Final
Environmental Impact Statement
For
Proposed Mortar and Artillery Training At
Richardson Training Area,
Joint Base Elmendorf-Richardson, Alaska

Summary

2026

PRIVACY ADVISORY

This Environmental Impact Statement (EIS) was provided for public comment in accordance with the National Environmental Policy Act (NEPA) of 1969. NEPA provides an opportunity for public input on United States Department of the Air Force (DAF) decision making, allows the public to offer input on alternative ways for the DAF to accomplish what it is proposing, and solicits comments on DAF's analysis of environmental effects.

Public input allows the DAF to make better-informed decisions. Letters or other written or verbal comments provided may be published in this EIS. Providing personal information is voluntary. Private addresses were compiled to develop a stakeholder inventory. However, only the names of the individuals making comments and specific comments are disclosed. Personal information, home addresses, telephone numbers, and email addresses are not published in this EIS.

COMPLIANCE

Procedurally this EIS was developed in compliance with NEPA, as amended by Public Law 118-5, Fiscal Responsibility Act of 2023 (42 United States Code 4321 et seq.).

ACCESSIBILITY NOTICE

The digital version of this Final EIS is compliant with Section 508 of the Rehabilitation Act of 1973 because assistive technology (e.g., "screen readers") can be used to help the disabled to understand applicable electronic media. Due to the nature of graphics, figures, tables, and images occurring in the document, accessibility may be limited to a descriptive title for each item.

PROPOSED MORTAR AND ARTILLERY TRAINING AT RICHARDSON TRAINING AREA, JOINT BASE ELMENDORF-RICHARDSON, ALASKA

FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS)

a. Responsible and Cooperating Agencies: United States Air Force (Air Force) is the Responsible Agency. United States Army (Army) is the proponent and a cooperating agency. National Marine Fisheries Service (NMFS) is a cooperating agency.

b. Proposed Action: This EIS addresses the proposal to modify the conditions under which live-fire weapons training and qualification is conducted at Joint Base Elmendorf-Richardson (JBER) to meet the Army's home station training requirements and to ensure Army elements at JBER are fully prepared for operational deployments in support of the United States' evolving Arctic Strategy.

c. Inquiries: Inquiries may be submitted to JBER Public Affairs, JBER.PA@US.AF.MIL, (907) 552-8151; (U.S. Post Office) JBER Public Affairs, 10480 Sijan Ave., Suite 123, Joint Base Elmendorf-Richardson, AK 99506.

d. Report Designation: Final EIS

e. Abstract: This EIS has been prepared pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code § 4321 et seq.). This EIS has been prepared to ensure that comprehensive and systematic consideration is given to potential environmental impacts that may result from implementing the proposed action or any reasonable alternatives. This EIS assesses the potential environmental consequences that would result from the proposal to modify the conditions under which indirect live-fire weapons training can be conducted at JBER. The proposed action would optimize recurring indirect live-fire weapons training at JBER to meet home station training requirements in accordance with current Army training doctrine. Reasonable alternatives were identified and evaluated based on selection standards by Army Richardson Training Area Installation Range Office personnel. Alternatives that met all established selection standards were considered reasonable and retained for consideration in this EIS. Resources addressed in the EIS include noise, air quality, sub-arctic climate considerations, safety and occupational health, earth resources, water resources, wetlands, biological resources, wildland fire, cultural resources and subsistence, land use and recreation, transportation and circulation, socioeconomics, infrastructure and utilities, hazardous materials and waste, and forest resources. This EIS incorporates the public and interagency comments received during the March to May 2020 scoping period and the 25 April to 24 June 2025 Draft EIS public review and comment period.

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LIST OF ACRONYMS AND ABBREVIATIONS

Air Force	United States Air Force
Army	United States Army
BMP	best management practice
CALFEX	Combined Arms Live Fire Exercise
CFR	Code of Federal Regulations
DAF	Department of the Air Force
EIS	Environmental Impact Statement
ERF	Eagle River Flats
ERF-IA	Eagle River Flats Impact Area
ESA	Endangered Species Act
HE	high explosive
JBER	Joint Base Elmendorf-Richardson
mm	millimeter
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
PMART	proposed mortar and artillery training
ROD	Record of Decision
SOP	standard operating procedure
U.S.	United States
WP	white phosphorus

SUMMARY

S.1 INTRODUCTION

This is a summary of the Final Environmental Impact Statement (EIS), which addresses the proposed mortar and artillery training (PMART) at the Richardson Training Area on Joint Base Elmendorf-Richardson (JBER), Alaska. The reader is encouraged to review the entire EIS for details on any subject contained in the Summary.

This EIS has been prepared pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code § 4321 et seq.). Under NEPA, federal agencies must analyze and document the impacts of their proposed actions and identify mitigation measures to offset the potential impacts.

The United States (U.S.) Air Force (Air Force) manages JBER and is responsible for ensuring NEPA compliance for actions on the installation, while the U.S. Army (Army) retains operational responsibility for training areas and ranges and is the project proponent—the agency proposing the PMART action. The Air Force is the lead agency for preparation of this EIS. The Army and the National Marine Fisheries Service (NMFS) are cooperating agencies for the EIS.

S.2 LOCATION AND BACKGROUND

JBER is a 73,041-acre military installation in southcentral Alaska, adjacent to Anchorage, the community of Eagle River, Knik Arm of Cook Inlet, and Chugach State Park. JBER supports Alaskan Command, 11th Air Force, 11th Airborne Division, and more than 90 supported and tenant organizations.

Eagle River Flats (ERF) Impact Area (ERF-IA) is a 2,483-acre explosive munitions impact area on JBER that has been used for weapons training since the 1940s and is currently the only dedicated impact area at JBER. ERF-IA includes ERF, an estuarine salt marsh of approximately 2,092 acres, as well as associated upland buffer areas, and is located at the mouth of Eagle River, which meanders through ERF and discharges into Eagle Bay.

ERF-IA supported heavy all-season use until February 1990, when firing was temporarily suspended due to waterfowl mortality caused by white phosphorus (WP). Since 1991, restrictions have been in place that limit use of ERF-IA to winter months when established ice thickness requirements are met. Remedial action objectives for WP cleanup have been maintained since 2006. Because the winter training window varies annually and does not allow units stationed at JBER to conduct the full range of training tasks at JBER, the Army seeks to expand its capabilities by resuming live-fire weapons training exercises during all seasons. The proposed action focuses on live-fire mortar and artillery training, which requires a dedicated impact area to contain explosive munitions, fragments, and debris. In 2010, a draft EIS was developed to resume all-season firing at JBER. However, a final EIS was never developed, primarily because of changes in the proposed action and identification of a new potential alternative. Based on these factors, a new EIS has been prepared.

S.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

Purpose

The Air Force, Army, and NMFS have coordinated on the EIS to meet each agency's NEPA obligations. The Army's purpose for the proposed action is to increase military readiness by optimizing recurring indirect live-fire weapons training, qualification, and certification at JBER to meet home station training requirements in accordance with current Army training doctrine.

Need

The Army needs to conduct frequent live-fire mortar and artillery training, qualification, and certification exercises under realistic conditions/standards throughout the year to prepare soldiers for combat operations.

Units participating in a Combat Training Center rotation must complete all prerequisites at home station, including company Combined Arms Live Fire Exercises (CALFEXs). CALFEX capabilities at JBER are limited by seasonal restrictions and because the current facilities do not provide a realistic training environment. All-season training is necessary to ensure that live-fire training occurs at the required frequency and soldiers achieve and maintain critical combat skills. Under the current live-fire restrictions, units stationed at JBER must travel more than 700 miles (round trip) to Fort Wainwright to train and qualify individual soldiers and weapon system crews. This continual requirement to deploy in order to train reduces readiness, violates the principle and benefit of home station training, places qualification and certification at increased risk, and unnecessarily separates soldiers from families for protracted training exercises.

