



Gulkana

Community Wildfire Protection Plan

Prepared by Scott Yeats and Jonathan Haufler
Ecosystem Management Research Institute
And Jeffrey Hermanns Forest Solutions.

Edited by Jason Hoke, Ahtna Inter-Tribal Resource Commission

October 2017

CONTENTS

EXECUTIVE SUMMARY	II
GULKANA RISK ASSESSMENT.....	III
COLLABORATION	5
GULKANA CWPP PLANNING AREA	6
COMMUNITY PROFILE	6
COMMUNITY OF GULKANA	6
WUI BOUNDARY.....	6
LOCATION AND GEOGRAPHIC LOCATION.....	7
POPULATION, DEMOGRAPHICS.....	7
NATURAL FIRE BREAKS	9
COMMUNITY RISK ASSESSMENT.....	11
GULKANA SUMMARIZED RISK ASSESSMENT	11
GULKANA ACTION PLAN	15
PRIORITIZED TASKS AND MATRIX OF MITIGATION MEASURES.....	15
SUMMARY	19
APPENDIX A – DETAILED TREATMENT MAPS AND PLOD MAPS.....	20
<i>High and Moderate Risk Fuels</i>	<i>25</i>
APPENDIX B – COPPER RIVER VALLEY HISTORICAL FIRE INFORMATION: 2012-2017	27
APPENDIX C – RISK EVALUATION METHODS, FUEL LOADING HAZARDS	32
RISK EVALUATION: IDENTIFYING AREAS OF GREATEST THREAT	33
STRUCTURE DENSITIES AND EVACUATION ROUTES	35
<i>Wildland-Urban Interface.....</i>	<i>35</i>
CUMULATIVE EFFECTS – FINAL RISK ASSESSMENT	37
WATER QUALITY AND WATERSHEDS	37
AIR QUALITY.....	37



Figure ES-1 XXXXX. Photo Credit: T. Cambell.

Executive Summary

The Gulkana Community Wildfire Protection Plan (Gulkana CWPP) is a collaborative effort between Ahtna, AITRC, Native Village of Gulkana, the State of Alaska DNR Forestry, BLM and the National Park Service. This CWPP attempts to fully understand the risk of wildfire on the Gulkana community and appropriately mitigate future wildfire hazards. In order to accomplish this, a thorough analysis and risk assessment was conducted regarding Gulkana village values, current and future community development, and surrounding land use.

This CWPP will:

- Assess the risk posed by wildfire to the community of Gulkana;
- Identify local values of concern;
- Identify local fire protection response and capabilities as well as natural and man made barriers; and
- Develop mitigation measures designed to protect identified values from the threat of wildfire.

Gulkana is vulnerable to catastrophic wildfire due to a nearly uninterrupted timber stand of white and black spruce that encompasses the entire community. Frequent thunderstorms and associated lightning

strikes in and around the community are a constant cause for wildfire concern during the peak lightning season in May, June and July. An even greater threat is posed by human-caused fires in the local area. However, wildfire destruction is preventable if the correct protective steps are taken. After the CWPP Risk Assessment and the corresponding tasks are put into effect, mitigating wildfire risk can begin in a cohesive, focused and prioritized manner.

Gulkana Risk Assessment

The following is the list of highest to lowest risk for the Village of Gulkana. In addition Figure ES-2 provides a generalized map of wildfire risk within the planning area.

1. **Lack of Defensible Space for some private homes and structures.** Also review of each home and structure construction and physical properties needs to take place. Additionally, other items stored around the homes such snow machines and vehicles that do not run are very problematic for fires in the urban interface. They immensely hinder firefighting efforts and are a significant health risk and danger to the firefighter and residents making suppression efforts just not possible do to risk at times.
2. **Insufficient clearing of hazardous forest fuels for egress and ingress on the only main road leading in from the Glenn Highway.** This road would not be open for travel including evacuation during a wildfire. This also could block off response from wildfire response by engines, tenders and personnel.
3. **No community safety zone with shelter.** The community center is located with islands and stands of hazardous forest fuels in the close proximity to the structure and should not be considered to be a safety zone or a safe evacuation location during a significant wildfire event in Gulkana.
4. **Electricity lines and infrastructure could be lost very soon after a significant wildfire event begins due to the volume and proximity of hazardous forest fuels.** (Copper River Electric) cuts power as soon as lines are threatened to provide safety for the system and emergency responders.) The result is no power to home and a loss of any ability to use well water from loss of power to the pump. Few homeowners have any backup power generators. Near total loss of electrical lines and poles which could result in loss of power for weeks.
5. **Little to no firefighting equipment and personnel in the village for initial response to a wildfire.** The IA response with equipment and personnel will be the Gulkana VFD just a couple miles and minutes away. State of Alaska DOF response time for engines and personnel from Copper Center is 25 minutes if they are available and not on another fire response. Without proper response during conditions of high fire danger, the fire could quickly grow with little hope of containment before significant destruction would occur.
6. **No evacuation and emergency response plan for a large fire in or adjacent to the village.**
7. **Fuel loading around village.** There are stands of spruce in and around the parameter of the village that have been cleared of ground fuel and ladder fuels but were not thinned and are susceptible to a wind driven crown fire.

8. **The volume and congestion of hazardous forest fuels immediately surrounding the village.** The congestion of continuous heavy to extreme fuel loading could result in extreme fire behavior and the loss of some homes and structures and values in the village.
9. **The volume and congestion of hazardous forest fuels within ½ mile of the village.**

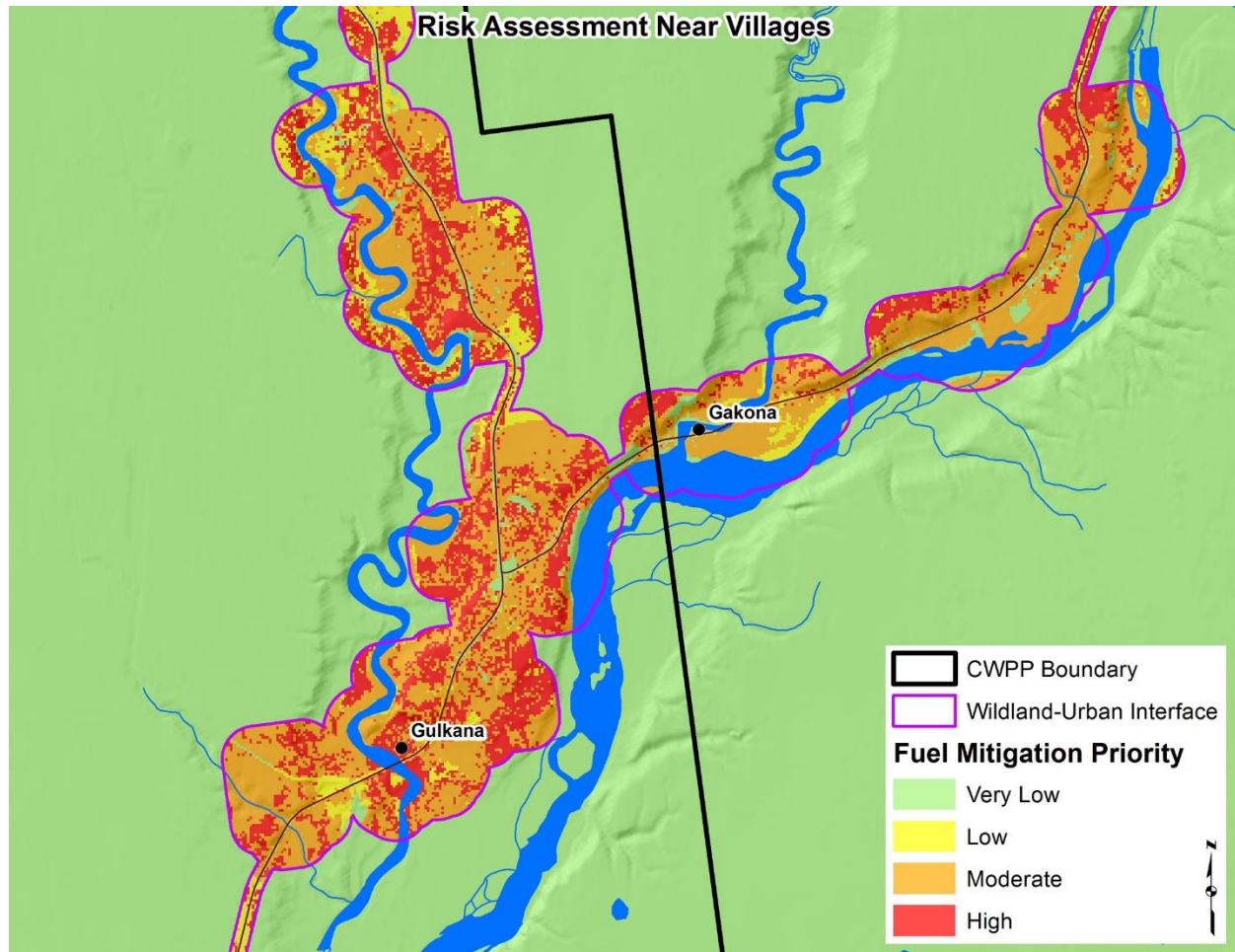


Figure ES-2. Close up of Risk Assessment and WUI Boundary Surrounding Gulkana, Alaska

Collaboration

The Gulkana Community Wildfire Protection Plan (Gakona CWPP) is a collaborative effort between Ahtna, AITRC, Native Village of Gulkana, the State of Alaska DNR Forestry, BLM and the National Park Service. Receiving input from all entities will ensure a smooth transition and continuation of this CWPP. The CWPP will only succeed if a collaborative effort is implemented. There are many entities that have a vested interest in the success of this plan:

Gulkana Village – The involvement of the Gulkana community and their willingness to invite other parties to work together to identify the risks, issues and challenges of adopting this plan is crucial. Prioritizing and identifying tasks and items required to mitigate each risk will require community involvement and teamwork with other stakeholders.

Ahtna – As the land owner and the regional corporation for the village Ahtna shares a large burden of responsibility for the village. Ahtna will be very key to the future implementation of the plan and long-term monitoring of the work completed.

Ahtna Intertribal Resource Commission (AITRC) – As a lead advocate for the Ahtna Region villages AITRC has a front seat in the CWPP. They applied and received funding to complete this CWPP process and plan. They also have applied for implementation WUI grants for the action items of the plan. AITRC will also be involved in finding solutions such as funds to complete biomass projects and the monitoring of the work completed.

State of Alaska Division of Forestry (DOF) – DOF acts as the lead agency for fire suppression in the Copper River Basin. DOF has a mission to prevent and suppress wildfires in compliance with the Alaska Fire Plan. DOF has the equipment and trained personnel to contribute to the future success of this CWPP.

