Finding of No Significant Impact:
Unmanned Aircraft System Training from Fort Carson to Pinon Canon Maneuver Site, Colorado
April 2020

Introduction

The congested airspace above Fort Carson prevents a full range of realistic training of Combat Aviation Brigade (CAB) and other military units operating Unmanned Aircraft System (UAS). The available training area for UAS operations needs to be expanded outside of Fort Carson's restricted airspace (R2601) in order to maintain an appropriate military readiness posture. Fort Carson is proposing to take advantage of changes in Federal Aviation Administration (FAA) regulations to use national airspace between Fort Carson and Pinon Canon Maneuver Site, and over PCMS, for operations and training of UAS.

Description of the Proposed Action

The proposed action is that UAS training occur in the National Airspace System between Fort Carson and PCMS for Gray Eagle and similar UAS. The UAS would travel in any FAA approved airspace class. UAS training flights would follow all FAA and Army requirements and regulations and will occur at 13,000 feet mean sea level or higher. Once at PCMS, the UAS would practice targeting (there would be no ordnance onboard), surveillance, communications or other information gathering tasks in accordance with Department of Defense Directive 5200.27 (Acquisition of Information Concerning Persons and Organizations not Affiliated with the Department of Defense).

The proposed action accounts for the activities of the UAS while in flight. There are many other connected actions that take place in order to get the aircraft in and out of the National Airspace System, as well as to operate the UAS. The analysis of the Environmental Assessment (EA), and this Finding of No Significant Impacts (FNSI), tiers to previous environmental analysis and incorporates the documents by reference (32 CFR 651.1 (d)(3)). The Gray Eagle and other UAS, along with associated facilities and the stationing of personnel have been analyzed in previous environmental assessments as is discussed in Section 1.6 of the EA.

No Action Alternative

The No Action Alternatives means that training in Fort Carson's restricted airspace would continue but no UAS training in National Airspace System would occur.

Public Review

Pursuant to 651.14(b), Title 32 Code of Federal Regulations (Environmental Analysis of Army Actions), the Army made the Environmental Assessment (EA) and Draft Finding of No Significant Impact (FNSI) available to the public for 30 days starting on March 4, 2020 prior to a final decision. A Notice of Availability (NOA) of the documents was

announced in local media for three days. The documents are available online at: http://www.carson.army.mil/organizations/dpw.html#three.

There were four comment letters received on the EA and FNSI. The comments were used to identify any concerns about the effects on the environment. The comments helped Fort Carson identify three areas that needed clarification. First, the reason for no mitigation requirements was clarified as well as reinforcing that training will follow all FAA and Army safety requirements. Second, in response to concerns over the types of UAS that the EA analyzes for a citation was added that provides clarity about the classes of UAS. Finally, the description of No Action alternative was edited to clarify the differences from the Proposed Action alternative. These changes have been incorporated into this EA and FNSI.

Summary of the Environmental Consequences

No significant impacts are anticipated as a result of implementing the Proposed Action. The potential impacts have been broken down into four categories: beneficial, none (or no impacts), negligible, minor, moderate but less than significant, or significant. These are summarized in Section 3.1 of the EA. There were several Valued Environmental Components (VEC) that were dismissed from detailed analysis. These included land use, air quality and greenhouse gases, water resources, soil and geology, socio-economics, traffic and transportation, airspace, facilities, utilities, and hazardous materials.

The effects of noise on communities would be negligible. The UAS training would occur above 13,000 feet mean sea level which is on average 8,000 feet above ground level in the area training would occur. At this elevation, the UAS would be all but inaudible to most people.

There would be no effect to cultural resources because of the elevation of the training. There would be no audible noise or vibrations felt that could affect cultural resources or sites.

There would be no effect to biological resources. Effects of aircraft flight to wildlife, including big game and migratory birds, takes place at less than 2,500 feet above ground level. The training will occur on average at 8,000 feet above ground level having no effect on biological resources.

Mitigation Measures

There are no mitigation measures required to avoid or minimize environmental harm because the effects of the Proposed Action are negligible to none without mitigation. UAS training flights would follow all FAA and Army requirements and regulations. All safety precautions required by the Army and the FAA will be followed, including flight

path modifications, to minimize the risk of damage to life or property during training flights including Fort Carson's emergency procedures found in Appendix A of the EA.

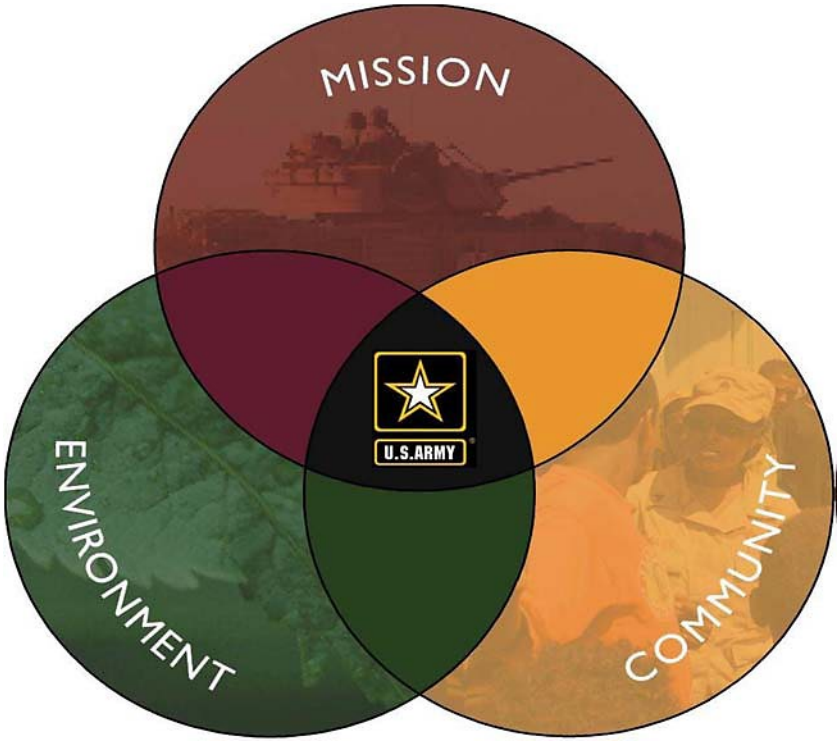
Conclusion and Findings

Based on careful review of the EA, I have determined that no significant direct, indirect, or cumulative impacts to the human or natural environment are anticipated because of the implementation of the Proposed Action. The Proposed Action is not a major federal action that would significantly affect the quality of the environment within the meaning of Section 102(2)(c) of NEPA; and an environmental impact statement is not required, and will not be prepared. My decision is based on the potential environmental and socio-economic impacts associated with the Proposed Action as is analyzed in the EA. This decision complies with legal requirements and will take into account all submitted information regarding reasonable alternatives and environmental impacts.

Date: 20200428

BRIAN K. WORTINGER
COL, AR
Garrison Commander
Fort Carson, Colorado

Environmental Assessment for the Unmanned Aircraft System Training from Fort Carson to Pinon Canon Maneuver Site, Colorado
April 2020



Fort Carson

Directorate of Public Works, Environmental Division

Environmental Assessment
Unmanned Aircraft System Training from Fort Carson to Pinon Canon Maneuver Site, Colorado
April 2020

Prepared By:
Marcus Gray, NEPA Coordinator
Directorate of Public Works, Environmental Division
Fort Carson, CO 80913

Angie Bell, NEPA Program Manager
Directorate of Public Works, Environmental Division
Fort Carson, CO 80913

Reviewed By:
Directorate of Plans, Training, Mobilization, and Security
Directorate of Public Works
Staff Judge Advocate Office

Submitted By:

HAL ALGUIRE
Director
Public Works
Fort Carson, CO 80913

27 April 2020
Date

Approved By:

BRIAN K. WORTINGER
COL, AR
Garrison Commander
Fort Carson, CO 80913

28 April 2020
Date

Contents

Tables

Figures

1 Introduction

1.1 Background

The purpose of this Environmental Assessment (EA) is to document the environmental impacts of Unmanned Aircraft System (UAS) training off Fort Carson in the National Airspace System and the Pinon Canyon Maneuver Site (PCMS).

