# TAHOE CLIMATE SCIENCE 2014 SYMPOSIUM

NOVEMBER 13, 2014

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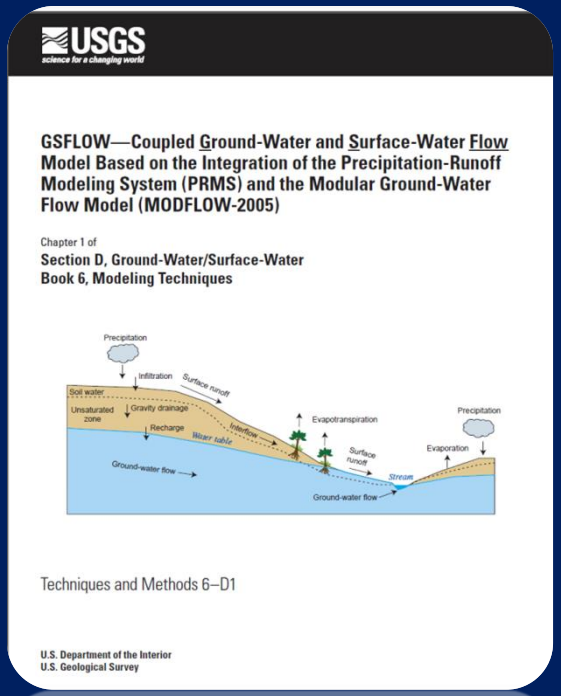
# HYDROLOGY MODEL FOR TAHOE

- Integrated surface and groundwater flow model (GSFLOW)
- Simulate water resources and nutrient transport from watersheds to lake
- Provide insights about how watersheds drain to lake, lake storage, and linkages to climate




