WILDLAND FIRE PROTECTION PLAN

GARKANE ENERGY COOPERATIVE

DATE: July, 2024

REVISION: V2

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

Table of Tables

Table of Figures

Versioning Record

The following table details the nature, date, and primary author of major revisions to the document. The location of significant changes and updates should be noted in the description column.

Table 1. Plan Review and Revision Record

Date	Version	Author	Revision Description
Jan. 2020	V1	SWCA	Original document adopted and submitted in 2021
July 2024	V2	SWCA/BKI	Report and maps updated by BKI Engineering

THIS PAGE INTENTIONALLY LEFT BLANK

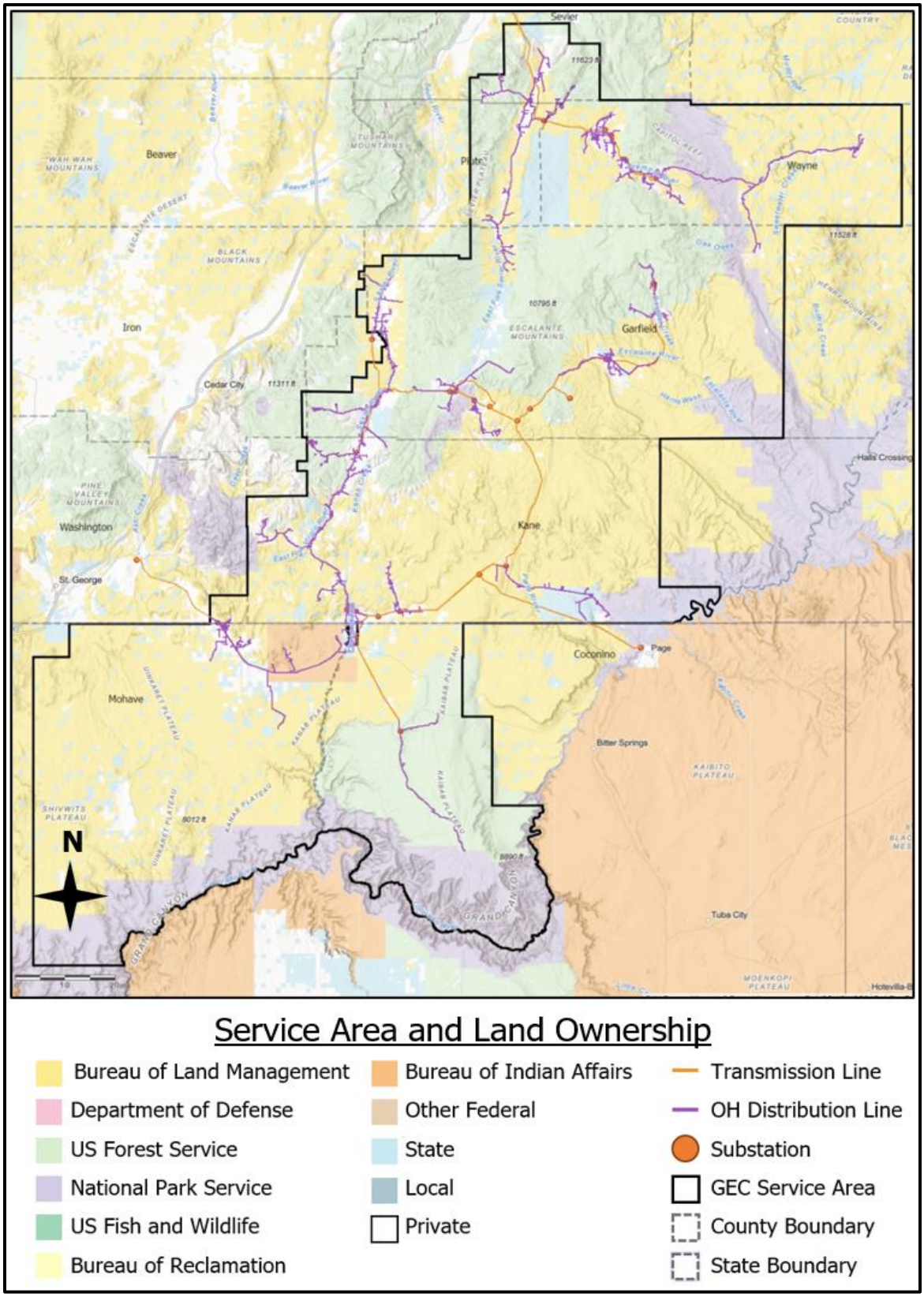
1 Introduction and Overview

Formed in 1938, Garkane Energy Cooperative, Inc. (GEC) is a member-owned cooperative, whose mission is to provide superior, responsive customer service as well as energy services of value at fair prices, while cultivating a culture of safety in a manner that builds trust among its members and employees alike. The cooperative is located about 150 miles south of Salt Lake City, Utah; 200 miles northeast of Las Vegas, Nevada; and 200 miles north of Phoenix, Arizona. GEC serves all or parts of six counties in south-central Utah and two counties in north-central Arizona. Garkane serves four national parks (Zions, Bryce Canyon, Grand Canyon, and Capitol Reef), two National Monuments (Grand Staircase-Escalante and Pipe Spring), a National Recreation Area (Glen Canyon), three National Forests (Dixie, Fishlake, and Kaibab), and numerous State Parks. These federal and state lands encompass close to 90% of the total landmass of the Co-op's 14,000 square miles of service territory. Over 70 Garkane employees serve a total of 16,192 members, 14,343 of whom are in Utah, with 1,849 Arizona members. GEC's network includes approximately 325.5 miles of transmission line, 1320.1 miles of overhead distribution line, 770.5 miles of underground distribution line, and 33 substations (Table 2).

Table 2. Service Area Statistics/Asset Overview

County/State	Transmission	OH Distribution	UG Distribution	Substations	Members
Garfield, UT	127.5	351.65	136.55	11	3,171
Iron, UT	0	0.35	0	0	0
Kane, UT	100.6	344.33	440.10	10	7,678
Piute, UT	5.7	63.91	7.91	1	162
Sevier, UT	24.6	67.03	22.63	1	557
Washington, UT	22.5	12.00	16.58	2	384
Wayne, UT	28.4	246.18	95.85	5	2,391
Coconino, AZ	36.7	96.54	18.12	3	66
Mohave, AZ	0	115.71	71.26	0	1,783

Figure 1. Service Area/Land Ownership



1.1 Policy Statement

Given recent increases in wildfire frequency and severity throughout Utah, on March 28, 2020, the Governor signed House Bill 66, Wildland Fire Planning and Cost Recovery, a law that grants the Public Service Commission rulemaking authority to enact rules establishing procedures for the review and approval of wildland fire protection plans. The law requires qualified utility and electric cooperatives to prepare and submit for approval a wildland fire protection plan in accordance with the requirements outlined in the Bill[1].

1.2 Purpose of the Wildland Fire Protection Plan

This Wildland Fire Protection Plan (Plan) describes the range of activities that GEC is taking or considering to mitigate the threat of power line–ignited wildfire, including the protocols and procedures that GEC would undertake, as well as industry best practices. The Plan complies with the requirements outlined under House Bill 66 to prepare a wildland fire protection plan by July 1, 2020, and every 3 years thereafter. The final plan has been reviewed by all pertinent agencies, including a third-party review by subject matter experts. The plan was adopted by the GEC Board of Directors on June 1, 2020. All sections of the Plan will be reviewed and revised on an annual basis, and the findings will be presented to the Board of Directors. The Plan will be fully revised every 3 years, which will include a revised risk analysis and development of plan recommendations to incorporate new technology and industry best practices.

1.3 Plan Objectives

GEC's overarching goal is to provide safe, reliable, and economic electric service to its members. In order to meet this goal, GEC routinely constructs, operates, and maintains its electrical lines and equipment in a manner that minimizes the risk of catastrophic wildfire posed by its electrical lines and equipment.

1.3.1 Minimizing Sources of Ignition

The goal of this Plan is to assess and minimize the probability that the GEC transmission and distribution system may contribute to or be the origin of a wildfire ignition. In addition, the Plan identifies measures to be taken to protect the system from wildfire damage to secure service for GEC members.

1.3.1 Resiliency of the Electric System

An additional goal of this Plan is to ensure long-term resilience of the GEC electric grid. Through implementing this Plan, GEC will be able to assess industry best practices and technologies to reduce the potential for a service interruption and improve and facilitate restoration of service.

[1] https://le.utah.gov/-2020/bi11s/static/HB0066.htm1

1.4 Organization of the Wildland Fire Protection Plan

The Plan is organized into the following sections:

Section 1: Introduction
Section 2: Overview
Section 3: Objectives of the WFPP
Section 4: Wildfire Risk Analysis
Section 5: Wildfire Prevention Strategies and Protocols
Section 6: Community Outreach and Education
Section 7: Integration with Applicable Plans
Appendix A: Acronyms
Appendix B: Literature Cited
Appendix C: Definitions
Appendix D: Detailed Mapping of High-risk Segments and Action Plan

Table 3 provides a quick reference for locating content required by Utah HB 66

Table 3. Plan Compliance with HB 66 Requirements

HB 66, 54-24-203 Sect. Requirement	Description	Plan Section Number
(1)	An electric cooperative shall prepare a wildland fire protection plan in accordance with the requirements of this chapter.	
(2)	A wildland fire protection plan under Subsection (1) shall include:	
(2) (a)	A description of areas within the service territory of the electric cooperative that may be subject to a heightened risk of wildland fire.	4.1, 4.6, 4.7, 4.8, Appendix D
(2) (b)	A description of the procedures, standards, and time frames that the electric cooperative will use to inspect and operate its infrastructure.	5.1, 5.1.1, 5.1.2, 5.1.3
(2) (c)	A description of the procedures and standards that the electric cooperative will use to perform vegetation management.	5.2, 5.2.1

(2) (d)	A description of proposed modifications or upgrades to facilities and preventative programs that the electric cooperative will implement to reduce the risk of its electric facilities initiating a wildland fire.	5.3
(2) (e)	A description of procedures for de-energizing power lines and disabling reclosers to mitigate potential wildland fires, taking into consideration:	5.4
(2) (e) (i)	The ability of the electric cooperative to reasonably access the proposed power line to be de-energized;	
(2) (e) (ii)	The balance of the risk of wildland fire with the need for continued supply of electricity to a community; and	
(2) (e) (iii)	Any potential impact to public safety, first responders, and health and communication infrastructure	
(2) (f)	A description of the procedures the electric cooperative intends to use to restore its electrical system in the event of a wildland fire; and	5.5
(2) (g)	A description of potential consultation, if applicable, with state or local wildland fire protection plans.	2.1-2.14
(3) (a)	An electric cooperative shall submit the wildland fire protection plan described in this section to its governing authority:	
(3) (a) (i)	On or before June 1, 2020; and	
(3) (a) (ii)	On or before October 1 of every third year after calendar year 2020.	7.3.1
(3) (b)	The governing authority shall:	
(3) (b) (i)	review the plan submitted under Subsection (3)(a); and	7.3
(3) (b) (ii)	consider input from:	
(3) (b) (ii) (A)	The Division of Forestry, Fire, and State Lands created in Section 65A-1-4;	7.1
(3) (b) (ii) (B)	Any other appropriate federal, state, or local entity that chooses to provide input; and	7.1
(3) (b) (ii) (C)	other interested persons who choose to provide input.	7.1
(3) (c)	The governing authority shall approve a wildland fire protection plan submitted under Subsection (3)(a) if the plan:	7.3
(3) (c) (i)	is reasonable and in the interest of the electric cooperative members; and	
(3) (c) (ii)	appropriately balances the costs of implementing the plan with the risk of a potential wildland fire.	

(3) (d)	An electric cooperative shall file with the commission a wildland fire protection plan submitted and approved under this section.	7.3
(4)	An electric cooperative shall:	
(4)(a)	file with its governing authority an annual report detailing the electric cooperative's compliance with the wildland fire protection plan; and	7.3.1
(4)(b)	file with the commission a copy of the annual compliance report described in Subsection (4)(a).	7.3.1

2 Existing Wildfire Planning Efforts

2.1 Coordination With State or Local Wildland Fire Protection Plans

The Plan is designed to align with wildfire mitigation goals identified in other existing land management plans already in place in the service area. The service area incorporates portions of Sevier, Piute, Wayne, Garfield, Kane, Iron, Washington, Mohave, and Coconino Counties. Within each county are numerous Communities at Risk (CAR) from wildfire, which are referenced in the Utah Department of Natural Resources (DNR) Utah Wildfire Risk Assessment Portal (UWRAP)[2] and which may have specific wildfire mitigation measures proposed under municipal and county planning documents.

2.2 Sevier County

As of 2010, there are 20,802 residents in Sevier County (Six County Association of Governments [AOG] 2015). The county covers 1,976 square miles, and federal land accounts for 76% of the land ownership in the county. Much of the private land is not developable due to county zoning requirements for water access and 40 acres per house in much of the county (Utah State University Extension 2005). Sevier County shares one full-time fire warden with Wayne and Piute Counties.

As of May 2020, there is no Community Wildfire Protection Plan (CWPP) for Sevier County. There are four CWPPs that cover smaller communities within the county: Acord Lakes/Salina Creek (2013), Fishlake Basin (2012), Monroe Mountain/Cove Mountain (2013), and Clear Creek/Pahvant (2013). All plans list powerlines as a value at risk. Common mitigation actions in all four plans include fuel treatment projects around roads and buildings and property-owner education and outreach. These plans are not available online; Sevier County is covered under the Central Utah Regional Wildfire Protection Plan (RWPP)[3].

Based on this planning effort, there are no GEC substations at risk and approximately 25 miles of OH powerline at moderate risk and 24 miles at high risk from wildfire in Sevier County.

2.3 Piute County

At 754 square miles, Piute County is one of the smallest of Utah's 29 Counties. As of 2010, there are 1,556 residents in Piute County, most of which live in towns along highway 89. Over 74% of the county is federal or state owned (Utah State University Extension 2005). Much of the privately-owned land is not developable due to a lack of water and county zoning requirements which call for water access and five acres per house. Piute County shares one full-time fire warden with Sevier and Wayne Counties and has three volunteer fire departments (VFDs), located in Circleville, Junction, and Marysvale (Six County AOG 2015).

[2] Utah DNR Wildfire Risk Assessment Portal: https://wildfirerisk.utah.gov/

Although Piute County does not have a CWPP, Marysvale has a CWPP that identifies several wildfire protection goals: fuel reduction projects, equipment upgrades for first responders, and development of an emergency response plan. Specific mitigation actions in the plan include fuel break construction, fuel reduction projects, and—most pertinent to utilities—vegetation clearing under power lines (Marysvale, Utah 2005). This plan is not online and is quite outdated; plan updates are underway. The most recent wildfire planning document for the county is the Central Utah RWPP.

Based on this planning effort, there are no GEC substations at risk in the county and GIS analysis shows approximately one mile of OH powerlines at moderate risk and one mile at high risk from wildfire.

2.4 Wayne County

As of 2022, there are 2,645 residents in Wayne County (Six County AOG 2015), the majority of which live in towns in Rabbit Valley. State and federal governments own almost 96% of Wayne County's land. Much of the private land is not developable due to lack of water and county zoning ordinances. Any existing development occurs along Highway 24 and along SR 12 up onto Boulder Mountain. The entire county is served by a single fire district with 6 stations, 70 volunteers, a part-time paid fire chief, and a part-time fire marshal in addition to a shared fire warden with Sevier and Piute Counties.

When a fire exceeds the capability of local and area resources, additional regional and federal resources will be ordered through the Richfield Interagency Fire Center, except for the far eastern portion of the county, which is served by the Moab Fire Center (SWCA 2007a).

Wayne county officials are currently in the process of developing a CWPP and have identified county hazards and potential mitigation actions. These identified hazards include poor access to communities for emergency vehicles, limited defensible space surrounding communities, and limited communication to rural, seasonal populations. Potential future mitigation goals include road and infrastructure improvements, fuel reduction and defensible space creation, and increasing cell phone service throughout the region (Wayne County n.d.).

Garkane power is distributed into the county through a radial feed in one direction, through lines collocated along SR 24. In the past, fires in other counties have disrupted power to Wayne County. In turn this has disrupted emergency communications and endangered vulnerable populations, for example people with electrical oxygen generating devices and other medical devices. During previous fires in Sevier County, power was disrupted to all fire stations throughout Wayne County, since none have backup power. Cellular phone systems also failed, and a Utah Department of Public Safety Communications site backup generator failed, resulting in a complete inability to dispatch or communicate with firefighters.

County fire personnel are concerned about the resiliency of the grid and the lack of any alternative to the single route feed to the county (Steve Lutz, Wayne County Fire Chief, personal communication, June 10, 2020). GEC have been working to address this concern, however the most recent project review, conducted in July of 2019, found that the lowest cost alternative to a single route feed would an estimated expenditure of roughly 18 million dollars. This alternative would not pay for itself over the expected life of the facilities. In time with continued improvements in technology, GEC are hopeful a more viable option will be identified. Although the CWPP in not yet available, Wayne County is covered under the Central Utah RWPP.

Based on this planning effort, there are no GEC substations at risk in the county and GIS analysis shows approximately 11 miles of OH powerlines at moderate risk and nine miles at high risk from wildfire.

2.5 Garfield County

As of 2015, Garfield County is home to 5,009 residents (Five County AOG 2017), and 96% of the land in Garfield County is non-private land. Garfield County has 11 fire departments at risk to wildfire (SWCA 2007b).

In 2019, Garfield County developed a CWPP to address fuel management concerns following large wildfires in the county. The plan aims to motivate local governments and citizens to address issues impacting community safety and resilience to fire. The goals identified in the plan include improving response time to fire incidents, reducing fuel loads through timber harvest, and using prescribed fire as a management technique. While there is no specific action related to utilities, utilities are identified as a protected value in the county (Garfield County 2019).

The Garfield County CWPP is not available online; however, Garfield County is covered under the Southwest Utah RWPP.[4] There are also four community fire plans for Garfield County: Panguitch Lake, Boulder Town/Salt Gulch, Mammoth Creek, and Ruby's Inn (SWCA 2007b).

Based on this planning effort, there is one Garkane substation at moderate risk, and approximately 127 miles of OH utility lines are at moderate risk, and 17 miles at high risk to wildfire.

2.6 Kane County

As of 2020, Kane County is home to 7,666 residents (Five County AOG 2017), and 85% of Kane County is federally owned. The county has nine fire departments at risk to wildfire (SWCA 2007b).

In 2018, Kane County developed a CWPP to motivate local governments and citizens to act on issues affecting wildfire resilience and safety in their communities. In response to recent large fires in the county, the plan identifies several past accomplishments related to wildfire

mitigation and future goals and mitigation actions. Past accomplishments included outreach and education, first responder training, firefighting equipment improvements, and fuel reduction projects. The goals in the plan are to continue these activities. Utilities are listed as a protected value, but there is no further mention of utilities in the plan (Kane County 2018). There are five community fire plans for Kane County: Glendale, Duck Creek, Zion Ponderosa, Zion View, and Bryce Woodlands (SWCA 2007b). Kane County is also covered under the Southwest Utah RWPP.

Based on this planning effort, there are two Garkane substations at moderate risk, approximately 333 miles of utility lines at moderate risk to wildfire, and 151.34 miles of line at high risk.

2.7 Iron County

As of 2020, Iron County has 57.286 residents (2020 US Census population estimate); 77% of Iron County is public and urban land, and the county has nine fire departments (SWCA 2007a).

Iron County does not have a CWPP; the most recent wildfire planning document covering the county is the Southwest Utah RWPP. There are seven community wildfire protection plans in Iron County: Rainbow Meadows, Brian Head, Far West/Comstock, Cedar Highlands, Quichipa, New Castle, and Old Irontown.

Based on this planning effort, there are no Garkane substations, and no powerlines found to be at risk from wildfire in Iron County. GEC's service area boundary includes a very small piece of Iron County with only approximately 1,800 feet of Garkane-managed power lines in this county.

2.8 Washington County

As of 2020, Washington County has 180,275 residents (2020 US Census population estimate). Much of the county consists of federal National Park Service (NPS), U.S. Forest Service (USFS), and Bureau of Land Management (BLM) owned lands. Washington County has 21 fire departments (SWCA, 2007a).

Washington County does not have a CWPP; the most recent wildfire planning document covering the county is the Southwest Utah RWPP. There are 14 community plans for the county: New Harmony, Dammeron Valley, Winchester Hills, Leeds, Gunlock, Central/Brookside/Mountain Meadow, Kolob Terrace, Kolob M.I.A. Camp, Pine Valley, Diamond Valley, Enterprise, Veyo, Apple Valley, and Hildale City.

Based on this planning effort, there is one Garkane substation at moderate risk, and 15 miles of powerline identified to be at moderate and approximately one mile at high risk.

2.9 Coconino County

As of 2020, Washington County has 144.472 residents (2023 US Census population estimate).

Nearly two thirds of the county is USFS and BLM land with approximately 17 miles of transmission line in Coconino traversing BLM land. There are no fire districts within the bounds of the service area in Coconino County.

Coconino County does not have a CWPP; the most recent wildfire planning document covering a portion of the county is the Greater Flagstaff CWPP, however this is outside the service area.

Based on this planning effort, there is one Garkane substation at moderate risk, and approximately 26 miles of OH utility lines are at moderate risk, and 44 miles at high risk to wildfire.

2.10 Mohave County

As of 2023, Mohave County is home to 223.682 residents (2023 US Census population estimate). Of the publicly owned lands within the WUI, BLM is the largest land manager with 1,275,080 acres, or 42%. The distribution system in this county traverse BIA and BLM lands in addition to private land.

Although Mohave County does have a CWPP (2008), it does not include the areas with GEC assets in its risk assessment or mapping.

Based on this planning effort, there are no Garkane substations at risk of wildfire. There are nine miles of OH powerlines found to be at moderate risk from wildfire in Mohave County.

2.11 Regional Planning Efforts

In 2015, the Six County AOG developed a pre-disaster mitigation plan to reduce community vulnerability to natural hazards. Identified wildfire mitigation strategies include fire break creation and maintenance, road improvements, first response equipment upgrades, and fuel reduction (Six County AOG 2015). The pre-disaster mitigation plan is available online[5].

In 2017, the Five County AOG developed a natural hazard mitigation plan covering Beaver, Garfield, Iron, Kane, and Washington Counties. The overarching goal of the plan is to reduce risk through education and outreach, collaboration, and mitigation actions. Specific wildfire mitigation actions include fuel reduction, education within the wildland-urban interface (WUI), and improved equipment for first responders. In much of the service area, the district fire warden, local VFDs, and state are all responsible for prevention, detection, and suppression of wildland fires on all non-federal wildland. Upon initial attack, the fire wardens will be notified as to the size and reinforcements necessary. When the fire exceeds the capability of local and area resources, additional regional and federal resources will be ordered through the Richfield

Interagency Fire Center (Sevier County 2006). Support is furnished by local and area resources, including VFDs, State, BLM, and USFS resources.

2.12 United States Forest Service

Fire management planning for the Dixie and Fish Lake National Forests are housed within the Wildland Fire Decision Support System (WFDSS). That platform includes spatial data for locations of utility corridors within each National Forest. Each Forest also has response plans that guide fire response based on values at risk and estimated fire behavior. Actual response is dictated by resource availability at the time of the fire.

2.13 Bureau of Land Management

In 2020, the BLM issued an instruction memorandum to establish policies regarding routine operation and maintenance activities on electric utilities' ROW to reduce wildfire risk. This memorandum establishes that the ROW holders have the authority to conduct operation and maintenance activities and that they must do everything reasonable to reduce wildfire risk within or in the immediate vicinity of their ROW. Furthermore, ROW holders must comply with any requirements to control or prevent property damage and protect public health and safety. Unless in direct conflict with applicable laws and regulations, the BLM requests to be notified within 30 days of maintenance completion (BLM 2020).

In 2004, the BLM Cedar City Field Office developed the Southwest Utah Support Area Fire Management Plan. The plan is currently under revision. GEC should align any future iterations of this Plan with the revised fire management plan. The 2004 plan was developed to establish wildland fire management goals, including restoring fire as a management tool to the ecosystem, reducing fire suppression costs, reducing hazardous fuels, and protecting at-risk communities. Transmission lines are identified as a value at risk, and the vulnerability of transmission line corridors and rights-of-way (ROWs) to wildfire is discussed for each fire management unit. The BLM asserts that fire suppression will be practiced in all ROWs (BLM 2004).

2.14 National Park Service

Fire management for Bryce Canyon National Park and Cedar Breaks National Monument is guided by a joint Fire Management Plan for the units, dated 2010. Zion National Park fire management is guided by the 2005 Fire Management Plan. The NPS is currently reviewing options for updating these documents.

Federal agencies routinely develop fuel treatment planning to address hazardous fuels within their jurisdiction. GEC could work with the BLM, NPS and USFS to look for opportunities to treat fuels in and around the GEC right-of-way (ROW) to help mitigate wildfire risk in areas projected to have high or extreme fire behavior.

2.15 Roles and Responsibilities

2.15.1 Company Structure

Table 3 below outlines the proposed assignments of the implementation of the Plan. These assignments are subject to change.

Table 4. Company Structure

Strategy	Lead Personnel
Operational Practices	Operations Manager(s)
	Operations Superintendent
System Hardening	Operations Superintendent
	Engineering Manager
Enhanced Inspections	Facilities Inspector
Situational Awareness	Operations Superintendent
	Engineering Manager
Reclosing and De-energization	Engineering Manager
	Substation Manager
Public Safety and Notification	Member Services
Vegetation Management	Operations Superintendent
Wildfire Response and Recovery	Operations Superintendent
	Chief Operating Officer

2.16 Coordination with Outside Entities

Figure 1 outlines the land ownership within the GEC service area. Contact information for all entities within the service area is provided in Table 9 in Chapter 7.

2.16.1 County

All counties in the state of Utah are affected by Utah Code Section 65A-8-6 (House Bill 146, which was passed by the Utah Legislature in the 2004 General Session and took effect in March 2006).

Utah Code Section 65A-8-6 requires that counties meet eligibility requirements to enter into a cooperative agreement with the Utah Division of Forestry, Fire and State Lands (UDFFSL) for wildfire protection. The Code states that counties shall

- Adopt a wildland fire ordinance based on minimum standards established by the division (UDFFSL);
- Require that the county fire department fluent or equivalent private provider under contract with the county meet minimum standards for wildland training, certification, and wildland fire suppression equipment based on nationally accepted standards as specified by the division UDFFSL); and
- File with the division (UDFFSL) a budget for fire suppression costs.

Each of these eligibility requirements must be met before UDFFSL may enter into a cooperative agreement for wildfire protection with any county.

According to UWRAP data, 50 at-risk communities are situated withing the GEC service area. These communities have been identified as being at risk of significant impact from wildfire to their respective infrastructure and/or economies by an interagency panel of wildfire experts. This designations provides support for a municipality to seek funding for wildfire mitigation.

2.16.2 State

There is a checkerboard of land ownership within the service area, including state trust land adjacent to BLM managed land. Wildfires that occur on state and private land outside of city limits are managed by the UDFFSL, and fire suppression efforts are coordinated through county fire wardens who work with federal agencies and local fire departments (Utah Division of Emergency Management 2019).

2.16.3 Federal

GEC works closely with federal agencies (NPS, BLM, USFS) to identify and remove hazard trees from ROWs that cross federal land. This requires a written summary of any work performed on federal land, including location, power line names, details regarding the tree or vegetation, date, etc.

The following federal land occurs in the service area:

Utah:

- USFS: Dixie National Forest and Fish Lake National Forest
- BLM: Kanab and Richfield Field Office
- Grand-Staircase Escalante National Monument and Glen Canyon National Recreation Area.

Fire response in the Utah service area is partially coordinated through the Color Country Interagency Fire Center and the Great Basin Coordination Center. This is a cooperative effort among the BLM, NPS, Bureau of Indian Affairs (BIA), USFS, and FFSL. Also coordinating fire response in the service area are the Central Utah Interagency Fire Center and the Richfield Interagency Fire Center, also a cooperative effort through the BLM, BIA, NPS, USFS, and FFSL (Great Basin Coordination Center 2020).

Arizona:

- USFS: Kaibab National Forest
- BLM: Arizona Strip Field Office and Grand Canyon-Parashant Field Office
- BIA: Kaibab Indian Reservation

The Department of Forestry and Fire Management (DFFM): The DFFM provides fire protection to 22-million acres of state and private lands. DFFM also provides suppression on other land jurisdictions through cooperative agreements. Along with internal resources, DFFM has access to 2,700 wildland firefighters and 3,000 pieces of equipment from local and federal cooperating agencies.

