joint Pacific Multinational Readiness Capability (JPMRC).	<ul style="list-style-type: none"> ▶ Enable enhanced home-station training in the Pacific by the 4th Quarter FY2015. 	Completed	JPMRC Initial Operation Capability Exercises were conducted on 23–27 February 2015, 1–3 March, and 1–6 March and found to be successful. JPMRC was then used to support Pacific Pathways via Exercise Talisman Saber in August 2015.
	<ul style="list-style-type: none"> ▶ During FY2017–2022 JPMRC capability will execute 2-3 enhanced home station training and 2-3 multinational exercises per year. 	Ongoing	JPMRC will increase readiness while maintaining training capabilities and establish multinational training opportunities for Commanders.
Update the TC 25-1 Training Lands that define doctrinal land requirements.	<ul style="list-style-type: none"> ▶ Publish new doctrine by the 3rd Quarter FY2015. ▶ Update Army Range Requirements Model to determine Army training land requirements by the 3rd Quarter FY2015. 	Ongoing	Sending to Army Publishing Directorate August 2016. Army Range Requirements Model will be updated with published data March 2017.
Review the Army Training Land Strategy (ATLS) for incorporation into the Facility Investment Strategy (FIS). Prioritize Army training land investments through land acquisition, compatible use buffering, sustainable management, and use of other federal land.	<ul style="list-style-type: none"> ▶ Plan for training investment priorities across the Future Years Defense Program (FYDP). 	Ongoing	
	<ul style="list-style-type: none"> ▶ Implement an annual review and update process for the ATLS as part of the FIS. 	Ongoing	An updated version of the Army Training Land Strategy (ATLS) is currently being reviewed and will be included in the FY2016 Training Support System (TSS) Facility Master Plan.
Execute Training Land Acquisitions to offset the nearly five million acre shortfall in training land assets.	<ul style="list-style-type: none"> ▶ NTC Fort Irwin, California—Open the Western and Southern Expansion Areas (WEA and SEA) for training. 	On hold	Opening the WEA will be detailed in the updated RCMP. FORSCOM anticipates executing FY2016 dollars to initiate opening the WEA with projected training operational date of 2020.
	<ul style="list-style-type: none"> ▶ Fort Polk JRTC, Louisiana—U.S. Army Corps of Engineers (USACE) complete title work and appraisals of property located in priority expansion areas and initiate formal negotiations with land owners. 	Partially Completed	Remaining land holdings (less than 500 acres) have been referred to the Department of Justice. Total acquired lands exceed 42,000 acres.
	<ul style="list-style-type: none"> ▶ Fort Benning, Georgia—Complete the Environmental Impact Statement (EIS) to study proposed areas for training land acquisition by 4th Quarter FY2011. 	Cancelled	The Fort Benning Training Land Expansion EIS withdrawal Notice of Intent (NOI) package was officially listed in the Federal Register on 7 July 2016.

Table 4-4 Range Space Actions and Milestones (continued)*Goal: Manage Increasing Military Demand for Range Space***Marine Corps**

Actions	Milestones	Status	Additional Service Comment
Define future requirements for land ranges and other areas to support training, current and projected land shortfalls, and possible courses of action to mitigate shortfalls at range complex-, regional- and Service-levels.	▶ Include range requirements analysis in regional and Service level Range Complex Management Plans (RCMPs)	Ongoing	
	▶ Facilitate enhanced cross-service utilization of range areas in Regional RCMPs. Strong relationships and an effective network of operating forces' SMEs and range managers provide operational planners and unit-level trainers assistance in identifying non-Marine Corps locations that can support their training requirements. Agility of operating forces' training plans is shifting somewhat to explore newer training venues for revised mission sets that span greater geographic areas. Range scheduling supporting use of other Service ranges is often problematic, as each Service's unit training and pre-deployment training tempos vary and each Service-level training responsibilities take primacy over other desired users. Access and transit to other public lands addresses primary requirements to connect Marine Corps installations with other DoD installations and or public lands.	Ongoing	
	▶ Initiate strategic-level assessment of range requirements and shortfalls regarding training land and airspace.	Ongoing	Preliminary assessment prepared in FY2011; additional studies in furtherance of strategic assessment objectives per Expeditionary Force 21, Marine Corps Strategic Campaign Plan, and Defense Policy Review Initiative (DPRI) are ongoing, including OSD-directed Pacific Training Analysis, and Marine Corps assessments of training land requirements in the Pacific region.
	▶ Continue range expansion efforts for MCAGCC Twentynine Palms.	Ongoing	Lands acquired per FY2014 NDAA, efforts to acquire private lands, establish associated SUA and establish required range support/infrastructure are ongoing.
	▶ Continue range expansion planning for Townsend Bombing Range.	Ongoing	ROD signed January 2014, Phase I land acquisition underway.

Table 4-4 Range Space Actions and Milestones (continued)*Goal: Manage Increasing Military Demand for Range Space***Marine Corps (continued)**

Actions	Milestones	Status	Additional Service Comment
<p>(continued)</p> <p>Define future requirements for land ranges and other areas to support training, current and projected land shortfalls, and possible courses of action to mitigate shortfalls at range complex-, regional- and Service-levels.</p>	<ul style="list-style-type: none"> ▶ Conduct strategic land requirements analysis. 	Ongoing	<p>Presently in analysis per CMC Planning Guidance 2015; Expeditionary Force 21, Marine Corps Strategic Campaign Plan published in 2014.</p> <p>Off-installation transit axis and corridor analysis (OITACA) study commenced in September 2015 conducted by MCIWEST and I Marine Expeditionary Force (I MEF) to identify and validate an off-installation portfolio of resources for transitory training access. The OITACA study is ongoing with a planned completion date of March 2018.</p>
	<ul style="list-style-type: none"> ▶ Strategic and NEPA analysis in order to improve training and readiness opportunities on MCLB Barstow. When completed, Barstow will increase support to combined ground and aviation training operations, provide capability for multiple units to conduct simultaneous training and add flexibility for Marine Corps operational requirements. 	Ongoing	<p>MCLB Barstow has been planning and developing training opportunities with MCIWEST Range and Training Area Management based on demand signal from I MEF units who are seeking space/facilities for training activities. NEPA analysis will be finalized no later than December 2016.</p>

Navy

Actions	Milestones	Status	Additional Service Comment
<p>Define all future requirements for land and sea training space and possible courses of action to mitigate or solve range air space shortfalls at Navy range complexes.</p>	<ul style="list-style-type: none"> ▶ U.S. Pacific Fleet and USFF will continue to annually identify and assess future training space requirements for Navy land and sea range space requirements. Requirements will be based on force structure change, changes in Training and Readiness standards, and introduction of new weapon systems and missions. 	Ongoing	<p>The Fleets identify, validate, and budget for new training range space requirements annually, as well as trigger change input to land withdrawal requirements.</p>

Air Force

Actions	Milestones	Status	Additional Service Comment
<p>Complete Nevada Test and Training Range Land Withdrawal Renewal.</p>	<ul style="list-style-type: none"> ▶ Publish draft Legislative Environmental Impact Statement (LEIS) by November 2017. ▶ Finalize LEIS by September 2018. ▶ Submit LEIS to Department of Interior (DOI) by November 2018. ▶ Submit SECINT/SECAF legislative proposal to Congress by May 2020. 	Ongoing	<p>The current land withdrawal granted in Public Law 106-65 continues through 5 November 2021. Per Federal Land Policy Management Act (FLPMA), the Air Force must submit a Land Withdrawal Case File renewal request to extend the 2,919,890 acres from the DOI by November 2018. Weekly meetings are held to ensure intermediate milestones are achieved and that the renewal is on track to meet all regulatory requirements.</p>

Table 4-4 Range Space Actions and Milestones (continued)*Goal: Manage Increasing Military Demand for Range Space***Air Force (continued)**

Actions	Milestones	Status	Additional Service Comment
Secure Utah Test and Training Range (UTTR) Land Access Rights.	<ul style="list-style-type: none"> Secure access control rights (up to 100 hours per year) through permissive easements in eight areas of federal and state lands surrounding the UTTR. 		It was determined that an agreement with DOI, similar to the one set up for Air Force use of Arizona's Cabeza Prieta Wildlife Refuge per Public Law 106-65, would meet Air Force requirements while also best serving BLM and the public interests. A similar agreement would leave management of the subject lands with BLM and not require a waiver to the OSD Land Acquisition Moratorium or trigger FLPMA requirements upon the Air Force. No land will be transferred to the Air Force.

Table 4-5 Energy Actions and Milestones*Goal: Address Impacts from New Energy Infrastructure and Renewable Energy Impacts***Army**

Actions	Milestones	Status	Additional Service Comment
Assess on-going Army energy security projects for impact on mission.	<ul style="list-style-type: none"> Participate in the DoD Energy Subcommittee and assess strategic implications of infrastructure policy on Army training equities. 	Ongoing	

Marine Corps

Actions	Milestones	Status	Additional Service Comment
Support OSD-directed energy infrastructure policy and assessments.	<ul style="list-style-type: none"> U.S. Pacific Fleet and USFF will continue to annually identify and assess future training space requirements for Navy land and sea range space requirements. Requirements will be based on force structure change, changes in Training and Readiness standards, and introduction of new weapon systems and missions. 	Ongoing	Given that the Marine Corps in some locations relies on other Services' training ranges and airspace, the Marine Corps is examining current processes to ensure proactive input and engagement for renewable energy projects that may potentially impact Marine Corps training capabilities and operating force readiness.

