Appendix B - Section 7 Consultation and Biological Assessment

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
JOINT FORCE HEADQUARTERS
MASSACHUSETTS NATIONAL GUARD
OFFICE OF THE ADJUTANT GENERAL
2 RANDOLPH ROAD
HANSCOM AFB, MA 01731-3001

REPLY TO
ATTENTION OF:

14 April, 2020

Environmental, Natural Resources

Tom Chapman
U.S. Fish and Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301

Subject: Request for Concurrence on Determinations for the Construction and Use of a Multi-purpose Machine Gun Range at Camp Edwards, MA

Dear Mr. Chapman:

Attached is a Biological Assessment for the proposed construction and use of a new machine gun range at Camp Edwards, MA, by the Massachusetts Army National Guard. The proposed action has been determined to be critical training infrastructure to provide readiness training and qualification of soldiers from Massachusetts and throughout the region. Construction is anticipated to start in late Fiscal Year 2020.

The majority of the proposed action meets all the criteria for exemptions from incidental take prohibitions under the 4(d) rule for the Northern Long-eared Bat. However, a portion of potentially related actions – firebreak improvement and wildland fire fuel reduction – may occur within the 0.25-mile buffer of a potential man-made hibernaculum. These related actions are not yet designed or funded and have an uncertain timeline. However, planning and project scoping will all include protections to avoid any potential incidental take or adverse affect within the buffer zone of the potential hibernaculum.

The Massachusetts Army National Guard requests your concurrence with the determination that the proposed construction and use of a multi-purpose machine gun range at Camp Edwards, including associated actions, may affect, but are unlikely to adversely affect the listed plants American Chaffseed and Sandplain Gerardia. Additionally, the proposed action and associated projects may affect, but are unlikely to adversely affect the Northern Long-eared Bat with the potential exception of land clearing operations outside the hibernaculum buffer which are exempted from incidental take prohibitions under the 4(d) rule.

This project has been separately coordinated and permitted with the Massachusetts Division of Fisheries and Wildlife. A Conservation and Management Plan has been collaboratively developed with final administrative review and permit issuance in process. A significant mitigation plan has been developed to achieve overall net benefit for all potentially impacted state-listed species for this proposed action and other upcoming major construction activities at Joint Base Cape Cod.

The Division did not determine that the construction and use of the MPMG Range and associated projects would present any potential for take of listed plants or bats, including the federal species under evaluation. Additionally, the intensive mitigation efforts were collaboratively adapted to ensure long-term commitment and investement in pine barrens habitat management and ecosystem diversity with the primary focus of ensuring the long-term net benefit of listed species and their various habitats.

Should you have any questions please contact me at jacob.c.mccumber.nfg@mail.mil or 508-294-2243.

Sincerely,

Jacob McCumber
Natural Resources and ITAM Program Manager
Massachusetts Army National Guard

Enclosures

Massachusetts Army National Guard

Natural Resources and Integrated Training Area Management Program

Biological Assessment
Multipurpose Machine Gun (MPMG) Range and Associated Projects

I. General

The Massachusetts Army National Guard (MAARNG) has proposed to construct, maintain, and operate a mission-essential Multipurpose Machine Gun (MPMG) Range at the Camp Edwards Training Site in Sandwich, Barnstable County, Massachusetts. The proposed action primary footprint is 199 acres and includes the current location of an inactive range referred to as KD Range as it is a combined 36-acre footprint of a Known Distance Range and rocketry range (Fig. 1).

Camp Edwards is an almost 15,000-acre property managed by the MAARNG within the overall 21,000-acre Joint Base Cape Cod. The primary mission for the MAARNG at Camp Edwards is effective soldier training for the variety of Army National Guard (ARNG) units of the Commonwealth and surrounding states as the largest training site in New England. MAARNG units include infantry, transportation, artillery, horizontal and vertical engineers, aviation, and a variety of other specializations. The MPMG Range has been identified through Army training doctrine as the greatest need for MAARNG readiness training as use of this range is fundamental to qualifications within a large number of Military Occupational Specialties (MOS). The nearest MPMG Range is at Camp Ethan Allen, VT, which is over 270 miles away and does not allow for sufficient soldier throughput.

Camp Edwards is on state-owned land, which is leased to the US Department of the Army and licensed to the Army National Guard. Due to historical conditions the care, custody, and control of the property, subject to the lease, was transferred to the Massachusetts Division of Fisheries and Wildlife through Chapter 47 of the Acts of 2002 under MA General Law. This same legislation also established the Upper Cape Water Supply Reserve, which is predominantly coincident with the primary training area of Camp Edwards. This Reserve is overseen and governed by an Environmental Management Commission consisting of three state agency commissioners and informed by a dedicated Environmental Officer and two advisory committees, one consisting of community representatives and the other regional scientific experts. Compulsory Environmental Performance Standards were established for the Reserve, including among other categories significant conservation commitment for rare species of flora and fauna.

The MAARNG has a dedicated Natural Resources and Integrated Training Area Management (NR-ITAM) Program within its Environmental Affairs Office. The NR-ITAM Program is officed at Camp Edwards, which is the primary training site and land for MAARNG. Based on the regulatory commitments of Camp Edwards and the requirements of the Massachusetts Endangered Species Act extensive mitigation is proposed under a Conservation and Management Permit and the establishment of an extensive mitigation bank at Camp Edwards for the net benefit of state-listed species including a sandplain grassland guild, pine barrens guild, and Eastern Box Turtle (*Terrapene carolina carolina*).

This Biological Assessment is required under Section 7 of the Endangered Species Act. It primarily references the Proposed Multi-Purpose Machine Gun Range Environmental Assessment prepared under the National Environmental Policy Act (Environmental Analysis of Army Action 32 CFR Part 651),

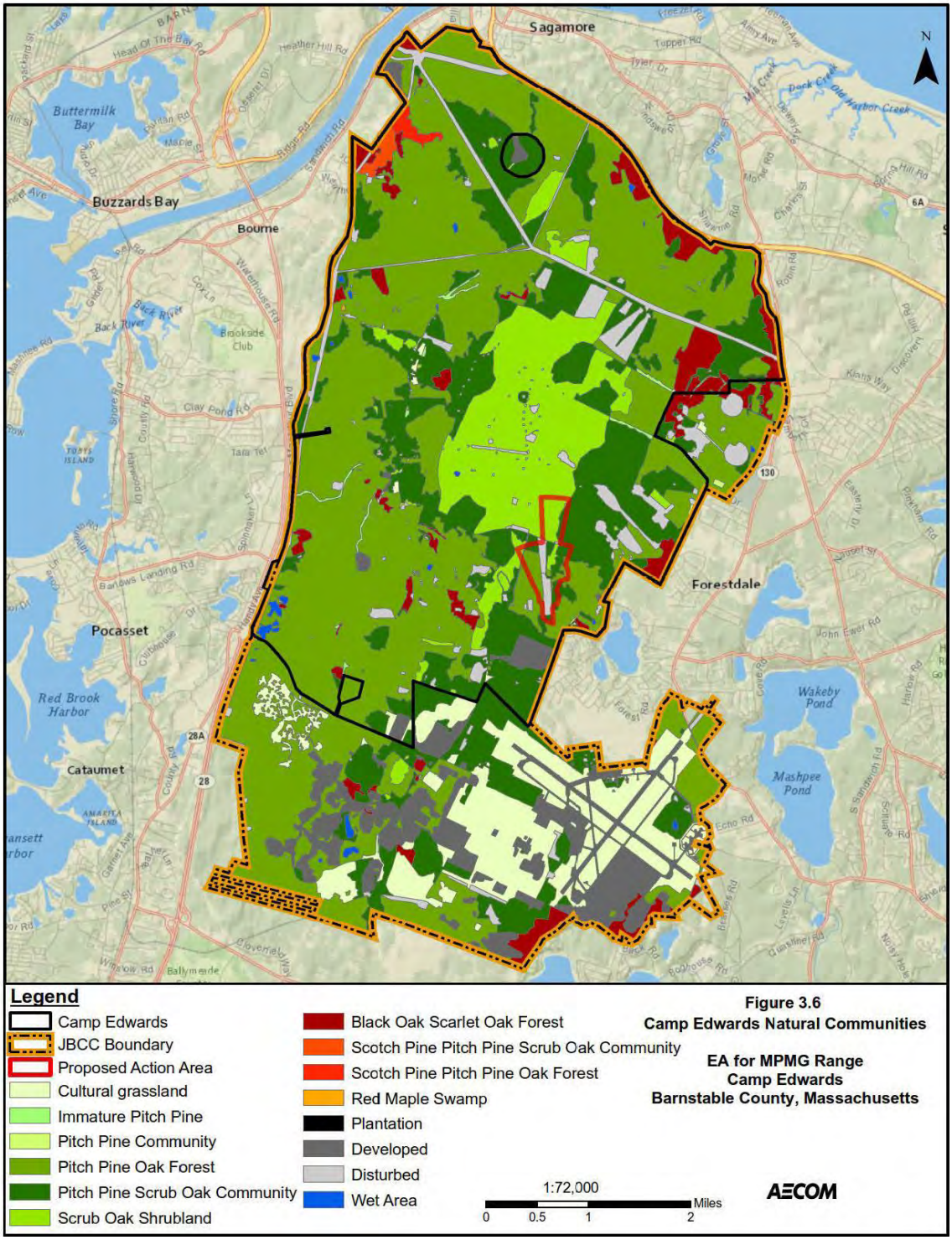


Figure 1. Map of Joint Base Cape Cod showing the proposed action area (red outline) over the natural communities map for the base and general location on upper Cape Cod with the canal at top.

