

Pack River Stressor Identification Process

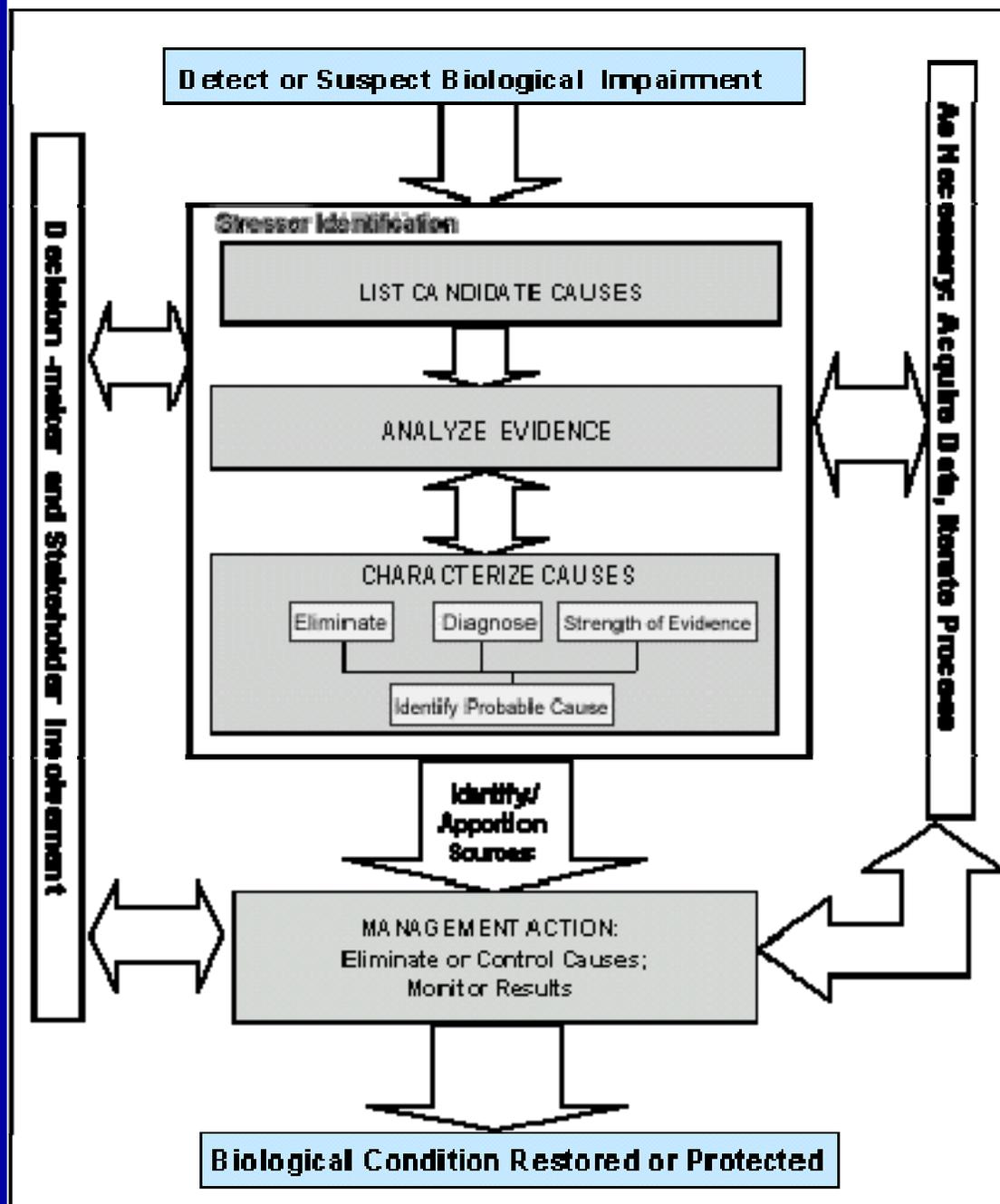
Darren Brandt

TerraGraphics Environmental Engineering

Stressor Identification Process

- A formal and rigorous process to identify stressors causing biological impairments in aquatic ecosystems and
- a structure for organizing the scientific evidence supporting the conclusions

