

DESERT TORTOISE COUNCIL

3807 Sierra Highway #6-4514

Acton, CA 93510

www.deserttortoise.org

eac@deserttortoise.org

Via email only

September 15, 2025

Department of the Navy
Naval Facilities Engineering Systems Command Southwest
Attn: Ryan Maynard, Project Manager
750 Pacific Highway
San Diego, California 92132
ryan.m.maynard4.civ@us.navy.mil

RE: Public Draft Environmental Assessment for Permanent Special Use Airspace Establishment and Modifications at Marine Corps Air Ground Combat Center, Twentynine Palms, CA (EAXX-007-17-XMC-1730226032)

Dear Mr. Maynard,

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and northern Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

Both our physical and email addresses are provided above in our letterhead for your use when providing future correspondence to us. When given a choice, we prefer to receive emails for future correspondence, as mail delivered via the U.S. Postal Service may take several days to be delivered. Email is an "environmentally friendlier way" of receiving correspondence and documents rather than "snail mail."

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats occupied by the Mojave desert tortoise (*Gopherus agassizii*) (synonymous with Agassiz's desert tortoise), our comments include relevant information from the recent scientific literature on the tortoise/tortoise habitat, other relevant information, and recommendations intended to enhance protection of this species and its habitat

during activities that may be authorized by the Marine Corps, which we recommend be included and analyzed in the environmental documents associated with this proposed action. Please accept, carefully review, and include in the relevant environmental documents and the project file the following comments from the Council for the proposed action.

The Mojave desert tortoise is among the top 50 species on the list of the world's most endangered tortoises and freshwater turtles. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers the Mojave desert tortoise to be Critically Endangered (Berry et al. 2021), "... based on population reduction (decreasing density), habitat loss of over 80% over three generations (90 years), including past reductions and predicted future declines, as well as the effects of disease (upper respiratory tract disease/mycoplasmosis). *Gopherus agassizii* (sensu stricto) comprises tortoises in the most well-studied 30% of the larger range; this portion of the original range has seen the most human impacts and is where the largest past population losses have been documented. A recent rigorous rangewide population reassessment of *G. agassizii* (sensu stricto) has demonstrated continued adult population and density declines of about 90% over three generations (two in the past and one ongoing) in four of the five *G. agassizii* recovery units and inadequate recruitment with decreasing percentages of juveniles in all five recovery units."

This status, in part, prompted the DTC and the Desert Tortoise Preserve Committee to join Defenders of Wildlife (Defenders of Wildlife et al. 2020) to petition the California Fish and Game Commission (Commission) in March 2020 to elevate the listing of the Mojave desert tortoise from Threatened to Endangered in California under the California Endangered Species Act (CESA). In its status review, California Department of Fish and Wildlife (CDFW) (2024a) stated: "At its public meeting on October 14, 2020, the Commission considered the petition, and based in part on the Department's [CDFW] petition evaluation and recommendation, found sufficient information exists to indicate the petitioned action may be warranted and accepted the petition for consideration. The Commission's decision initiated this status review to inform the Commission's decision on whether the change in status is warranted."

Importantly, in their April 2024 meeting (CDFW 2024b), the Commission voted unanimously to accept the CDFW's petition evaluation and recommendation to uplist the tortoise from threatened to endangered under CESA based on the scientific data provided on the species' status, declining trend, numerous threats, and lack of effective recovery implementation and land management. On July 15, 2025, the tortoise was officially uplisted to endangered status under CESA (Commission 2025).

Description of the Proposed Action

The Marine Corps, serving as lead agency, and the Federal Aviation Administration (FAA) served as a cooperating agency, prepared the Public Draft Environmental Assessment for Permanent Special Use Airspace Establishment and Modifications at Marine Corps Air Ground Combat Center (EA). In the EA, the Marine Corps analyzes the "potential environmental impacts associated with establishing new permanent [Special Use Airspace] SUA and modifying existing SUA at the Marine Air Ground Task Force Training Command (MAGTFTC), Marine Corps Air Ground Combat Center, Twentynine Palms, California (Combat Center)" (Marine Corps 2025). This EA focuses on impacts associated with the proposed changes to airspace and aircraft operations, as previously analyzed in the 2012 Final EIS.

