Same old barrier, new technology

The Wissey Siphon

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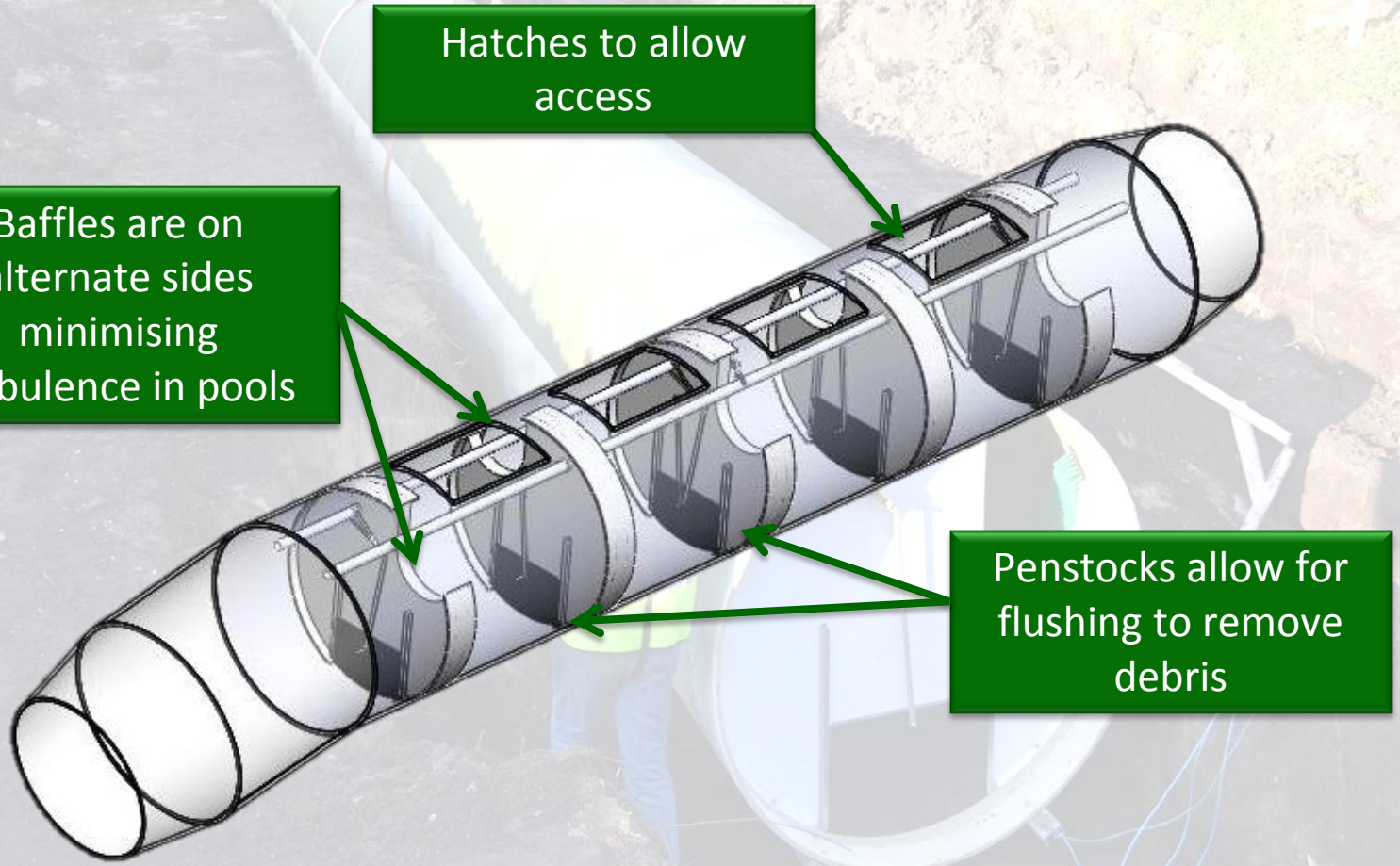
Kye Jerrom – Environment Agency