S.4 PROPOSED ACTION AND ALTERNATIVES

Current indirect-fire training at ERF-IA is conducted only in the winter and involves mortars (60-millimeter [mm], 81-mm, and 120-mm) and artillery (105-mm). The proposed action would expand the training to include non-winter months and add 155-mm artillery to the authorized weapon systems. Types of rounds fired by these weapons systems include high explosive (HE), illumination, smoke, and training rounds. WP rounds, which were previously linked to waterfowl mortality, are no longer fired at ERF-IA and would not be fired under any alternative considered in this EIS. The Air Force requested an incidental take authorization, but NMFS determined it was not necessary for the specified activities because they would not harass (as defined for "a military readiness activity" under 16 United States Code § 1362 [18][B])[1] or result in the mortality of any marine mammal or marine mammal stock.

The Air Force is considering two action alternatives that meet the purpose and need for the proposed action of modifying training conditions at JBER. A No Action Alternative in which training conditions would not be modified is also carried forward for analysis, as required by NEPA. Both action alternatives would remove the winter firing restrictions at ERF-IA, reinstate all-season indirect live-fire training and qualification, and add 155-mm artillery to the authorized weapon systems, which would increase the maximum number of rounds fired into ERF-IA annually compared to the No Action Alternative. Both alternatives would also include built-in protection measures developed to avoid or reduce impacts to Cook Inlet beluga whales (*Delphinapterus leucas*) and other resources, including (but not limited to) habitat buffers based on acoustic modeling, limited fire periods for HE rounds, and redistribution of targets.

The same annual maximum number of rounds would be fired under both action alternatives (Table S-1). The alternatives would differ as far as whether ERF-IA would be expanded and whether travel to Fort Wainwright is likely to occur. The 155-mm rounds would be used under both action alternatives.

If either Alternative 1 or Alternative 2 is selected in the Record of Decision (ROD), the Army intends to allow units to begin all-season firing in the existing ERF-IA as soon as practicable following the decision. Alternative 2 would not require additional construction; however, if Alternative 1 is selected, the Army anticipates at least one to two construction seasons before the expansion area is ready for use.

[1] According to 16 United States Code § 1362(18)(B), in the case of a military readiness activity "harassment" has a narrower definition that means the action (1) injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild or (2) disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns to a point where they are abandoned or significantly altered.

Table S 1 Total Number of Rounds Allocated by Alternative each Fiscal Year

Munitions Type	Alternative 1	Alternative 2	No Action Alternative
60-mm Mortar HE Rounds	1,036	1,036	518
60-mm Mortar Other Rounds[1]	3,290	3,290	1,645
81-mm Mortar HE Rounds	592	592	296
81-mm Mortar Other Rounds	1,880	1,880	940
120-mm Mortar HE Rounds	744	744	372
120-mm Mortar Other Rounds	2,592	2,592	1,296
105-mm Howitzer HE Rounds	2,612	2,612	1,306
105-mm Howitzer Other Rounds	1,334	1,334	714
155-mm Howitzer HE Rounds	144	144	N/A
155-mm Howitzer HE Training Rounds	900	900	N/A
155-mm Howitzer Other Rounds	146	146	N/A
Total Rounds	**15,270**	**15,270**	**7,087**

Note: [1]"Other Rounds" refers to illumination, smoke, blank rounds, and training rounds not containing HE (all training rounds except 155-mm).
Key: HE = high explosive; mm = millimeter; N/A = not applicable

Alternative 1—All-Season Live-Fire Training That Meets Training and Certification Requirements with Expanded Impact Area in Order to Fully Meet CALFEX Live-Fire Proficiency in Accordance with Army Training Strategy[2] (Preferred Alternative)

As described above for the proposed action, Alternative 1 would reinstate all-season indirect-fire training and add 155-mm artillery to the authorized weapon systems.

Under Alternative 1, ERF-IA would increase in size to roughly 3,086 acres through its expansion into approximately 585 acres of adjacent upland. Impact area expansion would entail clearing 359 acres of vegetation, creating approximately 1.8 miles of gravel service roads and five vehicle gravel service pads inside the cleared area, and creating a 3-mile firebreak along the boundary of the cleared area. An approximately 226-acre vegetated buffer would remain.

Alternative 1 best meets the Army's need and is the Preferred Alternative. The expanded impact area would allow the Army to fully meet CALFEX live-fire proficiency and certification in accordance with Army regulations and doctrine and would minimize the need to travel to other installations. Although travel to other installations cannot be ruled out for any alternative, Alternative 1 assumes no travel to Fort Wainwright as a realistic scenario.

Alternative 2—All-Season Live-Fire Training at Existing ERF-IA Only That Meets Training and Certification Requirements and Marginally Meets CALFEX Live-Fire Proficiency in Accordance with Army Training Strategy

The key difference between this alternative and Alternative 1 is that ERF-IA would not be expanded, and all mortar and artillery rounds (Table S-1) would be fired within the existing impact area boundary. While resumption of all-season firing and incorporation of 155-mm howitzers would allow for a training environment that marginally fulfills CALFEX certification training requirements, soldiers would not experience realistic wartime conditions (the impacts of mortar and artillery rounds in close proximity) and

[2] Throughout this EIS, the full titles of the action alternatives have been shortened to assist the reader. Alternative 1 is referred to as Alternative 1: All-Season Live-Fire Training with Expanded Impact Area, and Alternative 2 is referred to as Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only.

would not receive the full benefit of a CALFEX. While all training could occur on JBER, this alternative assumes a more likely scenario that some travel to Fort Wainwright would occur.

No Action Alternative

Under the No Action Alternative, ERF-IA would continue to be used at the current operations tempo and with the same seasonal restrictions and current habitat buffers. Home station units would deploy to other Army-controlled training lands to conduct required small unit training and would continue to travel to Fort Wainwright to conduct indirect live-fire qualification and training whenever ice cover requirements are not met at ERF-IA. The maximum number of rounds fired at JBER annually would be limited by seasonal restrictions (Table S-1), and all allotted 155-mm rounds would be fired at other installations.

S.5 ENVIRONMENTAL COMPARISON OF ALTERNATIVES

The EIS describes the affected environment and potential environmental consequences for resources that could be affected by the proposed action. Direct, indirect, and cumulative effects from construction (expansion of ERF-IA) and operations (firing and training exercises) are considered.

Table S-2 summarizes the environmental consequences for all alternatives. The summaries provided document potential impacts assuming adherence to existing best management practices (BMPs), standard operating procedures (SOPs), policies, guidance documents, and regulations, and with the protective measures built into the action alternatives. For some resources, additional mitigation (Section S.7) has been identified as a result of the impact analysis. Table S-2 includes those measures identified during the analysis where mitigation would reduce the impact to less than significant.

