

Developing an Improved Weather Forecasting System for Lake Mead National Recreation Area



Mark Sappington*
National Park Service
Lake Mead NRA



Todd Lericos
National Weather Service
Las Vegas Weather Forecast Office

This project is made possible by:



Funding from the Southern Nevada Public Lands Management Act (SNPLMA)



Funding from the Federal Lands Recreation Enhancement Act (FLREA) and additional contributions from Lake Mead NRA



Contributions from the National Weather Service, including equipment, personnel time, staff expertise, and much more...



How it started



- Need for safety and planning
- Willingness of NPS to allocate resources to develop a network of observation platforms
- Willingness of NWS to provide resources to provide marine weather forecast services



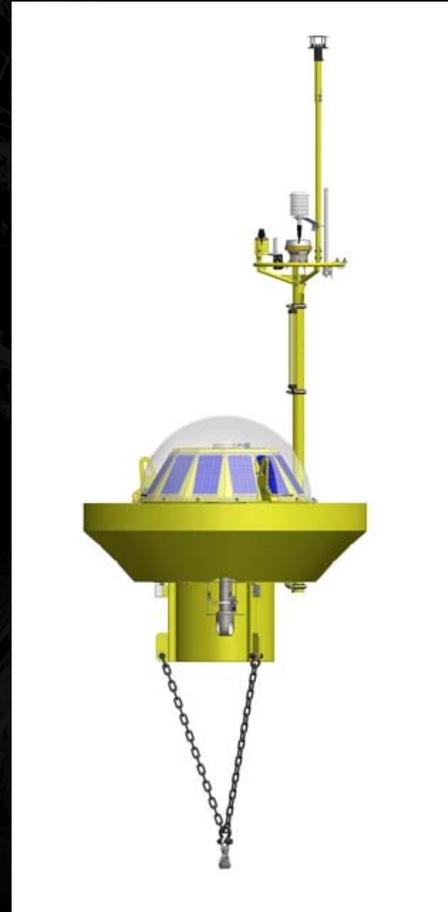
How it started - Need



- Lake Mead Recreation Area ranks in Top 10 annually for NPS locations visited (6-7 million)
- Swimming and Boating account for 7-10 deaths a year on average since 2000
- No routine weather and water observation or forecasts are available
- Planning needs internally in Lake Mead NRA (park staff) as well as marinas and other agencies operating on the lakes



NPS Observation Network



\$360k investment

Axys WaveWatch Buoys (x5)