RRC Fish Passage Workshop
29 April 2013

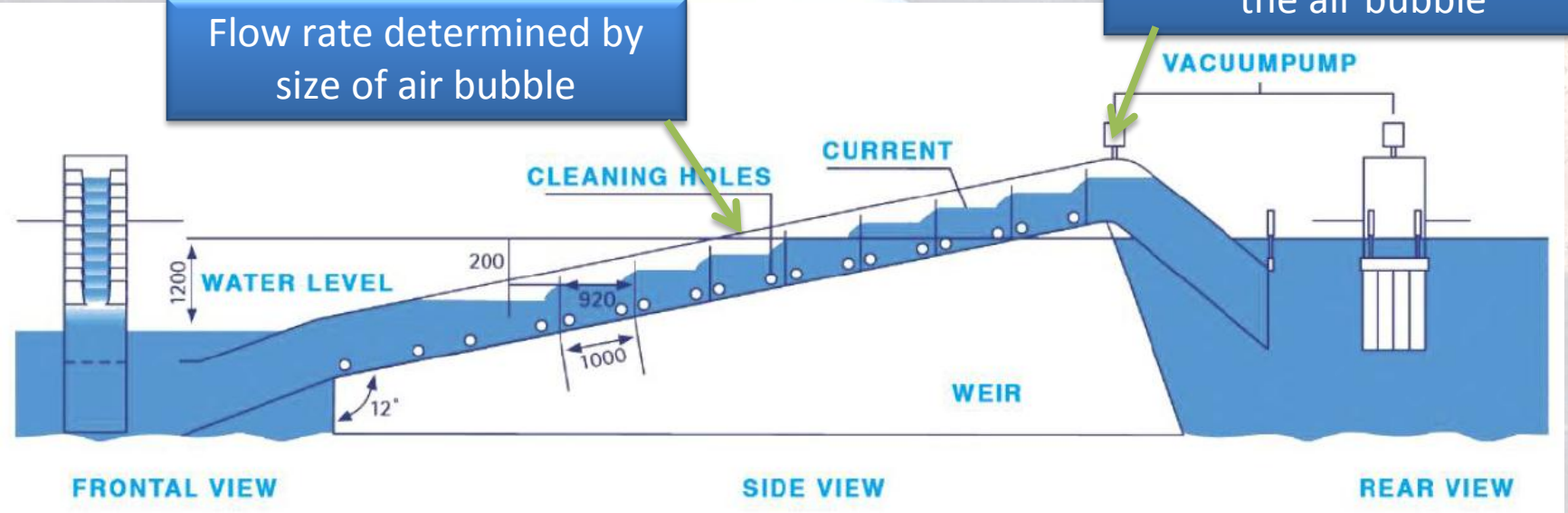
INSIDE THE SIPHON FISH LADDER



THE SIPHON FISH LADDER

Vacum pump regulates and maintains the size of the air bubble

Flow rate determined by size of air bubble



PRODUCT SUMMARY

- Pipe diameter from 0.8 – 2.4m diameter
- Made from a coated GRP Vinylester
- Fully UV and osmosis resistant
- 40 Tonne point load
- Auxiliary flow available if required to compete against other flows
- Low maintenance requirement
- Entrance and exit chambers provide dark and quiet shelter for fish
- Quick installation time
- Passes a wide range of fish species including bottom dwelling species

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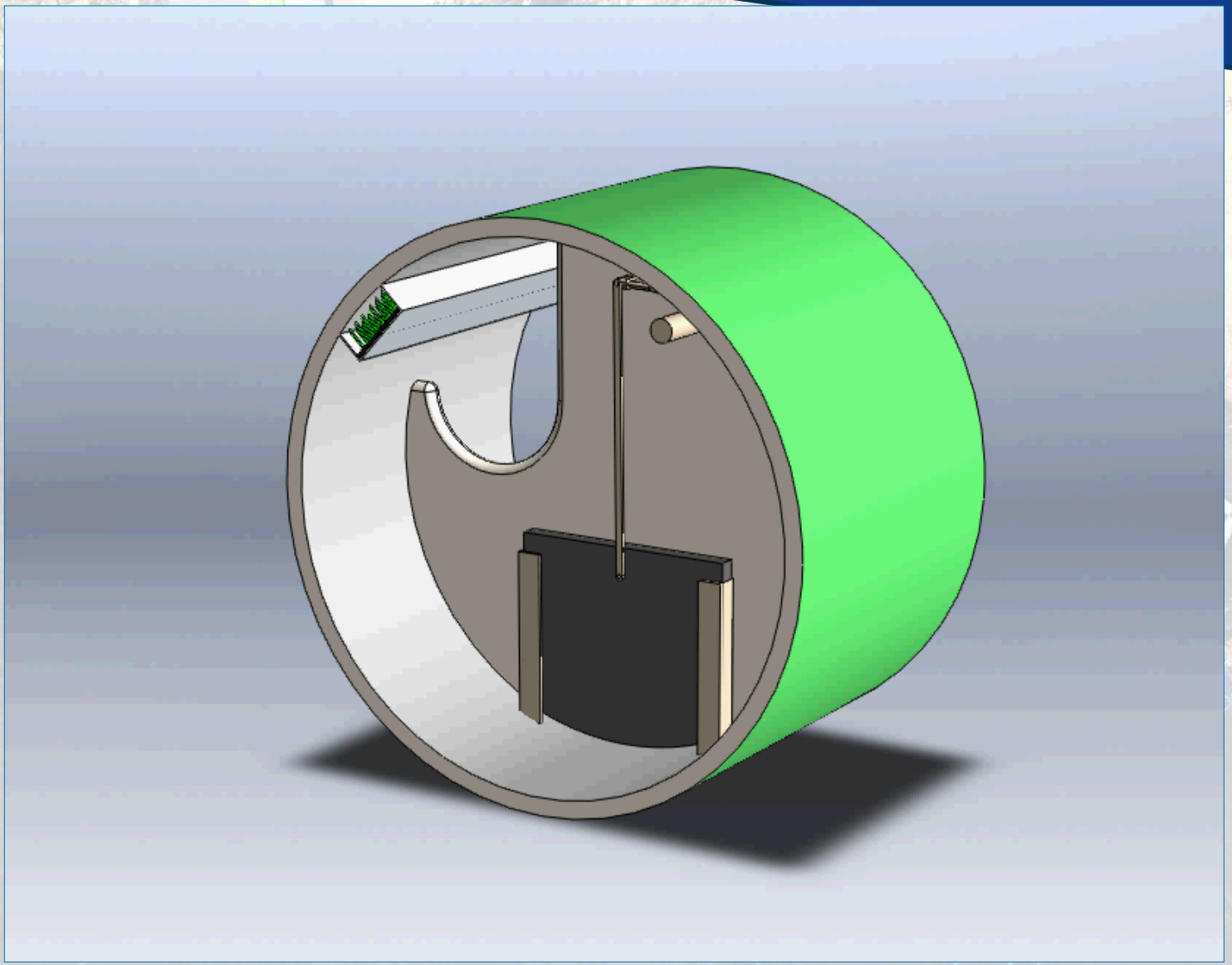
…for innovation and versat