Table S-2 Environmental Comparison of Alternatives

Acronyms used are defined at the end of the table.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Noise (Section 3.1) This section addresses community noise. Noise impacts on specific resource areas are included in the corresponding resource section.	Impacts would not exceed significance thresholds. Increases to noise in sensitive areas would be limited to seasonal impacts in isolated recreation areas and would remain below significance levels. Long-term community noise impacts associated with increased large arms CDNL noise contours (from increased firing) would encompass a larger area on and off the installation, but there would only be one seasonal noise-sensitive land use within the predicted 62 dB CDNL and above noise contours.	Impacts would not exceed significance thresholds. No temporary construction noise. Noise impacts from large arms training would be identical to those under Alternative 1.	No change in noise levels from baseline conditions.
Air Quality (Section 3.2)	With BMPs to control fugitive dust, impacts from construction would not exceed insignificance thresholds.[1] Short-term increase in emissions associated with land clearing, potential burning of slash, and construction. Release of carbon due to conversion of 350 acres of forest to grass, long-term removal of 9 acres of forest, and thinning of 226 additional acres. Annual emissions associated with prescribed fire to maintain open conditions. Long-term reduced vehicle emissions due to less travel to Fort Wainwright annually. Vehicle emissions associated with increased local travel at JBER would be offset by a corresponding decrease in local travel at Fort Wainwright. Localized, negligible increase in emissions of HAPs during live-fire training with increased number of rounds fired at ERF-IA would not present a human health risk. Annual GHG emissions associated with prescribed fire. Long-term reduction in vehicle GHG emissions due to less travel to Fort Wainwright annually. Long-term reduction in carbon sequestration from conversion of forest and maintaining open conditions in the expansion area.	Impacts would not exceed insignificance thresholds.[1] No temporary construction emissions. Short-term release of carbon and increase in annual emissions from potential burning of slash and prescribed burning additional acres (Alternative 1) would not be realized. Long-term reduced vehicle emissions would be less than under Alternative 1, as some travel to Fort Wainwright would likely occur. No increased local vehicle emissions at JBER or corresponding decreases at Fort Wainwright. Localized, negligible increase in emission of HAPs would be less than under Alternative 1, although the rounds would be fired elsewhere. Long-term reduction in GHG emissions from reduced vehicle travel would be less than under Alternative 1. Long-term change in carbon sequestration (Alternative 1) would not be realized. Overall, a beneficial impact to air quality is likely.	No change in annual emissions from baseline conditions. Air quality impacts from vehicle travel would be greater than under Alternatives 1 and 2. No temporary construction emissions or annual emissions associated with prescribed fire. No reductions in GHG emissions from reduced vehicle travel. Overall, impacts to air quality likely would be less than under Alternative 1 and greater than under Alternative 2.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Sub-arctic Climate Considerations (Section 3.3)	Fewer weather impacts than Alternative 2 and the No Action alternative because training would not be limited by ice thickness, training could occur during all seasons, and the upland expansion area would be less susceptible to flooding and erosion than ERF.	Fewer weather impacts than the No Action Alternative due to all-season training, but greater susceptibility to flooding and erosion than Alternative 1 because the impact area would not be expanded into uplands.	Greater weather impacts than the action alternatives due to ice thickness requirements, more frequent training at Fort Wainwright where red flag days from wildfire are more common, and likely increased flooding and erosion at ERF.
Safety and Occupational Health (Section 3.4)	Impacts would not exceed significance thresholds. Short-term safety risks to contractors performing land clearing and construction in the proposed expansion area, which would be reduced by adhering to required BMPs in applicable safety procedures and standards. Long-term increase in UXO at ERF-IA, increased fire risk in the proposed expansion area, and a beneficial impact to soldier safety from reduced vehicle travel and transport of munitions.	Impacts would not exceed significance thresholds. No short-term safety risks associated with construction. Long-term impacts would be similar to those under Alternative 1, except there would be no increased fire risk, and the beneficial impact from reduced travel would be lower than under Alternative 1 because some travel to Fort Wainwright is likely to occur.	No change in safety risks from baseline conditions. No short-term safety risks associated with construction, no increase in UXO at ERF-IA, and no increased fire risk. Risks to soldier safety from vehicle travel and transport of munitions would be greater than under Alternatives 1 and 2.
Earth Resources (Section 3.5)	Impacts from cratering in the expansion area would exceed significance thresholds. Short-term destabilization of soils associated with 359 acres of clearing in the proposed expansion area. Long-term permanent burial of soils in 3.5 acres and long-term periodic disturbance of soils in 5.8 acres of firebreaks. Increased potential for runoff and erosion. Long-term impacts to up to 1,510 acres of soil spread across existing ERF-IA and the proposed expansion area from disturbance associated with detonation of rounds during non-frozen conditions. Total estimated area of soil disturbance in a given training year would not exceed 6 acres for all target areas combined. Potential for deposition of munitions residues throughout target areas and very low risk of striking gravel-capped areas and discharging sequestered WP. Disturbance of sediments could redistribute small quantities of WP, if present.	Impacts would not exceed significance thresholds. No impacts to soils outside the existing ERF-IA. Long-term impacts to up to 1,160 acres of soil in existing ERF-IA from detonation of rounds, which is less than under Alternative 1, and no new areas of soil disturbance. Maximum disturbance area of 6 acres annually would be concentrated over a smaller area if all training occurs at JBER, and the degree of impact to soil in ERF could be greater than under Alternative 1. Potential deposition of munitions residues would occur over a smaller area than under Alternative 1, with greater impacts in existing ERF-IA. Very low risk of striking gravel-capped areas and discharging sequestered WP. Disturbance of sediments could redistribute small quantities of WP, if present.	No impacts to soils outside the existing ERF-IA. Soil disturbance would be less than under Alternatives 1 and 2 because frozen conditions would protect soils. Lower risk of damaging gravel caps and disturbing sediments and less deposition of munitions residues.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Water Resources (Section 3.6)	Impacts are not expected to exceed significance thresholds. No direct impacts from construction of the proposed expansion area, but potential indirect effects from increased sedimentation from destabilized soils and spills from construction equipment, minimized through BMPs specified in SWPPP. Long-term potential for impacts to water resources in ERF-IA through increased deposition of munitions constituents and soil disturbance from detonation of rounds. Water quality criteria exceedances are not anticipated. No or negligible impacts to groundwater or potential drinking water sources.	Impacts are not expected to exceed significance thresholds. No construction-related impacts, and affected area would be limited to the existing ERF-IA. Potential impacts from live-fire training similar to those under Alternative 1, although it is possible that more munitions would be detonated in ERF-IA.	No construction-related impacts. Long-term potential for impacts to water resources in ERF-IA would not increase from baseline levels and would be less than under Alternatives 1 and 2.
Wetlands (Section 3.7)	Impacts would not exceed significance thresholds. Long-term degradation of up to 59 acres of wetlands in the vegetation buffer, and potential indirect impacts from vegetation clearing of the proposed expansion area. Any unanticipated and unavoidable impacts to wetlands would be compensated for through a mitigation bank or in-lieu fee instrument. Long-term impacts to estuarine wetlands from live-fire training during non-frozen conditions and an increased number of rounds detonated in ERF-IA. Total estimated area of wetland disturbance in a given training year would not exceed 4.8 acres for all target areas combined. Potential phytotoxic impacts from an estimated 50 percent increase in annual deposition of energetic residues relative to the No Action Alternative. The social value component of wetlands would be reduced, but no significant reduction in overall function.	Impacts would not exceed significance thresholds. No impacts to wetlands from construction. Greater degree of wetland impact than under Alternative 1 if all training occurs at JBER. Long-term impacts to up to 6 acres of estuarine wetlands annually. Potential phytotoxic impacts from an estimated 50 percent increase in annual deposition of energetic residues relative to the No Action Alternative. The social value component of wetlands would be reduced, but no significant reduction in overall function.	No impacts to wetlands from construction. No change from baseline conditions. Winter firing restrictions would protect wetlands from disturbance and result in lower potential phytotoxic impacts than under Alternatives 1 and 2.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Biological Resources (Section 3.8)	**Vegetation:** Impacts would not exceed significance thresholds. Direct impacts to 585 acres of vegetation, including 359 acres of clear-cutting, 226 acres of alteration through thinning, and increased fire risk in the expansion area. Indirect impacts from increased risk of erosion, sedimentation, and windthrow over 7 acres from construction and maintenance of the proposed expansion area, and increased risk of windthrow in the thinned vegetation buffer. Increased susceptibility to invasive plant species in the proposed expansion area. Mitigation to monitor and treat invasive species would prevent their spread beyond the ROI. Annual disturbance of up to 6 acres from live-fire training during non-frozen conditions would impact vegetated and non-vegetated areas at ERF-IA. Potential phytotoxic impacts from an estimated 50 percent increase in annual deposition of energetic residues relative to the No Action Alternative. The affected area would be spread across the existing ERF-IA and the proposed expansion area.	**Vegetation:** Impacts would not exceed significance thresholds. No impacts to vegetation from construction. Greater degree of vegetation disturbance than under Alternative 1 if all training occurs at JBER. Annual disturbance of up to 6 acres of vegetation from live-fire training (same as Alternative 1). There is a 50 percent increase in annual deposition of energetic residues relative to the No Action Alternative (same as under Alternative 1). The affected area would be limited to existing ERF-IA.	**Vegetation:** No impacts to vegetation from construction. No change from baseline conditions. Winter firing restrictions would help protect vegetation from disturbance. Lower phytotoxic impacts than under Alternatives 1 and 2.
