



... And When That Doesn't Work ...

Real-Time Monitoring in Real-Life



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Continuous Water Quality Monitoring in the Lower Rio Grande Valley

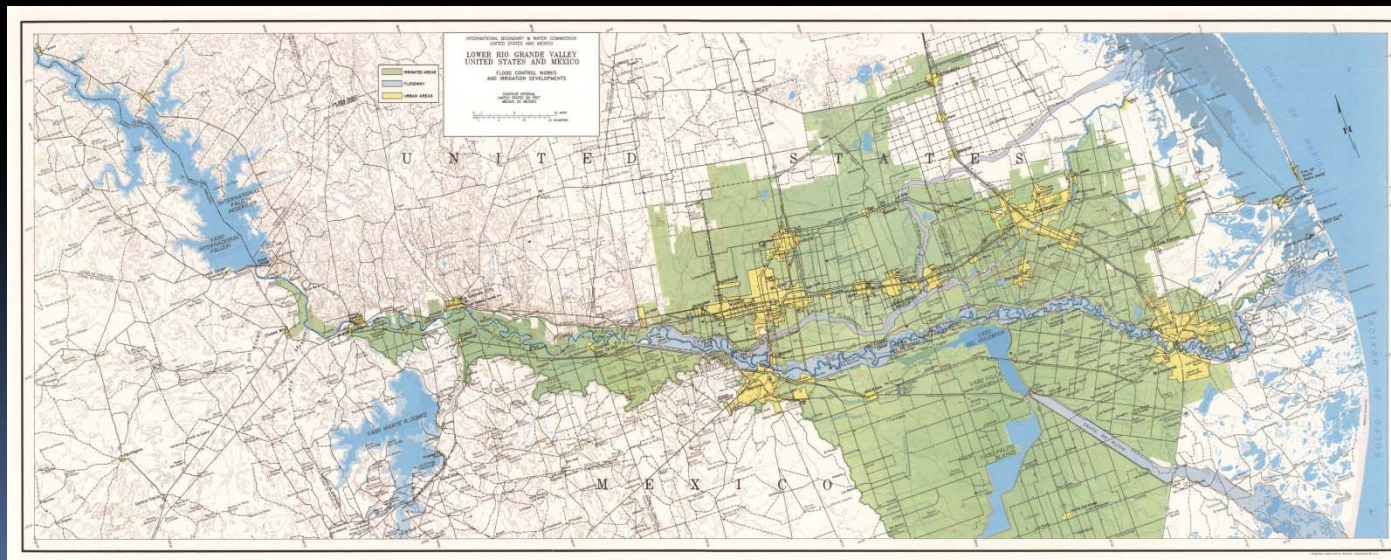
A funny thing about this river

When it doesn't rain, the flow in the river increases.

When it does rain, the flow in the river decreases.

There are exceptions ... we call them hurricanes.

The Lower Rio Grande downstream of Falcon Dam is the conveyance for raw water for potable supplies and irrigation.



Continuous Water Quality Monitoring in the Lower Rio Grande Valley

What are we dealing with here?

Agricultural return flows from irrigated land in Mexico re-enters the Rio Grande upstream of Anzalduas Dam on the Texas/Mexico Border near McAllen and Reynosa.

These agricultural return flows may have total dissolved solids (TDS) concentrations in excess of 2500 mg/l.

This can have devastating effects on irrigated crops downstream in Texas and Mexico. Crop damage may occur at TDS concentrations of 1000 mg/l.

The El Morillo Drain was constructed by IBWC/CILA in 1967 to divert high TDS agricultural return flows to the Gulf of Mexico instead of back into the Rio Grande above Anzalduas Dam.

The drain collects agricultural return flows from approximately 50,000 acres of intensively farmed land in Mexico and diverts high TDS flows to the Gulf of Mexico via a 78 mile canal.

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TCEQ's Goals in the Lower Rio Grande Valley

To manage water quality in the Lower Rio Grande by ensuring the El Morillo Drain is operating as it should and by releasing water from storage in Falcon Reservoir to maintain TDS concentrations below levels that would damage crops.

