Enhanced river restoration and WFD implementation in Norway.

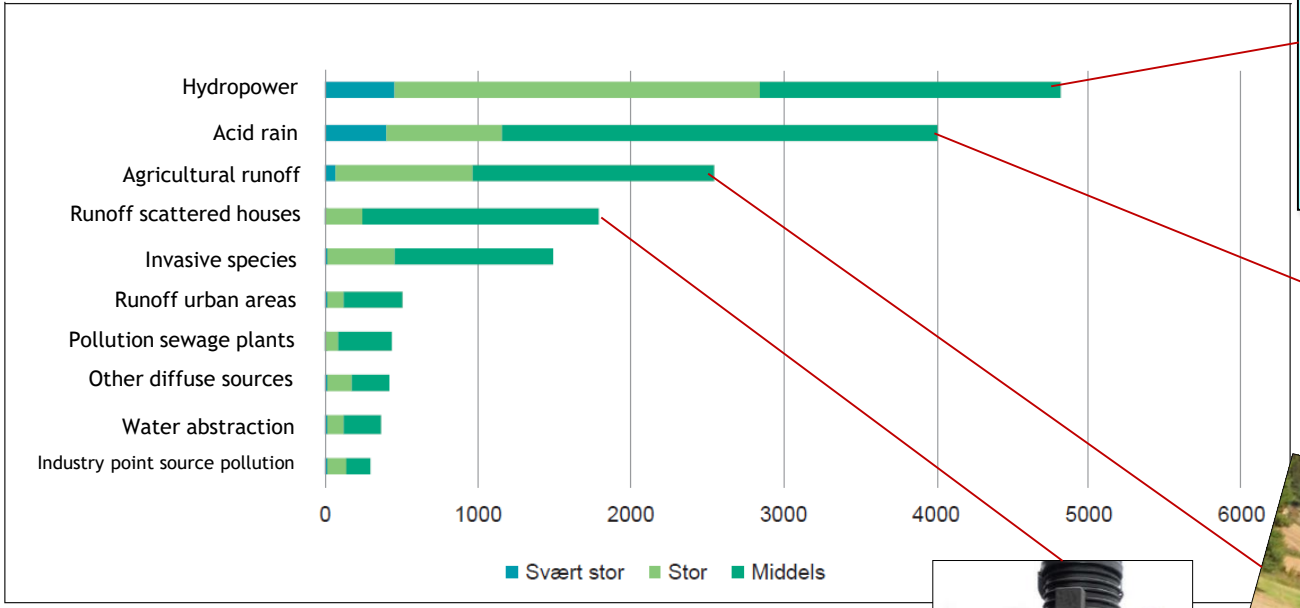
Anders Iversen, National Water Coordinator, Norwegian Environment Agency

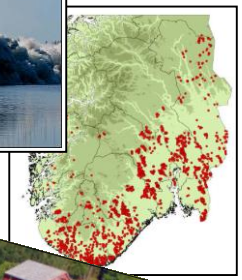
Foto: Anders Iversen

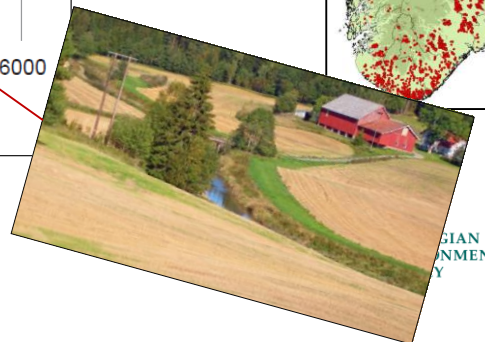
Foto: Morguefile

Foto: Anders Iversen

Main pressures on water environment







Figur: Fra Medl. St. 14 (2015-2016) Natur for Livet – Norsk handlingsplan for naturmangfold. Datakilde: Vann-nett.

