

# Development of Hydrologic Monitoring Equipment

DL4-Met Hydroclimate Data Logger

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13 Nov 2008

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# Thanks to our Sponsors

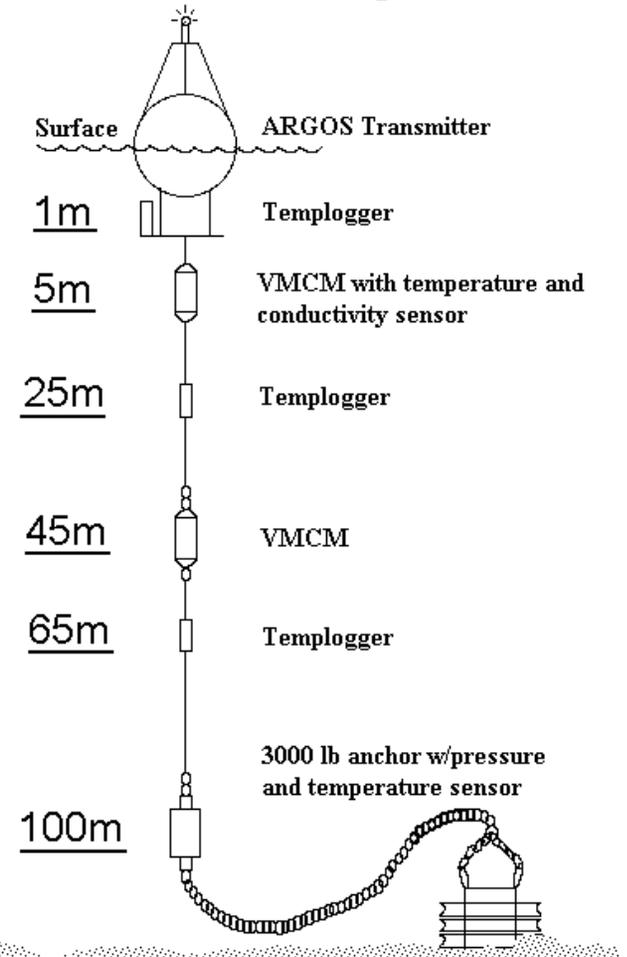


National Science Foundation  
WHERE DISCOVERIES BEGIN

Department of Water Resources  
California Cooperative Snow Surveys



## Standard 100m Mooring



# The Hydraulics Laboratory

- Fluid Mechanics Laboratory  
Experimental Facilities: Stratified Flow Channel, Wind-Wave Channel, Deep Tank, Temperature/Pressure Calibration Facility, Pressure Test Facility (2,000 psi and 10,000 psi)
- Technology Application Group



# The Hydraulics Laboratory

## Fluid Mechanics Lab



Stratified Flow Channel



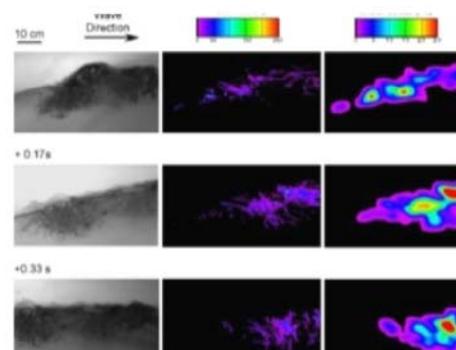
Wind Wave Channel



Deep Tank

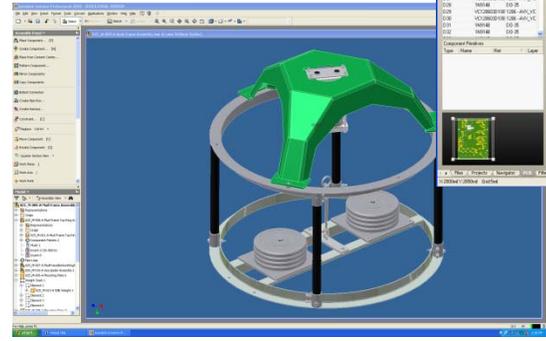
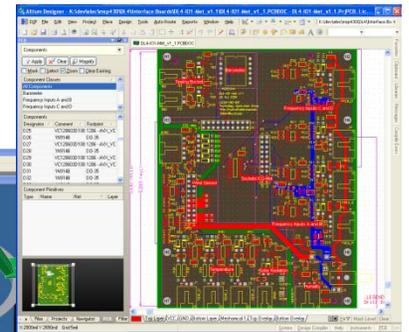


