DOC MAPPING

Depth of Cover Specialists

The Best Tool for the Job:

A review of current methods and technologies for locating underwater utilities at dredging sites

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The Right Tool for the Job

DoC Mapping is not beholden to any one tool or approach. Different tools work in different situations.

The following tools are in our arsenal.

- Probing
- Sub-bottom Profiling
- Advanced Sonar Technologies
- Electromagnetic Locating
- Electromagnetic Modeling

The best survey results include more than one type of data that cross verify each other.

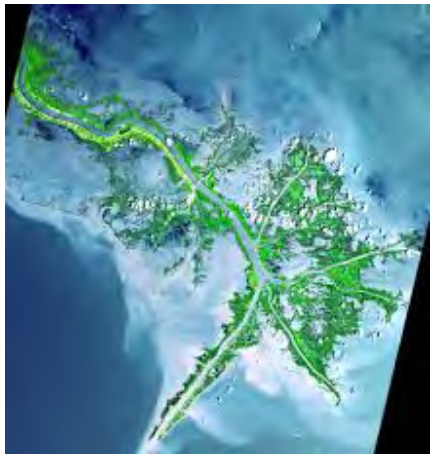
The goal is the deliver results at are:

- **Transparent!**
- **Verifiable!**
- **Repeatable!**

Probing, the old school method...

Probing has been used traditionally for shallow water surveys for a number of reasons:

- Simple
- Inexpensive equipment
- Accurate depth and position if done right



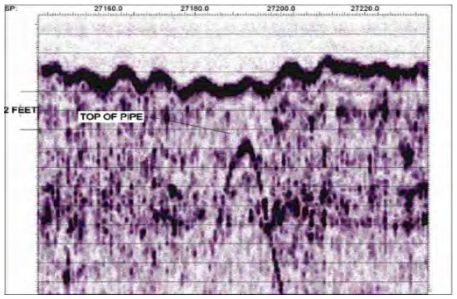
It has a few downsides though:

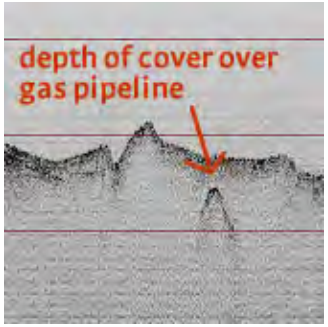
- Slow!
- Wide point spacing
- You need to have a pretty good idea of where the pipe is
- Need good weather

What might work better?

Acoustics / Sub-Bottom Profiling

Sub-bottom profiling has been around for years and is sometimes used for DoC Surveys.





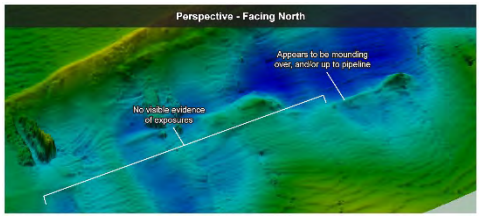
Pros:

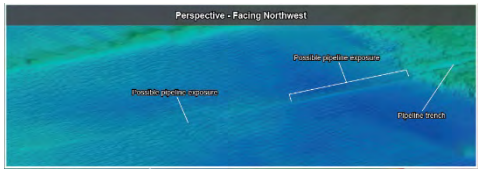
- Large survey areas possible
- Very accurate Z measurement
- No signal required
- Works on a variety of materials

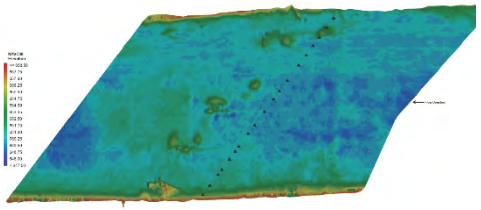
Cons:

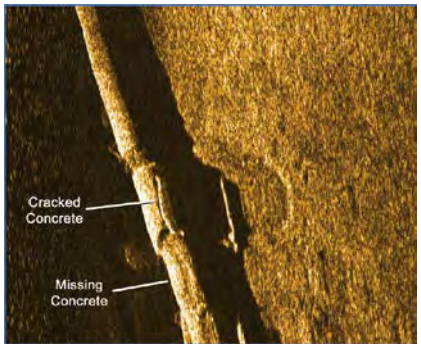
- Interpretation can be a “dark art”
- Post-processing can take a long time
- Highly dependent on seabed material
- X/Y coordinates can be less accurate
- Expensive / complicated

What might work better?









