GEOSPATIAL WORLD FORUM
23-25 JANUARY, 2017, HYDERABAD, INDIA

Ground Water Mapping, Monitoring and Analyzing

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My potable water journey

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https://www.google.co.in/search?q=tap+water+hyderabad&espv=2&biw=1702&bih=813&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiNr8jYjtvRAhUDLI8KHXiiD6QQ_AUIBygC#tbm=isch&q=water+smart+meters+hyderabad&imgrc=G_YUOQOWLe4gtM%3A

Introduction

- Water is becoming a critical factor in the developed and developing world, it's also becoming political, with tran-boundary issues becoming heated, both supply and contamination.
- Water scarcity is impacting every country in the world, and not just north Africa and the Middle East.
- With only 1% of the world total water supply available for consumption, and we need dramatically improve the way manage this resource.
- Ground water is often out of sight, but "out of sight out of "mind no longer applies.
- The level's of groundwater contamination and depletion are how becoming a serious concern.

Mapping

- Mapping or GIS has always been an important tool for ground water management. But has tended to map to status-quo rather than the real time situation.

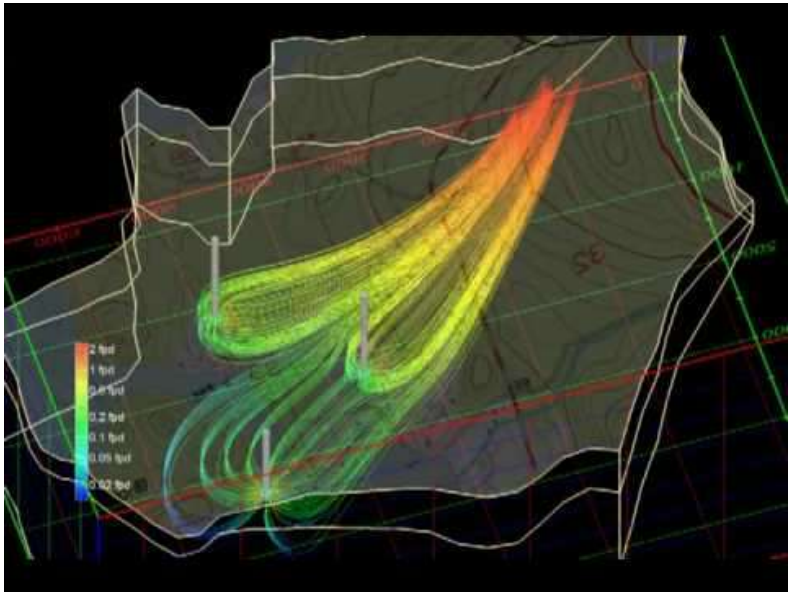
- Also the volume of advanced mapping data and the advent of more sophisticated monitoring system, means that it's time to take our systems and data to the next level.

- Need to starting thinking in 3D, both above and below ground.
  - 3D Terrain Model are important
  - Mapping Complete Water Infrastructure
  - Consumer location
    - Point and Area
  - Surface Conditions
    - Point, Linear and Area
  - Contamination Sources
    - Point, Linear, Area

- A Lot of Data!

Modelling

- It’s a very complex infrastructure we are modelling:
  - Supply, Consumption, Collection, Treatment, Loss
- The relationships between the elements are sophisticated:
  - Rain Water Collection/Harvesting
  - Water Metering
  - Agricultural Use
  - Commercial utilisation
- Flow and Loss rate between sources
- Possible Contamination sources and impact.



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Granular Modelling

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Adding a New Data Dimensions

Sources (all)

Collection

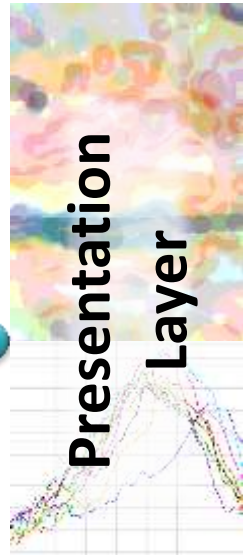
Consumers

Treatment

Ground Water Data Model

Analysis

Actionable Analytics



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Adding a Temporal Element

- The time of year has a dramatic impact on the overall water cycle, so recording information throughout the year is important as supply and demand will change.
- But it's only after having some sample years, can we start to accurately track trends. So a benchmarking process is necessary at the object level.
- Add's a massive amount of data, so use of smart storage and active meta data speeds analytical and temporal based processing.
- Cyient has been developing "data roll-up and drill down" algorithms to further enhance performance and improve accuracy.
- GIS Rolling display can quickly show water stress areas or possible flooding situations

Monitoring

- Move to real time monitoring
  - Real Time Water Quality
- Much more to monitor
  - Not just level and flow
  - Closer to source
  - Land and Pollution
  - Monitor the water cycle
- Need to be available to the consumer community, so real time access, published in real time.
- Some great examples in Australia and UK. Which demonstrate the benefits of information transparency.

Analyzing

Analysis

- GIS has been the perfect tool for performing as-is analysis, but we now need to start to track trends and develop more sophisticated analysis functions.
- Ground water, has been considered as a sources, but we now need to model and perform analysis of it’s entire life cycle.
- Most of the outputs are maps and reports

Actionable Analytics

- The key for moving forward is to have any analytic functions as actionable. We have seen recent problems in water supply, where identified issues where not actioned.
- The Flint situation is an excellent examples of where actionable analytics would have enable a simple problem to quickly resolved.
- Most of the outputs are actions the business need to take!

Conclusions

- Ground Water Mapping is very important
- Need to cover whole Ground water life cycle
- Water Quality is not a “nice to have” (NSW Office of Water - is a great example)
- A dynamic and analytical approach is required
- Smart Cities have helped, significantly to raise awareness of the need for effective water management.