Glass Walled  
Wave Channel



# The Hydraulics Laboratory

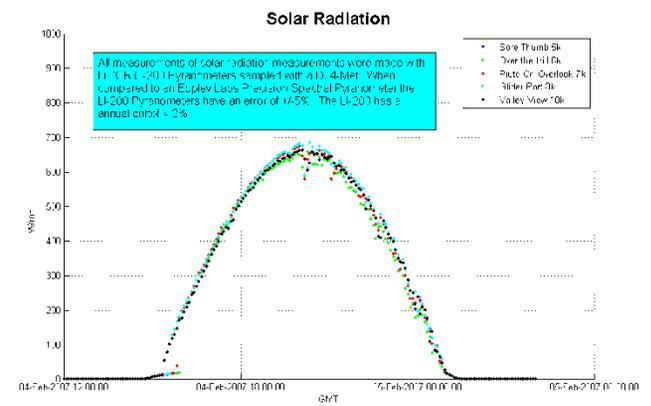
## Technology Application Group

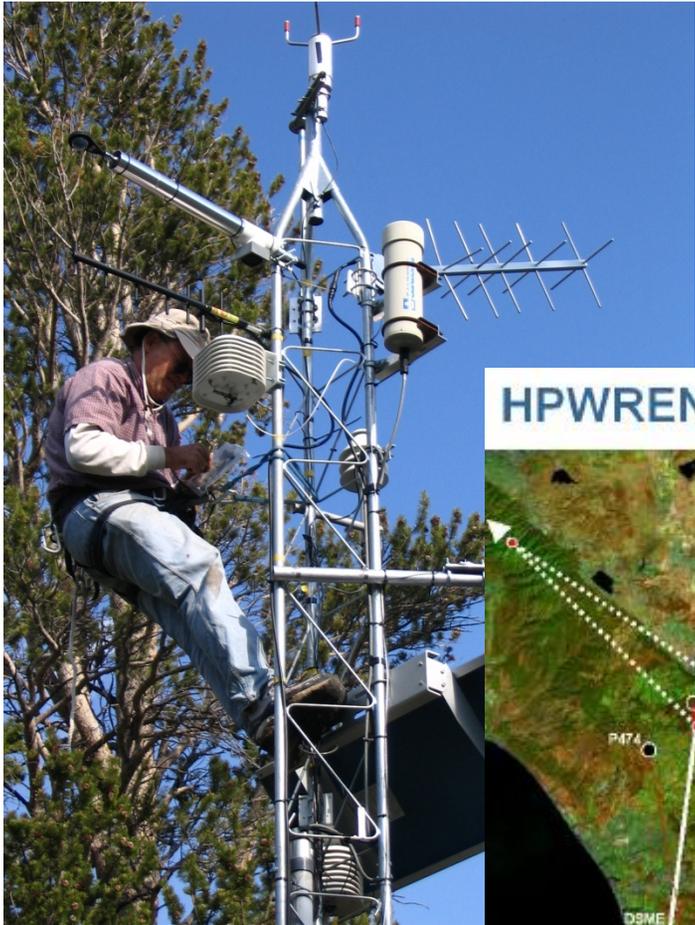