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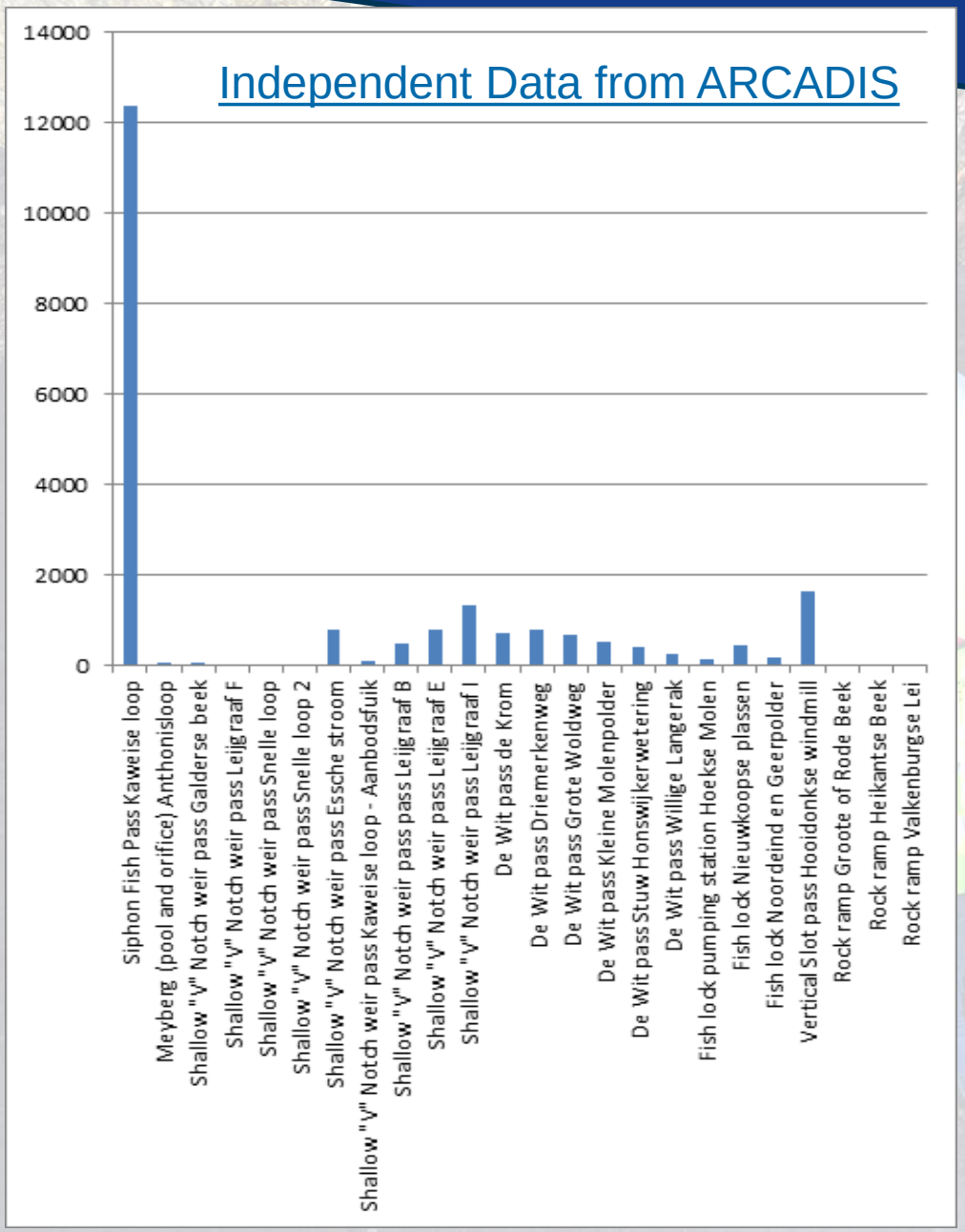
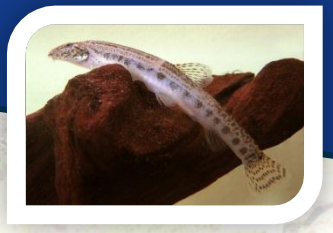