Table 4-5 Energy Actions and Milestones (continued)*Goal: Address Impacts from New Energy Infrastructure and Renewable Energy Impacts***Marine Corps (continued)**

Actions	Milestones	Status	Additional Service Comment
Implement Marine Corps Interim Policy on Conduct of Compatibility Assessments for Off-Installation Renewable Energy Projects.	<ul style="list-style-type: none"> ▶ Establish standards and improved processes for reviewing and assessing potential adverse impacts of renewable energy development on military training ranges and airspace. ▶ Comply with requirements set forth in 32 CFR 211 for the conduct of Mission Compatibility Evaluations of renewable energy project proposals. ▶ Ensure that all echelons of MCICOM and other stakeholder Marine Corps entities monitor proposed energy infrastructure development in vicinity of Marine Corps installations and military training airspace and sea space. ▶ Execute formal outreach and engagement with all governmental, non-governmental, and private and commercial stakeholders of renewable energy programs relevant to Marine Corps activities. ▶ Conduct formal and informal renewable energy Mission Compatibility Evaluations at installation, MCI region, and Headquarters levels. 	Ongoing	
Implement the Marine Corps Expeditionary Energy Strategy (2011).	<ul style="list-style-type: none"> ▶ Marine Corps Expeditionary Energy Office (E2O) (established 2009). ▶ Plan and execute strategy to substantially reduce energy footprint of operational forces (e.g., 50% reduction in fossil fuel use by operating forces by 2025). 	Ongoing	
Implement Marine Corps Installations Energy Conservation Strategy.	<ul style="list-style-type: none"> ▶ Implement Marine Corps Installations Energy Conservation Strategy. 	Ongoing	

Navy

Actions	Milestones	Status	Additional Service Comment
Engage renewable energy proponents to mitigate or minimize impacts on naval training.	<ul style="list-style-type: none"> ▶ Continuously respond to requests for analysis on potential impacts to range capabilities and range space from proposed energy infrastructure on range capabilities. 	Ongoing	
	<ul style="list-style-type: none"> ▶ Use the Mission Compatibility Analysis Tool (MCAT) to conduct mission impact assessments. 	Ongoing	MCAT installation is complete and operations are meeting the Navy's requirement objectives.
	<ul style="list-style-type: none"> ▶ Continue to interact with BOEM state renewable energy task forces to support an iterative assessment of wind energy development proposals to minimize impacts to Navy/DoD readiness requirements in federal waters. 	Ongoing	
	<ul style="list-style-type: none"> ▶ Continue to support the DoD Siting Clearinghouse in assessing renewable energy development proposal impacts. 	Ongoing	

Table 4-5 Energy Actions and Milestones (continued)*Goal: Address Impacts from New Energy Infrastructure and Renewable Energy Impacts***Air Force**

Actions	Milestones	Status	Additional Service Comment
Engage renewable energy proponents in order to collaborate on site selection.	▶ Continue to coordinate with Department of Energy and American Wind Energy Association to share data from development screening tools.	Ongoing	Air Force coordinates through Siting Clearinghouse process.
Create and field a DoD tracking and visualization tool for energy proposals.	▶ Develop MCAT.	Ongoing	Awaiting internal DoD evaluation of current technology.
Prepare for increased renewable energy priority and development.	▶ Participate in the White House Task Force on Wind Turbine Impacts on Radar.	Ongoing	
	▶ Engage the BLM to improve siting process.	Ongoing	

Table 4-6 Climate Actions and Milestones*Goal: Anticipate Climate Change Impacts***Army**

Actions	Milestones	Status	Additional Service Comment
Assess Global Climate Change risks and vulnerabilities.	▶ Track changes in range Sustainment, Restoration, and Modernization and Integrated Training Area Management systems resulting from unexpected weather patterns.	Ongoing	Updating AR 350-19 and AR 200-1 to incorporate climate change considerations. An additional ISR-MC metric is being developed to assess impacts of atypical weather events in terms of lost training days. Developing draft guidance: Climate Change and Integrated National Resource Management Plans (INRMP).

Marine Corps

Actions	Milestones	Status	Additional Service Comment
Support OSD-directed climate change policy and assessments.	▶ Continue to respond to requests for data and analysis on potential impacts of range operations on climate change, and climate change impacts on range capabilities (as directed by OSD).	Ongoing	MCIEAST G-7 conducted climate change assessment to consider the potential implications of climate change to mission sustainability and adapt as required. MCICOM GF and G-7 conducted cursory review and analysis; results shared with installation and Region Encroachment Management office to be incorporated into encroachment management monitoring.

Table 4-6 Climate Actions and Milestones (continued)*Goal: Anticipate Atypical Weather/Climate Change Impacts***Marine Corps**

Actions	Milestones	Status	Additional Service Comment
(continued) Support OSD-directed climate change policy and assessments.	▶ Assess climate change and appropriate encroachment management actions in installation and regional ECPs. Climate change has been incorporated as an encroachment category in the Marine Corps Encroachment Management Order (MCO 11011.23) to be evaluated within installation encroachment control plans.	Ongoing	
	▶ Continue leadership role at Headquarters level in DoD Clean Air Act Services' Steering Committee, Subcommittee for Global Climate Change.	Ongoing	Marine Corps representative is currently the Subcommittee chair.

Navy

Actions	Milestones	Status	Additional Service Comment
Support OSD-directed climate change policy and assessments.	▶ Implement DoD Quadrennial Defense Review Global Climate Change directives.	Ongoing	
	▶ Observe and assess climate change impacts and include in planning the specific applied climate change trends and vulnerabilities to range capabilities identified by DoD.	Ongoing	Implementing requirements from DoDI 3200.21 through several guidance documents including OPNAVINST 3571.4, Operational Range Clearance Policy for the Navy; OPNAVINST 3550.1A, Range Air Installations Compatible Use Zones Program; OPNAVINST 8020.14A, Department of Navy Explosives Safety Management Policy; and the Navy Range Sustainability Environmental Program Assessment (RSEPA) Manual.

Air Force

Actions	Milestones	Status	Additional Service Comment
Assess Global Climate Change risks and vulnerabilities.	<ul style="list-style-type: none"> ▶ Align AF climate change adaptation and mitigation efforts and ensure consistency and transparency in approach used. ▶ Incorporate climate change adaptation planning requirements in AF Instructions to ensure compliance with DoDD 4715.21 and DoDI 3200.21. 	Ongoing	<p>The Air Force Civil Engineering community established a climate change adaption working group in 2016. The cross-functional group ensures that Air Force climate change adaptation planning and mitigation efforts are aligned with OSD policy/guidance.</p> <p>AFI 13-212V1 and AFI 90-2001 are currently in revision and will include climate change adaptation planning mandates.</p>

Table 4-7 Environmental Stewardship Actions and Milestones*Goal: Sustain Excellence in Environmental Stewardship***Army**

Actions	Milestones	Status	Additional Service Comment
Monitor the Army Range Assessment Program.	▶ Continue reviews of assessments every five years.	Ongoing	

Marine Corps

Actions	Milestones	Status	Additional Service Comment
Maintain Service-wide environmental management and range sustainability programs in accordance with applicable laws and regulations.	▶ Engage in national regulatory and legislative processes on issues that may potentially impact range sustainability or range readiness in coordination with OSD.	Ongoing	
	▶ Continue to engage local, regional, and State regulatory agencies on issues that may affect range sustainability or range readiness.	Ongoing	
	▶ Explore broader, landscape-level approaches and partnerships to meet regulatory and stewardship responsibilities for natural resources (e.g., wetland and endangered species banks) at the regional and national levels in coordination with the other branches of service, DOI, USACE, and the Environmental Protection Agency.	Ongoing	
	▶ Encourage NGOs and local communities to work on regional solutions for land use conflicts (e.g., Southeast Regional Partnership for Planning and Sustainability (SERPPAS) and Western Regional Partnership(WRP)).	Ongoing	

Navy

Actions	Milestones	Status	Additional Service Comment
Execute Service-wide environmental management and range sustainability programs as required by law/regulation.	▶ Evaluate the implementation and effectiveness of Integrated Natural Resources Management Plans (INRMPS) at the end of each FY.	Ongoing	
	▶ Continue NEPA, MMPA, and ESA compliance requirements for at-sea operational areas and range complexes.	Ongoing	

Air Force

Actions	Milestones	Status	Additional Service Comment
Continue environmental management and range sustainability programs.	▶ Maintain active participation in Range Sustainment Initiatives (e.g., SERPPAS and WRP).	Ongoing	

4.2 Funding

FY2013 NDAA Section 366(a)(3)(C) requires DoD and the Military Services to report on funding requirements associated with implementing range sustainability initiatives. Four categories are used as a frame of reference for reporting training range sustainability requirements. Descriptions and examples of the funding categories are found in Table 4-8 below.

Table 4-9 presents the funding data for FY2016–FY2021. FY2016 actual funded levels are provided as a reference point. Data for FY2017–FY2021 represents the Military Service requirements reflected in the FY2017 President's Budget Request. The data for FY2018–FY2021 are estimates for planning purposes, and do not reflect actual funded levels.

Starting with the 2010 SRR, REPI program funds, which are centrally managed by OSD, have been broken out separately from Military Service encroachment funding for more accurate reporting. REPI funds support buffer initiatives across the Military Services and are allocated by OSD to the Military Services based on a competitive selection process that considers an assessment of threats, needs, and military priorities. Any Military Service funds budgeted for buffer projects are captured in that Military Services' encroachment lines.

Table 4-8 DoD SRI Funding Requirements Categories

Funding Category	Description	Specific Examples
Modernization & Investment	<ul style="list-style-type: none"> ▶ Research, development, acquisition, and capital investments in ranges and range infrastructure. It includes related items such as real property purchases, construction, and procurement of instrumentation, communication systems, and targets. 	<ul style="list-style-type: none"> ▶ Constructing new multi-purpose training ranges at Army installations ▶ Constructing IED Defeat Lanes ▶ Upgrading Small Arms Ranges
Operation & Maintenance	<ul style="list-style-type: none"> ▶ Funds allocated for recurring activities associated with operating and managing a range and its associated infrastructure, including funds dedicated to range clearance, real property maintenance, and range sustainment plan development. 	<ul style="list-style-type: none"> ▶ Clearing unexploded ordnance prior to range construction ▶ Implementing CivPay for Range Operators at Army installations
Environmental	<ul style="list-style-type: none"> ▶ Funds dedicated to environmental management of ranges, including range assessments, response actions, and natural and cultural resource management planning and implementation. 	<ul style="list-style-type: none"> ▶ Conservation funding for INRMPS and Integrated Cultural Resources Management Plans ▶ Environmental mitigation costs associated with range modernization and range construction ▶ Conducting Range Assessments
Encroachment	<ul style="list-style-type: none"> ▶ Funds dedicated to actions optimizing accessibility to ranges by minimizing restrictions that do or could limit range activities, including outreach and buffer projects. 	<ul style="list-style-type: none"> ▶ ACUB program administration and support ▶ Encroachment plans

Table 4-9 Service Training Range Sustainment Funding (\$M)