Engineering and Design

Field Support

Processing and Analysis

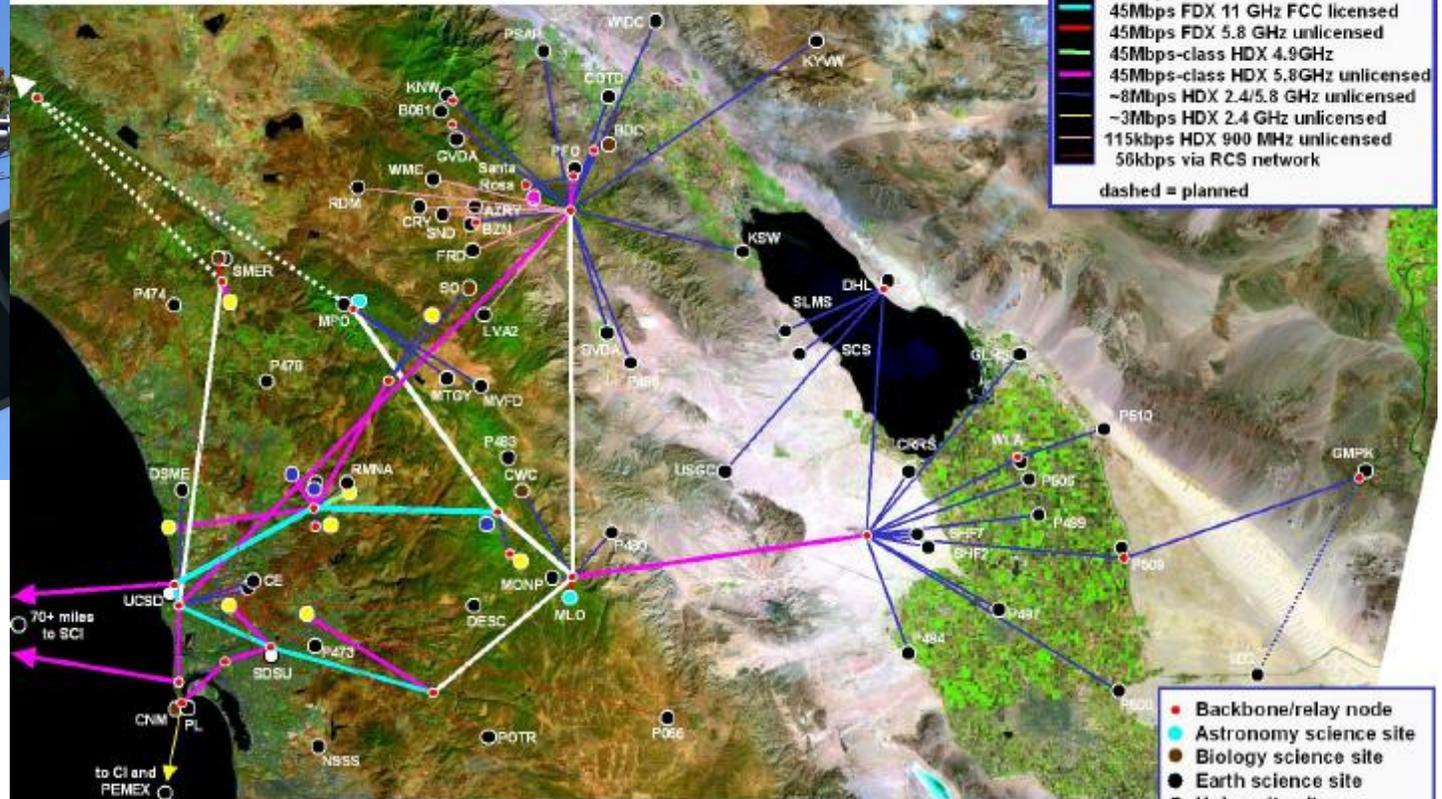




Dan Cayan



## HPWREN topology, August 2008



approximately 50 miles:

