Questions for Jeremy
The last slide went by fast, so maybe I missed it, but how do you ensure the latest science is being used by the various agencies that need it/want it, how do you know they are receiving your products and using the science?
Would good forest management reduce the amount of debris flow after a fire.
SoCal and alluvian Fan debris flows is most of the research. . However, not all debris flows are created equal. How can we best advise partners in NorCal when this is most of the info they can find?
I get a lot of small landowners asking questions about post-fire erosion control specific to their area. Issues with invasive species, which method, costs expected etc. Is there a good resource for non-agency folks or is there not enough information?
Seems like the Forest Service and National Park Service managers are well aware of the BAER program, post fire risks. BLM seems to be behind the curve as far as manager's knowledge. How do we educate BLM management?
Having more radar data and gauge data is great. Can you talk about how we solve the issue of getting this data into the warning software.

Questions for Science Panel	
CATEGORY	QUESTIONS
	All: We heard of many concerns and issues. What issue would Each panelist like to see addressed first? What is their priority#1?
Katherine Rowden	
	For Katherine Rowden: How often does flash flood guidance change after fires burn?
Dave	
	Dave - Do you find annual recurrence interval rainfall info helpful, or does it matter?
Jeremy	
	Jeremy - how is the work on the post fire tool kit in CA addressing science needs identified? Is the task force working on the right things?
	Jeremy- do all States is use same method to map alluvial fans?
	Jeremy and Don - are you seeing communities being more willing to stand-by CGS recommendations on post-fire risk/evacuations/re-occupation of impacted areas in the post-Thomas Fire world?
Don and Stephen	
	Both Don and Stephen alluded to sizing structures for post-fire conditions, has consideration been given to temporary structures or crossings to accommodate the changing conditions prior to sizing a permanent structure?
Modeling	
	To the best of your knowledge, has anyone adopted machine learning modeling for runoff for post fire environments?
	How would you like uncertainty be presented in model estimates? color code map, probability, likelihood, the model is right or wrong
	How useful are wildfires prediction for the following season, based on, e.g., satellite soil moisture data.
	Do we need to prioritize designing interactive tools/models for post-fire hazards? Or are static products (e.g. maps) more beneficial?
	How do we make sure that we differentiate modeling threats that can be mitigated with treatments from threats like larger debris flows that cannot be mitigated?
	What is the point in running both hydrologic models and debris flow models? What r the key differences?
	would pre-disturbance fuels work help to reduce post fire impacts? If so has any work been conducted in an area that has experienced a disturbance?

Communication	
	My take is that community planners think of alluvial fans as dormant like volcanos. How do we improve our messaging?
	What are some ways you suggest sharing of information can be done efficiently between agencies - between federal agencies, between federal and state and from fed to state to local? is there/should there be a single repository? Who would manage?
	to the panel: What is the best way to relay your science results to managers dealing with these issues, and helping them to apply it quickly and efficiently?
	How do you collaborate with biologists (botany/soil/microbial) on post-fire mitigation? Who do you collaborate with?
	Has anyone on the panel worked with social scientists before regarding the communication of post-fire hazards issue? How was it implemented and how well did it work?
	Inciweb can be an effective way of communicating post-fire information with all cooperating agencies able to post information and contacts. The public has access to it also.
	How could the Federal agencies better coordinate the interagency development of post-fire products, services, and science.
BAER	
	Why does BAER hydrology seem to always underestimate flooding?
	How can we get federal agencies BAER teams to look at downstream impacts that are off of federal lands? Change policy to allow them to look at those needs where work on federal lands can make positive impacts off federal land.
	Why don't the BAER teams include a silviculture and fuels specialist that will help in the assessment of risks associated with future fire events and ecological restoration?
	do you think stream stats needs updating to better support BAER model estimates? how?
	How standardized are BAER reports from various agencies? If not, would that be possible? If standardized , these reports would be easier for machines to parse and analyze.
	How can BAER increase collaboration with microbiologists, seeing as how soil microbes can be key to soil aggregation and mitigation efforts?
	I''m concerned with apparent lack of follow-through from BAER to longer-term (6 months to 4 years post-fire) rehab and management, particularly discounting of hydrologic concerns that may inhibit timber salvage.
Debris Flows/Runoff	
	Given a lot of the research on alluvial fan flooding post fire is across SoCal. What's the best way for Norcal to address questions partners have, since not all debris flows are the same?

