

Hydrometric Data: The Long View

Measuring Authority Coal-Face to Archive

22nd October 2013

CEH Wallingford

Richard Brown, Head of Hydrology

Interaction with NRFA

Mutual Benefits

Reflections

2012/13

30th Annual Report to the
UK Surface and Groundwater
Archives Committee



National River Flow Archive
and
National Groundwater Level Archive

Complete Daily Mean Flow Records (/10)

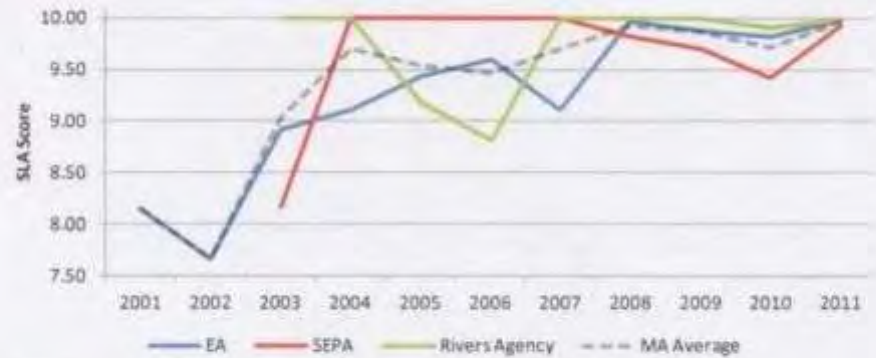


Figure 4: Average Daily Mean Flow completeness scores by UK Measuring Authority

Service Level Agreement

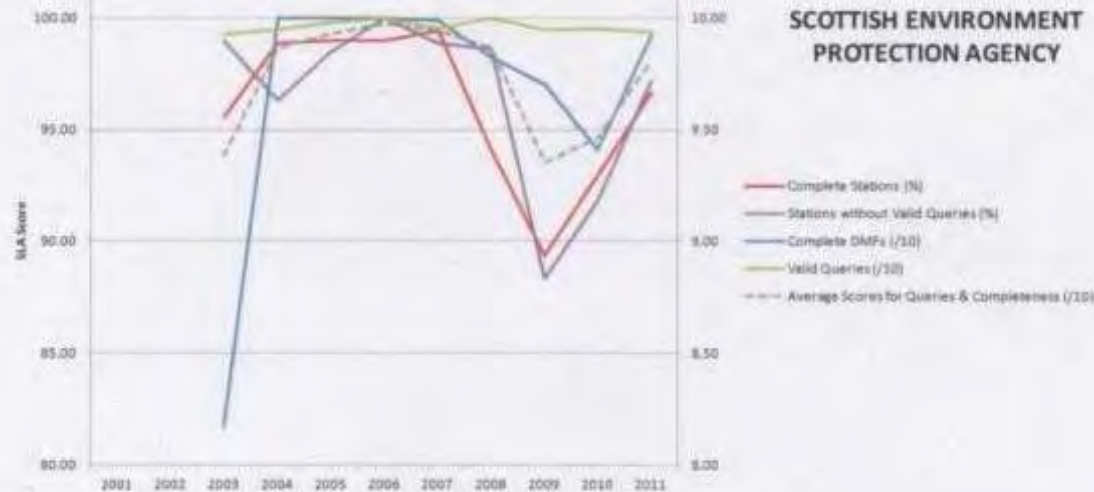


Figure 6: SEPA SLA Indicators for 2011 Data Submission

Interaction with NRFA

Mutual Benefits

Reflections



“According to this, the gauging station ought to be about here!!”



Liaison Visits and Data Audits



Shop Window

Hydrological Summary for the United Kingdom

General

Synoptic patterns across most of the country during September were typically autumnal but monthly rainfall totals were generally modest, mostly 50-60% of average, contributing to significant rainfall deficiencies in the June-September timeframe. There were a few notable storm events and some isolated flood alerts, mostly in mid-month, but with recessions then re-established, runoff rates in many catchments were seasonally depressed entering October. Reservoir replenishment since May has been below average and late-September stocks were notably below average in a number of, mostly southern, impoundments. For England & Wales as a whole reservoir stocks remain healthy (albeit substantially below the record levels of September 2012) but spatial variations are considerable. Seasonally flooded stocks characterise parts of southern England and western Scotland. Despite groundwater recessions now extending for at least seven months in the most responsive aquifers, groundwater levels generally remain close to the early autumn average. Whilst the overall water resources situation is healthy, the relatively high soil moisture deficits at month-end (reflecting similar conditions in 2009 and 2011) across much of Lowlands imply a significant delay in the seasonal recovery of river flows and up over the coming three months, it is unlikely that soils will approach sat. As a consequence there is an increased likelihood of notably low late in of the 2013/14 aquifer recharge season.

Rainfall

After a dry and warm start to September, cyclonic conditions brought locally torrential downpours late in the first week, on the 17, 24-hour rainfall totals of 62.8mm at Durham and 71.5mm at Nonesuch Abbey (and Louthian) were reported, and most extensive heavy rainfall occurred around mid-month. Driven by a vigorous jet stream, a sequence of active frontal systems crossed the UK, from the 15°-17° in north-west Scotland. Climatix Inc reported a two-day rainfall total of 82mm. Thereafter, persistent high pressure, centred on Scandinavia, restricted the eastern penetration of further low pressure systems and dry weather predominated; precipitation was largely restricted to fog drip in many localities. Many regions registered September rainfall totals within the 70-80% range but parts of Wales and eastern Britain (i.e. south-east and the Cotswolds in particular) were notably dry - precipitation totals fell below 20mm in parts of Humberside and Lincolnshire. Convective storms contributed to the few areas registering substantially above average September rainfall (e.g. parts of north-east England). For much of the country, September was the fourth successive month registering below average rainfall and, at the national scale, the June-September period was the driest since 2000, particularly notable rainfall deficiencies characterise parts of eastern and southern England (in Anglian region it was the driest for 23 years). Rainfall deficiencies for 2013 thus far are moderate across most of the UK but water year (October-September) rainfall totals are close to the long-term average.