Biological Resources (Section 3.8)	**Fish:** Impacts could potentially exceed significance thresholds, even with mitigation measures. Potential short-term indirect impacts from sedimentation into fish habitats from clearing and construction would be minimized by BMPs. Potential long-term adverse impacts from live-fire training during ice-free conditions through exposure to underwater noise, munitions strikes, alteration of habitat in unbuffered areas, and exposure to munitions constituents. Protective measures would reduce but not avoid or eliminate impacts.	**Fish:** Impacts could potentially exceed significance thresholds, even with mitigation measures. No construction impacts. Potential long-term impacts similar to those under Alternative 1, but the degree of impact could be greater than under Alternative 1 if all training occurs at JBER because more rounds would detonate in the existing ERF-IA.	**Fish:** No change from baseline conditions. With winter-only firing restrictions and less live-fire training at ERF-IA, outside of adult salmon migration periods, impacts would be lower than under Alternatives 1 and 2.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Biological Resources (Section 3.8)	**Terrestrial Wildlife:** Impacts would not exceed significance thresholds. Short-term impacts from noise disturbance during construction of the proposed expansion area. Long-term loss of 359 acres of forest and woodland habitat, degradation of up to 59 acres of wetland habitat, and alteration of various habitats through thinning in the vegetative buffer, but creation of grassland, edge, and successional habitats. Long-term impacts from live-fire training during all seasons through periodic noise disturbance, habitat alteration, and increased risk of exposure to munitions residues. Degree of impact would depend on the species and timing of training, but most species would temporarily leave or habituate. Risks for direct strikes would be reduced by regulations that require cease fire if wildlife is observed. Very low risk of striking gravel-capped areas from live-fire training during ice-free conditions and discharging sequestered WP that could be ingested by birds. Disturbance of sediments could redistribute small quantities of WP, if present, but would not be expected to impact waterfowl populations.	**Terrestrial Wildlife:** Impacts would not exceed significance thresholds. No loss of forested habitat or construction impacts. No or minimal impacts to forest and woodland species from live-fire training, but the degree of impact to waterfowl and other wildlife that use ERF-IA could be greater than under Alternative 1 if all training occurs at JBER. Risks for direct strikes would be reduced by regulations that require cease fire if wildlife is observed. Very low risk of striking gravel-capped areas from live-fire training during ice-free conditions and discharging sequestered WP that could be ingested by birds. Disturbance of sediments could redistribute small quantities of WP, if present, but would not be expected to impact waterfowl populations.	**Terrestrial Wildlife:** No change from baseline conditions. Live-fire training would continue to be restricted during waterfowl migration periods, and migratory birds would not be present in large numbers during firing activities. Gravel caps would continue to be protected from damage and exposure of WP by winter ice conditions. Impacts would be lower than under Alternatives 1 and 2.
Biological Resources (Section 3.8)	**Marine Mammals:** Impacts are unlikely to exceed significance thresholds with implementation of mitigation measures. Potential short-term indirect impacts from sedimentation into marine mammal habitats from clearing and construction would be minimized by BMPs. Potential long-term impacts from live-fire training during all seasons through periodic noise disturbance, hazardous fragment strikes, habitat alteration, reduction in prey species (fish), and bioaccumulation of munitions constituents from live-fire training. Habitat buffers, seasonal firing restrictions, and other built-in protective measures, BMPs/SOPs, and mitigation developed as a result of the analysis would reduce impacts to less than significant.	**Marine Mammals:** Impacts are unlikely to exceed significance thresholds with implementation of mitigation measures. No construction impacts. Potential long-term impacts similar to those under Alternative 1, but the degree of impact could be greater than under Alternative 1 if all training occurs at JBER because more rounds would detonate in the existing ERF-IA. Habitat buffers, seasonal firing restrictions, and other built-in protective measures, BMPs/SOPs, and mitigation developed as a result of the analysis would reduce impacts to less than significant.	**Marine Mammals:** No change from baseline conditions. With live-fire training limited to periods when Eagle River is frozen over, Eagle Bay has high ice concentrations, and marine mammals have a lower likelihood of being present, impacts would be lower than under Alternatives 1 and 2.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Biological Resources (Section 3.8	**Special Status Species:** Potential impacts to EFH and managed fish species and ESA-listed marine mammals are as described above for fish and marine mammals. Impacts to bald eagles, SGCNs, birds of conservation concern, and other SSCs are as described above for terrestrial wildlife. For rare plants, impacts would not exceed significance thresholds. No rare plants are known to occur in the proposed expansion area, and there would be a low risk of impacts to suitable habitat through wetland avoidance. No impacts to rare plants or habitat from live-fire training in the proposed expansion area. No rare plants have been documented in the existing ERF-IA, but suitable habitat is present. Live-fire training during ice-free conditions would have the potential to impact rare plants, if present, through direct disturbance, disturbance of habitat, or phytotoxicity.	**Special Status Species:** Potential impacts to EFH and managed fish species and ESA-listed marine mammals are as described above for fish and marine mammals. Impacts to bald eagles, SGCNs, birds of conservation concern, and other SSCs are as described above for terrestrial wildlife. For rare plants, impacts would not exceed significance thresholds. Impacts to rare plants in ERF-IA would be similar to those under Alternative 1, although there is a potential for more habitat disturbance if all training occurs at JBER.	**Special Status Species:** Impacts to EFH and managed fish species and ESA-listed marine mammals are as described above for fish and marine mammals. Impacts to SSCs are as described above for terrestrial wildlife. No change from baseline conditions. Winter firing restrictions would help protect vegetation from disturbance and would result in lower phytotoxic impacts than under Alternatives 1 and 2.
Wildland Fire (Section 3.9)	Impacts would not exceed significance thresholds. Short-term introduction of new ignition sources during construction. Potential risks from prescribed and wildland fire would be mitigated by following the WFMP. Long-term increase in the annual number of potential ignition sources, introduction of ignition sources into the proposed expansion area, and expansion of live-fire training into the summer fire season.	Impacts would not exceed significance thresholds. No impacts associated with construction or impact area expansion. Long-term increase in the annual number of potential ignition sources and expansion of live-fire training into the summer fire season. While the same number of rounds would be fired as under Alternative 1, ignition risk would be lower, as all potential ignition sources would be targeted into the existing ERF-IA, which has a low fire risk.	No impacts associated with construction or impact area expansion. Winter-only use of ERF-IA would continue to result in low wildland fire risk, and there would be fewer potential ignition sources than under Alternatives 1 and 2.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Cultural Resources and Subsistence (Section 3.10)	**Cultural Resources:** Impacts have the potential to exceed significance thresholds, but with implementation of the PA, direct, indirect, and unanticipated/inadvertent adverse effects would be resolved. Project design of the proposed expansion area avoids direct impacts to documented archaeological sites. Potential for long-term impacts to archaeological sites from live-fire training in the proposed expansion area, and potential for long-term impacts to known or unknown archaeological sites or sites of traditional cultural importance in ERF-IA from training when sediments are unfrozen. **Subsistence:** Impacts would not exceed significance thresholds, and implementation of additional mitigation measures for biological resources would likely help reduce impacts. No direct impacts to subsistence. Potential long-term indirect impacts as a result of impacts to fish and other subsistence resources from live-fire training during periods when these subsistence resources are likely to be present (refer to *Biological Resources* for more information).	**Cultural Resources:** Impacts have the potential to exceed significance thresholds if unidentified cultural resource sites occur in ERF-IA, but with implementation of the PA, unanticipated/inadvertent adverse effects would be resolved. Potential for impacts to cultural resources less than under Alternative 1 because there would be no risks to documented archaeological sites outside of existing ERF-IA. Potential long-term impacts to known or unknown archaeological sites or sites of traditional cultural importance in ERF-IA would be similar to those under Alternative 1. Risks would be slightly higher than under Alternative 1 if all training occurs at JBER. **Subsistence:** Impacts would not exceed significance thresholds, and implementation of additional mitigation measures for biological resources would likely help reduce impacts. Impacts to subsistence similar to and potentially greater than those under Alternative 1, if all training occurs at JBER.	**Cultural Resources:** No increase in risk for impacts to cultural resources from baseline levels, as the impact area would not be expanded and winter firing restrictions would remain in place. **Subsistence:** No increase in risk for impacts to subsistence from baseline levels. Potential impacts would be lower than under Alternatives 1 and 2 because winter firing restrictions would remain in place.
Land Use and Recreation (Section 3.11)	Impacts would not exceed significance thresholds. **Land Use:** No impacts to off-post land uses, and short-term impacts to training uses from construction. Over the long term, expanding the impact area would preclude other types of training over 585 acres, but the changes would meet JBER planning goals. The on- and off-post area subject to noise levels of 57 to >70 dB CDNL during firing activities at ERF-IA would increase, with potential land use incompatibilities over 129 off-post acres. **Recreation:** A total of 30 acres would become off-limits to recreation. Long-term impacts associated with more frequent periodic closures of TAs to recreation and more frequent large arms noise that could be experienced by more recreational users both on and off JBER. Impacts could occur during all seasons.	Impacts would not exceed significance thresholds. **Land Use:** No impacts from construction. Long-term impacts from expanded large arms noise contours would be identical to those under Alternative 1, with potential land use incompatibilities over 129 off-post acres. **Recreation:** No increase in areas off-limits to recreation. Impacts to the recreation experience would be similar to those under Alternative 1 if all training occurs at JBER, but the extent of periodic closures could be less because the impact area would not be expanded.	**Land Use:** No impacts to existing or future land uses on or off JBER. Long-term adverse effect on land use planning goals, as ERF-IA would not be expanded. **Recreation:** No increase in areas off-limits to recreation, and no change in frequency or level of TA closures to recreation and large arms noise experienced by recreational users.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Transportation and Circulation (Section 3.12)	Impacts would not exceed significance thresholds. Short-term localized impacts to transportation and circulation during construction of the proposed expansion area. Long-term beneficial impacts from construction of 1.8 miles of gravel service roads. Long-term beneficial impact on regional off-base transportation network due to reduced travel to Fort Wainwright. More use of on-base roads, as soldiers would deploy less frequently.	Impacts would not exceed significance thresholds. No construction or development of new roads. Long-term beneficial impacts on off-base transportation would be less than under Alternative 1 because some travel to Fort Wainwright would occur. Use of on-base roads would be greater than under the No Action Alternative, but less than under Alternative 1.	No construction or development of new roads. Travel to Fort Wainwright and associated impacts to off-base transportation would be greater than under Alternatives 1 and 2. Use of on-base roads would be lowest under this alternative.
Socioeconomics (Section 3.13)	Impacts would not exceed significance thresholds. Long-term beneficial impacts to military expenditures and soldier quality of life associated with fewer trips to Fort Wainwright. Estimated annual travel-related cost reduction of up to $618,300. Negligible impacts to economic activity, no impacts to population, no direct impacts on housing, and no indirect impacts on housing values.	Impacts would not exceed significance thresholds. Long-term beneficial impacts would be lower than under Alternative 1 because some travel to Fort Wainwright would likely occur. Estimated annual travel-related cost reduction of up to $262,900, and less time spent at home than under Alternative 1. Negligible impacts on economic activity, no impacts on population, no direct impacts on housing, and no indirect impacts on housing values.	No effect on socioeconomics. Military expenditures would remain unchanged, and soldier quality of life would continue to be adversely impacted by training time spent away from families.
Infrastructure and Utilities (Section 3.14)	Impacts would not exceed significance thresholds. Expansion of ERF-IA would support the military mission. More frequent maintenance of infrastructure assets may be required as a result of increased training at JBER. Long-term increase in annual utility demands at JBER as a result of increased training that would not exceed the available capacity of utility systems.	Impacts would not exceed significance thresholds. No infrastructure improvements would occur. More frequent maintenance of infrastructure assets may be required, but less than under Alternative 1. Long-term increase in annual utility demands would be less than under Alternative 1 and would not exceed the available capacity of utility systems.	No impacts to infrastructure or utility systems. Infrastructure and utility use would remain at current levels.