Notice of Project Change prepared and submitted under the MA Environmental Policy Act (310 CMR 11.00), and Conservation and Management Permit prepared and submitted under the MA Endangered Species Act. In summary, while the project could affect the Northern Long-eared Bat through forest removal and work near a hibernaculum, the potential to negatively impact the species or individuals is

minimal and the long-term impact is anticipated to be neutral or slightly beneficial through habitat improvement.

II. Federally Listed Species Within the Action Area

While nine terrestrial species are federally listed within Barnstable County only four have potential to be found at Camp Edwards or within the proposed action area and only two (Northern Long-eared Bat, American Chaffseed) were identified on the Official Species List for this project received May 1st, 2019. Following are briefs for each species or group with more detailed review for particular species following the proposed action description.

Marine Seashore Species

The Piping Plover (*Charadrius melodus*, Threatened), Red Knot (*Calidris canutus rufa*, Threatened), and Roseate Tern (*Sterna dougallii dougallii*, Endangered) all commonly occur in Barnstable County with the former and latter species nesting locally. All three species use and are dependent upon coastal habitat for breeding and foraging including dunes and saltmarshes. The Northeastern Beach Tiger Beetle (*Cicindela dorsalis dorsalis*, Threatened) is more narrowly tied to open beach habitat with minimal activity and very isolated known occurrence. None of these four species have any observation records at Camp Edwards despite long-term bird surveys and targeted tiger beetle surveys (2016/2017) nor is there any suitable habitat on site for breeding, foraging, or migrant staging. Likewise, there is no apparent mechanism for any foreseeable or likely MAARNG actions at Camp Edwards to have either direct or indirect effect on these three species or their habitat. The MPMG Range proposed action will have **no effect** on Piping Plover, Red Knot, Roseate Tern, or Northeastern Beach Tiger Beetle.

Plymouth Redbelly Turtle (*Pseudemys rubriventris bangsi*, Threatened)

The Plymouth Redbelly Turtle is not known to occur south of the Cape Cod Canal and is associated with freshwater ponds. While glacial kettle hole ponds and other limited freshwater sites do occur at Camp Edwards this species has no observation records despite extensive pond and turtle surveys and is not expected to occur. Additionally, no freshwater sites are in or near the proposed action area and there is no mechanism for direct or indirect effects through site management or implementation of the proposed action. The MPMG Range proposed action will have **no effect** on Plymouth Redbelly Turtle.

Plants

Two federally listed plant species are known to occur in the county. Neither American Chaffseed (*Schwalbea americana*, Endangered) nor Sandplain Gerardia (*Agalinis acuta*, Endangered) has been documented at Camp Edwards or Joint Base Cape Cod during floristic surveys or intensive habitat monitoring. While neither species has received targeted survey efforts within the last twenty years both have been species of interest since at least the 1980s at Camp Edwards between staff of the Massachusetts Division of Fisheries and Wildlife (MADFW) and MAARNG Natural Resources. Extensive and intensive floristic inventories were conducted during the 1990s at Camp Edwards and annual vegetation monitoring has been conducted by qualified individuals throughout the installation since the 1990s to conduct long-term ecosystem health studies, fire effects monitoring, habitat use studies for wildlife, and rare plant surveys/monitoring, among other projects.

Sandplain Gerardia occupies sandplain grassland habitats such as its relocation site at the Crane Wildlife Management area and historic cemeteries in Sandwich and Falmouth. While there are locations nearby to the north and south of Joint Base Cape Cod this species has not been observed in similar conditions on base, including managed sandplain grasslands, mowed roadsides, and mowed lawn areas. MAARNG Natural Resources personnel annually assist MADFW with Sandplain Gerardia surveys both to facilitate their surveys, but also ensure familiarity with habitat, search image, and species identification. The

species has not been observed on walk-throughs of the proposed action area or mitigation areas nor has it been found during any survey efforts. As no currently suitable habitat exists and the species has not been documented the proposed action will have **no effect** on Sandplain Gerardia.

American Chaffseed was a more focal species for Massachusetts botanists and ecologists in the 1980s and 1990s with some anecdotally referenced focus on Camp Edwards. This focus was due to the significant fire regime and expansive, low scrub oak (i.e., bear oak; *Quercus ilicifolia*) barrens within the designated impact area. The intensive use of artillery, mortars, and other explosive devices maintained a very early successional community of low scrub oak and affiliates with grasses primarily present in frost bottom glacial depressions. Despite intensive floristic surveys completed in the 1990s American chaffseed was not documented. The use of artillery, mortars, and other explosives ended in 1997 due to contamination of groundwater within a sole source aquifer. Vegetative growth, canopy closure, and ecological succession have continued unabated within all unexploded ordnance areas to the detriment of species diversity and the early successional community. The sole exception is groundwater remediation activities, including direct removal of unexploded ordnance in high use target areas to include vegetative mowing or removal and digging with heavy equipment after surface or subsurface magnetometry. Areas impacted by minimal soil disturbance during ordnance removal have the potential for unexpected *Schwalbea* emergence as occurred elsewhere on Cape Cod. However, conditions within the proposed action area are generally unsuitable and the species has not been detected historically or during recent site visits. Additionally, the species has not been found during intensive frost bottom rare plant surveys conducted annually in the vicinity of the proposed action. As the proposed action (described below) area does not have any apparently suitable habitat conditions nor has in over 20 years, but could reintroduce more favorable conditions for the species the MPMG Range and associated project **may affect, but is unlikely to adversely affect** American Chaffseed.

Rusty Patched Bumble Bee (*Bombus affinis*, Threatened)
The Rusty Patched Bumble Bee was formerly broadly distributed throughout the eastern United States with somewhat generalist foraging on flowers in open habitats. However, the only extant population or recent record in the region is in Harwich, MA approximately 22 miles away. Based upon the proximity to the extant population and suitability of habitat through much of Camp Edwards a targeted bumble bee survey was contracted in 2017 following more generalized bee surveys in 2013 and 2014, all of which included the proposed action area. While suitable habitat for this generalist and the Yellow-banded Bumble Bee (*Bombus terricola*, not listed) does occur, neither has been documented in targeted survey efforts. The MPMG Range proposed action will have **no effect** on Rusty Patched Bumble Bee.

Northern Long-eared Bat (*Myotis septentrionalis*, Threatened)
The Northern Long-eared Bat (NLEB), much as the above species, was once widespread and abundant throughout the eastern United States with somewhat generalist habitat affinities. However, due to the impacts of White Nose Syndrome the population has declined by over 90%. Cape Cod and the nearby islands have been focal areas for NLEB surveys and conservation due to a combination of maternity season activity and winter activity including hibernation sites and opportunistic foraging. Camp Edwards does support the NLEB and the MAARNG has invested heavily in proactive monitoring and conservation for the species, including extensive acoustic surveys, mist netting, and radiotelemetry. The NLEB is the dominant focus on impacts assessment for the MPMG Range proposed action.

A single potential hibernaculum has been identified on Camp Edwards in a large, metal groundwater treatment facility near the proposed action area. A single, male NLEB was documented roosting in the building on October 1st, 2nd, and 5th of 2016, suggesting potential use as a hibernaculum despite failure to confirm overwinter use through acoustic and visual surveys. This individual was actively tracked and located from 24-SEP-2016 through 18-OCT-2016 and found using five different buildings as roost sites, four of which were outside the base boundary on private property.

NLEB activity has been found to generally be highly concentrated as a small number of sites, most of which still have a very low activity level. For all of CY2017 only 26 recorded bat calls were identified as NLEB, 25 of which were at site 15_35 southeast of the proposed action area (Figure 5). The activity level for site 15_35 was averaged 0.07 calls per detector night across 2017, which is predominantly skewed by a brief peak in spring activity offsetting very little activity during maternal or fall seasons. Contrastingly, fall monitoring (August through December 2016) had identical activity levels both in calls and distribution to all of 2017, potentially reflecting foraging activity of the single roosting bat moving between roost locations or an actual decline in numbers. Northern Long-eared Bat locations at Camp Edwards based both on acoustics and telemetry studies are almost solely restricted to areas on the base boundary adjacent to off-site structures (particularly residential neighborhoods) and within topographic drainages associated with kettle hole ponds (e.g., Snake Pond and Shawme Ponds in Sandwich). While there are other acoustic sites with NLEB or likely NLEB detections these are consistently at extremely low levels representing foraging bouts.

Site 15_35 is unique in its level of activity during both the typical active season and the winter. However, the activity at this site tends to be highly restricted, spatially. Sampling in 2016 was a bit anomalous with a somewhat broader distribution of higher relative activity for NLEB, however, sites still averaged less than 1 call recorded per night for the species and were restricted to the southeastern boundary of Camp Edwards near Forestdale neighborhoods. Only a single natural roost has been documented on Camp Edwards in a pitch pine in the northeastern corner of the installation occupied for one night before the individual moved to an off-base roost. A total of 50 mist net survey nights were implemented at Camp Edwards during 2015 and 2016 resulting in a total of only 5 NLEB captures despite intensive acoustic survey support for site selection. In each of three efforts only one bat was able to be tracked (one each in the summer of 2015 and 2016 was never located). A total of nine roosts were located, only two of which were on Camp Edwards and only three were natural (trees).

Based on intensive acoustic and mist-netting efforts it appears that the majority of NLEB roosting occurs off of Camp Edwards. The installation likely provides foraging habitat away from roost sites with activity primarily associated with small water features within larger topographic depressions near or generally connected to larger kettle hole ponds. Foraging habitat tends to be in much more oak dominated forest stands, which also at Camp Edwards tend to have lower basal area and much more open heath understory as opposed to stands with more pitch pine and scrub oak components. However, more investigation and data analysis is needed. Stands meeting the described characteristics are concentrated on the far eastern and northern boundary portions of Camp Edwards – areas that historically had much less wildfire.

