

Date of Report: 10/30/2020**BURNED-AREA REPORT****PART I - TYPE OF REQUEST****A. Type of Report**

- 1. Funding request for estimated emergency stabilization funds
- 2. No Treatment Recommendation

**B. Type of Action**

- 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)
- 2. Interim Request # \_\_\_\_\_  
 Updating the initial funding request based on more accurate site data or design analysis

**PART II - BURNED-AREA DESCRIPTION****A. Fire Name: Range****B. Fire Number: UT-NWS-1080****C. State: Utah****D. County: Utah****E. Region: R4, Intermountain Region****F. Forest: Uinta Wasatch Cache****G. District: Pleasant Grove****H. Fire Incident Job Code: PNNN7Y (1502)****I. Date Fire Started: 10/17/2020****J. Date Fire Contained: 93% on 10/24/2020****K. Suppression Cost: \$2,800,000 on 10/24/2020****L. Fire Suppression Damages Repaired with Suppression Funds (estimates):**

1. Fireline repaired (miles): Not reported
2. Other (identify):

**M. Watershed Numbers:***Table 1: Acres Burned by Watershed*

HUC #	Watershed Name	Total Acres	Acres Burned	% of Watershed Burned
160202010108	Pole Canyon-Provo River	15,064	2,790	19%
160202010109	Dry Canyon	15,896	273	2%

**N. Total Acres Burned:***Table 2: Total Acres Burned by Ownership*

OWNERSHIP	ACRES
NFS	1,069
OTHER FEDERAL (LIST AGENCY AND ACRES)	N/A
STATE	1,806

OWNERSHIP	ACRES
PRIVATE	188
TOTAL	3,063

**O. Vegetation Types:** Oak, Shrubs, Grasses, Mixed Conifer

**P. Dominant Soils:** PGLS1 – Storm family very gravelly loam; PGLS4 – Tonigut family loam; PGFM8 – Big baldy-Etchen family complex

**Q. Geologic Types:** Limestone, landslide deposits, alluvial fan deposits.

**R. Miles of Stream Channels by Order or Class:**

*Table 3: Miles of Stream Channels by Order or Class*

STREAM TYPE	MILES OF STREAM
PERRENIAL	0.1
INTERMITTENT	10.4
EPHEMERAL	0
OTHER (DEFINE)	0

**S. Transportation System:**

**Trails:** National Forest (miles): 2.3

Other (miles): 5.9 (mapped in spatial dataset)

**Roads:** National Forest (miles): 1.1 (ML1)

Other (miles): 2.1 (mapped in spatial dataset)

### **PART III - WATERSHED CONDITION**

**A. Burn Severity (acres):**

*Table 4: Burn Severity Acres by Ownership*

Soil Burn Severity	NFS	Other Federal (List Agency)	State	Private	Total	% within the Fire Perimeter
Unburned	176	0	133	22	331	10%
Low	495	0	471	104	1,070	32%
Moderate	546	0	1,335	85	1,966	58%
High	28	0	1	0	29	<1%
<b>Total</b>	<b>1,245</b>	<b>0</b>	<b>1,940</b>	<b>211</b>	<b>3,396</b>	<b>100%</b>

**B. Water-Repellent Soil (acres):** 1,433 acres (all high SBS assumed to be water repellent, 71% of mod SBS sampled was water repellent).

**C. Soil Erosion Hazard Rating:** Not rated for soil map units in the BAER analysis area.

**D. Erosion Potential:** WEPPcloud-PEP model runs were completed on three burned watersheds within the analysis area. The watershed name, size, hillslope soil loss, channel soil loss are predicted as follows:

1. Unnamed drainage upstream of Murdock Diversion: 980 acres; 570 tons/year hillslope soil loss; 210 tons/year channel soil loss.
2. Unnamed drainage above Mt. Timpanogos Park: 580 acres; 280 tons/year hillslope soil loss; 27 tons/year channel soil loss.
3. Unnamed drainage east of Orem PD Range: 53 acres; 55 tons/year hillslope soil loss; 0 tons/year channel soil loss.