Bream

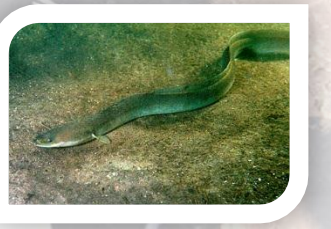


Spined Loach

Roach

perch

Gudgeon



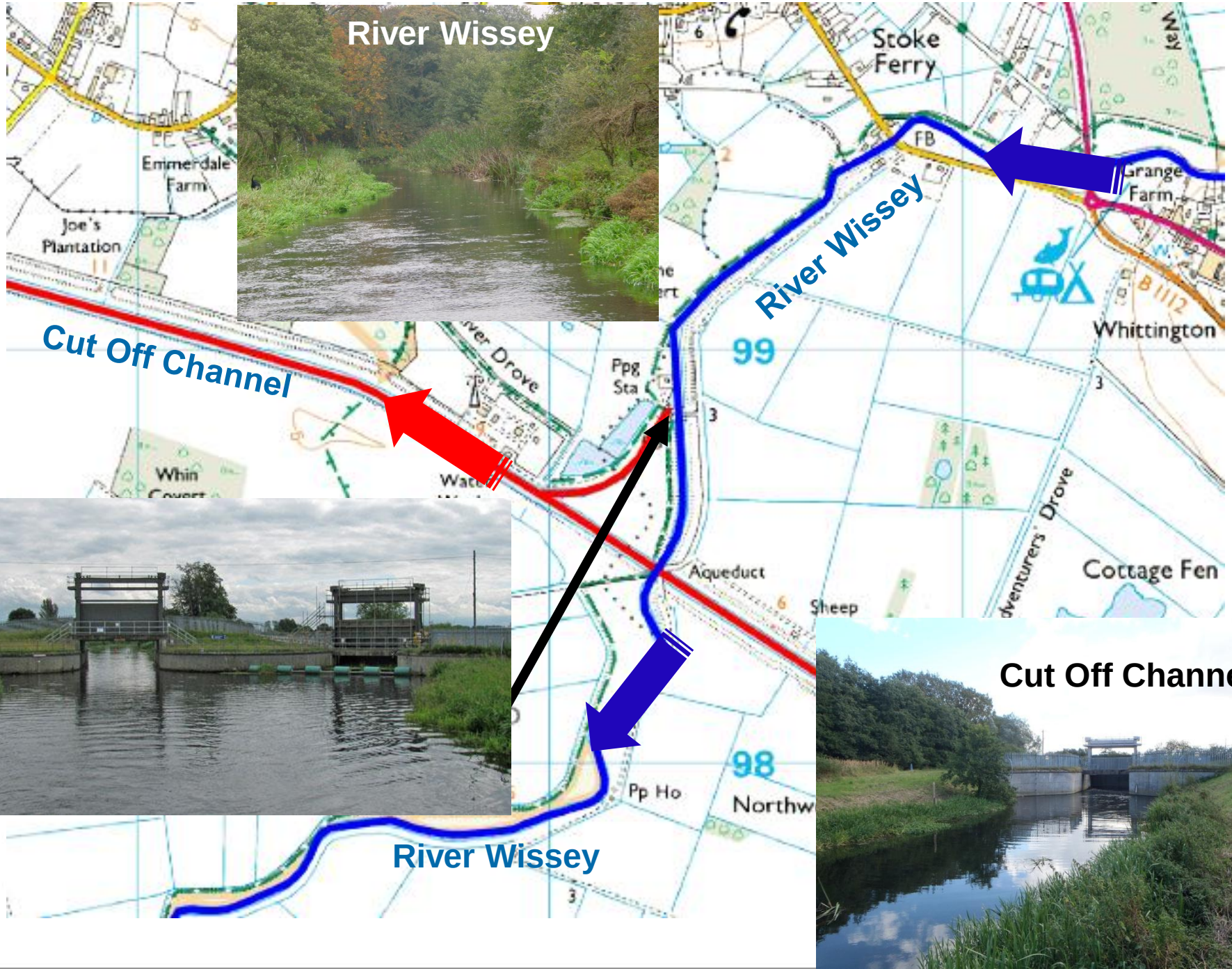
European Eel

Pike

Bleak

Independent Data from VisAdvies


NORFOLK
CAMBRIDGESHIRE
Wissey
SUFFOLK
Cut Off Channel
Great Ouse
ESSEX
GTR. LONDON
THE WASH
Boston
Hunstanton
Sheringham
Norfolk Coast
Holt
Fakenham
Aylsham
Holbeach
Spalding
Wisbech
Swaffham
Wymondham
Downham Market
March
