FINAL
ENVIRONMENTAL ASSESSMENT

WILLIAMS LAKE WILDLIFE CONTROL
BUCKLEY AIR FORCE BASE, COLORADO

Prepared for:
460 CES/CEV

January 2010

Report Documentation Page

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14. ABSTRACT

The USAF proposes to develop and conduct a program for controlling wildlife at Williams Lake on BAFB whose presence in the runway and airspace areas are hazardous to flight operations. Williams Lake is the primary wildlife attractant at BAFB. It is necessary for the base to conduct aircraft operations in a manner that achieves mission objectives, provides for the safety of aircraft operators, and maintains the integrity and balance of the on base environment. Specific activities to be performed as part of the Proposed Action include a continuation of control measures recommended by the current Bird Aircraft Strike Hazard (BASH) Plan with the addition of a wiregrid system over the open water to deter waterfowl landings. This EA was prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of developing and conducting a program for controlling wildlife at Williams Lake at BAFB. Three alternatives including the no action alternative were analyzed. Several environmental resources were reviewed but not analyzed in detail in the EA either because the resources are not present at or adjacent to the project area or because implementation of established best management practices would ensure no significant impacts. These resources include air quality, geology resources, noise, socioeconomics, transportation, hazardous materials and waste environmental restoration program, pollution prevention, cultural resources, lightscape and night sky prime and unique farmlands, radon, asbestos, environmental justice, and utilities. Some resources were analyzed in detail in the EA: physical resources including groundwater, soils, water resources and airspace; biological resources including vegetation, wetlands and floodplains, wildlife, and threatened and endangered species; and other resources including health and safety, land use, visual and recreation.

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FINDING OF NO SIGNIFICANT IMPACT
WILLIAMS LAKE WILDLIFE CONTROL AT BUCKLEY AIR FORCE BASE, COLORADO

Agency: U.S. Air Force, 460th Space Wing

Background: The United States Air Force (USAF) prepared an Environmental Assessment (EA) to assess the potential environmental consequences of developing and conducting a program for controlling wildlife at Williams Lake on Buckley Air Force Base (BAFB) whose presence in the runway and airspace areas are hazardous to flight operations. This EA was prepared in accordance with requirements of the National Environmental Policy Act (NEPA) and the corresponding NEPA-implementing regulations of the Council on Environmental Quality (40 Code of Federal Regulations [CFR] 1500) and the USAF (32 CFR 989).

Proposed Action: The Proposed Action is to develop and conduct a program for controlling wildlife at Williams Lake on BAFB whose presence in the runway and airspace areas are hazardous to flight operations by implementing a wire-grid system in addition to the BASH plan recommendations. Three alternatives were analyzed, including the no action alternative.

Factors Considered in Determining That No Environmental Impact Statement is Required: The EA, which is incorporated by reference, analyzed the environmental impacts of implementing the Proposed Action alternatives by taking into account all relevant environmental resource areas and conditions. Several environmental resources were reviewed but not analyzed in detail in the EA either because the resources are not present at or adjacent to the project area or because implementation of accepted engineering or design techniques would ensure no significant impacts. These resources include air quality, geology resources, noise, socioeconomics, transportation, hazardous materials and waste, environmental restoration program, pollution prevention, cultural resources, lightscape and night sky, prime and unique farmlands, radon, asbestos, environmental justice, and utilities. The USAF has examined the following resource areas and found that implementing the Proposed Action would not result in any significant impacts: physical resources including groundwater, soils, water resources, and airspace; biological resources including vegetation, wetlands and floodplains, wildlife, and threatened and endangered species; and other resources including health and safety, land use, visual, and recreation.

Public Notice: NEPA, 40 CFR §1500-1508, and 32 CFR §989 require public review of the EA before approval of the Finding of No Significant Impact (FONSI) and implementation of the Proposed Action. A 30-day public review was conducted and concluded on December 29, 2009.

Finding of No Significant Impact: Based on the requirements of NEPA, 40 CFR §1500-1508, and 32 CFR §989, I conclude that the environmental effects of implementing the Proposed Action are not significant, and therefore, an environmental impact statement (EIS) will not be prepared. A notice of availability for public review was published in the Aurora Sentinel and The Denver Post on or after November 26, 2009 indicating a 30-day review period. A hard copy of the Draft EA and Draft FONSI was placed in the Denver, Aurora, and Boulder public libraries for dissemination. Signing this FONSI completes the USAF Environmental Impact Analysis Process.

CLINTON E. CROSIER, Colonel, USAF
Commander, 460th Space Wing

20 Aug 10
Date

COVER SHEET
ENVIRONMENTAL ASSESSMENT
FOR WILLIAMS LAKE WILDLIFE CONTROL AT BUCKLEY AIR FORCE BASE, COLORADO

a. **Responsible Agency:** U.S. Air Force (USAF), 460th Space Wing

b. **Proposed Action:** Develop and conduct a program for controlling wildlife at Williams Lake on Buckley Air Force Base (BAFB) whose presence in the runway and airspace areas are hazardous to flight operations.

c. Written comments and inquiries regarding this document should be directed to:

Mr. Bruce James, 460 CES/CEV, 660 S. Aspen Street (Stop 86), Bldg. 1005, Room 178, BAFB, Colorado 80011-9551; telephone (720) 847-7245.

d. **Privacy Advisory**: Comments on the Environmental Assessment (EA) were requested. Letters or other written or oral comments are presented in the appendices of this EA. Addresses were compiled to develop a mailing list for those requesting copies of the Final EA. However, only the name of individuals making specific comments will be disclosed. Personal home addresses and phone numbers were not published in this EA.

e. **Designation:** Final Environmental Assessment

f. **Abstract:** The USAF proposes to develop and conduct a program for controlling wildlife at Williams Lake on BAFB whose presence in the runway and airspace areas are hazardous to flight operations. Williams Lake is the primary wildlife attractant at BAFB. It is necessary for the base to conduct aircraft operations in a manner that achieves mission objectives, provides for the safety of aircraft operators, and maintains the integrity and balance of the on base environment. Specific activities to be performed as part of the Proposed Action include a continuation of control measures recommended by the current Bird Aircraft Strike Hazard (BASH) Plan with the addition of a wire-grid system over the open water to deter waterfowl landings.

This EA was prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of developing and conducting a program for controlling wildlife at Williams Lake at BAFB. Three alternatives including the no action alternative were analyzed. Several environmental resources were reviewed but not analyzed in detail in the EA either because the resources are not present at or adjacent to the project area or because implementation of established best management practices would ensure no significant impacts. These resources include air quality, geology resources, noise, socioeconomics, transportation, hazardous materials and waste, environmental restoration program, pollution prevention, cultural resources, lightscape and night sky, prime and unique farmlands, radon, asbestos, environmental justice, and utilities. Some resources were analyzed in detail in the EA: physical resources including groundwater, soils, water resources, and airspace; biological resources including vegetation, wetlands and floodplains, wildlife, and threatened and endangered species; and other resources including health and safety, land use, visual, and recreation.

g. **Comments were received by:** December 29, 2009

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1.0 PURPOSE OF AND NEED FOR ACTION

This Williams Lake Wildlife Control Program Environmental Assessment (EA) was prepared in accordance with the U.S. Air Force (USAF) Environmental Impact Analysis Process (EIAP) (32 Code of Federal Regulations [CFR] Part 989). The EIAP complies with the regulations promulgated by the Council on Environmental Quality (CEQ) (40 CFR Part 1500-1508), which, in turn, implements Section 102 (2) of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] §4321 to §4370d). This EA has been prepared by the USAF to satisfy the EIAP, which requires the assessment of environmental effects resulting from the Williams Lake Wildlife Control Program at Buckley Air Force Base (BAFB).

1.1 INTRODUCTION AND BACKGROUND

BAFB was formerly operated by the Colorado Air National Guard (COANG) and now is hosted by the 460th Space Wing (SW). The 460 SW mission is to "deliver global infrared surveillance, tracking and missile warning for theater and homeland defense and provide combatant commanders with expeditionary warrior Airmen." The 460 SW hosts many tenant organizations with a wide range of missions from flight training to support for transient military aircraft, Navy, and Marine Corps training and a number of space-related initiatives.

The USAF has prepared this EA to assess the potential environmental effects resulting from executing a Wildlife Control Program at Williams Lake on BAFB, which is required to minimize or prevent wildlife interference with aircraft operations on the base. Williams Lake is located approximately 2,083 feet from the runway and is directly under the normal overhead traffic pattern. Specific activities to be performed or considered as action alternatives include implementation of recommendations from BAFB's current Bird Aircraft Strike Hazard (BASH) Plan, a wire-grid system over the lake intended to discourage waterfowl from landing in the lake, and drainage of the lake.

1.2 LOCATION AND DESCRIPTION OF BUCKLEY AIR FORCE BASE

BAFB is a 3,283-acre parcel of land located on the eastern edge of urbanized portions of the city of Aurora, in Arapahoe County, Colorado (**Figure 1**). The base is approximately three miles east of Interstate 225 and ten miles southwest of Denver International Airport (USAF 2008). **Figure 2** shows BAFB roads and major on base features. **Figure 3** shows the Williams Lake area within BAFB.

The COANG operates aircraft on the BAFB airfield, the only operating military airfield in the Denver Metropolitan Area. The airfield supports the training of the 120th Fighter Squadron; deployment needs of the 140th Wing; training of the Colorado Army Guard Aviation units; deployment needs of Army Guard, Reserve and Active Duty Units in this region; to include the Regional Civil Support Team; and provides services for government and military aircraft crossing the country (USAF 2001a).

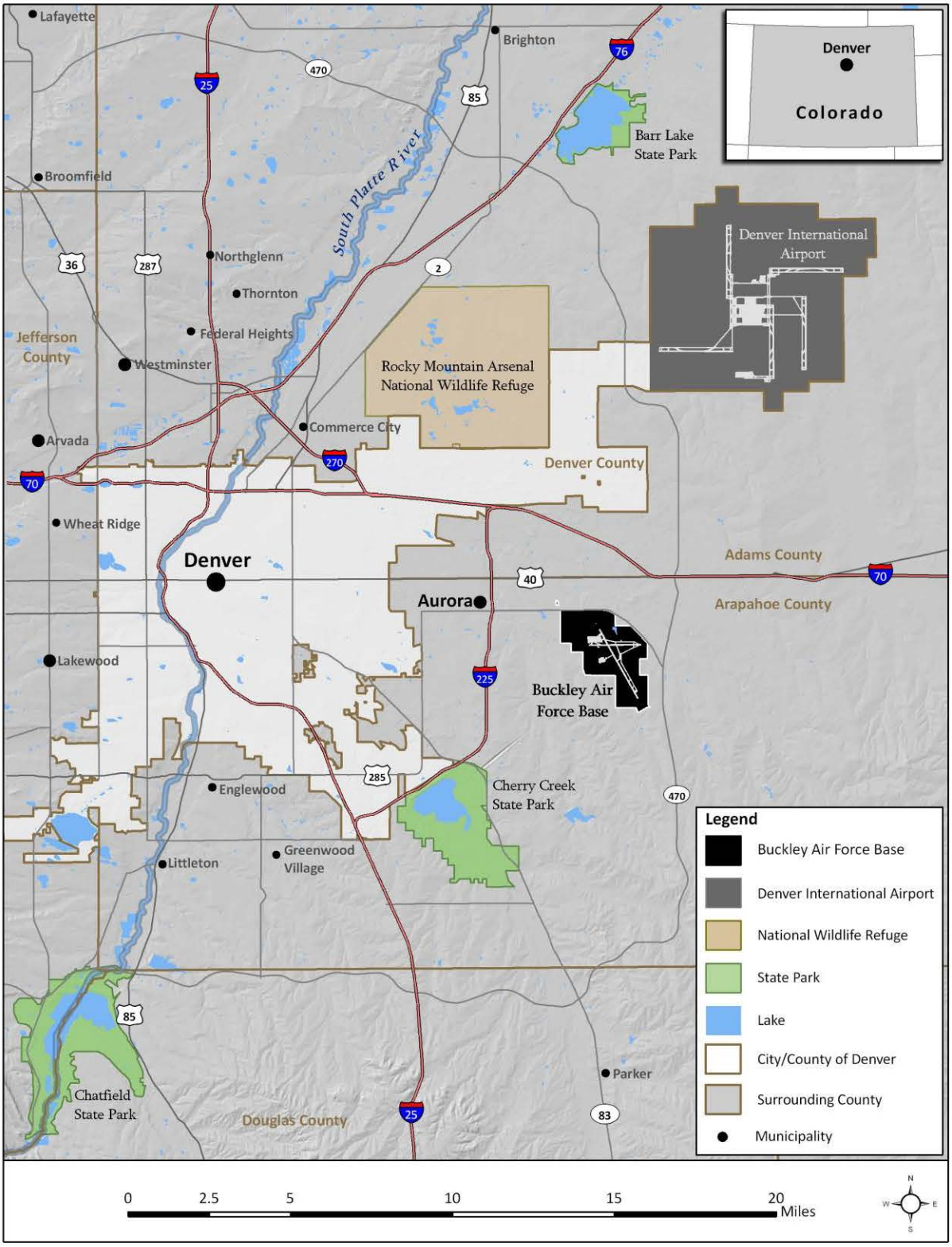

Figure 1 – Vicinity Map

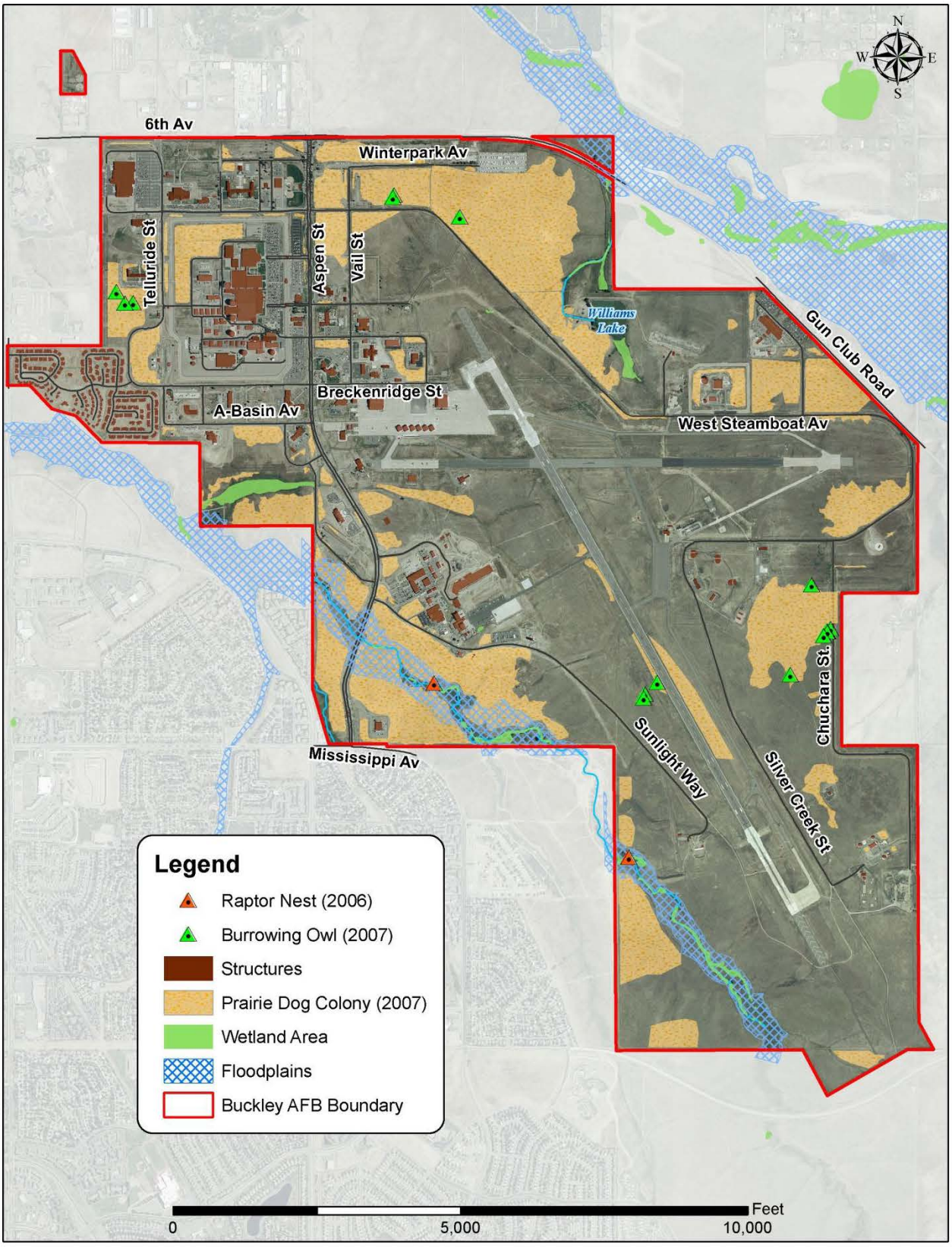

Figure 2 – Installation Map

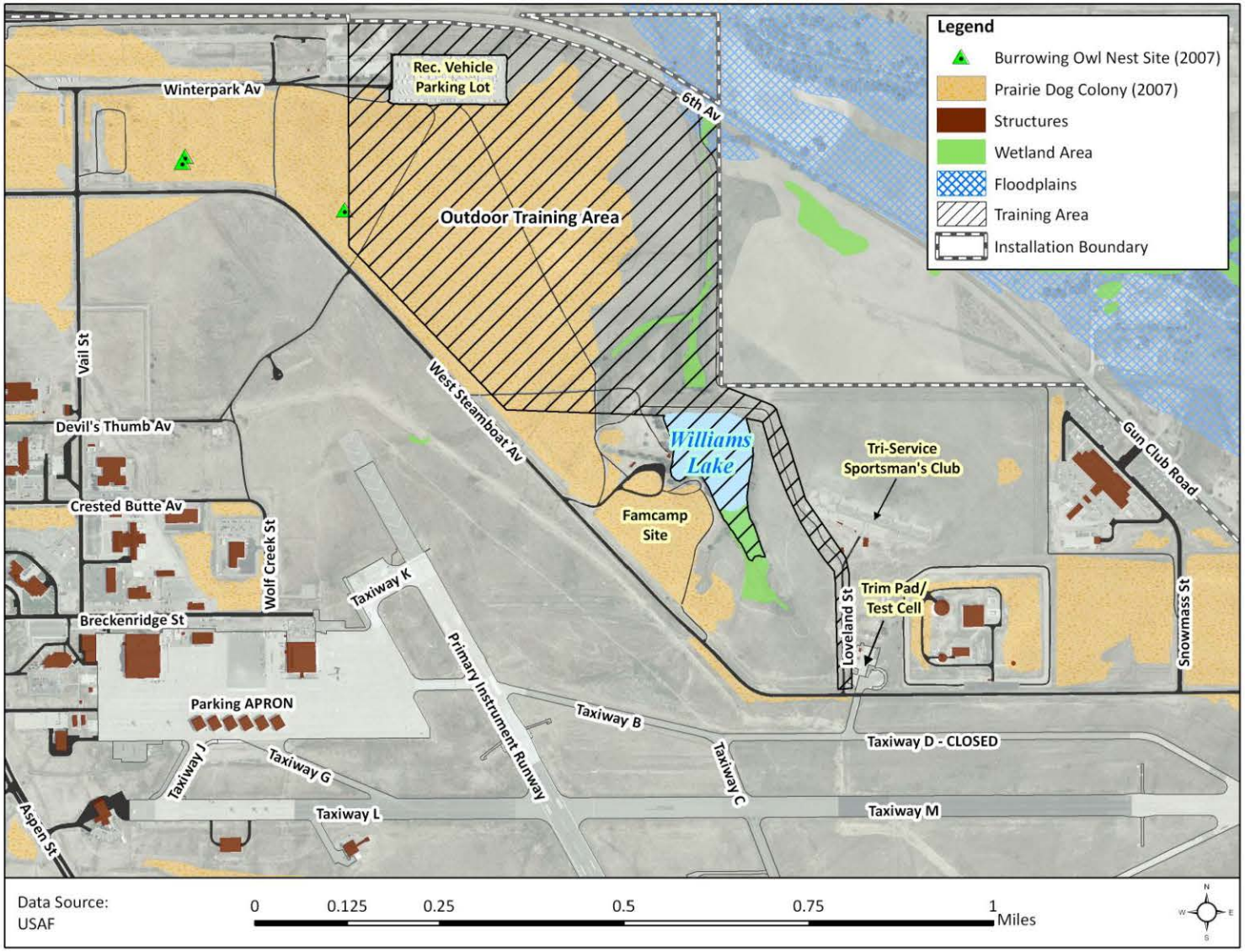

Figure 3 – Williams Lake Area

1.3 PROPOSED ACTION

BAFB proposes to develop and execute a Wildlife Control Program at Williams Lake that would minimize the attraction of Williams Lake to wildlife species, specifically waterfowl, and thereby reduce the bird aircraft strike hazard potential for aircraft operations on the base.

1.4 NEED FOR THE PROPOSED ACTION

The need of the Williams Lake Wildlife Control Program is to:

- Satisfy aircraft operations needs and reduce bird aircraft strike hazards at BAFB;
- Improve safety for pilots and reduce costs of aircraft damage or loss;
- Satisfy base mission objectives;
- Satisfy elements of the BAFB Integrated Natural Resources Management Plan, and
- Support the objectives of the National Security Strategy.

1.5 OBJECTIVES OF THE PROPOSED ACTION

The objectives of the Williams Lake Wildlife Control Program are to maximize results achieved by employing accepted wildlife control techniques that include:

- Habitat modification and exclusion for targeted species;
- Implementation of harassment and repellent techniques that have proven to be effective at other airports and airfields;
- Achieve a balance between management of natural resources and flight safety, and
- Removal of wildlife from areas where strike hazards are a concern.

1.6 RELEVANT PLANS, EAS, LAWS, REGULATIONS, AND OTHER DOCUMENTS

The following relevant documents were reviewed and contributed to the development of this EA:

- USAF EIAP, 32 CFR Part 989
- Capital Improvement Program Final Environmental Assessment; BAFB, Colorado (CO); March 2006;
- Construction III Final Environmental Assessment; BAFB, CO; December 2006;
- Final Freight Transfer Facility Environmental Assessment; BAFB, CO; June 2007;
- Final Draft Family Camp Facility; BAFB, CO; August 2007;
- Integrated Natural Resources Management Plan; BAFB, CO; January 2007;
- Bird Aircraft Strike Hazard (BASH) Plan; September 2002.
- Migratory Bird Treaty Act; 1918 (16 U.S.C §703 - §712);
- Rules and Regulations for Dam Safety and Dam Construction; January 2007;
- Colorado Revised Statutes, Title 33; latest;
- BAFB General Plan; 2005 (USAF 2005c);
- Stormwater Management Plan (SWMP), updated annually in accordance with Municipal Separate Storm Sewer System (MS4) permit requirements;
- National Environmental Policy Act (NEPA); 1969 (42 U.S.C. 4321-4347, as amended).
- Clean Water Act (CWA) (33 U.S.C. §1251 et seq. (1972))
- Stormwater Phase II Final Rule, 1999 (33 U.S.C. §1251 et seq. (1972))

1.7 DECISIONS THAT MUST BE MADE

The 460th Space Wing Commander will make the decision to implement a Williams Lake Wildlife Control Program based upon a review of the program as a whole and its associated effects as presented in this EA.

1.8 SCOPE OF THIS ENVIRONMENTAL ANALYSIS

The scope of this EA is to assess the impacts that would result from implementing a wildlife control plan for Williams Lake that would reduce the numbers of waterfowl that are attracted to Williams Lake and represent a hazard to aircraft operations at BAFB. The analysis will identify future wildlife control measures and reduce the impacts from implementing wildlife control program measures on natural and cultural resources. This EA considers past, current, and potential wildlife control actions conducted within the BAFB boundary. The study area for this EA includes BAFB and its region of influence (ROI). The ROI determines the geographical area to be addressed as the affected environment. Although the base boundary represents the ROI limit for some resources, potential impacts associated with other resources may transcend these limits. This EA describes and addresses the potential impacts of the Proposed Action.

1.8.1 History of the Planning and Scoping Process

The USAF BASH Team has 21 reported bird strikes for the 140th Wing in its database recorded between 1985 and July 2001. Based upon data collected by BAFB, the current frequency of BASH incidents at BAFB is approximately 7.6 incidents per 10,000 arrival/departure operations. These strikes have occurred to assigned and transient aircraft at various times of year and include raptors, doves, and meadowlarks among other species. Additionally, two coyotes have been struck by F-16s at the base. Many of the recent strikes have been recorded in the airfield environment where the situation can be addressed through habitat management, bird watch condition warnings, control of wildlife populations, and bird dispersal techniques.

Bird strikes have occurred throughout the year and at varying times of day. The situation changes throughout the year with migrant birds causing potential problems during both migration periods and breeding grassland birds causing problems during the summer months. These conditions are the target of the BASH program at BAFB.

The transition of BAFB to an Air Force Base prompted a revision of the BASH Plan along with several other plans. The U.S. Department of Agriculture (USDA) Wildlife Services currently has a two-year full-time contract to assist base personnel with wildlife management and control.

USDA Wildlife Hazard Assessment

In 2003-2004 USDA conducted a 14-month Wildlife Hazard Assessment for the purpose of identifying wildlife attractants at BAFB, specific hazardous species observed in surveys conducted throughout this period, and quantification of the threat that these species represented. Several guild classifications of birds were noted in 83 surveys including corvids (crows, magpies, and ravens), doves, raptors, sparrow-like birds, and waterfowl. **Figures 4 and 5** below (USDA 2004) illustrate the findings relevant to waterfowl using Williams Lake (Survey Location #8). The percent occurrence refers to the percentage of times the guild was observed at the survey location over the total survey period. Average number is the average number of individuals observed on any survey.

The assessment stated that the best method to control waterfowl is the removal or exclusion of attractive

wetland/pond habitats. Wire grids are effective at 10-20 foot intervals over ponds and other wetlands. Some form of exclusion should be installed to prevent waterfowl, especially Canada geese, from accessing Williams Lake. Using long grass management (8 - 12 inches) or an unpalatable ground cover can effectively preclude a wide variety of birds, including geese, from feeding on airfields. Pyrotechnics work well for most waterfowl, especially during the hunting season (USDA 2004).

If the birds habituate to hazing efforts, it may become necessary to shoot a few individuals to reinforce these methods. Habituation to hazing techniques is most often noticeable with resident birds but may also occur in migrants a few weeks after the regular hunting season closes. Waterfowl are also affected by the use of visual repellents in conjunction with pyrotechnics. A coyote (or dog) effigy can be an effective deterrent for keeping waterfowl from feeding areas, especially if the birds are migrants just passing through (USDA 2004).

Selected recommendations from the assessment that are relevant to wildlife control at Williams Lake include:

General

- Assign wildlife control personnel to increase time spent on bird deterrence;
- Train personnel in bird deterrence and wildlife harassment; and
- Adopt a "No Wildlife Feeding Allowed" policy.

Wildlife Deterrence

- Expand wildlife control operations to include all hours of operation;
- Concentrate hazing efforts early in the morning; and
- Use overhead wire-grid systems across water bodies that cannot be filled or netted.

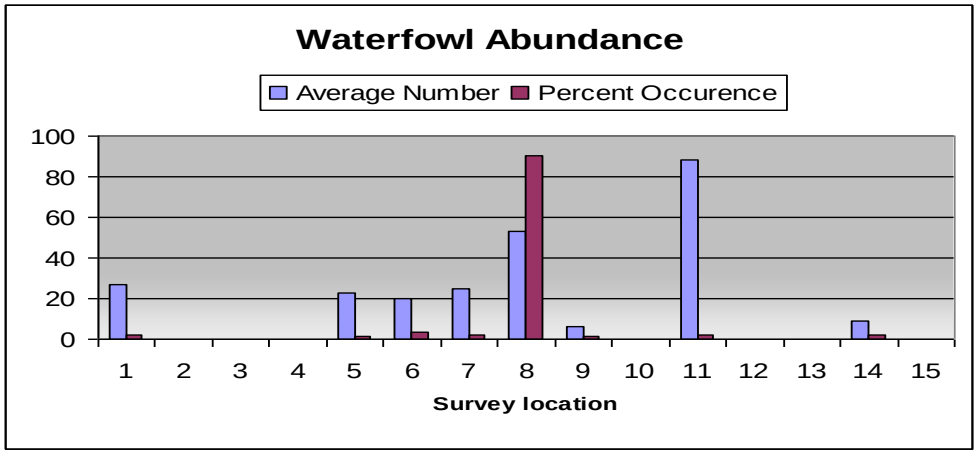

Figure 4 – Comparing Bases' Waterfowl Abundance

Note: Survey Location 8 is Williams Lake as contrasted with other base survey locations, which are specifically identified in the USDA Wildlife Hazard Assessment (USDA 2004).