**E. Sediment Potential:** WEPPcloud-PEP model runs were completed on three burned watersheds within the analysis area. The watershed name, size, and sediment delivery to the watershed outlet is predicted as follows:

1. Unnamed drainage upstream of Murdock Diversion: 980 acres; 770 tons/year
2. Unnamed drainage above Mt. Timpanogos Park: 580 acres; 320 tons/year
3. Unnamed drainage east of Orem PD Range: 53 acres; 55 tons/year

**F. Estimated Vegetative Recovery Period (years):** 3-5 years

**G. Estimated Hydrologic Response (brief description):** An analysis of expected peak flows was conducted in the WEPPcloud (pre-fire) and WEPPcloud-PEP (post fire) models for the 2, 5, and 10-year return interval flood events. The results of the modeling are presented below in table 5. These increases in peak flows are expected to occur in response to short duration, high intensity thunderstorms. The increased watershed response to these precipitation events is expected to persist for approximately 3 to 5 years while canopy vegetation, ground cover, and soil hydrophobicity recover to pre-fire conditions.

*Table 5. Pre and post fire peak flows*

Modeled Watershed	Pre-fire Q2 (cfs)	Post-fire Q2 (cfs)	Pre-fire Q5 (cfs)	Post-fire Q5 (cfs)	Pre-fire Q10 (cfs)	Post-fire Q10 (cfs)
Unnamed drainage upstream of Murdock Diversion	48	110	58	180	72	240
Unnamed drainage above Mt. Timpanogos Park	48	82	62	140	80	280
Unnamed drainage east of Orem PD Range:	1	9	4	16	5	28

An analysis of post-fire debris flow threats in response to a range of rainfall intensities was conducted by the USGS. When a 15-minute rainfall intensity of 24 millimeters per hour design storm was modeled (equivalent to approximately 0.25" of rain in 15 minutes), the probability of debris flows occurring on the burn scar is 20-40% in most of the modeled basins (Figure 2). This design rainstorm has a 1-year recurrence interval for the burned area. When a 15-minute rainfall intensity of 32 millimeters per hour design storm was modeled (equivalent to approximately 0.32" of rain in 15 minutes), the probability of debris flows occurring on the burn scar is 40-60% in most of the modeled basins (Figure 3). This design rainstorm has a 2-year recurrence interval for the burned area. When a 15-minute rainfall intensity of 40 millimeters per hour design storm was modeled (equivalent to approximately 0.39" of rain in 15 minutes), the probability of debris flows occurring on the burn scar is 60-80% in most of the modeled basins (Figure 4). This design rainstorm is slightly less than what is identified as a 5-year recurrence interval for the burned area.

## **PART V - SUMMARY OF ANALYSIS**

### **Introduction/Background**

The Range fire was caused by target shooting at a law enforcement training range above Orem on the afternoon of October 17, 2020. It quickly burned to the NE, up the face of Mt. Timpanogos and into Provo Canyon. Containment was achieved through the use of retardant, terrain features, handlines, dozer lines, and firing operations.

During the BAER survey, potential threats to trail systems within the Timpanogos Wildlife Management Area, the Mt. Timpanogos Park infrastructure, and the Murdock Diversion were identified by the assessment team.

These assets are threatened by expected increases in post-fire runoff, debris flows, and sedimentation originating from areas of moderate and high soil burn severity. Further evaluation of these threats and the associated risks is recommended to the entities responsible for this infrastructure. This includes but is not limited to the Utah Division of Wildlife Resources, the City of Orem, and the Provo River Water Users Association.

The remainder of this report will focus on threats to Critical BAER values as identified in FSM 2523 – Emergency Stabilization – Burned Area Emergency Response.