As a consequence there is an increased likelihood of notably low late in of the 2013/14 aquifer recharge season.

Ground

With some of Britain, deficits that has been, any aquifer may bore in contrast levels are, and continued of last year England, & their norm where a fa below that of water a will contin notably to responsive depressed; Garage, all show req Maximum their norm in the Chaf generally i

In most catchments, the late summer river flow recessions continued into early-September but the majority were interrupted by, mostly minor, spike conditions around the 7-9th; a few flood alerts were in operation in north-east England (in Redcar flash flooding required the evacuation of 40 homes) and southern Scotland. The third week witnessed three extensive spikes; nonetheless, estimated outflows from Great Britain remained below the long-term daily average throughout September (with the exception of the 16th). With few exceptions, September runoff totals were below average but within the normal range. Importantly, however, sustained recessions over the latter half of the month, and continuing into October, saw flows in responsive rivers approach the lowest on record, for the

River flow ... River flow ...



River flows

Estimated based on average flows from our contributing. A given percentage flow can represent various drought conditions in particular catchments where flow patterns are relatively stable but be such within the normal range is important to catchments where the annual variation is more pronounced. Note: the period of record on which these observations are based varies from catchment to catchment. Participation can be limited in relation to the latter series.



UK Hydrometric Register

- National River Flow Archive Home Page
- About the NRFA
- Search for NRFA data
- NRFA Data Holdings
- NRFA Data Retrieval
- National Hydrological Monitoring Programme
- Hydrology in the UK
- NRFA Publications
- Long records
- Contacts

Welcome to the National River Flow Archive

The National River Flow Archive (NRFA) is the UK's focal point for river flow data.

The NRFA collates, quality controls, and archives hydrometric data from gauging station networks across the UK including the extensive networks operated by the **Environment Agency** (England), **Natural Resources Wales**, the **Scottish Environment Protection Agency** and the **Rivers Agency** (Northern Ireland).

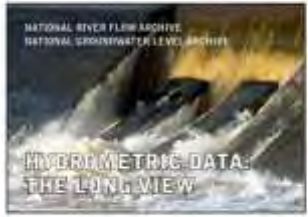
River flow data for ~400 gauging stations can be downloaded from this website. Data for a further ~1000 gauging stations can be requested via our manual **retrieval service**. The data are normally available free-of-charge.

- Search for gauging stations, download river flow data, and access station and catchment information
- Find out about the data stored by the NRFA
- Find reports on current hydrological conditions, the status of water resources, and recent major flood and drought events
- Find out about the measurement of river flows in the UK



NRFA News Friday, 18 October 2013

"Hydrometric Data: The Long View" MEETING NOW FULL (22 October 2013) - 23 September 2013

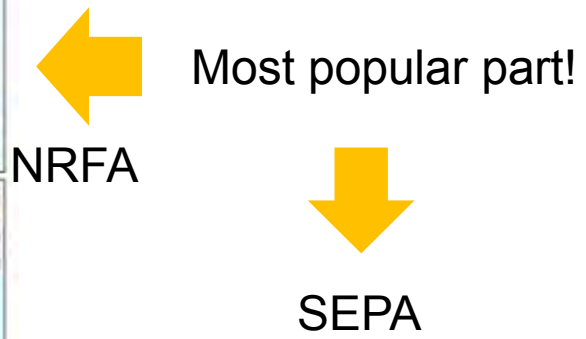


THIS MEETING IS NOW FULL.

A free one-day meeting will be held at CEH's site at Wallingford, Oxfordshire on **22 October 2013** to celebrate 30 years of the National River Flow Archive and National Groundwater Level Archive being hosted in Wallingford by NERC. The meeting will review the achievements of the archives and the exploitation of this rich hydrological data resource by its broad user community.

Places are limited so please register by 20 September 2013. Further details and registration form can be found [here](#).

Web Access



x55k access in 2012

Navigation menu: Home, Publications, Consultations, Application forms, Downloads, Contact us

Search bar: You are here: Home > Water > River levels > River level data

Search filters: Free Search, Map Search, Documents, FAQs, Photo info

Graph: Dee (Gochpar) @ Woodend (NR: NO 02402 39013)

Level in metres vs Time (GMT) from 00:00 Wednesday 18 to 00:00 Friday 19

Station Name	Dee (Gochpar)@Woodend
Local Data (day)	Click here
Gauge Datum (mODD)	75.8
Catchment Area (km ²)	1370
Acquisition Date	September 1972
Highest Stage (m-River)	3.512 m @ 13/07/1982 17:48
Lowest Level (m-River)	0.24
Average Level (m-River)	0.72

Legend: Dee (Gochpar) @ Woodend - Latest Level: 0.54m

Flood Risk Management

National Flood Risk Assessment (2011)

- 125,000 properties
- 1 in 13 businesses
- 1 in 22 homes

Floodline
0845 988 1188
SCOTTISH ENVIRONMENT
PROTECTION AGENCY
www.sepa.org.uk

24HR FLOODING ADVICE
ONLY A CALL OR A CLICK AWAY

National Flood Risk Assessment Grid




SEPA
Scottish Environment
Protection Agency

managing flood risk and flood warnings

Home | Publications | Publications | Appointment | Venues | Contact us

Home > Home Page > Flooding > Flood Updates

River and coastal flooding updates for Scotland

To find out the latest flooding information issued for your area, please select one of the following search options:

- Search by postcode, town or Floodline quick dial code in the box below.
- If Flood Alerts or Warnings are in force, you can select from a list of Flood areas below.