The Arizona Department of Forestry and Fire Management's All Hazard Incident Management Team (IMT) provides response and recovery services to the state of Arizona during emergency situations. The Type 3 IMT is made up of State Forestry professionals, along with law enforcement, firefighters, and paramedics from partnering agencies.

BLM: Each district fire zone is supported by an interagency dispatch center, airtanker base, as well as other established aviation facilities. The Arizona program supports 2 helitack modules; Weaver Mountain, based on the Phoenix District, and Moki, on the Arizona Strip District. Single-engine airtankers are supported by a year-round base in Safford, hosted by the Gila District, and a seasonal base in Kingman, hosted by the Colorado River District.

When a fire exceeds initial attack capabilities, the dispatch offices place orders for additional fire resources to the appropriate coordination center.

THIS PAGE INTENTIONALLY LEFT BLANK

3 Wildfire Prevention Strategy and Programs

This Plan details a number of wildfire prevention strategies and protocols that are designed to prevent and/or mitigate the threat of wildfire to system infrastructure and to communities who depend on GEC service. These are described in more detail in Section 4.

- **Vegetation Management** – Measures to control vegetation near overhead transmission lines and clearance specifications, as well as hazardous fuels information to reduce potential wildfire spread.
- **Enhanced Inspections** – Assessment and diagnostic activities and mitigating actions. Inspections would focus on ensuring all infrastructure is in working condition and that vegetation clearance specifications are maintained.
- **Situation Awareness** – Methods to improve system awareness and environmental conditions.
- **Operational Practices** – Mitigating actions that are taken on a day-to-day basis to reduce
  wildfire risks. These actions prepare GEC for high-risk periods, associated with heavy winds and dry conditions.
- **System Hardening** – Technical and system upgrades aimed at reducing potential contact between infrastructure and fuel sources and making the system more resilient to wildfire and other natural disasters.
- **Procedures for De-energization and Reclosing** – Conditions under which lines may be de-energized to reduce wildfire risk or protect people and/or equipment during a wildfire incident, and the conditions for restoring service after the risk has abated.
- **Wildfire Response and Recovery** – Procedures for wildfire response in order to formalize protocols in the event of an ignition.
- **Public Safety and Notification** – Measures for engaging the community in identifying and reducing wildfire risk. Includes public warnings and notifications in the interest of public safety.

4 Wildfire Risk Analysis and Risk Drivers

The Wildfire Risk analysis process utilizes the DNR UWRAP, the US Forest Service Wildfire Hazard Potential dataset with some modifications, as outlined in Appendix A.

The purpose of the wildfire risk analysis is to identify areas within the GEC Utah service area that are particularly susceptible to high-intensity, severe wildfire behavior, so as to develop mitigation measures for preventing utility-related ignitions and to improve system resilience to outside wildfire threat.

4.1 Fire History

Figure 2 illustrates the fire history within the GEC service area. The fires presented are large fires (greater than 100 acres) and do not represent all ignitions. Many of these large fires were located in close proximity to GEC infrastructure, likely because the lines are often collocated with highways, which tend to be an ignition source for wildfires.

While firefighters suppress 95% of Utah wildfires on initial attack, adverse weather and topography, heavy fuel loads, and urban development can create catastrophic wildfire conditions. The three largest fires in Utah have occurred since 2007, each burning more than 70,000 acres. 2007 saw the greatest number of acres burned in a single year since 2000; 1,385 wildfires burned almost 650,000 total acres. This total includes the largest wildfire in Utah's history, the Milford Flat fire, which destroyed nearly 364,000 acres (Utah Division of Emergency Management 2019).

The fire season on the Arizona Strip usually runs from May through early October, with the number of fires peaking in June and July. Lightning is the most common cause of fires, accounting for about 81 percent of all fires burning 96 percent of the total acres. Nearly 90 percent of these fires burn less than 10 acres, and less than two percent consumed more than 1,000 acres.

4.1.1 Sevier County

In Sevier County, at least 719 fire starts were reported by the state of Utah, BLM, and USFS between 1973 and 2020 (SWCA 2007a) with 13 fires over 1000 acres between 2002 and 2023 (Monitoring Trends in Burn Severity [MTBS] interagency database[7]). The areas of highest fire density are along Highway 89 and Highway 24 and atop the Sevier Plateau. Major wildfires include the Oldroys fire near Richfield in 2000, which burned 59,000 acres and the 42,956 acres Twitchell Canyon fire which also burned in Piute County (SWCA 2007a).

4.1.2 Piute County

At least 101 wildfire starts were reported in Piute County between 1973 and 2017 (SWCA 2007a; MTBS). Four fires over 1,000 acres occurred in Piute County from 2002 through 2012,

Most of these occurred in the Tushar Mountains located in the western portion of the county near Marysvale, Junction, and Circleville (SWCA 2007a).

4.1.3 Wayne County

At least 74 fire starts were reported in Wayne County between 1973 and 2017 (SWCA 2007; MTBS). The majority were located along the rim of the Aquarius Plateau, near the communities of Torrey, Teasdale, and Grover (SWCA 2007).

4.1.4 Garfield County

Over the last 40 years, Garfield County has experienced hundreds of wildfires ranging from very small to over 40,000 acres. One of the largest fires since 2000 was the Bulldog fire, which burned approximately 31,726 acres on BLM land, north of Ticaboo (Five County AOG 2017). The Brianhead fire, located on in both Iron and Garfield Counties, burned 74,276 acres in 2017.

4.1.5 Kane County

Kane County has experienced over 600 fires on BLM land alone, the largest of which have been the Pine Hollow fire in 2020 at 11,552 acres and the Big Wash fire in 2002 at 5,253 acres (MTBS).

4.1.6 Iron County

In Iron County, since 1976, there have been over 600 fires on BLM land. While the majority of these fires have been small, some have been quite large. The Baboon fire in 2012 burned 19,778 acres of BLM land (Five County AOG 2017).

4.1.7 Washington County

A large portion of Washington County has been affected by wildfire over the past 50 years. Between 2000 and 2023, there have been at least 58 wildfires in the county (MTBS). The largest fires have been the Westside fire in 2005 (66,900 acres) and the Jarvis fire in 2006 (50,697 acres) (Five County AOG 2017).

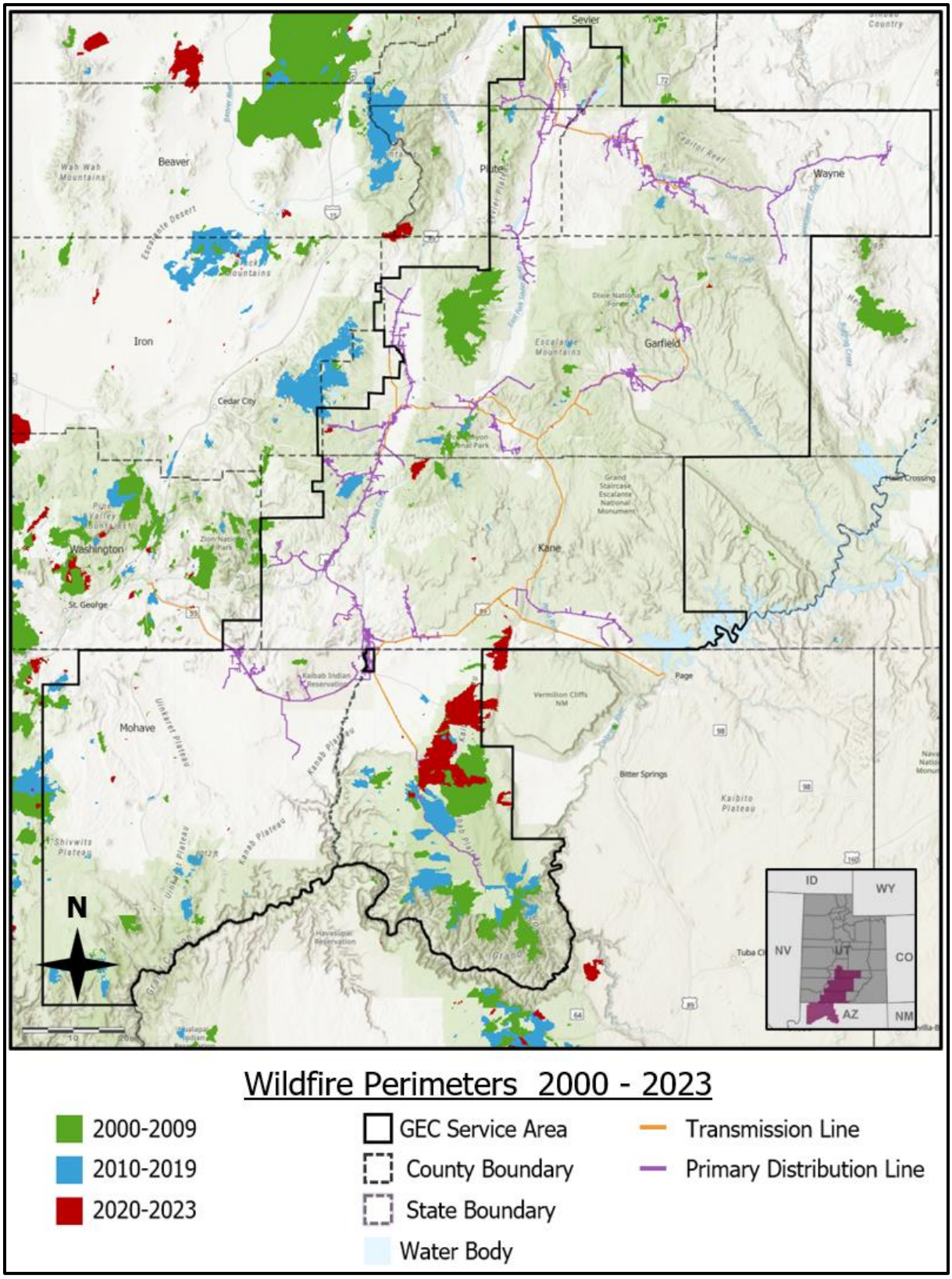
4.1.8 Mohave County

Mohave County has seen approximately 67 wildfires since 2000 with 14 of those over 10,000 acres. These fires have been primarily on US Forest Service and National Park Service managed lands. The largest fires were the Jarvis fire at 49,636 acres and the Cow Fire at 44,460 acres in 2006 and 2005 respectively.

4.1.9 Coconino County

Coconino County has a very high wildfire occurrence, with 144 large fires from 2000 to 2021. Two of the largest fire to burned entirely within the county border was the Rafael fire (75,741 acres) of 2021 and the Mangum fire (71,634) in 2020.

Figure 2. Historic Wildfire Perimeters



4.2 Vegetation Communities and Ecoregions

The GEC service area falls mostly within the Colorado Plateau and Wasatch and Uinta Mountains ecoregions, with a small portion in the Basin and Range province ecoregion. The Colorado Plateau lies between the Great Basin to the west and the Rocky Mountains to the east. The flora and fauna of the region include elements of each of these provinces in addition to endemic species that have evolved in areas of relative isolation atop the Plateau.

Wildfires were once common occurrences throughout the grasslands and forests of the Colorado Plateau. These regular wildfires helped maintain an open forest structure in the region's middle-elevation forests by preventing tree encroachment into mountain meadows and grasslands. In some areas, regular wildfires led to replacement of forested land with grassland or savannah. Fire suppression has disturbed this natural occurrence, and like other ecoregions, pinyon-juniper woodlands, ponderosa pine forests, and drier mixed-conifer forests of the Colorado Plateau have shifted from a fire regime of frequent, surface fires to one of stand-replacing, high-intensity fires (Grahame and Sisk 2002).

The Wasatch and Uintah Mountain ecoregion is a block of high montane habitat stretching from southeastern Idaho and southwestern Wyoming to isolated ranges of the Colorado Plateau in southern Utah. It is composed of high, glaciated mountains, dissected plateaus, foothills, and intervening valleys. The ecoregion encompasses two different mountain ranges; the Wasatch, a major north–south range; and the Uinta, one of few major east–west ranges in the United States (World Wildlife Fund 2001).

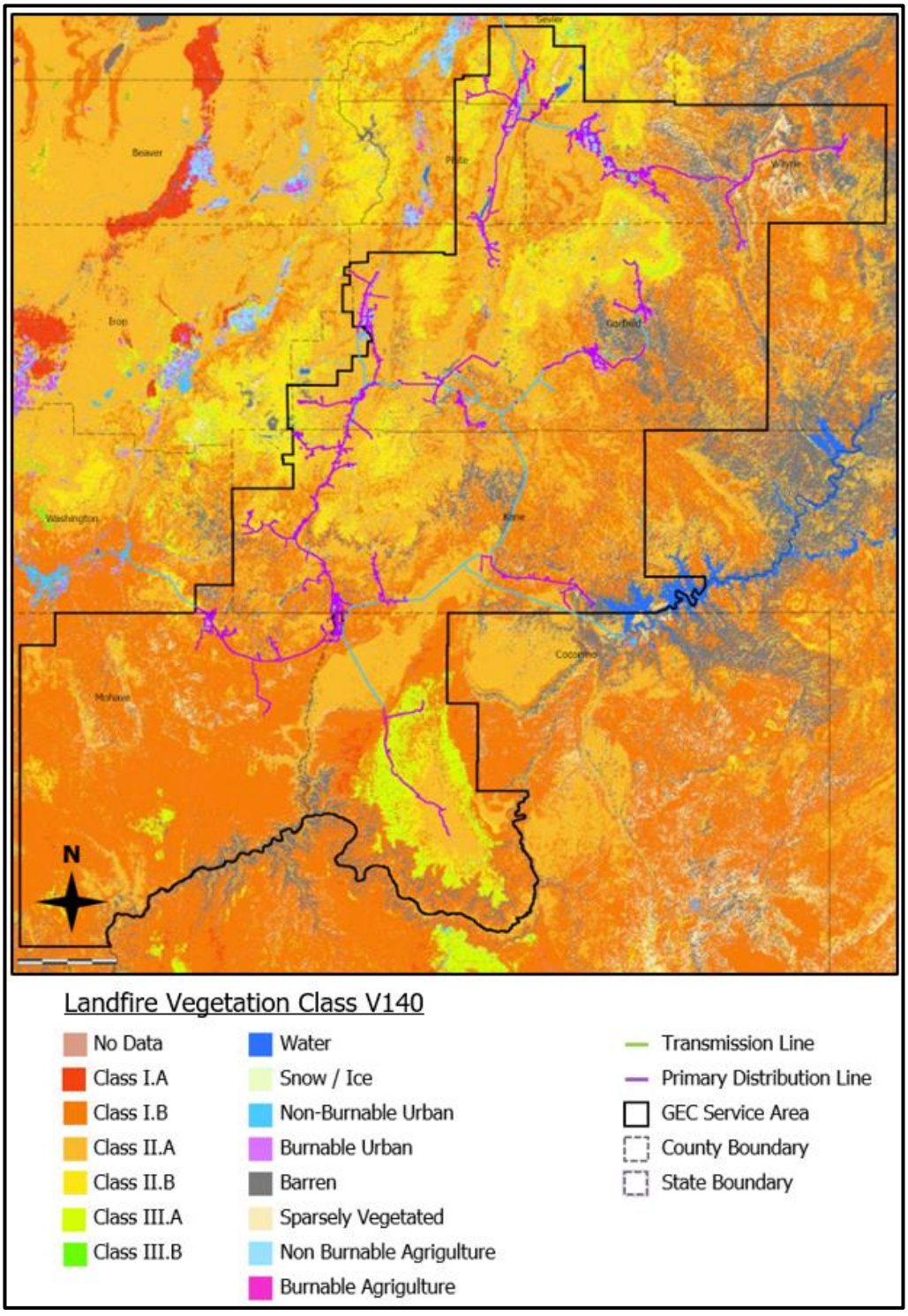
Continued grazing and 50 years of attempted fire exclusion, combined with favorable climatic conditions, have allowed juniper expansion to go unchecked (Ferry et al. 1995). Decreases in fire frequency are also significantly affecting ponderosa pine forests. Historically, the ponderosa pine ecosystem had frequent, low-intensity, surface fires that perpetuated park-like stands with grassy undergrowth (Barrett 1980, as cited in Ferry et al. 1995). In recent years, however, humans have attempted to exclude fire on these sites, resulting in ponderosa pine forests that are overstocked and subject to severe stand-destroying fires (Mutch et al. 1993, as cited in Ferry et al. 1995). Long-term fire suppression has also resulted in a loss of aspen.

The GEC service area is made up primarily of pinyon-juniper, hardwood, and desert shrub communities (Figure 3). Adult juniper trees in mature stands are difficult to burn since the understory is usually sparse. Winds greater than 35 miles per hour are necessary to carry wind through the canopy of pure juniper stands (*Vegetation Types of the Wasatch-Cache National Forest* 1991, as cited in BLM 2005a). Frequency of ignitions in the desert shrub vegetation type has been estimated at 35 to more than 300 per year (FEIS 2004, cited in BLM 2005b). Fire-adapted plants are generally not found in these communities as these vegetation types have not burned enough historically to support them. Most desert shrub species do not readily regenerate following fire (SWCA 2007a).

Of notable concern in the GEC service area is Cheatgrass (*Bromus tectorum)*, a highly competitive invasive grass species from Eurasia. Cheatgrass has altered native plant community

structure and promotes wildfire by increasing the risk of shorter fire return intervals (Bishop et al. 2019). As cheatgrass continues to spread throughout the west, new threats are placed on communities and infrastructure.

Figure 3. Vegetation Classification



4.3 Fuels

The fuels in the planning area are classified using Scott and Burgan's (2005) Standard Fire Behavior Fuel Model classification system[3]. This classification system is based on the Rothermel surface fire spread equations, and each vegetation and litter type is broken down into 40 fuel models.

The general classification of fuels is by fire-carrying fuel type (Scott and Burgan 2005):

(NB) Non-burnable
(GR) Grass
(GS) Grass-Shrub
(SH) Shrub
(TU) Timber-Understory
(TL) Timber Litter
(SB) Slash-Blowdown

The dominant fuel models that occur within the GEC line buffer (0.25-mile buffer on either side of the line) are shown in Table 5 and Figure 4. Definition for the fuel model classes are provided in Table 6. These data were captured and classified by LANDFIRE in 2019 (Version 200) and are the most recent models available at the time of this update. This analysis of the fuel data is done in order to allow comparison between plans and illustrate changes to the landscape over time.

Table 5. Scott and Burgan Fuel Model Composition – Distribution

Fuel Class	Distribution Acres	Transmission Acres	Total Percent
NB1	16,680	2,793	5
NB3	25,260	1,959	6.99
NB8	1,796	40	0.47
NB9	12,774	4,515	4.44
GR1	52,189	15,848	17.48
GR2	28,085	4,465	8.36
GR3	583	18	0.15
GS1	38,970	11,977	13.09
GS2	89,885	28,793	30.50
SH1	3,756	3,027	1.74
SH2	1,365	256	0.41

[3] https://apps.fs.usda.gov/fsgisx01/rest/services/RDW_Landfire/US_40ScottAndBurganFBFM_v200/ImageServer

SH3	146	0	0.03
SH5	8,895	3,271	3.12
SH7	2,451	342	0.71
TU1	3,307	5	0.85
TU2	182	84	0.06
TU5	5,512	56	1.43
TL1	194	6	0.05
TL2	424	59	0.12
TL3	6,625	595	1.85
TL5	2,166	96	0.58
TL6	313	9	0.08
TL8	8,380	374	2.24
TL9	9	0	0.00

Figure 4. Fuel Model Classification

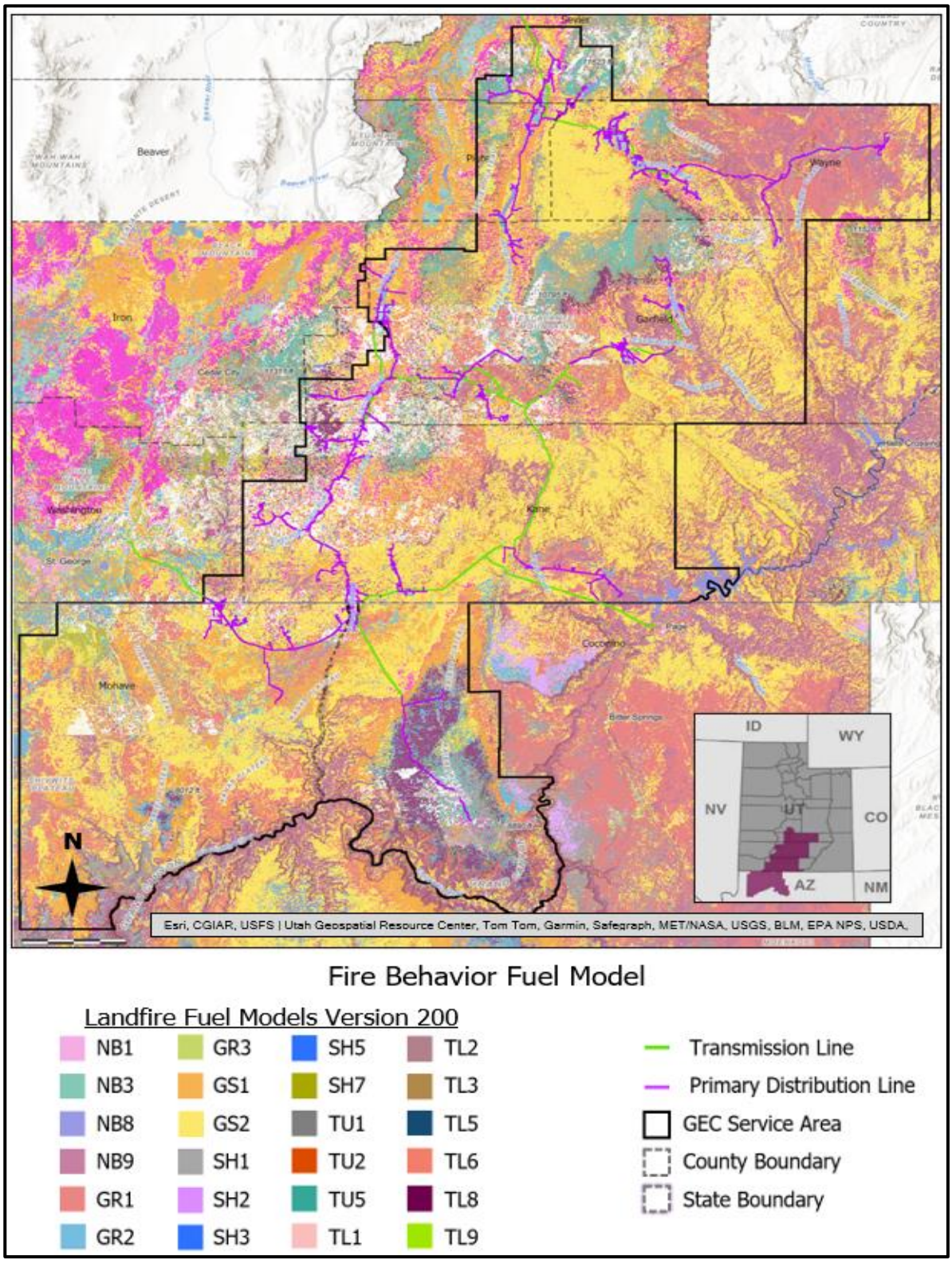


Table 6. Fuel Model Descriptions

1.	Grass: Nearly pure grass and/or forb type
i.	**GR1:** Grass is short and patchy. Spread rate is moderate (5-20 chains/hour); flame length low (1-4 feet); fine fuel load (0.40 ton/acre)
ii.	**GR2:** Moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20-50 chains/hour); flame length moderate (4-8 feet); fine fuel load (1.10 tons/acre)
2.	Grass-Shrub: Mixture of grass and shrub, up to approximately 50% shrub cover
i.	**GS1:** Shrubs are about 1 foot high, low grass load, Spread rate moderate (5-20 chains/hour); flame length low (1-4 feet); fine fuel load (1.35 tons/acre).
ii.	**GS2:** Shrubs are 1-3 feet high, moderate grass load. Spread rate high (20-50 chains/hour); flame length moderate (4-8 feet); fine fuel load (2.1 tons/acre)
3.	Shrub: Shrubs over at least 50% of the site; grass sparse to non-existent
i.	**SH1:** Low fuel load, depth about 1 foot, some grass fuels present. Spread rate very low (0-2 chains/hour); flame length very low (0-1 feet)
ii.	**SH2:** Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuels present. Spread rate low (2-5 chains/hour); flame length low (1-4 feet); fine fuel load (5.2 tons/acre)
iii.	**SH7:** Very heavy shrub load, possibly with pine overstory. Fuel bed depth 4-6 feet. Spread rate high (20--50 chains/hour); flame length very high (12-25 feet)
4.	Timber-Understory: Grass or shrubs mixed with litter from forest canopy
i.	**TU1:** Fuel bed is low load of grass and/or shrub with litter. Spread rate low (2-5 chains/hour); flame length low (1-4 feet); fine fuel load (1.3 tons/acre)
ii.	**TU5:** Fuel bed is high load conifer litter with shrub understory. Spread rate moderate (5-20 chains/hour); flame length moderate (4-8 feet)
5.	Timber-Litter: Dead and downed woody fuel beneath a forest canopy
i.	**TL3:** Moderate load. Spread rate very slow (0-2 chains/hour); flame length low (1-4 foot); fine fuel load (0.5 ton/acre)
ii.	**TL6:** Moderate load, less compact. Spread rate moderate (5-20 chains/hour); flame length low (1-4 feet)
iii.	**TL8:** The primary carrier of fire is moderate load long-needle pine litter, may include small amount of herbaceous load. Spread rate is moderate; flame length low
6.	Non-burnable: Insufficient wildland fuel to carry wildland fire under any condition
i.	**NB1:** Urban or suburban development; insufficient wildland fuel to carry wildland fire
ii.	**NB3:** Agricultural field, maintained in non-burnable condition
iii.	**NB8:** Land covered by open bodies of water such a lakes, rivers, etc.
iv.	**NB9:** Bare ground. Devoid of enough fuel to support wildland fire spread

4.4 Topography

The service area covers portions of the Basin and Range province, the Colorado Plateau, and the Wasatch and Uinta Mountains ecoregion.

The southwest corner of Utah is contained in two major physiographic provinces. Most of Iron and Washington Counties lie within the Basin and Range province, which generally consists of north–south-trending mountain ranges separated by broad arid valleys with interior drainage. Garfield and Kane Counties are located in the Colorado Plateau, which consists of uplifted sedimentary rock strata. As aforementioned, the Wasatch and Uinta Mountains ecoregion is composed of high, glaciated mountains, dissected plateaus, foothills, and intervening valleys, encompassing both the Wasatch and Uinta mountain ranges. Above an elevation of approximately 11,000 feet, alpine meadows, rockland, and talus slopes occur (World Wildlife Fund 2001). On a more localized scale, the area is also speckled with a variety of topographic features. Part of this area has experienced a great amount of volcanic activity, which is evident in extinct volcanoes, mountains, great lava fields, and mesas. Geological forces have uplifted huge portions of the land and have created great rifts in others. Of particular notoriety are the erosional features of the area, including the great canyons and cliffs carved by water and wind that make up national and state parks in and around the service area such as Zion National Park, Bryce Canyon National Park, and Grand Staircase-Escalante National Monument (SWCA 2007b).

Topography is important in determining fire behavior. Steepness of slope, aspect (direction of slope face), elevation, and landscape features can all affect fuels, local weather (by channeling winds and affecting local temperatures), and rate of spread of wildfire.

There are many steep slopes throughout the GEC service area that would influence fire behavior and spread. The service area is large and highly variable in topography. In the southwest portion of the service area, the landscape is made up of low-lying urban areas that are not topographically complex, surrounded by moderately topographically complex areas shaped by water features. Steep canyon walls, bluffs, benches, and terraces make up this canyon landscape. Aspect and slope vary widely throughout this region. Canyon topography makes up much of the remaining portions of the service area, with similar features including terraces, benches, and steep canyon walls.

The northwestern portion of the service area consists of flat, agricultural valleys, and more moderate hills. Steeper canyons can be found in the center of the service area in Bryce Canyon National Park and around Capitol Reef National Park.

4.5 Weather

Of the three fire behavior components, weather is the most likely to fluctuate. Accurately predicting fire weather remains a challenge for forecasters. As winds and rising temperatures dry fuels in the spring and summer, conditions can deteriorate rapidly, creating an environment that is susceptible to wildland fire. Fine fuels (grass and leaf litter) can cure

rapidly, making them highly flammable in as little as 1 hour following light precipitation. Low live fuel moistures of shrubs and trees can significantly contribute to fire behavior in the form of crowning and torching. With a high wind, grass fires can spread rapidly, engulfing infrastructure and communities, often with limited warning for evacuation. There is high variability of up/down canyon winds. In steep topography this can lead to dramatic shifts in wind direction and speed over the course of minutes.

