Chapter 4— Municipal

The Municipal Fire encompasses 1,736 acres within Clearwater County, Idaho. Land cover consists of forestland (72%), shrub/scrub (27%), and grassland/herbaceous (1%). Ownership is predominately private (69%), followed by tribal (24%), and state (7%). The majority of the fire area received a low burn severity classification (72%, 1,242 acres), with 27% moderate and 1% high. Precipitation ranges from 24 to 29 inches while elevations range from 1,260 to 2,730 feet at higher elevations.

NWS identified two homes for potential flash flood potential in the Municipal Burn Area. It was determined that flash flooding, rock slides, and debris flows were possible when high intensity rainfall (0.40 inches or more in less than 30 minutes) occurred. Homes near the base of the Municipal fire are at the greatest risk for damage. USFS identified an additional four structures as at risk for post-fire debris torrent damages.

USGS considered 1,426 acres, and 17 miles of stream at a low risk for post-fire debris flow hazard risk. According to the USFS GeoWEPP model, 345 acres are considered high erosion risk (>10 tons/acre). There are 10.2 miles of roads within the burned area. The majority of these occur on private ownership (71%). Of these roads, 0 miles were identified as having a road erosion hazard.

USGS identifies 0.7 miles of streams, with 0.7 miles considered perennial and a stream density of 0.3 miles per square mile of burned area. USFWS considers 0.4 miles of streams within the burn area to be critical fish habitat for ESA listed steelhead. There is one water system considered to be a low risk for post-fire debris flows or runoff events. An analysis of the IDWR data shows that this water system is a groundwater source. The water system is used for domestic and agricultural purposes.

Over 906 acres of private forestlands were damaged with the majority of these occurring on slopes greater than 40%. NRCS recommends 1,539 acres of private lands for reforestation. IDFG identified 1,539 acres of burned area as bird nesting habitat needing 1 to 3 trees per acre to provide nesting habitat for birds.

Hazard trees were removed from critical areas near homes the Fall of 2015. Hazard trees will continue to be a threat near homes and need future monitoring.

Three culverts were identified as at risk from post-fire runoff events.

The following assessment areas were assessed but no concerns or issues were found: Farm Infrastructure, Fire Suppression Restoration Needs, Flooding Hazard, NRCS EWP Analysis and Road Erosion Hazard.

The following assessment areas are in progress and no data is available at the time of this publication: Weed Invasion Analysis.

The following assessment areas were not evaluated: FS BAER Analysis and Salvage.

Key Findings:
- 2 sites were identified for potential flash flooding and debris flow hazards.
- 1% of the area burned area is considered high burn severity.
- 345 acres are considered high erosion risk (>10 tons/acre). Of these, 4 acres are located on private lands.
- 72% of the burned area is forestland.
- 69% of the burned area is private lands.
- 1,539 acres of private forestland are identified for reforestation.
• 65% of the burned area is located on >20% slope.
• 3 sites identified as moderate risk of post-fire debris torrents and/or minor flooding. 5 homes and 2 businesses have an elevated risk of being affected by possible debris torrents and minor flooding.
• 1,539 acres of private forestlands are identified for nesting bird habitat protection.

Prioritized Actions

The following list of prioritized actions is approved by elected officials of Clearwater County Commissioners and Clearwater Soil and Water Conservation District. These bodies met in August 2016, reviewed the fire assessment and identified needed actions.

1. Critical Area Planting and reforestation on high and moderate burn sites. Critical area plantings will address post fire flooding risk, debris flow risk, and critical fish habitat at risk.
2. Work with the Clearwater County Weed department and other sources on weed control of burned areas and fire suppression lines.
Burn Scar Flash Flooding Analysis

Locations downhill and downstream from burned areas are very susceptible to flash flooding and debris flows, especially near steep terrain. Rainfall that would normally be absorbed will run off extremely quickly after wildfire, as burned soil can be as water repellant as pavement. As a result much less rainfall is required to produce a flash flood.

The NWS identified flash flooding risk when more than 0.40 inches of rain are received in 30 minutes. The greatest risk is for homes near Orofino, ID at the base of the Municipal Burn. Both areas are considered a very high risk for public safety. (Figure 6)

![Figure 6. Municipal flash flooding risk areas.](image)
Burn Severity Characterization

Description: The burn severity map is developed from remote sensing (Burned Area Reflectance Classification (BARC)) derived data layer of post-fire vegetation condition and validated and adjusted during field surveys. The maps show the burn severity of soils and watersheds by categories of unburned, very low, low, moderate, and high. These ratings indicate the level of post-fire conditions for the soil and ground surface that is likely to affect water infiltration, runoff, and soil erosion.

