National Aeronautics and
Space Administration

FINAL NASA SCIENTIFIC BALLOON PROGRAM SUPPLEMENTAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

NASA Goddard Space Flight Center
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Wallops Island, Virginia

August 2025

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FINAL

NASA SCIENTIFIC BALLOON PROGRAM

SUPPLEMENTAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

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Proposed Action: Scientific Balloons to be Launched from a New Launch Site

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Abstract: For over 35 years, NASA has launched and monitored the flights of scientific balloons launched from the Columbia Scientific Balloon Facilities (CSBF) at the Fort Sumner Municipal Airport in the Village of Fort Sumner, New Mexico, and in Palestine, Texas. Scientific balloons are used to collect scientific data and conduct research in the fields of geoscience, heliophysics, and astrophysics while operating in a near-space environment. Currently up to 31 scientific balloons are launched each year. NASA proposes to expand the scientific balloon program by: increasing the number of scientific balloons launched each year to a maximum of 41; adding a new launch site in Burns, Oregon; adding a new tracking site in Idaho Falls, Idaho; and improving and constructing facilities at the Fort Sumner, Palestine, and proposed Burns launch sites. In accordance with the National Environmental Policy Act, NASA has prepared this Scientific Balloon Program Supplemental Programmatic Environmental Assessment (PEA) to evaluate the potential environmental effects of the proposed action.

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
AFFF	aqueous film-forming foam
ANSI	American National Standards Institute
APE	Area of Potential Effect(s)
ARTCC	Air Route Traffic Control Center
BPO	Balloon Program Office
CAA	Clean Air Act
CFR	Code of Federal Regulations
CSBF	Columbia Scientific Balloon Facility
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
FAA	Federal Aviation Administration
FL	flight level
FONSI	Finding of No Significant Impact
ft^2	square feet
GSA	Government Services Administration
GSFC	Goddard Space Flight Center
lb(s)	pound(s)
LBP	lead-based paint
LCP	lead-containing paint
LOA	letter of agreement
MOSI E&SR	Management Operations Services and Information Environmental and Safety Review
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
nm	nautical mile
NOA	Notice of Availability
NOI	Notice of Intent
NOTAM	Notice to Air Missions
NO_2	nitrogen dioxide
NPR	NASA Procedural Requirement
NRHP	National Register of Historic Places
NSF	National Science Foundation
O_3	ozone
PCBs	polychlorinated biphenyls
PEA	Programmatic Environmental Assessment
PFAS	per- and polyfluoroalkyl substances
SDS	Safety Data Sheet
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SULMA	Special Use Land Management Area
THPO	Tribal Historic Preservation Office
UNESCO	United Nations Educational, Scientific and Cultural Organization
U.S.	United States
U.S.C.	United States Code
USCB	U.S. Census Bureau
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WFF	Wallops Flight Facility
yd^3	cubic yard(s)

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1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION

1.1 INTRODUCTION

For over 35 years, the National Aeronautics and Space Administration (NASA) Balloon Program Office (BPO) has administered, launched, and monitored the flights of scientific balloons from two launch sites in the United States (U.S.): the Columbia Scientific Balloon Facility (CSBF) located at the Fort Sumner Municipal Airport in the Village of Fort Sumner, New Mexico, and CSBF located in Palestine, Texas (**Figure 1.1-1**). Scientific balloons are used to collect scientific data and conduct research in the fields of geoscience, heliophysics, and astrophysics while operating in a near-space environment. Significant finds, such as the discovery of the ozone hole above the Antarctic in the mid-1980s, have been made by instruments tested or operated on balloon missions launched from these sites.

Main Entrance to CSBF Palestine

In 2010, NASA prepared a Programmatic Environmental Assessment (PEA) that evaluated the potential environmental consequences associated with up to 31 launches per year, 25 originating from CSBF Fort Sumner and 6 from CSBF Palestine (NASA 2010). The NASA BPO anticipates the maximum number of launches from these two existing sites would remain at a maximum of 31 over the next 10 years. To provide more opportunities to launch heavy payloads, NASA BPO proposes to increase the annual number of scientific balloon launches each year to a maximum of 41, by adding 10 annual launches from a new launch site in Burns, Oregon and a new tracking station in Idaho Falls, Idaho (**Figure 1.1-2**). At this time, it is unknown if NASA would lease or purchase land for facilities at the proposed Burns launch site.

In order to update the 2010 NASA Scientific Balloon Program Final PEA, NASA has prepared this Supplemental PEA in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, (42 United States Code [U.S.C.] 4321–4370), as amended by the Fiscal Responsibility Act of 2023 (Public Law [P.L.] No. 118-5, div. C, tit. III, § 321(b), 137 Stat. 10, 40 (amending NEPA § 107) (2023) (codified at 42 U.S.C. § 4336a)), The 2010 Final PEA is hereby incorporated by reference with new information and analysis provided as appropriate.

This Supplemental PEA presents the potential environmental consequences associated with the ongoing scientific balloon mission activities from launch to recovery at the two existing launch sites, and from the proposed new launch site as well as construction and demolition at each site. The analysis includes the No Action Alternative in which the NASA BPO would continue scientific balloon launches at existing facilities but would not add a new launch site, tracking station, or conduct any construction or demolition at the existing CSBF Palestine or CSBF Fort Sumner.

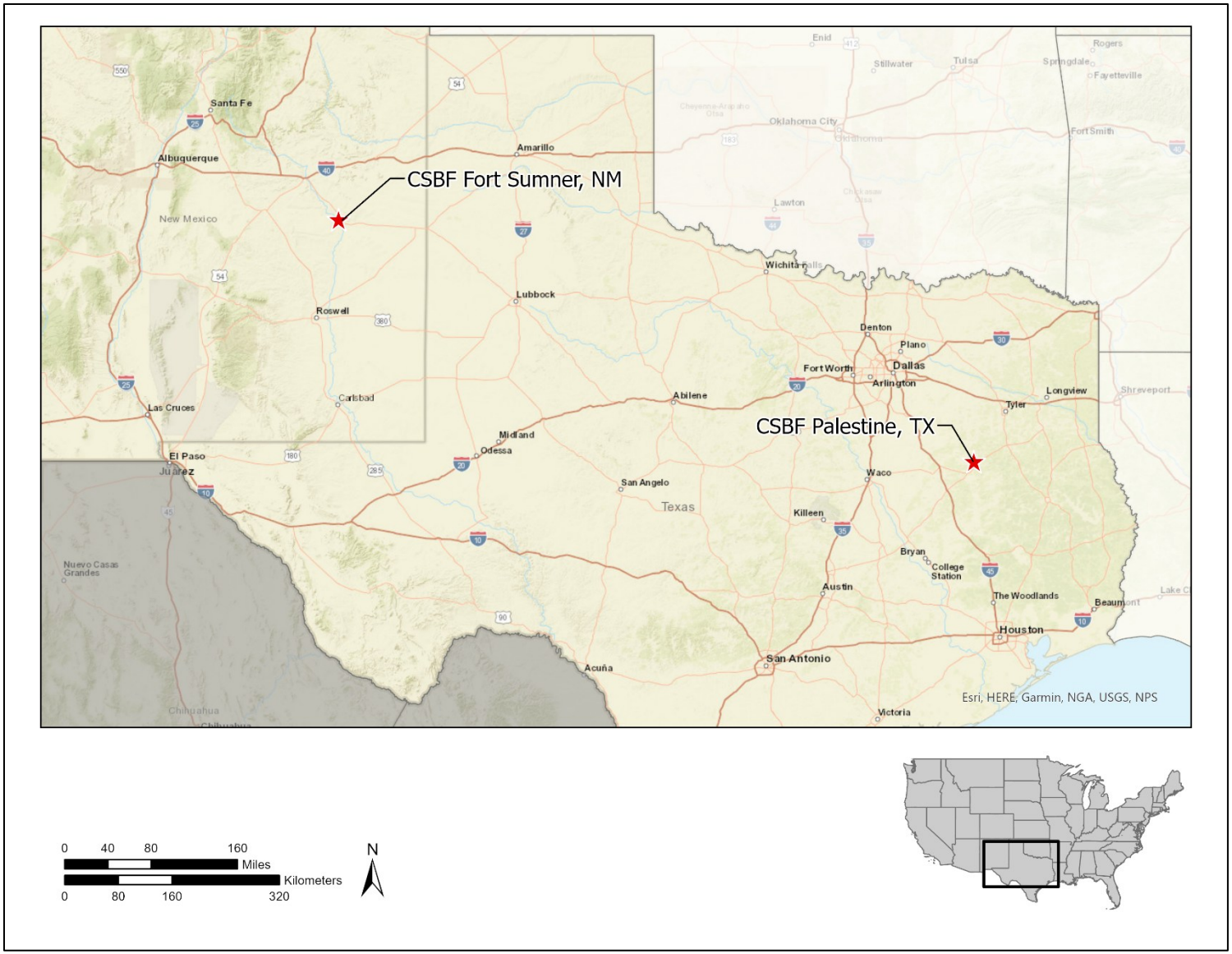


Figure 1.1-1. Location of CSBF Fort Sumner and CSBF Palestine

Figure 1.1-2. Location of the Proposed Launch Site in Burns, Oregon

1.2 BACKGROUND

The 2010 Final PEA provides the history of the NASA scientific balloon program including acquisition and use of CSBF Fort Sumner and CSBF Palestine. The mission of NASA BPO is to provide knowledgeable service and technical expertise to NASA centers and college universities worldwide in the launch, tracking, and recovery of scientific experiments suspended from large, high-altitude, scientific balloons.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The primary purpose of the NASA Scientific Balloon Program is to support NASA's Science Mission Directorate for research initiatives conducted in a near-space environment. This includes NASA science disciplines of Particle Astrophysics, Geospace Science, Infra-red/Submillimeter Astrophysics, Gamma Ray/X-Ray Astrophysics, Solar and Heliospheric Physics, Planetary Science, and Earth Science. The NASA scientific balloon program offers scientists and engineers a low-cost opportunity to explore an experimental concept and develop the hardware to gather and measure near-space data for analysis. Significant contributions have been made to NASA's science program from measurements taken by scientific balloon-borne instruments. Many indirect contributions have also been made to NASA's science program from instruments that were developed and tested using scientific balloons.

NASA's scientific balloon program has seen a dramatic increase in the demand to test more sophisticated equipment and experiments. Because of the flexibility and flight longevity of the program, a steady stream of new instrumentation can be tested on scientific balloons. Each year, the NASA BPO accepts applications from scientific researchers and students requesting support. The applications that are selected are chosen based on scientific and technical merit; however, many are not selected due to the high demands at the existing launch sites. Therefore, NASA BPO proposes to increase the number of launches each year by 10 to a total of 41 launches by adding a launch site to meet new science mission desires, i.e., larger payload (physical size, shape, and weight) and longer afloat times than can be accommodated at the existing launch sites.

1.4 RELEVANT LAWS AND REGULATIONS

The laws, regulations, and Executive Orders (EOs) listed below include, but are not limited to, the regulatory framework pertinent to the implementation of the Proposed Action:

NEPA (42 United States Code [U.S.C.] sections 4321–4370h)
Clean Air Act (42 U.S.C. section 7401 et seq.)
Clean Water Act (33 U.S.C. section 1251 et seq.)
National Historic Preservation Act (54 U.S.C. section 306108 et seq.)
Endangered Species Act (16 U.S.C. section 1531 et seq.)
Migratory Bird Treaty Act (16 U.S.C. sections 703–712)
Bald and Golden Eagle Protection Act (16 U.S.C. sections 668–668d)
Toxic Substances Control Act (15 U.S.C. sections 2601–2629)
Resource Conservation and Recovery Act (42 U.S.C. section 6901 et seq.)
EO 12088, Federal Compliance with Pollution Control Standards
EO 13175, Consultation and Coordination with Indian Tribal Governments

1.5 PUBLIC AND AGENCY INVOLVEMENT AND INTERGOVERNMENTAL COORDINATION

NEPA directs agencies to involve the public and agencies in preparing and implementing their NEPA procedures.

1.5.1 Public and Agency Involvement

The following steps have been taken to involve the public and agencies in the preparation of this Supplemental PEA:

- **Scoping Letters.** Scoping letters that describe NASA's Proposed Action were provided to potential stakeholders. The letter provided background on the scientific balloon program and a figure showing the existing and proposed launch sites and down range support sites, as well as the existing and proposed operation areas where scientific balloons and payload would be recovered. The scoping letter requested comments on the Proposed Action, which would be considered in the development of the Supplemental PEA. Stakeholders were given 30 days to provide comments to NASA Wallops Flight Facility (WFF). The scoping period ended on February 18, 2025; NASA received seven letters during the scoping period.
- **Draft Supplemental PEA.** The draft Supplemental PEA analyzed the environmental consequences of the Proposed Action and No Action Alternative. Emails and letters were sent to national, regional, and state agencies located within the existing and proposed operations areas. A Notice of Availability (NOA) was placed in the *Federal Register* notifying the public of the availability of the draft Supplemental PEA for review on the internet at: https://www.nasa.gov/goddard/memd/nepa/NASA-Balloon-SPEA. An advertisement was also placed in the following newspapers: the Palestine Herald (Texas), the DeBaca County News (New Mexico), and the Burns Times-Herald (Oregon). The 30-day public comment period ended on June 16, 2025. Four letters were received..
- **Final Supplemental PEA and Finding of No Significant Impact (FONSI).** This final Supplemental PEA is a revision of the draft Supplemental PEA, which incorporates comments received. It provides the decision-maker a comprehensive review of the Proposed Action and the potential environmental effects. The final Supplemental PEA and FONSI is available for review on the internet at: https://www.nasa.gov/goddard/memd/nepa/NASA-Balloon-SPEA.
  Notices of the Final PEA and FONSI were placed in the *Federal Register* and in the following newspapers: the Palestine Herald (Texas), the DeBaca County News (New Mexico), and the Burns Times-Herald (Oregon).

Appendix A provides the public notices, the list of agencies consulted, and comments received from the public and agencies. NASA did not hold public meetings during the preparation of this Supplemental PEA, nor did NASA receive a request from the public to host a public meeting.

1.5.2 Intergovernmental Consultation and Coordination

In accordance with Section 106 of the National Historic Preservation Act (NHPA) (36 CFR 800.3(f)(2)) and EO 13175, *Consultation and Coordination with Indian Tribal Governments*, NASA is consulting with federally recognized Native American tribes within the NASA BPO operations areas regarding the Proposed Action and environmental impact analysis. Emails and letters were sent to tribes located within the existing and proposed operations areas seeking comments during the 30-day scoping period on the

Proposed Action to be considered in the subsequent development of the Supplemental PEA. Emails and letters were also sent to the same tribes providing them the opportunity to review and comment on the findings presented in the draft Supplemental PEA and draft FONSI during the 30-day public comment period. **Appendix B** provides the list of tribes consulted, the NHPA Section 106 Government-to-Government consultation letter, and email, and comments received during this consultation.

2.0 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVES

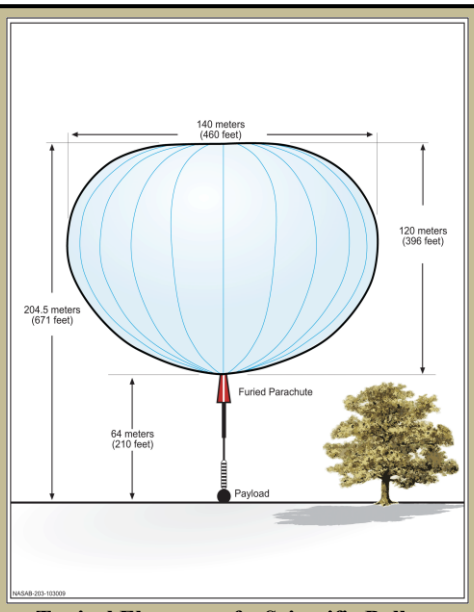
This chapter provides a description of NASA's scientific balloon launch/flight operations originating from CSBF Fort Sumner and CSBF Palestine, and from the proposed Burns site (refer to **Figures 1.1-1 through 1.1-2**). **Section 2.1** describes the flight elements of the scientific balloon program. **Section 2.2** defines the "envelope" concept used throughout this document to assess effects from a generic or typical scientific balloon and payload system. **Section 2.3** describes the flight procedures of the scientific balloon program. **Section 2.4** presents the Proposed Action. **Section 2.5** provides a description of the No Action Alternative; the No Action Alternative reflects the *status quo*. **Section 2.6** provides a table that summarizes the potential environmental effects to each resource area analyzed in this Supplemental PEA.

2.1 ELEMENTS OF A BALLOON FLIGHT SYSTEM

Typical elements of a NASA scientific balloon flight system include the scientific balloon, parachute, flight train assembly, and gondola/payload with integrated scientific instrumentation suspended from the bottom of the scientific balloon. A standard scientific balloon is composed of thin sheets of polyethylene film (much like a typical food storage bag) sealed together with enclosed polyester fibers. Inflation of a typical scientific balloon requires approximately 4,587 cubic yards (yd^3) of gaseous helium. Scientific balloons can reach altitudes of 30 miles above the earth, carry payloads up to 8,000 pounds (lbs), and stay aloft for up to 36 hours. The distance the scientific balloon system may travel from the launch site varies between a few miles to a few hundred miles. The distance is determined by the mission requirements, as well as seasonal variability of upper atmospheric winds.

Government and private sector research scientists submit flight applications to NASA's BPO which reviews, approves and schedules flights. Following approval, staff begin meeting with the applicants to discuss specific requirements and the criteria that would yield a successful mission.

Most scientific balloon flights are scheduled during the spring (generally March to June) or fall (generally August to October) campaign periods at CSBF Fort Sumner. During these periods, "stratospheric turnaround" occurs. Turnaround is a period of a few days when the stratosphere above the jet stream (approximately 19 to 28 miles above the earth) slows and changes zonal direction. As a result, scientific balloons remain aloft nearer to the launch facilities and stay aloft longer, extending the data collection periods. Balloon flights occur outside these times as well and are scheduled based on conditions necessary to ensure a successful mission.



Typical Elements of a Scientific Balloon Flight System

2.2 ENVELOPE CONCEPT

Because a number of different scientific balloons and payloads could be launched, a generic scientific balloon and payload system were chosen for this Supplemental PEA as the demonstration or "envelope" to provide a benchmark for assessing effects on resources at the launch sites and the operations areas. The

envelope scientific balloon and payload defines the characteristics of commonly used materials and systems. Under the envelope concept, existing and future scientific balloon systems possessing similar qualities as the "envelope" would be expected to have less than or equal effects. For example, if the envelope scientific balloon system has an insignificant effect on a resource, a smaller system would also have an insignificant effect. **Table 2.2-1** presents the scientific balloon system envelope evaluated in this PEA. **Table 2.2-2** lists the materials and instruments evaluated as the payload envelope. Minor materials or instruments that are not listed may be included on the scientific balloon system, as long as they pose no substantial hazard to the human environment.

Table 2.2-1. Scientific Balloon System Envelope

Component	Volume	Mass	Length / Size
Parachute assembly and flight train	N/A	992 lbs	131-feet diameter parachute, 85-feet long cable ladder
Scientific Balloon	967,884 yd^3	6,173 lbs	427-feet width x 262-feet height
Ballast material	N/A	1,543 lbs	N/A
Helium	8,894 yd^3	N/A	N/A
Scientific Balloon and parachute lines	N/A	N/A	745 feet
Gondola	N/A	3,968 lbs	10-feet length x 10-feet width x 26-feet height
Pyrotechnics	N/A	<0.006 ounces	N/A

Legend: lbs = pounds; N/A = not applicable; yd^3 = cubic yards.

Table 2.2-2. Payload Materials and Instruments Envelope

Component	Envelope	Additional Documentation Required
Radio Frequency	Electromagnetic fields must be within American National Standards Institute (ANSI)-recognized acceptable levels as stated in Institute of Electrical and Electronics Engineers C95.1-1991.	Radio frequency data confirming compliance
Lasers	Meets ANSI Safety standards (ANSI Z136.1-2000 and Z136.6-2000).	Laser data confirming compliance
Radioactive Materials	Quantity and type of radioactive material are within the approval authority level of the NASA Nuclear Flight Safety Assurance Manager.	Copy of Safety Evaluation Report as per NPR 8715.26 Section 3.1
Biological Agents	Biological agents must meet conditions of Biosafety Level 2 of the National Institutes of Health and Centers for Disease Control and Prevention Biosafety in Microbiological and Biomedical Laboratories.	Laboratory data confirming compliance
Chemical Release	Must not pose a substantial hazard and cannot have a significant adverse effect on the atmosphere.	Sufficient analysis to support compliance

2.3 SCIENTIFIC BALLOON FLIGHT PROCEDURES

NASA BPO personnel follow a methodical process of implementing approved scientific balloon flight procedures for each launch. At the launch site, NASA BPO personnel work with the science team to make final flight preparations, including: a pre-flight meeting; integration and testing of the science payload; flight plan and readiness reviews; launch operations; in-flight operations; balloon flight termination; and post-flight recovery operations of the scientific instrumentation, support equipment (i.e., launch vehicle, spool truck, hutch clutch, helium truck and trailer, and portable lighting), and scientific balloon system. Each of these activities is described below.

2.3.1 Pre-Flight Meeting

NASA BPO personnel begin the planning process for each payload/instrument after receiving a flight application. Prior to arriving at the launch site, multiple meetings are held between NASA BPO and the applicant to define all the mechanical, electrical, and data interfaces. Safety requirements are defined based on the systems that are being flown. NASA BPO personnel also perform mechanical certifications of all components to be used in flight.

2.3.2 Integration and Testing of the Science Payload

When the science team arrives at the launch site, NASA BPO personnel conduct a launch site requirements review to ensure any changes to requirements have been captured and incorporated into the latest planning documentation and equipment configurations. Over a few days, the applicant team finishes final payload/instrument flight preparations. The payload is then integrated with the flight support systems. Following integration, a mechanical and electrical compatibility test is conducted, followed by a flight readiness review, after which the integrated science and flight systems are declared "flight ready." On average, it takes 2 to 4 weeks for an applicant to make the payload/instrument flight ready.

Scientific Instrument Preparation in Progress

The Mission Manager presents the results of the flight readiness review to a panel chaired by the WFF Director and consisting of the representatives from the NASA BPO, the Safety Office, and NASA Headquarters. After polling the panel, the WFF Director issues an 'Approval to Proceed'.

Some scientific instruments may include small quantities of materials (e.g., batteries, cryogens, etc.) that could be hazardous to people or the environment (see **Section 3.9, Hazardous Materials and Systems** for more information). Generally, hazardous materials only present potential environmental consequences during preparation of the payload for flight and when the payload lands. To ensure safety requirements are met for both the public and the launch team, the NASA WFF Safety Office plans, develops, and provides policies and procedures that are implemented during ground, flight, and recovery activities. All hazardous materials to be used by a scientific group are identified well in advance of flight activities. NASA BPO has standard procedures in place to contain any spills and to store, handle, and dispose of hazardous material in accordance with all applicable federal and state regulations.

NASA BPO personnel provide electronic communications equipment that is attached to the scientific instruments. The communication interface provides a scientific balloon-to-ground link throughout the duration of the flight, allowing personnel to monitor the flight path of the scientific balloon and send communications, as needed.

The payload/instrument is attached directly to the gondola structure. NASA BPO engineers certify every payload to ensure mechanical integrity. Many payloads include ballast, which is used to control ascent and maintain a stable altitude. The amount of ballast material required is dependent on the weight of the payload, the size of the scientific balloon, and the required float altitude. Ballast consists of inert materials - very

fine glass beads (grain size 0.027 to 0.033 inches) or fine steel shot (grain size 0.012 to 0.020 inches) – that can be released to adjust float altitude. Ballast is normally released in 30 second increments, at a flow rate of 60 pounds per minute and is not likely to be perceptible on the ground.

To be NASA-certified, the gondola must accommodate the scientific instrumentation, ensure survivability of the scientific instrumentation during landing, maintain integrity of the electronic equipment, and have sufficient ballast weight. Provided the gondola design meets NASA requirements, a flight plan and a pre-flight readiness review are completed.