#### A. Describe Critical Values/Resources and Threats (narrative):

*Table 6: Critical Value Matrix*

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

##### 1. Human Life and Safety (HLS):

- a. Human life and safety of Forest visitors and employees traveling on NFS lands throughout the burnscar is threatened due to the potential for injury or loss of life from debris flows, flash floods, falling trees, rolling rocks, and other burned area hazards. The probability of damage or loss is **unlikely** because of the relatively low risk of flooding or debris flow damage on the NFS land which is in the upper elevations of the burnscar. In addition to this the overhead hazards are limited as most of the burned vegetation is oak brush and grasses. Falling rocks are the most probable threat to HLS. The magnitude of consequence is **major** since entrapment or being hit by falling debris could result in serious injury or loss of life. The risk level is **intermediate**. Treatments are not recommended.

- 2. **Property (P):** The Alta Ditch (70413) and Upper Alta Spring (70230) NFS maintenance level 1 roads are threatened due to increased post-fire runoff and debris flows that could result in erosion of cut and fill slopes, loss of control of water, and deposition of debris on the road surface. Post fire peak flow and debris flow model outputs indicate that an increased watershed response to short duration, high intensity precipitation is expected. The probability of damage or loss is **possible** given the amount of moderate SBS that is above the road system. The magnitude of consequence is **moderate** because debris deposition on the roads would require emergency removal to restore access to permitted municipal water delivery infrastructure and erosion of fill slopes would require repair to restore control of water as well as the structural integrity of the road shoulders. The risk level is **intermediate**. Treatments are not recommended.

- b. The Little Baldy NFS trail is threatened due to increased post fire runoff that could result in erosion of the trail tread. The probability of damage or loss is **possible** given the amount of moderate SBS located above the route. The magnitude of consequence is **minor** since only three short segments, all less than 0.15 miles, are threatened, resulting in limited property damage if the loss were to occur. The risk rating is **low**. Treatments are not recommended.

- 3. **Natural Resources (NR):** Soil productivity and hydrologic function on NFS lands within the burnscar are threatened due to the potential for increased runoff and erosion of soil horizons. The probability of damage or loss is **possible** as hillslopes within the upper portions of the burned area are steep and now lack effective ground cover. The magnitude of consequence is **moderate**. Damage to the soil resource is expected to be considerable following thunderstorms and will result in hillslope erosion, channel scouring, and gully formation. The risk rating is **intermediate**. Treatments are not recommended.

- b. Native plant communities on NFS lands located along the dozer and hand lines (1.5 acres total area) are threatened by the potential introduction of non-native invasive species (NNIS). The probability of damage or loss is **likely**. Firefighting equipment is assumed to be a vector for introduction of NNIS. The magnitude of consequence is **minor**. The risk rating is **low**. Emergency treatments are not recommended. Follow-up detection and spraying along this feature by the District weed crew is recommended during spring and summer of 2021.
- 4. Cultural and Heritage Resources:** One cultural resource site that is potentially eligible for NRHP listing is threatened by the possibility of burial or artifact transport during a debris flow event. The probability of damage or loss is **unlikely** given the size and slope position of the artifacts. The magnitude of consequence is **minor** since the loss would result minimal, localized effects. The risk rating is **very low**. Treatments are not recommended.

**B. Emergency Treatment Objectives:** No treatments proposed.

**C. Probability of Completing Treatment Prior to Damaging Storm or Event:**

**Land:** N/A

**Channel:** N/A

**Roads/Trails:** N/A

**Protection/Safety:** N/A

**D. Probability of Treatment Success**

*Table 7: Probability of Treatment Success*

	<b>1 year after treatment</b>	<b>3 years after treatment</b>	<b>5 years after treatment</b>
<b>Land</b>	N/A		
<b>Channel</b>	N/A		
<b>Roads/Trails</b>	N/A		
<b>Protection/Safety</b>	N/A		

