

Technical Advancements in Data Collection

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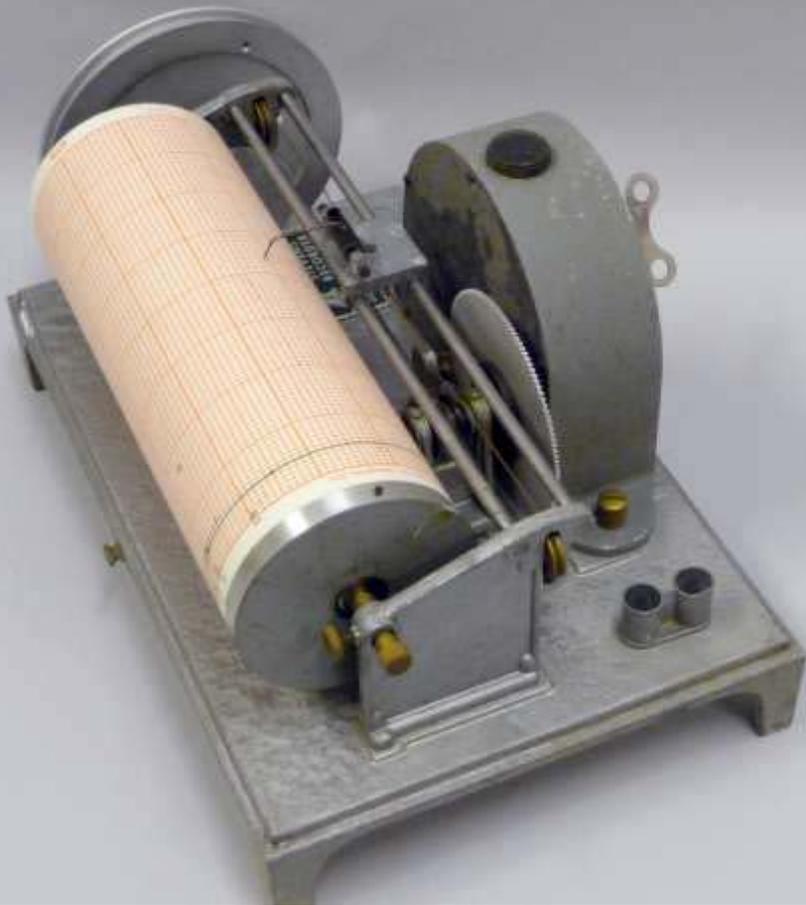