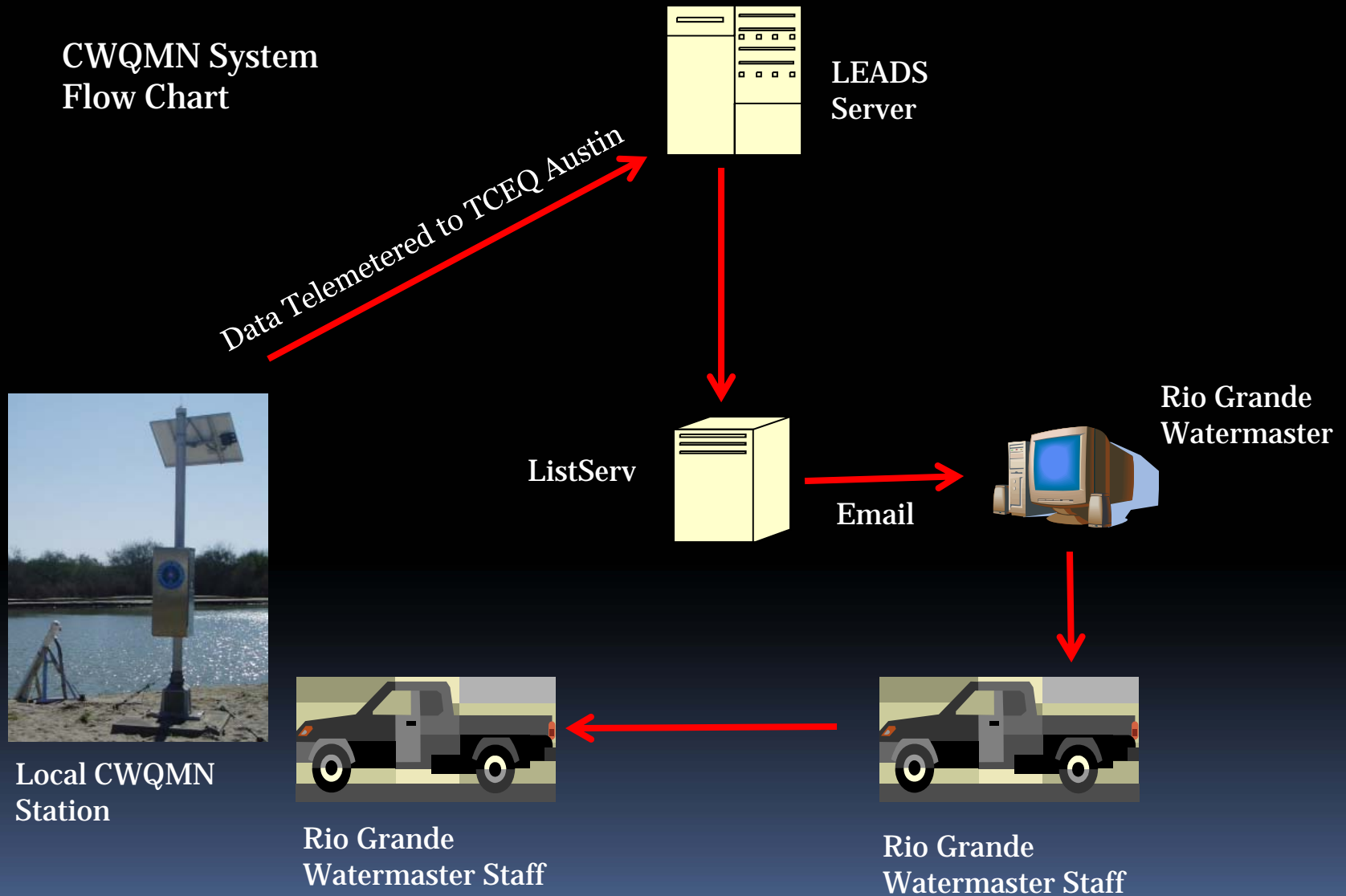
To maintain water quality at acceptable TDS concentrations while conserving water in storage upstream in Falcon and Amistad Reservoirs.

