– om vann fra fjell til fjord

Flow targets for key env issues/objectives in regulated rivers and HMWB

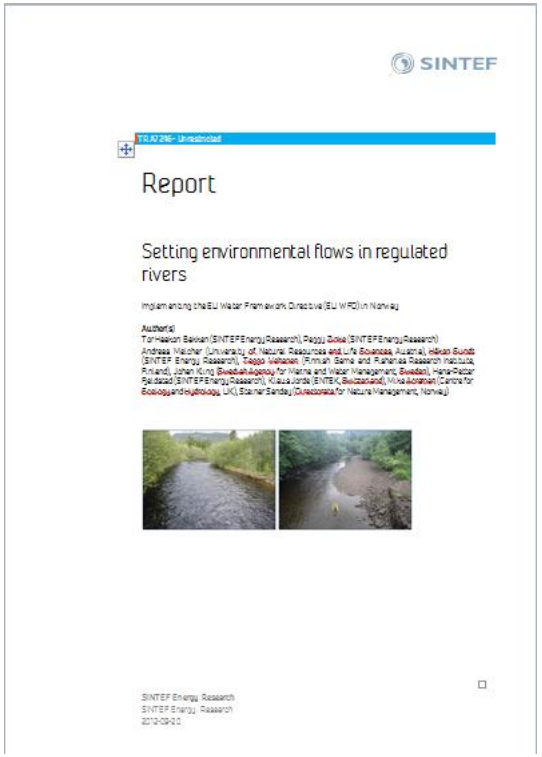
Jo H. Halleraker,
Norwegian Directorate for Nature Management

..and thanks to lots of Researchers for illustrations….

Flow target workshop, SINTEF, 23.-24. April 2012

Focus – Flow targets

- Finding the right balance
  - EUs blueprint for water – defining standards
  - Baselines
- «Everyone» talks about it – practise?
- «Enough» water in rivers is effective for
  - Fundamental for (key) aquatic organism
  - Riverine organisms
  - Key proseses
  - Landscape, recreation etc
- Basis requirement for other mitigation measures
- Flow target requirement, assessments
  - Significant adverse on hydropower
  - Environmental objectives

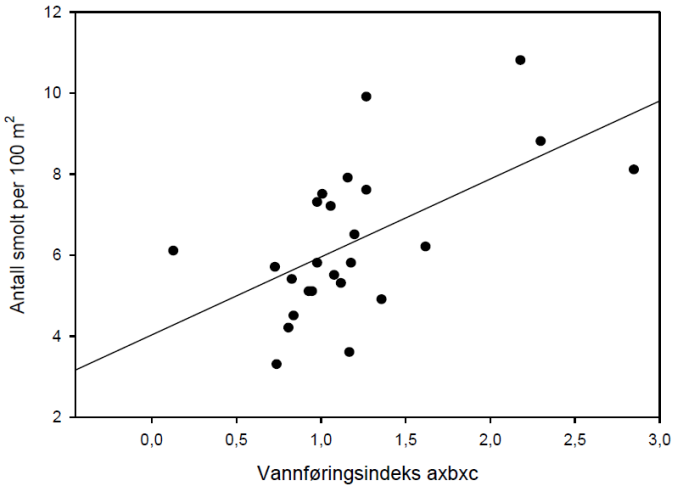

SINTEF

Report

Setting environmental flows in regulated rivers

Flow target - Environmental objectives

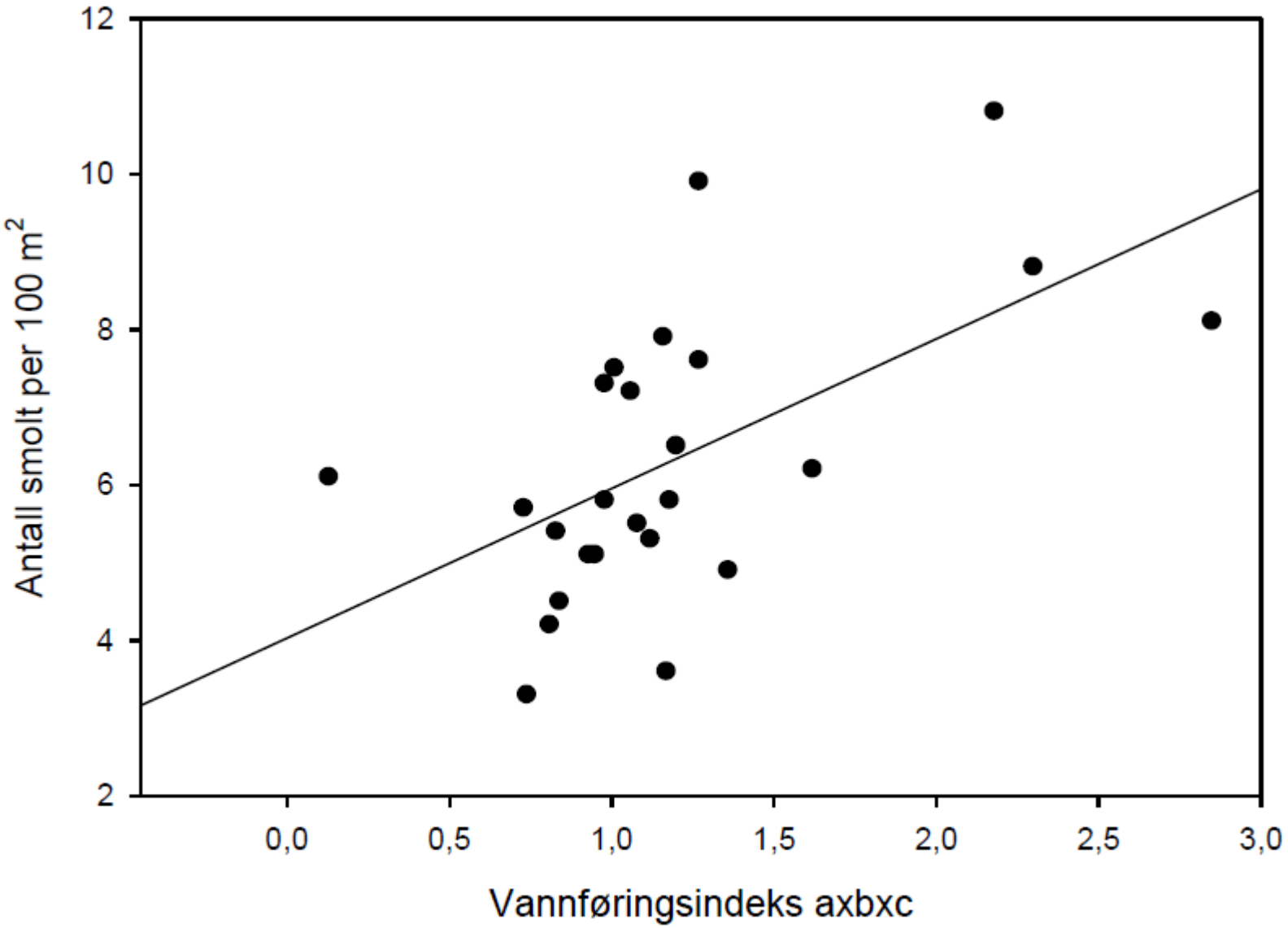
- Crucial to define ambition level for
  - Environmental standards
  - Key issues and objectives
- Establish dose-response relationship
  - Hydrology and ecological/environmental response
  - Morphological alteration
    - E.g. migration barriers
  - Physio-chemical change
    - Temperature
    - Acidification