III. Project Description

The primary proposed action is the clearing and construction of a Multipurpose Machine Gun Range in two phases at Camp Edwards. Phase One of the project includes construction of a 128-acre range and support area in FY2020 consisting of range support buildings and infrastructure and 8 lanes at a distance of 800-meters from the firing line. Phase Two does not yet have funding or a target year, but is included as it is an associated project. Phase Two would be extension of the two center lanes to a 1,500-meter distance from the firing line and cover an additional 61 acres of land. The combined phases (Fig. 2) require clearing of approximately 163 acres of vegetation beyond the KD Range area including pitch pine – oak forest (PPOF), pitch pine – scrub oak community (PPSO), and scrub oak shrubland (SOS). The total maintained range area will be approximately 199 acres including support and staging areas.

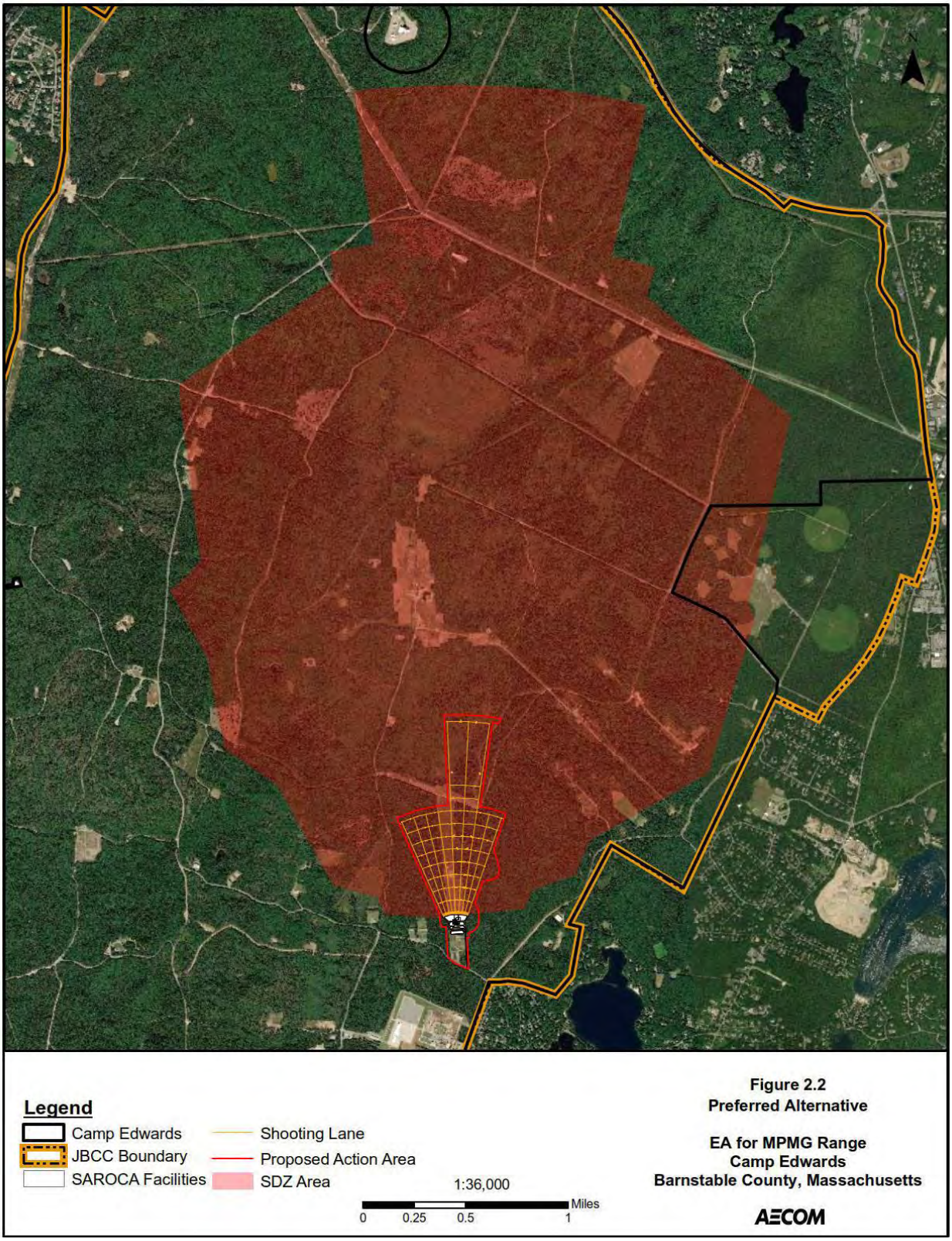


Figure 2. Preferred Alternative range design with eight 800-meter lanes of Phase 1 and two extensions to 1,500-meters during Phase 2. The red shading is the Surface Danger Zone (SDZ) or safety area for personnel exclusion during range use, though range design attempts to contain the majority of rounds.

Figure 3. Current KD Range Area looking north from Pocasset-Forestdale Road. This is the center of the proposed range footprint. Constructed support building will be in the foreground near the existing shed and tower. The 800-meter targets will be at the northern extent of the current, cleared range area.

Secondary proposed actions include upgrading wildland fire control elements necessary to more safely operate the MPMG Range and the habitat improvement projects required to achieve net benefit for state-listed species impacted by the proposed action. Additional actions include the grounds and facilities maintenance and Army training usage of the MPMG Range. While Figure 2 shows the Surface Danger Zone (SDZ) for the proposed range use, this is a safety model only and not a definition of any development action. The SDZ is a computer model for "1 in a million" probability of bullet impact without vegetation or terrain and is used to ensure potential impacts are kept within the base boundary and exclude personnel during range use.

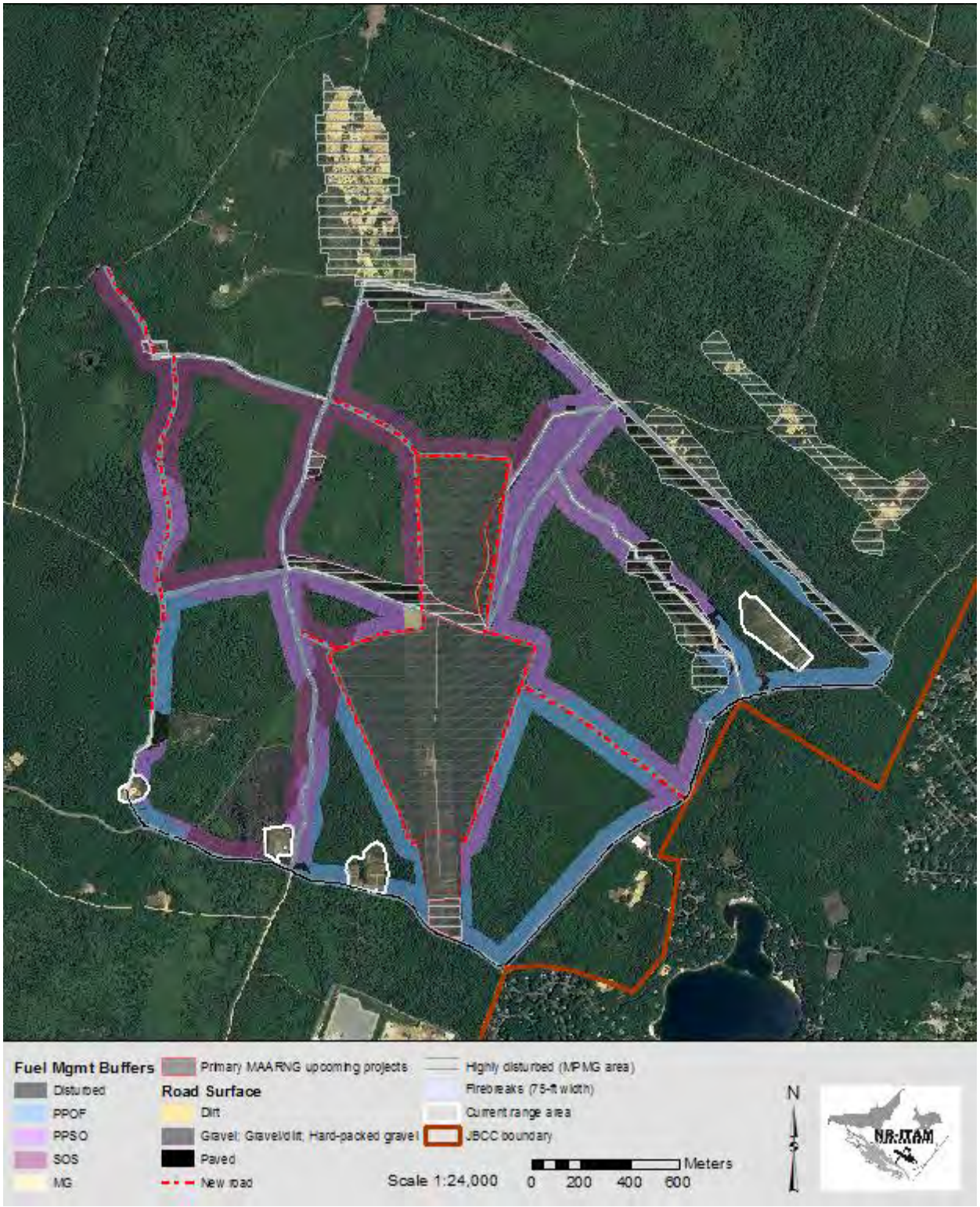


Figure 4. Fire control elements notionally planned for implementation to minimize wildfire risk resulting from range use and maximize prescribed fire to manage wildland fuels. Existing roads provide the majority of needed firebreaks. New fire breaks are dominated by the range perimeter road, but additional new breaks are proposed and shown in red dashed lines. Buffer polygons represent natural communities for proposed 200-foot wide "shaded fuel breaks" subject to mechanical forest thinning.

