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A little about who we are and what we do

- Sales and support of sensors
- System Integrator for monitoring systems
- After sales support including repair lab and field team for operational maintenance and calibration
- We specialise in measurement and sensors
- We cover a very wide range of disciplines. Including water (quantity and quality), air, and structural measurement
- We operate across the entire country
- Company has been around for almost 50 years

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Where our perspective comes from

- We have a very wide range of activities
- Spread across the entire country
- Much of our work comes as requests for management information. We only discover later that this is to assist with consent compliance
- Customers with very diverse needs
  - A very wide range of consent conditions
  - Very diverse management objectives
  - And very different scales of business (budgets)

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Our relationship with Regional Council's

- We deal with pretty much all the regional councils
  - They are our customers (monitoring teams)
  - They have an advocacy role for the environment (they are often advising our customers)
  - They are the "policeman" that many of our customers report to (consent officers)

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Where data is used

- Comparison between regions
  eg national rain gauge network
- Historical patterns
  eg climate change?
- Compliance for specific organisation
  eg discharge during high flows
- Advance scientific understanding
  eg researchers
- Efficient management of resources
  eg irrigation management
- Emergency response
  eg fire weather
- Etc …….

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Two important points

- The end use should define the methods and technology used (Horses for Courses)
- While Regional Councils may be an end user of the data, they are often not the primary user

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Areas that create issues for us

- As I said earlier, customers come to us looking for measurement solutions, not necessarily "compliance solutions"
- So they ask a vague question, possibly related to their consent, or more likely their interpretation of a consent requirement
- Due to some aspects of the environment being difficult to measure, particularly continuously, indirect measurement is fairly common
- Two examples that are more difficult to understand are turbidity, and open channel flow (Discharge)

Flow

- Flow is regularly required for Discharge consents
- Direct measurement is difficult, and expensive
- Traditionally flow is measured using velocity – area method
- In natural channels – area is often not stable (silting or weed etc)
- But velocity is largely related to head, or pressure from upstream
- So a water level to flow relationship can be determined

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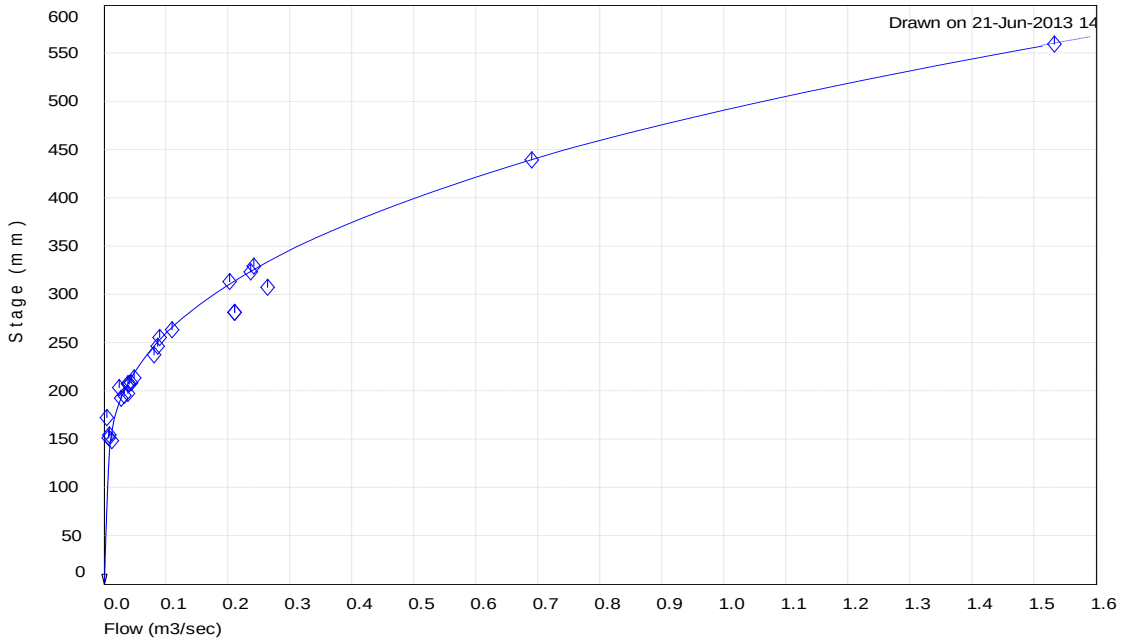
Measuring Water Flow (Discharge)



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Where the arguments start

- Some consents, being aware of this method specify discharge between specified water levels.
- The water level to flow relationship needs checking at regular intervals – which depend on the water course (opinion)
- Some regional Council flow records are based on measurements done from bridges. Where consents are based on these historic records, new measurement methods (Like Acoustic Doppler flow measurement from boats) can call the basis for consents into question.
- New technology can have considerable cost savings for measurement, and sometimes improved accuracy. Depending on the understanding of these new technologies at a Council there can be considerable disputes.

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Turbidity

- Mostly used as a proxy for suspended solids in Resource Consents
- Usually used as a way of measuring water clarity
- Measured in NTUs – Nephelometric Turbidity Units. These units are defined by a method, not an SI unit.
- Standard is Formazin solutions (But there are other options)
- Formazin ≠ Water

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Where the arguments start

- Customer wants their data to be accurate. The system they have spent thousands on is giving a reading 2 NTU different from Lab samples….
- "NTU values have no intrinsic physical, chemical of biological significance" The NTU units need co-relation to the physical (or other) property being measured.
- Regional Councils have recently drafted and adopted a "National Standard" for Turbidity recording. This standard is not necessarily the best way to measure in every situation. In fact they have standardised on a method that we believe to be unsuitable in the majority of natural environments.
- The most common method (Nephelometry) of measurement has significant natural factors which mask the measurement of the likely desired parameter. For example when trying to measure Suspended Solids, Nephelometry is also affected by sediment colour, particle size, water colour, and biological activity. In summary, "it has issues"

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How things seem to work in practice

- Regional council staff are generally happy with "a good effort" in monitoring. (to date…)
- Problems largely depend on your relationship with the person at the council
- Most Council staff are tolerant of some non compliance, especially where measurement issues like above exist.
- This means consistency is a pipe dream. Even within a single council.
- Enforcement action is rare. Strongly worded letters are more common. But most common is getting away with murder. Unless you are an easy target.
- Note that this is our experience. It may not be the same for everyone

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Some of the issues we see

- Some regional council staff have commercial interests in the field
- Skills vary widely in regional council staff
- Some consent holders have a lot more power than others
- Some consent holders have fairly large “levers” with which to manage the regional council
- Regional councils have a lot of “history” to deal with
- Regional councils will “play favorites” to encourage businesses to assist them with advocacy or compliance (environmental advocacy and being the policeman do not always mix well)

We don't get involved in judging the suitability of consent conditions

- But
  - We do not believe councils understand the practicalities for continuous water quality data. Natural variations of water quality can be very large, and these do not seem to be reflected in consent conditions. Percentile limits would be superior to absolute limits in these cases.
  - It seems likely that there is a lack of experience with the norms of continuous water quality data. Possibly much of the data they are looking at is from close to outputs of catchments (ie heavily damped). When operating closer to pollution sources, both natural and manmade, very different norms exist. These norms do not seem to be reflected in the consents that we have seen.
  - A proportion of councils flow data (that consents are based on) is based on a historic record that could be considerably improved by use of newer technology. Some bridge based flow measurements, could be improved by measurements in open water. It is likely that a number of business operations are restricted by this practice.
  - **These issues seem to currently be dealt with by a variable approach to enforcement rather than solid understanding.**