The congested airspace above Fort Carson prevents a full range of realistic training of Combat Aviation Brigade (CAB) and other military units operating UAS; therefore, the available training area for UAS operations needs to be expanded outside of Fort Carson's restricted airspace (R2601) in order to maintain an appropriate military readiness posture. With approval from the Federal Aviation Administration (FAA) and abiding by all requirements and regulations, Fort Carson is proposing to use national airspace between Fort Carson and PCMS, and over PCMS, for operations and training of UAS. As of November 2018, only the Gray Eagle at Fort Carson is approved by the FAA to operate in Class A, E, and/or G airspace along the STYX Route to transit between Fort Carson and PCMS. In the future, Fort Carson may request additional or alternate routes between Fort Carson and PCMS or above PCMS for the Gray Eagle (MQ-1C) or other similar class UAS, with FAA approval. The FAA can modify the flight path for any number of reasons or Fort Carson could request a change to increase safety.

This opportunity to improve UAS training and Soldier readiness at Fort Carson is a result of recent regulation changes by the FAA. Training on UAS was limited to restricted airspace until the FAA issued 14 Code of Federal Regulation (CFR) Part 107.41 on June 28, 2016 (effective August 29, 2016), which amended the regulation to allow the operation of UAS outside of restricted airspace. Until that time, Fort Carson could only perform live training for Gray Eagle within existing restricted airspace at Fort Carson. The restriction has limited the training opportunities for Fort Carson Soldiers because the restricted airspace is heavily used by all aviation assets and has a limited area of operations. The Army has begun to qualify/certify their UAS pilots for Instrument Flight Rules (IFR) operations, per FAA requirements, so they can fly in the greater National Airspace System. This, and the rule change in 2016 to allow for UAS in the greater National Airspace System, are the reasons Fort Carson is proposing to use the newly available airspace for training.

The only option to get a UAS to PCMS prior to the regulation change, was to disassemble it and move it by truck or rail. This method of transit will still continue as an option for the Shadow (RQ-7B) UAS, but is not practical for the Gray Eagle, which requires a hardened/paved surface runway for launch and recovery, which PCMS does

not have. Also, UAS operating at PCMS are currently limited to flying within the restricted airspace (R2603) which currently has a ceiling of 9,999 feet mean sea level (MSL), or about 5,000 feet above the average terrain. The most effective way to use Gray Eagle UAS to meet mission and training requirements is at elevations normally higher than that, which further restricts the training opportunities at PCMS if trying to remain within the maximum ceiling of R2603.

1.2 Current Conditions

1.2.1 UAS Use and Infrastructure

There are several types of UAS stationed at Fort Carson, with the Gray Eagle currently being the largest platform on inventory. It is a diesel powered aircraft and can weigh as much as 3,600 pounds with fuel and payload. The Gray Eagle is considered a Division level asset and enhances the CAB training by integrating a key combat enabler within the modern battle space. The Gray Eagle has multiple uses including surveillance, target acquisition, command, control, communications and intelligence collection. Although weapons capable, the Gray Eagle is not armed with live ordinances during training exercises in flight at Fort Carson. Units may only install "dummy" ordnance payloads to replicate the drag experienced on the aircraft and allow units to imitate the degraded aerodynamics and performance of an armed aircraft.

Fort Carson has four runways where UAS are launched and recovered. However, Butts Army Airfield (BAAF) is the only facility capable for launch and recover operations for the Gray Eagle UAS. The airfield has a UAS hangar complex for a Gray Eagle Company. The complex includes operations and maintenance hangar with shops, storage and supply, and company administration areas. The three other airfields are used for Shadow UAS operations and lack appropriate infrastructure for Gray Eagle. Agony Airfield North is a complex with hard surface runway (too short for Gray Eagle), hangar, towers and other associated support infrastructure. The other three airfields are more austere and are used for the other types of UAS at Fort Carson. Specifications of the UAS currently stationed at Fort Carson can be found in the 2012 *Combat Aviation Brigade Environment Assessment*, the 2015 *MQ-1C Gray Eagle UAS EA*, and the 2015 *Piñon Canyon Maneuver Site (PCMS) Training and Operations Final Environmental Impact Statement* on the Fort Carson NEPA webpage at https://www.carson.army.mil/organizations/dpw.html#three.

PCMS has an airfield located near the Cantonment Area. The runway is surfaced with gravel and there are two clam shell temporary support buildings and concrete parking apron. This airfield is not suitable for Gray Eagle because the runway is not a paved surface, nor does it meet the required dimensions.

1.2.2 Airspace Use

Fort Carson's restricted airspace (R2601) is congested, not just with aircraft but with artillery training and other live fire training (Figure 1). The Fort Carson restricted airspace sees about 160,000 movements a year.

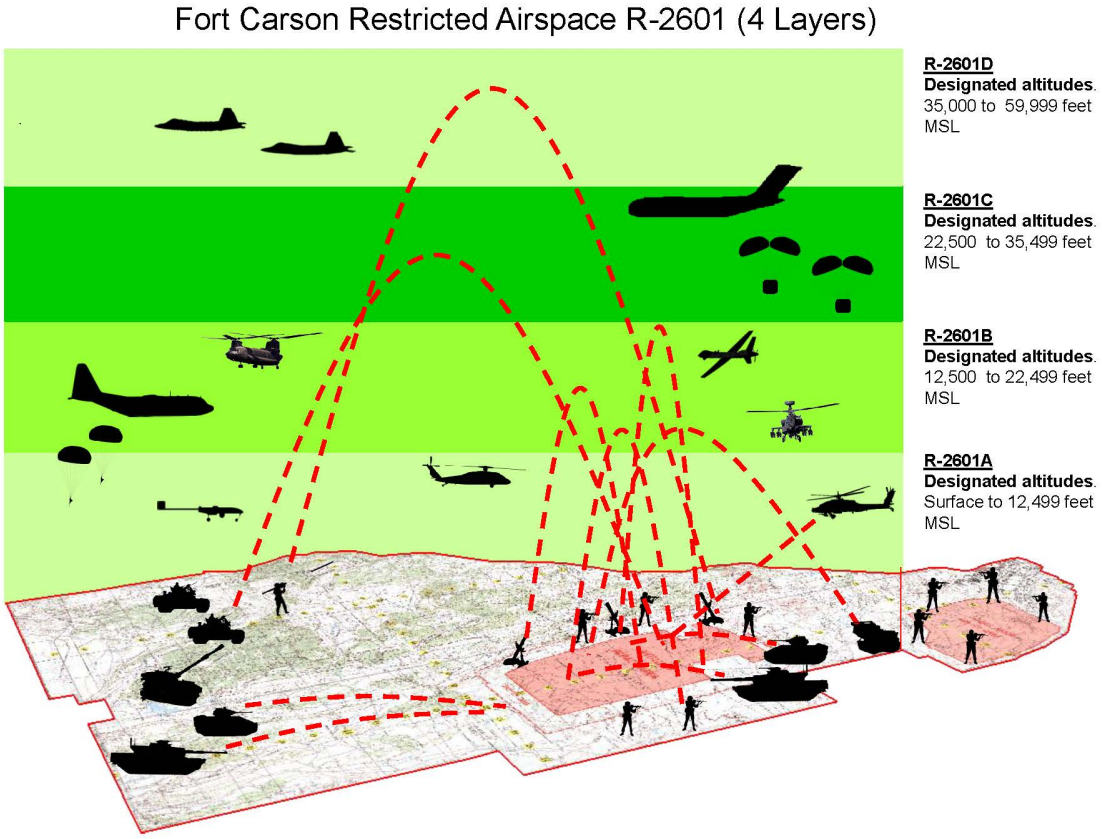


Figure 1: Diagram illustrating the multiple uses of the airspace above Fort Carson.

Army UAS currently operating from Fort Carson do not have unencumbered access to the National Airspace System, unlike manned aircraft. In order for a UAS to operate under complete Army control, the Army is required to fly within one of the special use restricted airspace designated areas above Fort Carson or PCMS, R2601 or R2603 respectively. For UAS flight outside of these areas a Certificate of Waiver or Authorization (COA) from the FAA is required. A COA allows Army UAS to fly pre-coordinated flight routes.