	What is being done in the Southwest to better predict runoff?
	Given the uncertainties in clear water modeling and bulking factors should we consider alternative methods to evaluate risk from post fire flooding/debris flows. Colorado has developed a fluvial hazard zone mapping program that may be a good alternat
	At some point I would like to hear a discussion about the use of runoff models verses debris flow models. What are the differences in the two and why use both? Or why not?
	Can the risk on alluvial fans ever Be mitigated enough or do people need to be removed from them to stay safe
Precip	
	Has any one looked at using space based rainfall data? I am not sure if it is available fast enough?
	There has been a lot of work done on probabilities for debris flows and in creating rainfall thresholds. The NWS in a forecast sense is moving more and more toward probabilistic rainfall forecasts. How can we match up those probailities in practice?
	Does NWS or others have a detailed database of past post-fire flash floods and debris flows coupled with estimated precipitation rates that generated these? If so, does it include high rainfall intensity non-events?
Funding	
	Wondering if some of the panelists could touch on their thoughts about the use of funds for and benefits of fire suppression compared to post-fire stabilization and rehabilitation.
	What have been your experiences with funding post fire mitigation projects /actions, and are there improvements to those funding sources being considered to allow a more timely response?
Community Isses	
	Much pressure to "capture value" in burned dead/dying (or even minimally at-risk) timber, justified by roadside hazard in local National Forest. Also protect roads with culvert installation. How to deal with this as community member?
Fan Mail	
	Thank you so much for referencing the Joint Fire Science Program - the regionally-based Fire Science Exchanges provide support, online resources and website for exchange of science, briefs, webinars, videos, and links about many wildfire issues -
	The topics supported by the Fire Science Exchange Networks embrace most issues regarding wildland fire, particularly fire ecology, management, post-fire effects, social science and community preparedness, & many other topics. Glad we can be of help!

Three words or phrases to describe your post-fire challenges.	
CATEGORY	RESPONSES
Accuracy	
	Accurate
	accuracy
Agencies	
	Agencies
	Agency_boundaries
	Jurisdiction_boundaries
	Turf_war
	turf_wars
Communicate/communication/collaboration	
	Collaboration
	Communicate
	Communicate
	Communicate
	communication
	Communication
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	Communication
	communication
	Communication
	Communication
	communication
	Communication_with_local
	Hazard_communication
	Communications
	Information_access
	Leadership_Communication
	Messaging
	Sharing
	Sharing_Information
	Tech_transfer
	Education
Coordination	
	Coordination
	Coordination
	Coordination
	coordination
	Coordination
	coordination
	Coordination
	Coordination
	coordination
	agency_coordination
	interagency_cooperation
	interagency_coordination
	Interdisciplinary

	timely_coordination
	Integration
	Issues_dont_get_dropped
	Partner's_expectations
Data	
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	Data
	Data
	Data
	Data
	Data
	data
	data
	Data_availability
	data_gaps
	Data_gaps
	Data_gaps
	Data_Information
	Data_sharing
	data_standards
	data-data-data-data
	Easy_access_to_data
	Lack_of_regional_data
	Ready_to_use_data
	Real-time_data
	Soils_data_or_lack_of
	Subjective_Bias

	Sufficient_data
	high_resolution_imagery
	science
	Simplicity
	Standardization
	Not_an_exact_science
	Redundancy
	return_interval
Death	
	Death
	Death
Debris Flows	
	Debris_Flow_Modeling
	debris_flows
Erosion	
	erosion
	erosion
	erosion
	erosion
	Erosion
Sedimentation	
	Sedimentation
	Sedimentation
Flooding	
	Flood_probability
	Flooding
	Inundation
	Estimating_discharge
	adjusting_runoff_know
	runout
Forecasting	
	forecast_uncertainty
	Forecasting
	Meteorology

