# United States Department of the Interior

**Pacific Southwest Region**
**FISH AND WILDLIFE SERVICE**
Reno Fish and Wildlife Office
1340 Financial Blvd., Suite 234
Reno, Nevada 89502
Ph: (775) 861-6300 ~ Fax: (775) 861-6301


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File No. 2017-F-0436

William A. Dunkelberger
Forest Supervisor
Humboldt-Toiyabe National Forest
1200 Franklin Way
Sparks, Nevada 89431

Colonel J. E. Donnellan
Commanding Officer
United States Marine Corps
Marine Corps Mountain Warfare Training Center
HC-83
Bridgeport, California 93517

Subject: Final Biological Opinion for the Enhancement of Operations and Training Proficiency at the Marine Corps Mountain Warfare Training Center, Mono County, California

Dear Mr. Dunkelberger and Colonel Donnellan:

This document transmits the U.S. Fish and Wildlife Service's (Service) final Biological Opinion (BO) on the proposed Enhancement of Operations and Training Proficiency (proposed action) at the Marine Corps Mountain Warfare Training Center (MCMWTC) as described in the biological assessment (BA) jointly prepared by the U.S. Forest Service (USFS), Humboldt-Toiyabe National Forest (HTNF) and the U.S. Marine Corps (USMC). The USMC conducts most of its activities on the Bridgeport Range District of the HTNF. The BO describes the effects of the proposed action on the federally-listed as threatened Lahontan cutthroat trout (LCT; *Oncorhynchus clarkii henshawi*), threatened Yosemite toad (YT; *Anaxyrus canorus*) and its designated critical habitat, and the endangered Sierra Nevada yellow-legged frog (SNYLF; *Rana sierrae*) and its designated critical habitat, in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*). The Service's Reno Fish and Wildlife Office (RFWO) received your request for formal consultation on May 10, 2017. The

proposed action will be consistent with conditions outlined in the current 40-year Special Use Permit (SUP) (USFS 2009) and in annual SUPs, which are described in Annual Operating Plans (AOPs).

In completing this BO, the Service has considered the following: (1) The 2017 BA for the project (USFS and USMC 2017a), (2) the 2018 AOP for the MCMWTC (USFS and USMC 2017b), (3) file information and reference material located at the Service's RFWO, and (4) personal communication among the HTNF, USMC, and Service staff. A complete record of this consultation is on file at the RFWO.

## CONSULTATION HISTORY

As described above, the Service received the USMC's request for formal consultation on May 10, 2017. The Service initiated consultation at that time. On June 28, 2017, staff from the RFWO conducted a site visit with USMC staff to discuss the proposed action in more detail. As the Service drafted the BO, questions about specific details of the proposed action arose. To adequately address those questions, on September 6, 2017, the RFWO provided a draft BO to USMC staff to confirm the accuracy of the project description. We received comments from the USMC on September 21, 2017. We had a phone conversation with the USMC to discuss the comments and edits to the draft BO on October 3, 2017. Following that conversation, we requested additional information from the HTNF and USMC to complete our analysis of the proposed action. We received that information via email from the HTNF and USMC on September 21; October 4, 19, and 30; and November 1, 3, 6, 7, 9, and 13. The USMC and Service agreed in an email on November 15, 2017, that because of the extra time required to verify the details of the proposed action, the consultation initiation date would change from May 10 to September 6, 2017, when the RFWO submitted the draft BO for review by the USMC. On January 5, 2018, we provided an official draft BO to the USMC and HTNF staff. We received comments from the USMC and HTNF on January 22 and 24, 2018. Staff from the USMC, HTNF, and Service had a conference call on January 30, 2018, to discuss the comments on the draft BO. On February 1, 2018, the Service requested additional information and clarification on comments from the USMC and HTNF. The USMC provided this information on February 13, 2018. On February 21, 2018, the Service and USMC had a phone conversation to discuss the Service's remaining questions regarding the information provided. On February 26, 2018, the Service sent a second draft of the BO to the USMC and USFS. The Service received minor comments from the USFS and USMC on February 26 and March 6, 2018.

# BIOLOGICAL OPINION

## DESCRIPTION OF THE PROPOSED ACTION

The USMC operates the MCMWTC base facilities and primary training areas on USMC lands and the HTNF (Figure 1). The MCMWTC mission, since 1951, is to train approximately 15,000 military personnel annually in high-altitude, mountainous, and cold weather Tactics, Techniques, and Procedures (TTPs). The MCMWTC is comprised of a base camp, 16 training areas (TAs), and 1 conservation area (CA); a permanent dirt runway that functions as an expeditionary airfield

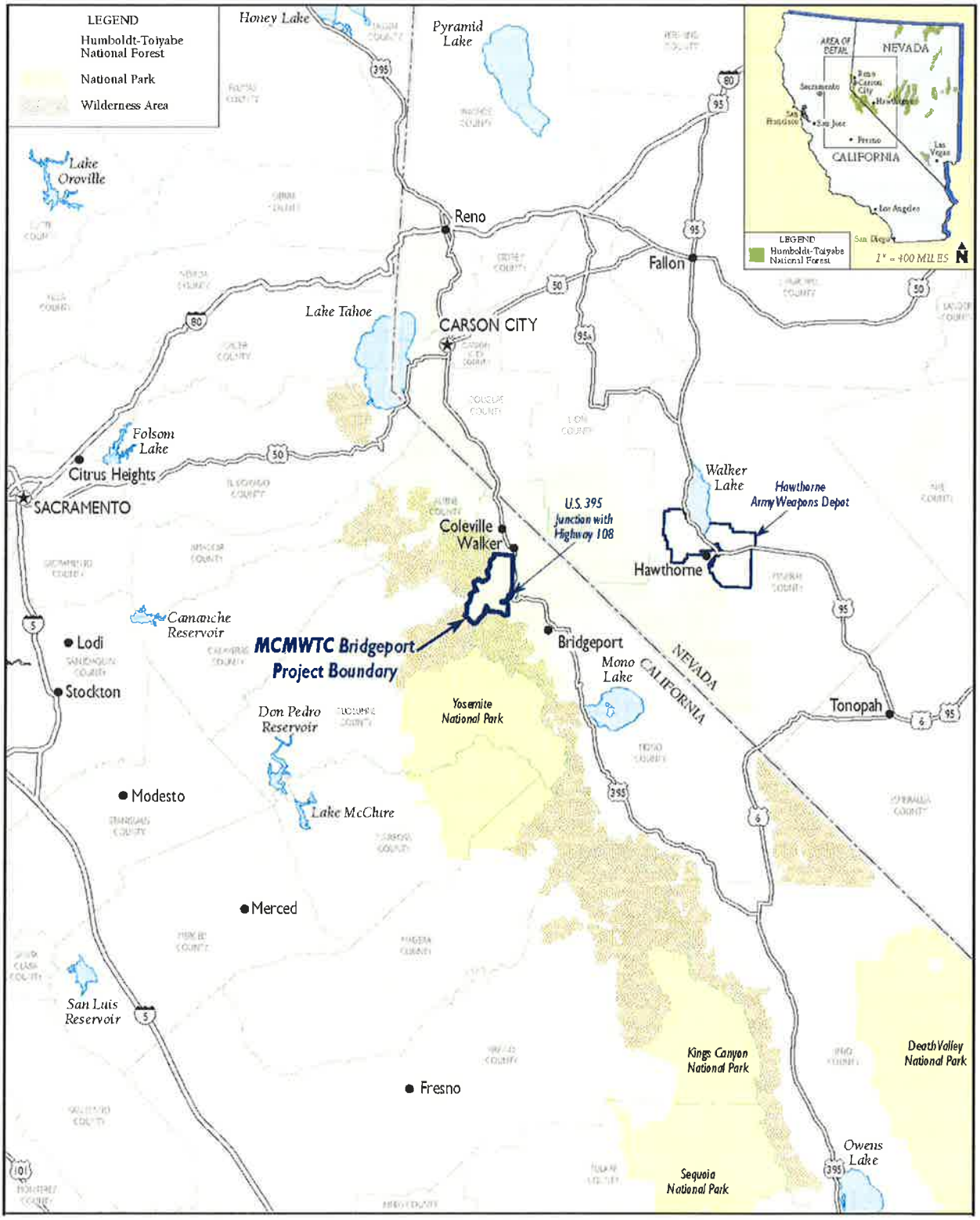


Figure 1. The regional location of the MCMWTC (USFS AND USMC 2017a).

(EAF) at Sweetwater Airstrip in Lyon County, Nevada; and 4 training corridors (Burcham Flat Road, Kirman Lake Road, Lucky Boy Pass Road, and Masonic Road). The TAs accommodate the following four training components: landing zones (LZs) and drop zones (DZs), EAFs, ranges, and training corridors. The USMC conducts a range of small-unit training activities throughout the year at the MCMWTC.

The proposed action is to use current or previously authorized MCMWTC facilities, TAs, EAFs, LZs and DZs, ranges [*i.e.*, live-fire small arms training ranges and Avalanche Initiation Sites (AIS)], training routes, and training corridors, and new or currently unused LZs, landing points, and training corridors. There will be no new construction of facilities or roads, or an increase in the number of military personnel trained annually at the MCMWTC. The proposed action includes 22 training events covering 36 different types of activities (USMC 2018a); these training events and activities can occur throughout the 16 TAs at the MCMWTC though they may be limited by seasonal conditions and design features as specified in permits. The USMC identified a maximum number of each type of training event that occurs annually at the MCMWTC; however, the actual number of training events will vary annually depending on the demand for those training events and weather conditions.

In the past, the USMC conducted military training activities under special-use authorizations in the form of SUPs, memoranda of agreements, or interagency agreements. Currently, the HTNF provides for the use of primary training areas through a 40-year SUP, four annual SUPs, and an AOP. The HTNF issued the 40-year SUP in 2009 and it expires in 2049. The HTNF also issued temporary SUPs to the USMC for various training activities in specific areas. These temporary SUPs include: Permit BRI571 (for winter training in the Leavitt Lake area including portions of Sardine Meadows); Permit BRI572 [for use of some LZs and DZs for Relocatable Housing Units (RHUs) and Combat Operations Centers (COCs)]; Permit BRI573 (for training in the areas surrounding Pickel Meadows); and Permit BRI574 (to conduct convoy training on Masonic Mountain and Lucky Boy Pass Roads). In an effort to consolidate these multiple permits (*i.e.*, 40-year, annual, and temporary SUPs), and to cover new training events, equipment, vehicles, and weaponry, the HTNF proposes amending the existing 40-year SUP with the USMC.

The 40-year SUP covers almost 18,211 hectares (ha) [45,000 acres (ac)] and delineates 3 areas for the USMC to use: the Intensive Use Area [base camp (upper and lower) 140 ha (348 ac) (USMC 2017a, 2018)]; Limited Use Areas [also known as the Training Area (includes all TAs and other areas except base camp and Sweetwater Airstrip)]; 17,774 ha (43,920 ac); and Sweetwater Airstrip Special Use Area [194 ha (480 ac)]. These three areas are collectively referred to as the MCMWTC (USFS 2009). The 40-year SUP includes an AOP that describes the activities allowed in these areas.

*Aerial Operations (LZs, DZs, and EAFs)*

There are 59 LZs and 4 DZs designated on the MCMWTC (USMC 2017a). Designated LZs allow for the take-off and landing of rotary-wing (*i.e.*, helicopters) and tilt-rotor aircraft (*i.e.*, MV-22 Osprey) and the delivery of supplies, equipment, and personnel. Some of the LZs are also used as DZs for dropping individual military personnel by parachute or cargo pallets.

There are no large cargo delivery site drops such as for vehicles. The USMC may also use LZs and DZs to place RHUs and COCs. In many cases, the USMC will incorporate design features (*i.e.*, conditions of the AOP and SUPs) that restrict the use of LZs and DZs to certain types of aircraft, activities, portions of the site, specific times, protective buffers, or allow use only under specified conditions such as minimum snow cover (Figure 2). For instance, the HTNF authorizes specific LZs for use of the MV-22 on a case-by-case, monthly basis and imposes seasonal restrictions to reduce fire hazards.

Two EAFs, also considered LZs and DZs, are used by the USMC. One is located at the MCMWTC base camp and another is at Sweetwater Airstrip in Nevada. The EAFs are used for the take-off and landing of fixed- and rotary-wing aircraft and other activities in support of training. The USMC may conduct other rotary- and tilt-rotor aircraft operations, including aerial navigation, low-level terrain flight, mountain and confined area landings, external lift operations, aerial delivery/insertion of personnel and supplies by parachute, troop pickup by vehicle, movement of personnel over land following delivery/insertion, and simulated close air support. Fixed-wing aircraft operations include simulated close air support and reconnaissance operations, and aerial delivery/insertion of personnel and supplies. The USMC may also use small Unmanned Aerial Vehicles (UAVs) that can be hand-launched (USMC 2017a). Large Unmanned Aircraft Systems (UAS) that need a runway to launch will be restricted to an EAF (USMC 2017a).

*Ranges*

Ranges collectively include live-fire small arms training and AISs. The USMC conducts live-fire small arms training on 13 ranges and initiates avalanches with explosives in 3 AISs on the MCMWTC (Figure 3). The USMC temporarily sets up firing points and targets on ranges; these are later removed along with all casings and debris. All normal vehicular and foot traffic approaches to the ranges and impact areas are posted with guards or observers, and/or warning signs. The USMC uses explosives such as 2,4,6-trinitrotoluene (TNT), dynamite, Composition C4 (C4), time fuse, blasting caps, and detonation cord to initiate avalanches for training purposes. The USMC may also use these tools to mitigate avalanche threat at frequently used training sites.

The USMC restricts all live fire and explosive training to established, authorized ranges and in accordance with all applicable Marine Corps Orders, Training Center Orders, policies and directives. All operations involving avalanche initiation take place in approved AISs and in accordance with the MCMWTC Range Regulations (USFS and USMC 2017b). Additionally, the USMC limits and monitors the use of incendiary devices, ordnance, explosives, live ammunition, pyrotechnics, and campfires when there are fire restrictions (USFS and USMC 2017b). The USMC also stores ammunition, such as small arms ammunition and pyrotechnic or demolition munitions, in staging areas in each training area in compliance with Department of Defense (DOD) regulations. When ammunition storage is no longer required, the USMC removes the ammunition and any trash from the area (USFS and USMC 2017b).

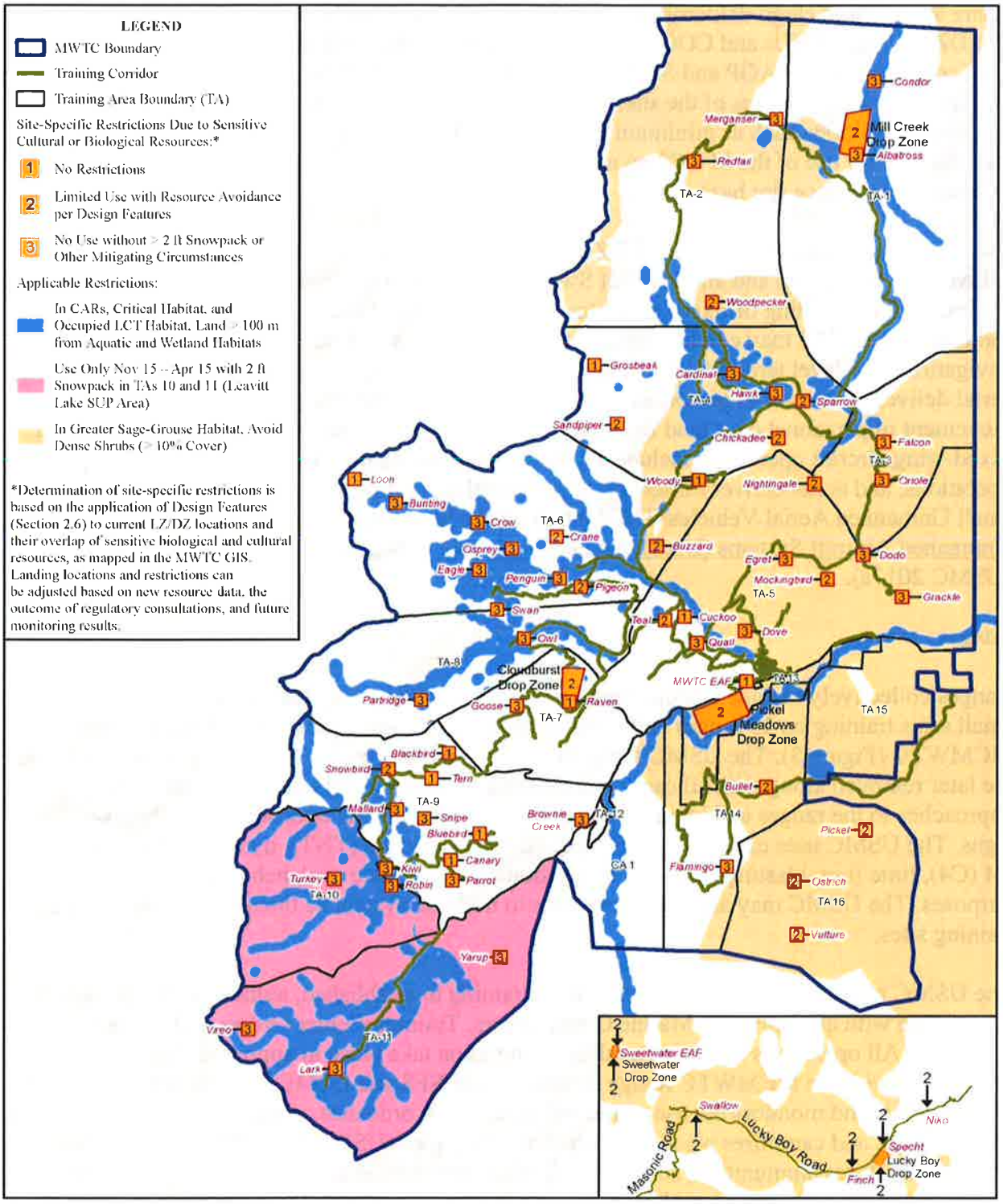


Figure 2. Proposed use of LZs and DZs on the MCMWTC (USFS and USMC 2017a).

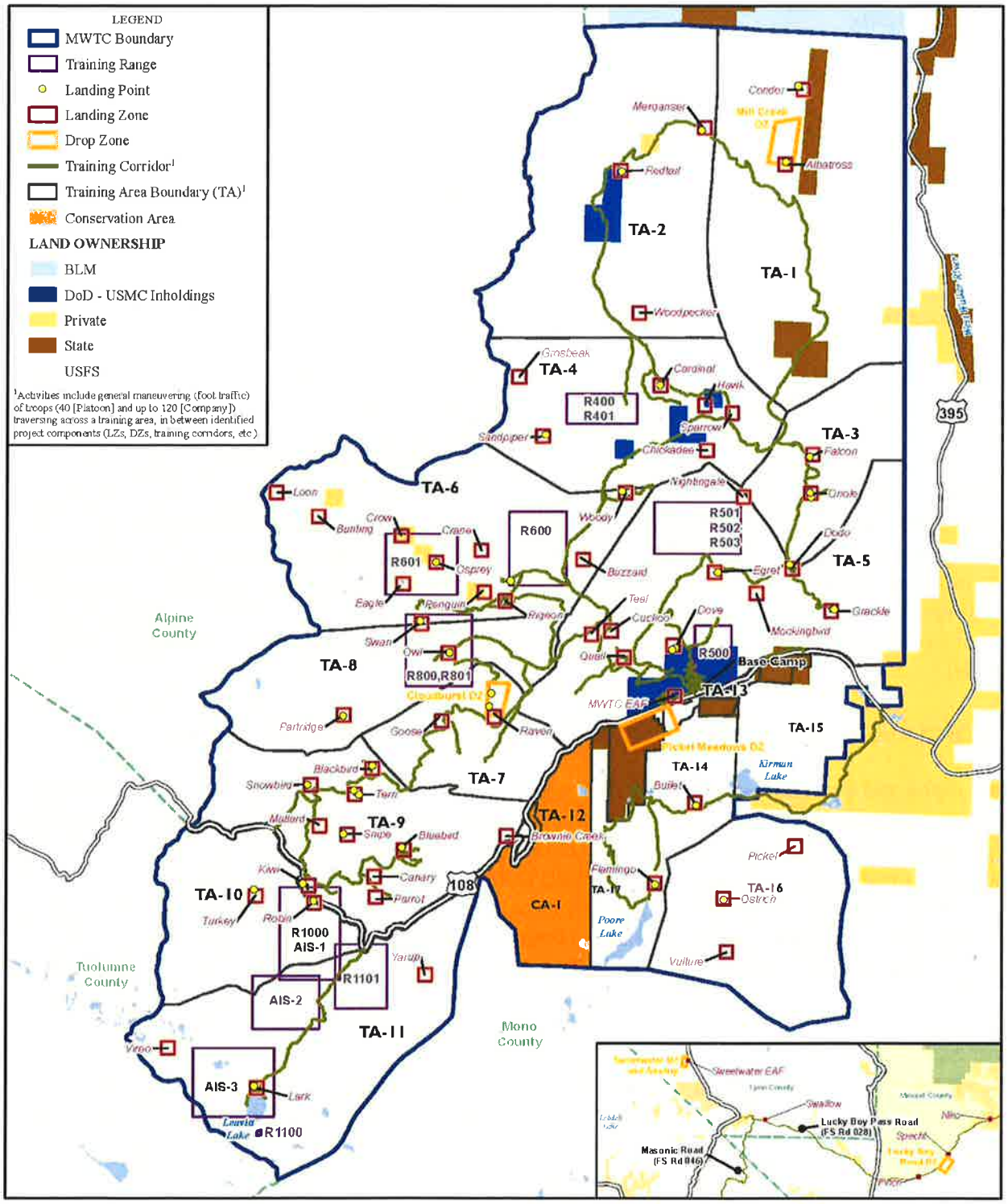


Figure 3. Range components under the proposed action (USFS AND USMC 2017a).

*Training Events*

The MCMWTC provides instruction on 22 training events, which includes 36 different types of activities (USMC 2018a). Of these training events, 19 are existing training events that currently occur on the MCMWTC and 3 are proposed training events. Figure 4 shows the location of the existing training events within each TA. Figure 5 shows the location of two future training events – the Joint Assault Bridge and Medium Girder Bridge exercises. The USMC currently conducts expeditionary vehicle convoy training along existing roads located in the MCMWTC. The training events (current and future) can take place within or adjacent to habitat occupied by LCT, SNYLF, and YT, or in critical habitat for SNYLF and YT but are subject to design features that implement seasonal restrictions and limit the intensity of use.

In conjunction with the training events, the USMC may setup temporary COCs and RHUs. Both COCs and RHUs are subject to restrictions (*e.g.*, timing, placement) as described in the BA (USFS and USMC 2017a). The USMC uses COCs to coordinate tactical actions in the field; they serve as the headquarters or command posts. The largest COC have up to 5 large tents, 10 vehicles, 3 generators, and 100 personnel. Smaller COCs have only a few four-man tents and man-portable radios. Temporary fencing such as barbed wire may surround the COCs. The USMC places large COCs in existing disturbed areas (*e.g.*, recreational campsites, parking areas, LZs or DZs). The RHUs are temporary structures that simulate villages or buildings from other countries. The USFS does not allow the USMC to establish more than 5 RHUs per location or 25 per exercise, and it can only access them by vehicle using existing roads (USFS and USMC 2017b).

Activities Conducted in Conjunction with Operation and Maintenance Activities

Operations and maintenance activities that support the training events described in the Training Events section include: sanitation (including trash removal), placement of temporary structures (*e.g.*, tents), bivouac and troop assembly, vehicle fueling and maintenance, vehicle and equipment operations, overland travel by foot, water procurement and distribution, road maintenance and repair, and grooming with snow grooming vehicles. Many, if not all, of these activities occur in conjunction with training events. The information on the activities described below is from the 2018 AOP (USFS and USMC 2017b).

*Sanitation*

The USMC uses prepackaged food (*i.e.*, Tray Rations and Meals Ready to Eat), Port-a-Johns, banta buckets, or wag bags, and conducts trash sweeps to minimize the generation of trash and human waste.

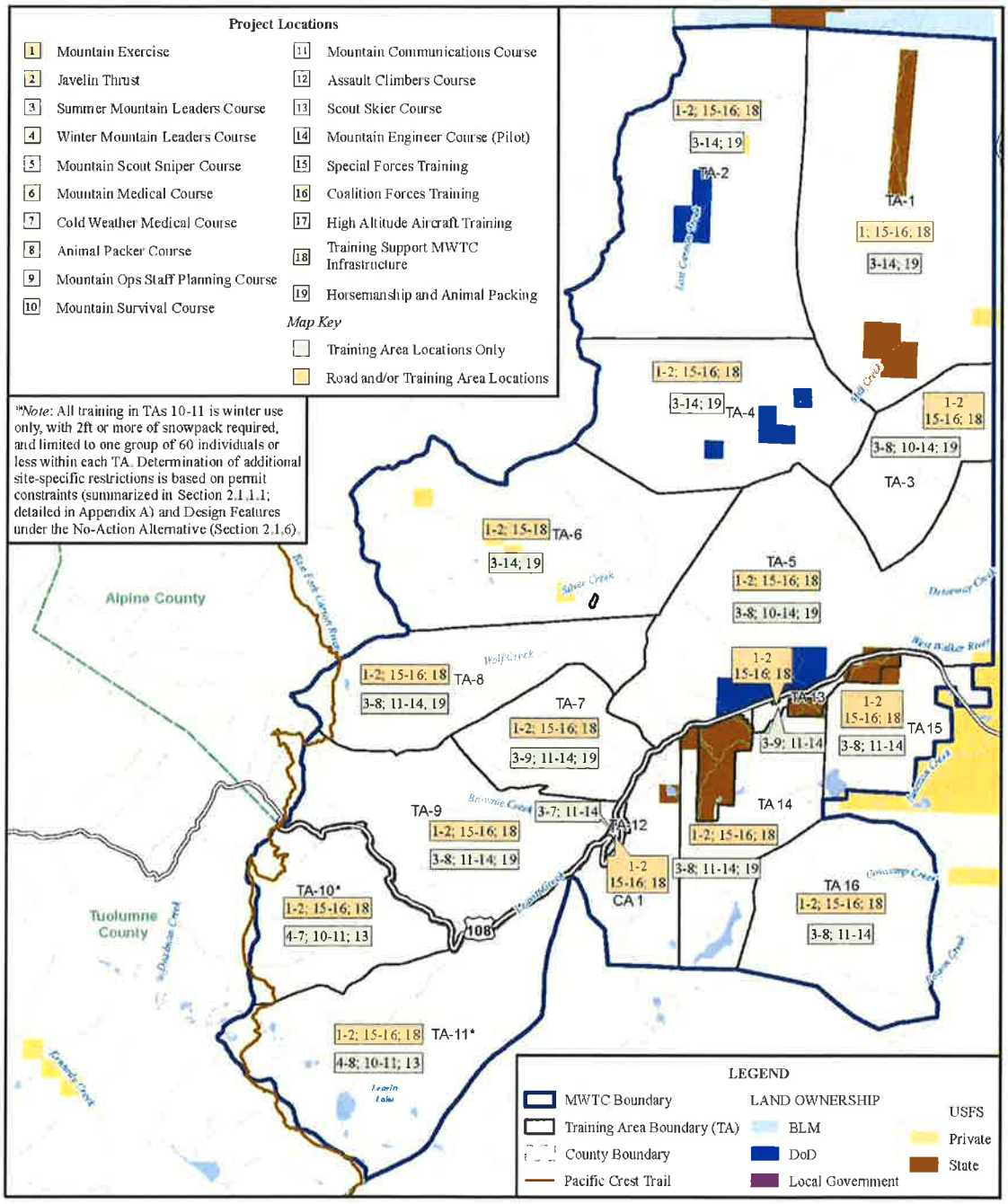


Figure 4. Existing training events within the MCMWTC training areas (USFS AND USMC 2017a).