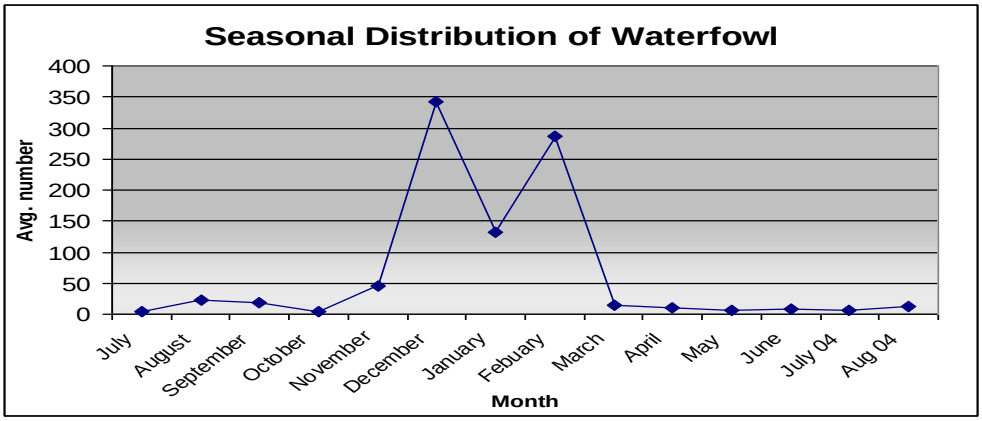

Figure 5 – Seasonal Distribution of Waterfowl

Note: Figure 5 depicts monthly bird populations and shows substantially higher populations during the migration season (USDA 2004).

140th Wing Safety Concerns – The 140th Wing Safety Office (140WG/SE) has documented a position that actions should be taken to address the use of Williams Lake by waterfowl species. One of the expressed concerns was that a fish stocking activity in May 2006 immediately increased the populations of fish-eating birds like pelicans and cormorants. The increase in pelican population is of particular concern because from 1985 to 2006 the average cost to the USAF for each pelican strike was over $32 million. The Canada goose average was over $1.2 million per strike (USAF 2007a).

In a memo dated 21 June 2006 to Bruce James, USDA recommends that Williams Lake be drained because of its risk to aviation and advises against "practices which have the potential to attract additional birds to Williams Lake. Such practices would include stocking with fish, installing water aerators/fountains, and pumping water to maintain the lake" (USDA 2006), which 140WG/SE cites.

An independent BASH consultant that contributed to preparation of the BAFB BASH Plan (USAF 2006a) said of Williams Lake in that document, "Due to its close proximity to the approach end of Runway 14 a long term solution needs to be explored to detract larger species of birds from approaching the runway." Additionally, in November 2006, BAFB received an Environmental, Safety Occupational Health Compliance Assessment and Management Program (ESOHCAMP) evaluation, in which the flight safety inspector identified the hazard Williams Lake posed as a "Major" finding and determined this hazard posed a "high risk" that needs to be addressed (Conklin 2008).

140WG/SE has also contributed to the background for the EA with the following observations:

- Bird presence is quantified by the local Bird Watch Condition (BWC). This is categorized as BWC Low (no impact), BWC Moderate (limits ability for traffic pattern work) and BWC Severe (no flying unless operational necessity). Conditions have been Severe only a few times. BWC Moderate occurs approximately weekly and this number increases during the migratory season. The primary species that dictates BWC Moderate is Canada geese (Conklin 2008).
- One USDA Wildlife Biologist and one Wildlife Specialist are currently under contract. There are several instances of delayed takeoffs to allow bird dispersal by USDA using pyrotechnics. Eleven propane cannons have been effective in the past; occasionally they have been out of service but plans exist for replacing all of them. Active harassment by personnel has proven more effective when available (Conklin 2008).
- Normal traffic pattern is east of the field because of noise concerns for the population west of the field. During the migratory season the Control Tower has notified pilots of bird concentrations to the east and pilots have modified their patterns (the reverse is also true but aircraft generally try to

avoid west patterns). The direction of traffic doesn't impact training, but community relations is the driving factor for the east pattern, which overflies Williams Lake (Conklin 2008).

- The presence of any waterfowl on Williams Lake is the greatest BASH risk. These species, including geese, pelicans, and cormorants, all occasionally present on Williams Lake, have historically caused the most damage (cost and fatalities) to USAF aircraft and are a focal point for BAFB BASH efforts (Conklin 2008).

The BAFB BASH Plan was developed to manage the aircraft strike hazard resulting from all types of wildlife on the base. The Proposed Action in this EA would focus specifically on those actions from the BASH Plan and appropriate additional actions that may be taken to control wildlife that are attracted to Williams Lake, primarily waterfowl.

1.8.2 Issues Studied in Detail

Resource or issue areas analyzed in detail within this EA appear in Table 1-1.

Table 1-1 – Issues Studied in Detail

Resource or Issue Studied in Detail	Measurement Method
Groundwater	Quality and Quantity of Groundwater
Soils	Soil Disturbance and Erosion Potential
Water	Surface and Stormwater Quality
Airspace	Airspace Restrictions/Hazards
Vegetation	Potential to Affect Vegetation Growth
Wetlands and Floodplains	Potential to Affect Jurisdictional Wetlands
Wildlife	Potential to Disturb Wildlife Communities
Threatened, Endangered, and Other Sensitive Species	Potential to Affect Threatened and Endangered Species (T&E) and Habitats
Health and Safety	Potential to Affect Existing Safety Measures
Land Use	Compatibility of Affected Land Uses
Visual	Potential to Affect Visual Assets
Recreation	Potential to Affect Established Recreational Activity

1.8.3 Issues Eliminated from Further Study

In accordance with CEQ guidance, the following resources were eliminated from detailed analysis in this EA because the resource does not exist on or adjacent to BAFB or because design techniques would be implemented to avoid impacts to the resource. Resources eliminated from detailed analysis are: air quality, geology resources, noise, socioeconomics, transportation, hazardous materials and waste, environmental restoration program, pollution prevention, cultural resources, lightscape and night sky, prime and unique farmlands, radon, asbestos, environmental justice, and utilities.

These resource topics are not relevant to the scope of this EA and were eliminated from further analysis. The rationale for dismissing these resource topics from further consideration is described below.

1.8.3.1 AIR QUALITY

The total direct and indirect emissions for the Proposed Action were estimated. General Conformity under the Clean Air Act, Section 176 has been evaluated according to the requirements of 40 CFR 93,

Subpart B (Appendix B). The requirements of this rule are not applicable to this action, because the highest total annual direct and indirect emissions from this proposed action have been estimated at 0.13 tons nitrogen oxides (NO_x), 0.03 tons volatile organic compounds (VOCs), 0.10 tons carbon monoxide (CO), and 0.14 tons particulate matter less than 10 microns in diameter (PM_{10}), which would be below the conformity threshold values 100 tons per year, and would not be *regionally significant*. These levels of emissions would be negligible, and air quality has not been carried forward for detailed analysis in this EA, air emissions associated with the Proposed Action would be *de minimis*. If Alternative C (Drain Williams Lake) were chosen, additional analysis would be needed to determine if the general conformity rule applied.

1.8.3.2 GEOLOGY RESOURCES

BAFB is located within the Denver Basin. The Denver Basin is a structural depression that is 300 miles long and 200 miles wide. The Denver Basin consists of geologic layers in excess of 13,000 feet thick that range in age from the late Carboniferous through the Quaternary periods(USAF 2008).

The geology near Williams Lake would support the types of wildlife control activities that are required to control wildlife hazards to aircraft operated by the tenants and other users (USAF 2001a). Therefore, geology resources are eliminated from further analysis.

1.8.3.3 NOISE

The ROI for noise is BAFB and extends one mile beyond its boundary. A sensitive receptor is any person or group of persons in an environment where low noise levels are expected, such as schools, day cares, hospitals, and nursing homes (USAF 2005a). There are no sensitive receptors immediately adjacent to the Williams Lake area. There are no activities associated with the alternatives that would affect the Air Installation Compatible Use Zone (AICUZ) noise contours at BAFB. Therefore, noise-related resources are eliminated from further analysis.

1.8.3.4 SOCIOECONOMICS

The activities associated with the alternatives would neither generate nor reduce revenues within nearby U.S. Census Bureau (USCB) tracts as well as there would not be associated impacts related to taxes, retail services, or school enrollment as a result of these activities. The exception would be the components of the lake wire-grid system and any equipment/temporary jobs if the lake were drained. However, given the limited scale of these actions and surrounding economic activity, these expenditures should be negligible. Therefore, socioeconomic resources are eliminated from further analysis.

1.8.3.5 TRANSPORTATION

Any increased traffic from implementing the alternatives (such as installing the wire-grid system or the limited traffic from draining the lake) should be negligible as compared to current background traffic at and near BAFB. The impacts to aircraft are analyzed in the airspace section. Therefore, transportation-related resources are eliminated from further analysis.

1.8.3.6 HAZARDOUS MATERIALS AND WASTE

There are no activities associated with the alternatives that would affect the generation or handling of hazardous wastes or the use and handling of hazardous materials at BAFB. Therefore, hazardous materials and waste-related resources are eliminated from further analysis.

1.8.3.7 ENVIRONMENTAL RESTORATION PROGRAM (ERP)

One of ten ERP sites identified at BAFB, Site 5, is located southeast of Williams Lake. However, current ERP investigations indicate that Site 5 has no contamination and will not be evaluated further. For this reason, and because no other ERP sites are affected by the Wildlife Control Program activities at Williams Lake, resources related to the ERP are eliminated from further analysis.

1.8.3.8 POLLUTION PREVENTION

There are no activities associated with the alternatives that would affect the generation of solid wastes or pollution prevention (P2) initiatives at BAFB. Therefore, pollution prevention resources are eliminated from further analysis.

1.8.3.9 CULTURAL RESOURCES

The activities associated with the alternatives would not involve any of the identified historic or cultural resources at BAFB. Therefore, cultural resources are eliminated from further analysis.

1.8.3.10 UTILITIES

The ROI for this issue area includes the installation utility infrastructure and the adjoining public utility systems. Implementing any of the alternatives would not result in significant impacts to public services or utilities. Therefore, this resource was eliminated from further study.

1.8.3.11 LIGHTSCAPES OR NIGHT SKY

Areas surrounding BAFB are urbanized and populated. Many existing artificial light sources pollute the night sky. The Williams Lake Wildlife Control Program would not generally be conducted at night. In instances where activities were conducted through the night, sources and intensities of artificial lighting used to support these activities would be small, providing light for small areas on the ground, and would not be different from artificial light sources already used on base such as road-side lamp posts and security lighting. Therefore, there would be no impacts to lightscapes or night sky, and this impact topic was eliminated from further analysis.

1.8.3.12 PRIME AND UNIQUE FARMLANDS

There are prime and unique farmlands at BAFB; however, the Natural Resources Conservation Service (NRCS) has determined that it would not be feasible to introduce agricultural production under the current conditions (USAF 2008). Therefore, the prime and unique farmlands resource was eliminated from further analysis.

1.8.3.13 RADON

The Proposed Action only involves minor building (poles). None of the alternatives include building modifications or buildings that are used for lodging, housing, or childcare. Therefore, impacts from radon are not expected and are not analyzed in this EA.

1.8.3.14 ASBESTOS

One of the chief asbestos issues at BAFB is the World War II (WWII) era buildings that were in use at BAFB around 1944. These buildings were demolished during the late 1940s and early 1950s. The building materials were removed from the base, but many of the foundations were left behind. The wide use of asbestos prior to 1980 contributes to the concern that the demolition debris that was buried or spread may have contained asbestos and may not have been mitigated to today's standards. The alternatives do not involve these asbestos concerns or any other known asbestos sources at BAFB. Therefore, impacts from asbestos are not analyzed for this issue in this EA (USAF 2007b).

1.8.3.15 ENVIRONMENTAL JUSTICE

The ROI for environmental justice is Arapahoe County, Colorado. The alternatives would not have an adverse impact to the surrounding community. Thus, none of them would have an overall disproportionately adverse environmental or human health effect on the minority population (USAF 2001a). Therefore, this impact topic was eliminated from further analysis.

1.9 APPLICABLE PERMITS, LICENSES, AND OTHER CONSULTATION REQUIREMENTS

The following is a list of applicable regulations and permits.

Table 1-2 – List of Applicable Regulations and Permits for Wildlife Control Program

Applicable Regulation	Regulating Agency	Project Application
Municipal Separate Storm Sewer System (MS4) permit	U.S. Environmental Protection Agency (USEPA)	Regulates discharges to municipal storm sewer systems.
National Pollutant Discharge Elimination System (NPDES) Stormwater Construction General Permit (CGP) [CGP and Stormwater Pollution Prevention Plan (SWPPP)]	USEPA	Possible removal of dam and any construction such as the wire-grid system. If greater than one acre is disturbed, a CGP and SWPPP for construction activities would be needed as part of the CGP.
Migratory Bird Treaty Act	US Fish and Wildlife Service	Protection and taking of migratory bird species
Rules and Regulations for Dam Safety and Dam Construction	Colorado Division of Water Resources	Lake draining and dam removal

1.10 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

This EA is organized into eight chapters.

- Chapter 1.0 contains a statement of the purpose and need for the Proposed Action; defines the sites and locations for the Proposed Action; presents the scope of the environmental review; outlines the organization of this EA; and describes resources eliminated from detailed analysis in this EA.
- Chapter 2.0 of the EA describes the alternatives; identifies alternatives considered but eliminated and presents a comparison of any potential environmental consequences from these alternatives; describes foreseeable cumulative impacts for three alternatives; states any unavoidable environmental impacts; and describes any irreversible commitment of resources.
- Chapter 3.0 contains a general description of the environmental resources that potentially could be affected by the alternatives and also analyzes the environmental consequences of the alternatives.
- Chapter 4.0 identifies the preparers of the EA.
- Chapter 5.0 identifies the agencies, organizations, and persons to whom copies of the statement were sent.
- Chapter 6.0 provides a list of source documents relevant to the preparation of this EA.
- Chapter 7.0 provides a list of acronyms and abbreviations used in this EA.
- Chapter 8.0 lists the appendices to this document, Appendix A – Impact Significance Criteria, Appendix B – Applicability Analysis under the General Conformity Rule, and Appendix C – Public Involvement and Agency Coordination.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This section provides a detailed description of alternatives including the Proposed Action. The USAF has prepared this EA to assess the environmental impacts of a Wildlife Control Program at Williams Lake in the northeast sector of BAFB. Wildlife Control activities support USAF mission objectives.

2.2 PROCESS USED TO DEVELOP THE ALTERNATIVES

2.2.1 History and Development Process of Alternatives

Williams Lake, located in the northeastern part of BAFB, is a man-made reservoir of approximately 10 acres that was originally developed for recreational opportunities. It was created in 1961 by damming a minor tributary of Sand Creek. The water level within the lake is maintained by a well and supplemented by runoff from BAFB, a twofold condition that is necessary because the size of the drainage basin is very small relative to the size of the reservoir as shown on the right in an excerpt from a 2003 installation drainage map for BAFB (approximate drainage basin boundary is shown by the red line). For much of its history, Williams Lake has served as a recreational fishery (USAF 2008).

From the 1960s to the early-1990s, Williams Lake was stocked with trout, but there was no spawning habitat and cormorants and other fish-eating birds preyed on large numbers of fish. In the mid-1990s, Buckley Air National Guard and the U.S. Fish and Wildlife Service (USFWS) began a bass and bluegill stocking program. Following the fish kill of summer 2005, Williams Lake was stocked in spring 2006 with bass, bluegill, and catfish. In order to maintain optimum health of the lake environment, a SolarBee solar powered aerator was installed to control blue green algae, improve lake aesthetics, and eliminate fish kills. The aerator also controls inorganic chemical releases from sediment and improves dissolved oxygen and pH levels. The current fishing program at BAFB was developed in coordination with USFWS and 460th Mission Support Group, Services Division (USAF 2008).

A Family Camp (FamCamp) facility is planned for the west shore of Williams Lake that derives maximum benefit from its close proximity to the lake. The preferred location for the FamCamp is adjacent to the southwest side of Williams Lake and is approximately 12 acres in size. This location incorporates the natural amenity of the only water feature located on BAFB and is in conformance with the BAFB General Plan for future development. The proposed site has existing facilities in the area that include buildings #1100 (Restrooms or bathhouse) and #1104 (indoor meeting/game room), both made of wood. Building #1104 is located adjacent to William's Lake, serves as a lake side meeting room, and includes a wood deck. There is also a children's playground and two un-numbered picnic pavilions west of #1104. A conceptual layout for the FamCamp is shown in the following illustration (USAF 2007c).

As a Category I installation (having suitable habitat for conserving and managing fish and wildlife), BAFB (Base) contains areas of native habitat, including Williams Lake, that are attractive to wildlife. In addition, the Base is situated between a rapidly growing metropolitan area and a large mosaic of open prairie and cultivated agricultural fields. The Base and the surrounding environment support both native habitats (such as grasslands and riparian corridors) and urban/suburban habitats (including buildings, parks, golf courses, athletic fields, large reservoirs, small ponds, and landscaped areas). This combination of habitats provides numerous opportunities for a wide variety of species to meet their food, water, and cover requirements.

Attempting to remove any one species would simply leave a vacuum in the local ecosystem that would be filled by another species. For example, removal of prairie dogs would allow for expansion of the rabbit and mouse populations. Removal of the rabbits would allow for expansion of a variety of small rodents including mice, voles, and ground squirrels. Prairie dogs, rabbits, and small rodents are all prey for local raptors and terrestrial predators. Removing coyotes would be expected to result in increased prey populations, increased occupancy by other predators (foxes, more raptors, etc.), or both. Replacing open grasslands with roads and buildings would reduce or preclude occupation by some native species (such as prairie songbirds and raptors) but would encourage increases in species such as European starlings and rock pigeons (both potentially significant hazards due to their tendency to form large flocks) as well as raccoons and other species that are common in urban/suburban environments. Thus, this Wildlife Control Program at Williams Lake would rely primarily upon habitat management to influence species' use of the lake. Use of dispersal techniques outlined in the BASH Plan and lethal removal would sometimes be necessary to eliminate hazardous situations that are not adequately controlled through habitat management (USAF 2008).

The three alternatives presented in this EA are purposefully developed to represent progressive stages of wildlife control program complexity, ranging from a No Action Alternative that continues implementation of recommendations from the BAFB BASH Plan to a "mid-range" plan that utilizes a wire-grid deterrent system on the lake that is not specifically mentioned in the BASH Plan and finally to an alternative that drains Williams Lake, thereby eliminating this wildlife-attracting feature.

2.2.2 Alternatives Eliminated from Detailed Study

Alternatives considered but eliminated in this EA include the following:

Modify or eliminate aircraft operations activities. More than 75 years ago, the 140th Wing's subordinate unit, the 120th Fighter Squadron, mustered into the COANG as the 120th Observation Squadron, 45th Division - Aviation. In 1946, the 120th reorganized to become a separate entity. That year the unit became the first Air National Guard unit to be federally recognized. Reactivated as the 120th Tactical Fighter Squadron, the squadron began flying the P-51 Mustang. Also formed was the 140th Fighter Group - later to become the 120th Fighter Squadron and 140th Wing, respectively. This highly decorated unit has been mobilized for World War II, the Korean War, the Berlin Crisis, the Cuban Missile Crisis, the Pueblo Crisis, and Vietnam, in addition to many domestic efforts. During the Pueblo Crisis the 120th spent 15 months on active duty, including a year at Phan Rang Air Base, Vietnam.

More recently, the 140th Wing (WG) has been called upon for service in Operation Desert Storm, Operations Northern and Southern Watch, Operation Noble Eagle, Operation Enduring Freedom, and Operation Iraqi Freedom. Hours after the planes hit the World Trade Center, on September 11, 2001, dedicated aircrews had jets patrolling Colorado skies ready to challenge any who would threaten freedom. That mission became the Air Sovereignty Alert mission and continues today.

This unit's ability to perform its flying mission at these historically high levels would be severely compromised by reduction or elimination of the unit's flight operations. Therefore, this alternative was eliminated from detailed study.

Conduct unit flying operations at alternative off base facilities. The Department of Defense and the USAF have assigned this historic flying mission to BAFB based upon several military and operational factors that are beyond the scope of this assessment to evaluate. The assignment of this flying mission to BAFB effectively utilizes existing installation infrastructure that would be very difficult to duplicate in another location without taxing infrastructure resources at the receiving site or building or renovating facilities at a greatly increased cost. Therefore, this alternative was eliminated from detailed study.

Relocate Williams Lake elsewhere on the base. Relocation of Williams Lake has been suggested as a possible alternative that could offer recreational amenities and natural habitat of the current Williams Lake without associated hazards to flight operations. An alternative that has been discussed at BAFB (McWharter 2008a) is to move the lake further northwest, adjacent to a proposed 2050 FamCamp location. The runway would also be extended in this 2050 planning scenario. It is not known whether the new location would be directly under an aircraft traffic pattern, but such relocation would not eliminate the birdstrike hazard and would therefore not achieve the Proposed Action objectives described in Section 1.5. Therefore, this alternative was eliminated from detailed study.

Provide a hunting program to reduce wildlife. Implementing a hunting program would have been in agreement with the Sikes Act and Executive Order # 13443, which promote recreational hunting, fishing, and conservation of wildlife. However, due to the small size of BAFB, there were safety concerns, and therefore, this alternative was eliminated from detailed study.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 Alternative A: Implement BASH Plan Recommendations (No Action)

2.3.1.1 Principal Actions of Alternative A

The No Action Alternative is to continue implementation of recommendations from the current BASH Plan (USAF 2006a) that are either specific to Williams Lake or are of a general nature that is inclusive of the wildlife control needs at Williams Lake.

General. A bird/wildlife aircraft strike hazard exists at BAFB and its vicinity due to resident and migratory bird species and other wildlife. Daily and seasonal bird movements create various hazardous conditions. The BASH Plan establishes procedures to minimize the hazard to all assigned and transient aircraft at the Base and in their operating areas. No single solution exists to this BASH problem, and a variety of techniques and organizations are involved in the control program. This plan is designed to:

(1) Bird Hazard Working Group (BHWG) would continue on regular basis.
(2) Establish procedures to identify high hazard situations and to aid supervisors and aircrews in altering or discontinuing flying operations when required.
(3) Establish aircraft and airfield operating procedures to avoid high-hazard situations.
(4) Provide for disseminating information to all assigned and transient aircrews on bird hazards and procedures for bird avoidance.
(5) Establish guidelines to decrease airfield attractiveness to birds.
(6) Provide guidelines for dispersing birds when they are present on the airfield.
(7) Provide guidelines for avoiding birds in operating areas away from the airfield.
(8) Identify organizations/Office of Primary Responsibility (OPRs) with authority to upgrade, initiate, or downgrade bird watch conditions.
(9) Establish a working relationship between the 460 SW and 140 WG.

Airfield Habitat Management. Airfield vegetation and drainage are managed to minimize bird and wildlife attractants. Williams Lake is a small reservoir northeast of the airfield that is used as a recreation area. Expanded picnic areas were developed in spring 2002. This lake is highly attractive to a variety of waterfowl and other species, particularly during winter. Canada geese, mallards, and great blue herons were among the birds observed that are attracted to this lake. These birds must be dispersed using standard frightening techniques as described below. Garbage must be carefully controlled at the lake using containers that prevent access by birds and other wildlife. Additionally, the Base should post signs around the lake prohibiting the feeding of birds and other wildlife at this site to minimize its attractiveness.

Bird/Wildlife Management and Control Measures. A variety of dispersal and control measures should be available to Base personnel to use on an as-needed basis. These measures should be stored where readily available at any time when birds or other wildlife threaten airfield operations.

(1) Active Harassment. A combination of frightening devices should be available for use whenever birds are present on the airfield or in surrounding areas. Primary among those are pyrotechnic devices that can be fired from 15mm "starter" pistols (as shown in the photo this section), standard 12-gauge shotguns, or modified flare pistols. These devices fire pyrotechnics many meters over flocks of birds that present hazards. Skillful use of the devices can disperse birds from the field in desired directions. They produce a variety of loud sounds and explosions, bright flashes of light, and/or trailing smoke. Training for safely using the devices and coordination with the Air Traffic Control (ATC) Tower is imperative. Pyrotechnic devices can be extremely effective in dispersing waterfowl, gulls, shorebirds, and flocks of blackbirds. Gulls and blackbirds may also be dispersed using a combination of pyrotechnics and bioacoustics.

Bioacoustics are the recorded distress and alarm calls of species to be dispersed. They are projected over a speaker system that may be mounted on the roof or through the window of a vehicle. Birds will sometimes disperse upon hearing species-specific calls but may come to investigate the source of the sound and can then be encouraged to leave using pyrotechnic devices. These active harassment techniques should be used on the airfield and in all hazardous surrounding areas, such as on Williams Lake.

The airfield also has a system of remotely-triggered propane cannons, as shown on the right, that can be activated from the tower when birds are near any of the numerous units on the field. These devices are a good supplement to the use of other standard dispersal techniques, and would be most effective if used in combination with other techniques. The cannons are

located near the runway and are not found at Williams Lake.

(2) Depredation. Removal of nuisance birds and other wildlife may be conducted with appropriate annual USFWS permits by USAF, Air National Guard (ANG), USDA, or private contracted personnel. Trapping, poisoning, and shooting of flocks of birds or other wildlife such as coyotes and deer may be required on a periodic basis. USDA, Wildlife Services personnel are currently employed by the Base for this work. Depredation is a last resort measure that may reinforce other habitat management or active control efforts and is recommended when a severe hazard persists for several days or individuals become acclimated and fail to respond to other active control efforts.

2.3.1.2 Mitigation and Monitoring

No mitigation or monitoring activities are planned with implementation of a No Action Alternative for the purpose of reducing potentially significant impacts. BAFB would continue implementation of Best Management Practices (BMPs) and Standard Operating Procedures (SOPs) that are intended to minimize degradation of resources resulting from implementation of a Wildlife Control Program at Williams Lake. BMPs for several resource areas are located in Table 2-7.

2.3.1.3 Past Relevant Actions

Past actions relevant to the Williams Lake Wildlife Control Program are monitored and documented by BAFB as completed projects documented on annual construction and demolition lists and resource management actions that are recommended for optimum benefit by various management plans and policies at BAFB. Wildlife control activities occur across a wide area. Thus, it is presumed that all construction, demolition, and resource management activity has relevance to the Wildlife Control Program to a lesser or greater degree, and all activities are summarized in the table below.

Table 2-1 – Relevant Past Actions

Type of Action	Number of Facilities	Project Footprint square feet (ft^2) (1)	Facility Size ft^2 (2)
Construction with Structures	16	2,499,599	560,935
Construction without Structures	1	0	Not Applicable (NA)
Demolition	2	180,486	30,081

Resource Management Plan	Past Relevant Actions
Integrated Natural Resources Management Plan (INRMP)	Burrowing Owl Survey Prairie Dog Survey Wetland Monitoring Wetland Sign Placement
Integrated Cultural Resources Management Plan (ICRMP)	Conduct cultural resources survey Designate 6 historic buildings on base
MS4 Minimum Control Measures, BMP, Measurable Goals; Stormwater Management Plan (SWMP)	List sources of stormwater pollution Prepare written educational materials Conduct stormwater improvements surveys Implement construction plan controls Implement post-construction site runoff management
BAFB General Plan	Designate & regulate compatible land uses

Resource Management Plan	Past Relevant Actions
BASH Plan	Implement procedures to eliminate or reduce environmental conditions that attract birds to airfield
Hazardous Waste Management Plan	Establish procedures for management & control of hazardous waste generation & handling
Pest Management Plan	Invasive Weed Survey

(1) For most projects, footprint is 6 times the size of the facility's first floor.
(2) Project facility square footage does not include disturbance due to construction; such as laydown areas and generally doesn't include parking lots.

2.3.1.4 Present Relevant Actions Not Part of the Proposed Action

Present actions that are relevant to the Williams Lake Wildlife Control Program, but not part of the Proposed Action, are monitored and documented by BAFB in the form of projects under construction as documented on annual construction and demolition lists and resource management actions that are recommended for optimum benefit by various management plans and policies at BAFB. Wildlife control activities occur across a wide area. Thus, it is presumed that all construction, demolition, and resource management activity has relevance to the Wildlife Control Program to a lesser or greater degree, and all activities are summarized in the table below.