Historic Field Equipment

Stevens chart recorder

Early Price current meter

Zeiss surveyor level



Acoustic Technology in the Nevada Water Science Center



RDI Streampro and Rio Grande ADCPs



Sontek
FlowTracker ADV
and
RiverSurveyor
ADCP

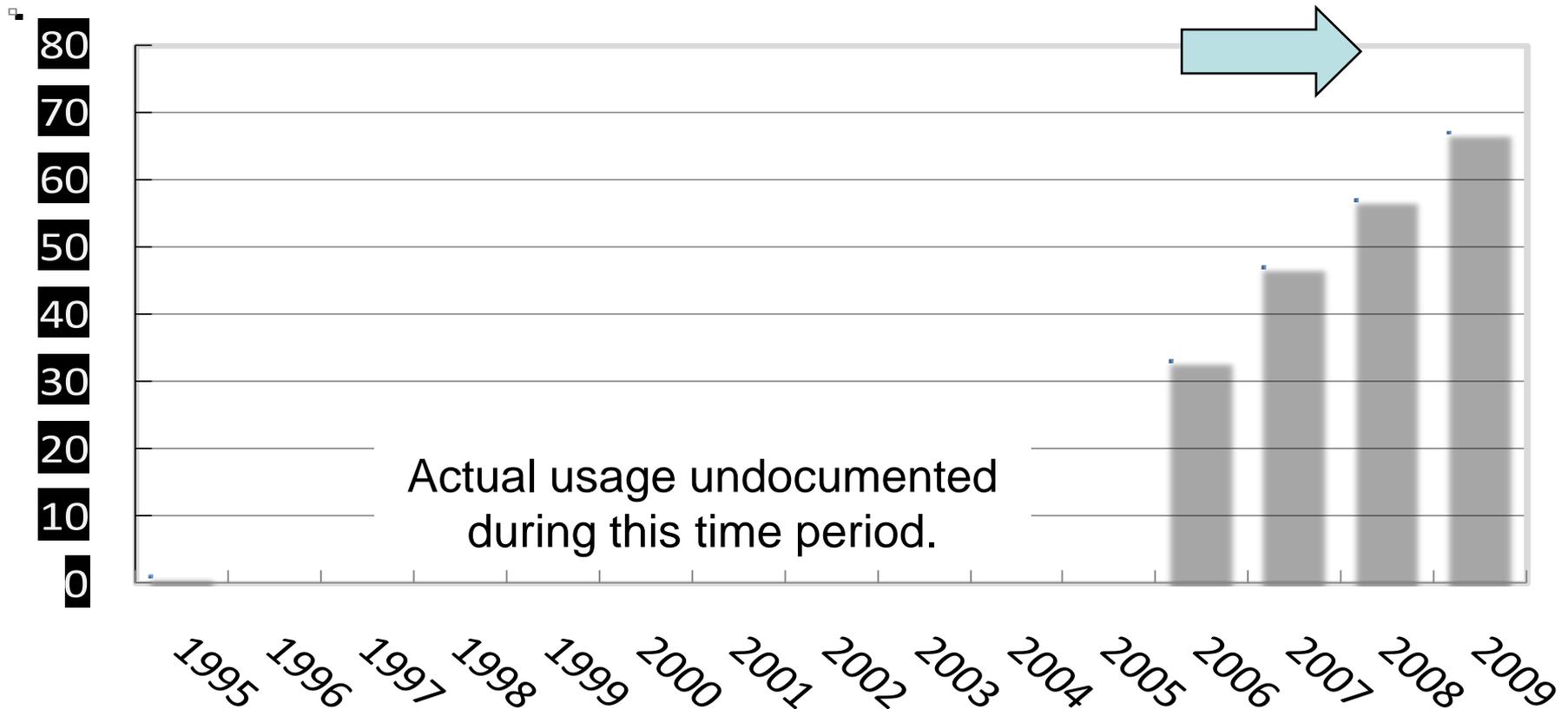


USGS Acoustic Use Nationwide

1995: ~100% mechanical meters

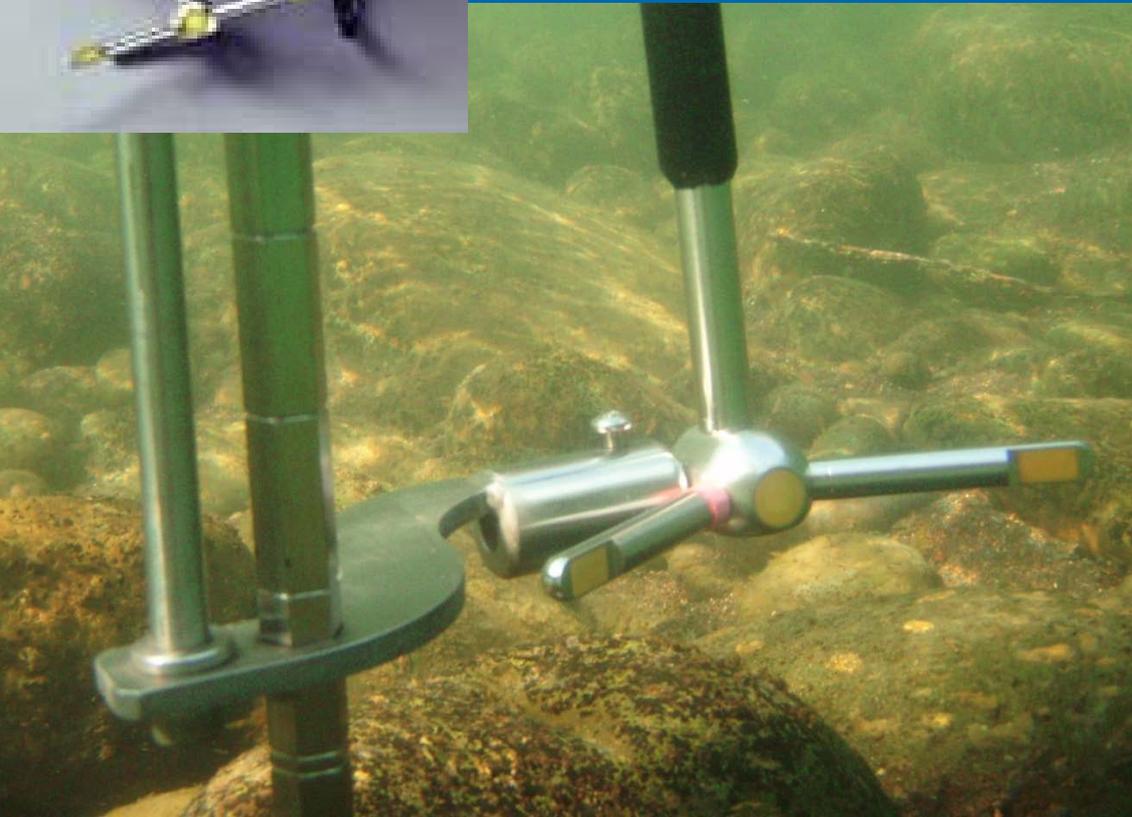
2009: 67% of all Qm's were hydroacoustic