Figures 5–14 provide weather data across the project area. These locations were chosen based on the long period of record and geographic locations that represent the service area variability. The driest temperatures in the region occur during May through September, with temperatures reaching into the high 90s and low 100s in May through September. These dry conditions would elevate fire behavior during this period, as vegetation dries and becomes more available for combustion. The average monthly precipitation is low in June and increases rapidly in July as a result of monsoon rain patterns. Vegetation management and other wildfire mitigation measures should be completed prior to peak fire season (May–October).

Figure 5. Daily Temperature Extremes and Averages – Brian Head (420900)

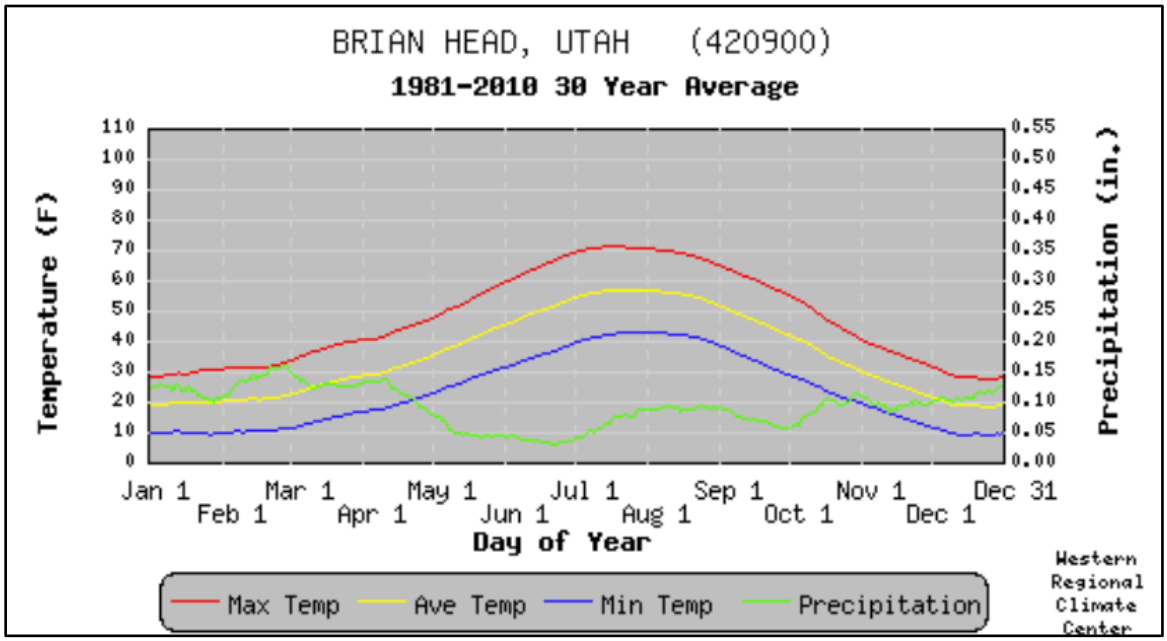


Figure 6. Monthly Average Precipitation for Brian Head, UT

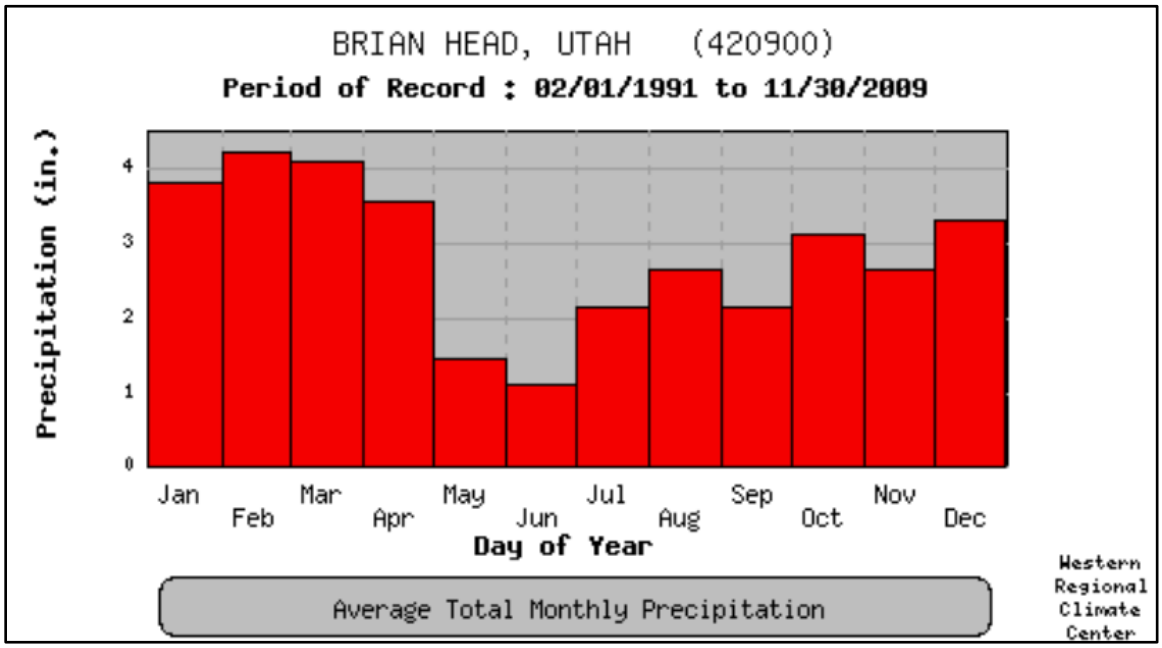


Figure 7. Daily Temperature Extremes and Averages – Loa, UT

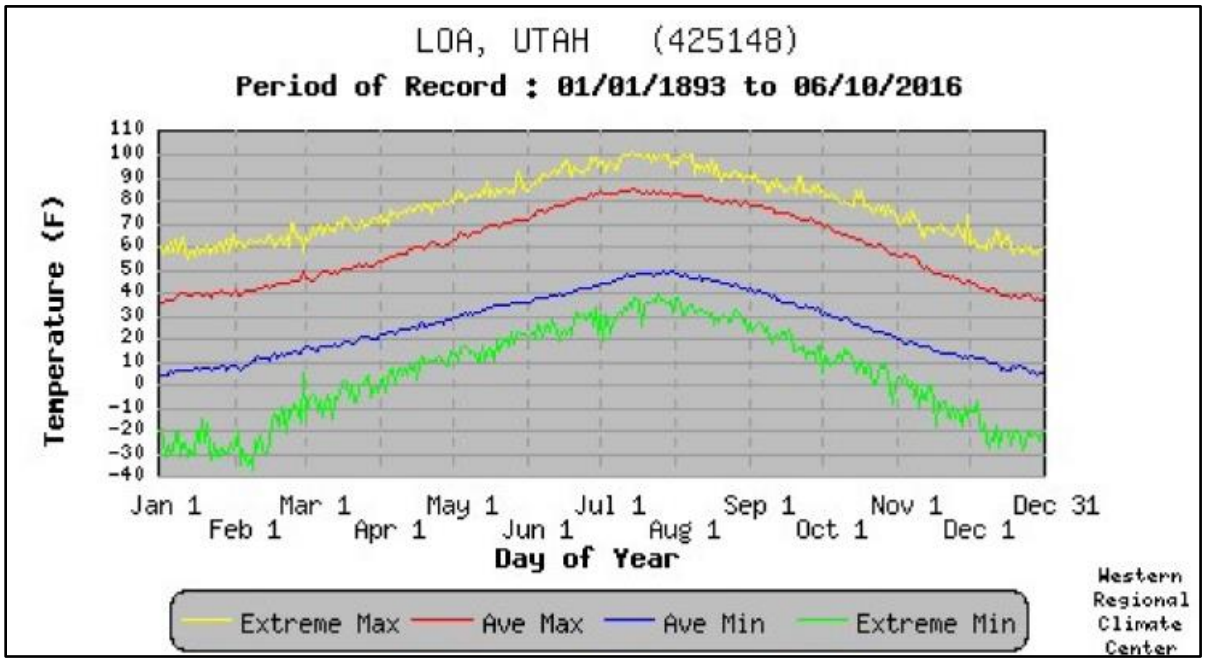


Figure 8. Monthly Average Precipitation – Loa, UT

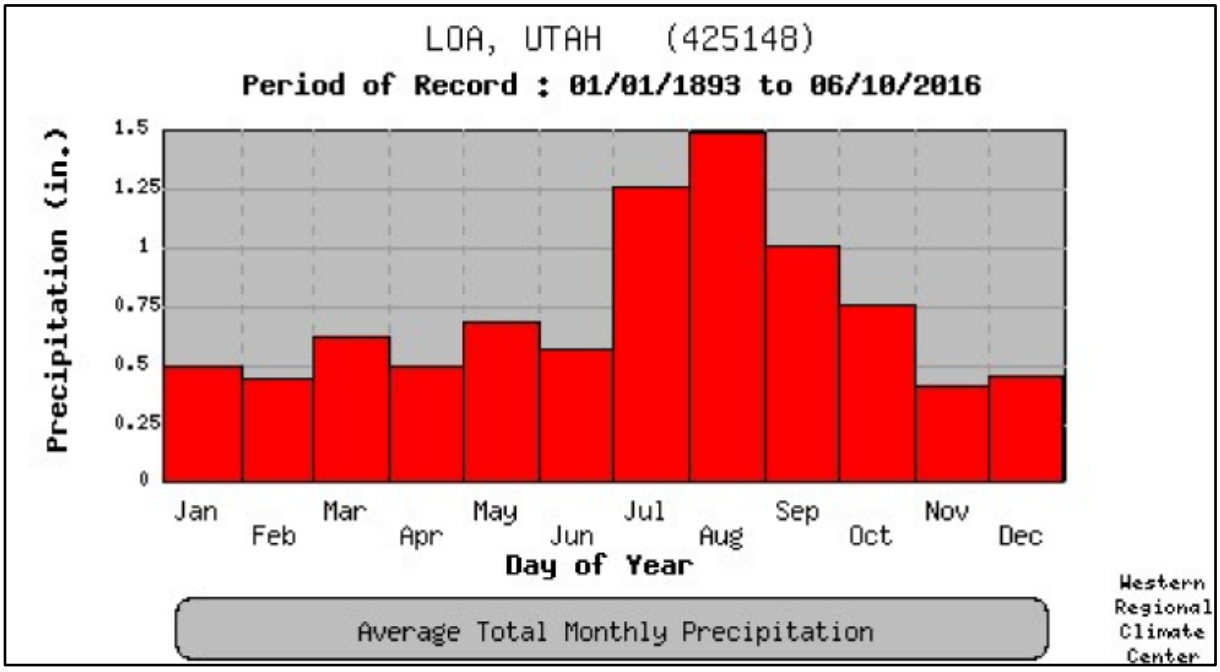


Figure 9. Daily Temperature Extremes and Averages – Escalante, UT

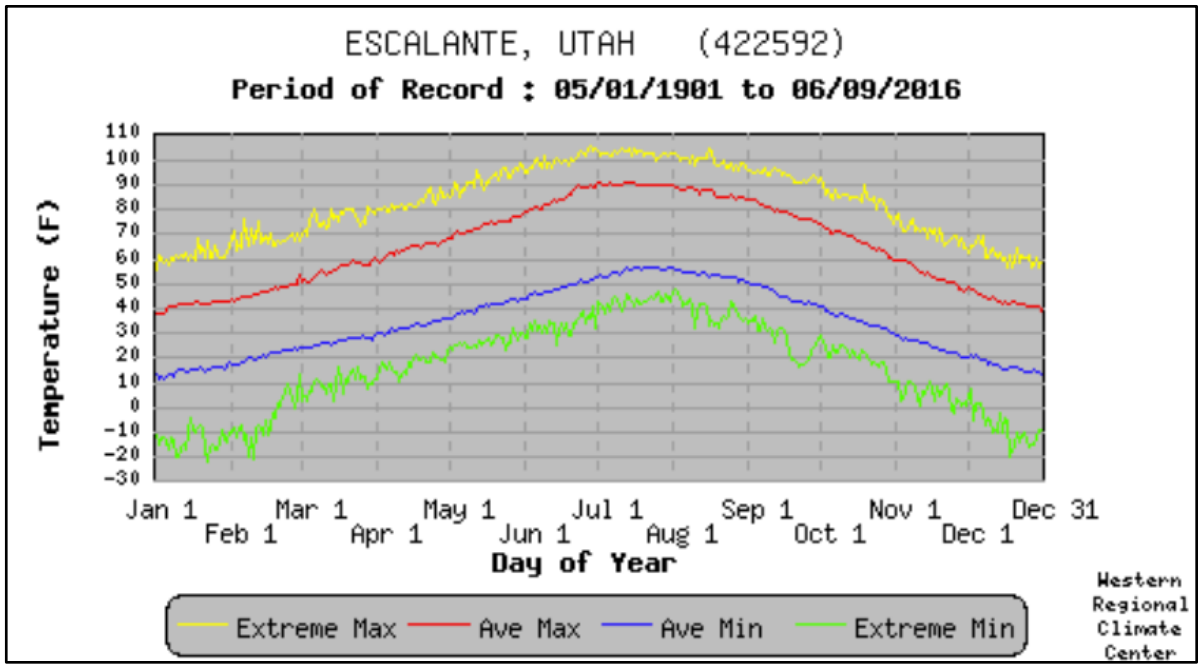


Figure 10. Monthly Average Precipitation – Escalante, UT

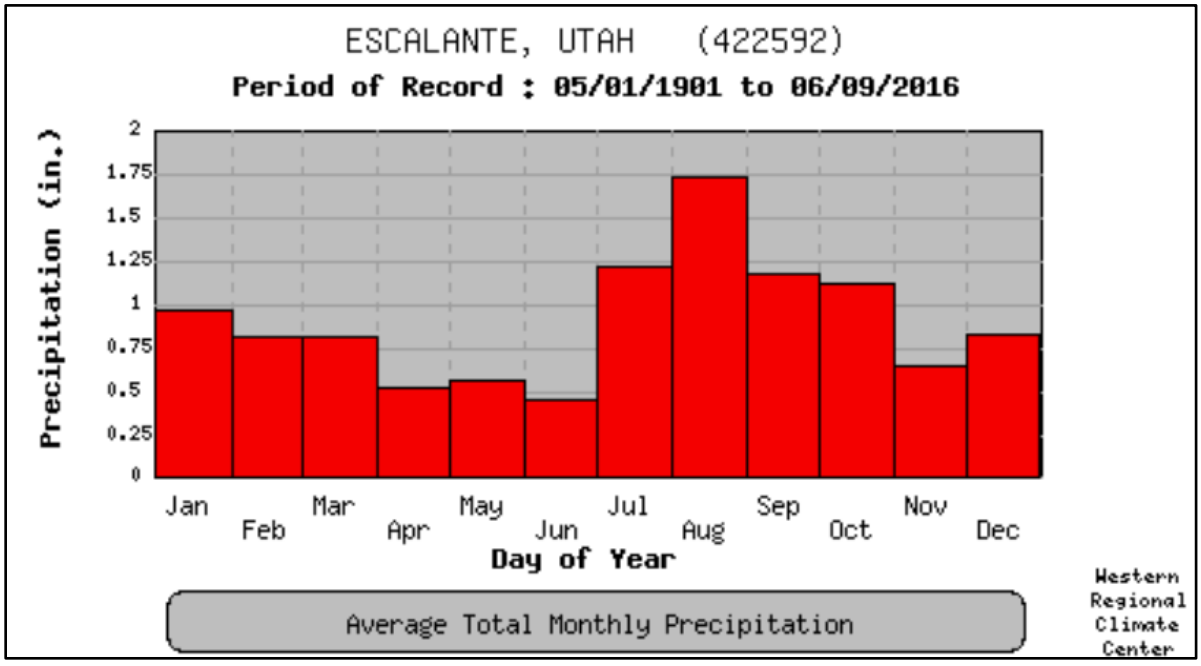


Figure 11. Daily Temperature Extremes and Averages - Colorado City, AZ

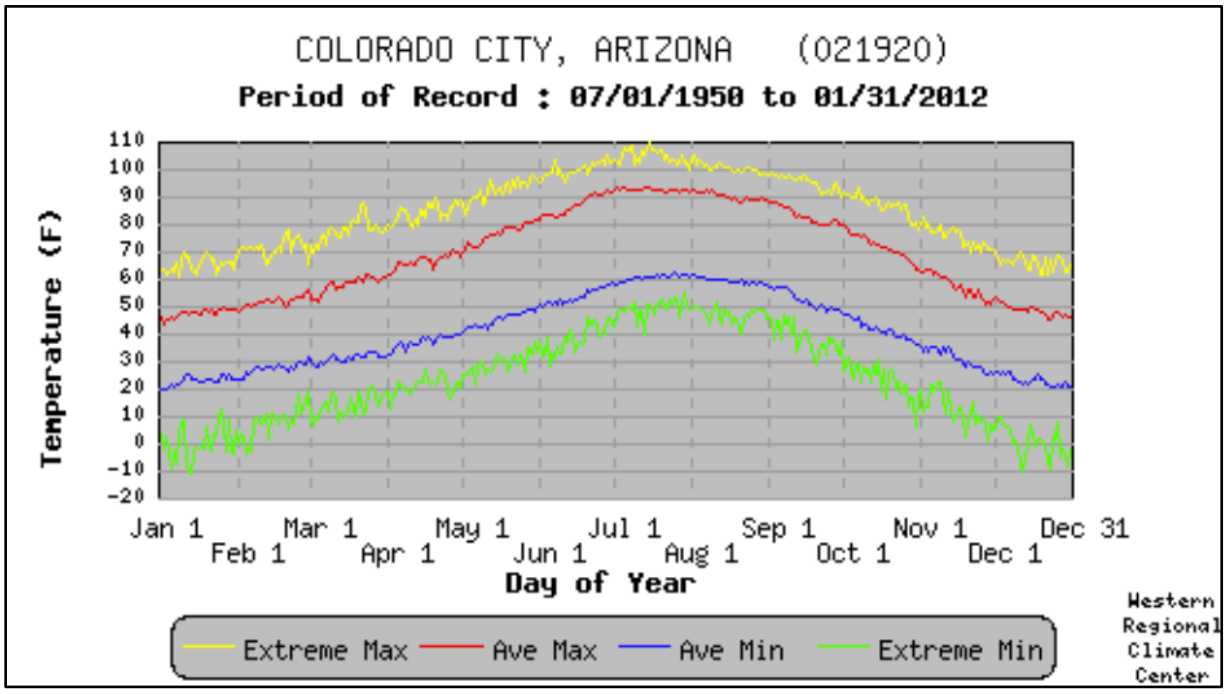


Figure 12. Monthly Average Precipitation-Colorado City, AZ

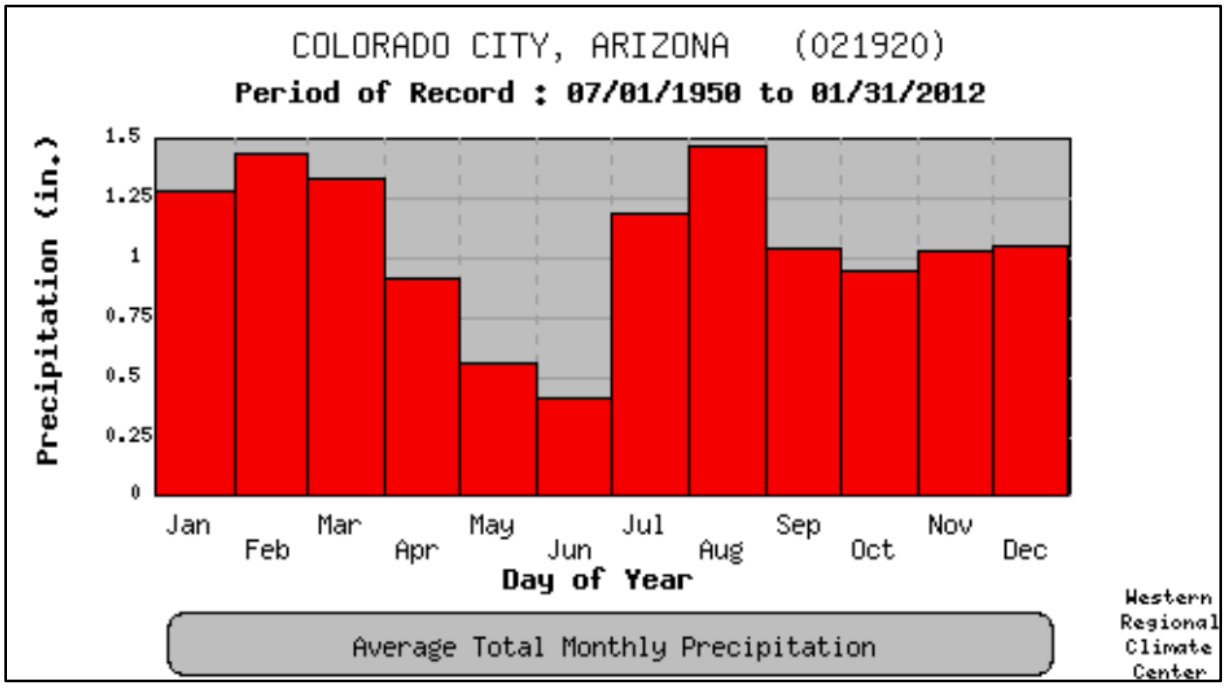


Figure 13. Daily Temperature Extremes and Averages -Jacob Lake, AZ

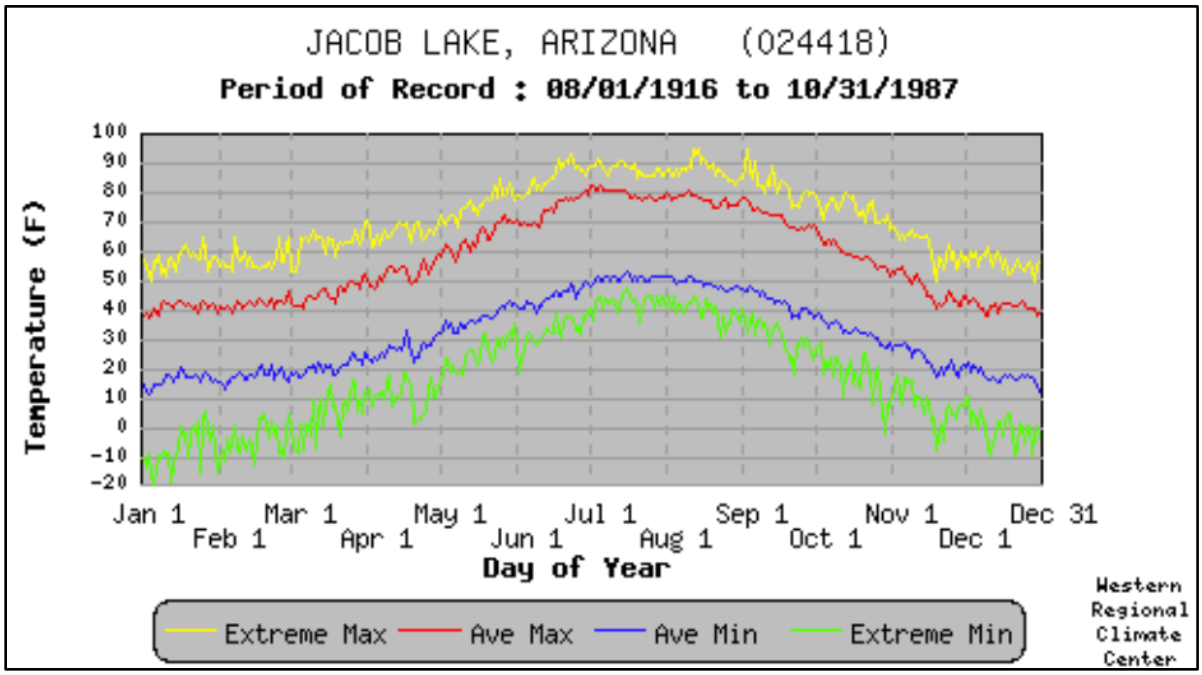
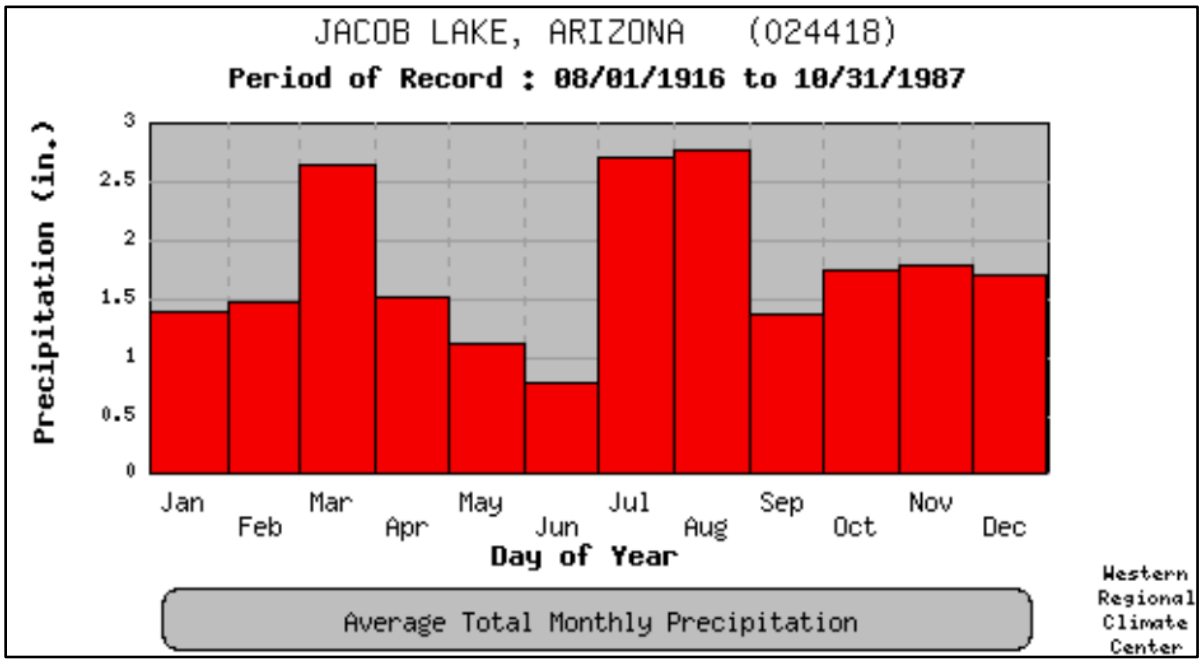


Figure 14. Monthly Average Precipitation- Jacob lake, AZ



4.6 Fire Behavior

This Plan utilizes map products from the 2023 USFS Wildfire Hazard Potential mapping datasets to support analysis of fire behavior and risk within the GEC service area (see section 4.6.1 for inputs to WHP). This analysis assists GEC in identifying areas that are most prone to wildfire in order to create a plan to prioritize vegetation management actions to mitigate potential fire effects.

GEC identified that approximately 33% of their lines are located within areas of moderate wildfire threat and 15% is at high wildfire threat level (Table 5). This amounts to 549 miles of overhead line at a moderate threat, and 247 miles of line classified as high to Very High threat.

In areas predicted to have the highest fire behavior, GEC can also consider prioritizing infrastructure improvements that ensure resilience of the grid. Furthermore, in areas where fire behavior is expected to be high, as a result of fuels, topography, weather, and past fire occurrence, GEC will work with the community to identify actions that communities can take to mitigate against potential ignitions and to alert the community in the event of a wildfire.

4.6.1 Wildfire Hazard Potential

The Wildfire Hazard Potential (WHP) map (Figure 16) used in this plan is a raster geospatial dataset produced by the USDA Forest Service, Fire Modeling Institute (FMI). It is intended to inform evaluations of wildfire risk or prioritization of fuels management needs across large landscapes. The specific objective of the WHP map is to depict the relative potential for wildfire that would be difficult for suppression resources to contain.

The WHP-2023 dataset was built upon:

- Spatial vegetation and wildland fuels data from *LANDFIRE 2020* (version 1.4.0). The *LANDFIRE* Fire Behavior Fuel Models layer is a primary input to the FSim Burn Probability (BP) and Fire Intensity Level (FIL) datasets and forms the foundation for WHP.
- Spatial datasets of wildfire likelihood and intensity were generated for the conterminous U.S. with the *Large Fire Simulator* (FSim). FSim simulates the growth and behavior of hundreds of thousands of fire events for risk analysis across large land areas using geospatial data on historical fire occurrence, weather, terrain, and fuel conditions. Effects of large-fire suppression on fire duration and size are also simulated. This research aims to develop a practical method of quantifying geospatial wildfire impacts, including annual probabilities of burning and fireline intensity distributions at any point on the landscape.
- Point locations of past fire occurrence from 1992 through 2020

Areas mapped with higher WHP values represent fuels with a higher probability of experiencing torching, crowning, and other extreme fire behavior under conducive weather conditions. An essential aspect of the WHP method is the use of "resistance to control weights" at the end of the mapping process. This serves to reduce the WHP index in areas

with light fuels, such as grass and shrubs. This helps to inform where forest fuel reduction treatments might be most needed.