*Temporary Structures*

The USMC uses tents, trailers, or inflatable structures during training events. There is a limit of 10 large structures per location, and no more than 30 per exercise. Inflatable decoys, balloons, and weather equipment may also be used. Vehicles and trailers are required to stay on existing roads or previously disturbed areas.

*Bivouac and Troop Assembly*

Military personnel may establish a temporary area where they eat, rest overnight, and perform minor equipment and vehicle maintenance. There could be day and night movement of vehicles (wheeled and tracked), supplies, and equipment to and from the sites.

*Vehicle Fueling and Maintenance*

Military personnel may transfer fuel from bulk containers to tactical vehicles or fuel containers, or wheeled and tracked vehicles. Vehicle maintenance is limited to minor repairs that do not involve draining engine or transmission fluid. The USMC will have spill kits available and will locate fuel at least 152 meters (m) (500 feet (ft)) from water sources.

*Vehicle and Equipment Operations*

The USMC uses vehicles, weapons systems, ordnance, engineer systems, aircraft, and equipment to support training activities. The existing and additional equipment and weaponry fall within the following categories: Motor Transport Vehicles, Heavy Equipment, Engineer Equipment, Aircraft, Small Arms, and Explosives (see Table 2-2 in USFS AND USMC 2017a).

*Overland Foot Travel*

Military personnel travel off-road, use unimproved trails, or existing roads to travel through the training area. During the winter, overland travel requires the use of skis, snowshoes, and small sleds dragged by individual military personnel (USMC 2018a). They avoid marshy and/or wet areas year round and, when possible, avoid walking on burned vegetation, and minimize their exposure to water during river or stream crossings.

*Water procurement and distribution*

The purpose of water procurement and distribution is to contain and distribute water to military personnel in the training area. Military personnel use fire hydrants to fill containers of various types (rubber, canvas, metal) and sizes [1,892.5 to 75,700.0 liters (L) (500 to 20,000 gallons) (gal)] with water. The USMC and other military personnel also individually procure water from streams during training and purify it by using filters, iodine tablets, or boiling (USMC 2018b).

The USMC also utilizes a riparian water right in lower base camp. At lower base camp, below Silver Creek Falls, the USMC annually removes approximately 1,892.5 L (500 gal) of water from Silver Creek, runs the water through a purification system, takes a sample, and then returns the water to Silver Creek (USMC 2017a).

*Road Maintenance and Repair*

Road maintenance and repair involves the addition of fill-dirt to the top of the road surface, which is then graded and compacted. Personnel may also use heavy equipment to add or repair trenches on either side of the road for drainage. During winter conditions, military personnel use snow-grooming vehicles on existing roads to maintain access to the training area.

*Battlefield Simulations*

During battlefield simulations, military personnel simulate the use of artillery, use smoke for screening or obscuring maneuver forces, and use flares and blanks (USFS and USMC 2017b, USMC 2018a). The USMC conducts all simulations in accordance with MCMWTC Range Regulations, limits pyrotechnics depending on fire restrictions, and collects casing and debris upon completion of the exercise (USFS and USMC 2017b).

Training Events

The following paragraphs describe each training event. The number of each training event corresponds to its location in each TA (Figure 4). The USMC currently implements training events 1 through 19 on the MCMWTC. Training events 20 through 22 are new training events that the USMC will implement in 2018.

*1. Mountain Exercise*

The Mountain Exercise is the main training exercise conducted at the MCMWTC. The event takes place at and between the MCMWTC in California and the Hawthorne Army Depot and Naval Air Station in Fallon, Nevada. The Mountain Exercise occurs over 24 to 31 days, 6 times per year (4 times during the summer, 2 times during the winter) (USFS and USMC 2017b), and involves approximately 600 to 1,200 participants per event. This exercise occurs in all 16 TAs (except TAs 10 and 11) and along Lucky Boy Pass Road, Masonic Road, and Kirman Lake Road. There are 3 progressive training phases during which the training unit participates in several classes, practices individual and small unit skills, and executes a battalion-level (500 to 1,000 military personnel) exercise as the culminating event.

During Phase I, military personnel receive training over 1 to 3 days in company-size groups (150 to 200 military personnel) on topics such as proper use and care for personal clothing and equipment, military mountaineering equipment, mountain health considerations, considerations for casualty evacuation, and mountain weather. The USMC typically teaches these classes at existing LZs.

During Phase II, military personnel receive training in the same company-size groups as Phase I, but remain in the field overnight and rotate between training stations over 10 to 12 days. During the summer, there are multiple stations spread out across the MCMWTC such as rock-climbing, fixed-rope installation, rappelling, land navigation and route selection, water obstacle crossing, casualty evacuation, and survival techniques. Military personnel conduct non-tactical movements between stations along roads or established trails. They conduct tactical movements between stations off-road and off-trail. During these movements, the training company maintains tactical formations, dispersion between troops, and all-around security. In the winter, the location of stations is dependent on snow conditions. The stations include over-the-snow movement with skis and snowshoes, land navigation and route selection, casualty evacuation, and survival techniques. Rotation between stations is similar to that for the summer exercise.

Phase III, or the Final Exercise, consists of force-on-force operations over 7 to 8 days. The training unit conducts a variety of offensive and defensive actions against a live opposition force and is required to use all of the skills obtained during Phase I and II training. It is during the Final Exercise that all USMC assets (ground, logistics, aviation) are brought together in order to create a realistic scenario for the training unit.

Part of the USMC training during the Mountain Exercise includes river and stream crossings, which occur as military personnel move across the landscape. These crossings typically involve rock hopping, walking, or swimming across. The USMC conducts river crossings on the West Walker River adjacent to the Leavitt Training Area in TA-12 and at the Sonora Bridge river crossing site. During a river crossing, up to 200 military personnel may participate with smaller groups of 4 to 12 individuals crossing at a time. At the Sonora Bridge river crossing site, military personnel practice crossing the river during the day and night. These events occur four times annually (*i.e.*, once during each summer Mountain Exercise) and each group crosses four to six times on the West Walker and three to four times at the Sonora Bridge crossing sites (USMC 2017b).

The USMC also use the two locations described above for rope suspension bridge training. A rope bridge consists of a rope strung between two anchor points on either side of the river. The intent is to have a taut rope such that personnel and gear could move across the river with minimal sag in the rope (USMC 2017b).

*2. Large Scale Exercise (Javelin Thrust)*

The Large Scale Exercise, also known as Javelin Thrust, occurs once per year over 14 training days. This modified Mountain Exercise training event involves up to 1,200 military personnel on the ground and up to 5,000 overall (*e.g.*, air support, personnel at Hawthorne Army Depot and Naval Air Station) (USMC 2017a). It occurs in TAs 1 to 9 and 12 to 16 and along Lucky Boy Pass Road, Masonic Road, and Kirman Lake Road (USMC 2018a). This exercise allows training units to operate over a realistically scaled area of operations and to conduct operations in multiple types of terrain.

*3. Summer Mountain Leaders Course*

The Summer Mountain Leaders Course occurs twice per year with 40 days per event (USMC 2017a). The class sizes range from 22 to 45 students and the course occurs in TAs 1 to 9 and 12 to 16. It is a foot mobile course designed to train military personnel to become experts in mountain and alpine operations. Training activities such as climbing, navigating within the mountains in a survival situation, mock casualty evacuation, and managing a water obstacle-crossing site. Each course entails a large amount of hiking but minor vehicle use is also involved; vehicles are required for logistical resupply, mock casualty evacuation, and movement of students. All vehicles remain on the road.

*4. Winter Mountain Leaders Course*

The Winter Mountain Leaders Course occurs 3 times per year with 40 days per event (USMC 2018a). The class sizes range from 22 to 45 students and the course occurs in all 16 TAs. It is a foot mobile course designed to train military personnel to become subject matter experts in cold weather operations. Training activities include managing a cold-water immersion (USMC 2018b), negotiating alpine ice and snow terrain, applying snow-covered concealment techniques, and bivouac in a snow-covered environment.

*5. Mountain Scout Sniper Course*

The Mountain Scout Sniper Course occurs 6 times per year with 24 days per event (USMC 2018a). The class sizes range from 8 to 24 students and the course can occur in all 16 TAs depending on the snowpack. It is a foot mobile course designed to train scout snipers to be tactically and technically proficient in a mountainous environment. Training activities include firearm use under different conditions (*e.g.*, live fire of weapons systems, care and maintenance under different conditions, and the effects of extreme angles on the trajectory of the round); stalking and concealment techniques in a mountainous environment using camouflage techniques and methods of moving undetected to advantageous positions; man tracking; counter-tracking; over-snow mobility including traversing snowy terrain using skis, snowmobiles, and light-tracked vehicles; mountain communications using different radio equipment; and mountain survival tactics including expedient survival shelters, classes on procuring game and water, and survival navigation (USMC 2017a).

*6. Mountain Medical Course*

The Mountain Medical Course occurs 4 times per year with 24 days per event (USMC 2018a). The class sizes range from 10 to 40 students and the course occurs in all 16 TAs depending on snowpack (USMC 2017a). It is a foot mobile course designed to give students the knowledge to move a casualty in a summer mountainous environment without vehicle or air support; to become a proficient medical provider in a cold weather, high altitude environment; and to plan and conduct medical operations in a high altitude, summer mountain environment. Training activities include performing cold weather preventative medicine, managing a hypothermia casualty, and applying the principles of nutrition in a mountainous environment.

*7. Cold Weather Medical Course*

The Cold Weather Medical Course occurs 3 times per year with 21 days per event (USMC 2018a). The class sizes range from 10 to 50 students and the course occurs in all 16 TAs. It is a foot mobile course designed to train students on how to support their units in a cold weather, mountainous environment. Training activities include managing common cold weather injuries (*e.g.*, hypothermia), managing high altitude health problems, and managing a submersion (*e.g.*, snow or water) incident casualty. Ice breaking, which involves the use of mechanical and/or manual devices such as chainsaws or drills to create an opening in a frozen waterway, is typically done in conjunction with cold-water immersion to train military personnel on proper procedures for dealing with a fall through the ice (USFS and USMC 2017b).

*8. Animal Packer Course*

The Animal Packer Course occurs 4 times per year with 16 days per event (USMC 2018a). The class sizes range from 12 to 48 students. The course occurs in TAs 1 to 9 and 12 to 16, typically from April to November depending on snow depth. It is a foot mobile course designed to train military personnel to become more effective in a mountainous environment utilizing pack animals (*e.g.*, mules) for transporting crew-served weapons, ammunition, supplies, and wounded personnel to and from areas inaccessible to motorized or mechanized air and mobile transportation. Training activities include performing the duties of the packmaster and handler, performing first aid on an injured animal, and negotiating obstacles with pack animals. During this course, personnel utilize trails and move cross-country (USMC 2017a). The USMC is allowed to graze animals in meadows but they remain attached to a highline (a rope suspended between two trees) (USMC 2017a); they are also fed weed-free hay (USFS and USMC 2017b).

*9. Mountain Operations Staff Planning Course*

The Mountain Operations Staff Planning Course occurs concurrently with every Mountain Exercise for 8 days (USMC 2017a). The class sizes range from 15 to 40 students and the course occurs in all 16 TAs depending on snowpack (USMC 2017a). It is a foot mobile course designed to train military personnel involved in staff planning to become proficient in planning mountain warfare operations. Classroom training activities include applying intelligence planning, mountain command and control, and maneuver planning considerations for mountain warfare operations. Students in this course participate in hikes throughout the training area to gain a position to view the terrain and discuss the effect of the environment on military operations and equipment (USMC 2017a).

*10. Mountain Survival Course*

The Mountain Survival Course occurs once per year over 20 days. Class sizes range from 12 to 44 students and the course occurs in TAs 1 to 9 and 10 to 11 (USMC 2017a). Within TAs 10 and 11, the course is authorized for winter use only when there is 0.6 m (2 ft) or more of snowpack. It is a foot mobile course designed to teach military personnel survival techniques for a mountainous environment. Training activities include building survival fires and shelters, use of

signaling devices, food and water procurement, primitive tool and weapons construction, navigation and other survival techniques (*e.g.*, managing a cold-water immersion) (USMC 2018b).

Military personnel receive training on constructing survival fires using various techniques (*e.g.*, bow and drill, magnesium fire starter, and gunpowder). Training on survival fires may be limited during fire restriction season. Additionally, the fires are always attended, completely drowned after training, and appropriate fire-fighting equipment is on-site (USFS and USMC 2017b).

Military personnel receive training on the construction of survival shelters, which require the establishment of temporary bivouac sites. The shelters are constructed of available materials such as ponchos, poncho liners, space blankets, cord, and dead or downed vegetation. Following each training session, military personnel dismantle the shelters and return the site to its original state (USFS and USMC 2017b).

Military personnel also receive training on survival signaling. Survival signaling requires the use of a signal mirror, deadfall (*i.e.*, fallen trees or brush) or rocks, visible or infrared strobes or lights, or use of a signaling fire. The deadfall is returned to its original location after completion of the training. The use of a signaling fire follows the procedures described above for constructing survival fires as well as HTNF fire restrictions (USFS and USMC 2017b).

Survival food and water procurement involves the temporary establishment of expedient traps and/or snares, and fishing with a limited amount of line, hooks, and equipment. The California Department of Fish and Wildlife (CDFW) issues an annual permit to the USMC for hunting and fishing (USFS and USMC 2017b) and instructs military personnel on what individual species look like and what can be captured under the permit (USMC 2018a). The USMC and other military personnel also individually procure water from streams during training and purify it by using filters, iodine tablets, or boiling (USMC 2018a).

### *11. Mountain Command, Control, and Communications Course*

The Mountain Command, Control, and Communications Course occurs 6 times per year with 16 days per event (USMC 2018a). Class sizes range from 28 to 50 students and the course occurs in all 16 TAs depending on snowpack (USMC 2017a). It is a foot mobile course designed to train communicators in the employment of communications assets in a mountainous environment under all weather conditions.

During this event, military personnel establish sites for communications equipment, radio antennas, generators, camouflage nets, and communications vehicles (USMC 2108a). When using generators and fuel containers, military personnel place them in secondary containment to prevent petroleum products from seeping into the environment (USMC 2018a). Training activities include instruction in wave theory and propagation, field expedient antennas, and retransmission operations, and the advantages and disadvantages of various radio equipment.

*12. Assault Climbers Course*

The Assault Climbers Course occurs 4 times per year with 30 days per event (USMC 2018a). The class sizes range from 16 to 45 students and the course occurs in TAs 1 to 9 and 12 to 16. It is a foot mobile course designed to train ground combat arms in mountain warfare TTPs. Training activities include climbing and belaying, conducting a lead climb on steep terrain, and managing a water obstacle-crossing site.

*13. Scout Skier Course*

The Scout Skier Course occurs twice per year with 23 days per event (USMC 2018a). Class sizes range from 16 to 45 students and the course occurs in all 16 TAs. It is a foot mobile course designed to train personnel in winter mountain picketing and skiborne patrolling. Training activities include managing an avalanche search, applying snow-covered concealment techniques, and skijoring (*i.e.*, a person on skis pulled by dogs, snowmobile, or other animal or vehicle).

*14. Mountain Engineer Course*

There are two Mountain Engineer Courses – Winter and Summer. The Winter Mountain Engineer Course will be piloted in winter 2018. It will be conducted once per year over 25 days and occur in all 16 TAs. The purpose of the Winter Mountain Engineer Course is to train combat engineers and infantry assault men in engineering TTPs applicable to snow-covered, high altitude, and mountainous terrain (USMC 2018a). Training activities will include initiating an avalanche, negotiating a snow or ice-covered water obstacle, ice breaching and breaking, conducting ice reconnaissance, and creating improvised obstacles (*e.g.*, abatis or snow obstacles) (USMC 2018a).

Avalanche training is discussed in the Ranges section and ice breaking is described under the Cold Weather Medical Course section. Ice breaching uses explosives to create a hole in a frozen waterway. All operations involving the use of explosives are conducted in accordance with the MCMWTC Range Regulations (USFS and USMC 2017b).

The Summer Mountain Engineer Course will follow the Winter Mountain Engineer Course in summer 2018. It occurs twice per year with 25 days per event. The course occurs in TAs 1 to 9 and 12 to 16. The class sizes range from 20 to 35 students. The purpose of the Summer Mountain Engineer Course is to train engineers in a mountainous environment that allows them to meet training requirements (USMC 2018b). Training activities include surveying mountainous terrain, designing drainage structures, and preparing survivability plans.

Other training activities that will occur as a part of this course include demolitions operations and abatis training (USMC 2017a). Demolitions training involves the use of military explosives (*e.g.*, TNT, dynamite, C4, time fuse, detonation cord) during avalanche initiation, ice breaching, boulder reduction, and abatis training. All demolitions operations are conducted in accordance with the MCMWTC Range Regulations and appropriate USMC orders, directives, and standard

operating procedures. Abatis training involves training military personnel on how to fall trees (using chainsaws, land clearing tools, and explosives such as TNT, C4, and time fuse) and create obstacles. Any obstacles are disassembled within 5 days of the end of the exercise. Tree stumps are cut so that they are no higher than 15 centimeters (cm) (6 inches (in)) in height. Downed trees are limbed, branches placed in slash piles, and the tree cut into 1.8 meters (m) to 2.4 m (6 to 8 ft) sections (USFS and USMC 2017a).

*15. Special Forces Training*

Special Forces Training course occurs along Lucky Boy Pass Road, Masonic Road, and Kirman Lake Road and in all 16 TAs, depending on snowpack, as a part of each Mountain Exercise (USMC 2017a). It is a fully integrated exercise that allows general purpose force units, Special Operations Forces units, and aviation units the opportunity to conduct a full spectrum of operations in mountainous, high altitude and cold weather conditions. Training activities include conducting surveillance and reconnaissance, raids, foreign internal defense (*i.e.*, providing combat skills training to portions of the exercise force), and other operations in conjunction with the USMC infantry battalion against a USMC infantry company as a part of an exercise in a free play, intelligence driven scenario.

*16. Coalition Forces Training*

The USMC does not currently conduct Coalition Forces Training at the MCMWTC. In the past, the USMC conducted this event along Lucky Boy Pass Road, Masonic Road, and Kirman Lake Road and in all 16 TAs. It held this event 1 to 3 times per year with 10 days per event (USMC 2017a) with up to 120 military personnel participating at a time. Coalition Forces Training is a scenario-based exercise focused on infantry TTPs in steep, mountainous terrain in all-weather conditions and at medium to high altitude. Training activities include command and control, conducting operations in mountainous terrain, and advising foreign security forces. The USMC will conduct any future Coalition Forces Training, in accordance with all design features and restrictions found in the active SUPs and AOP.

*17. High Altitude Aircraft Training*

During High Altitude Aircraft Training, aircrews are trained on aircraft performance, limitations, operations, and support to ground personnel in high altitude, cold, steep terrain. Training activities include simulated close air support, intelligence, surveillance and reconnaissance, assault support, and aerial delivery. Simulated close air support involves practicing aerial maneuvers that will be used to deliver aerial fires (*e.g.*, bombs and guns); there is no actual shooting or dropping of explosives. Intelligence, surveillance, and reconnaissance involve the use of aircraft sensors to inform the ground units of what they observe. Assault support involves delivering military personnel or supplies by aircraft and aerial delivery uses aircraft to drop supplies (USMC 2017a). High Altitude Aircraft Training includes a convoy escort above 914 m (3,000 ft) above ground level (AGL) in wilderness areas (USMC 2018a). The training aircraft land on LZs but not on roads; the roads are used for visual sighting purposes only. High Altitude Aircraft Training occurs in all 16 TAs (USMC 2018b) and the Sweetwater Airstrip.

*18. Training Support – MCMWTC Infrastructure*

Training support for the MCMWTC infrastructure occurs in all 16 TAs and along Lucky Boy Pass Road, Masonic Road, and Kirman Lake Road. This occurs primarily through vehicular logistical support. This vehicular support can include the use of tractor-trailers, heavy equipment, dump trucks, and over-the-snow support vehicles. Activities include the transport of food, materials, and personnel throughout the training area. The MCMWTC personnel also support the HTNF with the maintenance of many of the roads within the TAs per current USFS standard operating procedures, protocols, and appropriate SUPs. The HTNF provides road maintenance training to MCMWTC personnel on a periodic basis to ensure the implementation of its Best Management Practices. Road crews consisting of the MCMWTC personnel also help place signs and snow stakes to ensure proper navigation of roadways during both the summer and winter months. Other support services include the transport, set-up, and take down of RHUs and walls; the transport, set-up, cleaning, and take down of temporary restroom facilities; various surveys; inspections; vegetation remediation; wildlife observations; range clean-ups; fire response; and regulation enforcement. On a case-by-case basis, and in rare circumstances, MCMWTC personnel may provide some refueling, incident response, and towing services.

*19. Horsemanship and Animal Packing*

The Horsemanship and Animal Packing Course occurs 4 times per year with 16 days per event. Following the completion of this course, military personnel participate in an additional 7 days in the Mountain Exercise training event (USMC 2017a). The class sizes range from 8 to 14 students and includes 2 instructors. This course occurs in TAs 1 to 9 and 12 to 16. This course is designed to teach military personnel how to utilize horses and mules in a mountainous environment. Training activities include learning basic movement on horseback, how to negotiate obstacles with animals, plan routes, and bivouac with livestock in a field environment.

*20. Joint Assault Bridge Exercise*

The Joint Assault Bridge (JAB) is a folded metal bridge mounted on a tank chassis and deployed over wet and dry crossings. One JAB training exercise, which includes one full setup and disassembly, will last a single day and involve approximately 40 military personnel. The JAB will be setup at specific areas located on the West Walker River, Silver Creek, Mill Creek, Wolf Creek, and Lost Cannon Creek (Figure 5).

*21. Medium Girder Bridge Exercise*

The Medium Girder Bridge (MGB) is a temporary, hand-built bridge used twice a year by approximately 80 military personnel. The MGB will be set up at specific areas on the West Walker River, Silver Creek, Mill Creek, Wolf Creek, and Lost Cannon Creek (Figure 5). The bridge is transported using heavy equipment and would involve a small number of military personnel moving through the water along the outer perimeter of the bridge to set it up and disassemble it (MCMWTC 2016a as cited in USFS and USMC 2017a).

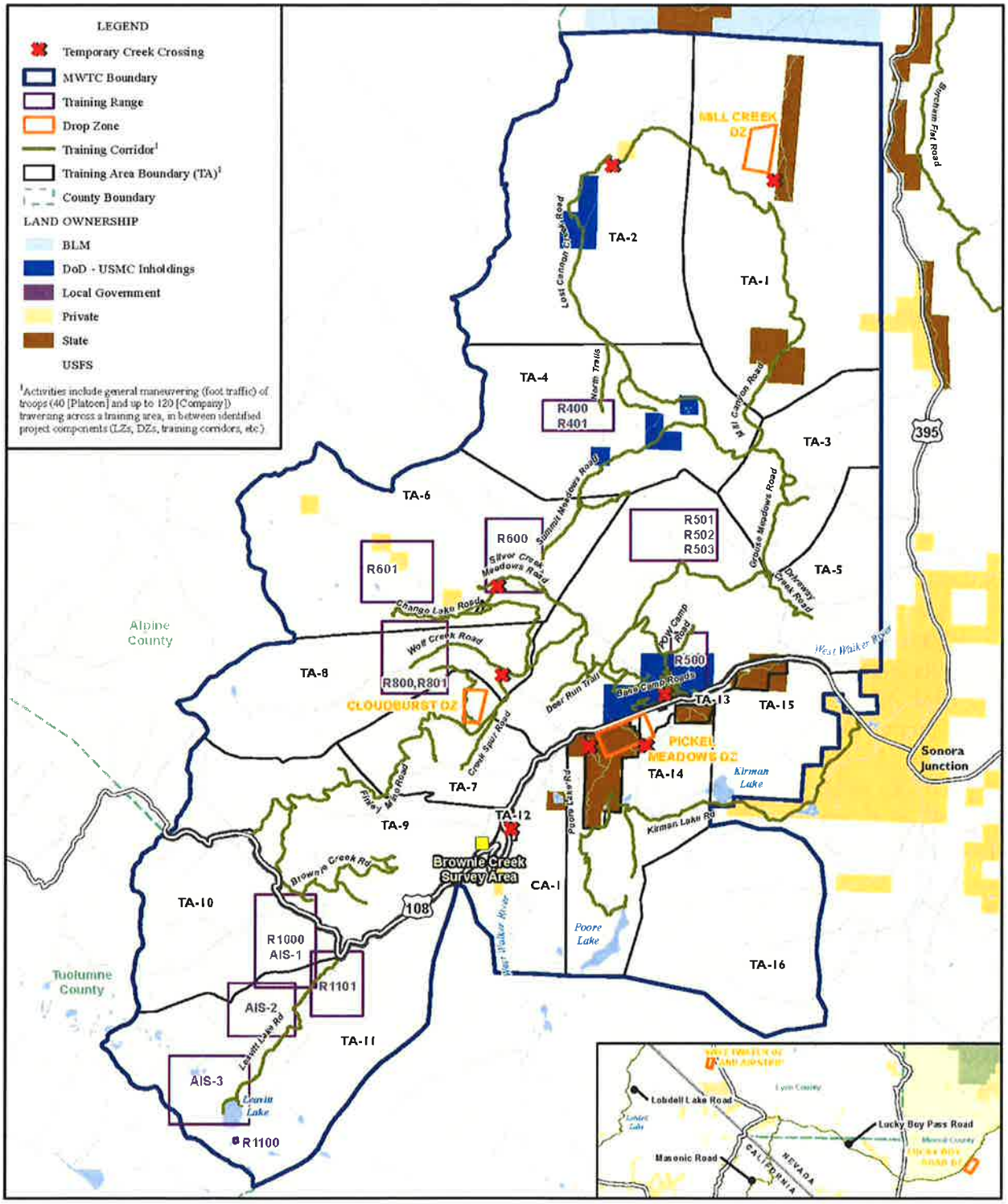


Figure 5. Location of temporary river and stream crossings using the JAB and MGB (USFS AND USMC 2017a).