Note: locations are approximate



High Performance Wireless Research and Education Network

<http://hpwren.ucsd.edu>

# Why not buy a COTS unit?



*Lower power*  
*Lower cost*  
Radio Telemetry



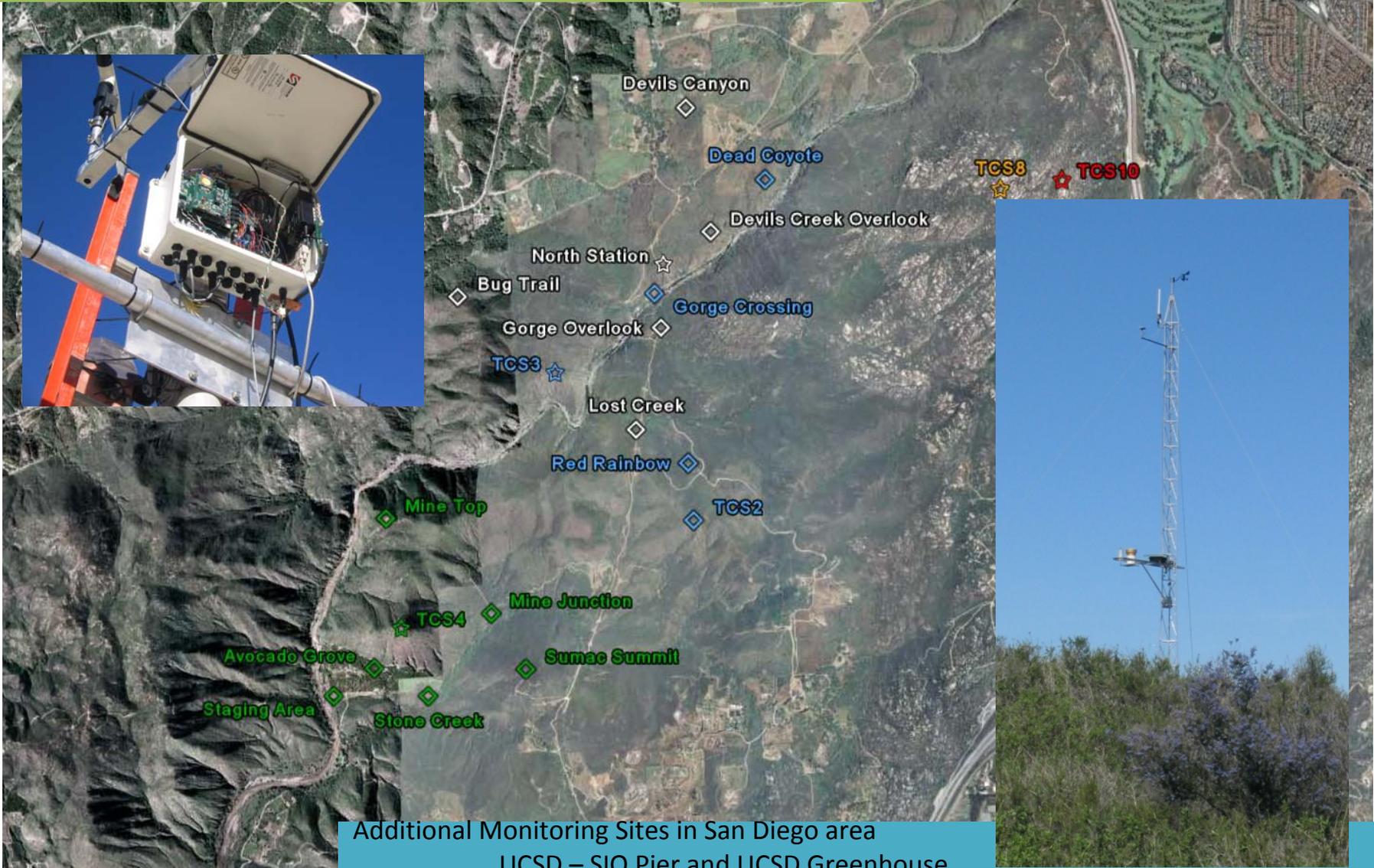
DL1-Met

Santa Margarita Ecological Reserve



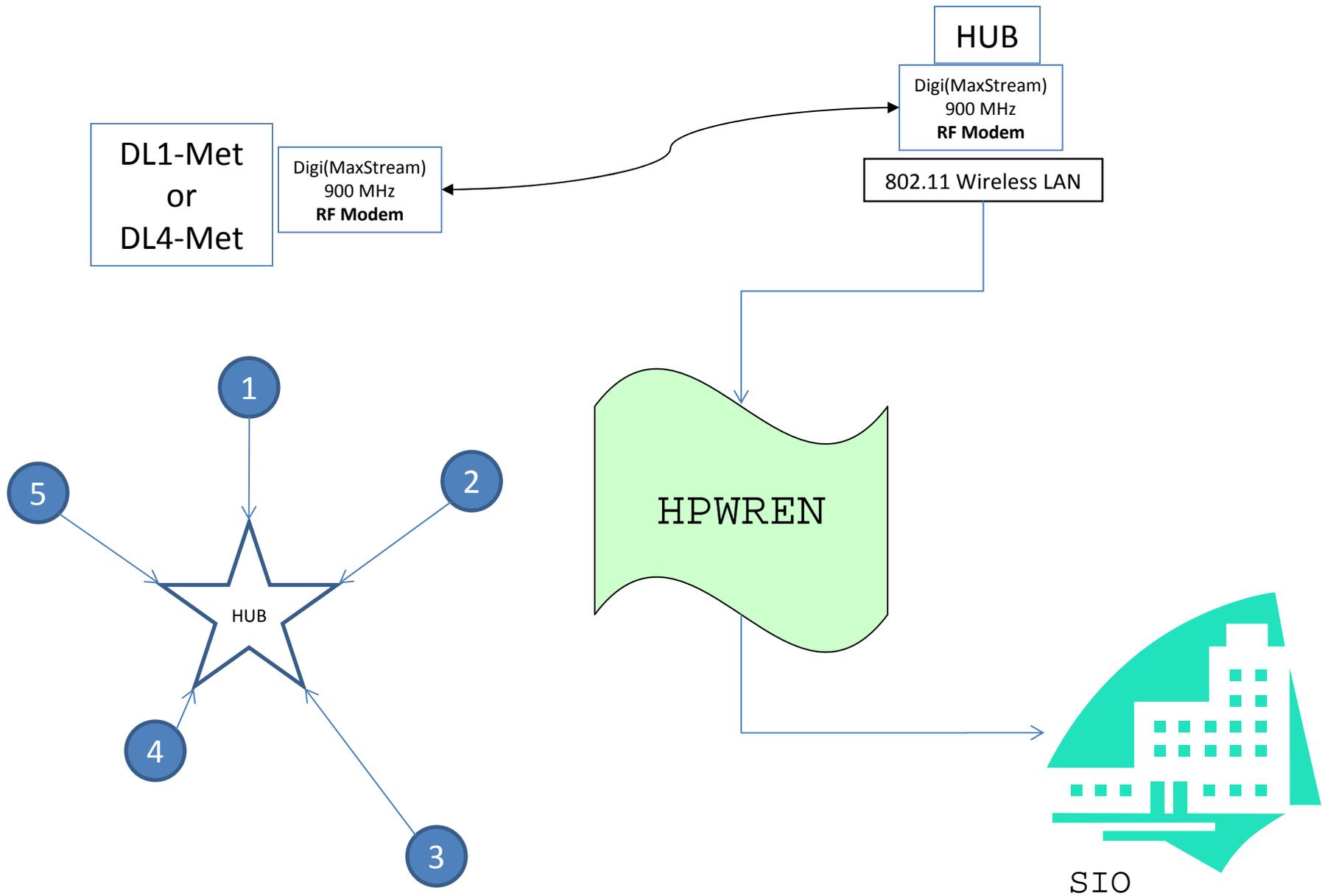
<http://fs.sdsu.edu/kf/reserves/smer/>

# Santa Margarita Ecological Reserve (SMER) SIO Hydroclimate Stations