On its own, WHP is not an explicit map of wildfire threat or risk, but when paired with spatial data depicting highly valued resources and assets such as communities, structures, or powerlines, it can approximate relative wildfire risk to those resources and assets. WHP is not a forecast or wildfire outlook for any particular season as it does not include any information on current or forecasted weather or fuel moisture conditions.

4.7 Risk Assessment

The wildfire risk map presented in Figure 15 aims to identify sections of the GEC service area that are at elevated risk for wildfire. A 0.25 mile buffer was created around the T&D lines and overlaid on the WHP map for analysis. Table 7 illustrates the breakdown of this 0.5 mile wide corridor within the 7 layers of the WHP risk map with results depicted in acres of corridor for each risk tier.

4.8 Action Plan

Appendix D shows this same data set spatially zoomed to show details associated with moderate to very high-risk segments of the GEC lines.
For this map, the "high" and "very-high" risk classes were combined into one tier and defined as "high." Seventeen threat map locations were chosen where there was presence of threatened line or lines identified by GEC as having moderate or higher threat. The extent was then expanded where threatened line was found adjacent to high-structure-density areas. Analysis only focused on overhead lines as this equipment is more vulnerable to vegetation encroachment and fire.

Table 11 in Appendix D describes these high-risk segments with associated mitigation measures that could be applied to mitigate risk. A priority scale from low to high is applied across all moderate and high-risk segments to facilitate implementation based on the intensity of the risk-i.e. potential for intense fire behavior and proximity to high density structures. The risk assessment is based on desktop analysis. GEC will ground truth priority sections before proceeding with Plan implementation. GEC can use this as an Action Plan for implementing mitigation measures on these circuits.

Figure 15. Wildfire Hazard Potential

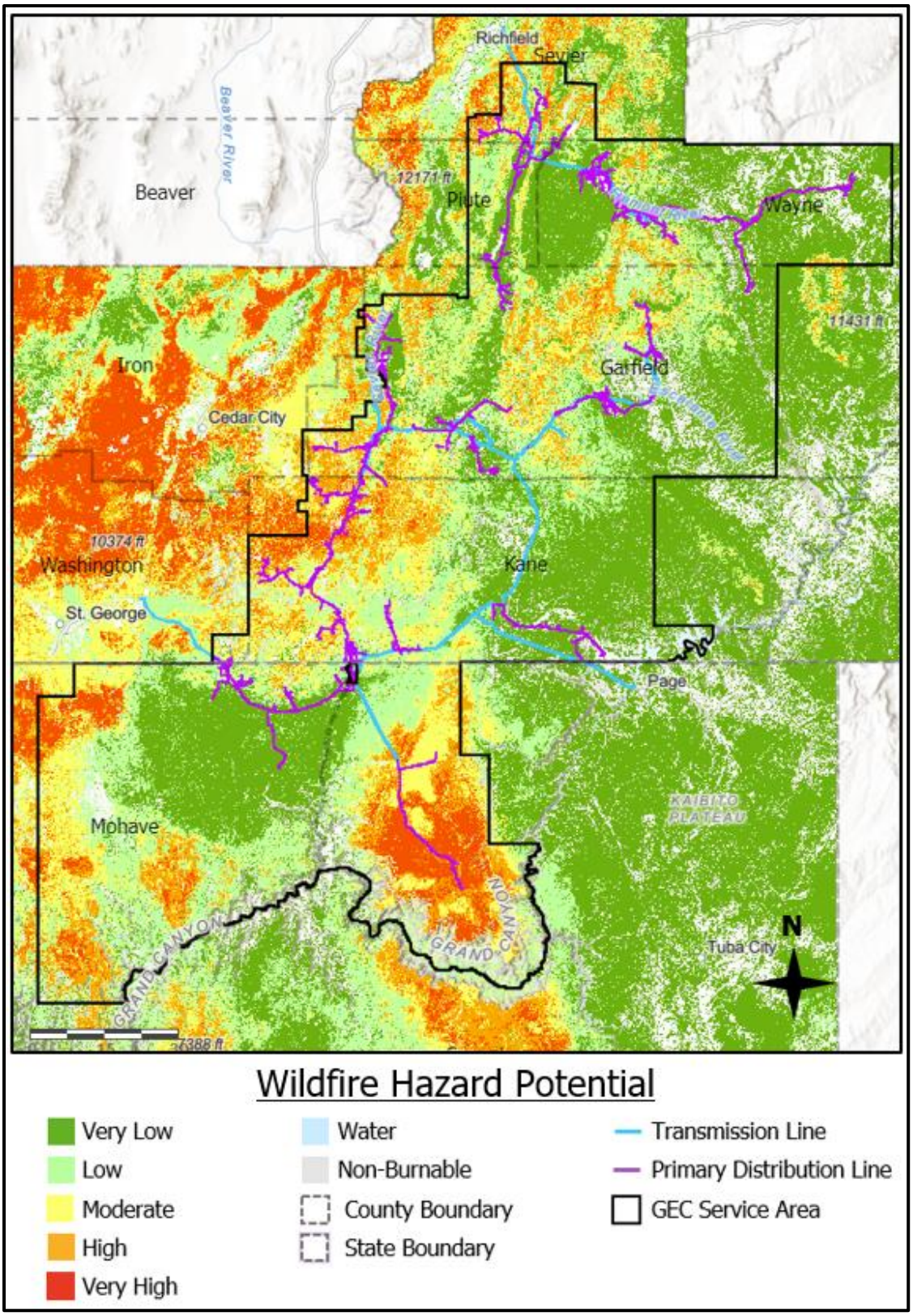


Table 7. Wildfire Hazard Potential within .5 Mile T&D Corridors

Asset Type	Risk Class	Acres	Percent
Distribution	Very Low	127364	41.02
	Low	56938	18.34
	Moderate	34813	11.21
	High	22954	7.39
	Very High	10741	3.46
	Non-burnable	55887	18
	Water	1788	0.58
Transmission	Very Low	47135	43.32
	Low	34300	31.52
	Moderate	8265	7.60
	High	5802	5.33
	Very High	885	0.81
	Non-burnable	12377	11.38
	Water	43	0.04

THIS PAGE INTENTIONALLY LEFT BLANK

5 Wildfire Prevention Strategies and Protocols

5.1 Inspection Procedures

The inspection policies and procedures adopted by GEC are in accordance with Rural Utilities Service (RUS) Bulletin 1730-1 Exhibit A and NESC section 214 a-b.

GEC's overhead patrol and inspection programs focus on safety and reliability and are designed to identify conditions that may pose a hazard or the risk of an ignition or disruption of service. The overhead patrols and inspection programs are primarily focused on the identification, assessment, prioritization, and documentation of abnormal conditions. These conditions may occur due to operational use, degradation, deterioration, environmental changes, or third-party actions.

In addition, several preventive and corrective maintenance programs are focused on maintaining assets, replacing assets or targeted service reliability improvements, such as the pole test and line equipment inspection and testing. There are three defined levels for these routine distribution line inspections:

*-**A patrol inspection** is a simple visual inspection of applicable utility equipment and structures that is designed to identify obvious structural problems and hazards. Patrol inspections may be carried out in the course of other company business. Overhead patrols of equipment and conductors are required to be completed every year in high fire threat areas and biannually system wide.*

*-**A detailed inspection** is one in which individual pieces of equipment and structures are carefully examined and opened, and the condition of each is rated and recorded. Overhead detailed inspections of equipment and conductors are required to be completed every 5 years in high fire threat areas and every 10 years in moderate and low fire risk areas.*

*-**An intrusive inspection** is defined as one that involves moving soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading. For wood poles that are over 15 years old and have not been previously subjected to intrusive inspections, an intrusive inspection must be performed. For wood poles that have previously passed an intrusive inspection, the follow-on intrusive inspection interval is 10 years.*

In addition to identifying and resolving immediate safety or reliability hazard conditions, a compliance inspector is required to identify and document the field scenarios that impact safety and reliability. All overhead assessments must be performed using visual observations and may also include diagnostic testing (e.g., hammer sound test, bore tests) to verify pole integrity. GEC uses a module of NISC Software called Distribution Inspection, to collect and

track detailed inspection data. The software organizes the priority of each hazard as "OK," "Attention Needed," or "Immediate Attention Needed." The work resulting from data collected in the NISC Distribution Inspection module is prioritized based on several factors when evaluating an abnormal condition, including both the probability and impact of a failure or exposure to the public or workers. The Distribution Inspection module is directed to identify deficient conditions, create corrective notifications, and assign priority and risk to an identified hazard. Although a designated inspector generally performs these detailed and intrusive inspections, all crews and personnel have the tools and ability to perform such inspections and document accordingly.

5.1.1 Patrol Inspections

Patrol inspections are continuously performed by qualified personnel as they traverse GEC's service territory when performing work. Personnel are trained to do patrol inspections as they focus on safety and reliability, identifying conditions that may pose a hazard or the risk of an ignition. If a hazard is discovered, it is documented using GEC's NISC Distribution software. Each hazard identified will be documented by the qualified person doing the inspection and prioritized and scheduled appropriately by the Operations Manager and Operations Superintendent. If it is categorized as "Immediate Attention Needed," it is documented, and the qualified person on-site will determine if there is a risk to the public. If there is risk, the inspector will immediately notify his/her supervisor and stay on-site to stand guard until the risk can be mitigated. Patrol inspections are done on GEC's system annually in high fire risk areas and biannually system wide. The Operations Manager and Operations Superintendent review the NISC software monthly to evaluate and prioritize the maintenance that is generated through the inspection process. These actions reduce the potential for component failures and facility damage and facilitate a proactive approach to repairing or replacing identified, degraded, or damaged components.

5.1.2 Detailed Inspections

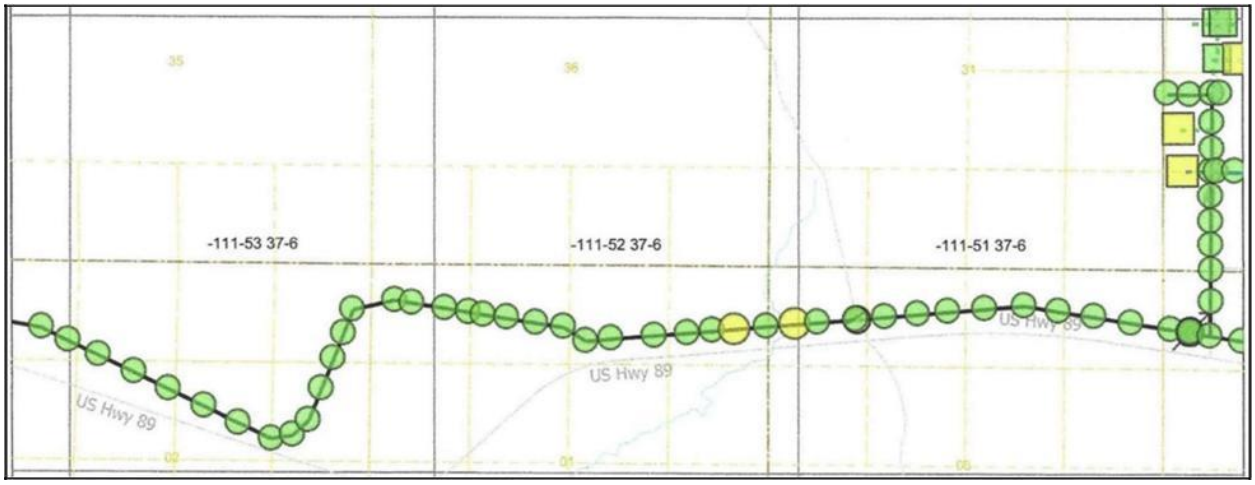
Detailed inspections are generally performed by a designated inspector but can also be done by any qualified person. These inspections involve systematically visiting and inspecting every pole and documenting the findings. If a problem is discovered, it is documented using the NISC software. If is categorized as "OK," it is documented, and no action is needed. If it is categorized as "Attention Needed," it is documented by the qualified person doing the inspection and prioritized appropriately by the Operations Manager and Operations Superintendent. If it is categorized as "Immediate Attention Needed," it is documented, and the qualified person on-site will determine if there is a risk to the public. If so, the inspector will immediately notify his/her supervisor and stay on-site to stand guard until the risk can be mitigated. Detailed inspections are performed on a 5-year cycle in high fire threat areas and a 10-year cycle in other areas.

5.1.3 Intrusive Inspections

Intrusive inspections are generally done by a qualified contractor or a designated inspector but can be done by any qualified person. These inspections involve systematically visiting and inspecting every pole and documenting the findings. There are three levels when doing intrusive inspections (pass, marginal, and fail). When a pole passes an intrusive test, the pole is on a 10-year test cycle. If a pole is marginal, it will be revisited and tested annually to determine deterioration rate. If a pole has less than 67% of the original required strength, it will be categorized as "fail" and will be changed out within 180 days. All data rea documented using the NISC program. Poles under "Intermediate" category would fall under the "Attention Needed" category in NISC. If a pole fails, it falls under the category "Immediate Attention Needed".

An example of a NISC Distribution Inspection report is provided in Figure 16. Green indicates "OK" status, yellow means the pole "Needs Attention". A red pole would need "Immediate Attention".

Figure 16. NISC Distribution Inspection Report



GEC's Operations Managers and Operations Superintendent should review the NISC software monthly to prioritize work generated by the inspection program. Inspectors should promptly communicate with the Operations Managers in their respective areas if any problems found are a threat to the public or are in the "Immediate Attention Needed" category. Any problem that is a threat to the public will be fixed immediately. Any problem that is not a threat to the public but is categorized as "Immediate Attention Needed" will be fixed within 180 days. Any inspections categorized as "Attention Needed" should be fixed within 1 year of the inspection.

5.2 Vegetation Management Protocols

The objective of vegetation management is to maintain GEC's property and ROWs in a manner that reduces the risk of wildland fires; ensures the safety of landowners, employees, and the public; and complies with National Electrical Safety Code, Rural Utility Service, federal, state, and local laws and regulations pursuant to the operation of electrical facilities. The following protocols will be followed:

A. GEC will seek required government permits or applicable authorization for vegetation and tree removal or trimming, including but not limited to federal, state, municipal, and tribal laws, ordinances, rules, and regulations. The Cooperative shall seek to trim/remove vegetation and/or trees that in the GEC's opinion present an immediate hazard, danger, or substantial risk to its system, employees, or public safety.

B. Will use had cutting, pruning, and mechanical cutting to maintain proper clearances in accordance with recognized industry engineering and electrical safety practices.

C. A "hazardous tree" is a tree that is dead, is severely damaged, or may present reasonable risks to the GEC's lines and facilities. A hazardous tree may be in GEC's ROW, in a public ROW, or on private property. For the safety of the public and/or all involved, GEC may opt to remove a landowner's hazardous tree, or remove the line from service to allow the landowner to safely remove the hazardous tree. A hazardous tree shall be removed or pruned in accordance with this policy to mitigate safety hazards. GEC has a good working relationship and works closely with the NPS, USFS, and the BLM to identify and remove any hazardous tree from any ROW that crosses federal land. A summary of hazard vegetation work must be provided when working on federal land. This summary must include the following.
    1. The global positioning system (GPS) or geographic location of the trees or vegetation
    2. The power line name and/or number
    3. The species and status of the tree or vegetation (live or dead)
    4. The size class of the tree
    5. The date the trees were located
    6. The number, sized class, and species of trees that were damaged or removed due to felling the hazard tree or vegetation if applicable.
    7. The date the action occurred
    8. The wildlife or fish species and/or their critical habitat in the vicinity of the action

D. GEC will strive to remove all trees, whether hazardous or not, growing beneath GEC's lines in a public ROW or its own ROW. All trees that can be reasonably removed from private ROWs, with the landowners' permission, shall be removed. A special effort shall be made to remove all young trees in ROWs while they are small and before they become a hazard to the power line. Brush and other vegetation will be removed during regular tree trimming procedures.

E. Trees will be trimmed to the extent that the designated minimum clearance area will be kept free of growth until the next scheduled trimming cycle. If the trimming cycle is other than 3 years, as may be required for a fast-growing tree species or where limited trimming is permitted by the landowner, appropriate records will be maintained to ensure that timely primary trimming is accomplished. Areas identified as high fire risk areas will be inspected annually. GEC uses NISC's ROW Maintenance module for documentation of vegetation monitoring and trimming. It also provides the ability to set revisit dates to alert GEC of areas in need of attention.

F. Landowners shall provide GEC access to all public ROWs and GEC easements where maintenance and cutting or pruning of vegetation and trees may be needed, in GEC's opinion, to avoid danger to the public or interference with the operation and maintenance of its power lines or facilities.

G. GEC has no affirmative duty to remove trees outside its ROWs. With a written request from a landowner, GEC may assist the landowner with the removal of a hazardous tree outside the ROW at no cost to the landowner, as long as GEC has identified the tree as a hazardous tree.

H. Removal of branches and other debris from vegetation and tree removal in or outside the ROW or easement is the sole responsibility of the landowner unless otherwise agreed upon in writing. Stumps will be cut as close to ground level as possible. Complete removal of a stump is the responsibility of the landowner.

I. GEC will maintain a tree trade-out program, which will allow a landowner to receive a tree to replace a tree GEC removes completely from the ROW provided the landowner 1) signs a tree trade-out contract; and 2) has an alternative planting location agreeable to GEC. GEC will remove the tree, including grinding the stump to ground level, if required, and provide the landowner a tree trade-out certificate. The landowner may choose to keep the wood.

J. GEC will control vegetation and trees around its property, including the fenced boundaries and within substations to ensure the safety of its landowners, employees, and public while maintaining the reliability and integrity of its facilities.

K. GEC will have a communication program for the public to notify GEC of trees in and around its power lines. GEC will encourage members to report trees that are potential hazards, in and outside the ROW, which may become a threat to public safety and/or the system's reliability.

5.2.1 GEC Tree Trimming Policy

The following guidelines will be used when obtaining a ROW for the purpose of building and maintaining utility lines:

- Trees, shrubs, or bushes will not be planted directly above underground or below overhead utility lines. Before digging, it is the member's responsibility to call 811 to locate the underground utility lines.
- All trees, shrubs, or bushes must remain at least 5 feet on either side of locates and flags designating underground utility lines.
- The member assumes responsibility for all trees, shrubs, or bushes that are planted in the utility easements. In the event that GEC has to excavate any utilities in the easement or maintain any equipment, GEC will not replace or be responsible for any trees, shrubs, or bushes that need to be removed.
- All 120/240/480-volt triplex/quadraplex services must maintain a minimum clearance of a 1-foot radius from all trees or branches.
- All open secondary wire requires a minimum clearance radius of 5 feet from all trees or branches.
- All primary wire requires a minimum clearance radius of 10 feet from all trees or branches.
- A GEC field representative will ensure that all tree trimming is complete prior to construction. No lines will be energized until clearances are met.
- A member always has the option of underground construction (at the member's expense) if the necessary overhead ROW clearances cannot be made.
- GEC is presently utilizing the "Shigo Method" for all tree trimming and maintenance applications. This method is endorsed and promoted by the National Arborist Association.

For all maintenance tree trimming where the member does not allow the Shigo Method, the member has the option to have the tree topped or shaped at the member's expense. The member will be responsible for all hours spent by the contractor and will be required to reimburse GEC for payment made to the contractor every time a tree is trimmed by any option other than the Shigo Method. The 10-foot rule will apply to all primary conductors upon completion of topping or shaping.

Due to insurance and Occupational Safety and Health Administration (OSHA) regulations, only tree trimming contractors hired by GEC are allowed to work within 10 feet of primary conductors. With these guidelines in place, and by utilizing the Shigo Method for tree trimming, GEC will rotate on a 3-year cycle for trimming and tree removal.

5.3 Modifications and Upgrades to Infrastructure

The following information outlines the corrections process that GEC employs for its infrastructure

Table 8. CEC Correction Process

Line Number	Control Number	Correction Process
1	C1	Overhead patrols and inspections
2	C2	Overhead conductor replacement
3	C3	Animal abatement
4	C4	Overhead equipment replacement
5	C5	Deteriorated pole replacement
6	C6	Vegetation Management
7	C7	Protective equipment

- Cl – Overhead Patrol and Inspections: GEC patrols and inspects its overhead electric facilities to identify damaged facilities and other conditions that may pose a risk of wildfire ignition. Patrols and inspections are performed annually in high-risk wildfire areas and biannually system wide.
- C2 – Overhead Conductor Replacement: Programs under which an overhead conductor is either proactively replaced through a targeted program or replaced after a failure occurs. Conductor replacement work in high-risk wildfire areas and for conductors with a higher likelihood of failure is prioritized.
- C3 – Animal Abatement: The installation of new equipment or retrofitting existing equipment with protection measures intended to reduce animal contacts. This includes raptor framing on distribution and perch guards on transmission poles in required areas.
- C4 – Overhead Equipment Replacement: Proactive identification and replacement of critical, deteriorating overhead distribution equipment, such as cross-arms, transformers, capacitors, reclosers, and switches.
- C5 – Deteriorated Pole Replacement: The identification and replacement of deteriorated wood distribution and transmission poles, including intrusive inspection work (pole test and treat) and replacement or remediation. GEC's program tests

poles approximately every 10 years, which exceeds the inspection cycle compliance requirements, and incorporates wood preservation practices that also go beyond compliance. These factors allow GEC to identify and mitigate the decay of wood, which reduces failures.

- C6 – Vegetation Management: GEC's Vegetation Management (VM) Program includes inspection and identification of vegetation that poses a potential safety hazard, as well as clearing and removal of vegetation, and quality assurance. The main components of this work are the routine VM Program, vegetation control, and quality assurance.
- C7 – Protective Equipment: The installation of new equipment (e.g., fuses, reclosers, and SCADA installation) that isolates equipment when abnormal system conditions are detected.

5.4 De-energization Protocols and Reclosing

In the event of wildfire, GEC provides personnel to work directly with Incident Command and attends all incident meetings to provide input and coordination between fire operations and GEC system operation. If during a fire a distribution or transmission line is requested to be removed from service for the safety of firefighting personnel, GEC will work closely with Incident Command using industry clearance and safety procedures for any line outages to ensure the safe operation of fire crews and equipment.

GEC considered as an option putting all reclosers and circuit breakers on non-reclose settings to ensure that the power would go off and stay off in the case of any short circuit during the windy, hot, dry summer months. However, due to the radial nature inherent in the rural distribution and transmission lines of rural electric cooperative service territories, that action would put whole communities out of service for prolonged periods of time.

During the fire season (June 1 to October 31) GEC operations crews will not replace and re-energize blown fuses until they have driven the line downstream from the fuse to ensure that there are no conductors on the ground or among any dry vegetation and thus avoid starting a wildland fire. Also, after any line recloser locks out, the line crew will try the recloser only once before driving the length of the circuit for the same reasons.

5.5 Restoration of Service

GEC will restore power following an outage only after confirming that it is safe to do so. Crews will patrol all facilities de-energized during a loss of service to identify any damage that needs to be repaired before re-energizing. To reduce the outage impact to customers, GEC may use helicopter patrols in areas where visibility is not limited by vegetation. GEC assigns a task force consisting of supervisors, crews, and inspectors to each circuit or portions of a circuit. This structure enables GEC to patrol and perform step restoration. Step restoration is when a substation is re-energized, and circuits are subsequently safely energized in segments as patrols continue. Any necessary repairs are conducted while patrols continue to allow for restoration to proceed as efficiently as possible.

GEC has a sufficient work force and quality working relationship with bordering cooperatives, municipalities and IOUs in the area. In the event of a wildfire causing significant damage, GEC could call on crews from these entities to help with labor and materials. A list of key emergency contact telephone numbers (emergency agencies, key personnel, contractors and equipment suppliers and other utilities) are posted in GEC's SCADA room and are available to dispatchers (Table 7). GEC will also have a qualified person working closely with wildland firefighters via incident command to ensure the safety of their crews as it works to restore power as safely and efficiently as possible.

THIS PAGE INTENTIONALLY LEFT BLANK

6 Community Outreach and Education

6.1 Public Safet and Notification

GEC regularly communicate with members on being prepared for planned outages and unplanned outages (see Appendix C for examples of regularly communicated messages to GEC members through the quarterly newsletter).
The following are actions that GEC currently employs and/or would consider adopting in order to improve public safety and notifications:

- GEC implements texting notification services to alert members of power outages. All members who have a cell phone or email on file with the coop will receive updates on outage restoration efforts.
- GEC also encourage the use of generators for those members that rely on emergency communications and at-risk people who rely on medical devices.
- GEC offers the membership option to purchase Generlink systems and will install them to ensure generators are properly connected according to the safety specifications.
- GEC ensures that endangered populations have been communicated with during a planned or unplanned outage. It is company procedure to call all members who are on the medical list when there is a planned outage so they can prepare accordingly.
- Members can also receive information from the GEC Facebook page, which is updated regularly during a planned or extended outage.
- GEC will routinely coordinate with county emergency managers and fire staff prior to fire season to determine fire season outlook and potential red-flag periods.
- GEC coordinates during emergencies or large-scale outages with county emergency managers and fire staff in conjunction with agency dispatch.
- GEC has developed communication protocols with county health departments for emergency notifications to vulnerable members (i.e., medical facilities, schools, etc.) and ensures that emergency personnel have the power to run emergency communications to their constituents.
- GEC would consider the development of a web-based map for the public to see current outages and estimated restoration.

Additional public outreach options that could be employed in conjunction with county or local emergency managers include:

- Utilizing local radio and television media to broadcast public service messages.

GEC will compile and disseminate information to members regarding community wildfire preparedness, evacuation, and vigilance before and during fire season (FFSL Wildfire Preparedness Literature[4]; Ready, Set, Go[5], Firewise[6], Fire Adapted Communities[7]

[4] FFSL: https://ffsl.utah.gov/fire/wildfire-community-preparedness/
[5] Ready, Set, Go: https://www.wildlandfirersg.org/s/?language=en_US
[6] Firewise: https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA/Firewise-USA-Resources/Firewise-USA-sites
[7] Fire Adapted Communities: https://fireadapted.org/

7 Integration with Applicable Plans

GEC engages closely with the County Emergency Manager and attends the Utah Department of Public Safety Uintah Basin Infrastructure Resilience Council (IRC). During wildland fire events, GEC works in full coordination with incident command for the wildland event.

Section 2.3 outlines existing wildfire planning documents for entities within the service area. The contacts for these entities, in addition to important contact information for agency staff who may need to be contacted in the event of a wildfire, are included in Table 7.

Table 9. GEC Agency Contact List

Name	Agency	Title	Phone	Email
Nathanial Johnson	Utah Rural Electric Cooperative	Executive Director	801-619-6519	
Alan Alldredge	Kane County	Emergency Manager	453-644-4995	Aalldredgekcso@kane.utah.gov
Chad Justus	Garfield County	Emergency Manager	970-945-0453	N/A
Jimmy Harris	Wayne County	Emergency Manager	435-836-1348	N/A
Steve Lutz	Wayne County	Fire Chief	801-979-1279	dobrosteve90@gmail.com
Bryan Thiriot	Five County AOG	Executive Director	435-673-3548 ext. #121	bthiriot@fivecounty.utah.gov
Nathan Wiberg	Five County AOG	Associate Planner	435-673-3548 ext. #105	nwiberg@fivecounty.utah.gov
Tyler Timmons	Six County AOG	Regional Planner	435-893-0738	ttimmons@sixcounty.com
Danon Hulet	FFSL	SW Area Manager	435-592-0099	danonhulet@utah.gov
Spencer Rollo	FFSL	Kane County Fire Warden	435-819-0671	spencerrollo@utah.gov
Josh Soper	FFSL	Garfield County Fre Warden	435-590-4718	joshsoper@utah.gov
John Schmidt	FFSL	Area WUI Specialist	435-590-0353	johnschmidt@utah.gov
Brion Terry	FFSL	Tri-County: Sevier, Piute, Wayne Fire Warden-	435-201-9722	bterry@utah.gov
Taylor Moosman	FFSL	Area WUI Tech	435-979-1388	taylormoosman@utah.gov
Kevin Greenhalgh	Dixie Nat. Forrest	Fire Mgmt. Officer	435-691-3771	kevin.greenhalgh@usda.gov
Tyler Monroe	Fish Lake Nat. Forrest	Fire Mgmt. Officer	435-896-2328	tmonroe@fs.fed.us
Josh Tibbetts	BLM Color Country Paria River Districts	Fire Mgmt. Officer	435-865-3018	jtibbett@blm.gov

Table 10. GEC Agency Contact List (continued)

Name	Agency	Title	Phone	Email
Nick Howell	BLM	District Fire Mitigation & Education Specialist	435-865-3026	nhowell@blm.gov
Brett Ostler	NPS	Fire Management Officer. Utah Group	801-538-5389	brettostler@utah.gov
General Contact	Coconino County OEM	N/A	938-679-8311	emergencymanagement@coconino.az.gov
BLM-Arizona Strip District		Dispatch	435-865-4600	N/A
		Report a Wildfire	435-865-4611	N/A
		Office	345-688-3200	N/A

7.1 Input from the Division of Forestry

GEC will make the WFPP available to the UDFFSL for its review and solicit comments for inclusion in the final draft. All relevant local, state, and federal agencies, as well as cooperative members, are also welcome to provide input.