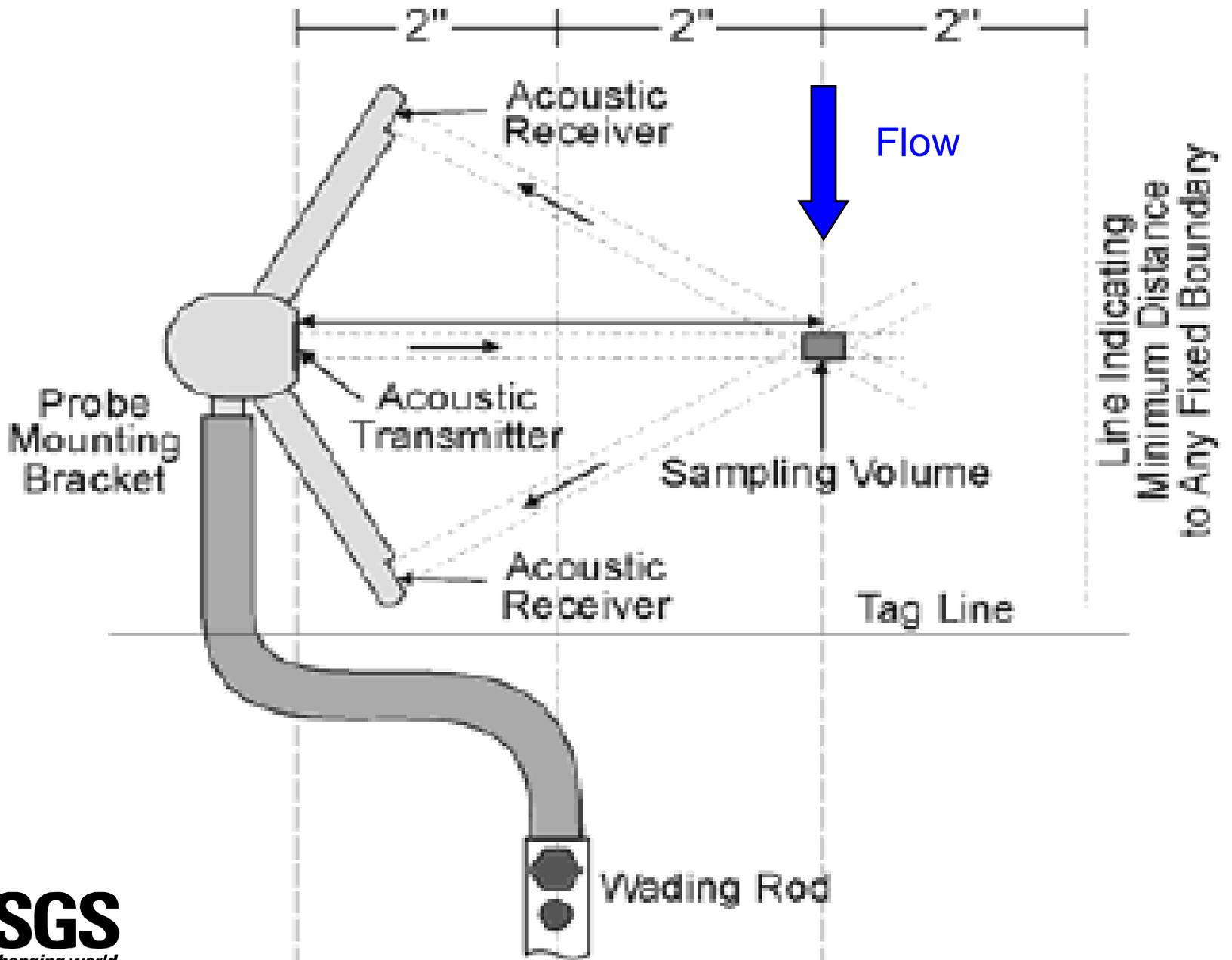
Nevada near 80% for 2008-09 Water Years



Sontek FlowTracker ADV

Replaces Price AA