Service*	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Army	Actual	Requested	Requested	Requested	Requested	Requested
Modernization & Investment	\$101.7	\$138.8	\$140.1	\$226.5	\$161.3	\$84.1
Operations & Maintenance	\$306.7	\$295.7	\$304.1	\$312.3	\$313.5	\$312.8
Environmental	\$421.6	\$459.0	\$466.6	\$493.7	\$495.3	\$502.4
Encroachment	\$20.7	\$11.2	\$11.8	\$12.0	\$12.2	\$12.5
Army Total	\$850.7	\$904.7	\$922.6	\$1,044.5	\$982.3	\$911.8
Marine Corps						
Modernization & Investment	\$14.8	\$22.9	\$21.9	\$27.2	\$22.2	\$24.9
Operations & Maintenance	\$77.0	\$76.8	\$91.9	\$80.4	\$79.6	\$81.2
Environmental	\$13.9	\$23.1	\$24.5	\$24.5	\$24.1	\$24.6
Encroachment	\$20.7	\$14.6	\$15.2	\$15.7	\$16.3	\$16.5
Marine Corps Total	\$126.4	\$137.4	\$153.5	\$147.8	\$142.2	\$147.2
Navy						
Modernization & Investment	\$69.4	\$84.3	\$95.3	\$105.5	\$89.8	\$98.1
Operations & Maintenance	\$179.4	\$194.0	\$217.6	\$200.0	\$191.7	\$196.6
Environmental	\$30.0	\$30.7	\$30.3	\$30.5	\$32.5	\$33.0
Encroachment	\$22.3	\$27.5	\$28.1	\$28.6	\$29.2	\$29.8
Navy Total	\$301.1	\$336.5	\$371.3	\$364.6	\$343.2	\$357.5
Air Force						
Modernization & Investment	\$33.6	\$48.3	\$209.3	\$203.7	\$236.8	\$185.6
Operations & Maintenance	\$292.3	\$324.4	\$330.4	\$335.8	\$344.4	\$340.0
Environmental	\$20.0	\$20.6	\$21.2	\$21.9	\$21.9	\$21.9
Encroachment**	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Air Force Total	\$345.9	\$393.3	\$560.9	\$561.4	\$603.1	\$547.5
OSD						
REPI Program	\$75.0	\$60.2	\$25.9	\$24.3	\$24.9	\$25.6
DoD						
DoD Total	\$1,699.1	\$1,832.1	\$2,034.2	\$2,142.6	\$2,095.7	\$1,989.6

*Range sustainability programs are fully represented in the Military Services' programming and budgeting processes. Program fluctuations generally reflect the best alignment of resources across competing Military Service priorities based on programming guidance and validated by the Service Chiefs and Department Secretaries.

**The Air Force tracks SRI-related funding through two channels (A3 and A4) and do not precisely sync with how the SRR defines the four categories. As a result, the Air Force is unable to report on Encroachment funds, as defined in the SRR.

Table 4-10 outlines Military Service explanations for fluctuations of 10 percent or greater from one year to the next. Funding requirements for range sustainability efforts are fully represented in the Military Services' programming and budgeting processes. Program fluctuations often reflect the choices Military Service

Chiefs and Department Secretaries have to make in accepting risk and balancing their total portfolios across competing priorities in a fiscal environment that continues to increase in austerity. The reasons for those fluctuations and their impacts are highlighted in the table below.

Table 4-10 Funding Fluctuation Explanation

Army

Modernization & Investment	Operation & Maintenance	Environmental	Encroachment
Funding levels are higher than the 2016 SRR submission due to including two subcategories that are used for minor construction projects. Fluctuations are also due to receiving buyback funds to offset cuts that were made; the intent is to level these investments across the Future Years Defense Program (FYDP).	The Army has accepted risk in range operations and maneuver land management, reducing resourcing levels in order to fund higher priority training requirements. Funding levels will begin to increase in FY2018, with resourcing amounts becoming more level in FY2019.	FY2018 reduction is due to revised estimates for threatened and endangered species management.	Increases from FY2016 submittal are due to realigning funds to reduce risk with respect to Threatened and Endangered Species management.

Marine Corps

Modernization & Investment	Operation & Maintenance	Environmental	Encroachment
Increases in Modernization accounts beginning in FY2016 reflect resource management decisions to support range expansions scheduled at MCAGCC Twentynine Palms and Townsend Bombing Range and to ensure critical replacement/replenishment of high-use training systems. The Marine Corps has prioritized funding to selectively permit some level of modernization to meet emerging operational requirements tied to scheduled range expansions and to ensure critical replacement/replenishment of high-use training systems. Subsequent to FY2017 PB, an additional allocation of about \$14 million has been added to the Procurement Marine Corps (PMC) account of the range program to provide for specific modernization projects. Note: FY2016 funding is YTD and will be adjusted after the year closes out.	The Marine Corps has prioritized funding to ensure the sustainment of current range capability. This projected level of O&M funding will ensure that current range capabilities and capacities are fully sustained across the FYDP.	In FY2016, the Marine Corps only conducted sampling based on previous assessment results at two installations under the Operational Range Assessment Program. The program requires assessments to be conducted at a minimum every five years. Two installations will be assessed in FY2017 to include some additional sampling, as required. In FY2018, the Marine Corps will begin assessing up to three installations annually and through the FYDP, which accounts for the cost increase.	Funding for Marine Corps encroachment management program is adequate and generally stable.

Table 4-10 Funding Fluctuation Explanation (continued)**Navy**

Modernization & Investment	Operation & Maintenance	Environmental	Encroachment
Changes reported in requested resources compared to 2016 reporting are relatively minor and are a consistent reflection of requirements to upgrade legacy instrumentation and field new capabilities.	O&M resources are relatively stable given the overarching fiscal environment. Increase in FY2016 actuals over 2016 reporting is due to final approval of overseas contingency operation resources.	No significant fluctuation from one year to the next across the FYDP.	Encroachment resources remain relatively stable.

Air Force

Modernization & Investment	Operation & Maintenance	Environmental	Encroachment
The increase across the FYDP is the result of the decision to infuse funding in range infrastructure to research, develop, procure and sustain advanced threat emitters, range communications/networks, datalink systems, and constructive to live technologies.	No significant fluctuations.	No significant fluctuations.	Not applicable; actual numbers reported via OSD.

4.3 The Readiness and Environmental Protection Integration Program

The Readiness and Environmental Protection Integration (REPI) Program works to protect the military's ability to accomplish its training, testing, and operational missions by helping relieve or avoid land-use conflicts near military installations. The program achieves its mission through projects that promote compatible development; preserve off-installation habitat to address Endangered Species Act (ESA) regulations that restrict use of DoD training and testing lands; and support education, engagement, and regional sustainability and planning efforts. Through the REPI Program, DoD works with stakeholders to find solutions to military-community-environmental encroachment issues, primarily by supporting cost-sharing agreements between the Military Services and private conservation organizations or state and local governments to maintain compatible land uses and preserve habitats important to military installations.

These unique partnerships, authorized by Congress (10 U.S.C. § 2684a) in 2002, acquire easements or other interests in land from willing sellers to prevent

incompatible development and loss of important habitat near installations and ranges where the military tests, trains, and operates. By acting proactively, the REPI Program protects investments made to modernize and build range infrastructure and other training, testing, and operating assets, while avoiding spending on more costly alternative training approaches or mission relocations.

OSD manages the REPI Program to provide DoD policies, standards, and oversight and to administer congressional funding for authorized projects. In addition, REPI supports stakeholder engagement activities, leads partnerships with shared interests across large landscapes, and works to integrate various tools to enhance interagency initiatives supporting the military mission. REPI is a critical component of DoD's SRI. In light of ongoing budget constraints across DoD and for REPI partners—private and government alike—the REPI Program is pursuing a number of initiatives to create greater value and provide greater flexibility to trainers, testers, and operators.

Sentinel Landscapes

One of the REPI Program's newest and high profile initiatives is the Sentinel Landscapes Partnership with the USDA and the DOI. Sentinel Landscapes are places where

preserving the working and rural character of key landscapes strengthens the economies of farms, ranches, and forests; conserves habitat and natural resources; and protects vital test and training missions conducted on military installations that anchor such landscapes. The Sentinel Landscapes Partnership is looking to better align and deliver federal programs to recognize landowners and provide an incentive for their continued maintenance of these landscapes in ways that are compatible with the nation's defense activities.

In 2016, the partnership designated three new Sentinel Landscapes: Avon Park Air Force Range, Florida; Camp Ripley, Minnesota; and the Eastern North Carolina region. All of these new landscapes demonstrated exceptional federal, local, private, and public coordination around protecting the military mission while also preserving rural economies and wildlife habitat at each location. These designations add to the existing list of Sentinel Landscapes, which include Joint Base Lewis-McChord, Washington; Fort Huachuca, Arizona; and Naval Air Station Patuxent River-Atlantic Test Ranges, Maryland.

Across three of the six Sentinel Landscapes, \$30.9 million in REPI Program funds have leveraged an additional \$54.9 million from partners since FY2003, including USDA's Natural Resources Conservation Service (NRCS), USFWS, U.S. Forest Service (USFS), BLM, states, local governments, universities, and private organizations. Funding information is pending for the three most recent Sentinel Landscapes. Under the leadership of each anchor installation and key local partners, these funds are providing technical assistance, capacity, and unique job training and research opportunities within the military mission footprint of the six Sentinel Landscapes. The joint prioritization of funding support and deliberate co-location of efforts will ultimately serve to protect the long-term testing, training, and operational capabilities of the military installations while also achieving partners' species, habitat, and land conservation goals.

Due to the success at designated Sentinel Landscapes, the partnership has created an application process for future designations. For competitive consideration, potential Sentinel Landscapes will be required to show evidence of advanced planning, engagement, and compatible management strategies to advance mutually beneficial working lands, natural resources, and military mission protection goals. Interested parties must submit applications online by the deadline in March 2017, with designations announced in late Summer 2017.

The 2016 REPI Challenge

In its fifth year, the 2016 REPI Challenge continues to generate partner excitement and innovative ideas to protect valuable lands that support training, testing, and operations. In 2016, winning projects will leverage \$7.2 million in REPI Challenge funds with \$9.5 million in other DoD funds and nearly \$44 million in partner funding to advance protection of 27,506 acres at four locations. As the REPI Challenge proposals show, the REPI Program is helping to broaden the scale and practices of land conservation across the United States.

The REPI Program designed the REPI Challenge to harness the creativity of the private sector to access and leverage unconventional sources of funding, attract additional philanthropic sources, and take advantage of market-based approaches to secure the most land at the least cost. Of the eight finalists in 2016, submissions from partners at Fort Hood in Texas, Fort Huachuca in Arizona, Naval Air Station Patuxent River-Atlantic Test Ranges in Maryland, and Townsend Bombing Range in Georgia rose above and beyond in proposing innovative, larger-scale, and ambitious projects.