Watton
Attleborough
Whittlesey
Ramsey
Chatteris
Littleport
Thetford
Diss
Ely
Mildenhall
St Ives
Eye
Wissey Siphon Pass
FISH
Pass


River Wissey
Stoke Ferry
Emmerdale Farm
Joe's Plantation
FB
Grange Farm
River Wissey
Cut Off Channel
Whittington
B1112
99
Ppg Sta
Aqueduct
Sheep
Cottage Fen
98
Pp Ho
River Wissey
Cut Off Channel

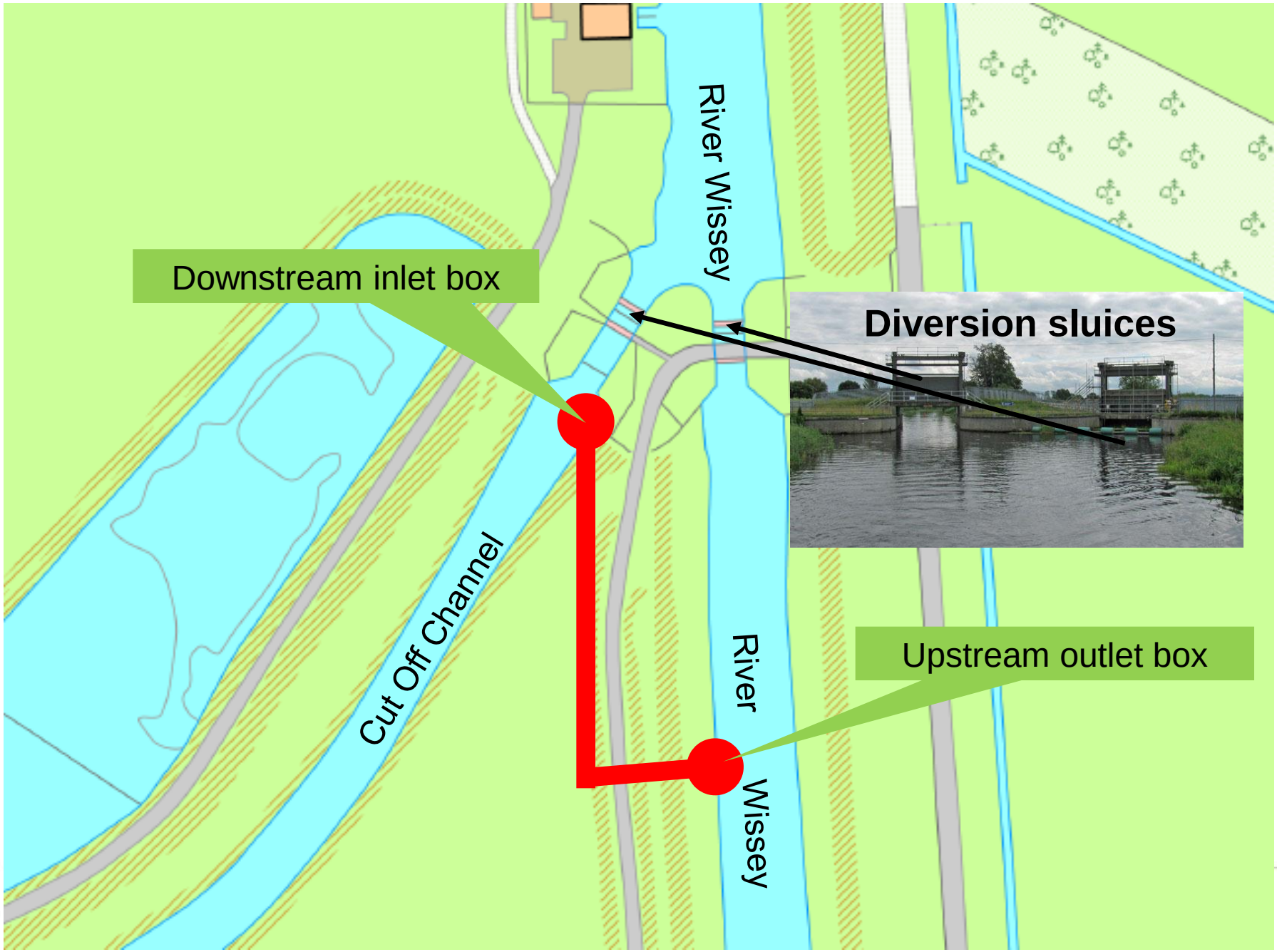
What were the drivers for fish passage?