Resource Area	Alternative 1: All-Season Live-Fire Training with Expanded Impact Area	Alternative 2: All-Season Live-Fire Training at Existing ERF-IA Only	No Action Alternative
Hazardous Materials and Waste (Section 3.15)	Impacts would not exceed significance thresholds. Short-term impacts associated with generation of new hazardous materials and waste during construction. Live-fire training would occur when ERF-IA is not frozen and gravel caps are exposed, but the risk of an errant round damaging a gravel cap and redistributing capped or buried WP is very low. Outside of gravel-capped areas, disturbance of sediments that may contain WP, if they are present at all, is not expected to result in such quantities that would be bioavailable to waterfowl. Long-term beneficial impacts associated with a reduced risk of spills because of reduced vehicle travel to Fort Wainwright.	Impacts would not exceed significance thresholds. The affected area would be less than under Alternative 1 because ERF-IA would not be expanded. Similar to Alternative 1, very low risk of an errant round damaging a gravel cap and redistributing WP, even with more rounds potentially fired into ERF, if all training occurs at JBER. Outside of gravel-capped areas, disturbance of sediments that may contain WP, if they are present at all, is not expected to result in such quantities that would be bioavailable to waterfowl. Long-term beneficial impacts associated with a reduced risk of spills because of reduced vehicle travel, although likely less than under Alternative 1 because some travel to Fort Wainwright would likely occur.	No increase in risk of spills on JBER. Winter firing restrictions would continue to limit the potential for disturbance of gravel caps and associated re-exposure of remediated WP. Risks of spills associated with vehicle travel to Fort Wainwright would be greater than under Alternatives 1 and 2.
Forest Resources (Section 3.16)	Impacts would not exceed significance thresholds. Removal of forest resources in the proposed expansion area equivalent to approximately 1 percent of the total area of the forest types on JBER that would be affected by the clear-cut. Creation of approximately 3 miles of new forest edge, which would increase susceptibility to windthrow and insect pathogens. Increased risk of forest fires associated with increased live-fire training and expanding ERF-IA, which would be minimized by following the WFMP. Increased risk of exacerbating spruce beetle outbreak by cutting and relocating receptive host material, which would be mitigated by following BMPs.	Impacts would not exceed significance thresholds. No removal of forest resources or creation of new forest edge. Potential increase in fire starts with increased live-fire training, but all rounds would be fired in ERF-IA where there are only small stands of trees and risk of wildland fire is low. Risk of fire and outbreak of insect pathogens would be less than under Alternative 1.	No removal of forest resources. Risk of fire and outbreak of insect pathogens would be less than under Alternatives 1 and 2.

Note: [1] In the Air Force Level II Quantitative Assessment that was completed for this EIS, "Insignificance thresholds" are emission levels for criteria pollutants that are used to identify clearly insignificant impacts and flag potentially significant impacts that warrant additional analysis. The Level II assessment does not use significance thresholds.

Key: BMP = best management practice; CDNL = C-weighted Day-Night Average Noise Level; dB = decibel; EFH = Essential Fish Habitat; EIS = Environmental Impact Statement; ERF = Eagle River Flats; ERF-IA = Eagle River Flats Impact Area; ESA = Endangered Species Act; GHG = greenhouse gas; HAP = hazardous air pollutant; JBER = Joint Base Elmendorf-Richardson; PA = Programmatic Agreement; ROI = Region of Influence; SGCN = Species of Greatest Conservation Needs; SSC = Species of Special Concern; SWPPP = *Storm Water Pollution Prevention Plan*; TA = Training Area; UXO = unexploded ordnances; WFMP = *Wildland Fire Management Plan*; WP = white phosphorus

S.6 CUMULATIVE EFFECTS

The cumulative impacts assessment analyzed the effects on the environment that would result from the incremental impact of the proposed action (Alternatives 1 and 2) when added to the effects of other past, present, and reasonably foreseeable future actions on JBER and the surrounding area. While individually these actions may not lead to notable or significant environmental impacts, they could, when analyzed in the aggregate, generate impacts that are significant. The analysis considers past actions, such as stationing actions at JBER and military training at ERF-IA, development in the region, establishment of parks and game refuges, and the Good Friday Earthquake of 1964. Present and reasonably foreseeable future actions considered included port development, railroad and other transportation projects, oil and gas development, recreational and commercial fishing, and various construction projects on JBER, among others.