*22. Expeditionary Vehicle Convoy Training*

The USMC currently conducts expeditionary vehicle convoy training but, in the future, it will use new equipment. This type of training involves the use of wheeled all-terrain and ambush-protected vehicles to expose drivers to various types of driving terrain, vehicle handling, and performance characteristics. The USMC trains drivers, assistant drivers, fire teams, squads, and companies on how to respond to various types of combat environments that could occur during convoy operations including simulated explosions of an Improvised Explosive Device (IED) or an ambush.

The IED simulations involve a simulated explosion (using talcum powder or cornstarch) triggered by the vehicle rolling over a device in the road or by passing a device alongside the road. For some simulations, military personnel dig a small hole [approximately 15 to 30 cm (6 to 12 in) deep and 15 to 61 cm (12 to 24 in) wide] in previously disturbed ground to simulate an IED. They clean or remove these substances (*i.e.*, talcum powder or cornstarch) and/or devices from the area immediately following the training activity. A simulated ambush involves military personnel, located on foot adjacent to the road, shooting blanks (no projectiles, sound only) to simulate combat conditions.

Convoy training also includes Counter IED (CIED) operations, logistic base set-up, aerial operations, and mine-rolling activities. Logistic base set-up currently occurs on private property (*i.e.*, Hilton Ranch) by permit. This consists of group and individual tents with usually 5 to 10 large tents and between 40 and 50 small tents. Vehicles are parked in designated areas near these tents. High Altitude Aircraft Training (*i.e.*, training event #17) will occur in conjunction with expeditionary vehicle convoy training. Military personnel conduct aerial operations, usually with helicopters, along the routes of convoys and may insert personnel or cargo at designated and approved LZs or DZs. Mine-rolling training also occurs along the road, which involves attaching mine-rolling devices to military vehicles driving ahead of convoys to set off potential simulated explosives in the road.

The USMC is not permitted to drive vehicles off existing roads during these training activities (USMC 2018a). The talcum powder and/or cornstarch used as simulation substances in IEDs are relatively non-toxic, and the manner of use in which these substances are dispersed into the air and then fall to the ground poses little risk to people or wildlife. For those roads that pass through lands other than HTNF and DOD lands (*e.g.*, Bureau of Land Management land or private land), vehicles and foot traffic are only allowed to leave the disturbed road surface as set by agreement with the land owner/manager.

<u>Training Corridors</u>

The USMC currently conducts training along three existing training corridors (Kirman Lake Road, Lucky Boy Pass Road, and Masonic Road). Under the proposed action, the USMC will expand its activities to Burcham Flat Road (a corridor that was authorized for use in the past) and Lobdell Lake Road (a new training corridor) (Figure 6). The USMC uses training corridors for specific training activities and operations such as basic vehicle transit of equipment, supplies,

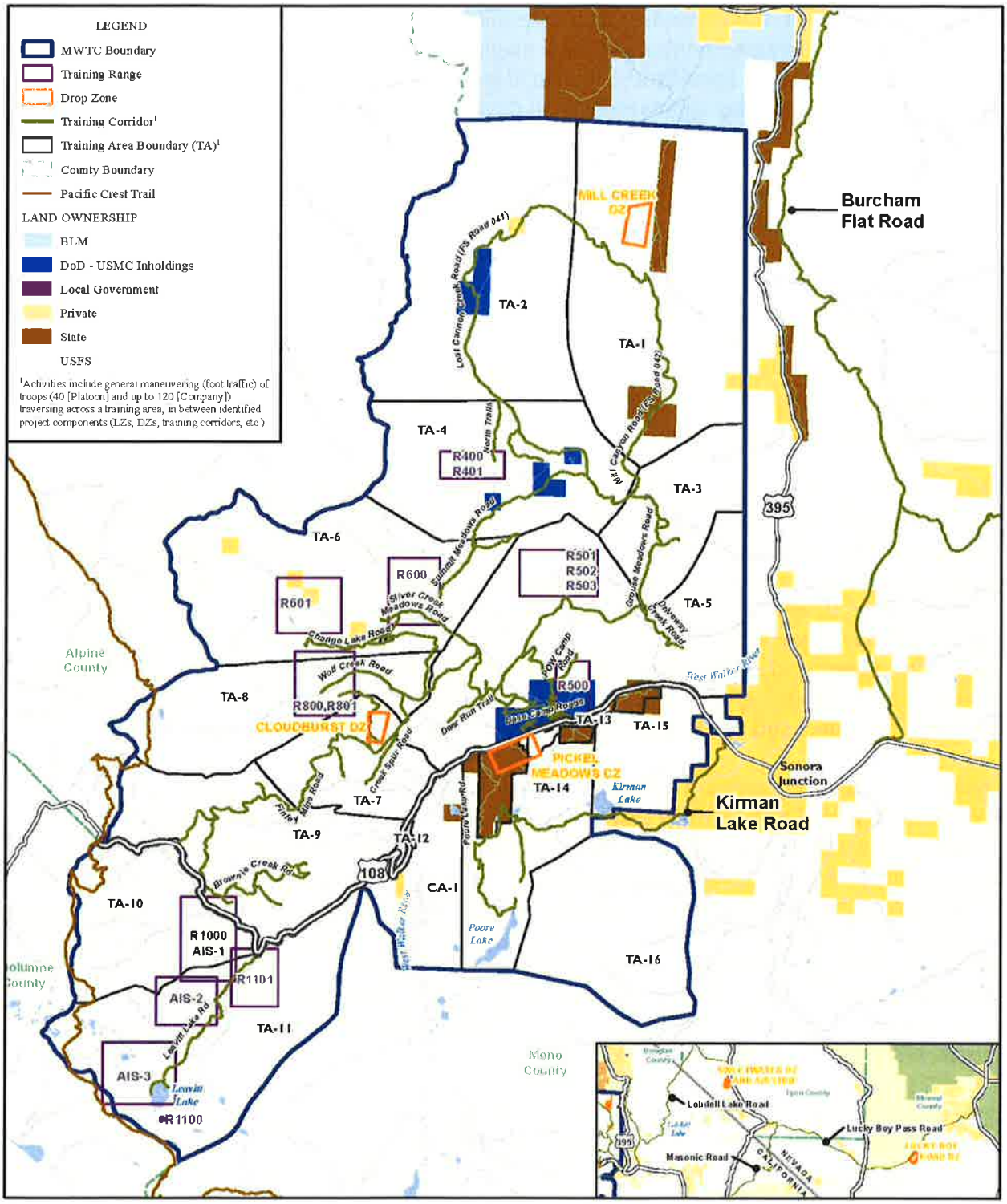


Figure 6. Proposed training corridors at the MCMWTC (USFS AND USMC 2017a).

and military personnel. It will conduct convoy training (as described in the Expeditionary Vehicle Convoy Training section) in the same manner and frequency as previously authorized by temporary/annual permits. Specifically, this includes up to 12 training events annually during the summer months, each lasting approximately 14 days, and involving approximately 200 military personnel. The USMC will not allow vehicles to travel off-road.

Kirman Lake Road originates at California State Route 108 outside of the MCMWTC and near the eastern boundaries of TAs 14 to 16 (Figure 6). The USMC currently uses Kirman Lake Road for small unit movements and safety vehicle convoys of four vehicles or less to support small unit logistics and camp activities at one LZ (*i.e.*, LZ Bullet). Training activities with the new vehicles and equipment will occur only at specified segments of Kirman Lake Road to avoid or reduce impacts to environmental resources. The segment that the USMC uses consists of the entrance at the Bently property, crosses through the Bently property, and extends on the unimproved road to the end of the road at Mud Lake. High Altitude Aircraft Training will occur in conjunction with use of this road.

Foot traffic consisting of up to 200 individuals associated with small unit movements will traverse Kirman Lake Road to access TAs 12 to 16. Private lands on or adjacent to Kirman Lake Road will also be used to access approved training areas as authorized under separate agreement between the landowner and the MCMWTC to provide logistical support and for additional operational base camps. Under the existing entry permit between the owners of the Bently property and the Department of the Navy, the USMC can enter upon, over, and through the property for ingress and egress. Access is allowed for conditioning hikes of 250 to 500 military personnel and 2 vehicles up to 9 times per year, and for ice breaking drills with approximately 40 military personnel and 5 over-snow vehicles up to 3 times per year.

Masonic Road [Forest Service Road (FSR) 046] is an improved dirt road approximately 24 kilometers (km) (15 miles (mi)) east of the MCMWTC. The USMC will use Masonic Road for convoy driver training; it will not travel off-road with vehicles. Convoy operations could consist of up to 20 military vehicles on existing roads. Training activities associated with convoy operations are typically conducted in conjunction with battlefield simulations. This could include the use of simulated explosive devices to initiate reaction drills including dismounting (personnel leave a vehicle to conduct other activities such as setting up a safety perimeter but remain within vicinity of the road (USMC 2018a)); searching the area for enemy personnel and additional explosive devices; blank fire; temporary halting; casualty treatment and evacuation; and aircraft support (USMC 2017a, USFS and USMC 2017b).

Lucky Boy Pass Road (FSR 028/199) is an improved dirt road approximately 32 km (20 mi) east of the MCMWTC. The USMC will use Lucky Boy Pass Road for convoy and simulated IED training, which entails tactical convoy operations for hostile roads, crossings, and terrain as expected in foreign countries. It will also use Lucky Boy Pass Road for convoy training and related logistics and movement in realistic terrain. The USMC will use aircraft in conjunction with use of this road. Private lands on or adjacent to Lucky Boy Pass Road will also be used to access approved training areas, to provide logistical support, and for additional operational base camps.

Burcham Flat Road (FSR 031) is located outside the eastern boundary of the MCMWTC. As needed, the USMC will use this road to test and evaluate tactical vehicles before acquisition. In the past, the HTNF authorized the use of Burcham Flat Road on a case-by-case basis for experimental vehicle testing and simulated ambush operations, which also included foot traffic alongside the road. The USMC will use Burcham Flat Road for convoy operations with optional air escort, IED simulation and CIED operations, ambush operations, logistic base setup at designated locations, aerial operations, and mine-rolling activities.

Lobdell Lake Road (FSR 32067/Trail 22482) connects to Burcham Flat Road on its southern terminus, and to several roads and trails at its northern terminus that are less developed and appropriate for high clearance vehicles only. The USMC proposes to use Lobdell Lake Road primarily for convoy driver training and limited IED and ambush training. The convoy training will turn around at the northern terminus of the road, where it connects to Jackass Flat Road, to return via the same way (MCMWTC 2016b as cited in USFS and USMC 2017a). The USMC will turn vehicles around on disturbed land only. Lobdell Lake Road will be used during the Mountain Exercise training event, 6 times per year (4 in the summer and 2 in the winter) for up to 5 days per exercise (MCMWTC 2016b as cited in USFS and USMC 2017a).

**Avoidance and Minimization Measures**

The USMC and HTNF developed the following design features to avoid or minimize potential effects associated with the proposed action. The HTNF incorporated these measures into the AOP, 40-year SUP, and four existing temporary SUPs and the USMC will continue to apply them to the proposed action. In addition, the USMC will implement the following design features described below to avoid or minimize potential adverse effects to LCT, SNYLF, YT, and critical habitat for SNYLF and YT. In some cases, the Service has modified the wording slightly where needed to improve clarity. The Service also did not include measures that were not relevant to the analysis in this BO.

Fishing Restrictions

1. Mill Creek and Silver Creek are closed to all fishing.
2. Wolf Creek Lake is closed to all fishing. Wolf Creek is only open to catch and release fishing with artificial flies and barbless hooks from August 1 to November 15.
3. All anglers, including military personnel, within the MCMWTC must have a valid state of California fishing license and be compliant with CDFW regulations when fishing open waters.
4. All current fishing regulations will be followed, including potential future changes to fishing regulations.
5. At no time should any life stage of any amphibian species be consumed during survival exercises due to the potential presence of federally-listed amphibians.

Lahontan Cutthroat Trout

1. At no time will any LCT be captured and/or consumed.
2. No landing of aircraft, ground disturbing activities (*e.g.*, digging, vegetation removal), bivouacking, or activities involving groups larger than 25 individuals occur within 100 m (328 ft) of occupied LCT streams, except for temporary placement of bridges for JAB and MGB exercises and group stream crossings at hardened areas (see LCT #4 below). Vehicles and personnel will not move into or out of the water to place or use the JAB, and vehicles will not move into or out of the water during MGB assembly or use. In addition, vegetation will not be removed during these exercises.
3. Motorized vehicles will only cross streams on bridges and designated/authorized USFS roads and/or crossing points. Live stream crossings (*i.e.*, motorized vehicles in water) are not permitted within LCT occupied streams (Silver, Mill, Wolf Creeks).
4. No wading or walking up and downstream within the stream channel in LCT occupied streams will occur. Stream crossings are allowed for small groups (less than 25 people); larger groups will cross only at bridges or culverts.
5. Creation of rock/log dams that could impede fish passage is not authorized.
6. The deployment (which also includes removal) of the MGB in Mill, Silver, and Wolf Creeks is limited to one (1) 2-day event per stream every 3 years.
7. To limit impacts to LCT during spawning activities, the MGB will not be deployed between April 1 to July 30.

Yosemite Toad and Sierra Nevada Yellow-Legged Frog Habitat

1. No training activities will be conducted within occupied breeding habitat during the breeding season (May 1 to July 30). Questions regarding occupied habitat should be directed to the MCMWTC Environmental Office and/or Range Control.
2. Designated critical habitat areas will have the same requirements as critical aquatic refuges (CARs).
3. At no time will any life stage of any amphibian species be consumed during survival exercises.
4. No landing of aircraft, ground disturbing activities (*e.g.*, digging, vegetation removal), bivouacking, or activities involving groups larger than 25 individuals within 100 m (328 ft) of streams, lakes, meadows, marsh areas, or wetlands within critical habitat, except for temporary placement of bridges for JAB and MGB exercises, group stream crossings at hardened areas (see LCT #4 above), and for placement of RHUs and COCs within previously disturbed footprints at the Highway 108/Finley Mine Road junction. Vehicles and personnel will not move into or out of the water to place or use the JAB, and vehicles will not move into or out of the water during MGB assembly or use. In addition, vegetation will not be removed during these exercises. Existing public roads will continue to be used.
5. The HTNF and USMC will place graduated stakes and/or markers at specific locations near occupied YT breeding habitat. The graduated stakes and/or markers serve two purposes: (1) To measure the depth of snowpack to ensure that no training occurs in TAs 10 and 11 until there is the minimum amount of snowpack required as described below; and (2) to delineate the occupied YT breeding habitat in TA-9 and mark the area that is off-limits to

training activities. If the snow depth is below the minimum required as described below, then no activity is authorized.

a. No training will occur in TA-10 unless there is 0.6 m (2 ft) of snow measured at the Sardine Meadows measuring point. The USMC will measure the snow depth at that location for Lower Sardine Meadows before each training exercise. A date-stamped photo will be taken of the measuring post and provided by the MCMWTC Natural Resources to the HTNF and USFWS as the season progresses. Post-use photos will be taken immediately after (within 24 hours) the completion of any bivouac activities and compiled into an end of season report for the HTNF.
b. No training will occur in TA-11 until a minimum of 0.6 m (2 ft) of snow is present at the Leavitt Lake gate. A date-stamped photo will be taken of the measuring post and provided by MCMWTC Natural Resources to the HTNF and USFWS as the season progresses. Post-use photos will be taken immediately after (within 24 hours) the completion of any bivouac activities.

6. The USMC will provide a written report to the HTNF and USFWS at the close of the season (winter training) that will include at least the following information: description of actual use activities, dates and numbers, accompanying date stamped photos (including post use), and written summary identifying any unexpected issues or concerns.
7. Except for the use of existing public roads, no training activities or exercises involving overland foot travel or groups larger than 25 individuals will occur within 100 m (328 ft) of YT breeding ponds [including existing (Lower Sardine Meadows pond, Upper Sardine Meadows pond, and Leavitt Lake breeding pond) and future locations], regardless of season (winter/summer).
8. All USMC initiated avalanches will be planned to occur outside the avalanche zone covering Koenig Lake.
9. Within YT critical habitat, RHUs are only allowed on 0.6 m (2 ft) of snowpack or more.

Water/Soils

1. No waste or by-product will be discharged on the ground or into water sources.
2. Training units and associated bivouacs will stay 100 m (328 ft) away from the trails, streams, lakes, springs, wet meadows, and other sensitive areas. All human waste disposal will be done using fully maintained and/or enclosed methods that are carried out (*e.g.*, porta johns and wag bags) and disposed of properly.
3. No driving will be conducted in wetlands and meadows, except on designated roads and designated crossing points.
4. Motorized vehicles will only cross streams, wet meadows, and wetlands where there is an existing designated road or motorized trail crossing. The USMC will institute erosion control in disturbed areas mutually agreed upon by the USMC and HTNF.

Trash Cleanup

1. The USMC will conduct a trash cleanup ("Mountain Sweep") twice per year after the snowmelt (spring and fall).

2. The USMC will conduct a Mountain Sweep after every Mountain Exercise event; staff and the training unit will follow the training path and pick up all visible trash.
3. The USMC will conduct a weekly Mountain Sweep after snowmelt begins, and will continue to monitor for trash ("Police Call") until MCMWTC Range Control and the Environmental Office clear the areas.
4. The USMC will conduct Mountain Sweep in TAs 10 and 11 and Upper Sardine Meadows (TA-9). A small USMC working party accompanied by a biological monitor (MCMWTC Environmental or HTNF staff) will be dispatched to Police Call the training areas as the snow level decreases.
5. The USMC will discuss the importance of trash cleanup and "Leave No Trace" procedures, as outlined above, to new students upon their arrival at the MCMWTC.

Monitoring and Adaptive Management Program

1. The USMC will monitor training and adaptively manage activities to reduce potential impacts to federally-listed species as specified below. Resource conditions will be evaluated on a year-to-year basis (or more frequently, if deemed necessary in areas of high activity) so that trends can be detected and adjustments made if it appears that conditions are degrading as a result of the MCMWTC activities. The adaptive management of the MCMWTC operations and training is incorporated into the Integrated Natural Resources Management Plan.
2. The condition of natural habitats subject to use by the USMC will be monitored by establishing permanent reference sites and collecting relevant data, including digital photographs, on an annual basis at approximately 100 locations throughout the permit area. Year-to-year comparisons will be used to assess trends in the condition of resources and their most likely causes. The type of data collected will depend upon the setting, the resources of interest, and the overlap of training activities. Digital photography from a UAV or UAS may be used where appropriate to provide a relatively rapid and non-intrusive method of surveying broad-scale areas. For the federally-listed aquatic species, the relevant measurement indicators will include, but are not necessarily limited to:
    a. Continued presence of a breeding population within historically occupied areas as indicated through standard population sampling methods.
    b. The area, bordering vegetative cover, and degree of disturbance of occupied meadows, ponds, and streams.
    c. Road widths and evidence of expansion/erosion along the edges in close proximity to aquatic habitats.
3. The MCMWTC Commanding Officer will appoint a maneuver damage inspector(s) to conduct maneuver damage inspection and monitoring on an annual or as needed basis in all areas where federally-listed species could potentially occur or be affected by training activities to minimize or avoid damage to soils, vegetation, and aquatic habitats.
4. Areas to be monitored on an annual or as needed basis for the protection of federally-listed aquatic species (either by UAV/UAS aerial photography or by ground monitoring) include, but are not limited to:
    a. Temporary bridge (JAB and MGB) deployment areas that may affect LCT and SNYLF on the West Walker River, Silver Creek, Mill Creek, and Wolf Creek.

   b. Highway 108/Finley Mine Road junction where RHU and COC establishment will occur adjacent to the YT Upper Sardine Meadows breeding pond.
   c. LZs within SNYLF and/or YT critical habitat (*i.e.*, Bunting, Crow, Eagle, Lark, Loon, Merganser, Osprey, Owl, Partridge, Penguin, Pigeon, Robin, Snowbird, Swan, and Turkey).
5. The maneuver damage inspector will identify sites on HTNF lands needing protection to facilitate recovery from maneuver damage to soils, vegetation, aquatic habitats, and other federally-listed species resources. Sites will be marked as temporarily off-limits to training activities, and recovery will be monitored. Closed areas will be added as needed to the "Off-Limits" map used to help military trainers for planning purposes. This includes areas where the MGB is deployed on the West Walker River, Mill, Silver, and/or Wolf Creeks; where small groups (25 personnel or less) cross LCT-occupied streams; and any known YT and/or SNYLF breeding locations.
6. The MCMWTC Commanding Officer will appoint an official representative who will be responsible for compliance with all protective measures agreed upon by the USMC, HTNF, and Service. This person will receive and investigate reports of non-compliance with the ESA, including the terms and conditions of the BO, and will have the authority to stop all activities that may violate the ESA or these measures.
7. The USMC will provide a written report to the HTNF and Service by January 31 of each year the BO is in effect, beginning the year following issuance of the BO. Each report will document the types, numbers, and locations of training activities conducted within critical habitat, occupied habitat, and/or the applicable buffers of federally-listed species; discuss the effectiveness of the USMC's protective measures and the terms and conditions of the existing BO; and recommend any other measures that allow for better protection of federally-listed species or more workable implementation.
8. If monitoring indicates impacts to resources from training activities, additional mitigation measures may be applied as part of adaptive management.
9. Where access by qualified biologists has been approved by the Service, CDFW, and HTNF for purposes of research and monitoring, the USMC will facilitate and deconflict such access with training activities as much as practicable.

The following are measures from the 2018 AOP (USFS and USMC 2017b). The wording has been changed slightly to improve clarity where needed. These measures may not directly apply to LCT, SNYLF, or YT or designated critical habitat, but they will avoid and minimize the effects of the proposed action on these species and critical habitat.

Special Use Area – Leavitt Lake

Activity in the Leavitt Lake area is limited to the snow season (November 15 – April 15). Training will remain on areas with a snowpack of roughly 0.6 m (2 ft) or more. Training will not occur on marshy areas during the thaw, regardless of the time of year, in order to safeguard YT and SNYLF critical habitat.

Aquatic Species and Habitats – CARs
Concentrated and/or ground disturbing activities within CARs should be avoided, especially within 30 m (100 ft) of a wetland area and 100 m (328 ft) from known LCT, YT, and SNYLF habitat.

Stock Use, Livestock Control, and Range Resources
Weed Free Forage Requirements. The MCMWTC will comply with the USFS Weed Free Forage Requirements, purchase only feed that is certified weed-free, and ensure that all pack animals are fed only hay that is certified weed-free.

Pesticides and Herbicides
- The MCMWTC will not use pesticides/herbicides without the prior written approval of the HTNF.
- Vehicles will be cleaned of vegetation matter prior to entering the training area to prevent the accidental introduction of noxious and invasive weed species and the spread of annual invasive grasses.
- Requests for approval of planned uses of pesticides/herbicides will be submitted to the HTNF as needed by the MCMWTC prior to pesticide purchase or use.
- No pesticides or herbicides will be disposed of on USFS lands.

Fire and Fuels
The MCMWTC will limit and monitor the use of incendiary devices, ordnances, explosives, live ammunition, pyrotechnics and campfires during fire restrictions.

Recreation
- Vehicles are permitted only on designated motorized trails per USFS Motor Vehicle Use Map (MVUM).[1]
- Use of motorized vehicles off designated roads or motorized trails is prohibited.

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the ESA requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this BO considers the effects of the proposed Federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) The Status of the Species, which describes the range-wide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the

1 The MVUM is the official map of designated routes. It displays those roads, trails, and areas designated for motor vehicle use, including class of vehicle and time of year.

Environmental Baseline, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the species.

## ANALYTICAL FRAMEWORK FOR THE DESTRUCTION OR ADVERSE MODIFICATION DETERMINATION

Section 7(a)(2) of the ESA requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification" was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

> "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

The "destruction or adverse modification" analysis in this BO relies on four components: (1) The Status of Critical Habitat, which describes the range-wide condition of the critical habitat in terms of the key components (*i.e.*, essential habitat features, primary constituent elements (PCEs), or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the Environmental Baseline, which analyzes the condition of the critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the listed species; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) the Cumulative Effects, which evaluate the effects of future non-Federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat.

For purposes of making the "destruction or adverse modification" determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding

the value (*i.e.*, the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the Environmental Baseline analysis.

STATUS OF THE SPECIES

*Lahontan Cutthroat Trout*

Lahontan cutthroat trout were listed by the Service on October 13, 1970, as endangered under the Endangered Species Protection Act of 1969 (Service 1970) and subsequently reclassified as threatened on July 16, 1975, under the ESA, to facilitate management (Service 1975). There is no designated critical habitat for LCT. Lahontan cutthroat trout are an inland subspecies (one of 14 recognized subspecies in the western United States) of cutthroat trout endemic to the Lahontan Basin of northern Nevada, eastern California, and southeastern Oregon. The range of LCT is divided into three Geographic Management Units (GMUs) based on geographical, ecological, behavioral, and genetic factors, and has been managed as such since 1995. The three GMUs include: (1) Western Lahontan Basin (Western GMU) comprised of the Truckee, Carson, and Walker River watersheds; (2) Northwestern Lahontan Basin (Northwestern GMU) comprised of the Quinn River, Black Rock Desert, and Coyote Lake watersheds; and (3) Eastern Lahontan Basin (Eastern GMU) comprised of the Humboldt River and tributaries. The proposed action is located within the Western GMU.

The Lahontan Cutthroat Trout Recovery Plan (Recovery Plan; Service 1995) identified a need for development of ecosystem plans for LCT in the Truckee and Walker River Basins. Short-Term Action Plans (Action Plans) for the Truckee and Walker River watersheds were published in 2003 (Service 2003a, Service 2003b). The Action Plans identify short-term activities and research that will further understanding of the conservation needs of LCT specific to the Truckee and Walker River watersheds and utilize adaptive management to refine the long-term recovery strategy. The Service published the LCT 5-year review in 2009 (Service 2009). The purpose of a 5-year review is to evaluate whether or not a species' status has changed since it was listed (or since the most recent 5-year review). Relevant information on the status of LCT, life history traits, population dynamics, habitat requirements, threats, and historical and current distribution can be found in the Recovery Plan (Service 1995), Action Plans (Service 2003a, b), and the 5-year review (Service 2009). A brief summary of our findings in the 5-year review is presented below.

The protocol used in the 5-year review requires that each occupied LCT stream be treated as an individual mapping segment (May and Albeke 2008). Specific information relative to stocking records, presence of nonnative fish, LCT density, habitat quality, and relative stream width were collected for each mapping segment (May and Albeke 2008). For purposes of this BO, summaries of these mapping segments will collectively be referred to as currently occupied streams.

As defined in May and Albeke (2008), conservation populations represent a combination of mapping segments that when united together represent a conservation unit. For purposes of this BO, summaries of these mapping segments will collectively be referred to as conservation populations. Conservation populations can exist in a genetically unaltered condition (*i.e.*, core

conservation populations with genetic analysis indicating greater than 99 percent purity and/or there is reason to believe that the genetics are unaltered), and/or they can be based on unique ecological, genetic and behavioral attributes of significance even with some level of genetic introgression (hybridization). Conservation populations may exist as a network of subpopulations or streams, or they may exist as an independent stream or stream segment, but not all currently occupied habitat was categorized within each conservation population.