7.2 Identifying Unnecessary or Ineffective Actions

This Plan should be revised every 3 years. As part of that revision process, GEC would monitor the effectiveness of the wildfire mitigation strategies within this document to assess the merits of the modifications and to implement adaptive management to improve future results. During the annual review process, GEC should also update mitigation strategies through review of industry best practices.

7.2.1 Identifying Deficiencies in the WFPP

The Operations Manager will be responsible for ensuring that this WFPP meets all public agency guidelines to mitigate the risk of its assets becoming the source or contributing factor of a wildfire. Staff responsible for assigned mitigation areas have the role of vetting current procedures and recommending changes or enhancements to build upon the strategies in the WFPP. Either due to unforeseen circumstances, regulatory changes, emerging technologies or other rationales, deficiencies within the WFPP will be sought out and reported to the Board of Directors in the form of an updated WFPP on an annual basis.

The Operations Manager or their designee will be responsible for spearheading discussions on addressing any plan deficiencies and collaborating on solutions when updating the WFPP. At any point in time when deficiencies are identified, the Supervisors or their delegates are responsible for making the appropriate policy adjustments. GEC staff and qualified stakeholders are encouraged to bring any potential deficiencies to the attention of the Operations Manager.

The Operations Manager, along with the appropriate staff, will evaluate each reported deficiency, and if determined to be valid, shall record the deficiency for further action

7.3 Plan Approval Process

The WMP is presented to the Board of Directors (BOD) by the Engineering and Operations Managers. The BOD along with corporate council has the opportunity to ask questions and address concerns based upon their representation of Membership. Once the plan has been fully reviewed by the BOD, a motion to accept and majority approval will allow the plan to be approved and implemented. This WFPP will be submitted to the Utah Utility Commission within 30 days of approval.

7.3.1 Submittal to the Utah Utility Commission

GEC shall file with its governing authority an annual report detailing the electric cooperative's compliance with the wildland fire protection plan; and file with the commission a copy of the annual compliance report.

Table 10. Commission Submittal Record

Version No.	Date of Approval	Date of Submittal to Commission
V1		
V2		

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix A: Acronyms

ANSI	American National Standards Institute
BIA	Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BMP	Best Management Practices
CWPP	Community Wildfire Protection Plan
DLI	Detailed Line Inspections
DEM	Department of Emergency Management
DFPC	Division of Fire Prevention and Control
EM	Engineering Manager
EOC	Emergency Operation Center
GBCC	Great Basin Coordination Center
GEC	Garkane Electric Cooperative
GIS	Geographical Information System
HFTA	High Fire Threat Area
IFPL	Industrial Fire Protection Level
IMT	Arizona Dept. of Forestry All Hazard Incident Management Team
IR	Infrared (imaging)
KV	Kilovolt
KWH	Kilowatt Hours
MW	Mega Watts
MVCD	Minimum Vegetation Clearance Distance
NESC	National Electric Safety Code
NFDRS	National Fire Danger Rating System
NF	National Forest
NOAA	National Oceanic and Atmospheric Administration
NUIFC	Northern Utah Interagency Fire Center
NWS	National Weather Service
OH	Overhead
OEM	Office of Emergency Management

OSHA	Occupational Safety and Health Administration
OM	Operations Manager
O&M	Operations and Maintenance
RFW	Red Flag Warning
ROW	Right-of-Way
RUS	Rural Utilities Service
SCADA	Supervisory Control and Data Acquisition
T&D	Transmission and Distribution
UDFFSL	Utah Division of Forestry, Fire and State Lands
UIFC	Utah Interagency Fire Center
UG	Underground
USDA	United States Department of Agriculture
USFS	United States Forest Service
VM	Vegetation Management
WFAS	Wildland Fire Assessment System
WHP	Wildfire hazard Potential
WFPP	Wildland Fire Protection Plan
WUI	Wildland Urban Interface

Appendix B: Literature Cited

Balch, J.K., B.A. Bradly, C.M. D'Antonio, and J. Gomex-Dans. 2013. Introduced annual grass increases regional fire activity across the arid western USA (1980-2009). *Global Change Biology* 19:173– 183.

Bishop Tara. B. B.: Munson, Seth: Gill, Richard A.: Belnap, Jayne: Petersen, Steven L.: St. Clair, Samuel B. 2019. Spatiotemporal patterns of cheatgrass invasion in Colorado Plateau National Parks. *Landscape Ecology* 43:925-941.

BLM 2004, Southwest Utah Support Area Fire Management Plan.

- 2005a. FONSI/DR and Environmental Assessment for the Utah Land Use Plan Amendment of Fire and Fuels Management Plan
- 2005b. Richfield Fire Management Plan Environmental Assessment. UT-050-04-045.

Ferry, Gardner W., Clark Ferry, G. Robert, Robert W. Mutch, Willard P. Leenhouts, and G. Thomas Zimmerman. 1995. Altered Fire Regimes Within Fire-adapted Ecosystems.

Five County Association of Governments (AOG). 2017. Natural Hazard Mitigation Plan. https://hazardmitigationplan.files.wordpress.com/2017/09/five-county_fema-approved-nhmp_full-resolution-size.pdf

Garfield County. 2019. County Wildfire Preparedness Plan.

Grahame, John D., and Thomas D. Sisk, ed. 2002. Canyons, cultures and environmental change: An introduction to the land use history of the Colorado Plateau. Available at: http://www.cpluhna.nau.edu.

Great Basin Coordination Center. 2020. Dispatch. Available at: https://gacc.nifc.gov/gbcc/dispatch.php.

Kane County. 2018. County Wildfire Preparedness Plan.

Marysvale, Utah. 2005. Wildfire Protection Plan.

Reisner, M.D., J.B. Grace, D.A. Pyke, and P.S. Doescher. 2013. Conditions favoring *Bromus tectorum* dominance of endangered sagebrush steppe ecosystems. *Journal of Applied Ecology* 50:1039– 1049.

Scott, J.H., and R.E Burgan. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. USDA Forest Service. General Technical Report RMRS-GTR-153.

Sevier County. 2006. Sevier County 2006 Mobilization Guide. Prepared by Sevier County, County Seat, Utah. Submitted to Utah Division of Forestry, Fires and State Lands, Salt Lake City.

Six County Association of Governments (AOG). 2015. Pre-Disaster Mitigation 5-Year Plan.

SWCA Environmental Consultants (SWCA). 2007a. Central Utah Regional Wildfire Protection Plan.

- 2007b. Southwest Utah Regional Wildfire Protection Plan.

Utah Division of Emergency Management (UDER). 2019. Utah State Hazard Mitigation Plan. Available at: https://hazards.utah.gov/wp-content/uploads/Utah-State-Hazard-Mitigation-Plan-2019.pdf.

Utah State University Extension. 2005. Agricultural County Profiles. Available at: http://extension.usu.edu/htm/publications/by=category/category =94 /.

Utah Wildfire Risk Assessment Portal. 2020. Wildfire Risk Assessment Portal. Available at: https://wildfirerisk.utah.gov/.

Wayne County. n.d.

World Wildlife Fund. 2001. Terrestrial ecoregions of North America: A Conservation Assessment. Wasatch and Uinta montane forests. Island Press. Available at: http://www.worldwildlife.org/ wildworld/profiles/terrestrial/na/na0530_full.html.

Appendix C: Definitions

ANSI Z—133.1: Defines an electric hazard to exist anytime a tree worker, tool, tree, or any other conductive object is closer than 10 feet from an energized conductor with a voltage of 50,000 volts or less. From this 10-foot baseline, 0.4 inches of required clearance is added for every 1,000 volts above the 50,000-volt baseline. ANSI Z-133 provides tables that outline minimum approach distances for both qualified and non-qualified tree workers based on voltage and elevation.

Best Management Practices (BMP): Innovative environmental protection practices applied to help ensure that projects or regular operations are conducted in an environmentally responsible or effective manner.

Burnable fuel: Refers to fuel models that are "ignitable" in the fire modeling. Burnable land cover includes grasses, herbs, shrubs, trees, leaf litter, dead-and-down branchwood, etc.

Danger Tree: A danger tree is any tree, on or off the right-of-way, that can contact electric power lines. A danger tree may be completely healthy and intact, or it may be sick or dead. Even a healthy tree could sustain damage in a severe storm and impact nearby power lines, thus the potential for "danger."

Distribution System: The final stage in the delivery of electric power carrying electricity from the transmission system to individual consumers. The HCE distribution system includes 14.4Kv lines not tied to generation facilities.

Defensible Space: An area around a structure, either natural or manmade, where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildfire and the structure. In practice, it is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

FSim: FSim is a high-resolution wildfire simulation model, developed by the Rocky Mountain Research Station, that is used to simulate fire behavior and spread. FSim simulates a typical fire season thousands of times to generate a "library" of plausible fires that could occur on the landscape. FSim and its outputs have been used across the country by various researchers, land managers, and insurance companies to prepare for fire seasons.

Fire Mode: Protective relay setting that contain moderately sensitive instantaneous tripping and will perform a single automatic reclose operation.

Fire Risk: "Risk" is the potential damage a fire can do, to the area under existing conditions, including any modifications such as defensible space, irrigation and sprinklers

and ignition resistant building construction which can reduce fire risk. Risk considers the susceptibility of what is being protected.

Fire Season: 1) Period(s) of the year during which wildfires are likely to occur, spread, and affect resource values sufficiently to warrant organized fire management activities. 2) A legally enacted time during which burning activities area regulated by state or local authority.

Great Basin Coordination Center: The focal point for coordinating the mobilization of resources for wildland fire and other incidents throughout the Geographic Area (AZ, ID, NV, WY). Located in Salt Lake City, UT, the Center also provides Intelligence and Predictive Services related products for use by the wildland fire community for purposes of wildland fire and incident management decision-making.

Hardening: Modifications to electric infrastructure to reduce the likelihood of ignition and improve the survivability of electrical assets.

Hazard Tree: A specific type of danger tree that poses a greater likelihood of causing damage to electric power lines or equipment. In this case, the tree is structurally unsound and positioned in such a way that it could fall onto conductors.

Hot Line Tag: Protective relay settings that contain very sensitive instantaneous tripping and will not allow an automatic reclose.

Industrial Fire Precaution Level (***IFPL):*** Activated when needed during the summer fire season, IFPL are an activity closure system to reduce wildfire risk. By law (WAC 332-24-301), it applies to woods workers and other industrial forest users on 13 million acres of unimproved private, federal, and state forestlands protected by the BMLM or Forest Service. Levels range from Level-1 to Level-4.

Landscape: Refers generally to the area of interest in a project or study and could refer to modeled or on-the-ground conditions.

National Fire Danger Rating System (NFDRS): A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels. It combines the effects of existing and expected states of selected fire danger factors into one or more qualitative or numeric indices that reflect an area's fire protection needs.

Northern Utah Interagency Fire Center (NUIFC): Northern Utah Interagency Fire Center (NUIFC) is located in Draper, UT. It is a joint dispatch center in cooperation between the Bureau of Land Management, US Forest Service and the State of Utah Forestry Fire and State Lands. NUIFC is responsible for dispatching and coordination of wildfires in the following Counties: Box Elder, Cache, Rich, Tooele, Weber, Morgan, Davis, Duchesne, Juab, Sanpete, Salt Lake, Summit, Wasatch, and Utah.

OSHA Requirement 1910.269: Occupational Safety and Health Administration's vertical standard pertaining to the generation, transmission, and distribution of electricity.

A specific section of OHSA 1910.269 requires that everyone performing tree work in proximity to electric hazards must be qualified and their training has to be documented.

Public Safety Power Shutoff (PSPS): When severe weather or conditions create a substantial wildfire risk, specific portions of the service area may be de-energized in the interest of public safety.

Pruning: Also referred to as "trimming", tree pruning is the selective removal of branches that are not an adequate distance from the primary line, or that will grow too close to the power line before the next maintenance cycle.

Recloser: Recloser is a device that is typically used in over-head distribution systems to interrupt the circuit to clear faults. Automatic reclosers have an electronic control and vacuum interrupters that may automatically reclose to restore service if a fault is temporary. There may be several attempts that may be made to clear and reenergize the circuit if the fault still exists the recloser locks out. Reclosers are made in single-phase and three-phase versions and use oil or vacuum interrupters.

Red Flag Warning (RFW)[8]: A term used by fire- weather forecasters to call attention to limited weather conditions of importance that may result in extreme burning conditions. A RFW will be issued when there is high confidence that Red Flag criteria will be met within the next 24 to 48 hours, or when those criteria are already being met or exceeded. A warning may be issued for all, or portions of a fire weather zone or region. Zones impacted by the event will be listed within the Red Flag Warning product.

Remote Automatic Weather Station (RAWS): an apparatus that automatically acquires, processes, and stores local weather data for later transmission to the GOES Satellite, from which that data is retransmitted to an earth-receiving station for use in the national Fire Danger Rating System.

Right-of-Way (ROW): The corridor of land under (and adjacent to) a transmission or distribution line.

Risk: A measure of the probability and severity of adverse effects that result from exposure to a hazard.

SCADA: SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA generally refers to an industrial computer system that monitors and controls a process. In the case of the transmission and distribution elements of electrical utilities, SCADA will monitor substations, transformers, and other electrical assets. It is possible to control or reset equipment remotely using SCADA.

[8] Source: https://www.weather.gov/bou/RFW_Definitions

Substation: Part of the electrical generation, transmission and distribution system, substations transform voltage from high to low, or the reverse, or perform any of several other important functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels. A substation may include transformers to change voltage levels between high transmission voltages and lower distribution voltages, or at the interconnection of two different transmission voltages.

Transmission System: The bulk delivery of electrical energy from a generating site to an electrical substation. At HCE, for line maintenance purposes, the transmission system is comprised of 69kV radial (sub-transmission), 115kV lines, structures, and switches.

Utah Division of Forestry, Fire and State Lands: The Utah Division of Forestry, Fire, and State Lands is responsible for forest health, responding to wildland fires and managing sovereign lands in Utah.

Utah Interagency Fire Center: The Uintah Basin Interagency Fire Center coordinates aviation, equipment, and ground resources and provides logistical support for anticipated and ongoing wildfire activity nationwide. Uintah Basin dispatch area includes the following agencies: Uintah and Ouray Agency, Ashley National Forest, Ouray National Wildlife Refuge, Green River District, Utah Division of Forestry Fire and State Lands, and Dinosaur National Monument.

Vegetation: Trees, shrubs, and any other woody plants.

Vegetation Management: A broad term that includes tree pruning; brush removal through the use of power saws and mowers; the judicious use of herbicides and tree growth regulators; hazard tree identification and removal; the implementation of strategies to minimize the establishment of incompatible species under and near power lines; and the control of weeds.

Wildfire: Also called wildland fire, an unplanned, uncontrolled fire in a forest, grassland, brushland or land sown to crops.

Wildfire Mitigation Plan (WMP): A comprehensive plan to reduce the threat and severity of wildfire within an electric utility's service area. Plans include the preventive strategies and programs adopted by the utility to minimize the risk of its facilities causing wildfires along with its emergency response and recovery procedures.

Wildfire Risk: Combines the likelihood of a fire occurring (Threat), with those of areas of most concern that are adversely impacted by fire (Fire Effects). Wildfire Threat Index is derived from historical fire occurrence, landscape characteristics including surface fuels and canopy fuels, percentile weather derived from historical weather observations and terrain conditions. Fire Effects are comprised of Value Impacts and Suppression Difficulty.

Wildfire Threat: A number that is closely related to the likelihood of an acre burning.

Wildlands: Forests, shrub lands, grasslands, and other vegetation communities that have not been significantly modified by agriculture or human development*. A more specific meaning for fire managers, used by the National Wildfire Coordinating Group (which coordinates programs of participating wildfire management agencies nationwide), refers to an area in which development is essentially non-existent (except for roads, railroads, power lines, and similar transportation facilities); structures, if any, are widely scattered.

Wildland Urban Interface (WUI): Line, area, or zone where structures and other human development meet or intermingle with vegetative fuels in wildlands.

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix D: Detailed Mapping of High-Risk Segments with Action Plan

Table 11. Mitigation Action Plan

Map ID	Location	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
2	East Zion	Includes East Zion communities: Willow Canyon Ponderosa Clear Creek Zion Canyon Buffalo Ridge Mineral	**Willow Canyon, Ponderosa, Clear Creek and Zion Canyon** all include high and medium threat line segments and high and medium area threat. Ponderosa is adjacent to an area of high structure density. These areas are located within mixed grass-shrub-timber fuels. These fuels can exhibit extreme rates of spread (>55ft/min) and extreme flame lengths (> 30ft). UWRAP recognizes all four areas as having a high density of values at risk. Portions of the areas fall in varied topography; steep grades could elevate fire behavior under certain conditions. These areas have been prone to historically high density of wildfire occurrence, likely due to their proximity to residential and recreational use areas. Lines in this area are composed of single phase and three phase distribution line. Willow Canyon, Ponderosa, and Clear Creek are protected by the Clear Creek OCR. A portion of Clear Creek and all of Zion Canyon are protected by the East Zion recloser. Additional protective devices for each grouping include the following: Willow Canyon-FUS805; Ponderosa-FUS803; Clear Creek-FUS28680; Zion Canyon-RUS800.	Fire prevention signage on the highway (work with the County and UDOT) More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially I areas of high structure density.	**High**- due to the location along the highway and potential for ignitions.

Map ID	Location	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
2	East Zion	Includes East Zion communities: Willow Canyon Ponderosa Clear Creek Zion Canyon Buffalo Ridge Mineral	**Buffalo Ridge and Mineral** exhibit high and medium line threat and high and medium area threat. Buffalo Ridge has an area of high structure density. Both areas are made up of grass fuels, with some shrub component. These fuels can exhibit high and extreme rates of spread (30-44 ft/min) and high flame lengths (~ 20-30 ft). Slopes are moderate throughout much of the area, moderating potential fire growth. Both areas have seen a high density of previous wildfires, that appear to be associated with the highway, and are therefore likely attributed to passing motorists or other human activity. Lines in this area are composed of single phase and three phase distribution line protected by the East Zion Recloser. Additional protective devices for each grouping include the following: Buffalo Ridge – none; Mineral – FUS810, FUS809.	Fire prevention signage on the highway (work with the County and UDOT) More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially I areas of high structure density.	**High**- due to the location along the highway and potential for ignitions.

Map ID	Location	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
3	Mt Carmel, Orderville	Includes: Barracks Orderville Quarter Circle H Ranch Mt Carmel Mt Carmel Junction	**Barracks and Mt Carmel Junction** both include medium threat segments and medium to high area threat. These line segments occur along the highway and through areas dominated by grass and low shrub fuels. These fuel types can exhibit rapid rates of spread (33-44 ft/min) and moderate flame lengths (4-8 ft). Much of the risk along these segments is attributed to a high to extreme density of previous wildfire occurrence, which is associated with the proximity to the highway and therefore likely a result of passing motorists. Values at risk in the area are relatively low. Lines in this area are composed of single phase and three phase distribution line. Barracks is protected by the East Zion Recloser. Mt. Carmel Junction is protected by the Mt. Carmel Junction and Sands 34.5 Reclosers.	More frequent vegetation inspections.	**Moderate**- due to the relatively low density of values at risk adjacent to the lines.