Please note: if no Alerts or Warnings are in force, you will only see a searchable map of Scotland!

Search by:

Find area by:

FLOOD ALERT (FLOODING IN FORCE)

FLOOD WARNING (FLOODING IN FORCE)

SEVERE FLOOD WARNING (FLOODING IN FORCE)

Obseparings and Awardees - CA	Yes
Carries and Substans	Yes
Carries and Impu	Yes
Taxi s	Yes

Floodline quick dial codes

To find out your local Floodline quick dial code, please click here.



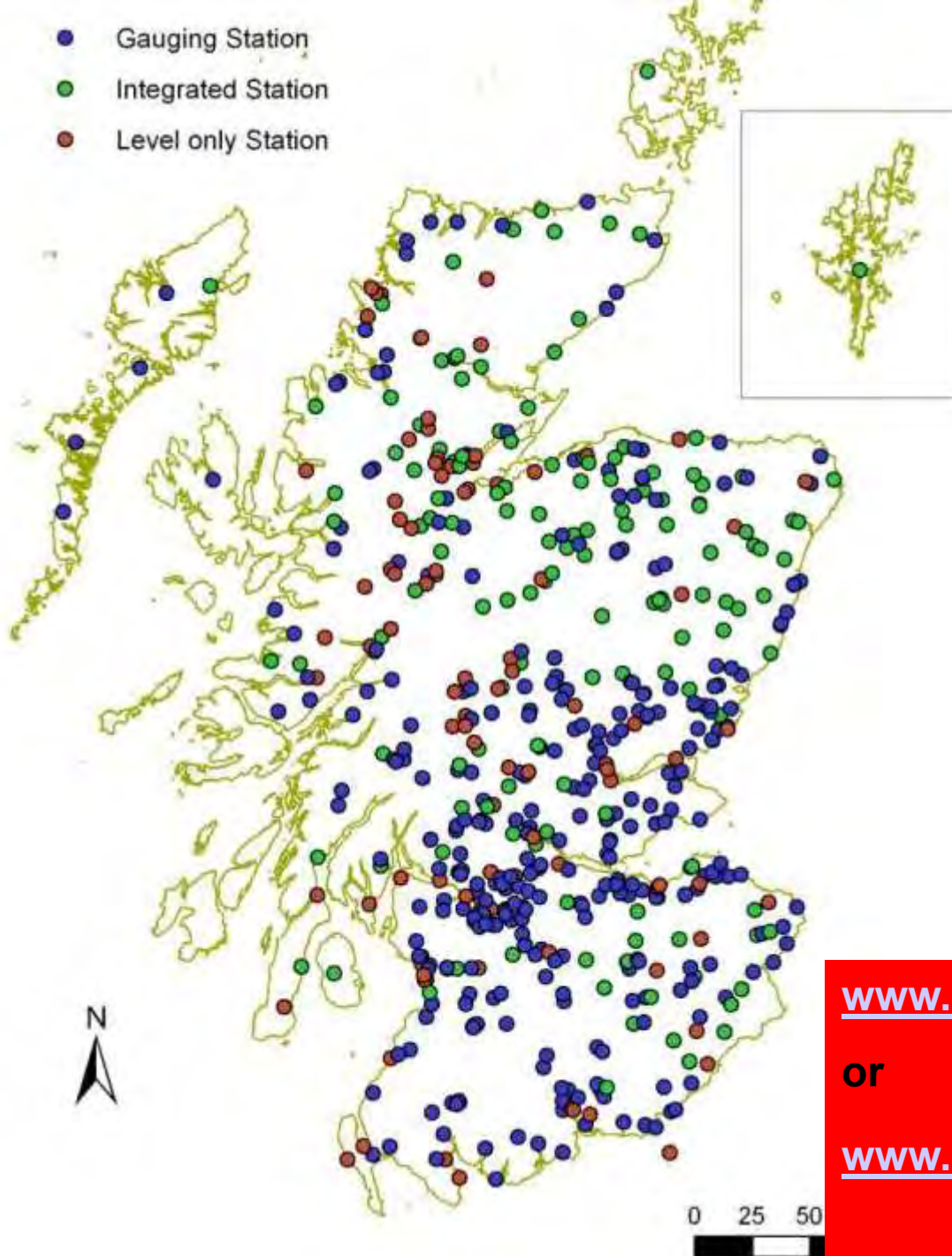
Flood Hazard Maps for Scotland



- Dumfries example
- Q200
- Good match with more expensive model

- CEH Flow grid improved across Scotland by using real data from Gauging Stations
- Upstream gauging station high value
- Good flood history

