Case studies on network design

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Why? What?

- Better understanding of the various difficulties in network design
- Challenges in building and maintaining a sufficient network

- Process
- Each case country/NHS
- Common challenges
- ... What if we could start from scratch?

Process

- Discussions with task group ”Inventory of monitoring needs; network optimization and strategic planning” on task limitations
- Preparation of a network description questionary
- Norwegian network as example
- Using task leaders as directors on what network should be included
- Evaluting anwers from 8 countries


Europe
Iceland
Sweden
Finland
Norway
Estonia
Latvia
Lithuania
Denmark
Ireland
Netherlands
United Kingdom
Belarus
Poland
Germany
Belgium
Ukraine
Czech Rep
Luxembourg
Slovakia
France
Moldova
Austria
Hungary
Switzerland
Romania
Slovenia
Liechtenstein
Croatia
Bosnia and Herzegovina
Serbia
Portugal
Italy
Bulgaria
Spain
Macedonia
Greece
Montenegro
Albania

Estonia

- Sea level monitoring, water management, flood protection,
- Automatic, realtime, clear responsibilities
- Limitied finances: temporal stations and modelling
- Wishes:
  - more small catchments
  - More in flood prone rivers
  - co-located with meterology

Finland

- Forcasting and management - flood, hydropower, lake
- Automatic and realtime, rather dense
- Many parameters (also: snow, evaporation, icecover and groundfrost)
- Evaluation: objectives & cost efficiensy
- Halved network, approx same cover
- Wishes:
  - More even distribution (elevation and geographical)
  - More near cities/suburbs (bigger need, easier operation)
  - Reliable instrumentation (less fixing + simple data management)

Germany

- Shipping/navigation, water mangagement, flood forecasting, hydropower
- Old, very dense network. According to EU law. Management in three levels.
- Water level, discharge, groundwater (inc. quality)
- Wishes:
  - more equality from authorities for consitent countrywide data

Macedonia

- Water mangagement, floodprotection, hydropower
- High climatic and altitude variation + unstable profiles
- Manual network - limnigraphs, some automatic (few work)
- Cut downs (economical reasons) – halved
- Wishes:
  - Automatic, modern stations
  - Stable profiles
  - More even distribution (altitude and geographical)

Norway

- Flood forecasting, energy prognosis
- Large remote areas + high climatic variation
- Scarce automatic network (redundancy)
- Wishes:
  - More small catchments
  - More even distribution (altidude and geographical)
  - Co-locate with meterology

Romania

- Forcasting (flood/avalanche/ice gem), water mangagement, hydropower
- Large climatic variations, flash floods, unstable profiles
- Automatic and realtime, redundancy
- Many parameters, also: precipitation, snow, evapo/transpiration
- Wishes:
  - More fast, small catchments
  - More even distribution (altitude and geographical) - representative
  - More in unregulated rivers
  - More automatic discharge (ADCP/magnetic)

Switzerland

- Flood protection, water management, hydropower
- Large climatic variations
- Sufficient - 240 discharge, 500 groundwater
- Automatic and realtime
- Wishes:
  - Better coordination federal and state
  - Better standardization & integration water quality
  - Redundancy

UK/ England and Wales

- High: drainage, land use, water utilization
- Large artificial influence – hard to see natural changes
- Very dense network
- 55% purpose-built structures, 35% open channel, 6% ultrasonic or electromagnetic
- Very good tools for network assesment – optimal regionalization focus
- Standarization – national and international

Similarities and differences

- High climatic variability
- Mostly automatic and realtime
- >50% satisfied with network
- Highly varying densities

Country	Density stations/100.000km2
Estonia	124
Finland	100
Germany	1120 (w.l.) 840 (q)
Macedonia	253
Norway	201
Romania	419
Switzerland	570
UK	830 (q)

… closer to ideal

- More automatic/redundancy – w.l. and discharge,
  - less travel!
- Stable profiles
- Better distribution (altitude and geographical)
- Smaller unregulated catchments
  - but others: more where people or risks are
- Co-location (meterology)
- Better comunication and standarization between units