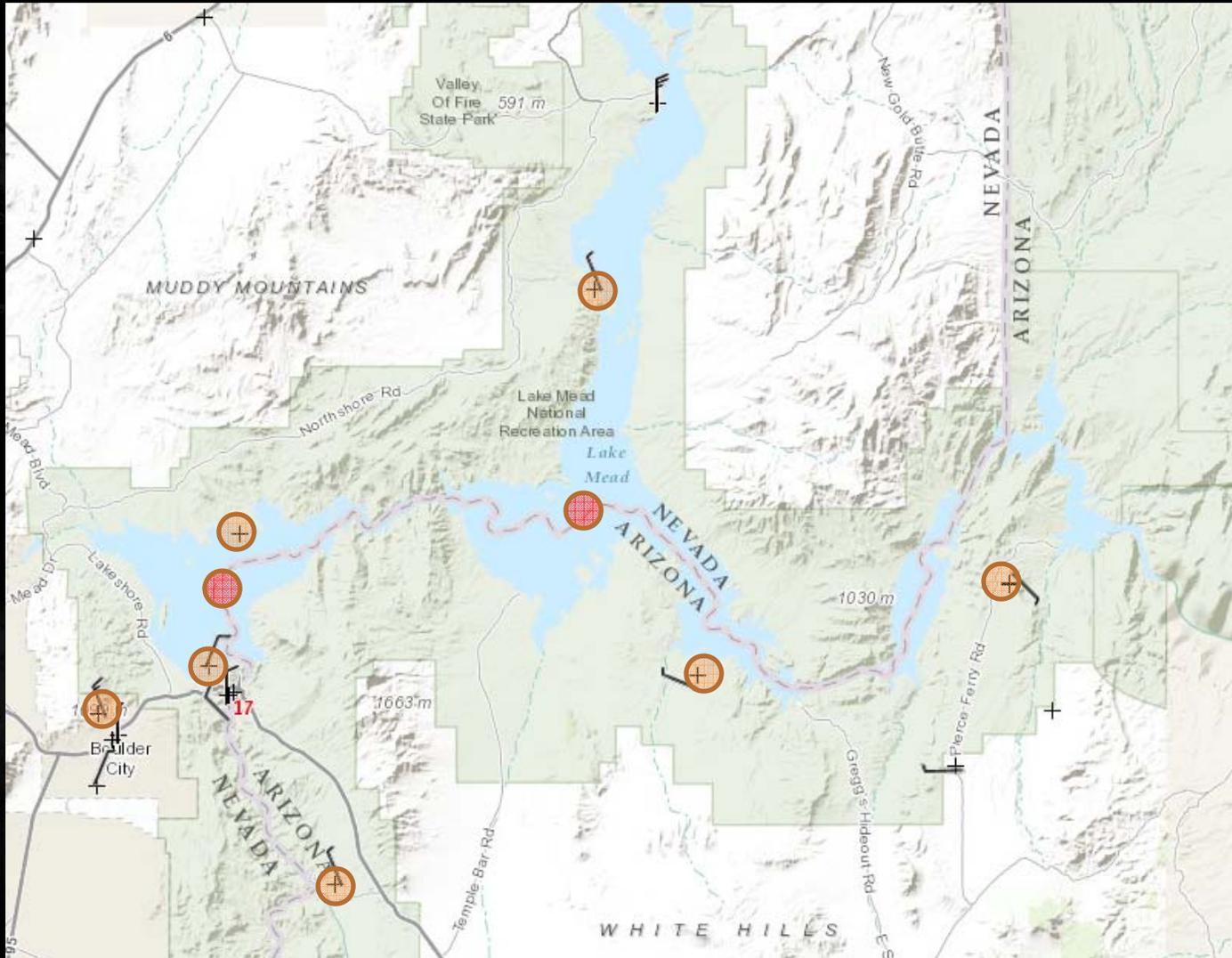
- Wind
- Temperature
- Relative Humidity
- Wave height / Direction
- Water Temperature
- Atmospheric Pressure

Campbell Scientific Weather Stations (x12)

- Wind
- Temperature
- Relative Humidity
- Atmospheric Pressure
- All Satellite communication – Real Time