- Gauging Station
- Integrated Station
- Level only Station



SEPA Gauging Stations

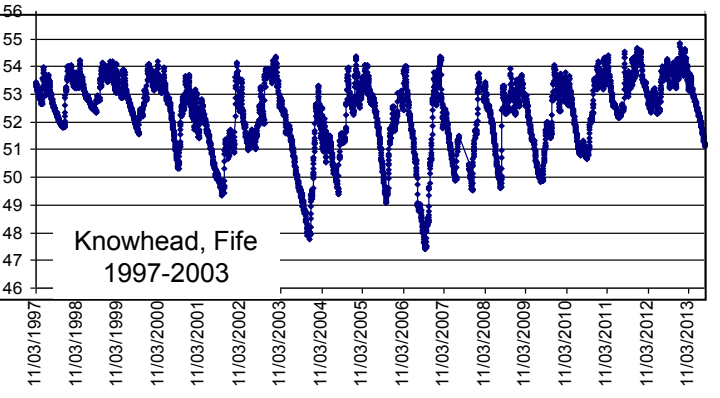
www.sepa.org.uk/data/river_levels/index

or

www.riverlevels.mobi

Groundwater Levels

Knowhead borehole, Fife
Groundwater level daily means
1997-2013



Knowhead, Fife
1997-2003

72 sites
(33 SEPA)
Earliest 1976

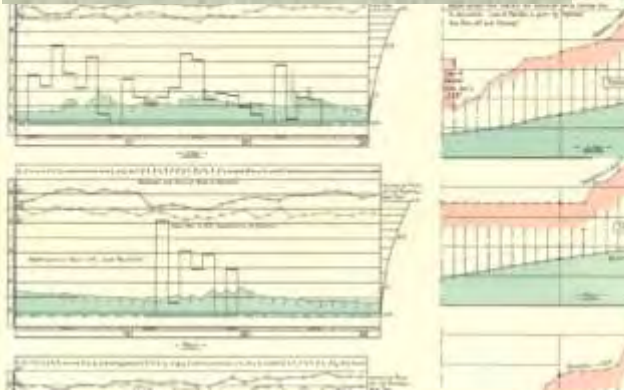


The Long View

William Newsam McLean MA, CEng, (Captain, RE) 1874-1968



River Dee
Cairnton,
Woodend
1929



River Garry
1913





Underpinning Data - Then

Underpinning Data - Now

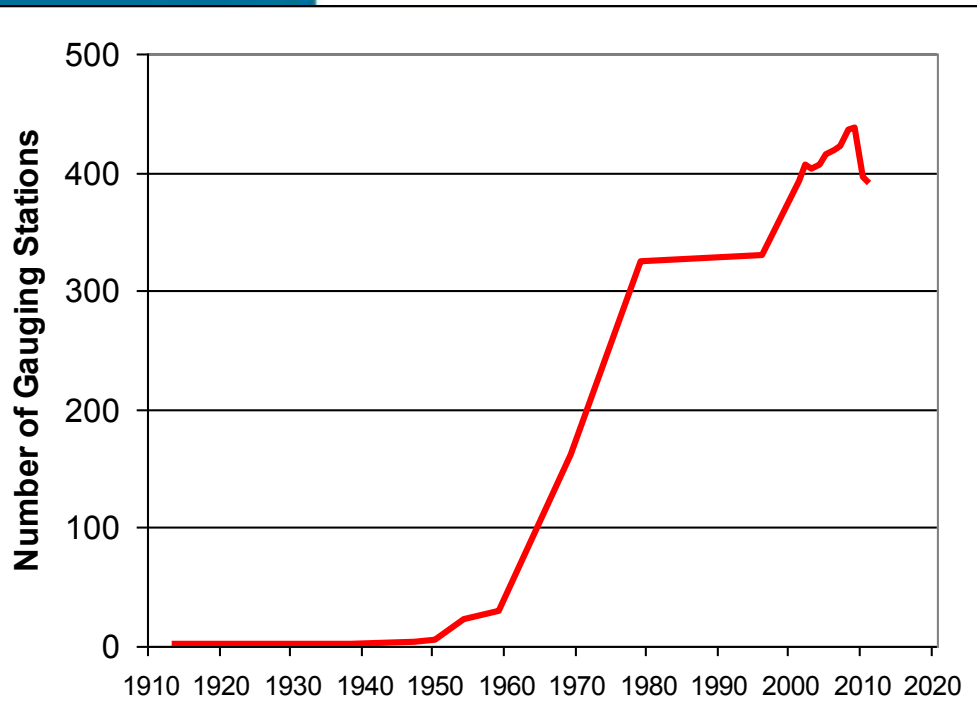
358 licences in past 6 years
Average 416 kW



The Long View

Richard Brown HRPB and SEPA 1980-20??

Some Reflections.....