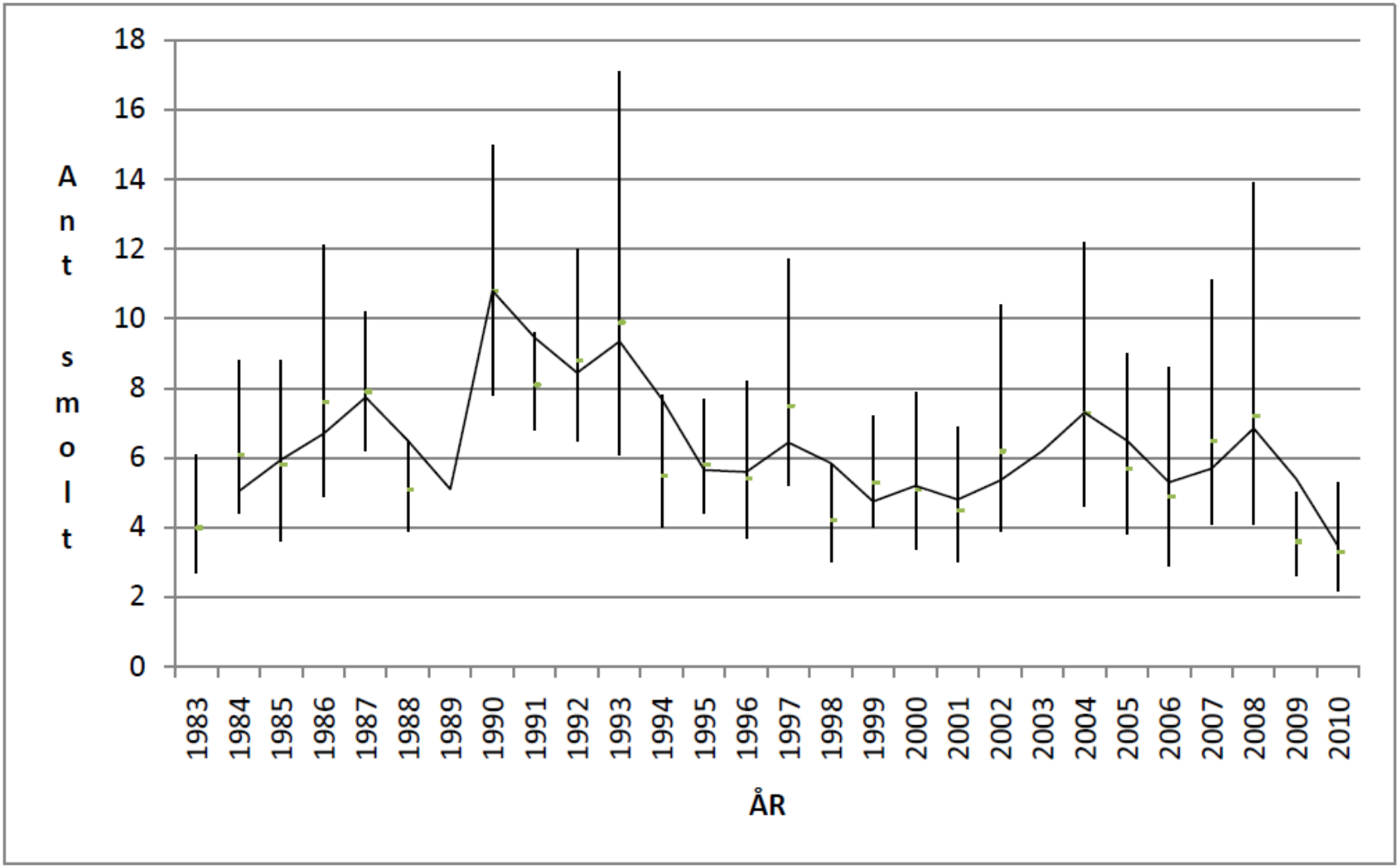
«Beliefs» EFR - methodology by Norwegian water managers…..