Local VFD – Gakona VFD responds to fires in the area, and is a valuable local interest with an important role in wildfire mitigation efforts.

BLM – The BLM is responsible for fire suppression administration (not directly for suppression) of the native lands in the region, including changes to the fire plan and funding fire suppression efforts on native lands. The BLM FMO and supporting staff have expertise and resources to lend to the CWPP effort.

National Park Service NPS (Wrangell Saint Elias) - With the world's largest national park system on the doorstep of the village the NPS has an important role to play in the surrounding communities. They have a fire staff of FMO and AFMO with extensive experience to lend to the plan.

Gulkana CWPP Planning Area

The Gulkana Planning Area is located in the Copper Basin of Alaska and represents a land area of approximately 270,781 acres or 423 mi². The Fire Plan boundary spans 18 miles from north to south and 18 miles from east to west. Figure 1 identifies the actual boundary of the Fire Plan within the state of Alaska. The primary community within the Fire Plan region is Gulkana, near the junction of the Gulkana and Copper Rivers.

Community Profile

Community of Gulkana

Gulkana Village is an Ahtna Athabascan Native village located in east central Alaska, on the east bank of the Gulkana River near its confluence with the Copper River. Bordered by both rivers, Gulkana is located 14 miles north of Glennallen at milepost 127 on the Richardson Highway. Ahtna Athabascans have lived in the Copper River basin for 5,000 to 7,000 years.

Until the mid- to late- nineteenth century, most of Ahtna people lived a semi-nomadic lifestyle. They traveled seasonally, following wild game throughout the region to sustain them, harvesting berries and other wild plants, and caching salmon and other non-salmon fishes as they went. The Ahtna semi-nomadic lifestyle continued into the late nineteenth century, when they began to settle into villages scattered throughout what is now known as the Ahtna Region. The Ahtna Region is a geographic area ranging from the Alaska Range to the northwest, the Wrangell-St. Elias mountain ranges to the west, the Chugach Mountains to the south, and the Talkeetna Mountains to the west. This area includes large portions land owned by the federal and state governments, and Alaska Native corporations. While the Ahtna Region is highway-accessible and fairly modernized, the Ahtna people continue to practice a customary and traditional lifestyle whenever possible. The Ahtna culture, values, and vision are inextricably tied to subsistence resources and support cultural customs and traditions that have existed for thousands of years.

WUI Boundary

The wildland-urban interface is frequently defined as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.” The WUI boundary was determined by the 100 meter buffer on the major highways and a 400 meter buffer of private parcels that contained a structure and were near the highway corridor. Single structures that occurred long distances from existing infrastructure were not included in the WUI delineation. Refer to Figure 6 and 7 for WUI within the Gulkana planning area.

Location and Geographic Location

Gulkana is located at 62°14'25"N 145°25'22"W (62.240213, -145.422883). Gulkana is located 14 miles north of Glennallen at milepost 127 on the Richardson Highway.

Population, Demographics

Table 1 represents the estimated population of the Fire Plan area according to data acquired by the U.S. Census Bureau in 2010. While the census area boundaries did not precisely represent the Fire Plan boundaries, the data presented are believed to generally reflect the population estimates. Additional information is provided on housing units and types of occupancy to illustrate the level of seasonal, recreational, or occasional use within the planning area. Figure 2 displays land ownership within the Gulkana Fire Plan area.

Table 1. Estimated Population of the Fire Plan Area (Source: U.S. Census Bureau, 2010).

Gulkana	
Population	
Year-round occupants	119
Total Housing Units	
Occupied year-round	37
Seasonal, recreational or occasional use	5
Vacant	18
Total	60

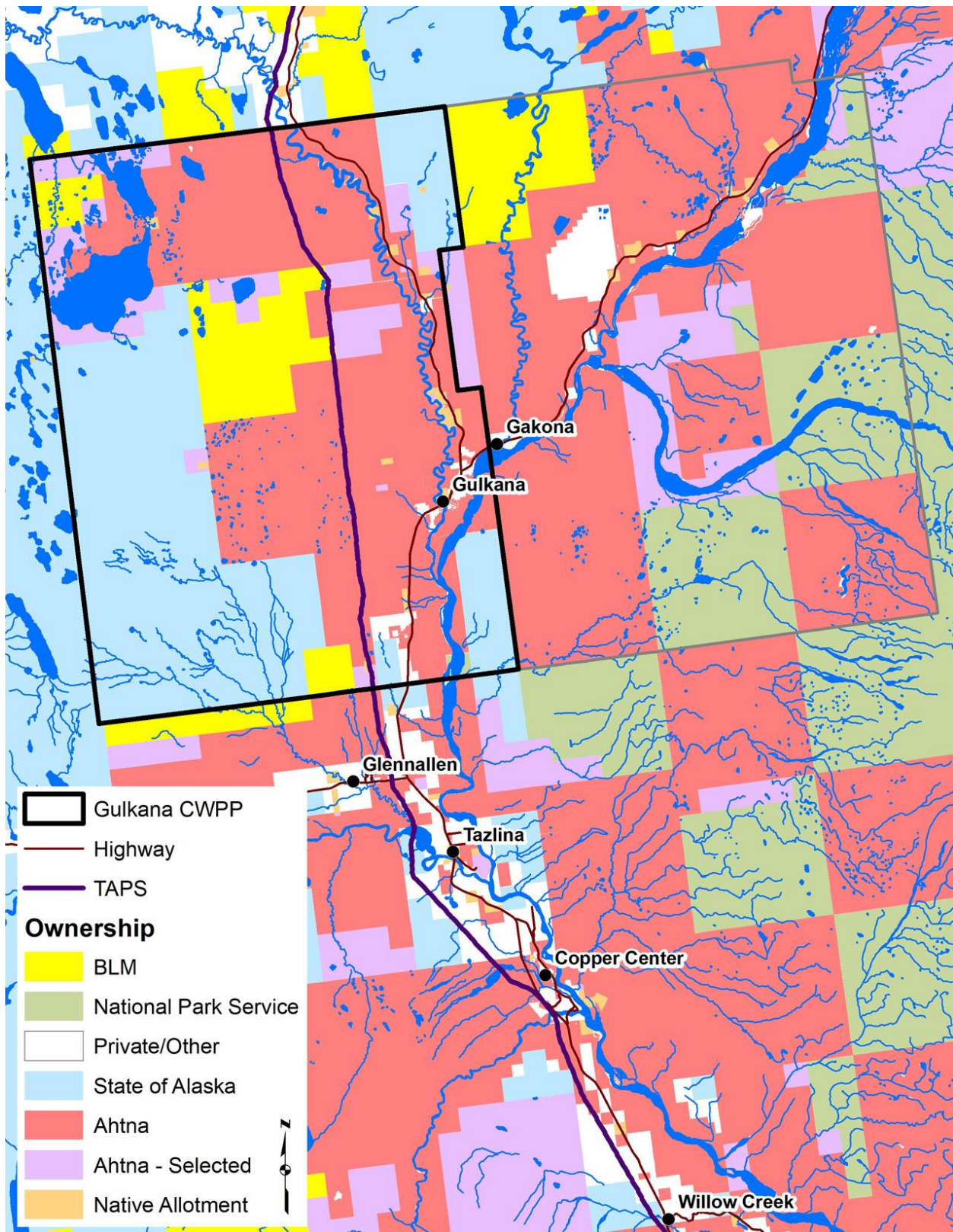


Figure 1. Land Ownership, Infrastructure, Primary Lakes, and Streams in the Fire Plan Area.

Figure 4. Existing vegetation types in the Gakona Fire Plan area. Mapping was done by Michael Fleming and is hosted by the Geographic Information Network of Alaska.

One of the outcomes of this CWPP is to disturb the heavy thick layer of moss along the forest floor, which will warm the ground through exposing the soil bed. This will initiate seeding of the forest floor and stimulate the coppice sprouting of hardwoods, thereby replacing the fire explosive black and white spruce. This is a stand conversion of the forest. Opening up the predominate spruce timber stand canopy and allowing sunlight to the ground level will induce a partial to full stand conversion depending on the individual site and the desired outcome. In many stands, white spruce will be selected by tree health and size to leave in islands of trees. The site will regenerate with aspen, poplar, cottonwood and willow seeding and coppice release sprouting. The ground must be disturbed with scarification to achieve these results. The stand conversion will assure a fire resilient hardwood and willow forest for at least 30 to 60 years and much longer with routine fuel maintenance.

Natural Fire Breaks

The occurrence of the Copper, Gulkana, and Gakona Rivers along with several large lakes represents the primary natural firebreaks within the Fire Plan area. In addition, Alaska Routes 1 and 4 may act as firebreaks during mild to moderate weather conditions. However, it is important to note that under more extreme or critical weather conditions (i.e., high temperatures, low humidity, and moderate to high winds), burning embers can be carried long distances and ignite fires on the other side of natural firebreaks.

