Foto: Kim Abel, naturarkivet.no

MILJØ-
DIREKTORATET

Nordic WFD Conference 2019
Vaasa, 21.– 23. May

Workshop Hydromorphology

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Senior Advisor

Preparation of next program of measures regarding designing of measures that aim to mitigate physical impact

- Presentation of national hydromorphological assessment method and if the method is included in national or regional legislation or guidelines.
- Lessons learned using hydromorphological assessment methods that are able to predict the risk of not achieving good ecological status due to hydromorphological pressures (CIS guidance no 36).
- Process for updating program of measures regarding identifying measures designed to mitigate physical impact and/or preventing deterioration.

Water bodies in Norway

Category	Waterbodies	HMWB	Area/length
Coastal waters	2282	55	93737 km ^{2}
Groundwater	1394	0	4775 km ^{2}
Lakes	6426	1026	11980 km ^{2}
Rivers	19525	2157	433683 km

National hydromorphological assessment method

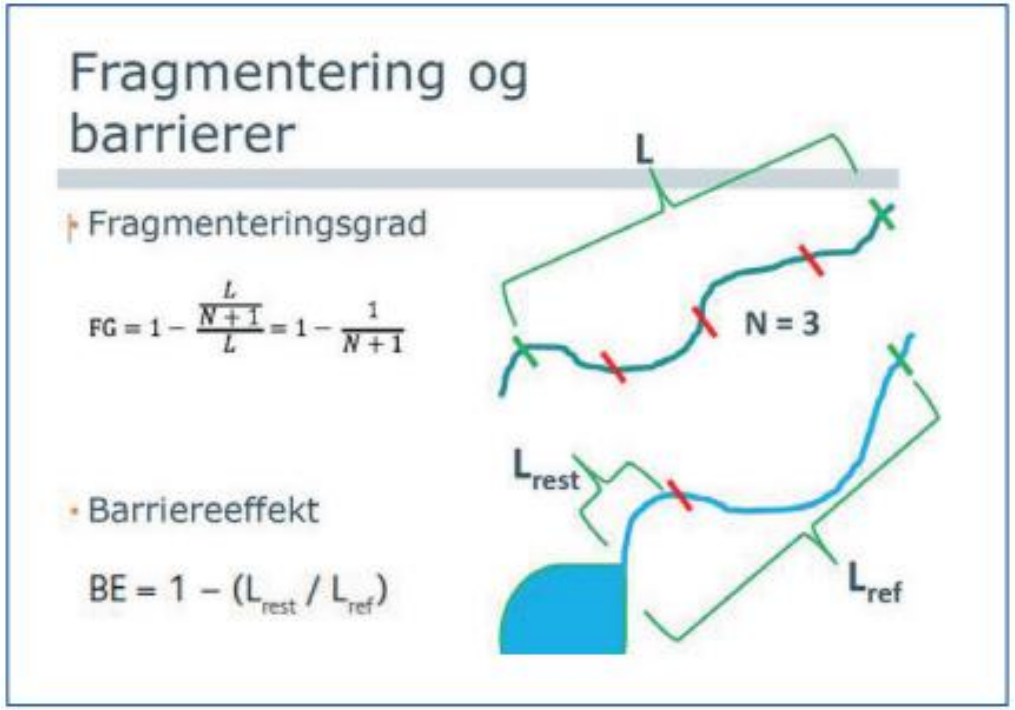
- Fish/macrophytes/invertebrates
- Hymo-parameteres
- Pressure analysis
- Potential is assessed by looking at planned measures in HMWB

- Guidance Documents

Parameters included in hydromorphological QE

Supporting elements for QE fish:

- Water flow og wetted area
- Ecological continuum and barriers: criteria for classes (depth/ fall, gradient(%) specified for Atlantic salmon, trout, grayling, minnow,
- Fragmentation and barriers
- Water level amplitude
- Morphological parameters



Criteria for pressures analysis – status less than good

- Lakes:
  - rivers are regulated into lakes larger than 0,5 km2,
  - Water level changed more than 10 meters
  - Active regulation with annual variability higher than 3 meters between high and low regulation of water level

- Rivers
  - Over 50 % of waterbody altered
  - Ice is missing due to regulation
  - Transfer of water where tributaries are dry
  - Dams or transfer where minimum flow downstream is lower than Q95
  - Hydropeaking – rapid changes

Lessons learned

- Status and designation of HMWB is mostly based on pressures analyses
- Criteria for designating HMWB not sufficient information to assess status
- Lack good biological and hydromorphological parameteres for assessing status in regulated rivers
- Potential is based on information on planned measures in the water body – not properly registered in all water bodies

- We are developing an improved system for classification of hymo-parameters

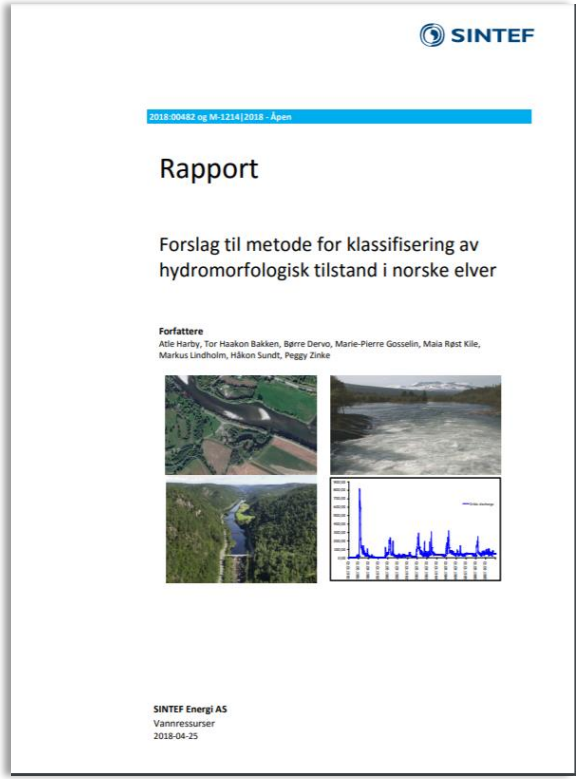
Proposed new system for classification of hydromorphological QE in rivers