and pygmy meter in
most field conditions.





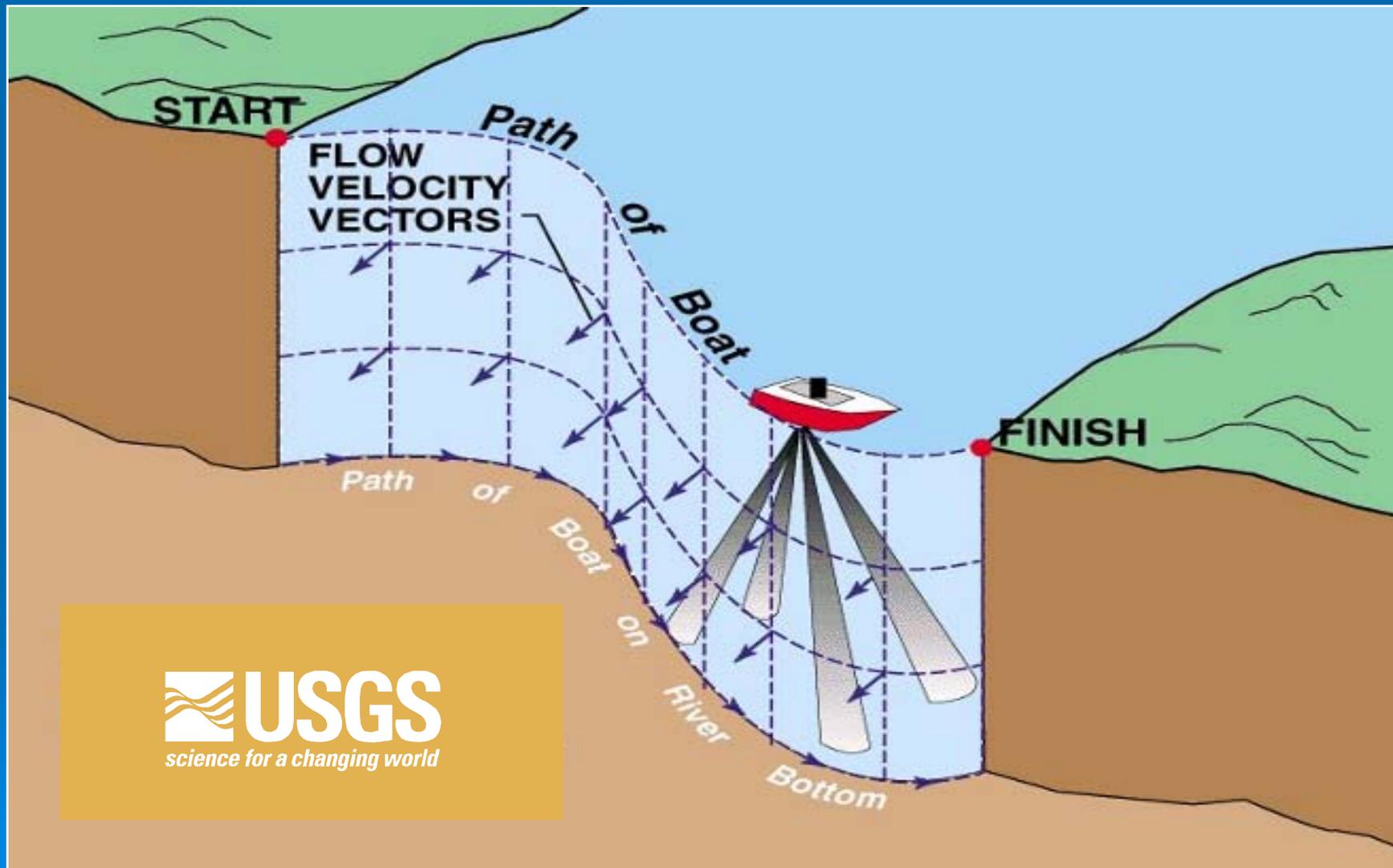
Advantages over mechanical velocity meters:

