

Welcome to
Sustainability in Hydropower 2023

-Ecological mitigation, best practises and governance

Trondheim, Norway 13-15 June 2023

Anders Iversen, Norwegian Environment Agency



SUSHP 2023

The 2nd International Conference on
Sustainability in Hydropower

Welcome to the 2nd International Conference on Sustainability in Hydropower

- The first SUSHP conference was in Storforsen, Sweden in June 2019.
- Theme in 2023: Ecological mitigation, best practices and governance.
- We have 70 presenters, 140 participants on site, 34 online, 13 countries.



Organizers:



Swedish Agency
for Marine and
Water Management





Mardøla i Eikesdalen
Foto: Bård Bredesen, Naturarkivet.no

Water in Norway

Annual rainfall:

- 1414 mm average
- 2250 mm on west coast

Rivers;

- 490.000 km rivers and creeks
- 39.000 km rivers $>1 \text{ m}^3/\text{sec}$

Lakes:

- 455 000 lakes – 17000 km^2
- 400 with area larger than 5 km^2
- The 4 deepest lakes in Europe

Numerous waterfalls:

- Highest 840 m





Hydropower and ecology in Norway

Approximately 130 TWh annually.

- 98 % of inland, stationary power consumption.
- 50 % of Europe's storage capacity.

Impact on:

- 15 of the 20 highest waterfalls
- 70 % of the no. of river basins
- 17 % of river stretch
- 30 % of lake area

Effects:

- Reduced flow of water/sediments
- Rapid variation in level (ramping)
- Reduced connectivity
- Fish injured/killed in turbines
- Change in water temperature
- Oxygen supersaturation



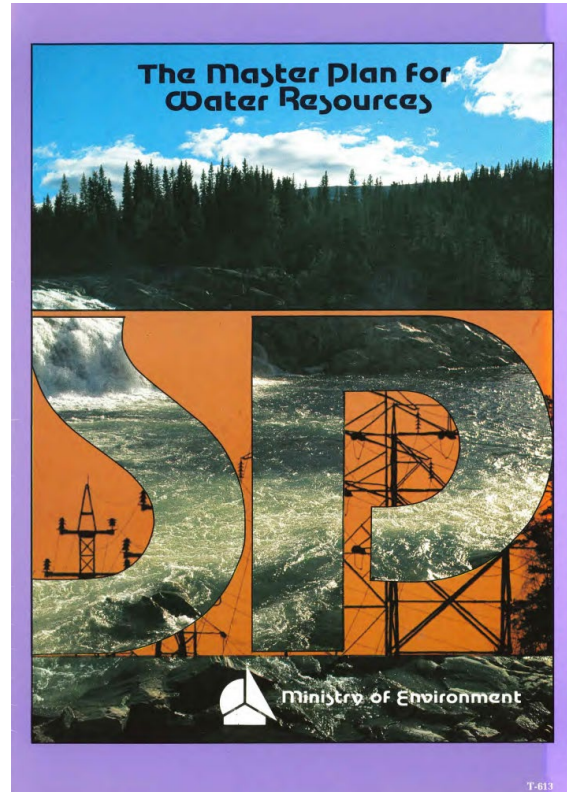
Balancing hydropower and ecology in Norway 1970s and onwards

1963 – PM Einar Gerhardsen: “As long as the battle is fought over individual watercourses, it is always possible to mobilise so many arguments and so much political pressure that the development view prevails. To avoid a development where Norway's unique nature is consumed bit by bit, it was necessary to have an overall plan for protection”.