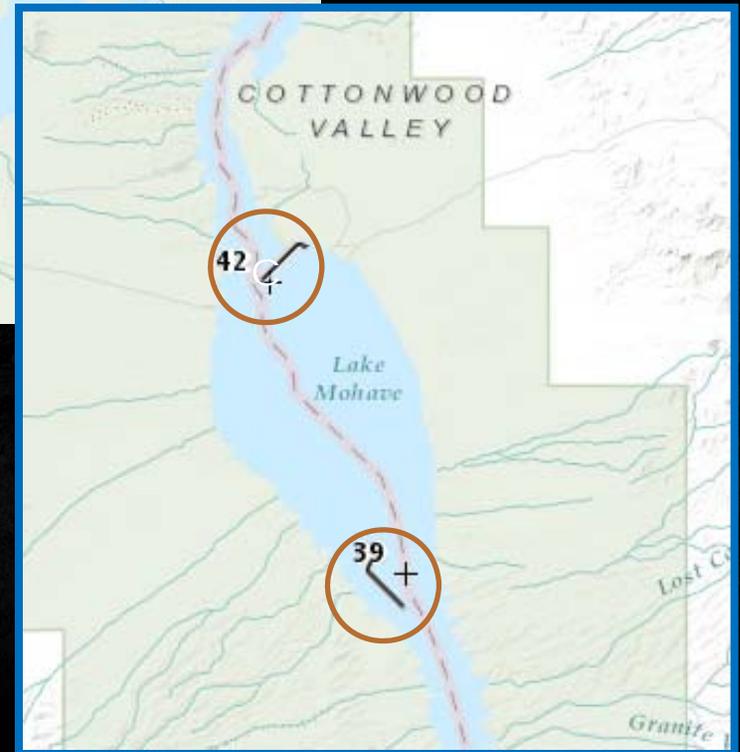


Lake Mead - Surface and Buoy Locations





Lake Mohave - Buoy Locations





Progress



Land Station Information

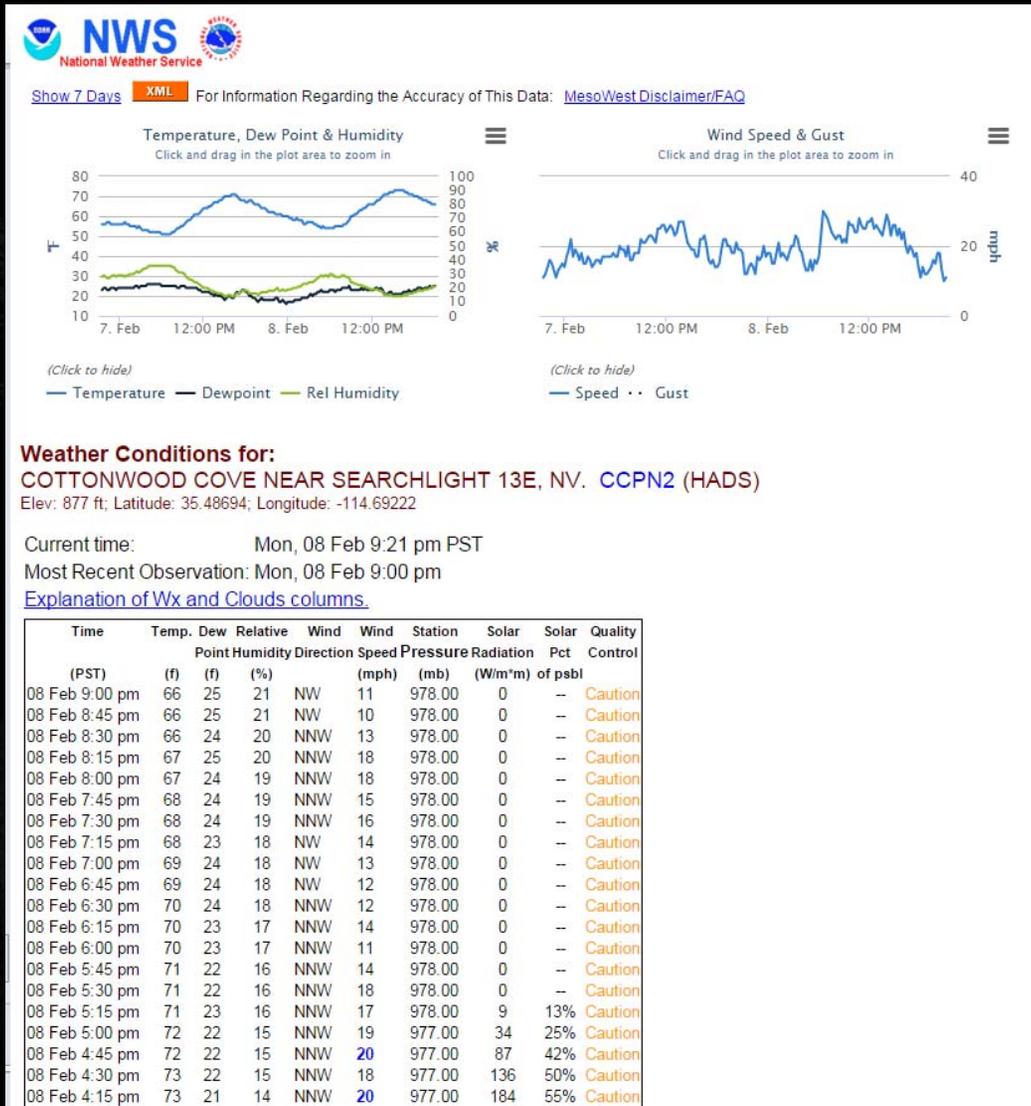
9 Station already installed and transmitting

- Cottonwood
- Katherine's Landing
- Temple Bar
- Echo Bay
- Pierce Ferry
- Willow Beach
- Boulder City
- Callville
- Boulder Island