20 Hydromorphological elements:

- Hydrological regime (8)
- River continuity (8)
- Morphological conditions (4)

- Proposed weighing of parameters

- http://tema.miljodirektoratet.no/Documents/publikasjoner/M1214/M1214.pdf


SINTEF

2018:00482 og M-1214|2018 - Åpen

Rapport

Forslag til metode for klassifisering av hydromorfologisk tilstand i norske elver

Forfattere
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SINTEF Energi AS
Vannressurser
2018-04-25

Process for updating program of measures regarding identifying measures designed to mitigate physical impact and/or preventing deterioration.

- The local river basin districts are requested to propose measures to the Water Region Authority.
- The water region authorities are encouraged to conduct meetings with the sectoral authorities regarding proposals for measures to mitigate physical impact.
- Finally, the sector authorities are responsible for prioritizing and proposing measures within their own authority area.

Session 2

Objectives and exemptions for ecological status/potential due to physical impact according to article 4.5 WFD

Less stringent environmental objectives in the plans of the 1st cycle

- National guidelines for less stringent objectives were only given for water bodies affected by hydropower
- Less stringent environmental objectives were given in regulated rivers where:
  - there were no functioning aquatic ecosystem
  - necessary mitigating measures were disproportionately expensive
  - Ex: streams downstream of intakes (dry streams)
- Environmental objectives in these were moderate or poorer potential

GEP minimum requirements: What is a functioning ecosystem (from the Norw. HMWB's guidance)?

- All quality elements naturally present must be present, but
  - The inventory can be changed
  - Some species or genotypes can be absent
  - Water vegetation can be absent in regulated lakes
- Crucial ecological functions for life cycles must be present
  - Minimum possibilities for natural spawning and growing up
  - A significant part of the WB must **have water cover throughout the year**
  - Measures (fish stocking, habitat adjustments) can be done to reach the objectives for anadromous fish
  - Minimum requirements for migration and distribution for particular important species or stocks (parts of the year). Some of the natural migration possibilities can be replaced by measures (artificial fish passes, moving of fish)

National cost-benefit analysis in 2011

- The Energy and Resources Directorate and the Environment Agency
- Gave an over-all-cost-benefit-analysis or "where do we get our moneys worth?"
- Came up with a prioritized list.
- Premises:
  - Focus on "minimum flow release/environmental flow" estimated Q95 & production lost
- Applies mainly to HP with regulated reservoirs
- Includes development of methodology as well as a systematic approach, River Basin by River Basin, Water Body by Water Body review

Mitigation measures to reduce hydropower impacts in the RBMP's

- RBMPs adopted, with adjustments, by the Ministry (July 2016)
  - 387 water bodies specified in decision
  - Flow measures in more than 50 HP watercourses by 2033
  - Estimated production loss: 1,1 -1,7 TWh (Apr 1-1,5 % of the total production)
- Political signals on hydropower and biodiversity from parliament (2016)
  - Increase revision of terms (to enable minimum flow release)
  - Modernise legal possibilities for mitigation requirements

Mitigating impacts from hydropower in priority water bodies by 2021-2033

River basin districs	Flow measures	Other measures	Total
Glomma/Västerhavet	35	**33**	68
Vest-Viken	35	**56**	91
Agder	17	**8**	25
Rogaland	2	**1**	3
Hordaland	10	**13**	23
Sogn/Fjordane	13	**48**	61
Møre/Romsdal	12	**10**	22
Trøndelag	8	**10**	18
Nordland	16	**23**	39
Troms	8	**21**	29
Finnmark	4	**4**	8
Norway	**160**	**227**	**387**

Environmental objectives in HMWB

- Text describing anticipated improvement in status, some examples:
  - Enhanced fish stock
  - Functioning aquatic ecosystem
  - GES for one/some QE(s)
  - Improve status regarding pollution

Exemptions

- Art 4.4 extended deadlines for objectives
  - Recovery after measures, implementetaion of measures
- Art 4.5 Less stringent objectives
  - Regulated rivers without minimum flow, dry rivers
- Art 4.7. New activity

Årøyelvi øvre - HMWB Art 4.5

Elv: 077-113-R

Vassdragsnr
Totalt areal nedbørsfe

Vannregionkoordinato
Vannområde
Kommune

Miljøtilstand

Økologisk potensial

Kjemisk tilstand

Miljømål

Økologisk

Kjemisk

Risiko

Påvirkning

Jordbruk
Diffus forurensning
Diffus avrenning fra an

Vannkraft
Hydrologisk påvirkning
Hydrologiske endringer

Tiltak

5106-421-M
Tiltaksnavn
Tiltakstype
Tiltaksstatus
Unntak
Påvirkning

5106-422-M
Tiltaksnavn
Tiltakstype
Tiltaksstatus
Unntak
Påvirkning

REDIGER

SE MER

SE MER

SE MER

HAR TILTAK

SE MER