Collaborators include Justin Huntington and others from DRI

# HYDROLOGY MODEL FOR TAHOE (FLOODS)

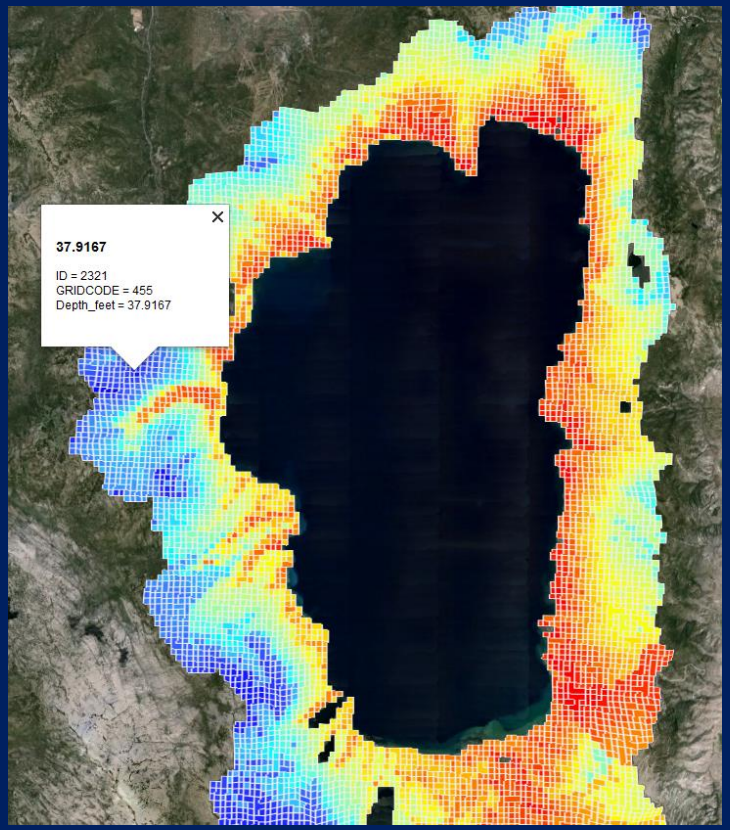
- Arkstorm simulation of streamflow

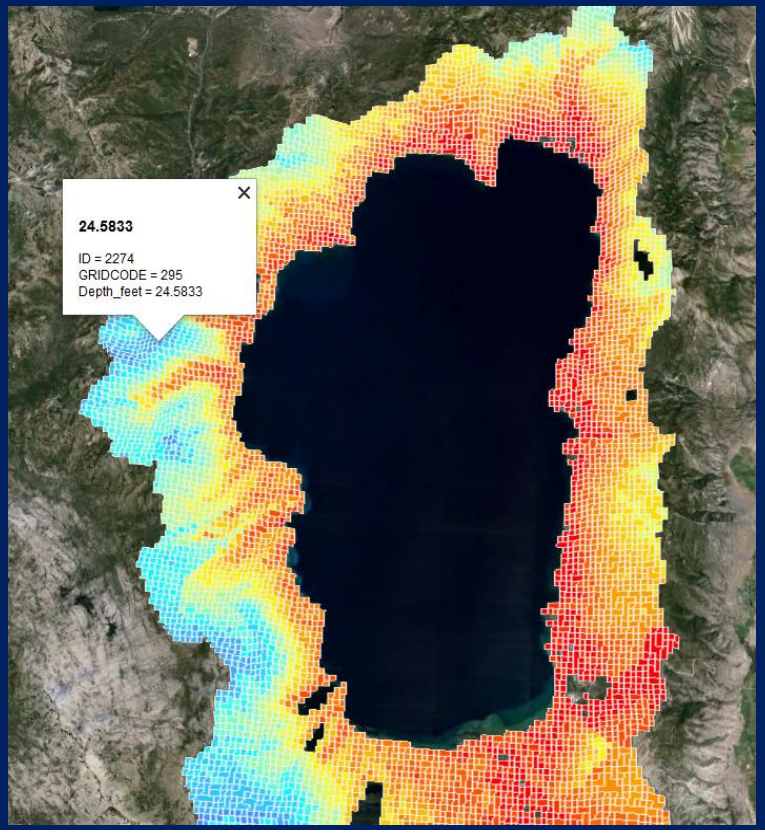


Model explicitly simulates streamflow in channels