NWS working with Contractors and NWS HQ to get the data flowing



Data Availability



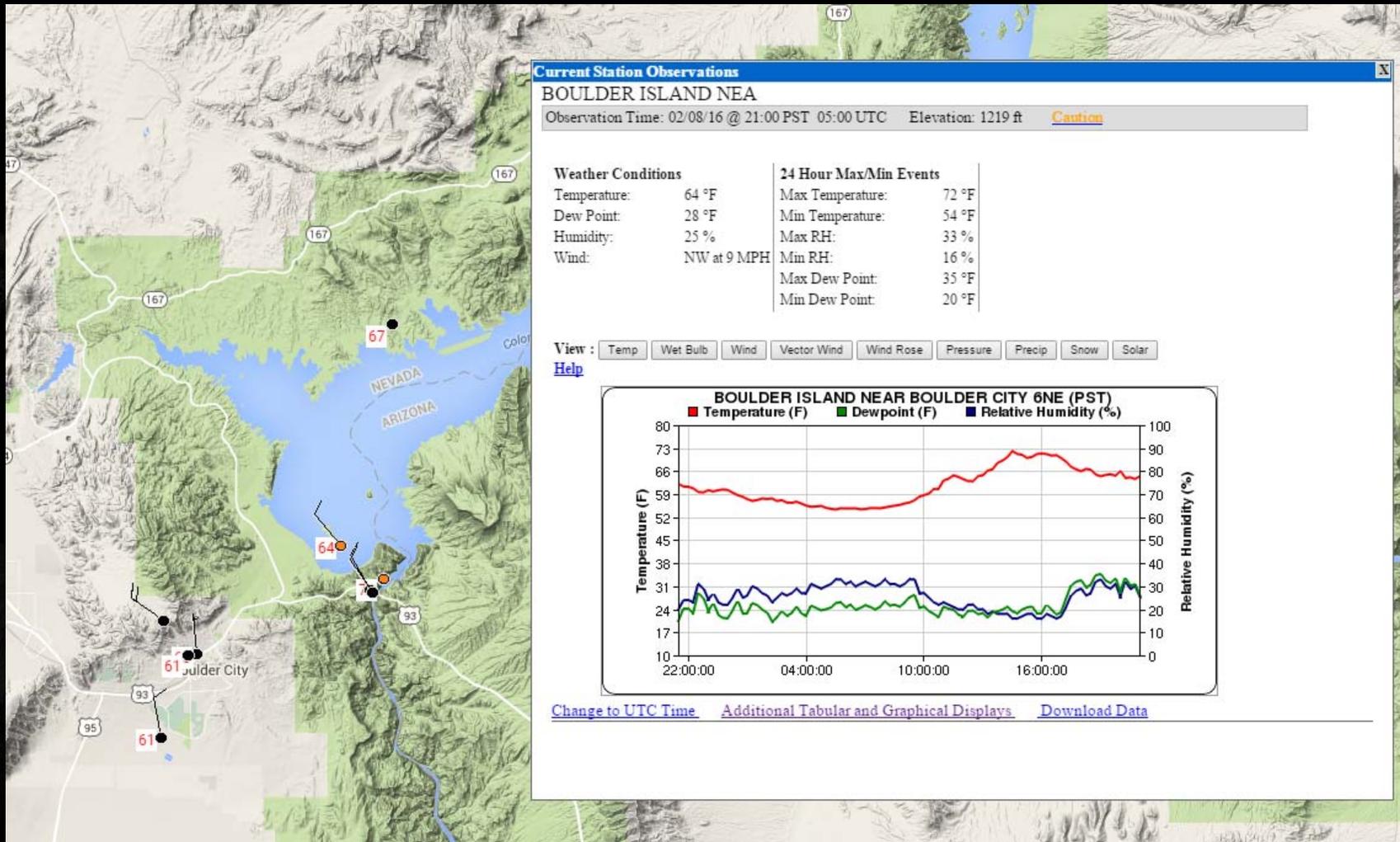
<http://goo.gl/Pc7dCD>



Data Availability

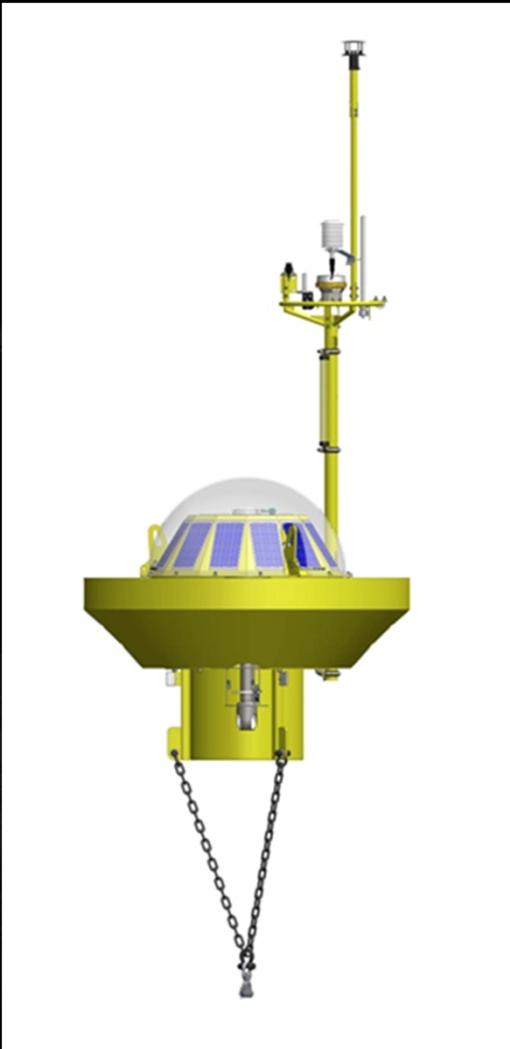


<http://goo.gl/Dlcsdd> - (must select "All Networks" on right)





Progress



Buoy Information

- 5 Stations being bench tested at contractors location
- NWS working with Contractors and NWS HQ to get the data flowing
- Problems early on figuring out how to make these data readily available. Path forward is clear now.