1913



Garry Old and New

1996



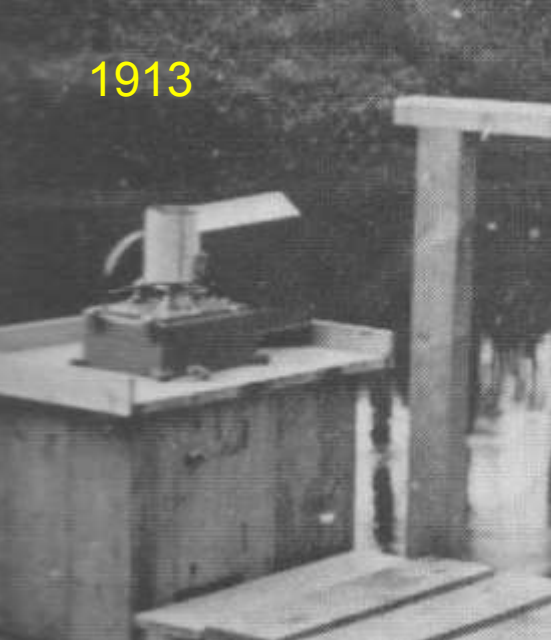
1997



Revisit, Review, Renew



1913



Loggers Change

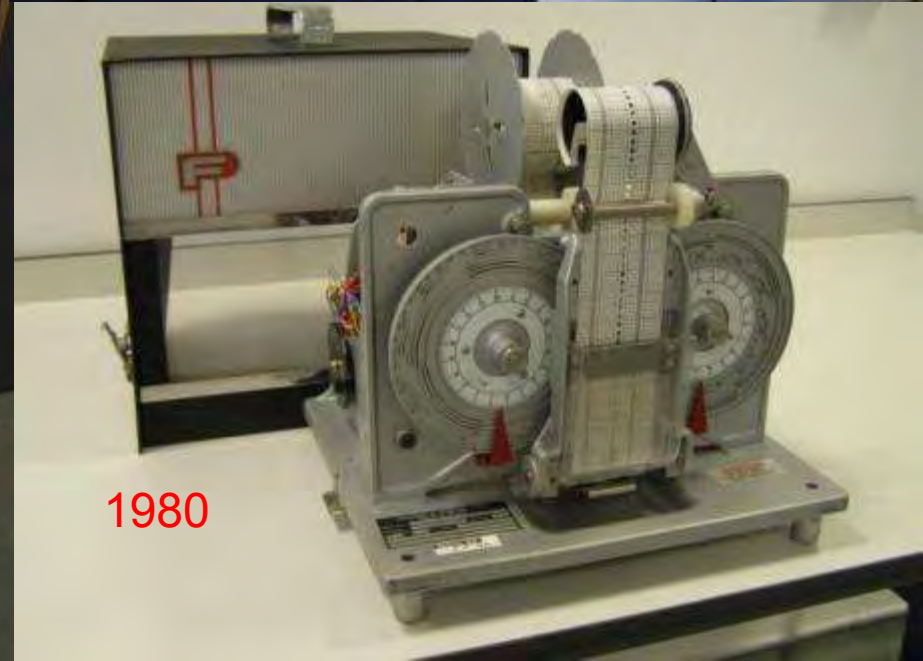
2011



1980



1980



Acoustic Doppler Current Profiler

- Fixed Instruments

Argonaut SW



Argonaut SL





Radar level sensor

RQ-30 for Non-contact Flow Measurement



Acoustic Doppler
surface velocity
sensor

Radar water
level sensor

ADCP Flow Measurement



ADCP Boat Deployment



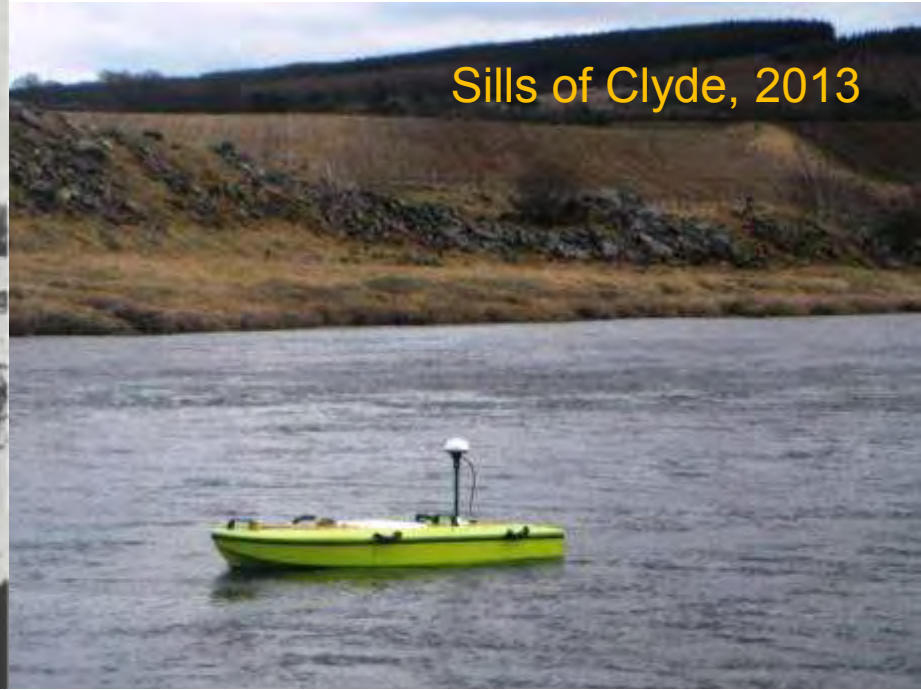
Remote controlled ARC-boat



River Ness, 1930



Sills of Clyde, 2013



Boat Gauging Changes!