The Marine Corps analyzed two action alternatives in addition to the No Action Alternative.

No Action Alternative: Under the No-Action Alternative, there would be no change to the existing SUA at the Combat Center. The No-Action Alternative captures anticipated changes to aircraft used in training, including the replacement of AV-8B and FA-18 with the F-35 aircraft.

Figure 1 shows the location of the existing SUA.

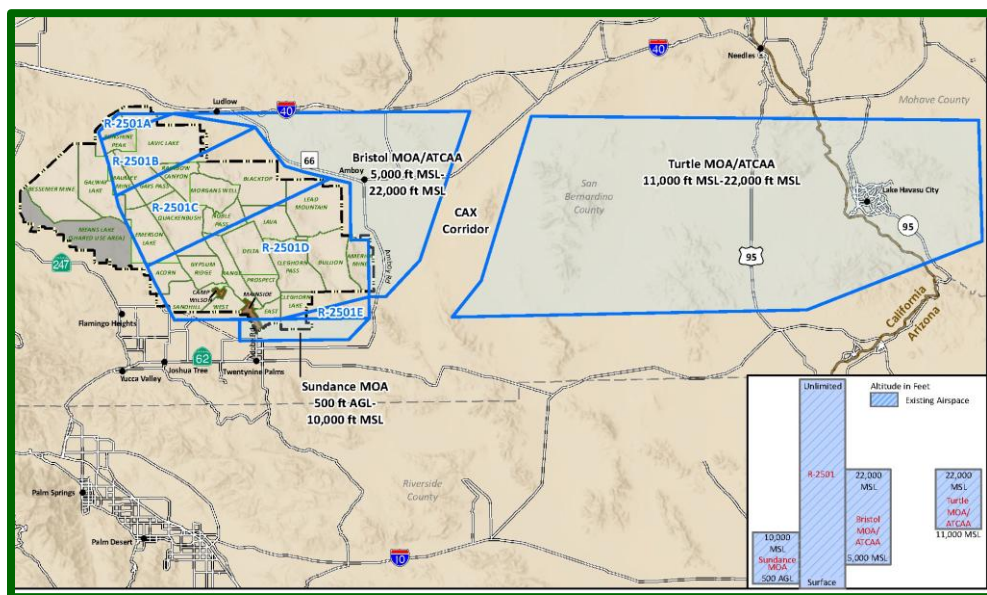


Figure 1. Existing airspace used to support the Combat Center.

Alternative 1: Under this alternative additional airspace and elevations would be designated (Figure 2) and additional sorties would occur (Table 1).

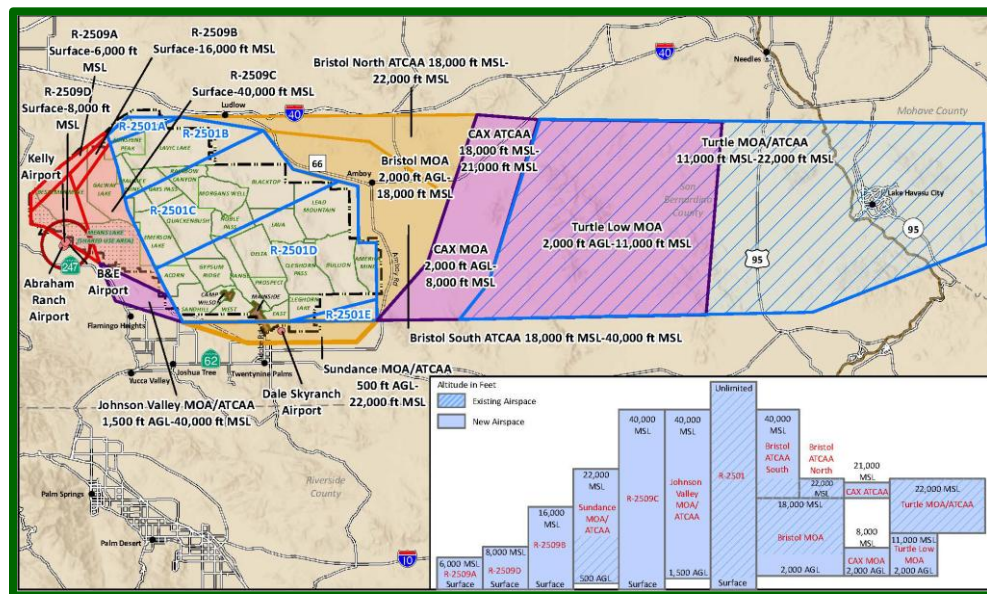


Figure 2. Special use airspace under Alternative 1.