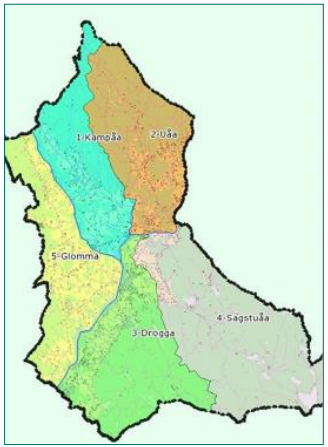
Most important achievements 2010-2016 due to WFD

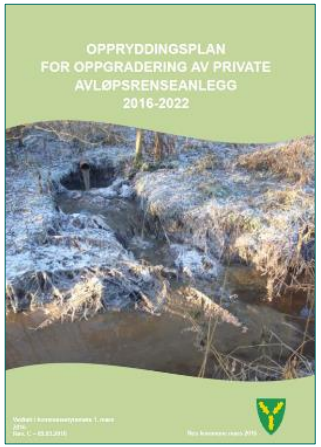
1. Improved monitoring and knowledge base (approx. 8 million EUROS increase in annual budget)
2. Moving towards better water status (revision of hydropower and pollution permits, improvements in sewage handling and road culverts).
3. Catchment (basin) based water management (with RBMPs and PoMs).
4. New arenas for sector integration (local, regional, and national level).
5. Active local involvement in many areas.

Example: plan for cleaning up sewage from scattered houses (Nes municipality)

Tabell 3 – fremdriftsplan. Antall pålegg er basert på tall pr. 01.12.2015 og kan bli justert.

Sone	Antall pålegg	Invitasjon/ infobrev	Infomøte	Varsel om pålegg	Vedtak pålegg	Tiltak ferdigstilt
1- Kampåa	243		Avholdt	April 2016	Mai 2016	Mai 2018
2 - Uåa	313	August 2016	Avholdt	April 2017	Mai/Juni 2017	Juni 2019
3 - Drogga	279	Januar 2018	Februar/Mars 2018	April 2018	Mai/Juni 2018	Juni 2020
4 - Sagstuåa	160	Januar 2019	Februar/Mars 2019	April 2019	Mai/Juni 2019	Juni 2021
5 - Glomma	520	Januar 2020	Februar/Mars 2020	April 2020	Mai/Juni 2020	Juni 2022
Total ant. anlegg	1515					






Stor miljødugnad går etter programmet

NORWEGIAN ENVIRONMENT AGENCY

Example: case handling of hydropower cases where environmental objectives can lead to increased requirements for environmental flow (The Norwegian Water Resources and Energy Directorate)

Godkjente miljømål som kan medføre krafttap			
Tidsfrist	2021	2027	2033
Revisjonssaker	11	12	25
Øvrige saker	7	19	6
Antall saker	18	31	31


Foto Bjørn M. Larsen (elvemusling), og Eva Thorstad (ål).

Norges vassdrags- og energidirektorat

Example: adapting industry pollution permits to WFD requirements (The Norwegian Environment Agency)

Industry with permits from Environment Agency (approx. 130)

- **2014**: New monitoring requirements adapted to WFD.
- **2015:** New monitoring implemented by industry.
- **2016:** Results reported, assessed by Environment Agency.
- **2017:** Permanent, new monitoring requirements set.
- **Ongoing:** Assessment of need for new mitigation measures.

Herøya. Foto: Roar Gammelsæter.

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Mitigation for fish passage in culverts under roads

Foto: Knut Aune Hoseth (NVE)

Foto: Knut Aune Hoseth (NVE)

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Example: measures in agriculture

- Compliance with national regulation on fertilizer products
- Grants from regional agricultural environmental programme (RMP)
- Local subsidies for environmental measures in agriculture (SMIL)

  - ✓ *Environmental plan for each farm*
  - ✓ *Buffer zones, riparian vegetation*
  - ✓ *Reduced plowing in fall*
  - ✓ *Constructed wetlands / retention basins*
  - ✓ *Vegetation on erosion-prone areas*
  - ✓ *Improved handling and storage of manure*
  - ✓ *Better adapted fertilizer and use*
  - ✓ *Restoration of creeks and wetlands*

I Førde kommune. Foto: Staffan Hjohlman

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Collection of some examples of measures in Norway

NORWEGIAN ENVIRONMENT AGENCY

Drivers for increased restoration effort

Climate change adaptation: *Nature based solutions, Natural water retention measures.*

Water Framework Directive: *Protect, enhance and restore.*

CBD Aichi target 15: *by 2020 restore at least 15 per cent of degraded ecosystems.*

SDG 6.6: *By 2020, restore water-related ecosystems, including wetlands, rivers, and lakes*

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Increased attention on river and wetland restoration in Norway

2010 – Planning for first national cycle of Water Framework Directive begins, for 2015 RBMPs.

2015 - Recommendations from Environment Agency to Ministry:

- Establishment of a national restoration network.
- Cost-effective restoration of mires and wetlands.