# HYDROLOGY MODEL FOR TAHOE (SNOWPACK)

- Arkstorm simulations of snow depth

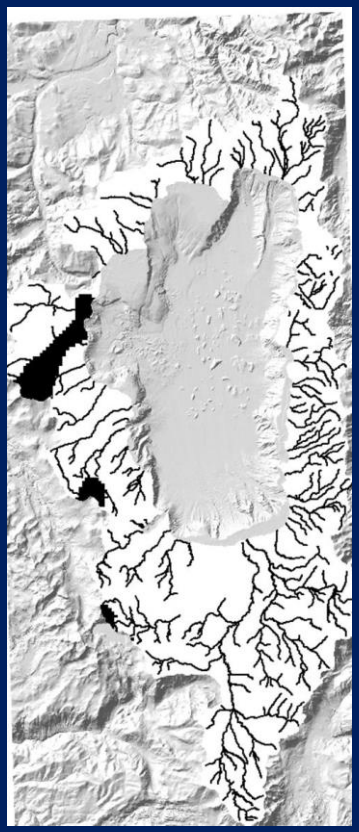


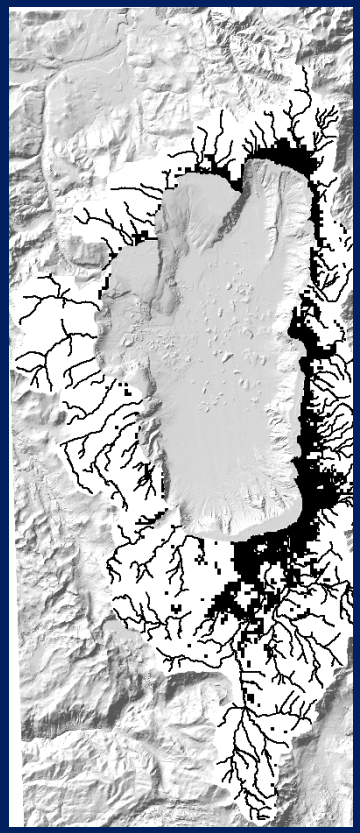

13 feet of snow melted during second phase of storm