- Hydrological indexes
  - “Hydrological impact on evolution”
- Wetted area
  - Landscape consideration, recreation – human preferences.
- Historical knowledge
- Expert judgment
- R&D results
  - E.g 13 cm/h
- Habitat modeling and GES/GEP?

Orkla – smoltproduction vs winter_Q



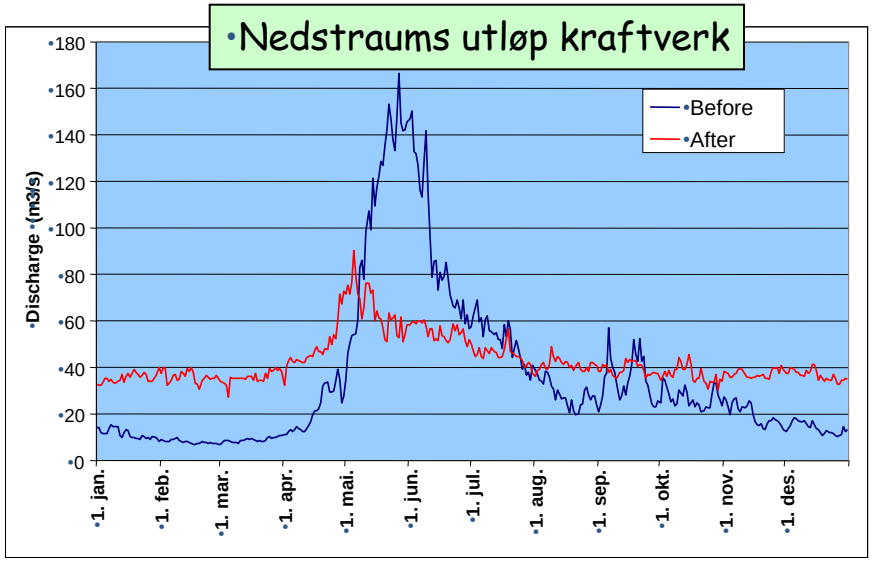
Smolt production in Orkla

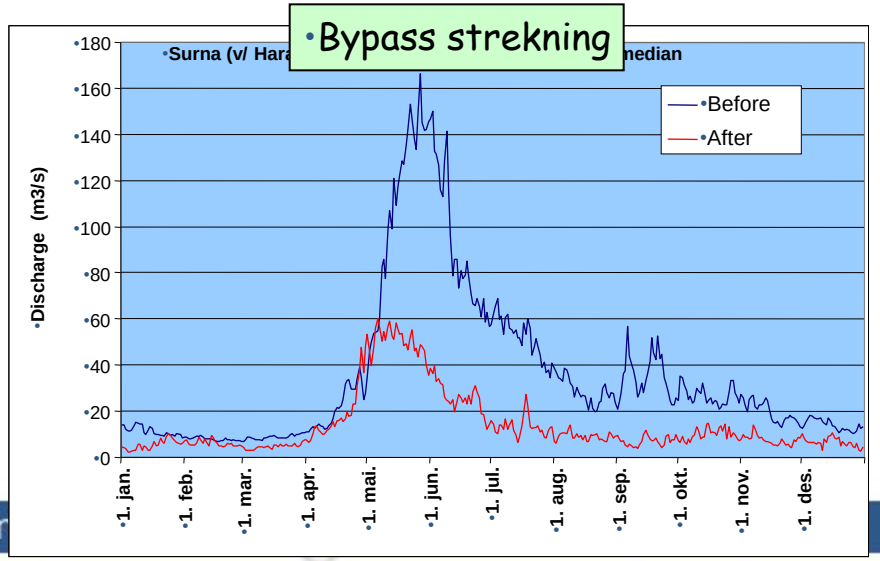


Find acceptance level….