The proposed additional fire control elements (Fig. 4) are currently not designed or funded with the exception of the range perimeter road. Firebreak improvement and fuel reduction are critical elements of standard range use with tracer ammunition. Tracer ammunition is typical and often required component of Army range use with machine guns and rifles. Tracer rounds have a pyrotechnic charge to illuminate line of fire, which also introduces wildfire risk when illuminated rounds impact dry vegetation. A comprehensive, base-wide firebreak and fuels assessment and improvement plan is currently ongoing to better identify and design firebreak and fuels management improvements based on current condition and computer wildfire modeling.

Approximately 10 acres of additional firebreak road are proposed including widening of some existing roads to a 15-foot standard and addition of 4.5 miles of new fire road to serve as fire breaks. Based upon the extreme wildland fire hazard of scrub oak shrubland (SOS) and pitch pine – scrub oak vegetative communities, firebreaks are planned to have 30-foot wide shoulders mowed annually in the fall to avoid wildlife impacts. Experience at Camp Edwards has shown this to be effective maintenance while providing high quality, diverse habitat for pollinators and edge associated species (e.g., Eastern Whip-poor-will, foraging bats). The existing maintained fire roads in the area have approximately 35.6 acres of mowed "shoulder" serving as fire/fuel break. The proposal shown in Figure 4 includes an additional 45.5 acres of mowed shoulder to achieve the 30-foot standard on both sides of each fire road. New fire roads and mowed shoulders will require whole tree removal including roots (roads) or flush cutting stumps to a point sufficient for tractor maintenance.

The final planned fire control element is implementing fuel reduction treatments within a 200-foot wide buffer along every fire road. These "shaded fuel breaks" are designed as a thinning operation to increase tree spacing to between 20 and 300 feet (trunk to trunk). This reduces crown fire potential and meets recommendations for pine barrens management and Southern Pine Beetle risk reduction. Understory scrub oak will be spot treated within these buffers through shrub mowing. The majority of fire control element implementation will require unexploded ordnance survey and support as it occurs within formal impact area and other former explosive range areas. As mapped in Figure 4 the shaded fuel breaks cover 386.1 acres, of which just over 50 acres is already significantly disturbed and of minimal ecological value. The majority of the shaded fuel breaks are proposed in SOS (116.6 acres), and PPSO (128.9) communities. Approximately 89 acres of pitch pine – oak forest (PPOF) are mapped for shaded fuel break treatment, the majority of which has a significant scrub oak understory component and ecologically functions similar to PPSO. Areas identified as significantly disturbed are primarily former range areas that have had extensive and deep explosive ordnance removal. Areas that have been allowed to revegetate are near 100% cover of young pitch pine.

The majority of new fire road would require unexploded ordnance support with removal to a depth of 3 feet or more for detected ordnance. Such action would include hand clearance of understory vegetation followed by magnetometry and removal of surface ordnance. This would be followed by overstory tree clearing and ground penetrating metals detection for digging removal of materials. Clearing of mowed shoulder areas in ordnance zones would require surface removal of ordnance including understory vegetation mowing, surface magnetometry, and spot removal of detected ordnance. Over 250 acres of the proposed shaded fuel breaks are anticipated to need significant unexploded ordnance support for surface clearance similar to the mowed shoulders.

Maintenance of the range area will primarily consist of monthly tractor mowing with a mix of cool and warm season grasses including red fescue and little bluestem. Surrounding areas within the proposed firebreaks are expected to have a four to eight year prescribed fire return interval to balance impacts to the natural community with wildfire hazard reduction and protecting the surrounding neighborhoods, schools, and other inhabited areas of Sandwich, MA.

Range use will be greatest from May through August with a combination of day and night firing to meet soldier qualification standards. Standard range use includes tracer ammunition, which introduces significant potential for wildfire ignition when vegetation is dry. Additionally, night firing will introduce additional night-time noise beyond that already occurring. However, noise studies including models and field testing suggest an overall insignificant increase in noise levels and impacts (US Army Public Health Center, Noise Assessment for the Proposed Multi-Purpose Machine Gun Range, Camp Edwards: 01-May-2019). Light minimization measures were developed by the designer for this project including yellow spectrum (2700-3000 Kelvin) downward facing lights that will only be on during range use to minimize impacts to state-listed Lepidopterans and bats.

Timing and Additional Details of Project Elements

Phase One of the proposed action is scheduled to begin late summer of 2020 (August/September). The first action will be installation of an erosion barrier around the limits of construction to include trenching and standard silt fence installation. This measure is primarily designed as a movement barrier and impact minimization measure for the state listed eastern box turtle (*Terrapene carolina*). An intensive box turtle surveys will immediately follow silt fence completion. Tree removal with unexploded ordnance support will initiate as soon as box turtle clearances are complete and will likely extend from November 2020 through February 2021. Removed trees will be chipped on site and disposed off-site, presumably being used for biomass power generation. Site grading and range construction is scheduled to begin in early 2021. The overall timeline from tree removal through installation of targets and construction of support buildings is expected to last 12 to 18 months.

Phase Two of the proposed action is not yet funded or designed. The Department of the Army may choose to fund the design and construction of the 1,500-meter lanes as early as 2022 or it may not occur at all. The Environmental Assessment for the MPMG Range and associated projects and state environmental review and mitigation actions all evaluate and plan for Phase Two to ensure due diligence, but it is not currently an approved or planned project by National Guard Bureau.

The fire control elements for the MPMG Range are likewise currently unprogrammed relative to the federal budget. Significant unexploded ordnance support will be required for the majority of the proposed combination of actions, which includes widening of some existing roads, construction of new roads, widening of mowed road shoulders, and mechanical forestry for all elements and creation of shaded-fuel breaks. Given that funding is not yet programmed for the unexploded ordnance support or fire breaks it is anticipated that implementation would begin no earlier than 2022. A fire hazard assessment is underway currently that is planned to more tightly identify needed fire breaks to address existing fire hazard.

IV. Anticipated Impacts

Impacts of the action must be assessed for direct, indirect, and cumulative effects of activities on federally-listed species and their habitats. However, for this project and the relevant species specific protections, exemptions, and policies for listed plants and the Northern Long-eared Bat will be incorporated. Incidental take is exempted from incidental take prohibitions under the 4(d) rule for the Northern Long-eared Bat unless the action results in incidental take within 0.25-mile of a hibernaculum or within a 150-foot buffer of a maternity roost. No known maternity roosts or potential maternity roosts exist in the vicinity of the project despite multiple mist-netting efforts in the vicinity.

A potential hibernaculum exists at the eastern edge of the proposed action area (Figs. 5 and 6) between acoustic stations 15_35 and 16_06 and approximate 0.38-mile from the Phase 1 proposed action area. The potential hibernaculum was discovered during mist-netting surveys implemented in 2016 to evaluate fall swarming and early winter NLEB activity at Camp Edwards. Despite targeting NLEB activity only a