NORWEGIAN MINISTRY OF CLIMATE AND ENVIRONMENT

2015 - Assignments from Ministry to Environment Agency:

- Set up an inter-agency coordination group to boost river restoration efforts (coordination, dissemination, financing).
- Prepare a plan for restoration of mires/wetlands 2016 – 2020 (binding carbon, water retention, ecological improvement).

2015 – National report on handling of storm water (promotes nature based solutions).

2016 – Parliament approves national action plan for biodiversity (Aichi target for restoration).

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Financing of restoration (approx. EUROS)

Type of measure	2016	2017	2018
Mitigation measures hydropower	HP companies	HP companies	HP companies
Mitigation measures road culverts	Maintenance budget	Maintenance budget	Maintenance budget
Measures for WFD objectives (except for polluter pays)	1,0 million	4,0 million	2,0 million
National plan for mire and wetland restoration	1,5 million	3,0 million	2,5 million
Restoration of outdated flood defense	0,25 million	0,25 million	0,25 million
Storm water measures as part of water/sewage tax (proposed)	-	-	-

ENVIRONMENT AGENCY

Annual national restoration seminars

Main national tool for:

- Dissemination of knowledge
- Sharing for experiences
- Networking
- Inspiration

Target groups:

- Local and regional water management
- National authorities
- Experts and researchers
- Non-governmental organizations

Foto: Anders Iversen

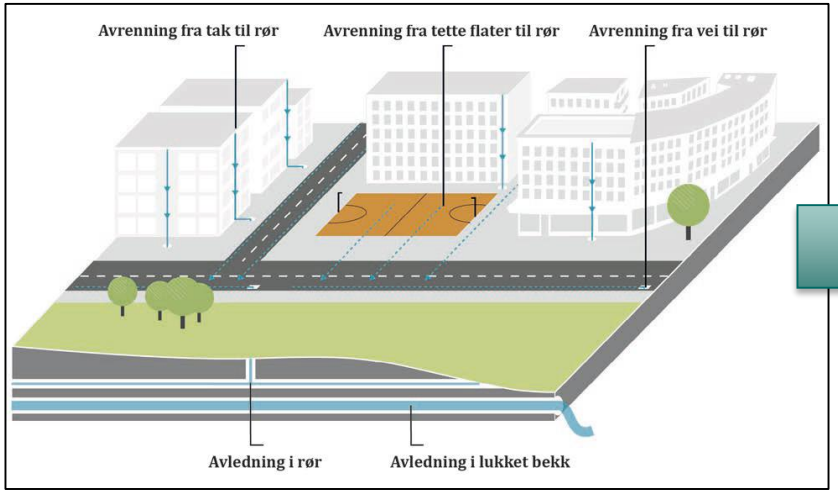
Year	Part.
2010	*37*
2011	*38*
2012	*62*
2013	*86*
2014	*76*
2015	*111*
2016	*93*
2017	103
2018	?