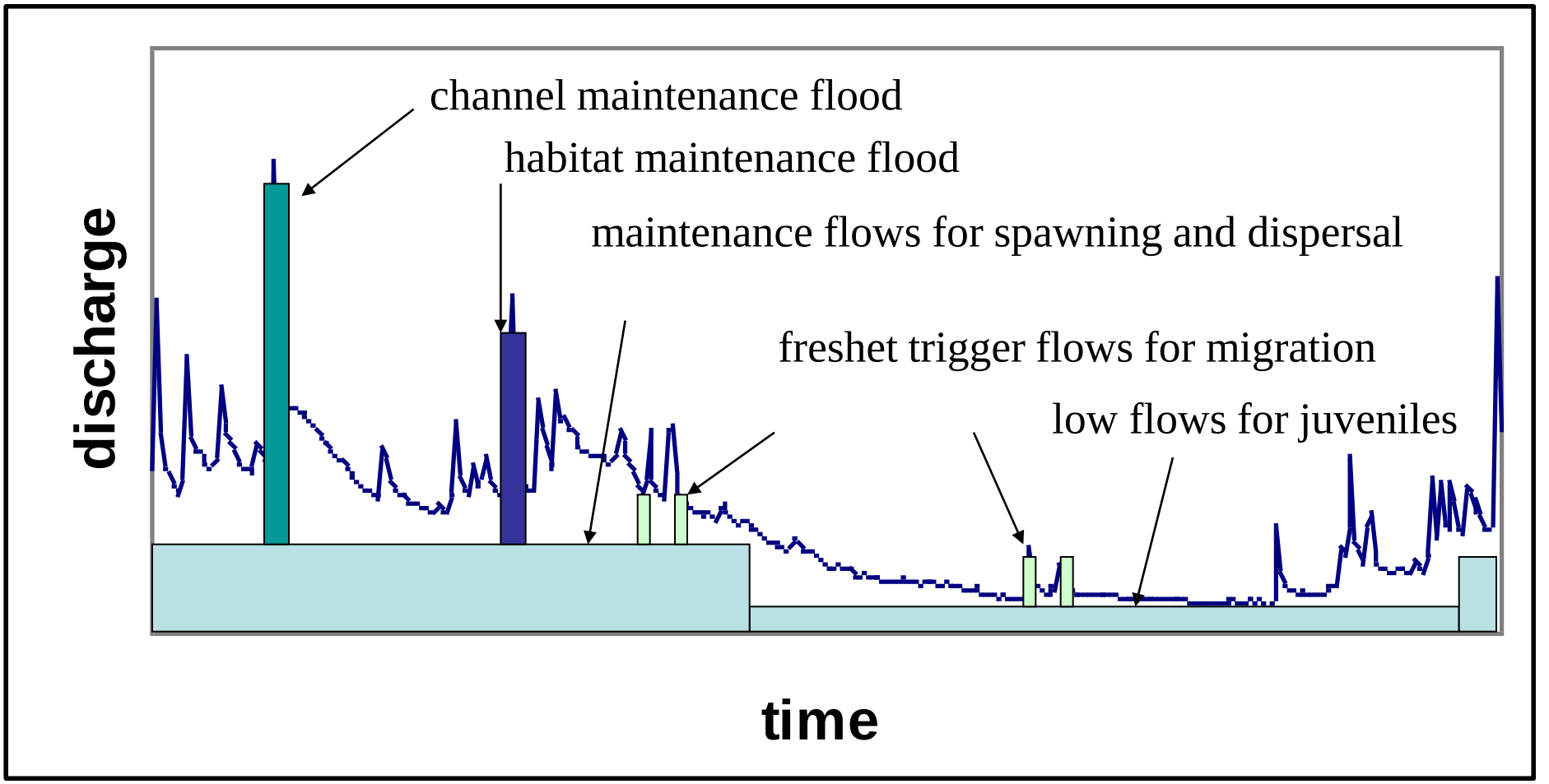
- Downstream HPP
- By-pass sections

- Importance of unregulated instream flow
  - Tempature
  - Water quality
  - Q

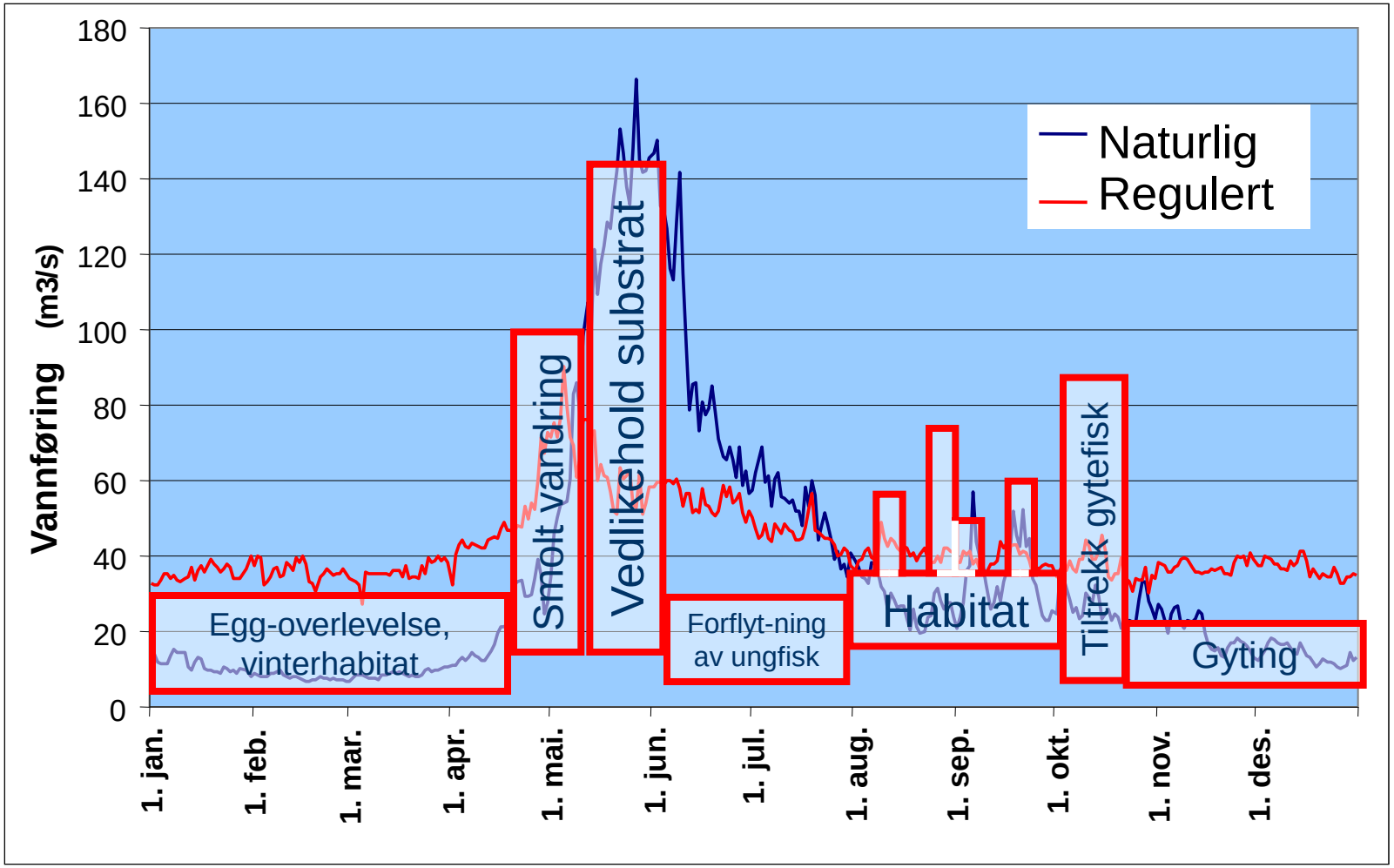