2.3.3 Flight Plan and Readiness

A flight plan and pre-flight readiness review is held no more than 72 hours before an anticipated scientific balloon launch. The flight plan specifies the altitude for scientific balloon "float" and duration at the specified altitude; requirements for maintaining altitude (including release of ballast material); length of time at specific altitudes based on the weight of the scientific balloon system; the number and type of recovery vehicles and crew; and identification of hazardous material, if any, that may be present at the recovery site. To ensure readiness, a compatibility check of the scientific balloon-to-ground communication link is again tested, and certification of the gondola and all rigging equipment (parachute, cables, and hardware) is finalized.

During the pre-flight readiness review period, NASA BPO personnel coordinate with the appropriate Federal Aviation Administration (FAA) Air Route Traffic Control Center (ARTCC). For scientific balloons launched from CSBF Palestine and CSBF Fort Sumner, the Fort Worth, Texas ARTCC is contacted and for balloons that may enter airspace to the west of that, the Albuquerque, New Mexico ARTCC is contacted. For balloons originating from the proposed Burns launch site, the Seattle, Washington ARTCC would be contacted.

Coordination with the ARTCCs includes providing the anticipated launch time and preparation of a Notice to Air Missions (NOTAM) that is disseminated by the appropriate ARTCC to inform pilots of procedures, hazards, or flight activities, temporary or permanent, which may occur within defined airspace units. On launch day, approximately one hour before release/ascent, the NASA BPO personnel notify the appropriate ARTCC, which actively manages flights as needed to ensure flight safety in the region. In addition to the NOTAM, NASA BPO personnel notify the airspace manager at Cannon Air Force Base (located near Clovis, New Mexico) prior to launching scientific balloons from Fort Sumner.

2.3.4 Launch Operations

To have a safe, effective launch, specific weather conditions are required. Winds must be blowing in a constant direction with maximum speeds between 6 and 7 miles per hour (mph) up to 200 vertical feet and not greater than 12 mph from 200 to 1,000 vertical feet. Wind speeds exceeding these conditions could result in damage to the scientific balloon. Launches are delayed if such specifications are not met.

Payload Being Transported to Launch Pad

NASA BPO meteorologists use a small, untethered weather balloon to check wind direction and speed prior to the anticipated launch. If the conditions are

considered favorable, the payload is moved from the staging area to the launch pad. A separate vehicle (spool truck) transports the flight train, scientific balloon, and parachute to the launch pad. NASA BPO mission crews lay out the flight train, balloon, and parachute and rig the scientific balloon system together after which electronic communication systems are given a final check to ensure functionality of the scientific balloon-to-ground link.

Next, the scientific balloon is partially inflated with helium gas; only a fraction of the scientific balloon's volume is filled since the helium expands as it rises. When the scientific balloon has been inflated with the calculated volume of helium required to achieve float altitude, it is released from the launch vehicle and slowly rises. As the scientific balloon's position becomes vertical in relation to the payload, the payload is released from the mobile transport vehicle and the scientific balloon/payload begins ascent. The scientific balloon's ascent is monitored so that the average rate is no less than 400 feet per minute from release to approximately 60,000 feet (11.4 miles or flight level (FL)600).

Filling Balloon

Payload Released

Balloon/Payload in Ascent

Operations Area

The existing operations area spans portions of twelve states (**Figure 2.3-1)**. Balloon and payload collection points from 2009 to 2024 are illustrated on **Figure 2.3-2** (NASA BPO 2022a).

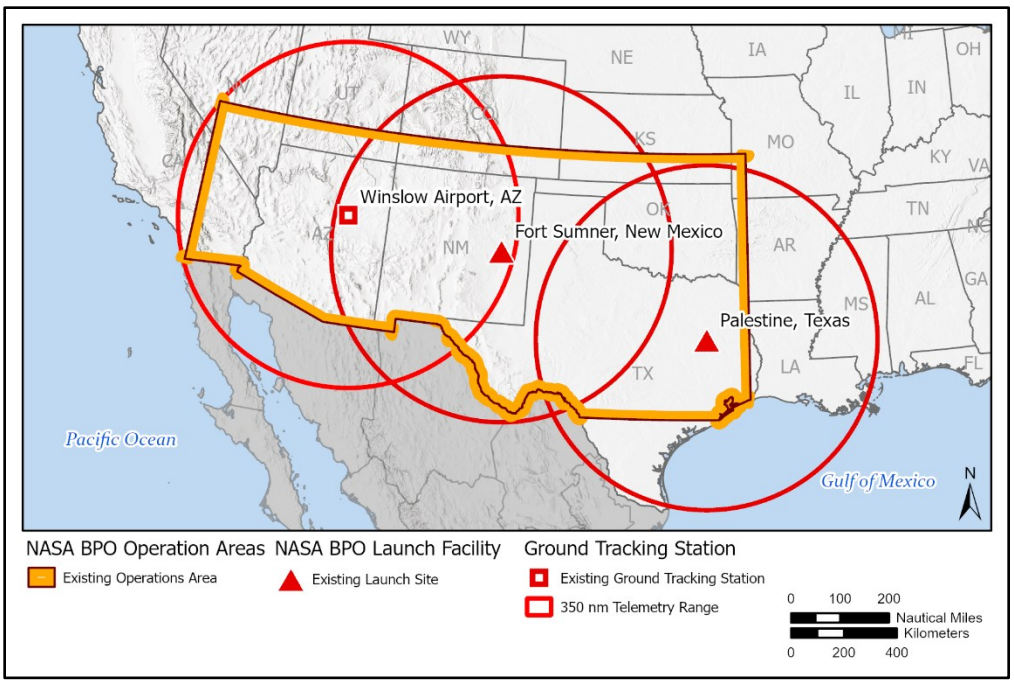


Figure 2.3-1. Existing Operations Area

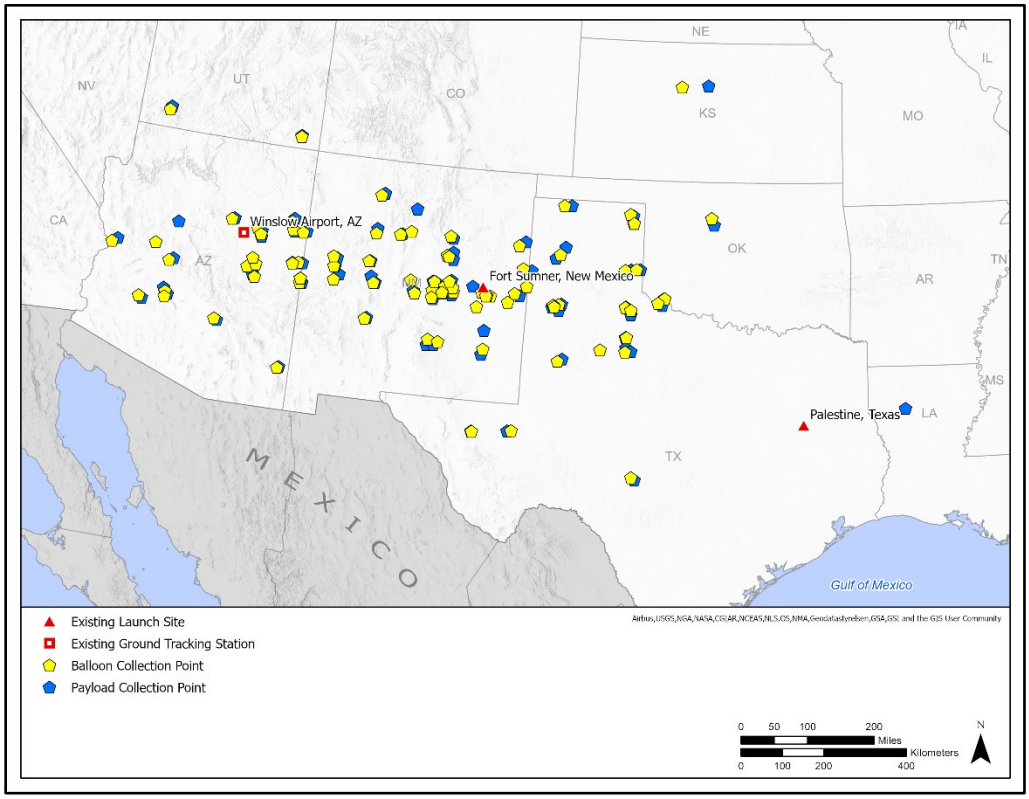


Figure 2.3-2. Scientific Balloon and Payload Collection Points (2009 to 2024)

2.3.5 In-Flight Operations

It takes approximately two hours for the scientific balloon to reach float altitude in the stratosphere, generally between 22 and 26 miles above the earth. Depending on atmospheric conditions, it could take up to eight hours to reach an altitude of 30 miles. The scientific balloon system is monitored and controlled from release throughout the duration of the mission by NASA BPO personnel.

While scientific balloons are in flight, they may traverse a few hundred miles. To accommodate this, there are three line-of-sight telemetry towers forming overlapping circles of approximately 350 nm each (see **Figure 2.3-1**). Command stations already in use by the NASA BPO are located at CSBF Fort Sumner and CSBF Palestine. NASA leases a parcel of land at the Winslow-Lindbergh Regional Airport, from the City of Winslow, Arizona, for placement and use of a mobile telemetry ground tracking station. The WFF Spectrum Manager coordinates as appropriate to obtain frequency permissions at each location to ensure there is no electromagnetic interference.

During flight operations, communication with the scientific balloon is maintained by using towers at the launch site command stations. The electronic equipment transmits command, tracking, and telemetry signals between the scientific balloon system and the ground command stations. If there is lack of network availability at these preferred down range airports, NASA may select another airport with better connectivity.

The scientific balloon's altitude is controlled via radio commands sent from the launch site command station. If the scientific balloon float needs to be lowered, a command is sent to vent helium until the correct altitude is achieved. Cooling night-time temperatures cause the helium to contract resulting in loss of scientific balloon lift. In this case, a command signal can be sent to release a portion of the ballast material until the correct altitude is achieved. Large scientific balloon flight systems may be launched with as much as 800 lbs of ballast that could be expended in order to control the rate of ascent and to maintain altitude stability during the night. The duration of the scientific balloon flights is limited by the volume of both ballast material and helium gas.

2.3.6 Balloon Flight Termination

The scientific balloon mission is terminated by command either when the science requirements of the mission have been met or to maintain compliance with NASA flight safety rules. All flight terminations are conducted in such a manner as to protect human safety and minimize property damage.

NASA BPO personnel predict where the scientific balloon and payload will land using a NASA-developed model. The model considers the weight of the scientific balloon flight system and existing wind/weather conditions to provide a line of trajectory from the coordinate point that the termination command will be given. Using real-time computer monitoring, the trajectory of the scientific balloon/payload is overlaid on an aeronautical chart showing population centers along with state and federal special use land management areas (SULMAs), such as tribal lands; national and state forests and parks; and wilderness areas which can then be avoided.

The Payload with Attached Parachute Descends Back to the Ground

One hour prior to terminating the flight, NASA BPO personnel contact the FAA to begin coordination for approval to terminate. Once the trajectory is known, FAA actively manages flights as needed to ensure flight safety in the region. After coordination with the FAA is completed, a radio command is sent from the command station to trigger a small, self-contained pyrotechnic device that separates the scientific balloon from the payload while also ripping a hole in the scientific balloon, thereby releasing the remaining helium. This action precipitates deployment of the parachute to ensure safe descent of the payload.

Payload Landing

Tracking systems are used to follow the descent of the scientific balloon and payload. Upon landing, a semi-automatic parachute release system is used to separate the parachute from the payload to prevent the payload from being dragged and potentially damaged. The period between radio command for the scientific balloon to separate from the payload and subsequent landing of the scientific balloon, payload, and parachute is approximately 45 minutes. After the command is sent to terminate the scientific balloon flight, the scientific balloon and payload/parachute system typically travel an additional 20 miles, and once separated, the scientific balloon typically travels an additional 7 miles.

The footprint of a typical payload is less than 100 square feet (ft^2). The footprint of the scientific balloon varies, generally a few thousand square feet. Parachutes are sized according to the weight of the payloads.

2.3.7 Post-Flight Recovery Operations

Because the trajectory of the scientific balloon can be predicted, a recovery team can be deployed before flight termination to retrieve the payload/parachute quickly. The recovery team generally consists of two to three NASA BPO personnel dispatched from the launch location, and one to two members of the scientific group.

Prior to the command to terminate flight, an aircraft is dispatched to track the scientific balloon system. The tracking aircraft follows the path of the scientific balloon and payload/parachute and relays that information to the retrieval team and monitoring command station personnel on the ground. Should the command station lose line-of-sight telemetry due to landforms obstructing the electronic signal, the tracking

airplane and/or retrieval team can communicate when to give the command to separate the parachute from the payload.

Given the ability to track the scientific balloon and payload/parachute, recovery is often accomplished within 24 hours. Once the scientific balloon system has landed, agencies and landowners are contacted to obtain permission to access the landing locations, if required. Coordination with landowners is typically performed after the scientific balloon system has reached the ground. Landowners may wish to designate ingress/egress for recovery team vehicles. A vehicle, like the one pictured below, is often used to lift and transport the sections of the separated scientific balloon system. The recovery team collects all sections of the scientific balloon system leaving no physical evidence at the recovery site. The scientific equipment is returned to the science group, the scientific balloon is disposed of, and the payload/gondola and parachute are inspected for future reuse.

Payload Recovery

Parachute Recovery

2.4 PROPOSED ACTION

2.4.1 Scientific Balloon Launch Sites

2.4.1.1 CSBF Fort Sumner

CSBF Fort Sumner encompasses approximately 50 acres. The site consists of a large World War II hangar used for equipment and launch vehicle storage, a NASA payload processing facility that includes offices and an operations control center, and a launch pad. The Fort Sumner Campus is comprised of three structures on 8.1 acres of NASA-owned land, adjacent to two structures (hangar and office space) on 41.7 acres of land leased from the Village of Fort Sumner, a former Army Air Corps Base that is now the Fort Sumner Municipal Airport. The airport operates two runways and averages 200 aircraft operations per year (AirNav 2024a).

Site Improvements

NASA proposes to implement site improvements identified in the CSBF Campus Master Plan at Fort Sumner from 2025 through 2032 (CSBF 2021a). **Figure 2.4-1** illustrates the proposed site improvements at CSBF Fort Sumner.

Under the Proposed Action (i.e., Action Alternative), buildings would be demolished, constructed, and renovated, along with general infrastructure maintenance and improvement activities. Demolition would include identifying hazardous and salvageable/recyclable materials; materials such as concrete, brick, metals, and other building components would be salvaged for recycling or reuse in accordance with federal, state, and local requirements. Construction would include site preparation and excavation; erection of foundations, structural components, and the building shells; completion of interior spaces, support

equipment, and utilities; and final grading and landscaping. Renovation could include improvements to building envelopes and interior spaces; replacement of heating, ventilation and air conditioning systems or equipment; and replacement or upgrades of electrical, plumbing, fire alarm, and information technology infrastructure.

Under the Proposed Action, the following activities would occur at CSBF Fort Sumner within the property owned by NASA:

- demolish one building (300 ft^2),
- construct four buildings (19,200 ft^2), and
- renovate one building (8,800 ft^2).

Personnel and Operations

There would be no change in NASA BPO personnel and no change in the number of scientific balloons launched each year from CSBF Fort Sumner. NASA BPO anticipates the maximum number of annual launches would remain at 25 through 2032 (NASA BPO 2024).

2.4.1.2 CSBF Palestine

CSBF Palestine encompasses approximately 438 acres, consisting of open and forested lands, two scientific balloon launch pads, and twenty buildings (**Figure 2.4-2**). The site is bisected by road Farm to Market (FM) 3224. NASA owns and uses the West Launch Range, which encompasses 289 acres. NASA leases the East Launch Range from the City of Palestine for long-term storage of equipment. The East Launch Range, which adjoins the Palestine Municipal Airport, encompasses 149 acres. The airport operates two runways and averages 35 aircraft operations per day (AirNav 2024b).

Site Improvements

In 2017, NASA began implementing the CSBF Campus Master Plan at Palestine which has a planning horizon of 2037 (CSBF 2021a). **Figure 2.4-2** provides an overview of the proposed site improvements at CSBF Palestine during the four-phase implementation period. Under the Proposed Action, the following activities would occur within the properties leased/owned by CSBF:

- demolish 17 buildings (totaling 41,100 ft^2),
- construct 12 buildings (totaling 62,900 ft^2), and
- renovate 3 buildings (totaling 19,000 ft^2).

Personnel and Operations

There would be no change in NASA BPO personnel and no change in the number of scientific balloons launched each year from CSBF Palestine. NASA BPO anticipates the maximum number of annual launches would remain at six through 2032 (NASA BPO 2024).

2.4.1.3 Proposed Burns Launch Site

The proposed Burns launch site would be located at the Burns Municipal Airport, which lies approximately 6 miles east of Burns, Oregon. The airport has two runways, two taxiways, and hangars for each runway. The airport property encompasses 825 acres and averages 22 aircraft operations per day (AirNav 2024c). The location of the proposed scientific balloon launch site is shown on **Figure 2.4-3**.