Operation of UAS (such as the Gray Eagle and Shadow) are conducted at Fort Carson within the existing restricted airspace (R2601). When they are launched from the adjacent BAAF (which is adjacent to R2601) an approved COA is required, and then the aircraft transits into the restricted airspace to conduct training. Fort Carson currently has a COA for Gray Eagle (2018-WSA-1865 COA) to fly a path known as Route STYX

(Figure 2) to or from PCMS at an elevation of 13,000 up to 22,000 feet MSL. The current Route STYX leaves Fort Carson at the most southeast corner heading east into Pueblo County, then continues north and east of the City of Pueblo, then continues southeast towards PCMS crossing above Las Animas County, then Otero County, then back to Las Animas County arriving at PCMS. The route is approximately 82 miles. Once above PCMS, the FAA through the authority of the Denver Air Route Traffic Control Center (ARTCC), can allow the UAS to loiter in Class A airspace (18,000 feet MSL and above) above PCMS. The current COA expires in November 2020, however efforts are underway to renew and keep the COA active for UAS operations to continue to have access to off installation flight, as needed. The physical route will continually be assessed and adjusted based on population growth/density to ensure risk is continually mitigated as much as possible. This EA analyses the environmental effects of exercising the COA for the STYX route and future modifications.

1.3 Actions Considered for Cumulative Effects

Reasonably Foreseeable Actions in the National Airspace System are difficult to define. The actions that may have cumulative effects with the proposed action are best described using on-going activities in each airspace class.

The National Airspace System has six airspace classes with different on-going activities associated with each class. The classes and their uses are described in Table 1.

Table 1: National Airspace System Classes.

Airspace System Class	On-going Activities
Class A	An en route, high-altitude space used mainly by aircraft traveling from one area of the country to another. All aircraft in Class A airspace must be able to operate using Instrument Flight Rules (IFR).
Class B	Airspace surrounding 29 high use airports in the United States. It is intended to help with the management of air traffic activities around airports.
Class C	Airspace around any airports with control towers and radar approaches (Colorado Springs Airport).
Class D	Areas around 120 designated airports that are under the jurisdiction of the local air traffic control tower to help manage air traffic activities (BAAF Fort Carson).

Class E	A general category of airspace intended to provide adequate separation between aircraft using IFR and aircraft using Visual Flight Rules (VFR).
Class G	Any airspace not designated as A, B, C, D or E airspace. Air traffic control does not have authority in this airspace.

1.4 Purpose and Need

UAS have several components which include the aircraft, payload, human operator, computer systems, communication platforms, and information displays. UAS are not actually “unmanned”, this is a misnomer. Trained professional Soldiers operate and maintain Army UAS at all times; therefore, an Army UAS is never “unmanned”.

UAS are the “eyes of the Army” and are used to quickly collect, process and disseminate relevant intelligence and information. The Army employs UAS for many of the tactical, operational and strategic operations it undertakes to support Soldiers and the mission. UAS are used for surveillance, security, command and control support, communications support, combat support and sustainment. The use of UAS reduces the Soldiers workload, thus improving their agility, flexibility, and safety (UAS CoE, 2010, Section 2.6). UAS employment also allows the United States military to reduce the risk to our military personnel during combat operations, resulting in higher survivability rates for personnel deployed fighting for and on behalf of the nation.

Technologies are changing rapidly, making UAS more and more indispensable to our armed forces with each improvement and technology integration. Having well-trained operators allows the Army to take full advantage of the upgrades during both war and peace operations. One of the keys to well-trained personnel is the ability to perform both live and virtual training, as well as integrated training exercises (UAS CoE, 2010, Section 7.2).

It is becoming more and more difficult to deconflict the restricted airspace use (R2601) over Fort Carson because of the multiple use and high demand. The restricted airspace at Fort Carson is not large enough to support the full range of battlefield tasks our Soldiers require to support the modern warfare. The change to the FAA regulation has opened up new training opportunities such as flying off the installation to PCMS and over PCMS, above the restricted airspace. Expanding the training to the greater National Airspace System will help to alleviate this for UAS training.

In order to be successful, Soldiers need to train as they fight. This includes using the full sensor capabilities on board for navigation and to be fully trained on IFR flight. The full capabilities of the UAS for training in the Fort Carson restricted airspace is

hampered due to its limited size. There is a need for more non-simulated training opportunities for Gray Eagle pilots, and the ability to make long distance flights using IFR, which is often required during military and humanitarian missions, currently does not exist on Fort Carson.

The use of the greater National Airspace System to train UAS operators will increase Soldier skills on essential UAS tasks, improve leader decision making and increase Soldier safety while in theater. The expanded area will also allow for additional training to analyze a wider variety of reconnaissance and surveillance data from PCMS and testing of techniques and tactics not possible within the small amount of airspace at Fort Carson only. Route STYX will provide opportunities for more realistic UAS operator training, integrating long distance flight into other battlefield tasks, and while operating via Satellite Communications (SATCOM), a task critical for future combat operations.

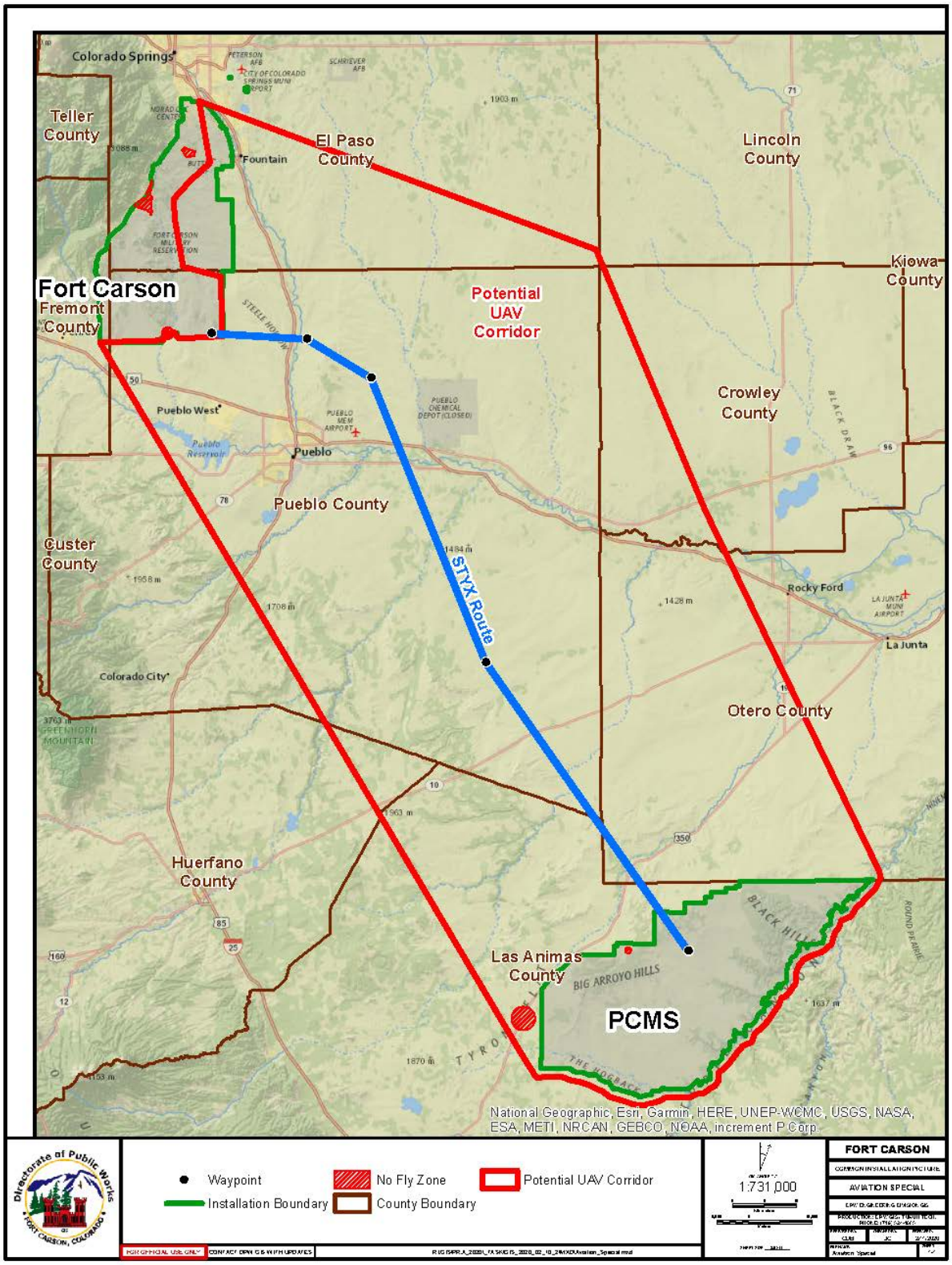


Figure 2: Analysis Area and proposed STYX route.