Fort Hood is working with a coalition of partners, including the Compatible Lands Foundation, NRCS, and Earth Day Texas to protect over 1,000 acres directly adjacent to the installation's western border where heavy maneuver training and live-fire exercises take place. A REPI award of \$1.5 million is leveraging \$2.2 million in partner contributions to protect the Army's ability to continue to perform multiple and intensive scenarios over several weeks at a time across 67,000 acres of vital training area. The partnership also provides job training and employment opportunities for veterans through compatible "green manufacturing" and Veterans-to-Farmers programs.

At Fort Huachuca, the Arizona Land and Water Trust, NRCS, BLM, USFWS, USFS, and the State of Arizona are protecting 3,500 acres of historic working ranch lands under the R2303 Military Airspace and Buffalo Soldier Electronic Test Range. A REPI award of \$2.6 million will leverage \$10.3 million in partner funding to reduce proliferation of electromagnetic interference with electronic testing and support the installation's 160,000 annual air operations. In addition to maintaining an unrestricted military mission environment, the REPI Challenge project will prevent degradation of water

resources within the San Pedro River watershed relied on by the installation, Soldiers and their families that live there, and the surrounding community.

Meanwhile, Naval Air Station Patuxent River-Atlantic Test Ranges, Chesapeake Conservancy, The Conservation Fund, St. Mary's County, Lower Shore Land Trust, and the State of Maryland, together with local landowners, are working to protect 28 parcels under Special Use Airspace (SUA) and helicopter operating areas from incompatible development. A REPI award of \$1 million is being leveraged nearly 8:1 to support supersonic flight training missions; field carrier landing practice; and Naval research, development, test, and evaluation. Protection of these properties will support approximately 150,000 annual operations at Naval Air Station Patuxent River and over 2,000 test events at the Atlantic Test Ranges.

Finally, Townsend Bombing Range is working with its partners to protect almost 20,000 acres deemed by the installation and the State of Georgia as the largest and most important unprotected tract of essential habitat remaining in the lower Altamaha River Corridor. This multi-phase project leverages \$2 million in REPI Challenge funding with \$4.6 million in traditional REPI funding provided to the Marine Corps through standard DoD processes as well as \$3.7 million from the Office of the Assistant Secretary of Defense for Readiness in support of training range operations and readiness. Subject to the availability of funding, DoD plans to provide an additional \$1.2 million toward this project in FY2017 to support completion of the final phase. The project will ensure that this large parcel within the installation's low-altitude training airspace will remain undeveloped, effectively achieving the installation's encroachment protection goals while leveraging over \$23 million from the State of Georgia, USFWS, USFS, and private donors.

Off-Installation Regulatory Solutions

The REPI Program is also looking at innovative ways to use the various authorities Congress has provided to work in partnerships outside our military installations to help more effectively address the Department's ESA obligations. To that end, the Department is facilitating a pilot initiative with the USFWS and state agencies in the Southeast to focus off-base conservation efforts to help preclude an at-risk species from being listed under the ESA, provide regulatory flexibility and predictability related to mission activities, and reduce regulatory pressure on military missions. While the effort is still

under development, DoD's approach is anticipated to provide a framework to proactively address other at-risk species around the U.S., whose listing could impact mission flexibility.

4.4 Office of Economic Adjustment Compatible Use and Joint Land Use Studies Program

Working with communities since 1961, the DoD Office of Economic Adjustment (OEA) has helped communities in all 50 states and several U.S. territories develop comprehensive strategies to adjust to defense industry cutbacks, base closures, force structure realignments, base expansion, and incompatibilities between military operations and local development. OEA's Compatible Use and Joint Land Use Studies (JLUS) Program is the only program of direct federal assistance to help states and communities work with the Military Services to prevent and mitigate impacts where civilian community encroachment impairs military operations. Technical and financial assistance is available to state and local governments for a Compatible Use or JLUS project to partner with the local military installation to plan and carry out strategies promoting compatible civilian use adjacent to an installation complex, including related ranges, SUA, and associated military training routes and military operations areas.

Created in 1985, the JLUS Program brings communities and the military together to study and recommend strategic actions designed to balance community and military needs. Through a community-driven planning process, adjacent communities and often the state, in partnership with the installation, identify and evaluate a wide range of both existing and potential future encroachment challenges, including compatible siting of energy projects that may impair the continued operational utility of the military installation. The affected communities then develop a strategic action plan to identify specific actions, responsible parties, a proposed timeline, and possible funding sources to address the encroachment challenges.

As of December 2016, 132 JLUS projects have been completed and more than 80 projects are underway across the country to remedy encroachment and promote compatible civilian development. Some examples of these projects are:

Fort Hood, Texas

Fort Hood is located in central Texas, adjacent to the City of Killeen, and straddles both Bell and Coryell Counties. The City of Killeen is serving as the sponsor for the Fort Hood JLUS and partners include Fort Hood, the cities of Killeen, Copperas Cove, Gatesville, Harker Heights, Temple, Belton, Nolanville, and Brownwood, and the counties of Bell and Coryell.

The JLUS was initiated in August 2015 and was completed in December 2016. The primary study area includes the 217,000-acre installation and adjacent jurisdictions within a three mile radius. The expansive Western Training Area also is included, which extends northwest to Brownwood, due west to San Angelo, and southwest to Fredericksburg, encompassing approximately 8,200 square miles.

Existing incompatible residential development near Fort Hood lies adjacent to the Western Maneuver Training Area with noise, dust, and smoke complaints resulting in self-imposed training restrictions. Light generated from this civilian development is impacting the installation's ability to conduct night training. Future infrastructure extensions, to include water, utilities, and roads, near the east and west installation boundaries may lead to further incompatible residential and commercial development.

The following are the primary guiding study goals:

- ▶ Identify and mitigate compatibility and encroachment issues that may impact training, operations, testing and power projection missions at Fort Hood
- ▶ Enhance regional collaboration
- ▶ Inform the update to the City of Killeen Strategic Plan —Vision 2030 v2.0

The study partners have developed a range of recommendations for consideration, organized into four major categories: regional coordination in support of compatible growth, planning for compatible growth, regulations to support compatible growth strategies, and supplemental strategies. The JLUS includes a comprehensive list of recommendations prepared for the consideration and voluntary implementation by communities in the region. In addition to the JLUS report, the JLUS Policy Committee also developed a separate implementation plan with community-specific strategies and direct guidance for each study partner.

The quantifiable off-post impacts associated with current training at Fort Hood are merged into a single unit referred to as the "Encroachment Awareness Area." The Encroachment Awareness Areas identified are associated with the following military operations that present compatibility challenges: small and large caliber weapons noise, aircraft accident potential, aircraft noise, and community growth potential in encroachment awareness areas.

Two emerging compatibility challenges are also being studied—spectrum encroachment related to the pending deployment of Terminal High Altitude Area Defense (THAAD) batteries from the 69th ADA Brigade for training at Fort Hood once the necessary training facilities are constructed, and the potential construction of a second, 10,000-foot parallel runway at Robert Gray Army Airfield.

An MOU among Fort Hood, participating JLUS jurisdictions, and other stakeholders, has been drafted to serve as a perpetual framework among the parties to carry out the JLUS recommendations and support continued communication and coordination among all parties over time. The MOU, while likely not "legally binding" on the Parties to it, would nonetheless memorialize the communities' commitment to the ongoing protection of Fort Hood and its mission over time.

State of Washington Compatible Use

In August 2016, Washington State Department of Commerce initiated a review of recommendations from recently completed JLUS within the state to develop statewide strategies and actions to facilitate and complement local government efforts to promote compatible civilian development in support of continued military operations. This statewide planning effort is intended to produce: (1) a legislative report with a baseline assessment of Washington State's role and responsibilities to promote compatible land use practices in support of continued military operations, and (2) a proposed Washington State Military and Community Compatibility Strategy that establishes a framework for state initiatives to support and enhance ongoing efforts of local government to promote compatible community land use development.

The legislative report, projected for completion in December 2017, will include a set of recommendations for consideration by the legislature and the Governor. The proposed Washington State Military and Community

Compatibility Strategy is intended to outline a path and timeline toward carrying out the preferred recommendations of the legislature and the Governor in their support toward local jurisdictions' ongoing compatibility efforts.

The following are the objectives of the legislative report and the proposed Washington State Military and Community Compatibility Strategy:

- ▶ Identify and assess existing conditions and recommendations from recently completed JLUS projects.
- ▶ Map processes linked to land use compatibility and the roles of agencies/stakeholders.
- ▶ Conduct a gap analysis.
- ▶ Provide recommendations for consideration by the Legislature and the Governor.
- ▶ Continue to grow the state's capacity for civilian-military coordination.
- ▶ Set a course for maintaining the state's compatibility effort.

4.5 DoD Natural Resources Program

DoD's Natural Resources Program enables the military's combat readiness mission by ensuring continued access to realistic habitat conditions. The Natural Resources Program, including the DoD Components, invested approximately \$300 million in FY2015 to ensure continued access to the 25 million acres of military land, air, and water resources needed to accomplish vital testing, training, and operational activities, and to ensure the long-term sustainability of our nation's priceless natural heritage. The Sikes Act, as amended (10 U.S.C. §670), authorizes DoD to manage the natural resources under its stewardship, and requires that DoD develop comprehensive INRMPS that are fully coordinated with the USFWS and the appropriate state agency.

In FY2004, Congress amended the ESA to recognize the significant contributions that installation INRMPS make to promote the recovery of listed species. The amendment states that where the USFWS or NMFS determines that an INRMP provides a conservation benefit to a species for which critical habitat has been proposed, the USFWS or

NMFS cannot designate critical habitat on the military lands included in that INRMP. This is because INRMPS provide protections as good as, or often, better than the protections afforded by critical habitat designation. Since Congress passed the amendment, 55 installations and satellite facilities have used INRMP exclusion based on the amended language for 126 total unique species.

To assist the Military Services, the OSD provides policy, guidance and oversight on preparing and implementing INRMPS. DoD Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, is the Natural Resource Program's primary policy document. In addition, OSD manages the DoD Legacy Resource Management Program, which funds high priority natural and cultural resource projects that benefit mission objectives but cannot be funded by the installation. Since Congress established the Legacy Program in 1991 (10 U.S.C. §2694), DoD has funded approximately 3,000 projects totaling over \$300 million.