Overview of the Stressor Identification Process



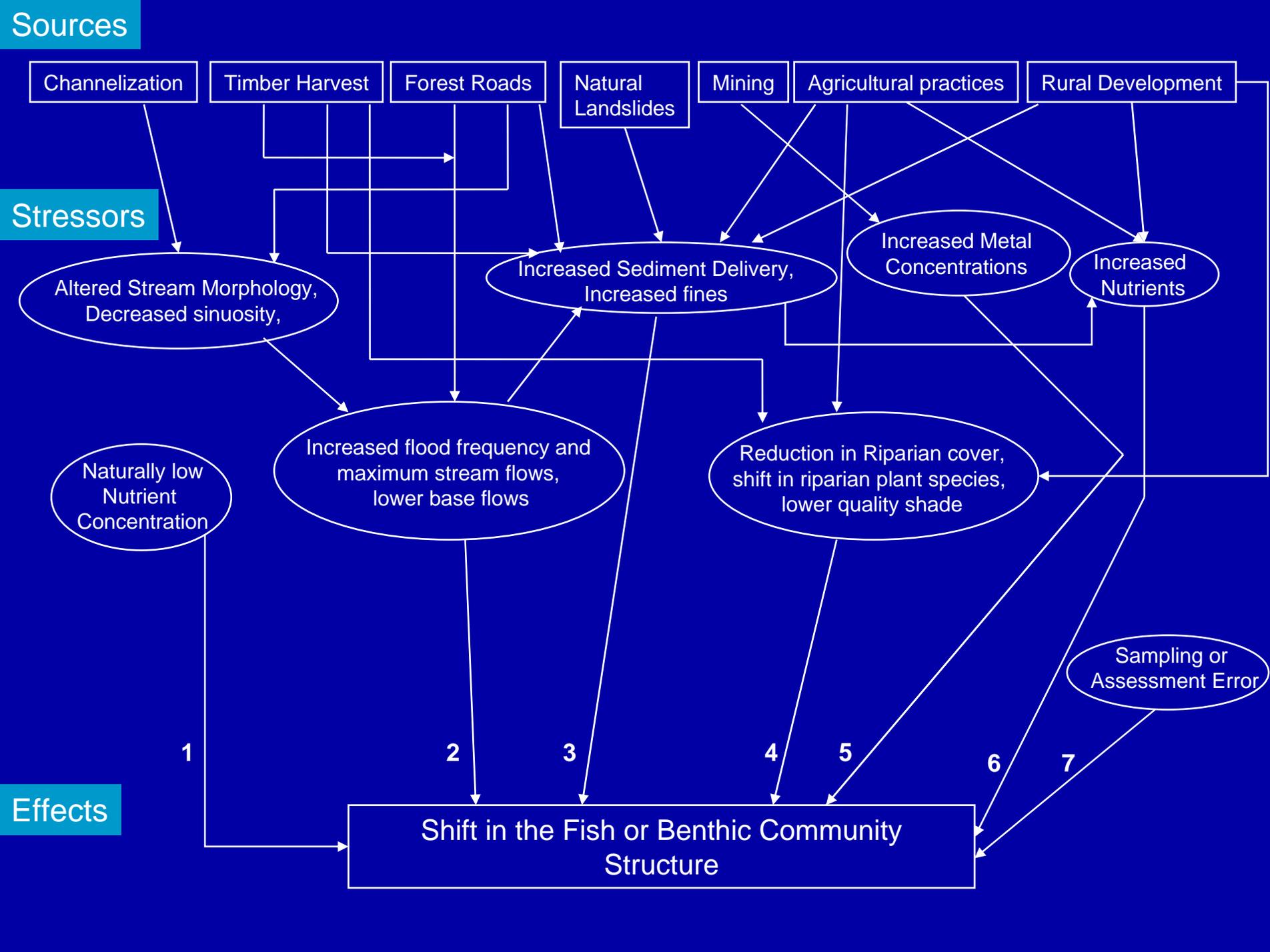
Streams Needing Pollutant Determination in the Pack River Drainage

Water Body Name	Assessment Unit No.	Impairment Boundaries	Pollutant of Concern
Rapid Lightning Creek	ID17010214PN033_03	Rapid Lightning Creek – Trapper Creek to Pack River. Third order portion of Rapid Lightning Creek.	Cause Unknown ^a
Gold Creek	ID17010214PN034_02	Gold Creek – Source to Pack River. First and second order portions of Gold Creek.	Cause Unknown ^a
Upper Pack River	ID17010214PN041_02	Upper Pack River – source to Lindsey Creek. First and second order portions of Pack River, West Branch Pack River, Zuni Creek, Martin Creek, Homestead Creek and Lindsey Creek, Pearson Creek, Youngs Creek, Thor Creek, Beehive Creek, Slide Creek.	Cause Unknown ^a
McCormick Creek	ID17010214PN042_02	McCormick Creek – Source to Pack River. First and second order portions of McCormick Creek.	Cause Unknown ^a
Hellroaring Creek	ID17010214PN044_02	Hellroaring Creek – source to Pack River. First and second order portions of Hellroaring Creek	Cause Unknown ^a
Sand Creek	ID17010214PN049_02	First and Second order portions, source to Schweitzer Creek	Cause Unknown ^a
	ID17010214PN049_03	Sand Creek – Source to Schweitzer Creek. Third order portion of Sand Creek.	Cause Unknown ^a



