Burned Area Emergency Response
Engineering Report – Bagley Fire

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Objectives: Evaluate the effect of the Bagley fire on the Forest's infrastructure and the possible damage to the infrastructure, forest resources, and surrounding watershed due to increased runoff from burned slopes.

Issues: The issues of concern include current damage and the potential of damage caused by increased runoff. Engineering concerns include culvert blockage and failure, erosion of road surface and road bed, and road damage that poses a safety threat.

Observations:
A). Background information: The fire boundary encloses approximately 150 miles of forest roads with the majority of those roads being maintenance level 1 and 2 roads. Overall the roads are in decent shape but do not have adequate drainage structures to handle the increased runoff expected from the fire damage.

B). Reconnaissance Method: All reconnaissance was completed by vehicle and foot access. Areas of high/moderate burn severity and specific values were the priority for field survey.

C). Findings/Description of Emergency: All road areas surveyed generally have the same issues.

- Undersized/plugged and misaligned culvert pipes.
- Degradation of road surface drainage profile causing runoff to flow down the road.
- Erosion at pipe and dip outlets with no energy dissipaters.
- Berms and/or through cuts that channel water on road surface with inadequate drainage relief and erosion protection.
- Damaged or failed over side drains.
- Large fills with heavy woody debris and sediment above culvert pipes.
- Assumed average ~ 1 stump hole per 2 miles road in high/moderate burn areas. (Assumption for all roads based on roads observed)
- Open cat lines that could suffer erosion and pose a safety concern if not closed.
- Burned up road number signs.

Treatment recommendations:
A). Management treatments:

37N48

- **Clean out culvert inlets-11 @ $XXX/ea ($XXX)**
- **Remove Outside Berm-0.45miles @ $XXX/ mile ($XXX)**
- **Repair Stump hole-1@ $XXX /stump hole. ($XXX)**

37N95

- **Clean out culvert inlets and catch basin -8 @ $XXX /ea ($XXX)**
- **Clean out and repair smashed culvert inlets and catch basin-2 @ $XXX /ea ($XXX)**
- **Remove Outside Berm-0.5miles @ $XXX / mile ($XXX)**
- **Repair Stump hole-2@ $XXX /stump hole. ($XXX)**
- **Install rolling dip and construct rock dissipater -2 @ $XXX / dip ($XXX)**
- **Construct rocked critical dip to accommodate overtopping and protect the road fills-4 @ $XXX each ($XXX)**

37N51Y

- **Clean out culvert inlets and catch basin -2 @ $XXX /ea ($XXX)**
- **Clean out and repair smashed culvert inlets and catch basin-1 @ $XXX /ea ($XXX)**
- **Brush Channel to prevent culvert plugging 200' ($XXX)**
- **Construct rocked critical dip to accommodate overtopping and protect the road fills-4 @ $XXX each ($XXX)**

37N43

- **Clean out culvert inlets and catch basin -4 @ $XXX /ea ($XXX)**
- **Brush Channel to prevent culvert plugging 200'- 5 locations ($XXX)**
- **Install rolling dip and construct rock dissipater -4 @ $XXX / dip ($XXX)**
- **Construct rocked critical dip to accommodate overtopping and protect the road fills-4 @ $XXX each ($XXX)**

37N68

- **Riprap outlet dissipater -3 @ $XXX /ea ($XXX)**
- **Brush Channel to prevent culvert plugging 200'- 2 locations ($XXX)**
- **Clean out culvert inlets and catch basin -4 @ $XXX /ea ($XXX)**
- **Armor culvert inlet-2 @ $XXX /ea ($XXX)**
- **Armored Crossing Overflow-2 @ $XXX /ea ($XXX)**
- **Construct rocked critical dip to accommodate overtopping and protect the road fills- 3@ $$XXX each ($XXX)**
- **Install end section on inlet- 3 @ $XXX ($XXX**

37N33A

- **Clean out culvert inlets and catch basin -6 @ $XXX /ea ($XXX)**
- **Clean out and repair smashed culvert inlets and catch basin-1 @ $XXX /ea ($XXX)**
- **Clean Ditch whole length of road-0.68 miles ($XXX)**
- **Install rolling dip and construct rock disapator-12 @ $XXX / dip ($XXX)**
- **Install rolling dip with leadoff ditch ~20' and construct rock dissipater - ($XXX)**
- **Armor culvert outlet-5 @ $XXX /ea ($XXX)**
- **Install road closure barrier- ($XXX)**
- **Repair drainage at concrete ditch-($XXX)**
- **Armored Crossing Overflow-1 @ $XXX /ea ($XXX)**

37N33C

- **Clean out culvert inlets and catch basin -2 @ $XXX /ea ($XXX)**
- **Clean out and repair smashed culvert inlets and catch basin-1 @ $XXX /ea ($XXX)**
- **Clean Ditch whole length of road-0.70 miles ($XXX)**
- **Install rolling dip and construct rock dissipater -2 @ $XXX / dip ($XXX)**

Fire area overall costs

- **Storm patrol-$XXX (3 weeks two people)**
- **Monitoring-$XXX (3 weeks two people)**
- **Signs-$XXX**

B). Monitoring: Monitoring or storm patrol of roads the first 1-3 years after fire.

C). National Fire plan proposals, long term project proposals: Closure of roads in proposed areas for resource protection to reduce damage to road surfaces during wet weather periods. Decommissioning segments of roadways to trails, that are no longer needed for administrative access or that have a high probability to contribute large amounts of sediment deposits into tributaries. Further evaluation and replacement of undersized culverts.

Consultations: Members of the BAER Assessment Team and regional engineering personal.

References: Best Management Practices booklet by the USDA Forest Service. (Author unknown at this time)**.**