# SNOW-MELT NUTRIENT TRANSPORT MODEL

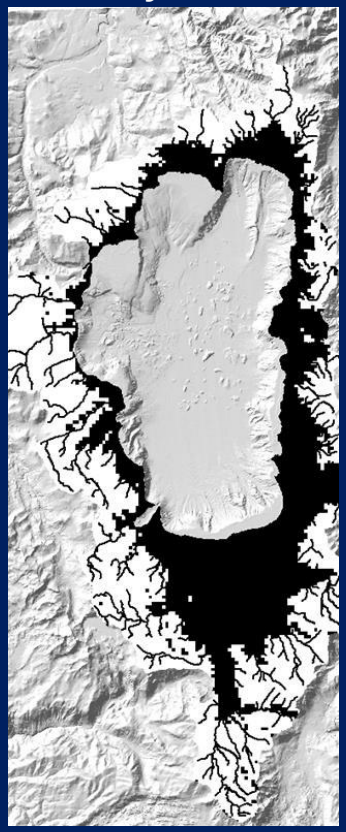
March, 12



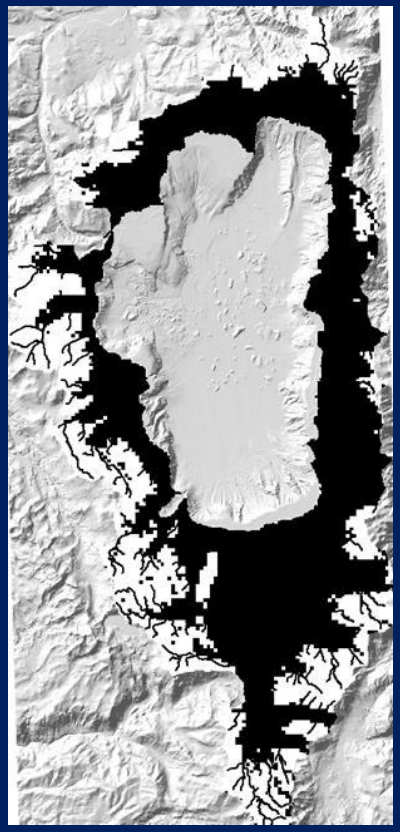
April, 13



May, 7

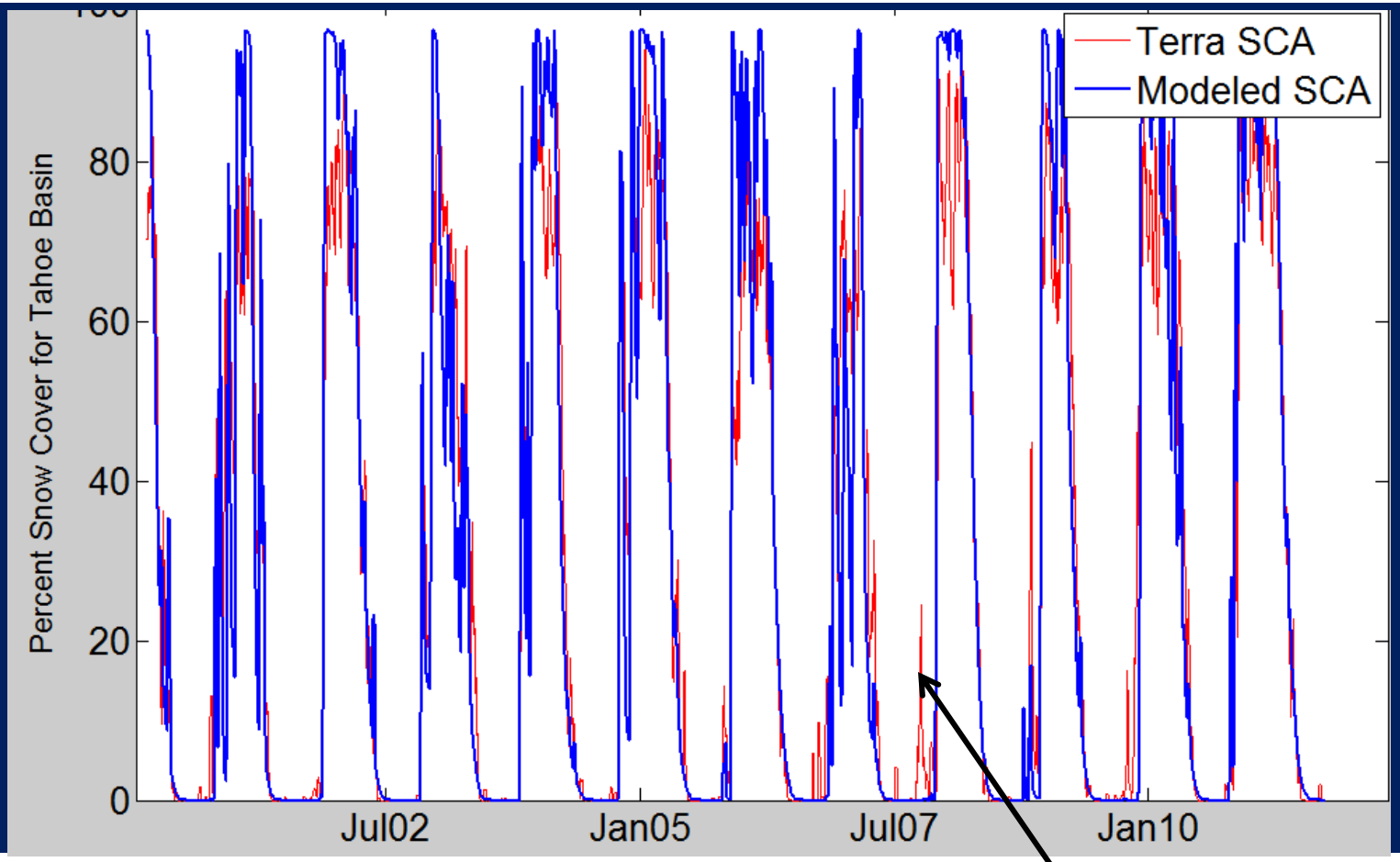


June, 16



**MODIS Terra Spatially Distributed Snow Covered Area (Melt WY2011)**