Security and safety concerns result in access limitations that shelter many DoD lands from development pressures and large-scale habitat loss. As a result, some of the finest remaining examples of rare wildlife habitats are found on military installations. In addition, many types of military training activities and land uses are compatible with threatened and endangered species management. Consequently, these lands are home to more threatened, endangered, and at-risk species per acre than any other federal lands. Currently, DoD manages approximately 400 species listed as threatened or endangered and over 500 species at-risk of needing listing protection. A prime example of this is Fort Bragg's management of the red-cockaded woodpecker. In 1990, the U.S. Fish and Wildlife Service (USFWS) issued a biological opinion that required protection for the species on Fort Bragg, and a recovery goal of 350 breeding pairs was set. The consultation agreement required the Army to restrict and modify training, requiring a 500-foot buffer around each tree with a nesting cavity. As a result, training restrictions were implemented that significantly degraded training capability. Since that time, Fort Bragg's conservation efforts in collaboration with USFWS have succeeded in all red-cockaded woodpecker-related training restrictions being lifted. Today, there are 430 breeding pairs at Fort Bragg, but because the species is still listed as endangered, new range and training land development must consider impacts to the installation's red-cockaded woodpecker population.

In 2009, Congress amended Section 103(a) of the Sikes Act to authorize the use of cooperative agreements to maintain and improve off-installation natural resources where doing so may relieve or eliminate current or anticipated restrictions to military activities. This provision allows installation commanders to address some portion of their conservation responsibilities—especially those related to ESA-listed, at-risk, and candidate species—by supporting natural resources projects off their installations, resulting in installation land being preserved to support military training and testing. DoD's Natural Resources Program has partnered with DoD's REPI Program to develop collaborative, habitat-based projects at a landscape or regional scale that benefit on-installation flexibility by conserving resources outside installation boundaries.

Going forward, DoD's Natural Resource Program will continue to work with external and internal (e.g., REPI) stakeholders to support and enhance management efforts that help prevent species of concern to DoD from being listed and that facilitate species delisting/down-listing. Specifically, the Natural Resource Program intends to fund the development of a dynamic online recovery plan, and to partner on Threatened and Endangered Species Team (TEST), which promotes conservation planning to recover federally listed species using ESA Section 7(a)(1) to engage in proactive consultations versus using the post-listing consultation Section 7(a)(2) process.

4.6 DoD Climate Change Adaptation Initiatives

During 2016, DoD continued to execute the strategy outlined in the *2014 DoD Climate Change Adaptation Roadmap* and issued DoD Directive (DoDD) 4715.21, *Climate Change Adaptation and Resilience*. The DoDD outlines the policy, roles and responsibilities for climate adaptation and resilience across the defense enterprise. The DoDD has provided the impetus for all the DoD Components to begin identifying where a changing climate has the potential to impact their mission areas and what additional issuances should be updated to ensure climate is appropriately considered.

The DoD Components that completed the screening level vulnerability assessment surveys in 2015 are using the information they received to identify next steps in qualifying effects to their installations and operations from a changing climate. While extremely qualitative in

nature, the assets identified, both on and off the installation, have provided a basis for discussion with both internal and external stakeholders regarding effects associated with a changing climate. During 2016, the regional climate resilience planning pilot efforts led by DoD were completed. While the effort led by Old Dominion University in the Greater Hampton Roads region has concluded, the Navy is working with the DoD OEA to leverage three JLUS in the region to support a more robust stakeholder engaged planning process. The Michigan (Army National Guard) and Mountain Home, Idaho (Air Force) pilot planning processes met with great success and the communities are actively involved in follow on planning. DoD is using these pilot efforts to develop a planning template that can be used across the country to facilitate regional stakeholder planning for a more resilient response to climate effects.

DoD is continuing to update policies and procedures for incorporation of the consideration of future climate changes. The procedures section in DoDI 3200.21, *Sustaining Access to the Live Training Domain*, requires DoD Components to identify and evaluate the risks to training and range capability from the impacts of climate change as part of their planning process. Specifically, DoD Components are requested to consider increases in severe weather events, temperature, sea level, and changes to land cover and vegetation and precipitation as well as effects on threatened, endangered, or species at risk. DoD Components are also required to use adopted climate scenarios and predictive tools to qualify and quantify these risks.

DoD continues to work with range owners, operators and users to ensure the most current climate science tools, scenarios, and models are available to support range planning efforts. As the science continues to evolve, DoD is evaluating operations to ensure safe and effective training.

5

Evolving SRI Activities and Emerging Issues

As DoD's SRI has continued to mature, range capabilities have also developed to meet evolving and shifting encroachment challenges. The following subsections highlight some focus areas that are growing within SRI designed to meet burgeoning challenges.

5.1 New SRI-Related Influences and Actions

DoD continues to evolve in its approach to managing encroachment-related issues on its military training ranges. In 2016, USD(P&R) responded to several requests for coordination on national monument and marine sanctuary designations as they relate to military training activities. USD(P&R) coordinated with the Office of the General Counsel and the Military Services through the SRI Working Integrated Product Team to develop common language to capture DoD concerns related to these designations and their potential impact to military training activities.

USD(P&R) also initiated efforts to update and revise the 12 encroachment factors evaluated every three years as part of the SRR reporting cycle range assessments. New encroachment factors are being developed, such as foreign access or control and climate change, while others are being consolidated. It is anticipated these new factors will be evaluated as part of the 2018 SRR.

DoD acknowledges the recommendation set forth in the SASC Report 11-49, "Military Training Ranges for Special Operations Forces," to include a review of the general capabilities, critical issues, and future capabilities necessary for ranges supporting unique SOF training requirements. This year's report is the first instance where DoD has incorporated the specifically identified topic areas for affected SOF training ranges. DoD will continue to include and improve the reported information in future SRRs.

5.2 Budget Reductions Impacting Range Capability

Implications from the Budget Control Act of 2011 continue to remain an impediment to DoD and the Military Service's ability to maintain readiness. The decrease in total obligation authority necessitated changes to force structure, current and future readiness, O&M, RDT&E investments, as well as acquisition programs in competition for DoD appropriations to effectively balance competing requirements across the Department as well as within each Military Service. Coupled with this are congressionally mandated procurement and expenses that further compound fiscal constraints. Each Service weighs current versus future readiness in an attempt to achieve an executable budget strategy. The readiness accounts for each of the Military Services are the training enablers that ensure forces are proficient and prepared to deploy for contingencies across the range of military operations, including major combat operations. Continual decrements to these readiness-funding accounts are delaying range

modernization plans and are negatively impacting range capacity and throughput as range operations support functions are reduced.

5.3 Foreign Investment and National Security

The Department remains focused on the issue of foreign investment activities located in proximity to military training and testing areas. The potential persistent surveillance and collection capabilities afforded foreign entities through investment in assets near military training and testing equities presents significant national security and encroachment challenges to DoD. Multiple Services have addressed this issue in this year's report and DoD continues to develop strategies designed to mitigate the impacts to training and testing from foreign investment and national security encroachment.

In 2014, the GAO released a report evaluating the risk to DoD ranges and installations from foreign investment encroachment and the Department's ability to address these risks. DoD concurred with the recommendations stemming from this report. Specifically, DoD is pursuing opportunities to obtain information related to foreign investment and transactions in proximity to DoD mission essential locations from agencies with land management authority as well as conduct a risk assessment related to those locations.

In late 2015, DoD submitted a report to Congress on the Security Risks related to Foreign Investment in the United States, in response to House Report 113-466 accompanying the FY2015 NDAA. The report addressed the process by which DoD and the Military Services assess national security risks posed by foreign investment in proximity to DoD operating areas or installations, actions that might be taken by DoD to mitigate such risks, the manner in which DoD coordinates with other federal agencies on this issue, and procedures by which the OSD could communicate concerns to other federal departments and agencies regarding potential transactions by foreign-controlled entities in proximity to DoD activities.

DoD is also considering legislative relief as an avenue to mitigate national security-related encroachment and has engaged the various federal land managers to expound on potential issues related to DoD concerns.

5.4 Threatened and Endangered and Candidate Species

By September 2017, the USFWS will make listing determinations on the 251 Multiple District Litigation Plan candidate species as ordered by the court. DoD continues to work with the United States Fish and Wildlife Service (USFWS) to address any potential impacts from these determinations. DoD is developing an approach in conjunction with the USFWS and state agencies in the Southeast to encourage military installations to contribute to habitat management and enhancement on private, state, and federal lands, which would provide regulatory flexibility, greater predictability related to mission activities, and reduce regulatory pressure on military missions. Although this effort is still under development, it is a promising undertaking benefiting all parties involved.

5.5 Demand for Electromagnetic Spectrum

DoD operations—in the air, on land, on and under the sea, in space, and in cyberspace—are fundamentally dependent on use and control of electromagnetic spectrum. Spectrum dependent systems (SDS) and capabilities are utilized to support training platforms (both on-range and off-range) as well as DoD operations. All joint functions, such as movement and maneuver, fires, command and control, intelligence, protection, sustainment, and information exchange, are accomplished with systems that use spectrum. The DoD depends on access to spectrum to evaluate and maintain the readiness of our forces. Continued Congressional support to ensure the Department maintains access to spectrum in the future is critical to maintaining force readiness.

As potential adversaries continue to aggressively field electronic attacks and cyber technologies that significantly erode DoD's ability to use the spectrum to conduct military operations, the need to train our forces to deny that use of spectrum increases; the ability to retain use of the spectrum on the battlefield requires access to spectrum for the training community. In addition, advances in potential adversary command, control, communications and computers; ISR; improvised explosive devices (IEDs); and area denial weapon systems require the development, fielding, training, and

integration of complex electronic attack, electronic support, and electronic protection technologies – all which require access to spectrum.

In comparing the DoD's use of spectrum in training activities versus real operations, the training community requires access to more electromagnetic spectrum than the forces need during real world operations. In addition to the spectrum needed to support warfighting systems, spectrum is needed to support training-related SDSs that:

- ▶ Replicate the electromagnetic profile that would be presented by the adversary forces to provide realistic training for U.S. Signals Intelligence and Electronic Attack components;
- ▶ Control/coordinate synthetic representations of adversary forces to reduce the cost of training by replacing live elements with synthetic replicas;
- ▶ Quickly assess mission impacts due to denial of spectrum;
- ▶ Improve DoD's ability to deny adversary use of spectrum without degrading use by friendly forces or non-aligned entities; and
- ▶ Exchange ground truth position and other data to support real time casualty assessment and kill notification/removal.