Table 2-2 – Relevant Present Actions

Type of Action	Number of Facilities	Project Footprint ft^2 (1)	Facility Size ft^2 (2)
Construction with Structures	8	1,077,535	63,692
Construction without Structures	2	615,000	NA
Demolition	0	0	0
Resource Management Plans	**Present Relevant Actions**		
INRMP	Implement Hunting Program Establish mowing requirements Monitor/maintain riparian vegetation Burrowing Owl surveys Prairie dog surveys Maintain prairie grassland mosaic Maintain prairie dog colonies Maintain shortgrass prairie areas Define prairie dog carrying capacity Conduct raptor surveys		
ICRMP	Cultural resource awareness program Implement cultural resources training		
MS4 Minimum Control Measures, BMP, Measurable Goals; Stormwater Management Plan (SWMP)	Implement construction plan controls Implement post-construction site runoff management Implement P2, good housekeeping BMPs		
BAFB General Plan	Maintain land use controls		

Resource Management Plans	Present Relevant Actions
BASH Plan	Implement procedures to eliminate or reduce environmental conditions that attract birds to airfield
Hazardous Waste Management Plan	Implement procedures for management & control of hazardous waste generation & handling
Pest Management Plan	Weed Control Program

(1) For most projects, footprint is 6 times the size of the facility's first floor.
(2) Project facility square footage does not include disturbance due to construction; such as laydown areas and generally doesn't include parking lots.

2.3.1.5 Reasonably Foreseeable Relevant Actions Not Part of the Proposed Action

Reasonably foreseeable relevant actions that are not part of the Proposed Action are monitored and documented by BAFB as planned projects not yet under construction as documented on the annual construction and demolition lists and resource management actions that are recommended for optimum benefit by various management plans and policies at BAFB. Wildlife control activities occur across a wide area. Thus, it is presumed that all construction, demolition, and resource management activity has relevance to the Wildlife Control Program to a lesser or greater degree, and all activities are summarized in the table below.

Table 2-3 – Relevant Foreseeable Actions

Type of Action	Number of Facilities	Project Footprint ft^{2} (1)	Facility Size ft^{2}(2)
Construction with Structures	50	4,664,855	1,264,803
Construction without Structures	42	9,223,846	NA
Demolition	37	2,142,174	357,029

Resource Management Plans	Foreseeable Relevant Actions
INRMP	Implement prescribed burns Native grass overseeding Distribution of rabbitbrush & yucca Anticipate & execute prairie dog relocation Install prairie dog fence around installation
ICRMP	Cultural resource awareness program Implement cultural resources training
MS4 Minimum Control Measures, BMP, Measurable Goals; Stormwater Management Plan (SWMP)	Implement construction plan controls Implement post-construction site runoff management Implement P2, good housekeeping BMPs
BAFB General Plan	Preserve land use controls
BASH Plan	Implement procedures to eliminate or reduce environmental conditions that attract birds to airfield
Hazardous Waste Management Plan	Implement procedures for management & control of hazardous waste generation & handling

Resource Management Plans	Foreseeable Relevant Actions
Pest Management Plan	Weed Control Program

(1) For most projects, footprint is 6 times the size of the facility's first floor.
(2) Project facility square footage does not include disturbance due to construction; such as laydown areas and generally doesn't include parking lots.

2.3.2 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

2.3.2.1 Principal Actions of Alternative B

Several wildlife control activities are described in Section 2.3.1 that are recommended by the current BASH Plan and have been or are being implemented under the guidance of that plan. Many of the implemented actions have begun only recently, some within the past year. Because of this recent initiation for some activities, there has not yet been sufficient information available to evaluate the overall effectiveness of the Alternative A (No Action Alternative).

Alternative B presented here presumes that Alternative A is at least partially successful, and there is a need for additional actions to achieve an acceptable level of safety with regard to bird strike hazards to aircraft operations. However, this additional action would be in addition to implementing the BASH plan recommendations. One specific additional action is considered in this alternative: a wire-grid system to be placed over Williams Lake that would deter waterfowl landings on the lake.

2.3.2.1.1 Wire-grid System

Wire-grid systems have been used successfully to cover lake surfaces on or near airports and airfields throughout the country and exclude use of the lakes by waterfowl. With proper grid spacing, waterfowl find it difficult to land on or take off from the lake and, therefore, would look elsewhere for water bodies that are more accessible.

Grid spacing has varied from one application to the next and is also dependent upon the species or size of birds that are being excluded. USDA – Animal and Plant Health Inspection Service (APHIS) Animal Damage Control sources recommend 20-foot spacing for geese, 10-foot spacing for ducks, and 5-foot spacing to exclude all waterfowl (USDA 1994). Another USDA – APHIS source reported success with a larger 100-foot spacing at an airport in Detroit, Michigan, excluding large percentages of geese, gulls, cormorants, swans, and most duck species, but failing to exclude herons, egrets, kingfishers, and small duck species (USDA no date).

In most instances, grid lines should be installed high enough to allow people and equipment to move beneath them. Where aesthetics or other factors preclude overhead grids, grids can be installed at the water surface, or no more than 1 inch below. In these installations, grid wire spacing should be no more than 5 feet (USDA 1994).

Grid-line materials. Several types of materials have been used for these systems, including steel wire, polypropylene, ultraviolet (UV)-protected monofilament lines, polypropylene lines, super-braided fishing line, and Kevlar lines. The braided fishing line and Kevlar line were the most effective at avoiding stretching and weakening or breakage due to abrasion (USDA 1993, 1994).

The wire-grid system may be perceived as an aesthetic and recreational detraction. For this reason, 460th Civil Engineering Squadron (CES)/Environmental Flight (CEV) (Hatch 2007) has indicated the intent to use the system only during waterfowl migration season. This strategy would allow the system to serve as a deterrent during the peak period for bird movement on the Base and reduce its impact on aesthetics during the peak season for other recreational uses of Williams Lake (fishing, boating, family camping, etc.).

The grid would likely be above water with 100 x 100 foot grids first using high strength salt water fishing line on metal posts with guy wires and anchors in the bank. 50 by 50 foot grids could be used if the larger spacing doesn't work.

2.3.2.2 Mitigation and Monitoring

No mitigation or monitoring activities are planned with implementation of this alternative for the purpose of reducing potentially significant impacts. BAFB would continue implementation of BMPs and SOPs that are intended to minimize degradation of resources resulting from implementation of Wildlife Control Program measures. BMPs for several resource areas are located in Table 2-7.

2.3.3 Alternative C: Drain Williams Lake

2.3.3.1 Principle Actions of Alternative C

There are several control strategies that may be used in combination when providing wildlife control on an airfield: aircraft flight schedule modification, habitat modification and exclusion, repellent and harassment techniques, and wildlife removal (BSC USA 2007). Alternative C focuses on the habitat modification and exclusion approach by removing entirely the wildlife attracting feature, Williams Lake. However, non-lake BASH plan recommendations would still be implemented under this alternative.

This is likely to be a costly approach, in terms of the resources and effort required to accomplish it as well as the disruption in the local ecosystem that has developed around Williams Lake. The selection of Alternative C would most likely consider one or more of these factors that tend to balance the costs associated with the alternative: 1) past forms of control have proven to be ineffective; 2) potential forms of control are perceived as unlikely to succeed; 3) there is insufficient time to allow other forms of control to become established; or 4) the potential risk of losing pilots, damaging aircraft, and the corresponding risk to the heavily populated local area is too high as measured against the confidence that other control measures would succeed.

2.3.3.1.1 Procedure for Draining

Prior to draining the lake, the CDOW would be contacted to determine if they have an interest in recovering and relocating game fish from Williams Lake. Whether performed by the CDOW or by BAFB, fish would be removed from the lake in an effort to avoid interference with the pumping operation and as a means to derive additional benefit from this resource.

The specific feed pipeline from the groundwater well that maintains the lake's water level would be deactivated, although the groundwater well itself would remain active. Impounded water would be pumped over the dam or into the existing overflow channel, discharging into the small tributary that drains this basin. The water would either be pumped slowly or the area around the end of the pump's discharge line would be protected against the force of the discharge in an effort to minimize excessive erosion from this point discharge into the tributary.

There are no industrial facilities within the small drainage area for the lake, but contaminants in the sediments may be a concern. BAFB has no knowledge of possible contaminants because lake sediments have not been tested. BAFB has tested fish tissue for certain contaminants and tested groundwater for contaminants from a site 1/4 mile up gradient from the lake and have not yet found contaminant concerns. However, pumping water and any accompanying sediments out of the lake to Sand Creek to the north would require water and sediment testing (Hatch 2008).

2.3.3.1.2 Removing the Dam

The dam structure currently used to impound water for Williams Lake would be removed after the lake has been drained so that runoff from the Williams Lake drainage basin may flow unimpeded in its natural drainage pattern. The State Engineer with the Colorado Department of Water Resources has established

guidelines for the removal or "breaching" of dams in the state (CDWR 2007), BAFB would comply with all state guidelines and regulations regarding dam safety.

Exact procedures that would be followed are dependent upon the hazard classification of the dam and the jurisdictional height of the dam from the crest of the emergency spillway to the invert of the former natural channel at the centerline of the dam. A precise characterization of the Williams Lake dam structure with regard to these parameters is not known, so an assumption is made for purposes of this assessment that the more stringent requirements would apply as follows (CDWR 2007):

> "7.1.2.1 The dam shall be excavated down to the level of the natural ground, or as necessary in accordance with Rule 7.1.2.3, at the maximum section; and shall be of sufficient width to pass the 24-hour, 100-year flood with a maximum increase in reservoir depth of five feet. However, the maximum breach width shall not exceed the width of the original natural channel before the dam was constructed, regardless of the 100-year flood magnitude unless approved by the State Engineer for improved public safety.
>
> 7.1.2.2 The sides of the breach shall be excavated to a slope that is stable, but not steeper than 2:1 (two horizontal to one vertical). Slope stability analysis that provides an adequate factor of safety for steeper slopes may be accepted by the State Engineer, but in no case shall the slopes be steeper than 1:1.
>
> 7.1.2.3 The breach shall be designed to prevent silt previously deposited in the reservoir and material excavated for the breach from washing downstream.
>
> 7.1.2.4 Water impounded in the reservoir area shall be released in a controlled manner that will not endanger lives or damage downstream properties.
>
> 7.1.2.5 The drawing(s) of the plan for the breach of a dam shall include the location, dimensions and lowest elevation of the breach.
>
> 7.1.2.6 The removal or breaching of the dam shall be performed under the purview of an engineer.
>
> 7.1.2.7 The engineer shall submit written notice of the completion of the removal or breaching of the dam along with as-constructed plans."

2.3.3.2 Mitigation and Monitoring

Replacement wetland areas would be created of equivalent size to those wetland areas surrounding Williams Lake that are lost as a result of the actions in this alternative. The existing wetland areas are not jurisdictional wetlands that are regulated by the US Army Corps of Engineers (USACE) (USACE 2001, 2003). The replacement requirement does not arise because they are jurisdictional wetlands, but rather because there is a USAF instruction (AFI 32-7064) and Department of Defense Directive 4715.3-Environmental Conservation Program that there be no net loss of wetlands (USAF 2008). It is unclear at this time where the replacement wetlands would be located, except that the replacement would be accomplished in a manner that would not recreate an attraction for wildlife that is hazardous to aircraft operations.

Freshly exposed sediments on the former lake bed would be subject to erosion until a vegetative cover can be established. For this reason, the exposed former lake bed would be revegetated as soon as possible following drainage of the lake. A similar protection strategy is required for the areas excavated beneath the existing dam structure. Some form of stabilization like Hydromulching or biodegradable erosion blanket would minimize sediment movement until the protective vegetation becomes established.

Any steps taken to protect the receiving channel from excessive erosion, similar to or as described above, would be a mitigation response intended to reduce impacts to soil and water resources from the forceful discharge of pumped lake water required in this alternative. A construction stormwater permit in accordance with the USEPA's construction general permit (CGP) would be required and requirements of

the USAF Engineering Technical Letter 03–1: Storm Water Construction Standards (AF ETL 03–1) and BAFB's MS4 permit would also be applicable. Both the CGP and AF ETL 03–1 include specific requirements for control of stormwater runoff during construction and stabilization of the disturbed areas to mitigate impacts from construction, along with monitoring to document compliance. Further, permits may need to be revisited, such as stormwater, depending on what the final plans for the Williams Lake area is.

A positive response from CDOW on BAFB's offer to remove game fish from Williams Lake would reduce impacts on wildlife from draining the lake.

2.4 SUMMARIES OF ALTERNATIVES

This section contains tabular summaries of the expected achievement of project objectives, comparison of project activities, expected environmental effects, best management practices, and mitigations for all alternatives.

Table 2-4 – Summary Comparison of Predicted Fulfillment of Project Needs & Achievement of Project Objectives

Project Objective	Alternative A No Action	Alternative B Proposed Action	Alternative C
Satisfy aircraft operations needs	Partial	Yes	Yes
Improve pilot safety	Yes	Yes	Yes
Satisfy base mission objectives	Yes	Yes	Yes
Support National Security Strategy objectives	Yes	Yes	Yes
Habitat modification and species exclusion	Partial	Yes	Yes
Implement harassment/repellent techniques	Yes	Yes	Yes (non-lake ones)
Remove wildlife from hazard areas	Partial	Partial	Partial

Table 2-5 – Summary Comparison of Project Activities			
Project Activities	**Alternative A No Action**	**Alternative B Proposed Action**	**Alternative C**
Implement lake-related BASH Plan recommendations	Disperse birds from lake using standard frightening techniques; Control garbage at the lake using containers that prevent access by birds and other wildlife; Post signs at lake prohibiting feeding of birds and other wildlife	Disperse birds from lake using standard frightening techniques; Control garbage at the lake using containers that prevent access by birds and other wildlife; Post signs at lake prohibiting feeding of birds and other wildlife	No activities; lake doesn't exist.
Implement non lake-related BASH Plan recommendations	Continue Bird Hazard Working Group on regular basis; Establish procedures to identify high hazard situations and aid in altering or discontinuing flying operations as required; Establish aircraft and airfield operating procedures to avoid high-hazard situations; Provide for disseminating information to aircrews on bird hazards and bird avoidance procedures. Establish guidelines to decrease airfield attractiveness to birds. Provide guidelines for dispersing birds that are present on the airfield. Provide bird avoidance guidelines for operating areas away from the airfield. Identify OPR authorities to upgrade, initiate, or downgrade bird watch conditions. Establish a working relationship between the 460 SW and 140 WG.	Continue Bird Hazard Working Group on regular basis; Establish procedures to identify high hazard situations and aid in altering or discontinuing flying operations as required; Establish aircraft and airfield operating procedures to avoid high-hazard situations; Provide for disseminating information to aircrews on bird hazards and bird avoidance procedures. Establish guidelines to decrease airfield attractiveness to birds. Provide guidelines for dispersing birds that are present on the airfield. Provide bird avoidance guidelines for operating areas away from the airfield. Identify OPR authorities to upgrade, initiate, or downgrade bird watch conditions. Establish a working relationship between the 460 SW and 140 WG.	Continue Bird Hazard Working Group on regular basis; Establish procedures to identify high hazard situations and aid in altering or discontinuing flying operations as required; Establish aircraft and airfield operating procedures to avoid high-hazard situations; Provide for disseminating information to aircrews on bird hazards and bird avoidance procedures. Establish guidelines to decrease airfield attractiveness to birds. Provide guidelines for dispersing birds that are present on the airfield. Provide bird avoidance guidelines for operating areas away from the airfield. Identify OPR authorities to upgrade, initiate, or downgrade bird watch conditions. Establish a working relationship between the 460 SW and 140 WG.
Implement actions beyond BASH Plan recommendations	No additional activities planned	Install wire-grid system above lake surface to exclude birds.	Drain Williams Lake.

Table 2-6 – Summary Comparison of Predicted Environmental Effects				
Resources	**Alternative A No Action**	**Alternative B Proposed Action**	**Alternative C**	**Remarks**
Groundwater	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Probable occurrence Beneficial	Alt. C – The beneficial impact from discontinuing pumping of groundwater to maintain lake level
Soils	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Alternative (Alt.) C – Potential erosion on exposed slopes of former lake bed before non-aquatic vegetation established even with the erosion control blanket
Water Resources	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Medium extent Possible occurrence Adverse	Alt. C - Short-term turbidity in receiving channel when lake is drained
Airspace	Minor Magnitude Short-term duration Medium extent Possible occurrence Adverse	Minor Magnitude Short-term duration Medium extent Possible occurrence Beneficial	Minor Magnitude Short-term duration Medium extent Possible occurrence Beneficial	Pilot safety is improved by the implementation of all three alternatives
Vegetation	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Possible occurrence Adverse	Moderate Magnitude Long-term duration Small extent Probable occurrence Adverse	Alt. C – Aquatic vegetation eliminated and exposed lake bed is revegetated with terrestrial vegetation
Wetlands and Floodplains	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Major Magnitude Long-term duration Small extent Possible occurrence Adverse	Alt. C – Isolated wetland areas adjacent to Williams Lake would be eliminated

Table 2-6 – Summary Comparison of Predicted Environmental Effects				
Resources	**Alternative A No Action**	**Alternative B Proposed Action**	**Alternative C**	**Remarks**
Wildlife	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Possible occurrence Adverse	Moderate Magnitude Long-term duration Small extent Probable occurrence Adverse	Alt. C – All aquatic species of plants and animals are eliminated at Williams Lake but not from and around the Base
Threatened, Endangered, or Other Sensitive Species	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Possible occurrence Beneficial	T&E species at BAFB are terrestrial and are unlikely to be impacted by actions at Williams Lake
Health and Safety	Minor Magnitude Long-term duration Medium extent Unlikely occurrence Adverse	Minor Magnitude Long-term duration Medium extent Possible occurrence Beneficial	Minor Magnitude Long-term duration Medium extent Possible occurrence Beneficial	Pilot safety is improved by the implementation of all three alternatives but Alternatives B and C have possible interference with lake training activities.
Land Use	Minor Magnitude Long-term duration Small extent Possible occurrence Adverse	Minor Magnitude Long-term duration Small extent Possible occurrence Beneficial	Minor Magnitude Long-term duration Small extent Possible occurrence Beneficial	Alt. B – Grid-system would slightly impact outdoor training exercises on the lake; Alt. C – Outdoor training using the lake not possible; lake as amenity for FamCamp eliminated.
Visual	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Long-term duration Large extent Possible occurrence Adverse	Minor Magnitude Long-term duration Large extent Unlikely occurrence Adverse	Alt B – Wire grid is hardly noticed if maintained to be clear of debris; Alt C – Lake view is eliminated as an amenity to FamCamp area
Recreation	Minor Magnitude Short-term duration Small extent Unlikely occurrence Adverse	Minor Magnitude Short-term duration Small extent Probable occurrence Adverse	Minor Magnitude Long-term duration Small extent Probable occurrence Adverse	Alt B – The wire-grid system only minimally detracts from recreation Alt C – Potential for fishing, boating, and related nature observation eliminated with drainage of lake

Table 2-7 – Best Management Practices (BMPs)	
Resources	**BMPs to be Employed for All Alternatives**
Groundwater	• None
Soils	• Installation of buffer areas in and around highly erodible soils and steep slopes • Apply water during dry periods • Cover soils during heavy rain events • Use silt barriers to restrict erosion of exposed soils • Establish limits of clearing and grading to protect and preserve riparian corridors, native grasslands, and implementing landscape plans that would stabilize soils
Water Resources (including Stormwater)	• Install silt fences around material stockpiles, stormwater drainage routes, culverts, and drains • Install hay or fabric filters, netting, and mulching around material stockpiles, stormwater drainage routes, culverts, and drains • Maintain a 50 foot buffer zone around William's Lake and wetlands • Activities restricted within the buffer area include: excess use of fertilizers, pesticides, or other chemicals; vehicular traffic or excessive pedestrian traffic; and removal or disturbance of vegetation and litter (material animals use for bedding) that might result in increased soil erosion at the site or loss of buffers • Implement coverage for stormwater discharges under the USEPA NPDES CGP where earth disturbing activity is ≥ 1 acre • Where earth disturbing activity is ≤ 1 acre, implement stormwater runoff sediment and pollutant controls in accordance with AF ETL 03–1 • Implement post-construction stormwater runoff sediment and pollutant controls in accordance with requirements in BAFB's MS4 permit
Airspace	• Utilize established warning system to avoid flying operations when there is an increased hazard from birds near the airfield • Disperse birds from Williams Lake using standard frightening techniques as recommended in the BASH Plan • Garbage must be carefully controlled at Williams Lake using containers that prevent access by birds and other wildlife • Post signs around Williams Lake prohibiting the feeding of birds and other wildlife at this site to minimize its attractiveness • Raise pattern altitude if possible and in coordination with Denver International Airport and Air Traffic Control (ATC) • Change pattern direction to avoid bird concentrations if possible and in coordination with ATC • Avoid takeoffs/landings at dawn/dusk ± 1 hour • Limit or prohibit formation takeoffs and landings • Depart pattern in trail; rejoin 3,000 feet above ground level (AGL) • Reschedule local training or transition elsewhere • Raise altitude en route to low-level or training areas • Limit time on low-level routes to minimum for training requirements • Select low-level routes or training areas based on bird hazard data from Headquarters Air Force Safety Center, Flight Safety, and Wildlife using the Bird Avoidance Model and Avian Hazard Advisory System for low-level route and range analysis • Close auxiliary field • Split formation during recovery • Discontinue formation instrument approaches • Make full-stop landings

Table 2-7 – Best Management Practices (BMPs)	
Resources	**BMPs to be Employed for All Alternatives**
Biological Resources (Wildlife, Vegetation, Threatened & Endangered Species)	• Revegetate all disturbed areas at the proposed site prior to closing the project • Trees near the lake would not be affected by the Proposed Action because the trees are within the 50 foot riparian buffer that protects the lake and surrounding vegetation and wildlife. The following activities would be restricted within the buffer area: excess use of fertilizers, pesticides, or other chemicals; vehicular traffic or excessive pedestrian traffic; and removal or disturbance of vegetation and litter (material animals use for bedding) that might result in increased soil erosion at the site or loss of buffers • Conduct a migratory bird survey prior to construction to verify if they are occurring in the construction area • Start construction (especially site preparation) either prior to nesting season or after most birds have fledged (March through the end of July) • Utilize steel shot for any on-base depredation of birds. • Utilize dogs to patrol the lake and harass waterfowl that are trained to avoid nesting sites of protected wildlife
Wetlands and Floodplains	• Maintain a 50 foot buffer zone around William's Lake and wetlands • Stormwater control and sediment control must be implemented to protect these areas • Spill prevention, control, and countermeasures are in place and executed • Create replacement wetland(s) for wetlands lost
Health and Safety	• Bird watch program would alert aircraft operating units when wildlife hazards are present near the airfield • Follow safety BMPs such as Occupational Safety and Health Administration regulations.
Land Use	• None
Visual or Scenic	• None
Recreation	• None

2.5 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake is the preferred alternative.

2.6 DESCRIPTION OF AREAS RELATED TO CUMULATIVE EFFECTS

The CEQ regulations for implementing NEPA require assessment of cumulative effects in the decision-making process for federal actions. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects are considered for the No Action Alternative and the action alternatives. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Both additive and interactive cumulative impacts are assessed. Additive impacts accumulate by adding more of the same impact on a resource. Interactive impacts accrue as a result of assorted similar or dissimilar actions being taken that tend to have similar impacts, relevant to the valued resource in question.

The geographic area of influence for cumulative impacts varies according to resource area. The temporal scope is the same for all resources and is defined as impacts that have taken or would take place within ten years.

Cumulative effects were determined by combining the effects of the Proposed Action with other past, present, and reasonably foreseeable future actions. Cumulative impacts are analyzed under each resource area for each alternative in Chapter 3. According to City of Aurora, there are no current plans for new activities within a half of a mile of Williams Lake (Figure 6) (Aurora 2007a). Further, while more description regarding land use and recreation are in Chapter 3, Figure 7 below illustrates future planned parks near BAFB (Aurora 2007b).

Tables 2-1, 2-2, and 2-3 also list the management plans for BAFB, which can counterbalance some of the environmental impacts caused by the Capital Improvement Projects listed in Table 2-8 below. Based on analysis of each alternative with past, current, and reasonably foreseeable future activities, the contribution of each alternative to cumulative impacts would be expected to be low, predominately due to the small amount of construction and small area of impacts from the alternatives. The exception is some of the Alternative C cumulative impacts, which are detailed in Chapter 3.