**E. Cost of No-Action (Including Loss):** N/A

**F. Cost of Selected Alternative (Including Loss):** N/A

**G. Skills Represented on Burned-Area Survey Team:**

- |   |   |                                      |                                   |   |
|---|---|--------------------------------------|-----------------------------------|---|
| <input checked="" type="checkbox"/> Soils | <input checked="" type="checkbox"/> Hydrology | <input type="checkbox"/> Engineering | <input type="checkbox"/> GIS      | <input checked="" type="checkbox"/> Archaeology |
| <input checked="" type="checkbox"/> Weeds | <input type="checkbox"/> Recreation           | <input type="checkbox"/> Fisheries   | <input type="checkbox"/> Wildlife |   |
| <input type="checkbox"/> Other:           |   |                                      |                                   |   |

**Team Leader:** Brendan Waterman

**Email:** brendan.waterman@usda.gov

**Phone(s):** 385-377-4338

**Forest BAER Coordinator:**

**Email:** Brendan Waterman

**Phone(s):** 385-377-4338

**Team Members:** *Table 8: BAER Team Members by Skill*

<b>Skill</b>	<b>Team Member Name</b>
<b>Team Lead(s)</b>	Brendan Waterman
<b>Soils</b>	
<b>Hydrology</b>	Charlie Condrat
<b>Engineering</b>	
<b>GIS</b>	

Skill	Team Member Name
Archaeology	Rachelle Handley - consulted
Weeds	Jana Leinbach - consulted
Recreation	Jentry Cataluna
Other	

**H. Treatment Narrative:** None recommended.

**Land Treatments:** N/A

**Channel Treatments:** N/A

**Roads and Trail Treatments:** N/A

**Protection/Safety Treatments:** N/A

**I. Monitoring Narrative:** N/A

**PART VI – EMERGENCY STABILIZATION TREATMENTS AND SOURCE OF FUNDS**

Line Items	Units	NFS Lands			Other	Other Lands			All
		Unit	# of	BAER \$		# of	Fed	# of	
	Cost	Units	\$	units	\$	Units	\$	Total	
<b>A. Land Treatments</b>									
			\$0	\$0		\$0		\$0	\$0
			\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>			\$0	\$0		\$0		\$0	\$0
<b>Subtotal Land Treatments</b>			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<b>B. Channel Treatments</b>									
			\$0	\$0		\$0		\$0	\$0
			\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>			\$0	\$0		\$0		\$0	\$0
<b>Subtotal Channel Treatments</b>			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<b>C. Road and Trails</b>									
			\$0	\$0		\$0		\$0	\$0
			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<i>Insert new items above this line!</i>			\$0	\$0		\$0		\$0	\$0
<b>Subtotal Road and Trails</b>			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<b>D. Protection/Safety</b>									
			\$0	\$0		\$0		\$0	\$0
			\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>			\$0	\$0		\$0		\$0	\$0
<b>Subtotal Protection/Safety</b>			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<b>E. BAER Evaluation</b>									
Initial Assessment	Report	\$2,400	---	\$0		\$0		\$0	\$0
				\$0	\$0	\$0		\$0	\$0
<i>Insert new items above this line!</i>			---	\$0		\$0		\$0	\$0
<b>Subtotal Evaluation</b>			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<b>F. Monitoring</b>									
			\$0	\$0		\$0		\$0	\$0
			\$0	\$0		\$0		\$0	\$0
<i>Insert new items above this line!</i>			\$0	\$0		\$0		\$0	\$0
<b>Subtotal Monitoring</b>			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>
<b>G. Totals</b>									
Previously approved									
Total for this request			<b>\$0</b>	<b>\$0</b>		<b>\$0</b>		<b>\$0</b>	<b>\$0</b>

**PART VII - APPROVALS**

1.