Data Used in the SI Process

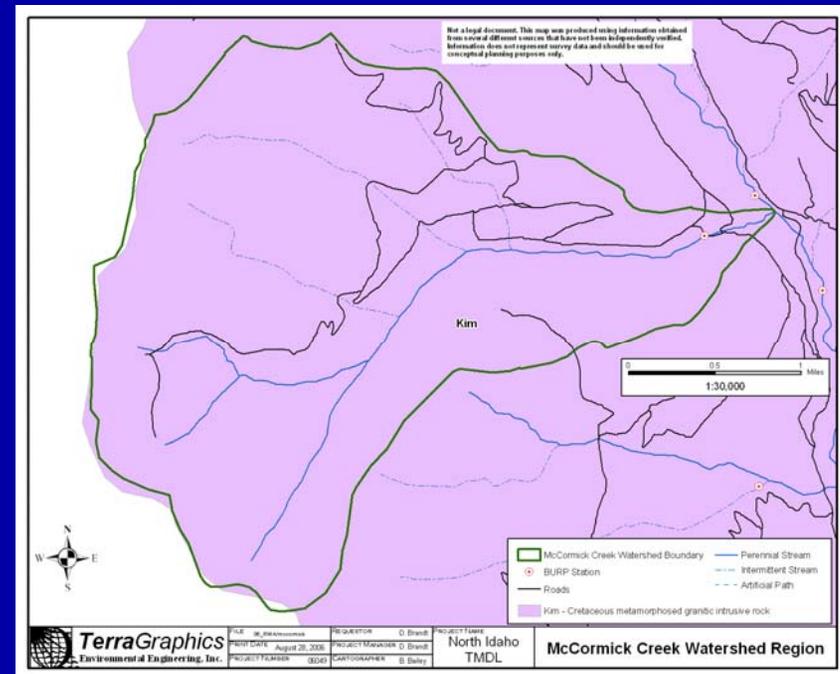
- BURP data
 - Fish and Macroinvertebrates
 - Habitat Information
- Cumulative Watershed Assessment Reports
- Nutrient Data
- GIS coverages
- Channel Survey data
- TMDLs, FS reports, personal communication



Findings

McCormick Creek

- Increased nutrients and high metal concentrations were eliminated as potential stressors based on available information from investigation of current and historic land use practices. It was determined that the most likely causes for the poor macroinvertebrate and fish scores were low nutrients and sampling/assessment problems.
- We do not recommend the development of a Total Maximum Daily Load (TMDL) at this time.

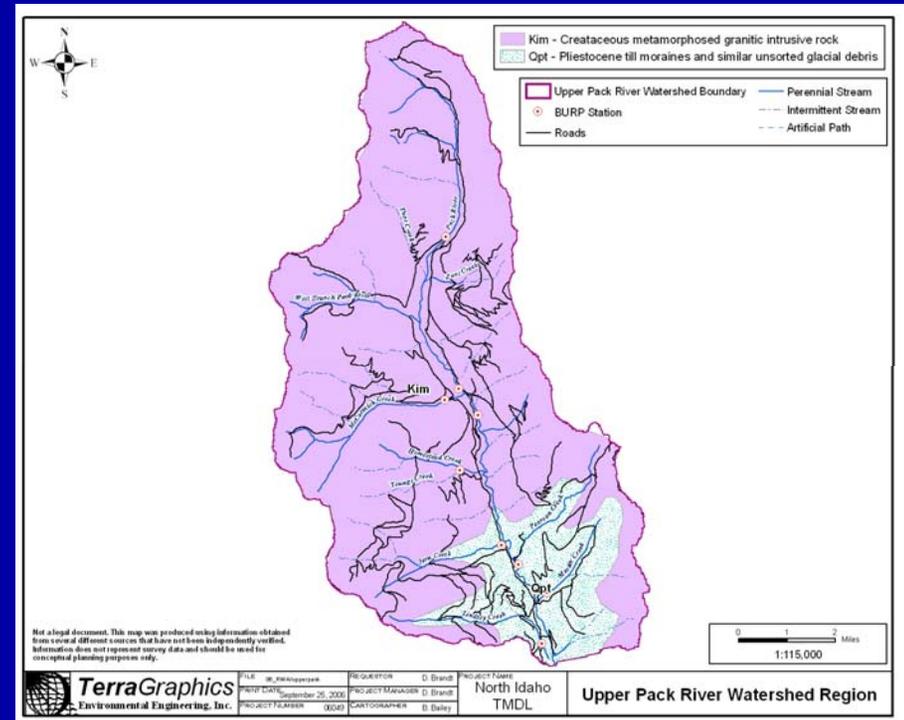


McCormick Creek cont.