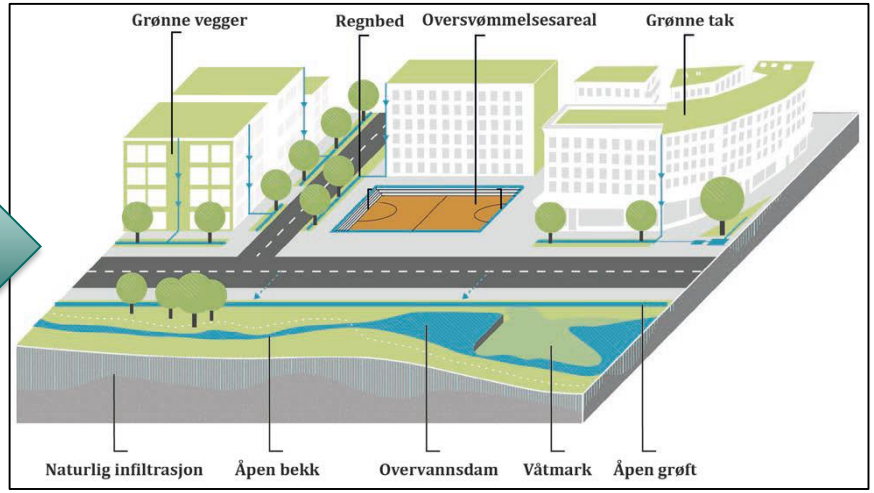
NORWEGIAN ENVIRONMENT AGENCY

Bringing international key-note speakers to us

Year	Title	Speaker
2018	Restoration of eelgrass fields on the Swedish coast	Gothenburg University, Sweden
2018	Inclusive design in Room for the River	Rijkswaterstaat, Netherlands
2017	Can natural Flood Risk Management be effective?	Dundee University, Scotland
2017	How to assess the effects of ecological restoration?	Umeå University, Sweden
2016	From garbage dump to nature reserve	Örebro municipality, Sweden
2016	Linking river and wetland restoration to good ecological status	Environment Agency, UK
2015	Natural Water Retention Measures	NWRM secretariat, France
2015	REFORM project - conclusions and future directions	REFORM participant, Denmark
2014	REFORM project – increasing the success of restoration	REFORM project leader, Netherlands
2014	Adding large structures to improve habitat health	Umeå University, Sweden
2013	River Restoration Centre (RRC) – examples and lessons	RRC Director, UK
2012	River Restoration in Europe: RESTORE, REFORM and River Wiki	RESTORE project manager, UK
2012	European Centre for River Restoration (ECRR)	ECRR chairman, Netherlands
2011	River Restoration in Denmark	Environment Agency, Denmark

National report on handling of storm water (2015)





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Nature Based Storm Water Handling

Kilde: Bent C. Braskerud

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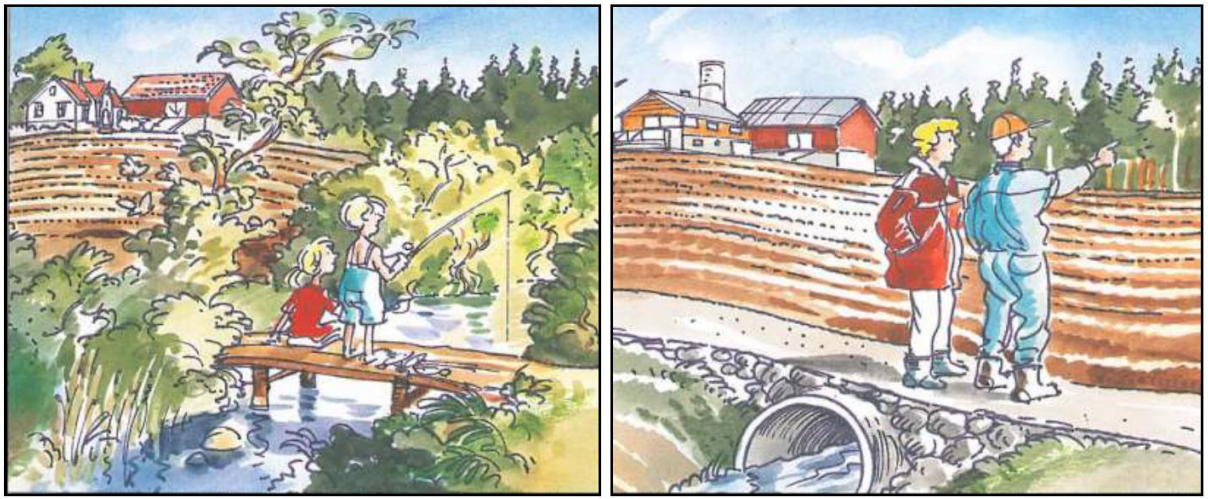
Agriculture (drainage)

- 40.000 creeks in agricultural areas were closed between 1976 and 1988, partly due to subsidies.



Kilde: Leif R. Karlsen

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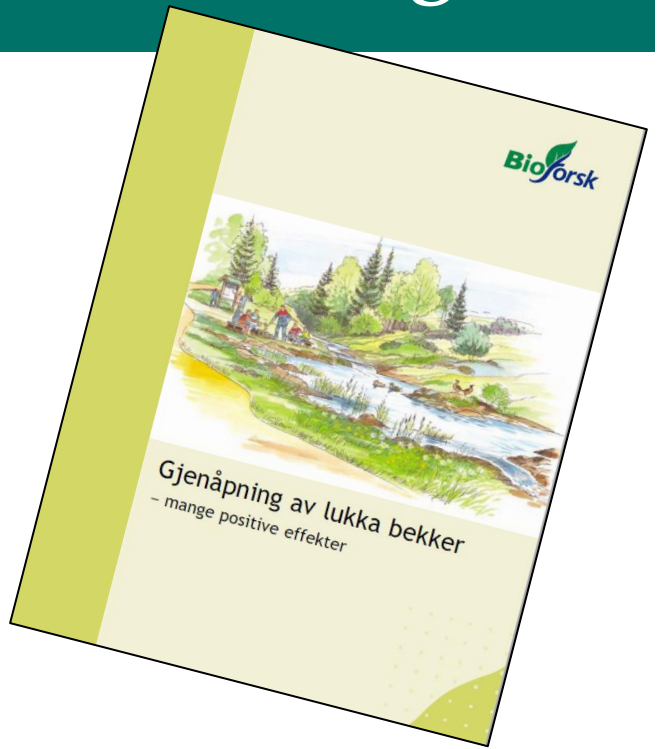
Agriculture (re-opening/meandering)