Forest Supervisor

Date

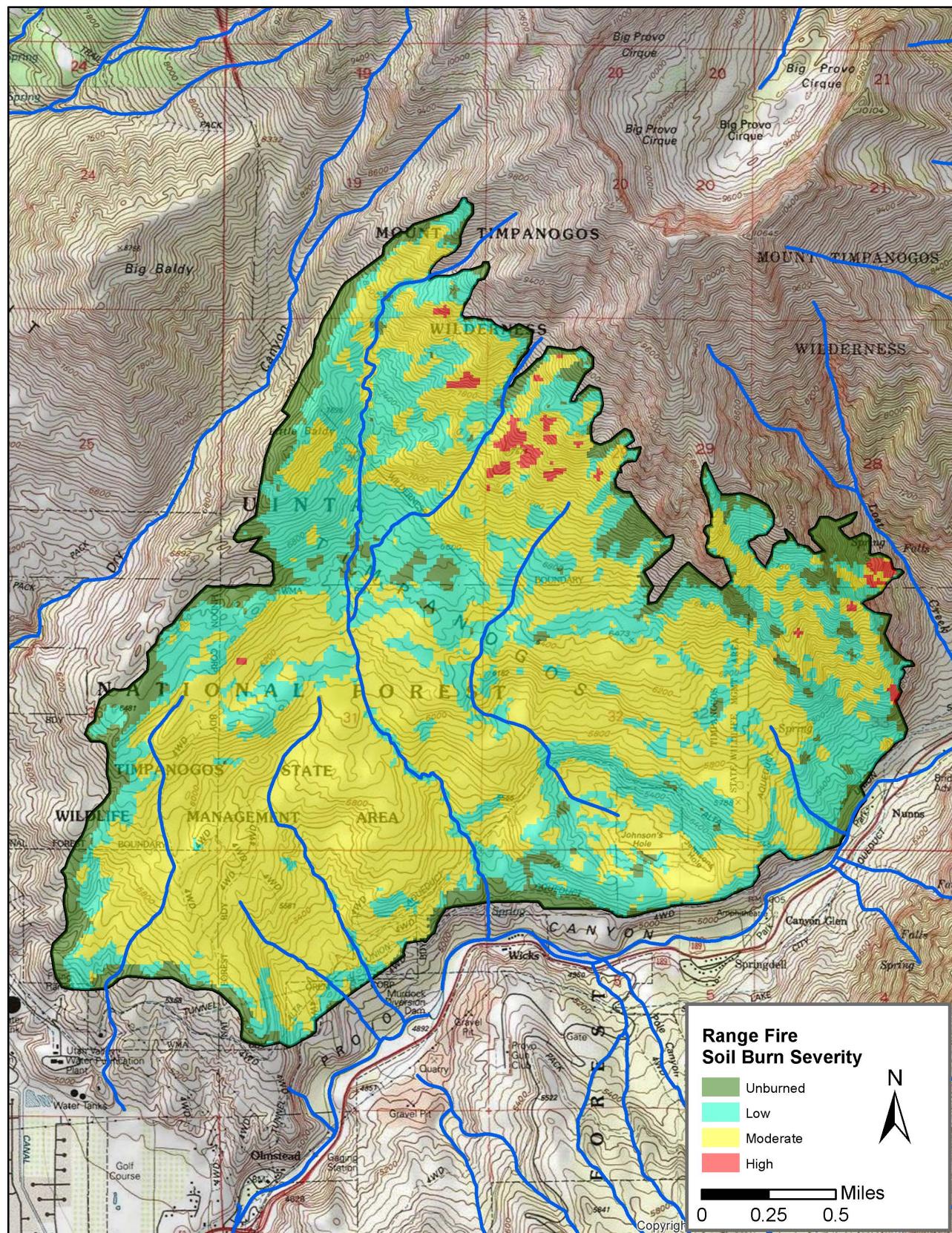


Figure 1. Soil Burn Severity