Advanced Sonar Technologies

MultiBeam and MultiPhase sonar technologies provide much higher resolution of bottom features:

Pros:

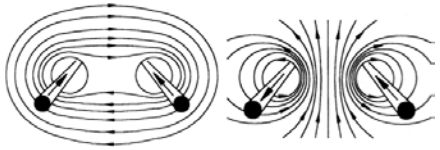
- **Amazing detail on bottom features**
- **Provides clues to the pipes true location**
- **Great for characterizing exposures**
- **Great for quantifying scour**

Cons:

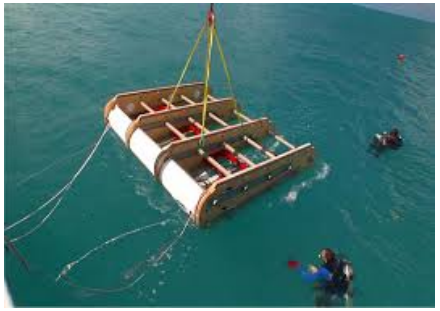
- **Only shows features on the riverbed**
- **Post-processing can take a long time**
- **Can be expensive and complicated to do right**

What might work better?

Electromagnetic Remote Sensing

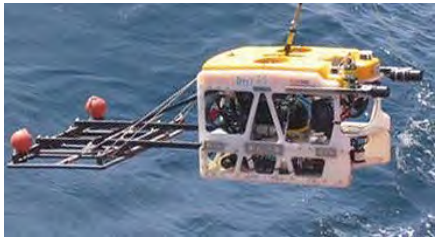


Electromagnetic remote sensing uses magnetometers and gradiometers to measure the magnetic field associated with the pipeline.



Three basic types:

- **Passive magnetometers**
- **Electromagnetic Locators**
- **Electromagnetic Modelers**



What might work better?

Electromagnetic Locating

Locators utilize a set of sensors that detect the orientation and relative strength of the magnetic field emitted from the pipe.

Pros:

- Fairly simple / inexpensive
- Fast
- Can be very accurate
- Large areas can be covered

Cons:

- Signal required
- Relies on operator to interpret the magnetic field
- Operator must precisely position the antenna and hold it still
- Data in invisible once reading is taken
- Difficult in deep water, swift currents

What might work better?

Electromagnetic Modeling

Modelers use and array of gradiometers to measure the orientation and relative strength of the magnetic field in order to generate model of the field.

Pros:

- Large survey areas possible
- All data is saved for later review
- Accurate X, Y and Z positions, GPS Integration
- Works while moving, multiple readings per second.
- Excellent for deep water, currents, long pipe runs

Cons:

- Signal required
- Complicated / Expensive

Signal!

Passive magnetic field detection

- No signal required
- Uses intrinsic magnetic field
- Need to be close
- Very susceptible to noise

Active magnetic field detection:

- Signal application required
- Easy to isolate signal
- Strong signal
- Field strength / frequency is tunable