Foto: Atle Hauge (Bioforsk)

Foto: Arne T. Hamarsland (NVE)

Kilde: Leif R. Karlsen

Kilde: Leif R. Karlsen



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Agriculture (constructed wetland)

sedimentation and capture of nutrients

Foto: Arne J. Lyshol

Foto: NIBIO

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Flood defense

Jonathan E. Colman (NaturRestaurering)

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Reopening access to flood plains and side creeks

Jonathan E. Colman (NaturRestaurering)

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Reopening access to flood plains and side creeks

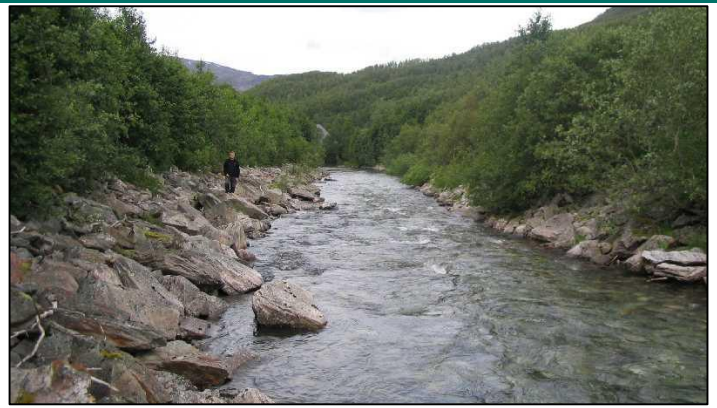
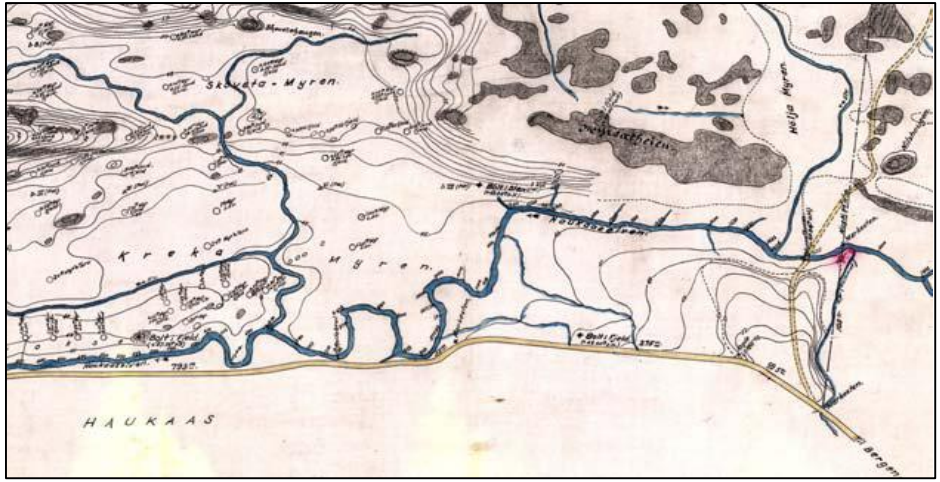


Foto: Knut Aune Hoseth (NVE)

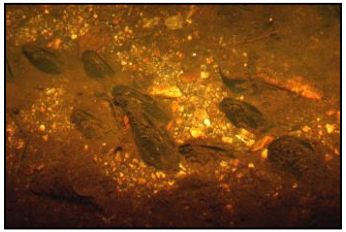
Foto: Knut Aune Hoseth (NVE)

Jonathan E. Colman (NaturRestaurering)

Re-meandering for river mussels



1903



2005

Kilde: Håvard Bjordal

Re-meandering for river mussels

Now

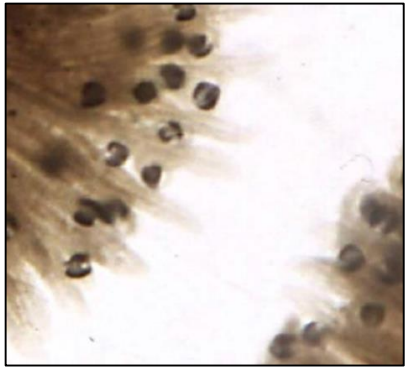
Future?