Electromagnetic spectrum access to support warfighter training activities continues to be a challenge and any additional loss of spectrum will directly impact DoD's ability to conduct live training. In 2017, the Marine Corps, Navy, and Air Force reported on access to the electromagnetic spectrum as either a critical or an emerging encroachment issue. The Navy reported on the potential for interference of existing transmissions due to renewable energy development, specifically wind turbines. The Army cited spectrum encroachment concerns related to the pending deployment of Terminal High Altitude Area Defense batteries from the 69th ADA Brigade for training at Fort Hood. In addition to loss of spectrum availability, the increased use of spectrum surrounding DoD ranges by the commercial sector degrades ability to train. One example is related to the importance of training in a realistic environment of GPS denial in response to our adversaries developing and implementing GPS and satellite communications jamming capabilities. The ability to train in an environment that replicates the capabilities of U.S. adversaries has become

increasingly difficult due to the adverse impacts of such training on surrounding communities. Training exercises associated with Mountain Home AFB resulted in significant, temporary disruption in civilian and commercial navigation and aviation, affecting nearby communities and agriculture business. Further exercises have been restricted by size, duration, and location in order to minimize adverse impact, resulting in nonrealistic training and limited ability to execute TTPs.

To address spectrum-related challenges, DoD continues to focus on spectrum efficiency, flexibility, and adaptability to accelerate the fielding of technologies that enable spectrum sharing and improve access opportunities. The Department is also positioning to increase the agility of DoD spectrum operations, moving toward advanced assignment tools and technology to compress the usage requirements, along with modified policies, regulations, and standards, to enable DoD to exploit improvements to SDS spectrum flexibility and facilitate spectrum sharing. The Department plans to use proceeds from the Spectrum Relocation Fund to prototype a waveform capability designed to meet the training community's needs and cohabitate with Long-Term Evolution (LTE) cellular devices.

5.6 Continued Growth in Domestic Use of Unmanned Aircraft Systems

In recent years UASs have been widely used to perform a variety of overseas military missions including collecting critical intelligence data, taking lethal action, and enhancing situational awareness. Current UAS capabilities span a broad spectrum, ranging from small systems (e.g., Raven, Dragon Eye, and Pointer), through tactical-level systems (e.g., Shadow, Hunter), theater-level systems (e.g., Predator), and finally up to the national-level systems (e.g., Global Hawk). Increased requirements to man and train the proliferation of remotely piloted aircraft (RPA) and UAS operators has continued to drive a strong demand for suitable training ranges and adequate airspace. Coupled with these requirements to perform advanced level training to maintain proficiency and combat readiness standards across the Military Services are the increased demands on electromagnetic spectrum allocations to enable realistic inter-operability with manned units and prevent interference from the proliferation of commercial off-the-shelf devices.

The primary purpose of domestic UAS training and exercises is for DoD forces to conduct realistic training in their core mission areas. Since domestic UAS training presents unique legal, privacy, and coordination issues, the use of these systems must be in accordance with standing DoD regulations and policy. This includes applicable laws, regulations, and agreements concerning UAS operations in the National Airspace System (NAS), which reflect extensive consultation between the DoD and the FAA. The Secretary of Defense is the approval authority for all domestic Homeland Defense, Defense Support of Civil Authorities, and National Guard state support UAS operations, including DoD UAS operated by National Guard personnel in Title 32 or State Active Duty status. The current defense policy guidance regarding domestic UAS use is captured in Deputy Secretary of Defense Policy Memorandum 15-002, "Guidance for the Domestic Use of Unmanned Aircraft Systems," dated February 17, 2015.

The proximity of military training areas to the FAA controlled NAS remains an issue, but great strides have been made to alleviate this issue through interagency policy, procedure, and the continued introduction of ground-based sense-and-avoid and airborne sense-and-avoid (GBSAA) systems. Previous RAND studies have identified the unique limitations of UASs pertaining to operations in the NAS that can make integration into home station training difficult. Currently, UASs can only operate in restricted military airspace or in the NAS with certificates of authorization from the FAA. DoD is exploring ways to increase stateside training with UASs while minimizing the impact on the NAS. Part of this effort involves expanding the amount of restricted airspace located near units flying small-sized UASs that have limited range and flight duration. As more restricted airspace becomes available to these units, access to the NAS becomes less of a requirement. Additionally, for those units employing larger UAS platforms (with greater range and loiter ability), less-cumbersome procedures for gaining access to the NAS must be adopted in order to facilitate training opportunities.¹

Recently established FAA rules and new developments in GBSAA technologies show promise to enhance domestic training within the NAS. In June 2016, the Small UAS Rule

(14 CFR Part 107) was passed, allowing qualified UAS pilots to operate small UAS (55lbs or less) within the NAS. While flight is limited by altitude, visual line of sight, and other restrictions, a key provision in the rule offers the ability to waive most of the restrictions if an applicant can demonstrate the ability to operate the UAS safely. The new Part 107 ruling is a step forward in allowing access to the NAS, and similar legislation for larger UAS could be forthcoming. Developments in GBSAA technologies are working to open up regions of civil airspace for properly equipped UASs by allowing them to operate safely in accordance with the FAA's mandate to "do no harm." It would also allow UAS to operate without requiring certificates of authorization to be issued. After several successful demonstrations of GBSAA, the Army is planning to equip a number of its UAS training bases with this technology in order to extend current military airspace into adjoining civil airspace. By doing this, the Army hopes to increase its UAS training capacity. Moreover, though the Army is leading the development of GBSAA, this technology is designed for use by all the Military Services.²

5.7 Offshore Energy

The Military Services conduct a number of mission readiness activities across multiple areas of the outer continental shelf (OCS). The Navy uses the airspace, sea surface, sub-surface, and seafloor of the OCS for events ranging from instrumented equipment testing to live-fire exercises. The Air Force conducts flight training and systems testing over extensive areas on the OCS. Marine Corps amphibious warfare training extends from offshore waters on the OCS to the beach and inland, and includes subsurface and airspace. The OCS provides unique training and range capability resources critical to DoD testing, training and operations.

In an ongoing partnership with the DOI and BOEM, DoD continues to evaluate energy resource development on the OCS for potential impacts to military readiness. In 2015, the Office of the Assistant Secretary of Defense (Readiness) and representatives from the Military Services worked extensively with the BOEM Office of Strategic Resources to complete DoD's input related to the

¹ Rostker, Bernard D. [and ten others] (2014). *Building Towards a UAS Training Strategy* (Report No. RR-440-OSD). Washington D.C.: RAND National Defense Research Institute. 34-5.

² *Ibid.*, 40-1.

2017–2022 Outer Continental Shelf Oil and Gas Leasing Draft Proposed Program. DoD conducted a comprehensive analysis of mission compatibility with offshore oil and gas development in the planning areas included in the 2017–2022 draft proposed program. The assessment was finalized and submitted to BOEM in January 2016. For geological and geophysical surveying in advance of oil and gas development, DoD coordinates with BOEM and industry in an ongoing basis to ensure the survey activities and DoD's offshore training activities are deconflicted.

DoD continues to take part in the BOEM-led offshore wind energy commercial planning process, to include participation in several State-Intergovernmental Renewable Energy Task Forces where information is exchanged that will assist BOEM in during its decision-making process. In 2016, and at the request of DoD, BOEM commissioned a study on floating offshore wind technologies, conducted by the Department of Energy National Renewable Energy Laboratory (NREL). The study was initiated to assist DoD in assessing the mission compatibility of this emergent technology with the Department's offshore test and training activities. DoD participated in the study by providing BOEM and NREL with a list of parameters it would need to complete a mission compatibility assessment of an offshore floating wind facility.

5.8 DoD's Long-Term SRI Outlook

Effective military training is the foundation for the successful execution of our national defense mission. Ensuring effective training will continue to challenge the Department through this period of constrained budgets, rapidly evolving military capabilities, competition for the land, sea and air space, electromagnetic spectrum, and evolving threats. Sustainable access to training ranges gives our military personnel the space to develop and sharpen their warfighting skills, maximizing the probability of mission success and reducing our losses. DoD ranges must continue to provide the capacity and capabilities needed for effective training. Through the SRI and related efforts, DoD continues to work to sustain the capability to train on its ranges, airspace, and sea space.

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Appendix A: Range Inventory Updates

FY2013 NDAA Section 366(c) specifically details the requirement for DoD and the Military Services to develop and maintain an inventory of operational ranges. DoD maintains an inventory of its ranges, range complexes, military training routes, and special use airspace and has reported this inventory annually in previous SRRs. For this year's SRR, DoD is providing Congress with only that inventory information that has changed from last year's report. Both the Army and the Marine Corps had changes to their inventories and these changes are presented in Tables A-1 and A-2, respectively.

USD(P&R) will ensure the Military Services review and update their inventories annually and report any necessary changes to Congress.