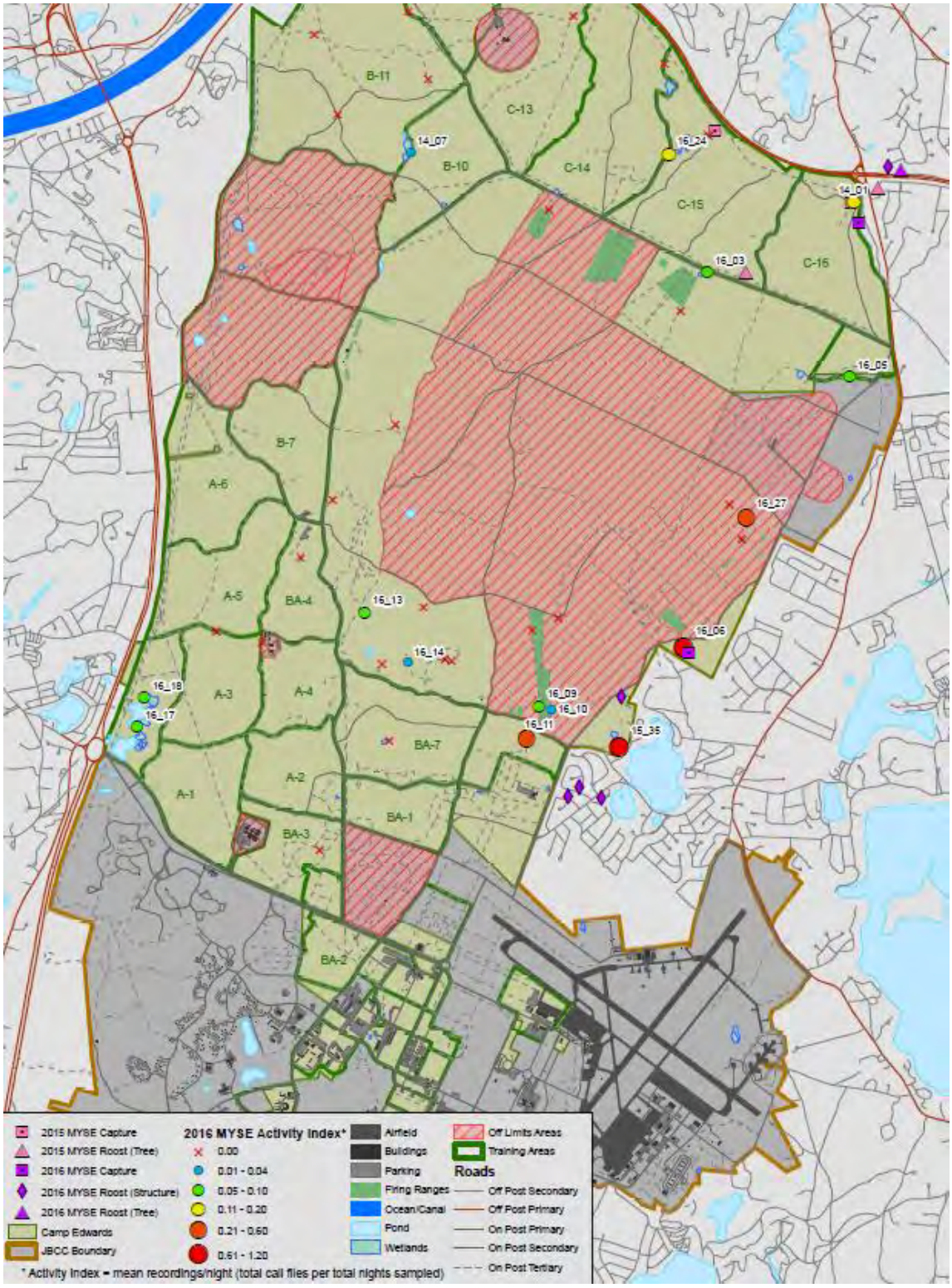


Figure 5. Acoustic and mist-netting results from multiple intensive efforts throughout 2015 and 2016 including in-house acoustic surveys, summer mist-netting, and fall mist-netting. Note that the highest activity acoustic sites (15_35, 16_06) averaged only up to 1.2 NLEB calls recorded per night. Roosts of the single fall NLEB captured near 16_06 were clustered around Snake Pond (immediately east of 15_35) except for one roost not mapped approximately 3 miles to the northeast of 16_06.

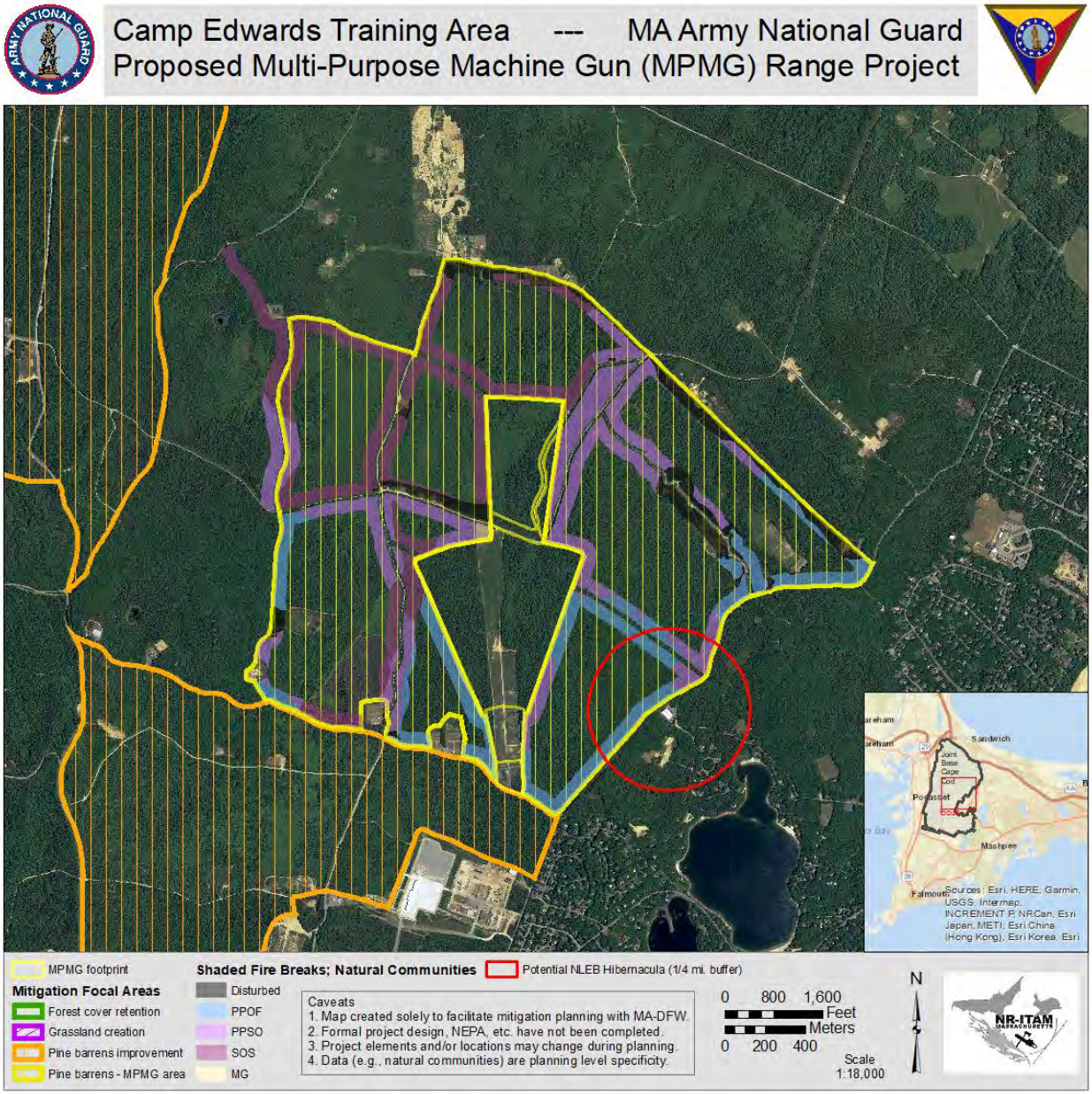


Figure 6. The potential on-site hibernaculum is the large, white rectangle inside the red circle, which represents a 0.25-mile buffer for incidental take evaluation. Hashed areas are focal mitigation zones identified within the Conservation and Management Permit under the Massachusetts Endangered Species Act with the yellow-hashed area representing pine barrens management designed to meet wildfire risk minimization needs of the MPMG Range – primarily the use of mechanical forest thinning and prescribed fire. Blue and purple polygons within the 0.25-mile buffer are proposed forest thinning zones in pitch pine – oak forest and pitch pine – scrub oak natural communities – both of which are dominated by scrub oak in the understory and more functionally represent pitch pine – scrub oak.

single non-reproductive male was captured. The single individual was tracked to 5 roosts, all of which were man-made structures. Four of the five roosts were off of Camp Edwards in neighborhoods. The single roost site on Camp Edwards was inside a large groundwater treatment facility full of industrial water filtration equipment providing a steady hum of background noise, consistent temperature in the low

50s (F), and high relative humidity much like a cave environment. The individual was only detected within the building a single night on 29-SEP-2016, using off-site roosts on either end. This large, industrial-type building provides environmental and acoustic isolation from the surrounding environment.

Tree Removal

Tree removal will occur in multiple phases with varying prescriptions for implementation of the different portions of this project. The first and most significant is clearing the Phase 1 range area, followed by either the clearing of the Phase 2 range area (northern two lanes) or fire breaks and fuels management. Range area clearing will likely be implemented by vertical extraction with an excavator to remove roots and stumps and facilitate range grading and maintenance. The fuels management treatments will use standard methods for pine barrens management, which is targeted thinning to reduce basal area and canopy density to achieve tree spacing of 20-30 feet trunk to trunk. Trees will be removed with a feller-buncher and/or skidder and low tire pressure on skid roads to minimize soil and wildlife impacts. Timing of tree removal is prioritized for late fall through winter based on contract timing for Phase 1.

Incidental take within the protected buffer of the potential hibernaculum would be avoided through timing restrictions for the fuel management tree removal activities. Limiting timber harvest activities to winter within the protected buffer will avoid incidental take of bats potentially roosting in the surrounding forest (e.g., fall swarming near a hibernaculum). The particular structure with documented use is highly isolated from surrounding conditions in contrast to caves, tunnels, trees, or crawl spaces under buildings. Reduction in forest density will not affect the microclimate of the groundwater treatment facility. Noise from tree removal operations should be minimal, short-duration (e.g., 1 week or less), and insignificantly different from occasional heavy equipment operation nearby prior to discovery of NLEB roosting. Staging and chipping operations for tree removal would be located outside the 0.25-mile buffer to minimize potential noise impacts.

The tree removal for the range area does represent a loss of potential NLEB habitat, however, forest density in the proposed action area, combined with a very dense, tall understory dominated by bear (scrub) oak (*Quercus ilicifolia*) represented marginal habitat condition based on site-wide surveys and monitoring (Figure 5). The primary NLEB activity at Camp Edwards appears to be foraging forays by bats roosting off-site and using edges and trails for their foraging and movement activities. Bat monitoring within the proposed action area has shown only minimal use by NLEB suggesting movement corridors as opposed to gleaning activity or roosting. Additionally, the fuels management treatments proposed are anticipated to be neutral or beneficial with respect to NLEB activities including both roosting and foraging. Forest health at Camp Edwards and throughout southeastern Massachusetts suffers due to past land uses and a lack of forest management. The pine barrens habitat responds extremely well to properly designed management in all considerations for NLEB habitat conditions including structure and diversity. The proposed thinning operations will maintain high degrees of canopy closure while significantly reducing stocking rates by roughly half, increasing solar exposure and diversity in the understory and increasing individual tree vigor in the overstory. This will also reduce wildland fire intensity, reducing potential for incidental take during wildland fire events (planned or wild).