Upper Pack River (2nd order section)

- Increased nutrients and high metal concentrations were eliminated as potential stressors based on available information from investigation of current and historic land use practices. We determined that the likely stressor was excessive sediment.
- We recommend the development of a sediment Total Maximum Daily Load (TMDL) for the lower portion of the Upper Pack River watershed.

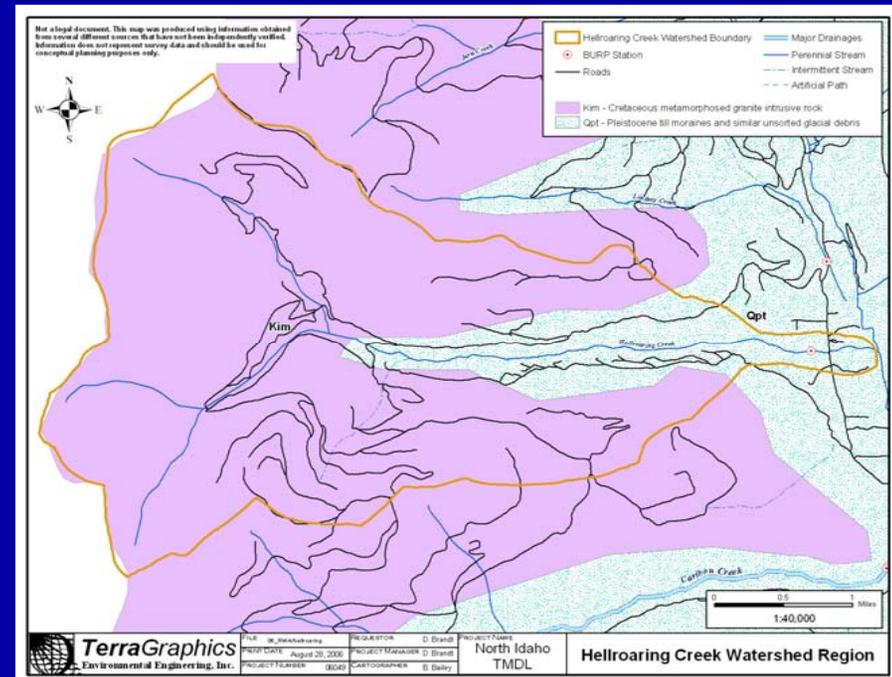


Upper Pack River (2nd order section) cont.



Hellroaring Creek

- Increased nutrients and high metal concentrations were eliminated as potential stressors based on available information from investigation of current and historic land use practices. We concluded that the likely causes of impairment are from increased sediment delivery, low nutrients and, to a lesser extent, stream temperature.
- We recommend that a sediment Total Maximum Daily Load (TMDL) be developed for the Hellroaring Creek Watershed.

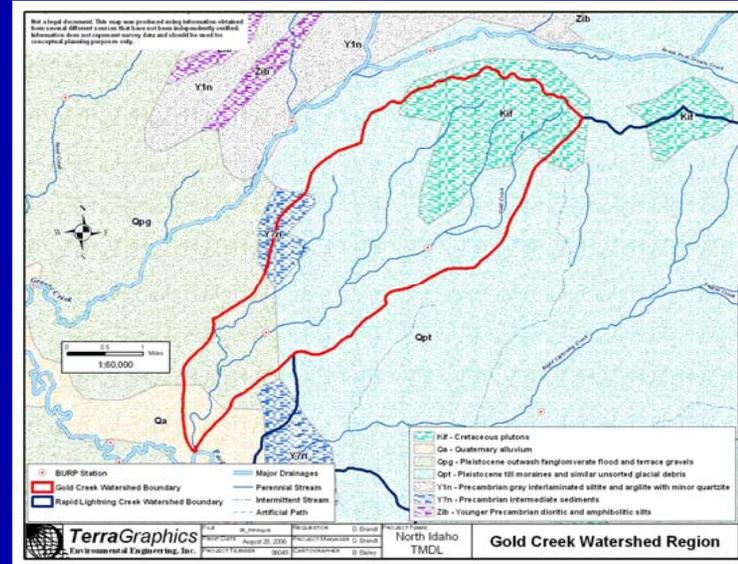


Hellroaring Creek cont.