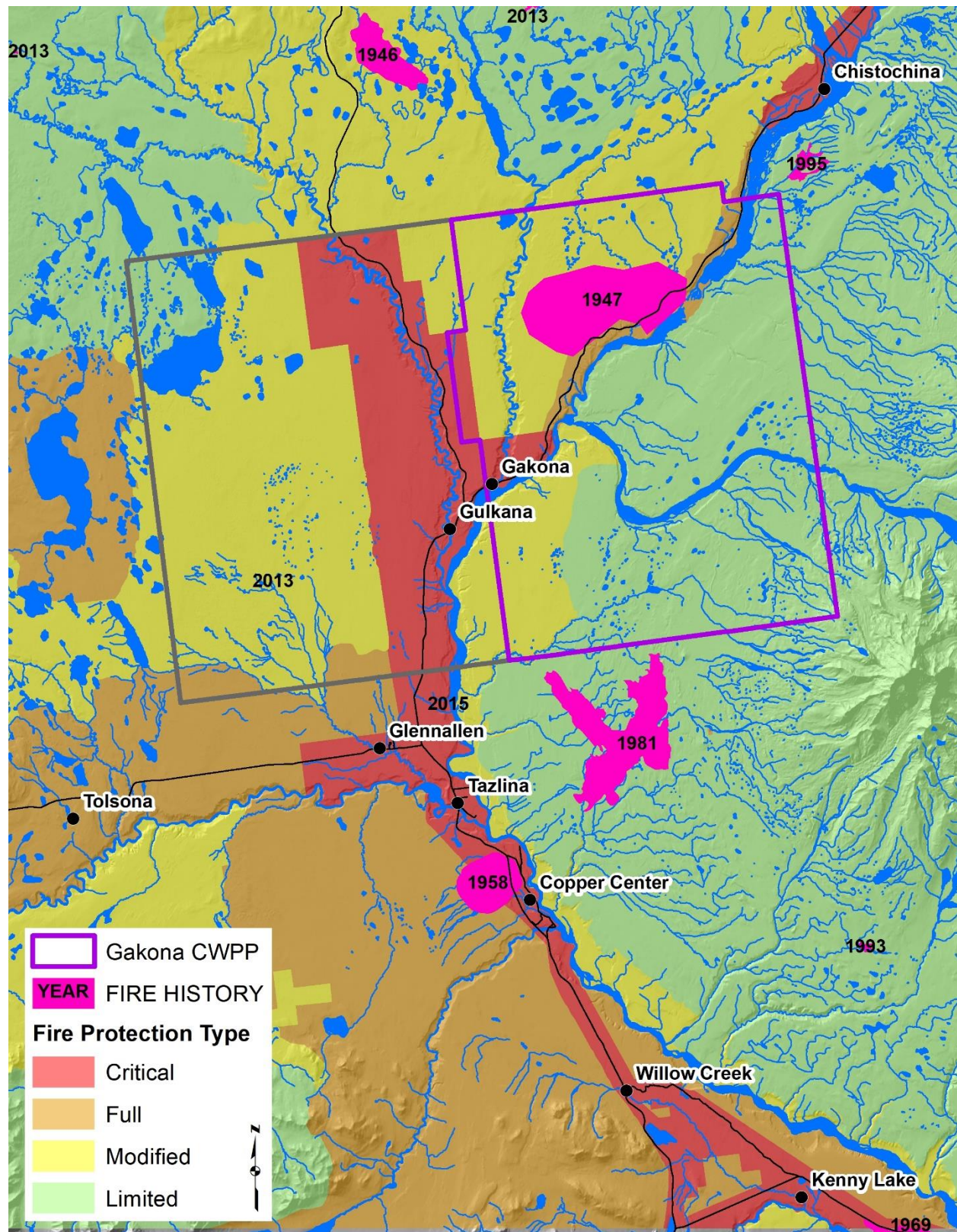


Figure 6: Fire Protection Type and Fire History in the Gulkana Fire Plan Area

Community Risk Assessment

The following is a detailed list of highest to lowest risks contributing to wildfire threat level for the Village of Gulkana. Figure 7 and Figure 8 show wildfire risk within the CWPP planning area and community WUI boundary. Risk assessment methods are detailed in Appendix D.

Gulkana Summarized Risk Assessment

The following is the list of highest to lowest risk for the Village of Gulkana.

1. **Lack of Defensible Space for some private homes and structures.** This is twofold; first is the hazardous forest fuels in close proximity to the home which threatens the survival of the home, second is the large amount of abandon or dead vehicles, snow machines, construction materials and other type debris surrounding many homes. This is a large threat to the survival of the home when on fire and is also toxic and hazardous to the responding firefighters and residents. It also immensely hinders firefighting efforts and can make the job of defending the home almost impossible due to severe danger in an emergency situation. A specific defensible space recommendation given the fuels and situation is discussed in this plan.
2. **Insufficient clearing for ingress and egress along most roads including the Glenn Highway.** These access points may not be open for travel including evacuation during a wildfire and could block response efforts by wildfire response by engines, tenders and personnel.
3. **No community safety zone with shelter.** The community center is located with islands and stands of hazardous forest fuels in the close proximity to the structure and should not be considered to be a safety zone or a safe evacuation location during a significant wildfire event in Gulkana.
4. **Loss of electricity post wildfire event.** Electricity lines and infrastructure could be lost very soon after a significant wildfire event begins due to the volume and proximity of hazardous forest fuels. (Copper River Electric) cuts power as soon as lines are threatened to provide safety for the system and emergency responders.) The result is no power to home and a loss of any ability to use well water from loss of power to the pump. Few homeowners have any backup power generators. Near total loss of electrical lines and poles which could result in loss of power for weeks.
5. **Little to no firefighting equipment and personnel in the village for initial response to a wildfire.** The IA response with equipment and personnel will be the Gakona VFD just a couple miles and minutes away. State of Alaska DOF response time for engines and personnel from Copper Center is 25 minutes if they are available and not on another fire response. Without proper response during conditions of high fire danger, the fire could quickly grow with little hope of containment before significant destruction would occur.
6. **No evacuation and emergency response plan for a large fire in or adjacent to the village.**

7. **The volume and congestion of hazardous forest fuels throughout and immediately surrounding the village.** The congestion of continuous heavy to extreme fuel loading could result in extreme fire behavior and the loss of the majority of homes and structures and values in the village.
8. **The volume and congestion of hazardous forest fuels within ½ mile of the village.**
9. **Maintaining a sustainable approach to fuel reduction and community independence.** Fuels around the area may be used after fuel reduction products as a sustainable option to oil-based heat and power in the community.

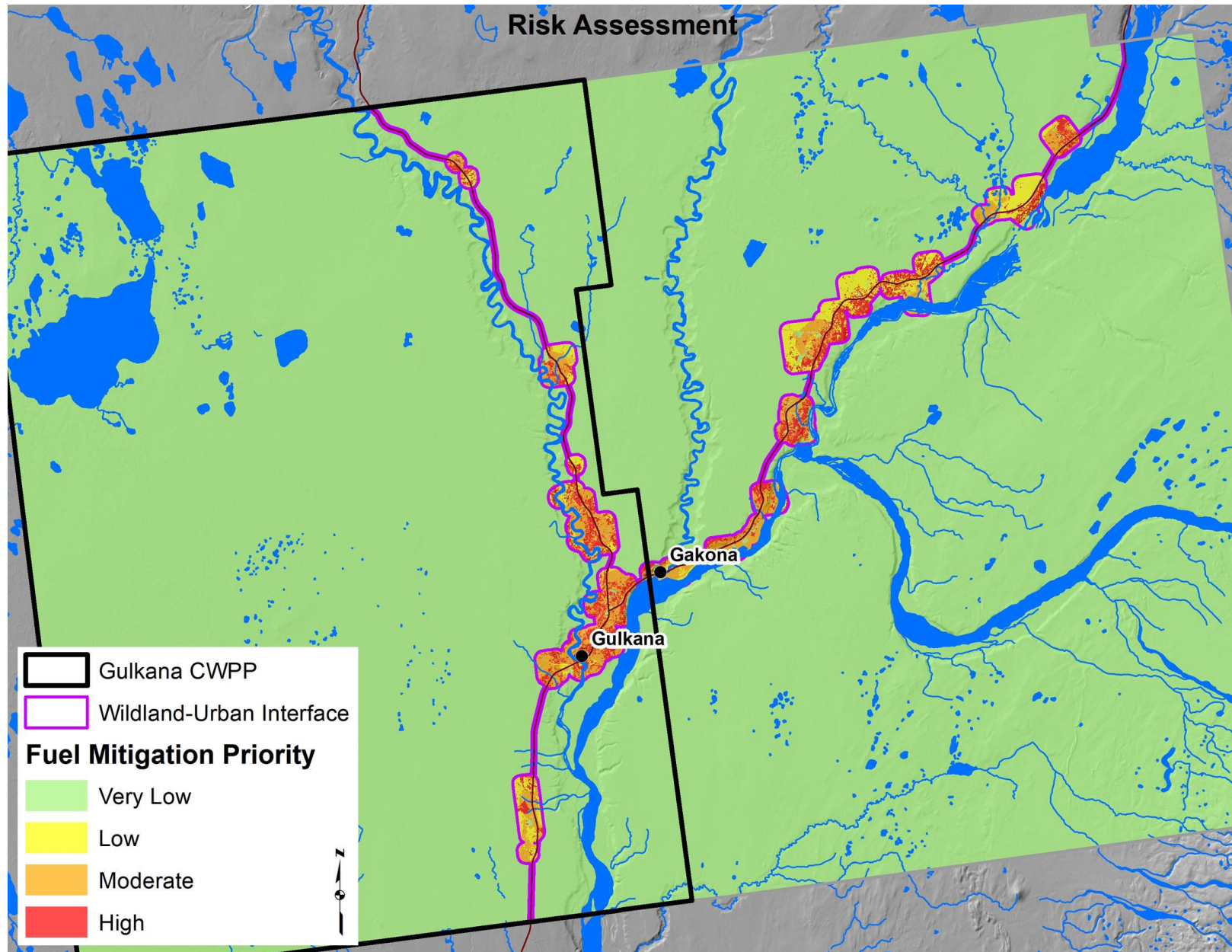


Figure 7. Fuels Risk Assessment, WUI Boundary, and CWPP Planning Area Boundary for Gulkana.