Table S-3 provides a summary of the results of the cumulative effects analysis for each resource. It considers the contribution of the proposed action and other projects to cumulative effects, as well as the aggregate cumulative effects when all actions are considered together. Determinations of significance consider SOPs, policies, guidance documents, regulations, protective measures, and additional mitigation identified for each resource. In all instances, determinations are the same for both action alternatives.

Table S-3 Summary of Cumulative Effects by Resource

Resource Area	Proposed Action	Other Cumulative Projects	Cumulative Effects
Legend: ○ – No or negligible contribution of project(s) to cumulative effects, or beneficial effects □ – Impacts would occur but would be less than significant (considers mitigation, where applicable) Δ – Potentially significant impacts; monitoring needed to establish impact and need for additional mitigation ● – Significant and unavoidable impacts even after mitigation			
Noise	□	□	□
Air Quality	□	□	□
Sub-arctic Climate Considerations	○	□	□
Safety and Occupational Health	○	□	□
Earth Resources	●	□	□
Water Resources	□	□	□
Wetlands	□	□	□
Biological Resources – Vegetation	□	□	□
Biological Resources – Fish	**Δ**	□	**Δ**
Biological Resources – Terrestrial Wildlife	□	●	●
Biological Resources – Marine Mammals	□	□	□
Biological Resources – Special Status Species	□	●	●
Wildland Fire	□	□	□
Cultural Resources	□	□	□
Subsistence	□	□	□
Land Use and Recreation	○	□	□
Transportation and Circulation	○	○	○
Socioeconomics	○	○	○
Infrastructure and Utilities	□	□	□

Resource Area	Proposed Action	Other Cumulative Projects	Cumulative Effects
Hazardous Materials and Waste	□	○	□
Forest Resources	□	□	□

S.7 MITIGATION MEASURES

Mitigation measures avoid, minimize, or compensate for environmental impacts and include the following:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation measures identified in this EIS will be considered during preparation of the ROD. Four types of mitigation measures are considered in the EIS: (1) protective measures built into the proposed action; (2) BMPs and SOPs that would continue to occur under the proposed action; (3) mitigation determined as a result of the impact analysis that the analysis assumes would be selected in the ROD; and (4) additional measures being considered that may not be selected in the ROD but would be considered for future implementation.

Mitigation measures that are included as part of the selected alternative or selected in the ROD will be implemented in a mitigation plan. Measures to avoid or mitigate direct and indirect effects to cultural resources were resolved in a Programmatic Agreement developed through consultation under 36 CFR § 800.6. The Programmatic Agreement is included in Appendix I, and stipulations will be included in the ROD.

On behalf of the Army, the Air Force coordinated with NMFS in developing mitigation measures through the informal consultation process. The ROD will document mitigation measures to be implemented in accordance with the mitigation plan. The mitigation plan will identify principal and subordinate organizations responsible for the execution and oversight of specific mitigation measures. For the purposes of Endangered Species Act (ESA) Section 7 informal consultation, the Letter of Concurrence issued by NMFS (Appendix B) states that the proposed action will incorporate the mitigation measures for marine mammals included in this EIS. It is the Air Force's responsibility to work with the Army to ensure all required actions are executed as described in the ROD and subsequent mitigation plan.

Table S-4 identifies mitigation measures in each of the four categories, by resource area, that would avoid, minimize, or compensate for potential impacts or identified significant impacts associated with each alternative. Where an alternative would have an unavoidable impact that the Air Force cannot mitigate, such unavoidable impacts are identified in this EIS for decision-makers. Additional management, regulatory, and design elements that will be adhered to but are not considered mitigation measures are included in the individual resource sections of this EIS, generally in the Regulatory Setting discussions.

For additional clarity, Table S-5 lists a subset of mitigation measures in each of the four categories that apply to each munition type that would be fired in ERF-IA under the proposed action.

Table S-4 Mitigation Measures by Resource Area

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Protective Measures Built Into the Proposed Action																	
Implement new habitat protective buffers (fire exclusion zones, No Fire Areas) based on noise modeling results.				•	•			•		•	•		•	•			
Implement limited fire periods for HE rounds during all inundating tide events (predicted and observed).								•		•	•			•			
Implement a limited fire period for HE rounds during the peak beluga whale upriver visitation period (determined to be 9 August through 18 October; dates will be periodically reviewed). HE rounds could still be fired into the upland expansion area during this time.								•	•	•	•			•			
Redistribute targets away from buffer areas.					•			•		•	•			•			
Prohibit use of white phosphorus.[1]				•	•				•		•			•		•	
Target higher elevation areas to protect fish in vegetated low-lying ponds or depressions that cannot be easily observed.					•			•	•	•	•			•			
During inundating tides at night, restrict units to targets outside routinely inundated areas.					•			•	•	•	•			•			
Use visual clearing and slow start prior to firing.									•	•	•			•			
Cease fire if marine mammals are observed (30 minutes for beluga whales, 15 minutes for other marine mammals, or until they are seen moving out of Eagle River).										•	•			•			
Clear unexploded rounds from the expansion area after each training event (Alternative 1).				•	•				•		•			•		•	

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Best Management Practices and Standard Operating Procedures																	
Do not place targets in open waterbodies.					•			•	•	•	•			•			
Do not fire into open navigable waterbodies or observable open water.					•			•	•	•	•			•			
No firing of 155-mm rounds into unbuffered areas near the Eagle River relict channel due to space limitations.					•			•		•	•			•			
Use a Fire Direction Center and other systems for accuracy.				•	•			•	•	•	•			•			
Use forward observers to monitor for observable open water and forward observers or radar to observe rounds impacting or bursting (leads to not firing in most waterbodies), with cease fire and shifting to different targets as needed.					•			•	•	•	•			•			
Use night vision equipment or ILLUM rounds to observe targets at night.				•	•			•	•	•	•			•			
Cease fire and initiate an investigation for any round that impacts outside the target area or is not observed impacting.				•	•			•	•	•	•		•	•		•	
Provide 2-week advance notice and late fire notice to the public.	•														•		
Dampen soil with water during excavation and grading to maintain minimum soil moisture. Water a minimum of twice daily on unpaved/untreated roads and on disturbed soil areas with active operations (Alternative 1).		•															
Prohibit excavation and grading during high winds (i.e., greater than 20 miles per hour) (Alternative 1).		•															
Use tarps during transport of fine materials (Alternative 1).		•															
Dampen stockpiles of soil or other loose material with water (Alternative 1).		•															
Use wind breaks (Alternative 1).		•															

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Reduce speeds of construction vehicles to 15 miles per hour if excessive fugitive dust is observed (Alternative 1).		•															
Maintain construction equipment in good operational condition (Alternative 1).		•															
Track Sustainability Development Indicators as detailed in the IDP to demonstrate progress toward Air Force and DoD policies and initiatives and in support of Goal 6 of the IDP: improve JBER as a sustainable installation.		•															
Implement the WFMP within the RTA at JBER.		•										•					•
Adhere to all existing applicable safety regulations and BMPs for range use; munitions storage, use, and transport; construction; prescribed burns; and vehicle travel.			•														
Implement the Sustainable Range Awareness Program to provide education to soldiers to ensure operations and activities at ERF-IA are carried out in a sustainable manner.				•	•	•	•	•	•	•	•		•	•			
Adhere to spill prevention and cleanup procedures outlined in the most current INRMP and JBER Spill Prevention, Control, and Countermeasures Plan.				•	•			•		•	•			•		•	
Adhere to the most current JBER Industrial SWPPP.				•	•			•		•	•			•		•	
Adhere to the project-specific Construction General Permit and SWPPP during construction to minimize potential construction impacts (Alternative 1).				•	•			•		•	•					•	
Place targets strategically to minimize the risk of increased erosion from project activities.				•	•												
Adhere to construction BMPs that minimize erosion and sedimentation (Alternative 1).				•	•	•	•	•		•	•						
Do not place targets on capped areas.				•	•			•	•		•			•		•	
Avoid remediated areas during training exercises to the extent practicable.				•	•			•	•		•			•		•	