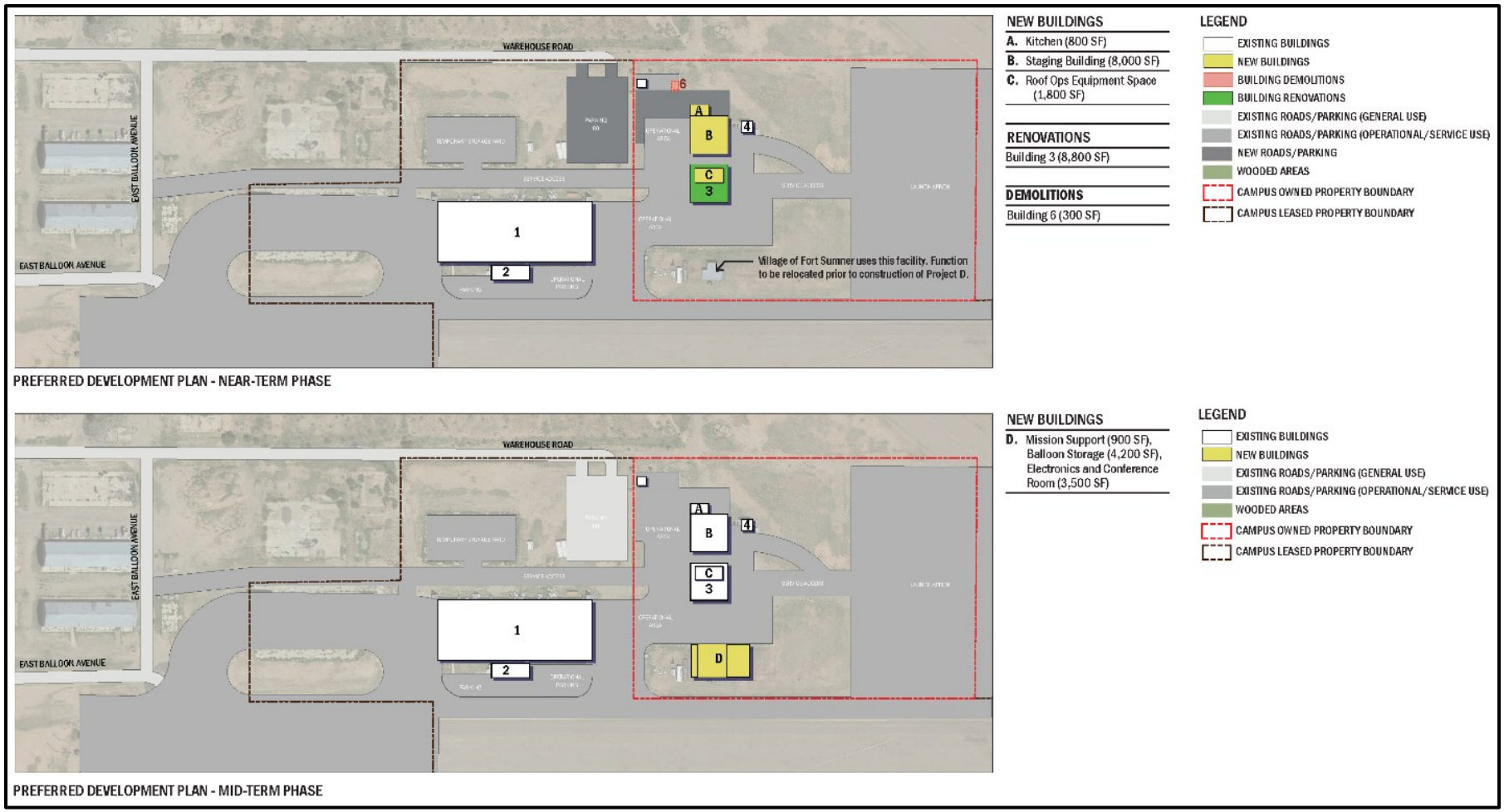


Figure 2.4-1. CSBF Fort Sumner Proposed Site Improvements

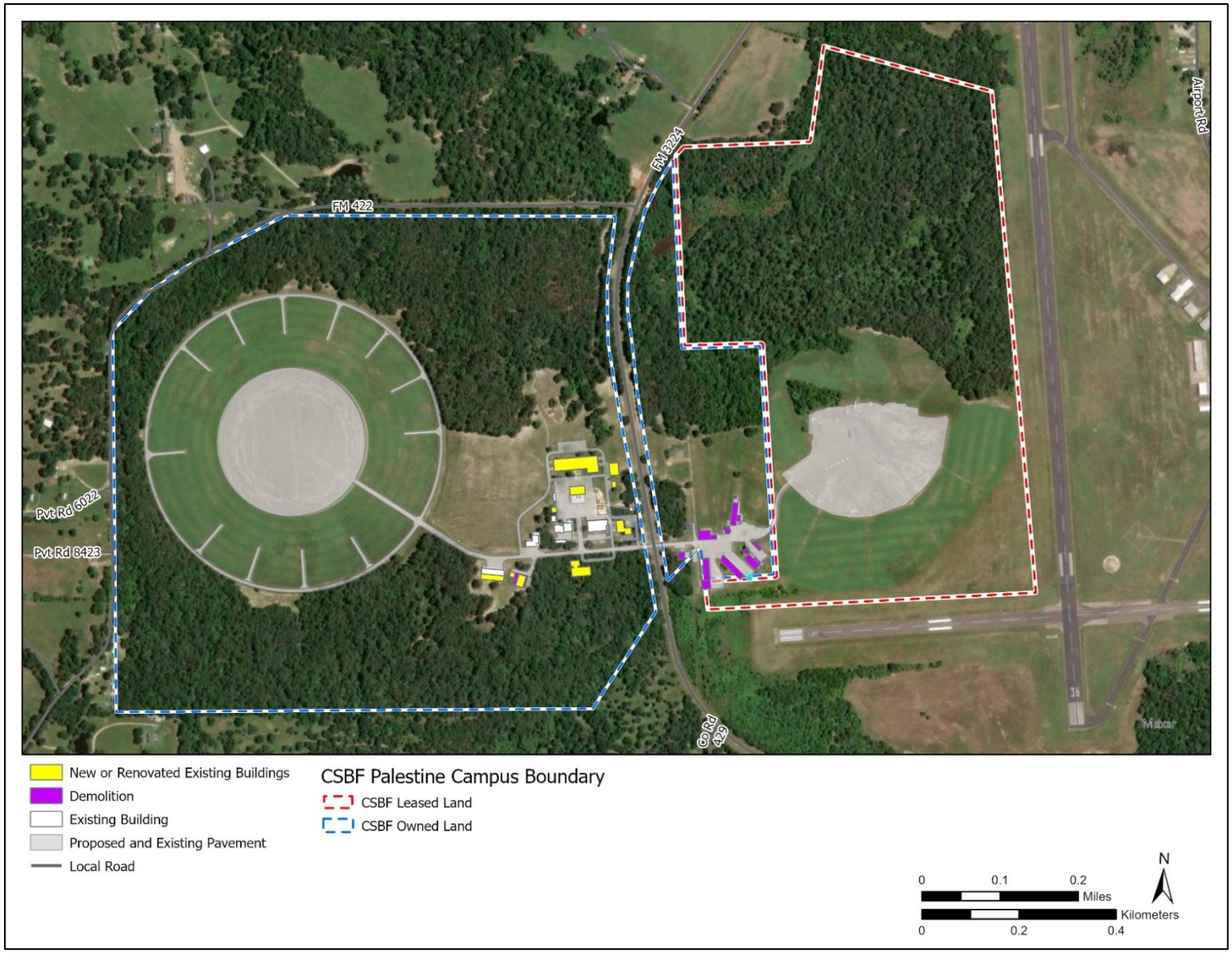


Figure 2.4-2. CSBF Palestine Proposed Site Improvements

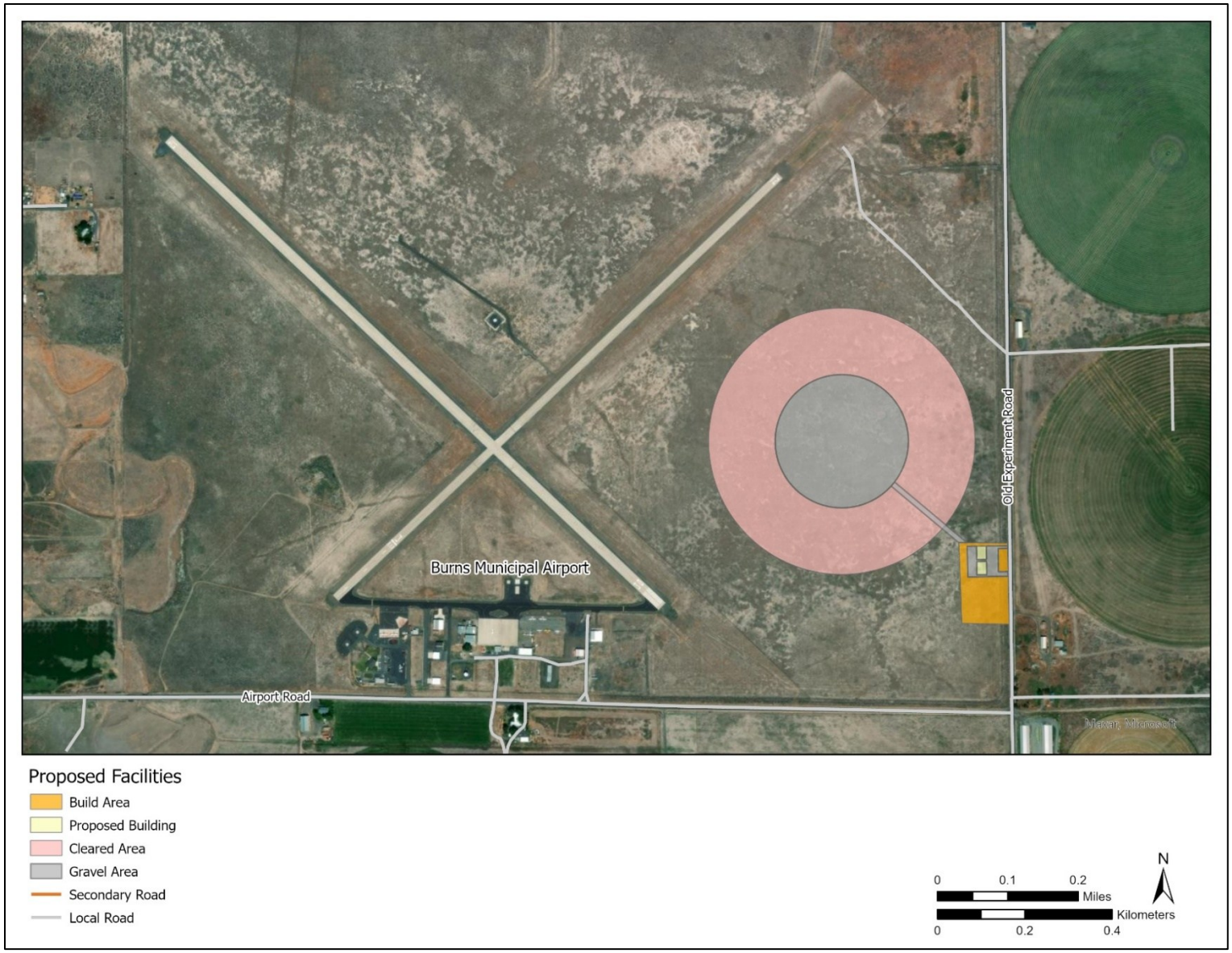


Figure 2.4-3. Proposed Burns Launch Site Construction at the Burns Municipal Airport

Site Improvements

NASA proposes to construct two new buildings at the Burns launch site (NASA BPO 2024). The locations of the new buildings are illustrated in **Figure 2.4-3**.

The new buildings are anticipated to consist of:

- two 3-story staging buildings (16,000 ft^2),
- paved parking areas around buildings (68,000 ft^2), and
- one large scientific balloon launch pad (70 acres).

Personnel and Operations

NASA BPO anticipates as many as 15 NASA BPO personnel would travel to the proposed Burns launch site from CSBF Palestine and remain on-site for approximately 8 weeks during scientific balloon campaigns. In addition, up to 40 research scientists/students would be anticipated to arrive at the site to prepare their scientific instruments/payload for a duration of 3 to 6 weeks. The NASA BPO anticipates that up to 10 launches annually could occur from the Burns launch site.

Burns Operations Area

The proposed Burns operations area would span portions of 12 states (**Figure 2.4-4)**.

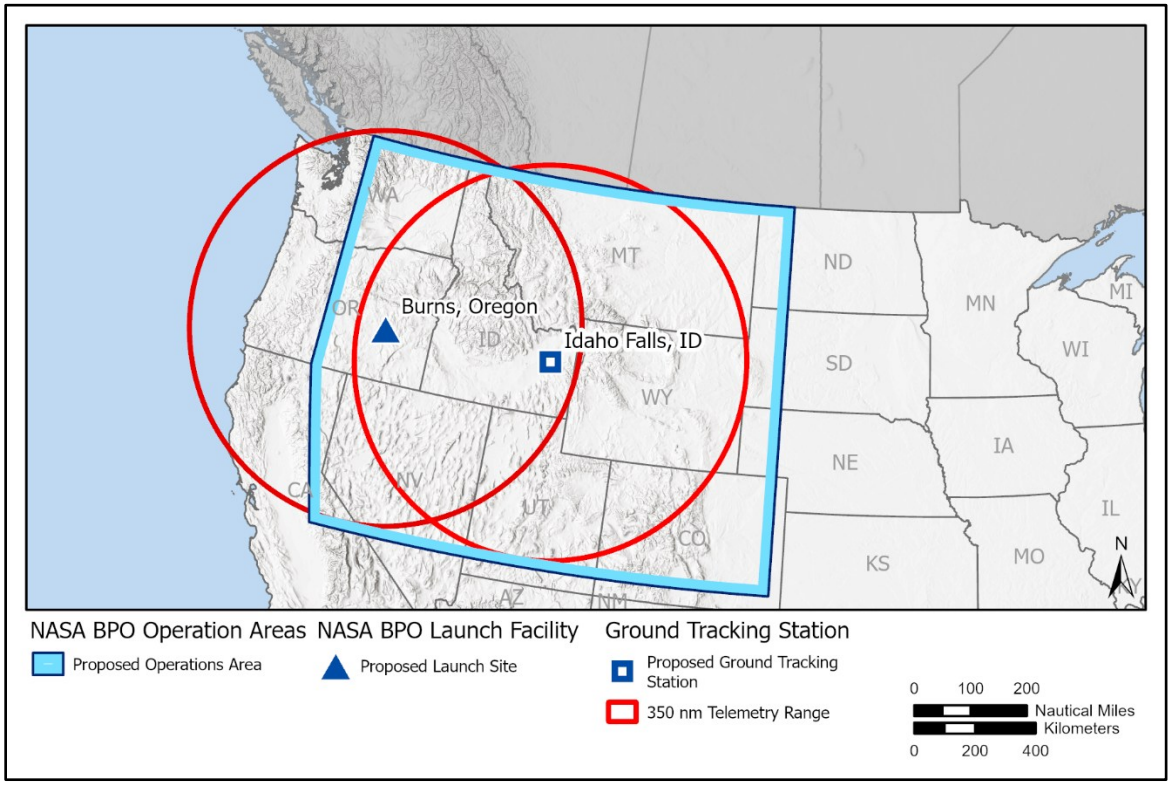


Figure 2.4-4. Proposed Burns Operations Area

2.4.1.4 Idaho Falls Tracking Station

For flights launched from the proposed Burns site, flights would be monitored from the command station at the Burns Municipal Airport, and a mobile telemetry ground tracking station in Idaho Falls, Idaho, would be used (**Figure 2.4-5**).

Site Improvements

NASA BPO would likely lease approximately 3,000 ft^2 of land at the Northeast General Aviation Area of the Idaho Falls Regional Airport. A new concrete pad approximately 50 x 50 ft (2,500 ft^2) would be constructed to allow for the set-up of the mobile telemetry station, which would be powered by an integrated generator and would be brought in for each launch and removed afterward. No permanent buildings would be necessary for NASA BPO operations at Idaho Falls. During operations, portable toilets would be provided on-site.

Personnel and Operations

Operation of the Idaho Falls Tracking Station would occur only in association with launches from the Burns launch site (up to 10 times per year). During these times, the telemetry station would be in operation, tracking the balloon and payload movement. This would require up to five NASA BPO personnel for set-up and tear down, with two people remaining on-site for duration of operations. It is expected that personnel would remain on-site for up to 40 days during balloon campaigns.

2.4.2 Scientific Balloon Flights

The NASA BPO anticipates that up to 10 scientific balloon flights per year would originate from the proposed Burns launch site, for a total maximum of 41 balloon launches annually. **Table 2.4-1** provides the average number of scientific balloons launched from CSBF Fort Sumner and CSBF Palestine over the previous 10 years and the maximum number of scientific balloon launches anticipated from the respective facilities each year (NASA BPO 2024a).

Table 2.4-1. Actual and Proposed Maximum Annual Balloon Launches

Launch Site	Scientific Balloon Launches		Campaign Launch Period	Direction of Scientific Balloon Float
	Average (Actual)	Maximum		
CSBF Fort Sumner	4	10	March to June	East to West
	12	15	August to mid-September	East to West
			Mid-September to October	West to East
CSBF Palestine	4	6	Summer / Fall	East to West
Burns (proposed)	0	10	Spring to Fall	West to East
Total	**20**	**41**		

Source: NASA BPO 2024.

Figure 2.4-5. Location of Proposed Idaho Falls Down Range Tracking Station

2.5 NO ACTION ALTERNATIVE

Under the No Action Alternative, NASA BPO would not add the Burns launch site, the Idaho Falls Tracking Station, or 10 additional launches per year to the NASA scientific balloon program. The CSBF Campus Master Plan (CSBF 2021a) would not be implemented. Annually, up to 25 scientific balloons would be launched from CSBF Fort Sumner, and up to six would be launched form CSBF Palestine (NASA 2010). The potential for effects to any of the resources considered in this Supplemental PEA would remain at *status quo* with no change anticipated to the existing environmental conditions at either of the existing launch sites or within the existing operations area.

2.6 SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

Table 2.6-1 provides a summary of the potential effects to each resource analyzed in this Supplemental PEA. Based on the analysis presented, no significant environmental effects would result from implementation of the Proposed Action (i.e., Action Alternative) or No Action Alternative.

This Supplemental PEA will serve as a reference for which future scientific balloon launches from the proposed Burns site and the continuation of scientific balloon launches from CSBF Fort Sumner and CSBF Palestine will be evaluated to ensure NEPA compliance. Future scientific balloon systems not specifically mentioned in this Supplemental PEA would be considered within the scope of this document if analysis determines that their effects do not exceed those associated with the envelope scientific balloon system.

The subsequent analysis and final determination would be documented in the web-based Goddard Space Flight Center (GSFC) Management Operations Services and Information (MOSI) Environmental and Safety Review (E&SR) Checklist, which would be completed for inclusion in the official project files. If the analysis finds that the effects are outside the scope of this Supplemental PEA, further NEPA documentation may be prepared.

The GSFC Environmental Management Division has created the MOSI E&SR Checklist that would be used prior to each scientific balloon launch campaign. The MOSI E&SR Checklist would be used by NASA BPO to help determine whether the proposed scientific balloon missions fall within the operations covered by the Scientific Balloon Program Supplemental PEA or whether separate NEPA analysis may be required prior to the proposed scientific balloon launch campaign. The MOSI E&SR Checklist provides steps to evaluate whether the scientific balloon system fits within the envelope characteristics.

Table 2.6-1. Summary of Potential Effects to Resource Areas

Resource Area	Action Alternative	No Action Alternative
Airspace and Scientific Balloon Operations	No significant adverse effects to airspace management or balloon operations are anticipated to result from this proposal. Operations from CSBF Fort Sumner and CSBF Palestine would continue to adhere to the letter of agreement with the Albuquerque ARTCC and Fort Worth ARTCC (CSBF 2021b), and Cannon Air Force Base would continue to be notified prior to balloon launches to further enhance safety in the region. Coordination with Seattle ARTCC, and other FAA ARTCCs as needed to ensure safety, would occur for launches from the proposed Burns, Oregon launch site. As such, effects to other users of the airspace from balloons launched from the existing and proposed sites would not be adverse.	There would be no change to airspace and balloon operations as existing conditions would remain unchanged from that analyzed in 2010 (NASA 2010).
Safety	There would be no significant safety effects. NASA BPO has extensive safety procedures for launch and recovery activities that ensure safety of staff and the general public. Models developed by NASA are used to predict the landing location of the balloon system. Along with real-time computer monitoring and controls, population centers and SULMAs can be avoided, virtually eliminating the potential for injury to people or property.	Safety protocols and procedures currently in place would continue to be observed (NASA 2010).
Air Quality	There would be no significant effects to air quality resulting from the proposed action. Emissions from construction activities at each of the launch sites and operations emissions at each of the launch sites would not perceptibly affect the air quality within each county/district or affect attainment status. The counties where CSBF Fort Sumner and CSBF Palestine, the proposed Burns launch site, and the proposed Idaho Falls tracking site are in attainment for all criteria pollutants, except for a small portion of Anderson County where CSBF Palestine is located. This area near the former Big Brown Power Plant is designated as a nonattainment area for the 2010 sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS). Air emissions from balloon operations, motor vehicle operations, and tracking airplanes would not be perceptibly changed within the existing and proposed operations areas. Overall, no perceptible change in air emissions would be anticipated from implementation of the Proposed Action.	Air emissions would remain virtually unchanged from that analyzed in 2010 (NASA 2010).
Socioeconomics	There would be no significant adverse effects to socioeconomics. The proposed Burns launch site would experience a short-term positive economic effect each year during balloon	The socioeconomic conditions at CSBF Fort Sumner and CSBF Palestine would remain virtually

Resource Area	Action Alternative	No Action Alternative
	campaigns from the purchase of food, supplies, and lodging by personnel, research scientists, and students. Proposed construction, demolition, and renovation would occur over a number of years and is relatively small scale and, therefore, not anticipated to contribute measurably to socioeconomic effects.	unchanged from that analyzed in 2010 (NASA 2010).
Land Use	No significant adverse effects to land use are anticipated. SULMAs would continue to be avoided under the Proposed Action. The existing operations area spans portions of 12 states; the proposed operations area would span portions of 12 states. The chances of a balloon/payload landing within the same vicinity more than once would be very unlikely. Recovery operations are often complete within 24 hours after landing. Should a balloon/payload land within a SULMA, or on private land, the land manager/landowner would be contacted prior to the recovery team accessing the site. If required, a permit or authorization would be obtained to retrieve the balloon/payload.	The same emphasis on avoiding sensitive lands would continue as previously analyzed (NASA 2010).
Biological Resources	No significant adverse effects to biological resources are anticipated; operations would continue to avoid known critical habitats and wetlands. If unplanned circumstances resulted in the need to land a payload within a designated critical habitat, NASA BPO personnel would initiate contact with U.S. Fish and Wildlife to determine the best method for payload recovery, with the least environmental effect.	There would be no change to biological resources beyond existing conditions. There would be no increase in activity under the No Action Alternative; therefore, no increased effects from payload landing and/or recovery operations beyond that previously analyzed (NASA 2010).
Cultural Resources	There is a potential for adverse effects to cultural resources from balloon/payload landing and recovery activities; however, the probability for affecting culturally significant resources is extremely low. Predictive modeling used for balloon/payload landing would continue to be used for avoidance of all known culturally significant areas. If a balloon or payload landing were to occur on culturally sensitive lands, NASA BPO personnel would contact the appropriate State or Tribal Historic Preservation Officer prior to recovery activities.	Balloon operations would continue as they have for the past 35 years, and as previously analyzed (NASA 2010), with continued avoidance techniques to limit potential effects to culturally sensitive areas.

Resource Area	Action Alternative	No Action Alternative
Hazardous Materials and Systems	Adequate measures are in place and would continue to be implemented in the event hazardous materials were used during balloon staging and operations. Should a release of any hazardous materials occur during payload landing/recovery operations, staff would implement NASA-approved procedures for cleanup in accordance with applicable U.S. federal and state regulations.	No change from that analyzed in 2010 (NASA 2010).

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 ANALYSIS APPROACH

NEPA requires analysis of resources potentially affected by a proposed federal action or alternative. It also provides that an EA should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. Therefore, an EA should be focused and analytic, rather than encyclopedic. NEPA also requires a comparative analysis that allows decision-makers and the public to differentiate among the alternatives. This Supplemental PEA focuses on those resources that would be affected by NASA's proposal to:

- continue launches and associated operations from the CSBF Fort Sumner and CSBF Palestine;
- implement improvements at the CSBF Fort Sumner and CSBF Palestine;
- add a new launch site and associated operations from Burns, Oregon;
- implement improvements at the Burns launch site; and
- establish and implement improvements at a down range telemetry site in Idaho Falls, Idaho.

NEPA requires a discussion of effects in proportion to their significance and only enough discussion of other than significant issues to show why more study is not warranted. The analyses in this Supplemental PEA consider the current conditions (i.e., baseline) of the affected environment and compares those to conditions that might occur should the Proposed Action (i.e., Action Alternative) or No Action Alternative be implemented. The potential effects to the following resource areas would be negligible or non-existent; as such, they are not carried forward for detailed analyses in this Supplemental PEA.

Transportation: For this Supplemental PEA, transportation refers to the movement of vehicles or vessels on roadways, water, or rail systems; air transportation is addressed separately. Transportation and traffic issues are currently minimal in the regions surrounding the existing launch sites and proposed Burns launch site. Local traffic would be expected to increase minimally at launch and telemetry sites during seasonal campaigns; however, the additional traffic would not be expected to adversely affect transportation resources or traffic conditions at any of the launch sites. Vehicles used during recovery activities would be minimal and spread throughout the operations areas across numerous states. As such, the potential effect on transportation would be negligible and this resource was not considered further.

Noise: Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. Noise generated from construction activities at CSBF Fort Sumner, CSBF Palestine, and proposed Burns launch site would be short-term and localized in nature and not significantly contribute to the existing noise profile at the active airport site locations. Operations activities at any of the launch sites, balloon flight, increased vehicular activity at the proposed Burns launch site, or balloon recovery activities would be anticipated to produce noise levels consistent with existing conditions. As such, this resource was not considered further.

Geology and Soils: Potential effects to geology or soils from balloon system launch, landing, or recovery activities would not be anticipated. The potential for soils compaction from payload landing or from vehicles used during recovery activities exists; however, this would not be adverse or long-lasting. An inadvertent spill of hazardous materials from recovery vehicles or damaged payload instrumentation would be unlikely. Additionally, if a spill were to occur onto ground surfaces, personnel would implement the

spill response procedure developed and approved during the pre-flight plan discussions for each anticipated balloon launch as directed by NASA. Implementing the CSBF Campus Master Plan at Fort Sumner and Palestine (CSBF 2021a), and the proposed construction at the Burns site would not change the geology or soils at any of the sites. No adverse effects to geology or soils would be expected; therefore, this resource was not considered further.

Visual Resources: Visual resources are defined as the natural and man-made features that comprise the aesthetic qualities of an area. Visual resources would not be affected at CSBF Fort Sumner or CSBF Palestine since the balloon launches represent an ongoing activity that defines the location. A minor effect on visual resources would be anticipated at the Burns launch site since balloons would be a novel feature on the horizon of the Burns Municipal Airport. However, the period of time the inflated balloon would be held in the ground position would be short. People on the ground may be able to observe the balloons at float from distances up to 100 miles away. This is not anticipated to result in adverse effects on visual resources, as the balloons would move quickly out of range. The sighting of a balloon in flight would be short-lived, and the rate of occurrence at any one location would be limited. Recovery teams ensure that all components of the balloon system (i.e., balloon, payload, and parachute) are removed during recovery activities thereby creating no lasting visual effects. As no permanent change to the landscape character or features within the landscape would be anticipated at the proposed new sites, this resource was not considered further.

3.2 AIRSPACE AND SCIENTIFIC BALLOON OPERATIONS

The safe, orderly, and compatible use of the nation's airspace is made possible through a system of flight requirements and procedures, airspace management actions, and air traffic control procedures. The national airspace system is designed and managed to protect aircraft operations around most airports and along air traffic routes connecting these airports, as well as within special areas where activities such as military flight training are conducted. The FAA has the overall responsibility for managing the airspace system in the U.S. and accomplishes this through close coordination with state aviation and airport planners, military airspace managers, and other entities. The FAA assigns responsibility for units of airspace to ARTCCs.

3.2.1 Affected Environment

The affected environment for the Proposed Action is the existing and proposed operations areas. The operations area associated with CSBF Fort Sumner and CSBF Palestine covers portions of 12 states, and the operations area for scientific balloons launched from the proposed Burns site covers portions of 12 states.

Airspace Operations

Flights originating from CSBF Palestine operate in airspace controlled by the Fort Worth ARTCC; however, balloons launched from CSBF Fort Sumner often cross between two separately controlled airspace units. A Letter of Agreement (LOA) exists between NASA and the FAA (Albuquerque ARTCC and Fort Worth ARTCC) (CSBF 2021b) which allows the launch of unmanned aerial balloons under Federal Aviation Regulation 101, Subpart D, *Unmanned Free Balloons*. For balloons over 6 lbs, FAA requires the balloons be equipped with a Mode C "transponder" (short for transmitter-responder).

A transponder is an electronic device attached to the balloon system that transmits a response to a secondary radar system to assist air traffic controllers in maintaining separation distances between aircraft. A balloon's transponder is activated during ascent from launch to 60,000 feet above the ground (FL 600). Per the LOA,

a balloon in ascent is monitored via electronic tracking with reports to the ARTCC at each 10,000-foot level up to and including FL 600. The average rate of ascent needs to be 400 feet per minute from the moment of release to FL 600. During the ascent, if the transponder fails to operate, the Albuquerque and Fort Worth ARTCCs have the option to request that the balloon mission be canceled. During descent, the transponder must again be activated at or below FL 600. A balloon in descent is tracked, both visually and electronically, at or below FL 600 to the point of ground contact. Visual tracking is accomplished using a tracking van and a tracking aircraft that accompany the balloon from FL 600 to landing, all the while maintaining radio communication with the appropriate ARTCC.

NASA BPO personnel are responsible for providing FAA with a NOTAM alerting pilots of potential hazards for aircraft operating in a specific region or location. NOTAMs are disseminated by the Fort Worth Automated Flight Service Station per the LOA (CSBF 2021b). In addition, for balloon launches from Fort Sumner, contact is made with Cannon Air Force Base due to the presence of military aircraft operating in the region. Approximately one hour before a launched balloon's ascent or descent/landing, the appropriate ARTCC would be notified so flights in the area can be actively managed to ensure flight safety in the region.

NASA would establish similar flight operations procedures and notifications with the Seattle ARTCC for balloon flights originating from the proposed Burns launch site.

Balloon Operations

In addition to monitoring the balloon system during ascent/descent via FAA transponder, NASA BPO personnel maintain communication with the balloon system using electronic line-of-sight telemetry. Line-of-sight telemetry permits the ground station to transmit orders to the balloon system in flight. Commands include those sent to the science instrument(s) and those used to control the balloon flight systems. Commands sent during flight termination include balloon/payload separation, parachute activation, and payload/parachute separation. Balloons launched from CSBF Fort Sumner are commanded by NASA BPO personnel at CSBF Fort Sumner and are supported by personnel at CSBF Palestine for easterly flights and are supported by a mobile telemetry ground station at the Winslow-Lindbergh Regional Airport for westerly flights. Balloons launched from the proposed Burns site would be commanded by NASA BPO personnel based at CSBF Palestine who would travel to the site temporarily and would be supported by a down range mobile telemetry ground station located at the Idaho Falls International Airport in Idaho for easterly flights. Each command station is capable of transmitting messages within a 350-nm radius (see **Figures 2.3-1 and 2.4-4**).