Lahontan cutthroat trout populations have been and continue to be impacted by nonnative species interactions, habitat fragmentation and isolation, degraded habitat conditions, drought, and fire (Rhymer and Simberloff 1996, Dunham *et al.* 1997, Dunham *et al.* 2002, Dunham *et al.* 2003a, Fagan 2002). Nonnative fish co-occur with LCT in 36.4 percent of currently occupied stream habitat and all currently occupied historical lake habitat except for Walker Lake. Most LCT populations that co-occur with nonnative species are decreasing and the majority of populations extirpated since the mid-1990s have been lost as a result of nonnative species. Nonnative fish also occupy habitat in nearly all unoccupied LCT historical stream and lake habitat, making repatriation of LCT extremely difficult. The majority of LCT populations are isolated and confined to small habitats (stream width) and short stream lengths. These factors reduce gene flow between populations, and reduce the ability of populations to recover from catastrophic events thus threatening their long-term persistence and viability (Frankham 2005). The literature suggests that to ensure long-term persistence, cutthroat populations should consist of more than 2,500 individuals, occupy at least 8 km (5 mi) of habitat, and have no nonnative species present (Hilderbrand and Kershner 2000). Currently, only 28.2 percent of LCT conservation populations occupy habitat greater than 8 km (5 mi) in length and over 83 percent of currently occupied streams have fewer than 150 fish per mile. Pyramid and Walker Lakes are important habitat for the lacustrine (relating to or associated with lakes) form of LCT. Conditions in these lakes have deteriorated over the past 100 years and continue to decline, most dramatically in Walker Lake. The present or threatened destruction, modification, or curtailment of LCT habitat and range continues to be a significant threat and in some instances is increasing in magnitude and severity.

Recreational fishing for LCT in popular fishing waters is regulated and augmented by hatcheries; however, harvest from recreational fishing in the Western GMU does appear to pose a threat to LCT recovery because it impedes our ability to establish recovery populations, to understand the life history needs of lacustrine LCT, and to identify the actions needed to achieve recovery. Some occupied waters are either closed to fishing or have catch and release regulations while others are under general fishing regulations. While LCT in small streams may be vulnerable to overharvest, most occupied habitats are in remote areas and receive little fishing pressure. Scientific and educational sampling is controlled by State and Tribal permitting processes and new, non-lethal techniques have been developed for genetic analyses. Overutilization for commercial, recreational, scientific, or education purposes is not believed to be a significant threat at this time except for priority recovery waters in the Western GMU.

Disease is currently not a threat to LCT; however, it has the potential to become more widespread due to warmer waters that could result from climate change (Rahel *et al.* 2008). Brown (*Salmo trutta*) and brook (*Salvelinus fontinalis*) trout are known piscivores (carnivorous

animal which eats primarily fish); however, the extent to which these nonnative species prey on LCT is unknown. Most historical waters in the western portion of LCT's range, including lakes, and to a more limited extent in the Quinn River watershed and North Fork Little Humboldt River sub-watershed, are occupied by brown trout. Brook trout are the most common nonnative salmonid that co-occur with LCT and are found in nearly every major historical LCT watershed. Lake trout (*Salvelinus namaycush*), another nonnative fish species, are known to prey on LCT in lake environments. Efforts to manage the impacts from lake trout to reintroduced LCT are ongoing in Fallen Leaf Lake and strategies have been identified to abate these impacts. These strategies will be used in the other large historical lakes within the Western GMU where lake trout are found in order to increase the success of LCT reintroductions into these lakes. Disease is not believed to be a significant threat to LCT at this time. Predation from nonnative fish continues to be a threat where their distribution overlaps with LCT. The presence of nonnative predatory fish within unoccupied historical LCT habitat continues to impede recovery efforts in these waters.

The impacts to LCT from climate change are not known with certainty. Predicted outcomes of climate change imply that negative impacts will occur through increased stream temperatures, decreased stream flow, changes in the hydrograph, and increased frequency of extreme events such as drought and fire (Haak *et al.* 2010). These impacts will likely increase the magnitude and severity of other existing threats to LCT. Adding stressors predicted by climate change may exacerbate the current threats to LCT populations throughout its range, many of which already have multiple stressors affecting their persistence.

In the 5-year review, the Service concluded that LCT still meets the definition of threatened throughout its range. Lahontan cutthroat trout in the Western and Northwest GMUs are the most tenuous due to having a few isolated small populations, the presence of nonnative species in most fluvial and lacustrine habitats, complexity of threats on the lacustrine form of LCT, and poor water quality in Walker Lake. While the Eastern GMU has the largest intact habitat for LCT, populations also suffer from nonnative species, and small isolated populations.

*Sierra Nevada Yellow-legged Frog*

The Service published a final rule on April 29, 2014, listing the SNYLF as endangered (Service 2014). This final rule went into effect on June 30, 2014. Historically, the range of the SNYLF extended in California from north of the Feather River, in Butte and Plumas Counties, south to the Monarch Divide on the west side of the Sierra Nevada crest in Fresno County. East of the Sierra Nevada crest in California, the historical range of the SNYLF extends from areas north of Lake Tahoe, through Mono County (including the Glass Mountains) to Inyo County (Service 2014). On the HTNF, the current known distribution of SNYLF extends from the West Fork Carson River watershed south to Virginia Lakes in the West Walker River watershed.

Relevant information on the status of SNYLF, life history traits, population dynamics, habitat requirements, threats, and historical and current distribution can be found in the final rule (Service 2014). A brief summary of our findings in the final rule is presented below.

The Service determined that the SNYLF is presently in danger of extinction throughout its entire range, based on the immediacy, severity, and scope of the threats to its continued existence. These include habitat degradation and fragmentation, predation and disease, climate change, inadequate regulatory protections, and the interaction of these various stressors impacting small remnant populations. A rangewide reduction in abundance and geographic extent of surviving populations of SNYLFs has occurred following decades of fish stocking, habitat fragmentation, and most recently a disease epidemic caused by the pathogenic fungus *Batrachochytrium dendrobatidis* (Bd). Surviving populations are smaller and more isolated, and recruitment in diseased populations is much reduced relative to historic norms. This combination of population stressors makes persistence of this species precarious throughout the currently occupied range in the Sierra Nevada (Service 2014).

*Sierra Nevada Yellow-legged Frog Designated Critical Habitat*

On August 26, 2016, the Service published a final rule designating 437,929 ha (1,082,147 ac) as critical habitat for SNYLF (Figure 7, Service 2016). This final rule went into effect on September 26, 2016. Critical habitat represents approximately 18 percent of the historical range of the species. Critical habitat is divided into three genetic clades or groupings. Each clade has multiple subunits: clade 1 has 4 subunits; clade 2 has 14 subunits; and clade 3 has 6 subunits. All subunits designated as critical habitat are considered occupied (at the subunit level) and include lands within Lassen, Plumas, Sierra, Nevada, Placer, El Dorado, Amador, Calaveras, Alpine, Tuolumne, Mono, Mariposa, Madera, Fresno, and Inyo Counties, California (Figure 7, Service 2016).

The MCMWTC falls into clade 2 for the SNYLF and has designated critical habitat in subunit 2H (Wells Peak, Figure 7), which totals 11,711 ha (28,939 ac). In the MCMWTC, there is total of 3,738 ha (9,238 ac) of critical habitat (32 percent of subunit 2H) of which 158 ha (390 ac) contains the PCEs for SNYLF (USMC 2017c). In other words, 4 percent of the critical habitat (subunit 2H) in the MCMWTC contains the PCEs for SNYLF. Most of the known occurrences of SNYLF are within designated critical habitat. But due to a lack of surveys and the cryptic nature of this species, absence cannot be confirmed.

*Yosemite Toad*

The Service published a final rule on April 29, 2014, listing the YT as threatened (Service 2014). This final rule went into effect on June 30, 2014. The known historical range of YT in the Sierra Nevada extended from the Blue Lakes region north of Ebbetts Pass (Alpine County) to south of the Evolution Lake area (Fresno County) (Karlstrom 1962, Stebbins 1985). Yosemite toad habitat historically spanned elevations from 1,460 to 3,630 m (4,790 to 11,910 ft) (Stebbins 1985, Stephens 2001). On the HTNF, the current distribution of the YT extends from the Kinney Lakes area in the West Fork Carson River watershed south to Virginia Lakes in the East Walker River watershed.

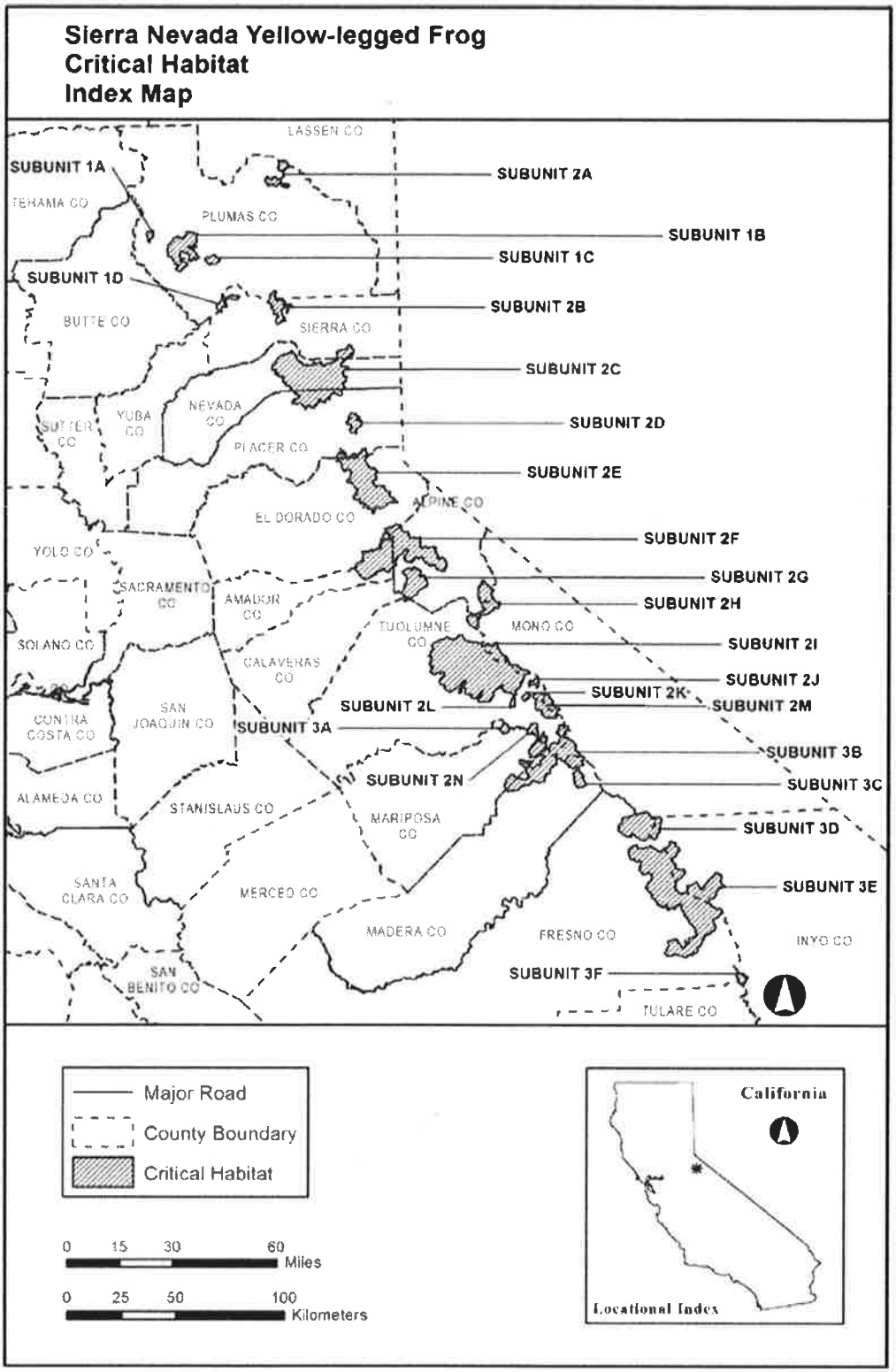


Figure 7. Final designated critical habitat for the SNYLF (Service 2016). Subunit 2H (Wells Peak) is within the MCMWTC.

Relevant information on the status of the YT, life history traits, population dynamics, habitat requirements, threats, and historical and current distribution can be found in the final rule (Service 2014). A brief summary of our findings in the final rule is presented below.

The Service determined that the YT is likely to become endangered throughout its range within the foreseeable future, based on the immediacy, severity, and scope of the threats to its continued existence. These include habitat loss associated with degradation of meadow hydrology following stream incision consequent to the cumulative effects of historical land management activities, notably livestock grazing, and also the anticipated hydrologic effects upon habitat from climate change. The Service also found that the YT is likely to become endangered through the direct effects of climate change impacting small remnant populations, likely compounded with the cumulative effects of other threat factors (*e.g.*, Bd) (Service 2014).

*Yosemite Toad Designated Critical Habitat*

On August 26, 2016, the Service published a final rule designating 303,889 ha (750,926 ac) of critical habitat for YT (Figure 8, Service 2016). This final rule went into effect on September 26, 2016. Critical habitat represents approximately 28 percent of the historical range of the YT and is divided into 16 different units. All units designated as critical habitat are considered occupied (at the unit level) and include lands within Alpine, Tuolumne, Mono, Mariposa, Madera, Fresno, and Inyo Counties, California (Service 2016).

Only Critical Habitat Unit 2 (Leavitt Lake/Emigrant) is located within the MCMWTC. Critical Habitat Unit 2 is 30,803 ha (76,115 ac) in size. There are approximately 3,358 ha (8,298 ac) of Critical Habitat Unit 2 located within the MCMWTC, or approximately 11 percent. Most of the current YT occurrences are within designated critical habitat. But due to a lack of surveys and the cryptic nature of this species, absence cannot be confirmed.

*Physical or Biological Features*

In accordance with section 3(5)(A)(i) and 4(b)(1)(A) of the ESA and regulations at 50 CFR 424.12, in determining which areas within the geographical area occupied by the species at the time of listing to designate as critical habitat, we consider the physical or biological features essential to the conservation of the species and which may require special management considerations or protection. These include, but are not limited to: (1) Space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing (or development) of offspring; and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

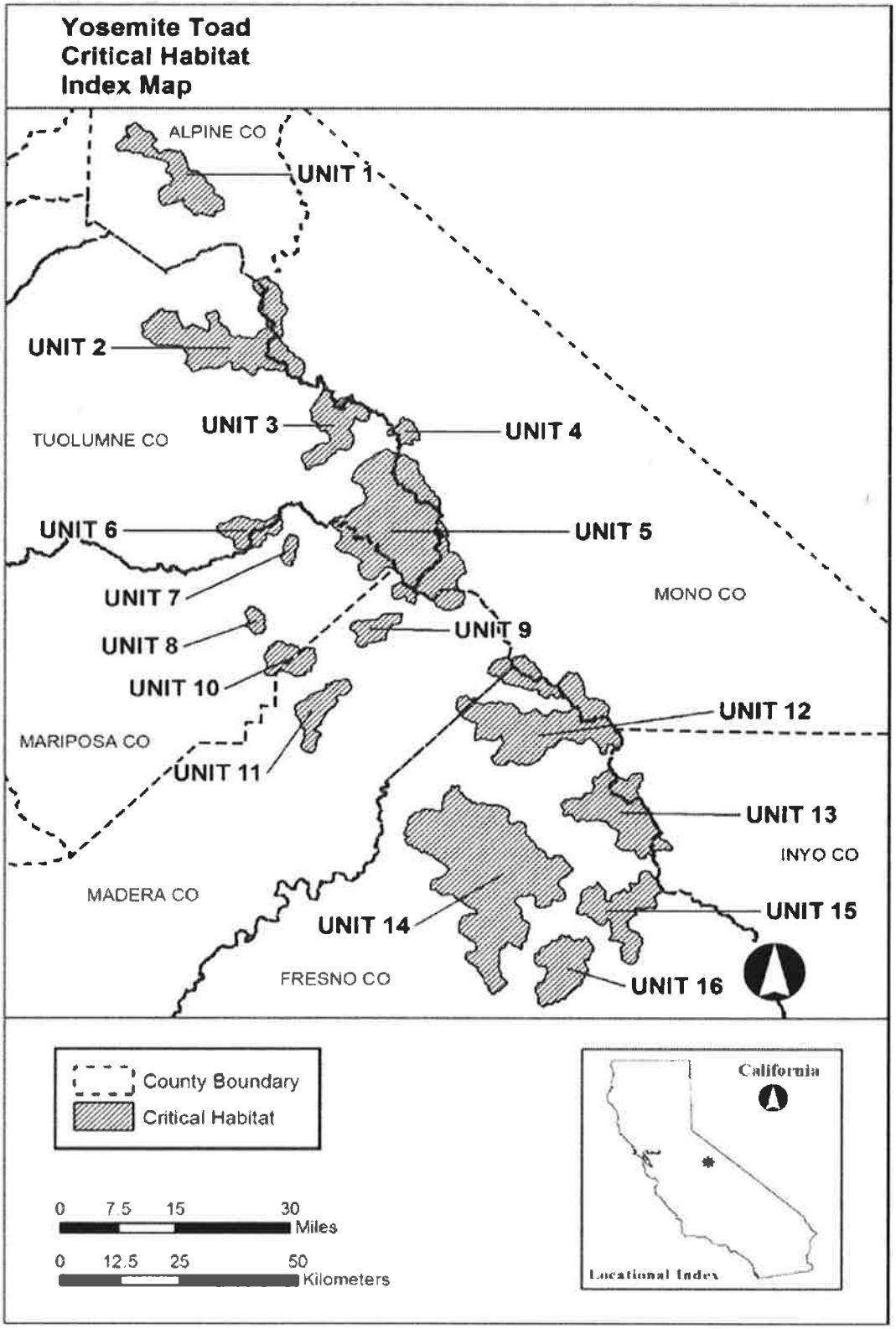


Figure 8. Final designated critical habitat for the YT (Service 2016). Critical Habitat Unit 2 is within the MCMWTC.

We derive the specific physical or biological features essential for the SNYLF and YT from studies of these species' habitat, ecology, and life history to designate critical habitat. Under the ESA and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of the SNYLF and the YT in areas occupied at the time of listing, focusing on the features' PCEs. Primary constituent elements are those specific elements of the physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species.

*Primary Constituent Elements for Sierra Nevada Yellow-legged Frog*

Critical habitat is defined by the PCEs. The PCEs specific to the SNYLF include aquatic habitat for breeding and rearing, aquatic nonbreeding and overwintering habitat, and upland habitat, which are further defined below:

(1) Aquatic habitat for breeding and rearing
Habitat that consists of permanent water bodies, or those that are either hydrologically connected with, or close to, permanent water bodies, including, but not limited to, lakes, streams, rivers, tarns, perennial creeks (or permanent plunge pools within intermittent creeks), pools (such as a body of impounded water contained above a natural dam), and other forms of aquatic habitat. This habitat must:

(a) For lakes, be of sufficient depth not to freeze solid (to the bottom) during the winter (no less than 1.7 m (5.6 ft), but generally greater than 2.5 m (8.2 ft), and optimally 5 m (16.4 ft) or deeper (unless some other refuge from freezing is available)).

(b) Maintain a natural flow pattern, including periodic flooding, and have functional community dynamics in order to provide sufficient productivity and a prey base to support the growth and development of rearing tadpoles and metamorphs.

(c) Be free of introduced predators.

(d) Maintain water during the entire tadpole growth phase (a minimum of 2 years). During periods of drought, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they may still be considered essential breeding habitat if they provide sufficient habitat in most years to foster recruitment within the reproductive lifespan of individual adult frogs.

(e) Contain:

i. Bank and pool substrates consisting of varying percentages of soil or silt, sand, gravel, cobble, rock, and boulders (for basking and cover);

ii. Shallower microhabitat with solar exposure to warm lake areas and to foster primary productivity of the food web;

iii. Open gravel banks and rocks or other structures projecting above or just beneath the surface of the water for adult sunning posts;

iv. Aquatic refugia, including pools with bank overhangs, downfall logs or branches, or rocks and vegetation to provide cover from predators; and

v. Sufficient food resources to provide for tadpole growth and development.

(2) Aquatic nonbreeding and overwintering habitat

This habitat may contain the same characteristics as aquatic breeding and rearing habitat (often at the same locale), and may include lakes, ponds, tarns, streams, rivers, creeks, plunge pools within intermittent creeks, seeps, and springs that may not hold water long enough for the species to complete its aquatic life cycle. This habitat provides for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult mountain yellow-legged frogs. Aquatic nonbreeding habitat contains:

(a) Bank and pool substrates consisting of varying percentages of soil or silt, sand, gravel, cobble, rock, and boulders (for basking and cover).

(b) Open gravel banks and rocks projecting above or just beneath the surface of the water for adult sunning posts.

(c) Aquatic refugia, including pools with bank overhangs, downfall logs or branches, or rocks and vegetation to provide cover from predators.

(d) Sufficient food resources to support juvenile and adult foraging.

(e) Overwintering refugia, where thermal properties of the microhabitat protect hibernating life stages from winter freezing, such as crevices or holes within bedrock, in and near shore.

(f) Streams, stream reaches, or wet meadow habitats that can function as corridors for movement between aquatic habitats used as breeding or foraging sites.

(3) Upland habitat

(a) Upland areas adjacent to or surrounding breeding and nonbreeding aquatic habitat that provides areas for feeding and movement by SNYLF.

i. For stream habitats, this area extends 25 m (82 ft) from the bank or shoreline;

ii. In areas that contain riparian habitat and upland vegetation (*i.e.*, mixed conifer, ponderosa pine, montane conifer, and montane riparian woodlands), the canopy overstory should be sufficiently thin (generally not to exceed 85 percent) to allow sunlight to reach the aquatic habitat and thereby provide basking areas for the species;

iii. For areas between proximate (within 300 m (984 ft)) water bodies (typical of some high mountain lake habitats), the upland area extends from the bank or shoreline between such water bodies;

iv. Within mesic habitats such as lake and meadow systems, the entire area of physically contiguous or proximate habitat is suitable for dispersal and foraging.

(b) Upland areas (catchments) adjacent to and surrounding both breeding and nonbreeding aquatic habitat that provide for the natural hydrologic regime (water quantity) of aquatic habitats. These upland areas should also allow for the maintenance of sufficient water quality to provide for the various life stages of SNYLF and its prey base.

Subunit 2H: Wells Peak

Subunit 2H consists of approximately 11,711 ha (28,939 ac), and is located in Alpine, Mono, and Tuolumne Counties, California, approximately 6.4 km (4 mi) west of Highway 395, and bounded by Highway 108 on the south (Figure 7). Land ownership within this subunit consists of approximately 11,650 ha (28,788 ac) of Federal land and 61 ha (150 ac) of private land. Federal holdings within the subunit 2H are within the HTNF [8,710 ha (21,523 ac)] and Stanislaus National Forest [2,939 ha (7,262 ac)], and the Carson-Iceberg and Emigrant Wilderness Areas. Approximately 158 ha (390 ac), or approximately 4 percent, of subunit 2H are located within the MCMWTC. This subunit is considered to be within the geographical area occupied by the species at the time of listing, and it contains the physical or biological features essential to the conservation of the species, is currently functional habitat sustaining frogs, and is needed to provide for core surviving populations and their unique genetic heritage.

The physical or biological features essential to the conservation of the SNYLF in the subunit 2H may require special management considerations or protection due to introduced fishes, inappropriate grazing activity, timber management and fuels reduction, and recreational activities.

*Primary Constituent Elements for Yosemite Toad*

Critical habitat is defined by the PCEs. The PCEs specific to the YT include aquatic breeding habitat and upland habitat, which are further defined below:

(1) Aquatic breeding habitat
   (a) This habitat consists of bodies of fresh water, including wet meadows, slow-moving streams, shallow ponds, spring systems, and shallow areas of lakes, that:
      i. Are typically (or become) inundated during snowmelt;
      ii. Hold water for a minimum of 5 weeks, but more typically 7 to 8 weeks; and
      iii. Contain sufficient food for tadpole development.
   (b) During periods of drought or less than average rainfall, these breeding sites may not hold surface water long enough for individual YTs to complete metamorphosis, but they are still considered essential breeding habitat because they provide habitat in most years.

(2) Upland habitat
   (a) This habitat consists of areas adjacent to or surrounding breeding habitat up to a distance of 1.25 km (0.78 mi) in most cases (*i.e.*, depending on surrounding landscape and dispersal barriers), including seeps, springheads, talus and boulders, and areas that provide:
      i. Sufficient cover (including rodent burrows, logs, rocks, and other surface objects) to provide summer refugia;
      ii. Foraging habitat;
      iii. Adequate prey resources;

iv. Physical structure for predator avoidance;
v. Overwintering refugia for juvenile and adults;
vi. Dispersal corridors between aquatic breeding habitats;
vii. Dispersal corridors between breeding habitats and areas of suitable summer and winter refugia and foraging habitat; and/or
viii. The natural hydrologic regime of aquatic habitats (the catchment).

(b) These upland areas should also maintain sufficient water quality to provide for the various life stages of the YT and its prey base.

Unit 2: Leavitt Lake/Emigrant

This unit consists of approximately 30,803 ha (76,115 ac), and is located near the border of Alpine, Tuolumne, and Mono Counties, California, predominantly south of Highway 108 (Figure 8). Land ownership within this unit consists of approximately 30,789 ha (76,081 ac) of Federal land and 13 ha (33 ac) of private land. The Leavitt Lake/Emigrant Unit is predominantly within the Stanislaus National Forest [23,066 ha (56,998 ac)] and HTNF [7,348 ha (18,157 ac)], including lands within the Emigrant and Hoover Wilderness Areas, and Yosemite National Park [375 ha (926 ac)]. Approximately 3,358 ha (8,298 ac), which was based on a 1.25-km (0.78-mi) buffer around known breeding habitat, or 11 percent, occurs within the MCMWTC (USMC 2017c). This unit is currently occupied and contains the physical or biological features essential to the conservation of the species. This unit is considered essential to the conservation of the species because it contains a high concentration of YT breeding locations and represents a variety of habitat types utilized by the species. The Leavitt Lake/Emigrant Unit provides continuity of habitat between adjacent units, as well as providing for a variety of habitat types necessary to sustain YT populations under a variety of climate regimes.

The physical or biological features essential to the conservation of the YT in the Leavitt Lake/Emigrant Unit may require special management considerations or protection due to inappropriate grazing and recreational activities. This unit also has threats due to disease, predation, and climate change. Climate change is not considered a manageable threat. The need for special management considerations or protection due to disease and predation is currently undefined due to uncertainty regarding the extent and magnitude of these particular stressors.

ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem, within the action area. The environmental baseline is a snapshot of a species' health at a specified point in time. It does not include the effects of the action under review in this consultation.

Action Area

The implementing regulations for section 7(a)(2) of the ESA define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this BO is the MCMWTC training area, including training corridors and other areas (*e.g.*, Sweetwater EAF/DZ and Lucky Boy Road DZ) that are located outside the boundaries of the MCMWTC. The action area overlaps with the Bridgeport Ranger District on the HTNF and is located within the range of the LCT, SNYLF, and YT. The action area also includes designated critical habitat for both the SNYLF and YT.

Previous Consultations in the Action Area

Below is a list of consultations completed for LCT, SNYLF, and YT within the action area. The terms and conditions in previous BOs for these listed species remain in effect. In each case, the Service made the determination that the proposed actions would not jeopardize the continued existence of the species, or adversely modify its critical habitat.

*Lahontan Cutthroat Trout, Sierra Nevada Yellow-Legged Frog, and/or Yosemite Toad*

- 1994 Biological Opinion U.S. Forest Service Grazing Allotments Affecting Federally Listed Fish in California (File No. 1–1–94–F–40)
- 1995 Biological Opinion Bull Canyon, Slinkard, Silver King, Mill Canyon, Frying Pan/Murphy Creek, and Noble Grazing Allotments (File No. 1–1–95–F–66)
- 1996 Biological Opinion Mill Canyon Sheep and Goat (S&G) and Frying Pan/Murphy Creek Allotments (File No. 1–1–96–F–71)
- 2002 Biological Opinion Emergency Consultation for the Cannon Fire, Walker, California (File No. 1-5-02-F-320)
- 2003 Biological Opinion and Conference on the Biological Assessment for the Sierra Nevada Forest Plan Amendment Supplemental Environmental Impact Statement (File No. 1-1-03-F-2638)
- 2005 Biological Opinion Mill Canyon Fuels Reduction Project, Mono County, California (File No. 1-5-05-F-089)
- 2006 Biological Opinion Mill Canyon Fuels Reduction Project (File No. 1-5-06-F-231)
- 2006 Biological Opinion Silver Creek S&G Allotment (File No. 1–5–06–F–155)
- 2009 Biological Opinion Silver Creek S&G Allotment 2009–2011 (File No. 2009–F–0209)
- 2011 Biological Opinion Silver Creek S&G Allotment 2012–2014 (File No. 2009–F–0209–R001)
- 2015 Biological Opinion Silver Creek S&G Allotment 2015 (File No. 2009–F–0209–R002)
- 2016 Biological Opinion Silver Creek S&G Allotment 2016–2017 (File No. 2009–F–0209–R035)

- 2017 Biological Opinion for the Proposed California Integrated Weed Management Program, Carson and Bridgeport Ranger Districts, Humboldt-Toiyabe National Forest, California (Alpine, El Dorado, Lassen, Mono, Nevada, Placer, Plumas, Sierra, and Tuolumne Counties) (File No. 2017-F-0341)
- 2017 Biological Opinion for Continued Rangeland Management on the Carson and Bridgeport Ranger Districts, Alpine and Mono Counties, California (File No. 2017-F-0083)

**Status of the Species and Critical Habitat within the Action Area**

The following paragraphs and figures describe and show the location of LCT, SNYLF, and YT, and designed critical habitat within the action area. This information, unless noted otherwise, is based on descriptions provided in the BA (USFS and USMC 2017a).

Lahontan Cutthroat Trout

There are three CARs in the action area that support LCT: Silver Creek, Wolf Creek, and Mill Canyon. Lahontan cutthroat trout were introduced to each of them. The distribution of LCT in Wolf Creek is limited to approximately 5.1 km (3.2 mi) of the creek. It is unlikely, due to increased gradient, that the distribution of LCT will extend downstream and low flows make it unlikely they will extend their distribution upstream (USFS 2004a). Multiple age classes of LCT are distributed within approximately 5.6 km (3.3 mi) of Silver Creek (USFS 2004b). A large self-sustaining population of brook trout is thought to be the reason why LCT have not moved downstream to other naturally occurring habitat (USFS 2004b). Distribution of LCT is limited in Mill Creek to approximately 8.7 km (5.4 mi) (USFS 2004c).

There are also areas that contain potential but unoccupied habitat or are actively stocked by CDFW. Surveys conducted in Lost Cannon Creek did not identify any LCT; however, potential habitat is present (USFS 2005a). The West Walker River is occasionally stocked with hatchery LCT (unpublished CDFW stocking data). Kirman Lake is also regularly stocked with LCT by CDFW (unpublished CDFW stocking data). Figure 9 (USFS and USMC 2017a) shows locations occupied by LCT within the action area (USFS 2008, unpublished CDFW stocking data).

Sierra Nevada Yellow-Legged Frog

The BA provides a detailed description of the locations of SNYLF in the MCMWTC or action area (USFS and USMC 2017a), and Figure 10 (USFS and USMC 2017a) shows currently occupied habitat and sightings for SNYLF (USFS 2004a, USFS 2005b, USFS 2008, CNDDB 2015 as cited in USFS and USMC 2017a, CDFW 2014b as cited in USFS and USMC 2017a). Populations of SNYLF have been documented in the Silver Creek CAR (LZ Eagle and between LZ Loon and Bunting); Wolf Creek CAR (Wolf Creek Lake); Silver Creek CAR (Chango Lake); and Summit Meadows CAR (LZ Cardinal and Hawk). Sightings of SNYLF have occurred in TAs 10 and 11. Between 2001 and 2011, CDFW conducted surveys at Leavitt Lake (TA-11) and did not detect any SNYLF.

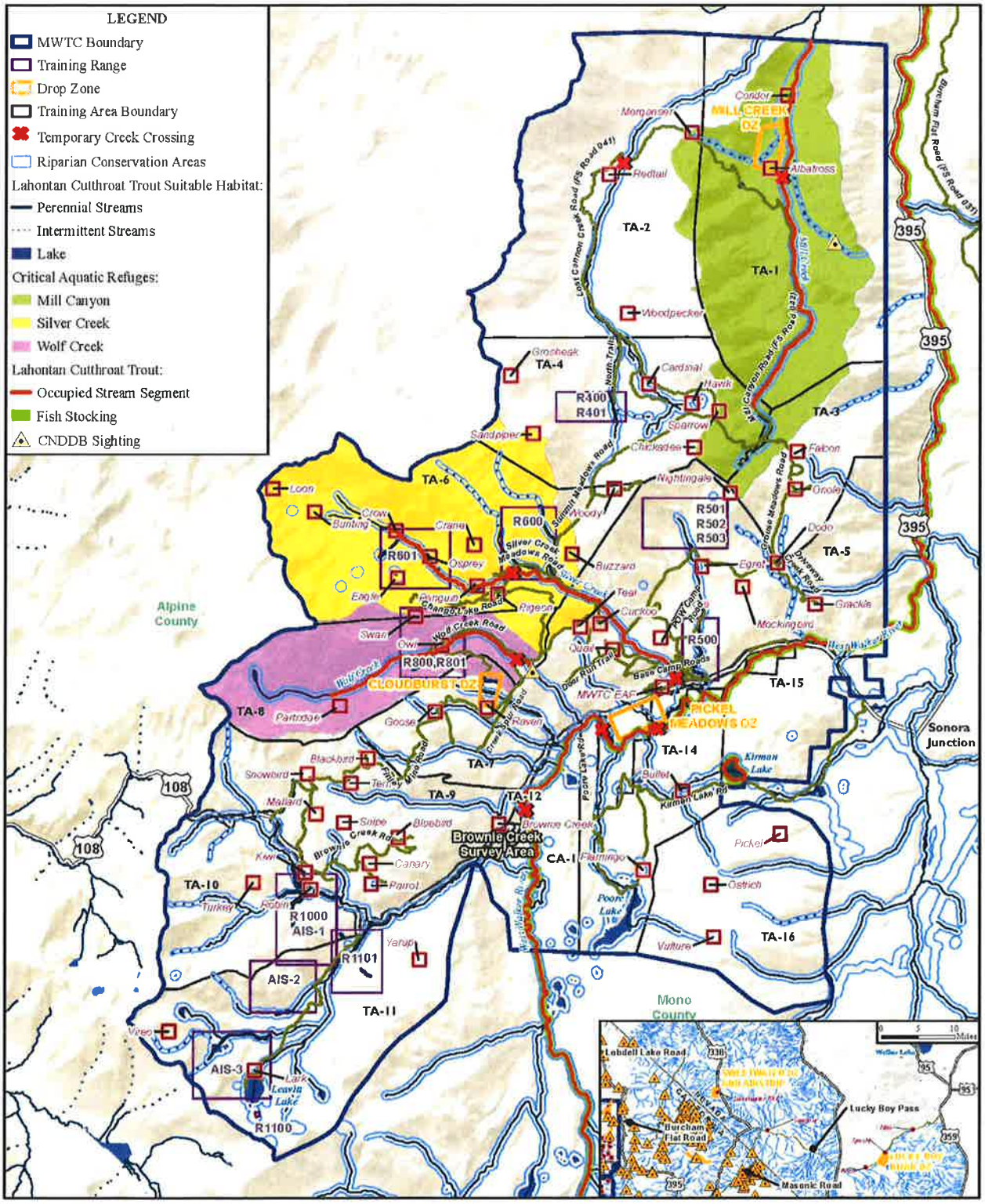


Figure 9. Locations of LCT within the MCMWTC or action area (USFS and USMC 2017a).

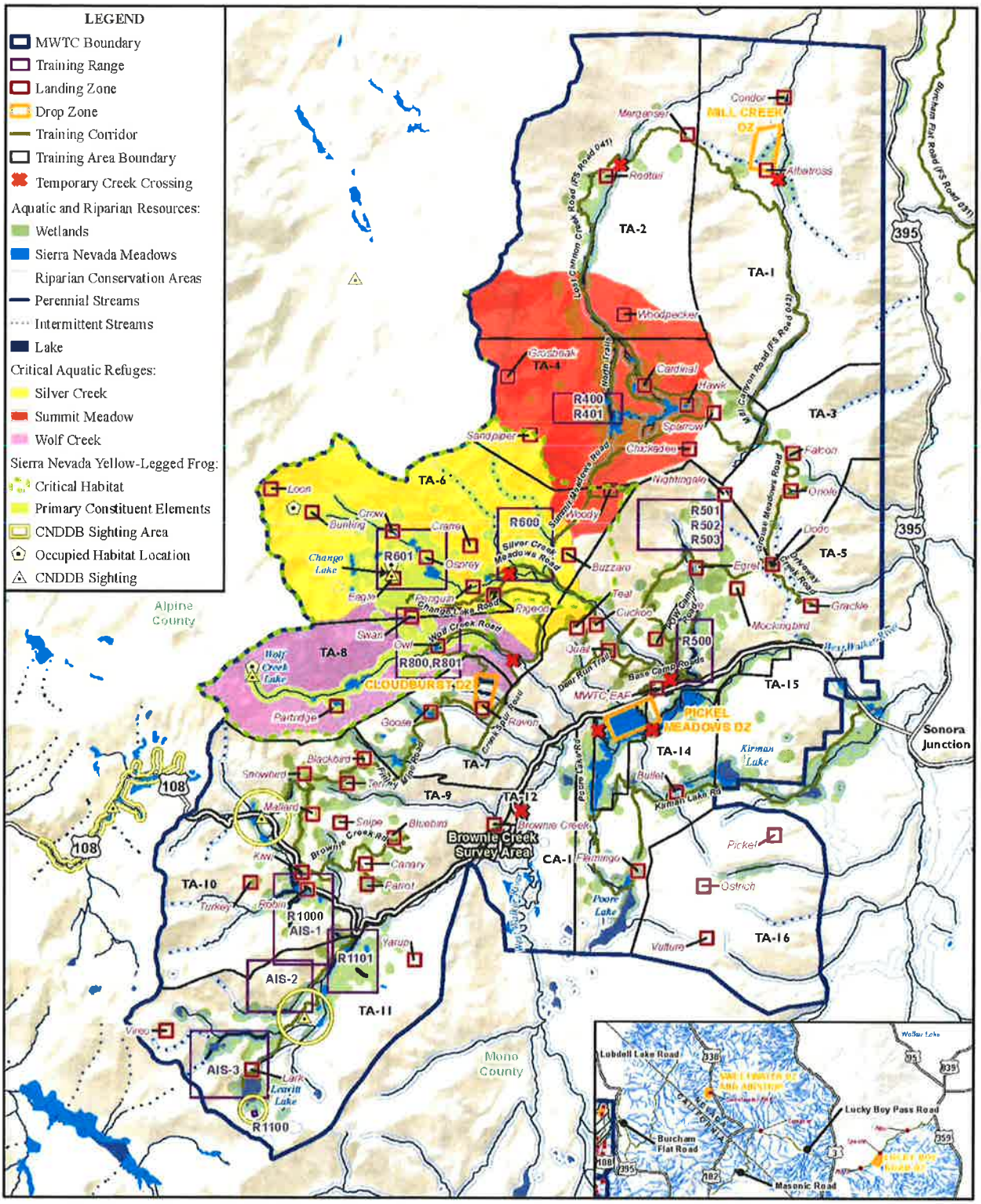


Figure 10. Locations of SNYLF within the MCMWTC or action area (USFS and USMC 2017a).

Yosemite Toad

The BA provides a detailed description of the locations of YT in the MCMWTC (USFS and USMC 2017a), and Figure 11 (USMC 2017d) shows currently occupied habitat and sightings for YT [CNDDB 2015 as cited in USFS and USMC 2017a, Forest Service 2016 as cited in USFS and USMC 2017a, Naval Facilities Engineering Command Southwest (NAVFAC SW) 2009, USFS 2005b, USMC 2017e]. Populations of YT have been documented in TAs 4, 9, 10, and 11. In TA-4, YTs were documented in Summit Meadows (Summit Meadows CAR; USMC 2017e). In 2017, a new population of YT was documented in TA-9 at LZ Parrot (USMC 2017e). Yosemite toads also occur at various locations throughout TAs 10 and 11. There are historical records and sightings for YT in Chango Lake (TA-6 and Silver Creek CAR), TAs 10 and 11, and Wolf Creek Lake (Wolf Creek CAR).

**Factors Affecting the Species and Critical Habitat in the Action Area**

The analysis that follows describes factors affecting the environment of the species or designated critical habitat in the action area. The baseline includes State, tribal, local, and private actions already affecting the species or that will occur contemporaneously with the consultation in progress. Unrelated Federal actions affecting the same species or critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the action area that may benefit listed species or critical habitat.

Livestock Grazing

Grazing of livestock in Sierra Nevada meadows and riparian areas (rivers, streams, and adjacent upland areas that directly affect them) began in the mid-1700s with the European settlement of California (Menke *et al.* 1996). Following the gold rush of the mid-1800s, grazing increased to a level exceeding the carrying capacity of the available range, causing significant impacts to meadow and riparian ecosystems (Meehan and Platts 1978, Menke *et al.* 1996). By the turn of the 20th century, high Sierra Nevada meadows were converted to summer rangelands for grazing cattle, sheep, horses, goats, and pigs, although the alpine areas were mainly grazed by sheep (Beesley 1996, Menke *et al.* 1996). Stocking rates of both cattle and sheep in Sierra meadows in the late 19th and early 20th centuries were very heavy (Kosco and Bartolome 1981), and grazing severely degraded many meadows (Ratliff 1985, Menke *et al.* 1996). Grazing impacts occurred across the range of the LCT, SNYLF, and YT, as cattle and sheep were driven virtually everywhere in the Sierra Nevada where forage was available (Kinney 1996, Menke *et al.* 1996).

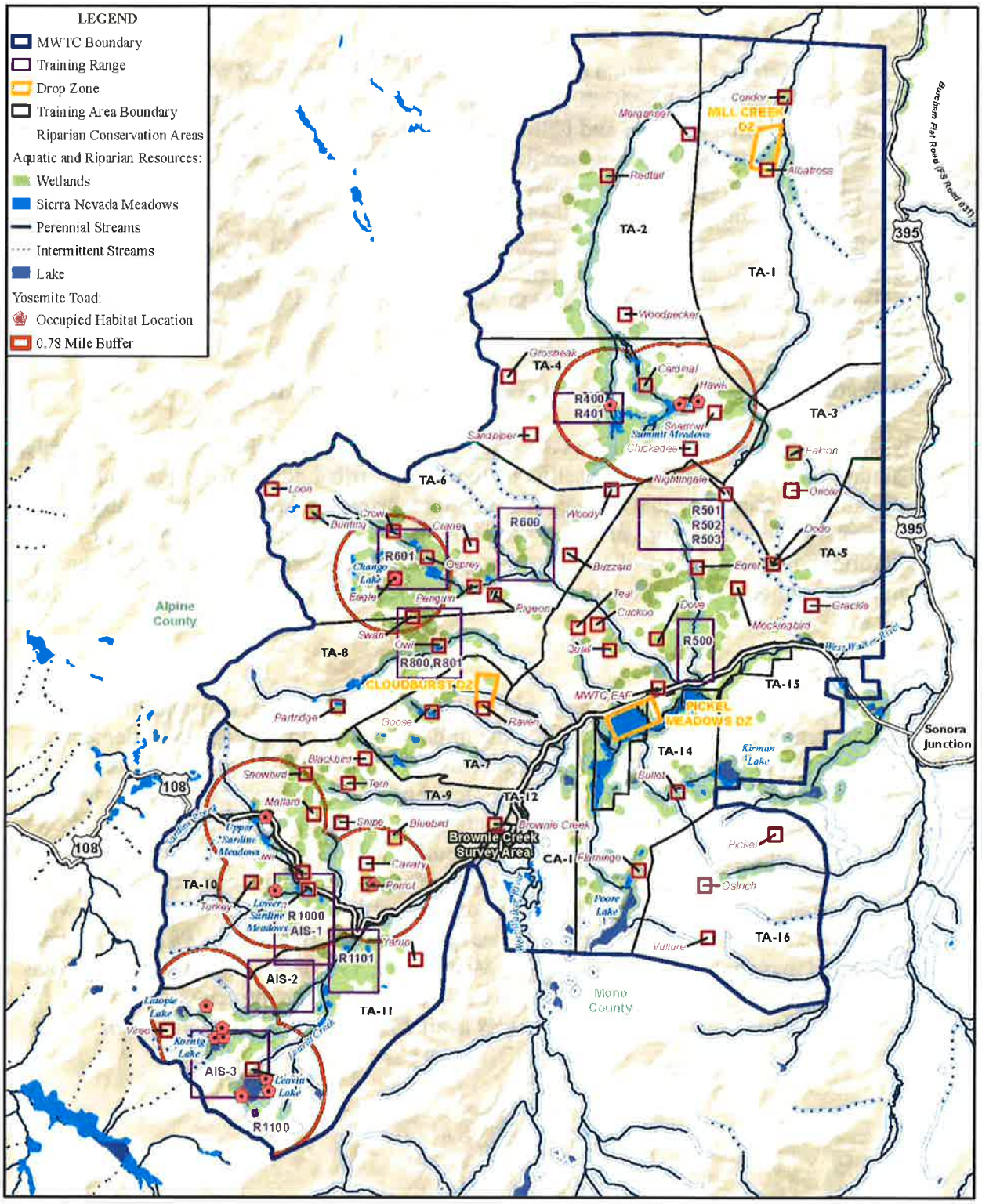


Figure 11. Locations of YT within the MCMWTC or action area (USMC 2017d).

During World Wars I and II, increased livestock use occurred on National Forests in the west, causing overuse in the periods 1914–1920 and 1939–1946, and then between 1950 and 1970 livestock numbers were permanently reduced due to allotment closures and uneconomical operations, with increased emphasis on resource protection and riparian enhancement. Further reductions in livestock use began again in the 1990s, due in part to USFS reductions in permitted livestock numbers, seasons of use, implementation of rest-rotation grazing systems, and to responses to drought (Menke *et al.* 1996). Between 1981 and 1998, livestock numbers on National Forests in the Sierra Nevada decreased from 163,000 to approximately 97,000 head, concurrent with Forest Service implementation of standards and guidelines for grazing and other resource management (USFS 2001a, USFS 2001b). Historical evidence indicates that heavy livestock use in the Sierra Nevada has resulted in widespread damage to rangelands and riparian systems due to sod destruction in meadows, vegetation destruction, and gully erosion (see review in USFS *et al.* 2014 and in USFS *et al.* 2015).

Due to the long history (Menke *et al.* 1996) of livestock and packstock grazing in the Sierra Nevada it is difficult to establish a reliable quantitative estimate for the historical significance and contribution of grazing on LCT, SNYLF, and YT populations. However, because the negative effects of livestock on riparian/meadow habitat have been documented in some locations along with documented direct mortality, the decline of some populations of amphibians has been attributed to the effects of livestock grazing (Jennings and Hayes 1994, Jennings 1996, USFS *et al.* 2014, USFS *et al.* 2015).

In the action area, the HTNF continues to manage livestock on four grazing allotments on the Bridgeport Ranger District. These allotments include Sardine C&H Allotment, Silver Creek S&G Allotment, Lost Cannon S&G Allotment, and Mill Canyon S&G Allotment.

Roads

Roads can affect the hydrology, geomorphology, and disturbance regimes in stream networks (Jones *et al.* 2000). Increases in the frequency and magnitude of flood events have been attributed to roads (Jones *et al.* 2000), which reduce a stream's ability to cope with large disturbances, and it may not be as resilient as it once was under a normal disturbance regime. Water, through precipitation or shallow groundwater transport, may be intercepted by the road and rerouted into the stream at the road crossing (Wemple *et al.* 1996), which can add to the flood peak and increase sediment delivery to the stream (Sugden and Woods 2007).

There are two different types of roads located in the action area: paved highway and unpaved dirt roads. Table 3-2 in USFS and USMC (2017) identifies the acres and miles of training corridors and roads that occur within the action area. This overlap in roads with habitat occupied by LCT, SNYLF, and YT exposes these species to adverse effects associated with the presence and use of roads. There are also numerous road crossings on both Silver and Wolf Creeks (both CARs that support SNYLF and LCT), and roads parallel both streams in several locations with inadequate riparian buffers. State Route 108 is another major road that bisects and runs parallel to occupied YT breeding habitat. The impact to LCT, SNYLF, and YT from use of roads can be direct (*e.g.*, mortality from collisions) or indirect (*e.g.*, modify or degrade habitat). For example,

U.S. Forest Service staff have observed crushed YT juveniles and adults on the road into a popular campground on the Stanislaus National Forest (Brown 2006 as cited in USFS *et al.* 2015) and State Route 108 on the HTNF (E. Nordin, Service, pers. obs., June 21, 2017). Additionally, several studies have found that increasing road densities were clearly associated with declining salmonid populations (Lee *et al.* 1997, Dunham and Rieman 1999).

Nonnative Fish and Other Predators

*Lahontan Cutthroat Trout*

Competition from nonnative trout has been identified as one of the most detrimental threats to native inland cutthroat trout (Griffith 1988, Behnke 1992, Young 1995). Some recent studies indicate that both abiotic and biotic processes can influence competitive advantages for nonnative trout over native trout (Dunham *et al.* 2002, Peterson *et al.* 2004, Shepard 2004, de la Hoz Franco and Budy 2005, Quist and Hubert 2005, Korsu *et al.* 2007, McGrath and Lewis 2007, Hasegawa and Maekawa 2008).

In a 2004 survey, nonnative brook trout were found dispersed throughout the Silver Creek watershed (USFS 2004b). Approximately 450 brook trout individuals ranging from 50 to 254 millimeters (mm) (2 to 10 in) in total length were captured and removed. This size distribution indicates a large self-sustaining population of brook trout in Silver Creek. When brook trout invade streams occupied by cutthroat trout, the native cutthroat trout decline or are displaced (Griffith 1988, Behnke 1992, Young 1995). Competition with brook trout reduces recruitment of cutthroat trout and reduces inter-annual survival of juveniles, leading to a reduction of population size (Peterson *et al.* 2004, McGrath and Lewis 2007). When LCT occur in the same stream as brook trout, LCT typically occupy the colder, headwater reaches and the nonnative trout occupy areas downstream (Dunham *et al.* 1999, Dunham *et al.* 2002). Competition from nonnative trout, especially brook trout, is recognized as a significant threat to LCT (Service 2009).

*Sierra Nevada Yellow-legged Frog*

The most prominent predator of SNYLFs is introduced trout, whose significance is well-established because it has been repeatedly observed that SNYLFs rarely coexist with fish, and it is known that introduced trout can and do prey on all SNYLF life stages except for eggs (Bradford 1989, Bradford *et al.* 1993, Drost and Fellers 1996, Jennings 1996, Knapp 1996, Knapp and Matthews 2000, Knapp *et al.* 2001, Vredenburg 2004). Knapp (1996) estimated that 63 percent of lakes larger than 1 ha (2.5 ac) in the Sierra Nevada contain one or more nonnative trout species, and more than 60 percent of streams contain nonnative trout. In some areas, trout-occupied waters comprise more than 90 percent of total water body surface area (Knapp and Matthews 2000).

The predation of SNYLFs by fishes observed in the early 20th century by Grinnell and Storer and the documented population declines of the 1970s (Bradford 1991, Bradford *et al.* 1994) were not the beginning of the SNYLF's decline, but rather the continuation of a long decline that started soon after fish introductions to the Sierra Nevada began in the mid-1800s (Knapp and

Matthews 2000). Metapopulation theory (Hanski 1998) predicts this type of time lag from habitat modification to population extinction (Knapp and Matthews 2000). In 2004, Vredenburg (2004) concluded that introduced trout are effective predators on SNYLF tadpoles and suggested that the introduction of trout is the most likely reason for the decline of species.

This threat due to predation by introduced trout is a significant, prevalent risk to SNYLFs both rangewide and within the action area, and it will persist into the future in those locations where fish are present.

*Yosemite Toad*

Overall, the data and available literature suggest that direct mortality from fish predation is likely not an important factor driving YT population dynamics. This does not discount other indirect impacts, such as the possibility that fish may be effective disease vectors. Because YTs use more ephemeral breeding habitats (which are less habitable to fish species as they cannot tolerate drying or freezing) minimizes the interaction of fish and toad tadpoles (Drost and Fellers 1994). Further, Jennings and Hayes (1994) stated that the palatability of YT tadpoles to fish predators is unknown, but often assumed to be low based on the unpalatability of western toads (Drost and Fellers 1994, Kiesecker *et al.* 1996), to which YTs are closely related. Grasso *et al.* (2010) concluded that early life stages of the YT likely possess chemical defenses that provide sufficient protection from trout predation.

Other predators besides nonnative fish may also have an effect on YT populations. Sherman and Morton (1993) reported evidence of toad predation by common ravens (*Corvus corax*) and concluded this activity was responsible for the elimination of toads from one site. These researchers also confirmed, as reported in other studies, predation on YT by Clark's nutcrackers (*Nucifraga columbiana*). The significance of avian predation may increase if the abundance of common ravens within the current range of the YT increases as raven abundance has increased as much as 300 percent in some areas of western North America since 1980 (Coates and Delhanty 2010) and is increasing at a rate of 2.5 percent a year (Sauer *et al.* 2013). However, the degree to which avian predation may be affecting YT populations has not been quantified.