# Simulated Verses Measured SCA—Spatially Aggregated

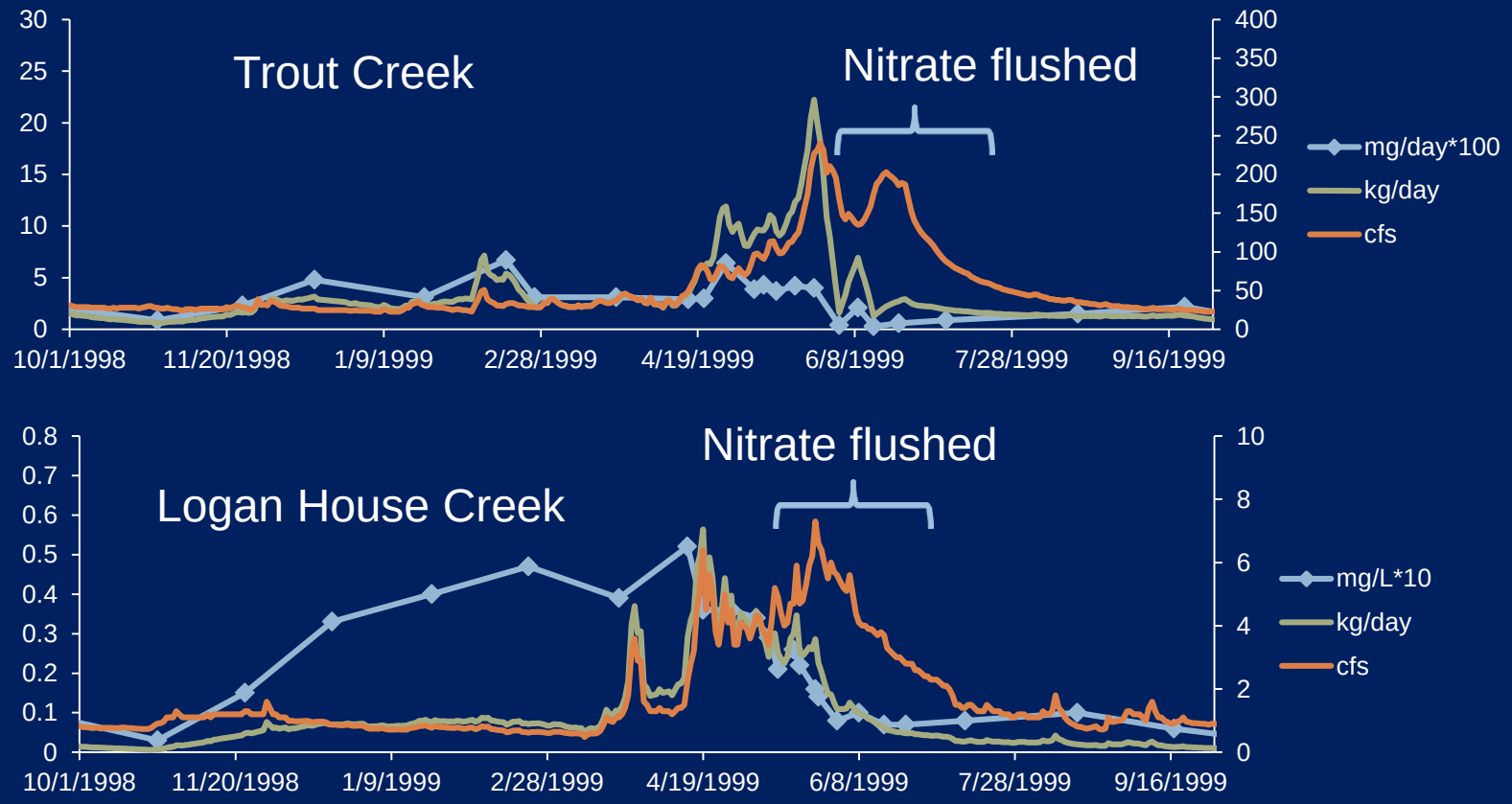



Difficult to match early season storms

# STREAM NUTRIENT LOADS AND NEAR-SHORE QUALITY

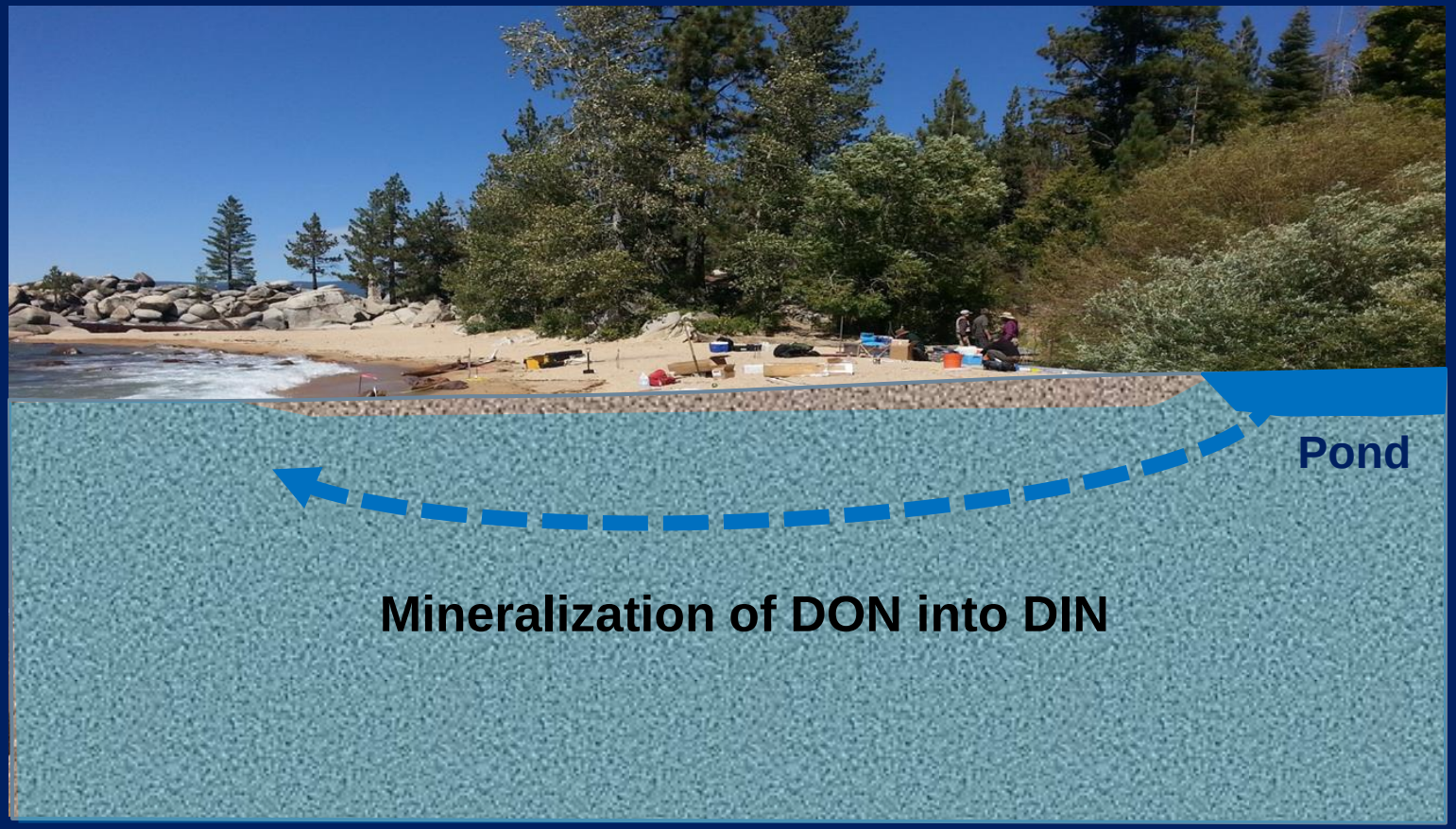