- **WFD – Good ecological status by 2015**
  - Failing for fish (gudgeon, roach, spined loach, pike, perch)
  - Fish passage highlighted as a reason for failure
  - Improve fish classification from moderate to good
  - Positive impacts on adjoining tribs, Gadder, Watton Brook, Stringside stream
- Eel regulations 2009
- Compliant with Fish Passage Regulations
- Norfolk sea trout fishery

The problem:

- What did we need:
  - Maintain flood defence integrity
  - Suitable for all species
  - Deliver environmental outcomes
  - Meets current legislation
  - Cost effective
  - 1.8m head difference
  - 2 way passage

- The Options:
  - Do nothing
  - Barrier removal
  - Fish pass flap
  - Natural bypass channel
  - Larinier fish pass


River Wissey
Downstream inlet box
Diversion sluices
Cut Off Channel
River
Upstream outlet box
Wissey

Design parameters?

- Low flows, minimal water consumption
  - Minimum 0.05m/s
  - Optimum 0.11m/s
  - Maximum 0.4m/s
  - Operational with flows between Q10-Q95

- Suitable for…
  - Slow water coarse fish 10 – 60cm
  - Eel 10 – 100cm
  - Minor species 3 – 12cm
  - Sea trout 30 – 60cm

Installation and construction:

- 8 weeks in total, (5 days installation)
- 4 sections, 3 lorries, 1 crane
- Minimal access delays to
- No accidents

The finished product:

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Does it work??? What the monitoring should tell us:

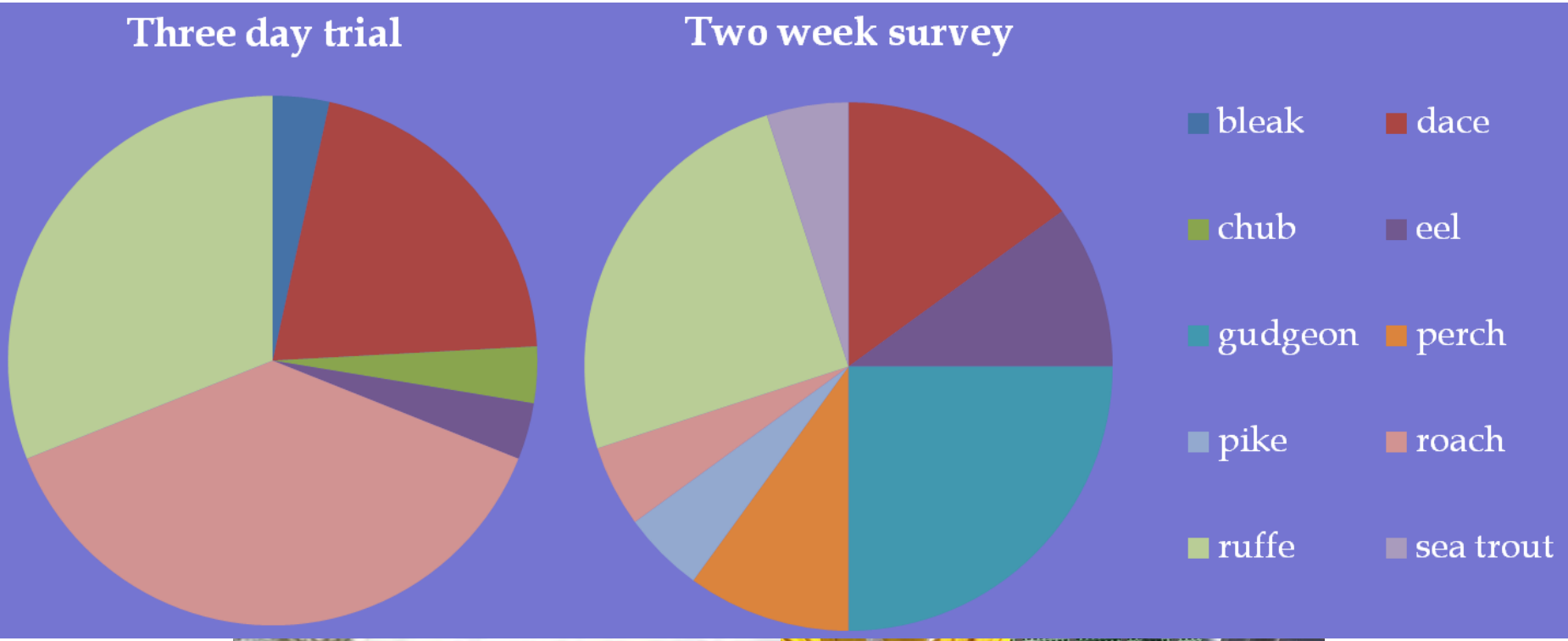
- Species and size ranges that use the siphon
- Seasonal activity
- Travel times and failed attempts
- If individuals use the siphon on more than one occasion and in either direction
- The effect of environmental influences, such as temperature, river level and flow, competing attraction flows on fish movement.
- Once passed this barrier, are others a problem?