- Slated to go in very soon.



NWS Marine Weather Products – (Planned)



Routine Marine Weather Forecasts



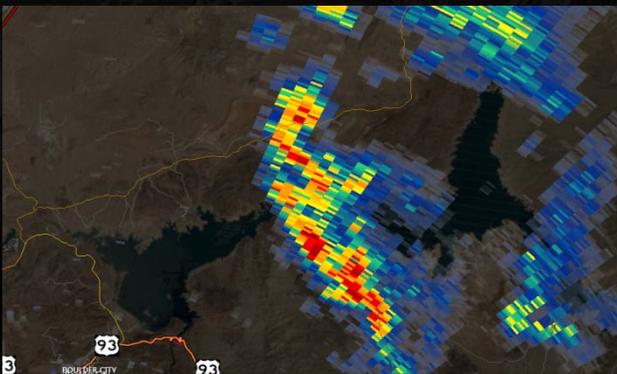
- Wave Heights
- Winds
- Temperatures (air and water)
- Expected weather conditions

Small Craft Advisories



- Issued Lake Wide for expected conditions that will affect small boats and recreational craft

Severe Thunderstorm Warnings – For Lakes



- Will be Issued for portions of the Lake when conditions are short-fused or rapidly changing like a thunderstorm. Special criteria and wording will be used.