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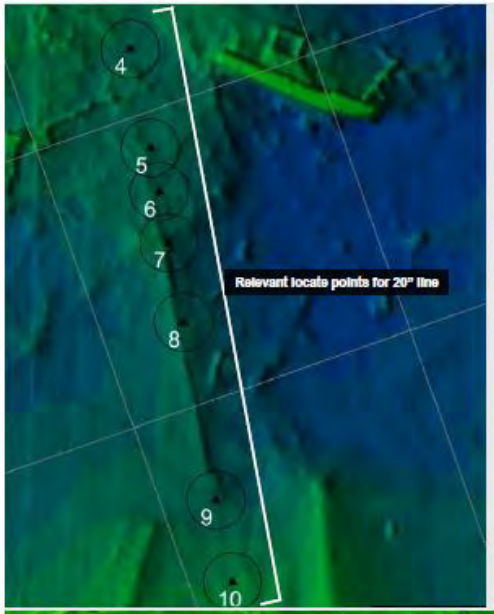
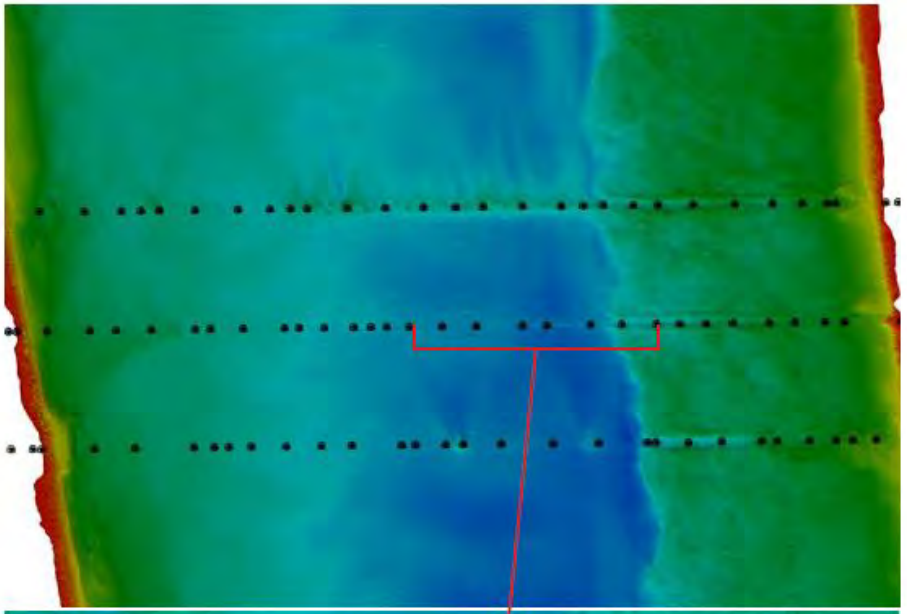
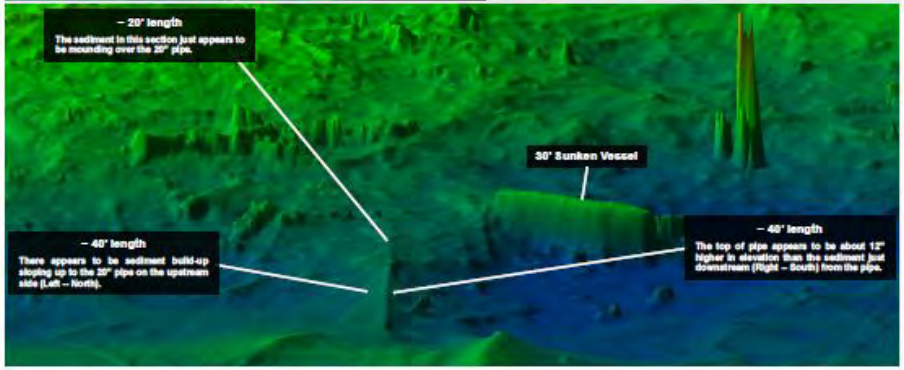
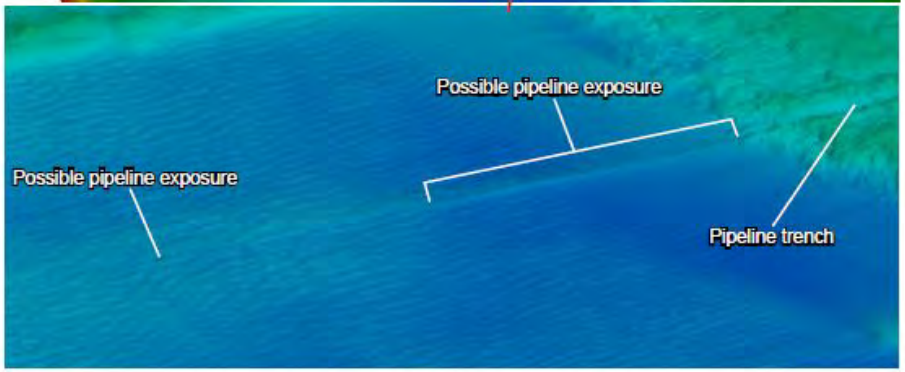
I love it when a survey plan comes together!