DATA QUALITY OBJECTIVE:

- To monitor temperature and specific conductance at selected locations on the Lower Rio Grande
- To estimate TDS within $\pm 5.0\%$ RPE
- To notify the Rio Grande Watermaster electronically when total dissolved solids exceed the established notification level (currently 999 mg/l).

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CWQMN System
Flow Chart



Continuous Water Quality Monitoring in the Lower Rio Grande Valley

The TCEQ Rio Grande Watermaster is the primary user of the data produced by the Lower Rio Grande Valley CWQMN network.

The TCEQ Rio Grande Watermaster uses the CWQMN data to monitor the quality of the water up and down the river and inform customers of the total dissolved solids (TDS) in the water being delivered for irrigation or water supply.

When TDS concentrations at a station(s) exceed the threshold established by the Rio Grande Watermaster, electronic notifications are sent from an automated ListServ in Austin.

The Rio Grande Watermaster confirms the TDS concentrations in the field and confirms that the El Morillo Drain near Reynosa is operating properly.

The Rio Grande Watermaster also sends daily water quality data reports to TCEQ and IBWC, irrigation districts, municipalities, and independent farmers while TDS concentrations remain above the threshold. These reports are derived from CWQMN, IBWC, and irrigation district data.

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CWQMN began in the Lower Rio Grande Valley with deployment of two stations above Anzalduas Dam to monitor TDS in irrigation and potable water supplies.



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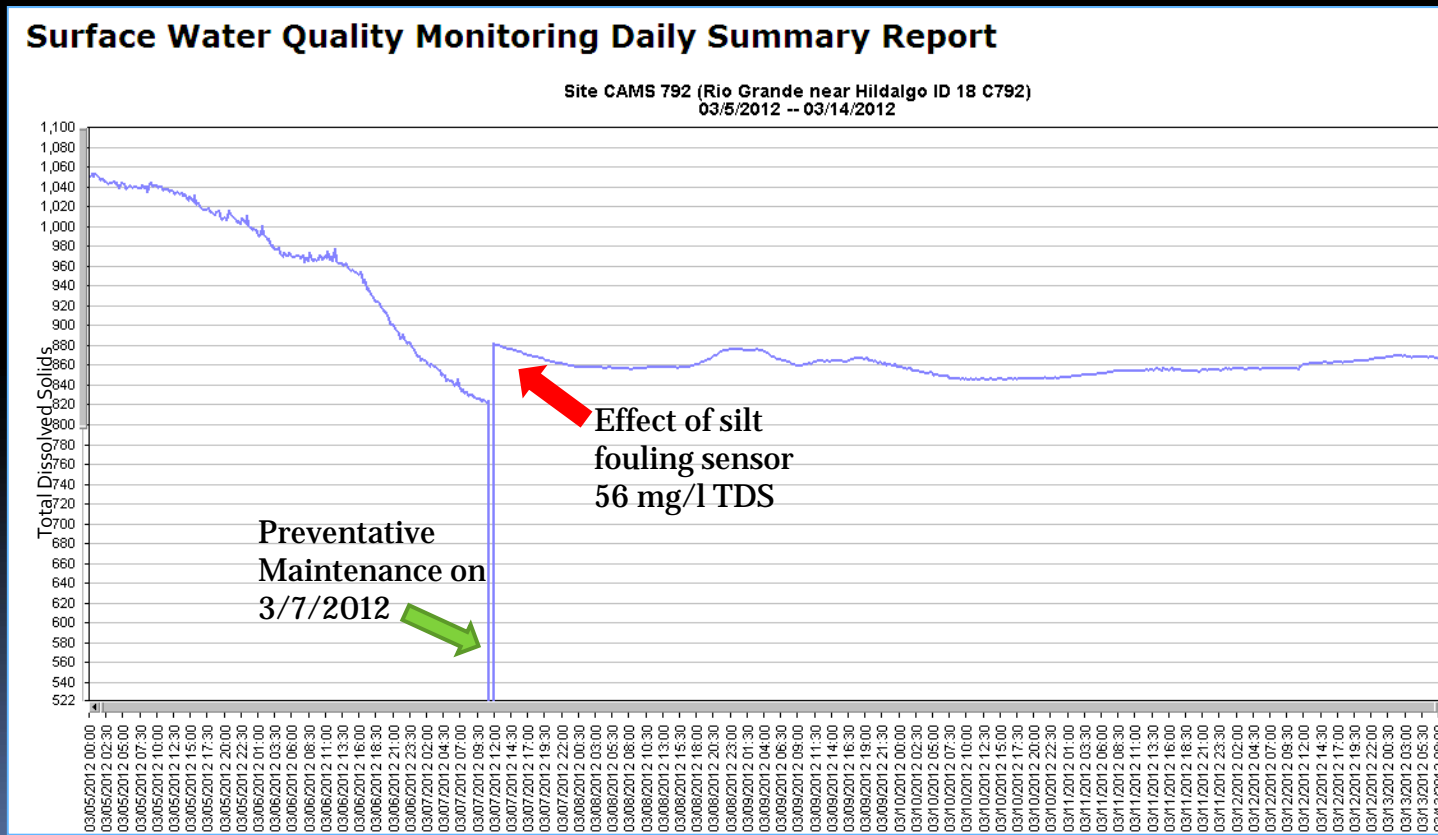
... and here we are today.