Table 1. Estimated Sorties flown annually under Baseline (No Action) and Alternatives 1 and 2 in the EA (Marine Corps 2025, Table A-6).

Aircraft	No-Action Alternative (Total / Above FL270 ¹)			Alternatives 1 and 2 (Total / Above FL270 ¹)		
	R-2501 A/B/C/D/E and Sundance MOA	Bristol MOA/ ATCAA	Turtle MOA/ ATCAA	R-2501 A/B/C/D/E, R- 2509A/B/C/D, Sundance MOA/ATCAA, Johnson Valley MOA/ATCAA	Bristol MOA/ ATCAA, CAX MOA/ATCAA, Turtle Low MOA	Turtle MOA/ ATCAA
Total	5,991/455	2,249/423	2,400/200	7,730/635	2,249/671	2,400/200

¹ > FL270 and >FL180 are subsets of sorties.

*Sorties are defined as “the total use of the combined range complex SUA by a single aircraft for one full period”

Alternative 2: This is the preferred alternative. This alternative would establish additional SUA and elevations for flights (Figure 3) and would increase the number of sorties (Table 1). It would differ from Alternative 1 as follows:

- Limiting altitudes to 16,000 feet MSL in R-2509C and Johnson Valley MOA.
- Not creating a Johnson Valley ATCAA or CAX ATCAA.
- Limiting altitudes in Bristol ATCAA to FL220 (same as existing airspace) and not dividing into Bristol North ATCAA and Bristol South ATCAA.
- Modifying the southern boundary of Sundance ATCAA.