1.5 Scope of Analysis

This EA has been developed in accordance with the National Environmental Policy Act (NEPA), regulations issued by the Council on Environmental Quality (CEQ) published in 40 Code of Federal Regulations (CFR) Parts 1500-1508, and the Army's NEPA-implementing procedures published in 32 CFR Part 651, *Environmental Analysis of Army Actions (Army Regulation 200-2)*. This EA facilitates the planning and decision-making by the Garrison Commander. It helps the Army, stakeholders, and the public understand the potential extent of environmental impacts of the Proposed Action and alternatives, and whether those impacts (direct, indirect, and cumulative) are significant.

This EA analyzes the effects of the proposed action, including flying in the greater National Airspace System and above PCMS only. Connected actions such as maintenance, launch and landing are analyzed in previous environmental documents (Section 2.2) and are included in the cumulative effects analysis as on-going actions.

1.6 Related Environmental Documents

Fort Carson and the Army have completed several Environmental Assessments and found no significant impacts from the use of UAS, particularly the Gray Eagle, Shadow and Raven. These are the most common platforms in use by the Army today. As technologies change the names and capabilities of the UAS used by the Army may change, but the use and effects are expected to be similar to the current UAS.

The 2012 *Fort Carson Combat Aviation Brigade Station Implementation EA* was designed to implement effectively and efficiently the stationing decision, to include ensuring adequate facilities requirements were met. The Installation had to provide for the training readiness, deployment, administrative functions, and Soldier and Family Quality of Life elements for those assigned to and supporting the incoming CAB that was to be home-stationed at Fort Carson. The analysis included flight operations and training of UAS (Shadow) at Fort Carson, but specifically did not include the Gray Eagle UAS. In 2012, there were no extended range multi-purpose (ERMP) UAS expected to be stationed at Fort Carson at that time.

The *EA for the MQ-1C Gray Eagle UAS* was signed in April 2015 which evaluated potential environmental impacts of the Army's proposal to construct a UAS training complex and operate the MQ-1C Gray Eagle, at Fort Carson, CO. The purpose of the Proposed Action was to implement the UAS equipment, assignment and stationing decision described in the *2014 Aviation Force Structure Realignment* Record of Environmental Consideration by the Department of the Army for the stationing of an Aviation Regiment Gray Eagle Unit at Fort Carson, CO in 2017. The need for the Proposed Action was to provide adequate facilities, training and flight operations

capability, and support for the new equipment and for assigned Soldiers and their Families.

The 2015 *Piñon Canyon Maneuver Site (PCMS) Training and Operations Final Environmental Impact Statement* (2015 PCMS EIS) evaluated the environmental impacts associated with training Fort Carson Brigade Combat Teams (BCTs) in full brigade-size exercises at PCMS, and allow additional training opportunities using new tactics and equipment. The Army purpose and need of the Proposed Action is the ability to conduct realistic and coordinated large-scale training that integrates the ground and air resources of assigned and visiting units, including mechanized, infantry, support, and combat aviation assets. To accomplish this, the Army must maintain large maneuver and training areas of varying characteristics with complex terrain. Advances and changes in equipment and weapons systems and in their coordinated use require changes to the manner in which PCMS is internally configured and utilized.

1.7 Public Involvement

Pursuant to 651.14(b), Title 32 Code of Federal Regulations (Environmental Analysis of Army Actions), the Army made the Environmental Assessment (EA) and Draft Finding of No Significant Impact (FNSI) available to the public for 30 days starting on March 4, 2020 prior to a final decision. A Notice of Availability (NOA) of the documents was announced in local media for three days. The documents are available online at: http://www.carson.army.mil/organizations/dpw.html#three.

There were four comment letters received on the EA and FNSI. The comments were used to identify any concerns about the effects on the environment. The comments helped Fort Carson identify three areas that needed clarification. First, the reason for no mitigation requirements was clarified as well as reinforcing that training will follow all FAA and Army safety requirements in Section 4.5. Second, in response to concerns over the types of UAS that the EA analyzes for a citation was added that provides clarity about the classes of UAS to Section 2.1. Finally, the description of No Action alternative in Section 2.3 was edited to clarify the differences from the Proposed Action alternative. These changes have been incorporated into this EA.

1.8 Agency and Tribal Consultation

In accordance with 32 CFR 651.36 regarding other agency and organizations involvement, USAG Fort Carson has provided a copy of these documents to appropriate local, state, and federal government agencies and Native American tribes for their review and comment.

1.9 Decision to be Made

A decision will be made on whether the Proposed Action will have significant impacts. As part of the decision-making process, the Garrison Commander will consider all relevant environmental information and stakeholder and public issues of concern raised as part of the NEPA process. If the process results in a FNSI, the Garrison Commander will document his or her decision on which alternative to implement, which would be signed no earlier than 30 days from the publication of the NOA of the Final EA/Draft FNSI (see Section 1.7 above for information on the NOA publications). Upon a determination that there are no significant impacts, the Army would sign the FNSI and carry out the decision.

2 Proposed Action, No Action Alternative, and Alternative Screening Criteria

2.1 Proposed Action

Fort Carson is proposing that UAS training take place in the National Airspace System between Fort Carson and PCMS, and above PCMS for the Gray Eagle (MQ-1C) or other similar class UAS (Class 4), with FAA approval. Classes of UAS are described in *Eyes of the Army: U.S. Army Roadmap for Unmanned Aerial Systems, 2010-2035* (Army UAS Center of Excellence, 2010 https://apps.dtic.mil/dtic/tr/fulltext/u2/a518437.pdf).

The current COA from the FAA allows the Gray Eagle to travel along Route STYX in Class A, E and/or G airspace. However, the analysis in this EA will cover a wider area for potential flight paths to account for any future adjustments to the routes or additional routes that may be authorized by the FAA in the future (Figure 2). The FAA can modify the flight path for any number of reasons or Fort Carson could request a change to increase safety.

The UAS would travel in any FAA approved airspace class. UAS training flights would follow all FAA and Army requirements and regulations and will occur at 13,000 feet MSL or higher. When flying in Class A airspace (18,000 feet MSL or above) the aircraft would operate using IFR flight plans and only in visual meteorological conditions, but if required to fly between 13,000 feet and 17,999 feet MSL visual flight rules (VFR) would apply and a chase aircraft would be required. Once arriving at PCMS the UAS will fly within the boundary of PCMS in Class A airspace above the restricted airspace R2603.

Once at PCMS, the UAS would practice targeting (there would be no ordnance onboard), surveillance, communications or other information gathering tasks. Surveillance and information gathering and analysis training will only occur on data

gathered from PCMS or Fort Carson properties. Department of Defense Directive 5200.27 (Acquisition of Information Concerning Persons and Organizations not Affiliated with the Department of Defense) restricts the collection of data on the civilian population unless there is a national defense reason and the Secretary of Defense is the approval authority.

2.2 Connected Actions

Connected actions are those that are closely related [to the proposed action] and should be discussed in the same environmental document (32 CFR 651.51 (a)(1)). The proposed action accounts for the activities of the UAS while in flight. There are many other connected actions that take place in order to get the aircraft in and out of NAS, as well as to operate the UAS. The analysis of this EA tiers to previous environmental analysis and incorporates the documents by reference as is outlined in 32 CFR 651.1 (d)(3). The Gray Eagle and other UAS, along with associated facilities and the stationing of personnel have been analyzed in previous environmental assessments. The analyses are summarized in Section 1.6 of this EA.

The UAS will launch from and land at BAAF and fly to restricted airspace R2601 at Fort Carson using an existing COA. UAS flight operations and ground maintenance teams will be at Fort Carson since the aircraft is physically based from BAAF. UAS such as the Gray Eagle will not land at PCMS because the airstrip is unpaved and does not meet the requirements for safe landings. The launching and landing of UAS are analyzed in the 2015 *EA for the MQ-1C Gray Eagle UAS* and the 2012 *Fort Carson Combat Aviation Brigade Station Implementation.* Smaller platforms such as the Shadow do land at PCMS during training events, which is included in the 2015 *PCMS EIS*.

Personnel and equipment may be present at PCMS to support flight operations, data collection and facilitate targeting and communications training (Gray Eagle would still be required to take-off and land at BAAF). Temporary shelters, such as tents, may be erected to house ground support at PCMS during training. The footprint would be small (less than 1 acre) and temporary. The use of tent stakes, grounding rods, and generators would be expected and are included in the analysis in the 2015 *PCMS EIS*. UAS may be used to support training of Brigade Combat Teams (BCT), or smaller units, at PCMS. The training will include data collection and analysis, providing communication platforms and other command and control support. UAS are not authorized to carry munitions at Fort Carson, PCMS or in between. The training will not exceed 2015 *PCMS EIS* restrictions and will implement all mitigations and requirements of the EIS.