- Ability to make a 2 point measurement at depths to 1.5 ft.
- Ability to measure shallow depths and slow velocities.
- Much more accurate accounting of flow angles.
- Diagnostic software allows for much improved QA/QC of measurements.

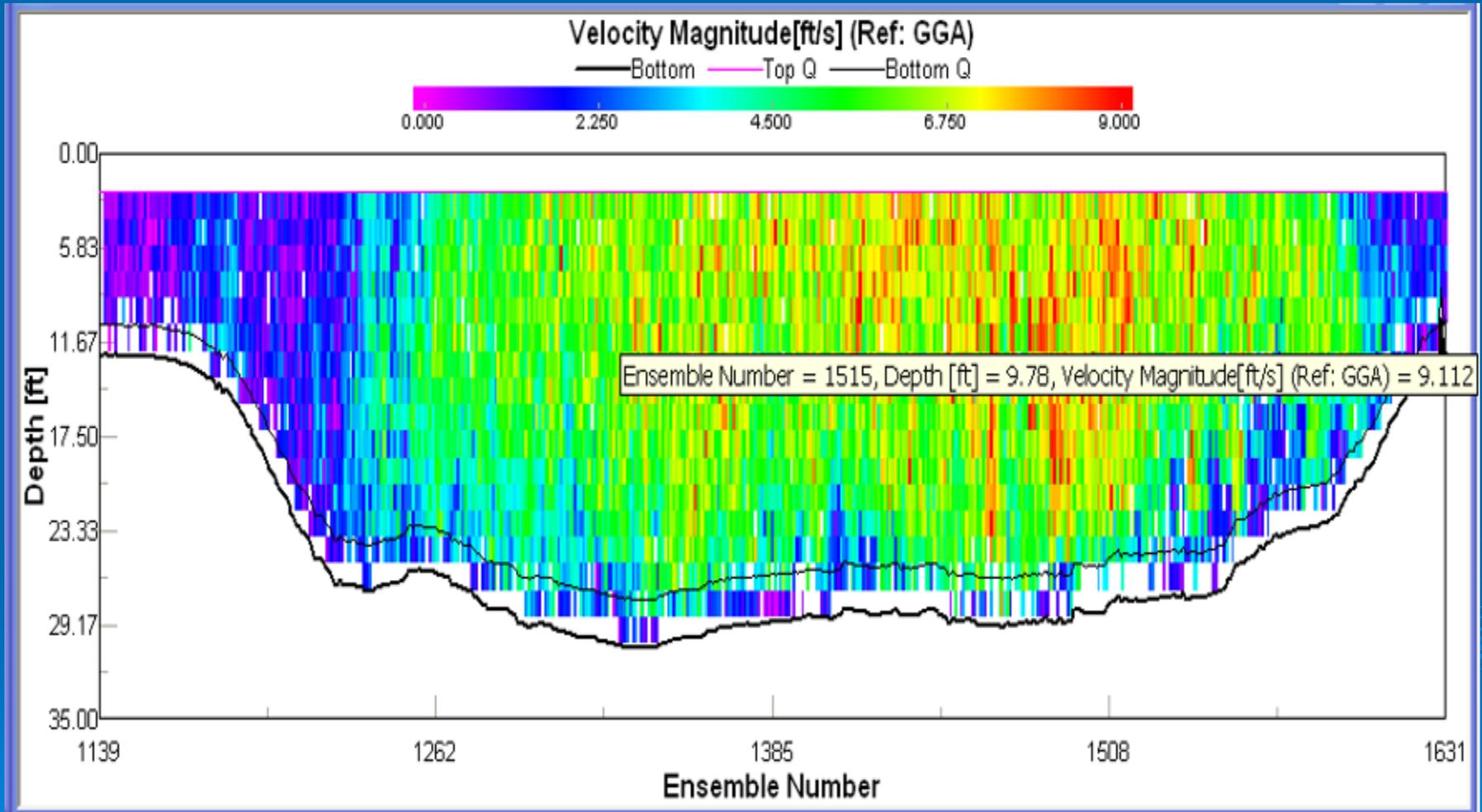
Acoustic Doppler Current Profilers



The ADCP profiles depths and velocities continuously across the stream channel.



Cross sectional data from an ADCP measurement.



ADCP QA/QC



New Bank Operated Cableways





Advantages of ADCP compared to use of AA meter and weights:

- Improved accuracy since we are measuring many more points in the water column.
- Improved efficiency. Measurement time is less, which is especially important during high flows.
- Less subject to fouling from floating material such as algae.
- Bank operated cableways allow a single person to safely and quickly make a measurement.

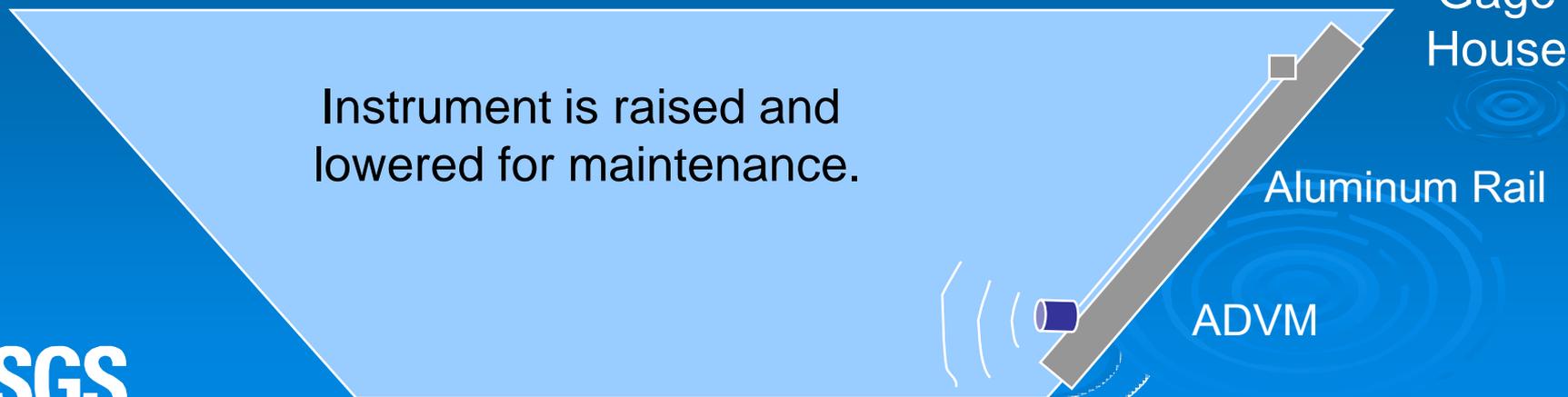


Disadvantages?



Acoustic Doppler Velocity Meter

- Typically used in situations where there is a poor relationship between stage and discharge due to variable backwater.
- Continuous measurements of velocity are used to compute discharge based on known channel geometry.