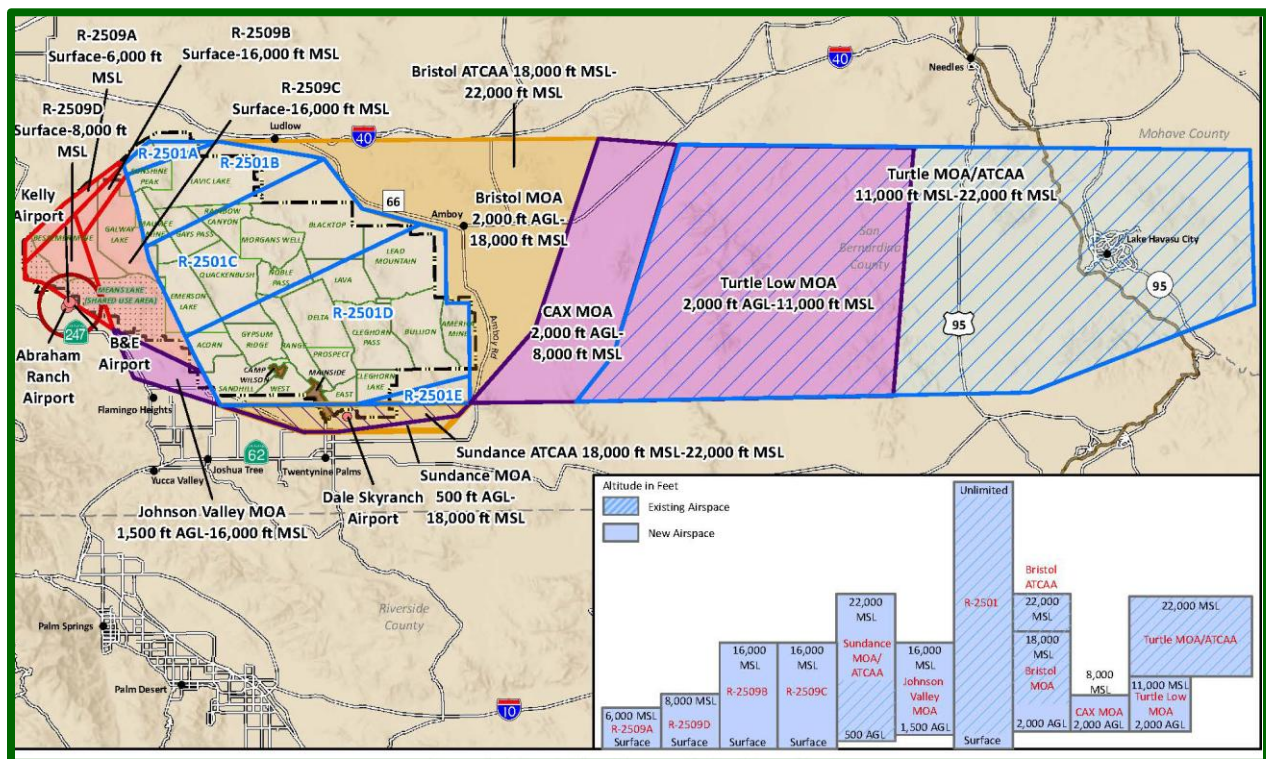


Figure 3. Special use airspace under Alternative 2.

Alternative 2 would add 1,737 square miles and 1,739 sorties to the airspace (Marine Corps 2025, Table A-1).

Two other alternatives were considered but dismissed from further analysis. They were (1) limiting the use of airspace to 200 days per year and (2) obtaining temporary special use airspace from the FAA. Both were eliminated because they did not meet the purpose and need of the proposed action.

The Combat Center is located in the Mojave Desert approximately 130 miles east of Los Angeles and 54 miles northeast of Palm Springs, in San Bernardino County, California, with CA State Route 62 to the north and Interstate 40 and the city of Twentynine Palms to the south. The project area includes airspace above, adjacent to, and to the east of the Combat Center. The Combat Center encompasses approximately 761,000 acres. The area encompassed by the SUAs outside the Combat Center for the alternatives was not found in the EA.

Comments on the EA

The comments on this EA are presented in the order that information is presented in it.

Page 3-4, Table 3.0-1 Summary of Anticipated Environmental Impacts: “There would be no impact on the desert tortoise because there would be no ground disturbance and previous studies concluded that aircraft noise is not known to significantly affect the desert tortoise. Conclusion: No significant impact.”

The Council disputes the Marine Corps conclusions that (1) we know that there would be no ground disturbance and that (2) previous studies concluded that aircraft noise is not known to significantly affect the tortoise.

We know that there would be no direct impacts from aircraft flights that result in ground disturbance unless an emergency landing or a crash occurred. Both of these events are rare occurrences but they do occur. Consequently, they should be discussed and analyzed in the final, revised EA.

In addition, there is information in the scientific literature that suggests that vibrations of certain intensities, especially when repeated, result in impacts to tortoise burrows. We were unable to find a study that was designed specifically to answer the question of whether recurring and loud vibrations generated by military aircraft affect the structural integrity of tortoise burrows. However, Barneich et al. (2004) conducted a limited study of the impacts of vibrations from blasting and mechanical sources on two artificial tortoise burrows with openings that would accommodate subadult or small adult tortoises. They induced progressively higher vibration levels near the test burrows while observing the stability of the burrows. They concluded that certain single-source vibration levels would result in damage to tortoise burrows.

In another study, Wilson (2011) reported that vibrational activity resulted in a reduction in the height of burrow entrances for pygmy rabbits in Utah. She did “not know how deeply the burrows were disturbed” and recommended that additional studies are needed to evaluate the impacts of vibrations on the underground portions of burrows.

Burrows are substantially important for the survival of the tortoise. Tortoises excavate burrows, know their locations, and use burrows to escape temperature extremes of summer and winter, escape from predators, and provide humidity in the desert's arid environment. Any damage that occurs to a burrow would require the expenditure of additional energy to repair or re-excavate the burrow. Desert tortoises rarely have energy reserves for such activities. In addition, any damage to a burrow may result in it not being available for protection from predators or temperature extremes and result in injury or mortality to a tortoise.