Map ID	Location	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
3	Mt Carmel, Orderville	Includes: Barracks Orderville Quarter Circle H Ranch Mt Carmel Mt Carmel Junction	**Mt Carmel, Quarter Circle H Ranch and Orderville** include medium and high risk segments and medium area risk. Mt Carmel and Orderville have areas of high structure density. These line segments pass through areas dominated by agricultural fuels, with some grass and shrub. These fuels exhibit low to moderate rates of spread (17-22 ft/min) and low to moderate flame lengths (~ 4ft). Much of the risk to these line segments can be attributed to the high density of values at risk, as well as the high to extreme historic fire occurrence. Lines in this area are composed of single phase and three phase distribution line. Orderville and Quarter Circle H Ranch are protected by the Sands 34.5 Recloser. Mt. Carmel is protected by the Mt. Carmel Town OCR and Sands 34.5 Recloser. Additional protective devices in Orderville include: Orderville Sub/Town REC, OCD74193.	Fire prevention signage on the highway (work with the County and UDOT). More frequent line and vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High-** due to the high density of values at risk adjacent to the lines, and the history of high fire occurrence.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
4	Glendale, Alton	Includes: Glendale Lydia's Canyon Glendale Canyon Spencer Bench Alton	**Glendale, Lydia's Canyon and Glendale Canyon** include high and medium threat line segments and high and medium area threat. Glendale exhibits high and medium structure density. These line segments serve residential and commercial business in Glendale and north along Highway 89. As such, much of the GEC infrastructure is found in areas made up of urban, agricultural and grass fuels. These fuels can exhibit moderate rates of spread (16-22 ft/min) and low to moderate flame lengths (4-8 ft). Areas adjacent to the highway, outside of more urban developments may exhibit more extreme rates of spread and flame length, particularly on steeper grades. Much of the risk to these line segments can be attributed to the high density of values at risk, as well as the high to extreme historic fire occurrence, particularly to the area east of Glendale. Lines in this area are composed of single phase and three phase distribution line protected by the Alton 35 Recloser. Additional protective devices for each grouping include the following: Glendale Canyon – none; Lydia's Canyon – FUS831; Glendale – FUS1585, FUS827-GlendaleStep	Fire prevention signage on the highway directed at local and recreational users (work with the County and UDOT). More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High**- due to the density of values at risk adjacent to the lines, and the history of high fire occurrence.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
4	Glendale, Alton	Includes: Glendale Lydia's Canyon Glendale Canyon Spencer Bench Alton	**Spencer Bench** includes high and medium threat line segments, and high and medium area threat. These line segments are found in shrub-timber fuels in areas of varied topography and some steep grades. These fuel types can exhibit extreme rates of spread (> 55ft/min) and extreme flame lengths (> 30ft). These lines are collocated with the highway and the greatest risk is attributed to an area of high fire occurrence, likely from passing motorists. Lines in this area are composed of single phase and three phase distribution line protected by the Alton 35 Recloser. Additional protective devices for Spencer Bench include: FUS1583, FUS1579.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High-** due to the high fire occurrence and potential for extreme fire behavior.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
4	Glendale, Alton	Includes: Glendale Lydia's Canyon Glendale Canyon Spencer Bench Alton	**Alton** includes high and medium threat line segments and high and medium area threat. The community of Alton is an area of high structure density. The line segments in this area pass through a mixture of grass, shrub and timber fuels. The community of Alton is dominated by agricultural and urban fuels. Fire behavior in this area would be variable, with most fuels in immediate proximity to the lines exhibiting moderate rates of spread (22-33 ft/min) and moderate flame lengths (4-8ft). The area southwest of Alton is rated high due to a high density of previous fire occurrence. Lines in this area are composed of single phase and three phase distribution line protected by the Alton 35 Recloser. Additional protective devices for Alton include: FUS1586, FUS1588, FUS1591	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High-** due to the history Of high fire occurrence and density of values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
5	Duck, Mammoth and Swains Creek	Includes: Mammoth Creek Duck Creek Village Strawberry Seaman Canyon Swains Creek	**Duck Creek Village, Strawberry and Swains Creek** are all areas of high structure density, with some medium threat line segments and medium area threat. These lines cross a range of fuel types, dominated by timber fuels. These fuels exhibit low to moderate rates of spread (22-33 ft/min) and low to moderate flame lengths (4-8ft). Risk in these areas can be attributed to the density of residential structures and values at risk. All three areas exhibit high to extreme historic fire occurrence densities. Lines in this area are composed of single phase and three phase distribution line. The Duck Creek Village & Color Country Reclosers protect Duck Creek. Strawberry, Swains Creek, and Seaman Canyon are protected by the Duck Creek 35 Recloser. Additional protective devices for each grouping include the following: Duck Creek – FUS798, FUS796, FUS797, FUS795, FUS19-DCV-1740, FUS80959, FUS793, FUS792, FUS767, MV Quaken Aspen OCR, Meadow View Rim Road OCR, MV Unit F OCR, MV Mirror Lake OCR; Strawberry – FUS780, FUS782, FUS783, FUS54-Str-3801, FUS1562; Swains Creek – FUS772, Fuse-SC-3954, FUS771, FUS770, FUS769, FUS768	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High-** due to the history Of high fire occurrence and density of values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
5	Duck, Mammoth and Swains Creek	Includes: Mammoth Creek Duck Creek Village Strawberry Seaman Canyon Swains Creek	**Seaman Canyon** is rated as a medium threat line segment. It is located within an area of heavy timber, which could low rates of spread by moderate flame lengths (4-8ft). Lines in this area are composed of single phase and three phase distribution line protected by the Duck Creek 35 Recloser.	More frequent vegetation inspections.	**Low-** due to the low density of values at risk and the low potential for fire behavior.
			Mammoth Creek includes medium threat line segments, medium area threat and areas of high structure density. The lines pass through a mixture of fuels, dominated by timber fuels, areas of which could exhibit high rates of spread (44-55 ft/min) and high flame lengths, some in excess of 30ft. Risk in the area can be attributed largely to the density of values at risk, as well as an area of heavy fire occurrence towards the west portion of the community. Lines in this area are composed of single phase and three phase distribution line protected by the Mammoth Creek 3ph OCR. Additional protective devices for	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High-**due to high density of values at risk and the history of wildfire occurrence.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
6	Tod's Junction, Hatch, Bryce Woodlands	Includes: Elk Ridge Bryce Summit Bryce Woodlands Mammoth Ridge	**Elk Ridge and Bryce Summit** include medium threat line segments and medium area threat. The lines are collocated with the highway. Tod's Junction, within the Elk Ridge polygon, is an area of high structure density. The lines pass through varied fuels, dominated primarily with shrubs and some timber. These fuels could exhibit moderate to extreme rates of spread and moderate to extreme flame lengths, with some flame lengths in excess of 30ft. The areas have a low to moderate historic fire occurrence. Lines in this area are composed of single phase and three phase distribution line, as well as transmission line north of Tod's Junction. Elk Ridge is protected by the Elk Ridge 12.5 and Duck Creek 35 Reclosers. Bryce Summit is protected by the Cedar Mtn Line Recloser. Additional protective devices for Bryce Summit include: FUS696, FUS643. The transmission line is protected at the Hatch substation.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW clearance around high threat segments, especially in areas of high structure density.	**High-** due to the high density of values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
6	Tod's Junction, Hatch, Bryce Woodlands	Includes: Elk Ridge Bryce Summit Bryce Woodlands Mammoth Ridge	**Bryce Woodlands** include some small segments at moderate threat and some moderate area threat. The lines cross an area dominated by timber fuels which could exhibit high to extreme rates of spread (>55ft/min) and flame lengths in excess of 30ft. This area includes some steep grades which can elevate fire behavior under certain conditions. The area is also classified as having relatively high aggregate values at risk. Lines in this area are composed of single phase line. Bryce Woodlands is protected by the Cedar Mtn Line Recloser. Additional protective devices include Bryce Woodlands OCR, FUS664.	More frequent line vegetation inspections. Consider wider ROW in areas of heavy timber density, due to potential extreme flame lengths.	**High-** due to the potential for extreme fire behavior, and values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
6	Tod's Junction, Hatch, Bryce Woodlands	Includes: Elk Ridge Bryce Summit Bryce Woodlands Mammoth Ridge	**Mammoth Ridge** includes a moderate threat line segment and some moderate area threat. This line crosses an area dominated by shrub and timber fuels which could exhibit high rates of spread (44-55ft/min) and flame lengths in excess of 30ft. This area includes some steep grades which can elevate fire behavior under certain conditions. The area is also classified as having relatively high aggregate values at risk. Lines in this area are composed of single phase distribution line protected by	More frequent line vegetation inspections. Consider wider ROW in areas of heavy timber density, due to potential extreme flame lengths.	**High-** due to the potential for extreme fire behavior, and values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
7	Dickinson Hill, Sevier River, Hercules	Includes: Sevier River, Hercules, Dickinson Hill	**Sevier River** includes two small medium threat line segments and medium and high area risk. These line segments are located close to the highway and pass through grass and shrub fuels which could exhibit extreme rates of spread (>55ft/min) and extreme flame lengths (> 30ft). This area has seen moderate to high fire occurrence density and is an area that is classified as having relatively high values at risk. Lines in this area are composed of single phase distribution line protected by the Spry Sub Recloser. Additional protective devices include South Spry OCR.	More frequent vegetation inspections.	**High-** due to the values at risk.
			Hercules includes a small line segment at medium threat. The fuels in the area are primarily agricultural, grass and shrub, with low rates and spread and flame length. The high risk along this segment can be attributed primarily to a history of high fire occurrence, likely due to the highway intersection and passing motorists. Lines in this area are composed of single phase and three phase distribution line protected by the Red Canyon Line Recloser. Additional protective devices include FUS748.	Fire prevention public outreach campaign targeted at recreationalists.	**Moderate-** due to the high fire occurrence but relatively low fire behavior potential.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
7	Dickinson Hill, Sevier River, Hercules	Includes: Sevier River, Hercules, Dickinson Hill	Dickinson Hill includes a small line segment with medium line threat and medium areas threat. The fuels in the area are a mixture of grass, shrub and timber which could exhibit extreme rates of spread (>55ft/min) and extreme flame lengths (> 30ft). This area has seen moderate to high fire occurrence density and is adjacent to Panguitch, an area with a high density of values at risk. Lines in this area are composed of transmission line protected at the Hatch Substation. Lines are owned by Garkane but do not fall within the service area; Garkane maintains a right of way for this line.	More frequent vegetation inspections.	**High-** due to the values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
8	Cave Lakes, Kanab Creek	Includes: Cave Lakes, Kanab Creek	**Kanab Creek** includes medium threat line segments and medium area threat. These lines are located within/adjacent to a riparian area with timber and shrub fuels. These fuels could exhibit high to extreme rates of spread (~50 f/min) and high to extreme flame lengths (20-30ft). The area has experienced moderate to high fire occurrence density. Because the lines are collocated with the highway, the area is classified as having relatively high values at risk, but is relatively remote, with limited structures or development.	Fire prevention public outreach campaign targeted at recreationalists.	**Moderate-** due to the potential high fire behavior, but relatively low values at risk.
			Cave Lakes includes some high threat line segments and high area threat. The greatest risk is associated with Cave Lakes Canyon, due to the presence of timber fuels, steep grades and a history of extreme fire occurrence. Fuels in the area could exhibit extreme rates of spread and extreme flame lengths, in excess of 30ft, elevated by the topography in the area. Lines in this area are composed of single phase and three phase distribution line protected by the Valley Circuit Recloser. Additional protective devices include FUS914, FUS1613.	More frequent vegetation inspections.	**Low** – due to the remote nature of the lines and low density of values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
9	Buckskin, 5 Mile, Paria	Includes: Buckskin, 5 Mile, Paria	**Buckskin** includes segments of transmission line, collocated with Highway 89. The segments are in an area of medium area threat. The dominant fuels are grass and shrub and could exhibit high rates of spread (33-44 ft/min) and moderate to high flame lengths (4-8 ft). The high threat rating for these segments can be attributed largely to a history of high fire occurrence. Lines in this area are composed of transmission line protected at the Buckskin substation.	More frequent vegetation inspections.	**Moderate-** due to the high fire occurrence, but low values at risk.
			5 Mile is a segment of primary line known by the GEC Area Manager as medium risk. The line is located in an area of dense pinyon juniper and is difficult to access. It also feeds several critical communication towers. The fuels in this area could exhibit high rates of spread (33-44 ft/min) and moderate to high flame lengths (~ 20ft). Lines in this area are composed of single phase distribution line protected by the Buckskin Microwave OCR.	More frequent vegetation inspections. Drone inspections Consider wider ROW due to access concerns and potential slow response times.	**Moderate-** due to access concerns and critical values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
9	Buckskin, 5 Mile, Paria	Includes: Buckskin, 5 Mile, Paria	**Paria** represents a segment of transmission line in an area of medium area threat. The dominant fuels are grass and shrub and could exhibit high rates of spread (33-44 ft/min) and moderate to high flame lengths (4-8 ft). The medium threat rating for this segment of line can be attributed largely to a history of moderate fire occurrence. Lines in this area are composed of transmission line protected at the Buckskin Substation.	More frequent vegetation inspections. Encourage more frequent vegetation treatments along highway ROW (County).	**Moderate-** due to the high fire occurrence, but low values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
10	Tropic, Barney Top	Includes: Tropic, Barny Top	**The Barney Top** line segments are small areas of medium threat line within medium area threat. These line segments pass through shrub and timber fuels that could exhibit high rates of spread (33-44 ft/min) and high flame lengths (~20ft). These segments are in varied topography which could elevate fire behavior under certain conditions. All segments are in areas of relatively low values at risk. Much of the risk can be attributed to previously high fire occurrence. Lines in this area are composed of single phase distribution line protected by Pine Lake and Hwy 12 Crossing OCRs.	More frequent vegetation inspections.	**Moderate-** due to the high fire occurrence, but low values at risk.
			Tropic line segments occur within a medium risk area. Lines are just north and west of the community of Tropic which has a high structure density and therefore high values at risk. Lines pass through shrub fuels that could exhibit extreme rates of spread (>55 ft/min) and flame lengths in excess of 30ft. The risk can also be attributed to a history of moderate to high fire occurrence. There are relatively low values at risk directly adjacent to the lines. Lines in this area are composed of single phase distribution line as well as a transmission. The distribution line is protected by the Tropic Cyn 1PH OCR. The transmission line is protected at the East Valley Substation.	Fire prevention public outreach campaign targeted at recreationalists.	**High-** due to the potential for extreme fire behavior and location close to the community of Tropic.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
11	Highway 12, The Blues, Long Canyon	Includes: West of the Blues, The Blues, Long Canyon	**West of the Blues** represents an area of transmission line with medium threat in a medium threat area. The line passes through grass-shrub fuels in an area of very variable topography that could elevate fire behavior. These fuels could exhibit high to extreme rates of spread (~55 ft/min) and high to extreme flame lengths (20-30 ft). The lines are in a more remote area with low values at risk. The area has a history of moderate fire occurrence. Lines in this area are composed of transmission line protected at the Henrieville substation.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections.	**Moderate-** due to the low values at risk but potentially high t extreme fire behavior.
			Long Canyon represents an area of transmission and distribution line with small sections of medium threat in a medium area threat. Lines pass through grass-shrub fuels. These fuels could exhibit extreme rates of spread (>55 ft/min) and extreme flame lengths (>30 ft). The lines are in an area of high density of aggregated values at risk. The area has experienced low to moderate historic fire occurrence density. Lines in this area are composed of single phase and three phase distribution line, as well as transmission line. The single phase line is protected by the Head of Rocks OCR; three phase line is protected by the Esc West Ckt OCR. The transmission line is protected at the Henrieville substation.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections.	**Moderate-** due to patchy threat along the line, but higher density of values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
12	Boulder, Salt Gulch	Includes: Boulder, Salt Gulch	**Boulder** represents two small sections of medium threat transmission and distribution line, north of the community of Boulder. Lines pass through shrub and timber fuels which could exhibit high to extreme rates of spread (30-50 ft/min) and high to extreme flame lengths (20-30ft). The risk in the area can be attributed to the high density of values at risk, due to the proximity to the highway and an areas of high structure density. The area has experienced low to moderate historic fire occurrence but is bordered to the northwest by an area that has a history of frequent fire occurrence. Lines in this area are composed of single phase and three phase distribution line protected by the East Fork Ckt and Boulder Sub-Town Ckt Reclosers. The transmission line is protected at one end by the Boulder substation and at the other end by the Escalante substation.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Encourage wider ROW in areas of heavy timber.	**High-** due to the location relative to areas of high values at risk as well as a history of high fire occurrence in the vicinity.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
12	Boulder, Salt Gulch	Includes: Boulder, Salt Gulch	**Salt Gulch** represents a small section of distribution line located west of Boulder. The line passes through agricultural, shrub and some timber fuels. These fuels could exhibit high to extreme rates of spread (30-50 ft/min) and high to extreme flame lengths (20-30ft). The risk in the area can be attributed to adjacent high values at risk. Lines in this area are composed of single phase distribution line protected by the Salt Gulch OCR. Additional protective devices include FUS-SaltGulch-01.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Encourage wider ROW in areas of heavy timber.	**High-** due to the location relative to areas of high values at risk.

Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
13	Antimony, Johns Valley Road	Includes: Johns Valley Road	**Johns Valley Road** includes a section of distribution line that is at medium threat in a medium threat area. The line passes through grass-shrub and some timber fuels. The fuels could exhibit high to very high rates of spread (30-50 ft/min) and high to very high flame lengths (20-30ft). The line passes through an area of high values at risk, largely due to the proximity to the highway and riparian areas and not as a result of structures. Lines in this area are composed of single phase distribution line protected by the Johns Valley OCR.	More frequent vegetation inspections. Consider wider ROW in areas of heavy timber density, due to potential extreme flame lengths.	**Moderate-** Due to high values at risk.

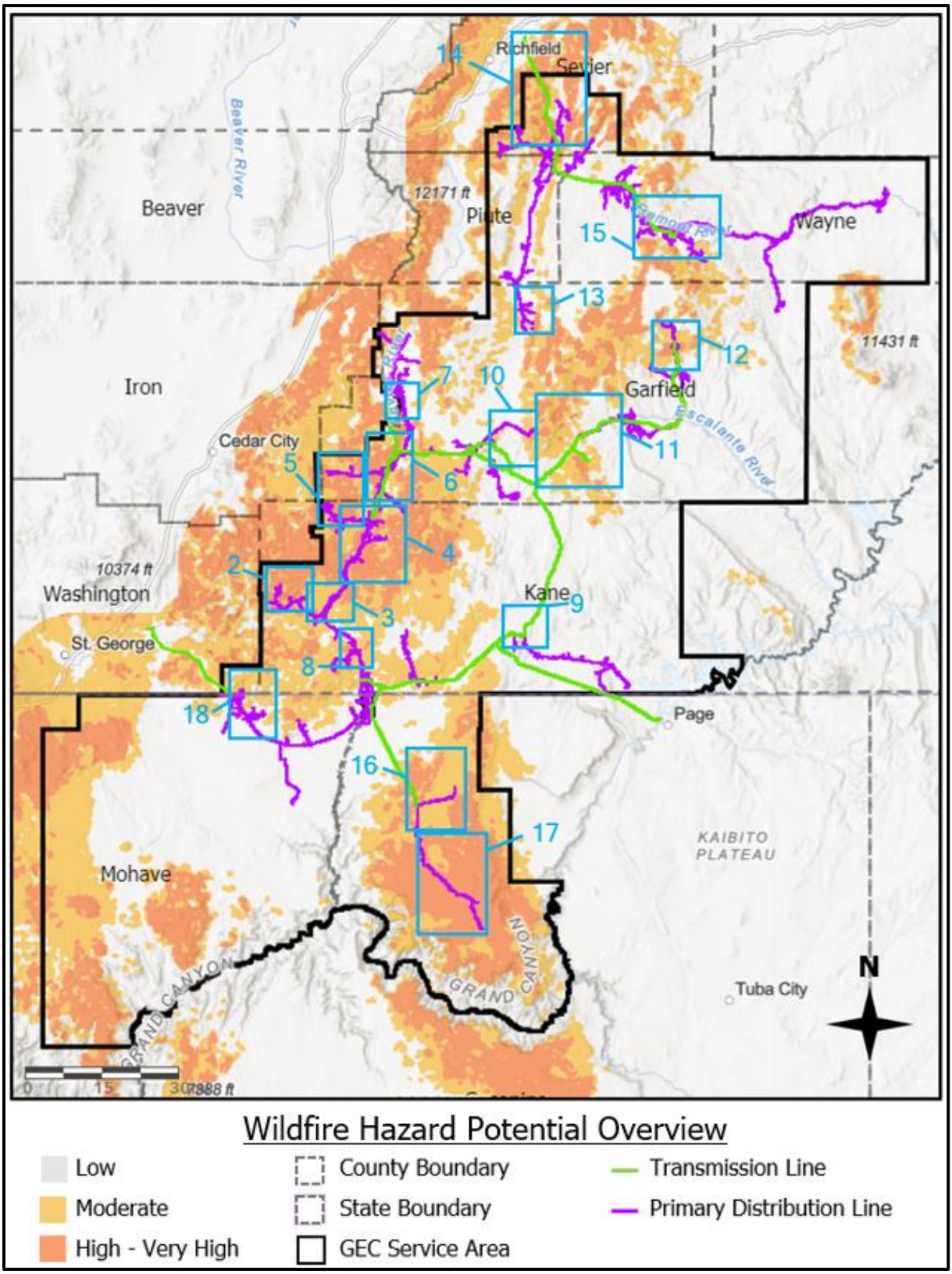
Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
14	Sigurd, Bear Ridge, Koosharem Reservoir	Includes: Sigurd, Bear Ridge, Daniels Road	**Sigurd** represents a section of transmission line south of the community of Sigurd that is rated as medium threat. The line passes through primarily agricultural land, with some grass-shrub fuels. These fuels could exhibit moderate rates of spread (22-32 ft/min) and moderate flame lengths (4-8 ft). The risk associated with this section can be attributed to the close proximity of the line to an area of high structure density and high values at risk. Lines in this area are composed of transmission line protected at the Sigurd substation.	Fire prevention public outreach campaign targeted at recreationalists.	**High-** due to the proximity to high density of values at risk.
			Daniels Road represents a section of distribution line with two small medium threat sections, adjacent to a medium threat area. The line passes through grass-shrub and some scattered timber fuels. These fuels could exhibit high to very high rates of spread (44-55 ft/min) and high to extreme flame lengths (20-30ft). The area has experienced a moderate to high fire occurrence history. Lines in this area are composed of single phase distribution line protected by the Burrville OCR. Additional protective devices include FUS1008.	More frequent vegetation inspections. Consider wider ROW in areas of heavy timber density, due to potential extreme flame lengths.	**High-** due to the potential for extreme fire behavior.

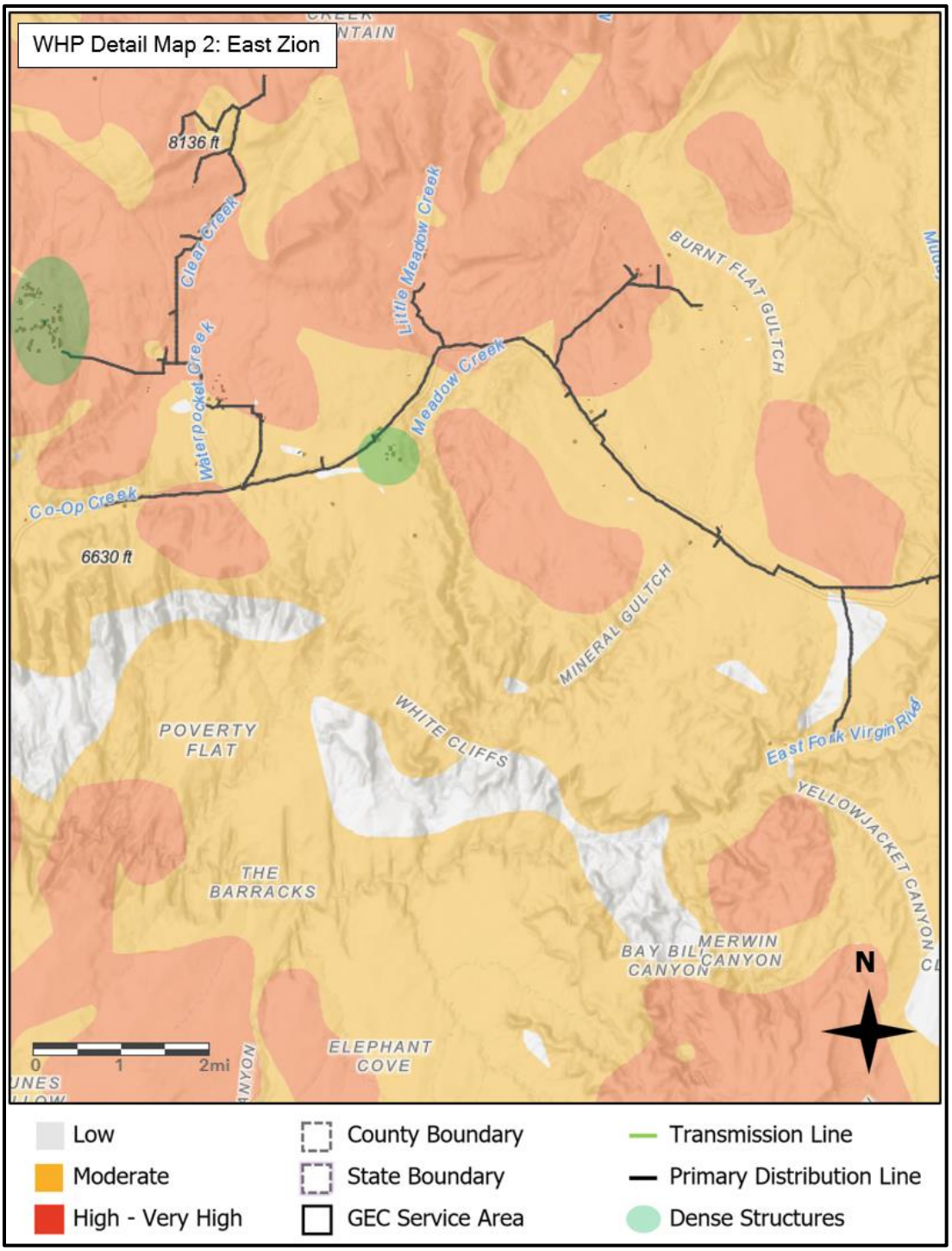
Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
15	Bicknell, Teasdale, Torrey, Birch Creek	Includes: Black Ridge and Birch Creek	**Black Ridge and Birch Creek** exhibit medium line threat and medium area threat. Both areas are made up of grass-shrub fuels, with some long needle litter. These fuels can exhibit very high to extreme rates of spread (44-55+ ft/min) and extreme flame lengths (>30 ft). These areas incorporate some steep slopes, which can elevate fire behavior under certain conditions. The risk in these areas can be attributed to the historically moderate to high density of wildfire occurrence, likely due to their proximity to recreational use areas. The lines are in close proximity to three communities with high structure density. Lines in this area are composed of single phase distribution line protected by the Pine Creek 3-ph and Teasdale OCRs.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW in areas of heavy timber density, due to potential extreme flame lengths.	**High-** due to three areas of high structure density and values at risk.

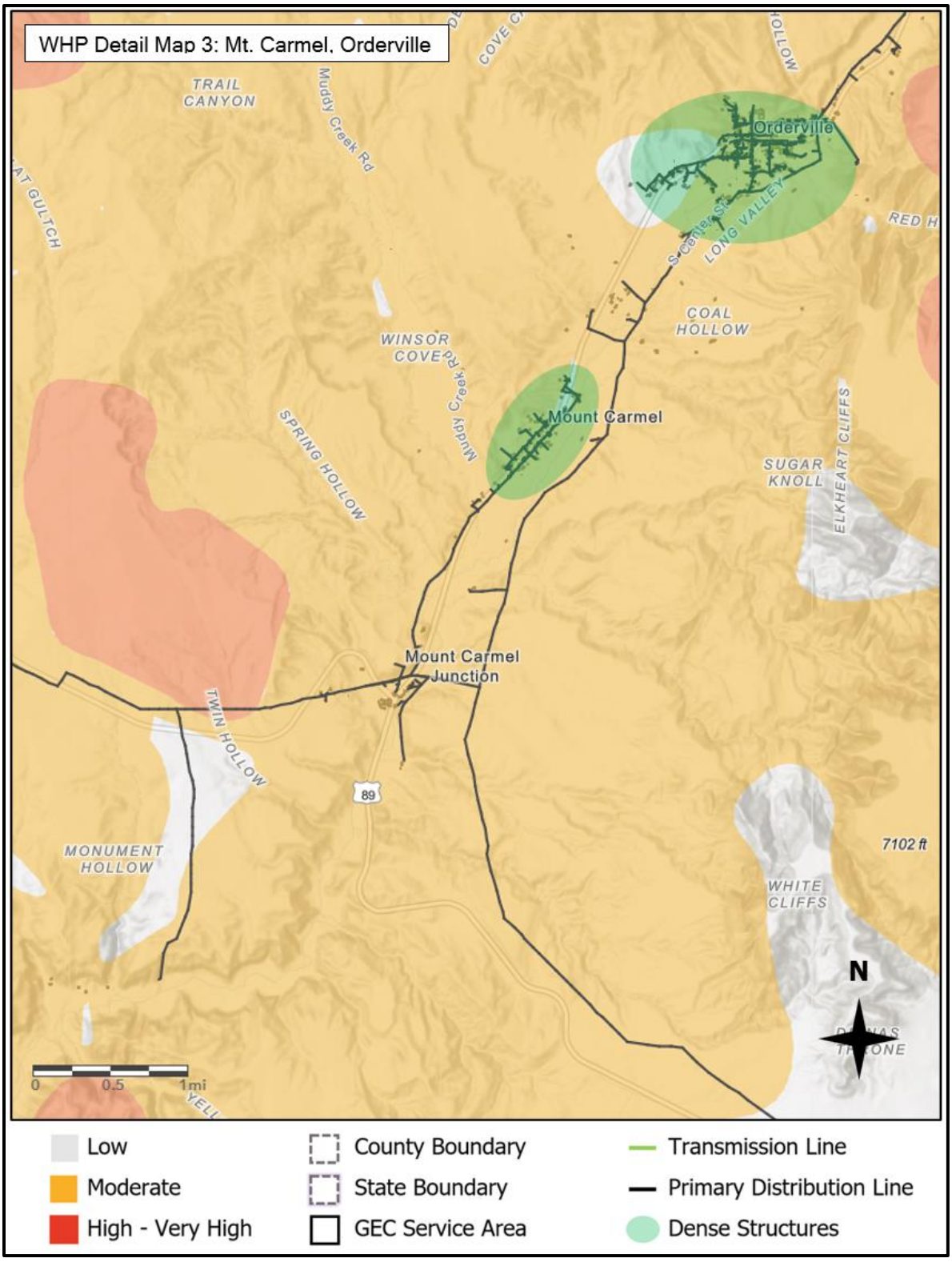
Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
16	7-1 7-2 7-3	Includes: Ryan, Castle Canyon, Jacob Lake	**Ryan and Castle Canyon** exhibit high line threat and moderate area threat. Both areas are made up of grass-shrub fuels, with some long needle litter. These fuels can exhibit very high to high rates of spread and moderate flame lengths (4-8 ft). These lines have cross country and roadside alignment, and are adjacent to, and traverse steep slopes which can elevate fire behavior under certain conditions. The risk in these areas can be attributed to the historically high wildfire occurrence. Transmission lines are under low threat due to the lack of fire history, low vegetation heights, and low WHP class. Lines in this area are composed of Transmission lines to the Ryan Substation and three phase distribution lines protected by the _____OCRs.	Fire prevention public outreach campaign targeted at recreationalists. More frequent asset inspections	**High-** for the distribution lines due to recuring large-scale wildfire in the area, landscape aspect, and moderate to high WHP class.

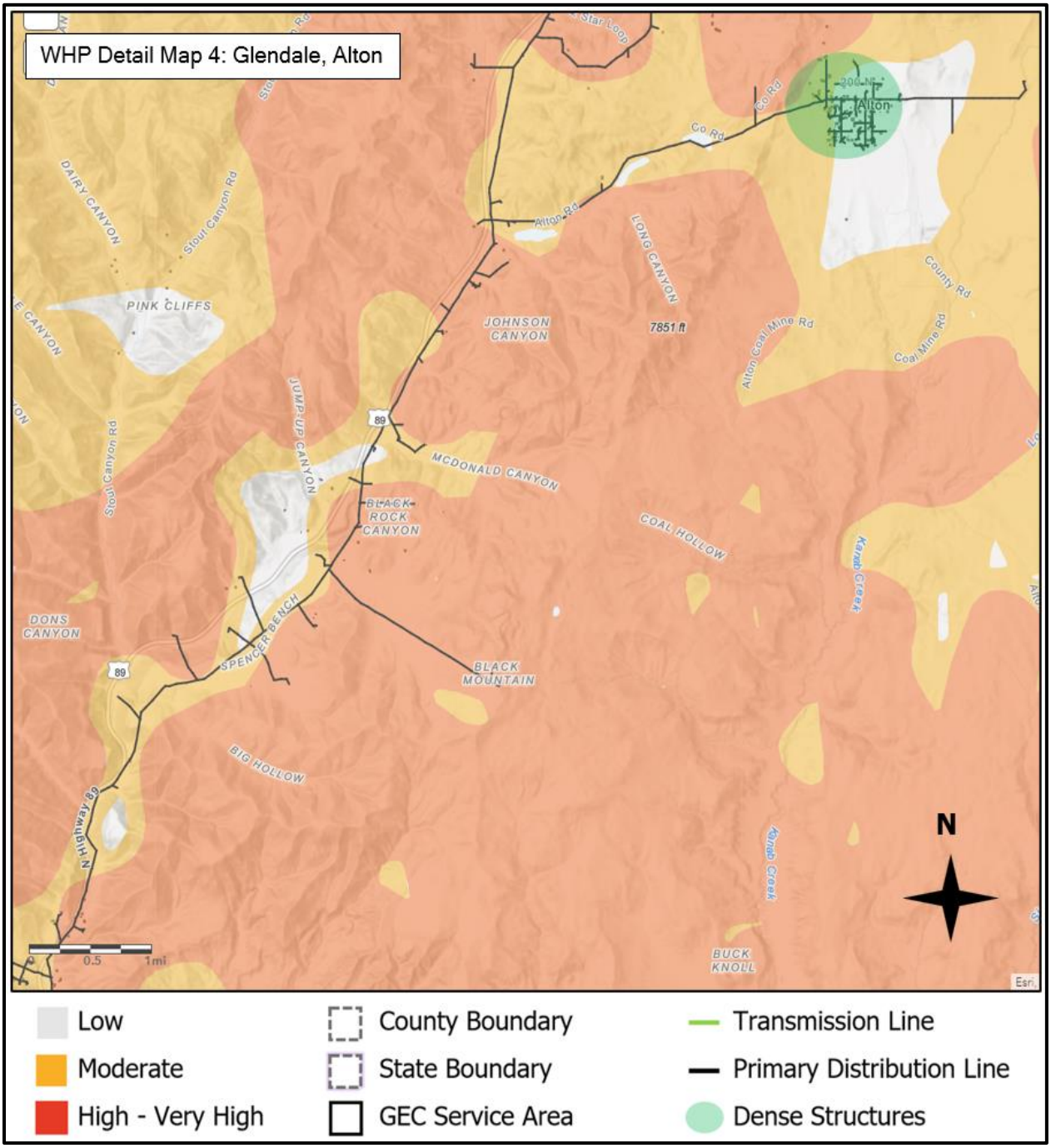
Map ID	Feeder	Description	Wildfire Risk Analysis Segment Indicator and Description	Mitigation Strategy	Priority (L, M, H)
17	7-2	Includes: Lookout Canyon	**Lookout Canyon** exhibit high line threat and low area threat. This circuit segment is located entirely with the High to Very High WHP tier. Fuels are made up of grass-shrub litter, very high load dry climate timber shrub with some long needle litter. Spread and flame lengths are moderate. These areas incorporate some steep slopes, which can elevate fire behavior under certain conditions. The risk in these areas can be attributed to the historically very high density of wildfire occurrence. Low structure density. Lines in this area are composed of three phase distribution line protected by the ____ OCRs.	Fire prevention public outreach campaign targeted at recreationalists. More frequent vegetation inspections. Consider wider ROW in areas of heavy timber density, due to potential extreme flame lengths.	**High-** due to high density of recuring wildfire.