Strathmore River, 1983



Innovative ADCP (Pentamaran?), 2011





Construction Challenges

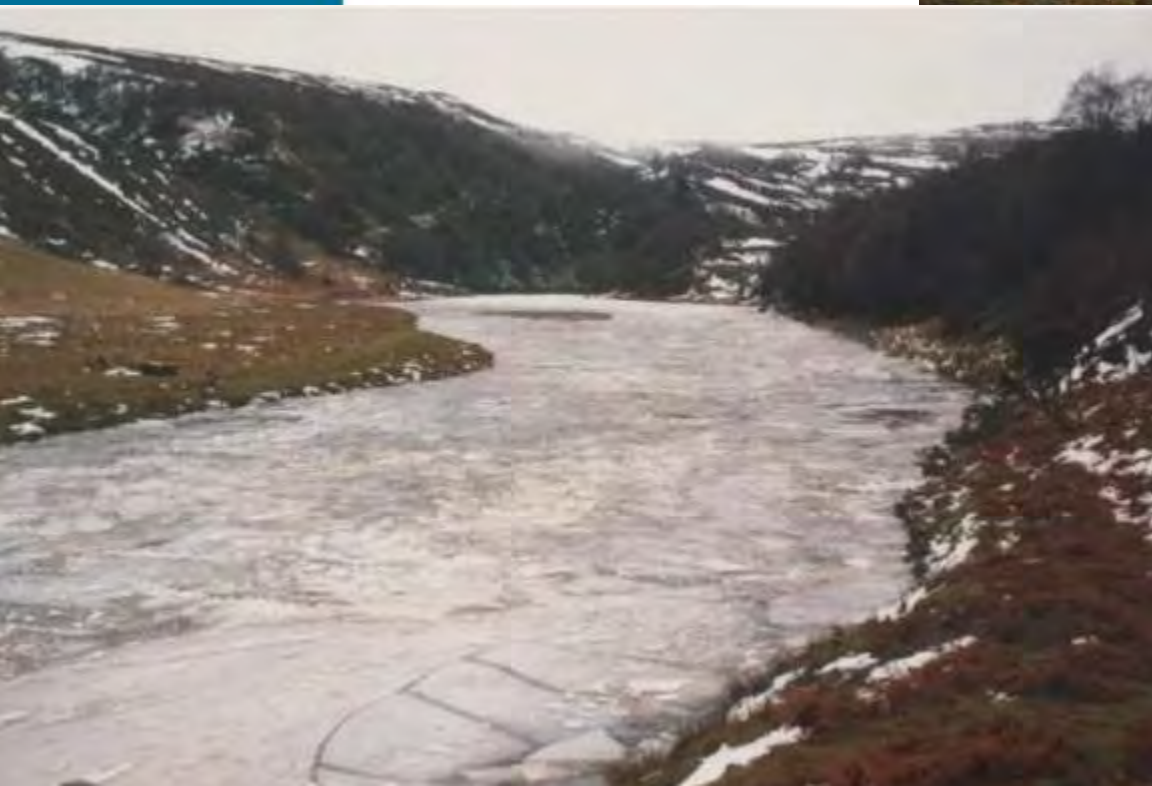


Challenges

**More Stringent Legislation
- H&S, CAR etc**



Flow Measurement Challenges





Resourcefulness!

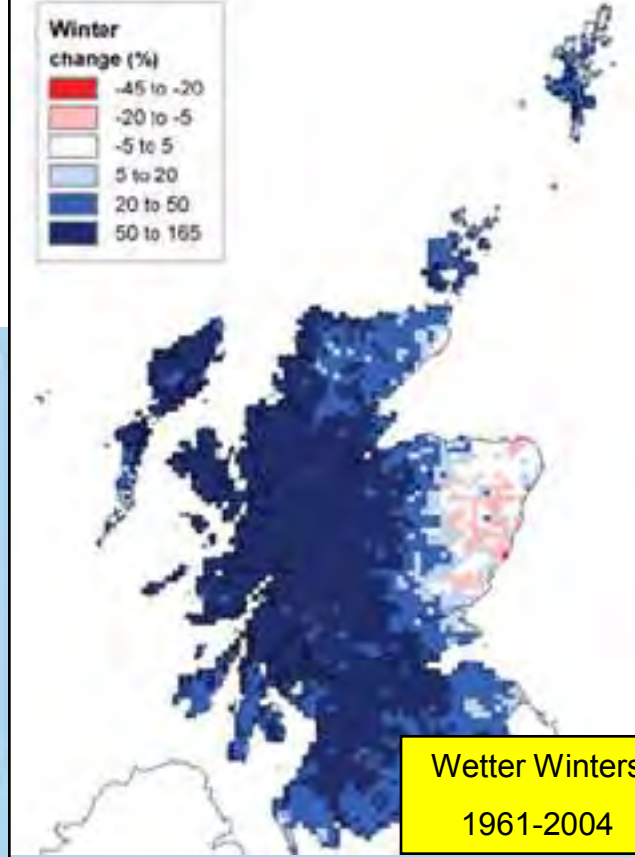
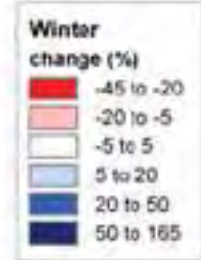