Source: United States Forest Service; Burn Severity GIS layer. 2015. Map generated by Cody Dawes, Nez Perce Soil and Water Conservation District.
Culverts/Bridges at Risk

Three culverts were identified as at risk. They are located on Franklin Draw, Hollywood Draw, and Cascade Drive (Table 24).

Table 24. Municipal Fire culverts at risk summary.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Name</th>
<th>Comments</th>
<th>Easting</th>
<th>Northing</th>
</tr>
</thead>
<tbody>
<tr>
<td>M01</td>
<td>Cascade Drive</td>
<td>Undersized culverts at risk</td>
<td>0565054</td>
<td>5145939</td>
</tr>
<tr>
<td>M02</td>
<td>Franklin Draw</td>
<td></td>
<td>0558793</td>
<td>5148023</td>
</tr>
<tr>
<td>M03</td>
<td>Hollywood Draw</td>
<td>Culvert below Hollywood Subdivision.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate risk for post-fire debris flow damages.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0560256</td>
<td>5147960</td>
</tr>
</tbody>
</table>
Debris Flow – Basin Hazard

Legend
- Roads
- Idaho Streams
- Municipal Complex Fire Boundary
- Low (1.428 AC)

25 Year Debris Flow Basin Hazard, Municipal Complex Fire
Source: Preliminary Hazard Assessment by USGS
Map Generated by Cody Dawes, Nez Perce Soil and Water Conservation District, January 2016
Debris Flow – Segment Hazard

Legend

- Low (17 mi.)
- Roads
- Idaho Streams
- Municipal Complex Fire Boundary

25 Year Debris Flow Segment Hazard, Municipal Complex Fire

Source: Preliminary Hazard Assessment by USGS

Map Generated by Cody Dawes, Nez Perce Soil and Water Conservation District. January 2016
Erosion Hazard

Legend
GeoWEPP Hillslope Erosion Potential
- 0 to 1 tons/acre (979 Acres)
- 1 to 10 tons/acre (780 Acres)
- 10 to 50 tons/acre (319 Acres)
- >50 tons/acre (28 Acres)

GeoWEPP Category, Municipal Fire

Source: Potential hillslope erosion as estimated from the GeoWEPP model. GeoWEPP is a geo-spatial interface for WEPP (Water Erosion Prediction Project). Model Runs completed by Mary Miller, Michigan Tech Research Institute and USFS Rocky Mountain Research Station, Moscow, Idaho.

Map Generated by Nikki Lane, Nez Perce Soil and Water Conservation District. June 2016
Farm Infrastructure Damages

No farm infrastructure damages were reported for the Municipal Fire.
Fire Suppression Restoration Needs

No analysis was completed for this fire.
Fish Habitat at Risk

Legend
- Low (0.2 mi.)
- Moderate (0.2 mi)
- Idaho Streams
- Municipal Complex Fire Boundary

Steelhead Critical Habitat by Burn Severity, Municipal Complex Fire

Source: Critical Habitat from National Marine Fisheries Service, Burn Severity verification by USFS
Map Generated by Cody Dawes, Nez Perce Soil and Water Conservation District. January 2016
Flooding Hazard

In lieu of quantitative information on increases in peak discharge, an existing HEC-RAS model was modified to examine river stage sensitivity to percentage increases in exceedance probability peaks. The existing model included a reach of the lower Orofino Creek, from its confluence with the Clearwater River upstream about 2 miles, was used to generate curves of additional river stage for increased exceedance peaks at 10% increase intervals. A family of curves showing the potential increase in Orofino Creek’s water surface elevation for the peak flow percentage increases is shown in Figure 7, below. This figure indicates that increases in peak runoff of only 10 percent result in increased river stages of more than a foot for the 10 percent through the 1 percent annual chance exceedance probability events. Similarly, a 40 percent increase in peaks increases stages by more than 2 feet for the same range of events, with stages increased by more than 3 feet for a 60 percent increase in event peaks.