3.2.2 Environmental Consequences

This assessment of airspace and balloon operations examines how the Action Alternative or No Action Alternative would affect FAA management of airspace within the existing operations area and proposed Burns operations area. Factors used to assess the significance of effects on airspace and air traffic include consideration of balloon operations which: could cause effects to current airspace usage by both military and civilian operations, require a shift or change in flight patterns to accommodate balloon operations, and/or the potential to modify airspace. If major changes to existing airspace usage would be required, the effect would be considered significant.

3.2.2.1 Action Alternative

The maximum number of flights from CSBF Fort Sumner and CSBF Palestine would remain the same as evaluated in the 2010 PEA (NASA 2010). As such, operational procedures and coordination with

Albuquerque and Fort Worth ARTCCs and Cannon Air Force Base would remain unchanged; no significant effects on military and civilian flight operations would be anticipated.

NASA BPO is proposing to increase the number of scientific balloons launched each year by 10 with the addition of the proposed Burns launch site. NASA BPO personnel would establish similar flight operations procedures and notifications with the Seattle ARTCC for balloon launch and landings from the Burns launch site, likely through an LOA. Changes to typical area flight patterns or modifications to airspace associated with the proposed new launch site and operations area would not be anticipated.

In summary, no significant effects to airspace management or balloon operations would be anticipated under the Proposed Action.

3.2.2.2 No Action Alternative

Under the No Action Alternative, there would be no change in the number of balloons launched from CSBF Fort Sumner and CSBF Palestine; coordination with appropriate ARTCCs and Cannon Air Force Base would continue without change, per the LOA (NASA 2010; CSBF 2021b). NASA BPO would not add the Burns launch site or the Idaho Falls mobile telemetry ground tracking station to the program. As such, effects to airspace or balloon operations beyond those previously evaluated would not be anticipated.

3.3 SAFETY

This section addresses practices utilized by NASA BPO personnel during all phases of a balloon operation to ensure the safety of people and property on the ground. This safety analysis addresses pre-flight, balloon launch, balloon flight, balloon system failure, balloon flight termination, and recovery activities.

3.3.1 Affected Environment

The WFF Safety Office plans, develops, and provides policies and procedures to ensure safety of personnel and civilians during ground and flight activities. A NASA-approved Balloon Ground Safety Plan, developed in accordance with the GSFC WFF Range Safety Manual (GSFC WFF 2024), assigns the responsibility for implementing the safety procedures for the balloon program to the on-site Operations Manager.

Pre-flight. The safety issues associated with this phase of operations are dependent on the type of research to be conducted and the identification of any hazardous materials, such as pressure vessels and NASA-approved pyrotechnics, that may be involved in the flight operations. A more detailed discussion of procedures for identifying hazardous materials and the handling procedures are provided in **Section 3.9,** Hazardous Materials and Systems. Based on information provided by the applicant, specific safety procedures would be instituted to ensure the safe handling and storage of hazardous materials. In addition to the evaluation of materials associated with the payload, the NASA BPO personnel would assess the potential risk to people from the balloon system.

Balloons are flown as "acceptable risk" which is industry standard Negligible Risk Criteria of less than 100 x 10^{-6} (or 100 in a million). For any mission that would exceed this risk of effect, approval would be required by the WFF Director of Suborbital and Special Orbital Projects with the concurrence of the Chief of Wallops Office of Safety and Mission Assurance.

Balloon Launch. Helium, a non-toxic, non-flammable gas, is used to inflate the balloons. While the gas does not pose a health risk, NASA has implemented a policy in which only essential personnel are permitted

near the balloon prior to balloon inflation and launch because of pressure vessel safety hazards. An area extending 96 feet on either side of the balloon and flight train with a 100-foot radius around the center of the spool and launch vehicle is cleared in accordance with the ground safety plan. The area remains under clearance conditions until the balloon system is released. Weather conditions prior to the launch are also considered. Winds must be blowing in a constant direction with speeds not greater than 6 to 7 mph up to 200 vertical feet and not greater than 12 mph from 200 to 1,000 vertical feet. Wind speeds exceeding these conditions could result in damage to the balloon; launches are delayed if such specifications are not met.

Balloon Flight. Balloon flight scheduling is based on conditions necessary for a successful flight, such as seasonal requirements, type of data to be collected, and/or flight duration. Most of the balloon flights are scheduled during spring and fall when stratospheric turnaround occurs (refer to **Section 2.1** and **Table 2.4-1**). The turnaround period is optimal for balloon launches because it allows the balloon to stay aloft for a longer period of time, thus extending the periods for experimental instruments to collect data. While balloons are in flight, the area they may traverse can be hundreds of miles. To accommodate each of the large operations areas, line-of-sight telemetry towers that form overlapping circles of 700-nm are and would be utilized (refer to **Figure 2.3-1** and **Figure 2.4-4**). During all phases of balloon system flight operations, contact is maintained by using these communication system towers. The WFF Spectrum Manager coordinates as appropriate to obtain frequency permissions at each location to ensure there is no electromagnetic interference.

Balloon System Failure. Balloon system failures, while rare, can occur in one of two ways. The first type of failure results from a gradual helium leak in the balloon, resulting in failure to fully achieve requirements for a successful mission. The second type of failure occurs when control of the balloon system is diminished due to an abrupt opening of the balloon surface, resulting in the immediate release of the parachuted payload. This second type of failure may impede ground control's ability to predetermine an optimal landing location. However, significant control of the balloon system would still exist, and the general landing location would be known. Pre-mission planning utilizes NASA-approved safety criteria that considers both of these failure modes to mitigate risk. During flight, ballast can be released to adjust the altitude and take advantage of winds that may aid in avoiding sensitive areas.

In examining balloons launched from CSBF Fort Sumner and CSBF Palestine from 2009 to 2024, there have been only two incidents in which missions were ended early due to balloon leaks, but the balloon remained intact until controlled termination (**Table 3.3-1**). One incident occurred in 2018 and one in 2022. Neither resulted in reports of damage to property or injury to any person (NASA BPO 2024).

Table 3.3-1. Mission Anomaly Rates from 2009 to 2024

Launch Site	Completed Launches	Anomaly	Percent Anomaly
CSBF Fort Sumner	99	2	2.2%
CSBF Palestine	7	0	0
Total	106	2	2.0%

Source: NASA BPO 2024.

Balloon Flight Termination

NASA BPO personnel are able to predict the landing location of the balloon system to within an approximate 5-nm radius. Models developed by NASA consider the weight of the balloon system (minus the weight of released ballast material), existing wind/weather conditions, and other factors to provide a line of trajectory from the coordinate point that the termination command will be given. Using real-time tracking software, the trajectory of the balloon/payload is overlaid on an aeronautical chart that shows

population centers, state and federal SULMAs, such as tribal lands; national and state forests and parks; and wilderness areas. The primary goal at balloon flight termination is avoidance of populated areas. **Figure 3.3-1** provides a screenshot of a predicted landing area using NASA-developed tracking software.

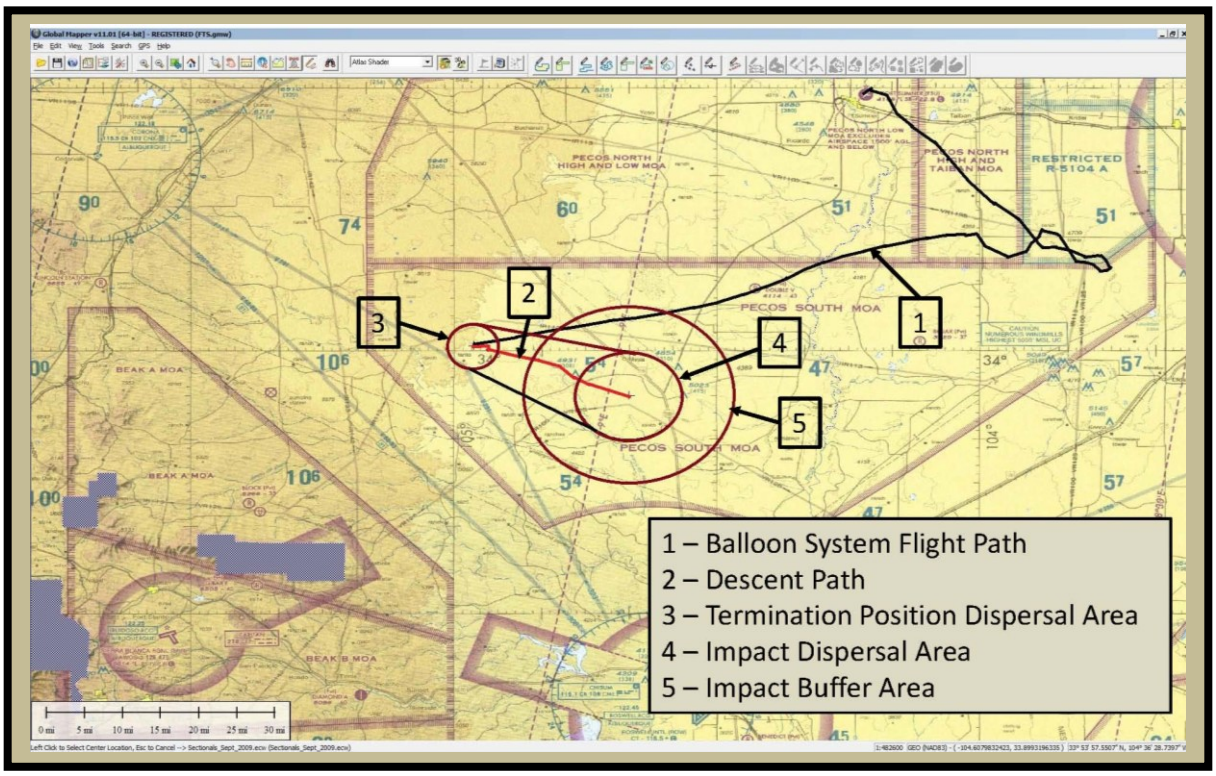


Figure 3.3-1. Tracking Software Screenshot of Predicted Landing Area

NASA BPO implements standard operating procedures to avoid populated areas. These standard operating procedures include:

- The payload impact area is defined as a 5-nm radius area about the predicted impact point (i.e., payload landing location).
- The buffer area is defined as a 5-nm ring about the payload impact area, yielding a 10-nm radius about the predicted impact point.
- Class 1 towns (population less than 500) may not be directly under the predicted impact point, but may be within the payload impact area (5-nm radius about the landing point).
- Class 2 cities (population 500-4,000) must be outside of the payload impact area, but may be within the buffer area (5-nm ring about the predicted impact area).
- Class 3 cities (population greater than 4,000) must be outside the buffer area.
- Termination will not be initiated within 2-nm of any area with a population greater than that of a Class 1 town.

Since the landing location can be predicted to within an approximate 5-nm radius, population centers and SULMAs can be avoided; this virtually eliminates the potential for injury to people or property. Additionally, parachutes and crush pads are integrated to reduce the force of a payload hitting the ground.

Recovery

Once the balloon system has landed, NASA BPO personnel arrive on-site to assess the needs for payload recovery. If the balloon system has landed on private property and the owner cannot be contacted, or if the system lands on property the ownership of which is unclear, personnel would contact the local law enforcement office to determine property ownership and to request an escort onto the site.

During the recovery phase, safety is of paramount concern, as in other phases of the balloon mission. Care is taken when detaching the payload and scientific instrumentation from the gondola to prevent damage to instrumentation and to ensure that no safety risks are incurred. Any substances or instruments that pose specific potential safety hazards are identified early in the balloon flight application process and are indicated in the ground safety plan. Recovery and ground safety procedures are prepared for each flight. For flights with the potential for a spill, on-site recovery teams are made aware of any potential hazards and are equipped with any necessary gear.

3.3.2 Environmental Consequences

This assessment of safety examines how implementing the Action Alternative or No Action Alternative would affect the safety of the NASA BPO personnel and the general public within each of the operations areas (refer to **Figure 2.3-1** and **Figure 2.4-4**). Effects would be considered significant if ground or recovery activities posed a substantial present or potential hazard to human health and safety. NASA BPO has extensive requirements and procedures for launch and recovery activities that ensure safety of the staff and general public.

3.3.2.1 Action Alternative

Construction

The proposed construction at CSBF Fort Sumner and CSBF Palestine and the proposed Burns and Idaho Falls sites, would be performed by qualified personnel who are trained to safely operate the appropriate equipment; and appropriate signage and fencing would be placed to alert pedestrians and motorists of project activities. Standard operating procedures would be followed by all personnel, and all activities would be conducted in accordance with federal and state Occupational Safety and Health Administration regulations.

Operations

Safety procedures currently in place for balloon system launch, flight, and termination would continue to be followed. Avoidance of population centers would continue to ensure the safety of the general public and protection of property. During the period 2009 to 2024, two incidents occurred in which the balloon did not perform as desired, resulting in a mission failure, yet without injury to people or damage to personal property (refer to **Table 3.3-1**). The addition of the Burns launch site and associated operations area would not increase concern for the safety of NASA BPO personnel or the general public. Existing safety procedures would be followed during recovery activities.

In summary, the potential risk to NASA BPO personnel and the general public under the Action Alternative would be negligible, and no significant effects on safety would be anticipated.

3.3.2.2 No Action Alternative

Under the No Action Alternative, NASA BPO would not add the Burns launch site and associated operations area to the program or the Idaho Falls Tracking Station. Construction, demolition and renovations proposed at CSBF Fort Sumner, CSBF Palestine, or the proposed Burns launch site or Idaho Falls tracking site would not occur. The potential for effects to this resource would remain at *status quo* with no change anticipated to the existing environmental conditions at either of the existing launch sites or within the operations area beyond those previously evaluated (NASA 2010). Implementing the No Action Alternative would not result in increased concerns for the safety of NASA BPO personnel or the general public, as current safety procedures would continue to be implemented.

3.4 AIR QUALITY

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. The Clean Air Act (CAA) and its subsequent amendments established the National Ambient Air Quality Standards (NAAQS) for the "criteria" pollutants: ozone (O_3), carbon monoxide, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 and 2.5 microns in diameter, and lead. These standards represent the maximum allowable atmospheric concentrations that may occur in a geographic area while ensuring protection of public health and welfare, with a reasonable margin of safety. Areas that violate a federal air quality standard are designated as nonattainment areas.

Hazardous air pollutants, also known as toxic air pollutants or air toxics, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Examples of toxic air pollutants include benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry-cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper. Examples of other listed air toxics include dioxin, asbestos, toluene, and metals, such as cadmium, mercury, chromium, and lead compounds (USEPA 2024a). The Proposed Action would not have any known significant sources of hazardous air pollutants and is, therefore, not analyzed in further detail.

Another factor used in defining the affected environment is mixing height, which is the upper limit of the atmosphere above earth's surface in which emissions may affect air quality. The portion of the atmosphere that is completely mixed begins at the earth's surface and may extend up to altitudes of a few thousand feet. Mixing height varies from region to region based on daily temperature changes, amount of sunlight, and other climatic factors. Based on historical data of balloon operations, the average mixing height of 6,500 feet would conservatively characterize the conditions within the scientific balloon operation areas (USEPA 1972).

3.4.1 Affected Environment

Helium, used to inflate the balloons, is an inert gas that does not interact with other chemicals in the atmosphere. The gas exists naturally in small quantities within the earth's atmosphere. On Earth, it is mined from underground pools where it occurs mixed with natural gas deposits. Helium is released from the balloon during either stratospheric float or at the moment when the balloon flight is terminated.

The ballast of the balloon system provides stability and control of the balloon during ascent. The amount of ballast material required is dependent on the weight of the payload, the size of the balloon, and the required float altitude to collect the desired scientific data. Ballast can be released to adjust the float altitude

of the balloon system. When releasing ballast, the flow rate is no more than 60 lbs per minute and is normally released in 30 second increments. The U.S. Environmental Protection Agency (USEPA) regulates particulate matter smaller than 2.5 and 10 microns, as these sizes can be easily breathed into the lungs of humans or animals.

Cryogens are substances used for refrigeration purposes, and may be necessary, depending on balloon mission requirements and scientific instrumentation used. Generally, cryogens are used to keep the detectors of scientific instruments very cold, thereby allowing them to be sensitive enough to produce the readings desired for the scientific mission. Cryogenic liquid helium and nitrogen are used for some activities. When used, quantities of these substances would vary between 100 to 130 gallons. If exposed to air, these liquids boil off. Atomic helium is inert and nitrogen, which is the most common constituent of the atmosphere, forms very stable bonds of N_2, rendering it nearly inert.

For the purposes of assessing air emissions in this Supplemental PEA, only those operations involving the use of ground equipment and vehicles used during construction and balloon system and payload launch and recovery activities are considered. The following provides the air quality affected environment for the existing launch sites and proposed new launch site in Burns, Oregon:

- The CSBF Fort Sumner is located in De Baca County, which is in attainment for all criteria pollutants (USEPA 2024d).
- The CSBF Palestine is located in Anderson County; a small portion along the eastern border of the county near the former Big Brown Power Plant is designated as a nonattainment area for the 2010 SO2 NAAQS (Texas Commission on Environmental Quality 2022), but CSBF Palestine is not located within this portion of Anderson County. Anderson County is in attainment for all other criteria pollutants (USEPA 2024a).
- The proposed Burns launch site is located in Harney County, and the area is in attainment of all criteria pollutants (USEPA 2024a).
- The Idaho Falls Tracking Station is located in Bonneville County, which is in attainment for all criteria pollutants (USEPA 2024a).

3.4.2 Environmental Consequences

If projected emissions were determined to increase ambient pollutant levels from below to above a national or state ambient air quality standard, further analysis of the emissions would be required to assess whether there was a likelihood of adverse effects on air quality.

No emissions of any criteria pollutants would occur at high altitudes, as there would be no sources to produce them. Motorized equipment utilized by the payload to collect scientific data would all be battery-powered. The balloon system would be terminated in the upper atmosphere and release helium well above the atmospheric mixing layer, which would not affect the near-earth environment. Although a rare occurrence, should all the ballast be released at one time, it would travel in the upper atmospheric winds and be dispersed over hundreds of miles. The particle size of the glass beads and steel shot used as ballast exceeds 10 microns, and, as such, neither of these materials is regulated by the USEPA.

3.4.2.1 Action Alternative

CSBF Fort Sumner – Criteria Pollutants

Construction

Site improvements at CSBF Fort Sumner would be implemented per the CSBF Campus Master Plan (CSBF 2021a). The site improvements would involve demolition, construction, and renovation activities (refer to **Section 2.4.1.1**). These improvements would be implemented over a multi-year period beginning in 2025. During construction, fossil fuel-fired construction equipment, trucks, and delivery vehicles would be a source of combustion emissions of criteria pollutants. Construction activities would also generate fugitive dust, i.e., particulate matter that is not emitted from a specific point source. Emissions from construction activity and associated effects to air quality would be temporary, lasting only for the duration of the construction period, intermittent based on the funding and implementation of the CSBF Campus Master Plan projects, and sporadic over the multi-year construction period between 2025 and 2032. This level of construction activity is not anticipated to cause De Baca County to be designated a nonattainment area for any criteria pollutants. The emissions of fugitive dust would be minimized due to implementation of control measures in accordance with standard construction practices, such as: spraying water on exposed soil during construction, proper soil stockpiling methods, and prompt replacement of disturbed ground cover or pavement. Additionally, measures to minimize construction combustion emissions could be employed, such as: using newer model equipment that incorporates the latest emissions reduction technologies, when practical; following manufacturer's operating recommendations regarding good combustion practices; and strict enforcement of idling limits for construction equipment.

Based on the existing attainment status, level of construction activity, and control measures, implementation of the Action Alternative at CSBF Fort Sumner would not affect the attainment status of the NAAQS for De Baca County or the region.

Operations

Emissions from vehicular traffic associated with balloon launch activities at CSBF Fort Sumner would not change, as no increase in balloon launches is proposed.

CSBF Palestine – Criteria Pollutants

Construction

Site improvements at CSBF Palestine would be implemented per the CSBF Campus Master Plan (CSBF 2021a). The site improvements would involve demolition, construction, and renovation activities (refer to **Section 2.4.1.2**) that would be implemented over a 20-year period beginning in 2025. Effects from construction activities to air quality would be the same as described for CSBF Fort Sumner; effects would be temporary, lasting only for the duration of the construction period, and would be intermittent based on the funding and implementation of Master Plan projects over the multi-year construction period. This level of construction activity is not anticipated to cause Anderson County to be designated a nonattainment area for any criteria pollutants. Emissions of fugitive dust and criteria pollutants would be similarly minimized through standard construction practices, as described for CSBF Fort Sumner. Based on the existing attainment status, level of construction activity, and control measures, implementation of the Action Alternative at CSBF Palestine would not affect the attainment status of the NAAQS for Anderson County or the region.

Operations

Emissions from vehicular traffic associated with balloon launch activities at CSBF Palestine would not change as no increase in balloon launches is proposed.

Existing Operations Area

The use of recovery vehicles (i.e., a modified flatbed truck, private vehicle, and small plane) during balloon and payload recovery operations resulting in a maximum of 31 round trips annually (for launches from both Fort Sumner and Palestine) would not perceptibly change air quality within the operations area.

Proposed Burns Launch Site – Criteria Pollutants

Construction

Site improvements at the proposed Burns launch site would involve the construction of new facilities and balloon launch pad. The site improvement projects would be implemented over a multi-year period beginning in 2025. Effects from construction activities to air quality would be the same as described for CSBF Fort Sumner or CSBF Palestine; effects would be temporary, lasting only for the duration of the construction period, and would be intermittent based on funding availability and likely occur over a multi-year construction period. This level of construction activity is not anticipated to cause Harney County to be designated a nonattainment area for any criteria pollutants. Emissions of fugitive dust and criteria pollutants would be similarly minimized through standard construction practices, as described for CSBF Fort Sumner and CSBF Palestine. Based on the existing attainment status, level of construction activity, and control measures, implementation of the Action Alternative at the proposed Burns site would not affect the attainment status of the NAAQS for Harney County or the region.

Operations

NASA BPO anticipates as many as 15 NASA BPO personnel would remain on-site for approximately 8 weeks during balloon campaigns at the proposed Burns launch site (refer to **Section 2.4.1.3**). In addition, up to 40 research scientists/students would be anticipated to arrive at the site to prepare their scientific instruments/payload for a duration of 3 to 6 weeks. Vehicular emissions would be anticipated to increase within Harney County due to activities associated with the proposed Burns launch site. The number of vehicles and resulting vehicular emissions would be considered minimal and would not be anticipated to perceptibly change the air quality within the affected environment. As such, no significant effect on air quality within Harney County would be anticipated.

Proposed Burns Operations Area

The use of recovery vehicles (i.e., a modified flatbed truck, private vehicle, and small plane) during balloon and payload recovery operations resulting in approximately 10 round trips annually would not perceptibly change air quality within the proposed Burns operations area.

Idaho Falls Tracking Station – Criteria Pollutants

Construction

Site improvements for the Idaho Falls Tracking Station would include a new concrete pad approximately 2,500 square feet to allow for the set-up of the mobile telemetry station. No permanent buildings would be necessary for NASA BPO operations at Idaho Falls. Effects would be temporary, lasting only for the duration of the construction period which would be less than one month to construct the concrete pad. Based

on the existing attainment status, level of construction activity, and control measures, implementation of the Action Alternative at the tracking station site would not affect the attainment status of the NAAQS for Bonneville County or the region.

Operations

Operation of the Idaho Falls Tracking Station would only occur during balloon launches from the Burns, Oregon, launch site (up to 10 per year). During these times, the telemetry station would be in operation, tracking the balloon and payload movement down range. This would require up to five NASA BPO personnel for set-up and tear down, with two people remaining on-site for duration of operations. It is expected that personnel would remain on-site for up to 40 days during balloon campaigns. Vehicular emissions would be anticipated to increase within Bonneville County due to activities associated with the proposed Burns launch site. Due to the limited number of personnel required, the number of vehicles and resulting vehicular emissions would be considered minimal and would not be anticipated to perceptibly change the air quality within the affected environment. As such, no significant effect on air quality within Bonneville County would be anticipated.