2.3 No Action Alternative

The No Action Alternative would mean that UAS training would continue in its current state. UAS would be used in the Restricted Airspace using the existing COAs to traverse between Butts Army Airfield and the Restricted Airspace at Fort Carson. Fort Carson Gray Eagle or similar class UAS would not be used for training in the National Airspace System. The current use of the National Airspace System by other aircraft would continue per FAA regulations.

2.4 Screening Criteria for Alternatives

Screening criteria were used to assess whether an alternative was "reasonable" and would be carried forward for evaluation in this EA. The screening criteria are based upon balancing training requirements with sustainment of the land, maximizing troop readiness, and supporting Soldier and Family quality of life at Fort Carson. The Army established the following screening criteria to identify the range of potential alternatives to meet the purpose and need of the Proposed Alternatives for acquiring additional airspace for Gray Eagle UAS flights from Fort Carson to PCMS.

2.4.1 Training Considerations

Reasonable alternatives must accommodate the training requirements based on FAA's decision to authorize Fort Carson Gray Eagle UAS to fly in additional airspace from Fort Carson to PCMS.

2.4.2 Quality of Life

Reasonable alternatives must consider impacts on the quality of life of the Soldier and their Families. The Army is committed to reducing the amount of time a Soldier must be away from home station to train.

3 Summary of Environmental Consequences and Proposed Mitigations

3.1 Valued Environmental Components and Focusing of the Analysis

In compliance with the NEPA and CEQ regulations, the description of the affected environment focuses on those resources and conditions potentially subject to effects from implementing the Proposed Action. CEQ regulations encourage NEPA analyses to be as concise and focused as possible. This is in accordance with CEQ regulations at 40 CFR 1500.1(b) and 1500.4(b): "…NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail….prepare analytic rather than encyclopedic analyses."

Valued Environmental Components (VECs) are categories of environmental and socio-economic resources for which impact analysis is conducted to enable a managed and systematic analysis of these resources. Table 2 presents each VEC and corresponding regions of influence (ROI) and thresholds of significance. The table also identifies which VECs are analyzed in this EA and which VECs are dismissed from further analysis; each includes an accompanying rationale. In conducting this analysis, a qualified subject matter expert reviewed the potential direct and indirect effects of the No Action Alternative and the Proposed Action Alternatives relative to each VEC. The subject matter expert carefully analyzed and considered the existing conditions of each VEC within the Proposed Action's ROI.

Through this analysis, it was determined that, for several VECs and VEC sub-components, negligible adverse effects were predicted without detailed analysis. This included land use, groundwater, floodplains, geology, airspace, facilities, energy demand and generation, utilities, hazardous materials, and hazardous waste. Table 2 provides a more detailed description of VECs carried forth for further analysis within Sections 4.1 through 4.3 of this EA.

Context and intensity are taken into consideration in determining a potential impact's significance, as defined in 40 CFR 1508.27. The context means that the significance of an action must be analyzed in several contexts such as the affected region, the affected interests, and the locality. The intensity of a potential impact refers to the impact's severity and includes consideration of beneficial and adverse impacts, the level of controversy associated with a project's impacts on quality of the human environment, whether the action establishes a precedent for future actions with significant effects, the level of uncertainty about project impacts, and whether the action threatens to violate federal, state, or local law requirements enacted for the protection of the environment. The severity of environmental impacts is characterized as none/negligible, minor, moderate, significant, or beneficial as described:

- **None/Negligible** – No measurable impacts are expected to occur. A negligible impact may locally alter the resource, but would not measurably change its function or character.
- **Minor** – Primarily short-term but measurable adverse impacts are expected. Impacts on the resource may be slight.
- **Moderate but less than significant** – Noticeable adverse impacts that would have a measurable effect on a wide scale (e.g., outside the footprint of disturbance or on a landscape level). If moderate impacts were adverse, they would not exceed limits of applicable local, state, or federal regulations.
- **Significant** – A significant impact may exceed limits of applicable local, state, or federal regulations or would untenably alter the function or character of the

resource. These impacts would be considered significant unless managed by mitigation efforts to a less than significant level.

- **Beneficial** – Impacts would benefit the resource/issue.

Table 2: Need for analysis by VEC

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
Land Use	Land use within and adjacent to Fort Carson	Impacts to land use would be considered significant if the land use were incompatible with existing military land uses and designations (including recreation). These impacts may conflict with Army land use plans, policies, or regulations, or conflict with land use off-post.	Yes	The land use will not be affected because the proposed action does not include launching or landing of the UAS from Fort Carson. This was analyzed by the 2014 *EA for Gray Eagle Unmanned Aerial System at Fort Carson, CO and the 2015 PCMS EIS*.
Air Quality and Greenhouse Gases (GHG)	Air Quality Control Region	An impact to air quality would be considered significant if the Proposed Action were to generate emissions which: • Did not meet Clean Air Act conformity determination requirements to conform with the	Yes	The UAS will be flying within National Airspace above 13,000 feet MSL. Activities above 3,000 feet above ground are exempt from the Clean Air Act conformity analysis. The areas expected to be flown through are in attainment for criteria air pollutants and the use of UAS is not expected to affect the attainment status.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		State Implementation Plan • Substantially increase GHG emissions; or • Contribute to a violation of any federal, state, or local air regulation.		
Noise	Areas adjacent to and within Fort Carson	Impacts would be considered to be significant if noise from the Proposed Action were to cause harm or injury to on-post or off-post communities, or exceed applicable environmental noise limit guidelines	No	UAS make noise during flight. This will be analyzed in detail in Chapter 4 for direct, indirect and cumulative effects.
Biological Resources	Biological resources below the airspace	Impacts to biological resources would be considered significant if: • Substantial permanent	No	The effects of UAS use near the ground such as landing, launching and flying at low elevations has been analyzed in previous analysis such as the *2012 CAB EA, 2014*

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		conversion or net loss of habitat at the landscape scale, • Long-term loss of impairment of a substantial portion of local habitat, • Loss of population of a species, • Unpermitted or unlawful "take" of Endangered Species Act protected species, or species protected under the Bald and Golden Eagle Protection Act or the Migratory Bird Treaty Act		*Gray Eagle EA and the 2015 PCMS EIS*. The noise from UAS flyovers may affect big game and migratory birds in the flyover areas. Further analysis is included in Chapter 4.
Water Resources	Watersheds, state-designated stream	Impacts to water quality would be significant if: • Results in an excess sediment load in Fort	Yes	The effects of UAS use near the ground such as landing, launching and flying at low elevations has been analyzed in previous analysis

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
	segments, and groundwater aquifers associated with Fort Carson. U.S. Army Corps of Engineers jurisdictional "waters of the U.S." and wetland resources	Carson waters affecting impaired resources, • Results in unpermitted direct effects to waters of the U.S., • Substantially affect surface water drainage or stormwater runoff, • Substantially affect groundwater quantity or quality, or • Do not comply with policies, regulations and permit related to wetland conservation and protection		such as the 2012 CAB EA, 2014 Gray Eagle EA and the 2015 PCMS EIS. Since the entire proposed action is in the air, there will be no direct or indirect effects to streams, wetlands or floodplains.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
Geology and Soil Resources	Geology and soil resources within the cantonment, range, and maneuver training areas	Impacts on geology, topography, and soil resources would be considered significant if: • The landscape could not be sustained for military training over a wide area, or • Excessive soil losses were to impair vegetation growth	Yes	The effects of UAS use near the ground such as landing, launching and flying at low elevations has been analyzed in previous analysis such as the 2012 CAB EA, 2014 Gray Eagle EA and the 2015 PCMS EIS. Since the entire proposed action is in the air, there will be no direct or indirect effects to soils or geology.
Cultural Resources	Cultural resources within the cantonment, range and maneuver training areas	Impacts to cultural resources would be considered significant if they cause direct or indirect alteration of the characteristics that qualify a property for inclusion in the National Register of Historic Places. These may include physical destruction, damage, alteration, removal,	No	There may be visual or auditory effects to cultural resources. Further analysis is included in Chapter 4.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		changes to or character of the setting, neglect causing deterioration, and transfer, lease or sale. The effects are also considered significant if the Section 106 process is not followed.		
Socio-economics	Socio-economic and environmental justice factors within Fort Carson and immediate surrounding communities	Impacts to socio-economics and environmental justice would be considered significant if: • Substantial changes to the sales volume, income, employment or population of Colorado Springs and surrounding area, • Disproportionate adverse economic, social, or health impacts on minority	Yes	There will be no effects to people in the local communities. No new personnel are expected as a result of the proposed action and there will be no effects to under-served or minority populations.