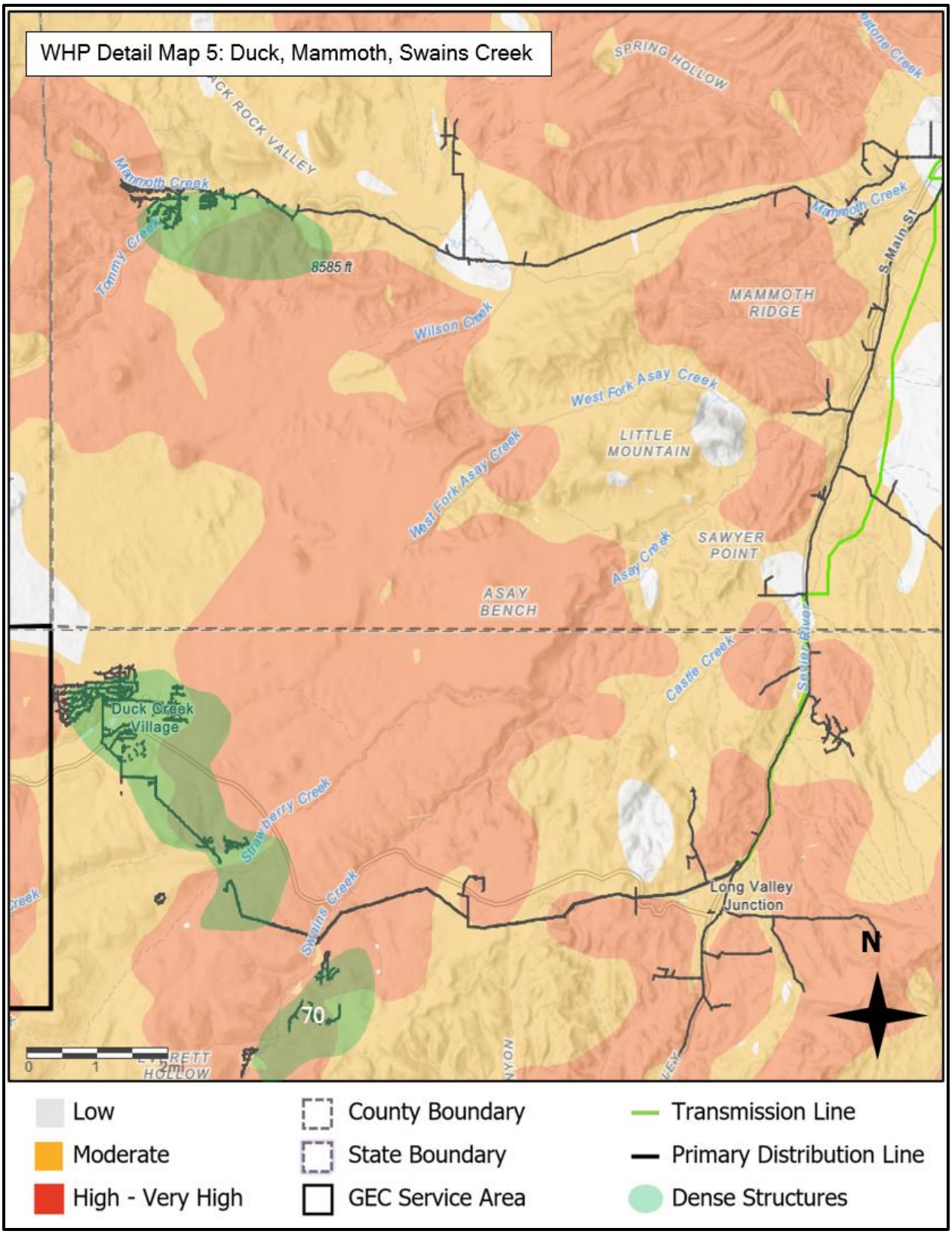
Figure 17. Wildfire Hazard Potential Overview

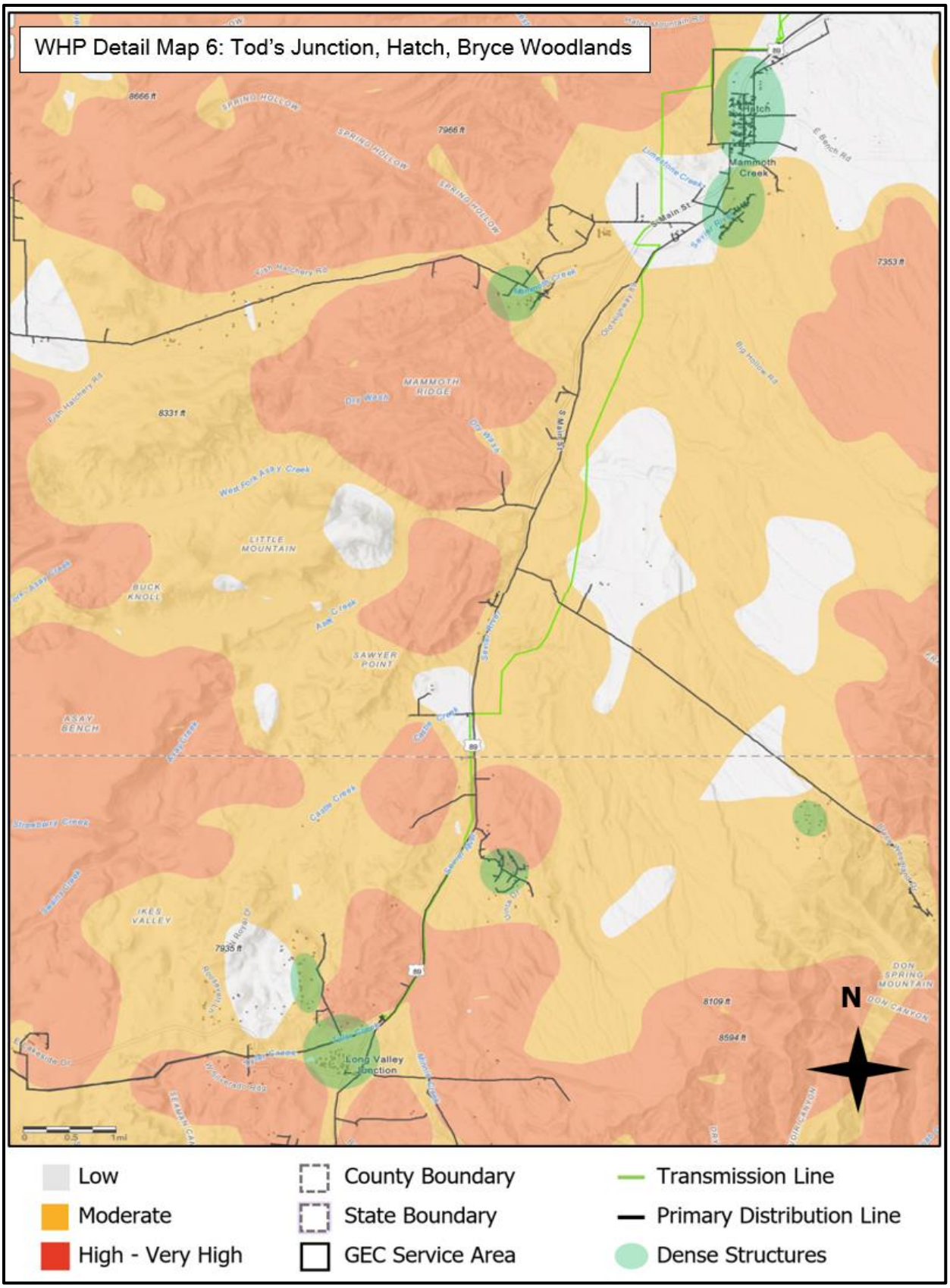


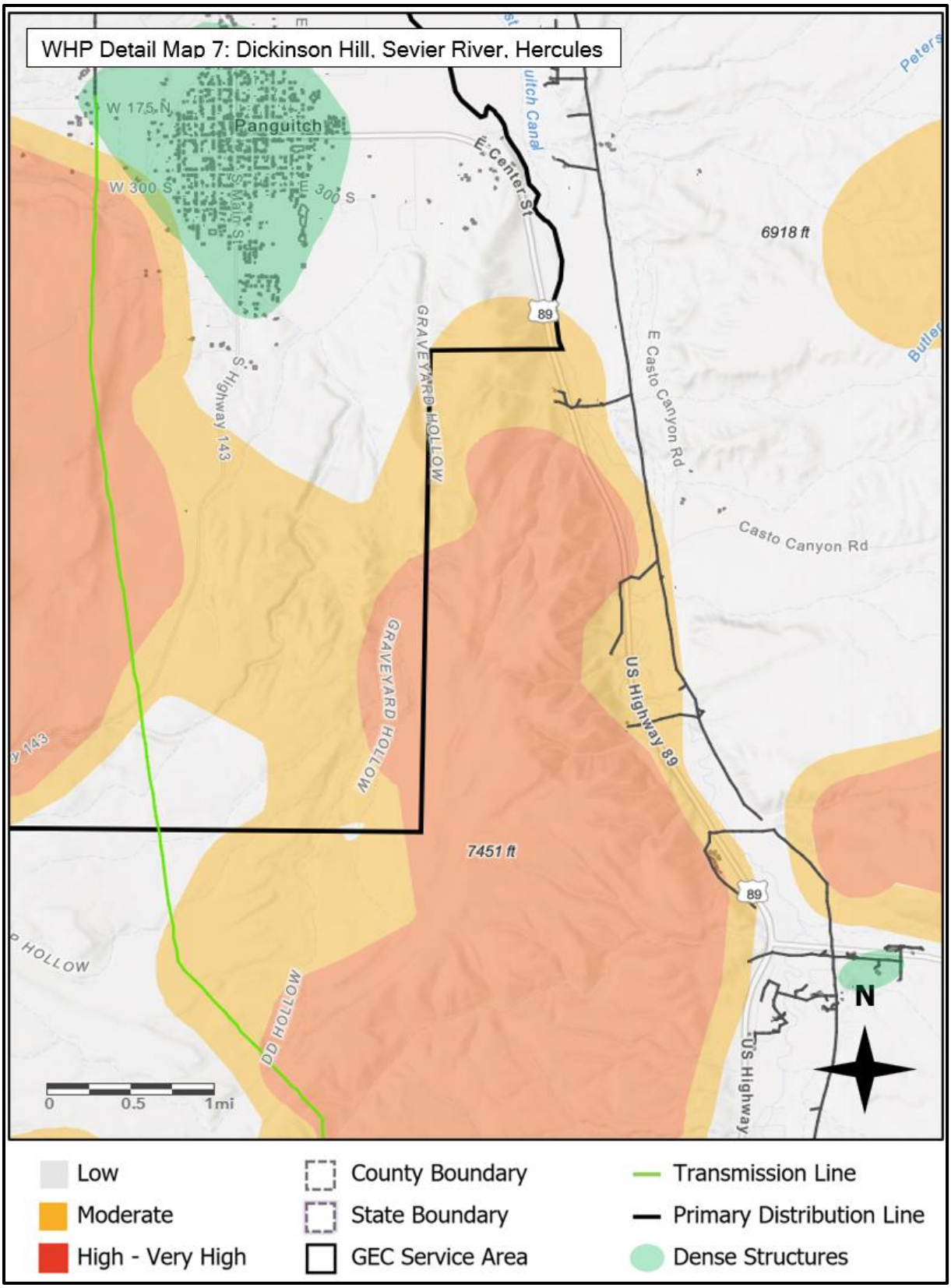

WHP Detail Map 2: East Zion
8136 ft
Clear Creek
Waterpocket Creek
Little Meadow Creek
Meadow Creek
BURNT FLAT GULTCH
Co-Op Creek
6630 ft
MINERAL GULTCH
WHITE CLIFFS
POVERTY FLAT
East Fork Virgin River
YELLOWJACKET CANYON
THE BARRACKS
MERWIN CANYON
ELEPHANT COVE
N
0 1 2mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

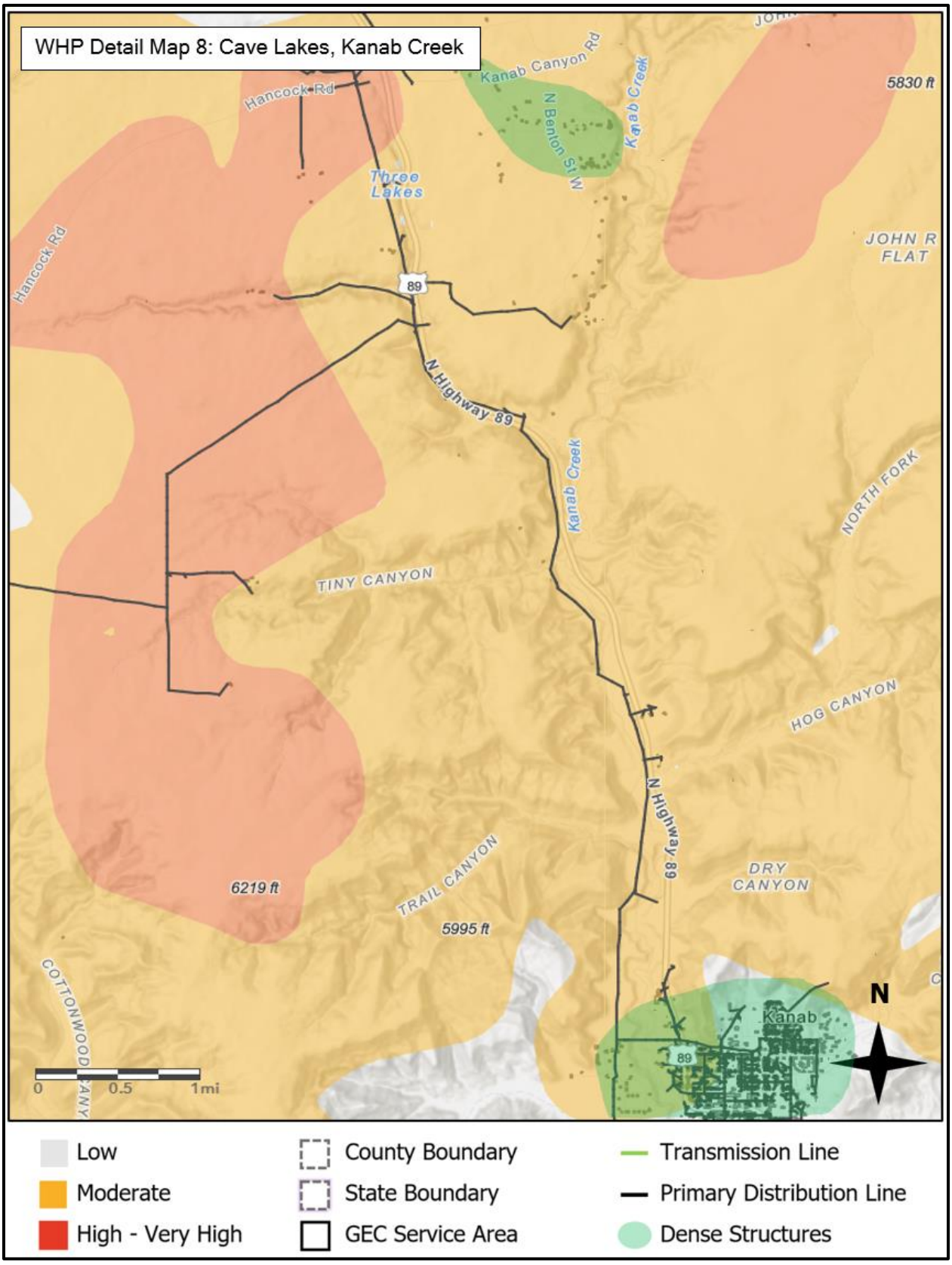

WHP Detail Map 3: Mt. Carmel, Orderville
TRAIL CANYON
Muddy Creek Rd
Orderville
LONG VALLEY
COAL HOLLOW
WINSOR COVE
Muddy Creek
Mount Carmel
SPRING HOLLOW
SUGAR KNOLL
ELKHEART CLIFFS
Mount Carmel Junction
TWIN HOLLOW
89
MONUMENT HOLLOW
7102 ft
WHITE CLIFFS
N
0
0.5
1mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

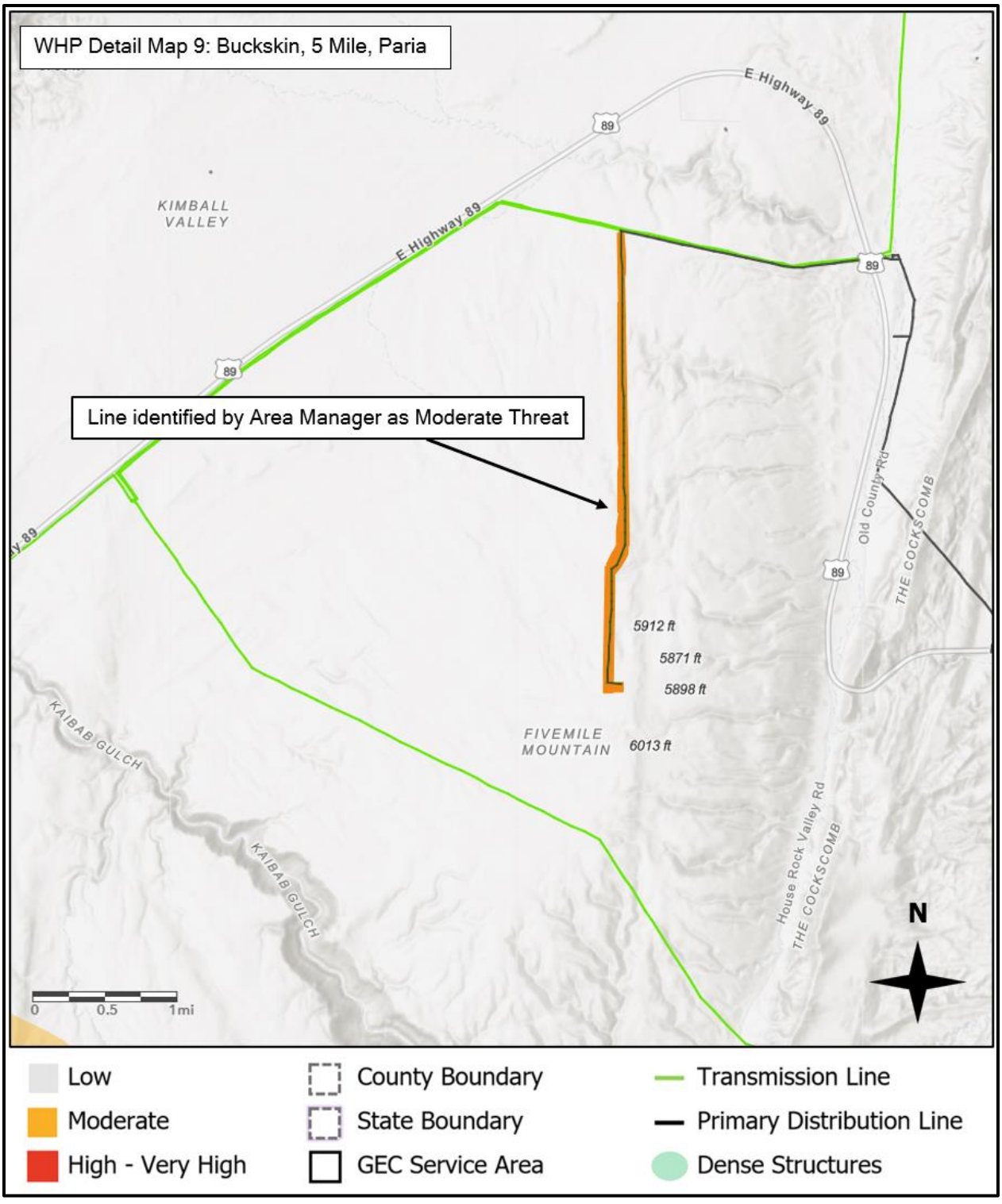

WHP Detail Map 4: Glendale, Alton
Alton
Co Rd
Alton Rd
DAIRY CANYON
Stout Canyon Rd
PINK CLIFFS
LONG CANYON
JOHNSON CANYON
7851 ft
County Rd
Alton Coal Mine Rd
Coal Mine Rd
JUMP UP CANYON
89
MCDONALD CANYON
BLACK ROCK CANYON
COAL HOLLOW
Kanab Creek
DONS CANYON
SPENCER BENCH
BLACK MOUNTAIN
BIG HOLLOW
N HIGHWAY 89
BUCK KNOLL
N
0 0.5 1mi
Esri
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

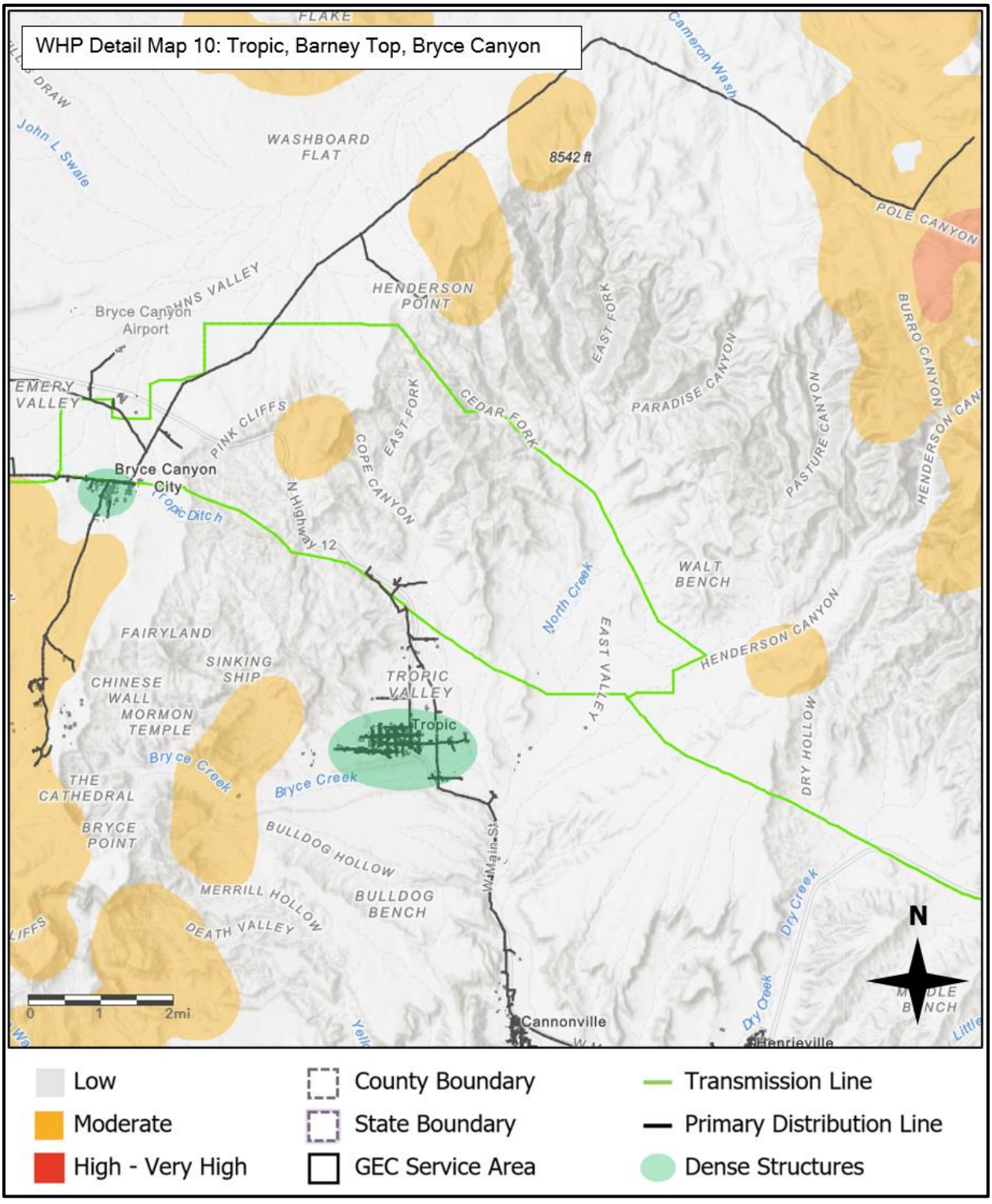

WHP Detail Map 5: Duck, Mammoth, Swains Creek
SPRING HOLLOW
Mammoth Creek
Tommy Creek
8585 ft
Wilson Creek
MAMMOTH RIDGE
S Main St
West Fork Asay Creek
LITTLE MOUNTAIN
SAWYER POINT
Asay Creek
ASAY BENCH
Castle Creek
Duck Creek Village
Strawberry Creek
Swains Creek
Long Valley Junction
70
N
0 1 2mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

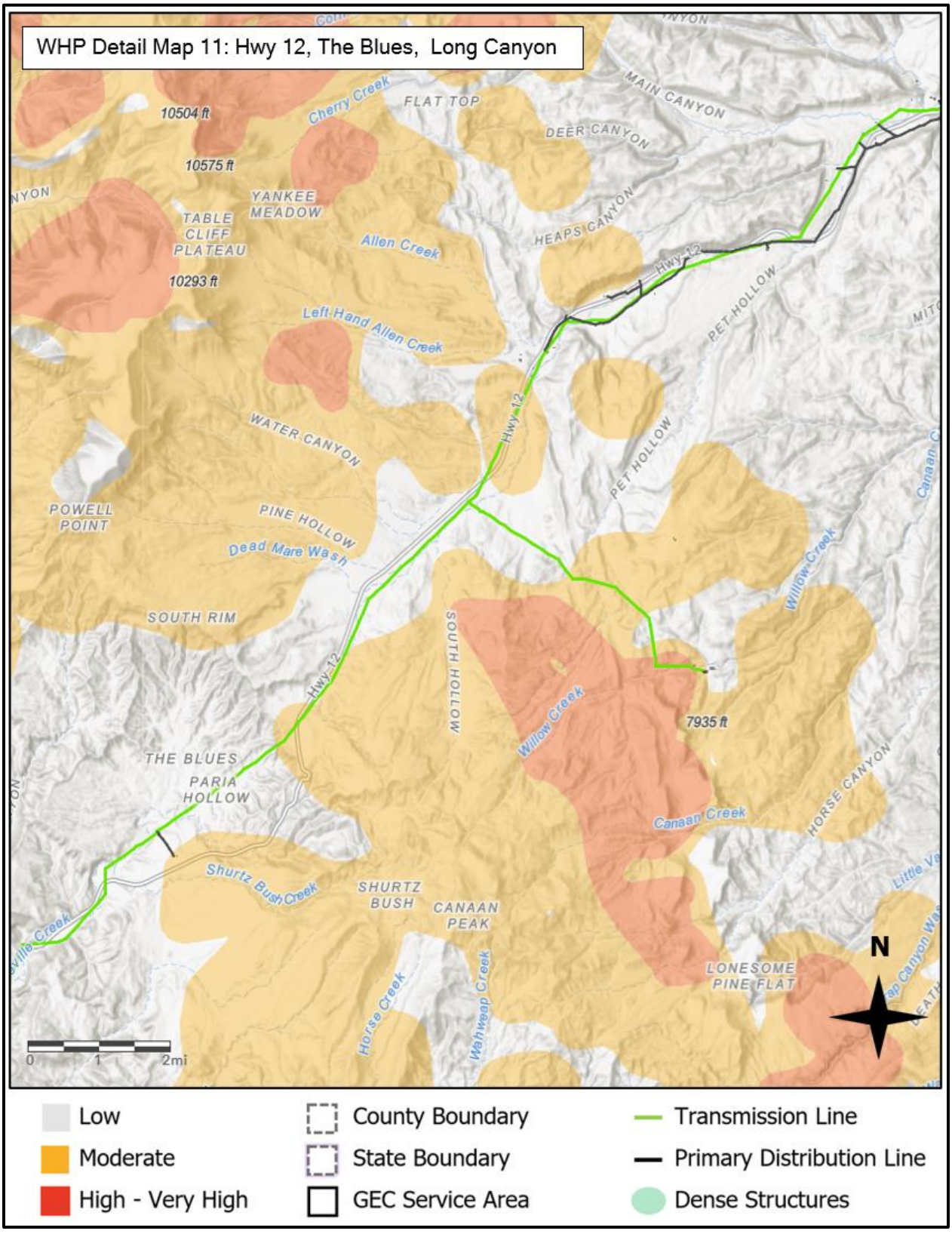

WHP Detail Map 6: Tod's Junction, Hatch, Bryce Woodlands
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures
N