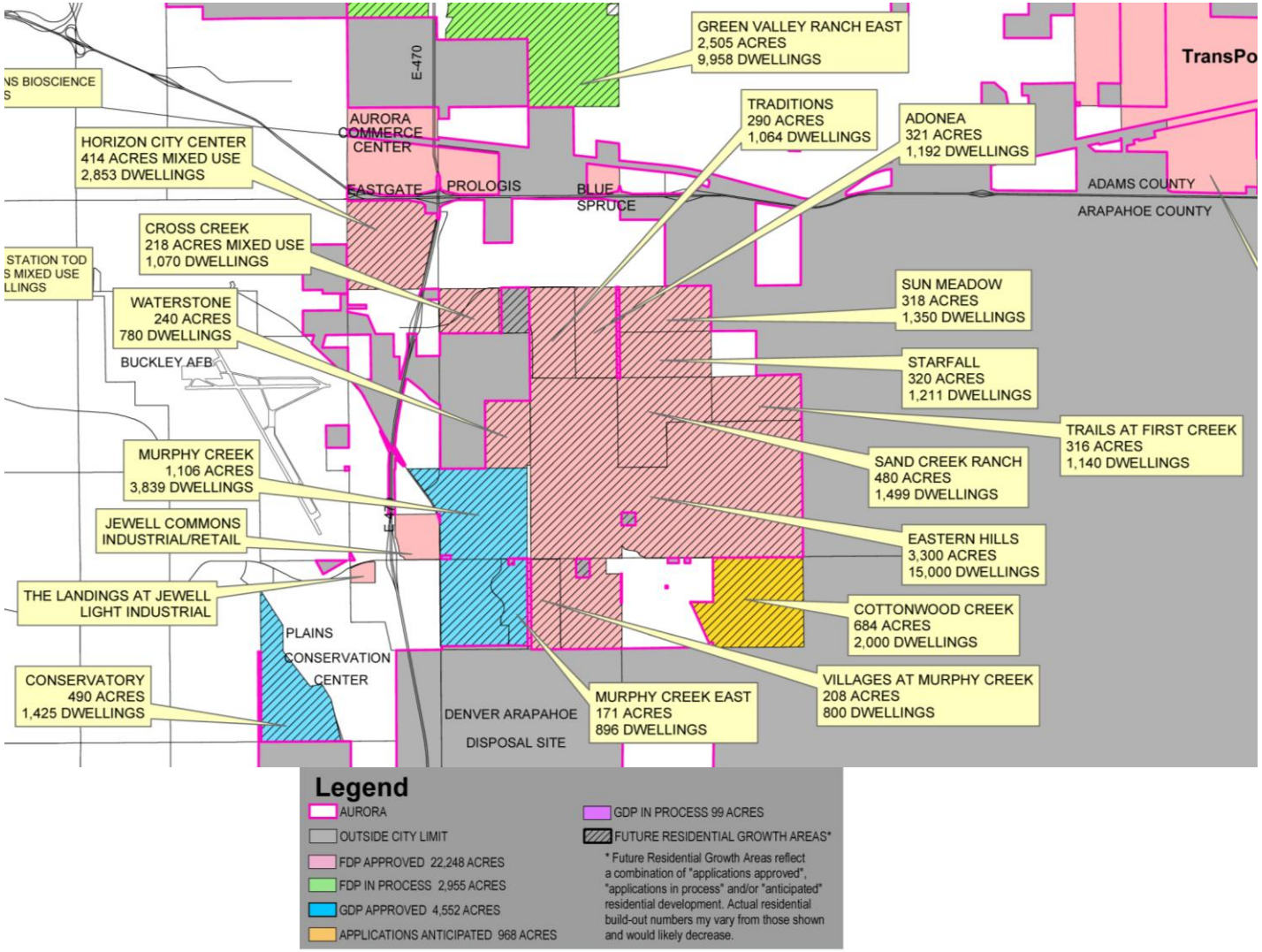

Figure 6 – Planned Development in Aurora, Colorado

Figure 7 – Planned Recreational Development in Aurora, Colorado

Table 2-8 – Recent, Current, and Planned Capital Improvement Projects		
Fiscal Year	**Projects**	**Project Footprint (ft^2) [a]**
02	BX/Commissary (completed)	200,152
02	Dormitory II (144 person)	54,250
02	Fitness Center (completed)	54,500
02	Military Family housing = 71 acres total land (e.g., for houses, landscaping, roads)	712,298
02	Telluride Gate (completed)	120
03	460th Space Wing Headquarters	51,066
03	ADAL SBIRS Mission Control (under construction)	18,000
03	Child Development Center 4-room Addition (Bldg 725)	743
03	Control Tower (COANG)	5,800
03	Demolish Building 25 (demolished)	NA
03	Engine Shop Addition Bldg 960 (COANG)	2,000
03	Entomology (O&M) Replace Entomology Shop	2,255
03	Fire Station Addition	21,531
03	Golf Driving Range	12
03	H-70 Fuel Storage Facility (O&M)	1,045
03	New northern runway extension (COANG)	37,500
03	Repair Runway, Taxiways, Ramps (COANG)	1,950,000
03	Two Pavilions at Williams Lake	60
03	Two Warehouses - Civil Engineering	10,000
04	ADD/Alter Access Roads (Airfield) (COANG)	443,520
04	Approach Lighting (COANG)	672
04	Civil Engineering Complex (COANG)	37,350
04	Demolish Entomology Facility (306)	1,160
04	Demolish Hydrazine Bldg (310)	820
04	Demolish Radio Relay Bldg (1620)	1,600
04	Fire Training Facility - Originally 08	44,512
04	Headquarters	51,066
04	Impound Lot (asphalt paved)	8,000
04	New East Gate (estimate based on existing structure at Peterson AFB)	128
04	New Visitor Center (estimate based on existing structure at Peterson AFB)	525
04	Repair Parking Lot East of Bldg 471	316,798
04	Repair Parking Lots ANG wide (COANG)	144,000

Table 2-8 – Recent, Current, and Planned Capital Improvement Projects		
Fiscal Year	**Projects**	**Project Footprint (ft^2) [a]**
04	Upgrade Base Infrastructure, Ph III	NA
05	Vail Street Improvements	91,200
05	Army Aviation Support Facility (COARNG)	120,000
05	Athletic Fields (two ball fields, 1 track, and 1 football field)	Fence 3,600 meters
05	CDCII Preschool Playground	8,800
05	CDCII Pretoddler Playground	5,225
05	CDCII Toddler Playground	6,450
05	Chapel Center	26,081
05	Child Development Center CDCII	24,197
05	Demolish Building 902	4,428
05	Demolish Electrical Shop (1631)	3,025
05	Demolish Marine Area Foundations	NA
05	Demolish Reserve Forces Bldg (1632)	600
05	Medical Clinic ADAL	4,563
05	Medical Warehouse	NA
05	Repair Taxiways A&K	NA
06	Athletic Fields Concession (NAF)	1,399
06	BITC Mailroom	NA
06	Car Wash (AAFES) – 06 MILCON project	2,000
06	Communications Center (ADAL 730) - Originally 05 – moved to 07	60,988
06	Consolidated Services Facility Admin	15,145
06	Demolish Warehouse (1011/1012)	22,949
06	Haz Materials Storage (Env. Level 1) HAZMART Pharmacy Construction initiated in 06	5,457
06	Haz Waste Facility (Env. Level 1) Construction initiated in 06	1,615
06	Leadership Development Center	17,631
06	Outdoor Rec Equip Rental (NAF) Originally 05, contract still not awarded.	9,288
06	Permanent Alert Shelters (COANG) FY08 - request congressional add for FY06 (Originally 05)	41,400
06	Youth Center (NAF) 06 MILCON project	28,586
07	Military Working Dog Kennel	5,205
07	-POL Ops Building	2,745
07	-Pump house	1,001

Table 2-8 – Recent, Current, and Planned Capital Improvement Projects		
Fiscal Year	**Projects**	**Project Footprint (ft^2) [a]**
07	-Storage Pol Bulk Ops Building	452
07	Consolidated Fuels Includes Demo of existing structures, construction of POL Ops Bldg, Pump House, and Storage POL Bulk Ops Bldg - are all listed separately in this table) NOTE: 06 Construction Project, proposed NTP is Jan 07; therefore, considering 07 project.	4,198
07	Construct FE Maintenance Facility	NA
07	Demolish Building 940	14,758
07	Demolish Building 950	20,303
07	Demolish Crash House (1606)	8,327
07	Demolish Engine Test Pad	2,045
07	Demolish Fuel Storage (200)	1,576
07	Demolish Fuel Tanker Stands	NA
07	Demolish Fuels Admin (302)	1,185
07	Demolish Fuels Lab (300)	1,503
07	Permanent Alert Crew Qtrs (COANG) - States Alert Facility	6,500
07	Replace Squadron Operations Facility	NA
07	Temporary Lodging Facility (NAF) - Originally 03	NA
07	Visitors Quarters	38,000
07	Widen 6th Avenue (DAR Project) - was 08	3 Lanes
08	Demolish Building 341 (Part of consolidated fuels)	216
08	FAMCAMP - Originally 07	Tent Sites 10 each
08	NSA/CSS	NA
08	Pharmacy	6,000
08	Taxiway and Arm/Disarm (COANG) Includes Demolition of existing parking apron and portion of Sunlight Road and taxiways F, W, X, and Y. Originally 08	877,500
08	Vehicle Maintenance Facility - Originally 07	19,504
09	Demolish Building 31	204
09	Entry Control Facility (was 08)	NA
09	Logistics Readiness Complex - Originally 06, now states in clear zone	12,917
09	RV Storage Lot	NA
10	Arts, Crafts, Auto Skills Development Ctr	11,119
10	Bowling Center and Community Activities (Peterson)	19,999
10	Education Center - Originally 07	22,012

Table 2-8 – Recent, Current, and Planned Capital Improvement Projects		
Fiscal Year	**Projects**	**Project Footprint (ft^2) [a]**
10	Fire Station Addition (crash house) – 2 Originally 09 – requesting FY 07. Joint ANG/AF	10,600
10	Fitness Center Addition (estimate based on existing swimming pool at Peterson AFB) Originally 09	12,652
10	SF Operations Facility – was 06, then 07	26,910
11	6th Ave Entry Gate	NA
11	Consolidated Base Warehouse - Originally 08	100,029
11	Construct Admin Facility (ADF)	NA
11	SBIRS Remote Ground Station	NA
11	Small Arms Range Outdoor Arm Range – now indoor with outdoor grenade launcher (originally 06)	6,512
11	Upgrade Based Infrastructure Ph IV - Originally 09	NA
11	Weapons Loading Facility (COANG) - Originally 09 – requesting 08	7,400
11	Youth Athletic Fields	NA
12+	Weapons Release Complex (COANG) - Originally 09 – requesting 09	6,000
12+	ADAL Weapons Release Complex (COANG)	NA
12+	Airmen Dining Facility	NA
12+	East Parking Apron	NA
12+	Mississippi Entry Gate	NA
12+	Spaced Based Infrared (SBIR) Operational Support Facility - Originally 09.	NA
12+	Telluride Entry Gate	NA
TBD	Expand Bldg 700 (COANG)	NA
TBD	Golf Course	NA
TBD	Reroute Steamboat Ave	NA

Source: (USAF 2006b).

Notes: [a] Project footprint does not include disturbance due to construction, such as laydown areas, and generally does not include parking lots.

NA = Not Available

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3.0 describes the existing environment and environmental consequences for implementing the proposed Williams Lake Wildlife Control Program for BAFB. NEPA requires that environmental documents provide a description of the existing environment of the proposed project and also disclose the environmental impacts of the reasonable alternatives to that action and any adverse environmental effects that cannot be avoided with implementation of the preferred alternative.

The following sections summarize the resource topic descriptions and reference the existing resource descriptions. Detailed information about the resource topics can be found in the referenced documents.

The ROI determines the geographical area to be addressed as the Affected Environment. Although the base boundary may constitute the ROI limit for some resources, potential impacts associated with some resources (e.g., air quality) go beyond the boundary. Thus, the ROI studied is defined for each resource area affected by the alternatives.

Each resource description is followed by a description of predicted environmental impacts to the resource for the alternatives. The significance of the impact is evaluated in accordance with criteria developed and presented in Appendix A for magnitude, duration, extent, and occurrence as well as classifying impacts as beneficial or adverse.

3.1 PHYSICAL SETTING AND TOPOGRAPHY

BAFB is located on the eastern edge of urbanized portions of the city of Aurora, in Arapahoe County, Colorado (**Figure 1**). The base is approximately three miles east of Interstate 225 and ten miles southwest of Denver International Airport (USAF 2008). **Figure 2** shows BAFB roads and major on base features.

BAFB is situated on 3,283 acres of flat to rolling uplands in the metropolitan Denver area. The majority of the installation's 2,608 acres is undeveloped (USAF 2008).

3.2 RELEVANT PHYSICAL RESOURCES AND ISSUES

Groundwater, soils, surface water, and airspace are resources that are analyzed together as the physical environment. Physical resource descriptions and environmental impacts to these resources from the No Action Alternative and other alternatives are addressed in the following four sections.

3.2.1 Groundwater

3.2.1.1 Description of Affected Environment

BAFB is located within a groundwater basin known as the Denver Basin. Four of the five major bedrock aquifers that exist within the Denver Basin underlie the base: the Denver, Upper Arapahoe, Lower Arapahoe, and Laramie-Fox Hills aquifers. A series of interbedded sandstones, siltstones, and shales comprise the Denver Basin. The aquifers are located in zones of sandstones and siltstones and are separated by beds of shale with low permeability. Groundwater is generally present under BAFB at depths of 20 feet or greater below ground surface (USAF 2008).

Surficial aquifers at BAFB are associated with present and ancestral surficial stream and river valleys. The aquifer systems (20 to 100 feet thick) are the result of alluvial deposition from erosion of upland

bedrock areas. The alluvial aquifer identified on BAFB is associated with Tollgate and Sand creeks and consists of primarily coarse-grained materials. These aquifer systems are the water source for the riparian vegetation that occurs along the creeks at the installation (USAF 2008).

Groundwater is recharged to this aquifer through direct infiltration of precipitation and irrigation water and by lateral and upward seepage of groundwater. Groundwater is discharged from the alluvial aquifer through seepage to streams, evapotranspiration, downward seepage into underlying bedrock aquifers, and extraction via pumping wells. Groundwater flow in these surficial aquifers at BAFB and within the surrounding area is generally in a north-northwesterly direction along the creekbeds, towards the South Platte River north of Denver (USAF 2008).

There are six groundwater wells on base. In 1986, the base connected their system with the City of Aurora distribution system. Potable water is supplied to BAFB by the City of Aurora (USAF 2006c). One of the groundwater wells is the supply source for maintaining the water level in Williams Lake. It is a 1,500 gallons per hour groundwater well that is only used for maintaining lake levels and for helicopter firefighting training from the lake at this time. It is being maintained as a backup source of water for firefighting if water supplied by the City of Aurora would get cut off or reduced. Additionally, it is considered a possible future source of non-potable water for landscape irrigation.

3.2.1.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.2.1.2.1 Impacts

The No Action Alternative continues current practices. Thus, with no new activities and the low level of impact to groundwater from the current BASH Plan implementation practices, the impact on groundwater is negligible. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, impacts to groundwater from implementing Alternative A would be minor, short-term duration, small extent, unlikely occurrence, and adverse. The adverse impact comes from the withdrawal of the aquifer to maintain Williams Lake.

3.2.1.2.2 Cumulative Impacts

Since the No Action Alternative does not introduce any new activities, Alternative A's contribution to past, present, and reasonably foreseeable future activities is negligible. No other projects are planned for about a mile off the boundary of the base near Williams Lake (Aurora 2007a, 2007b). Past, present, and reasonably foreseeable activities are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2.6. Some of these projects have had or would have a beneficial impact on groundwater, such as the stormwater improvement surveys that reduces or prevents contaminants from reaching the groundwater. Other projects have had or would have adverse impacts to groundwater through possible equipment spills or leaks, or erosion from construction activities, such as the construction of the pavilions at Williams Lake that could introduce contamination to groundwater. With implementation of proper BMPs, these adverse impacts can be minimized. Keeping withdrawal below recharge through monitoring would allow the aquifer's use into the future. Therefore, the cumulative impacts to groundwater would be minor, long-term, small extent, unlikely occurrence, and adverse due to withdrawal of the aquifer.

3.2.1.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.2.1.3.1 Impacts

Alternative B has the possibility of a wire-grid system in addition to the activities in Alternative A. The activities associated with these additions to the Wildlife Control Program at Williams Lake do not introduce any new effects to groundwater that were not present with Alternative A. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, the additional

impacts to groundwater from implementing Alternative B would be minor, short-term duration, small extent, unlikely occurrence, and adverse, which is due to continuing to withdrawal from the aquifer.

3.2.1.3.2 Cumulative Impacts

With BMPs in place, the groundwater effects from implementing Alternative B would be a negligible addition to past, present, and reasonably foreseeable future actions since it doesn't introduce any new contaminants or withdrawals of the aquifer. Consequently, the major contributors to cumulative impacts would be the same as described in the No Action Alternative. Therefore, the cumulative impacts to groundwater would be minor, long-term, small extent, unlikely occurrence, and adverse.

3.2.1.4 Alternative C: Drain Williams Lake

3.2.1.4.1 Impacts

Since the water level of Williams Lake is maintained by using a groundwater well and pump, draining the lake would eliminate the need to use the groundwater well to maintain lake levels, resulting in greater retention of groundwater within the source aquifer and use of this groundwater for other beneficial purposes. While some recharge would be lost from the absence of the lake and wetlands, overall the groundwater wouldn't be extracted to maintain the lake, which would be beneficial to groundwater resources. Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts to groundwater from implementing Alternative C would be minor, short-term duration, small extent, probable occurrence, and beneficial.

3.2.1.4.2 Cumulative Impacts

There may be some small level of loss of recharge of the aquifer from the lake, but the groundwater would also not be extracted to maintain the lake. With BMPs in place, the groundwater effects from implementing Alternative C would be a minor addition to past, present, and reasonably foreseeable future actions. Consequently, the major contributors to the cumulative impacts would be the same as described in the No Action Alternative, and the cumulative impacts to groundwater would be minor magnitude, long-term, small extent, possible occurrence, and beneficial.

3.2.2 Soils

3.2.2.1 Description of Affected Environment

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use. The major soil-mapping units present on BAFB include the Fondis-Weld, Alluvial Land-Nunn, and Renohill-Buick-Litle associations. Other areas on the installation have been identified as gravel pits, rock outcrop complexes, sandy alluvial land, and terrace escarpments (USAF 2007c, 2008).

The Renohill-Buick-Litle association comprises moderately deep, well-drained, loamy to clayey soils. The most common soil series within this association are the Renohill-Litle complex and the Renohill-Buick loam. Renohill soils are characterized as being moderately fertile with moderate internal drainage, steep slopes (3 to 30 percent slope), moderately slow to slow permeability (less than 0.63 inch per hour), and moderate water-holding capacity (0.15 inch per inch of soil) (USAF 2008). As shown in Figure 8, the soil complex surrounding Williams Lake is Renohill-Litle-Thedalund.

Fondis Weld complex surrounds the Renohill-Litle-Thedalund complex around the lake. The Fondis-Weld association mapping unit, composed of the Fondis and Weld soil series, covers the most surface

area at BAFB. This association consists of deep loamy soils that formed mainly in silty material deposited by the wind (loess). The Fondis soils are gently sloping (1 to 5 percent slope), well-drained, fertile upland soils with a high water-holding capacity (0.25 inch per inch of soil) and moderately slow permeability (less than 0.63 inch per hour), and are susceptible to wind and water erosion. The Weld soil series consists of deep, well-drained, level to gently sloping (0 to 3 percent slope) soils that occur mainly in uplands. The Weld soils have a moderate rate of water intake and a high available water-holding capacity (0.20 to 0.25 inch per inch of soil). The most common soils in the BAFB area are the Fondis silt loam and the Fondis-Colby silt loam (USAF 2007c, 2008).

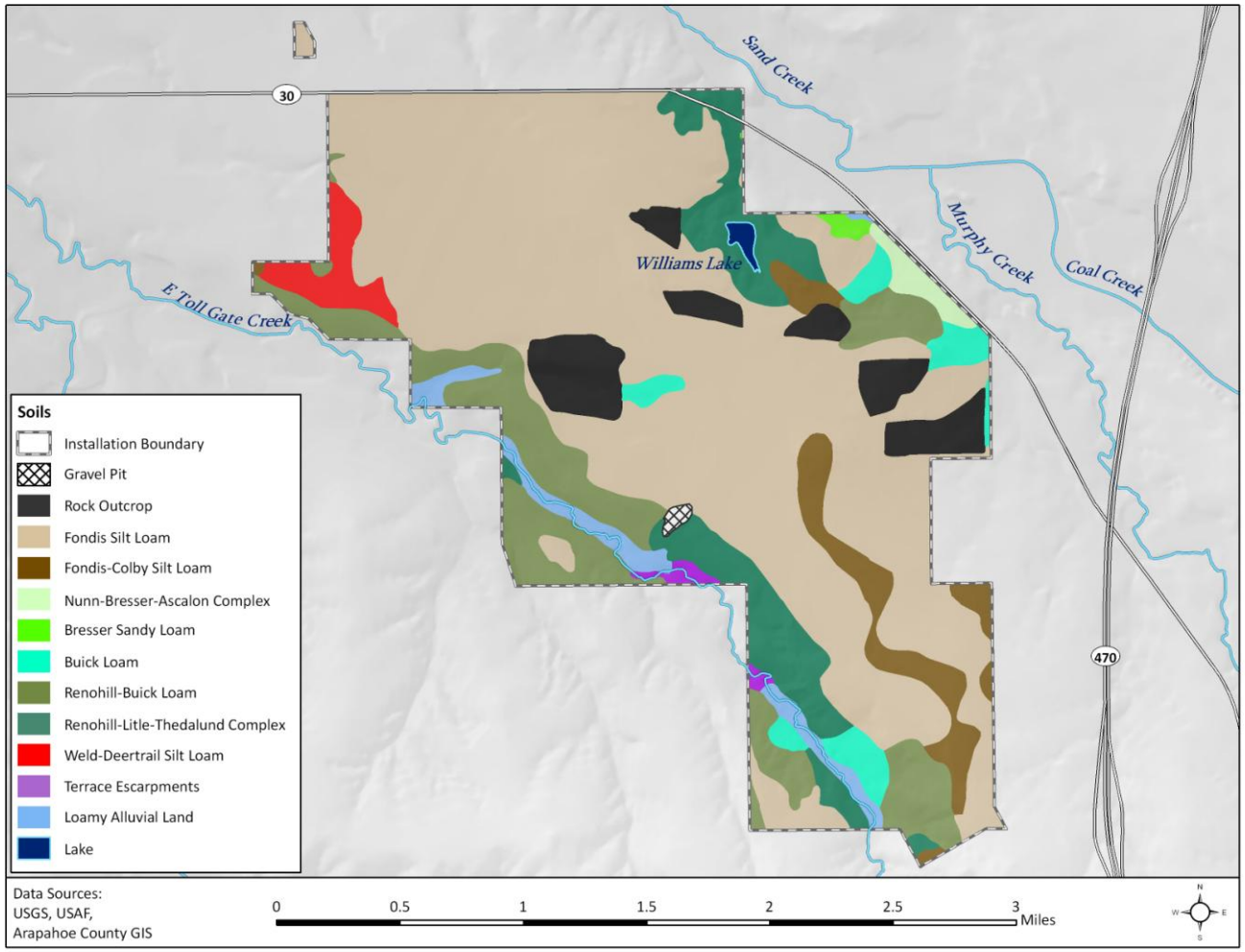

Figure 8 – Soil Types on BAFB

3.2.2.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.2.2.2.1 Impacts

The No Action Alternative continues current practices. Thus, with no new activities or construction, the impact on soils is negligible. Any associated additional foot traffic from continuing to implement the BASH Plan recommendations would likely be negligible due to the intermittent nature and the background traffic associated with recreation as well as these activities are already occurring. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, impacts to soils from implementing Alternative A would be minor, short-term duration, small extent, unlikely occurrence, and adverse. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.2.2.2.2 Cumulative Impacts

Since the No Action Alternative does not introduce any new activities, Alternative A's contribution to past, present, and reasonably foreseeable future activities is negligible. No other projects are planned for about a mile off the boundary of the base near Williams Lake (Aurora 2007a, 2007b). Past, present, and reasonably foreseeable future construction, training, and BAFB operation activities (listed in Tables 2-1, 2-2, and 2-3 as well as Table 2-8 and Section 2-6) have the potential for adverse impacts to soils through erosion and possible contamination such as from equipment spills. An example would be the two pavilions built at Williams Lake. However, implementation of proper BMPs would minimize these adverse impacts. BMPs are listed in Table 2-7. Continuing current off base activities would also be minimally adverse following proper BMPs. Further, some of the activities in Tables 2-1 through 2-3 could actually improve soil conditions (such as maintaining riparian habitat, which reduces erosion). Therefore, the cumulative impacts to soils would be minor, long-term, large extent, possible occurrence, and beneficial.

3.2.2.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.2.2.3.1 Impacts

Alternative B has the possibility of a wire-grid system in addition the activities in Alternative A. The wire-grid system would be suspended from poles. The system would probably be 100 x 100 foot grids using high strength salt water fishing line on metal posts with guy wires and anchors in the bank. Assuming 2 inch diameter poles and only using poles around the shoreline, approximately 26 poles would be needed for the 100 by 100 foot grids. The disturbance area for these poles would be approximately 82 square inches (approximately 0.6 square feet) or about 163 square inches (1.1 square feet) if a 50 by 50 grid was used. Either disturbance area is minimal compared to the 3,283 acres of BAFB as well as the area is already disturbed. The construction of wire-grid system would be temporary activities and conducted with BMPs that would minimize impacts from disturbance, especially as the soils are well drained. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts to soils from implementing Alternative B would be minor, short-term duration, small extent, unlikely occurrence, and adverse.

3.2.2.3.2 Cumulative Impacts

Implementing Alternative B would cause minimal soil disturbance as described above, the impacts of which would be minimized through BMPs. With proper BMPs in place, the soil disturbance from implementing Alternative B would be a minor addition to past, present, and reasonably foreseeable future actions. This is predominately due to the small project area and minimal construction component of the project. Thus, the major factors in cumulative impacts would be the same as described in the No Action Alternative section, and the cumulative impacts to soils would be minor, long-term, large extent, possible occurrence, and beneficial.

3.2.2.4 Alternative C: Drain Williams Lake

3.2.2.4.1 Impacts

Draining Williams Lake could impact soils by exposing lake-bottom sediments. Since the runoff of the airfield drains to the lake, there is a possibility for contamination in the sediments (USAF 2008). If further testing determines that soils were contaminated or otherwise unable to support revegetation, proper sediment cleanup and vegetative restoration BMPs would need to be performed. The type of activities necessary depends on the types of pollution in the lake bed. The testing of the sediments would be done as part of the project. The actual exposure of the lake bottom could cause erosion concerns if proper BMPs were not in place. The lake area would be seeded to help reduce erosion concerns and convert the area into a field. The area would be graded to return the site to its original contours and returned to native vegetation as much as possible. The final configuration would determine the resulting habitat. A creek would likely continue, and some wetlands may remain. Further, stabilization of the lake bed would occur until the vegetation establishes. If BMPs and contamination control were properly implemented, the impacts to soils from implementing Alternative C would be minor, short-term duration, small extent, unlikely occurrence, and adverse, using the criteria established for evaluating impacts to this resource presented in Appendix A. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.2.2.4.2 Cumulative Impacts

Implementing this alternative would have the most soil disturbance of any of the alternatives due to the grading, heavy machinery, and other project components that would be used to drain the lake and return the area to its natural state. However, BMPs would be implemented to minimize these adverse impacts, which include sediment testing to establish proper remediation procedures with the exposed lakebed sediments and spill prevention and response measures. With BMPs in place, the soil impacts from implementing Alternative C would be a minor addition to past, present, and reasonably foreseeable future actions. Consequently, the major factors in cumulative impacts would be the same as described in the No Action Alternative, and the cumulative impacts to soils would be minor, long-term, large extent, possible occurrence, and beneficial.

3.2.3 Water Resources

3.2.3.1 Description of Affected Environment

As shown in Figure 9, Williams Lake is the only permanent water body at BAFB. Created in 1961 by damming a minor tributary of Sand Creek, the lake currently occupies 10 acres, but the impoundment has a maximum surface area of 30 acres and can store up to 85 acre-feet. The lake is maintained by runoff and groundwater that is pumped from underground. The uses of the lake include fire-fighting, training (such as setup and use of the water purification unit), and recreational purposes (USAF 2008).

The drainage of BAFB in general is to the northwest, but runoff in the area of Williams Lake is towards Sand Creek (north) and Murphy Creek (east) (USAF 2007c, 2008). However, USACE determined in 2001 (currently being validated by USACE with an interim finding that wetlands remain isolated with no nexus) that Williams Lake and the associated drainage area are isolated waters and not hydrologically connected to Sand Creek (USAF 2008). Therefore, this water body and its drainage are not under the CWA (FHWA 2001; USAF 2008).

Water quality of Williams Lake has not been established. Possible contaminants include dichloro-diphenyl-trichloroethane (DDT), polychlorinated biphenyls, and heavy metals, such as mercury. In 2004, fish were sampled from Williams Lake for heavy metals, and the levels did not violate state health standards (USAF 2008). The water is tested for oxygen and pH, and some testing has occurred to verify

that the fish are safe for consumption (McWharter 2008b). The closest impaired water body is Sand Creek, which is listed for *Escherichia coli* (E. coli) and selenium (USEPA 2009).

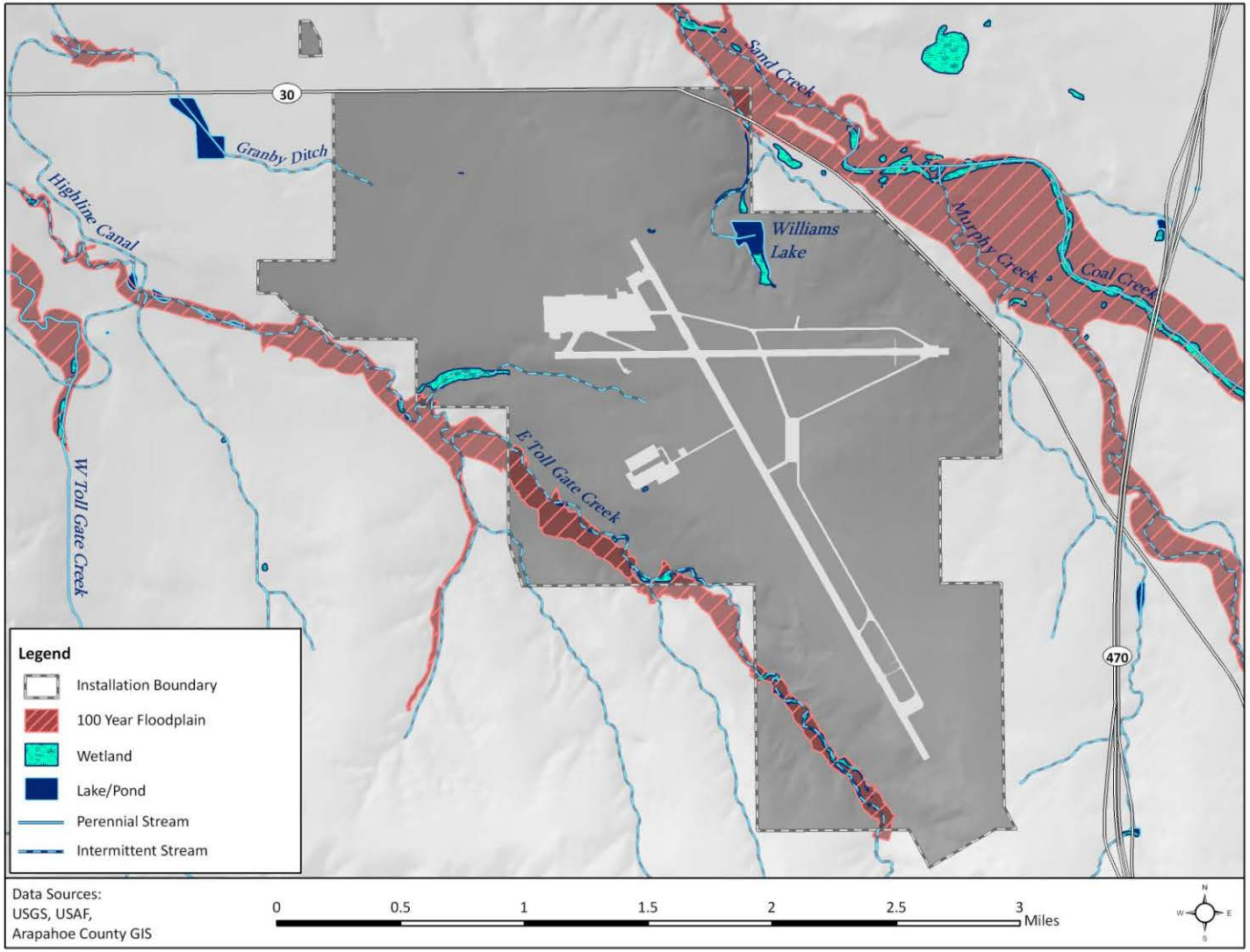

Figure 9 – Floodplains, Wetlands, and Water Bodies on and near BAFB

3.2.3.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.2.3.2.1 Impacts

Since Alternative A is only continuing the BASH Plan recommendations, implementing Alternative A would not change stormwater runoff, impervious surface area, or established BMPs. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, impacts to water resources from implementing this alternative would be minor, short-term, small extent, unlikely occurrence, and adverse. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.2.3.2.2 Cumulative Impacts

Without changing stormwater runoff, impervious surface area, or established BMPs, implementing Alternative A would have a negligible contribution to past, present, and reasonably foreseeable future actions. No other projects are planned for about a mile off the boundary of the base near Williams Lake. Projects listed in Table 2-8 and Section 2-6 have or will contribute to water resources impacts through changing the stormwater runoff, impervious surface area, and possible increase in erosion. One example would be the FamCamp, which would be very near the project location. However, with proper BMPs and the maintenance activities listed in Tables 2-1 through 2-3; these adverse impacts would be minimized or even prevented (such as the implementing post-construction site runoff management). In fact, some of the activities in Tables 2-1 through 2-3 may improve the water quality such as vegetation maintenance, which reduces erosion. Therefore, cumulative impacts would be minor, long-term, medium extent, possible occurrence, and beneficial.