Continuous Water Quality Monitoring in the Lower Rio Grande Valley

Develop instrument modifications to improve performance and data quality by minimizing accumulation of silt and sediment on the sensors.

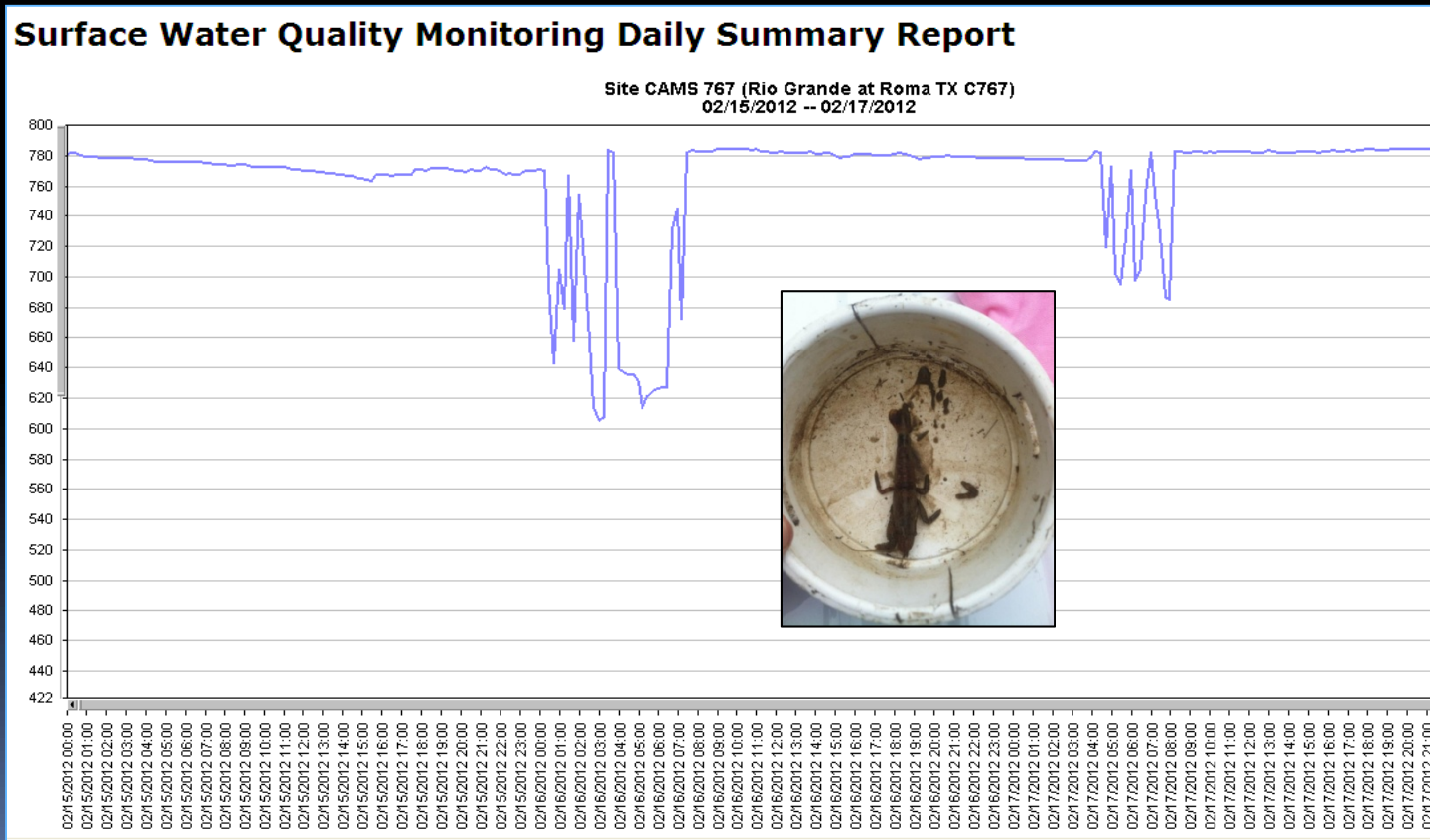
When conductivity sensors get covered with silt, sediment, or algae, they tend to read lower than they should.