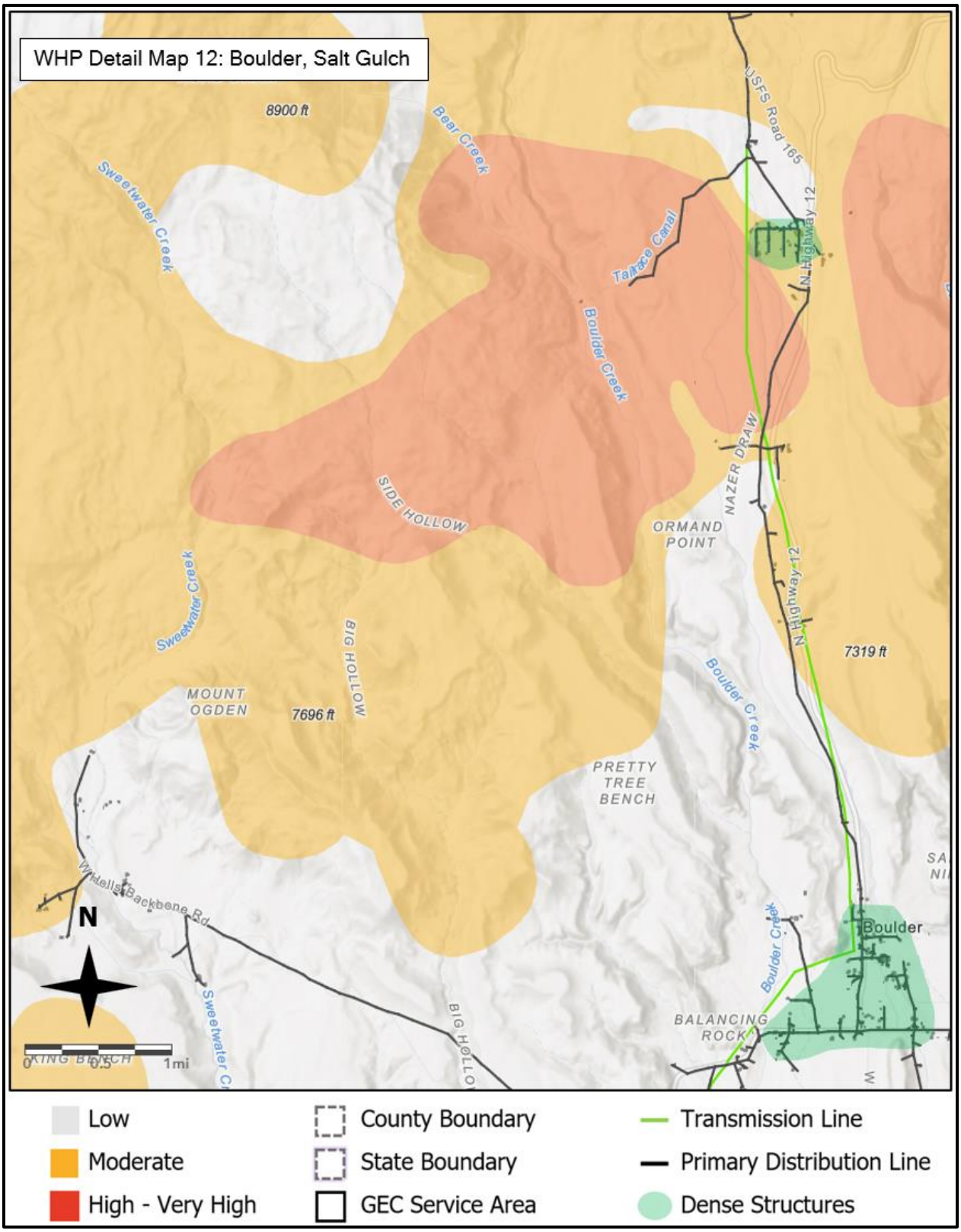

WHP Detail Map 7: Dickinson Hill, Sevier River, Hercules
Panguitch
W 175 N
W 300 S
E 300 S
E Center St
S Main St
S Highway 143
GRAVEYARD HOLLOW
GRAVEYARD HOLLOW
DD HOLLOW
E Casto Canyon Rd
Casto Canyon Rd
US Highway 89
US Highway
6918 ft
7451 ft
89
N
0
0.5
1mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

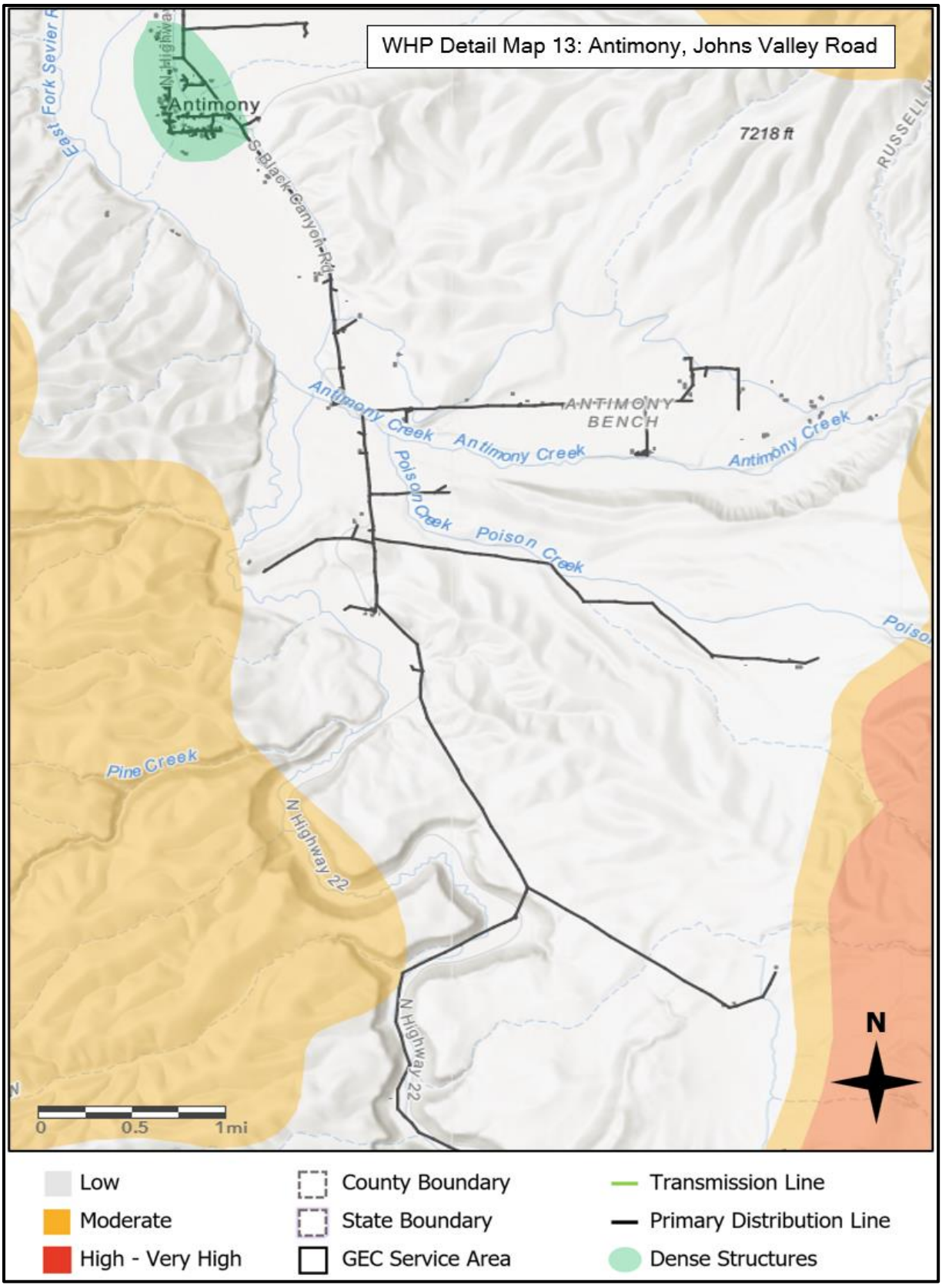

WHP Detail Map 8: Cave Lakes, Kanab Creek
Kanab Canyon Rd
Hancock Rd
N Benton St W
Kanab Creek
5830 ft
Three Lakes
JOHN R FLAT
Hancock Rd
89
N Highway 89
Kanab Creek
NORTH FORK
TINY CANYON
HOG CANYON
N Highway 89
DRY CANYON
TRAIL CANYON
6219 ft
5995 ft
COTTONWOOD CANY
Kanab
89
N
0
0.5
1mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

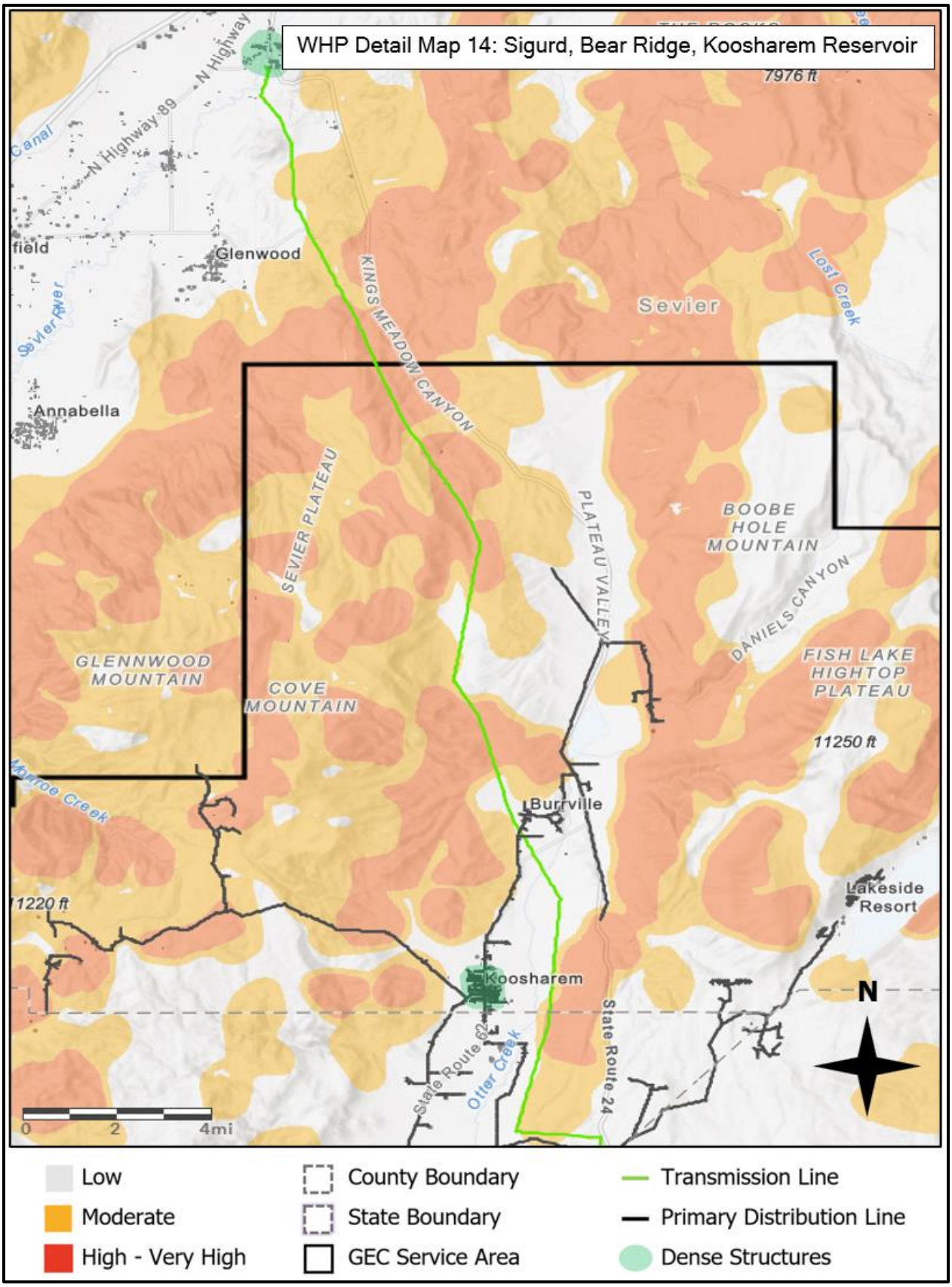

WHP Detail Map 9: Buckskin, 5 Mile, Paria
E Highway 89
89
KIMBALL VALLEY
Line identified by Area Manager as Moderate Threat
Old County Rd
THE COCKSCOMB
5912 ft
5871 ft
5898 ft
FIVEMILE MOUNTAIN
6013 ft
KAIBAB GULCH
House Rock Valley Rd
N
0
0.5
1mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

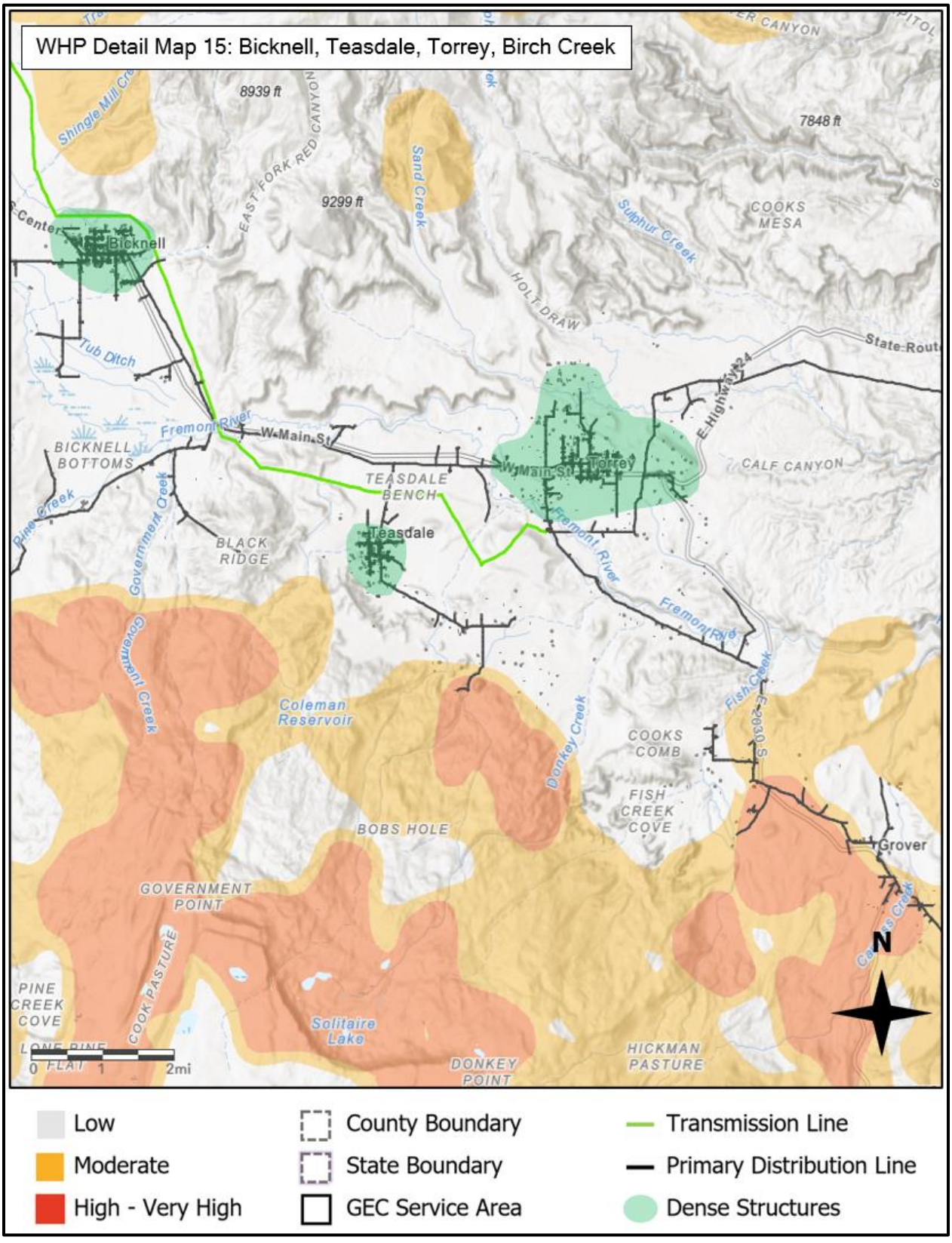

WHP Detail Map 10: Tropic, Barney Top, Bryce Canyon
FLAKE
Cameron Wash
John L Swale
WASHBOARD FLAT
8542 ft
POLE CANYON
HENDERSON POINT
Bryce Canyon Airport
EMERY VALLEY
PINK CLIFFS
EAST FORK
CEDAR FORK
PARADISE CANYON
PASTURE CANYON
BURRO CANYON
HENDERSON CAN
Bryce Canyon City
Tropic Ditch
COPE CANYON
N Highway 12
WALT BENCH
North Creek
EAST VALLEY
HENDERSON CANYON
FAIRYLAND
SINKING SHIP
CHINESE WALL
MORMON TEMPLE
TROPIC VALLEY
Tropic
DRY HOLLOW
Bryce Creek
THE CATHEDRAL
BRYCE POINT
BULLDOG HOLLOW
W Main St
MERRILL HOLLOW
BULLDOG BENCH
DEATH VALLEY
Dry Creek
N
0 1 2mi
Cannonville
Henrieville
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

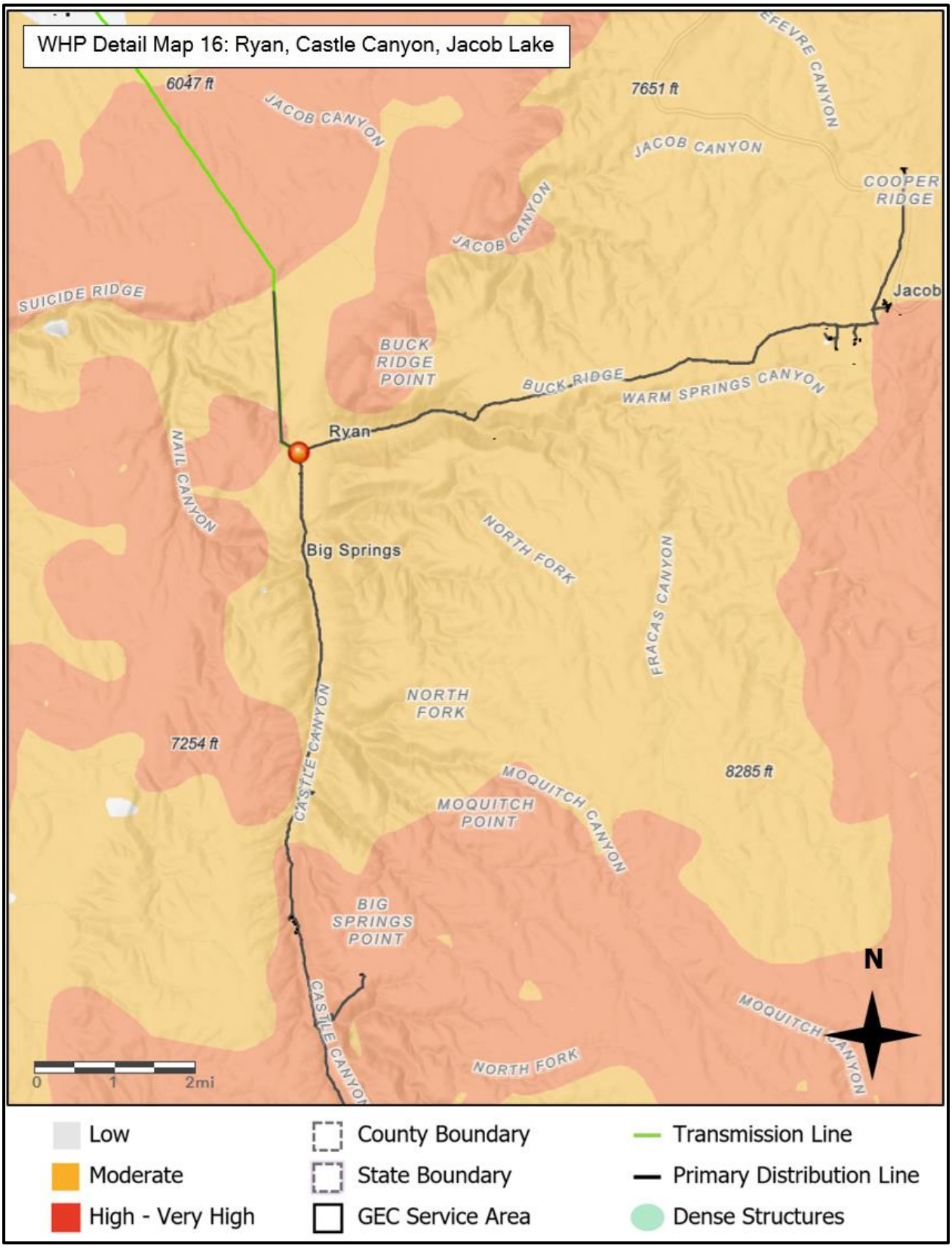

WHP Detail Map 11: Hwy 12, The Blues, Long Canyon
10504 ft
10575 ft
10293 ft
7935 ft
Cherry Creek
FLAT TOP
MAIN CANYON
DEER CANYON
YANKEE MEADOW
TABLE CLIFF PLATEAU
Allen Creek
HEAPS CANYON
Hwy 12
PET HOLLOW
Left Hand Allen Creek
WATER CANYON
POWELL POINT
PINE HOLLOW
Dead Mare Wash
SOUTH RIM
SOUTH HOLLOW
Willow Creek
THE BLUES
PARIA HOLLOW
Canaan Creek
HORSE CANYON
Shurtz Bush Creek
SHURTZ BUSH
CANAAN PEAK
LONESOME PINE FLAT
Horse Creek
Wahweap Creek
N
0
1
2mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures

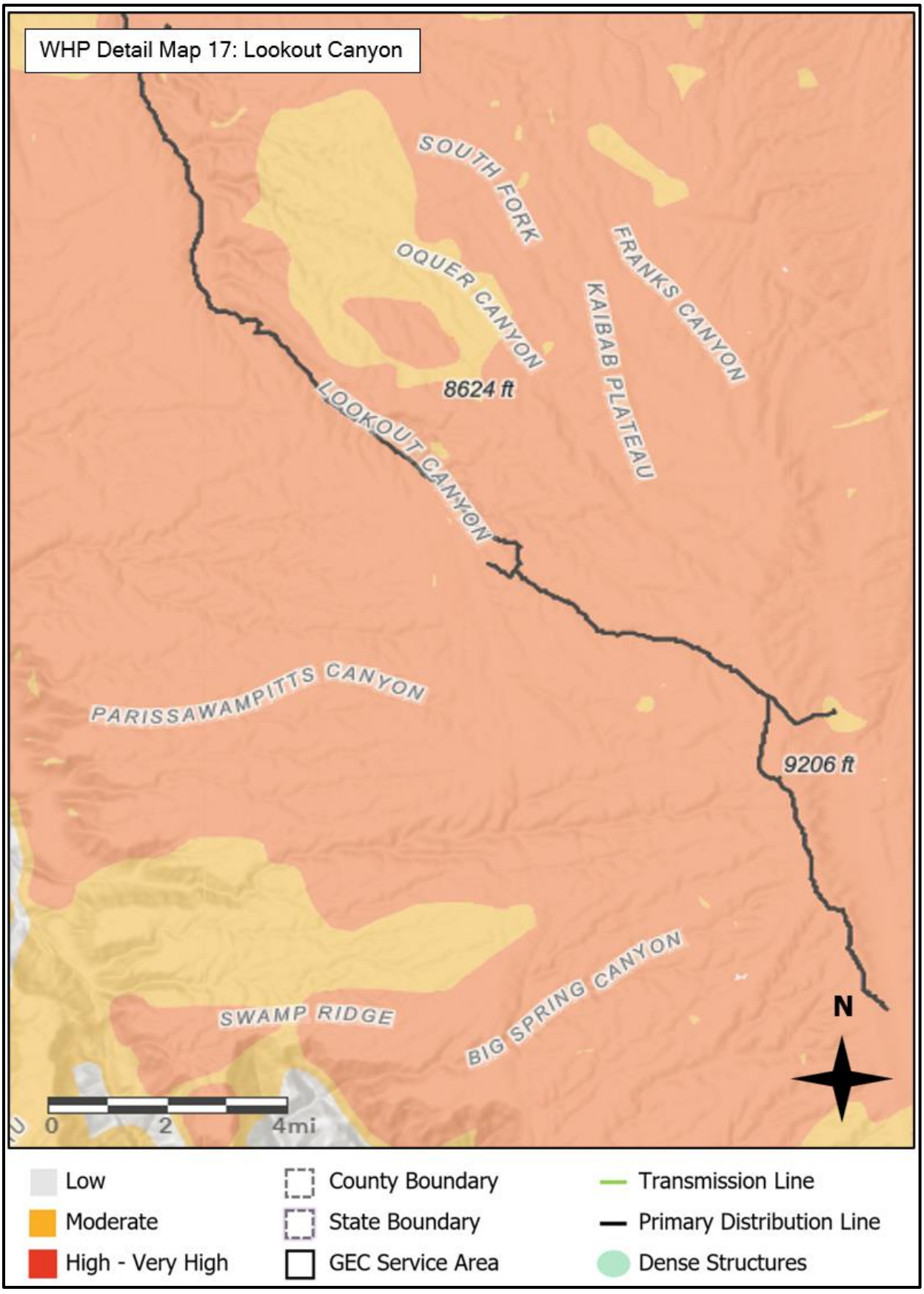

WHP Detail Map 12: Boulder, Salt Gulch
8900 ft
Bear Creek
Sweetwater Creek
USFS Road 165
Terrace Canal
N Highway 12
Boulder Creek
NAZER DRAW
SIDE HOLLOW
ORMAND POINT
Sweetwater Creek
BIG HOLLOW
7319 ft
MOUNT OGDEN
7696 ft
Boulder Creek
PRETTY TREE BENCH
Wells Backbone Rd
N
Boulder
Boulder Creek
BALANCING ROCK
Sweetwater Cr
BIG HOLLOW
0
0.5
1mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures


WHP Detail Map 13: Antimony, Johns Valley Road
Antimony
S Black Canyon Rd
7218 ft
ANTIMONY BENCH
Antimony Creek
Antimony Creek
Antimony Creek
Poison Creek
Poison Creek
Poison Creek
Pine Creek
N Highway 22
N Highway 22
N
0
0.5
1mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures


WHP Detail Map 14: Sigurd, Bear Ridge, Koosharem Reservoir
7976 ft
N Highway
N Highway 89
Canal
field
Glenwood
Sevier River
KINGS MEADOW CANYON
Lost Creek
Sevier
Annabella
SEVIER PLATEAU
PLATEAU VALLEY
BOOBE HOLE MOUNTAIN
DANIELS CANYON
FISH LAKE HIGHTOP PLATEAU
GLENNWOOD MOUNTAIN
COVE MOUNTAIN
11250 ft
Monroe Creek
Burrville
11220 ft
Lakeside Resort
Koosharem
N
State Route 62
Otter Creek
State Route 24
0
2
4mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures


WHP Detail Map 15: Bicknell, Teasdale, Torrey, Birch Creek
8939 ft
9299 ft
7848 ft
Shingle Mill Cr
EAST FORK RED CANYON
Sand Creek
Sulphur Creek
COOKS MESA
HOLT DRAW
Bicknell
Tub Ditch
Fremont River
W Main St
BICKNELL BOTTOMS
TEASDALE BENCH
Torrey
CALF CANYON
E Highway 24
Pine Creek
Government Creek
BLACK RIDGE
Teasdale
Fremont River
Coleman Reservoir
Donkey Creek
COOKS COMB
Fish Creek
FISH CREEK COVE
BOBS HOLE
Grover
GOVERNMENT POINT
COOK PASTURE
PINE CREEK COVE
Solitaire Lake
HICKMAN PASTURE
DONKEY POINT
N
0 1 2mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures


WHP Detail Map 16: Ryan, Castle Canyon, Jacob Lake
6047 ft
7651 ft
JACOB CANYON
JACOB CANYON
JACOB CANYON
EFEVRE CANYON
COOPER RIDGE
Jacob
SUICIDE RIDGE
BUCK RIDGE POINT
BUCK RIDGE
WARM SPRINGS CANYON
Ryan
NAIL CANYON
Big Springs
NORTH FORK
FRACAS CANYON
NORTH FORK
CASTLE CANYON
7254 ft
8285 ft
MOQUITCH CANYON
MOQUITCH POINT
BIG SPRINGS POINT
CASTLE CANYON
NORTH FORK
MOQUITCH CANYON
N
0
1
2mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures


WHP Detail Map 17: Lookout Canyon
SOUTH FORK
OQUER CANYON
FRANKS CANYON
KAIBAB PLATEAU
8624 ft
LOOKOUT CANYON
PARISSAWAMPITTS CANYON
9206 ft
SWAMP RIDGE
BIG SPRING CANYON
N
0
2
4mi
Low
Moderate
High - Very High
County Boundary
State Boundary
GEC Service Area
Transmission Line
Primary Distribution Line
Dense Structures