One study conducted by Bowles et al. (1999) titled "Effects Of Flight Noise from Jet Aircraft and Sonic Booms on Hearing, Behavior, Heart Rate, and Oxygen Consumption of Desert Tortoises (*Gopherus agassizii*)" concluded that aircraft noise is not known to significantly affect the tortoise. In the report, Bowles et al. (1999) said that the goals of the study were: "(1) to measure the auditory sensitivity of desert tortoises and determine the influence of vibration sensitivity thereon; (2) to determine whether tortoises suffered temporary loss of hearing after exposure to simulated subsonic and supersonic aircraft noise; (3) to measure behavioral and cardiac responses to aircraft noise; (4) to measure the relationship between heart rate and metabolic rate; and (5) to use this relationship to estimate changes in energy consumption after noise exposure." Thus, the study was limited to collecting data to assess these issues.

It was limited in other aspects some of which the authors acknowledged in their report.

Temperature limitations: The Bowles et al. (1999) study was conducted during limited temperature conditions. The ambient temperatures when physiological measurements were taken were 28-34°C. Bowles et al. stated that "[s]mall changes in temperature produced large changes in auditory sensitivity and activity, however, suggesting that the results of these experiments cannot be extrapolated to low temperature conditions." Tortoise activity may occur at any time of year and is not restricted to optimum ambient temperatures. Younger tortoises emerge in winter in response to precipitation even when temperatures are cold. During brief warm-up periods in winter, tortoises have been observed above ground. Thus, the impacts to tortoises from exposure to noise/vibration from aircraft use in colder temperatures should be analyzed and not dismissed as having no impact.

Age of tortoises studied: The Bowles et al. study was limited with respect to the age classes of tortoises used in the experiment. Only adult and large subadult tortoises were used in the experiment (midline carapace length ranged from 197 to 314 mm.). Consequently, there is no information on the effects of subsonic aircraft noise to hatchling or juvenile tortoises. We know from studies on humans and other animals that young animals are frequently more susceptible to adverse impacts than adults. In addition, Bowles et al. stated that "tortoises are not known to depend greatly on their hearing to detect danger, except perhaps when they are very young." Thus, it is reasonable to conclude that chronic exposure of hatchling and juvenile tortoises to aircraft noise may result in some hearing loss that may affect their ability to effectively detect predators and increase juvenile tortoise mortality. Please see "*Chronic exposure to aircraft noise*."

Frequency and duration of aircraft noise: Bowles et al. reported that "tortoises proved to be able to hear well enough to take advantage of soft sounds (e.g., rustle of a predator's wings)" and concluded that "noise masking could result in occasional losses of young animals" from them not hearing the approach of predators such as ravens, which may also apply to masking from military aircraft. "In most areas, any given location experiences fewer than 6 overflights per day. However, the probability of masking effects on communication is vanishingly-low given the low duty cycle of aircraft activity in most military operations areas" (Bowles et al. 1999).

According to the EA, the “Combat Center is the Marine Corps’ largest combined-arms, live-fire training range complex that affords units the opportunity to practice tactics in a realistic and challenging environment. Combined-arms exercises consist of integrating different combat arms (e.g., infantry, artillery, aviation) and operating together in a coordinated manner to maximize effectiveness on the battlefield. These exercises, often complex, generate combat readiness and lethality across the Marine Air Ground Task Force through simulated real combat situations.” Information provided in the EA indicates that more than 12,300 sorties would be flown every year under Alternatives 1 or 2. While the number of sorties is provided, we were unable to find information on the duration of an aircraft flight. This level of aircraft activity and noise does not seem to meet Bowles et al. (1999) definition of the “low duty cycle of aircraft activity in most military operations areas.” Consequently, the Council contends that applying the conclusions from Bowles et al. (1999) with respect to impacts to the tortoise from aircraft noise for the proposed action are not appropriate.