Continuous Water Quality Monitoring in the Lower Rio Grande Valley

Develop instrument modifications to improve performance and data quality by excluding critters, algae, and other organisms from sensors.

When aquatic organisms take shelter in the sensor deployment tube, sensor guard or sensor, things can look a little crazy.



Continuous Water Quality Monitoring in the Lower Rio Grande Valley

The TCEQ Rio Grande Watermaster 's current target is to provide preventative maintenance, collocated measurements, and calibration on a monthly basis at all stations.

Monthly maintenance may, or may not, be adequate due to fouling and/or invasion of the monitoring systems reducing overall performance.

TCEQ is working with modified sondes, sensors, and polymers to extend the effective deployment period for CWQMN stations in the lower Rio Grande.

Disclaimer: The depiction of specific brands or products in the remaining slides in this presentation does not constitute any endorsement of the respective brands or products by TCEQ.

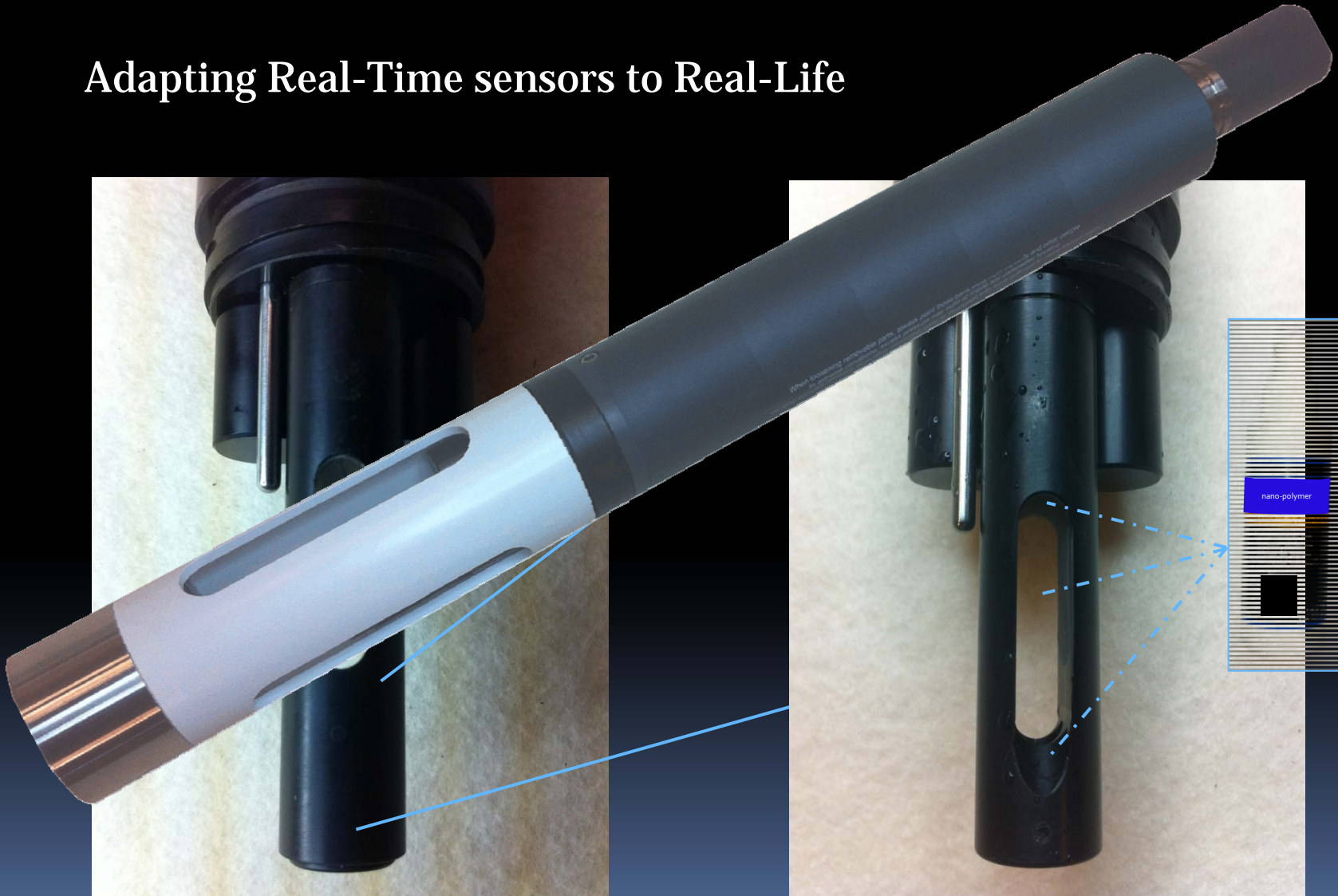
Continuous Water Quality Monitoring in the Lower Rio Grande Valley

On-Going efforts to modify instruments and stations to improve performance and data quality.

- Working to design and deploy sensors modified or enhanced to prevent silt and sediment deposition on the sensor, in the sensor guard , and the deployment tube using:
 - Nano-polymer coatings
 - Beach cut and through cut sensors
 - Bottomless sensors, guards and deployment tubes
- Working to keep the biology away from the sensor, in the sensor guard , and the deployment tube using:
 - Copper shrouds
 - Copper screens

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Adapting Real-Time sensors to Real-Life



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Adapting Real-Time sensors to Real-Life ... about that biology



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SUMMARY:

Updated instruments including sondes, data loggers, and modems

- Compact mini sonde temperature and conductivity
- New generation touch-screen datalogger and modem that can be reset remotely (most of the time).

Developed and implemented a standard operating procedure to ensure consistent and reliable data that can be compared to other data .

Revised notification levels from >850 mg/l of TDS to >999 mg/l at request from Rio Grande Watermaster in response to irrigator suggestions.

The LRG1 sondes are deployed at approximately half of the Lower Rio Grande CWQMN Stations. Full deployment will be completed in May.

It's not over yet TCEQ will continue to design and test instrument modifications to minimize silt and sediment accumulation sediment on the sensors and exclude critters from the sensors.

TCEQ Continuous Water Quality Monitoring in the Lower Rio Grande Valley

Questions?

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