Tree removal will not have any negative effect on listed plant species as both need open, sandplain conditions. Expansion of fire breaks and/or range maintenance could ultimately provide suitable habitat for both species when coupled with wildland fire transitioning from woodland and shrubland habitats, especially frost bottom microsites, providing for a high plant diversity and high solar exposure.

Firebreak Construction

The primary component of firebreak construction will be the tree removal addressed above. However, firebreak roads will have additional actions beyond the tree removal of fuels management in shaded fuel

breaks. After tree removal firebreak roads will have minor grading and, where needed, a layer of New England sourced granite gravel (i.e., "bluestone") laid down for road base. Those able to be left as dirt roads will be much as the majority of roads at Camp Edwards. Firebreak roads are anticipated to be 15-feet wide to provide for emergency vehicle access and maintenance. Road edges for firebreaks will be maintained through annual mowing at a width of 30-feet.

This long-term maintenance condition of narrow gravel roads and infrequently mowed edges at Camp Edwards provides hotspots of early successional plant diversity and wildlife diversity. A number of focal conservation species for the base (e.g., New England Cottontail, Eastern Whip-poor-will) are found in higher density at these ecotones providing access to low, but diverse plants and insects along with dense cover provided by the typical habitat at Camp Edwards. In addition to the primary intent of reducing wildfire risk these roads provide significant habitat benefit for a variety of wildlife including rare Lepidopterans and bees, along with being primary foraging and movement corridors for bats and other vertebrates. Appendix One includes a separate document developed for the MA Division of Fisheries and Wildlife describing wildland fire control elements and includes some reference photos for both maintained firebreak condition and shaded fuel break condition.

One new firebreak road is anticipated within the 0.25-mile buffer of the potential hibernaculum at Camp Edwards. It would provide a critical fuel break and emergency access on the eastern (downwind) flank of the MPMG Range. The only potential incidental take from firebreak development and maintenance is the tree removal described above. There will be minor and short-term heavy equipment use to spot grade the road bed and mowed shoulder areas as needed and for long-term minor grading on an as needed basis and annual tractor mowing. If the addition of gravel is required due to site conditions, it is anticipated that approximately one week of heavy equipment time will be necessary and activities will be timed outside the pup season (June and July) to avoid potential noise impacts. Annual mowing will occur in late November through December to avoid potential impacts to a variety of fauna, particularly the Eastern Box Turtle.

Range Use Including Noise

Actively used firing ranges on DoD installations have shown variable results with regards to overall bat habitat use and abundance. However, for regionally comparable installations and relevant species Fort Drum found that Northern Long-eared Bats and Indiana Bats exhibited similar densities near actively used ranges and had maternal roost sites. Wildlife, including bats, at Camp Edwards demonstrate a significant amount of familiarization to range noise. The habitat feature combination typically surrounding ranges appears to outweigh the noise and activity. Edge habitat and hard transitions from forest or shrubland to mixed forb/grass tends to lead to a high diversity of insects, birds, and various mammals.

The Army National Guard informal consultation for the Northern Long-eared Bat and ongoing military training operations received concurrence in 2015 that ongoing range use was not likely to adversely affect the NLEB. Studies on the Indiana Bat at Camp Atterbury, Fort Drum, and Fort Leonard Wood documented habituation to range use/noise and natural activity within range and impact area zones. The above referenced noise study completed by Army Public Health Command and the Environmental Assessment for the proposed action determined the MPMG to not be a significant addition to the noise

environment as it is being constructed adjacent to three actively used ranges for both day and night firing operations. NLEB in the vicinity of the proposed action and associated projects are presumed to be habituated range use, including long duration gunfire.

The design of projects associated with the proposed action – notably the fuels management mechanical treatments for shaded fuel breaks and general fuel reduction – incorporate noise minimization as a key priority due to the proximity of surrounding neighborhoods. This is primarily in the form of maintaining a relatively high tree density to minimize sound travel. These same treatments are likely to improve habitat conditions for both foraging and roosting NLEB, which is likely to bring them into higher noise zones, but based upon habituation this is unlikely to negatively affect NLEB. NLEB that may hibernate within the water treatment facility are highly buffered from exterior noise and are unlikely to be affected.

Wildland Fire

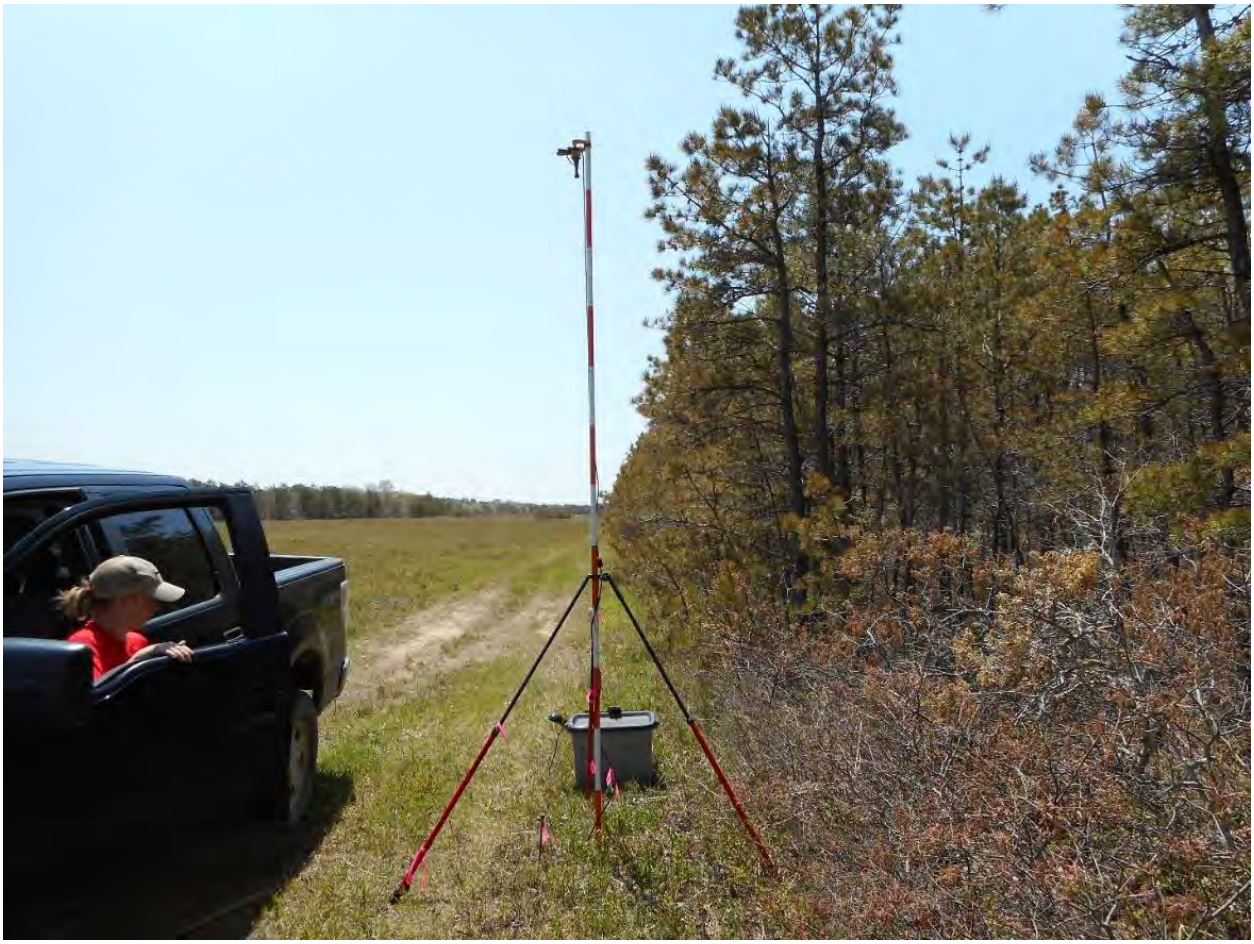
Wildland fire will be a critical element for both wildfire risk reduction surrounding the MPMG range as well as pine barrens habitat mitigation for impacts to state-listed species habitat. However, the MPMG range also introduces an increased risk of wildfire. The primary intent of all of the projects associated with the MPMG range construction is to reduce wildfire risk through minimization of fire spatial scale and intensity. Wildfire risk at Camp Edwards is generally high to severe given the history of wildfire and the resultant vegetation conditions. Particularly areas with unexploded ordnance concern had higher wildfire frequency, but have not experienced any wildfire since explosive ordnance training ended in 1997. This has created extreme fuel accumulation, which is a situation being addressed through planning and the associated fire breaks and fuels management projects.

Prescribed fire does have potential to negatively impact Northern Long-eared Bats through heat, smoke, and habitat impacts. Habitat changes resulting from wildland fire are primarily expected to be neutral or beneficial. Increased vigor and solar exposure in the understory and increased tree spacing will both improve conditions for foraging and roosting. Given the limited apparent use of Camp Edwards for roosting, especially areas dominated by pitch pine and scrub oak, direct impacts during fire operations are unlikely. Oak-heath woods used most by NLEB tend to have much lower flame heights, degree of fire behavior, and smoke production. Exposure of bats to convective or radiant heat from prescribed fires in a degree that constitutes take is unlikely given the observed patterns of bat activity and fire behavior in the proposed action area. Incidental take prohibitions for prescribed fire are exempted under the 4(d) rule for the Northern Long-eared Bat for areas greater than 0.25-mile from a hibernaculum. However, given the density of pitch pine and scrub oak in the areas between the potential hibernaculum and the proposed MPMG range, Northern Long-eared Bats are unlikely to be directly impacted by heat from a prescribed fire.