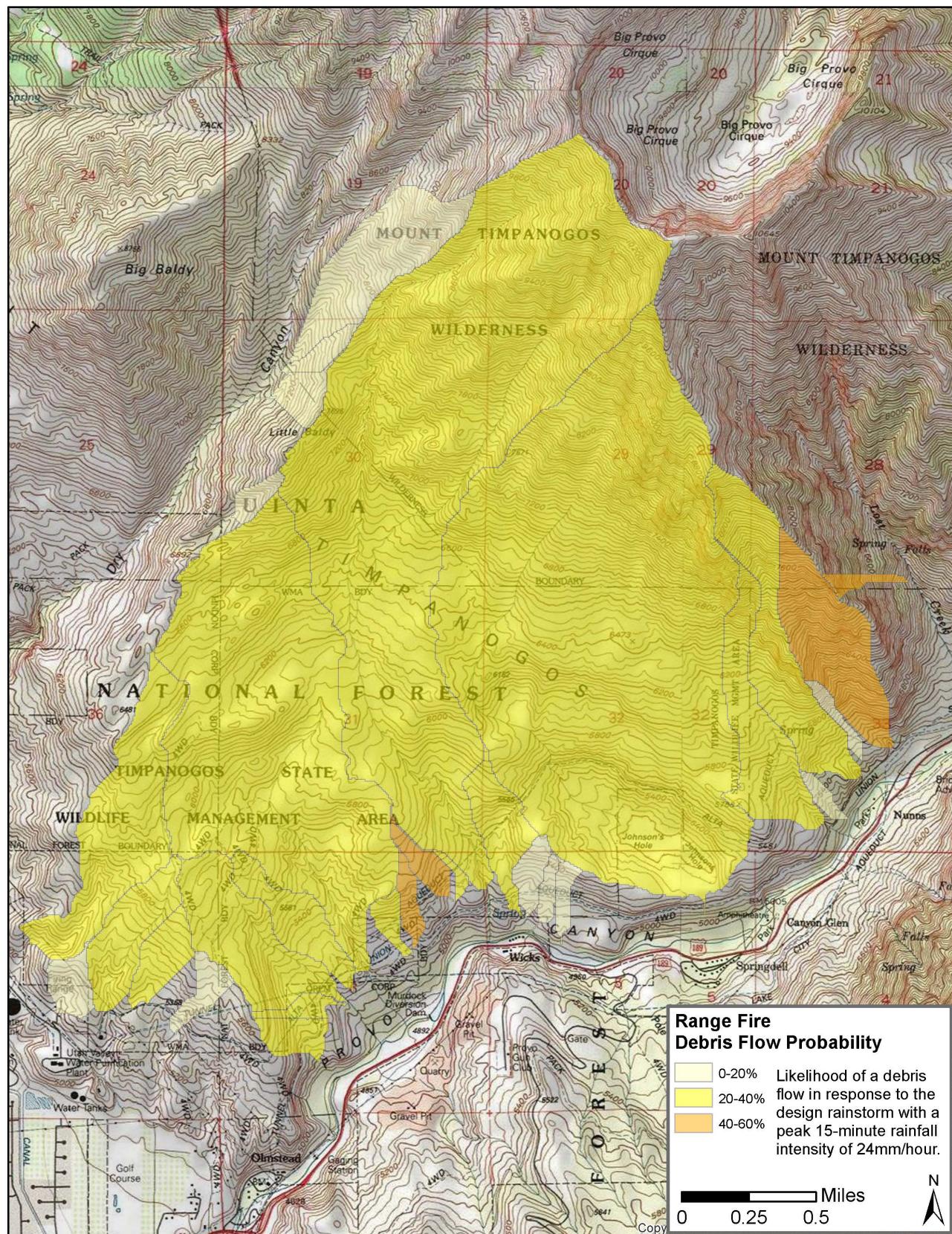


Figure 2. Debris Flow Probability at 15 min, 24mm/hour