Chronic exposure to aircraft noise: The Bowles et al. study was of limited duration. Chronic exposure to aircraft noise may adversely affect the ability of tortoises to hear. Tortoises are usually long-lived and military training is restricted to designated airspace. The typical lifetime home range of a tortoise is smaller than the existing or proposed SUA. Tortoises typically take 15 to 20 years to reach sexual maturity and can live for several more decades. Thus, tortoises in the existing SUA have been exposed to aircraft noise for a long time and this chronic exposure for years may have affected their hearing and other physiological responses including stress levels. The Bowles et al. report did not compare the responses of tortoises they studied from Barstow with tortoises that have experienced long-term exposure to aircraft noise. In humans, acute exposure to loud noise such as aircraft noise is usually not damaging to the function of hearing but chronic exposure is. If the hearing of tortoises has been adversely affected, they may not be able to hear the approach of predators such as ravens, coyotes, or badgers, and would be more susceptible to predation.

Behavioral responses to aircraft noise and adverse impacts: The Bowles et al. study evaluated the impacts of changed tortoise behavior on the ability of a tortoise to survive. For example, they observed that initially tortoises exhibited a freeze and quiescence behavior that lasted up to 113 minutes when exposed to subsonic aircraft noise. “The most acute response to aircraft noise was freezing, with slow changes in activity following thereafter. Freezing is a common reptilian defensive response (Suboski 1992) that seems very appropriate in the case of the desert tortoise, given its heavy armament” (Bowles et al. 1999). “This change in activity was confined to the period of exposure and the hour after (approximately), and was best characterized as a shift into an increased state of vigilance.” Unfortunately, this state of freezing and quiescence in a natural situation may leave a tortoise vulnerable to predation or potentially overheating, resulting in injury or death.

In acknowledging the limitations of their study, Bowles et al. (1999) recommended that:

- Tortoises should be investigated “under natural conditions in an area where exposures to aircraft noise is frequent. Activity should be measured under a variety of natural conditions, including extreme temperatures, hunger, water-deprivation, presence of predators, and presence of rivals.”

- The model of metabolic costs that Bowles et al. (1999) developed “should be tested with studies of free-ranging desert tortoises, which experience a wider range of conditions and activity states than the captives studied.”
- The physiological events that cause freezing and quiescence in response to sound should be studied. As it is clear that desert tortoises hear relatively well and are responsive to sounds in the environment, their sensory ecology should be examined. What are the meaningful natural sounds that they respond to? How well can they learn to recognize the acoustic signature of significant natural sounds and ignore irrelevant human-made noise?”

Given these observations and limitations, we conclude that the Marine Corps’ statement that there would be no ground disturbance and that previous studies concluded that aircraft noise is not known to significantly affect the tortoise is unsubstantiated.

The Council requests that in the Final ES the Marine Corps revise the current information to accurately reflect the limitations of the Bowles et al. (1999) study, review the scientific literature on research related to the proposed action and its potential impacts on tortoises [the Marine Corps states in the EA that the “Environmental Assessment (EA), analyzes the potential environmental impacts”] analyze the potential impacts to the tortoise/tortoise habitat including with respect to the survival and recovery of the tortoise for each alternative, and develop and implement effective mitigation to offset these impacts.

Page 3-22, Biological Resources, Federally listed Species: “The desert tortoise was listed as threatened by the State of California in 1989 . . .” Please add that the tortoise was uplisted to endangered by the State of California in 2025.

Page 3-25, Alternative 1, Special Status Species: “2) Tortoises do not appear to be heavily affected by noise (Bowles et al. 1999).” While Bowles et al. (1999) may have designed a study to measure some of the direct impacts to adult tortoises from acute exposure to aircraft noise, the direct and indirect impacts from long-term exposure and indirect impacts from acute exposure were not analyzed. Given the limitations of the Bowles et al. (1999) report and the information provided in our comments above under Page 3-4, Table 3.0-1 Summary of Anticipated Environmental Impacts, please revise this statement.

Page 3-25, Alternative 1, Special Status Species: “As such, any effect that noise associated with permanent SUA establishment might have on desert tortoises is expected to be negligible. The USFWS [U.S. Fish and Wildlife Service] concurred in this assessment (USFWS 2023). Therefore, there would be no significant impacts on the desert tortoise for Alternative 1.” The USFWS is required to analyze the impacts of a proposed action on the survival and recovery of the tortoise. They are also required to err on the side of the species when there is uncertainty about the impacts of an action on a species.