Table A-1 Army Training and Testing Range Complex Inventory Updates

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
89TH RSC Mead WET Site	US	NE	USARC	965	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
8 th Army Korea	OS	Korea	EUSA	5,611	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Aberdeen Proving Ground	US	MD	AMC	49,541	133	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Anniston Army Depot	US	AL	AMC	105	0	0	0	N	N	N	N	Y	N	N	N	N	N	Y
Ansbach LTA	OS	Germany	USAREUR	844	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Arden Hills Army Training Site	US	MN	ARNG	1,476	0	0	0	N	N	Y	N	N	N	N	N	N	N	Y
Auburn	US	ME	ARNG	134	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Bangor Training Center	US	ME	ARNG	142	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Baumholder	OS	Germany	USAREUR	44,100	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Belton LTA	US	MO	USARC	177	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Benelux TSC	OS	Belgium	USAREUR	60	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Bethany Beach Training Site	US	DE	ARNG	2	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
BG Thomas Baker Training Site	US	MD	ARNG	877	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Biak Training Center	US	OR	ARNG	43,885	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Black Rapids Training Site	US	AK	USARPAC	2,778	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Bog Brook/Riley Deepwoods Training Site	US	ME	ARNG	799	0	0	0	N	N	Y	N	Y	N	N	Y	N	N	Y

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
Buckeye Training Site	US	AZ	ARNG	1,476	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Camel Tracks Training Site	US	NM	ARNG	8,426	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Camp Adair	US	OR	ARNG	522	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Camp Ashland	US	NE	ARNG	674	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Camp Atterbury	US	IN	ARNG	33,778	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Beauregard	US	LA	ARNG	12,580	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Blanding	US	FL	ARNG	66,877	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Camp Butner	US	NC	ARNG	4,384	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Clark	US	MO	ARNG	1,074	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Crowder	US	MO	ARNG	4,173	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Camp Curtis Guild	US	MA	ARNG	704	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Camp Darby	OS	Italy	USAREUR	1	0	0	0	N	N	N	N	N	N	N	N	N	N	Y
Camp Edwards	US	MA	ARNG	13,673	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Fogarty Training Site	US	RI	ARNG	317	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Grafton	US	ND	TRADOC	9,938	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Camp Guernsey	US	WY	ARNG	78,357	46	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Camp Mabry	US	TX	ARNG	204	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Camp Mackall	US	NC	FORSCOM	60,097	0	0	0	N	N	Y	N	N	N	N	N	N	N	Y
Camp McCain	US	MS	ARNG	12,703	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Camp Navajo	US	AZ	ARNG	26,231	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type											
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other	
Camp Niantic	US	CT	ARNG	1	0	0	0	N	N	N	N	N	N	N	N	N	N	N	Y
Camp Rilea	US	OR	ARNG	1,649	0	0	0	N	N	Y	Y	Y	N	Y	N	N	N	Y	Y
Camp Robinson	US	AR	ARNG	30,870	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	N	Y
Camp Santiago	US	PR	ARNG	12,365	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	N	Y
Camp Shelby	US	MS	ARNG	133,308	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Camp Sherman	US	NC	ARNG	7	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	N
Camp Smith	US	NY	ARNG	1,490	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Camp Varnum	US	RI	ARNG	1	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	Y
Camp Villere	US	LA	ARNG	1,456	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	Y
Camp Williams	US	UT	ARNG	23,364	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	N	Y
Catoosa Volunteer Training Site	US	TN	ARNG	1,572	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Cellina-Meduna	OS	Italy	USAREUR	15,859	81	0	0	N	N	Y	N	Y	N	N	N	N	N	N	Y
De Bremond Training Center	US	NM	ARNG	1,326	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	N
Deepwoods Training Site	US	ME	ARNG	128,017	0	0	0	N	N	N	N	N	N	N	N	N	N	N	Y
Disney Training Center	US	KY	ARNG	500	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	N
Dugway Proving Ground	US	UT	ATEC	358,847	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
East Haven Rifle Range	US	CT	ARNG	4	0	0	0	N	N	Y	Y	N	N	N	N	N	N	N	Y
Eglin AFB (ALARNG)	US	FL	ARNG	33,196	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	N
Esler Field	US	LA	ARNG	1	0	0	0	N	N	N	N	N	N	N	N	N	N	N	Y

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
Ethan Allen Firing Range	US	VT	ARNG	10,397	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Floyd Edsal Training Center	US	NV	ARNG	1,733	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Foce del Reno	OS	Italy	USAREUR	210	0	0	0	N	N	N	Y	Y	N	N	N	N	N	N
Foce Fume Serchio	OS	Italy	USAREUR	4	0	0	0	N	N	N	Y	Y	N	N	N	N	N	N
Fort Benning	US	GA	TRADOC	165,903	422	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Bliss	US	TX	TRADOC	1,083,734	1,597	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Bragg	US	NC	FORSCOM	136,142	1,718	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Campbell	US	KY, TN	FORSCOM	100,823	931	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Carson	US	CO	FORSCOM	123,687	1,153	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Chaffee	US	AR	ARNG	64,322	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Custer Training Center	US	MI	ARNG	7,404	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Devens	US	MA	USARC	4,876	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Dix	US	NJ	USARC	27,328	104	0	0	N	N	N	Y	Y	N	N	N	N	N	Y
Fort Drum	US	NY	FORSCOM	98,227	299	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Eustis/ Fort Story	US	VA	TRADOC	4,819	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Gillem	US	GA	FORSCOM	448	0	0	0	N	N	Y	N	N	N	N	N	N	N	Y
Fort Gordon	US	GA	TRADOC	50,975	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Greely/ Donnelly Training Area	US	AK	USARPAC	634,677	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Hood	US	TX	FORSCOM	197,675	500	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Huachuca	US	AZ	TRADOC	73,423	815	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Hunter Liggett	US	CA	USARC	160,683	113	0	0	N	N	Y	N	Y	N	N	N	N	N	Y

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
Fort Indiantown Gap	US	PA	ARNG	15,009	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Irwin	US	CA	FORSCOM	635,559	560	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Jackson	US	SC	TRADOC	51,314	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Knox	US	KY	TRADOC	98,687	113	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Leavenworth	US	KS	TRADOC	3,416	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Fort Lee	US	VA	TRADOC	434	69	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Leonard Wood	US	MO	TRADOC	55,605	175	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Lewis	US	WA	FORSCOM	79,097	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort McClellan (Pelham Range)	US	AL	ARNG	22,199	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort McCoy	US	WI	USARC	125,747	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Pickett	US	VA	ARNG	38,836	161	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Polk	US	LA	FORSCOM	137,273	5,471	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Richardson	US	AK	USARPAC	53,468	163	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Riley	US	KS	FORSCOM	91,959	107	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Rucker	US	AL	TRADOC	60,437	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort Rucker TS Ozark	US	AL	ARNG	29	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Fort Sam Houston/Camp Bullis	US	TX	MEDCOM	27,289	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Sill	US	OK	TRADOC	83,362	153	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Stewart	US	GA	FORSCOM	271,547	556	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Fort Wainwright	US	AK	USARPAC	913,972	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Fort William Henry Harrison	US	MT	ARNG	6,435	0	0	0	N	N	Y	N	Y	N	N	Y	N	N	Y

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type											
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other	
Fort Wolters	US	TX	ARNG	4,045	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Grafenwoehr	OS	Germany	USAREUR	38,922	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Greenleaf Training Site	US	NE	ARNG	3,161	0	0	0	N	N	Y	N	Y	N	N	Y	N	N	N	Y
Guilderland	US	NY	ARNG	167	0	0	0	N	N	N	N	Y	N	N	N	N	N	N	Y
Gulkana Glacier Training Area	US	AK	ARNG	1,259	0	0	0	N	N	N	N	N	N	N	N	N	N	N	Y
Gunpowder MIL RES	US	MD	ARNG	240	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	Y
Happy Valley (Carlsbad)	US	NM	ARNG	714	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	N
Haws Crossroads WET Site	US	TN	USARC	195	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	N
Hawthorne Army Depot	US	NV	AMC	35,773	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	N
Hayden Lake LTA	US	ID	USARC	66	0	0	0	N	N	N	N	Y	N	N	N	N	N	N	N
Hidden Valley LTA	US	KY	ARNG	525	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	N
Hofenfels	OS	Germany	USAREUR	38,888	0	0	0	N	N	Y	N	Y	N	N	Y	N	N	N	Y
Hunter Army Airfield	US	GA	FORSCOM	3,162	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	Y
John Sevier Range	US	TN	ARNG	5	0	0	0	N	N	N	N	Y	N	N	N	N	N	N	N
Joliet Training Center	US	IL	USARC	3,554	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	N	Y
Kahuku Training Area	US	HI	USARPAC	9,403	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	Y
Kawailoa Training Area	US	HI	USARPAC	22,466	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	Y
Kekaha	US	HI	ARNG	62	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N	N
Kingsbury LTA	US	IN	USARC	938	0	0	0	N	N	Y	N	N	N	N	N	N	N	N	N

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
Limestone Hills Training Area	US	MT	ARNG	20,231	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Los Alamitos JFTB	US	CA	ARNG	257	0	0	0	N	N	N	N	Y	N	N	N	N	N	Y
Macon Training Site	US	MO	ARNG	3,102	0	0	0	N	N	Y	N	Y	N	N	Y	N	N	Y
McAlester AAP	US	OK	AMC	10,897	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
McCrary Training Center	US	SC	ARNG	20,347	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Milan Volunteer Training Site	US	TN	ARNG	2,388	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Monte Romano	OS	Italy	USAREUR	10,018	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
MOTSU	US	NC	MTMC	9	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N
MTA Camp Dodge	US	IA	ARNG	3,720	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
MTA Lauderick Creek Training Area	US	MD	ARNG	1,106	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
MTA SMR CP Pendleton	US	VA	ARNG	118	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
MTA Stead FAC	US	NV	ARNG	199	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N
New Castle Rifle Range	US	DE	ARNG	92	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
NGTC at Sea Girt	US	NJ	ARNG	120	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
NH NG Training Site	US	NH	ARNG	102	0	0	0	N	N	N	N	N	N	N	N	N	N	Y
Onate Training Site	US	NM	ARNG	8,426	0	0	0	N	N	Y	N	Y	N	N	Y	N	N	Y

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
Orchard (Gowen Field) Training Area	US	ID	ARNG	143,308	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Parks RFTA	US	CA	USARC	1,994	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Peason Ridge	US	LA	FORSCOM	87,874	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Pine Bluff Arsenal	US	AR	AMC	101	0	0	0	N	N	N	Y	Y	N	N	N	N	N	Y
Pinon Canyon Maneuver Site	US	CO	FORSCOM	224,432	0	0	0											
Plymouth Training Site	US	ME	ARNG	324	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Pohakuloa Training Area	US	HI	USARPAC	131,507	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
P-Series	OS	Italy	USAREUR	5,584	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Ravenna Training and Logistics Site	US	OH	ARNG	6,254	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
Red River Army Depot	US	TX	AMC	33	0	0	0	N	N	N	N	Y	N	N	N	N	N	Y
Redstone Arsenal	US	AL	AMC	20,878	25	0	0	N	N	Y	N	Y	N	N	N	N	N	N
River Road Training Site	US	DE	ARNG	83				N	N	Y	N	Y	N	N	N	N	N	N
Roswell	US	NM	ARNG	3,878	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N
San Giorgio	OS	Italy	USAREUR	26	0	0	0	N	N	N	N	N	N	N	Y	N	N	N
Santa Severa	OS	Italy	USAREUR	1,867	0	0	0	N	N	N	Y	Y	N	N	N	N	N	N
Schofield Barracks MIL RES	US	HI	USARPAC	45,818	0	0	0	N	N	Y	Y	Y	N	N	Y	N	N	Y
Smyrna Volunteer Training Site	US	TN	ARNG	520	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Tarlton LTA	US	OH	ARNG	100	0	0	0	N	N	Y	N	N	N	N	N	N	N	N