WFD recommendations

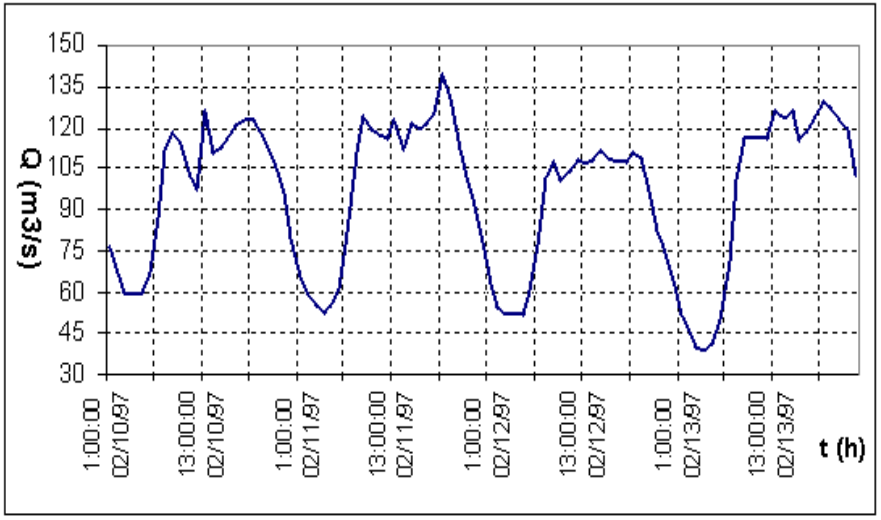


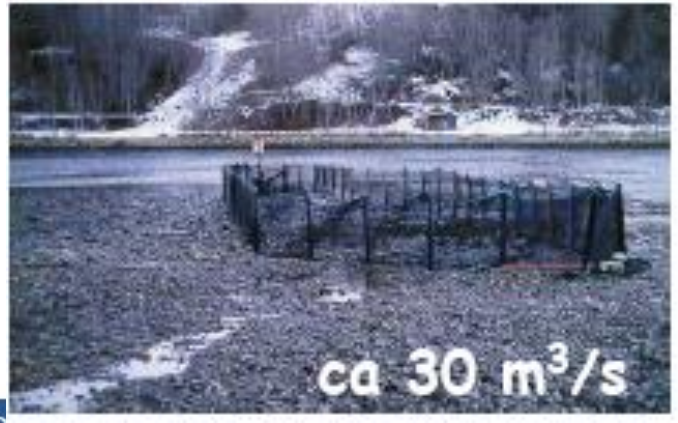
Blocks vs reponse



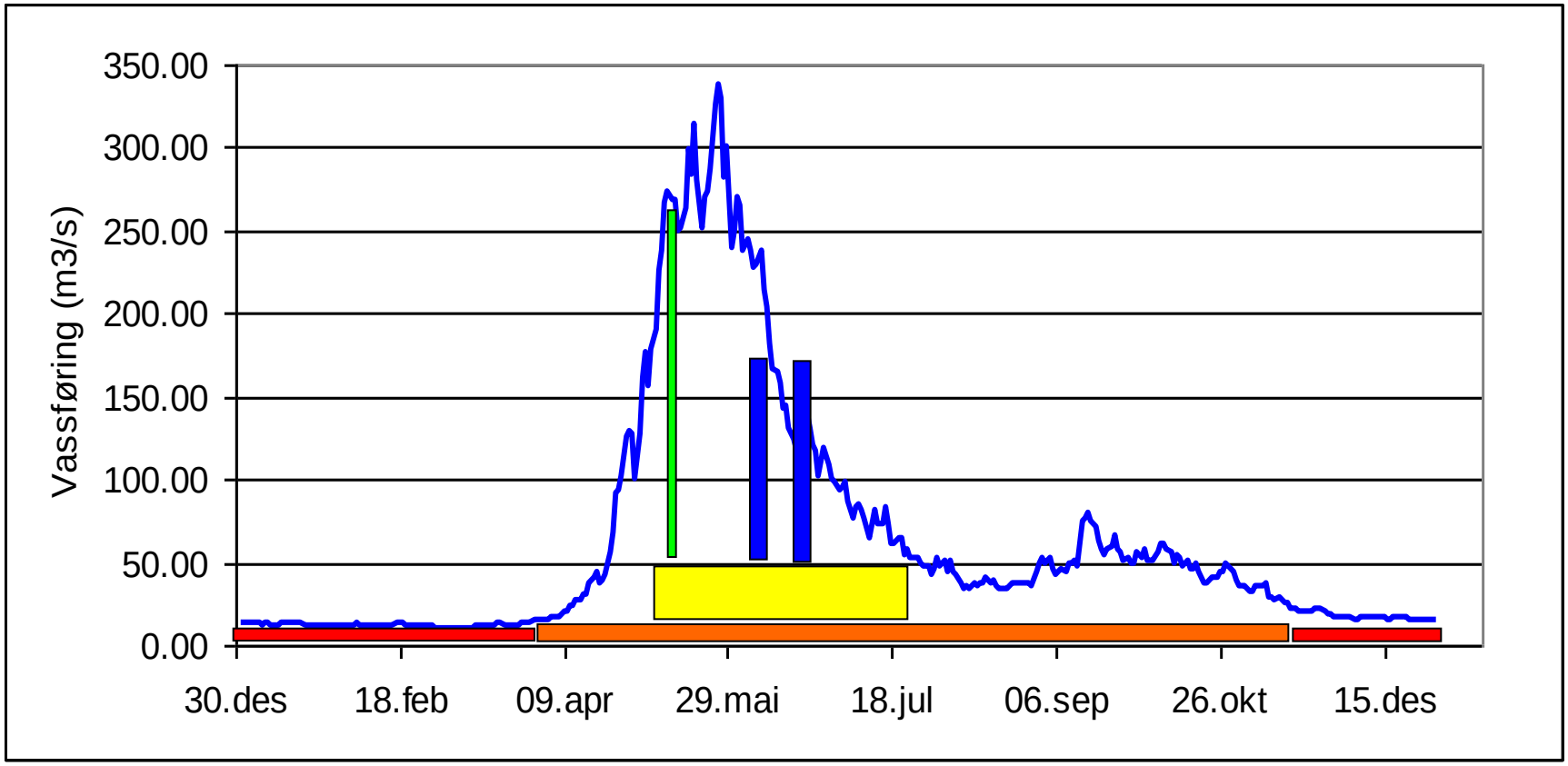
Gentle ramping

- < 10-15 cm/hour
- Better summer than winter