3.2.3.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.2.3.3.1 Impacts

Construction activities from the wire-grid system would cause soil disturbance, which have the potential to cause water quality impacts through erosion if proper BMPs were not implemented. If BMPs, such as silt fences, were appropriately implemented, the impacts to water quality should be negligible. Further, water quality risks would be minimized through implementation of proper waste collection at the recreational facilities, including fishing, which is already part of the fishing program requirements (USAF 2005b). Therefore, with proper BMPs, impacts to water resources would be minor, short-term, small extent, unlikely occurrence, and adverse from implementing this alternative, using the criteria established for evaluating impacts to this resource presented in Appendix A. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.2.3.3.2 Cumulative Impacts

Since Alternative B would have only minimal impacts to water resources, the contribution of Alternative B to past, present, and reasonably foreseeable future actions would be minimal. Consequently, the major components of cumulative impacts would be the same as the No Action Alternative. Therefore, cumulative impacts would be minor, long-term, medium extent, possible occurrence, and beneficial.

3.2.3.4 Alternative C: Drain Williams Lake

3.2.3.4.1 Impacts

Draining the lake constitutes a change in the watershed of BAFB. Depending on the water quality of Williams Lake and its sediments, the water drained may need to be treated for contaminants. The impacts to water quality would depend on how the lake was drained. If the well feed line would simply be turned off to "drain" the lake, the water impact would be less than if the dam were removed as possibly contaminated sediments and water would not be released to other water bodies. Allowing the water and sediments to discharge into the adjacent water bodies may introduce contamination. Thus, the water

quality as well as the sediments needs to be established before releasing this water. Even if the lake water were not contaminated, releasing the water would still change temporarily the conditions of the receiving water, such as turbidity. These impacts would need to be mitigated as appropriate such as slowly releasing the water, and the proposed necessary water and sediment testing prior to draining would establish the needed BMPs, if any.

The revegetation and other stabilization of the soils would minimize any soil erosion of the exposed lake bed. Proper planning would need to occur to determine the outcome of and to design appropriately handling of runoff in the area once Williams Lake was eliminated under this alternative. If the water does not have any substantial contamination or appropriate BMPs conducted, the impacts to water would be minor, short-term, medium extent, possible occurrence, and adverse, using the criteria established for evaluating impacts to this resource presented in Appendix A.

3.2.3.4.2 Cumulative Impacts

Draining the lake would temporarily impact water quality, but in the long-term, the impacts from implementing Alternative C would be minimal compared with past, present, and reasonably foreseeable future actions. The short-term, temporary impacts would be minimized because with proper procedures (such as testing the sediments and performing any necessary remediation) the impacts would be avoided. Further, part of the planning if the lake were drained would be establishing proper stormwater management for the area to make sure the creeks would not be contaminated from airfield runoff. Consequently, the major players in cumulative impacts would be the same as in the No Action Alternative. Therefore, cumulative impacts would be minor, long-term, medium extent, possible occurrence, and beneficial

3.2.4 Airspace

3.2.4.1 Description of Affected Environment

Airspace is the volume of air that overlies the earth's surface and extends from the surface to infinity. For the purposes of this document, the analysis has been confined to the airspace in the immediate vicinity of BAFB. This airspace is controlled by BAFB but is located near and influenced by the airspace associated with Denver International Airport. Air Traffic Control (ATC) manages safe movement of aircraft within the airspace, but not all movements within the airspace are aircraft tuned into ATC. The airspace is shared with airborne fauna such as birds, and it is the responsibility of ATC and BAFB to manage the airspace such that impacts to flight operations from the movements of birds are minimized.

The impact of bird presence at BAFB is quantified by the local Bird Watch Condition (BWC). This is determined by Base Operations and is divided into BWC Low (no impact), BWC Moderate (limits ability for traffic pattern work), and BWC Severe (no flying unless operational necessity). The exact numbers of Moderate or Severe conditions at BAFB are unknown, but it is estimated that BWC Moderate Condition occurs approximately weekly, and this number increases during the migratory season (October through April). The primary bird species that dictates BWC Moderate is Canada geese (Conklin 2008).

Based upon data collected by BAFB, the current frequency of BASH incidents at BAFB is approximately 7.6 incidents per 10,000 arrival/departure operations. As a means of controlling bird intrusions of the airspace, ATC has delayed takeoffs to allow bird dispersal by one or two USDA Wildlife biologists, currently under contract, using pyrotechnics. Eleven propane cannons have been effective in the past, but active harassment by personnel has proven more effective when available (Conklin 2008).

BAFB's normal traffic pattern is to the east of the field because of noise concerns with the much higher population west of the field (Figure 10). During the migratory season, the Control Tower has notified pilots of bird concentrations to the east, and pilots have modified their patterns. The direction of traffic

doesn't impact training, but community relations is the driving factor for the east pattern that overflies Williams Lake.

In addition to local BAFB operations concerns for bird hazards within the airspace, the situation and the proximity of Williams Lake, the primary wildlife attractant, to the airfield has been noted with recommendations for improvement by entities outside BAFB including:

- BASH, Inc. – 2001 Hazard Assessment (Conklin 2008)
- ESOHCAMP – November 2006 flight safety inspection (Conklin 2008)
- USDA Wildlife Services – June 21, 2006 memo (USDA 2006)

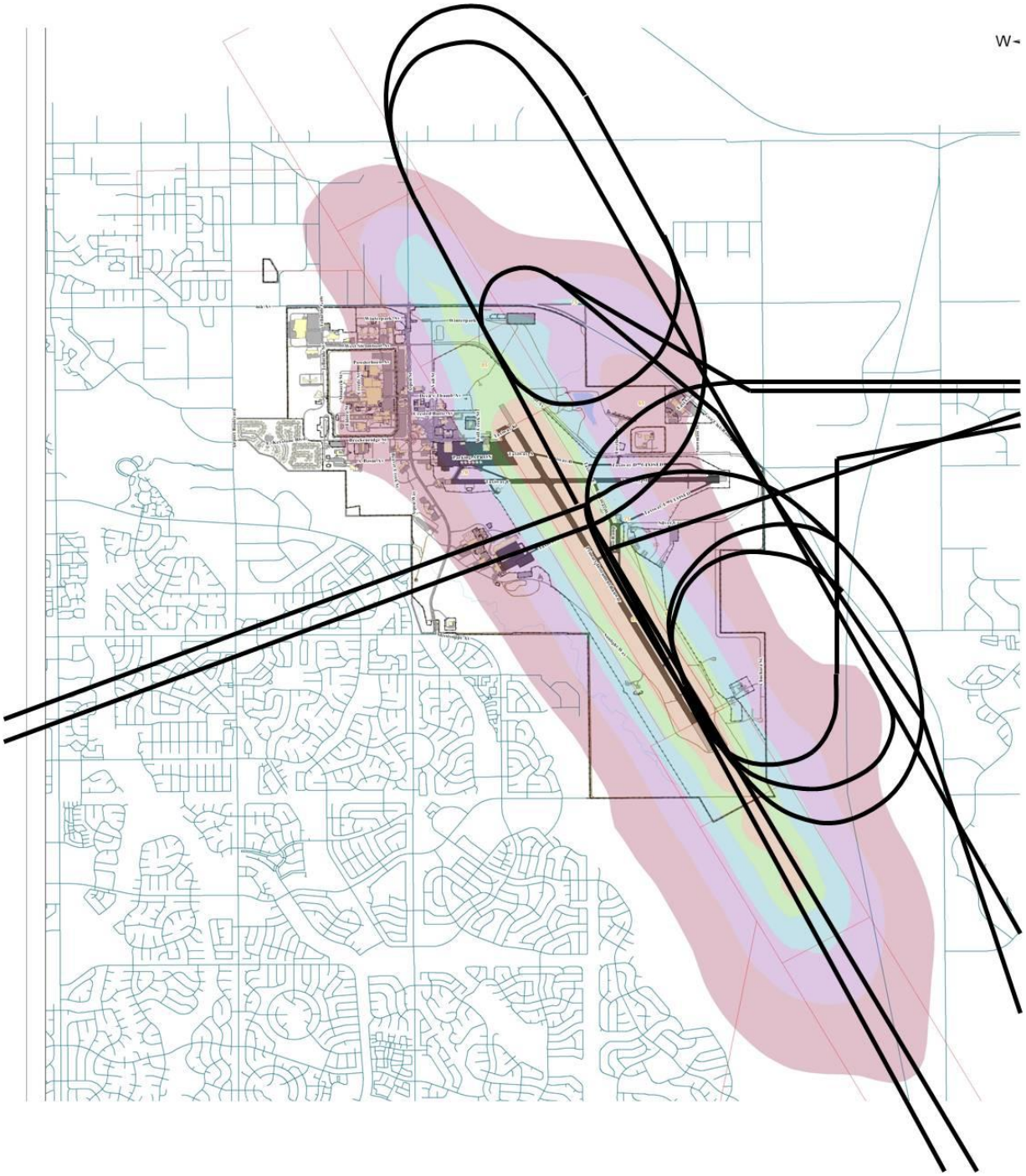

Figure 10 – Typical BAFB Aircraft Flight Patterns

3.2.4.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.2.4.2.1 Impacts

This alternative would continue implementation of the recommendations from the current BASH Plan. This implementation has thus far prevented a major safety incident, but the presence of waterfowl within the airspace remains a concern with aircraft operators at BAFB and external observers. Formal implementation of the recommendations has been underway for less than two years and so far appears to be successful. More time may be required before fully judging the implementation as a success, as there appear to be few other metrics available to make this determination.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts for Alternative A would be characterized as minor magnitude, short-term duration, medium extent, possible occurrence, and adverse.

3.2.4.2.2 Cumulative Impacts

Implementing the No Action Alternative would continue the BASH Plan recommendations that are designed to reduce BASH risks, but this would not be a change from the current situation since these actions are already being employed. Since there would be no additional impacts of the No Action Alternative to airspace resources, the contribution of Alternative A to past, present, and reasonably foreseeable future actions would be negligible. Projects occurring at and near the project site are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. Recent past projects that have had an impact on air space include a control tower, which has a beneficial impact on airspace through coordinating activities, and repairs of runways and other airfield improvements, which also improve airspace through increasing capacity and safety. However, other activities listed in those tables have had an adverse impact to airspace include restocking Williams Lake with fish, which has attracted waterfowl that increases BASH risks. However, with proper BMPs, such as those listed in Table 2-7, most of the adverse impacts can be minimized. Therefore, cumulative impacts would be minor, short-term, medium extent, possible occurrence, and adverse.

3.2.4.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.2.4.3.1 Impacts

The addition of a wire-grid system over the lake is intended to discourage use of Williams Lake by waterfowl and other species hazardous to aircraft flight, thereby positively affecting the airspace resource. The wire-grid system has the effect of reducing the attraction of the lake to waterfowl because their takeoffs and landings on the lake are made much more difficult by the grid system. The grid system and its resulting effects are occasional since it would be removed during the period outside the migration season, but waterfowl numbers are greatly reduced during these periods and so the effects on airspace at those times would be minimal. The positive effects of the system would be most pronounced in the immediate vicinity of the runway near the lake, but additional effects may also occur within airspace beyond the boundaries of the installation.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts for Alternative B would be characterized as minor magnitude, short-term duration, medium extent, possible occurrence, and beneficial.

3.2.4.3.2 Cumulative Impacts

Since there would be beneficial impacts of Alternative B to airspace resources, the contribution of Alternative B to past, present, and reasonably foreseeable future actions would counterbalance to a degree the cumulative adverse effects. Consequently, the cumulative impacts would be less adverse than those in the No Action Alternative. Therefore, cumulative impacts would remain minor, short-term, medium extent, possible occurrence, and adverse.

3.2.4.4 Alternative C: Drain Williams Lake

3.2.4.4.1 Impacts

Draining Williams Lake removes the primary wildlife attractant at BAFB and would have a positive impact on the numbers of birds that are potential hazards in the BAFB airspace. It should be noted that this alternative, like Alternative B, would not totally eliminate birds from the BAFB airspace, because many individuals have been observed overflying the base in passage from one off-base attractant to another. Nonetheless, this alternative removes a wildlife focal point from the Base, and that would be likely to result in fewer numbers of birds in the immediate vicinity of the runaway.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts for Alternative C would be characterized as minor magnitude, short-term duration, medium extent, possible occurrence, and beneficial.

3.2.4.4.2 Cumulative Impacts

Implementing Alternative C, which would remove the primary on base waterfowl attractant, would reduce BASH risk and that would benefit airspace. However, as other waterfowl attractants exist near the Base and waterfowl already migrate across BAFB airspace to travel between these off base sites, implementing Alternative C, like Alternative B, would have a positive, but possibly minor contribution to past, present, and reasonably foreseeable future actions. Consequently, the major players in cumulative impacts would be the same as in the No Action Alternative. Therefore, cumulative impacts would be minor, long-term, medium extent, possible occurrence, and adverse.

3.3 RELEVANT BIOLOGICAL RESOURCES AND ISSUES

Vegetation, wetlands/floodplains, wildlife, and threatened, endangered, and other sensitive species combine to create the biological environment being reviewed as part of this EA. The following sections present the biological resource descriptions for Williams Lake and the immediate vicinity within BAFB as well as the potential impacts to these biological resources from implementation of the alternatives presented in this EA.

3.3.1 Vegetation

3.3.1.1 Description of Affected Environment

Vegetation surveys were conducted at BAFB in 2001, and the vegetation was divided into the following types: crested wheatgrass prairie, mixed blue grama and western wheatgrass prairie, bottomland meadows, cottonwood/willows, weedy disturbed areas, and landscaped areas. With the exception of the weedy disturbed areas, crested wheatgrass prairie, and landscaped areas, all other habitats at BAFB can be considered native. Native short grass prairies are one of the most endangered habitats in the U.S. (USAF 2008). The dominant vegetative community occurring on base is the crested wheatgrass (*Agropyron cristatum*) community (USAF 2001a, 2004a), which is found particularly near developed portions of the base (USAF 2001a). Crested wheatgrass prairies at BAFB are uniform and have few other species associated with them (USAF 2008). The mixed blue grama (*Bouteloua gracilis*) and western wheatgrass (*Agropyron smithii*) prairie is the second most common vegetation type at BAFB (USAF 2001a). This community occurs in upland areas (USAF 2004a), primarily in the southern region of the base (USAF 2001a). Other common plant species associated with this habitat type are detailed in the BAFB INRMP (USAF 2008). Two vegetation types generally occupy riparian corridors at BAFB. The bottomland meadows tend to be dominated by fringed brome grass (*Bromus ciliatus*). The cottonwood/willows (*Populus* spp./*Salix* spp.) vegetation type dominates parts of the riparian corridor that appear to be moister and steeper than areas with fringed brome. Species in these areas are detailed in the INRMP (USAF 2008). Weedy disturbed areas at BAFB appear to be of two types: areas that have been disturbed by the

excessive presence of prairie dogs and areas that were disturbed during construction activity. These areas are invaded by weed species, including noxious weeds. Turf grasses of common introduced species are the predominant vegetation type on the improved areas of BAFB. Weeds and introduced species in these areas are detailed in the INRMP (USAF 2004b, 2008).

3.3.1.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.3.1.2.1 Impacts

Current minimal impacts to vegetation from implementation of the BASH Plan would continue under the No Action Alternative. These may include effects such as trampling from pedestrian traffic for depredation and mowing as well as use of herbicides, but these activities are minimally adverse, especially with proper BMPs (USAF 2006a). Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as minor magnitude, short-term duration, small extent, unlikely occurrence, and adverse (with the implementation of established BMPs presented in Table 2-7). This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.3.1.2.2 Cumulative Impacts

The contribution of Alternative A to cumulative impacts on vegetation, as it continues current practices, would be minor throughout the BAFB. No other projects are planned for about a mile off the boundary of the Base near Williams Lake. BAFB would continue implementation of BMPs and SOPs including following specific requirements for restoration by revegetation or reseeding if vegetation became disturbed. Past, present, and reasonably foreseeable future construction, training, and BAFB operation activities (listed in Tables 2-1, 2-2, and 2-3 as well as Table 2-8 and Section 2.6) have the potential for adverse impacts to vegetation through removal and erosion as well as possible contamination such as from equipment spills. One example would be the recreation construction near Williams Lake, such as the pavilions and FamCamp. However, proper BMPs would minimize these adverse impacts, which some are listed in Table 2-7. Continuing current off base activities would also be minimally adverse (and even possibly beneficial with improved agricultural practices) following proper BMPs. Further, some of the activities in Tables 2-1 through 2-3 could actually improve vegetation conditions (such as implementing prescribed burns and the weed control program, which maintains or improves vegetation). Therefore, cumulative impacts would be minor, long-term, small extent, possible occurrence, and beneficial.

3.3.1.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.3.1.3.1 Impacts

The installation of a wire-grid system might have an effect on vegetation if any of the support equipment presented a surface area compatible with plant growth at or near the waterline as well as when the installation of the pole removes a small area of vegetation where the poles were located. This small amount of vegetation removed for the poles should be a negligible area compared with the total vegetation of that type in the area and not compromise the viability of the resource. Lake parameter vegetation could be impacted during the installation and maintenance of a wire-grid system with removal of vegetation and trampling from pedestrian traffic. Impacts to vegetation growth could be mitigated through reseeding. Should reseeding be necessary in areas of temporary impact, those areas would be avoided until revegetation reached an acceptable level.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as minor magnitude, short-term duration, small extent, possible occurrence, and adverse (with the implementation of established BMPs presented in Table 2-7).

3.3.1.3.2 Cumulative Impacts

As described above, the impacts to vegetation from implementing the Proposed Action would be

negligible with proper BMPs, mainly due to the small project area and lack of major construction components in the alternative. Thus, the proposed program under Alternative B would have little cumulative impact to BAFB vegetation when taken into consideration against other past, present, and reasonably foreseeable future activities that might impact vegetation. Consequently, the major factors in cumulative impacts would be the same as described in the No Action Alternative. Therefore, the cumulative impacts to the vegetation are expected to be minor, long-term, small extent, possible occurrence, and beneficial. Management of any impacts would be the same as under Alternative A.

3.3.1.4 Alternative C: Drain Williams Lake

3.3.1.4.1 Impacts

Were Williams Lake to be drained, any submerged aquatic vegetation dependent on the lake for survival would be eliminated. Efforts would be necessary to revegetate the land that was under the footprint of the lake in order to prevent erosion. Over time the former lake area would return to a vegetative type typical of riparian drainage habitat now existing in areas above and below the area the lakebed occupies. BMP would be implemented in order to minimize the associated impacts to terrestrial vegetation. There is no similar best management practice to minimize the loss of aquatic vegetation.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as moderate magnitude, long-term duration, small extent, probable occurrence, and adverse (with the implementation of established BMPs presented in Table 2-7). This impact exceeds the significance criteria as defined in Appendix A because the lake aquatic species would no longer exist at BAFB. Other aquatic species may exist in the creeks. However, it is likely that the species are different, which would make the draining of the lake constitute a removal of the occurrence of these species at the BAFB.

3.3.1.4.2 Cumulative Impacts

The draining of Williams Lake as proposed under Alternative C would have a measurable cumulative impact to BAFB vegetation that would be long-term in nature due to the fact that this drainage would eliminate the one substantial area on BAFB capable of sustaining submerged aquatic vegetation. The cumulative impacts to vegetation are expected to be moderate because the lakebed would revert to vegetative types found elsewhere on BAFB and the greater Denver area provides many additional sites for the support of submerged aquatic vegetation. Thus, the cumulative impacts to the vegetation are expected to be moderate, long-term, small extent, probable occurrence, and beneficial. Management of any impacts would be the same as under Alternative A as well as other major contributors to cumulative impacts would be the same as described in the No Action Alternative section.

3.3.2 Wetlands and Floodplains

3.3.2.1 Description of Affected Environment

BAFB is located on the west edge of the Great Plains within a topographic depression known as the Denver Basin. The ground surface elevation of the base ranges from 5,700 feet mean sea level (MSL) at the southwest corner to 5,480 feet MSL at the northwest corner. The overall ground slope is approximately one percent (%) to the northwest.

The primary surface water drainage system in the region is the South Platte River, approximately 15 miles northwest of the Base. The Base is on high ground dividing the Sand Creek and Toll Gate Creek drainage basins. The east portion of the base drains into Sand Creek and Murphy Creek, which flow to the South Platte River; both of these creeks are east of the base. The west portion of the base drains into East Tollgate Creek, which generally flows along the southwest boundary of the base to Tollgate Creek and Sand Creek to the northwest. The principal surface water body on the Base is Williams Lake, which was constructed in 1961 and has had a maximum surface area of 30 acres.

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas (USACE 1987). Wetlands are protected as a subset of the "waters of the United States" (WOUS) under Section 404 of the CWA; the USACE requires a permit for any activities crossing wetlands or other WOUS. The term "waters of the United States" has broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). "Jurisdictional" WOUS are areas regulated under the CWA and also may include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, and "other" waters that (if degraded or destroyed) could affect interstate commerce (USAF 2001a).

A base-wide jurisdictional wetlands determination by the USACE has not been made for BAFB (USAF 2004a). National Wetland Inventory (NWI) maps identify a total of six wetland areas on BAFB (USAF 2001a). These areas are associated with the East Toll Gate Creek and Columbia Creek floodplains and Williams Lake and are also located near Buildings 1502 and 1503 (USAF 2001a). Williams Lake is classified as a palustrine open water wetland (See Figure 10). However, USACE ruled that Williams Lake and the associated drainage area (including wetlands) are isolated waters and not hydrologically connected to Murphy Creek, which is currently being validated by USACE with an interim finding that the wetlands remain isolated with no nexus (USAF 2008). Therefore, this water body and its drainage (including wetlands) are not under the jurisdiction of the USACE (FHWA 2001; USAF 2008).

3.3.2.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.3.2.2.1 Impacts

No negative impacts to wetlands or floodplains would occur as a result of the No Action Alternative. Continuing to implement the BASH plan would neither impact wetlands nor floodplains; therefore, conditions would not change under the No Action Alternative. There would be no impacts as there is no degradation or loss of wetland habitat nor a change in floodplain character. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts from implementing Alternative A to wetlands and floodplains would be minor, short-term, small extent, unlikely occurrence, and adverse. This reflects that it would take failure to implement BMPs or some other accident scenario for this resource to be affected by implementing this alternative.

3.3.2.2.2 Cumulative Impacts

Implementing Alternative A would contribute negligibly to past, present, and reasonably foreseeable future activities due to the likely lack of impacts under Alternative A. Wetlands and floodplains in the area have been impacted through conversion and introduction of contamination by the surrounding development. Some of these projects are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. These adverse impacts can be minimized with proper BMPs (Table 2-7) and replacement wetlands. For maximum mitigation, replacement wetlands should be of similar function as the destroyed wetlands and in the same watershed or other appropriate landscape scale so that the overall effect is no net wetland system function loss. Other projects listed in those tables have maintaining or even restoration effects on wetlands, such as stormwater management and wetland monitoring. Therefore, cumulative impacts would be minor, long-term, small extent, possible occurrence, and adverse.

3.3.2.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.3.2.3.1 Impacts

No negative impacts to wetlands or floodplains would be expected from the installation and maintenance of a wire-grid system over Williams Lake. There would be no impacts because the activity (as outlined under Alternative B) would cause neither appreciable degradation nor loss of wetland habitat nor a change in floodplain character. Therefore, using the criteria established for evaluating impacts to this

resource presented in Appendix A, the impacts would be minor, short-term, small extent, unlikely occurrence, and adverse. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.3.2.3.2 Cumulative Impacts

Implementing Alternative B would contribute negligibly to past, present, and reasonably foreseeable future activities due to the likely lack of impacts under Alternative B. Thus, the major players in cumulative impacts are the same as described in Alternative A, and cumulative impacts would be minor, long-term, small extent, possible occurrence, and adverse.

3.3.2.4 Alternative C: Drain Williams Lake

3.3.2.4.1 Impacts

The draining of Williams Lake, as proposed under Alternative C, would have a substantial impact to both the wetlands and floodplain in the immediate vicinity of the lake. The extent and character of wetlands would be reduced from the perimeter of the lake to a narrow strip of riparian habitat along the creek bank that would remain after drainage. The floodplain character in the immediate vicinity would be impacted in that any stormwater retention provided by the lake would be removed. This lack of stormwater retention would have some impact to drainage effects downstream. The final configuration would determine the level of impacts. The area would be graded to assure proper drainage to prevent pooling and some wetlands would likely remain.

It is USAF policy to have no net wetland loss. No plans exist yet on where the replacement wetlands would occur, but they would not be in the same area as the current wetlands. Unless the wetland was a functional replacement for the area currently served by the wetlands, there would be some wetland function loss. Thus, the "replacement" wetlands would not completely compensate for the wetland loss.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as major magnitude, long-term duration, small extent, possible occurrence, and adverse (with the implementation of established BMPs presented in Table 2-7). This impact exceeds the significance criteria as defined in Appendix A. This is true because the wetland would be eliminated from this location and the "replacement" wetlands would be in another location, which may not serve the same area to which the current wetlands provides services. At 30.7 acres the wetlands associated with Williams Lake are one of the larger areas of wetlands and the only wetland of its type at BAFB (combination of Palustrine Emergent Persistent and Palustrine Scrub/Shrub Broad Leaved Deciduous) (USAF 2008). Thus, the loss of this wetland could be substantial.

3.3.2.4.2 Cumulative Impacts

The cumulative impacts from implementation of Alternative C would be a reduction in wetland habitat in the area and a reduction in stormwater retention capacity. However, as other wetlands exist in the area and replacement wetlands would be created but at another site (probably off the base), the cumulative impact to wetlands would be moderate, long-term, small extent, possible occurrence, and adverse.

3.3.3 Wildlife

3.3.3.1 Description of Affected Environment

The large areas of open grass prairie, the riparian corridor associated with East Toll Gate Creek, and the open water at Williams Lake on BAFB provide a diversity of habitats that support many animal species. The INRMP for BAFB provides a list of the animal species potentially present at the base. This species list includes 337 birds, 43 mammals, 20 reptiles, and seven amphibians (USAF 2008).