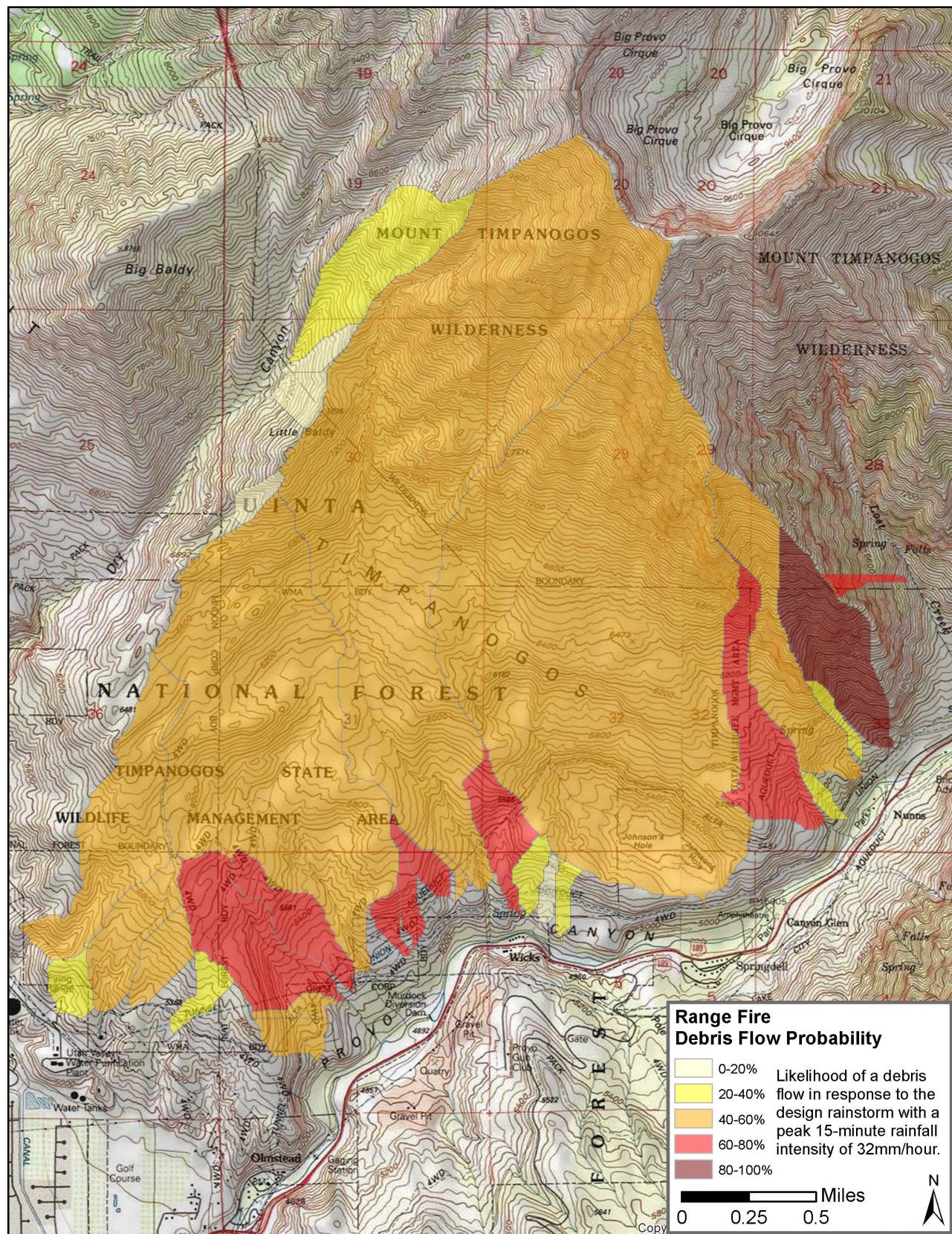


Figure 3. Debris Flow Probability at 15 min, 32mm/hour