- Better night than daytime
- Speed and frequency of importance for impact
- Dewatering time also important
- Minimum flow requirement cricial!



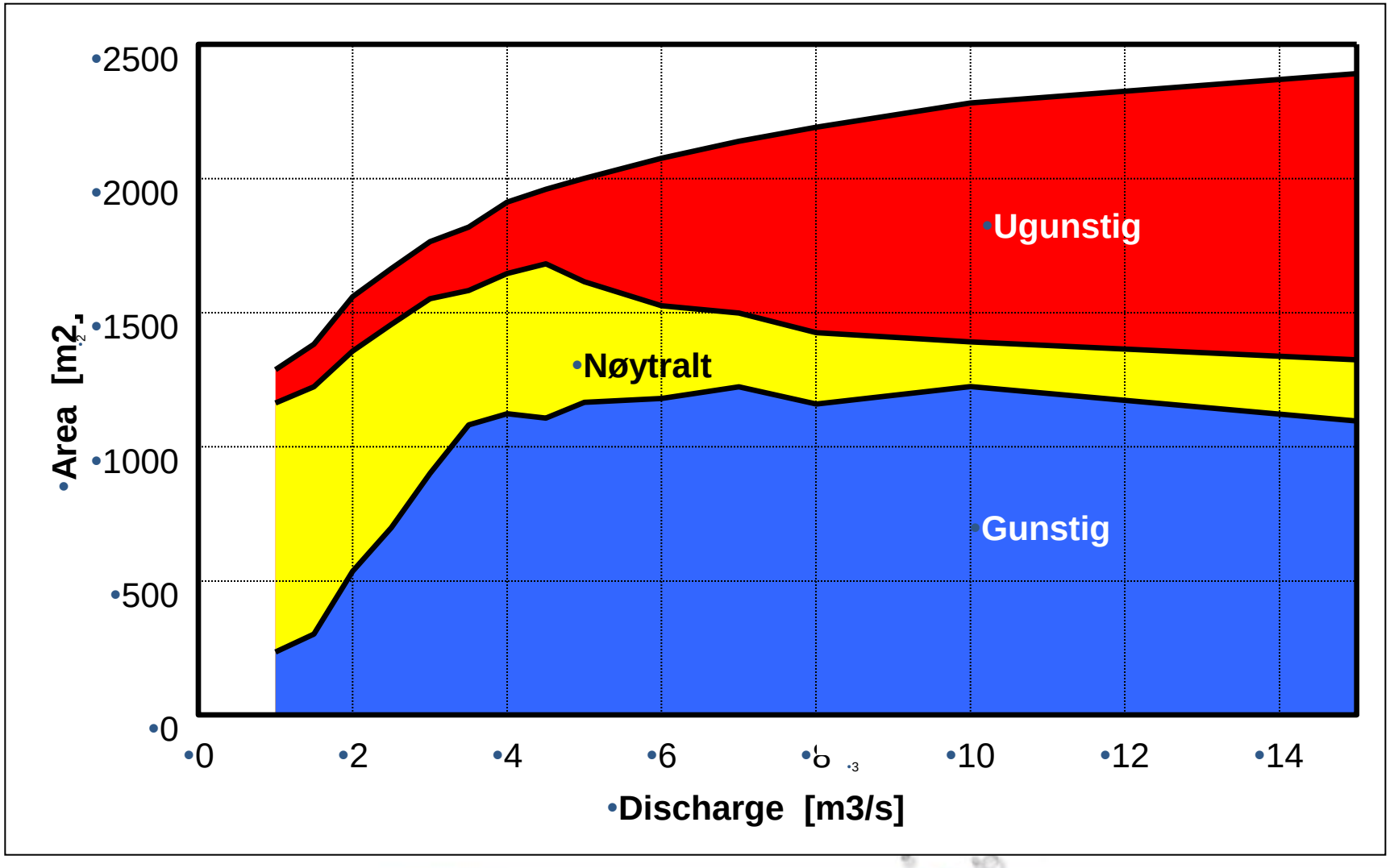


Bottlenecks?