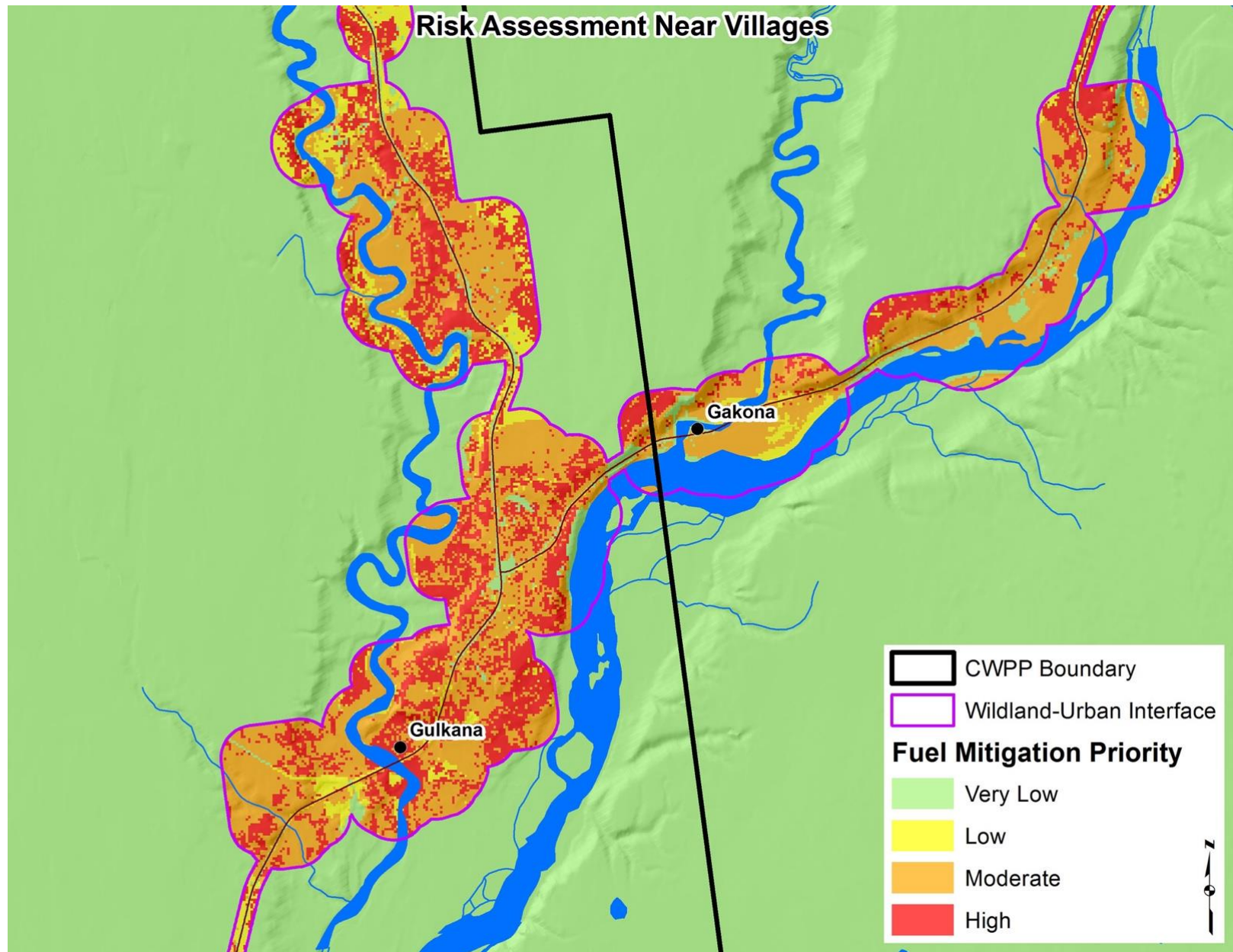


Figure 8. Close up of risk assessment and WUI boundary surrounding areas of Gakona and Gulkana.

Gulkana Action Plan

Prioritized Tasks and Matrix of Mitigation Measures

The following is the list of highest to lowest risk for the Village of Gulkana.

1. Lack of Defensible Space for many private homes and structures. This is twofold, first is the hazardous forest fuels in close proximity to the home that threatens the survival of the home. Second is the large amount of abandon or dead vehicles, snow machines, construction materials and other type debris with many homes. This is a large threat to the survival of the home when on fire, it is also very toxic and very hazardous to the responding firefighters and residents. This can immensely hinder the firefighting efforts and make the job of defending the home almost impossible do to the severe danger in an emergency situation. Also review of each home and structure construction and physical properties needs to take place to assess the survivability.
2. Insufficient clearing of hazardous forest fuels for egress and ingress on the only main road leading in from the Glenn Highway. This road would not be open for travel including evacuation during a wildfire. This also could block off response from wildfire response by engines, tenders and personnel.
3. No community safety zone with shelter. The community center is located with islands and stands of hazardous forest fuels in the close proximity to the structure and should not be considered to be a safety zone or a safe evacuation location during a significant wildfire event in Gulkana.
4. Electricity lines and infrastructure could be lost very soon after a significant wildfire event begins due to the volume and proximity of hazardous forest fuels. (Copper River Electric) cuts power as soon as lines are threatened to provide safety for the system and emergency responders.) The result is no power to home and a loss of any ability to use well water from loss of power to the pump. Few homeowners have any backup power generators. Near total loss of electrical lines and poles which could result in loss of power for weeks.
5. Lack of D-Space around the water treatment facility.
6. Little to no firefighting equipment and personnel in the village for initial response to a wildfire, they do not have a fire engine or VFD. The IA will come from Gakona VFD with engines and personnel in 10 to 20 minutes. The response time for engines and personnel from DOF Copper Center is 25 minutes if they are available and not on another fire response. During conditions of high fire danger, an insufficient IA of a fire could quickly grow with little hope of containment before significant destruction would occur.
7. No evacuation and emergency response plan for a large fire in or adjacent to the village.
8. The volume and congestion of hazardous forest fuels within the village.
9. The volume and congestion of hazardous forest fuels immediately surrounding the village within 300. The congestion of continuous heavy to extreme fuel loading could result in extreme fire behavior and the loss of some homes and structures and values in the village.
10. The volume and congestion of hazardous forest fuels within ½ mile of the village.

11. Hazardous fuels with 600 feet of wood pellet and log decks.
12. The pellet mill has no fire suppression system and no water and fire equipment outside. If this facility caught on fire in high fire danger it could easily spread to the spruce fuels and log decks and possibly threaten the village.

The following, Table 4: Gulkana CWPP Task Matrix, identifies solutions for each risk/concern listed in the previous section, proposed tasks to be completed to ensure proper risk mitigation, and potential entities that may address these tasks.

Table 4. Gulkana CWPP Task Matrix.

Gulkana CWPP Task Matrix		
Risk	Associated Tasks	Contacts/Responsible Entities
1. Lack of defensible space (including organic fuels, materials, household debris) for several private homes, structures and public structures.	<ol style="list-style-type: none"> 1. Conduct home and structure assessments on every home and structure willing to participate. 2. Conduct training with key village residents how to do home and structure assessment for defensible space, and work with the residents to understand how to improve the survivability of their homes. 3. Develop a community fuel depot where hazardous fuels removed by home owners and or community fuel reduction and removal programs can be placed and burned by DOF or VFD during safe burning periods. This has proven to be very helpful and successful in other communities. 4. Complete a hazardous materials clean up project on homes/structures within the planning area. 5. Apply for grant program and funding for a village cleanup project for removal of hazards materials such as abandon vehicles, snow machines, household debris, and other than hazardous forest fuels that will threaten both village residents and responding firefighters. 	Village administrator, AITRC's contract forester , grant applied for funding if successful would be available June 2018. Ahtna Land manager for approval of land use activities.

2. Insufficient clearing for egress and ingress on most roads including the Glenn Highway.	1. Apply for WUI grant for Defensible Space work to be completed. 2. Apply for BIA funds to complete fuels reduction/defensible space work. 3. Initiate contact with AK DOT for highway clearing along DOT maintained roadways. 4. Complete the Safe Passage Egress and Ingress project by removing hazardous forest fuels from identified roads imperative for safe travel during an emergency.	Village administrator, AITRC, AITRC contract forester, Ahtna Land Manager, AKDOT
3. No community safety zone with shelter.	1. Complete the Community Safety Zone and Evacuation Center Project by removing hazardous forest fuels from identified units around the community center.	Village administrator, AITRC, AITRC contract forester, Ahtna Land Manager, AKDOT,
4. Communication tower not safe from wildfire.	1. Contact AK State Communication for clearing the Communication Tower of hazardous fuels and debris. 2. Complete the Communication Tower Safety Zone Project by removal of hazardous forest fuels within 300 feet of the tower and guylines.	Village administrator, AITRC, AITRC contract forester, Ahtna Land Manager, AK ETS, AK DOF, Cell Phone Company
5. Loss of electricity lines and infrastructure post-significant wildfire event.	1. Complete the Gulkana Safe Power Project by removal of hazardous forest fuels from within 100 feet of the poles and line and all other power infrastructure.	Village Administrator, AITRC, AITRC contract forester, Ahtna Land Manager, Alaska Power & Telephone
6. Minimal firefighting equipment and personnel in the village for initial response to a wildfire.	1. Develop a Gulkana wildfire response program with local commitment, training, equipment and coordination with State of Alaska Copper River DOF office; included but not limited to: fire extinguisher, fedcos, hand tools, fire engine, pumps and hose. 2. Create a community watch program for fire and burning activities. 3. Strengthen local prevention programs in coordination with Copper River DOF.	Village Administrator, AITRC, AITRC contract forester, DOF, State Fire Marshals Office
7. No evacuation and emergency response plan for a large fire in or adjacent to the village.	1. Develop and implement a Gulkana emergency response plan using community, DOF collaborative group input. 2. Ensure the emergency response plan is easily accessible by community members and emergency personnel.	Village Administrator, AITRC, AITRC Contract Forester, DOF, VFD, Cooperators, AP&T, State DHS

8. The volume and congestion of hazardous forest fuels throughout and immediately surrounding the village.	1. Complete the Gulkana Safe Village Phase #1 hazardous forest fuels from with 150 feet of values of risk in identified Hazardous Fuels Units. 2. Complete the Gulkana Safe Village Phase #2 hazardous forest fuels the next 150 feet out from Phase #1 project in identified Hazardous Fuels Units. 3. Complete the Gulkana Safe Village Phase #3 hazardous forest fuels the next 300 feet out from Phase #2 project in identified Hazardous Fuels Units.	Village Administrator, AITRC, AITRC Contract Forester, NRCS, Ahtna Land Manager
9. Little to no outreach and fire education programs in place.	1. Conduct educational meetings for the community on the CWPP, emphasizing the importance of completing defensible space, emergency and evacuation plans, fire suppression responses and fire prevention with support and cooperation with Copper River DOF. 2. Develop safe burning practices and burn-barrel exchanges 3. Conduct yearly fire-prevention educational sessions in local schools.	Village Administrator, AITRC, AITRC Contract Forester, DOF, VFD, Cooperators, AP&T, State DHS
10. Maintaining a sustainable approach to fuel reduction and community independence.	1. Develop local business Hazardous Fuels Reduction removal capacity. 2. Complete the community center wood boiler project to begin heating the community with wood chips. 3. Develop an initiative to burn cordwood with new stoves and boilers instead of fuel oil. 4. Develop capacity and business to provide sustainable local wood products; including seasoned wood from completed fuel reduction projects to Copper River Basin and Valdez markets.	Village Administrator, AITRC, AITRC Contract Forester, NRCS, Ahtna Land Manager, SBA, AK Economic Development, REAP, US Department of Energy, Alaska Energy Authority

Summary

The community of Gulkana is in a difficult situation in regards to wildfire. It has a continuous hazardous fuel load that encompasses nearly the entire town and areas immediately surrounding it. This situation is conducive to a catastrophic wildfire that could threaten lives and property, possibly costing millions of dollars in damage. Lightning strikes are frequent during the summer months. Human caused fires are far more probable and typically occur during times when fire indices are at their highest. It is therefore widely recognized by the citizens of this community that given the right conditions, a destructive wildfire could occur that would quickly overwhelm firefighting capabilities. In light of this, the surest way to prepare for a wildfire of this magnitude is through fire prevention. Congress also recognizes this and has taken steps to correct the situation by enacting the Healthy Forests Restoration Act which directs communities at risk to develop a plan to address this issue. This fuel loading that has developed in Gulkana is neither healthy nor desirable, and the primary goal of this initiative is to reduce the fire danger to the community. Fuel reduction is by far the most effective way to protect Gulkana from a large scale destructive wildfire and return our forests to a healthier, more natural state. However, fuel reduction on the outskirts of Gulkana will not in itself solve the problem. A significant problem is the amount of fuel within the community itself. It is the intent of this plan to reduce fuel from inside the community, working outwards. High priority will be given to removing fuel around essential infrastructure such as communication towers, power lines, primary evacuation routes and centers, and around agencies responsible for conducting or assisting in firefighting efforts. While it is true that fuel reduction on the outskirts of town is important and necessary, reducing fuel on private property within the community is of greater importance; therefore it is imperative that members of the community become involved, especially during peak ignition days in summer. The most effective way for landowners to become involved is to incorporate FireWise measures into their home construction and landscaping; this includes fire resistant construction, improved ingress and egress, and fire resistant landscaping.