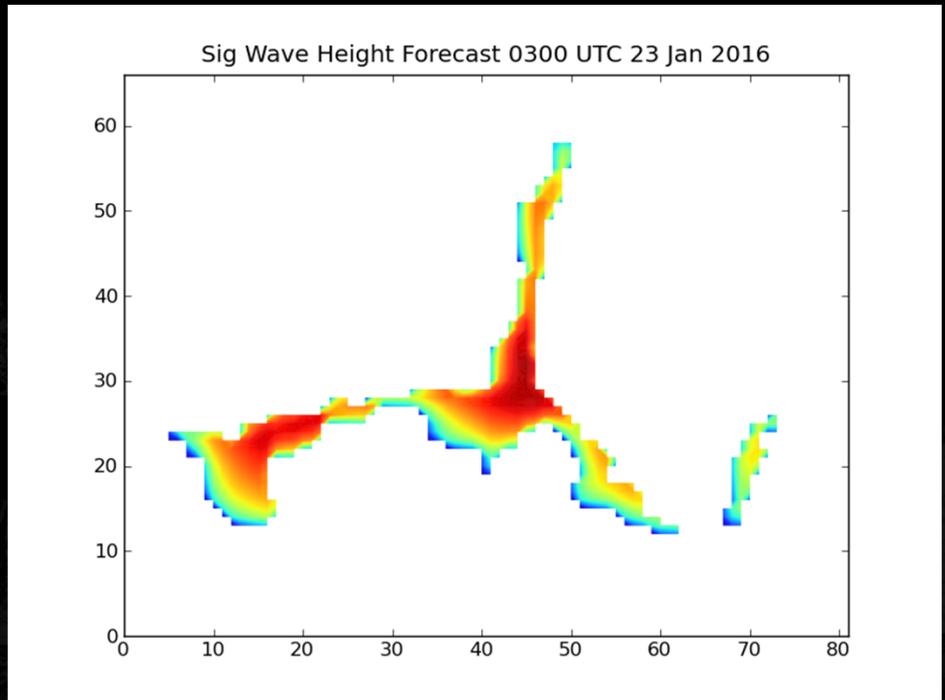


Wave Height and Direction Forecasting



SWAN Model

- SWAN (Simulating WAVes Nearshore) model is a spectral wave model developed at the Delft University of Technology, The Netherlands.
- Forecasts are produced for Wave Height and Direction
- Model is "driven" (input) by an atmospheric numerical model
- We have had our first successful run of this model. We still have a ways to go to make it viable.





Observations versus Forecasts

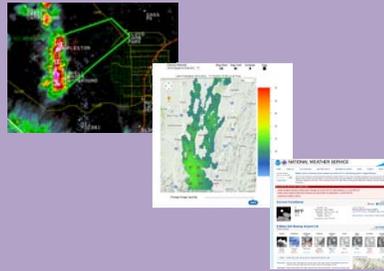


Observations



Forecast Products and Services

Watch, Warnings, Advisories
Weather/Wave Conditions



Verification and Calibration of Forecasts

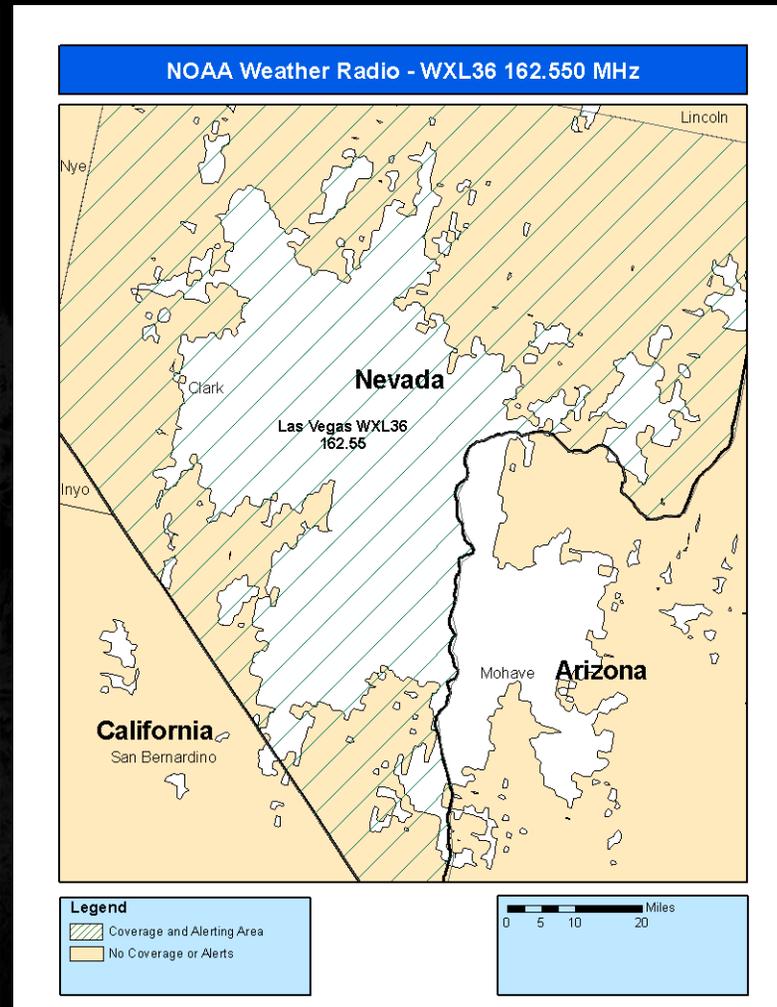


Customer Use

Real-Time observations for actions
Forecast services for planning and preparation



How visitors may use this info





How visitors may use this info



NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Las Vegas, NV
Weather Forecast Office

Home Current Hazards Current Conditions Forecasts Hydrology Climate Weather Safety Additional Info Contact Us

Death Valley N.P. Weather

No watches, warnings, or advisories in effect. Enjoy your visit!