Influence of cold water and nutrient loads on near shore (Ward Creek)

# SEASONALITY OF NITRATE LOADS IN STREAMS




Nutrients are flushed, often before peak flow

# ANOTHER SOURCE OF NUTRIENTS GW SEEPAGE



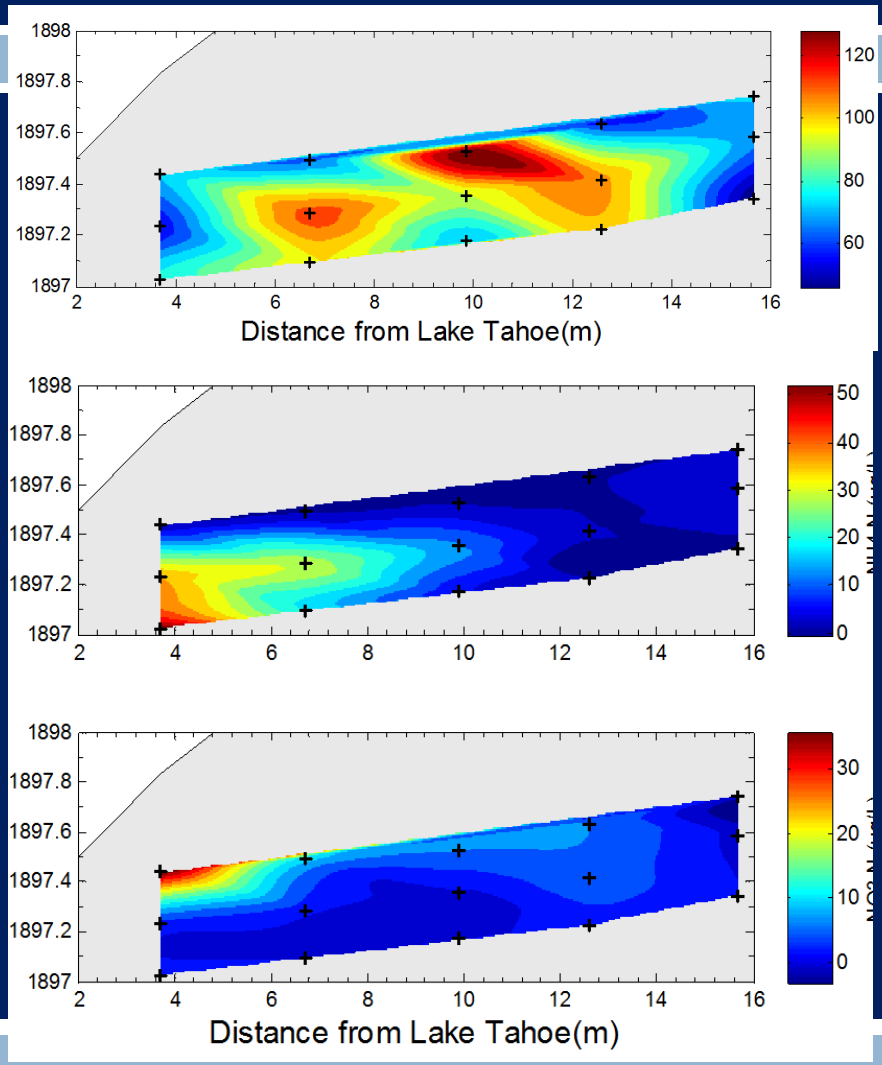

Collaboration with Ramon Naranjo (USGS)