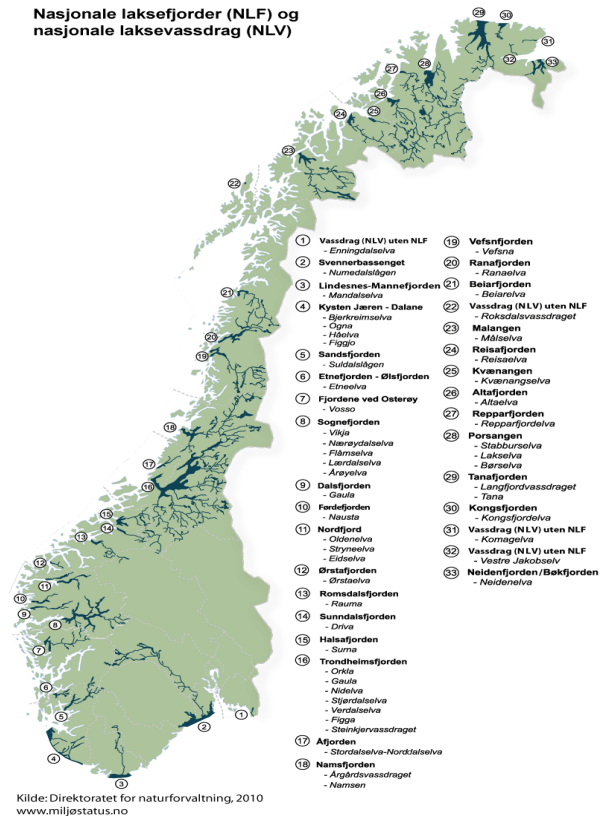
River protection plan (1973-)

Latest update 2018
390 watercourses
Covers app. 25 % of Norway



Master plan (1986-2016)

Prioritized hydropower projects with best economical benefit and minimum environmental loss



National Salmon Rivers (2003-)

Prioritized hydropower mitigation



The Water Framework Directive in Norway (2007-)

2001 – PM Jens Stoltenberg: “We have now reached the point where the time for new large-scale hydropower developments in Norway is over. The benefits of these developments are not great enough to justify the irreversible impact on nature. Untouched nature is becoming increasingly valuable”.



National assessment of permit revision (2013)

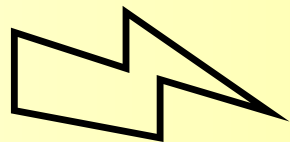
- Water Resources and Energy Agency (NVE)
- Environment Agency

River Basin Management Plans 2016-2021

Environmental objectives were approved that may require revision of permit and increased flow in 160 water bodies (77 revision cases).

River Basin Management Plans 2022-2027

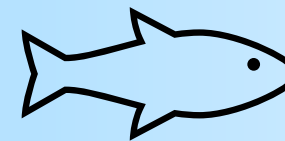
New environmental objectives were approved that may require revision of permit and increased flow in 28 additional water bodies (13 new revision cases).



- Paris Climate Agreement
- SDG 7 – Clean Energy
- SDG 13 – Climate Action



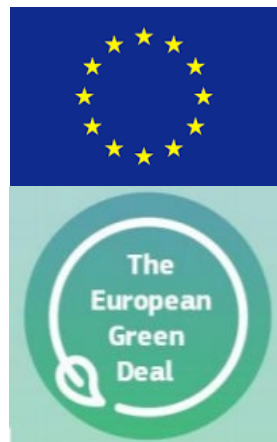
- Montreal-Kunming Agreement
- SDG 6 – Water
- SDG 15 – Ecosystems



- Water Framework Directive
- Biodiversity Strategy
- Taxonomy Goal 2 Water
- Taxonomy Goal 6 Biodiversity



- Biodiversity Act
- Water regulation
- White paper(s) biodiversity



- Renewable Energy Directive
- Climate Action Plan
- Repower Europe
- Taxonomy Goal 1 Climate