Climate Change

Research has shown that the annual mean temperature in North America has increased from 1955 to 2005; however, the magnitude varies spatially across the continent, is most pronounced during spring and winter months, and has affected daily minimum temperatures more than daily maximum temperatures (Field *et al.* 2007). Warming trends seen over the past 50 years in the United States are predicted to continue to increase (Field *et al.* 2007). The Intergovernmental Panel on Climate Change states that of all ecosystems, freshwater ecosystems will have the highest proportion of species threatened with extinction due to climate change (Kundzewicz *et al.* 2007). Species with narrow temperature tolerances and cold-water species (*e.g.*, salmonids, SNYLF, YT) will likely experience the greatest effects from climate change, and it is anticipated that populations located at the margins of the species' hydrologic and geographic distributions will be affected first (Bates *et al.* 2008, Rieman and Isaak 2010). Climate change is predicted to

have several effects on cold water habitat including: (1) Increased water temperature; (2) decreased stream flow; (3) reduced snowpack; (4) change in the hydrograph; (5) increased frequency and severity of extreme events such as drought and floods; and (6) changing biotic interactions between native and nonnative species and diseases (Stewart *et al.* 2005, Ficke *et al.* 2007, Bates *et al.* 2008, Pierce *et al.* 2008, Webb *et al.* 2008, Schneider *et al.* 2009, Kaushal *et al.* 2010, Wehner *et al.* 2011, Arismendi *et al.* 2013, Coats *et al.* 2013).

For the Sierra Nevada ecoregion, climate models predict that mean annual temperatures will increase by 1.8 to 2.4 Celsius (°C) [3.2 to 4.3 Fahrenheit (°F)] by 2070, including warmer winters with earlier spring snowmelt and higher summer temperatures (PRBO Conservation Science 2011). However, it is expected that temperature and climate variability will vary based on topographic diversity (for example, wind intensity will determine east versus west slope variability) (PRBO Conservation Science 2011). Mean annual rainfall is projected to decrease from 9.2 to 33.9 cm (3.6 to 13.3 in) by 2070; however, projections have high uncertainty and one study predicts the opposite effect (PRBO Conservation Science 2011). Given the varied outputs from differing modeling assumptions, and the influence of complex topography on microclimate patterns, it is difficult to draw general conclusions about the effects of climate change on precipitation patterns in the Sierra Nevada (PRBO Conservation Science 2011). Snowpack is, by all projections, going to decrease dramatically (following the temperature rise and more precipitation falling as rain) (Kadir *et al.* 2013). Higher winter streamflows, earlier runoff, and reduced spring and summer streamflows are projected, with increasing severity in the southern Sierra Nevada (PRBO Conservation Science 2011, Kadir *et al.* 2013).

*Lahontan Cutthroat Trout*

In response to increasing temperatures, LCT will likely shift their distribution to higher elevations to find adequate cooler stream temperatures (Keleher and Rahel 1996, Poff *et al.* 2002). This will likely increase fragmentation of populations, and coupled with increases in stochastic events, will further disrupt metapopulation dynamics which increase the probability of extinction (Dunham *et al.* 1997, Fagan 2002, Opdam and Wascher 2004, Frankham 2005, Wilcox *et al.* 2006). Restoring physical connections among aquatic habitats may be the most effective and efficient step in restoring or maintaining the productivity and resilience of many aquatic populations (Bisson *et al.* 2003, Dunham *et al.* 2003b, Rieman *et al.* 2003, Dunham *et al.* 2007). The focus should be to protect aquatic communities in areas where they remain robust and restore habitat structure and life history complexity of native species where aquatic ecosystems have been degraded (Gresswell 1999).

*Sierra Nevada Yellow-legged Frog and Yosemite Toad*

The key risk factor for climate change impacts on SNYLFs is likely the combined effect of reduced water levels in high mountain lakes and ponds and the relative inability of individuals to disperse and colonize across longer distances in order to occupy more favorable habitat conditions (if they exist). Although such adaptive range shifts have been observed in some plant and animal species, they have not been reported in amphibians. The changes observed in amphibians to date have been more associated with changes in timing of breeding (phenology)

(Corn 2005). This limited adaptive capacity for SNYLFs is a function of high site fidelity and the extensive habitat fragmentation due to the introduction of fishes in many of the more productive and persistent high mountain lake habitats and streams that constitute critical dispersal corridors throughout much of the frog's range including within the action area.

An increase in the frequency, intensity, and duration of droughts caused by climate change may have compounding effects on populations of SNYLFs already in decline. In situations where other stressors (such as introduced fish) have resulted in the isolation of SNYLFs in marginal habitats, localized SNYLF population crashes or extirpations resulting from drought may exacerbate their isolation and preclude natural recolonization (Bradford *et al.* 1993, Drost and Fellers 1996, Lacan *et al.* 2008, Ryan *et al.* 2014). Viers *et al.* (2013) have used a variety of risk metrics to determine that SNYLFs in the Sierra Nevada are highly vulnerable to climate change and that changing hydrology and habitat in the Sierra Nevada will likely have drastic impacts on remaining populations.

Most recently, modeled vulnerability assessments for Sierra Nevada montane meadow systems have utilized life history and habitat requirements to gauge vulnerability of amphibian species to climate change. This assessment indicates that vulnerability to hydro-climatic changes will likely be very high for the YT, and that continued or worsening stream channelization in montane meadows from flashy storms may worsen effects by further reductions in the water table (Viers *et al.* 2013).

Disease

Over roughly the last two decades, pathogens have been associated with amphibian population declines, mass die-offs, and even extinctions worldwide (Bradford 1991, Blaustein *et al.* 1994, Alford and Richards 1999, Muths *et al.* 2003, Weldon *et al.* 2004, Rachowicz *et al.* 2005, Fisher *et al.* 2009). One pathogen strongly associated with dramatic declines on all continents that harbor amphibians is chytridiomycosis caused by the chytrid fungus Bd (Rachowicz *et al.* 2005), which has now been reported in amphibian species worldwide (Fellers *et al.* 2001, Rachowicz *et al.* 2005). The correlation of notable recent amphibian declines with reports of outbreaks of fatal chytridiomycosis in montane areas has led to a general association between high altitude, cooler climates, and population extirpations associated with Bd (Fisher *et al.* 2009). *Batrachochytrium dendrobatidis* has been documented in all known populations within the action area and has been identified as the most likely cause of population extirpations and reductions on the HTNF in the 1980s and early 1990s (USFS *et al.* 2014, USFS *et al.* 2015).

*Batrachochytrium dendrobatidis* is now widespread throughout the Sierra Nevada and, although it has not infected all populations at this time, it is a serious and substantial threat rangewide to the SNYLF. While Bd has not been extensively tested on YT populations, they do co-occur on the HTNF with SNYLF populations, which have been documented as Bd positive; therefore, it is assumed that Bd is prevalent throughout all populations of YT on the HTNF. Additionally, the interaction of disease and other stressors, such as climate extremes, is not well understood in the YT. Research does suggest that the combination of these threats represents a factor in the historical decline of the species (Sherman and Morton 1993).

Population Isolation and Habitat Fragmentation

*Lahontan Cutthroat Trout*

Many LCT populations historically acted as metapopulations (Service 1995). The term metapopulation refers to a collection of discrete local breeding populations. Lahontan cutthroat trout metapopulation dynamics result when local breeding populations in tributary streams are interconnected by larger downstream habitats. Interaction among tributary populations may occur through "straying" or dispersal of resident and/or fluvial fish (Rieman and Dunham 2000). The presence of several subpopulations increases the probability that at least one will survive through periods of disturbance, such as drought, and consequently protect the genetic variation available for adaptation to change (Ray *et al.* 2000). Models of metapopulation dynamics illustrate that some metapopulations may go extinct even in the presence of suitable habitat and that unoccupied suitable habitat may be important for long-term survival of the species (Lande 2002).

Loss of connectivity among local populations during the past 150 years has isolated many local populations and has increased the risk of local extinctions (Dunham *et al.* 1997). Most LCT populations are in isolated stream segments with no connectivity with other populations and consequently have a high risk of extinction. Management directed towards metapopulation dynamics will require long-term improvement in habitat conditions to achieve recovery objectives.

*Sierra Nevada Yellow-legged Frog and Yosemite Toad*

Amphibian habitat in the Sierra Nevada has been modified due to the introduction of a nonnative predator that both competes for limited food resources and directly preys on SNYLF tadpoles and adults. Presence of nonnative trout in naturally fishless ecosystems has had profound effects on the structure and composition of faunal assemblages, severely reducing not only amphibians, but also zooplankton and large invertebrate species (Knapp 1996, Bradford *et al.* 1998, Finlay and Vredenburg 2007). Within the SNYLF's historical range, past trout introductions and the continuing presence of fish in most lakes resulted in the elimination of frogs from most waters that were suitable for fish.

Since the mid-1990s, various parties, including researchers, the CDFW, National Park Service, and USFS, have implemented a variety of projects to actively restore habitat for the SNYLF via the removal of nonnative trout including a project within the headwaters of the West Fork of the Walker River, which is within the action area (USFS *et al.* 2014). Although fish stocking has been curtailed within many occupied basins, the impacts to SNYLF populations persist due to the presence of self-sustaining fish populations in some of the best habitat that normally will have sustained SNYLFs. The fragmentation that persists across the range of this frog renders them more vulnerable to other population stressors, and recovery is slow, if not impossible, without costly and physically difficult direct human intervention (such as physical and chemical trout removal) (Knapp *et al.* 2007). While most of the impacts occurred historically, the impact upon the biogeographic (population/metapopulation) integrity of the species will be long-lasting.

Currently, habitat degradation and fragmentation by fish is considered a highly significant and prevalent threat to persistence and recovery of SNYLFs and YTs rangewide and within the action area.

Fire Management

Changes in historical fire regimes are well documented in the western United States (McKelvey *et al.* 1996, Arno 2000, Stephens and Sugihara 2006, Richardson *et al.* 2007, Brooks 2008, Miller *et al.* 2009, Miller and Safford 2012). Around the late 1800s, high-frequency, low-intensity fire regimes associated with dry forest types, as found in the eastern Sierra Nevada, began having longer fire return intervals due to: (1) Relocation of Native Americans which disrupted their historical burning practices; (2) loss of fine fuels, which carried low-intensity ground fires, due to extensive overgrazing; (3) disruption of fuel continuity on the landscape due to irrigation, agriculture, and development; and (4) fire exclusion management policies (Arno 2000, Keane *et al.* 2002). Effects from the post-Euroamerican settlement influence on fire regimes include longer fire return intervals which allow fuel loads to increase. In return, relatively small, low-intensity ground fires have become uncharacteristically large, stand-replacing fires (Arno 2000, Miller *et al.* 2009, Miller and Safford 2012). Fire has been a missing component to meadow systems within the Sierra Nevada which has allowed fuel levels to increase and has allowed conifers to encroach on meadow systems (Frenzel 2012). While no studies have confirmed a link between fire suppression and rangewide population decline of the YT or SNYLF, circumstantial evidence to date suggests that historic fire suppression may be a factor underlying meadow encroachment from conifers, particularly at lower elevations (USFS *et al.* 2015). Additionally, wildfires have occurred within the action area; however, there have been no documentation of direct fire-related impacts to YT or SNYLF.

Recreation

The action area occurs within the Bridgeport Ranger District of the HTNF. The dominant land uses in the area is outdoor recreation, USFS management programs, and the USMC training at the MCMWTC. Recreation activities within the action area include hunting, hiking, camping, skiing, and snowmobiling. Dispersed recreation on public lands can adversely impact listed species and their habitats (Clark and Gibbons 1991). Camping near springs and streams can impact riparian vegetation and streambank stability. Increased vehicle traffic on poorly designed or maintained roads, road crossings, and off-road vehicle use disturbs substrate and increases stream sedimentation. Recreational fishing can affect populations of LCT and both amphibian species by increasing stocking pressure in waterbodies with high recreational value. Introduction of nonnative species are frequently attributed to use of live bait for fishing and unauthorized introductions of nonnative gamefish species are sometimes associated with recreational fishing (Rahel 2004). Introduced species have adversely affected SNYLFs and YTs through predation and may contribute to disease problems (Service 2014). Most of the streams and lakes in the action area have self-sustaining trout populations or are stocked with hatchery raised trout for recreation. The CDFW does not stock waters within designated critical habitat.

Multiple Stressors

Many of the stressors discussed above do not act alone. Multiple stressors can alter the effects of other stressors or act synergistically to affect individuals and populations [Intergovernmental Panel on Climate Change (IPCC) 2002, Boone *et al.* 2003, Westerman *et al.* 2003, Opdam and Wascher 2004, Boone *et al.* 2007, Lawler *et al.* 2010, Reeves *et al.* 2010, Miller *et al.* 2011, Arkle and Pilliod 2015, Grant *et al.* 2016]. For example, Kiesecker and Blaustein (1995) describe how UV-B acts with a pathogen to increase embryonic mortality above levels shown with either factor alone. Interactions between current land uses and changing climate conditions are expected to cause shifts in populations, communities, and ecosystems (Hansen *et al.* 2001), which may make certain species more vulnerable to extinction (IPCC 2002). Additionally, chemicals may exist in the environment at sub-lethal levels; however, UV light may increase the toxicity of these chemicals or changing climate may increase an individual's susceptibility to infection, disease, or predation (Boone *et al.* 2003, Burkhart *et al.* 2003, Davidson *et al.* 2007, Bancroft *et al.* 2008, Rohr *et al.* 2008, Relyea 2009, Hof *et al.* 2011, Miller *et al.* 2011, Buck *et al.* 2012, Hooper *et al.* 2013, Rohr and Palmer 2013, Grant *et al.* 2016).

Predicted warming temperatures have been linked with disease outbreaks. Carey (1993) has suggested that, where environmental changes cause sufficient stress to cause immunological suppression, cold body temperatures that montane amphibians experience over winter could play a synergistic role in reducing further immunological responses to disease. Thus, such conditions might make SNYLFs more susceptible to disease. Additionally, Blaustein *et al.* (2001) have suggested that climate change could also affect the distribution of pathogens and their vectors, exposing amphibians to new pathogens. Climate change has been hypothesized as a driver for the range shift of Bd (Pounds *et al.* 2006, Bosch *et al.* 2007). However, other work has indicated that survival and transmission of Bd is more likely facilitated by cooler and wetter conditions (Corn 2005). Fisher *et al.* (2009) present a review of information available to date and evaluate the competing hypotheses regarding Bd dynamics, and they present some cases that suggest a changing climate can change the host–pathogen dynamic to a more virulent state.

## EFFECTS OF THE PROPOSED ACTION

### *Effects to Lahontan Cutthroat Trout, Sierra Nevada Yellow-legged Frog, and Yosemite Toad*

The analysis presented below on the effects of the proposed action on LCT, SNYLF, and YT is based on the current locations of each species in the action area. The current distribution of LCT, SNYLF, and YT is limited, which may minimize each species' exposure to the effects described below. However, we acknowledge that over the term of the 40-year SUP, the abundance and distribution of these species is likely to change. For instance, in 2017, the USMC reported a new YT population in the action area during surveys for this species (USMC 2017e). An increase in the abundance and distribution of these species will likely increase their risk of exposure to the effects described; however, even if the distribution or abundance of these species were to increase, we expect that the effects associated with the proposed action will remain relatively the

same. This is because the conservation measures, as described, will be implemented when and where necessary to minimize each species exposure to the risks associated with the proposed action.

Four training components broadly cover the activities the USMC will conduct in the action area. These activities overlap with habitat occupied by LCT, SNYLF, and YT, or aquatic features in CARs for SNYLF and YT. This includes: (1) Training events and other operation and maintenance activities; (2) aerial operations; (3) range use; and (4) training corridor and road use and maintenance. The Service expects potential adverse effects from the USMC activities to include disturbance (*e.g.*, visual, noise, habitat), trampling by humans or packstock, being struck by vehicles or equipment, and habitat loss or degradation from fire or chemical contamination.

Training Events and Other Operation and Maintenance Activities

The main effects of the proposed action are associated with training events and other operation and maintenance activities that involve human disturbance and, to a lesser degree, packstock use. Most of the training events and activities proposed by the USMC are foot mobile courses that involve dispersed and concentrated areas of human activity. These dispersed and concentrated activities are comparable to recreational activities such as hiking and camping, and can result in both direct and indirect effects to the species and their habitat. Direct effects include injury, mortality, and harassment of individuals. Indirect effects include changes in behavior in response to human presence, which may result from increased noise and visual disturbance, and habitat degradation. The number of military personnel involved in each training event or exercise varies but the largest (*i.e.*, Mountain Exercise) involves up to 1,200 individuals during a single exercise. Because we expect the effects of human disturbance to be similar to those associated with recreational activities, the following paragraphs discuss the impacts of recreational uses as they relate to the proposed action.

Generally, studies of the impact of recreational use, specifically camping, in designated wilderness and national parklands in the western United States have found that recreation creates considerable impact rapidly with light use, whereas recovery occurs only after lengthy periods of no use (Cole and Fichtler 1983, Cole 1986, Stohlgren and Parsons 1986, Cole and Marion 1988). Establishment of trails and camps disturbs vegetation and soil structure, resulting in changes in habitat structure and microclimate (Foin *et al.* 1977, Boyle and Samson 1985, Knight and Cole 1991). These activities as well as dispersed camping and other activities that occur near high-elevation meadows, ponds, lakes, and streams can result in increases in erosion and sedimentation, bank trampling, and vegetation disturbance. Heavy recreational use can mimic damage to vegetation and soils caused by overgrazing (Obedzinski *et al.* 2001). Three wilderness areas studied in the western United States concluded that the impacts on campsites used for less than 10 nights per year had already reached a threshold beyond which further increases in use had little effect on the severity of impacts. These impacts included loss of vegetation cover, soil compaction resulting in slowed infiltration rates, and pronounced increases in soil pH, organic matter content, and nutrient content (Cole and Fichtler 1983). Wastes from humans and

packstock may also introduce other water pollutants such as nitrogen that can result in algal blooms, decreased oxygen content, and increased water temperatures. This can affect egg, larval, and other life stages.

Recreational activities may also alter the hydrology of lakes, meadows, and creek or stream habitats potentially resulting in their degradation or drying. Recreational infrastructures such as developed campgrounds and dispersed activities such as hiking, camping, or use of packstock can compact soil, increase runoff and erosion, alter vegetation, modify pool mudflats, and trample stream banks and lakeshores. These effects can divert water, result in downcutting, and lower water tables, which may then result in a reduction or elimination of occupied or suitable habitat for amphibians. Yosemite toads breed in very shallow water habitats within meadows or lakes and a certain amount of mortality of eggs and tadpoles occurs naturally from desiccation and freezing. Given this natural vulnerability, any changes that result in decreased amounts and shorter persistence of the species' preferred shallow water breeding habitats may reduce reproductive success and recruitment, and ultimately the persistence of populations. Sierra Nevada yellow-legged frogs are highly aquatic, require perennial water for their multi-year tadpole stage, and generally require water that does not freeze to the bottom in winter or completely dry during the summer. Thus for both species, hydrological changes that result in shallower water or desiccation may reduce reproductive success and recruitment, survival of all life stages, and ultimately the persistence of populations. Shallower aquatic systems such as those found in wet meadows and small streams are more vulnerable to hydrologic impacts than deeper lakes.

Recreational activities may also cause erosion that can increase siltation and sedimentation, which can adversely affect the amount or quality of suitable or occupied aquatic habitat for amphibians (USFS *et al.* 2014, USFS *et al.* 2015), as well, as LCT. These activities may result in a decrease in vegetative cover along streams, lake shores, and in meadows, and can dislodge rocks, wood, and other cover. Humans and packstock may also adversely affect amphibians through injury, mortality, and harassment. This would most likely occur with YT in upland habitat where YT spend most of their time. The USMC is not permitted to conduct activities in YT breeding meadows. In upland habitat, human activity may crush YT in rodent burrows, or move or alter rocks, logs, or tree stumps used by YTs as refugia. Alterations to cover (*e.g.*, rocks, logs, *etc.*) may increase the risk of predation, change microclimates that can affect growth and survival, and influence prey availability by changing the prey's habitat (USFS *et al.* 2014, USFS *et al.* 2015).

Wading of people and livestock along streams or lake shores, or walking within or near meadow habitat may disrupt, injure, or kill SNYLF and YT. In upland habitat, burrows containing subadult or adult YTs may be injured or crushed by feet or hooves. Yosemite toads have also been found on hiking trails, under campfire rings in remote areas being actively decommissioned, and in burrows associated with rocks that line roads to developed campsites. Examples of direct mortality, injury, or harassment include observations of trampling of SNYLF larvae and juvenile frogs by packstock (V. Vredenburg, pers. comm., 2002 as cited in USFS *et al.* 2014). In addition, the USFS *et al.* (2015) documented the trampling, handling, and other disturbance of western toad (*Anaxyrus boreas*), a species closely related to the YT, egg masses,

tadpoles, and metamorphs by humans and pets. Rodriguez-Prieto and Fernandez-Juricic (2005) found that Iberian frog (*Rana iberica*) abundance decreased with proximity to recreational activities and that the time frogs spent in refugia was affected by the amount of human activity, which suggests these effects are possible for Sierra amphibian species, as well. Trash and other debris left by humans may also attract predators to the area. Trash cans serve as an attractant to common ravens, which prey on YT.

Human disturbance associated with the use of trails, river and stream crossings, and other activities and events (*e.g.*, placement of a JAB or MGB) conducted in and adjacent to river and streams occupied by LCT and SNYLF could directly and indirectly affect these species and their habitat through harassment, injury, or mortality. Silver Creek, which is occupied by LCT and SNYLF, is one such location where this could occur. It is likely that these activities will cause adult LCT and SNYLFs to temporarily disperse out of the area impacted by human disturbance. However, if they are present, LCT redds (spawning nests), eggs, and fry, and SNYLF eggs and tadpoles could be destroyed, injured, or killed through crushing. Human disturbance could also disrupt breeding and spawning activities. The indirect effects associated with human disturbance during river and stream crossings, and the placement of equipment along and adjacent to stream banks, could result in decreased survival and reproduction by disturbing important habitat features for these species. For instance, USMC activities could cause an increase in erosion and sedimentation, which then results in an increase in fine sediment composition in stream gravel. An increase in fine sediment has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes (USFS 2001c). Increased erosion and sedimentation can also negatively affect aquatic habitat by increasing turbidity. Military personnel that congregate along streambanks may trample vegetation. This will reduce cover used for shade or protection from predators as well as increase water temperature. Since LCT are a cold-water fish, an increase in water temperature could reduce suitable habitat. Finally, important habitat features in the aquatic environment such as rocks and sediment used for redds or other life stages (eggs, fry, tadpoles, *etc.*) could be disturbed or removed.

The USMC's proposed winter activities include the use of snowmobiles, snow grooming vehicles, snowcats, skis, snowshoes, and sleds. Snow compaction from snowmobile use, foot traffic, and other training has been shown to alter habitat quality in the subnivean (below snow) zone (Keddy *et al.* 1979). Compaction can alter temperatures below the snow, killing and/or injuring small animals below the snow, and alter below snow populations (Jarvinen and Schmid 1971, Keddy *et al.* 1979). This subnivean zone is most important for YTs because they typically overwinter in burrows. Sierra Nevada yellow-legged frogs are less likely to be directly impacted by over-the-snow travel because they usually overwinter under frozen lakes or streams. Lahontan cutthroat trout will also not be directly affected by over-the-snow travel because the USMC will not travel through any occupied streams during the winter. The USMC will also conduct other activities during the winter such as ice breaching using explosives (which was discussed in the Ranges section), ice breaking using mechanical and/or manual devices, cold-water immersion, and establishment of RHUs and COCs. The most likely effects associated with these activities will be increased visual and noise disturbance, and trash deposition that could attract predators of SNYLFs and YTs.

The USMC will implement measures in LCT-occupied streams to avoid and minimize the effects associated with human disturbance. These measures include: no wading or walking up and downstream during river and stream crossings; during training events (except the Mountain Exercise and the Large Scale Exercise), limiting group size to less than 25 individuals and to one location during river and stream crossings, and having larger groups (greater than 25 individuals) cross at bridges, existing roads, and trails; no creation of rock or log dams that could impede fish passage; and no ground disturbing activities (*e.g.*, digging, vegetation removal, bivouacking) or activities involving larger groups within 100 m (328 ft) of LCT-occupied streams. Some activities will still have the potential to injure or kill individuals, and degrade habitat. For instance, during large-scale exercises such as the Mountain Exercise, which could occur up to 6 times per year with an average of 800 military personnel per event, up to 200 military personnel could cross an occupied stream outside of hardened areas within the same day. The military personnel are not restricted to a specific river and stream crossing location and will likely be spread out in the river or stream. This type of disturbance has the potential to result in high impacts to some areas, though it will likely be of short duration (*e.g.*, 1 day) because military personnel will be moving across the landscape. Additionally, smaller groups of less than 25 individuals will be allowed to conduct training activities that are not ground disturbing (including bivouacking) within 100 m (328 ft) of aquatic features containing habitat occupied by LCT. Therefore, the potential still exists for LCT to be harassed, injured, or killed.

The USMC will minimize the effects associated with the placement of temporary bridges. This includes limiting their deployment to one to two training events per year; limiting the deployment of the MGB (which could involve individuals entering the water to assemble and disassemble it) on each LCT-occupied stream (Mill, Silver, and Wolf Creeks) to once every 3 years; and avoiding the deployment of the MGB during the LCT spawning season (April 1 to July 30). These measures minimize the potential for destroying redds, or injuring or killing eggs and fry by avoiding the LCT spawning season. The measures also minimize the potential for destroying eggs, or injuring or killing tadpoles by avoiding the SNYLF breeding season (May 1 to July 30). In both cases, disturbance will be limited in scope (*e.g.*, area of disturbance) and frequency (*i.e.*, one to two training events per year). On the West Walker River, there is no limitation on the frequency of deployment of the temporary bridges. In other words, it is possible the USMC could deploy the JAB and/or MGB every year. Therefore, LCT in the West Walker River could be harassed and potentially displaced from the immediate area though such harassment would be of short duration. Additionally, despite the measures described above, it is still possible the adult SNYLFs and tadpoles in Silver Creek may be harassed, injured, or killed by USMC activities. But again, the placement of temporary bridges would be of short duration and would not occur every year on Silver Creek.

In addition to the measures described above, the USMC will implement measures that avoid and minimize the effects associated with human disturbance to SNYLFs and YTs. These measures include: no training activities within occupied breeding habitats during the breeding season (May 1 to July 30); no ground disturbing activities (*e.g.*, digging, vegetation removal, bivouacking) or activities involving groups larger than 25 individuals within 100 m (328 ft) of occupied habitat and within 100 m (328 ft) of water bodies in critical habitat and CARs (except for the temporary placement of bridges); implementing a trash clean-up program; no training

activities or exercises that include overland foot travel will occur within 100 m (328 ft) of YT breeding habitat (except for RHU and COC establishment); and placing RHUs and COCs on previously disturbed ground at the Highway 108/Finley Mine Road junction and, in TAs 10 and 11, using them when there is a minimum of 0.6 m (2 ft) of snowpack.