Current Nevada Application

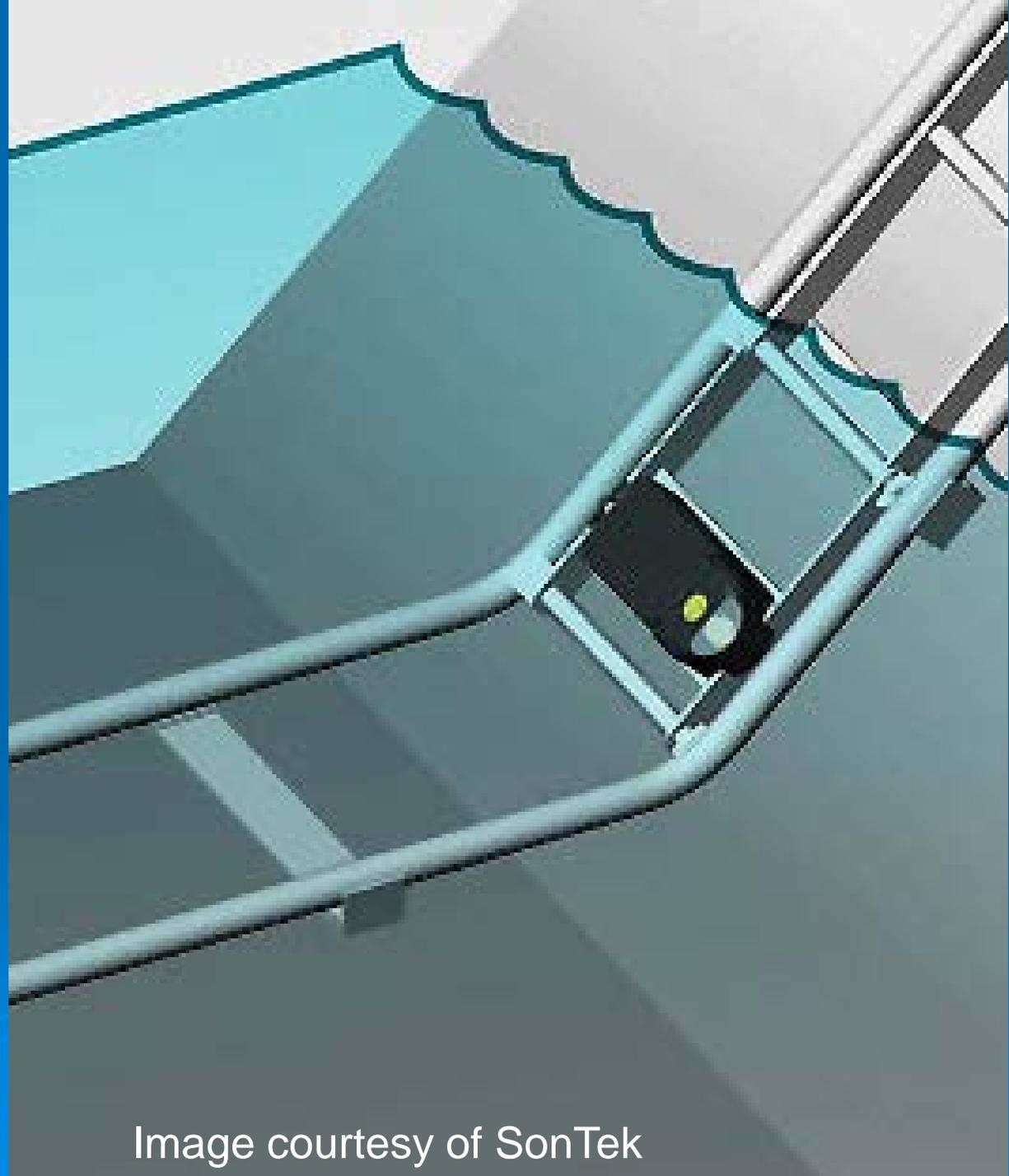
- Side Looker installed on rail system.
- Can be repositioned dependent on flows.



Photo courtesy of SonTek

Future Installation

Bottom mounted
up-looker profiles
most of the
water column and
does not have to
be repositioned at
low flows.



Gages and Equipment



Typical Nevada Gage

Sutron Accububble
bubbler system
with Sutron Satlink
data logger and
high data rate
transmitter.



Gages Past, Present, and Future

- Stilling wells require extensive labor and material to install. They are also subject to flood damage and siltation.
- Large gage houses with nitrogen tanks are still widely used but are also more labor intensive.
- Newer equipment continues to get smaller allowing for small gage structures that can easily be installed in a variety of locations.

Webcams



















Streamgaging in the Future

- Increased use of acoustics and GPS.
- Continued push towards faster more accurate data delivery.
- PDAs will make for a more seamless integration between the field data and the database.
- Increased use of non-contact sensors such as radar units.
- Long term: Webcam style stream gages? Other remote sensing applications?