3.4.2.2 No Action Alternative

Under the No Action Alternative, NASA BPO would not add the Burns launch site and associated operations area, the proposed Idaho Falls tracking site, and would not implement the CSBF Campus Master Plan at Fort Sumner or Palestine. The potential for effects to air quality would remain unchanged at either of the launch sites or within the existing operations area beyond those previously evaluated (NASA 2010).

3.5 SOCIOECONOMICS

Socioeconomics is defined as the social and economic activities associated with the human environment, particularly population, and typically encompasses personal income and employment. Socioeconomics for this Supplemental PEA focus on the general features of the local economies of the Fort Sumner, Palestine, and Burns launch sites. At Idaho Falls, four people would temporarily be located at the site for a period 30 days each year, resulting in no socioeconomic effect. Thus, this site is not discussed further. Proposed construction, demolition, and renovation activities would take place over several years and are not extensive. These activities are not expected to contribute measurably to local economies and will not be discussed further.

3.5.1 Affected Environment

The region of influence for each of the U.S. launch sites is the county in which it resides. Socioeconomic data presented is for the states of New Mexico, Texas, and Oregon.

Village of Fort Sumner

Population. The Village of Fort Sumner is the county seat of De Baca County, New Mexico. As shown in **Table 3.5-1**, the Village of Fort Sumner accounted for approximately 52 percent of the county population in 2020. The population of Fort Sumner experienced a decrease of 14 percent from 2010 to 2020 while De Baca County experienced a decrease of 16 percent in population. By comparison, the population of the State of New Mexico saw a population increase of 3 percent (U.S. Census Bureau [USCB] 2020).

Table 3.5-1. Village of Fort Sumner Population

Geographic Area	2010 Population	2020 Population	Percent Change (2010 to 2020)
Village of Fort Sumner	1,031	889	-14
De Baca County	2,022	1,698	-16
State of New Mexico	2,059,179	2,117,522	3

Note: Percentages have been rounded to the nearest whole number.
Sources: USCB 2010; 2020.

Income and Employment. The median household income for the Village of Fort Sumner in 2020 was $29,833; De Baca County was $31,625. Both compare much less than the State of New Mexico, which reported a median household income of $51,945 (USCB 2020). In 2020, the three largest industries in De Baca County with respect to employment were: educational/health care/social assistance services (23 percent), construction (19.5 percent), and agriculture (16 percent). By comparison, the three largest industries in the State of New Mexico were: educational/health care/social assistance services (26 percent), retail (11 percent), and professional and administrative management (11 percent) (USCB 2020).

City of Palestine

Population. The City of Palestine, Texas, is the seat of Anderson County. As shown in **Table 3.5-2**, the city accounted for approximately 32 percent of the county population in 2020. The population of the City of Palestine experienced a decrease of 1 percent from 2010 to 2020. Anderson County also experienced a 1 percent decrease in population during the same period. By comparison, the population of the State of Texas increased by nearly 16 percent (USCB 2020).

Table 3.5-2. City of Palestine Population

Geographic Area	2010 Population	2020 Population	Percent Change (2010 to 2020)
City of Palestine	18,712	18,544	-1
Anderson County	58,458	57,922	-1
State of Texas	25,145,561	29,145,505	16

Note: Percentages have been rounded to the nearest whole number.
Source: USCB 2010; 2020.

Income and Employment. The median household income for the City of Palestine in 2020 was $37,868; Anderson County was higher, with $43,455. By comparison, both were much less than the State of Texas, with a reported median household income of $64,034 (USCB 2020). In 2020, the three largest industries in Anderson County with respect to employment were educational/health care/social assistance services (20 percent), retail (18 percent), and public administration (10 percent). By comparison, the three largest industries in the State of Texas were: educational/health care/social assistance services (21 percent), professional and administrative management (12 percent), and retail (11 percent) (USCB 2020).

City of Burns

Population. The City of Burns, Oregon, is the seat of Harney County. As shown in **Table 3.5-3**, the city accounted for approximately 36 percent of the county population in 2020. The population of the City of Burns experienced a 3 percent decrease in size between 2010 and 2020 while Harney County had an approximate 1 percent increase in population during the same period. By comparison, the population of the State of Oregon increased by over 11 percent (USCB 2020).

Table 3.5-3. City of Burns Population

Geographic Area	2010 Population	2020 Population	Percent Change (2010 to 2020)
City of Burns	2,806	2,730	-3
Harney County	7,422	7,495	1
State of Oregon	3,831,074	4,237,256	11

Note: Percentages have been rounded to the nearest whole number.
Sources: USCB 2010; 2020.

Income and Employment. The median household income for the City of Burns in 2020 was $35,821; Harney County was lower, with $31,957. By comparison, both were much less than the State of Oregon, with a reported median household income of $67,058 (USCB 2020). In 2020, the three largest industries in Harney County with respect to employment were: educational/health care/social assistance services (31 percent), retail (21 percent), and arts and entertainment (13 percent). By comparison, the three largest industries in the State of Oregon were: educational/health care/social assistance services (24 percent), retail (12 percent), and manufacturing (11 percent) (USCB 2020).

3.5.2 Environmental Consequences

The socioeconomic analysis focuses on the short-term influx of NASA BPO personnel and researchers/students who would be expected to arrive during seasonal balloon launch campaigns (refer to **Table 2.4-1**) and the effect this short-term influx would have on the local economy from the purchase of food, supplies, and lodging. No change to population, employment, or income of residents would occur.

3.5.2.1 Action Alternative

Village of Fort Sumner

At the start of each campaign, up to 15 NASA BPO personnel from Palestine would arrive and remain in the Village of Fort Sumner for up to 8 weeks. In addition, up to 40 research scientists/students would transition into the Village of Fort Sumner for up to 6 weeks as they ready their scientific instruments. Estimates for lodging, meals, and incidentals for NASA BPO personnel and research scientists/students staying in the Village of Fort Sumner would total approximately $811,440 (Government Services Administration [GSA] 2024).

City of Palestine

An average of four research scientists/students is associated with each of the six balloon missions conducted each year at CSBF Palestine. The research scientists/students would arrive and remain in Palestine for up to 4 weeks. Estimates for lodging, meals, and incidentals for research scientists/students staying in Palestine would total approximately $108,192 (GSA 2024).

City of Burns

NASA anticipates that up to 15 NASA BPO personnel may travel to and remain at the proposed Burns launch site for up to 8 weeks during each balloon campaign. Up to 40 research scientists/students would be anticipated to arrive and stay for up to 6 weeks as they ready their scientific instruments. Estimates for lodging, meals, and incidentals for NASA BPO personnel and research scientists/students staying in the City of Burns would total nearly $405,720 (GSA 2024).

In summary, no significant effect on socioeconomic resources would be anticipated. The revenue generated each year from balloon campaigns would provide a short-term economic benefit to the local economies.

3.5.2.2 No Action Alternative

NASA BPO would not add the Burns launch site to the program or implement construction at the Burns site. Therefore, the existing socioeconomic conditions for the City of Burns a would remain at *status quo*. The No Action Alternative would continue to provide economic benefits to the Village of Fort Sumner and the City of Palestine with little change anticipated to the existing socioeconomic conditions at either of the existing launch sites, beyond those previously evaluated as balloon campaigns and missions at these two launch facilities would remain unchanged (NASA 2010).

3.6 LAND USE

Potential effects to land use would be associated with balloon landings in the existing and proposed operations areas. The proposed construction, demolition, renovation would occur in areas of compatible land use and would not result in changes to land use at CSBF Fort Sumner, CSPF Palestine, the proposed Burns launch site, or the proposed Idaho Falls tracking site, and these will not be discussed further.

The existing operations area encompasses a vast portion of the south central and southwestern U.S., while the proposed operations area would encompass a large area of the north central U.S. Within these large regions, lands are managed for a variety of purposes and by a number of federal and state agencies. Landing and recovering a payload on these lands may conflict with the management strategies set forth by the managing agency. For the purposes of this analysis, the land within the operations areas have been divided into SULMAs. These are areas that: (1) are owned and governed by Native Americans; (2) are dedicated to outdoor recreation; or (3) are under the stewardship of federal or state governments for the study or preservation of the lands and their environments. The following SULMAs were identified and analyzed in this PEA:

- Indian Reservations
- Military Reservations
- National Forests
- National Grasslands
- National Parks
- National Monuments
- National Recreation Areas
- National Wildlife Refuges
- State Forests/Parks
- Local Parks/Recreation Areas
- Wild and Scenic Rivers
- Wilderness Areas
- Wilderness Study Areas
- Other Managed Areas

Areas of managed land that are sensitive may require specific recovery techniques to minimize disturbance to the natural environment (e.g., helicopter recovery). In general, avoidance of many of these land classifications is the standard procedure implemented by NASA BPO personnel within the existing operations area, with avoidance usually facilitating rapid balloon and payload recovery.

3.6.1 Affected Environment

Existing Operations Area

Within the existing operations area, there are many acres of the managed lands listed (**Figure 3.6-1)**. **Table 3.6-1** shows the various SULMAs, their acreages, and which agency is responsible for management of the lands within the existing operations area. In some cases, multiple agencies may manage different aspects of the same lands. For example, in wilderness areas, the Forest Service may manage the land, but the Bureau of Land Management may oversee any mineral or mining activity on that land.

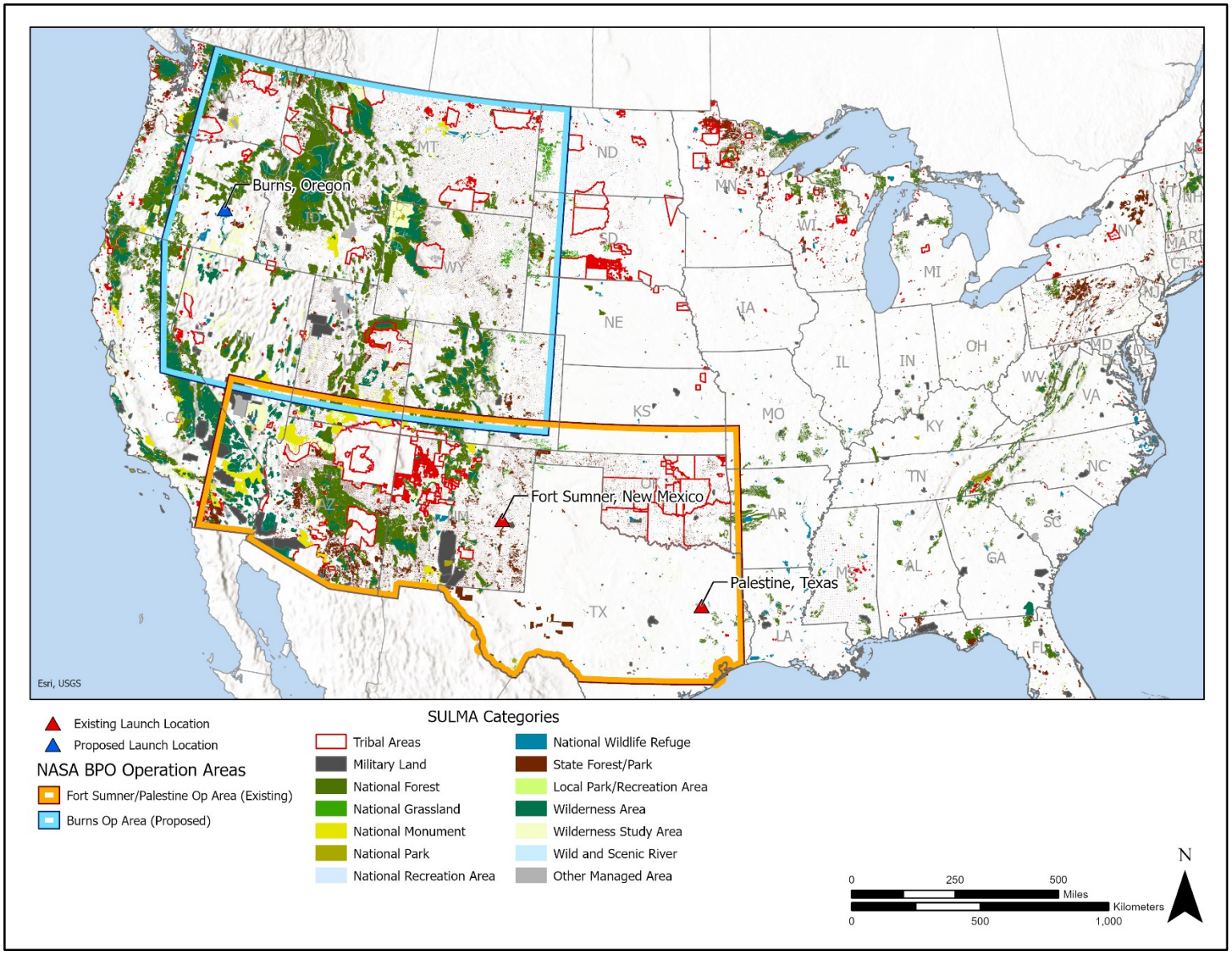


Figure 3.6-1. Special Use Land Management Areas within the Existing and Proposed Operations Areas

Of the managed lands within the operations area, Tribal Lands occupy the greatest percentage at 36 percent. Tribal Lands are avoided, reducing potential effects to these lands. National Forest lands make up the next highest percentage, at 15 percent. These areas are avoided because the ruggedness of the land and the general lack of roads makes payload recovery difficult.

Wilderness Areas and Military Reservations make up 8 and 7 percent, respectively, of the total managed land areas within the existing operations area. These areas are also generally avoided for landing and recovery activities. Military Reservations generally have very strict access requirements and are, therefore, not convenient landing areas, as recovery efforts may become problematic. Wilderness Areas do not necessarily have access restrictions but are generally devoid of roads, making recovery from these areas difficult. NASA BPO personnel make all practicable efforts to limit any activities within these lands. The remaining land classifications make up only small portions of the managed lands within the operations area.

When comparing managed lands within the affected states, Texas has exceptionally little managed land. Within the state of Texas, approximately 93 percent of all land area is privately owned, with the remainder belonging to federal, state, and local governments. Private lands require landowner permission to retrieve the payload.

Proposed Operations Area

Figure 3.6-1 shows the land coverage of the SULMAs within the proposed operations area. **Table 3.6-1** includes the various SULMAs and their acreages within the proposed operations area. Managed lands are dominated by National Forests, which make up approximately 45 percent. Wilderness Areas, Tribal Lands, and Wilderness Study Areas make up 12, 11, and 8 percent, respectively. The remaining land use categories make up only small portions of managed lands within the proposed operations area.

Table 3.6-1. SULMAs within the Existing Operations Area and Proposed Burns Operations Area in Acres

Type	Managing Agency	Land Area within Existing Operations Area	Land Area within Proposed Burns Operations Area
Tribal Lands	Bureau of Indian Affairs	130,854,012	23,905,877
Military Reservations	Department of Defense	24,370,999	3,941,580
National Forests	Forest Service	56,471,093	93,573,296
National Grasslands	Forest Service	1,706,103	2,627,328
National Parks	National Park Service	10,193,029	5,979,994
National Monuments	National Park Service	21,146,366	4,831,508
National Recreation Areas	Various Department of Interior Agencies	5,755,071	2,758,803
National Wildlife Refuges	U.S. Fish and Wildlife Service	16,519,974	4,648,163
State Forests/Parks	Varies by State	51,497,289	20,214,559
Local Parks/ Recreation Areas	Varies by State	1,313,013	297,464
Wild and Scenic Rivers	Various Department of Interior Agencies	331,944	1,904,873
Wilderness Areas	Various Department of Interior Agencies	31,080,633	24,960,703
Wilderness Study Areas	Various Department of Interior Agencies	12,152,074	14,844,599
Other Managed Areas	Other	5,001,531	4,679,646
Total		***368,393,132***	***209,168,393***

Source*:* U.S. Geological Survey (USGS) 2024.

3.6.2 Environmental Consequences

Land use effects consider the disturbance that could occur from balloon flight and recovery operations and how that disturbance may affect managed lands within the existing operations area and the proposed Burns operations area.

3.6.2.1 Action Alternative

Existing Operations Area

No change in land use or balloon operations is proposed within the existing operations area. Tribal Lands, National Forests, National Parks, National Wildlife Refuges, Wilderness Areas, and Military Reservations would continue to be avoided. These lands are avoided primarily to ease recovery efforts and to reduce the possibility of any adverse effects. Recovery efforts generally are complete within 24 hours but may require longer depending on the circumstance (e.g., ease of access to landing site, finding landowner to grant access).

Should a balloon/payload land within a SULMA, or on private land, the land manager/landowner would be contacted for permission to enter the property. If contact with the land manager/landowner cannot be obtained, NASA BPO personnel would request local law enforcement to escort the recovery team onto the property. Only after authorization is granted or escort provided would the recovery team access the site. Policy dictates that if private property is damaged, reparations are made through on-site negotiations with the landowner.

Proposed Operations Area

The policies and procedures implemented for current launches would be applied at the proposed Burns launch site and within the proposed Burns operations area. Sensitive and managed lands would be avoided.

3.6.2.2 No Action Alternative

Under the No Action Alternative, there would be no change to existing launch and recovery operations. Balloon operations and recovery procedures would continue as they have for the past 35 years with a sustained emphasis on avoiding sensitive lands as previously evaluated (NASA 2010). As such, the potential for effects to this resource would remain at *status quo* with no adverse effects anticipated.

3.7 BIOLOGICAL RESOURCES

Biological resources encompass plant and animal species and the habitats within which they occur. The biological resources considered in this Supplemental PEA include vegetation, wildlife, special-status species, and water.

Vegetation includes all existing upland terrestrial plant communities and submerged aquatic vegetation, with the exception of special-status species.

Wildlife includes all vertebrate and invertebrate animals. Fish, amphibians, reptiles, birds, mammals, and invertebrates are defined as wildlife.

Special-Status Species are defined as those plant and animal species listed as threatened, endangered, or proposed for listing as threatened or endangered by Endangered Species Act.

Water resources refer to surface and subsurface water, including lakes, ponds, rivers, streams, wetlands, and groundwater (aquifers). The Clean Water Act (CWA) of 1972 is the primary federal law that protects the nation's waters.

CBSF Fort Sumner, CBSF Palestine, the proposed Burns launch site, and the proposed Idaho Falls tracking site are previously disturbed and highly developed. In the areas where alterations are proposed, vegetation is maintained through mowing and haying and/or there is existing development and impervious surface. There is little natural habitat for wildlife in these areas. Wildlife species that may occur are those that can co-exist with ongoing operational activities. During construction and operations, any wildlife could be disturbed by noise and human activity. Site improvements would be unlikely to cause any adverse effects to wildlife or vegetation. There are no known special-status species or important water resources that occur at these locations. This analysis focuses on the existing and proposed operations areas.

3.7.1 Affected Environment

Due to the size of the existing and proposed operations areas, general ecological descriptions have been adapted from Ecological Regions of North America (USEPA 2022) and have been used to describe existing vegetation communities. **Figure 3.7-1** provides an overview of the Ecological Regions within the existing and proposed operations areas.

Existing Operations Area

The existing operations area encompasses a vast portion of the south central and southwestern U.S. The land occupied within the operations area is diverse in nature, transitioning from oak savannas in central Texas to desert in southwestern Arizona, and from flat plains and grasslands in the south to the Rocky Mountains in the north. **Figure 3.7-2** illustrates the ecological regions within the existing operations area, predominantly: South Central Semiarid Prairies (39 percent), Warm Deserts (22 percent), and Cold Deserts (13 percent).

There are 156 special-status species with federally designated critical habitat within the existing operations area (illustrated on **Figure 3.7-3**). Approximately 49 percent of the critical habitat area for the Mexican spotted owl (*Strix occidentalis lucida*) and 33 percent for the desert tortoise (*Gopherus agassizii*) lie within the existing operations area.

Wetlands and water resources for the U.S. are shown in **Figure 3.7-4**. The existing operations area is in the arid southwest of the U.S. and, as such, has limited water resources. Wetlands are typically found near flowing rivers and within the floodplains of those rivers and along lake shorelines.

Proposed Operations Area

Figure 3.7-5 illustrates the ecological regions within the proposed operations area. Approximately 42 percent of the area is made up of Cold Deserts dominated by sagebrush or saltbush-greasewood vegetation. Within the Cold Desert ecological region, large mammals are not abundant, but include mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and badger (*Meles meles*).

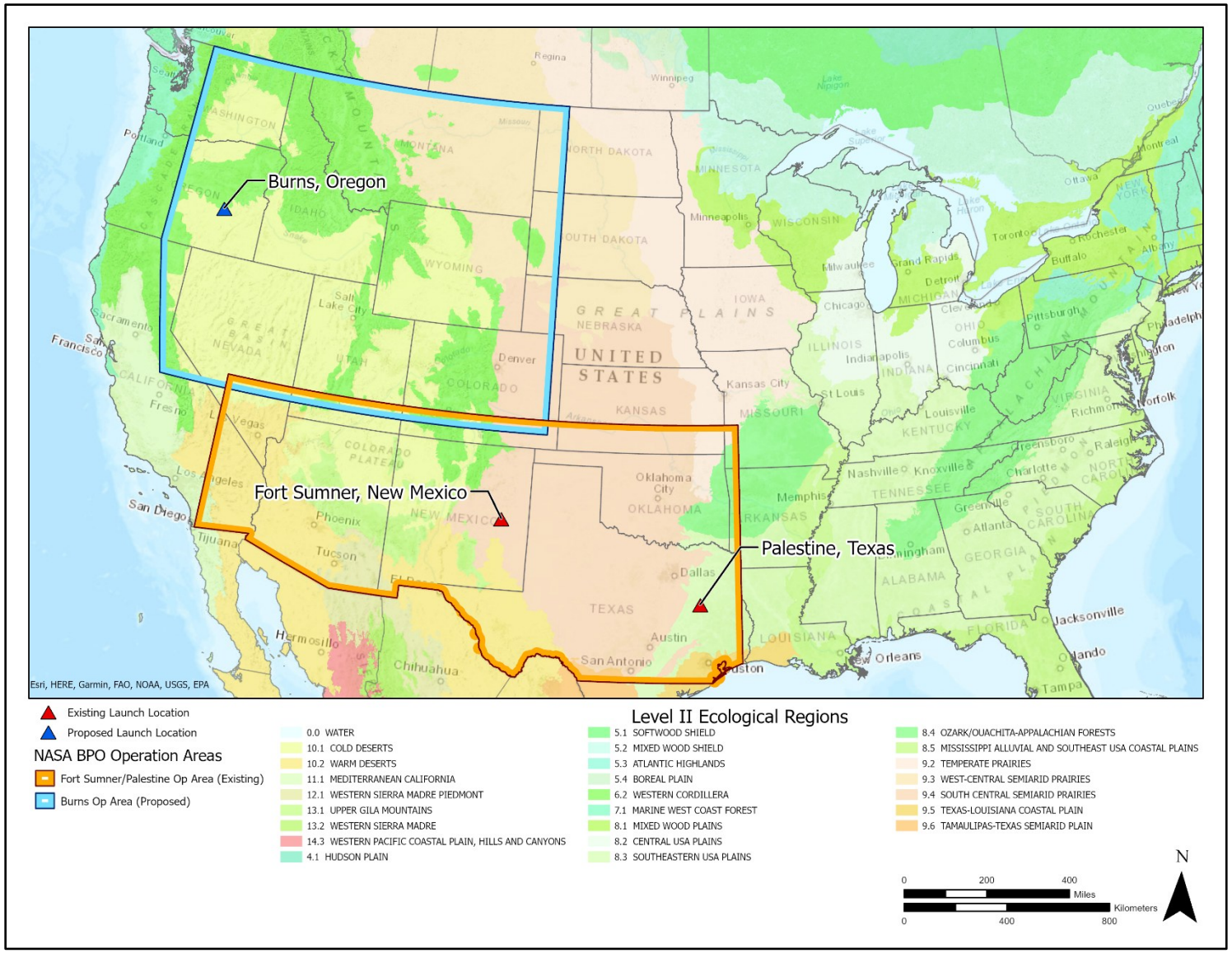


Figure 3.7-1. Overview of Ecological Regions within the Existing and Proposed Operations Areas