The Migratory Bird Treaty Act (MBTA) protects raptors and other migratory birds, including almost all birds native to North America. The Bald and Golden Eagle Protection Act affords protection specifically

to bald and golden eagles. The MBTA states that "Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not…" (USFWS 1989).

Raptor species observed at BAFB include the bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquilla chrysaetos*), American kestrel (*Falco sparverius*), Swainson's hawk (*Buteo swainsoni*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), and western burrowing owl (*Athene cunicularia*) (USAF 2001a, 2008). Grassland communities with black-tailed prairie dog (*Cynomys ludovicianus*) colonies support the western burrowing owls, and riparian corridors and some ornamental trees provide habitats for the other raptor species (USAF 2001a). Based on Geographic Information Systems (GIS) data provided by BAFB, sixteen burrowing owl nests, one Swainson's hawk nest, and one red tailed hawk's nest were recorded at BAFB. None of the burrowing owl nests were located in the vicinity of Williams Lake (USAF 2006d, no date).

The wetland areas on base support waterfowl and shorebird species. The black-tailed prairie dog is the most abundant small mammal in the grassland habitats at BAFB (USAF 2001a, 2008). The INRMP (USAF 2008) and the Final Environmental Assessment for Training Activities and Demolition of the Boresight Antennae and Buildings 440 & 441 (USAF 2001a) present the common species of mammals, water associated species, reptiles, amphibians, and larger herbivores at BAFB.

Fishery resources found at BAFB include Williams Lake and the small pools in the streambed of East Toll Gate Creek. In the past, Williams Lake has been stocked with trout, bass, and carp (*Cyprinus carpio*), and some anglers have reported catching catfish there. No formal survey of Williams Lake has been conducted. A CDOW survey of Toll Gate Creek downstream of BAFB yielded brook stickleback (*Labidesthes sicculus*), fathead minnow (*Pimephales promelas*), and white sucker (*Catostomus commersoni*) (USAF 2008).

3.3.3.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.3.3.2.1 Impacts

A bird/wildlife aircraft strike hazard exists at BAFB and its vicinity due to resident and migratory bird species and other wildlife. Daily and seasonal bird movements create various hazardous conditions. All of these species have at least some potential to pose a threat to flight safety. Although management can be used to reduce certain threats, this situation is not likely to change significantly regardless of how wildlife is managed on the installation (USAF 2008). The BASH Plan establishes procedures to minimize the hazard to all assigned and transient aircraft at the Base and in their operating areas; therefore, by its very nature, it is designed to impact those wildlife that may pose aircraft strike hazards. If selected as the preferred option, this No Action Alternative would continue implementation of recommendations from the current BASH Plan (USAF 2006a) that are either specific to Williams Lake or are of a general nature that is inclusive of the wildlife control needs at Williams Lake. Implementation of this course of action would not target and would not be expected to impact those species of wildlife that due to habit, sizes, or sheer numbers pose no threat to aircraft strikes. The viability of the target species should be threatened by the BASH Plan as only a few individuals would be temporarily affected.

Any impacts to individuals of a species (through BASH incidents or depredation) would be unlikely to threaten the viability of the species as only a few individuals would be taken. Thus, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as minor magnitude, short-term duration, small extent, unlikely occurrence, and adverse (with the implementation of established BMPs presented in Table 2-7). This reflects that it would take not following BMPs or some other accident scenario for the viability of the resource to be affected from implementing this alternative.

3.3.3.2.2 Cumulative Impacts

Implementation of the BASH Plan on the base is designed to impact wildlife, and this may include species of special concern: black tailed prairie dogs and the western burrowing owl.

BAFB has provisions for managing prairie dogs, including constructing fences to limit their spread and an annual survey, as well as surveys on an as-needed basis to prevent harm to the species resulting from base activities (USAF 2001b, 2008). Precautions would also be taken to avoid to the fullest extent possible burrowing owls nests and other ground nesting bird nests, which are typically found in abandoned prairie dog tunnels. Thus, the implementation of Alternative A would have a minimal contribution to past, present, and reasonably foreseeable future activities. This is due to the impacts to wildlife being minimized by BMPs, the ability of most wildlife to avoid these areas, and the long history of this area being used for military, which means the wildlife is acclimatized to these types of activities. Thus, the past, present, and reasonably foreseeable future activities are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. Some of these benefit wildlife such as maintaining their habitats. Others, such as construction that removes habitats or can introduce contamination, introduce adverse impacts. With proper BMPs (Table 2-7), adverse impacts can be minimized. The reduction in BASH incidents would also reduce the number of individuals being harmed by such events. The relocation of these individuals would also reduce their exposure to other operational hazards of BAFB like possible contamination from airfield runoff. However, the activities listed in the above tables prevent that, and some activities would actually benefit wildlife through water quality improvement of Williams Lake. Therefore, cumulative impacts to wildlife would be minor, long-term, small extent, unlikely occurrence, and beneficial.

3.3.3.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.3.3.3.1 Impacts

Williams Lake is a substantial attractant for species with high potential for BASH risk, especially Canada geese and other waterfowl. Wire-grid systems have been used successfully to cover lake surfaces on or near airports and airfields throughout the country and exclude use of the lake by waterfowl. With proper grid spacing, waterfowl find it difficult to land on or take off from the lake and, therefore, would look elsewhere for water bodies that are more accessible. This is the intended purpose and the planned result for wildlife impact – a reduction in the population and utilization of Williams Lake by birds that pose an aircraft-strike risk. If successful, there would be fewer species with high potential for BASH risk utilizing Williams Lake, and fewer individuals being subject to BASH incidents. The reduced frequency of individuals being harmed by BASH incidents would benefit these species.

In conclusion, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as minor magnitude, short-term duration, small extent, possible occurrence, and adverse.

3.3.3.3.2 Cumulative Impacts

The expected impact from implementing Alternative B would be to discourage the use of Williams Lake by waterfowl. This may require the relocation of some individual birds to other suitable habitat in the area, but this relocation would not be expected to impact overall populations as suitable habitat does exist nearby. Thus, the contribution of Alternative B to past, present, and reasonably foreseeable future activities would be minor. Therefore, the major drivers of cumulative impacts would be the same as described in Alternative A, and cumulative impacts to wildlife would be minor, long-term, small extent, unlikely occurrence, and beneficial

3.3.3.4 Alternative C: Drain Williams Lake

3.3.3.4.1 Impacts

This would have an immediate and long-term impact to wildlife that prefer the lake habitat and eliminate those aquatic species that are dependent on such a habitat. The riparian buffer along the edge of remaining drainage system could provide some habitat for dramatically reduced population of some wildlife species but some species occurrence on the base, particularly aquatic species, would be eliminated.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as moderate magnitude, long-term duration, small extent, probable occurrence, and adverse (with the implementation of established BMPs presented in Table 2-7). This impact would exceed the significance criteria as defined in Appendix A. The reason for the substantial impact is the removal of the lake habitat as well as elimination of the lake aquatic species from BAFB.

3.3.3.4.2 Cumulative Impacts

The cumulative impacts would be the elimination of the occurrence of some aquatic species on the Base and a reduction of the population of those species that prefer aquatic habitat. Many individuals would be displaced to other similar preferred habitat in the region. However, the viability of the species in the region would not be compromised with implementing this alternative because of the small number of species at the lake and the availability of suitable habitat elsewhere. Further, species would have a reduced exposure to the possibility of BASH incidents. Thus, implementing Alternative C would be a minor contribution to other past, present, and reasonably foreseeable future activities. Therefore, the other major players in cumulative impacts would be the same as described in the No Action Alternative, and the cumulative impacts would be minor, long-term, small extent, unlikely occurrence, and beneficial.

3.3.4 Threatened, Endangered or Other Sensitive Species

3.3.4.1 Description of Affected Environment

3.3.4.1.1 Special-Status Species

BAFB is required to consider the potential effects of the project on threatened, endangered, and proposed (T&E) species. T&E species and their habitats are protected under the Endangered Species Act (ESA). In order to comply with the ESA, the USFWS requires: (1) identification of the occurrence of federally listed and proposed species and their designated and proposed critical habitats; (2) evaluation of the potential effects to these species from the proposed project; and (3) exploration of alternatives to reduce or remove adverse effects (USFWS 1998).

Species listed by federal or state agencies as threatened, endangered, or of special concern that have the potential to occur on BAFB are shown in Table 3-1. Several sources were consulted in the creation of this table, including the USFWS (USFWS 2008a), CDOW (CDOW 2008a), Natural Diversity Information Source (NDIS) (CDOW 2008b), Colorado Natural Heritage Program (CNHP 2008), and environmental documents previously prepared for BAFB (USAF 2001a, 2004a, 2008).

Table 3-1 – Special Status Species Potentially Occurring on Buckley Air Force Base, CO

Common Name	Scientific Name	Status	Habitat Preference
Bald eagle	*Haliaeetus leucocephalus*	ST	Sea coasts, rivers, and large lakes; nests in tall trees or cliffs near water
Black-footed ferret	*Mustela nigripes*	FE, SE	Closely associated with prairie dog habitat; depends upon prairie dog almost exclusively for food and uses prairie dog burrows for nesting

Table 3-1 – Special Status Species Potentially Occurring on Buckley Air Force Base, CO			
Common Name	**Scientific Name**	**Status**	**Habitat Preference**
Black-tailed prairie dog	*Cynomys ludovicianus*	SC	Short-grass prairie
Ferruginous hawk	*Buteo regalis*	SC	Primarily nests in trees; often feeds on black-tailed prairie dogs
Swift fox	*Vulpes velox*	SC	Short- to mid-grass prairie; found in association with prairie dogs
Western burrowing owl	*Athene cunicularia*	ST	Primarily found in grasslands and mountain parks, usually in or near prairie dog towns; also uses well-drained steppes, deserts, prairies, and agricultural lands
Whooping crane	*Grus americana*	FE, SE	Mudflats around reservoirs and in agricultural areas; nest in wetlands
Common garter snake	*Thamnophis sirtalis*	SC	Aquatic, wetland, and riparian habitats along floodplains of streams.
Northern leopard frog	*Rana pipiens*	SC	Wet meadows, and banks or shallow areas of marshes, ponds, lakes, reservoirs, streams, and ditches.

Status
FC: Federal Candidate SC: State Special Concern
FT: Federally Threatened ST: State Threatened
FE: Federally Endangered SE: State Endangered

3.3.4.1.2 Sensitive Habitats

Sensitive habitats are those areas considered for protection due to their ecological value. They include wetlands, critical habitat for protected species, plant communities of limited or unusual distribution, and important seasonal use areas for wildlife. Wetlands are the only sensitive habitats known to occur on BAFB. These areas are found mostly along the riparian corridors and in association with Williams Lake. However, USACE ruled that Williams Lake and the associated drainage area (including wetlands) are isolated waters and not hydrologically connected to Murphy Creek, which is currently being validated by USACE with an interim finding that the wetlands remain isolated with no nexus (USAF 2008). Therefore, this water body and its drainage (including wetlands) are not under the jurisdiction of USACE (FHWA 2001; USAF 2008).

3.3.4.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.3.4.2.1 Impacts

As stated above, the BASH Plan establishes procedures to minimize the hazard to all assigned and transient aircraft at the Base and in their operating areas; therefore, by its very nature, it is designed to impact those wildlife that may pose aircraft strike hazards. Implementation of this course of action would not target and would not be expected to impact those species of wildlife that due to habit, sizes, or sheer numbers pose no threat to aircraft strikes. Provisions would be made to determine the impact of the BASH Plan on the species listed above. If monitoring indicated an impact of concern to such species consultation would be made with the USFWS to determine an alternate course of action.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as minor magnitude, short-term duration, small extent, unlikely occurrence, and adverse

(with the implementation of established BMPs presented in Table 2-7). This reflects that it would take not following BMPs, laws, or some other accident scenario for this resource to be affected from implementing this alternative.

3.3.4.2.2 Cumulative Impacts

The cumulative impact would be a possible reduction in the occurrence of primarily the avian listed species on the Base, but implementing Alternative A would have a negligible impact to T&E species as they would not be targeted for BASH activities unless allowed by USFWS. This is particularly true as federally protected species that would utilize the Williams Lake area have not been confirmed to be at BAFB (USAF 2008). Thus, Alternative A would have a negligible impact to past, present, and reasonably foreseeable future activities. Other past, present, and reasonably foreseeable future activities are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. These activities have the potential to impact T&E species through reduction or fragmentation of habitat. However, activities are not allowed to harm T&E unless a take permit is issued. Thus, T&E species obtain some benefit from the ESA protection, but they are still losing habitat through construction in other locations. Activities at BAFB are required to consider T&E and also the land use zoning would help minimize these conflicts. Further, as stated in Section 2.6, the cumulative impacts are focusing on the past 10 years and the project area. Therefore, the cumulative impacts would be minor, long-term, small extent, possible occurrence, and adverse.

3.3.4.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.3.4.3.1 Impacts

The installation of a wire-grid system over Williams Lake would not target any of the species listed in Table 3.1 with the possible exception of the whooping crane that might be discouraged from using the lake due to a wire-grid system although whooping cranes are not presently know to use Williams Lake. If whooping cranes were determined to be using Williams Lake, a consultation with USFWS would be made to verify that the wire-grid system would not have adversely impact this species. It is likely that the species would find another suitable location if Williams Lake had the wire-grid system.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts are characterized as minor magnitude, short-term duration, small extent, unlikely occurrence, and adverse. This reflects that it would take not following BMPs, law, or some other accident scenario for this resource to be affected from implementing this alternative.

3.3.4.3.2 Cumulative Impacts

Because none of the listed species would be targeted by the implementation of Alternative B, there would be little in the way of a contribution to cumulative impacts to the occurrence of the listed species on the Base. Therefore, the major contributions to cumulative impacts would be the same as the No Action Alternative, and the cumulative impacts would be minor, long-term, small extent, possible occurrence, and adverse.

3.3.4.4 Alternative C: Drain Williams Lake

3.3.4.4.1 Impacts

Of the species listed in Table 3.1 above, two (the bald eagle and the whooping crane) could be impacted by draining Williams Lake. This is due to the nature of both species and the fact that they prefer habitat associated with water such as Williams Lake. Draining the lake would force these species to find an alternate site for resting or feeding; however, because such alternate sites are available in the general area, the impact to these species would be negligible and could be considered beneficial by reducing their risk to aircraft strikes.

Using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts

are characterized as minor magnitude, short-term duration, small extent, possible occurrence, and beneficial.

3.3.4.4.2 Cumulative Impacts

Drainage of the lake would have the cumulative impact of reducing the occurrence of those listed species on the Base that prefer lake habitat. However, as stated above, these species should be able to find alternative locations that are not subject to the same BASH risks. Thus, the contribution of Alternative C to past, present, and reasonably foreseeable future activities should be minimal. Therefore, the major factors to cumulative impacts would be the same as described in the No Action Alternative, and cumulative impacts would be minor, long-term, small extent, possible, and adverse.

3.4 OTHER RELEVANT RESOURCES AND ISSUES

3.4.1 Health and Safety

3.4.1.1 Description of Affected Environment

One of the big concerns with safety in this project is BASH risks. When wildlife hits the aircraft, it endangers the pilot and the aircraft. Based upon data collected by BAFB, the current frequency of BASH incidents at BAFB is approximately 7.6 incidents per 10,000 arrival/departure operations

Any health risk from the consumption of the fish in Williams Lake depends on the water quality of the lake. The lake has been tested for some water quality perimeters, and none of the tested conditions exceed health regulations (See Section 3.2.3) (USAF 2008; McWharter 2008b).

Operators of the BASH Plan, such as the personnel conducting the pyrotechnics, would be properly trained, which reduces the human health and safety risks. Workers for draining the lake and operating the wire-grid system would be subject to the same types of risks that are generally associated with their professions. There is a rate of 15.2 deaths per 100,000 for construction workers, which is the third highest rate of death from injury (NIOSH no date). The construction incident rate of total recordable cases of non-fatal occupational injuries and illnesses in 2006 was 5.9 per 100 full-time workers (BLS 2007).

3.4.1.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.4.1.2.1 Impacts

Of the alternatives, this has the most risk to pilots and aircraft due to the contribution of Williams Lake to BASH risks. However, there would be a reduction in BASH incidents below the current rate of approximately 7.6 incidents per 10,000 arrival/departure operations due to full implementation of BASH Plan recommendation. The current BASH Plan activities could be implemented without substantial risk to human health and safety due to the safety procedures and training in place. Without construction of a wire-grid system or draining of the lake, the impacts from implementing this alternative would be minor, long-term, medium extent, unlikely occurrence, and adverse, using the criteria established for evaluating impacts to this resource presented in Appendix A. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.4.1.2.2 Cumulative Impacts

The reduction in BASH risk from implementing Alternative A should constitute only a minor incremental change in human health and safety when taken in consideration with other past, present, and reasonably foreseeable future activities due to small population that is exposed to BASH risk at BAFB. Other past, present, and reasonably foreseeable activities are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. Operational activities as well as construction pose a safety risk to workers, such as the

airfield repairs and upgrades, through possible exposure to dangerous materials (fuels) as well as accidents. With proper BMPs (Table 2-7), these impacts can be minimized. Beneficial impacts can occur through stormwater management, which prevents contamination, and hazardous waste management. However, these are more maintenance than improving human health. By reducing exposure to people, maintaining compatible land uses through zoning reduces human health and safety risks. Therefore, the cumulative impacts to human health and safety would be minor, long-term, medium extent, unlikely occurrence, and beneficial.

3.4.1.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.4.1.3.1 Impacts

Alternative B incorporates a wire-grid system in addition to Alternative A's activities. Adhering to proper safety procedures, installing and moving the wire-grid system on and off the lake (if moved seasonally) should constitute, at most, a minimal risk. The program (wire-grid system) should reduce the BASH risk for the pilots more than Alternative A due to this additional measure being implemented that should reduce the number of wildlife in the vicinity posing a BASH threat. Therefore, impacts to human health and safety from implementing Alternative B would be minor, long-term, medium extent, possible occurrence, and beneficial, using the criteria established for evaluating impacts to this resource presented in Appendix A. The possible occurrence would be due to the fact that the grid would not be employed year round and due to the small population exposed to BASH risk.

3.4.1.3.2 Cumulative Impacts

The increased BASH risk reduction from the utilization of a wire-grid system in addition to implementing the BASH Plan recommendations would only constitute a minimal incremental impact to human health and safety when considered with past, present, and reasonably foreseeable future actions due to small population that would be exposed to these activities. Therefore, the major components of the cumulative impacts would be the same as described in the No Action Alternative, and the cumulative impacts from implementing Alternative B would be minor, long-term, medium extent, unlikely occurrence, and beneficial.

3.4.1.4 Alternative C: Drain Williams Lake

3.4.1.4.1 Impacts

Draining the lake would pose a safety risk to the workers and any visitors during the draining or revegetation period. However, adherence to proper safety procedures should minimize these risks. Of the alternatives, Alternative C would reduce the risk the most from BASH. However, as other water bodies and wildlife habitat exist near the project area, draining the lake would reduce BASH risk but not eliminate this risk (See Figure 2). Further, by removing the lake, lake training exercises would not be able to be conducted as conveniently or cost-effectively as utilizing the on the base lake. They would have to be conducted elsewhere. Appropriate alternative locations may be difficult due to the necessary size of the body of water and quality of water for the portable water treatment plant due to wastewater. Further, these alternative sites are likely to be city-owned and possibly used for recreation. Thus, a cooperative agreement would be necessary between the military and the owner of the body of water and an appropriate schedule created minimizing recreational conflicts and weather (such as ice).

A further consideration would be the possible erosion and contamination from the runoff of the lake bottom sediments. However, the sediments would be tested and proper mitigation performed. Similarly, if this alternative were chosen, alternative arrangements would be implemented so that erosion and stormwater would be minimally affected. Moreover, BMPs would be employed (such as revegetation) to reduce the risk of erosion. With proper alternatives in place, the impacts should be minimized.

Assuming all of these conditions were met, the overall health and safety impacts would be a reduction in BASH risk relative to Alternatives A and B. Therefore, impacts from implementing Alternative C to human health and safety would be minor, long-term, medium extent, possible occurrence, and beneficial, using the criteria established for evaluating impacts to this resource presented in Appendix A. The possible occurrence is due to the fact that there would still be some BASH risk originating off the base as well as the small population exposed to the BASH risks.

3.4.1.4.2 Cumulative Impacts

Draining the lake would pose only a minor incremental impact to human health and safety when considered with past, present, and reasonably foreseeable future actions due to small population that is exposed to BASH risk at BAFB as well as the fact that there would still be BASH risks from waterfowl originating off base that cross over BAFB. This conclusion assumes that a proper alternative(s) to the training activities currently performed at Williams Lake were secured that does not introduce substantial risks to BAFB or the general public. Therefore, major components of cumulative impacts would be the same as the No Action Alternative, and the cumulative impacts from implementing Alternative C would be minor, long-term, medium extent, unlikely occurrence, and beneficial.

3.4.2 Land Use

3.4.2.1 Description of Affected Environment

BAFB contains about 3,283 acres adjacent to the city of Aurora, Arapahoe County, Colorado, within the Denver metropolitan area (USAF 2005a). Aurora contains 39,991 acres, which makes it the second largest city in the Denver metropolitan area and the third largest in the state. According to zoning, Aurora is 52% residential, which 40% is south of the base. These are single-family detached residences. To the southwest of the base, multifamily residences are the majority. The remaining 48% of Aurora is industrial and open space. Light industry is to the northwest and north of the base. Northeast, east, and southeast of the base are mostly open spaces. This open space is agricultural land and the Plains Conservation Center (USAF 2006e, 2008). Commercial development exists to the west of the base, and some residences are to the north-northwest (USAF 2006e). An area adjoining the base to the west is proposed for a park (Aurora 2007b). Due to noise concerns and possible interference with BAFB operations, the area to the east of BAFB is zoned to not have residential development but allows commercial, industry, and office development (Aurora 2003).

Fourteen categories of land use exist on the base (Figures 11 and 12), which prevents incompatible siting of facilities and/or operations (USAF 2007c). Most land uses at BAFB consist of airfield, open space, industrial, and commercial (i.e., office), and most make use of land areas that are already disturbed (USAF 2002). The land use at Williams Lake is water. The area immediately surrounding the lake is outdoor recreation with predominately open space land use surrounding the outdoor recreation area. The airfield is near the outdoor recreation land use surrounding Williams Lake (2,083 feet from the lake). Land uses off base in the vicinity of the lake are recreation and agriculture (USAF 2006e).

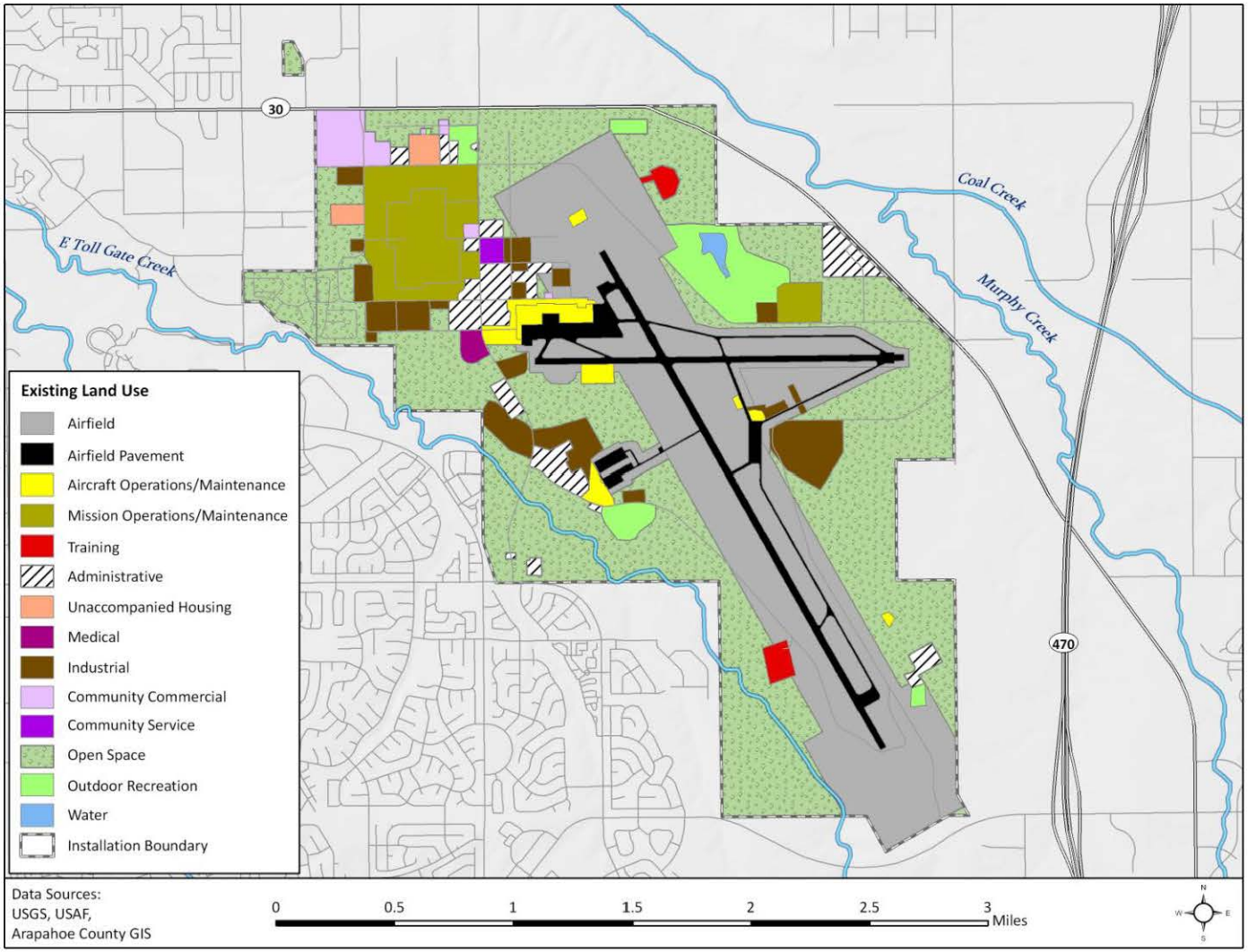

Figure 11 – Existing Land Uses on BAFB

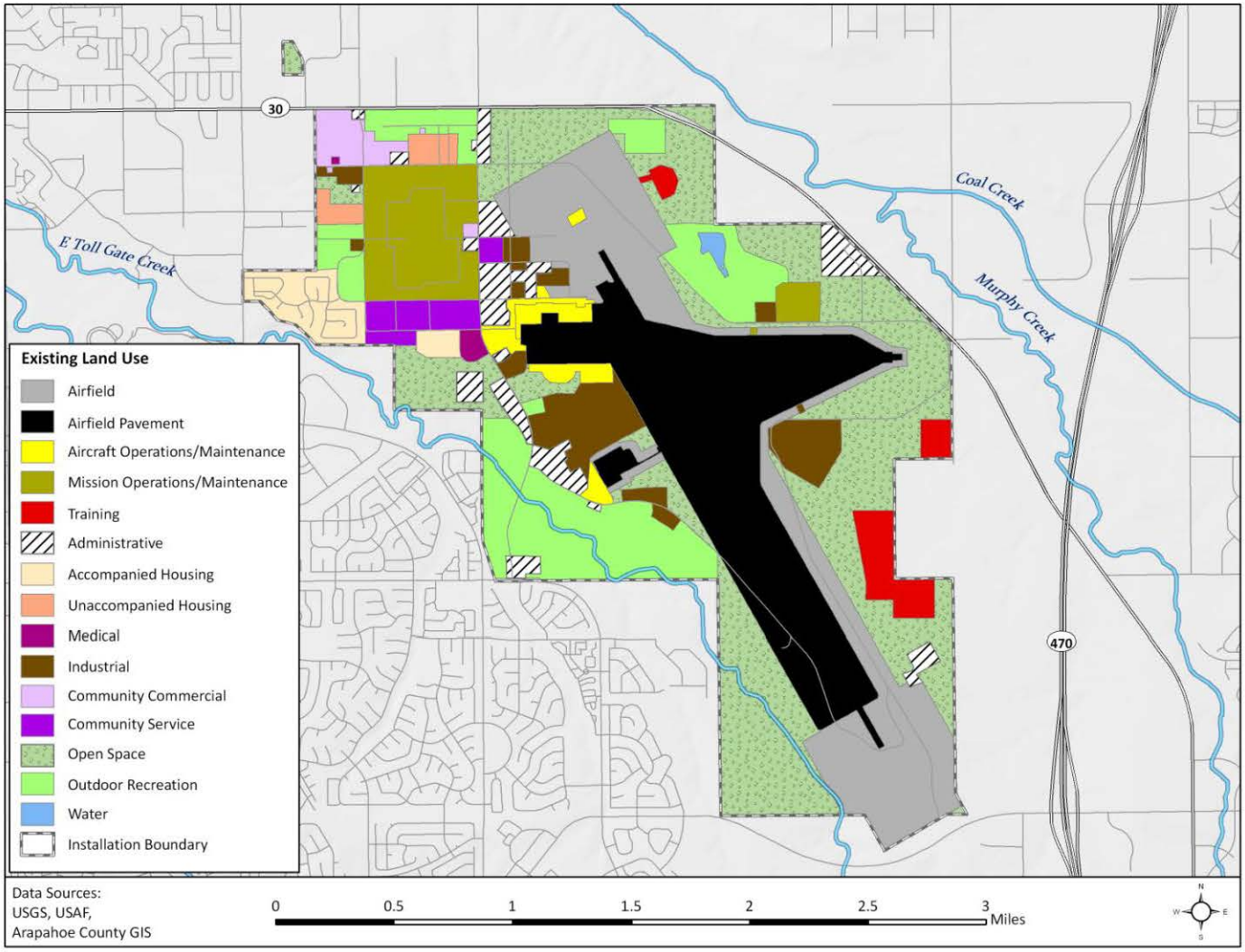

Figure 12 – Future Planned Land Uses at BAFB

3.4.2.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.4.2.2.1 Impacts

Under the No Action Alternative, the current land uses would continue, which include aircraft training nearby the lake, with the continued implementation of the BASH Plan recommendations of airfield habitat management and active harassment of wildlife, such as starter pistols and depredation. These activities, done appropriately, would not be in conflict with the land use of outdoor recreation at the lake, because they would be intermittent and temporary. The exception would be the signs asking visitors not to feed the wildlife. However, this is compatible with recreation. Further, keeping the airfield habitat in a condition that does not encourage wildlife is compatible with that land use.