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		or low-income populations, or • Substantially disproportionate health or safety risk to children.		
Traffic and Transportation	Public roadways and key access points within and near Fort Carson and roadways within the Installation boundary	Impacts to traffic and transportation would be considered significant if the activities: • Substantially degrade traffic flow during peak hours, or • Substantially exceed road capacity and design	Yes	The effects of UAS use near the ground such as landing, launching and flying at low elevations has been analyzed in previous analysis such as the 2012 CAB EA, 2014 Gray Eagle EA and the 2015 PCMS EIS. There will be no affects to public roadways since the UAS will be completing aerial missions only.
Airspace	Airspace above and surrounding Fort Carson	An impact to airspace would be considered significant if the Proposed Action violated federal Aviation Administration safety regulations or	Yes	Fort Carson will follow FAA guidelines per the COA. The COA does not permanently change how the airspace can or cannot be used. It can only be used with prior FAA consent and confirmation that the

VEC	ROI	Threshold of Significance	Dismissed from Further Analysis?	Rational for Analyzing Further or Not
		causes a substantial infringement of private or commercial flights		use would not affect other aircraft or hinder safety.
Facilities, Energy Demand and Generation, and Utilities	Facilities within Fort Carson. Utilities within Fort Carson and in the immediate surrounding communities and counties	Impacts to facilities, energy demand and generation, and utilities would be considered significant if the Proposed Action were to cause an impairment of the utility service to Fort Carson, local communities, homes or businesses.	Yes	The UAS flights will have no impacts to facilities and utilities on Fort Carson, PCMS and the surrounding communities.
Hazardous Materials	Fort Carson lands	Impacts to hazardous materials and hazardous waste would be considered significant if substantial additional risk to human health or safety would be attributed to the Proposed Action.	Yes	The effects of UAS maintenance and repair have been analyzed in previous analysis such as the 2012 CAB EA, 2014 Gray Eagle EA and the 2015 PCMS EIS. Hazardous materials are handled according to Federal, State and Army regulations.

4 Affected Environment and Environmental Consequences

4.1 Noise

4.1.1 Affected Environment

The National Airspace System outside of Fort Carson is used daily by various types of commercial, private and military aircraft. The National Transportation Noise Map developed by the Bureau of Transportation Statistics shows the 24-hour equivalent noise level in A-weighted decibels. A-weighted decibels, abbreviated dBA, are an expression of the relative loudness of sounds in air as perceived by the human ear. In this analysis the noise levels represent the approximate average noise energy due to transportation such as vehicles on roads and air traffic. The map is used to identify trends in transportation noise levels over regions. Figure 3 is the map of the existing noise levels in the ROI as of April 19, 2018. The map shows that there is up to an average of 55 dBAs along the major roads and immediately adjacent to major airports in the analysis area. The average noise level due to transportation is less than 35 dBA in a majority of the analysis area.

The annual impacts of noise in and around BAAF are relatively minimal beyond Fort Carson's boundary. The 2018 Fort Carson Installation Compatible Use Zone Study (APHC, 2018) found that there were no communities subjected to high enough levels of noise from BAAF to recommend land use limitations. Individual overflights beyond the airfield for training or transport may be disruptive depending on the sensitivity of the receptor, distance to the aircraft, and the weather or noise carrying conditions. Training flights can occur as low as 500 feet above surface level or as permitted by the FAA. (APHC, July 2018) The noise level was analyzed in the 2018 Fort Carson Installation Compatible Use Zone Study by the Army Public Health Center (APHC, July 2018). The study found that UAS launch and recovery operations take place at several different facilities throughout Fort Carson, using several different types of platforms. Currently, training flights with UAS take place within the restricted airspace R2601 at Fort Carson or within approved training areas on PCMS. Generally, the noise produced from UAS activities within the shared airspace is considerably quieter than other larger aircraft activities.

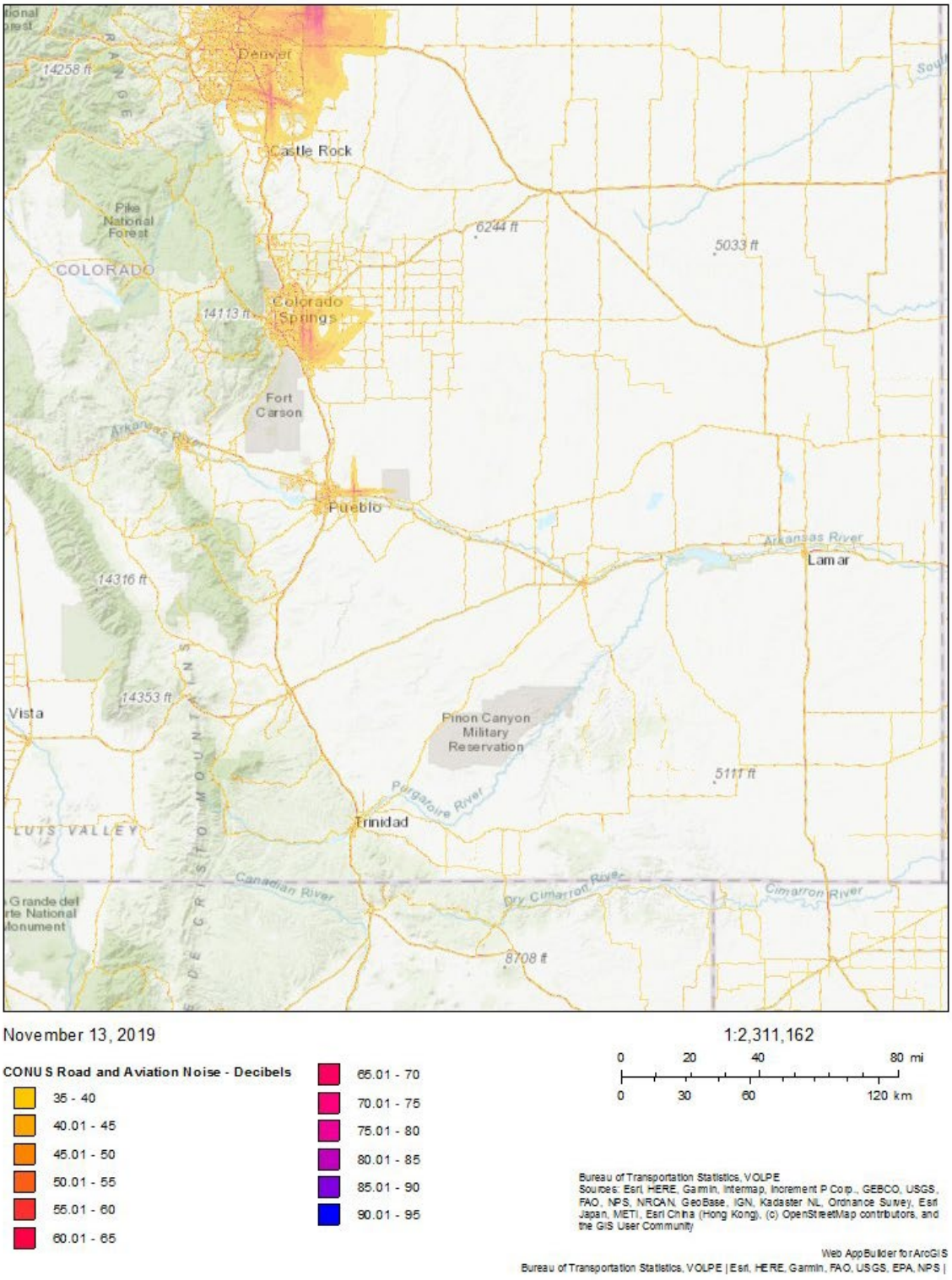


Figure 3: Average 24-hour noise level from transportation and aviation noise from https://www.transportation.gov/highlights/national-transportation-noise-map.

4.1.2 Environmental Consequences

4.1.2.1 No Action

There are no effects of the No Action Alternative since there are no changes to the current condition.