The greatest potential for incidental take during prescribed fire operations is likely long-term (overnight) smolder of the decomposing duff layer that can occur during drought conditions. Such a situation could lead to unusually high levels of particulates and carbon monoxide lingering within wooded areas during foraging or night roosting periods. Smolder events occur when burning under a high drought index in areas with a thick (e.g., 5 or more inches) duff layer. Smoke accumulation is typically minimal during the day when air is typically more mixed through convection and wind. However, nights with little wind allow smoke to settle and accumulate along with pronounced downward topographic drift. The proximity

of the proposed action area to residential neighborhoods and sensitive smoke receptors (e.g., Forestdale Elementary School) precludes the ability to burn under high drought index conditions (Keetch-Byram Drought Index greater than 300) due to the likelihood of a perceived nuisance condition. Large scale smolder conditions from prescribed burning with potential to negatively impact bats are unlikely to occur due to programmatic limits instituted in formal prescribed burn plans and smoke management policies designed to avoid nuisance smoke conditions.

IV. Additional Site Photos and Description



Active and passive bat acoustic monitoring and limited mist netting occurred at surrounding the proposed action area beginning in 2015. This figure shows a summer 2016 passive acoustic monitoring station at the northwestern corner of "KD" Range, which is proposed for conversion into the MPMG Range. This illustrates the stark transition between range "floor" (mowed grass, forb, and pine) and the dense pitch - pine scrub oak characteristic of past disturbances followed by a lack of management. This dense zone typically fades into somewhat more mature and open condition depending on the disturbance history. While for some species, such as the New England cottontail it can present a sheltered belt with access to forage, the density and plant composition present a significant barrier or detrimental condition to many other species of plant and animal. This condition also presents an extreme wildfire hazard.

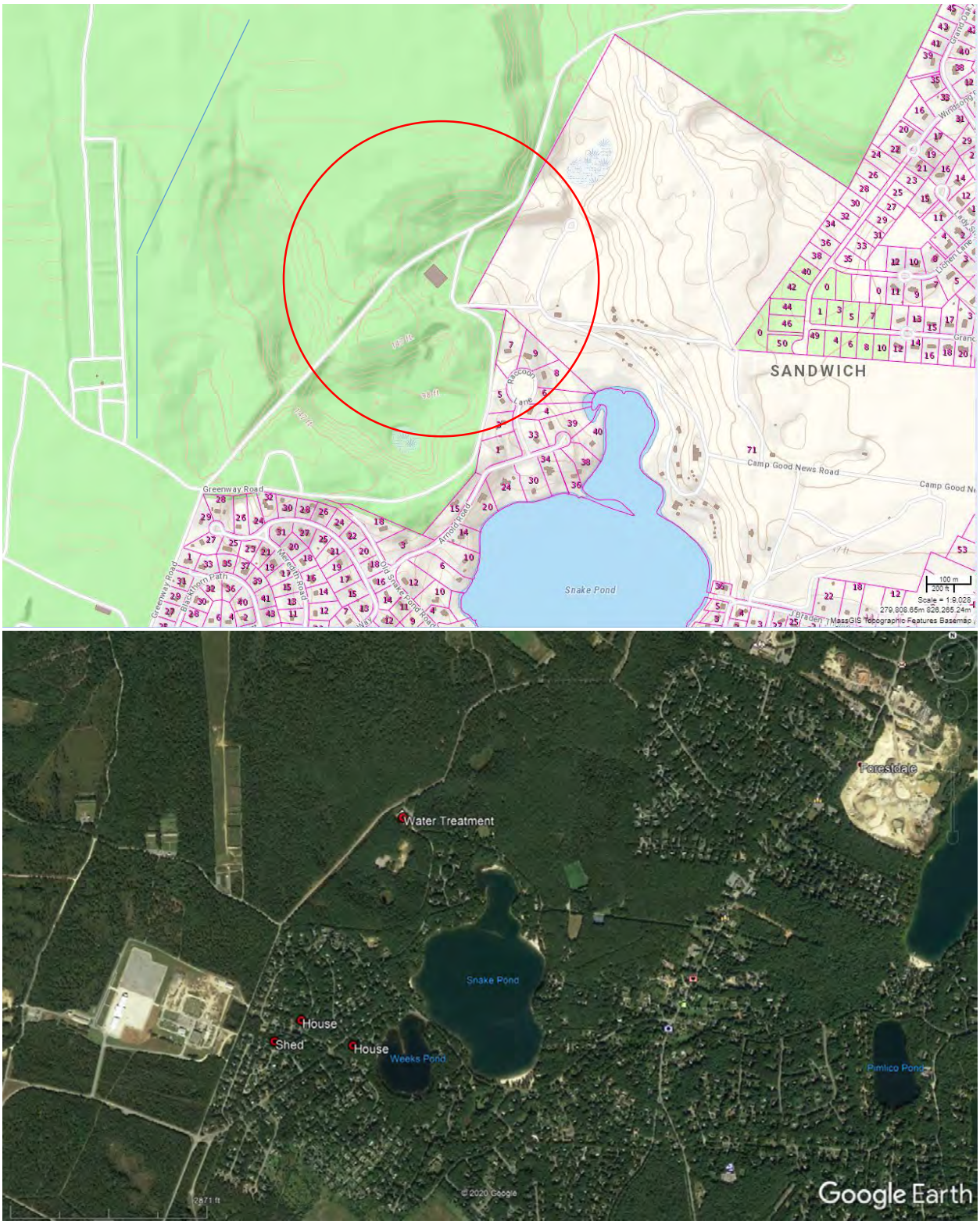
The range floor (or maintained footprint) is dominated by hardy pitch pines strongly rooted due to irregular mowing shown in this January 2019 photo. Airfield and firebreak maintenance at Joint Base Cape Cod have demonstrated that an annual late summer or fall mow can eventual reduce pitch pine cover and encourage diverse grasses and forbs.

Forested areas to the east and west of KD Range within and near the proposed action area are dominated by scrub oak understory with variable overstory condition. Scrub oak understory, high tree density (or no trees), and multi-stemmed oaks are all typical of past wildfires and range use on Camp Edwards. Monitoring has shown these dense understory and overstory stands have far less NLEB activity than the less common open oak stands of the far eastern and northern boundaries of the installation.

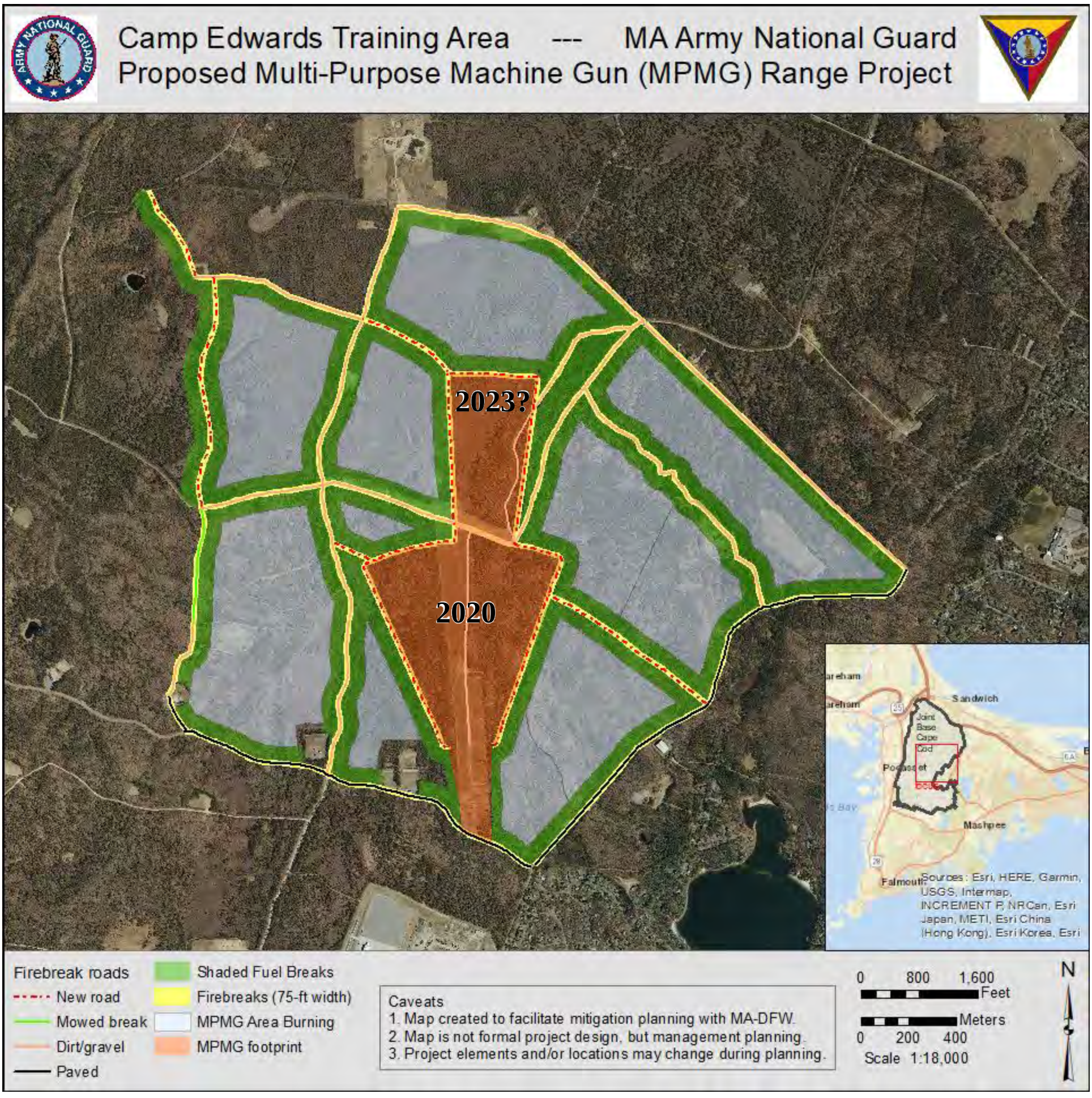
The exterior of the groundwater treatment building that had an October roosting NLEB male is a basic metal industrial building. The immediate surroundings are somewhat dense pines, but quickly transitioning into more open oak woodland community with fewer pines and more open understory compared to conditions immediately west across Greenway Road and into the proposed action area. Long-term acoustic monitoring failed to document the level of activity found 290 meters away along Bypass Bog Road at site 15_35, which has the consistently highest levels of NLEB activity for Camp Edwards, presumably due to the proximity to the neighborhood, Bypass Bog, and Snake Pond.