**Rising to
Challenges**

= Team Building

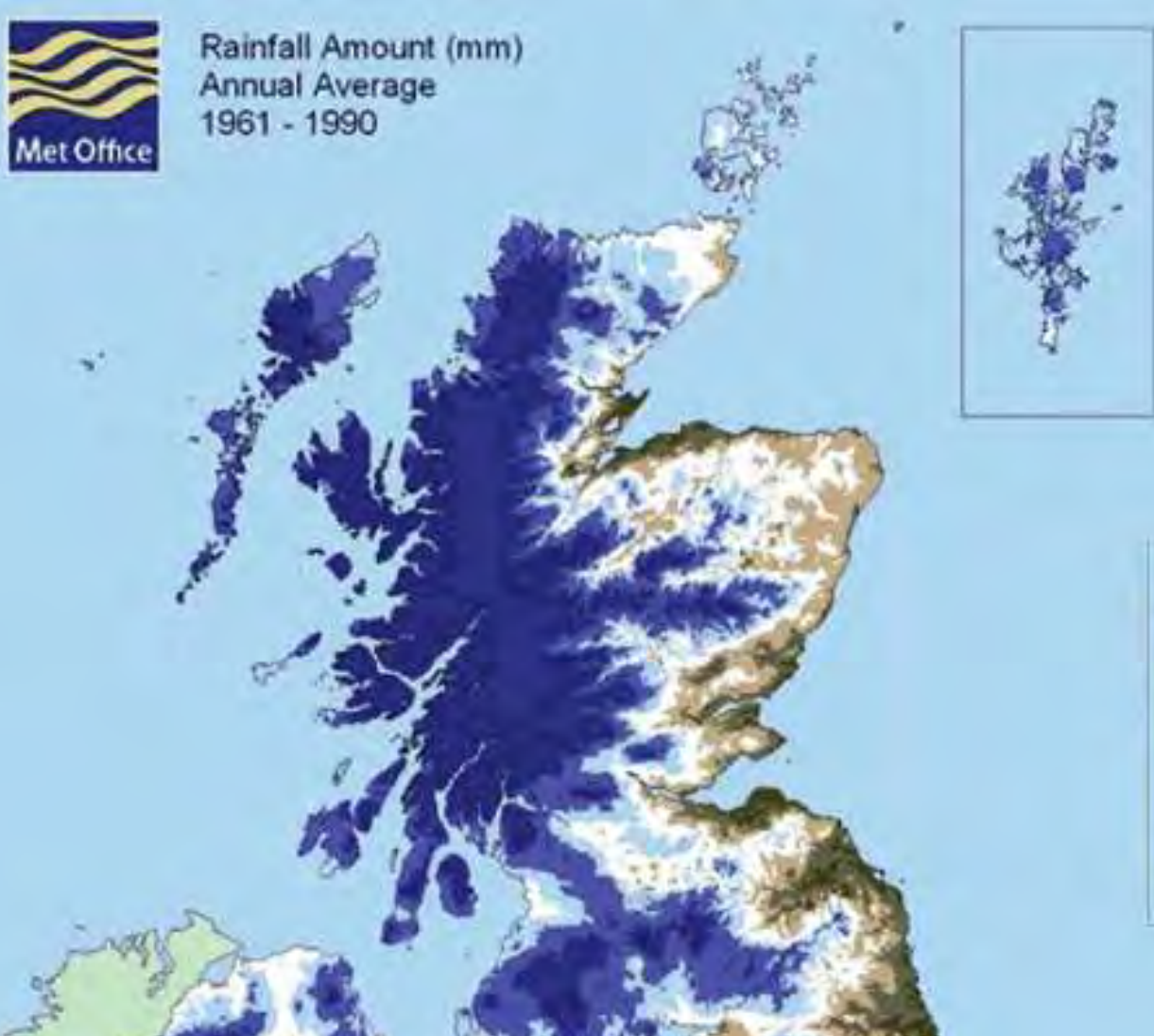
Changing Rainfall

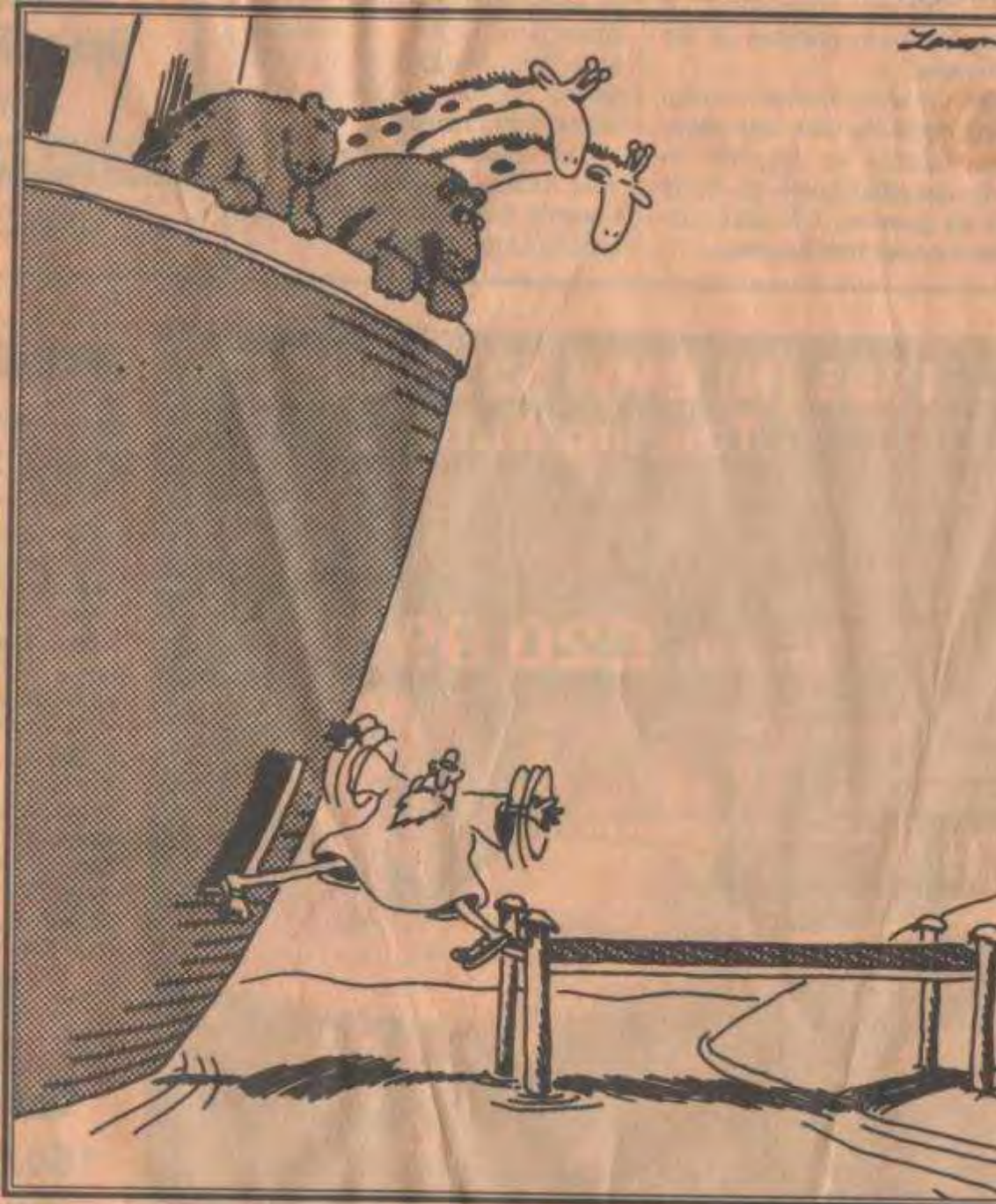


**Wetter Winters
 1961-2004**



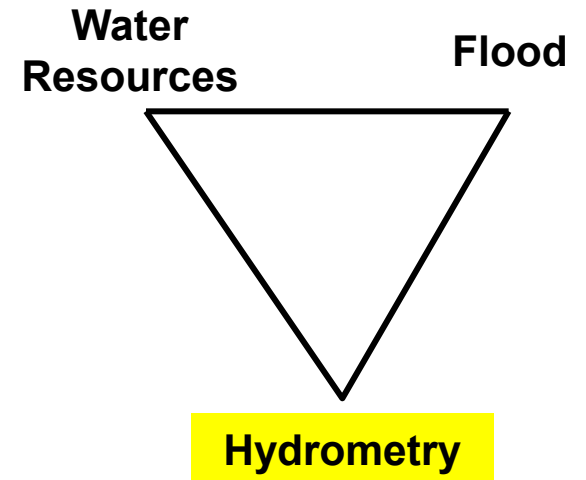