By all involved stakeholders considering adopting this CWPP for the community of Gulkana, the future wildfire risk will be mitigated, creating a safe, firewise community that is prepared for emergency response and evacuation and can independently manage hazard fuels that contribute greatly to this wildfire risk, strongly hindering the next wildfire catastrophe that may occur if no action is taken.

Appendix A – Detailed Treatment Maps and PLOD Maps

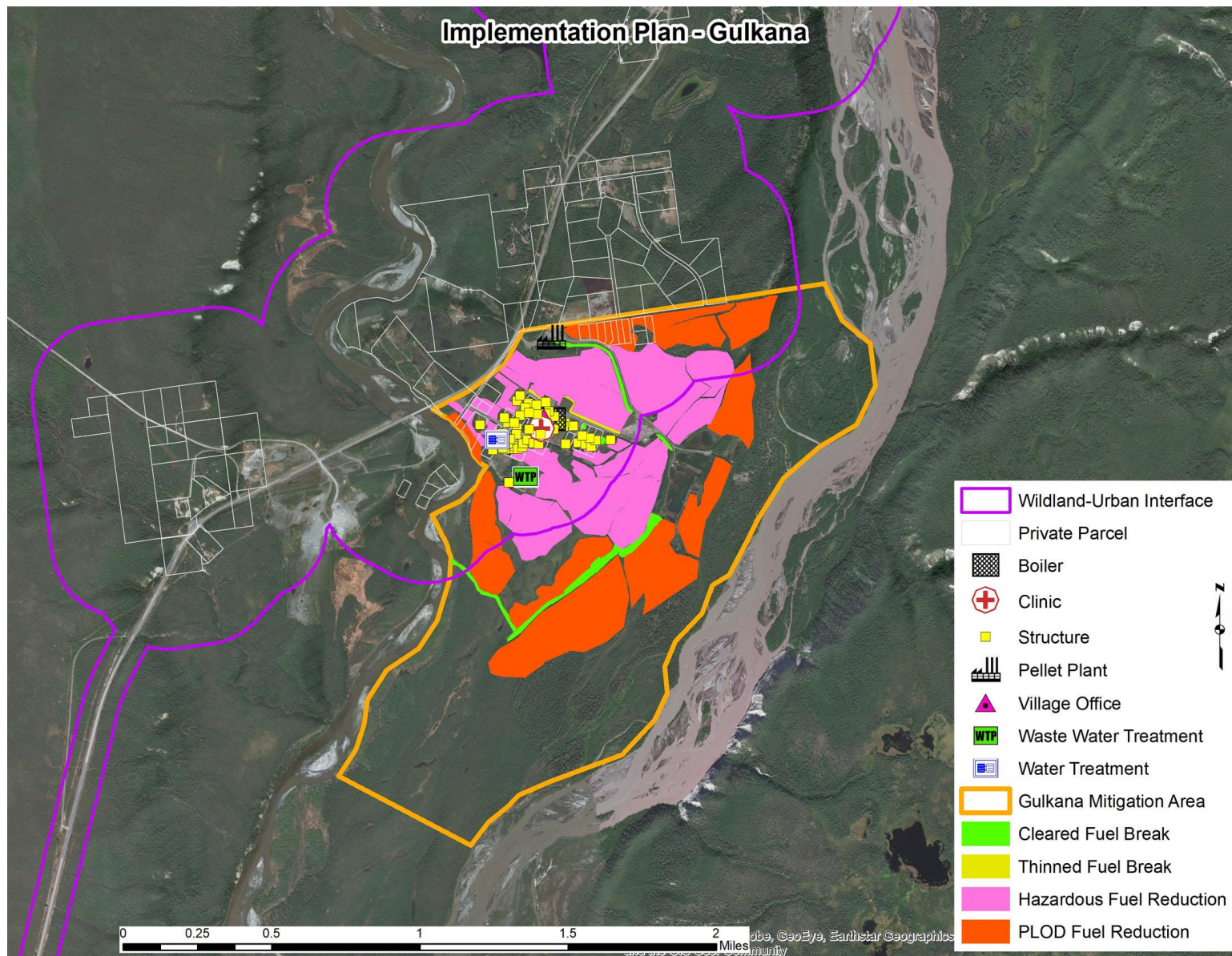


Figure B-1. Overview of Gulkana Village, structures, completed treatments, and proposed treatment areas.

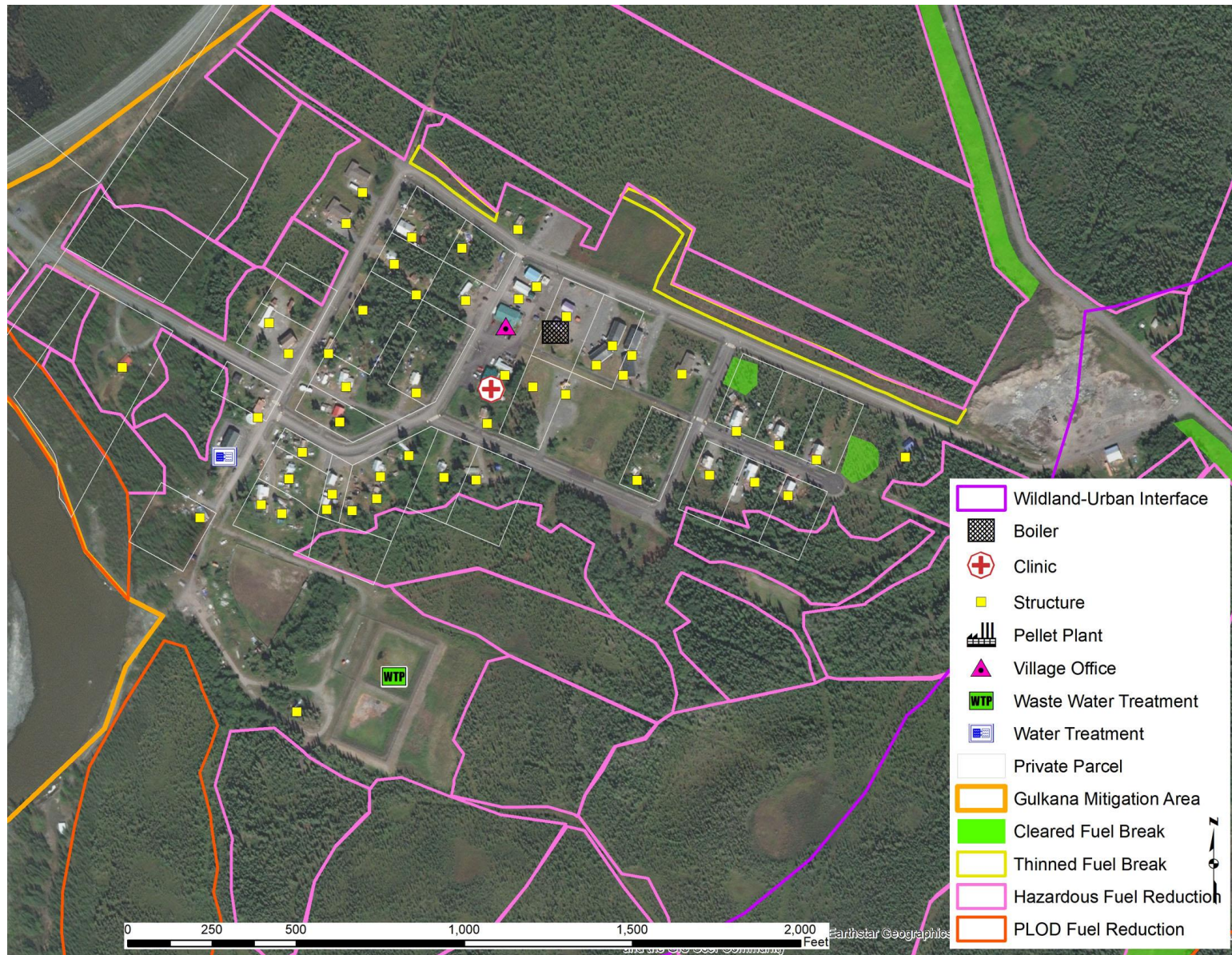


Figure B-2. Gulkana Village showing detailed implementation plan.