Current High Low Rain Snow Sky Wind Hazards Satellite Radar & Obs Webcam Forecast Climate

Printable Briefing

Death Valley National Park

Current Temperatures
3 AM Wednesday Jan 13 2016

Location	Temperature (°F)
Eureka Valley	24
Hunter Mountain	36
Stovepipe Wells	44
Furnace Creek	42
Saratoga	37

weatherv.gov/lasvegas
Vegas Weather
@NWSVegas

Disclaimer: This map is for informational purposes only.

DEATH VALLEY AREA FORECAST

Tonight	Partly cloudy in the evening then becoming mostly cloudy. Lows 32 to 35 in the mountains, around 40 at Furnace Creek. Winds generally light.
Saturday	Partly sunny. Highs around 50 in the mountains, 61 to 64 at Furnace Creek. Winds generally light.
Sat Night	Mostly cloudy in the evening then becoming partly cloudy. Lows 32 to 35 in the mountains, around 40 at Furnace Creek. Winds generally light.
Sunday	Mostly sunny. Highs 51 to 54 in the mountains, 66 to 69 at Furnace Creek. Winds generally light.
Sun Night	Mostly cloudy. Lows 35 to 38 in the mountains, 44 to 47 at Furnace Creek. South wind 5 to 10 mph increasing to 10 to 15 mph after midnight.
Extended	Mostly cloudy. Highs around 55 in the mountains, around 70 at Furnace Creek.

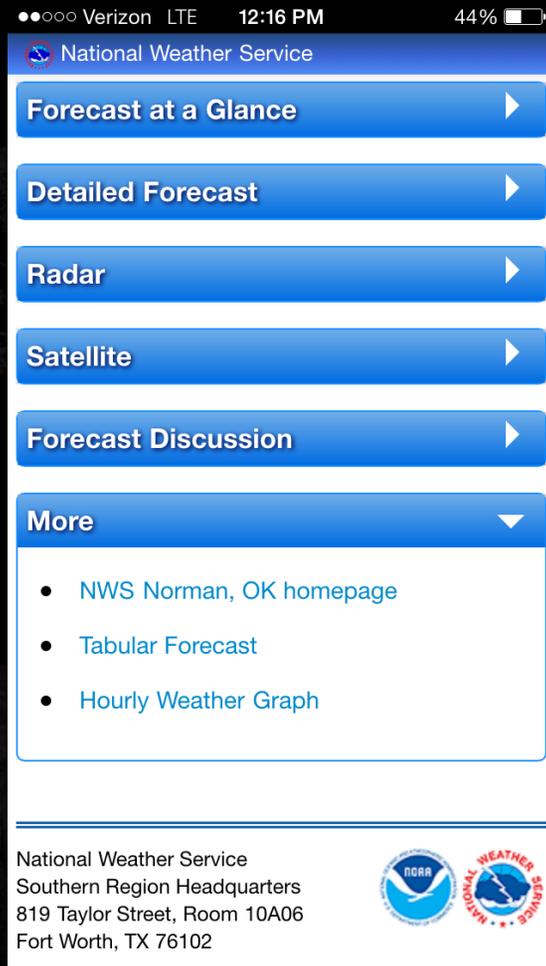
NWS Las Vegas @NWSVegas 4h
Strong winds continue in W San Bern Co. Watch 4 blowing dust & reduced vis near 29Palms #cawx pic.twitter.com/WRwh4MTBPC

Situation Report: San Bernardino Winds

- Blowing Dust**: Can reduce visibility and air quality.
- Crosswinds**: 40, 15, 62 mph.
- Strong Winds**: Strong winds are expected to continue into the early evening hours. Speeds: 35-45 mph, with isolated gusts to 60 mph.



How visitors may use this info



- NWS Mobile Weather Page for Lake
- Will have observations, forecasts etc.
- NWS is limited in what it can do with mobile pages
- May take some time to get approved



Join in the fun?



- We should document uses for these data beyond safety
- Possibilities remain for additional sensors etc.