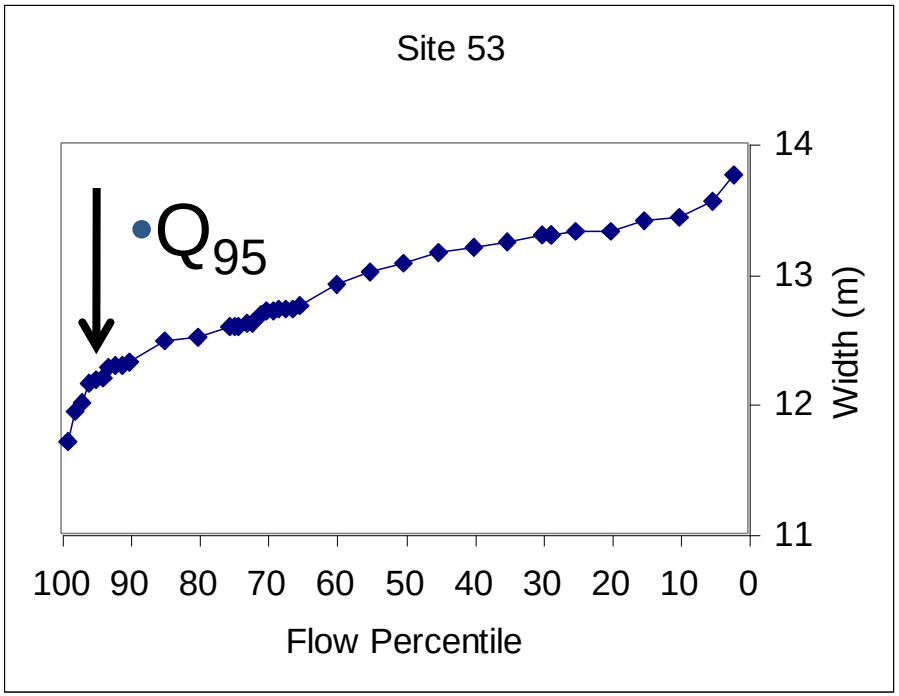


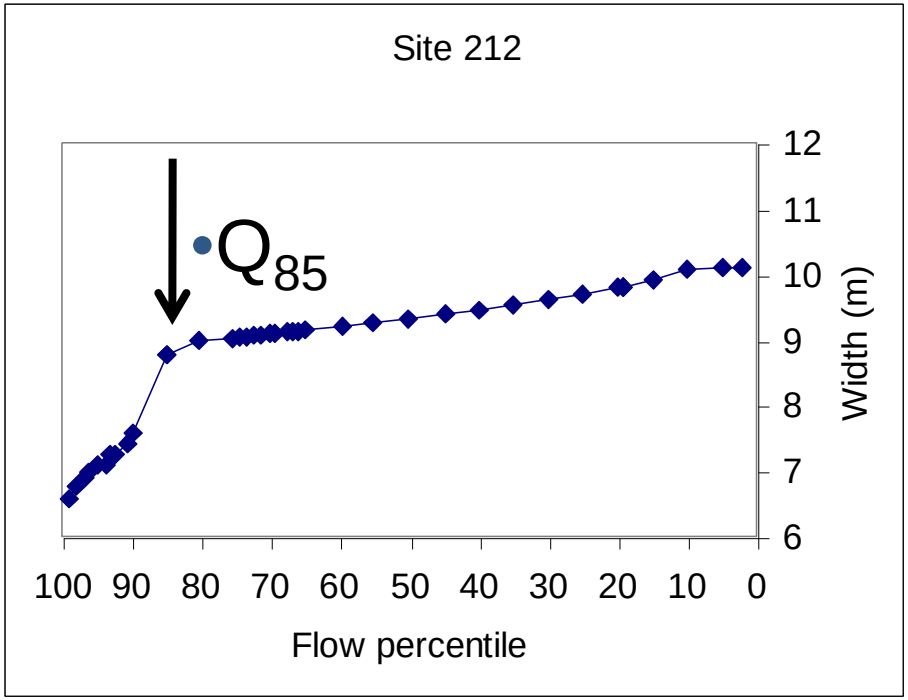
- Lavvassføring vinter
- Lavvassføring vår-sommar
- Sommarvassføring for rekreasjon
- Høgvassføring for kanalvedlikehald
- Høgvassføring for oppvandring

Result and relevance of habitat modelling?



Hydraulic geometry relations





Classification of water covered area - draft

Økologisk tilstand	Svært god	God	Moderat	Dårlig	Svært dårlig
Q_{minreg}/ Q_{minnat} Vinter	>0,80	0,80->0,60	0,60 ->0,40	0,40->0,25	≤0,25
Q_{minreg}/ Q_{minnat} Sommer	>0,70	0,70 ->0,50	0,50 ->0,30	0,30 ->0,20	0

- ***Tabell 7*** *Klassifisering basert på støtteparameteren minimum 7-døgns middel i vannføring om vinteren og sommeren i regulert elv (Q_{minreg}) i forhold til naturlig vannføring (Q_{minnat}):Q_{minreg}/ Q_{minnat}.*

Endangered species

Fossegrimemose (*Herbertus stramineus*)

i Åskåra, Bremanger

Rådgivende Biologer AS

How much water is needed to achieve…?