Table A-1 Army Training and Testing Range Complex Inventory Updates (continued)

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
Tooele Army Depot	US	UT	AMC	2,009	0	0	0	N	N	N	N	Y	N	N	N	N	N	N
TS NAS Fallon RG B19	US	NV	ARNG	51	0	0	0	N	N	N	N	Y	N	N	N	N	N	Y
T-Series	OS	Italy	USAREUR	10,698	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
Tullahoma MIL RES	US	TN	ARNG	7,931	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
Ukumehame Firing Range	US	HI	ARNG	41	0	0	0	N	N	Y	N	Y	N	N	N	N	N	N
Umatilla Chemical Depot	US	OR	AMC	21	0	0	0	N	N	N	N	Y	N	N	N	N	N	Y
Weldon Springs	US	MO	ARNG	1,631	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
West Camp Rapid	US	SD	ARNG	764	0	0	0	N	N	Y	N	Y	N	N	N	N	N	Y
West Point MIL RES	US	NY	USMA	12,778	0	0	0	N	N	Y	Y	Y	N	N	N	N	N	Y
West Silver Spring Complex	US	WI	USARC	5	0	0	0	N	N	N	N	N	N	N	N	N	N	Y
Whistler Creek TS	US	AK	USARPAC	542	0	0	0	N	N	Y	N	N	N	N	N	N	N	N

Table A-2 Marine Corps Training and Testing Range Complex Inventory Updates

Range Complex	United States (US) or Overseas (OS)	State or Country	Command/Component	Range Descriptions				Range Type										
				Land Area for Ranges (acres)	Special Use Airspace (sq nm)	Sea Surface Area (sq nm)	Underwater Tracking Area (sq nm)	Air-to-Air or Air-to-Surface	Air-to-Ground	Land Maneuver	Land Impact Area	Land Firing Range	C2W/EW	Ocean Operating Area	MOUT	Instrumented Underwater Tracking Range	Amphibious Area	Other
MCLB Albany	US	GA	MATCOM	4	0	0	0	N	N	N	N	Y	N	N	N	N	N	N
MCLB Barstow	US	CA	MATCOM	2,438	0	0	0	N	N	N	N	Y	N	N	N	N	N	N
MCMWTC Bridgeport	US	CA	TECOM	45,217	0	0	0	N	N	Y	N	N	N	N	N	N	N	N
MCB Hawaii	US	HI	MARFORPAC	1,986	0	0	0	N	N	Y	N	Y	N	N	Y	N	Y	Y
MCB Japan	OS	Japan	MARFORPAC	47,000	333	0	0	N	N	Y	Y	Y	N	Y	Y	N	N	Y
MCB Camp Lejeune	US	NC	MARFORLANT	157,253	151	0	0	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y
MCB Camp Pendleton	US	CA	MARFORPAC	125,704	180	0	0	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
MCB Quantico	US	VA	MCDC	55,278	278	0	0	N	Y	Y	Y	Y	N	N	Y	N	N	Y
MCAGCC Twentynine Palms	US	CA	TECOM	601,151	1,268	0	0	N	Y	Y	Y	Y	Y	N	Y	N	N	Y
MCAS Yuma/Bob Stump	US	AZ	MCIWEST	1,216,000	7,085	0	0	Y	Y	Y	Y	Y	Y	N	N	N	N	Y
Whistler Creek TS	US	AK	USARPAC	542	0	0	0	N	N	Y	N	N	N	N	N	N	N	N

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Appendix B: Abbreviation List

Table B-1 Abbreviation List

Abbreviation	Description
AC	Active Component
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
ACUB	Army Compatible Use Buffer
AETC	Air Education and Training Command
AFI	Air Force Instruction
AFSOC	Air Force Special Operations Command
ARSOF	Army Special Operations Forces
ASD/SOLIC-IC	Assistant Secretary of Defense for Special Operations/Low Intensity Conflicts and Interdependent Capabilities
ASW	Anti-submarine Warfare
ATLS	Army Training Land Strategy
BARSTUR	Barking Sands Tactical Underwater Range
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
BOEM	Bureau of Ocean Energy Management
CAS	Close Air Support
CJMT	Combined Joint Military Training
CMAGR	Chocolate Mountains Aerial Gunnery Range
CMC	Commandant of the Marine Corps
CNIC	Commander Naval Installation Command
CNMI	Commonwealth of the Northern Mariana Islands
CONUS	Continental United States
CPG	Marine Corps' Planning Guidance
CSE	Center Scheduling Enterprise
CQC	Close Quarters Combat

Table B-1 Abbreviation List (continued)

Abbreviation	Description
DoD	Department of Defense
DoDD	DoD Directive
DoDI	DoD Instruction
DOI	Department of the Interior
DON	Department of the Navy
DPRI	Defense Policy Review Initiative
DRRS RAM	Defense Readiness Reporting System – Range Assessment Module
EA	Environmental Assessment
EAP	Encroachment Action Plan
ECP	Encroachment Control Plan
EIS	Environmental Impact Statement
ECTRC	El Centro Training Range Complex
EOTS	Electro Optical Targeting System
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDNF	Forward Deployed Naval Forces
FHL	Fort Hunter Liggett
FIS	Facility Investment Strategy
FLPMA	Federal Land Policy Management Act
FMP	Full Mission Profile
FNSI	Finding of No Significant Impact
FRAGO	Fragmentary Order
FTRC	Fallon Training Range Complex
FY	Fiscal Year
FYDP	Future Years Defense Program
GBSAA	Ground Based Sense and Avoid Airborne
GPS	Global Positioning System
IED	Improvised Explosive Device
IMCOM	Installation Management Command
INRMP	Integrated Natural Resources Management Plan
ISR	Intelligence, Surveillance, and Reconnaissance
ISR-MC	Installation Status Report – Mission Capacity
ITE	Integrated Training Environment

Table B-1 Abbreviation List (continued)

Abbreviation	Description
JLGO	Joint Ground Liaison Office
JLUS	Joint Land Use Study
JPMRC	Joint Pacific Multinational Readiness Capability
JRTC	Joint Readiness Training Center
JTAC	Joint Terminal Attack Controller
LEIA	Legislative Environmental Impact Statement
LVC-IA	Live, Virtual, Constructive - Integrating Architecture
MAGTF	Marine Air Ground Task Forces
MARSOC	Marine Corps Forces Special Operations Command
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCAT	Mission Compatibility Analysis Tool
MCB	Marine Corps Base
MCI	Marine Corps Installation
MCICOM	Marine Corps Installations Command
MCLB	Marine Corps Logistics Base
MCRD	Marine Corps Recruit Depot
MCRP	Mission Capable Ranges Program
MCSCP	Marine Corps Service Campaign Plan
METL	Mission Essential Task List
MILCON	Military Construction
MIRC	Marianas Islands Range Complex
MMPA	Marine Mammal Protection Act
MOA	Military Operations Area
MOU	Memorandum of Understanding
MOUT	Military Operations in Urban Terrain
MTR	Military Training Route
NAS	National Airspace System
NAWDC	Naval Air Warfare Development Command
NAWS	Naval Air Weapons Station
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NGB	National Guard Bureau

Table B-1 Abbreviation List (continued)

Abbreviation	Description
NGO	Non-Governmental Organization
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NSW	Naval Special Warfare
NSWC	Naval Special Warfare Command
NTC	National Training Center
NWDA	Northwest Development Area
NWSTF	Naval Weapons Systems Training Facility
OCS	Outer Continental Shelf
OEA	Office of Economic Adjustment
O&M	Operation and Maintenance
OITACA	Off-Installation Transit Axis and Corridor Analysis
OMA	Operation and Maintenance, Army
OOS	Ocean Observing System
OPNAV	Office of the Chief of Naval Operations
OPSEC	Operations Security
OSD	Office of the Secretary of Defense
OTB	Over the Beach
PACOM	U.S. Pacific Command
PB	President's Budget
PGM	Precision Guided Munitions
PMC	Procurement Marine Corps
PMP	Pilot Mitigation Project
PMRF	Pacific Missile Range Facility
POM	Program Objective Memorandum
POTFF	Preservation of the Force and Families
PPBE	Planning, Programming, Budgeting, and Execution
PPM	Pacific Pocket Mouse
PUTR	Portable Underwater Training Range
R&D	Research and Development
RC	Reserve Component
RCMP	Range Complex Management Plan (Navy/Marine Corps)
RCMP	Range Complex Master Plan (Army)

Table B-1 Abbreviation List (continued)

Abbreviation	Description
RCTC	Regional Collective Training Capability
REPI	Readiness and Environmental Protection Integration
RFMSS	Range Facility Management Support System
RMT	Realistic Military Training
ROD	Record of Decision
RPA	Remotely Piloted Aircraft
SASC	Senate Armed Services Committee
SDS	Spectrum Dependent Systems
SEA	Southern Expansion Area
SERPPAS	Southeast Regional Partnership for Planning and Sustainability
SOCAL	Southern California Offshore Range Complex
SOF	Special Operations Forces
SOUC	Special Operations in Urban Combat
SOW	Special Operations Wing
SRI	Sustainable Ranges Initiative
SRR	Sustainable Ranges Report
STS	Special Tactics Squadron
SUA	Special Use Airspace
SWCC	Special Warfare Combatant Crewman
T&E	Test and Evaluation
TEST	Threatened and Endangered Species Team
THAAD	Terminal High Altitude Area Defense
TSPI	Time Space Position Information
TSS	Training Support System
TSWG	Technical Support Working Group
TTP	Tactics, Techniques, and Procedures
T/TSNS	Test and Training Space Needs Statement
U.S.C.	United States Code
UAS	Unmanned Aircraft System
UMMCA	Unspecified Minor Military Construction
USACE	U.S. Army Corps of Engineers
USAJFKSWCS	U.S. Army John F. Kennedy Special Warfare Center and School
USASOC	U.S. Army Special Operations Command

Table B-1 Abbreviation List (continued)

Abbreviation	Description
USD(P&R)	Under Secretary of Defense for Personnel and Readiness
USDA	U.S. Department of Agriculture
USFF	U.S. Fleet Forces Command
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USSOCOM	U.S. Special Operations Command
UTTR	Utah Test and Training Range
UUS	Unmanned Underwater Systems
VEC	Valued Environmental Component
WDZ	Weapon Danger Zone
WEA	Western Expansion Areas
WRP	Western Regional Partnership



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