4.1.2.2 Proposed Action

The UAS would fly at or above 13,000 feet MSL along the route to and from PCMS and once at PCMS. The average elevation of the ground in the analysis area is about 5,000 feet with the maximum being about 5,700 feet MSL and minimum elevation being about 4,500 feet MSL. This means that the UAS would be between 7,300 feet and 8,500 feet above ground level (AGL) and on average the UAS would be at least 8,000 feet AGL.

Once UAS aircraft reach mission altitudes the annoyance potential from overflight is considered very low. At 2,000 feet AGL, the annoyance potential of the UAS would be low, below 70 A-weighted decibels (dBA). At 5,000 feet AGL the noise level would be about 60 dBA (Army Public Health Center, 2018, Table 5-9). The percentage of the population that are annoyed or disturbed by aircraft noise less than 70 dBA is 5 percent (Army Public Health Center, 2018, Table 5-6). The finding takes into account not only those directly under a flight path but those to the side of a passing aircraft.

With UAS operations occurring well above the 5,000 feet AGL the annoyance levels will drop to negligible percentages as the noise will be inaudible to most people. The low level of noise expected for an UAS traveling at about 170 miles per hour, combined with the transient nature of the proposed action means that the effects to the noise disturbance would be negligible compared to the current condition.

4.1.2.3 Cumulative Effects

Cumulative impact is the impact on the environment, which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor or collectively significant actions taking place over a period of time (40 CFR 1508.7).

The effects as a result of the proposed action are negligible. Most people that live in the analysis area, unless immediately adjacent to a major roadway, are exposed to less than 35dBA on average over 24 hours under current conditions. This is a negligible effect. The annual average noise impacts from BAAF are minimal outside of Fort Carson's boundary. Generally, the noise produced from UAS activities within the shared airspace is considerably quieter than other larger aircraft activities. When added to the current condition, which is assumed to remain constant for the foreseeable future, the effects would remain negligible.

4.1.2.4 Mitigations

No mitigations required.

4.2 Cultural Resources

4.2.1 Affected Environment

Cultural resources are the non-renewable remnants of past human activities that have cultural or historical value and meaning to a group of people or a society. For the purposes of this EA, the term "cultural resources" includes historic properties, as defined in the National Historic Preservation Act (NHPA); archaeological resources, as defined in the Archaeological Resources Protection Act (ARPA); cultural items, as defined in the Native American Graves Protection and Repatriation Act (NAGRPA); sacred sites, as defined in Executive Order 13007; and collections, as defined in 36 CFR 79.

To identify cultural resources within the affected environment, the Fort Carson Cultural Resources Manager reviewed data maintained by the Fort Carson Cultural Resources Program, as well as data provided by the Office of Archaeology and Historic Preservation (OAHP) and the OAHP's COMPASS online database. USAG Fort Carson manages 1,213 protected resources within the area of potential effect. Outside USAG Fort Carson-managed lands, 1,913 protected resources have been documented. These resources represent every period of human occupation from the Paleoindian stage to the present, and include prehistoric lithic scatters, camps, and architecture; prehistoric and historic quarries and mining sites; prehistoric and historic rock art; historical homesteads and ranches; stage and trail remnants; historic districts; historic buildings, structures, and objects; and sacred sites.

In accordance with Section 106 of the NHPA and its implementing regulations, 36 CFR Part 800, consultation regarding effects to historic properties was initiated in September 2019. The initial Section 106 consultation undertaking review packet, dated September 24, 2019, was forwarded to the Colorado State Historic Preservation Officer (SHPO); federally recognized Native American Tribes culturally affiliated with USAG Fort Carson-managed lands; and other consulting and interested parties on September 26, 2019. The SHPO concurred with USAG Fort Carson's finding of *no adverse effect* via correspondence dated October 17, 2019 (HC #76656). Responses were also received from the City of Colorado Springs, Colorado Council of Professional Archaeologists, Not 1 More Acre!, Northern Cheyenne Tribe, and Otero County Board of Commissioners. In correspondence dated September 29, 2019, and October 28, 2019, respectively, the City of Colorado Springs and Northern Cheyenne Tribe agreed the proposed undertaking would have no adverse effects to historic properties. In correspondence dated October 23, 2019, October 22, 2019, and November 4, 2019, respectively, the Colorado Council of Professional Archaeologists, Not 1 More Acre!, and Otero County

Board of Commissioners disagreed with the finding of effect and voiced several concerns on the proposed undertaking. Responses to their concerns were sent on December 20, 2019. Due to a change in the proposed area of potential effects (APE), a revised undertaking review packet was sent to the SHPO, Native American Tribes, and other consulting and interested parties on January 14, 2020. Updates included a slight shift in the APE and clarification on flight details. Via correspondence dated January 27, 2020, the SHPO concurred with finding of no adverse effects to cultural resources (HC #76656). Responses were also received from the City of Colorado Springs and Pawnee Nation. Information on the Section 106 consultation and responses can be found in the administrative record for the project.

The Cimarron Route of the Santa Fe National Historic Trail runs through the affected environment along current-day U.S. Highway 350. This trail extends from Franklin, Missouri, to Santa Fe, New Mexico, and is one of the first great trans-Mississippi routes, playing a critical role for westward expansion. The Santa Fe Trail was designated a national historic trail in 1987 under the National Trails System Act. This Act was enacted to provide additional outdoor recreational areas, while promoting the preservation of and public access to historic resources. Designation as a national historic trail does not mean the trail (in its entirety) is a historic property under NHPA, an archaeological resource under ARPA, a cultural item under NAGPRA, a sacred site per EO 13007, or a collection per 36 CFR Part 79. The aforementioned Section 106 consultation included an analysis of potential effects to those portions of the Santa Fe National Historic Trail and associated historic resources that are categorized as historic properties under the NHPA.

4.2.1 Environmental Consequences

4.2.1.1 No Action

There are no effects of the No Action Alternative, since there are no changes to the current condition.

4.2.1.2 Proposed Action

Given the speed (up to 170 miles per hour), the high minimum altitude (13,000 feet MSL or on average 8,000 feet AGL), and intermittent nature at which the Gray Eagle will be flying, there will be no physical, visual, atmospheric, or auditory impacts to cultural resources. Therefore, there are no reasonably foreseeable, direct, indirect, or cumulative, negative impacts to cultural resources within the affected environment as a result of the Proposed Action.

4.2.1.3 Cumulative Effects

There are no direct or indirect effects to cultural resources, therefore there are no cumulative effects.

4.2.1.4 Mitigations

No mitigations required.

4.3 Biological Resources

4.3.1 Affected Environment

The Southern Rockies and Colorado Plateau Bird Conservation Region is a diverse area. Within this region, vegetation types transition from shrub-steppe, pinyon-juniper, montane shrubland, mixed conifer and aspen (Parrish et al. 2002). See the affected environment section in the big game issue discussion for a general habitat description.

The U.S. Fish and Wildlife Service lists birds of conservation concern (BCC) by bird conservation region (BCR). The project area lies within BCR 16–the Southern Rockies/Colorado plateau. Species listed as BCC within the habitat types available may include, but are not limited to golden eagle, peregrine falcon, flammulated owl, Lewis's woodpecker, gray vireo, pinyon jay, juniper titmouse, veery, Bendire's thrasher, Grace's warbler, brown-capped rosy finch, and Cassin's finch (U.S. Fish and Wildlife Service 2008). Known raptor species that nest within the project area include golden eagle, bald eagle, osprey, ferruginous hawk, Swainson's hawk, red-tailed hawk and possibly the Mexican Spotted Owl, which is federally listed as threatened. The area is home to large game including elk, mule deer, pronghorn, and bighorn sheep.

4.3.2 Environmental Consequences

4.3.2.1 No Action

There are no effects of the No Action Alternative since there are no changes to the current condition.

4.3.2.2 Proposed Action

There is limited information on the effects of UAS on wildlife, raptors and other migratory birds. However, there is some literature outlining the effects of rotary wing aircraft (helicopters) on wildlife. The noise signature is similar between helicopters and UAS so these studies are used here to approximate the effects of UAS fly-over activity on wildlife. Delaney et al. (1999) found that the Mexican Spotted Owl did flush with increasing helicopter noise. However, the flushing behavior ceased once the helicopter was more than 105 meters (about 345 feet) away and had a noise level of less than 92 dBA.

