Addressing Science Needs in the Lake Tahoe Basin

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Presentation to TRPA Governing Board
(19 November 2014)

TSC Climate Science Symposium:
Summary of Findings

www.tahoescience.org

TRPA GB Presentations:
Climate Impact Research Highlights

- *Maureen McCarthy (TSC)* – TSC Climate Science Symposium Summary of Findings
- *Pete Stine (USFS-PSW)* – Forest Conditions & Wildfires
- *Sudeep Chandra (UNR)* – Nearshore Impacts
- *Geoff Schladow (UCD)* – Outstanding Science Needs
- *Dennis Zabaglo (TRPA)* – AIS Program Update
- *Graham Kent (UNR)* – AlertTahoe Demo (on break)

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TSC Climate Science Symposium

- TSC Climate Science Symposium held 13 Nov 2014
- ***Purpose***: Stimulate discussion among researchers working on climate impacts and ecological resiliency in the Lake Tahoe Basin and across Sierra Nevada Ecoregion
  - Exchange Findings (ongoing/published)
  - Identify research gaps
  - Create opportunities for Collaboration
- 40+ participants including researchers from universities, federal agencies (USGS, USFS, USBR, NOAA/NWS), and CA/NV agencies, TRPA

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Panel 1: Climate Models & Impacts: Research Challenges & Gaps

- **Linking models across temporal scales: weather (days) to seasonal (months) to climate (decades)**
- **Resolving complex topography in downscaled climate models (typically with 2-6 km resolution)**
- **Linking extreme events with paleo/historical precedence and climate models**
- **Quantifying the sources of uncertainty in climate models and observed data**
- **Characterizing the impact of warmer temperatures on lake mixing and predicting change in oligotrophic/eutrophic status**
- **Understanding impacts of watershed vegetation change on nearshore nutrient loading**

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Panel 2: Storms & Floods: Research Challenges & Gaps

- **Predicting flood levels from precipitation**
- **Forecasting snow levels**
- **Understanding relationship between snowpack and nutrient loading in aquatic resources (streams, lakes)**
- **Correlating local and downstream soil moisture content from snowpack**
- **Validating remote sensing to quantify bioecological change**
- **Communicating uncertainties in probablistic models**
- **Funding long-term meteorological and ecological monitoring**

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Panel 3: Droughts & Heatwaves: Research Challenges & Gaps

- **Quantifying impacts of droughts on lake clarity and nearshore**
- **Modeling warmer water temperatures on AIS distribution/viability**
- **Validating models for evapotranspiration from Tahoe**
- **Mining species and ecosystem studies to better predict effectiveness of future restoration actions**
- **Linking watershed species interactions, plasticity, and compound structure to predict future distributions**
- **Evaluating synergies of climate and economic development on water supplies inside/outside the basin**
- **Promoting open data policies and creating data portals to enhance transdisciplinary data sharing**

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Panel 4: Wildfires & Air Quality: Research Challenges & Gaps

- **Quantifying synergy of weather, climate, and wildfire potential**
- **Modeling the impact of warmer temperatures on forest health, vegetation composition, ecological biodiversity, invasives encroachment**
- **Developing basin-scale models of smoke dispersion (and composition) from wildfires and prescribed burns**
- **Developing better fuel management metrics (beyond area treated or burned) to measure forest health and fire risk reduction**
- **Modeling cascading impacts of wildfires and flooding on nutrient loading, vegetation change, and ecosystem resiliency**
- **Testing and validating fire hazard maps for specific wildland-urban interfaces**
- **Deploying low-cost networked sensors for early warning of extreme events**

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Next Steps

- Promote cross-discipline data sharing and community model development to refine climate impact analysis and evaluate adaptation options
- Better link climate impacts to management actions in Tahoe and Sierra Nevada Ecoregion
- Integrate Tahoe Science into regional climate impact studies (e.g., CA 4th Climate Assessment)
- Leverage 2015 Tahoe Science Conference to highlight science-based management for climate adaptation and ecosystem resiliency

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