Locate data points overlaid onto a multibeam sonar surface image shows correlating evidence of line exposure.







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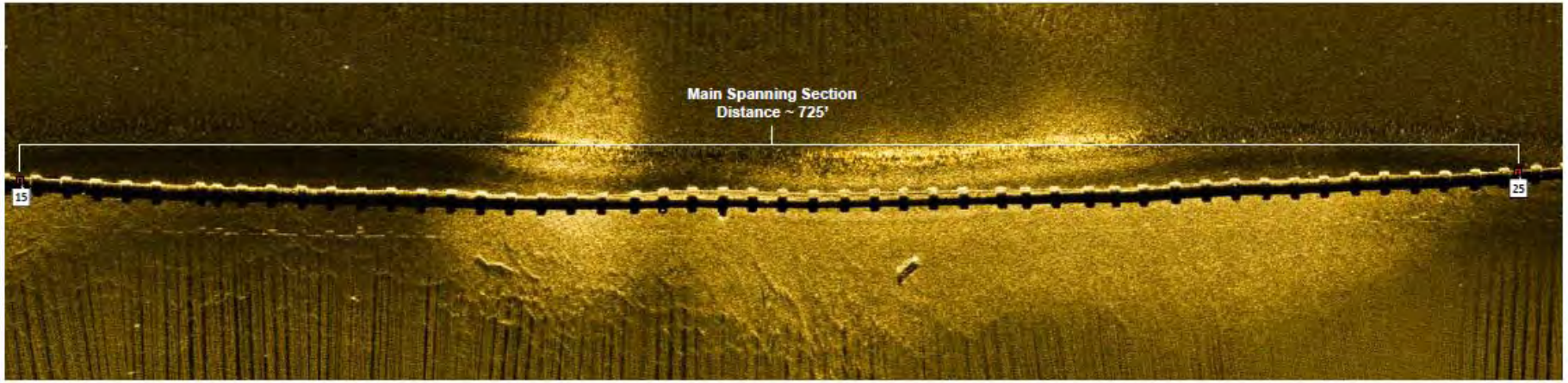
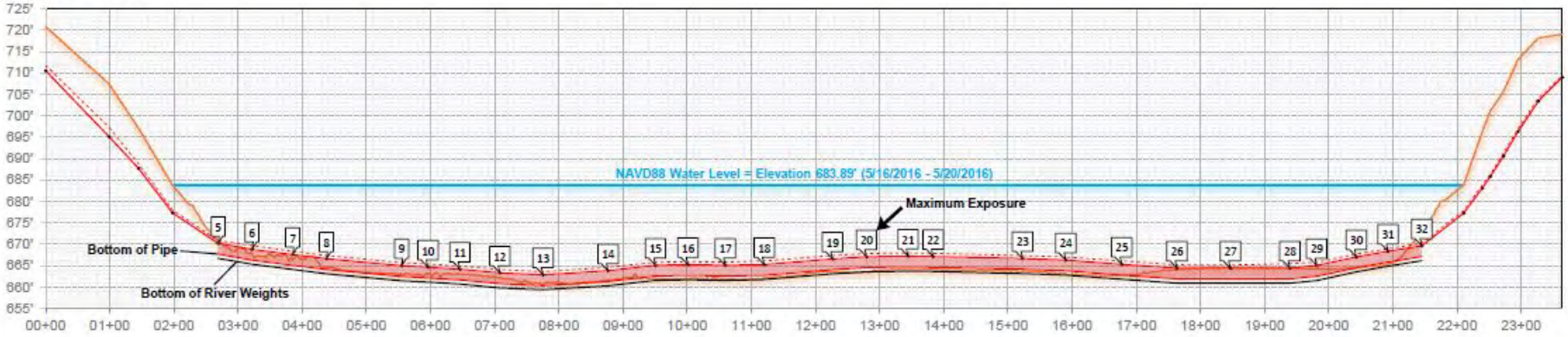


Locate data points portrayed in congruence with side scan sonar imagery confirms a spanning section of pipeline with attached river weights still resting on the lake bed.