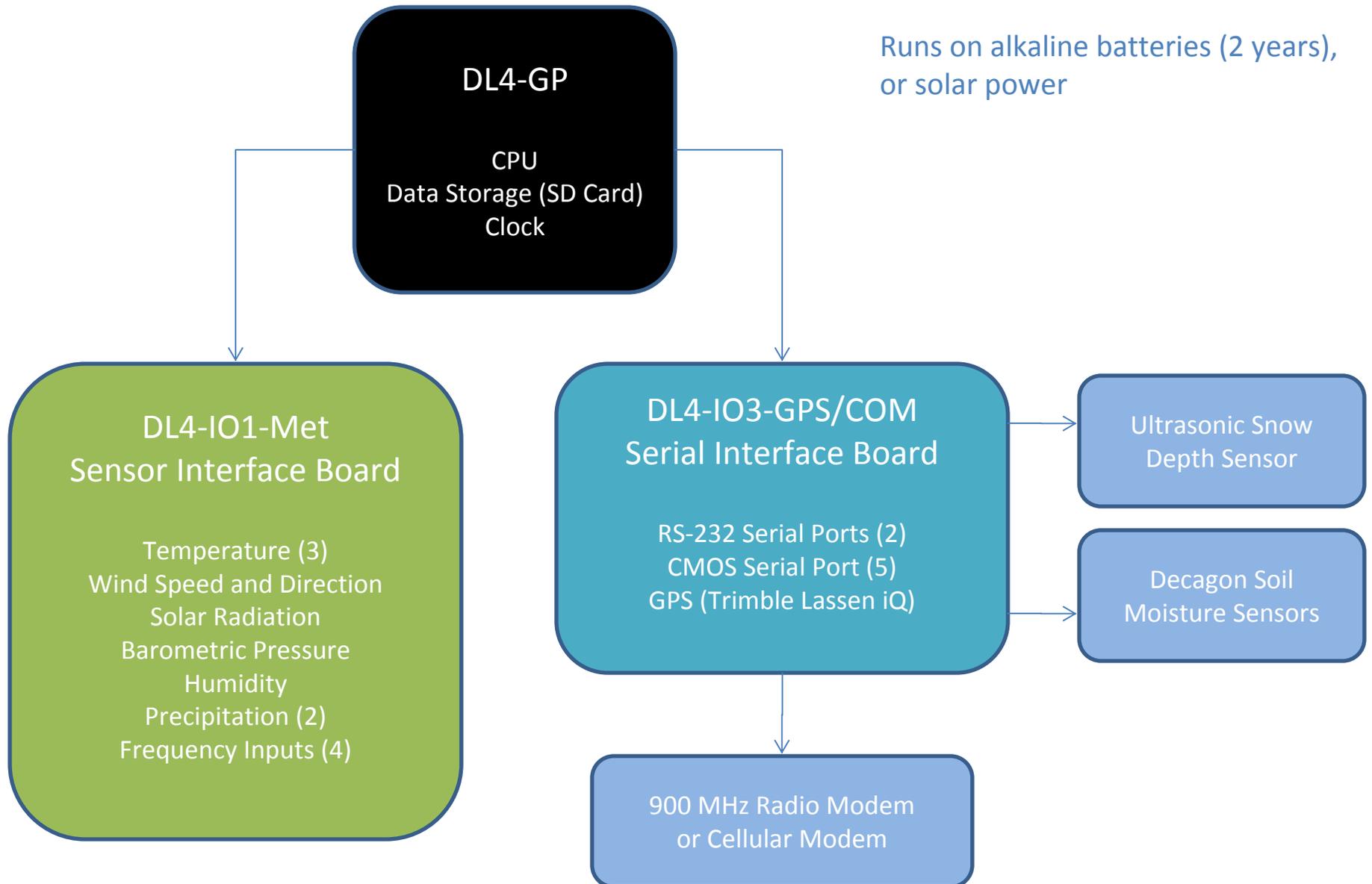
Additional Monitoring Sites in San Diego area  
UCSD – SIO Pier and UCSD Greenhouse  
Camp Pendleton – MCTSSA, confluence of De Luz and Santa Margarita Rivers  
(pending)