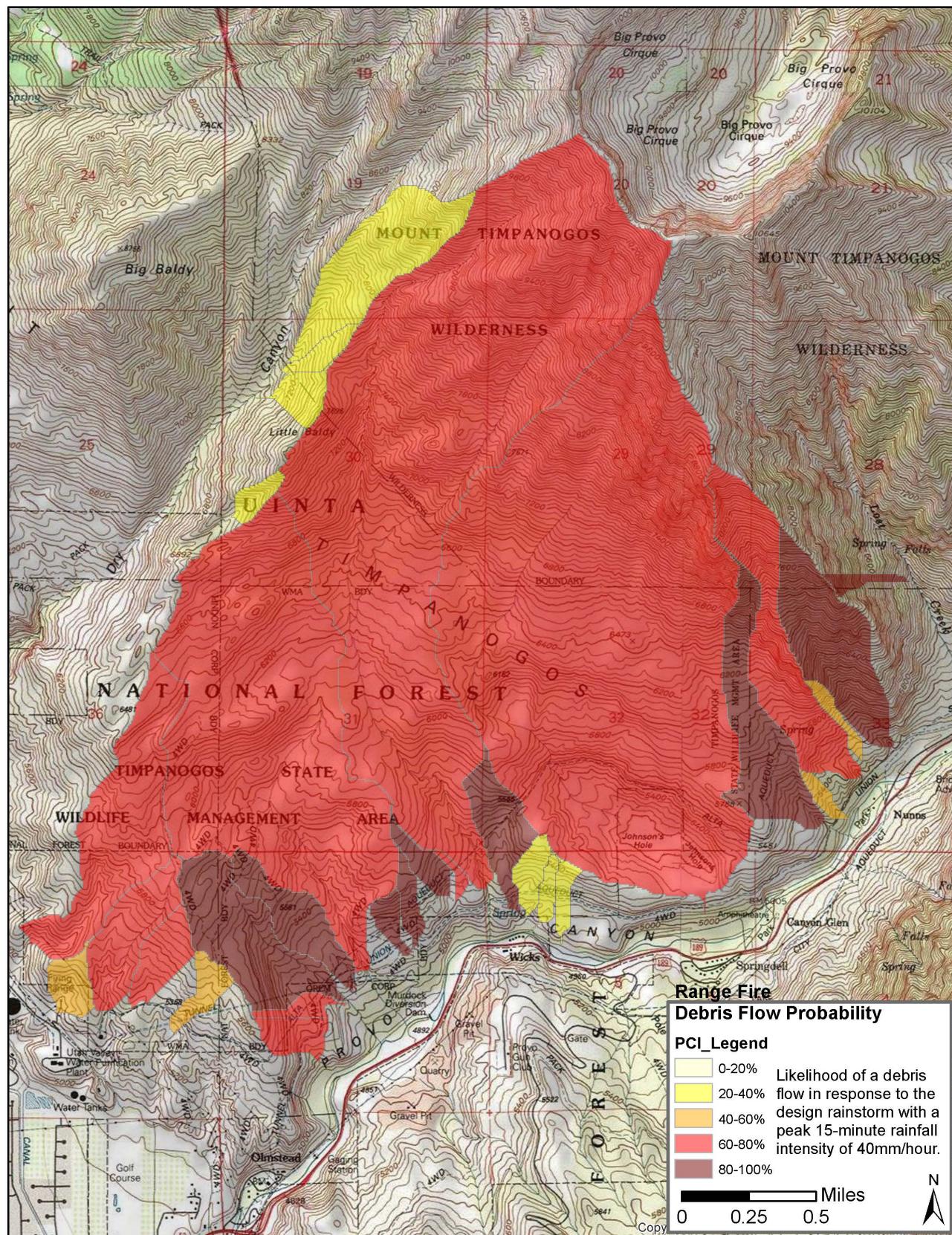


Figure 4. Debris Flow Probability at 15 min, 40mm/hour