Even with these avoidance and minimization measures in place, the USMC training events and other operation and maintenance activities still have the potential to harass, injure, or kill SNYLFs and YTs. For example, smaller groups of less than 25 individuals are allowed to conduct training activities that are not ground disturbing (including bivouacking) within 100 m (328 ft) of habitat occupied by SNYLF. As with LCT, during large-scale exercises, up to 200 military personnel could cross an occupied stream outside of hardened areas within the same day. Silver Creek is one location occupied by SNYLF that could be affected by this activity. Human disturbance from small groups and larger groups, though short-term, have the potential to harass, injure, and/or kill SNYLF (all life stages). Yosemite toads, specifically in upland habitat, could be harassed, injured, or killed during the placement of RHUs and COCs, or crushed by military personnel traveling by foot.

Aerial Operations (LZs and DZs)

Aerial operations at LZs and DZs have the potential to affect LCT, SNYLF, and YT through visual, noise, and habitat disturbances. In the BA (USFS and USMC 2017a), Table 3-2 identified the LZs and DZs that overlap with aquatic features containing habitat occupied by LCT, SNYLF and YT, or aquatic features in CARs for SNYLF and YT. Of the 59 LZs and 4 DZs on the MCMWTC, there are currently 19 LZs and 3 DZs that overlap with these areas. Many of these LZs and all DZs fall within a 100-m (328-ft) buffer of aquatic features containing habitat occupied by LCT, SNYLF, and YT, or aquatic features in CARs for SNYLF or YT. These areas and the LZs located in upland habitat for YT are subject to restrictions, which are described below in the paragraph describing avoidance and minimization measures.

The primary effect to individuals associated with the use of LZs and DZs, particularly SNYLFs and YTs, will be increased visual and noise disturbance. For example, the dropping of military personnel into a DZ will increase visual and noise disturbance. Impacts to wildlife from aircraft noise and visual stressors can include a startle reflex, increased expenditure of energy, decreased time and energy spent on life functions such as feeding and mating, increased likelihood of predation, and interruption of breeding behavior (Efroymson *et al.* 2000, Larkin 1996). Noises that are close, loud, and sudden and that are combined with a visual stimulus produce the most intense reactions in animals (Bowles *et al.* 1999). Rotary-wing aircraft, such as helicopters or MV-22s (in rotary-wing mode), generally induce the startle effect more frequently than fixed-wing aircraft (Frid 2003). Increased visual and noise disturbance could cause SNYLFs or YTs to cease normal activities such as foraging and breeding. The cessation of foraging and breeding could in turn negatively affect survival and reproduction.

A secondary effect associated with the use of LZs and DZs will be habitat disturbance that could occur because of the insertion of military personnel or cargo or the downdraft and outwash from the rotors on rotary-wing aircraft. The insertion of military personnel or cargo may result in

localized areas of habitat disturbance due to the crushing or removal of vegetation. Rotor wash may disturb vegetation and soil around take-offs, landings, and near-surface hovering. At take-off and landing sites, rotor wash underneath rotary aircraft, especially MV-22s, can damage or remove upright-branching vegetation, blow away loose snow and topsoil, and flush wildlife in the immediate vicinity (MCI West 2013). Wind velocities associated with the MV-22 have been measured at approximately 168 kilometers per hour (km/h) [104 miles per hour (m/h)] directly below MV-22s when hovering at 30 m (100 ft) AGL (MCI West 2013). MV-22 rotor wash wind speeds peak at 148 km/h (92 m/h) within 7.6 m (25 ft) of the aircraft at 60 degrees and 300 degrees relative to the nose of the aircraft. Wind velocities from rotor wash decline significantly with distance from the aircraft. Beyond 47.5 m (156 ft), wind speeds reflect consistent deceleration but extend to approximately 122 m (400 ft) at between 8 and 37 km/h (5 and 23 m/h) depending on the angle (MCI West 2013). At distances at and beyond approximately 122 m (400 ft), wind speeds generated from MV-22s will likely not be beyond naturally occurring wind speeds (USFS and USMC 2017a).

In addition, aircraft such as the MV-22, have the potential to start a wildfire that affects all three species or disturbs overwintering habitat for YTs. The elevated fire risk associated with the MV-22 is due to the exhaust heat of the nacelles (the housing that holds engines, fuel, or equipment on an aircraft). When the MV-22 landing sequence is initiated, the nacelles rotate to make a vertical landing, and the exhaust deflectors are automatically engaged to disperse heat from the nacelles. The heat from the MV-22 could ignite vegetation and start a fire, or melt snow that protects overwintering YTs. In a worst-case scenario, a wildfire could result in habitat loss or degradation (*e.g.*, increased erosion into aquatic habitat, loss of protective cover), and the injury and mortality of LCT, SNYLF, and YT. Melting snow may also affect overwintering YT by exposing their refugia and making them vulnerable to predation or by rousing them when prey is unavailable. Sierra Nevada yellow-legged frogs and LCT, which overwinter beneath frozen lakes and streams, are less likely to be affected by melting snow.

The available evidence indicates there is a very low likelihood of ignition from MV-22s, and this risk is further reduced because operators will not land in locations and under conditions where a wildfire could be started (MCI West 2013). Under normal operations with engine exhaust deflectors operating, the exhaust of the MV-22 should not heat the ground to a temperature high enough to support combustion of plant-based materials such as dry grasses (MCI West 2013, USMC and USFS 2013). The aircraft operates with the exhaust deflectors on at all times when on the ground because the exhaust deflectors activate as soon as there is weight on the main landing gear wheels. During the summer months, when MV-22s are in use, military personnel will be present to put out any fires that may start (USFS and USMC 2017b). Since the exhaust deflectors activate upon landing, there will also be little risk for significant levels of snowmelt below the aircraft during landings and takeoffs. Although the ignition of fires is unlikely, surface temperatures could be high enough to dry out and damage growing vegetation and, during winter use, to melt a small amount of snow on the surface (USFS and USMC 2017a). However, we expect that these effects will be limited in extent.

We anticipate that the effects associated with aerial operations at LZs and DZs will mostly be minor, with no injury or mortality expected. This is because the USMC will implement measures that will avoid or minimize the effects described above. Specifically, the HTNF identifies landing points within each LZ; determines applicable restrictions (*e.g.*, timing of use); and evaluates them annually to assess the effects of landings, foot traffic from troop insertions, and cargo drops. If these activities result in impacts such as soil compaction, erosion, sedimentation, or removal of vegetation, then the HTNF will modify the terms of use for this particular LZ to reduce these impacts. The USMC will also land aircraft outside of the 100-m (328-ft) buffer around aquatic and wetland habitat located in CARs and critical habitat, and LCT-occupied streams. This will minimize the potential effects to individuals and habitat associated with downdraft and rotor-wash from aircraft. As mentioned previously, the wind speeds generated from MV-22s will likely not be beyond naturally occurring wind speeds at distances at and beyond approximately 122 m (400 ft). Since aircraft cannot land within 100 m (328 ft) of aquatic and wetland habitat located in CARs and critical habitat, and LCT-occupied streams, visual and noise disturbance (including habitat disturbance) should be minimized. Furthermore, in TAs 10 and 11 where YTs are present, landings will only occur between November 15 and April 15 when there is at least 0.6 m (2 ft) of snowpack. There is also the same snowpack restriction for some of the LZs located outside TAs 10 and 11 in YT upland habitat. For LZs and DZs that do not have a snowpack restriction, such as DZ Hawk and LZ Parrot, aircraft must still land outside the required buffer around aquatic and wetland habitat in CARs or occupied habitat. This will minimize visual and noise disturbance experienced by YTs, and, to some degree, habitat disturbance. Finally, the USMC will monitor impacts and use adaptive management, as appropriate, to reduce the impacts associated with the use of LZs and DZs.

Range Use

The USMC conducts live-fire small arms and avalanche training at ranges. The activities associated with these trainings have the potential to affect LCT, SNYLF, and YT. In the BA (USFS and USMC 2017a), Table 3-2 identified the ranges that overlap with aquatic features containing habitat occupied by LCT, SNYLF and YT, or aquatic features in CARs for SNYLF and YT. About half of the live-fire small arms training ranges (R600, R601, R800/R801, R400, R1000/AIS-1, and R1100) and all of the AISs (AIS-1/R1000, AIS-2, AIS-3) overlap with these areas, though the AISs only overlap with habitat for YT. Many of these ranges fall within a 100-m (328-ft) buffer of aquatic features containing habitat occupied by LCT, SNYLF, and YT, or aquatic features in CARs for SNYLF or YT. These areas and the ranges are subject to restrictions as described below as part of the minimization measures.

There could be direct and indirect effects to LCT, SNYLF, and YT associated with the use of ranges. The direct effects could include injury and mortality from humans stepping on individuals, including eggs, fry, or tadpoles, or destroying redds. Indirect effects such as increased visual and noise disturbance from the use of firearms or ice breaching (which uses explosives) could cause individuals to cease normal behavior such as foraging and breeding, which could affect survival and reproduction. Avalanches initiated by military personnel could increase snow compaction, destroy vegetation, or cause erosion. Foot traffic could also cause soil

compaction that leads to increased erosion and impacts the quality of aquatic habitat. Activities at ranges will also generate munitions materials and trash that could contaminate and degrade habitat and attract predators to the area.

We anticipate that the effects (*e.g.*, increased noise, snow compaction) associated with the initiation of avalanches in AISs, specifically for YT, will be minimal because they will occur in areas where avalanches tend to naturally occur and no avalanche initiation will occur within occupied habitat. Ice breaching will also not occur in occupied habitat. Finally, there are restrictions in TAs 10 and 11 such as group size and minimum depth of snowpack that will likely limit noise and habitat disturbance.

The following analysis regarding munitions contamination is taken from the preliminary environmental assessment developed by the HTNF and USMC for the proposed action (USFS and USFS 2017a). The USMC assesses the use of ranges through the Range Environmental Vulnerability Assessment (REVA) program. The REVA program uses the term "munitions constituents (MC) loading" or MC loading to describe the amount and types of MCs potentially deposited onto the operational ranges as a result of military munitions training activities. The purpose of the REVA is to identify areas and activities that are subject to possible impacts from external influences and to determine whether a release or substantial threat of a release of MCs from the use of ranges to off-range areas may create an unacceptable risk to human health and/or the environment. Computer models use estimates for the amount and types of MCs fired onto the operational ranges to assess the potential for MCs to migrate off these ranges at detectable concentrations.

The USMC conducts a baseline assessment of range areas and periodic 5-year review assessments, and where applicable, the use of fate and transport modeling of the REVA indicator MC (*e.g.*, lead) based upon site-specific environmental conditions at the ranges and training areas [Headquarters Marine Corps 2008, Marine Corps Installations Command (MCICOM) 2012]. In 2007, the USMC conducted a baseline assessment under the REVA Program covering munitions use through 2006 on all 13 ranges (Headquarters Marine Corps 2008). The baseline REVA assessment completed for the MCMWTC in 2007 evaluated lead, the indicator MC associated with small arms ranges. The USMC did not identify any MC loading areas where cyclotrimethylene trinitramine (RDX), TNT, cyclotetramethylene tetranitramine, or perchlorate were used. The surface water and groundwater evaluation rankings for small arms ranges resulted in minimal scores. A "minimal score" means that the small arms range has minimal or no potential for lead migration, but actions may be necessary to ensure that continuing training activity at the range does not pose a future threat to human health and the environment. Two ranges had moderate rankings (groundwater for R-500 and surface water for R-600), but both of these rankings were modified to minimal because the potential for lead migration and exposure to groundwater receptors is low for R-500 and the loading potential for lead is low for R-600. Range 600 is located within the 100-m (328-ft) buffer around aquatic features occupied by LCT and SNYLF, and aquatic features in CARs for SNYLF. Range 500 is not located within the 100-m (328-ft) buffer around aquatic features occupied by LCT, SNYLF and YT, and aquatic features in CARs for SNYLF and YT. All other small arms ranges were ranked as minimal because of low MC loading and the low potential for lead transport in surface water and

groundwater based on site-specific conditions. In the most recent 5-year review, it was determined that a release or substantial threat of a release of MC from ranges to off-range areas does not create an unacceptable risk to human health and/or the environment. In 5 years, the ranges and training areas at the MCMWTC will be evaluated again (MCICOM 2012).
The USMC will minimize habitat disturbance and degradation from its use of ranges. This includes collecting and removing discarded munitions materials and trash from the ranges following training events. Additionally, the number of military personnel within the 100-m (328-ft) buffer around aquatic features in occupied habitat and CARs will be limited. At any single training event, large groups (more than 25 individuals) will not conduct activities, including the use of explosives, live demo, and small arms, within 100 m (328 ft) of occupied habitats, and within 100 m (328 ft) of water bodies in CARs. In occupied YT breeding habitat, the USMC will not conduct training activities during breeding season (May 1 to July 30). Even with these measures in place, military personnel could still displace LCT or SNYLF from suitable habitat, exposing them to predators, or disrupt normal behavior such a feeding, breeding, or aestivation through habitat disturbance (*e.g.*, avalanche training) or degradation (*e.g.*, contamination). However, it is difficult to determine to what degree this may occur.

Training Corridors and Roads

In the BA (USFS and USMC 2017a), Table 3-2 identified the training corridors and roads that overlap with aquatic features containing habitat occupied by LCT, SNYLF and YT, or aquatic features in CARs for SNYLF and YT. Only one training corridor overlaps with the 100-m (328-ft) buffer of LCT-occupied streams. It is primarily other roads (*e.g.*, USFS roads) that overlap with these areas. Training corridors and roads will be utilized by the USMC for various activities and training events. The USMC will also work with the HTNF to conduct road maintenance activities. In this section, we focus on the effects road maintenance, and the use of vehicles and other military equipment on training corridors and roads may have on each species. The adverse effects associated with the use of trails and other activities in conjunction with the training events and activities, which primarily involve human disturbance, was discussed previously in the Training Events and Other Operation and Maintenance Activities section.

Lahontan cutthroat trout, SNYLF, and YT all have characteristics that make them vulnerable to harassment, injury, or death from vehicles or equipment traveling along training corridors or roads. The USMC will not drive vehicles through streams occupied by LCT. This means there will be no direct effects such as injury or mortality of LCT, eggs or fry, or the destruction of redds. There could be indirect effects to LCT habitat, which is discussed in the next paragraph. The primary effect associated with use of training corridors and roads is injury or mortality of SNYLF and YT from being struck or crushed by vehicles or equipment. As mentioned previously, USFS and Service staff have observed crushed YT juveniles and adults on roads. The SNYLF and YT are cryptic and relatively small animals that may exhibit an immobilization response to danger, which makes it difficult for people to avoid them (Mazerolle *et al.* 2005, Andrews *et al.* 2008). Yosemite toad adults, and to a smaller extent SNYLFs, move among multiple habitats during their active season (*i.e.*, spring, summer, and early fall), especially

during the breeding season. Sierra Nevada yellow-legged frogs, which are highly aquatic, may be less likely to be struck or crushed by vehicles or equipment but YTs can move greater distances on land and tend to walk slowly, thus they cannot easily or quickly move to avoid danger.

The indirect effects associated with the use of training corridors and roads include increased disturbance (*e.g.*, noise), habitat degradation from chemical contamination, and the introduction of nonnative and invasive plant and animal species. Noise from vehicles or equipment may cause individuals to cease their normal behavior. Yosemite toads have been observed halting trilling during breeding season when vehicles drove by an active breeding site in a high elevation meadow, potentially modifying breeding behavior. Roadways are paths for contaminates to enter waterways as vehicles can leak oil, and sometimes fuel, that wash from road surfaces, becoming a source of petroleum product contamination to surface waters. Sierra Nevada yellow-legged frogs and YT also have permeable skin that may make them more susceptible to the toxic effects of chemicals from vehicles (Andrews *et al.* 2008). The adverse effects of these pollutants to amphibians include reduced survival, growth, and metamorphosis, altered physiology and behaviors, deformities in tadpole oral cavities, and elevated levels of stress hormones (Mahaney 1994, Lefcort *et al.* 1997, Brown *et al.* 2014, Andrews *et al.* 2008, Beebee 2013). Chemical or toxin contaminants can have numerous effects on aquatic animals, especially fish. In general, the effects of heavy metal or petroleum contamination are because many of their sensitive organs are in constant contact with their environment.

A review of the effects of heavy metals on salmonids, which are closely related to LCT, by Price (2013) indicates that heavy metals can have a variety of effects on individuals, from mortality (lethal exposure) to reductions in swimming speed, feeding rates, predation success, territoriality, egg/larval survival, growth and reproduction rates, olfaction, and impairment of development, mobility, and cellular functions over time (sublethal exposure). Similarly, there are a variety of effects, ranging from lethal to sublethal, to fish when they are exposed to varying levels of petroleum contamination (see Malins (1977) for specific information).

The use of roads may also affect plant species composition by changing soil and habitat properties, increasing the dispersal of nonnative and invasive plant species, and by altering biotic interactions and population dynamics (Avon *et al.* 2013). Roads can also facilitate movement of vectors for invasive species of plants (Tyser and Worley 1992, Forman *et al.* 2003) and animals (Rahel 2004). Increases in illegal fishing and illegal introductions of nonnative fish and other aquatic organisms are facilitated by public road access to different water bodies (Rahel 2004).

Road maintenance may also affect habitat quantity and quality for LCT, SNYLF, and YT by removing adjacent vegetation or increasing erosion and sedimentation. The effects associated with road maintenance are similar to those discussed above in the Training Events and Other Operation and Maintenance Activities section. Consequently, we will not reiterate those effects here.

The USMC will implement the following measures to avoid and minimize the effects associated with road maintenance, and the use of training corridors and roads. The USMC will minimize habitat disturbance by following the USFS's Best Management Practices for road maintenance,

and will only use existing roads and prohibit off-road vehicle use, except for over-the-snow travel. It will prevent the spread of invasive plants by power-washing all vehicles before use (USFS and USMC 2017b). Injury or mortality of LCT, and habitat degradation (*e.g.*, contaminants) or disturbance (*e.g.*, sedimentation) to occupied streams will be avoided by not allowing vehicles to cross occupied streams. Despite these measures, vehicles and other equipment could still strike SNYLFs and YTs or affect all three species via chemical contamination, resulting in their injury or death. However, because the action area is also open to the public, it will be difficult to attribute injury or death from these factors to a specific person or group.

Summary

The USMC intends to conduct activities that overlap with habitat adjacent to or containing LCT, SNYLF and YT, or aquatic features in CARs for SNYLF and YT. Four training components broadly cover the activities the USMC will conduct in the action area. This includes: (1) Training events and other operation and maintenance activities; (2) aerial operations; (3) range use; and (4) training corridor and road use and maintenance. The likely effects from these activities include harassment, injury, and mortality. Currently, the distribution of LCT, SNYLF, and YT is limited, reducing each species' exposure to the effects described above. Additionally, while there could be areas of concentrated activity, the majority of the USMC's activities will be dispersed across the landscape. This dispersed activity may result in an increase in disturbance that affects the species at the individual level (*e.g.*, injury or mortality), but it is unlikely to occur to such a degree that it will result in the extirpation of entire populations. The USMC will also implement measures that will avoid or minimize these effects to both the species and their habitat.

The Service recognizes that, over the term of the 40-year SUP, the distribution and abundance of LCT, SNYLF, and YT could change and/or increase, which could increase each species' exposure to the effects of the proposed action. But the measures, as described, will be implemented when and where necessary to minimize species exposure to the risks associated with the proposed action.

*Effects on Sierra Nevada Yellow-Legged Frog Critical Habitat*

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to serve its intended conservation role for the species. Activities that may destroy or adversely modify critical habitat are those that result in a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of the SNYLF. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of these species or that preclude or significantly delay development of such features. The role of critical habitat is to support life-history needs of the species and provide for the conservation of the species. In the action area, there is total of 3,738 ha (9,238 ac) of critical habitat (subunit 2H) in

the action area of which 158 ha (390 ac) contain the PCEs for SNYLF (USMC 2017c). This means that 4 percent of the critical habitat (subunit 2H) in the action area contains the PCEs for SNYLF.

*PCE 1: Aquatic habitat for breeding and rearing*

Water bodies such as lakes, streams, and other forms of aquatic habitat along with their associated riparian habitat could be impacted by the proposed action. The habitat features of PCE 1 for SNYLF most likely to be affected includes bank and pool substrates; open gravel banks and rocks and other structures used for sunning posts; aquatic refugia such as logs, branches, rocks, or vegetation used for cover; and sufficient food sources. Proposed activities may result in increased erosion and sedimentation into aquatic habitats, affecting bank and pool substrates; disturbing open gravel banks, or dislodging rocks and other structures that can be used by SNYLF for sunning posts; removing aquatic refugia (logs, branches, or vegetation) used for cover from predators; and destroying foraging habitat, thereby decreasing available prey. However, we anticipate that these effects will be temporary and short-term in nature because activities associated with the proposed action are not concentrated in aquatic breeding habitat but rather dispersed across the action area. The USMC will also implement measures to avoid or minimize effects to this PCE. These include not conducting training activities in occupied breeding habitat during the breeding season; not landing aircraft, allowing ground disturbing activities, or activities involving groups larger than 25 individuals within 100 m (328 ft) of streams, lakes, meadows, marsh areas, or wetlands within critical habitat; and implementing measures to protect water and soils.

*PCE 2: Aquatic nonbreeding and overwintering habitat*

The habitat features under PCE 2 that could be affected by the proposed action are the same as those described for PCE 1. In addition to overwintering refugia and habitats (such as streams, stream reaches, or wet meadow habitats) that function as corridors for movement between aquatic habitats. As described previously under PCE 1, bank overhangs, logs, branches, rocks, or vegetation, which serve as cover for SNYLF, may be disturbed or trampled. Ice breaching and landing aircrafts may disturb the ice and snow that provide thermal protection for SNYLF in overwintering habitat. Human disturbance could also increase erosion and sedimentation into aquatic habitats or trample vegetation in and adjacent to aquatic habitats that serve as corridors between breeding and foraging sites used by SNYLFs. Similar to those reasons above, we anticipate that the effects associated with the proposed action will be temporary and short-term in nature; disturbance will be dispersed rather than concentrated in areas that contain the features of PCE 2; and the USMC will implement measures to either avoid or minimize effects to the habitat as described under PCE 1, which will also minimize effects to PCE 2.

*PCE 3: Upland habitat*

As described for PCEs 1 and 2, the proposed action could affect upland habitat features that provide for feeding and movement of SNYLF and provide for the natural hydrologic regime both in quantity and quality. As discussed under PCEs 1 and 2, disturbance from the proposed action

will occur almost entirely in upland habitat for SNYLF. However, we anticipate that the associated effects will be temporary and short-term in nature; disturbance will be dispersed rather than concentrated in areas that contain the features of PCE 3; and the USMC will implement measures to protect water and soils, and avoid ground disturbance within 100 m (328 ft) of streams, lakes, meadows, marsh areas, or wetlands within critical habitat (except for limited circumstances). These measures will limit disturbance within upland habitat for SNYLF and maintain sufficient water quality to provide for the various life stages of SNYLF and its prey base.

*Effects on Yosemite Toad Critical Habitat*

As stated for SNYLF, the key factor related to the adverse modification determination is whether, with implementation of the proposed action, the affected critical habitat will continue to serve its intended conservation role for the species. Activities that may destroy or adversely modify critical habitat are those that result in a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of the YT. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of these species or that preclude or significantly delay development of such features. The role of critical habitat is to support life-history needs of the species and provide for the conservation of the species. In the action area, there is 3,358 ha (8,298 ac) of critical habitat (unit 2) that contains the PCEs for YT. This represents approximately 11 percent of designated critical habitat in unit 2. The following section will summarize the effects of the proposed action in relation to specific critical habitat PCEs for YT.

*PCE 1: Aquatic breeding habitat*

Fresh water, including wet meadows, slow-moving streams, shallow ponds, spring systems, and shallow areas of lakes all occur within the action area. Disturbance from the USMC's activities may remove vegetation, and/or disturb and/or add or compact soils. This could decrease the depth of shallow aquatic habitat or change surface water patterns such that it affects the quality of breeding habitat. We anticipate that these effects will be temporary and short-term in nature because activities associated with the proposed action are not concentrated in aquatic breeding habitat but rather dispersed across the action area. Additionally, most of the aquatic breeding habitat is located within TAs 10 and 11, where activities can only occur in the winter when there is a minimum of 0.6 m (2 ft) of snowpack and group size is limited. The USMC will also implement measures to avoid or minimize effects to this PCE. These include not conducting training activities in occupied breeding habitat during the breeding season; not landing aircraft, allowing ground disturbing activities or activities involving groups larger than 25 individuals within 100 m (328 ft) of streams, lakes, meadows, marsh areas, or wetlands within critical habitat; and implementing measures to protect water and soils.

*PCE 2: Upland habitat*

The majority of the critical habitat that could be adversely affected by the proposed action includes PCE 2. The action area contains approximately 3,358 ha (8,298 ac) that include PCE 2 (USMC 2017c). Some of this upland habitat is located within TAs 10 and 11, which are only open to winter use. Activities within these TAs can only occur when there is a minimum of 0.6 m (2 ft) of snowpack and group size is limited. The rest of the upland habitat could be affected by the USMC's other activities, specifically from human disturbance caused by foot traffic. These activities could affect summer and winter refugia, predator avoidance, feeding, movement, and the natural hydrologic regime both in quantity and quality for the various life stages of the YT and its prey base. Specific activities such as the establishment of RHUs and COCs at the Highway 108/Finely Mine Road junction have the potential to disturb upland habitat or destroy important habitat features. The USMC will limit these effects by placing RHUs and COCs on previously disturbed ground. However, there is still the potential for human disturbance to occur in upland habitat, which may disturb or destroy habitat features including burrows, stumps, and downed wood that are utilized by YT. We anticipate that the effects of activities conducted outside TAs 10 and 11 will be temporary and short-term in nature. The USMC will also implement measures to avoid and minimize the effects associated with these activities such as protecting water and soils, and not allowing ground disturbing activities (including vegetation removal) within 100 m (328 ft) of streams, lakes, meadows, marsh areas, or wetlands within critical habitat (except for limited circumstances).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the ESA.

Lands administered by the HTNF are interspersed and surrounded by private parcels on which intensive grazing management activities will likely typify the land-use practices. Private parcels will be managed by the permittees the same as the adjacent public lands since there are no fences. Grazing of interspersed and surrounding private lands could exacerbate the adverse effects of the proposed action on LCT, SNYLFs, and YTs.

Dispersed recreation on private lands can also adversely impact listed species and their habitats (Clark and Gibbons 1991). We mentioned the effects associated with dispersed recreation in the section on Recreation; therefore, we will not reiterate those effects here.