Anderson (2007) completed a literature review on the effects of noise, primarily from helicopters, on large mammals and migratory birds. The information presented in the report is used here to describe the potential effects of UAS flyover activity on wildlife resources between Fort Carson and PCMS. Osprey, Red-tailed Hawks and Bald

Eagles have been found to flush from nest when helicopter activity is between 10 to 100 meters (32 to 328 feet) away from the nest. Per the DPW Wildlife Office, when eagle nests are active, aircraft may fly over the buffer zone at or above 2500' AGL. Based on the height the UAS will fly at, it appears that active raptor nests will not be affected.

Mule deer were found to leave the area when the noise levels were between 82 and 102 dBA. Pronghorn began running or flushing when the noise levels where at 77 dBA and the aircraft was about 150 feet away. There was found to be mostly no reaction when the fixed wing planes were more than 100 meters (328 feet) away in one study. Another study showed no response by bighorn sheep when exposed to 91 to 112 dBA of aircraft noise. (Anderson, 2007)

The expected noise level of UAS flyovers at on average 8,000 feet AGL or above will have no effect on biological resources.

4.3.2.3 Cumulative Effects

The wildlife population is being minimally affected by most of the aircraft using national airspace between Fort Carson and PCMS because of the elevation above the surface most flights take place. There are some private plane and military activity that may currently be having a minor effect on wildlife resources because of low flight elevations, aircraft noise or frequency of the flyovers. These effects are likely minor because the wildlife in these areas have already become accustomed to the noise or have found other areas or habitat to use during times of disturbance. The cumulative effect of the proposed action is negligible.

4.3.2.4 Mitigations

No mitigations are required.

4.4 Environmental Consequences Summary

Table 3: Summary of cumulative effects by VEC.

VEC	Direct and Indirect Effects of the Proposed Action	Cumulative Effects of the Proposed Action
Noise	Negligible	Negligible
Cultural Resources	No Effect	No Effect
Wildlife Resources	No Effect	No Effect

4.5 Proposed Mitigation Summary

There are no mitigation measures required to avoid or minimize environmental harm because the effects of the Proposed Action are negligible to none without mitigation.

UAS training flights would follow all FAA and Army requirements and regulations. All safety precautions required by the Army and the FAA will be followed, including flight path modifications, to minimize the risk of damage to life or property during training flights including Fort Carson’s emergency procedures found in Appendix A.

.

5 Acronyms

AGL	Above Ground Level (Feet)
BAAF	Butts Army Airfield
BCT	Brigade Combat Team
CAB	Combat Aviation Brigade
CEQ	Council on Environmental Quality
CFR	Code of federal Regulations
COA	Certificate of Authorization
dBA	Decibels
DPTMS	Directorate of Plans, Training, Mobilization, and Security
DPW	Directorate of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FNSI	Finding of No Significant Impact
IFR	Instrument Flight Rules
MSL	Mean Sea Level (feet)
NAS	National Airspace System
NEPA	National Environmental Policy Act
NOA	Notice of Availability
PCMS	Pinon Canyon Maneuver Site
ROI	Region(s) of Influence
SPCCP	Spill Prevention, Control, and Countermeasures Plan
UAS	Unmanned Aircraft Systems
VEC	Valued Environmental Component
VFR	Visual Flight Rules

6 List of Preparers

Name	Installation/Affiliation	Role
Bell, Angie	Fort Carson/Environmental	NEPA Program Manager
Davis, Bert	Fort Carson/DPTMS	Range Control Officer
Hooper, William	Fort Carson/DPTMS	Chief of Training
Benford, James	Fort Carson/DPTMS	DPTMS Director
Blake, Michelle	Fort Carson/Environmental	Wildlife Biologist
Kolise, Jennifer	Fort Carson/Environmental	Cultural Resource Program Manager
Thomas, Wayne	Fort Carson/Environmental	NEPA/Cultural Branch Chief
Yohn, Richard	Fort Carson/Environmental	Air Program Manager
Lehmicke, Anna Joy	Fort Carson/Environmental	Wildlife Program

7 References

Anderson, Betty. 2007. A Literature Review of the Effects of Helicopter Disturbance and Noise on Selected Wildlife Species. Prepared for U.S. Army Alaska, Fort Wainwright.

Army Public Health Center. 2018 *Fort Carson Installation Compatible Use Zone Study.* Environmental Noise Branch, Environmental Health Sciences Division, Army Public Health Center, Aberdeen Proving Ground, Maryland. Copy on file at the Environmental Division, Directorate of Public Works, Fort Carson, Colorado.

Bureau of Transportation Statistics. 2019. The National Transportation Noise Map retrieved on November 13, 2019 from https://www.transportation.gov/highlights/national-transportation-noise-map

Defense Noise Working Group. 2018 *Community and Environmental Noise: A Guide for Military Installations and Communities.* Defense Noise Working Group, Department of Defense Noise Program, Washington, D.C. Copy available online at: http://dodnoise.org/.

Fort Carson. 2012. Fort Carson Combat Aviation Brigade Stationing Implementation Environmental Assessment and Finding of No Significant Impact. https://www.carson.army.mil/assets/docs/dpw/NEPA/fort-carson-final-ea-fnsi-cab.pdf

Fort Carson. 2015. Pinon Canyon Maneuver Site Training and Operations Environmental Impact Statement and Record of Decision. https://www.carson.army.mil/assets/docs/dpw/NEPA/2014-pcms-training-and-operations-final-eis.pdf

Fort Carson. 2015. MQ-1C Gray Eagle Unmanned Aerial System (UAS) at Fort Carson, CO Environmental Assessment and Finding of No Significant Impact. https://www.carson.army.mil/assets/docs/dpw/NEPA/2015-final-ea-fnsi-gray-eagle.pdf

Rylander, *et al*., 1974, "Re-Analysis of Aircraft Noise Annoyance Data against the dBA Peak Concept," Journal of Sound and Vibration, Volume 36, pages 399-406.

(UAS CoE) Army UAS Center of Excellence. 2010. "Eyes of the Army": U.S. Army Roadmap for Unmanned Aerial Systems, 2010-2035. https://apps.dtic.mil/dtic/tr/fulltext/u2/a518437.pdf

Appendix A: Emergency Procedures

The primary purpose of the Army's domestic UAS operations is for forces to gain realistic training experience, test equipment and tactics in preparation for potential overseas warfighting missions. Army UAS pilots have logged millions of UAS flight hours worldwide. This extensive experience is the foundation of the Army's careful adherence to aviation safety policies and procedures regarding both manned and unmanned aircraft. There are several emergency procedures in place concerning UAS training. Emergency procedures are exempt from NEPA review under 651.11(b).

Lost Link

In the case of lost-link with UAS, such as Gray Eagle and Shadow, by the controlling authority, the UAS utilizes pre-programmed contingency procedures until the link is re-established or the UAS ends the flight in a safe manner. The UAS is programmed to automatically orbit in restricted airspace at a designated safe location. For Fort Carson this is to the north west of Large Impact Area, until communications control is reestablished or the aircraft runs out of fuel and descends to the ground, still inside the restricted airspace. Lost link programmed procedures avoid unexpected turn-around and/or altitude changes and provide sufficient time to communicate and coordinate with Air Traffic Control. If the link is not reestablished within a predetermined time the aircraft may do one of the following:

1. Auto land; however, the aircraft will not exit the Restricted Area or Warning Area,
2. Proceed to another Lost-Link Point in an attempt to regain control link,
3. Proceed to a Flight Termination Point or the location specified in other contingency planning measures for flight termination.

Emergency Landing

Prior to an emergency landing or if the training was cut short due to other factors, such as weather, fuel dumping may need to occur to safely land the Gray Eagle. Fuel dumping is only authorized over the Large Impact Area at 6,000 feet AGL or at a pre-specified altitude to allow for the full dissipation of the fuel in the air.

Spill Response Procedures

Hazardous waste is managed under the Fort Carson Hazardous Waste Program. The program includes the proper handling and disposal of hazardous waste, as well as appropriate procurement, use, storage, and abatement (if necessary) of toxic substances. Several plans are in place to assist with the management of hazardous materials and waste including a Pollution Prevention Plan (also known as the Waste Minimization Plan), Facility Response Plan, Hazardous Waste Management Plan, and

the Spill Prevention, Control, and Countermeasures Plan (SPCCP). Any spills that may occur during UAS training are subject to the standard operating procedures in the Fort Carson Spill Prevention, Control and Countermeasure Plan. The SPCCP includes communication protocols and survey procedures for detecting any spills.