	Precipitation_probability
Funding	
	Funding
	funding
	Funding
	Funding
	funding
	funding
	Funding
	funding_prep
	Adequate_funding
	color_of_money
	Money
	money
	Money
	financial_support
	Quick_funding_periods
Resources	
	resources
	Resources
Hazards	
	hazards
	Hazards
Habitat Recovery	
	landscape_stabilization
	recovery
	recovery_time_frames
	Habitat_recovery
	reforestation
	Reforestation
	ecological_resiliency
	seedlings
	soil_health
	treatment_implementation

	vegetation_tecovery
	weeds
	Mice
Long term recovery	
	Long_term
	long_term_support
Mapping	
	Mapping
	Mapping
Modeling	
	Model_wars
	Modeling
	Modeling
	Modeling
	Modeling
	Modeling
	Modeling
	Modelling
	modelling
Monitoring	
	Monitoring
	Monitoring
	Monitoring
	Monitoring
	Monitoring
	monitoring
	nonlinear
Policy/Politics	
	policy
	politics
	politics
Pre-fire Prep	
	pre-fire_veg_knowledge
	Preparation

	good_preparation
Public	
	public
	Public's_expectations
Precipitation	
	rain_intensity
	rainfall_intensity_data
	Rainfall_rates
	Sub-hourly_precipitation
Risk	
	Risk
	Risk
	Risk
	risk
	community_risk
	risk_management
	risk_management
	risk_management
	risk_management
	risk-informed
	Risks
Internal Limitations	
	staffing
	Staffing_ResourcesTime
	Implementation
	Institutional_knowledge
	internal_management
	varying_priorities
	Understanding_complexity
	Underestimated
	Understanding
	organization
Thresholds	
	thresholds

	Thresholds
	Thresholds
Time	
	Time
	Time
	Time
	time
	time
	Time_limits
	Time_to_implement_actions
	Timely_current
	timing
	timing
Uncertaintly	
	UncerTainty
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	Uncertainty
	Uncertainty
	uncertainty
	Uncertainty
	unknown
	Unknown_unknowns
	Unrealistic_expectations
	lack_of_control

Community Impacts	
	Emotional
	evacuation
	Financial_impacts
	Fire_deniers
	Hectic
	catastrophic
	Chaotic
	Complex
	stressful
	Survivor_Needs
	trauma
	Safety
	Overlooked
	Values
	Protection
Other	
	Environmental
	Geology_matters
	Getting_timber_to_mellow
	Identifying
	Mid_understanding
	quantity_of_quality
	using_appropriate
	What_does_it_mean_to_me
	Access
	adaptation
	adequate_assessment
	Best_assumption

What is missing from post-fire assessments that you would like to see addressed?	
TOPICS	RESPONSES
Downstream Impacts	
	Downstream recommendations
	All values at risk.
	Downstream effects
	Downstream
	Impacts beyond federal boundaries
	Consideration of non-federal lands
	More on off forest effects/risks
	Downstream effects
	Downstream off-forest hazard assessments
	Impacts beyond federal boundaries.
	Downstream recommendations
	Downstream values
	Better assessment of downstream off fed land risks
	Downstream values at risk
	Downstream impacts and threats
	Downstream treatments
	Treating all lands
	Prediction of potential return interval(s) of mass wasting or debris flow events that might occur in the same place.
	Impacts to marine environment
Flooding/debris flows	
	Agencies requiring mudflow/debris-flow analyses in addition to clear-water modeling for post-fire recovery development
	coordinating risk from debris-flows and flooding
	debris flow inundation estimates
	debris flow vs. flash flood thresholds
	Debris outflow locations
	DF runout modeling.
	Downstream analysis flooding
	Downstream debris flow, not just those on federal land.
	Extent of debris flow runout

	Flash flood rainfall thresholds like USGS does for debris flows
	Flood risk changes with recovery
	Fluvial Hazard Zone mapping
	In-channel erosion processes
	Inundation mapping
	Inundation mapping
	Inundation mapping
	Inundation mapping on and below forest
	inundation potential
	Inundation Risk Maps
	Like flood inundation mapping but for potential debris flows. Visualization tools!!!
	Mapping of areas where salvage would cumulatively impact hydrologic concerns, vs where it would be less impactful.
	Mapping to the pour point
	post-fire debris flow and flood history
	Rainfall Thresholds
	suspended sediment transport downstream
	Tools for real-time debris flow monitoring. Camera or laser systems for very high risk areas.
	Which channel reaches are erosional/depositional
	Zones of erosion/deposion
	Alluvial Fan landform mapping
	Alluvial fan potential
Communication/Coordination	
	community outreach
	Public perception about messaging
	communication plan
	Community engagement
	Community pitteach
	Community communication
	Community outreach plan
	Impacts on indigenous communities and their homelands.
	Integration with local media and government