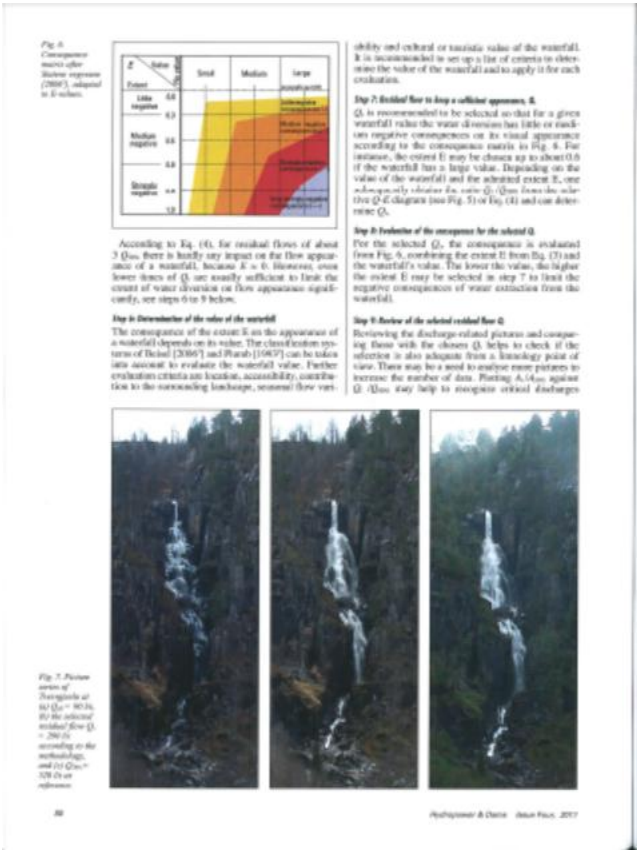
- Ecological or environmental objectives must be defined!
- Mitigation measures method
- Then dose-response relations
  - R&D
  - Expert judgment
  - Adaptive management
- Building block
  - Ecological bottlenecks
  - Protect other env objectives

Water Framework Directive maximum abstractions

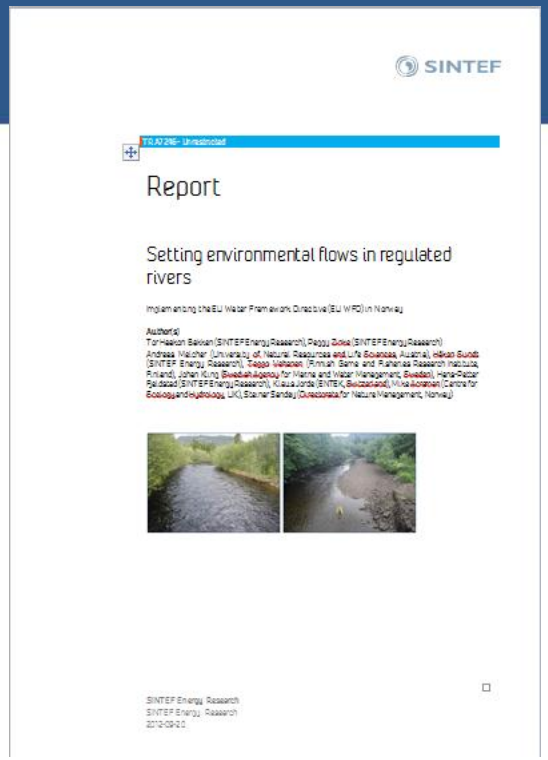
Type or sub type	Season	flow > Qn_{60}	Flow > Qn_{70}	flow > Qn_{95}	flow < Qn_{95}
Lowland meandering	Apr – Oct	30	25	20	15
	Nov – Mar	35	30	25	20
Middle reaches	Apr – Oct	25	20	15	10
	Nov – Mar	30	25	20	15
Headwaters	Apr – Oct	20	15	10	7.5
	Nov – Mar	25	20	15	10
Salmonid spawning & nursery areas (not Chalk rivers)	Jun – Sep	25	20	15	10
	Oct – May	20	15	flow > Q_{80} 10	flow < Q_{80} 7.5

Summaries E-flow target and WFD

- No – it is not the easiest task
- Case by case acceptable?
- Some flow targets possible to establish
  - Linked to key prosesses and indicators (water covered area)
  - Most relevant quality elements (e.g. fish)
  - Landscape, recreeation, other env objectives
- Building block method an approprate framework
- Multicriteria analysis and participation prosess




HydroPower
SOUTH EAST EUROPE
COMPARATIVE ANALYSIS OF METHODOLOGIES FOR THE IMPLEMENTATION OF ENVIRONMENTAL FLOWS (EF), ACCORDING TO THE WFD
WORK PACKAGE 4 – Preserving Water Bodies Ecosystems
Final Version
Date 07.11.2011
Authors
C. Mielach, R. Schinegger, S. Schmutz, A. Galie, F. Istan, I. Tanase, B. Popa, D. Gasparetto, I. Saccardo, M. Cesca, A. Rechberger, H. Talker, S.Santi, N. Conanti, N. Zvanut Smolar,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Implementing the EU Water Framework Directive (EU WFD) in Norway
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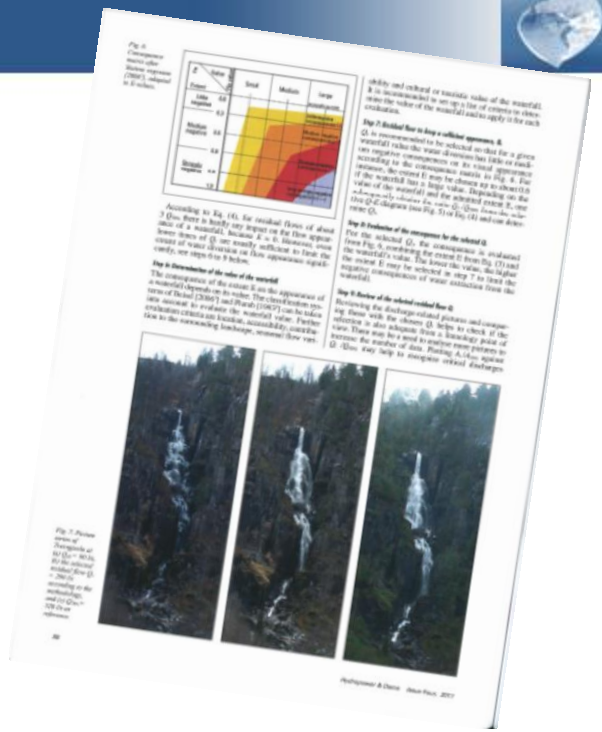

Challenging to settle flow targets on top of Europe…