![Figure 7. Increased State of Orofino Creek near Orofino, ID, vs. Percentage increases in Exceedance Probability Peak Discharge.](image-url)
FS BAER Analysis

A BAER analysis was not completed as no US Forest Service lands are located within the burned area.
Hazard Trees

Hazard trees were removed from critical areas near homes the fall of 2015. Hazard trees will continue to be a threat near homes and need future monitoring.
Land Cover Characterization

Legend
- Idaho Streams
- Municipal Roads
- Municipal Boundary

Land Cover
- Developed, Low Intensity (2 AC)
- Developed, Open Space (1 AC)
- Evergreen Forest (1,252 AC)
- Grassland/Herbaceous (18 AC)
- Shrub/Scrub (453 AC)

Description: Land Cover classes include: Developed, Open Space - Mix of constructed materials, but mostly lawn grasses. Impervious surfaces < 20% of total cover. Deciduous Forest - >20% deciduous trees. Evergreen Forest - >20% evergreen trees. Mixed Forest - >20% trees with mix of deciduous and evergreen trees. Shrub/Scrub >20% shrub vegetation. Grassland/Herbaceous - >80% grass/other herbaceous vegetation. Pasture/Hay - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Cultivated Crops - Areas used for the production of annual crops and/or being annually tilled. Woody Wetlands - Soils that are periodically saturated or covered with water and contain >20% forest or shrubland vegetation. Emergent Herbaceous Wetlands - Soils that are periodically saturated or covered with water and vegetation is >80% herbaceous.

Map generated by Cody Dawes, Nez Perce Soil and Water Conservation District.
Land Ownership Characterization

Legend
- Idaho Streams
- Municipal Roads
- Municipal Boundary

Ownership
- Private (1,195 AC)
- State (122 AC)
- Tribal (420 AC)

Description: Land ownership classes include BLM = Bureau of Land Management, Federal agency; IR = Indian Reservation, designated as tribal ownership; Private = non-governmental ownership; State = State of Idaho; USFS = United States Forest Service, federal agency; Federal = federal agency.

NRCS EWP Analysis

A damage survey report and analysis for the NRCS Emergency Watershed Protection Program was not completed for this fire.
Reforestation Needs – Private Forestlands

Legend
- Roads
- Idaho Streams
- Municipal Complex Fire Boundary
- Forest (907 AC)

Forest Acres on Private Land, Municipal Complex Fire
Source: BLM ownership layer, National Land Cover Database
Map Generated by Cody Dawes, Nez Perce Soil and Water Conservation District. January 2016
Road Characterization
Road Erosion Hazard

Over 10 miles of road are located within the burn area. No road erosion hazards were identified. However, there are many steep logging roads and power pole access roads that have erosion and small slope failure hazards (slumping of cuts and fills).
Salvage Analysis

No analysis was completed for the Municipal Fire.
Slope Characterization

Legend
- Idaho Streams
- Municipal Roads
- Municipal Boundary

Slope Category
- 0-20% (613 AC)
- 20-40% (564 AC)
- >40% (559 AC)

Description: Slopes were identified using Digital Elevation Model data. Slopes were divided into 3 categories 0-20%, 21-40%, and >40%.


Map generated by Cody Dawes, Nez Perce Soil and Water Conservation District.
Stream Characterization

Legend
- Municipal Boundary
- Municipal Streams
  - Perennial (0.7 mi)
  - Municipal Roads

Description: Stream segments are classified by perennial or intermittent. Perennial segments have water flowing throughout the calendar year. Intermittent segments contain water flow on a seasonal basis.

Structures at Risk

Description: A review of structures at risk of damage from post fire hydrologic effects was done using Google Earth and the burned area severity maps. Structures that were located in the floodplain or alluvial fans (generally at the base of steep draws) were located and mapped. Many of these properties have an existing risk of flooding and debris torrents that have been elevated to varying degrees due to the fires of 2015 and are represented by yellow dots.

Water Systems at Risk
Weed Invasion Analysis

The weed inventory and analysis is in progress, however data was unavailable as of the date of this report. Analysis is being completed by the Idaho County Weed Department.
Wildlife Habitat at Risk

Legend

- Roads
- Idaho Streams
- Municipal Complex Fire Boundary
- Forest (907 AC)

Forested Acres on Private Land, Municipal Complex Fire

Source: BLM ownership layer, National Land Cover Database

Map Generated by Cody Dawes, Nez Perce Soil and Water Conservation District, January 2016