	A publically available post fire database with field measurements, modeling, resources at risk and recommendations
	public outreach
	Follow-up report
	Coordination contact lists
	An end user education component
Report Components/Availability	
	Implementation plan
	Simplification of post-Fire assessments for public consumption
	Recommendations for immediate burn-out of scorched but not consumed fuels (as future fire hazard issue,) and interface with wildlife habitat.
	Cost effectiveness evaluation of recommendations
	Better Tools for mapping recovery and how it can inform risk
	Cost estimates compared with those for mitigation and prevention.
	Release of report to public, or at least being made available on web site(s).
	Make assessments easier to find
	Political and social implications of mitigation techniques
	Closer interaction and coordination with invasive species management efforts.
	Better coordination between USFS and states.
Model/Data	
	Model and data uncertainty.
	vegetation burn severity
	Tradeoffs
	temporal risk estimates
	probabilistic interpretation
	Model Certainty Assessment
	Analysis at smaller watershed scale
	Limitations of modeling and specifically saying how much the numbers should be trusted and presented
	Pre fire assessments made on treated areas to see if thinning and burning affects the models.
	Co-production of science and It's application
	Data needed but didn't have
Community Recovery	

	Survivor/Resource Connections
	Community perspective
	Socioeconomic information, who is impacted or at risk, most vulnerable
	resources available to private landowners impacted by fire
	Plan for community moving forward - what does community need to do moving forward, in what order, and with what resources
	One location to send impacted people to for additional resources. There is not one site they can get to key information.
	Managing expectations
	Local capacity to support agency assessments.
	Contact points for private landowners including as many agencies as possible.
	"Pocket-guide" for community managers and communities about what post-fire programs belong to which federal and state agencies and how they work.
Funding/Resources	
	funding to address mitigation recs
	Available programs/funding
	Funding for mitigations
	Mitigation resources
	Identify mitigation resources
	Funding to implement mitigation in a timely manner.
	funding opportunities
Long term recovery	
	long term rehab opportunities and needs.
	How risk changes over time.
	Reforestation need/potential
	Community well being assessment in post fire landscape
	working with those impacted to identify achievable mitigation actions
	Vegetation recovery
	Pist-fire monitoring
	Post-mitigation effectiveness
	Risk over time
	Vegetation recovery
	Monitoring and results.
	Long-term effects of fire on water supply and water quality.

Soil/Microbes	
	long-term soil impacts
	Microbes
	Soil Health Assessments
	Microbe recovery monitoring
	Soil hydraulic effects reporting
Follow up	
	Understanding of monitoring so that we can learn whether our assessments are accurate.
	Follow up and reporting on outcomes
	The framework for handing off to the forest, complete with responsible parties. Things get dropped all the time, and it is infuriating!
	I'd be really interested in some sort of follow up that brings together the "science info doesn't always meet my needs" response and the "I would like more webinars/virtual conferences" responses.
	Communicating results
	Monitoring and effectiveness of BAER plan
	Assessments of what actually happens compared to what the report was saying.
	Effectiveness monitoring. There is never a Feedback
	Updates as the burn scar ages
	follow up discussion between forests who applied BAER within the region
	Use of citizen scientists to help generate obs for post fire effects
Mentoring	
	Development of a process flow map, which partners do what task and in what order to get to the multiple end users.
	Monitoring for adaptive learning and management
	Mentoring
	better mentoring
	Introduction of new technologies and mentor ship on thes... like drones, models, model parameters, iterative modeling efforts and coordination between modeling groups.
	Science based desired conditions to guide long term landscape restoration
Uncertainty	
	Uncertainty in the numbers
	Uncertainty
	uncerntainty

	Uncertainty!
Other ?	
	Confidence intervals
	Thresholds
	Wind erosion potential and its effects on air quality, water, and landscapes
	Rainfall atlas for the Pacific Northwest
	Mitigation innovations
Comments	
	We should poll folks to find out what would meet their science needs and do webinars on the listed topics.
	Some of these areas are “natural” mobile drainages. At what point do we say this is a natural event?