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Follow the most recent guidance and recommendations on using types of munitions that minimize impacts to aquatic receptors to the maximum extent practicable.					•			•	•	•	•			•			
Manage wetland habitat in a manner that incurs no net loss of wetland acreage or functions unless necessary to support mission requirements, as prescribed in the INRMP.						•											
Adhere to riparian setbacks and habitat protection buffers set forth in the INRMP.					•	•	•	•	•	•	•			•			
Avoid thinning in wetlands to the extent possible (Alternative 1).						•											
Remove trees in wetlands by hand (Alternative 1).						•											
Limit tree removal in wetlands to no more than one-third of the basal area per acre (Alternative 1).						•											
Limit thinning in wetlands to winter months when soils are frozen (Alternative 1).						•											
During thinning in wetlands, avoid disturbance of the organic duff layer and below the ground surface (Alternative 1).						•											
Monitor installation ecosystems through the Long-Term Ecological Monitoring Plots per the INRMP.							•										
Manage vegetation at existing firing points, as prescribed in the INRMP.							•										
Adhere to BMPs and recommendations of JBER's *Invasive Species Management Plan* to limit the likelihood of introduction and extent of infestation of invasive plant species, which includes implementing equipment cleaning practices for construction equipment (Alternative 1).							•										
Regularly control invasive plant species in the proposed expansion area in accordance with the *Invasive Species Management Plan* and *Integrated Pest Management Plan* (Alternative 1).							•				•						

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Use weed-free soil, seeding mix, and other construction materials to minimize the introduction of invasive plant propagules to the proposed expansion area (Alternative 1).							•				•						
Adhere to the most current INRMP, which contains specific actions to protect, inventory, maintain, and improve fisheries and wildlife resources and their habitats. This document is continually reviewed and revised to respond to new or increasing impacts on fisheries and wildlife resources.								•	•		•			•			
Adhere to state and federal regulations as they relate to fish and wildlife resources. These include, but are not limited to, prohibition on harassment of fish and wildlife.								•	•	•	•			•			
Adhere to federal guidelines for clearing vegetation that detail provisions to minimize take of migratory birds, including avoiding construction activities during the nesting season (Alternative 1).									•		•			•			
Adhere to USFWS bald eagle management guidance.									•		•						
Adhere to regulations that require units that discover wildlife on training ranges or in training areas while conducting live-fire activities to immediately cease fire and report the number/location of animals. Prior to firing, areas around targets are visually cleared for all observable wildlife, such as waterfowl, shorebirds, and moose. Wildlife is not purposefully targeted, harassed, or killed.									•		•			•			
Confer and cooperate with the USFWS to ensure compliance with the MBTA and BGEPA, which may require additional conservation measures for migratory birds.									•		•			•			
Monitor responses and productivity of bald eagles nesting on/using ERF-IA.									•		•						
Maintain all tree-cutting and removal equipment and firefighting equipment in good condition and inspect prior to use to confirm that equipment is in compliance with fire safety standards, including but not limited to spark arrestors, fire extinguishers, and other firefighting equipment.		•										•					•

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Mark clearing limits prior to cutting/vegetation removal in the expansion area (Alternative 1)													•				
Monitor forest thinning in the cultural resources buffer by an archaeologist (Alternative 1).													•				
Require all contractors to produce their own SPCC Plan (Alternative 1)																•	
Require all personnel who access ERF-IA and associated firing points to adhere to JBER's SPCC/C-Plan, *Integrated Hazardous Material Plan*, and *Hazardous Waste Management Plan* regarding spills and hazardous materials and waste management.																•	
Perform a Munitions and Explosives of Concern Investigation prior to clearing the expansion area (Alternative 1).																•	
Maintain access controls to restrict access to the impact area.																•	
Delimb all felled trees and pile logging slash in a location away from live spruce stands. Process all spruce logging slash on-site by either chipping, burning, or burying (Alternative 1).																	•
If contract sale is not possible, move all felled logs to an established woodlot for disposal through the personal use firewood cutting program. Woodlot must be in direct sunlight (Alternative 1).																	•
If contract sale is not possible, stack felled spruce away from live spruce trees. Debark all spruce trees (at logging site prior to moving to woodlot) to expedite the drying of the logs and prevent use of logs by spruce beetles as host material (Alternative 1).																	•
If contract sale is not possible, for hardwoods, either debark or apply a saw-kerf cut the length of the log to expedite drying of material. Cut logs into lengths no greater than 72 inches (Alternative 1).																	•

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Mitigation Determined as a Result of Analysis																	
Following initial clearing of the proposed expansion area, use non-burning methods of slash disposal to the degree practicable (Alternative 1).		•															
Prohibit use of delay fuzes to minimize ground penetration.				•	•				•		•			•		•	
Make GIS-based tables and a map of remediated areas in ERF-IA available to the units that train at ERF-IA.				•	•				•		•			•		•	
If an errant round strikes a gravel cap, assume damage and place gravel in the affected area when practicable.				•	•				•		•			•		•	
Expand the protective measure that specifies limited fire periods for HE rounds to include 155-mm training rounds. This means that 155-mm training rounds, like full HE rounds, would not be fired into inundated areas during inundating tide events and would not be fired into ERF during the seasonal closure period (9 August through 18 October); 155-mm training rounds could still be fired into the proposed expansion area during this time.					•			•	•	•	•			•			
Appropriately compensate for unavoidable adverse impacts to wetlands through participation in an approved off-site mitigation bank or in-lieu fee instrument (if needed).						•											
Conduct preliminary treatment for management of existing invasive plant species populations and continue regular monitoring and treatment as needed (Alternative 1).							•				•						
Continue to evaluate rearing and residency of juvenile salmon and/or other fish species using trap surveys and/or eDNA (or other methods as appropriate) to monitor productivity in and adjacent to the ROI, as practicable.								•		•	•			•			
Continue fisheries harvest management, population studies (annual salmon enumeration studies), and habitat protection efforts at Sixmile Lake, Eagle River, and Otter Creek to ensure fish resources are effectively managed on JBER.					•			•		•	•			•			

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Monitor responses of birds to noise disturbance at ERF to inform future bird aircraft strike management decisions.									•		•			•			
During ice-off conditions, ensure that for each weapon fired (mortar and artillery), the weapon system impact area (target area, 8PE, and 12PE portions of SDZ) does not overlap habitat protective buffers, Eagle Bay, or Eagle River.								•		•	•			•			
During ice-off conditions, ensure that for each weapon fired (mortar and artillery), Areas A, B, and C of the SDZ do not overlap portions of Eagle Bay, Eagle River, or Otter Creek that have 130- or 500-meter buffers.								•		•	•			•			
During ice-off conditions, for portions of Upper Eagle River, Otter Creek, and the Otter Creek complex that have a 50-meter buffer, ensure that for artillery, Areas A, B, and C of the SDZ do not overlap the river/creek.								•		•	•			•			
During ice-off conditions, for portions of Upper Eagle River, Otter Creek, and the Otter Creek complex that have a 50-meter buffer, ensure that for mortars, Area B of the SDZs does not overlap the river/creek. For mortars that overfly the river/creek, ensure the minimum safety distances in DA-Pam 385-63 are applied to areas that overlap the river/creek.								•		•	•			•			
Implement a Mitigation and Monitoring Plan to include a year-round marine mammal monitoring program, per the 2025 Letter of Concurrence. Annual reporting will include a synthesis of visual and acoustic data collection techniques.										•	•			•			
Conduct pile-burning of logging slash after the onset of fall rains or during the spring prescribed burn window, which occurs between loss of snow cover and green-up (Alternative 1).		•										•					
Provide fire suppression resources with UXO and impact area maps to use when planning suppression response if an ignition is detected.		•										•					•