In the USFWS’s 2023 biological opinion, they stated “The Service (2017a) noted previously that the use of the Marine Corps’ (new and modified) airspace will not result in effects to desert tortoises...” Consequently, we will not discuss the Marine Corps’ use of airspace in this biological opinion. In the 2017 biological opinion, the USFWS stated that “[i]n its biological assessment, the

Marine Corps also included the “new and modified airspace, and adjacent surrounding lands in San Bernardino County, California that underlie the proposed airspace establishment” as part of its action area. We did not include this area in our biological opinion because the use of the airspace will not result in effects to desert tortoises (see Bowles et al. 1999).”

For reasons provided in this comment letter under Page 3-4, Table 3.0-1 Summary of Anticipated Environmental Impacts, the Council strongly disagrees with the USFWS’s conclusion that the use of airspace will not result in effects to desert tortoises. We are providing a copy of our comments to the Palm Springs and Southern Nevada Fish and Wildlife offices to remind the USFWS of their responsibilities under the Federal Endangered Species Act, to remind them that the Bowles et al. (1999) report did not conclude that the use of airspace will not result in effects to desert tortoises, and that this report had several limitations in its application to the proposed action some of which the authors identified in their report.

Page 4.2.4, Cumulative Impacts, Biological Resources: “The environmental consequences of past projects are reflected in existing biological conditions, including the identification of special status species by the U.S. Fish and Wildlife Service (USFWS) and CDFW, the requirements identified in the 2002, 2012, and 2017 Biological Opinions (BOs) (USFWS 2002, 2012, 2017) (Project 4), and existing conditions identified in the Integrated Natural Resources Management Plan [INRMP] (Combat Center 2024) and other regional conservation plans such as the Desert Tortoise Recovery Plan (USFWS 2011).” In other sections of the EA, the Marine Corps refers to the 2018 INRMP (e.g., Appendix D). Please provide consistent information in the EA with respect to the applicable version of the INRMP.

In addition, please describe how the proposed action, its impacts, and mitigation that would be implemented comply with the current INRMP. Alternatively, will the next INRMP need to be revised to accommodate changes that may result from implementation of the proposed action?

We were unable to find a copy of the 2024 INRMP online, only the 2018 INRMP. Please post the current INRMP online so the public may see what actions the Marine Corps is implementing to mitigate the adverse effects of aircraft use and noise on the tortoise/tortoise habitat.

We appreciate this opportunity to provide the above comments and trust they will help protect tortoises during any resulting authorized activities. Herein, we reiterate that the Council wants to be identified as an Affected Interest for this and all other projects funded, authorized, or carried out by the Marine Corps and the FAA that may affect desert tortoises or their habitats, and that any subsequent environmental documentation for this proposed action is provided to us at the contact information listed above. Additionally, we ask that you notify the Council at eac@deserttortoise.org of any other proposed actions that the Marine Corps may authorize, fund, or carry out in the range of any species of desert tortoise in the southwestern United States (i.e., *Gopherus agassizii*, *G. morafkai*, *G. berlandieri*, *G. flavomarginatus*) so we may comment on it to ensure that the Marine Corps fully considers and implements actions to conserve these tortoises as part of its directive under the Sikes Act Improvement Act.

Please respond in an email that you have received this comment letter so we can be sure our concerns have been registered with the appropriate personnel and office for this proposed action.

Respectfully,



Edward L. LaRue, Jr., M.S.

Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

Cc: Brian Croft, Field Supervisor, U.S. Fish and Wildlife Service, Palm Springs and Southern Nevada Field Offices, brian_croft@fws.gov

Heidi Calvert, Regional Manager, Region 6 – Inland and Desert Region, California Department of Fish and Wildlife, Heidi.Calvert@wildlife.ca.gov

Brandy Wood, Region 6 – Desert Inland Region, California Department of Fish and Wildlife, Brandy.Wood@wildlife.ca.gov

Eric Chan, Region 6 – Desert Inland Region, California Department of Fish and Wildlife, Eric.Chan@wildlife.ca.gov

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