Even with the current BASH Plan implementation, airfield activities would continue to be delayed or threatened by wildlife, and some of the wildlife would originate from Williams Lake. However, the land uses of Williams Lake, recreation and open space, are compatible with the zoning of the base and the off base uses in the vicinity of the lake. Nevertheless, the inherent conflict between the airfield and the wildlife (which some originate from Williams Lake) would still continue. Thus, under this alternative, the land use conflict would persist. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, impacts from implementing the No Action Alternative on land use would be minor, long-term, small extent, possible occurrence, and adverse.

3.4.2.2.2 Cumulative Impacts

Under this alternative, land uses would not change. While implementing the BASH Plan recommendations would reduce the present land use conflict between Williams Lake and the airfield, the conflict would still remain. Thus, continuing current land use, which includes some reduction of BASH risks based on continuing to implement the BASH Plan recommendations, would only minimally contribute to the past, present, and reasonably foreseeable future activities on and immediately around the Base. All activities would be expected to conform to zoning or land use classification to avoid incompatible activities, which minimizes land use impacts. These uses were described in the Section 3.4.2.1, and the changes to these land uses are described in listed in Tables 2-1, 2-2, and 2-3 as well as Table 2-8 and Section 2.6. No new planned developments exist off base within approximately a mile from the BAFB boundary near Williams Lake. Therefore, cumulative impacts from implementing Alternative A would be minor, long-term, small extent, possible occurrence, and beneficial.

3.4.2.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.4.2.3.1 Impacts

Under Alternative B, the increased measures of a wire-grid system would be implemented in addition to those activities in Alternative A, implementing the BASH Plan. These would be done to minimize conflicts with the recreational use of Williams Lake, such as wire-gird system being removed during peak recreational periods. The impacts to recreation for wildlife-viewing should not be totally diminished by the wildlife control as some wildlife, especially that which is not targeted by control activities, would be present. Further, as described in Section 3.4.4, many other wildlife-viewing and recreational opportunities exist near the Base. If the wire-grid system were properly maintained (debris removed, cleaned regularly, and removed during peak recreational periods, etc.), the result should be fewer delays in aircraft operations, which would reduce the current land use conflict between Williams Lake and the airfield, as well as minimal disturbance of the recreational use near Williams Lake. The recreational use of Williams Lake is compatible with the land uses on and off base. However, the wire-grid system would interfere with lake training exercises, and these activities would have to occur in an alternative location off the base, if necessary and possible, while the wire-grid system was in use. On the other hand, the wire-grid system would only be utilized for a small portion of the year, so this conflict would be minimal. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A,

the impacts on land use from implementing Alternative B would be minor, long-term, small extent, possible occurrence, and beneficial.

3.4.2.3.2 Cumulative Impacts

The addition of a wire-grid system, done appropriately, would be compatible with the area's land uses and thus only minimally changes land use through a reduction of BASH risks. However, the conflict between the airfield and Williams Lake would still remain. Thus, this reduction in BASH risks is only a minor incremental change to land use when considered with past, present, and reasonably foreseeable future activities on and immediately around the Base. Consequently, the major factors to cumulative impacts would be the same as described in the No Action Alternative. Therefore, cumulative impacts from implementing Alternative B would be minor, long-term, small extent, possible occurrence, and beneficial.

3.4.2.4 Alternative C: Drain Williams Lake

3.4.2.4.1 Impacts

Under Alternative C, the lake would be drained. This would remove some of the recreational opportunities that exist on base including fishing and wildlife-watching as well as the water vistas at the picnic areas. No other permanent outdoor water recreation exists currently on base (USAF 2006e). However, water recreation, including fishing, is available nearby off the Base, which reduces the impacts to recreation (Section 3.4.4).

The area that the lake currently occupies would be seeded. The area would be graded to return the site to its original contours and returned to native vegetation as much as possible. If the lake were removed, the wetland character may change. The final configuration would determine the resulting habitat. A creek would likely continue, and some wetlands may remain. The resulting field is compatible with outdoor recreation, which is the assigned land use surrounding Williams Lake, as well as the adjacent assigned open space land use and off base zoning of agriculture and recreation. The aircraft operations would be anticipated to have fewer delays under this alternative than the other alternatives as the lake would be removed. On the other hand, the potential for delays still would exist from other sources of wildlife off base. However, the lake training exercises would no longer be available on base, but alternatives would be found so to continue military training (see Section 3.4.1.4). These conclusions necessitate that alternative(s) be found to provide the training currently provided by Williams Lake (helicopter, water treatment plant, etc.) that do not cause a land use conflict with current users of the alternative (such as recreational users of reservoirs). Further, the alternative(s) must minimally disturb any additional people exposed to these activities (such as residents near the facility). If an appropriate alternative were not secured, the impacts would be substantial. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts on land use from implementing Alternative C would be minor, long-term, small extent, possible occurrence, and beneficial.

3.4.2.4.2 Cumulative Impacts

Draining the lake has effects on the possible future land uses, such as the FamCamp. Other options for the lake training exercises may exist but would likely not be as convenient or cost-effective as the base lake. However, alternative location(s) would be found, and other aquatic recreational opportunities do exist in the vicinity of the Base. The FamCamp may be slightly less attractive without the lake, but it would still provide recreational opportunities. Further, while the BASH conflict between Williams Lake and the airfield would be removed, there would still be a conflict between the airfield and wildlife that originate off of BAFB. Thus, the implementing this alternative does contribute to cumulative impacts but does not push them beyond an irretrievable threshold as alternatives do exist. The other major players in the cumulative impacts are the same as outlined under the No Action Alternative section. Therefore, when Alternative C is added to past, present, and reasonably foreseeable future activities on base and

immediately surrounding BAFB, the cumulative impacts would be moderate, long-term, small extent, possible occurrence, and adverse.

3.4.3 Visual

3.4.3.1 Description of Affected Environment

The closest protected viewshed is Rocky Mountain National Park, which about 50 miles northwest of the BAFB. Williams Lake, which provides water vistas, is about 2,083 feet from the runway on the BAFB. BAFB, as a whole, is zoned as industrial by the city, and the on base classified land use surrounding Williams Lake is outdoor recreation (USAF 2006e, 2005a). Buildings exist near the lake, and training activities frequently occur nearby and on the lake. The limited smoke generated by the active wildlife harassment should not exceed the Colorado Regulation 1 rules for smoke because it should not be in excess of 20% opacity (CDPHE no date) (See Section 1.8.3.1). The other proposed project components (such as wire-grid system) would also occur at BAFB.

3.4.3.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.4.3.2.1 Impacts

Under the No Action Alternative, no new buildings or activities would occur. The implementation of the BASH Plan would only be continuing current practices. When the pyrotechnics are used, these create a temporary visual disturbance with flashes of light and trailing smoke, which would be minimally adverse. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts to visual resources from implementing the No Action Alternative would be minor, short-term, small extent, unlikely occurrence, and adverse. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.4.3.2.2 Cumulative Impacts

Continuing current activities would only negligibly contribute to visual resources when considered with the past, present, and reasonably foreseeable future activities on and immediately around the Base. Other past, present, and reasonably foreseeable activities are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. Construction alters the view, such as the pavilions at Williams Lake or all the housing units. However, these are done with aesthetic considerations and generally with landscaping, which reduces the visual impact. Other reductions in the adverse impacts are accomplished through BMPs (Table 2-7). People also quickly adjust to new buildings, especially as these vistas are not unique, are predominately industrial, and are restricted to BAFB personnel and families. Therefore, cumulative impacts would be expected to be minor, short-term, small extent, unlikely occurrence, and adverse.

3.4.3.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.4.3.3.1 Impacts

Under Alternative B, a wire-grid system would be employed in addition to the Alternative A's activities. The above water wire-grid system would only be employed during peak migratory season. Thus, the wire-grid system would only be a minimal visual disturbance and not detract substantially in the industrial surroundings of the recreation facilities, such as the airfield and office buildings. The fishing line itself and any devices to increase the visibility of the system to avoid bird entanglement would cause minimal visual disruptions due to the minimally obtrusive nature of these materials. Proper cleaning and maintenance of the wire-grid system to minimize discoloration or accumulation of particles and debris that would draw attention to the system would reduce visual disturbance caused by the wire-grid system. The system should not cause much of a visual disruption in the industrial surroundings at BAFB. People visiting the lake may be able to see the wire-grid system, but the system would likely not be visible from a distance of the lake. Further, the system would not be employed during peak recreational season, which reduces the number of people impacted by the system. Therefore, using the criteria established for

evaluating impacts to this resource presented in Appendix A, the impacts to visual resources from implementing Alternative B would be minor, long-term, large extent, possible occurrence, and adverse.

3.4.3.3.2 Cumulative Impacts

Since a properly administered wire-grid system would only be minimally visually disruptive, this alternative, if implemented, would only constitute a negligible incremental addition to the visual resources on the Base when added to past, present, and reasonably foreseeable future activities on and surrounding the Base. Therefore, major components of cumulative impacts would be the same as described in the No Action Alternative section, and the cumulative impact is minor, short-term, small extent, unlikely occurrence, and adverse.

3.4.3.4 Alternative C: Drain Williams Lake

3.4.3.4.1 Impacts

Under Alternative C, Williams Lake would be drained. The draining of the lake would be a visual disturbance while the lake is being drained. The impact on visual resources could be reduced if the draining occurred during the recreational off-season, which would reduce the number of individuals that observed the activity. The field (or any recreational opportunities with appropriate aesthetic considerations) that would replace the lake would be in character with the surrounding land uses of outdoor recreation and open space. The area would be graded to return the site to its original contours and returned to native vegetation as much as possible. The final configuration would determine the resulting habitat. A creek would likely continue, and some wetlands may remain. However, the water view would be permanently gone. On the other hand, other water views are available on the surrounding parks, so this particular view is not unique (Section 3.4.4). Therefore, the impacts to visual resources from implementing Alternative C would be in the short-term major, large extent, probable occurrence, and adverse, but in the long run, impacts would be minor, large extent, unlikely occurrence, and adverse, using the criteria established for evaluating impacts to this resource presented in Appendix A. These long-term impacts are due to the fact the view is available off BAFB, the resulting field would not be visually disruptive, and the view is only available to BAFB personnel and families.

3.4.3.4.2 Cumulative Impacts

The loss of the water vista at BAFB would be a permanent change to visual resources. However, these types of water views are available off the base. People would adjust to the lack of the lake vista on Base, but draining the lake would permanently change the vista for the recreation that was planned and is planned for that area in order to take advantage of the lake vista, such as FamCamp. Most of the major components to cumulative impacts would be the same as in the No Action Alternative. Therefore, when Alternative C is added with past, present, and reasonably foreseeable future activities, the cumulative impacts to visual resources would be minor, long-term, small extent, possible occurrence, and adverse.

3.4.4 Recreation

3.4.4.1 Description of Affected Environment

Many recreational facilities exist in close proximity to BAFB (Figure 13). Rocky Mountain Arsenal National Wildlife Refuge (NWR) is approximately 5 miles northwest of the Base. This NWR offers many wildlife-viewing opportunities and seasonal fishing (USFWS, 2008b; USAF 2008). Approximately 7 miles to the southwest is Cherry Creek State Park, which allows camping, fishing, swimming, boating, hiking, biking, and winter sports. Barr Lake State Park, which is 14 miles north of BAFB, also provides recreational opportunities such as fishing, boating, hunting, and winter sports. Chatfield State Recreational Area provides camping, fishing, swimming, boating, hiking, biking, and winter sports, which is located approximately 19 miles southwest of the Base (USAF 2008).

Recreational opportunities at BAFB are picnicking, jogging, and outdoor sports (such as football and soccer) (USAF 2008). On base recreation is limited to installation personnel and families, military retirees, and tenants. The general public is only allowed during special events.

The closest off base recreational opportunity is Plains Conservation Center, which is adjoining the Base due south. Other adjacent parks include Sand Creek Riparian Preserve, Coal Creek Rodeo Arena, Buckley Natural Area, and Great Plains Park. The Sand Creek Riparian Preserve and Great Plains Park have picnic areas. The closest fishing, picnicking, and water vista at a park is Quincy Reservoir, which is 3.5 miles southwest of BAFB (Aurora 2007b). Aurora Reservoir is approximately 10 miles southeast of BAFB and has many amenities.

Williams Lake generally occupies about 10 acres but the impoundment allows for 30 acres and 85 acre-feet of water. One of the INRMP's goals is to "maintain viable fishing program at Williams Lake" (USAF 2008). Recreation at Williams Lake, including fishing, is similarly limited to active-duty, retired military, and civilian personnel (USAF 2007c). A Colorado fishing license and a BAFB fishing permit is required for fishing at Williams Lake for anyone over 16. Anyone under 12 must be accompanied by an adult 18 or more years old (USAF 2005b). 29 BAFB fishing permits were sold in 2008, and participation in the program has increased each year for the four year history of the program. Additionally, more advertising and special events next year are anticipated to increase program involvement (McWharter 2008b). FamCamp will be a recreational facility near Williams Lake to utilize the amenities of the lake. Activities available at the FamCamp will be camping, fishing, picnicking, trails, and playgrounds (USAF 2007c).

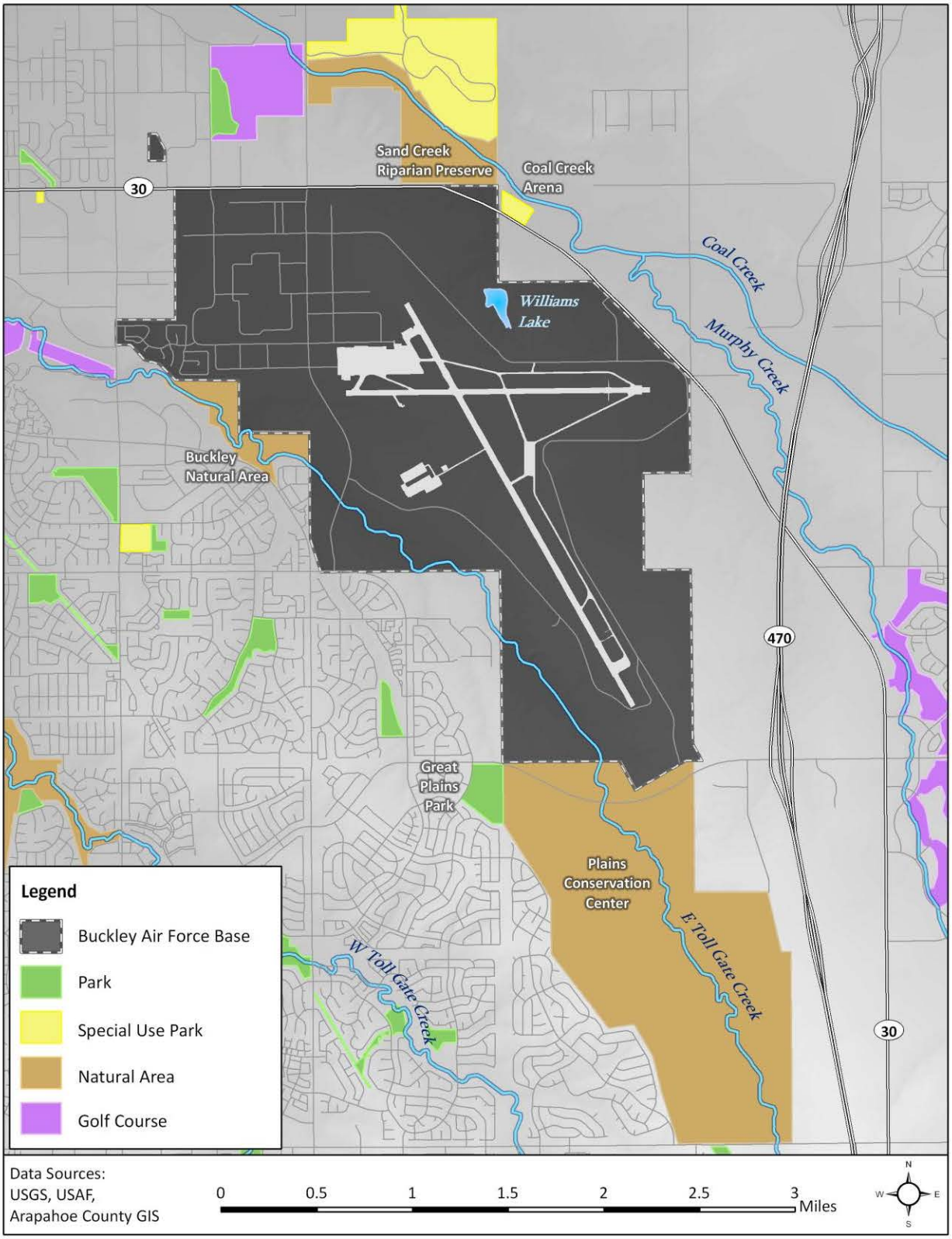

Figure 13 – Existing Parks and Other Recreational Opportunities near BAFB

3.4.4.2 Alternative A: Implement BASH Plan Recommendations (No Action)

3.4.4.2.1 Impacts

Under the No Action Alternative, recreation would proceed as it does currently. The FamCamp would add to the recreational use of Williams Lake. Any implementation of the BASH Plan would cause only temporary and intermittent disruptions to recreation. Thus, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts from implementing the No Action Alternative to recreation would be minor, short-term, small extent, unlikely occurrence, and adverse. This reflects that it would take not following BMPs or some other accident scenario for this resource to be affected from implementing this alternative.

3.4.4.2.2 Cumulative Impacts

Continuing to implement the BASH plan would only intermittently and temporarily disturb recreation. Thus, the implementation of Alternative A would constitute negligibly to past, present, and reasonably foreseeable future activities. Other past, present, and reasonably foreseeable future activities are listed in Tables 2-1 through 2-3 as well as Table 2-8 and Section 2-6. Some of these activities have benefited recreation, such as the two pavilions at Williams Lake, golf driving range, fitness center, and the planned FamCamp. Thus, cumulative impacts would be minor, long-term, small extent, possible occurrence, and beneficial with the additional planned nearby parks and FamCamp.

3.4.4.3 Alternative B: Proposed Action; Add a Wire-Grid System over Williams Lake

3.4.4.3.1 Impacts

Under Alternative B, the wire-grid system would be implemented in addition to activities under Alternative A. The wire-grid system would be implemented as to minimize impact with recreation with such options as only having the wire-grid system during off-peak recreation and selecting minimally obtrusive spacing and materials of the system (100 by 100 foot and fishing line). Thus, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts from implementing the Alternative B to recreation would be minor, short-term, small extent, probable occurrence, and adverse due to the possible detraction of the wire-grid system to aesthetics and not being able to use the lake while the grid was in place.

3.4.4.3.2 Cumulative Impacts

Adding a wire-grid system would constitute a minimal change to Base activities when added to past, current, and reasonably foreseeable future activities, which includes more park facilities in the vicinity of the Base (Aurora 2003). Therefore, the major components of cumulative impacts would be the same as described in the No Action Alternative, and the cumulative impacts would be minor, long-term, small extent, possible occurrence, and beneficial with the additional planned nearby parks and FamCamp.

3.4.4.4 Alternative C: Drain Williams Lake

3.4.4.4.1 Impacts

Draining the lake under Alternative C would remove the fishing and other water recreational opportunities at BAFB, which is an adverse and long-term impact. However, other fishing opportunities exist in the vicinity of the Base. In addition, the area would still be open to recreation after the field was established. The area would be graded to return the site to its original contours and returned to native vegetation as much as possible. The final configuration would determine the resulting habitat. A creek would likely continue, and some wetlands may remain. Therefore, using the criteria established for evaluating impacts to this resource presented in Appendix A, the impacts to recreation from implementing Alternative C are minor, long-term, small extent, probable occurrence, and adverse. This impact is considered significant as defined in Appendix A. It would be substantial, because Williams Lake is the

only aquatic recreation location at BAFB. The removal of the water vista would also degrade the recreational quality of projects located around Williams Lake such as the FamCamp.

3.4.4.4.2 Cumulative Impacts

The loss of Williams Lake for recreation would be adverse, but other opportunities exist in the area. Thus, the other major components of the cumulative impacts would be the same as described in the No Action Alternative section. Therefore, adding the loss of the lake to other past, present, and reasonably foreseeable future activities would have the cumulative impact of minor, long-term, small extent, possible occurrence, and adverse with other planned recreation facilities planned in or near BAFB.

4.0 LIST OF PREPARERS

The following have contributed information to the preparation of this Environmental Assessment:

460 SW/PA-Public Affairs
Mr. John Spann
Flight Chief, Space Wing Public Affairs
Experience: 35 yrs

460 SW/JA-Legal Affairs
Mr. Jeffrey C. Lindquist
Attorney-Advisor
Legal Experience: 19 yrs
Environmental/NEPA Experience: 13 yrs

460 SW/SE-Safety
Mr. Earl Faulkner
Safety Specialist
Experience: 24 yrs

460 MDOS/SGOAB
Capt. Travis Meidinger
Flight Chief, Bioenvironmental Engineering
Experience: 9 yrs

Mr. John Kurth
Industrial Hygienist
Experience: 30 yrs.

460 SW/AT-Anti-terrorism
Mr. Duane Judy
Installation Anti-terrorism Officer
Experience: 7 yrs

460 CES/CEC
Ms. Elizabeth Meyer
Deputy Flight Chief, Civil Engineering
Experience: 1 yrs

USFWS – 460 CES/CEV Support
Ms. Virginia Lightsey-Ceehorne
Experience: 5 yrs

460 CES/CEV
Mr. Floyd Hatch
Natural Resources Program Manager
Experience: 17+ yrs

Ms. Elise Sherva
Air and Storage Tanks Program Manager
Experience: 14 yrs

Mr. Bruce James
Environmental Flight Chief
Experience: 31 yrs

Mr. Corwin Oldweiler
Water Program Contract Support, Contractor
Experience: 21 yrs

Ms. Sandra Ingrassia
Hazardous Materials Program Manager
Experience: 6 yrs

Mr. Dale Carlson
Pollution Prevention Program Manager
Experience: 17 yrs

Ms. Laurie Fisher
Water Program Manager
Experience: 27 yrs

Mr. Mark Spangler
Installation Restoration Program Manager
Experience: 14 yrs

Ms. Pamela McWharter
NEPA/EIAP Program Support, Contractor
Experience: 6 yrs with EIAP NEPA

Mangi Environmental Group
Dave Henney
Project Manager
Experience: 35 yrs

Meghan Morse
Associate Project Manager
Experience: 3 yrs

Randy Williams
Senior Environmental Professional
Experience: 33 yrs

Tim Lavallee, P.E.
Senior Environmental Professional
Experience: 16 yrs

5.0 AGENCIES AND INDIVIDUALS CONTACTED AND DOCUMENT DISTRIBUTION

Mr. Dan Beley
Colorado Dept. of Public Health & Environment
Water Quality Control Division
WQCD-OQ-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Ms. Cynthia Holdeman
Government Publications
Denver Public Library
10 W. Fourteenth Ave. Pkwy.
Denver, CO 80204-2731

Mr. David Rathke
US Environmental Protection Agency
Region 8
1595 Wynkoop St
Denver, CO 80202-1129

Mr. Brent Bibles
Wildlife Researcher
Colorado Division of Wildlife
Wildlife Research Center
317 W. Prospect Road
Fort Collins, CO 80526

Mr. John Fernandez
City of Aurora
Planning, Environmental Division
15151 E. Alameda
Aurora, CO 80012

Mr. Bruce Rosenlund
Colorado Field Supervisor
US Fish & Wildlife Service
134 Union Blvd., Suite 675
Lakewood, CO 80228-1807

Ms. Carol Foreman
Central Library Reference Supervisor
Aurora Public Library
Administrative Offices
14949 E. Alameda Pkwy.
Aurora, CO 80012

Mr. Lee Pivonka
Colorado Dept. of Public Health & Environment
Federal Facilities
HMWM 2800
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Mr. Robert Watkins
Director of Planning
City of Aurora
15151 E. Alameda
Aurora, CO 80012

Ms. Nancy Chick
Colorado Dept. of Public Health & Environment
Air Pollution Control Division
APCD-TS-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Ms. Patricia Mehlhop
US Fish & Wildlife Service
134 Union Blvd., Suite 645
Lakewood, CO 80228-1807

Mr. Larry Svoboda
NEPA Unit Chief
US Environmental Protection Agency
Region 8
1595 Wynkoop St
Denver, CO 80202-1129

Mr. Ed Nichols
State Historic Preservation Officer
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137

Ms. Eliza Moore
Wildlife Manager
Colorado Division of Wildlife
6060 South Broadway
Denver, CO 80216

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7.0 ACRONYMS AND ABBREVIATIONS

460 SW	460th Space Wing
AF ETL 03-1	USAF Engineering Technical Letter 03–1: Storm Water Construction Standards
AFB	Air Force Base
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
Alt.	Alternative
ANG	Air National Guard
APHIS	Animal and Plant Health Inspection Service
AQCR 36	Metropolitan Denver Air Quality Control Region AQCR
AQCR	Air Quality Control Region
ATC	Air Traffic Control
BAFB	Buckley Air Force Base
Base	Buckley Air Force Base
BASH	Bird Aircraft Strike Hazard
BHWG	Bird Hazard Working Group
BMP	Best Management Practice
BSC USA	Bird Strike Committee USA
BWC	Bird Watch Condition
CAA	Clean Air Act
CARB	California Air Resources Board
CCR	Code of Colorado Regulations
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CES	Civil Engineering Squadron
CEV	Environmental Flight
CFR	Code of Federal Regulations
CGP	Construction General Permit/Stormwater Construction General Permit
CNHP	Colorado Natural Heritage Program
CO	Colorado
CO	Carbon Monoxide
COANG	Colorado Air National Guard
CWA	Clean Water Act
DDT	Dichloro-Diphenyl-Trichloroethane
E. coli	*Escherichia coli*
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESOHCAMP	Environmental, Safety Occupational Health Compliance Assessment and Management Program
ETL	Engineering Technical Letter
FamCamp	Family Camp
FONSI	Finding of No Significant Impact
ft^2	square feet
GCR	General Conformity Rules

GIS	Geographic Information System
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
lbs	Pound
MBTA	Migratory Bird Treaty Act
MS4	Municipal Separate Storm Sewer Systems
MSL	Mean Sea Level
NA	Not Available
NAAQS	National Ambient Air Quality Standards
NDIS	Natural Diversity Information Source
NEPA	National Environmental Policy Act
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O_3	Ozone
OPR	Office of Primary Responsibility
P.L.	Public Law
P2	Pollution Prevention
PM_{10}	Particulate Matter less than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter less than 2.5 Microns in Diameter
ROI	Region of Influence
SCAQMD	South Coast Air Quality Management District
SE	Safety Office
SO_2	Sulfur Dioxide
SOPs	Standard Operating Procedures
SW	Space Wing
SWMP	Stormwater Management Plan
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered and Proposed Species
TF	Transportable Fraction
tpy	Tons per Year
TSP	Total Suspended Particulates
US or U.S	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UV	Ultraviolet
VOC	Volatile Organic Compounds
WG	Wing
WOUS	Waters of the United States
WWII	World War II

8.0 APPENDICES

- Impact Significance Criteria
- Applicability Analysis under the General Conformity Rule
- Public Involvement and Agency Coordination

APPENDIX A

IMPACT SIGNIFICANCE CRITERIA

This appendix explains how the team evaluated the impacts they predicted.