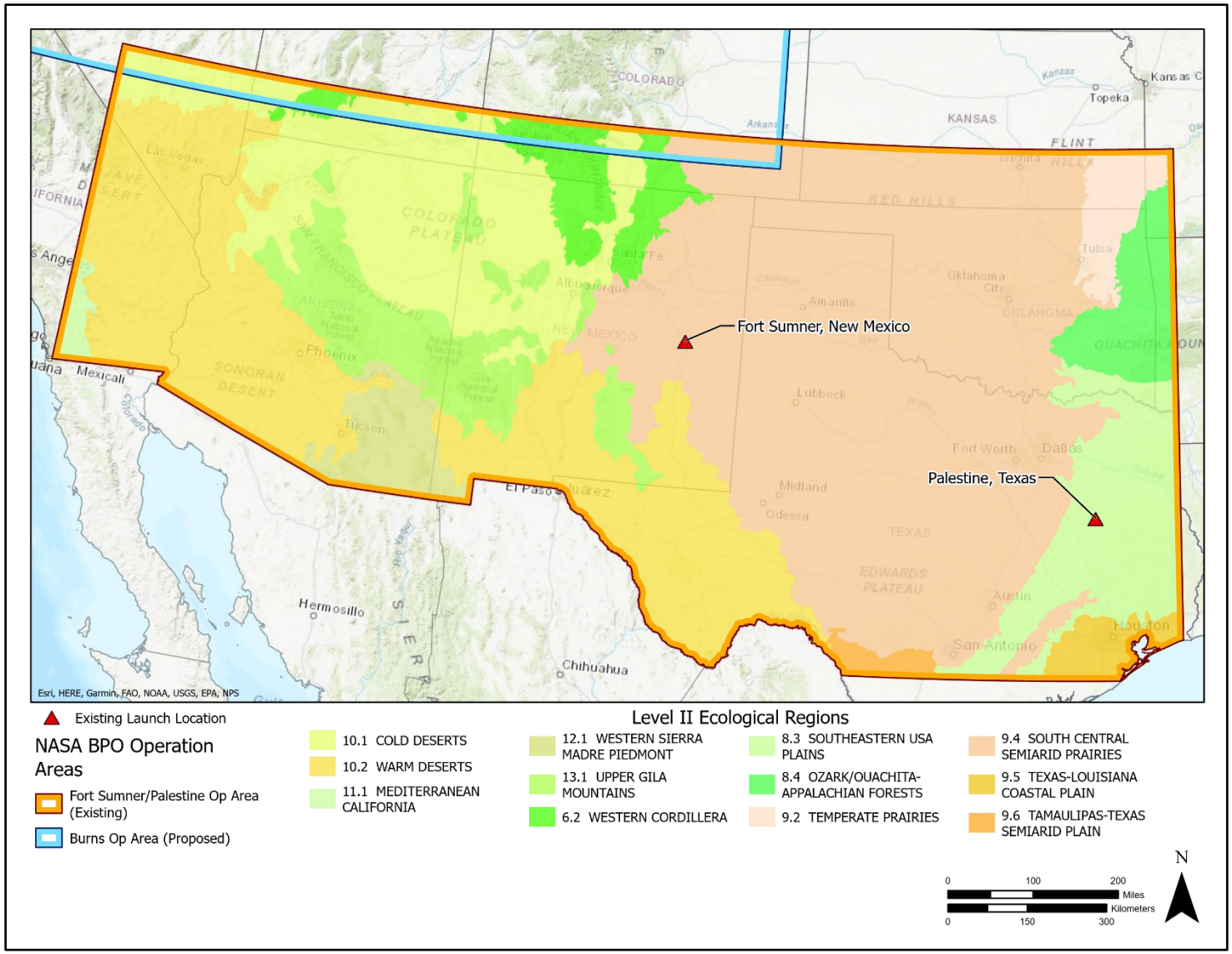


Figure 3.7-2. Ecological Regions within the Existing Operations Area

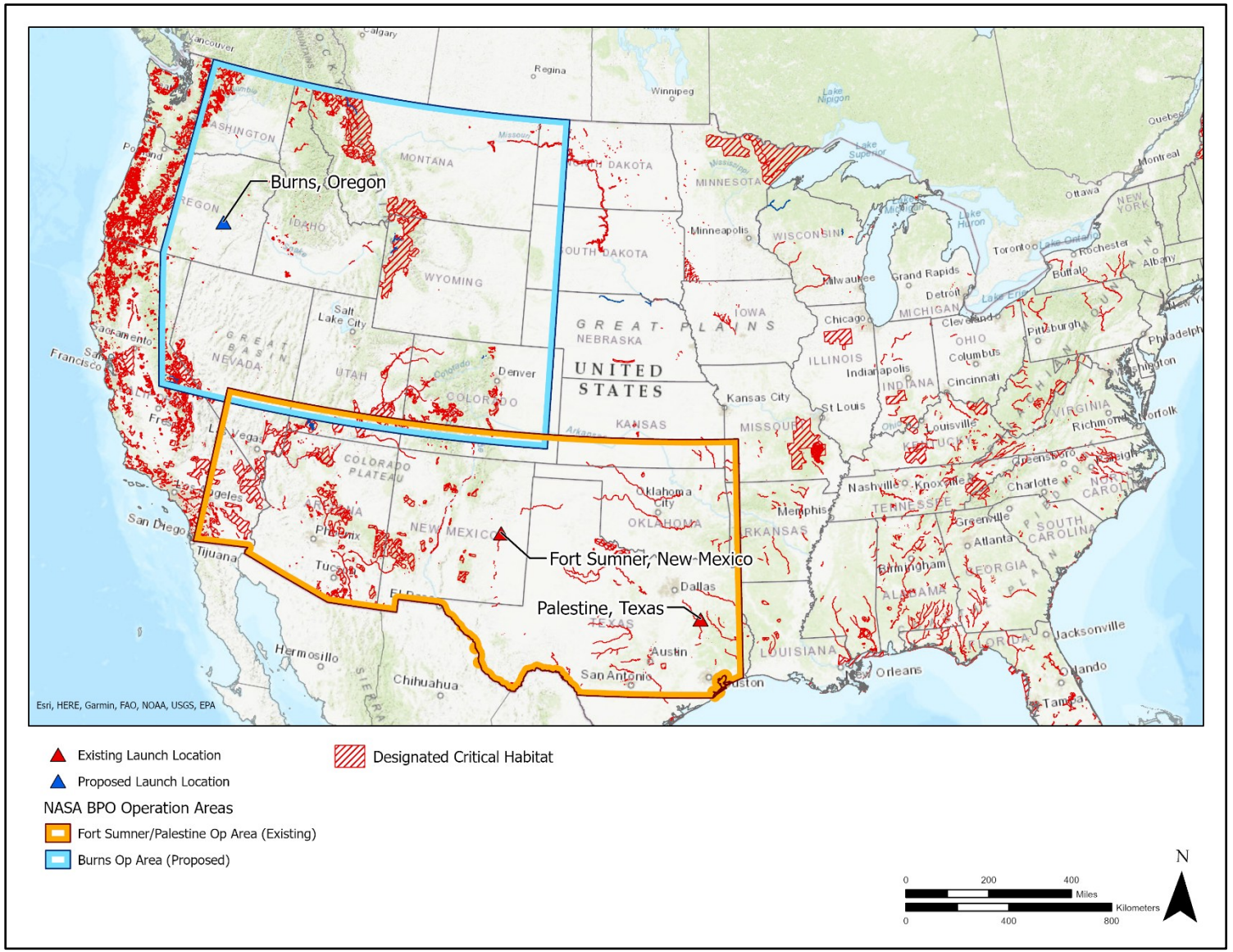


Figure 3.7-3. Designated Critical Habitat within the Existing and Proposed Operations Areas

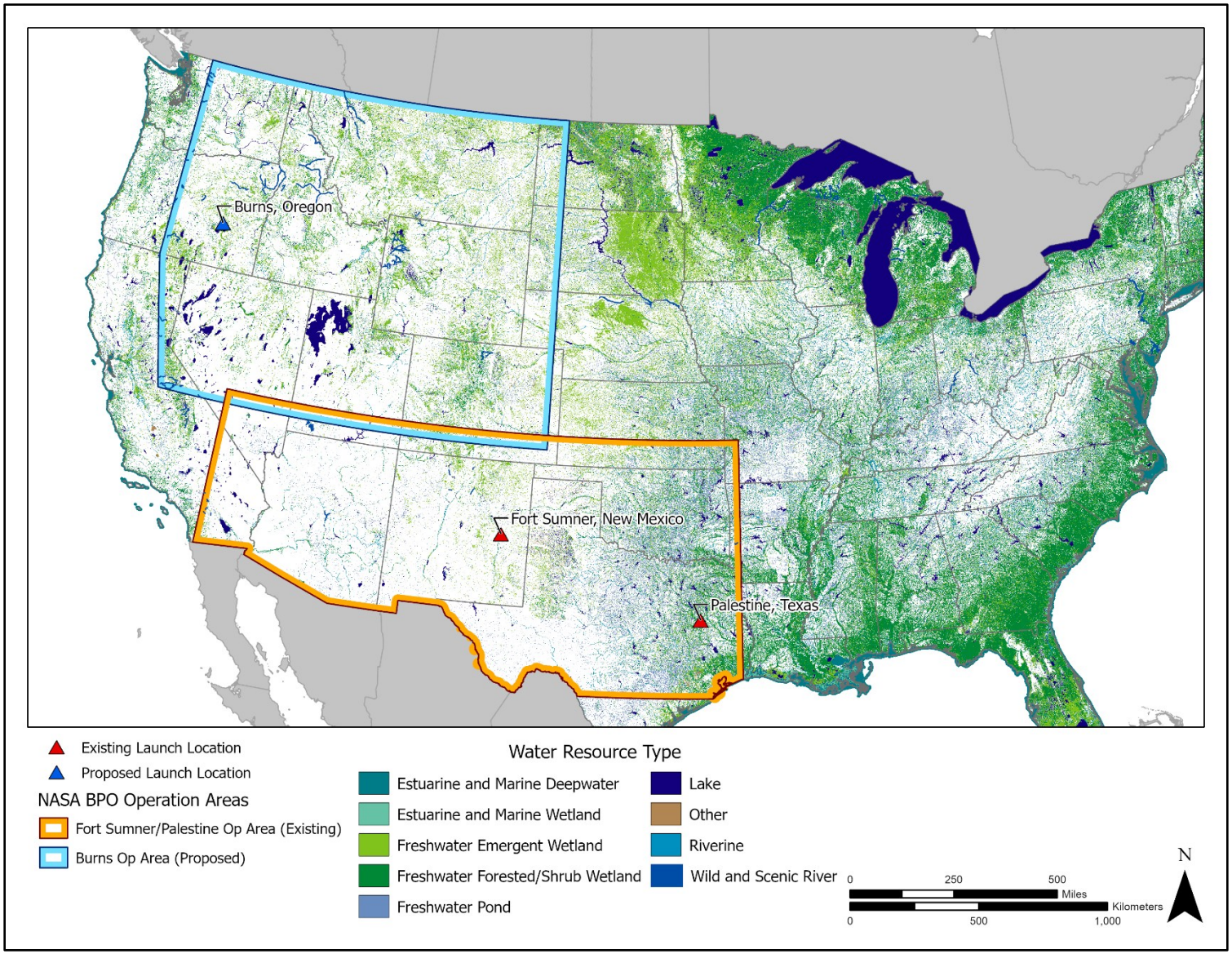


Figure 3.7-4. Wetlands and Water Resources within the Existing and Proposed Operations Areas

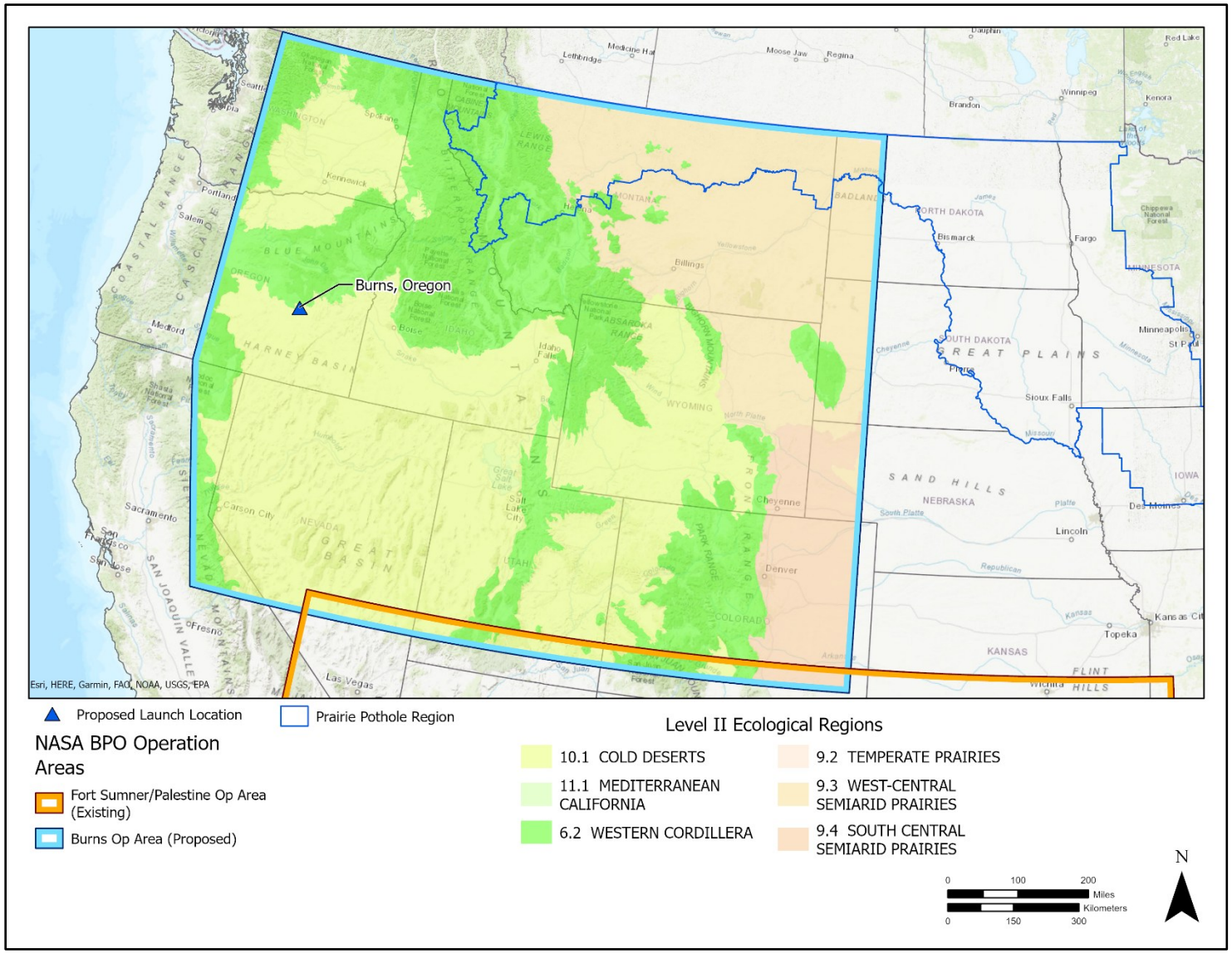


Figure 3.7-5. Ecological Regions within the Proposed Operations Area

The next largest ecological region in the proposed operations area is the Western Cordillera, making up 33 percent of the land area. The Western Cordillera is generally made up of forested mountain areas, predominately the Rocky Mountains and the Columbia Mountains. These areas are subarid to arid and mild in the southern lower valleys, but humid and cold in the central reaches at higher elevations. Vegetative cover is very diverse with many herb, lichen, and shrub associations and many conifer species at higher elevations. Characteristic mammals include mule deer, elk (*Cervus Canadensis*), moose (*Alces alces*), mountain goat (*Oreamnos americanus*), California bighorn sheep (*Ovis canadensis californiana*), coyote, black bear (*Ursus americanus*), and grizzly bear (*Ursus arctos horribilis*).

The last large ecological region within the proposed Burns operations area is the West-Central Semiarid Prairies, making up 19 percent of the land area. This area is along the northern reaches of the Great Plains and is dominated by the Northwestern Great Plains and Northwestern Glaciated Plains. Rain generally increases from west to east, with shortgrass prairie found in the rain shadow of the Rocky Mountains, giving way to mixed-grass prairie in the central Great Plains and tall grass prairie to the eastern edges of the region. Vegetation varies widely in this region with precipitation and latitude. The Prairie Pothole Region (shown on **Figure 3.7-5**) is an important area of inland wetlands that provide foraging and breeding habitat for a wide variety of waterfowl in the summer months. While not defined as a Level II Ecological Region, it is a recognized conservation priority area by USEPA, U.S. Fish and Wildlife Service, and the Natural Resources Conservation Service. This area extends through northern Montana into North Dakota, along the U.S./Canadian border. Generally, grasslands/prairie habitats of the Great Plains have been converted to agriculture or rangeland for livestock.

Within the proposed operations area, there are 46 special-status species with designated critical habitat (illustrated on **Figure 3.7-3**). This encompasses 21,401,625 acres. Approximately 62 percent of the critical habitat is for Canada lynx (*Lynx canadensis*) and 13 percent for the Mexican spotted owl.

Wetland and waters of the U.S. within the proposed operations area are illustrated on **Figure 3.7-4**. Wetland areas are sparse in the rain shadow of the Rocky Mountains but occur in larger sizes toward the eastern portion of the proposed operations area. A number of large lakes also exist within this proposed operations area.

3.7.2 Environmental Consequences

Potential effects to biological resources would be considered significant if species or habitats of concern were substantially affected over relatively large areas or if disturbances resulted in reductions in the population size or distribution of a special-status species.

3.7.2.1 Action Alternative

Existing Operations Area

Within the existing operations area, standard procedures for planned balloon and payload termination would continue to be followed. NASA BPO personnel would continually monitor balloons and payload health and use standard protocols to terminate balloon flights, thereby ensuring that balloons and payloads land in areas that are accessible to the greatest extent practicable. This includes making efforts to avoid designated critical habitat. However, if a balloon and payload were required to land within designated critical habitat, entry and retrieval of the balloon and payload would not permanently alter or destroy critical habitat. Human activities during payload and balloon recovery may cause temporary disturbance of wildlife in the vicinity

and may include trampling of vegetation during recovery efforts. However, all effects would be temporary in nature and would be very unlikely to occur within the same vicinity more than once. NASA BPO personnel would continue to avoid water bodies, rivers, and wetlands to the greatest extent practicable, as landing in these unnecessarily complicates retrieval of the balloon and payload. If a payload or balloon did land within a wetland, recovery efforts would not violate the CWA. No permanent alteration of any wetland would occur from recovery efforts.

Implementation of the Action Alternative would have similar, if not identical, effects to biological resources as those described in the 2010 PEA. There would be no significant effects to biological resources within the existing launch sites or operations area.

Proposed Operations Area

Within the proposed operations area, the standard procedures implemented for planned balloon and payload termination would be followed. This includes constant monitoring of the balloon and payload while in flight, and the use of up-to-date geographical information to ensure that flight termination allows for the balloon and payload to be accessed with little to no effect on the surrounding environment. NASA BPO personnel would continue to ensure that designated critical habitat was avoided to the greatest extent practicable. Minor temporary disturbance could occur during recovery, but it is highly unlikely that the same areas would be visited more than once. The small number of flights over a large land area also reduces the potential for any significant effects to biological resources. NASA BPO personnel would continue to avoid wetlands, water bodies, and rivers. There would be no significant effects to biological resources in the proposed operations area.

3.7.2.2 No Action Alternative

Under the No Action Alternative, there would be no change in balloon operations originating from CSBF Fort Sumner or CSBF Palestine or within the existing operations area. Balloon operations and recovery procedures would continue as they have for the past 35 years with a sustained emphasis on avoiding sensitive areas and critical habitats as previously evaluated (NASA 2010). Under this alternative, the proposed launch site, tracking site, and associated operations area would not be established. As such, the potential for effects to this resource would remain at *status quo* with no adverse effects anticipated.

3.8 CULTURAL RESOURCES

Cultural resources are defined as prehistoric or historic sites, buildings, structures, objects, or other physical evidence of human activity that are considered important to a culture or community for scientific, traditional, or religious reasons. Cultural resources include archaeological, architectural, and traditional cultural resources or properties. Archaeological resources are places where people changed the ground surface or left artifacts or other physical remains (e.g., arrowheads or bottles). Archaeological resources can be classed as either sites or isolates and may be either prehistoric or historic in age. Isolates often contain only one or two artifacts, while sites are usually larger and contain more artifacts. Architectural resources are standing buildings, dams, canals, bridges, and other structures. Traditional cultural properties are resources associated with the cultural practices and beliefs of a living community that link that community to its past and help maintain its cultural identity. Traditional cultural properties may include archaeological resources, locations of historic events, sacred areas, sources of raw materials for making tools, sacred objects, or traditional hunting and gathering areas.

Section 106 of the NHPA of 1966, as amended, and as implemented by 36 CFR 800, requires federal agencies to consider the effects of their actions on historic properties before undertaking a project. A historic property is defined as any cultural resource that is included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). The NRHP, administered by the National Park Service, is the official inventory of cultural resources that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP also includes National Historic Landmarks.

54 U.S. Code § 307101 requires that federal agencies consider the effect of the undertaking on a property that is on the list of United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites or on the applicable country's equivalent of the NRHP for purposes of avoiding or mitigating any adverse effect to cultural resources. World Heritage Sites are designated by UNESCO for having cultural, historical, scientific, or other form of significance. **Figure 3.8-1** illustrates the location of World Heritage sites near the existing operations area and the proposed Burns operations area. The U.S. *Historic Sites and Monuments Act* (1953) allows for the recognition of national historic sites but confers no legal status.

The Area of Potential Effects (APE) is the geographic area or areas within which an undertaking (project, activity, program, or practice) may cause changes in the character or use of any historic properties present (36 CFR 800.16(d)). The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking. NASA determined the APE for cultural resources consists of CSBF Fort Sumner, CSBF Palestine, the proposed Burns launch site, the ground tracking station in Idaho Falls, Idaho, and associated existing and proposed operations area (refer to **Figures 2.3-1 and 2.4-4** for the figure illustrating the operations areas and **Section 2.4** for figures of the launch sites). For archaeological resources, potential effects would be limited to the areas of new construction at CSBF Fort Sumner, CSBF Palestine, the proposed Burns launch site, and the ground tracking station in Idaho Falls, Idaho where ground-disturbing projects would occur.

In consideration of 36 CFR 800, federal agencies are required to initiate consultation with the state historic preservation office (SHPO) and tribal historic preservation office (THPO), informing them of the planned action and requesting their submittal of any comments or concerns.

In accordance with Section 106 of the NHPA (36 CFR 800.3(f)(2)) and EO 13175, *Consultation and Coordination with Indian Tribal Governments*, NASA consulted with SHPOs, as well as all federally recognized Native American tribes within the existing and proposed operations areas. Letters were sent to tribal leaders and THPOs in the states affected by this proposal and to the regional offices of the Bureau of Indian Affairs (BIA). **Appendix B** provides the Section 106 coordination correspondence.

3.8.1 Affected Environment

CSBF Fort Sumner, CSBF Palestine, and Existing Operations Area

Research for the proposed CSBF Fort Sumner site improvements included a search of the New Mexico Cultural Resources Information System (NMCRIS) to identify previous cultural resources surveys, archaeological sites, sites listed in the NRHP, sites listed in the New Mexico State Register, or any Historic Cultural Properties (HCPs) within the CSBF Fort Sumner location, as well as a 0.25-mile radius around the APE. The NMCRIS search resulted in the identification of five previous cultural resource surveys, one archaeological site (Fort Sumner Municipal Airport/LA 169027) and one historic structure (Fort Sumner Cemetery Wall and Entrance) that are listed in the NRHP and New Mexico State Register (Thomas et al. 2024).