The inside of the groundwater treatment building that housed a roosting NLEB in 2016 is dominated by pipes and massive carbon filter tanks approximately 20-feet tall. The top photo is looking from the eastern garage door across the rarely used administrative offices to the roost site in the rafters just past the end of the metal walkway. The high rate of groundwater flow and amount of water in the drains and floor leads to a consistently warm (approximately 55F) and humid environment. The mechanisms, metal walls/ceiling, and concrete floor lead to a consistent and isolated background acoustic environment.

The lone NLEB able to be captured and tracked during the fall 2016 mist netting occupied five different roosts across nearly one month of tracking in October and November. The only roosting site on Camp Edwards or Joint Base Cape Cod was in the groundwater treatment facility shown above. The roosting location was hanging from bare metal rafters on the interior roof of the building. The cobwebbed antenna is visible hanging down and to the left of the bat. He used this building on two different occasions separated by a separate roost east of the base and approximately 800 meters south of this location. All of his roost locations were within structures ranging from house exteriors to an open shed and this metal industrial-style building.



Supplementary maps show the topographic and property ownership context (top) of the roosts documented near the proposed action area (bottom). The primary proposed action does not extend east from the existing range into the drainage flowing southeasterly towards Snake Pond between the water treatment facility and the other roosts to the south (approximate blue line at top).



Project elements anticipated timing:

2020: Clear and construct primary range area (0-800m; range operations and control area; 140 acres)

2021-2023: Clear (ordnance and trees) and construct primary fire breaks (new breaks; widening and repairs where necessary; gravel roads and mowed shoulders)

2022-2024: Create shaded fuel breaks with mechanical forestry and ordnance clearing

2023-2025: Potential construction of two lanes north from 800m to 1,500m (unfunded; unprogrammed)

Big picture concepts

Prescribed burning will be critical to keeping fuel loading down to avoid catastrophic wildfire. We do not know yet what burn interval will be necessary to avoid extreme hazard conditions. Likely less than 5 year return interval will be necessary. Initial thoughts were that annual would be beneficial ecologically because that would facilitate patch burns with low severity. Longer return intervals will lead to more significant fuel loading and higher severity (less frequent, but more intense/severe burns). However, fuel accumulation is unlikely to support annual burning unless there is some community conversion (e.g., significant incursion of grasses and other fine fuels to carry fire), which is counter to internal (MAARNG) and external (MADFW) goals. This is all conceptualizing a maintenance mode/regime that is several years distant. After the initial 4 years or so of prescribed burning the annual leaf drop will be unlikely to carry fire. More likely is that true maintenance mode will have fire occurring every 2-5 years depending on conditions and adaptive management as the range is used. It will likely be at least 2023 before we are able to start reintroducing fire into the areas surrounding the MPMG range with rotation of ordnance removal and mechanical fuel treatment required prior to fire.

The initial 2-5 years will be the most challenging as fuel loading is extreme and a majority of areas have ordnance concerns. A key ecological help is that financial resources are very unlikely to be available to clear the entire area and/or treat fuels in a given year. Fuel and ordnance reduction will have to be staged and prioritized. Thus, fire implementation will be staged to follow those actions. Anticipation is burning after fuel/ordnance reduction and then following up the next year with fire to address standing dead, litter, etc.

Most critical aspect

Much of the planning for the units surrounding the MPMG range is for actions years out at this point and with dependencies we do not fully know. This includes fire behavior in the given fuels relative to tracer ammunition and various management/treatment regimes. We will rely on adaptive management focused on minimizing ecological impact and maximizing community safety. Monitoring of various resources (e.g., whip-poor-wills, state-listed moths, box turtles) to inform us on impacts to species and guilds. That monitoring will guide adaptive management and we will react accordingly. Responses to impacts or necessary adjustments to management regimes may include reducing return intervals of fire if reasonable or mitigating unanticipated negative effects if such occurs. We will be reporting annually on actions and monitoring along with planned actions.

Management Zones – much of this is in the original mitigation bank document, but some has developed over time; photos in original document

1) Range floor: the range floor will be overall treated as "non-habitat" from a management perspective. During construction impacts will be minimized to that required for tree removal and cut/fill for grade. Seeding will only occur as needed and will likely include a cover crop for stabilization and low rate of native low grasses (e.g., little bluestem). Management will be the same as other active range floors. There will be regular (monthly?) mowing from April through September to minimize flashy fuels (e.g., tall grass) and line of site issues. This will also minimize wildlife impacts by keeping out most nesting birds and improving the ability for mowers to observe animals that do occur for movement or avoidance (e.g., killdeer nests, box turtles). This tends to provide a matrix of diverse forbs and low native grasses.
2) Access roads: range roads and new fire breaks are being designed as combination dirt and gravel (as needed) roads the same as existing roads surrounding the impact area, but with more regular maintenance/repair than has recently occurred. The basic standard is 15-feet wide dirt road with stretches stabilized/capped with dense-grade bluestone where needed. Roads will be graded and spot repaired as necessary to allow for emergency access (fire response). These will be gated and locked most of the time.
3) Firebreak edges: Edges of fire breaks and primary access roads for the MPMG range and other ranges will be standard 30-feet wide to allow for tractor mowing (2 bat-wing deck widths). Once per year mowing in late November or early December allows for effective mowing of woody species while avoiding negative impacts on turtles and birds. This also provides a highly diverse low community of woody shrubs (cut down to 6-8 inches) intermixed with native grasses and forbs. Current roads managed in this way have exceptional pollinator habitat and use by woodland edge species. Baptisia is abundant, as are heath species and scrub oak, while being kept low enough to minimize fire behavior and allow for emergency equipment to pull off the road.
4) Shaded fuel breaks: we are currently contracting a fuel management and fire break plan that will model expected fire behavior and inform fuel reduction projects. However, the working standard for this plan is mechanically thinning 200-ft wide buffers surrounding all fire breaks around ranges using tracer ammunition. At this time the concept is limited to the MPMG range. The concept is to maintain significant tree cover with canopy and open heath/scrub understory (specific goal to maintain high quality pitch pine – scrub oak natural community and barrens heath community). Trees would be thinned to roughly 20 or 30 foot spacing to minimize potential for running crown fire while maintaining canopy cover for moisture retention. This would be quite similar to the western portion of Crane WMA (north) Understory would benefit significantly from increased solar exposure, but drying conditions would be moderated by remaining canopy to reduce fire hazard. Tree retention will also reduce potential noise issues with range use and minimize tracer ricochet. These shaded fuel breaks will mimic typical thinning projects for southern pine beetle risk reduction (e.g., 80 square feet per acre basal area) and pine barrens improvement. The design is meant to significantly improve conditions for pine barrens flora/fauna while reducing severe wildfire conditions that currently exist. The areas would have potential for winter mechanical treatment of understory (e.g., mowing with a skid steer) with 20-foot tree spacing, but primary management will be fire on a rotation of every 2-4 years to maintain canopy separation. Adaptive management will drive long-term management decisions on type and frequency of management to include reducing management (e.g., longer return interval) or increasing (added mowing, shorter fire return interval) depending on results from both wildfire and natural resources monitoring (e.g., moths).

Images (September 2019) showing current conditions of mowed fire break on the west side of the Camp Edwards impact area. In the left image there is a 20-ft mow to the right (east) and roughly an 8-ft mow to the west based purely on past maintenance. Similarly, in the right photo there is a nearly 30-foot mow on the west (right side) and 10-foot mow on the east. Note the plant diversity in the mowed areas, which is consistent throughout and responds well to an annual late fall mow. These edges provide quality habitat for many species and, when combined with shaded fuel break habitat transitions (vs. hard edge of young pine) will be excellent for a wide variety of species. Long-term intent is to develop firebreaks surrounding pyrogenic ranges with the 30-foot mowed edges focused on maintaining plant diversity (annual fall mow) with a gradual transition into open pine barrens habitat (shaded fuel breaks) maintained with occasional (every 3-4 years?) fire.

Shaded fuel break examples. The idea is to reduce overall basal area, ladder fuels, and canopy connectivity to significantly moderate fire behavior and facilitate fire suppression response. The goal is to maintain high quality pine barrens condition – not convert the community. Projects will meet current barrens habitat management objectives to support rare species and reduce vulnerability to threats like southern pine beetle. The western portion of Crane WMA is probably the best current example of the overall intent, which is to evenly thin and leave significant tree cover.

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