The CDFW frequently uses electrofishing methods to sample populations of fish in stream habitats within the action area. However, electrofishing is a necessary component of fish population monitoring. Adverse effects to LCT, SNYLFs, and YTs at the population level are not expected since the intent of the electrofishing program is to sample fish in stream habitats and only individual fish and amphibians are encountered on a periodic basis, and lake and pond habitats are not sampled using electrofishing equipment. Additionally, mortality of individual

LCT, SNYLFs, or YTs is not expected to occur during electrofishing activities as the settings used are low enough not to cause mortality or injury, or may not occur in occupied habitat for these species. Generally, the electrofishing program only occurs on a periodic basis unless it is part of an intensive nonnative fish eradication project using mechanical methods.

CONCLUSION

The regulatory definition of "to jeopardize the continued existence of the species" focuses on assessing the effects of the proposed action on the reproduction, numbers, distribution, and their effect on the survival and recovery of the species being considered in the BO. For that reason, we have used those aspects of each species' status as the basis to assess the overall effect of the proposed action on each species.

**Lahontan Cutthroat Trout, Sierra Nevada Yellow-legged Frog, and Yosemite Toad**

The activities under the proposed action could result in the harassment, injury, and/or mortality of individual LCT, SNYLFs, and YTs. The loss of individuals affects reproduction by decreasing the number of breeding animals within a population. The number of populations and their distribution within the action area is already small and limited due to various factors beyond the proposed action. Therefore, the loss of individuals and subsequent decline in reproduction could result in a reduction or loss of populations, which affects the distribution of each species, and potentially their recovery.

While we anticipate LCT, SNYLFs, and YTs may be harassed, injured, or killed as result of the proposed action, we do not expect these effects to occur to such a degree that entire populations may be extirpated. This is because the USMC will implement measures to avoid and minimize effects to individuals and their habitats, including critical habitat for SNYLF and YT. Also, activities will not be concentrated in specific areas but dispersed across the landscape, which will minimize each species exposure to the effects of the proposed action.

For LCT and the amphibians, the USMC will minimize indirect effects such as habitat disturbance by not allowing military personnel to wade upstream or downstream in LCT-occupied streams; not landing aircraft, allowing ground disturbing activities, or activities involving groups larger than 25 individuals within 100 m (328 ft) of LCT-occupied streams, or aquatic and wetland habitat located within SNYLF and YT critical habitat or CARs; not traveling off-road with vehicles; implementing measures to protect water and soils; and implementing a trash clean-up program. The USMC will also avoid and minimize direct effects (harassment, injury, and mortality) to the LCT (including redds, eggs and fry) by not capturing or consuming individuals; not allowing vehicles to cross LCT-occupied streams; and limiting the frequency of MGB deployment on LCT-occupied streams as well as conducting this training outside of the spawning season. Similarly, for the amphibians, the USMC will avoid and minimize direct effects to these two species (including eggs and tadpoles) by not conducting training activities within occupied breeding habitat during the breeding season; in TAs 10 and 11, only conducting training activities during the winter months when there is a minimum 0.6 m (2 ft) of snowpack; limiting the number of military personnel within TAs 10 and 11; and limiting the frequency of

MGB deployment as well as conducting this training outside of the breeding season. Even with the implementation of these measures, we expect that some individuals of all life stages of LCT, SNYLFs, and YTs may be harassed, injured, and killed because of the proposed action. The harassment or loss of some individuals, however, is not likely to impede the recovery of each species.

After reviewing the current status of LCT, SNYLF and YT, the environmental baseline for the action area, the anticipated direct and indirect effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the federally-listed as threatened LCT, endangered SNYLF, or threatened YT.

**Critical Habitat**

After reviewing the current status of the critical habitat of SNYLF and YT, the environmental baseline of critical habitat for the action area, the anticipated direct and indirect effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to result in the destruction or adverse modification of critical habitat of the SNYLF and YT because: (1) Only a small percentage (approximately 4 percent of SNYLF and 11 percent of YT critical habitat) will be subject to the effects of the proposed action; (2) the effects of the proposed action on the various physical and biological features will likely be minor and temporary; and (3) the USMC will implement measures to avoid or minimize effects to the PCEs of designated critical habitat. Consequently, the proposed action will not appreciably reduce the conservation value and function of critical habitat for these two species.

## INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR §17.3). Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR §17.3). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of sections 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are nondiscretionary and must be undertaken by the USMC, or made binding conditions of any permit issued by the HTNF to the USMC, as appropriate, for the exemption in section 7(o)(2) to apply. The HTNF has a continuing duty to regulate the activity covered by this incidental take statement. If the USMC fails to assume and implement the terms and conditions, or the HTNF fails to require the USMC to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any applicable permits, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USMC must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The actions analyzed in this BO could cause take of all life stages of LCT, SNYLFs, and YTs, including eggs, fry, tadpoles, metamorphs, subadults, and adults. Direct take is likely to occur in the form of harm and harassment through either injury and/or death of LCT, SNYLF, and YT. This could occur for LCT and SNYLF when military personnel enter occupied rivers or streams during crossings, during the placement of temporary bridges (JAB and MGB), or through human disturbance that occurs within and adjacent to meadow, aquatic, and upland habitats. Yosemite toads may be affected when the USMC conducts activities in upland habitat that is located adjacent to occupied breeding habitat outside of TAs 10 and 11, which are only open to winter use and when there is sufficient snowpack that would likely protect YTs from the USMC's activities. Indirect take in the form of harm and harassment could occur through the modification or degradation of habitat such that essential behavioral patterns including breeding, feeding, and sheltering are significantly impaired, which then results in death or injury of LCT, SNYLF, and YT.

The Service recognizes that providing a numerical estimate of incidental take of LCT, SNYLFs, and YTs is the preferred method of measuring take for some animals when it is biologically defensible; however, it is not possible to quantify the number of LCT, SNYLFs, or YTs that may be incidentally taken as a result of the proposed action. This is because: (1) Dead or injured individuals are difficult if not impossible to find; (2) individuals are subject to disturbance, injury, and death under natural circumstances and it will be difficult to separate injuries or death due to the proposed action; (3) the number of individuals changes over time due to immigration, emigration, and natural loss or creation of habitat through management (*i.e.*, seasonal number fluctuations, random environmental events, water regime changes); (4) the small body size of young fish and amphibians, cryptic colorations, rapid rates of decomposition, and presence of vegetation and other features (*e.g.*, rocks and logs) makes finding an incidentally taken individual extremely unlikely; (5) behavioral modifications exhibited before death are unlikely to be noticed or recognized; (6) effects of the proposed action, such as dispersed human activity, are largely unquantifiable in the short term, and may only be measurable as long-term effects on the species' habitat or population levels; (7) the action area is open to public access and it would be difficult to determine if take occurred as a result of military activities or other activities such as livestock grazing or recreation; and (8) the best scientific and commercial data available are not sufficient to enable the Service to estimate a specific amount of incidental take of the species' themselves.

Since we are unable to estimate the number of individual LCT, SNYLFs, or YTs that will be incidentally taken, the Service is providing surrogate measures for take. For LCT and SNYLF, the surrogate is based on: (1) The number and location of areas used for river and stream crossings and temporary bridge placements; (2) the frequency of these events; and (3) the estimated area of disturbance (including both indirect and direct effects) to quantify the extent of take allowed. For YT, we are providing a surrogate based on the area of upland habitat around occupied meadows up to a distance of 1.25 km (0.78 mi), excluding those areas located in TAs 10 and 11 that are only open to winter use when there is sufficient snowpack, that may be disturbed to quantify the extent of take allowed. We expect that the requirement of at least 0.6 m (2 ft) of snowpack in TAs 10 and 11 will be sufficient to minimize disturbance to YTs from the USMC's activities. The 1.25 km (0.78 mi) distance around occupied meadows is based on the potential distance YTs may disperse into upland habitat.

*Lahontan Cutthroat Trout and Sierra Nevada Yellow-Legged Frog*

(1) Number and Location of River and Stream Crossings and Temporary Bridge Placement

We anticipate that any LCT (including eggs and fry) located in the following occupied rivers and streams will be subject to incidental take in the form of harm, harassment, injury and/or mortality: West Walker River, Wolf Creek, Silver Creek, and Mill Creek. We anticipate that any SNYLFs (eggs, tadpoles, subadults, and adults) located in Silver Creek will also be subject to incidental take in the form of harm, harassment, injury and/or mortality. The number of river and stream crossings (which involve military personnel entering the water) and placement of temporary bridges are based on what is described in the BA (USFS and USMC 2017a). The USMC is limited to the following number (annually) and locations for river and stream crossings: three (3) on the West Walker River; one (1) on Wolf Creek; two (2) on Silver Creek; and one (1) on Mill Creek.

(2) Frequency of River Crossings and Temporary Bridge Placement for MGBs and JABs

The frequency of river crossings and placement of temporary bridges will be limited to 40 river crossings on the West Walker River, 1 JAB training exercise, and 2 MGB training exercises annually.

(3) Annual Estimated Area of Disturbance of River and Stream Crossings and Temporary Bridge Placement

River and Stream Crossings

We calculated an area of habitat disturbance for the river crossings on the West Walker River by adding 9.1 m (30 ft) to the width of the river at the designated crossing point and multiplying it by a length of 61 m (200 ft). The 9.1 m (30 ft) of disturbance accounts for streambank disturbance that may occur within 4.6 m (15 ft) at each crossing point. The 61 m (200 ft) length accounts for the direct and indirect effects that may occur 30 m (100 ft) upstream and downstream of the crossing point. There are multiple crossings points on the West Walker River;

therefore, to simplify the process of monitoring habitat disturbance, we have used the highest calculated value for potential habitat disturbance. The area of habitat disturbance allowed for the West Walker River will be limited to 0.20 ha (0.50 ac) for each river crossing.

The USMC does not restrict military personnel to specific crossing points on Wolf Creek, Silver Creek, or Mill Creek. We expect that disturbance will likely be confined to areas that military personnel can easily cross (*e.g.*, narrow areas or rocks that allow crossing without stepping into the water) or they may spread out along the length of the streams such that disturbance is not concentrated in one location as it is with river crossings. This makes it difficult to calculate an area of disturbance as we did above. In this case, we are providing take for the length of Wolf Creek, Silver Creek, and Mill Creek based on the distribution of LCT and SNYLF within these creeks. There are no YTs at these locations. This equates to 5.1 km (3.2 mi) of Wolf Creek, 5.3 km (3.3 mi) of Silver Creek, and 8.7 km (5.4 mi) of Mill Creek.

MGB

The assembly/disassembly of the MGB requires military personnel to enter the water. The MGB training exercises can only occur on Mill, Silver, and Wolf Creeks once every 3 years. In other words, the MGB will rotate between the three streams such that each stream is used only once every 3 years. There is no such restriction on the West Walker River. We calculated a range for the area of habitat disturbance similar to the river and stream crossings described above for the West Walker River. We also used the highest value calculated for potential habitat disturbance. For the MGB training exercise, we reduced the amount of habitat disturbance on the streambank because we assumed military personnel will congregate in a smaller area on either side of the MGB rather than disperse along the streambank as they might do for the river and stream crossings. We estimated this area of disturbance could be up to 464 square meters (5,000 square feet). In other words, an area of disturbance of up to 232 square meters (2,500 square feet) on either side of the MGB. The area of habitat disturbance allowed for each MGB training exercise will be limited to: 0.19 ha (0.48 ac) on the West Walker River; 0.10 ha (0.25 ac) on Wolf Creek; 0.25 ha (0.62 ac) on Silver Creek; and 0.26 ha (0.64 ac) on Mill Creek.

JAB

The JAB does not need military personnel to enter the waterway to assemble/disassemble it, and only one training event will occur per year. We acknowledge that during this exercise some streambank disturbance may occur when military personnel congregate on either side of the JAB. As described above for the MGB, we estimated this area of disturbance could be up to 464 square meters (5,000 square feet) total [*i.e.*, 232 square meters (2,500 square feet)] on either side of the JAB. Therefore, the area of habitat disturbance allowed for the JAB training exercise will be limited to 0.40 ha (0.11 ac) per year on either the West Walker River, Wolf Creek, Silver Creek, or Mill Creek.

*Yosemite Toad*

We anticipate that any YTs (subadults and adults) located in upland habitat (excluding TAs 10 and 11) adjacent to occupied breeding meadows will be subject to incidental take in the form of harm, harassment, injury and/or mortality. The total amount of habitat disturbance in upland habitat was calculated by applying a buffer of 1.25 km (0.78 mi) around occupied meadows located outside of TAs 10 and 11 to account for YT dispersal between meadows and upland habitat. We have excluded TAs 10 and 11 because these areas are only open to winter use, which is outside of the YT breeding season when YTs would be moving into or outside of breeding meadows. The area of disturbance allowed in upland habitat will be limited to 2,428 ha (6,000 ac) annually.

Summary of Take

*Lahontan Cutthroat Trout and Sierra Nevada Yellow-Legged Frog*

- Annual Number and Location of River and Stream Crossings and Temporary Bridge Placement:
  - Three (3) sites on the West Walker River
  - One (1) site on Wolf Creek
  - Two (2) sites on Silver Creek
  - One (1) site on Mill Creek

- Annual Frequency of River Crossings and Temporary Bridge Placement:
  - 40 river crossings
  - 2 MGB training exercises
  - 1 JAB training exercise

- Annual Estimated Area of Disturbance of River and Stream Crossings and Temporary Bridge Placement
  - River crossings (West Walker River only): 0.20 ha (0.50 ac)
  - Stream crossings: 5.1 km (3.2 mi) of Wolf Creek, 5.3 km (3.3 mi) of Silver Creek, and 8.7 km (5.4 mi ) of Mill Creek.
  - MGB:
    - West Walker River: 0.19 ha (0.48 ac)
    - Wolf Creek: 0.10 ha (0.25 ac)
    - Silver Creek: 0.25 ha (0.62 ac)
    - Mill Creek: 0.26 ha (0.64 ac)
  - JAB: A total of 0.40 ha (0.11 ac) per year on the West Walker River, Wolf Creek, Silver Creek, or Mill Creek

*Yosemite Toad*

- Up to 2,428 ha (6,000 ac) annually of upland habitat

The reasonable and prudent measures listed below, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If the above level of anticipated take is exceeded, the USMC and/or HTNF should contact the Service to determine if reinitiation of consultation is necessary.

**Effect of Take**

In the accompanying BO, the Service determined that this level of anticipated take is not likely to result in jeopardy to LCT, SNYLF, and YT or result in adverse modification or destruction of critical habitat for SNYLF and YT.

**Reasonable and Prudent Measures**

The following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of LCT, SNYLF, and YT:

1. The USMC must fully implement all conservation measures as described in the BA and reiterated in the Description of the Proposed Action section in the BO (including all appropriate project design features listed in permits). This reasonable and prudent measure must be supplemented by the terms and conditions indicated below.

2. The USMC must implement additional conservation measures to protect LCT, SNYLF, and YT from the negative effects associated with river and stream crossings, the placement of temporary bridges, and application of herbicides.

3. The USMC must monitor incidental take resulting from the proposed action and report it to the RFWO.

**Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the ESA, the HTNF and/or the USMC must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

To implement Reasonable and Prudent Measure Number 1:

1. The USMC must inform all military personnel of the conservation measures (*i.e.*, avoidance and minimization measures) and their responsibility to fully implement them.

2. The HTNF and USMC will apply the conservation measures identified in this BO to any newly documented populations of LCT, SNYLF, and YT located during the project's 40-year period. The USMC or HTNF must provide the Service with the results of any surveys conducted for LCT, SNYLFs, and YTs across the action area. These results will be provided by the entity responsible for conducting them. That year's survey results must be reported to the Service on or before December 31 of each year (or another USMC or HTNF and Service mutually agreed upon date). Reports will be sent to the Field Supervisor of the RFWO (address provided below).

To implement Reasonable and Prudent Measure Number 2, the USMC must fully implement the following Terms and Conditions:

1. Based on the description in the BA (USFS and USMC 2017a) regarding training events for river and stream crossings and placement of temporary bridges (JAB and MGB), the number of individuals trained per year, and the conservation measures as they apply to these activities, the USMC must implement the following:

    a. Staff from the MCMWTC Environmental Office must survey the proposed river crossing (*i.e.*, West Walker River) and temporary bridge placement location(s) at least 3 days prior to each training event. If any life stage of LCT, SNYLF or YT, or redds are detected at the proposed river crossing or temporary bridge placement location, then the USMC or HTNF will contact the Service for further discussion and determination.

    b. Following a negative survey (*e.g.*, no life stages of LCT or redds are detected), staff from the Environmental Office will mark (*e.g.*, using survey tape) the upstream and downstream boundaries of the area to be used for river crossings and temporary bridge placements so as to not exceed the area of disturbance allowed for take as described above.

    c. Prior to each training event for river crossings and temporary bridge placement, staff from the Environmental Office will brief military personnel participating in these event about the status of the LCT, SNYLF, and YT; the protections provided by this BO; and the importance of remaining within the upstream and downstream boundaries of the area used for river crossings and temporary bridge placement.

2. Ensure the application of herbicides is in compliance with the conservation measures, Reasonable and Prudent Measures, and Terms and Conditions identified in the BO (File No. 2017-F-0341) issued to the HTNF for its California Integrated Weed Management Program on the Carson and Bridgeport Ranger Districts.

To implement Reasonable and Prudent Measure Number 3, the USMC must fully implement the following Terms and Conditions:

1. The USMC must provide the RFWO with an annual report that includes the information as described in design feature #7 under the Monitoring and Adaptive Management Program, including a brief summary of the following:
    a. Implementation and effectiveness of conservation measures (*i.e.*, avoidance and minimization measures) and the terms and conditions;
    b. type and number of training events that occurred in the action area, including the total number of military personnel that participated in each type of training event;
    c. documentation of take of LCT, SNYLF or YT, if any; and
    d. information described in the Term and Condition #2 below.

    The first report is due to the RFWO on or before January 31, 2019 (or another USMC, HTNF, and RFWO mutually agreed upon date) of the first year of project implementation and every year for the duration of the 40-year SUP. The USMC and HTNF must work with the RFWO to ensure the reporting requirements are completed on time and include all information requested in this BO. Reports will be sent to the Field Supervisor of the RFWO. Please send reporting documents to the following address:

    Field Supervisor
    Reno Fish and Wildlife Office
    1340 Financial Boulevard, Suite 234
    Reno, Nevada 89502
    Telephone: (775) 861-6300

2. The USMC and/or HTNF must contact the RFWO if the annual number of military personnel and/or the number of activities exceed those identified in the Description of the Proposed Action. The Service will then determine if this increase in the number of military personal and/or activities may result in effects that result in additional take of federally-listed species. If additional take is suspected, the USMC and/or HTNF will reinitiate consultation with the Service.

3. In addition to the above mentioned, the USMC must submit summaries of events/activities as described below (similar to what is described for design feature #4 and #7 under the Monitoring and Adaptive Management Program in USFS and USMC 2017a).

    a. The USMC must report to the Service the following:
        i. Date(s), location(s), and total number of river crossings and temporary bridge placements;
        ii. An approximate number of military personnel participating in each event and an overall total number;
        iii. If an MGB was used, then an approximate number of military personnel that entered the water;

iv. Whether or not the measures described above in Reasonable and Prudent Measure Number 2, Term and Condition Number 1, were implemented and successful in avoiding or minimizing disturbance;
v. Any additional measures that may have been implemented and if they were successful in avoiding or minimizing disturbance;
vi. For the MGB and JAB trainings, provide photos of the area before, during, and after each event;
vii. For river crossings, provide a series of photos for each of the three river crossing sites on the West Walker River, including photos prior to the start of river crossing training (*i.e.*, "pre-disturbance" photo), approximately mid-season during training, and following the last river crossing training (*i.e.*, "end of training season" photo);
viii. For monitoring on Wolf, Silver, and Mill Creeks, provide a series of photos prior to (*i.e.*, "pre-disturbance" photo) and immediately following (*i.e.*, "post-disturbance" photo) the Mountain Exercise at a minimum of three locations on each creek (total of at least nine locations). These photos will be taken twice during the summer and once during the winter. The USMC, HTNF, and Service will discuss and identify these nine locations on Wolf, Silver, and Mill Creeks so photos are taken at the same location every year.

b. Following activities that occur with the 1.25 km (0.78-mi) buffer around occupied breeding habitat (excluding TAs 10 and 11, which are only open to winter use and outside of the breeding season when YTs would be moving into or outside of breeding meadows) the USMC must report to the Service the following:
    i. The date(s), location(s), and photos of RHU/COC placement at the Highway 108/Finley Mine Road junction;
    ii. The date(s), location(s), and a series of photos (taken quarterly throughout a calendar year) of YT habitat near LZ Parrot and DZ Hawk, and R400/401, and any new YT populations that are found outside of TAs 10 and 11.
    iii. Whether or not the measures described in the BA (USFS and USMC 2017a) were implemented and successful in avoiding or minimizing disturbance; and
    iv. Any additional measures that may have been implemented and if they were successful in avoiding or minimizing disturbance.

REPORTING REQUIREMENTS

Upon locating dead, injured, or sick threatened or endangered species during the entire length of time of the project (including monitoring), initial notification must be made to the Service's Division of Law Enforcement in Reno, Nevada at telephone number (775) 861-6360 within 3 business days. Instructions for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured threatened or endangered species to ensure effective treatment and care and in handling dead specimens to

preserve biological material in the best possible state. In conjunction with the care of sick and injured fish or wildlife, the preservation of biological materials from a dead specimen, the USMC has the responsibility to ensure that information relative to the date, time, and location of the specimens, when found, and possible cause of injury or death of each is recorded and provided to the Service.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to implement recovery actions, to help implement recovery plans, to develop information, or otherwise further the purposes of the ESA.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

### Listed Species

The following conservation recommendations will help ensure long-term survival and recovery of all listed species found within the action area:

1) The USMC and HTNF should coordinate with the Service in the development and implementation of a telemetry study on YT in at least one occupied breeding meadow outside of TAs 10 and 11. This site-specific information could be used to identify upland areas used by YTs. Based on the results of this study, the USMC, HTNF, and Service may identify additional measures, if necessary, to protect YTs and their habitat. For instance, the results of the study may demonstrate that YTs occur in an area less than a 1.25 km (0.78-mi) buffer around occupied breeding meadows. This could allow a smaller buffer to be established around occupied breeding meadows to either limit or exclude activities that may affect YTs and their habitat. Conversely, surveys may determine that YTs use upland habitat beyond the 1.25 km (0.78-mi) buffer.

2) Provide copies of any other monitoring results used to determine the need for maintenance or improvement of habitat to promote healthy and productive meadow and riparian areas (Medina *et al.* 2005). This will ensure that all necessary measures are being implemented to protect habitat for LCT, SNYLF, and YT.

3) Set up wash station(s) and clean all equipment and vehicles before they leave the action area, especially if they operating in areas infested with nonnative or invasive species.

The following conservation recommendations will help ensure long-term survival and recovery of LCT within the HTNF's Bridgeport Ranger District:

1) Manage unoccupied historical LCT streams within the HTNF Bridgeport Ranger District as if they were occupied such that habitat quality is either maintained or improved such that future stocking of LCT into these streams is not delayed due to poor habitat conditions.

2) Continue support and involvement in inventories and monitoring of LCT and their occupied habitats within the HTNF Bridgeport Ranger District.

3) Continue support and participation on the Walker Recovery Implementation Team.

4) Continue support and participation on the LCT Management Oversight Group.

The following conservation recommendations will help ensure long-term survival and recovery of SNYLF and YT:

1) Continue support and involvement in inventories and monitoring of SNYLF, YT, and their occupied habitats within the HTNF's Bridgeport Ranger District.

2) Continue support and involvement in the development or implementation of conservation strategies, recovery plans, or any other applicable guidance documents for the recovery of SNYLF and YT.

3) Establish other long-term population monitoring sites for SNYLF and/or YT similar to the Sardine Meadows program.

Candidate Species

The following conservation recommendations will help ensure long-term protection of whitebark pine (*Pinus albicaulis*) and Sierra Nevada Distinct Population Segment of the Sierra Nevada red fox (*Vulpes vulpes necator*) on the HTNF's Bridgeport Ranger District.

1) Continue support and involvement in the conservation of whitebark pine by implementing the rangewide restoration strategy (Keane *et al.* 2012) and regional conservation strategies as they are developed for the species.

2) Share any monitoring efforts (*e.g.*, sightings) with the USFS, the Sierra Nevada Red Fox Working Group, and Service.

3) Continue to send a representative from the MCMWTC to participate in the Sierra Nevada Red Fox Working Group.

4) Develop an educational program to inform snowmobilers and other individuals recreating on USFS land about the special status of the Sierra Nevada red fox and to prevent feeding or harassing of them.

Species of Concern

The following conservation recommendations will help ensure long-term protection of California spotted owl (*Strix occidentalis occidentalis*) and Bi-State sage-grouse (*Centrocercus urophasianus*) on the HTNF's Bridgeport Ranger District.

1) The Service published a positive 90-day finding to list the California spotted owl on September 18, 2015 (Service 2015). The Service has initiated a status review for the California spotted owl and at the conclusion of this review, we will issue a 12-month finding on whether or not the Service believes listing is warranted. As you may know, the USFS has initiated a Conservation Strategy for California spotted owl. When complete, the Conservation Strategy should provide management direction for the long-term persistence of the species and the habitat upon which it depends. We encourage the USMC and HTNF to participate in this effort and implement the Conservation Strategy once complete.

2) Continue to work with the Nevada Department of Wildlife and CDFW to survey the Bi-State sage-grouse leks annually.

3) Protect all functioning Bi-State sage-grouse nesting, brood-rearing, and wintering habitat and restore and enhance those habitats degraded or considered functioning-at-risk.

4) Continue to work with partners to implement State and local conservation plans which guide monitoring and threat identification and abatement. We encourage the engagement of local, State, and Federal wildlife biologists in the project planning process.

5) We recommend reliance on the latest Bi-State sage-grouse conservation guidance in the Bi-State Action Plan (Action Plan; Bi-State Technical Advisory Committee 2012), or any other applicable guidance documents. We encourage and support the implementation of all appropriate management direction identified in the Action Plan as the analysis and proposed projects are conducted. Additional recent guidance to consult during the planning process includes:

- Secretarial Order No. 3336 – "*Rangeland Fire Prevention, Management, and Restoration*", and subsequent plans and reports

- BLM 2015 – "*Greater Sage-Grouse Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessment; Northern Great Basin*"

- Chambers *et al.* 2014 – "*Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach*"

REINITIATION REQUIREMENT

This concludes formal consultation on the HTNF's and USMC's Enhancement of Operations and Training Proficiency at the MCMWTC. As required by 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this BO; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this BO; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please reference File No. 2017-F-0436 in future correspondence concerning this BO. We appreciate the cooperation of your staff throughout this consultation process. If you have any questions regarding this consultation, please contact me or Erin Nordin at (775) 861-6300.

Sincerely,

Lee Ann Carranza

for Carolyn Swed
Field Supervisor

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