# ANOTHER SOURCE OF NUTRIENTS GW SEEPAGE

DON (μg/L)

$NH_4$ (μg/L)

$NO_3$ (μg/L)

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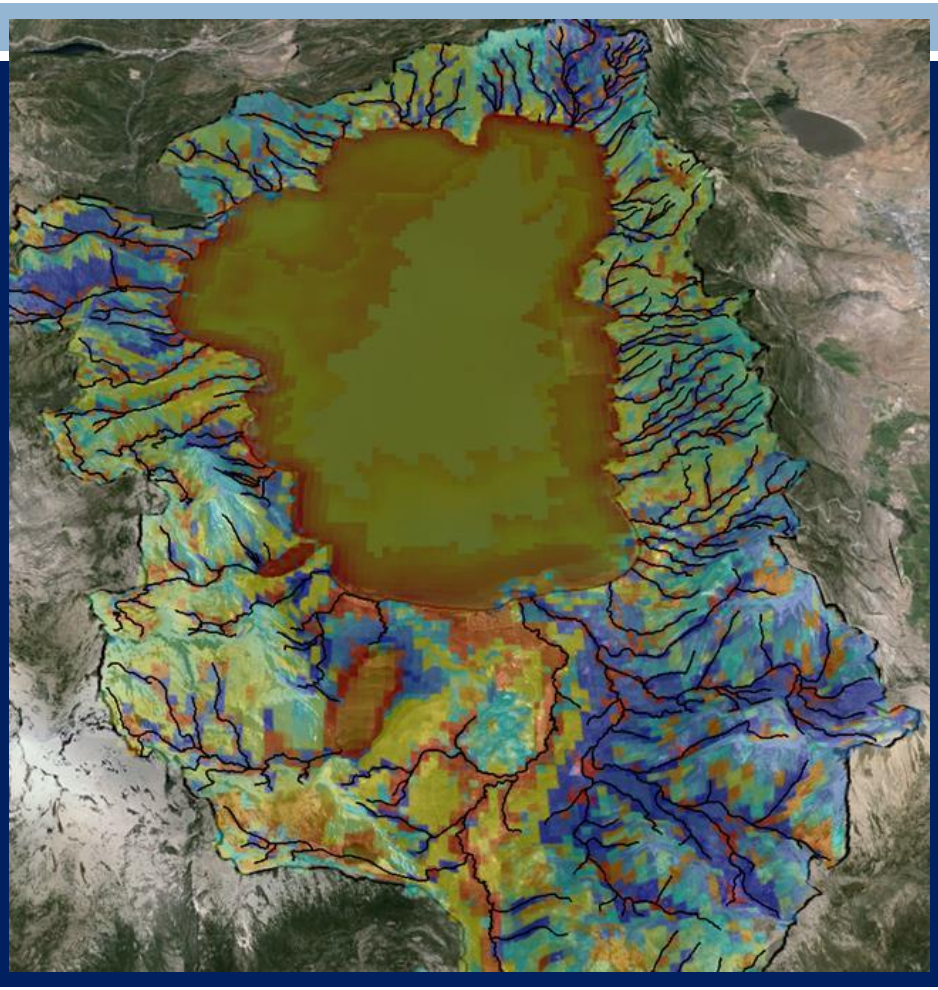
# GROUNDWATER SIMULATIONS



Blue = groundwater recharge
Red = groundwater discharge
Gold = no exchange

Surface water and groundwater interactions

# NEXT STEPS FOR MODELING

- Continue to study linkages between near-shore quality (e.g., periphyton) and watershed sources of nutrients
- Develop snowpack/nutrient transport model for GSFLOW
- Develop model as a tool to evaluate conceptual models, management options, and future climate impacts on near-shore lake quality

Thoughts?