Monitoring programme:

5 year monitoring programme in combination with Cranfield University

- Fyke netting, Passive Integrated Transponder (PIT) tags, accoustic tags, video cameras, DIDSON, ADCP (Acoustic Doppler Current Profiler)
- 3200 fish over the study period.
- Sea trout spawning runs,
- Elvers moving upstream,
- Silver eels moving downstream,
- Coarse fish spawning movements.

Fyke netting:



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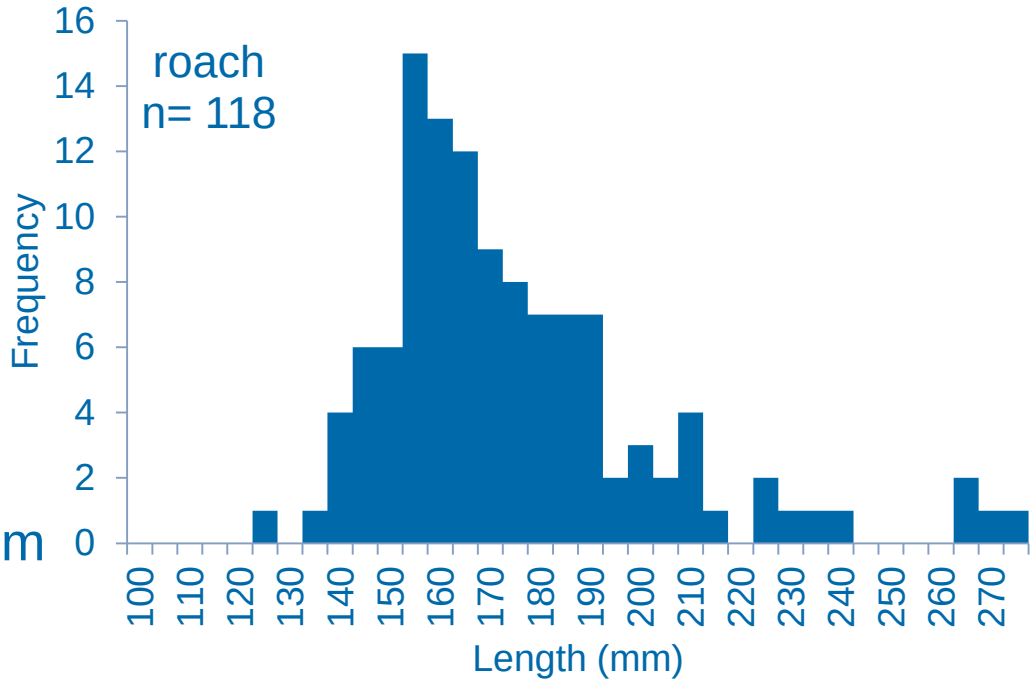
Tagged fish:

- Chub: 283 mm
- Perch: 190 mm
- Pike: 677 mm
- Rudd: 155 mm
- Sea trout: 553, 554 and 654 mm
- Tench: 200 and 231 mm
- Roach 120 mm – 270 mm x 118