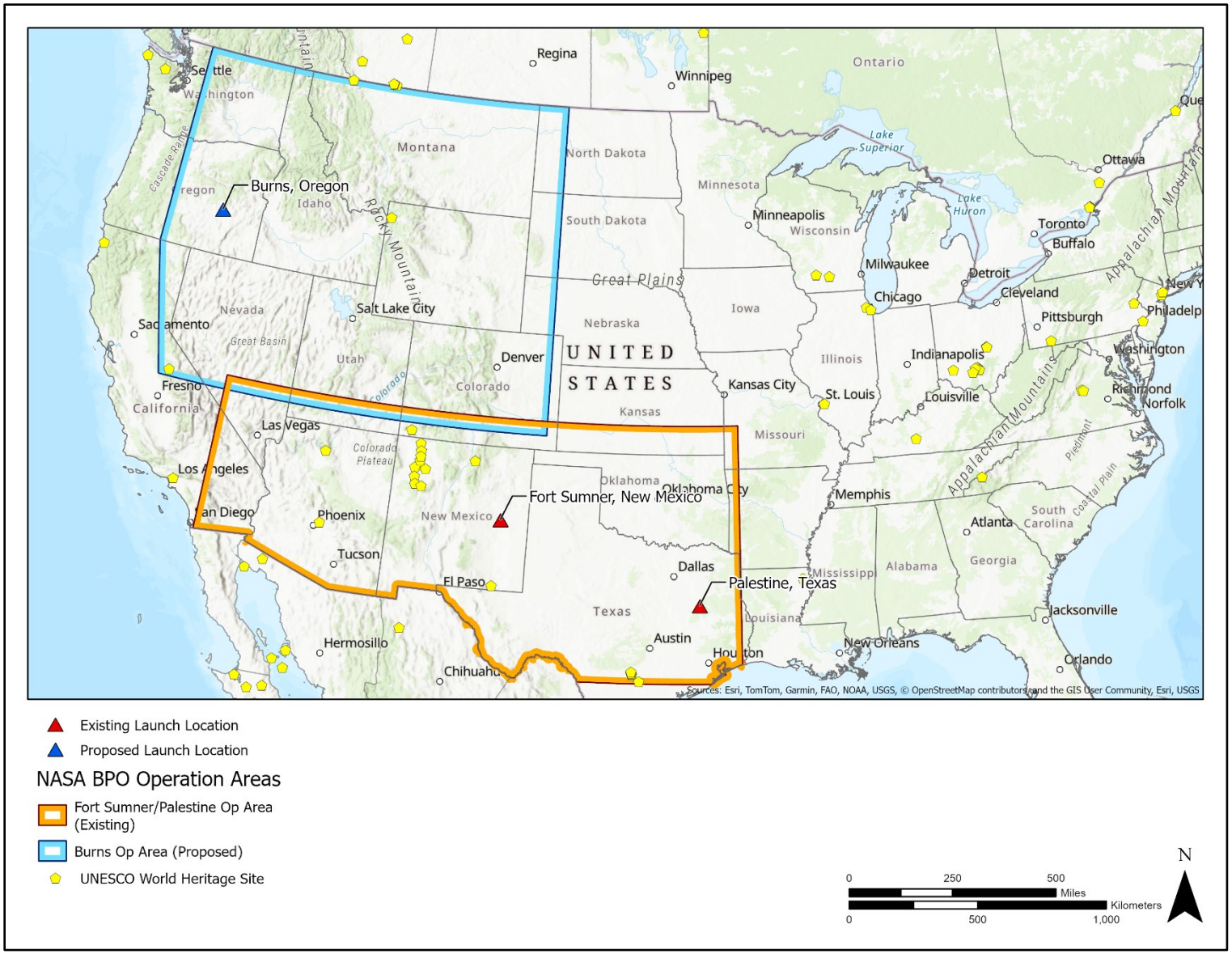


Figure 3.8-1. World Heritage Sites in North America

An archaeological and cultural sensitivity model was conducted at the Fort Sumner Municipal Airport in support of this PEA (Thomas et al. 2024). The proposed improvements are located within a previously recorded site, designated as a high probability area. Site LA 169027, also known as the Fort Sumner Army Airfield and Fort Sumner Municipal Airport, was documented as part of field investigations in 2011 (Parish et al. 2012 as cited in Thomas et al. 2024). Site LA 169027 was recommended eligible for inclusion in the NRHP under Criteria A and D during the previous investigation. This recommendation was primarily based on the association with the site's occupation and use during World War II. The previously recorded site is designated as having high probability of discovering archaeological finds. Documented activities to the north of site LA 169027 indicate there may be archaeological deposits remaining in that area, though it is expected that the integrity of these sites is low. Therefore, the area north of LA 169027 is designated as medium probability. A review of LiDAR data revealed two locations where structures or buildings may have been located in the past just west of runway 36 and to the north of the cemetery (Thomas et al. 2024).

Background research for the proposed CSBF Palestine site improvements consisted of an online search through the Texas Historical Commission's (THC's) Archaeological Sites Atlas (Atlas; THC 2024) and a review of archival maps and aerial photographs. Research focused on the identification of archaeological sites, Recorded Texas Historic Landmarks (RTHLs), sites listed in the NRHP, sites listed as State Antiquities Landmarks (SALs), cemeteries, and Official Texas Historical Markers (OTHMs) within the APE and within 0.25 miles of the APE. According to the Atlas, only two cemeteries are located within 0.25 miles of the APE. No previous surveys, previously recorded archaeological sites, RTHLs, NHRP properties, SALs, or OTHMs were identified within the APE nor within 0.25 miles of the APE (Thomas et al. 2024).

An archaeological and cultural sensitivity model of CSBF Palestine was completed in support of this PEA (Thomas et al. 2024). Proposed improvements are located within disturbed, low probability areas. Low probability was assigned to areas with steep slopes and visible disturbance. However, medium probability areas are located adjacent to the two structures proposed for demolition east of FM 3224. Medium probability was assigned to undisturbed areas with mild slope, proximity to water, and/or sitting above the Pleistocene-aged Fluviatile terrace deposits (Thomas et al. 2024).

Eleven buildings (1, 2, 3, 4, 5, 6, 7, 11, 14, 15, and 17) and two launch pads at CSBF Palestine were surveyed and evaluated individually for NRHP eligibility. Only one building (Building 5) was recommended eligible for NRHP listing at the state level under Criterion A in the area of Science (Korfmacher et al. 2024).

Of the eleven buildings surveyed, 10 have undergone some level of modification, from minor changes (paving a dirt floor) to major alterations (multiple additions). While most of the buildings lack one or more aspects of integrity due to these changes, they still generally retain integrity of location, setting, feeling, and association. While most of the surveyed buildings do not stand out as individually eligible, either due to a lack of individual significance or a lack of integrity, 10 of the 11 individually surveyed buildings and the two launch pads form a cohesive and recognizable historic district (Korfmacher et al. 2024). Building 17, the Tractor Shed, is not directly related to the mission of the facility as it primarily houses maintenance equipment, but it is still considered part of the setting of the property, and grounds maintenance is important to the overall function of the facility.

These buildings and structures were constructed prior to the shift from National Science Foundation (NSF) oversight of the property to NASA's administration. They represent the NSF's early efforts to establish, operate, and maintain a scientific balloon launch facility in the state of Texas. While not the only balloon

launch facility in the country, CSBF Palestine was the primary focus for National Center for Atmospheric Research, and its establishment supported both government and privately sponsored scientific studies using atmospheric balloons. As such, CSBF Palestine is significant at the state level under Criterion A in the area of Science for its role in promoting and advancing scientific balloon launches in the state. The period of significance for the historic district is 1962-1983, covering the period of oversight by the NSF prior to its transfer to NASA's jurisdiction. Other contributing features of the historic district include the primary access roads on both sides of FM 3224. These access roads connect the various buildings and the two launch pads. They are part of the property's circulation network and overall design and contribute to the look and feel of the property. The vegetation surrounding the property, while not cultivated, is considered part of the setting. FM 3224 splits the property into two halves and is not part of the historic district. As such, the historic district would be considered discontiguous, although just barely and only due to the public roadway (Korfmacher et al. 2024).

The CSBF Palestine campus also supports multiple modern buildings such as the Visitor Center (2009), Vehicle Storage II (2004), Warehouse II (1985), Test and Evaluation Building (1993), and the Operations Control Center (2004), which would be considered non-contributing to the recommended historic district. Other modern features, such as the Water Tower (1992), Base Sign (2003), and the Loading Dock (1995), would also be considered non-contributing to the historic district, although they and the modern buildings are considered part of the present setting. Overall, the CSBF Historic District retains integrity of location, setting, design, materials, workmanship, feeling, and association despite the modern additions and upgrades to existing buildings. The contributing resources consist of half of the existing primary buildings and structures at the facility and provide sufficient context to convey the significance of the property (Korfmacher et al. 2024).

Numerous federally recognized tribal locations and lands are found throughout the existing operations area, with large portions located in Arizona and western New Mexico (**Figure 3.8-2**).

Proposed Burns Launch Site, Idaho Falls Tracking Site, and Operations Area

The proposed Burns launch site would be located at the Burns Municipal Airport in Burns, Oregon. The site of the Burns Municipal Airport was first used as an airfield in 1929. In 1934, the Civil Works Administration awarded $5,000 to build a new airport (*Morning Oregonian* 1934). The City of Burns purchased 680 acres in 1942 and, subsequently, the Civil Aeronautics Administration built the Burns Municipal Airport, which included two runways of 5,200 feet (*The Oregonian* 1946). Presently, the Burns Municipal Airport covers 825 acres and operates two runways. Balloon flights would be monitored from the command station at the Burns Municipal Airport and a mobile telemetry ground tracking station in Idaho Falls, Idaho. The proposed Idaho Falls tracking site would be in a previously disturbed and highly developed area at the Idaho Falls Regional Airport. Therefore, there is a low likelihood of *in situ* cultural deposits within the proposed location.

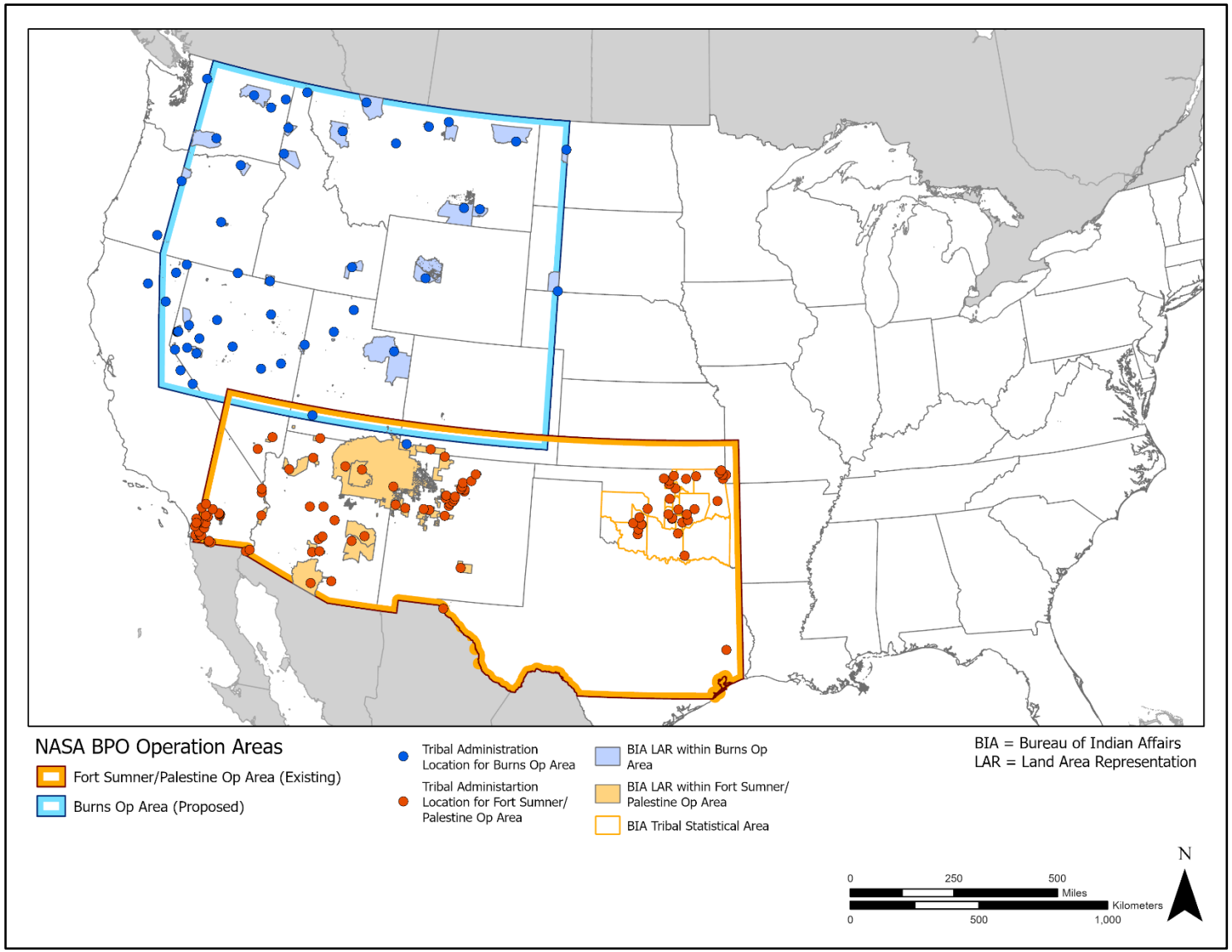


Figure 3.8-2. Federally Recognized Tribal Locations and Lands within the Existing and Proposed Operations Areas

Background research for the proposed Burns launch site consisted of an online search utilizing the Oregon Archaeological Records Remote Access portal and a review of archival maps and aerial photographs. Research focused on the identification of archaeological sites, recorded historic landmarks, sites listed in the NRHP, and cemeteries within 0.25 miles of the APE. According to the available data, there have been four previously conducted archaeological surveys within 0.25 miles of the APE. No previously recorded archaeological sites, cemeteries, or other historic features were identified within the APE (Thomas et al. 2024).

An archaeological and cultural sensitivity model of the proposed Burns launch site was completed in support of this PEA (Thomas et al. 2024). The proposed new construction projects would occur in a medium probability area due to the evaluation of LiDAR data that revealed a grid pattern that may have been roads. These features were not visible in historic documents or aerial imagery (Thomas et al. 2024).

A cultural resources survey was conducted at the Idaho Falls Regional Airport in May 2019 as part of Airport Improvement Program project #3-16-0018-041-2016. The survey evaluated above-ground resources for the entire airport. Previously documented properties include the NRHP-listed Idaho Falls Airport Historic District (#97001126), the NRHP-listed Red Baron Hangar (#19-18043), and the NRHP-eligible East Lateral Canal System (#19-18268). During the on-site investigation, 19 additional resources were identified as potentially eligible for listing in the NRHP. These consisted of three sub-lateral sections of the East Lateral Canal system located on airport property and an additional 16 structures that are potentially eligible as contributing resources to the NRHP-listed Idaho Falls Airport Historic District (Ardurra 2024).

Figure 3.8-2 illustrates the locations of federally recognized tribal locations and lands throughout the proposed Burns operations area.

3.8.2 Environmental Consequences

For cultural resources, the threshold for significant effects includes any disturbance that cannot be mitigated. Effects may occur through damage or destruction of all or a part of a historic property or result in the alteration of characteristics of the surrounding environment that contribute to the property's significance. Analysis of potential effects on cultural resources is based on the following considerations: (1) physically altering, damaging, or destroying all or part of a resource; (2) altering characteristics of the surrounding environment that contribute to resource significance; (3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or (4) neglecting the resource to the extent that it deteriorates or is destroyed. The potential to directly disturb cultural resources can be assessed by identifying the type and location of the proposed area of disturbance and by determining the exact locations of cultural resources that could be affected. Effects that are farther removed from the immediate project area including visual, audible (noise), or atmospheric changes due to the project implementation are more difficult to quantify.

Determination of significance for effects on cultural resources was established by comparing historical balloon and payload landing locations for balloon systems launched from CSBF Fort Sumner and CSBF Palestine and potential balloon and payload landing locations for balloon systems launched from the proposed Burns site with known, protected historic and cultural resources. Even though planning efforts are made to avoid known culturally important structures and sites, there is always the possibility for the discovery of new important sites.

3.8.2.1 Action Alternative

CSBF Fort Sumner, CSBF Palestine, and Existing Operations Area

The Action Alternative includes new construction and demolition at CSBF Fort Sumner and CSBF Palestine as part of the implementation of each location's Campus Master Plan (CSBF 2022). At CSBF Fort Sumner, efforts would include the demolition of Building 6, the renovation of Building 3, and the construction of six new buildings (refer to **Figure 2.4-1**). None of these buildings are eligible or listed in the NRHP.

At CSBF Palestine, efforts would include the demolition of 13 buildings (1, 2, 3, 4, 5, 6, 7, 9, 10, 14, 15, 23, and 32), the renovation of three buildings (11, 25, and 28), and the construction of 14 new buildings (refer to **Figure 2.4-1)**. Demolition of Buildings 1, 2, 3, 4, 5, 6, 7, 14, and 15, which are contributing buildings to the CSBF Historic District would be considered an adverse effect. In addition, Building 11 is a contributing resource to the CSBF Historic District and exterior renovations may constitute an adverse effect. NASA is consulting with the Texas SHPO to mitigate these adverse effects.

Throughout CSBF Palestine's operational history, there have been no significant effects to cultural resources and no adverse effects to historic properties or tribal lands within the existing operations area. By utilizing the predictive model for landing and recovery efforts and accessing the most current geospatial information regarding culturally significant sites, NASA BPO would continue to avoid all known culturally significant areas. Additionally, the probability of affecting a culturally significant resource given the vastness of the operations areas would be extremely low, as would the probability of the balloon and payload landing in the same location more than once. If a balloon and/or payload landing were to occur on culturally sensitive lands, NASA BPO personnel would contact the appropriate SHPO and/or THPO to coordinate recovery efforts.

Proposed Burns Launch Site, Idaho Falls Tracking Site, and Operations Area

The Action Alternative would include the construction of two new buildings at the proposed Burns launch site located at the Burns Municipal Airport (refer to **Figure 2.4-3**). There are no NRHP-eligible or listed historic properties at the Burns Municipal Airport. Based on the archaeology and sensitivity model, the proposed new construction projects would occur in a medium probability area. To avoid disturbance to unknown archaeological resources, NASA would employ an archaeological and/or tribal monitor for any planned ground-disturbing activities that take place within the APE at this location.

The Action Alternative would include a new concrete pad approximately 50 x 50 ft (2,500 ft^2) that would allow for the set-up of the mobile telemetry station at Idaho Falls. No permanent buildings would be necessary for NASA BPO operations at Idaho Falls. The new concrete pad would be located adjacent to the NRHP-listed Idaho Falls Airport Historic District and additional NRHP-eligible resources. The mobile telemetry station is not a permanent fixture and would be brought in for each launch and removed afterward. To avoid disturbance to unknown archaeological resources, NASA would employ an archaeological and/or tribal monitor for any planned ground-disturbing activities that take place within the APE at this location. Therefore, effects to the Historic District and the NRHP-eligible resources would be less than significant.

No significant effects on cultural resources would be anticipated in the proposed Burns operations area. By utilizing the predictive model for landing and recovery efforts and accessing the most current geospatial information, all known culturally significant sites would be avoided. Additionally, the probability of affecting a culturally significant resource given the vastness of the operations areas would be extremely

low, as would the probability of the balloon and payload landing in the same location more than once. If a balloon and/or payload landing were to occur on culturally sensitive lands, NASA BPO personnel would contact the appropriate SHPO and/or THPO to coordinate recovery efforts.

3.8.2.2 No Action Alternative

Under the No Action Alternative, there would be no change in balloon operations at CSBF Fort Sumner or CSBF Palestine or within the existing operations area as previously evaluated (NASA 2010). Balloon operations and recovery procedures would continue as they have for the past 35 years with a sustained emphasis on utilizing predictive modeling for balloon/payload landings to avoid all known culturally significant areas. Under this alternative, NASA BPO would not add the Burns launch site, Idaho Falls tracking site, and associated operations area to the program. As such, the potential for effects to this resource would remain at *status quo* with no adverse effects anticipated.

3.9 HAZARDOUS MATERIALS AND SYSTEMS

Hazardous materials, listed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA), are defined as any substance that, due to quantity, concentration, or physical, chemical, or infectious characteristics, may present a substantial danger to public health, welfare, or the environment. Hazardous materials are federally regulated by the USEPA, under the Federal Water Pollution Control Act; CWA; Toxic Substance Control Act (TSCA); Resource Conservation and Recovery Act (RCRA); CERCLA; and CAA. Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), polychlorinated biphenyls (PCBs), and lead-based paint (LBP), also referred to as lead-containing paint (LCP).

Under EO 12088, *Federal Compliance with Pollution Control Standards*, the federal government is required to comply with these acts and all applicable state regulations. Additionally, EO 12088, under the authority of the USEPA, ensures that necessary actions are taken to prevent, manage, and abate environmental pollution from hazardous materials.

3.9.1 Affected Environment

The affected environment for hazardous materials and systems consists of the balloon launch sites and balloon operations areas. There are numerous instances where hazardous materials and/or hazardous systems may be used during balloon preparation or flight operations. Below is a description of the categories of such hazardous materials and systems.

- *Radio Frequency.* Radio frequency or microwave emitters may be used on scientific equipment. All operations involving the use of non-ionizing radio frequency/microwave radiation devices must comply with the standards and regulations specified in Institute of Electrical and Electronics Engineers C95.1 *Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz* and Goddard Procedural Requirement 1860.3, *Radio Frequency Radiation Protection* (GSFC WFF 2024).
- *Lasers*. Lasers may be used as sensors for taking scientific measurements. All operations involving the use of lasers must comply with the standards and regulations of ANSI Z136.1, *Safe Use of Lasers*. Access and laser illumination levels are controlled to ensure that no personnel are present

within the ocular and skin hazard areas of the laser unless suitable protection is provided (GSFC WFF 2024).

- *Radioactive sources*. Small amounts of radioactive materials may be required in the calibration of scientific or balloon system instruments. The GSFC Radiation Protection Office maintains a broad scope Nuclear Regulatory Commission license for operations using radioactive sources that take place on GSFC property or temporary worksites; all operations must conform to the standards of the Nuclear Regulatory Commission Regulations (GSFC WFF 2024). CSBF Palestine maintains a Texas Department of Health Radioactive Materials and Notice of Reciprocal Recognition of License in New Mexico. The total activity of all sources is limited to 100 millicuries. No less than six months prior to a balloon flight, NASA BPO must be notified of the intent to fly radiological sources.
- *Biological agents/Chemical materials.* Small quantities of various types of Biosafety Level 1 biological agents or chemical materials may be present in scientific apparatus. These are materials (solids, liquids, or gases) that present a health risk or physical hazard to personnel, property, or the environment. For biological agents, laboratory data confirming compliance with the National Institutes of Health and Centers for Disease Control and Prevention Biosafety in Microbiological and Biomedical Laboratories must be provided. For chemical materials, a Safety Data Sheet (SDS) must be provided to NASA BPO personnel per the GSFC WFF *Integrated Contingency Plan* and be available during all parts of balloon operations (GSFC WFF 2024). The SDS is a standard form used to provide workers and emergency personnel with procedures for handling or working with substances in a safe manner and includes information such as physical data (melting point, boiling point, flash point, etc.), storage, disposal, protective equipment, and spill handling procedures. Unused chemicals may become hazardous wastes. Procedures for the control of hazardous wastes are covered under the Goddard Procedural Requirement 8500.3, *Waste Management* and the GSFC WFF *Integrated Contingency Plan* (GSFC WFF 2024).
- *Cryogens.* Cryogens are compressed gases (i.e., liquid helium or liquid nitrogen) that are used to cool the wire coils of superconducting magnets, thus reducing electrical resistance. Approximately 400 to 500 liters (100 to 130 gallons) would be used, if needed, for specific research activities. Cryogens can produce extremely cold temperatures (<-150˚C [-300˚F]) and have the potential for human hazards if mishandled. Hazards when dealing with cryogens include extreme cold, asphyxiation when used in a confined space, and explosion due to rapid expansion. However, when properly stored, the cryogens used do not present a hazard to people or the environment, though the container (pressure vessel) in which the gas is stored does present a hazard.
- *Pressure vessels.* At balloon float altitudes, many scientific instruments will not function properly in the near-vacuum conditions. In these cases, a pressure vessel is required that can provide both a pressurized operating environment, as well as assist in thermal control. While these vessels would not necessarily contain hazardous material, they could present a potential health hazard. A leaking vessel could explode and ignite a fire. To prevent effects to individuals on the ground, a number of safeguards are required when handling pressure vessels. Safeguards to assure the integrity of pressure vessels would include, but not be limited to, verifying that all the pressure system's fittings and seals are properly installed; periodic leak checking; examining test data showing design and pressure analysis; and pressure recording test dates with methodology and test results. There is a

certification and approval process for gondola/payloads that have pressure systems. Any pressure vessels systems shall be designed to an agreed upon standard, such as American Institute of Aeronautics and Astronautics S-080 or S-081 (GSFC WFF 2024).