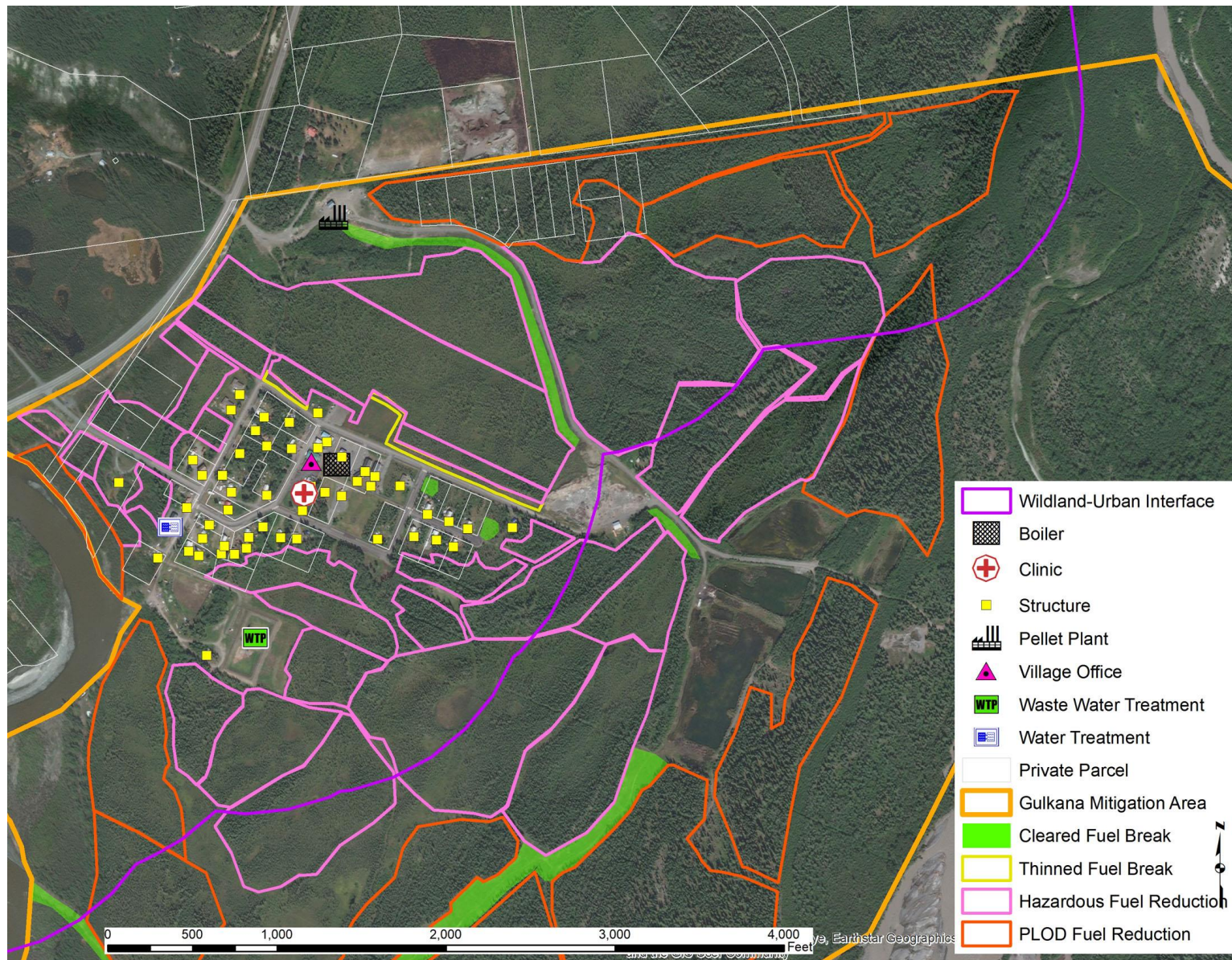


Figure B-3. Northern half of Gulkana Village showing detailed implementation plan.

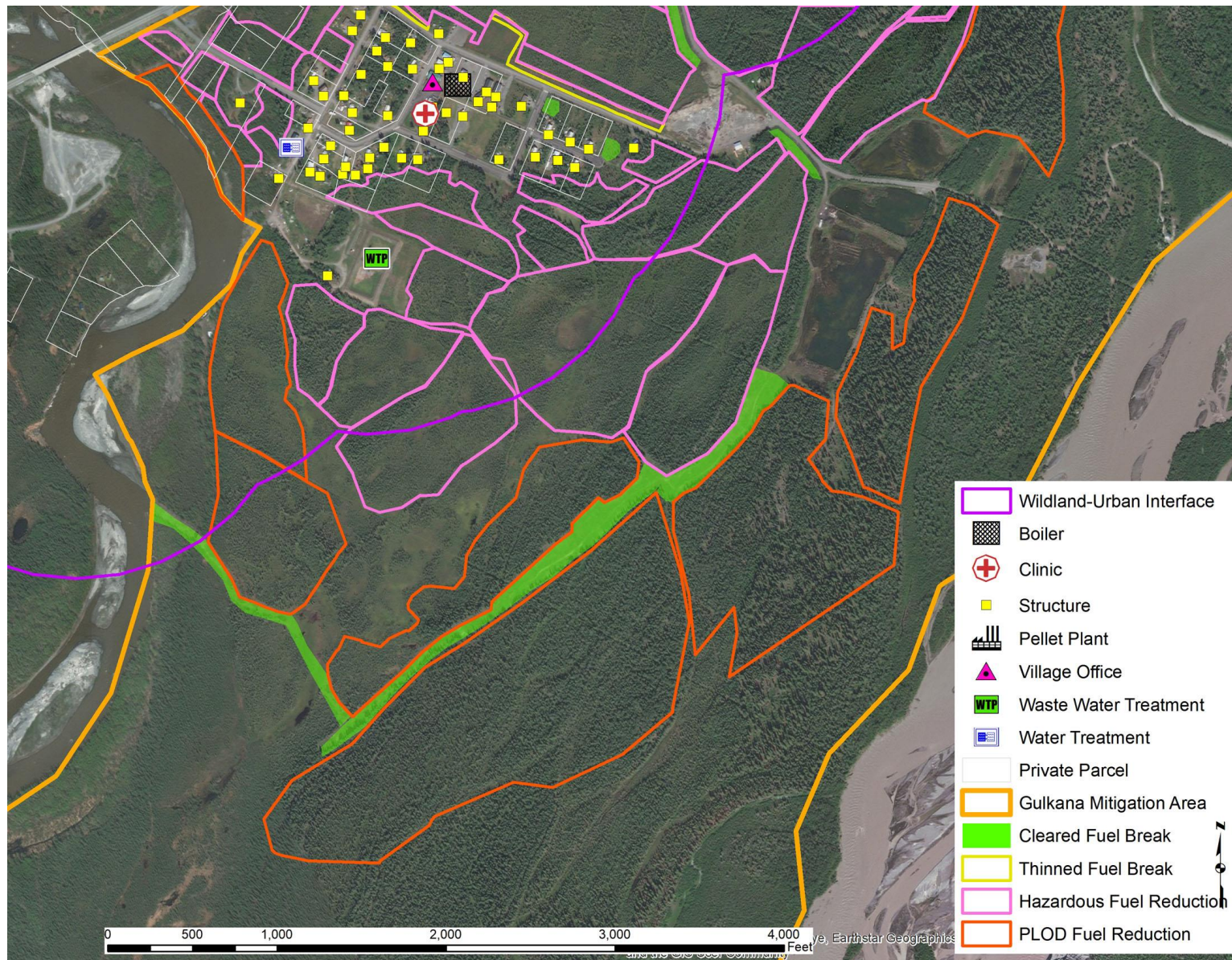


Figure B-4. Southern half of Gulkana Village showing detailed implementation plan.

High and Moderate Risk Fuels

The results of the risk assessment identified a total of 5,813 acres in the category of high or moderate risk fuels within the WUI for the Gulkana Fire Plan area. In addition, the portion of the PLOD in the Gulkana planning area occupies approximately 203 acres. Including the PLOD there are 5,954 acres that should be considered as high priority for fuels mitigation treatment (a portion of the PLOD overlaps with areas that already have a high or moderate risk rating). Table B-1 displays the acres in each risk category by landowner. Figure B-4 displays an overview of the projected PLOD areas and other treatment types in the planning area.

Table B-1. Risk rating and PLOD acres by landowner within the Gulkana Fire Plan area.

Land Management	PLOD	High	Moderate	Low	Very Low
Ahtna	190.3	1,643.78	2,096.07	1,296.23	494.42
Ahtna - Selected		9.80	33.95	21.91	8.55
State of Alaska		35.26	135.64	136.51	20.26
Native Allotment		350.64	599.64	104.29	65.38
Private	10.6	328.46	579.45	74.83	88.41

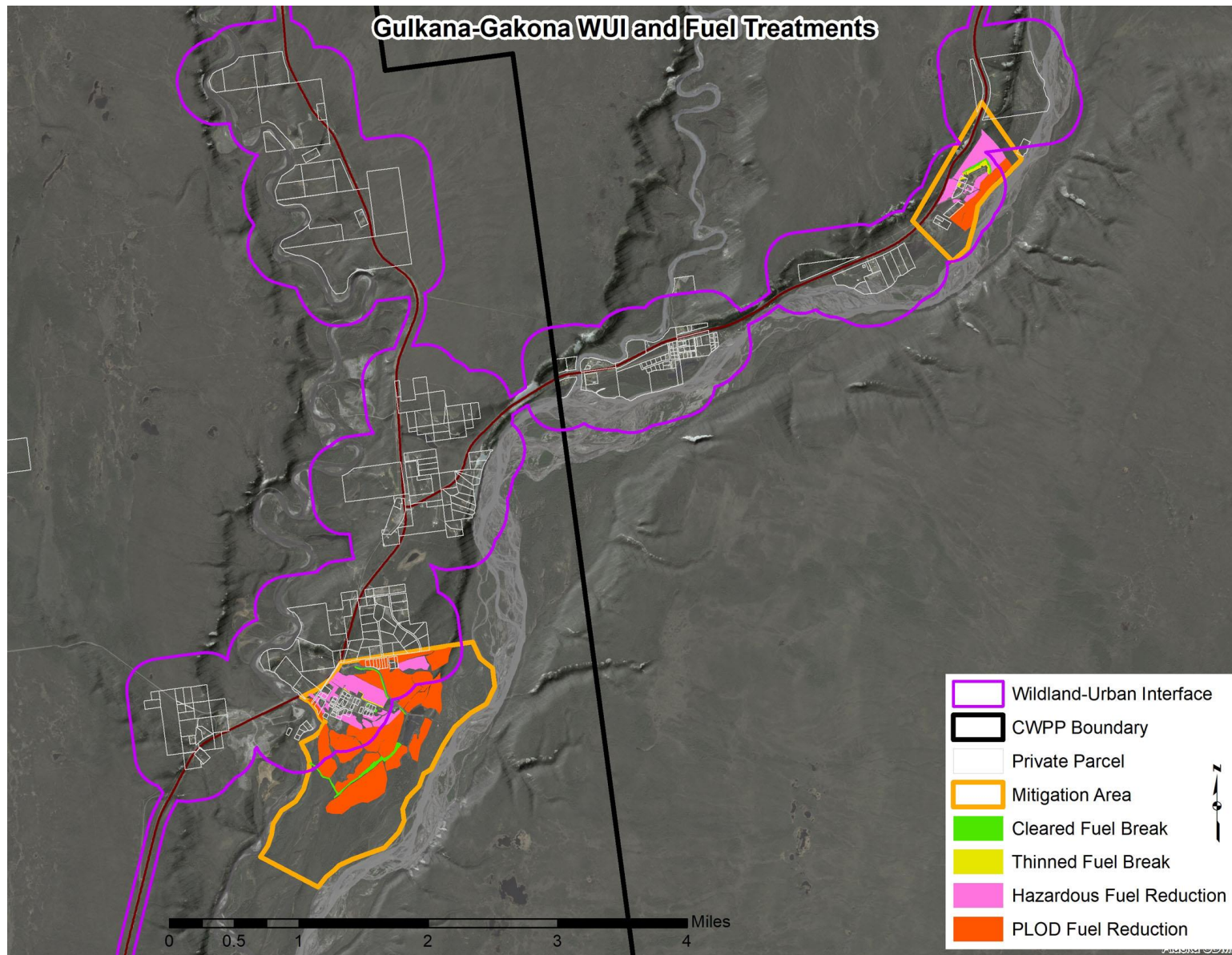


Figure B-5: Proposed treatment areas by type for Gulkana Fire Plan area with SPOT background.

