Stream water quality & aquatic habitat

- Erosion & sedimentation
- Temperature
- Peak flows
- Seasonal low-flow periods
Water quality-quantity linkages

**Stream stage** & discharge key response – traditional forest response measurement

**Soil moisture** a key response variable to disturbance

- Peak storm flows – antecedent moisture & partitioning of rain/snowmelt
- Erosion & sedimentation
- Snow accumulation & melt patterns
- Seasonal moisture availability, recruitment, evapotranspiration, fuel moisture
- Water yield to downstream flows
Effects of Vegetation Canopy and Topographic Structure on Snow Deposition and Melt

- Vegetation canopy alters the climate conditions at the snow surface via shading, wind reduction, temperature alteration, and modification of thermal radiation.

- Topography affects wind magnitudes, snow accumulation patterns, and radiation inputs.
Development & evaluation of water alternatives

Current activities:
- Evaluate possible sites using spatial & time series data
- Disciplinary integration with other team members
- Design a credible science agenda to meet management & public concerns – integration of science team & decisionmakers

Next steps
- Field visits to candidate sites; further disciplinary & stakeholder integration
- Prepare & evaluate alternatives for end-to-end integration of research/measurement & decisionmaking
Criteria for siting study plots

Habitat, recruitment, urban interface, adjacent private land, fireshed/watershed, representative, partnerships, existing data/infrastructure, community involvement, potential for positive impact, costs

- Looking for ~1 km$^2$ headwater catchments w/ perennial stream reach – nested within fireshed of 40-200 km$^2$ (10,000-50,000 ac)
Site evaluations in 4 forests

- Tahoe
- El Dorado
- Sierra
- Sequoia
5-yr treatment plans
5-yr treatment plans by elevation band

- 1500-2500 m
- 1000-1500 m
- <1000 m
- >2500 m
hydrometeorological measurements
first order streams
vegetation

pine

shrub

French Meadows

fir
first order
streams

KREW
Measuring snow & soil water in the forest

- horizontal & vertical variability
- wet & dry conditions
Instrument cluster prototypes

- Mt. Bigelow, AZ
- Valles Caldera, NM
- Yosemite, CA
- Reynolds Creek, ID
Design questions

Setting priorities among indicator variables for water quantity & quality?

Choosing priority elements of variability for site screening & selection?