- *Pyrotechnics.* A small explosive device is activated by NASA BPO personnel to separate the balloon from the parachute/payload during termination/descent. All pyrotechnics are rated Class 1.4S explosives and are self-contained. All personnel who store, handle, or install pyrotechnics are required to have approved training. Explosive devices must be 1-amp, 1-watt, and no-fire (meaning that 1-amp of current will not cause the pyrotechnic to fire or activate). Prior to any experimenter using pyrotechnics, the hazard is identified and procedures for installing pyrotechnics must be developed and approved by NASA BPO personnel for reliability, safety, and quality assurance (GSFC WFF 2024).
- *Petroleum products*. In addition to hazardous materials used in association with balloon operations, there is also the limited use of motorized equipment (e.g., on-site vehicles, recovery vehicles, and spool truck). All petroleum products, such as fuels, motor oils, and hydraulic fluids, would be handled in accordance with prescribed procedures. NASA BPO personnel are responsible for oil spill prevention and response and hazardous waste management (GSFC WFF 2024).

To ensure that all hazardous materials and systems are handled in a safe and secure manner, NASA balloon flight procedures require science groups to submit special ground and flight safety plans to address hazards associated with their gondola/payload. For each potential hazardous material proposed to be used, the user must provide an SDS. Additionally, all hazardous material(s) must be packaged to conform to applicable Department of Transportation regulations (GSFC WFF 2024).

NASA began implementing the CSBF Campus Master Plan at the Palestine launch site in 2017 and is proposing to implement the CSBF Campus Master Plan at the Fort Sumner launch site beginning in 2025. Prior to the start of any construction activities, a survey would be conducted on the buildings proposed for demolition to identify if potential ACM, LBP/LCP, or PCBs are present.

3.9.2 Environmental Consequences

The qualitative and quantitative assessment of effects from hazardous materials or hazardous systems focuses on how and to what degree a Proposed Action would affect their use, management, and disposal. A substantial increase in the quantity or toxicity of hazardous substances or hazardous systems used or generated is considered a potentially significant effect. Significant effects could result if there would be a substantial increase in human health risk or environmental exposure at a level that could not be mitigated to acceptable levels. Handling or using any hazardous material, by definition, could be hazardous to either individuals or the environment and result in environmental consequences. The SDS outlines safety procedures to be undertaken when handling hazardous materials used in a balloon system. NASA BPO personnel are informed of the presence of any hazardous materials present at the launch site, and personnel involved in balloon launch and recovery operations are provided with the SDS.

3.9.2.1 Action Alternative

Generally, there are two circumstances when hazardous materials present potential consequences to people on the ground. One circumstance is during payload preparation activities for operations, and the other is during landing and recovery activities. Prior to launching a balloon system, the gondola must be NASA-

certified: the gondola must sufficiently hold the scientific instrumentation, ensure survivability of the scientific instrumentation during landing, and maintain integrity of the electronic equipment.

Existing and Proposed Launch Sites

Precautions are taken to ensure proper handling by qualified NASA BPO personnel when using hazardous materials. These include personnel training and providing detailed plans for the use and handling of the material. Procedures are in place to contain any spills and to store, handle, and dispose of hazardous material in accordance with all applicable federal and state regulations. Operations involving the use of hazardous materials are performed under the monitoring of a NASA-certified Operational Safety Specialist. Adequate measures to ensure the safety of people and the environment are in place and would be instituted if hazardous materials were used during payload preparation activities. As such, the storage or use of these materials would not be anticipated to result in significant effects to the environment or people.

The 2020 Per- and Polyfluoroalkyl substances (PFAS) Preliminary Assessment Report at the launch sites concluded that no major PFAS sources, such as aqueous film-forming foam (AFFF), wastewater treatment plant effluent, or municipal waste landfills were identified (Tetra Tech 2020). Current fire protection systems potentially containing PFAS may be in buildings where site improvements are proposed. Special precautions would be taken for the handling and disposal of building materials suspected or confirmed to include ACMs, LBP/LCP, or PFAS to protect on-site workers from exposure to airborne hazards. Contractors approved by NASA would be used to carry out any required sampling, abatement, and permitting that may be required in accordance with federal, state, and local regulations. Fluorescent light bulbs and ballasts have the potential to contain PCBs. The removal and disposal of the fixtures would be performed in accordance with the *Toxic Substances Control Act Storage Disposal Requirements for Fluorescent Light Ballasts*. Construction activities would require the use of certain hazardous materials (e.g., paints, welding gases, solvents, preservatives, sealants) and may generate hazardous waste. Hazardous materials usage and hazardous waste generation during construction activities would be temporary and would be managed in accordance with federal and state regulations.

Hazardous materials have the potential to be released during operational activities from an accidental spill or discharge from parked privately-owned vehicles. Procedures for the control and minimization of hazardous material or hazardous waste releases are covered under the GSFC WFF *Storm Water Pollution Prevention Plan* and *Integrated Contingency Plan* (GSFC WFF 2023); these procedures would continue to be observed. As such, no effects on the management of hazardous materials, hazardous wastes, or hazardous systems would be expected at the existing launch sites, as no substantial change in operations would be anticipated. No effect would be anticipated at the Burns site, as the same procedures for the control and minimization of hazardous materials, waste, and systems would be observed.

Existing and Proposed Operations Areas

Scientific users are required to submit a payload recovery plan which identifies specific hazards and procedures associated with recovery, disassembly, and transportation of the payload back to the launch site. This plan must be approved by the Campaign Manager and is provided to the payload recovery team. The payload recovery team brings the necessary equipment to the recovery site specific to the type of hazardous material present, should cleanup of a spill be required. If lithium batteries are used, they would be disconnected and stored in approved shipping containers prior to transport back to the launch site (GSFC WFF 2024). Trucks used for tracking a balloon's descent and subsequent recovery operation would comply with applicable Department of Transportation regulations (GSFC WFF 2024). Prior to commencing any

balloon operations that utilize radioactive sources, NASA would seek to obtain a Notice of Reciprocal Recognition of License.

In summary, NASA BPO personnel are qualified in the handling of hazardous materials, hazardous waste, and hazardous systems and would continue to observe all precautions and measures when hazardous materials are present. In addition, all hazardous waste generated during construction activities would be managed in accordance with the procedures found in the GSFC WFF *Integrated Contingency Plan* (GSFC WFF 2023). As such, effects on potentially affected resources from hazardous materials would not be anticipated.

3.9.2.2 No Action Alternative

Under the No Action Alternative, there would be no change in balloon operations at CSBF Fort Sumner or CSBF Palestine or within the existing operations area. Balloon operations and recovery procedures would continue as they have for over 35 years and as previously evaluated in 2010 (NASA 2010). Under this alternative, NASA BPO would not add the Burns launch site, Idaho Falls tracking site, and associated operations area to the program. The CSBF Campus Master Plan would not be implemented at the Fort Sumner launch site or continue at the Palestine launch site, and no new construction would occur at the proposed Burns launch site. The potential for effects on potentially affected resources from hazardous materials would remain at *status quo* with no change anticipated to the existing environmental conditions at either of the launch sites or within the existing operations area.

4.0 REASONABLY FORESEEABLE FUTURE ACTIONS AND MITIGATION MEASURES

4.1 REASONABLY FORESEEABLE FUTURE ACTIONS

Reasonably foreseeable future actions include those federal and non-federal activities not yet undertaken, but sufficiently likely to occur, that a decision maker would take such activities into account in reaching a decision. These federal and non-federal activities that must be taken into account in the analysis of include, but are not limited to, activities for which there are existing decisions, funding, or proposals identified by the bureau. Reasonably foreseeable future actions do not include those actions that are highly speculative or indefinite. No effects are anticipated from implementation of the Proposed Action. No other known or foreseeable actions would be anticipated to affect resource areas affected by balloon launch, flight, termination, or recovery activities in the U.S.

4.2 MITIGATION MEASURES

NASA BPO personnel would, to the extent practicable, continue to utilize real-time mapping and analysis systems to avoid population centers and SULMAs while operating scientific balloons. The analyses in this Supplemental PEA provide NASA BPO personnel additional information regarding the location and sensitivity of environmental resources to be avoided that would be incorporated into the balloon flight activities currently administered and balloon flight activities proposed to ensure that any potentially sensitive lands are avoided, and that care is taken to minimize any unplanned effects. NASA BPO would continue its ongoing relationship with the FAA and would consider any concerns expressed by other agencies contacted about this proposal with jurisdiction within the existing operations area and proposed Burns operations area (refer to **Table 3.6-1**). Additionally, NASA would consider any concerns expressed by federally recognized tribes or SHPOs contacted in accordance with Section 106 of the NHPA and EO 13175, *Consultation and Coordination with Indian Tribal Governments*.

NASA BPO personnel would continue to contact land managers and/or local law enforcement prior to entering land of unknown ownership for recovery activities. Policy dictates that if private property is damaged, reparations are made through on-site negotiations with the landowner.

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6.0 LIST OF PREPARERS AND CONTRIBUTORS

NAME	TITLE/AREA OF RESPONSIBILITY	EDUCATION AND EXPERIENCE
NASA		
Bonsteel, Michael	Air Quality Program Manager Reviewer	M.S. Ecology Years of experience: 18
Bruner, Douglas	Environmental Engineer BPO PEA Project Lead	B.A. Geology, MS Engineering Geology Years of experience: 33 years
Garde, Gabriel	Chief, Balloon Program Office Program Stakeholder	B.S. Mechanical Engineering Years of experience: 20
Hamilton, Andrew	Balloon Program Office Deputy Chief	M.S. Aerospace Engineering, B.S. Aeronautical Engineering Years of experience: 28
Lankford, Todd	Mission Manager BPO Burns Project Lead	B.A. Electrical Engineering Years of experience: 22
Lindsey, Matthew	Environmental Scientist Project Manager	B.S. Sustainable Biomaterials Years of experience: 5
Miller, Shari	GSFC Environmental Planning Group Lead, NEPA Manager	B.S. Chemistry, B.S. Biology Years of experience: 30
Pollack, Janine	Environmental Engineer Environmental Due Diligence Lead	B.S. Geology, M.A. Geography Years of experience: 18
Romero, Irene	Cultural Resources Manager Cultural and Historic Lead	B.S. Architecture and Planning Years of experience: 8
Stantec-GS		
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Briscoe, Katie	Cultural Resources	M.A. in Archaeology M.S. in Historic Preservation Years of Experience: 9
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Harrison, Michael	Land Use, Biological Resources, Geographic Information Systems (GIS)	M.S. in Environmental Science Years of Experience: 22
Hoffman, Chareé	Airspace and Balloon Operations, Socioeconomics	B.S. Biology Years of Experience: 25
Pruitt, Elizabeth	Senior NEPA Planner Project Manager	M.S. and B.S. Biology Years of experience: 29
Przirembel, Janet	Production Coordinator	B.A. English Years of Experience: 31
Shoff, Abigail	GIS	B.S. in Geographical Information Systems Year of Experience: 13

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Appendix A
Public Involvement and Agency Coordination

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Mark Gordon, Governor

Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

DEQ

Todd Parfitt, Director

February 18, 2025

NASA Wallops Flight Facility
ATTN: Shari Miller
34200 Fulton St.
Building F-160 / Room C165
Wallops Island, Virginia 23337

RE: Wyoming Department of Environmental Quality Comments – NASA's Scientific Ballon Program Expansion Scoping

Dear Ms. Miller,

On behalf of the Wyoming Department of Environmental Quality (WDEQ), we appreciate the opportunity to comment on NASA's Scientific Ballon Program Expansion Scoping. WDEQ is charged with conserving and enhancing the quality of Wyoming's environment for the benefit of current and future generations. We envision a future where vibrant economic development and prosperity are achieved while providing sound and sensible environmental protection that protects human health and the environment.

It is important to note as a foundation for our comments that WDEQ has been delegated primacy over multiple programs by the federal government – water, air, solid and hazardous waste, abandoned mine land reclamation, coal mining, and underground injection control (UIC) wells, including class VI, for the geologic sequestration of carbon dioxide. In addition, WDEQ permits and regulates all minerals mined in the state such as gravel and bentonite. WDEQ has also received an agreement state status with the Nuclear Regulatory Commission for uranium mining and processing in the State of Wyoming. Wyoming received primacy delegations and agreement status as a result of federal agencies agreeing that Wyoming and WDEQ have the environmental, permitting and regulatory structure in place to ensure that any activity within WDEQ's authority is handled in a manner that protects human health and environment.

WDEQ offers the following comment:

- NASA should consider the potential for any hazardous materials or chemicals to be released from a launched balloon into the atmosphere, or to waterways or human populations on the ground in the event of a mechanical or technological failure. In addition, should a spill or release of any hazardous substance occur, WDEQ must be notified.

If you have any questions or need additional information, please feel free to contact Keith Guille at 307-777-6105 or keith.guille@wyo.gov.

Sincerely,

Todd Parfitt
Director
Wyoming Department of Environmental Quality

Cc: Nancy Vehr – Administrator, Air Quality Division
Keith Guille – Outreach Program Manager

ALABAMA-COUSHATTA TRIBE OF TEXAS

TRIBAL HISTORICAL PRESERVATION OFFICE

571 State Park Road 56 • Livingston, TX 77351 • (936) 563-1181

02/24/2025

NASA Wallops Flight Facility
Attn: Irene Romero
8800 Greenbelt Road
Building 26/Room N250
Greenbelt, MD 20771

SUB:RE: SCOPING FOR THE PROPOSED EXPANSION OF NASA'S SCIENTIFIC BALLOON PROGRAM

Greetings sir / madam:

The Alabama-Coushatta Tribal Historical Preservation Office is deeply committed to the historic preservation of its history, heritage, and historic lands. We seek the preservation of our historic lands, culture, artifacts, and natural habitat. Thank you for your submission of your department's Section 106 inquiry.

After a careful review of your documents, scope of work, and geographic reference point, we have come to the following conclusion:

While we are interested in your project, we do not have the resources to devote our full attention to this project or it is outside of our current urgent need scope of work reference point. Please keep us abreast of further work of your organization as our focus may change in the future.

We urge caution and care in protection of natural resources and of any heritage items of interest you may discover. Please let us know if there is a discovery and if we can be of assistance in the matter.

Thank you,

Delvin Johnson, Tribal Historical Preservation Officer
Alabama Coushatta Tribe of Texas
571 State Park Rd 56, Livingston, TX 77315
Johnson.Delvin@actribe.org
936.563.1181

COMANCHE NATION

NASA
Goddard Space Flight Center
Wallops Flight Facility
Attn: Ms. Irene Romero
Virginia 23337

February 19, 2025

Re: Scoping for the proposed expansion of NASA's Scientific Balloon Program

Dear Ms. Romero:

In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the Comanche Nation site files, where an indication of ***"No Properties"*** have been identified. (IAW 36 CFR 800.4(d)(1)).

Please contact this office at (580) 492-1153) if you require additional information on this project.

This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.

Regards

Comanche Nation Historic Preservation Office
Theodore E. Villicana , Technician
#6 SW "D" Avenue, Suite C
Lawton, OK. 73502

From: Sturges, Susan
To: gsfc-nepa@nasa.gov
Cc: Roesler, Caitlin; Miller, Shari (WFF-2500)
Subject: [EXTERNAL] RE: EPA Response to NASA"s Scientific Balloon Program Scoping Notice
Date: Tuesday, February 11, 2025 6:12:54 PM

Hello, resending EPA's response below to NASA's Scientific Balloon Program Scoping Notice with a copy to shari.a.miller@nasa.gov. The original email address gsfc-nepa@nasa.gov identified for email comments in the public notice was kicked back as undeliverable.

Thank you.

Susan Sturges
Acting NEPA Branch Manager

U.S. Environmental Protection Agency Region 10
NEPA Branch
Seattle, Washington
(206) 553-2117 | sturges.susan@epa.gov

Submit NEPA environmental review documents to R10-NEPA@epa.gov

---

From: Sturges, Susan
Sent: Tuesday, February 11, 2025 2:52 PM
To: gsfc-nepa@nasa.gov
Cc: Roesler, Caitlin <Roesler.Caitlin@epa.gov>
Subject: EPA Response to NASA's Scientific Balloon Program Scoping Notice

Dear Ms. Shari Miller,

Thank you for the January 2025 notification of NASA's intent to prepare a Supplemental to a 2010 Programmatic Environmental Assessment for proposed expansion of NASA's Scientific Balloon Program. The proposal includes activities associated with adding one new balloon site at the Burns Municipal Airport in Harney County, OR and one downrange telemetry site at the Idaho Falls National Laboratory in Bonneville County, Idaho. The program will add up to ten new ballon flights per year originating from the Burns launch site, increasing the annual number of scientific balloon launches to a maximum of 41.

We appreciate the opportunity to provide feedback. The EPA does not have formal scoping comments at this time and requests that EPA's copy of the NEPA document when ready for public distribution be sent to EPA Region 10 NEPA Branch's email (R10-NEPA@epa.gov).

Sincerely,

Susan Sturges

Acting NEPA Branch Manager

U.S. Environmental Protection Agency Region 10
NEPA Branch
Seattle, Washington
(206) 553-2117 | sturges.susan@epa.gov

Submit NEPA environmental review documents to R10-NEPA@epa.gov

TRADITIONAL
COUNCIL

CHAIRMAN
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SECRETARY
Freddie Hernandez Sr., Kisakodita

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MEMBERS
Kendall Scott, Metaa
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KICKAPOO

TRADITIONAL TRIBE OF TEXAS

2212 Rosita Valley Rd.
Eagle Pass, Texas 78852

TRIBAL COUNCIL

February 11, 2025

NASA Wallops Flight Facility
ATTN: Irene Romero
8800 Greenbelt Road
Building 26, Room N250
Greenbelt, MD 20771

Re: Scoping for the proposed expansion of NASA's Scientific Balloon Program

Dear Ms. Romero,

Our office is in receipt of a letter we received from the National Aeronautics and Space Administration, dated January 16, 2025, by which the Kickapoo Traditional Tribe of Texas (KTTT or Tribe), has been provided information with respect to the above-referenced projects.

With respect to said projects, we wish to advise you that the KTTT does not own land in or near the proposed project areas, nor would these endeavors affect any of the Tribe's cultural, historical, or sacred sites that we are aware of. Therefore, we believe that there is no need for the Tribe to act as a consulting party with respect to said projects. Nevertheless, the KTTT appreciates the opportunity it was granted to comment on these matters.

Should you have any questions, please do not hesitate to contact this office at (830) 421-5388.

Respectfully,

Signature

Jason C. Nelson
General Counsel

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 25, 2025

Shari Miller
WFF Center NEPA Manager
National Aeronautics and Space Administration (NASA)
34200 Fulton Street
Building F-160/ Room C165
Wallops Island, Virginia 23337

Via: **E-mail**

Re: **TCEQ NEPA Request #2025-092. EXPANSION OF NASA's SCIENTIFIC BALLOON PROGRAM. Anderson County.**

Dear Ms. Miller,

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

The proposed action is located in Anderson County, a portion of which is designated nonattainment for the National Ambient Air Quality Standard (NAAQS) for sulfur dioxide (SO2). Based on the information provided to the TCEQ, the proposed action is not located in the SO2 NAAQS nonattainment area; therefore, federal Clean Air Act, §176(c) general conformity requirements do not apply.

The Office of Water does not anticipate significant long term environmental impacts from this project as long as construction and waste disposal activities associated with it are completed in accordance with applicable local, state, and federal environmental permits, statutes, and regulations. We recommend that the applicant take necessary steps to ensure that best management practices are used to control runoff from construction sites to prevent detrimental impact to surface and ground water.

Any debris or waste disposal should be at an appropriately authorized disposal facility.

Thank you for the opportunity to review this project. If you have any questions, please contact the agency NEPA coordinator at (512) 239-5538 or NEPA@tceq.texas.gov

Sincerely,

Ryan Vise,
Division Director
External Relations

Oklahoma Historical Society
State Historic Preservation Office

February 14, 2025

Ms. Shari Miller, NEPA Manager
NASA Wallops Flight Facility
34200 Fulton St., Bldg. F-160/Room C165
Wallops Island, VA 23337

RE: File #0785-25; NASA's WFF Proposed Expansion of Scientific Balloon Program

Dear Ms. Miller:

We have received and reviewed the documentation concerning the referenced project in (over) Oklahoma. Additionally, we have examined the information contained in the Oklahoma Landmarks Inventory (OLI) files and other materials on historic resources available in our office. We find that there are no historic properties affected by the referenced project.

Thank you for the opportunity to comment on this project. We look forward to working with you in the future.

If you have any questions, please contact Kristina Wyckoff, Historical Archaeologist, at 405-521-6381.

Should further correspondence pertaining to this project be necessary, please reference the above underlined file number. Thank you.

Sincerely,

Lynda Ozan
Deputy State Historic
Preservation Officer

LO:pm

800 Nazih Zuhdi Drive, Oklahoma City, OK 73105-7917
405-521-6249 | Fax 405-522-0816 | www.okhistory.org/shpo

Appendix B
National Historic Preservation Act Section 106 Correspondence

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ALABAMA-COUSHATTA TRIBE OF TEXAS

TRIBAL HISTORICAL PRESERVATION OFFICE

571 State Park Road 56 • Livingston, TX 77351 • (936) 563-1181

02/24/2025

NASA Wallops Flight Facility
Attn: Irene Romero
8800 Greenbelt Road
Building 26/Room N250
Greenbelt, MD 20771

SUB:RE: SCOPING FOR THE PROPOSED EXPANSION OF NASA'S SCIENTIFIC BALLOON PROGRAM

Greetings sir / madam:

The Alabama-Coushatta Tribal Historical Preservation Office is deeply committed to the historic preservation of its history, heritage, and historic lands. We seek the preservation of our historic lands, culture, artifacts, and natural habitat. Thank you for your submission of your department's Section 106 inquiry.

After a careful review of your documents, scope of work, and geographic reference point, we have come to the following conclusion:

While we are interested in your project, we do not have the resources to devote our full attention to this project or it is outside of our current urgent need scope of work reference point. Please keep us abreast of further work of your organization as our focus may change in the future.

We urge caution and care in protection of natural resources and of any heritage items of interest you may discover. Please let us know if there is a discovery and if we can be of assistance in the matter.

Thank you,

Delvin Johnson, Tribal Historical Preservation Officer
Alabama Coushatta Tribe of Texas
571 State Park Rd 56, Livingston, TX 77315
Johnson.Delvin@actribe.org
936.563.1181

COMANCHE NATION

NASA
Goddard Space Flight Center
Wallops Flight Facility
Attn: Ms. Irene Romero
Virginia 23337

February 19, 2025

Re: Scoping for the proposed expansion of NASA's Scientific Balloon Program

Dear Ms. Romero:

In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the Comanche Nation site files, where an indication of ***"No Properties"*** have been identified. (IAW 36 CFR 800.4(d)(1)).

Please contact this office at (580) 492-1153) if you require additional information on this project.

This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.

Regards

Comanche Nation Historic Preservation Office
Theodore E. Villicana , Technician
#6 SW "D" Avenue, Suite C
Lawton, OK. 73502

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TRADITIONAL TRIBE OF TEXAS

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TRIBAL COUNCIL

February 11, 2025

NASA Wallops Flight Facility
ATTN: Irene Romero
8800 Greenbelt Road
Building 26, Room N250
Greenbelt, MD 20771

Re: Scoping for the proposed expansion of NASA's Scientific Balloon Program

Dear Ms. Romero,

Our office is in receipt of a letter we received from the National Aeronautics and Space Administration, dated January 16, 2025, by which the Kickapoo Traditional Tribe of Texas (KTTT or Tribe), has been provided information with respect to the above-referenced projects.

With respect to said projects, we wish to advise you that the KTTT does not own land in or near the proposed project areas, nor would these endeavors affect any of the Tribe's cultural, historical, or sacred sites that we are aware of. Therefore, we believe that there is no need for the Tribe to act as a consulting party with respect to said projects. Nevertheless, the KTTT appreciates the opportunity it was granted to comment on these matters.

Should you have any questions, please do not hesitate to contact this office at (830) 421-5388.

Respectfully,

Signature

Jason C. Nelson
General Counsel

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