Appendix B – Copper River Valley Historical Fire Information: 2012-2017

Table B-1. Reported wildland fires within the Gulkana Fire Plan Area since 1940.

DATE	NAME	YEAR	MANAGEMENT	LATITUDE	LONGITUDE	ACRES	GENERAL CAUSE	SPECIFIC CAUSE
9/1/1942	None	1942		62.25	-145.416671	0.1	Human	Campfire
8/18/1942	None	1942		62.299999	-145.350006	0.1	Human	Smoking
9/6/1942	Bear Creek	1942		62.266666	-145.416671	0.1	Human	Smoking
8/15/1942	None	1942		62.233333	-145.433334	0.1	Human	Campfire
8/2/1942	Gulkana	1942		62.266666	-145.366668	22.3	Human	Campfire
8/25/1942	None	1942		62.266666	-145.366668	0.1	Human	Campfire
7/29/1942	None	1942		62.316665	-145.350006	10	Human	Campfire
7/11/1948	Gulkana River	1948		62.25	-145.399993	6	Human	Unknown
7/15/1948	Gulkana Fire	1948		62.283332	-145.449996	1200	Lightning	Lightning
9/18/1950	Gulkana River Fire	1950		62.266666	-145.383331	0.3	Human	Debris Burning
8/21/1950	M.P. 129 Richardson Hwy.	1950		62.283332	-145.366668	0.3	Human	Campfire
7/13/1951	Gulkana Heights	1951		62.266666	-145.399993	1	Human	Smoking
5/24/1951	Mile 145	1951		62.483333	-145.449996	80	Human	Campfire
5/5/1951	Frank Ewan	1951		62.266666	-145.366668	0.5	Human	Miscellaneous
7/7/1951	Gulkana Hill Top	1951		62.283332	-145.366668	0.1	Human	Campfire
7/6/1951	Gulkana River	1951		62.266666	-145.383331	4	Human	Smoking
8/29/1951	Mile Post 122 1/2 Richardson Highway	1951		62.2	-145.449996	0.1	Human	Campfire
8/9/1952	Ewan Lake	1952		62.483333	-145.699996	4	Lightning	Lightning
8/13/1952	Copper River	1952		62.266666	-145.366668	19	Human	Incendiary
8/14/1952	Bear Creek Trail	1952		62.283332	-145.466659	0.3	Lightning	Lightning
6/8/1952	Gulkana River	1952		62.266666	-145.383331	1	Human	Miscellaneous
6/11/1952	Goat Meadow	1952		62.266666	-145.383331	8	Human	Campfire
10/1/1953	Ewan Lake	1953		62.366664	-145.649993	80	Human	Campfire
7/26/1953	Gulkana	1953		62.266666	-145.383331	0.1	Human	Unknown
9/9/1954	CACHE	1954		62.266666	-145.383331	0.1	Human	Debris Burning
8/9/1954	JUNCTION	1954		62.283332	-145.350006	0.3	Human	Miscellaneous

6/24/1954	BIG TIMBER #2	1954		62.299999	-145.333328	25	Lightning	Lightning
5/8/1954	BIG TIMBER	1954		62.299999	-145.350006	5	Human	Smoking
5/24/1954	Ewan Lake	1954		62.466667	-145.716659	2	Human	Smoking
5/17/1954	GULKANA	1954		62.266666	-145.383331	15	Human	Debris Burning
5/23/1955	JUNCTION INN	1955		62.283332	-145.366668	0.5	Human	INCENDIARY
8/1/1955	GULKANA	1955		62.266666	-145.350006	0.5	Human	Smoking
8/21/1955	GULKANA RIVER	1955		62.266666	-145.383331	0.1	Human	Campfire
6/8/1956	JUNCTION #1	1956		62.166667	-145.5	0.1	Human	SMOKING
5/17/1956	47 MILE	1956		62.316665	-145.333328	0.2	Human	SMOKING
6/3/1956	ACCIDENT LAKE	1956		62.166667	-145.833328	0.4	Human	RECREATION
5/17/1956	TAZLINA	1956		62.299999	-145.333328	0.1	Human	DEBRIS BNG
9/13/1956	PURLOINED COUPE	1956		62.2	-145.600006	0.1	Human	INCENDIARY
8/13/1957	GULKANA VILLAGE	1957		62.25	-145.333328	0.3	Human	SMOKING
7/7/1958	GLENNALLEN #2	1958		62.166667	-145.533334	5	Human	DEBRIS BNG
6/3/1958	GLENNALLEN	1958		62.2	-145.466659	0.1	Human	DEBRIS BNG
5/27/1958	GULCOPPER	1958		62.25	-145.350006	0.4	Human	SMOKING
6/2/1958	GULKANA	1958		62.466667	-145.333328	0.1	Human	SMOKING
6/29/1958	COPPERKANA	1958		62.416667	-145.399993	0.1	Human	SMOKING
7/3/1990	MI 1 TOK	1990	CRITICAL	62.299999	-145.333328	0.1	Human	FIREWORKS
8/13/1992	Gulkana Village	1992	FULL	62.266666	-145.366668	0.1	Human	OTHER
7/10/1992	Mile 131 Rich	1992	MODIFIED	62.333332	-145.350006	0.1	Human	POWERLINE
6/10/1992	Airport N	1992	FULL	62.166667	-145.466659	0.3	Human	LOGGING
6/28/1993	131 RICH	1993	CRITICAL	62.316665	-145.366668	0.1	Human	BURNING BLDG
7/29/1993	GULKANA R1	1993	MODIFIED	62.366664	-145.383331	0.2	Human	COOKING FIRE
5/2/1996	Suburban	1996	FULL	62.25	-145.433334	0.1	Human	VEHICLE
8/29/1996	GKN VILLAGE #2	1996	CRITICAL	62.266666	-145.366668	0.1	Human	BURNING BUILDING
7/19/1996	GULKANA #1	1996	FULL	62.266666	-145.366668	0.1	Human	SLASH BURN
7/18/1997	BRUSH ISLE	1997	FULL	62.316665	-145.566665	0.2	Human	CAMPFIRE
7/6/1997	SAILORS PIT	1997	FULL	62.299999	-145.366668	0.1	Human	CAMPFIRE

6/11/1997	GKN JCT.VILLAGE	1997	CRITICAL	62.283332	-145.350006	0.5	Human	BURNING BUILDING
7/13/1998	SAILORS	1998	FULL	62.3	-145.35	0.1	Human	CAMPFIRE
6/13/1999	MILE132RICH.	1999	FULL	62.33333	-145.3667	0.2	Human	Other
7/13/1999	GULKANAVILLAGE	1999	FULL	62.26667	-145.35	0.1	Human	Campfire
5/12/1999	Mile131Rich.	1999	FULL	62.31667	-145.35	0.1	Human	Slash Burn
7/4/1999	GULKANARIVERFIRE	1999	FULL	62.28333	-145.4	0.2	Human	Campfire
8/2/1999	MILE128RICHARDSON	1999	FULL	62.28333	-145.3333	0.1	Human	Campfire
8/22/2003	Sailor`s Pit	2003	FULL	62.31667	-145.35	0.1	Human	
6/17/2004	Sailor`s	2004	FULL	62.3	-145.3667	0.1	Human	Cooking/Warming Fire
7/16/2004	Gulkana Village	2004	FULL	62.26667	-145.3667	0.1	Human	Other(Unknown)
7/15/2005	GAKONA Junction	2005	CRITICAL	62.28333	-145.3333	0.1	Human	Debris Burning
7/4/2008	Mile 121 Richardson	2008	CRITICAL	62.193611	-145.446106	0.1	Human	Unknown
6/2/2008	Mile 1 Tok Cut-Off	2008	CRITICAL	62.29639	-145.338333	0.1	Human	Debris Burning
8/1/2010	Gulkana Village	2010	CRITICAL	62.273613	-145.367782	0.1	Human	Debris Burning
4/26/2010	Gulkana	2010	CRITICAL	62.266666	-145.366668	1	Human	Debris Burning
8/25/2010	132 1/2	2010	FULL	62.332778	-145.358062	0.1	Human	Power Line
8/16/2012	Gakona Junction	2012	UNPLANNED	62.288055	-145.354446	0.1	Human	Debris Burning
8/1/2013	Moose Creek	2013	Limited	62.250566	-145.689133	0.5	Lightning	Lightning
7/7/2013	Gulkana	2013	Critical	62.267233	-145.36765	0.1	Human	Debris Burning
6/18/2013	Mile 132 Richardson Hwy.	2013	CRITICAL	62.325027	-145.354416	0.8	Human	Miscellaneous
6/21/2013	Sailor`s Pit #1	2013	Critical	62.300966	-145.368116	0.1	Human	Campfire
6/17/2014	Sailor`s Pit #1	2014	CRITICAL	62.301055	-145.368138	0.1	Human	Human
6/7/2015	Sailor`s Catch	2015	Critical	62.30135	-145.3686	0.1	Human	Human
6/3/2015	Powerline 1	2015	CRITICAL	62.191666	-145.4475	0.1	Human	Human
8/10/2017	.5 Tok Cut-Off	2017	Critical	62.288983	-145.339483	0.8	Human	Miscellaneous
5/24/2017	131 Richardson	2017	CRITICAL	62.323472	-145.353472	0.1	Human	Miscellaneous

Appendix C – Risk Evaluation Methods, Fuel Loading Hazards

Risk Evaluation: Identifying Areas of Greatest Threat

A risk assessment was conducted to evaluate the risk of wildand fire to the community of Gulkana, Alaska. The goal of the risk assessment process is to determine what areas are cumulatively the most vulnerable to wildfire hazards. The risk assessment approach applied in this Fire Plan uses a Geographic Information System (GIS) and the relevant landscape data to evaluate the vulnerability of people, structures and community assets to potential wildfire. This type of analysis is dependent on the accuracy of the data used. To expedite completion of the plan and reduce overall costs, existing data were used to conduct the risk assessment. Accuracy assessments were not conducted on the existing data, including the fuels layer developed from the LANDFIRE coverage.