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
If previous cultural surveys of the proposed expansion are more than 10 years old, complete a new survey to evaluate NRHP eligibility of cultural resources present prior to construction (Alternative 1).													•				
Implement protective measures to prevent impacts to eligible historic properties in the proposed expansion area, including vegetation buffers at least 200 feet around affected properties, placement of barriers along the vegetation buffer, prohibiting training and maintenance activities within 200 feet of properties, and monitoring of site conditions annually (Alternative 1).													•				
Prepare a data recovery plan that includes excavation and systematic subsurface testing to identify stratified features and activity areas at the four NRHP-eligible archaeological sites in the proposed expansion area and implement the plan prior to construction (Alternative 1).													•				
Implement the Inadvertent Discovery, Unanticipated Effects, and Discovery of Human Remains protocols, as described further in the Programmatic Agreement.													•				
Conduct pile-burning on-site before winter snow prohibits burning or hydroax/mulch/chip as an alternative to burning (Alternative 1).																	•

	Noise	Air Quality	Safety and Occupational Health	Earth Resources	Water Resources	Wetlands	Vegetation	Fish	Terrestrial Wildlife	Marine Mammals	Special Status Species	Wildland Fire	Cultural Resources	Subsistence	Land Use and Recreation	Hazardous Materials/Waste	Forest Resources
Additional Measures Being Considered																	
Develop and implement appropriate efforts for comparative sampling and monitoring of hydrologic and biometric conditions in areas within and adjacent to ERF-IA.					•			•		•	•			•			
Consider opportunities to protect, enhance, and/or restore salmon habitat in the affected area, including within and outside the JBER installation boundary.					•			•		•	•			•			
Maximize use of the expansion area to reduce impacts to areas where juvenile fish may be present and during the height of salmon runs (mid-June through August) (Alternative 1).					•			•		•	•			•			
Consider the practicability of acoustic testing on the effects of managed fish species within the proposed project area.								•		•	•			•			

Note: [1] By regulation, WP is prohibited from use in wetlands or other bodies of water. This protective measure prohibits its use throughout ERF-IA, including the expansion area and other upland areas.

Key: BGEPA = Bald and Golden Eagle Protection Act; BMP = best management practice; C-Plan = Oil Discharge Prevention and Contingency Plan; DA Pam = Department of the Army Pamphlet; DoD = Department of Defense; ERF = Eagle River Flats; ERF-IA = Eagle River Flats Impact Area; GIS = Geographic Information System; HE = high explosive; IDP = *Installation Development Plan*; ILLUM = illumination; INRMP = *Integrated Natural Resources Management Plan*; JBER = Joint Base Elmendorf-Richardson; MBTA = Migratory Bird Treaty Act; mm = millimeter; NRHP = National Register of Historic Places; ROI = Region of Influence; RTA = Richardson Training Area; SDZ = Surface Danger Zone; SPCC = *Spill Prevention Control and Countermeasure*; SWPPP = *Storm Water Pollution Prevention Plan*; TA = Training Area; USFWS = United States Fish and Wildlife Service; UXO = unexploded ordnances; WFMP = *Wildland Fire Management Plan*; WP = white phosphorus

Table S-5 Mitigation Measures by Munitions Type

	All Full HE Rounds	155-mm Training Rounds	Full HE Howitzers	Full HE Mortars	All 155-mm Rounds	Other Rounds
Protective Measures Built Into the Proposed Action						
Implement new habitat protective buffers (fire exclusion zones, No Fire Areas) based on noise modeling results.	•	•	•	•	•	•
Implement limited fire periods for HE rounds during all inundating tide events (predicted and observed).	•		•	•		
Implement a limited fire period for HE rounds during the peak beluga whale upriver visitation period (determined to be 9 August through 18 October; dates will be periodically reviewed). HE rounds could still be fired into the upland expansion area during this time.	•		•	•		
Redistribute targets away from buffer areas.	•	•	•	•	•	•
Prohibit use of white phosphorus.[1]	NA	NA	NA	NA	NA	•
Target higher elevation areas to protect fish in vegetated low-lying ponds or depressions that cannot be easily observed.	•	•	•	•	•	•
During inundating tides at night, restrict units to targets outside routinely inundated areas.	•	•	•	•	•	•
Use visual clearing and slow start prior to firing.	•	•	•	•	•	•
Cease fire if marine mammals are observed (30 minutes for beluga whales, 15 minutes for other marine mammals, or until they are seen moving out of Eagle River).	•	•	•	•	•	•
Clear unexploded rounds from the expansion area after each training event (Alternative 1 only).	•	•	•	•	•	•
Best Management Practices and Standard Operating Procedures						
Do not place targets in open waterbodies.	•	•	•	•	•	•
Do not fire into navigable waterbodies or observable open water.	•	•	•	•	•	•
No firing of 155-mm rounds into the unbuffered areas near the Eagle River relict channel due to space limitations.		•			•	
Use a Fire Direction Center and other systems for accuracy.	•	•	•	•	•	•
Use forward observers or radar to monitor for observable open water and forward observers or radar to observe rounds impacting or bursting (leads to not firing in most waterbodies), with cease fire and shifting to different targets as needed.	•	•	•	•	•	•

	All Full HE Rounds	155-mm Training Rounds	Full HE Howitzers	Full HE Mortars	All 155-mm Rounds	Other Rounds
Use night vision equipment or ILLUM rounds to observe targets at night.	•	•	•	•	•	•
Cease fire and conduct an investigation for any round that impacts outside the target area or is not observed impacting.	•	•	•	•	•	•
Do not place targets on capped areas	•	•	•	•	•	•
Mitigation Measures Determined as a Result of Analysis						
Expand the protective measure that specifies limited fire periods for HE rounds to include 155-mm training rounds. This means that 155-mm training rounds, like full HE rounds, would not be fired into inundated areas during inundating tide events and would not be fired into ERF during the seasonal closure period (9 August through 18 October); 155-mm training rounds could still be fired into the proposed expansion area during this time.		•				
Implement 200-foot vegetative buffers around identified historic properties in the proposed expansion area (Alternative 1).	•	•	•	•	•	•
Prohibit use of delay fuzes to minimize ground penetration.	•	•	•	•	•	•
During ice-off conditions, ensure that for each weapon fired (mortar and artillery), the weapon system impact area (target area, 8PE, and 12PE portions of SDZ) does not overlap habitat protective buffers, Eagle Bay, or Eagle River.	•					
During ice-off conditions, ensure that for each weapon fired (mortar and artillery), Areas A, B, and C of the SDZ do not overlap portions of Eagle Bay, Eagle River, or Otter Creek that have 130- or 500-meter buffers.	•					
During ice-off conditions, for portions of Upper Eagle River, Otter Creek, and the Otter Creek complex that have a 50-meter buffer, ensure that for artillery, Areas A, B, and C of the SDZ do not overlap the river/creek.			•			
During ice-off conditions, for portions of Upper Eagle River, Otter Creek, and the Otter Creek complex that have a 50-meter buffer, ensure that for mortars, Area B of the SDZs does not overlap the river/creek. For mortars that overfly the river/creek, ensure the minimum safety distances in DA-Pam 385-63 are applied to areas that overlap the river/creek.				•		
Additional Measures Being Considered						
Maximize use of the expansion area to reduce impacts to areas where juvenile fish may be present and during the height of salmon runs (mid-June through August) (Alternative 1).	•	•	•	•	•	•

Note: [1] By regulation, WP is prohibited from use in wetlands or other bodies of water. This protective measure prohibits its use throughout ERF-IA, including the expansion area and other upland areas.
Key: ERF-IA = Eagle River Flats Impact Area; HE = high explosive; ILLUM = illumination; mm = millimeter; NA = measure is not applicable to this munition type; SDZ = Surface Danger Zone