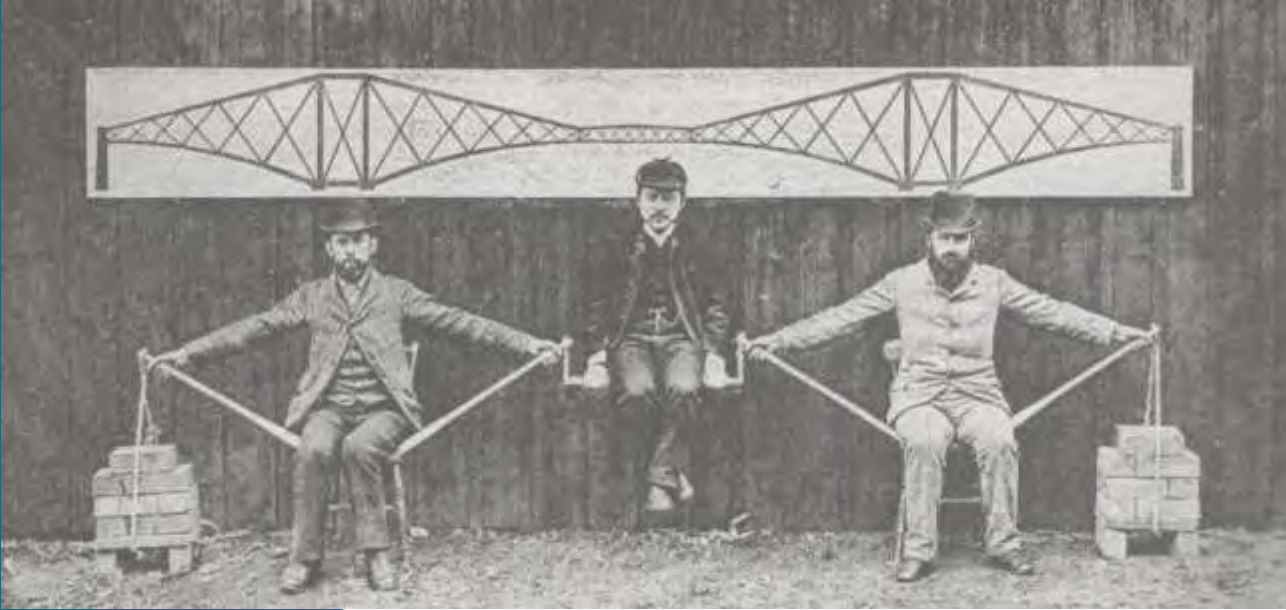
**Rainfall Amount (mm)
 Annual Average
 1961 - 1990**



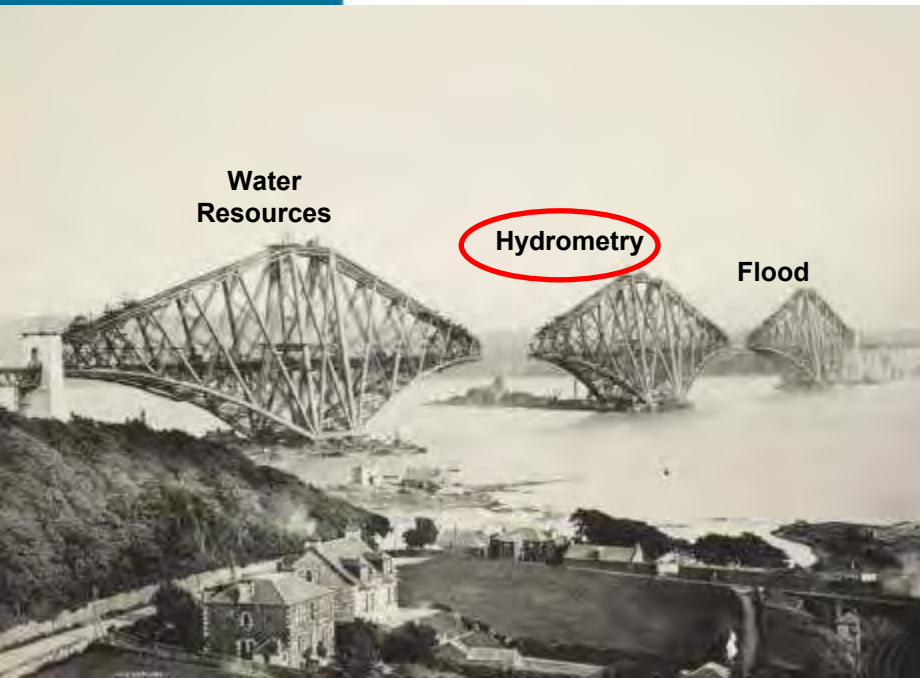


■ "We're in trouble."

Mind the Gap!



Bridging the Gap





Hydrometric Data

– the Long View

– the Last Laugh?