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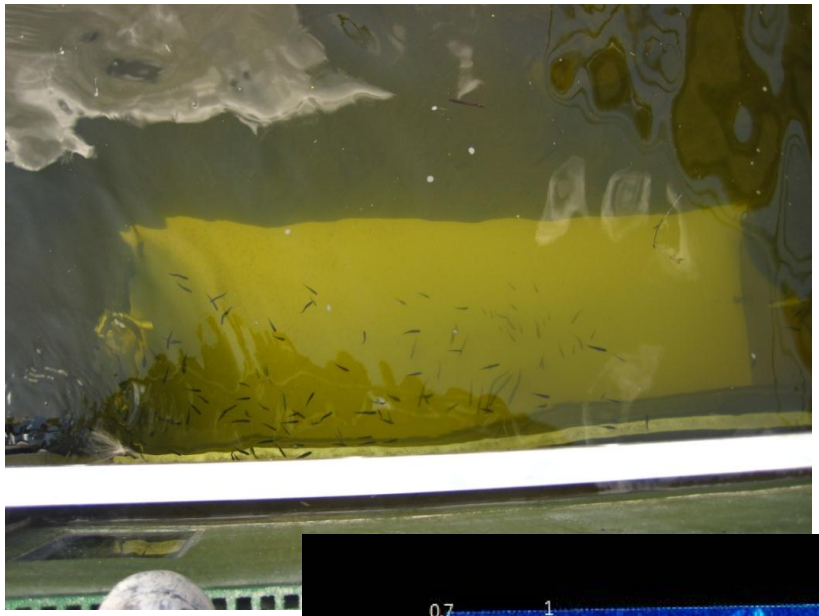
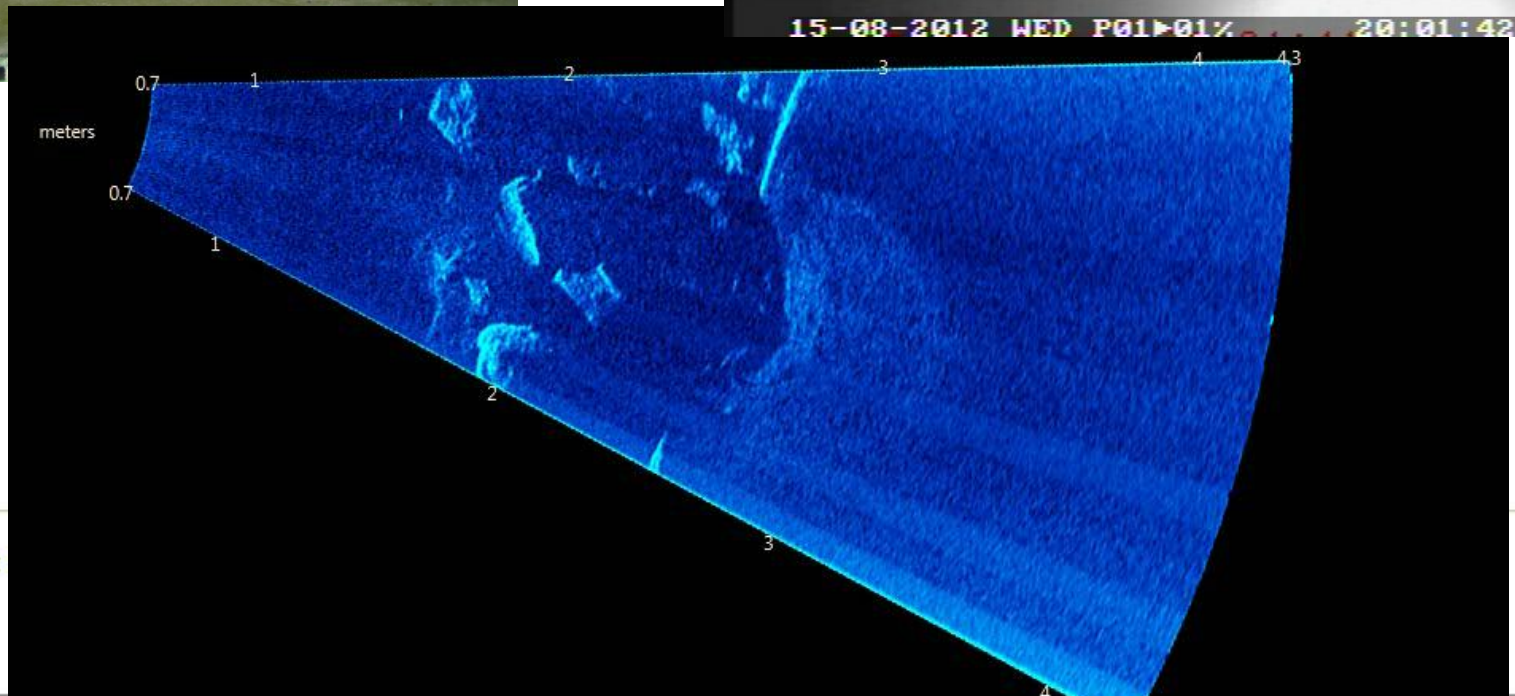
Monitoring summary:

- In the first month, 10 species have used the siphon, ranging in size from 65 – 553 mm.
- Refuge area for fish. . .
- We predict that more fish will use the siphon when the gate is closed and the flow from the siphon is the only attractant.
- Sea trout movements
- Evidence suggests that fish will habituate to the use of the siphon

Video camera/ARIS:





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The Wissey project…

- Novel UK design for full fish passage
- Nine months from start to finish
- Bid for finance in June 2011, main fix and permissions completed May 2012
- All permissions gained
- Audited for project and financial management and H&S
- Incident-free CDM notifiable project
- Total cost £407k (within budget)
- Full telemetry and ecological monitoring
- Considerations – planning, access, land ownership, water supply, licences, planning, time.