I need more, or improved, scientific information on…	
CATEGORY	RESPONSE
Bulking/Flooding	
	Bulking_Factor
	bulking_in_hydro_models
	Flood_bulking
	Flood_flows
	Flood_prediction
	hydrologic_modeling
	hydrologic_response
	Hydrology
	hyperconcentrated_flows
	Outflows
	Post_fire_flooding
	runout
	Inundation
	Inundation
	Inundation
	riparian_impacts
Runoff	
	Runoff
	runoff_thresholds
	regional_runoff_modeling
Burn Severity	
	Burn_severity
	burn_severity
	Burn_severity
Climate Change	
	climate_change
	CLIMATE_CHANGE
	Climate_change
	Climate_Change
	Climate_change
	climate_change_effects

	PHENOLOGY
Communication	
	Communication
	Communication
Community	
	Community_vulnerability
	citizen_response_to_risk
	Cultural_resources_locats
Debris Flow/Erosion	
	Debris
	debris_flow
	debris_flow
	debris_flow
	Debris_Flow
	debris_flow
	debris_flow
	Debris_flow_risk
	debris_flow_risk
	Debris_flow_runout
	Debris_flows
	Debris_flows
	debris_management
	Erosion_control
	hillside_erosion
	post_fire_runoff_modeling
	Sediment
	Sediment_bulking
	slope_stability
Downstream	
	Down_stream_inundation
	Downstream_effects
	downstream_values
Water Quality	
	Drinking_water

	drinking_water
	Water_quality
Fire Severity	
	Fire
	Fire_Severity_Modeling
	Fire_severity_modeling
Pre-fire	
	fuels_reduction
	High_event_areas
	Mitigation_effectivevness
	pre-fire
	Pre-Fire_data
	Preparation
	Pre-planning
Local Information	
	Geology
	Local_data
	Local_risk
	Long_term
	long-term
	statistics_on_local_risk
	wind_variables
	area
	Area-specific
	3D_mapping
Modeling	
	Better_modeling
	Model_accuracy
	Modeling
	Modeling
	modeling
	Modeling_hazards
	Results_midel_validation
Precipitation	

	Precip_thresholds
	Precipitation
	Precipitation
	Precipitation
	Precipitation
	Precipitation_effects
	predicition
	Rain
	Rainfall
	Rainfall
	rainfall
	rainfall_data
	Rainfall_intensity
	Rainfall_threshold
	Short_term_rain_intensity
	Storm_of_record
	Storm_predictions
Radar	
	Radar
	Radar_calibration
Recovery	
	Vegetation_data
	Treatment_effectiveness
	Habitat_recovery
	Recovery
	Recovery
	recovery
	recovery
	Recovery
	recovery
	Recovery
	Recovery
	Recovery
	recovery

	recovery
	Recovery_rates
	Recovery_timeframes
	Reforestation
	reforestation
	reforestation
	reforestation
	Reforestation
	Invasive_species
	Meadows_post-wildfire
	Native_seeding
	ongoing_efforts
	post-fire_treatments
	reburns
	removal_of_dead_and_dying
	resotring_soil_carbon
	Response_recovery
	Restoration
	salvage
	Weed_prevention
	Best_seedmix
Risk	
	Risk
	risk
	Risk
	risk_assessment
	threat_probabilities
Soil	
	Soil
	Soil
	Soil
	soil
	soil
	Soil

	Soil_hydrophobicity
	soil_recovery
	soil_variability
	Soils
	Soils_data
Thresholds	
	Thresholds
	Thresholds
	Thresholds
	Thresholds
	Thresholds
Uncertainty	
	Uncertainty
	uncertainty
	Uncertainty
Other	
	adaptive_management
	Air_quality
	Alluvial_fans
	antecedent
	certainty
	Dissemination
	Engineering
	magnitude
	Impact
	Impacts
	Innovation
	Natural_Process
	Observations
	Post_fire
	Post_fire_collect
	public
	specific