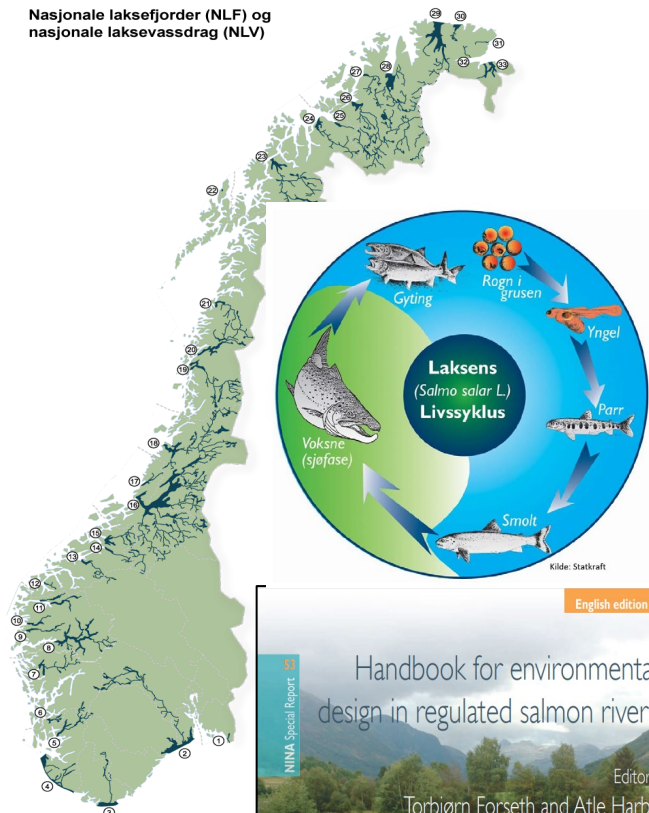


- Water Resources Act
- White paper(s) on energy

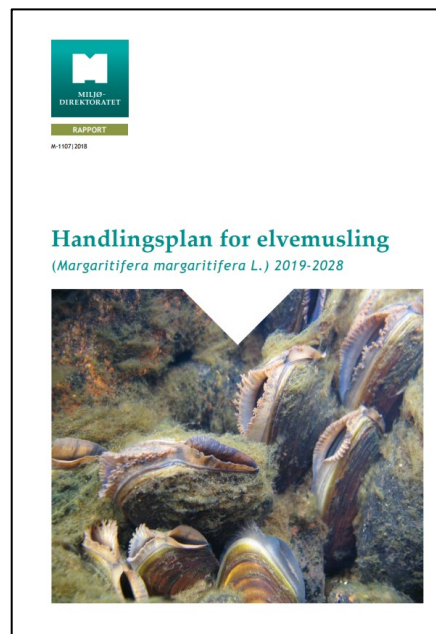
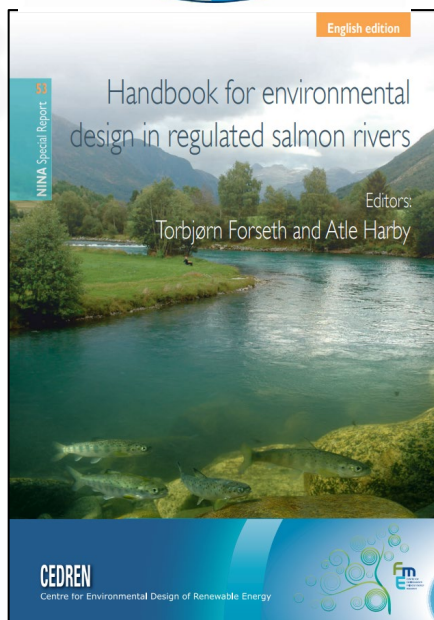
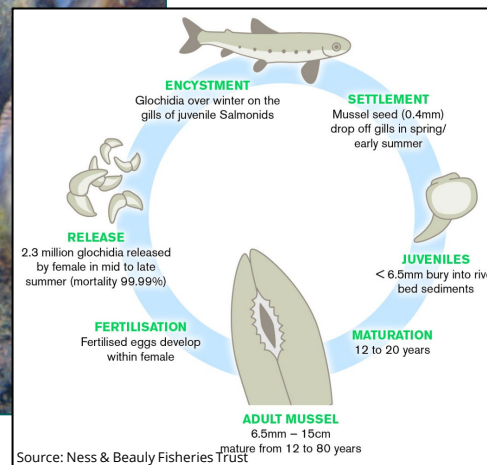
Towards ecosystem based management of regulated rivers and lakes



Nasjonale laksefjorder (NLF) og nasjonale laksevassdrag (NLV)



Kilde: Direktoratet for naturforvaltning, 2010
www.miljostatus.no



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Share new knowledge, tools and best practice examples for successful mitigation measures.

Identify sustainability challenges, win-win solutions and good governance.

Networking regarding hydropower and ecology with colleagues from 13 countries.