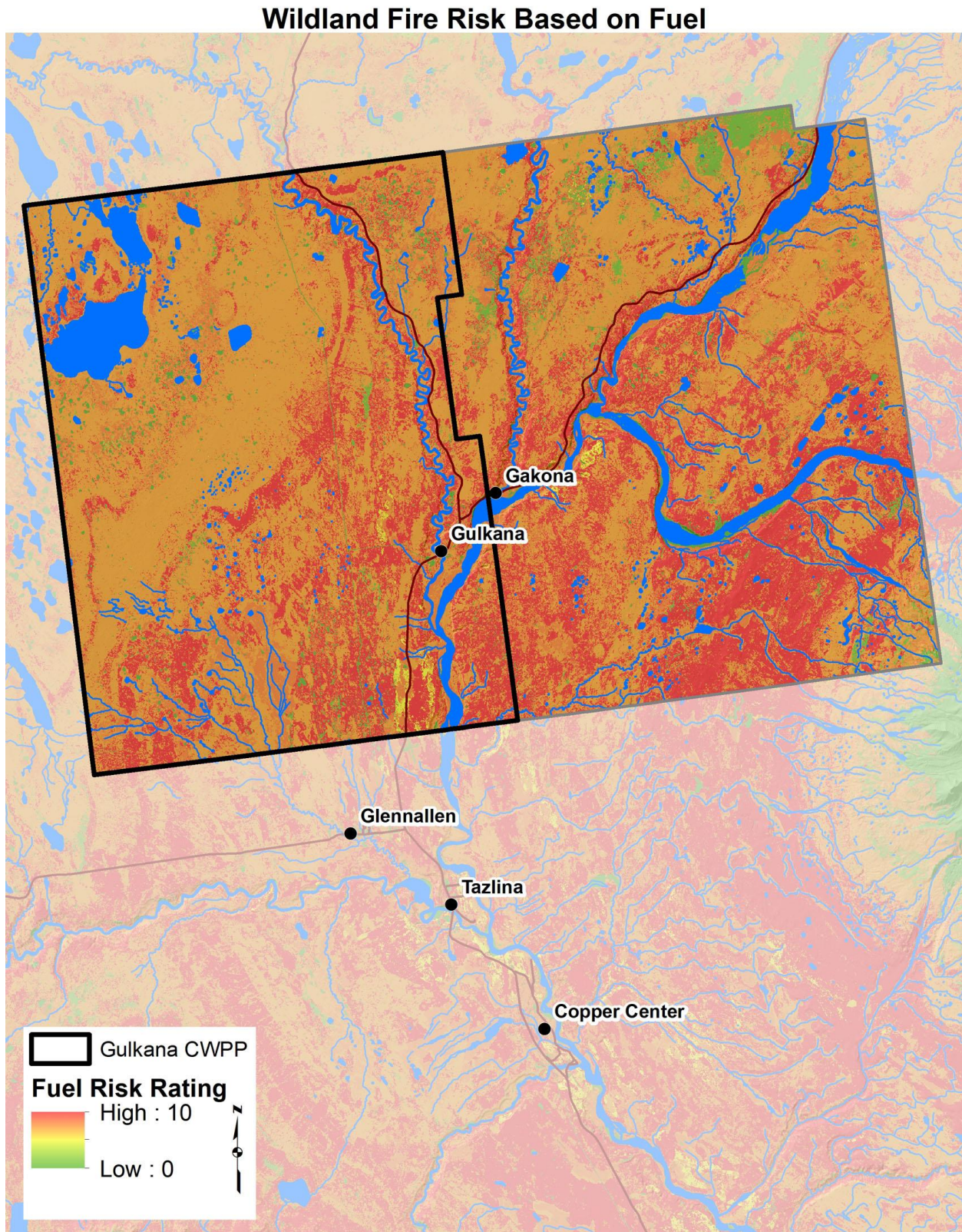


Figure D-2. Hazardous fuels in the Gulkana planning area, as classified using the Scott and Burgen (FBFM40) fuel models.

Structure Densities and Evacuation Routes

Information on structure densities per square mile for the Fire Plan area was combined with information on primary evacuation routes to produce a weighting prioritizing the vulnerability of the communities to wildfire risk (Figure D-3). Evacuation routes were based on a 100 meter buffer delineated on either side of Highway 1 and Highway 4. The structure densities per square mile were given weightings based on the following classes: 0=0, >0-1=1, >1-2=2, >2-5=3, >5-10=4, >10-25=5, >25-50=6, >50-100=7, >100-150=8, >150-200=9, >200=10. Structure density in the Gulkana area did not exceed 200 structures per square mile, so no areas were assigned a value greater than nine.

Wildland-Urban Interface

The wildland-urban interface is frequently defined as “the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.” The WUI boundary was determined by the 100 meter buffer on the major highways and a 400 meter buffer of private parcels that contained a structure and were near the highway corridor. Single structures that occurred long distances from existing infrastructure were not included in the WUI delineation.

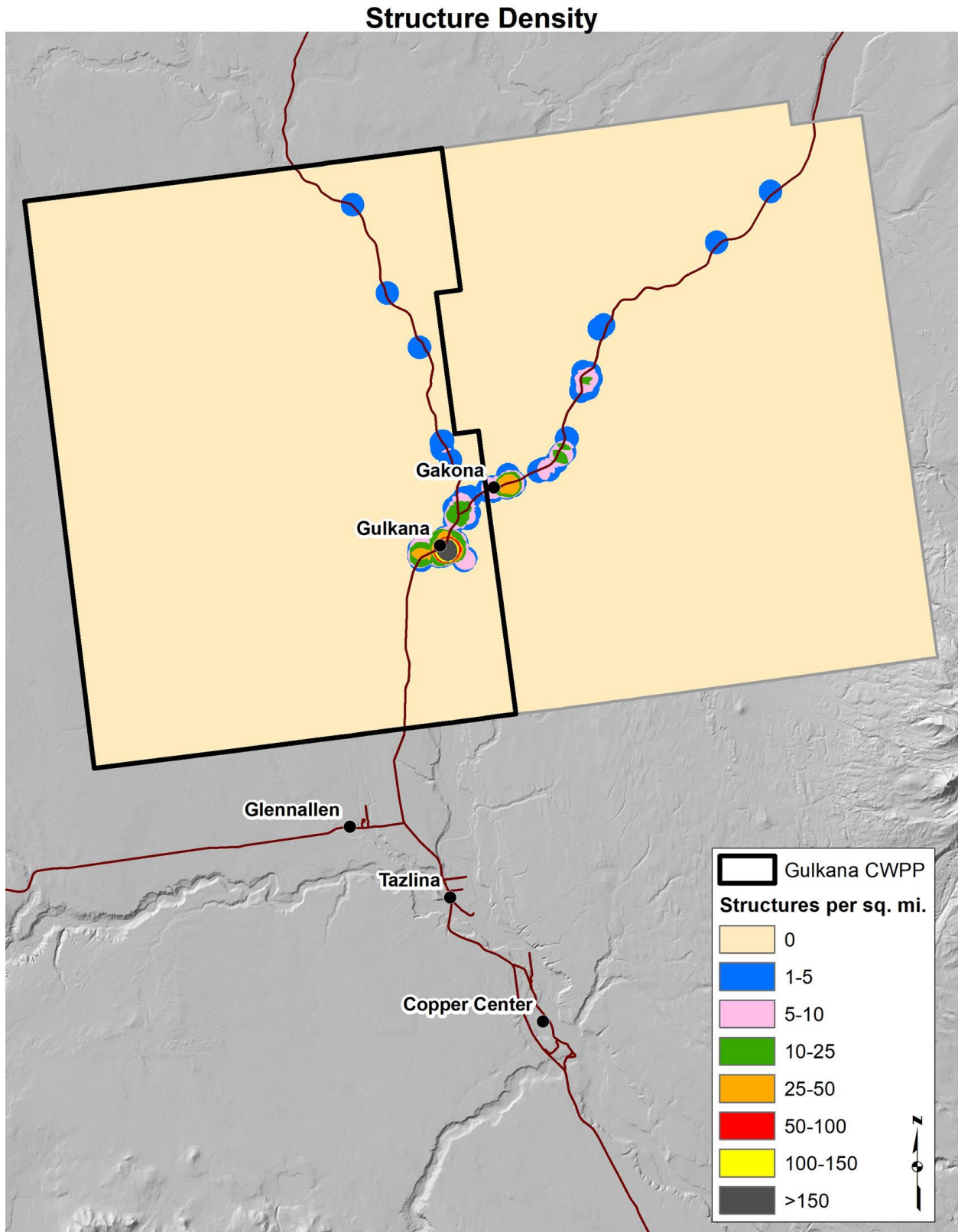


Figure D-3. Structure density in Gulkana fire plan area.

Cumulative Effects – Final Risk Assessment

The fuel hazards/slope information was combined with the structure densities/evacuation route information to produce a map of each stand's cumulative risk to human life or property. This map used the overall fuel hazard rating for each location that ranged from 1-15 based on the amount and type of fuels present as well as the slope. It then combined the fuel hazard with a structure density/evacuation route rating that ranged from 1-15, with 15 being the highest priority areas for human safety and evacuation areas and 1 being wildlands not in proximity to populated locations or evacuation routes. The fuel hazard rating and population/evacuation rating were combined using an 80%/20% split. This means 80% of the final score came from the fuels hazard/slope information and 20% of the final score came from the structure densities/evacuation route information. The resulting maps identify the combined ratings and identifies forest stands that present the greatest risk to human life or property under their existing conditions. The stands with high ratings can be listed by ownership and prioritized for preventive actions, either by agency management or for possible funding support for fuel thinning on private lands.

Water Quality and Watersheds

The Fire Plan area represents portions of two primary watersheds: the lower Gulkana River Basin and the lower Gakona River Basin. Both of these watersheds form a part of the larger Copper River Basin. The Copper River is a critical part of the local environment and any impacts in these watersheds would have profound impacts on local communities as well as communities further downstream.

The effects of wildfire on water quality and the watershed within the plan area will depend on several factors including the severity/intensity of the fire, post-fire precipitation, actions taken to control or suppress the fire, and the condition of the watershed pre-fire. Wildfire results in the loss of vegetation as well as the reduced capacity for soils to soak up rainwater and snow melt. The result is increased runoff and a greater volume of water reaching streams and lakes in a shorter period of time. Flash flooding is often a major concern following a significant wildfire event within a watershed. In addition, the loss of vegetation can result in increased sediment transport to streams and lakes due to soil erosion, reduced soil infiltration, and increased water volumes and overland flow rates. Water quality impacts frequently observed post-wildfire include increased transport of organic materials, nutrients and chemicals (i.e., fertilizers, herbicides) to surface waters, as well as increased turbidity (i.e., suspended particles) and water temperatures.

Air Quality

Wildfires are considered a natural source of air pollution and can sometimes cause severe short-term smoke impacts. These smoke impacts can pose a major health risk for some individuals. Symptoms from short-term smoke exposure range from stinging eyes, scratchy throat, cough, irritated sinuses, headaches, and runny nose. Individuals with pre-existing health conditions such as asthma, emphysema, congestive

heart disease and other conditions can have serious reactions. The elderly and young children are considered high-risk groups for health complications due to smoke.