# Network Link

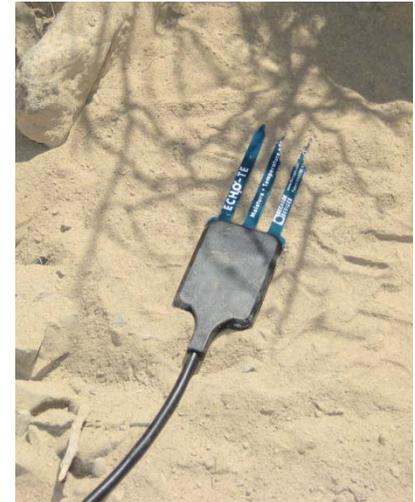
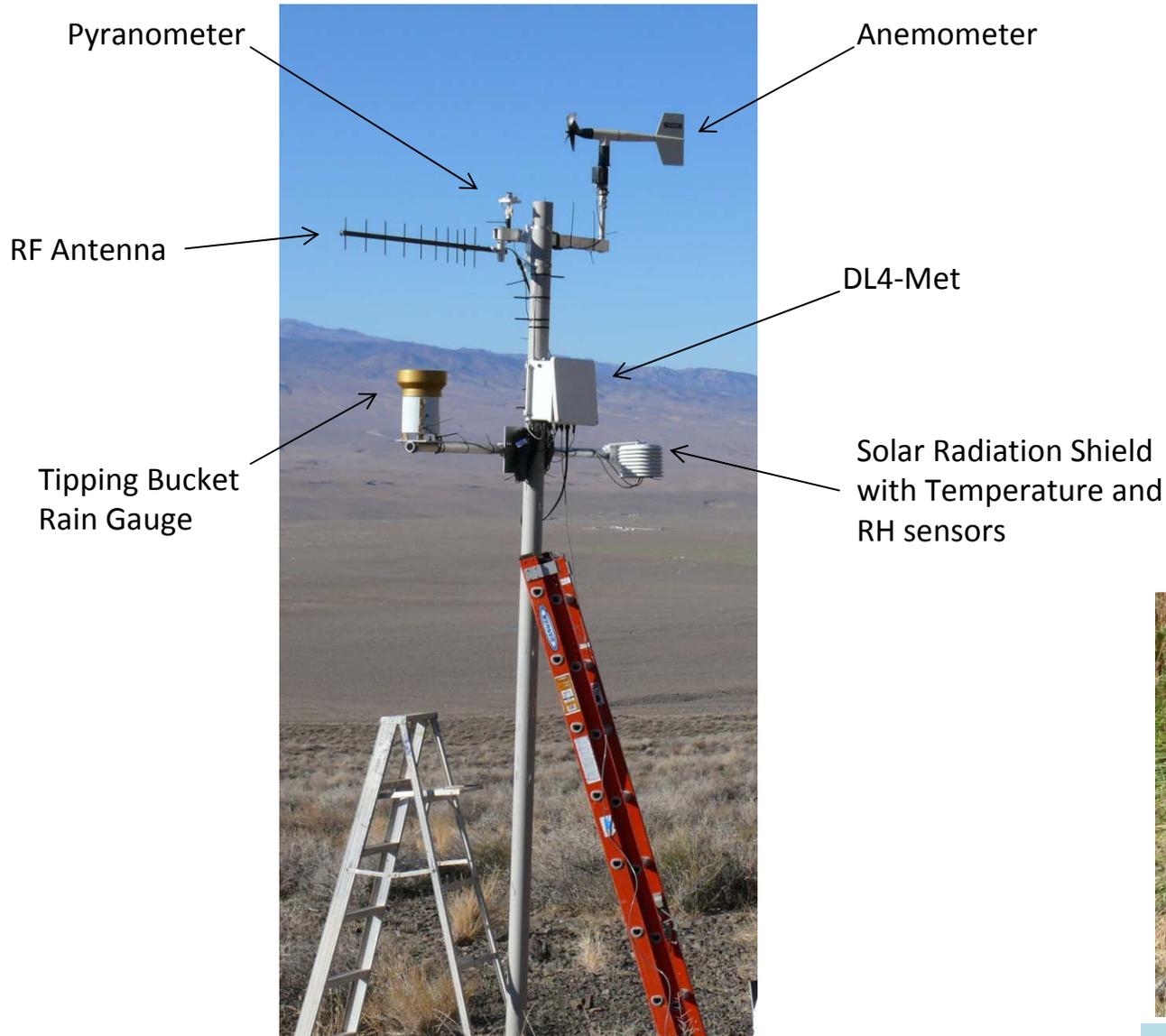


# DL4-Met Hydroclimate Data Logger

Runs on alkaline batteries (2 years),  
or solar power



# DL4-Met Hydroclimate Data Logger



Soil Moisture, Temperature, and Conductivity



Fuel Moisture and Temperature

# White Mountains Climate Monitoring Network



Piute Mountain (center). Piute Creek runs through the shaded canyon (right center) and the west ridge runs right up the center of the photo from valley floor to the peak.