The importance, or "significance," of an environmental impact depends on numerous factors. Some of these factors are objective, such as whether or not the action violates a law. Other factors are matters of judgment, such as the importance of losing wildlife habitat or of changes in the visual landscape. Thus, although resource impact conclusions incorporated classifying impacts as beneficial or adverse, the category of beneficial or adverse is not a component of the significance determination as significant impacts can be beneficial or adverse. Although there are some exceptions and special cases, the following major factors determine the significance of most types of impacts:

- Magnitude of the impact (how much, how intense, how severe, e.g. a violation of a law or regulation);
- Duration or frequency of the impact (how long or how often);
- Extent of the impact (how far, e.g. local, vs. regional context);
- Uncertainty (impact likelihood or occurrence, and associated unknowns).

Because there are multiple factors influencing impact significance, and because the environmental resources affected are so diverse, the EA team used a systematic approach to standardize the evaluation of impacts. The objective was to have impact evaluations be comparable. That is, a "significant" biological impact should be comparable to a "significant" social impact, and so on.

To achieve this goal, the method the team used consists of:

- a standard, overall evaluation framework that applies to impacts in all different resource areas;
- a series of resource-specific impact definitions; and
- a standard "formula" for combining impact factors into an overall level of significance.

This method is described below.

A STANDARDIZED FRAMEWORK

For each of the impact factors (extent, duration, etc.), the team identified several standard "levels" or categories. Thus, for example, the team established three standard levels of "extent"(large, medium, or small) for any impact on any resource. Similarly, the standard categories of "duration" were set as long-term and short-term.

The team also established standard levels of significance, significant, or less than significant.

RESOURCE-SPECIFIC IMPACT DEFINITIONS

Within each resource area, team members then formulated resource-specific definitions of what would constitute an impact of large extent, an impact of medium duration, etc. Thus, the definition of what would constitute a long-term noise impact was based on consideration of noise standards and the expertise of team members. The definition of what would constitute a long-term biological impact was based on ecological considerations, and so on. The result is that the definition of "long-term" in one resource area need not match the definition of long-term in other areas.

FORMULA FOR COMBINING IMPACT FACTORS

In this step, the team used their professional judgment and discussion, to identify what levels of impact factors would combine to yield a given level of significance. Obviously, an impact whose extent was categorized as "large," a duration that was long-term, a magnitude that was major, and a likelihood/occurrence that was certain, should be considered "significant." At the other extreme, an impact that was small in extent, of short-term duration, with minor magnitude, and highly unlikely even to occur, could reasonably be considered "less than significant." The table below summarizes the team's judgment as to the degree of significance that the many other possible combinations of factors would produce.

Impact Significance

In any resource area, an impact would have this degree of significance if it has any of these combinations of characteristics:

	Magnitude +	**Duration** +	**Extent** +	**Likelihood (Occurrence)**
Significant	Major	Any Level	Large or Medium	Probable
	Major	Long Term	Large or Medium	Possible
	Major	Short-term	Any Level	Possible
	Moderate	Any Level	Large or Medium	Probable
	Major	Any Level	Small	Probable
	Major	Long-term	Small	Possible
	Moderate	Any Level	Large	Possible
	Moderate	Any Level	Medium or Small	Possible
	Moderate	Any Level	Small	Probable
	Major	Any Level	Large	Unlikely
	Major	Long-term	Medium or Small	Unlikely
	Minor	Any Level	Large	Probable
	Minor	Long-term	Medium or Small	Probable
	Major	Short-term	Medium or Small	Unlikely
Less than Significant	Minor	Short-term	Medium	Probable
	Minor	Any Level	Large	Possible
	Minor	Long-term	Medium or Small	Possible
	Moderate or Minor	Any Level	Any Level	Unlikely
	Minor	Short-term	Medium	Probable
	Minor	Short-term	Small	Probable
	Minor	Short-term	Medium or Small	Possible

Within this overall analysis framework, the following are the resource-specific criteria the team used to evaluate the significance of impacts:

Groundwater

Term	Definition	
Magnitude		
Major	Contamination that poses health risks by sharply exceeding drinking water standards and forcing well closures OR substantial improvement in water quality.	
Moderate	Approaching or slightly exceeding drinking water standards on one or more parameters OR some improvement in drinking water quality on one or more parameters.	
Minor	Degradation of baseline conditions on one or more parameters without approaching or exceeding standards OR minimal improvement on one or more parameters.	
Duration (Duration is parameter- and criteria-specific and must be considered in that context.)	Input-Oriented	Event-Oriented
Long-term	Sufficient period to exhibit chronic effects	Continuous series of events greater than 1 to 2 years
Short-term	Sufficient period to exhibit acute effects	Single event
Extent		
Large	• Effect greater than entire aquifer, or • Greater than 40% of a major aquifer	
Medium (localized)	• Effect greater than 25% of a major aquifer, or • Greater than 50% of a small aquifer, or • Greater than 10 %, but less than 40%, of a major aquifer	
Small (limited)	Effect less than 25% of a single aquifer, or less than 10% of a major aquifer	
Occurrence		
Probable	Occurs under typical operating conditions	
Possible	Occurs under worst-case operating conditions	
Unlikely	Occurs under upset/malfunction conditions	

Soils

Term	Definition
Magnitude	
Major	Secondary effects (e.g., building damage, siltation of surface water) OR substantial improvement against erosion.
Moderate	Aesthetic effects
Minor	Imperceptible changes
Duration	
Long-term	Impact lasts more than 2 years
Short-term	Impact lasts less than 2 years
Extent	
Large	Greater than 5 acres of sloping ground or soils impacted
Medium (localized)	Between 1-5 acres of sloping ground or soils impacted
Small (limited)	Less than 1 acre of sloping ground or soils impacted
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Water Resources

Term	Definition
Magnitude	
Major	Immediately observable impact (e.g., fish kills), or any contamination posing secondary health risks OR substantial water quality improvement
Moderate	Some observable biological response (e.g., avoidance) OR some water quality improvement
Minor	No observable biological response
Duration	
Long-term	Conditions persist into the foreseeable future.
Short-term	Conditions persist less than 2 years.
Extent	
Large	• Effect over entire watershed (water body) or multiple watersheds, or • Greater than 40% of major water body
Medium (localized)	• Effect greater than 25% of watershed (basin), or • Greater than 50% of a small water body, or • Greater than 10%, but less than 40%, of a major water body
Small (limited)	Effect less than 25% of a single watershed, or less than 10% of a major water body. May include entire area of 1 to 2 small ponds (less than 5 acres) or a small seasonal wetland
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Airspace

Term	Definition
Magnitude	
Major	Action has the potential for catastrophic event resulting in loss of life, severe injuries requiring hospitalization, or major property damage or loss OR substantial reduction in above risks.
Moderate	Action has the potential to cause moderate injuries, which may require hospitalization, or moderate property damage or loss, chronic health effects that may interfere with one or more bodily functions and impair quality of life OR some reduction in above risks.
Minor	Action unlikely to result in more than minor injuries, which do not require hospitalization, or minor property damage or loss OR minimal reduction in above risks.
Duration	
Long-term	Exposure or risk persists longer than 5 years
Short-term	Exposure or risk persists less than 5 years or is temporary or occasional
Extent	
Large	Extending outside buffer zone into region, state, or nation
Medium (localized)	Confined to within buffer zone, but beyond site or facility
Small (limited)	Confined to site or individual facility on the site
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Aquatic Biological Resources

Term	Definition
Magnitude	
Major	Decline in or loss of any indicator species populations or habitats; loss or degradation of any unusual aquatic communities OR reversely, increase in any indicator species populations or habitats; increase or restoration of an unusual aquatic communities
Moderate	Some decline in or loss of any of any indicator species populations or habitats; some loss or degradation of any unusual aquatic communities OR reversely, some increase in any indicator species populations or habitats; some increase or restoration of an unusual aquatic communities
Minor	Minimal change to aquatic habitat or species in affected area
Duration	
Long-term	Greater than one year
Short-term	Less than one year
Extent	
Large	Effects documented at the population or habitat level
Medium (localized)	Effects documented in groups of individuals (20-100 individuals) or localized level for species outside the species targeted by the action
Small (limited)	Effects are limited to scattered individuals (<20 individuals) for species outside the species targeted by the action
Occurrence	
Probable	Occurs during typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Terrestrial Biological Resources (includes Vegetation)

Term	Definition
Magnitude	
Major	Decline in or loss of any indicator species populations or habitats; loss or degradation of any unusual communities OR reversely, increase in any indicator species populations or habitats; increase or restoration of an unusual communities
Moderate	Some decline in or loss of any indicator species populations or habitats; some loss or degradation of any unusual communities OR reversely, some increase in any indicator species populations or habitats; some increase or restoration of an unusual communities
Minor	Minimal change to terrestrial habitat or species in affected area.
Duration	
Long-term	Greater than 1 year (or during critical periods)
Short-term	Less than 1year
Extent	
Large	Greater than 5% of regional (as defined by county or space center boundaries, if known) resources
Medium (localized)	2% to 5% of regional resources
Small (limited)	Less than 2% of regional resources
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Wetlands/Floodplains

Term	Definition
Magnitude	
Major	Wetland is so completely altered as to lose a majority of wetland habitat value or function OR is so completely restored/created as a majority is functional
Moderate	Wetland retains some of its wetland habitat value or function OR some restoration
Minor	Wetland retains most its wetland habitat value or function
Duration	
Long-term	Impact lasts more than 2 years
Short-term	Impact lasts less than 2 years
Extent	
Large	Greater than 5% of the regional resource
Medium (localized)	2% to 5% of the regional resource
Small (limited)	Less than 2% of the regional resource
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Source: Executive Order 11990: Protection of Wetlands.

Threatened, Endangered, or other Sensitive Species

Term	Definition
Magnitude	
Major	Impact threatened or endangered species (T&E) that causes loss or degradation of habitat or impacts that could be consider taking of a species OR Impact to T&E species are such that protection is substantially improved
Moderate	Some disturbance or benefit to T&E, but not enough to change the viability of the resources.
Minor	Minimal change to T&E species in affected area
Duration	
Long-term	Greater than one year
Short-term	Less than one year
Extent	
Large	Effects documented at the population or habitat level
Medium (localized)	Effects documented in groups of individuals (20-100 individuals) or localized level for species outside the species targeted by the action
Small (limited)	Effects are limited to scattered individuals (<20 individuals) for species outside the species targeted by the action
Occurrence	
Probable	Occurs during typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Human Health and Safety

Term	Definition
Magnitude	
Major	Action has the potential for catastrophic event resulting in loss of life, severe injuries requiring hospitalization, or major property damage or loss; chronic health effects may be debilitating or severely impair quality of life (e.g. neurological damage), or raise incidence of life-threatening diseases (e.g. lung cancer, emphysema) OR reduces above risks/incidents
Moderate	Action has the potential to cause moderate injuries, which may require hospitalization, or moderate property damage or loss, chronic health effects that may interfere with one or more bodily functions and impair quality of life OR reduces above listed risks/incidents
Minor	Action unlikely to more than result in minor injuries, which do not require hospitalization, or minor property damage or loss OR reduces above listed risks/incidents.
Duration	
Long-term	Exposure or risk persists longer than 2 years
Short-term	Exposure or risk persists less than 2 years or is temporary or occasional
Extent	
Large	Extending outside buffer zone into region, state, or nation
Medium (localized)	Confined to within buffer zone into region, state, or nation
Small (limited)	Confined to site or individual facility on the site
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Land Use

Term	Definition
Magnitude	
Major	Unavoidable, not mitigable conflict OR greatly reduces conflict between land uses
Moderate	Unavoidable conflict but some mitigation is possible OR some reduction in conflict with mitigation possible
Minor	Conflict can be substantially mitigated OR minimal reduction in conflict.
Duration	
Long-term	Conflict lasts more than 5 years
Short-term	Conflict lasts less than 5 years or is temporary and occasional
Extent	
Large	Proposed project impacts an area greater than 5% of the planning area jurisdiction
Medium (localized)	------
Small (limited)	Proposed project impacts an area less than 5% of the planning area jurisdiction
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Alter Visual Quality

Term	Definition
Magnitude	
Major	A modification, which is dominant in the landscape and demands attention.
Moderate	A modification, which attracts attention, but is not dominant.
Minor	A modification, which can be seen, but does not attract attention.
Duration	
Long-term	Alteration lasts 5 years or more
Short-term	Alteration lasts less than 5 years or is temporary or occasional
Extent	
Large	Visual quality is altered for more than 1,000 people
Medium (localized)	Visual quality is altered for 100 to 1,000 people
Small (limited)	Visual quality is altered for less than 100 people
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

Recreation

Term	Definition
Magnitude	
Major	Project would eliminate OR create areas of prime or unique recreation opportunities or facilities
Moderate	Reduction OR creation of recreational opportunities within the area.
Minor	Slight modification of recreation opportunities within the area.
Duration	
Long-term	Impact lasts more than 5 years
Short-term	Impact lasts less than 5 years or is occasional
Extent	
Large	Affects users from more than 100 miles away
Medium (localized)	Affects users from about 50 miles away
Small (limited)	Predominantly local users
Occurrence	
Probable	Occurs under typical operating conditions
Possible	Occurs under worst-case operating conditions
Unlikely	Occurs under upset/malfunction conditions

APPENDIX B

APPLICABILITY ANALYSIS UNDER THE GENERAL CONFORMITY RULE

1.0 Summary

The total direct and indirect emissions were estimated for the Wildlife Control Program at Williams Lake, in the northeast sector of Buckley Air Force Base (BAFB), Colorado. Emissions from the following activities were accounted for:

- Installation of wire-grid system above Williams Lake.

General Conformity under the Clean Air Act, Section 176 has been evaluated according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this action because:

The highest total annual direct and indirect emissions from this proposed action have been estimated at 0.13 tons nitrogen oxides (NO_x), 0.03 tons volatile organic compounds (VOCs), 0.10 tons carbon monoxide (CO), and 0.14 tons particulate matter less than 10 microns in diameter (PM_{10}), which would be below the conformity threshold values 100 tons per year (tpy), and would not be *regionally significant*.

Notably, Alternative B: Add a Wire-Grid System over Williams Lake is the focus of this evaluation. If Alternative C: Drain Williams Lake is ultimately chosen additional analysis would be required to determine the applicability of the general conformity rule.

2.0 National Ambient Air Quality Standards and Attainment Status

U.S. Environmental Protection Agency (USEPA) Region 8 and the Colorado Department of Public Health and the Environment (CDPHE) regulate air quality in Colorado. The Clean Air Act (CAA) (42 U.S.C. 7401-7671q), as amended, gives the USEPA the responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) that set acceptable concentration levels for seven criteria pollutants: particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), nitrous oxides (NO_x), ozone (O_3), and lead. Short-term NAAQS (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term NAAQS (annual averages) have been established for pollutants contributing to chronic health effects. Each state has the authority to adopt standards stricter than those established under the federal program; however, the State of Colorado accepts the federal standards.

Federal regulations designate Air Quality Control Regions (AQCRs) in violation of the NAAQS as *nonattainment* areas. Federal regulations designate AQCRs with levels below the NAAQS as *attainment* areas. *Maintenance* AQCRs are areas that have previously been designated nonattainment and have been redesignated to attainment for a probationary period through implementation of maintenance plans. According to the severity of the pollution problem, nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme.

Arapahoe County (therefore the proposed site) is within the Metropolitan Denver Air Quality Control Region AQCR (AQCR 36) (40 CFR 81.16). The USEPA has designated Arapahoe County as the following:

- Moderate nonattainment for the 8-hour O_3 NAAQS,
- Maintenance Area for the CO NAAQS,
- Maintenance Area for the PM_{10} NAAQS,
- Attainment for all other criteria pollutants (40 CFR 81.306).

3.0 Clean Air Act Conformity and Applicability

The CAA contains the legislation that mandates the General Conformity Rule (GCR) to ensure that federal actions in designated nonattainment and maintenance areas do not interfere with a state's timely attainment of the NAAQS. The GCR divides the air conformity process into two distinct areas: applicability analysis and conformity determination. The applicability analysis process requires federal agencies to determine if their proposed action(s) would increase emissions of criteria pollutants above

preset threshold levels (40 CFR §93.153). These threshold rates vary depending on severity of the nonattainment and geographic location. Notably, the state of Colorado has adopted the federal standard in whole by references (5 Code of Colorado Regulations (CCR) 1001-12). Due to its 8-hour Ozone nonattainment status and the CO and PM_{10} maintenance status, the applicability thresholds for the area are 100 tons per year for NO_x, VOCs, CO, and PM_{10}.

The conformity regulation defines *regionally significant* emissions as the total direct and indirect emissions of a federal action that represents 10 percent or more of an area's total emissions for a criteria pollutant. A general conformity determination would be required if emissions are regionally significant, even if they are below the applicability threshold.

4.0 Emissions Calculations

Construction. All direct and indirect NO_x, VOC, CO, and PM_{10} emissions from construction actives were estimated. Detailed emission calculations are located in Attachment 1. These estimates include emissions from the following activities:

- Construction equipment during initial grid installation,
- Surface disturbance during initial grid installation,
- Delivery of equipment and supplies during initial grid installation, and
- Workers' commutes.

Operations. NO_x, VOC, CO, and PM_{10} emissions from operational activities were estimated. Detailed emission calculations are located in Attachment 1. These estimates include emissions from the following activities:

- Worker commutes to the site during annual grid installation and removal.

Notably, emission estimations were made using emission factors from a variety of sources, including:

- *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* (USAF 1999),
- *USEPA Compilation of Air Pollutant Emission Factors, AP-42, 5th edition, Vol. I: Stationary Point and Area Sources* (USEPA 1995),
- *CEQA Air Quality Handbook* (SCAQMD 1993), and
- *EMFAC 2007 (v2.3) Emission Factors* (CARB 2007a, 2007b).

Different approaches and "fine-tuning" these estimates may be possible based on localized conditions, and regional variations in emission sources. However, due to the limited size and scope of the proposed action, these refinements would not substantially change the total emissions, or applicability determination outlined herein.

5.0 Applicability Determination

The estimated emission rates for the action were below the applicability thresholds and are not regionally significant. Therefore, the GCR does not apply, and a general conformity determination is not required (Tables A-1 and A-2).

Table A-1 – Construction Emissions: Applicability Review						
Criteria Pollutant	**Construction Emissions (tpy)**	**Regional Emissions (tpy)**	**Percent Regional Emissions**	**Regionally Significant (Yes/No)**	**Applicability Threshold [tpy]**	**Exceeds *De Minimis* Thresholds? [Yes/No]**
NO_x	0.13	141,620[a]	<0.0001%	No	100	No
VOC	0.03	408,435[a]	<0.0001%	No	100	No
CO	0.10	662,110[b]	<0.0001%	No	100	No
PM_{10}	0.14	33,580[c]	<0.0001%	No	100	No

Sources: CDPHE 2008, 2005a, 2005b

Table A-2 – Operational Emissions: Applicability Review						
Criteria Pollutant	**Operational Emissions (tpy)**	**Regional Emissions (tpy)**	**Percent Regional Emissions**	**Regionally Significant (Yes/No)**	**Applicability Threshold [tpy]**	**Exceeds *De Minimis* Thresholds? [Yes/No]**
NO_x	<0.01	141,620[a]	<0.0001%	No	100	No
VOC	<0.01	408,435[a]	<0.0001%	No	100	No
CO	0.01	662,110[b]	<0.0001%	No	100	No
PM_{10}	<0.01	33,580[c]	<0.0001%	No	100	No

Sources: CDPHE 2005a, 2005b, 2008

Attachment 1 Emission Calculations

Table A1-1 – General Project Information		
Construction Duration	1	Month
Number of Construction Workers	7	Workers
Number of Annual Installers	5	Workers
Installation Frequency	2	Times Per Year
Days to Install	5	Days

Table A1-2 – Construction Emissions				
Construction Equipment Use				
Equipment Type	**Number of Units**	**Days on Site**	**Hours Per Day**	**Operating Hours**
Trenchers Composite	1	19	8	153
Cement & Mortar Mixers	1	19	6	115
Tractors/Loaders/Backhoes	1	19	7	134
Construction Equipment Emission Factors (pounds (lbs)/hour)				
Equipment	**CO**	**NO_x**	**VOC**	**PM_{10}**
Trenchers Composite	0.5080	0.8237	0.1851	0.0688
Cement and Mortar Mixers	0.0447	0.0658	0.0113	0.0044
Tractors/Loaders/Backhoes	0.4063	0.7746	0.1204	0.0599
Construction Equipment Emissions (tons)				
Equipment	**CO**	**NO_x**	**VOC**	**PM_{10}**
Trenchers Composite	0.0389	0.0632	0.0142	0.0053
Cement and Mortar Mixers	0.0026	0.0038	0.0006	0.0003
Tractors/Loaders/Backhoes	0.0273	0.0520	0.0081	0.0040
Total	**0.07**	**0.12**	**0.02**	**0.01**
Source: CARB 2007b				

Table A1-3 – Delivery of Equipment and Supplies				
Number of Deliveries	1			
Number of Trips	2			
Miles Per Trip	30			
Delivery days	10			
Total Miles	575			
Pollutant	**CO**	**NO_x**	**VOC**	**PM_{10}**
Emission Factor (lbs/mile)	0.0219	0.0237	0.0030	0.0009
Total Emissions (lbs)	12.62	13.63	1.72	0.49
Total Emissions (tons)	**0.01**	**0.01**	**0.00**	**0.00**
Source: CARB 2007a				

Table A1-4 – Surface Disturbance				
Total Suspended Particulates (TSP) Emissions	80	lbs/acre		
PM_{10}/TSP	0.45			
Period of Disturbance	30	days		
Capture Fraction	0.5			
Building/Facility	**Area [acres]**	**TSP[lbs]**	**PM_{10}[lbs]**	**PM_{10}[tons]**
All Facilities	0.3	600	270	0.14
Total	**0.3**	**600**	**270**	**0.14**
Sources: USEPA 1995, 2005				

Table A1-5 – Worker Commutes				
Number of Workers	7			
Number of Trips	2			
Miles Per Trip	30			
Days of Construction	10			
Total Miles	4,025			
Pollutant	**CO**	**NO_x**	**VOC**	**PM_{10}**
Emission Factor (lbs/mile)	0.0105	0.0011	0.0011	0.0001
Total Emissions (lbs)	42.46	4.44	4.34	0.34
Total Emissions (tons)	**0.02**	**0.00**	**0.00**	**0.00**
Source: CARB 2007a				

Table A1-6 – Total Construction Emissions (tons)				
Activity/Source	**CO**	**NO_x**	**VOC**	**PM_{10}**
Construction Equipment	0.07	0.12	0.02	0.01
Delivery of Equipment and Supplies	0.01	0.01	0.00	0.00
Surface Disturbance	0.00	0.00	0.00	0.14
Worker Commutes	0.02	0.00	0.00	0.00
Total Construction Emissions	**0.10**	**0.13**	**0.03**	**0.14**

Table A1-7 – Grid Installers Commutes				
Number of Annual Installers	5			
Number of Trips	2			
Miles Per Trip	30			
Days to Install	5			
Total Miles	1,500			
Pollutant	**CO**	**NO_x**	**VOC**	**PM_{10}**
Emission Factor (lbs/mile)	0.0105	0.0011	0.0011	0.0001
Total Emissions (lbs)	15.82	1.65	1.62	0.13
Total Emissions (tons)	**0.01**	**0.00**	**0.00**	**0.00**
Source: CARB 2007a				

Table A1-8 – Total Operational Emissions (tons)				
Activity/Source	**CO**	**NO_x**	**VOC**	**PM_{10}**
Grid Installers Commutes	0.01	<0.01	<0.01	<0.01
Total Operational Emissions	0.01	<0.01	<0.01	<0.01

APPENDIX C

PUBLIC INVOLVEMENT AND AGENCY COORDINATION

Below is a sample letter that accompanied the draft EA sent to each individual listed in Chapter 5.0.

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Dan Beley
Colorado Dept. of Public Health & Environment
Water Quality Control Division
WQCD-OQ-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Dear Mr. Beley,

The US Air Force (USAF) has prepared a Draft Environmental Assessment (EA) for a wildlife control program at Williams Lake on Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the USAF proposes to construct a wire-grid system over the surface of Williams Lake that will deter waterfowl landings and takeoffs from that surface. The Proposed Action is needed in order to satisfy aircraft operations needs and reduce bird aircraft strike hazards at BAFB, improve safety for pilots and reduce costs of aircraft damage or loss, satisfy base mission objectives, satisfy elements of the Buckley AFB Integrated Natural Resources Plan, and support objectives of the National Security Strategy.

The public comment period for this EA is 30 days. Please provide any written comments by 5pm on Monday, 26 December 2009 to:

Mr. Scott Wilson
460 CES/CEVP
660 South Aspen Street, Mail Stop 86
Buckley AFB, CO 80011-9551

If you have any questions please feel free to contact Scott Wilson at 720-847-7159, or via e-mail: scott.wilson@buckley.af.mil.

BRUCE JAMES, YF-02
Chief, Environmental Flight

GUARDIANS OF THE HIGH FRONTIER

Below are the responses received by the end of the public comment period.

Colorado Dept. of Public Health & Environment

From: LEE J Pivonka [mailto:ljpivonk@cdphe.state.co.us]
Sent: Tuesday, December 22, 2009 5:09 PM
To: Wilson Scott T Mr Civ USAF AFSPC 460 CES/CEV
Cc: James, Bruce R Mr Civ USAF AFSPC 460 CES/CEV; David Rathke
Subject: Buckley AFB: November 2009 Draft Environmental Assessment, Williams Lake Wildlife Control

Hi Scott,

I have reviewed the subject document and I have no substantive comments.

Thanks,

Lee

City of Aurora

Planning Department
15151 E. Alameda Parkway
Aurora, Colorado 80012
Phone: 303-739-7250
Fax: 303-739-7268
www.auroragov.org

December 10, 2009

Mr. Scott Wilson
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80111-9551

Dear Mr. Wilson:

Subject: Draft Environmental Assessment for wildlife control program at Williams Lake on Buckley Air Force Base (BAFB), Colorado

Thank you for the opportunity to comment on this document. The city has prepared the following comments relative to the proposed wire-grid system (Alternative B) for wildlife control at Williams Lake on BAFB:

- Staff has reviewed the Environmental Assessment and concurs that the proposed action, Alternative B, is the best alternative for minimizing environmental impact to Williams Lake and limiting bird strikes to aircraft. The city has no issues or concerns regarding this project.

Please contact me at (303) 739-7227 with any questions about this comment.

Sincerely,

R. Porter Ingrum
Airport Noise Coordinator
Comprehensive Planning Division

RPI/
cc: J. Fernandez
K. Hancock

OFFICE *of* ARCHAEOLOGY *and* HISTORIC PRESERVATION

November 24, 2009

Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Re: Wildlife Control Program at Williams Lake on Buckley Air Force Base. (CHS #56038)

Dear Mr. James,

Thank you for your correspondence dated and received on November 23, 2009 regarding the consultation of the above-mentioned project under Section 106 of the National Historic Preservation Act (Section 106).

After review of the provided additional information, we do not have any comment related to the draft Environmental Assessment. We recommend initiating consultation with our office in order to complete the Section 106 review process of the National Historic Preservation Act.

If unidentified archaeological resources are discovered during construction, work must be interrupted until the resources have been evaluated in terms of the National Register criteria, 36 CRF 60.4, in consultation with this office.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings.

Please note that our compliance letter does not end the 30-day review period provided to other consulting parties. If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Manager, at (303) 866-4678.

Sincerely,

Edward C. Nichols
State Historic Preservation Officer

COLORADO HISTORICAL SOCIETY
1300 Broadway Denver Colorado 80203 Tel 303/866-3395 Fax 303/866-2711 www.coloradohistory-oahp.org