Gold Creek

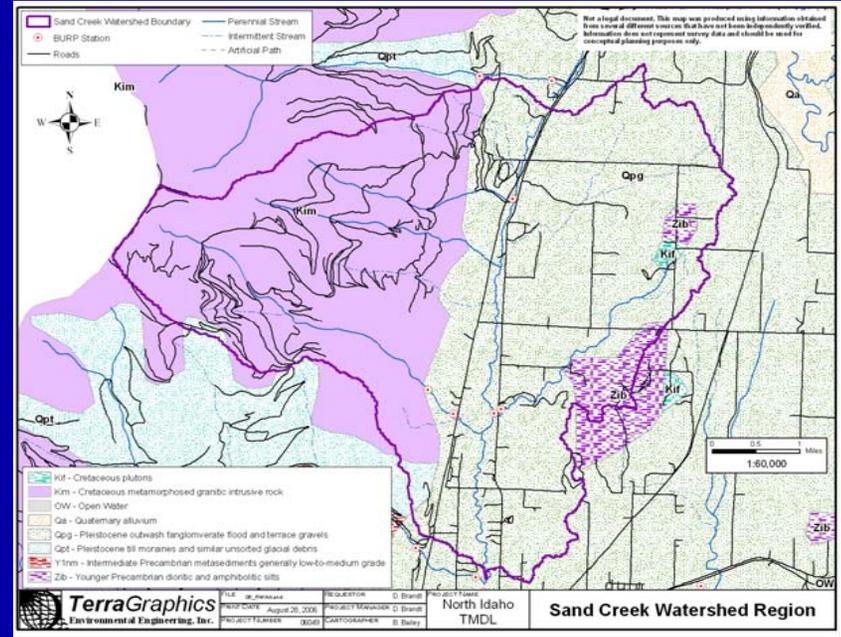
- High metal concentrations was eliminated as a potential stressor based on available information from investigation of current and historic land use practices. We concluded that the likely causes of impairment are high percent fines and thermal modification.
- We recommend that sediment and temperature Total Maximum Daily Loads (TMDLs) be developed for the watershed and that monitoring for determination of the nutrient status be undertaken to determine existing nutrient loading to the system.



Rapid Lightning Creek cont.



Sand Creek



- Low nutrients was eliminated as a potential stressor based on available information from investigation of current and historic land use practices. The remaining six potential causal agents were evaluated. We determined that high percent fines was a likely stressor but we were unable to determine if this was a natural condition or human induced.
- We recommend that the watershed be modeled to allow comparison of natural load to current load.
- We recommend the collection of additional temperature and nutrient data. These two candidate causes could be contributing factors, but sufficient data do not exist to determine this with any degree of certainty.

Summary Table

Water Body Name	Assessment Unit No.	Impairment Boundaries	Pollutant of Concern
Rapid Lightning Creek	ID17010214PN033_03	Rapid Lightning Creek – Trapper Creek to Pack River. Third order portion of Rapid Lightning Creek.	Sediment – TMDL recommended if watershed modeling supports it.
Gold Creek	ID17010214PN034_02	Gold Creek – Source to Pack River. First and second order portions of Gold Creek.	Sediment/Possibly Nutrients and Temperature
Upper Pack River	ID17010214PN041_02	Upper Pack River – source to Lindsey Creek. First and second order portions of Pack River, West Branch Pack River, Zuni Creek, Martin Creek, Homestead Creek and Lindsey Creek, Pearson Creek, Youngs Creek, Thor Creek, Beehive Creek, Slide Creek.	Sediment – Portions impacted by Sundance Fire and subsequent salvage operations.
McCormick Creek	ID17010214PN042_02	McCormick Creek – Source to Pack River. First and second order portions of McCormick Creek.	Low Nutrients – No TMDL
Hellroaring Creek	ID17010214PN044_02	Hellroaring Creek – source to Pack River. First and second order portions of Hellroaring Creek	Sediment
Sand Creek	ID17010214PN049_02	First and Second order portions, source to Schweitzer Creek	Sediment – TMDL recommended if watershed modeling supports it. Sediment loads may be natural.
	ID17010214PN049_03	Sand Creek – Source to Schweitzer Creek. Third order portion of Sand Creek.	No data