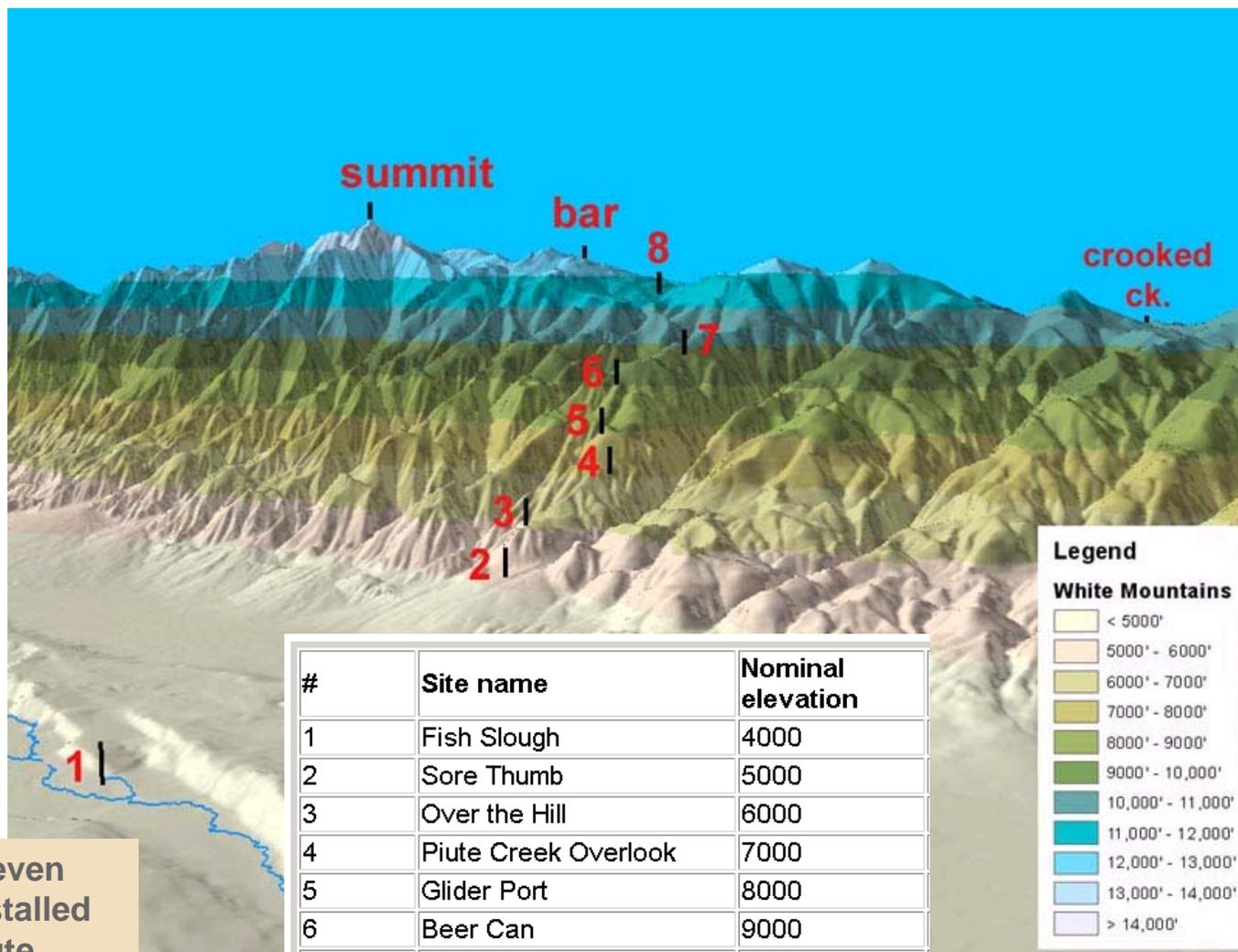
“Over the Hill” station located at 6100' (1860m)



DL4-Met installed on tower in White Mountains (site 39; Beer Can; 2743m; 9000 ft.)

# Mountain Climate Monitoring Network

Dan Cayan and Douglas Alden: Scripps Institution of Oceanography



Fall, 2006: Seven DL4-Mets installed along the Piute Creek drainage in the White Mountains

#	Site name	Nominal elevation
1	Fish Slough	4000
2	Sore Thumb	5000
3	Over the Hill	6000
4	Piute Creek Overlook	7000
5	Glider Port	8000
6	Beer Can	9000
7	Valley View	10000
8	Unnamed	11000
bar	<a href="#">Barcroft</a> *	12500
summit	<a href="#">Summit</a> *	14250

# Other Uses of DL4

- Time-Lapse Camera System
  - Nikon D2Hs, and Nikon D200
  - Two images per day



- Stream Gauge Logger
  - Polls Solinst Levelogger and transmits data



## Expanding Network

- San Diego County – 22 Sites (mainly DL1-Mets)
- White Mountains – 7 Sites, 8<sup>th</sup> site at 11,000' summer 2009
- Sierras – 10 Sites (most in Yosemite), 4 more sites to be installed in and around Stanislaus NF early Dec 2008.
- Sierras (for UC Merced) – 21 sites measuring soil moisture and snow depth.
- **Enhanced Flood Response and Emergency Preparedness**  
DWR/Scripps/NOAA  
6-8 sites from coast to American River Basin  
More river basins to follow

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