PROFILE VIEW



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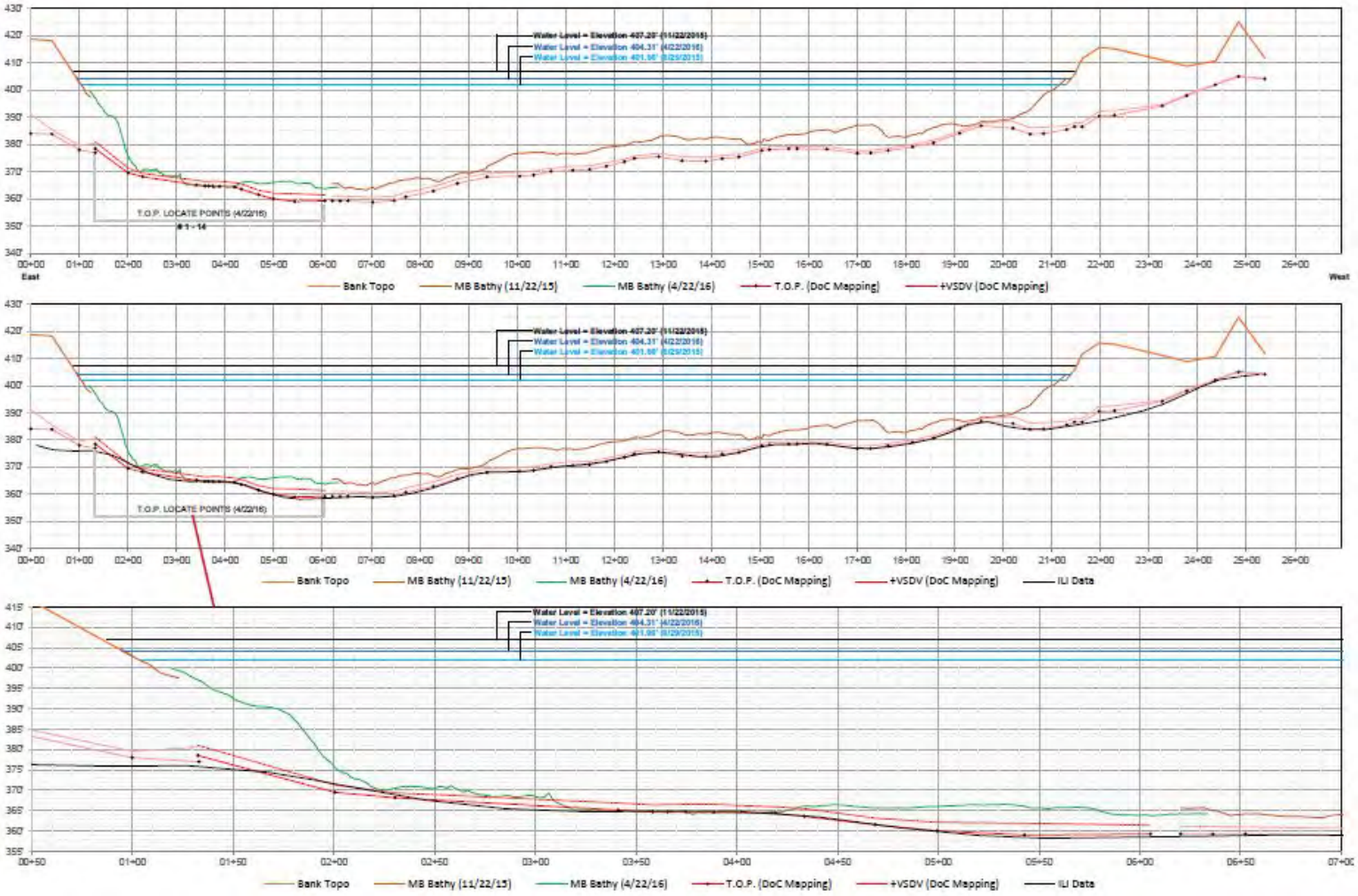

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Find Out More

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