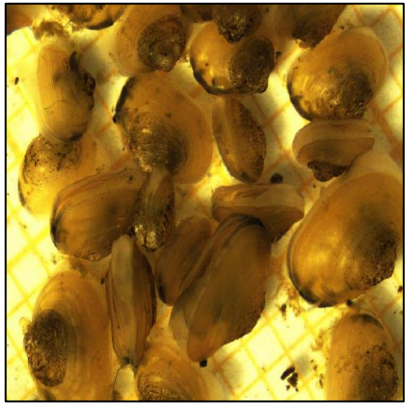
NORWEGIAN ENVIRONMENT AGENCY

Kilde: Håvard Bjordal

Re-meandering for river mussels

Stocking for reintroduction





Kilde: Håvard Bjordal

Re-meandering for river mussels

Restoration ongoing

NORWEGIAN ENVIRONMENT AGENCY

Kilde: Håvard Bjordal

Re-opening of urban rivers (Ila)

Kilde: Terje Nøst (Trondheim kommune)

Ila creek in Trondheim city.

70 years in pipes under industrial area.

New plan for roads and housing.

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Re-opening of urban rivers (Ila)

Kilde: Terje Nøst (Trondheim kommune)

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Re-opening of urban rivers (Ila)

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Re-opening of urban rivers (Ila)

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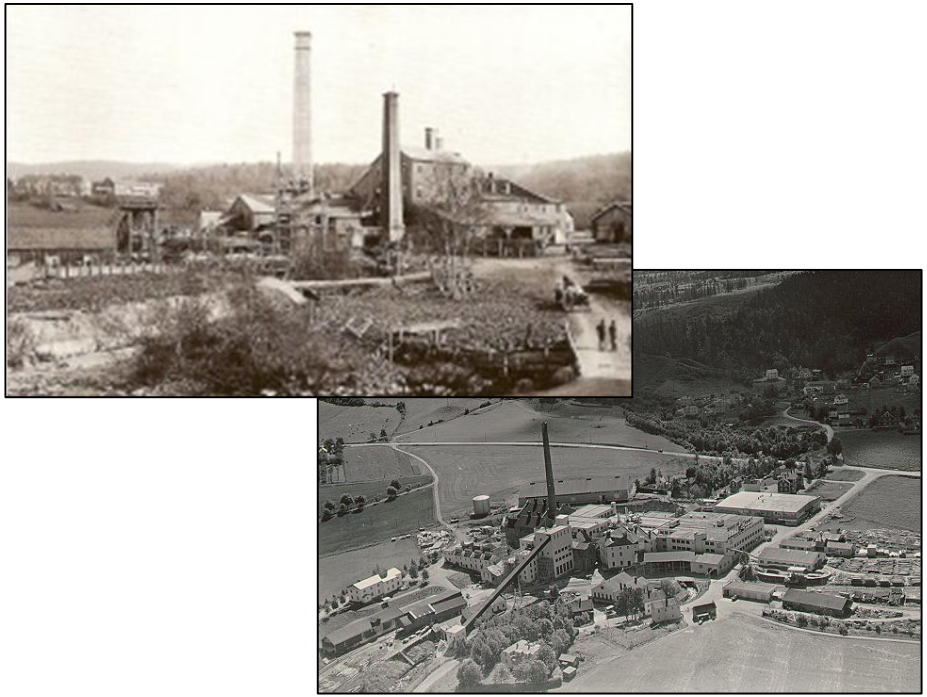
Kilde: Terje Nøst (Trondheim kommune)

Re-opening of urban rivers (Vikelva)



Kilde: Terje Nøst (Trondheim kommune)

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Re-opening of urban rivers (Vikelva)

NORWEGIAN ENVIRONMENT AGENCY

Kilde: Terje Nøst (Trondheim kommune)

Re-opening of urban rivers (Vikelva)

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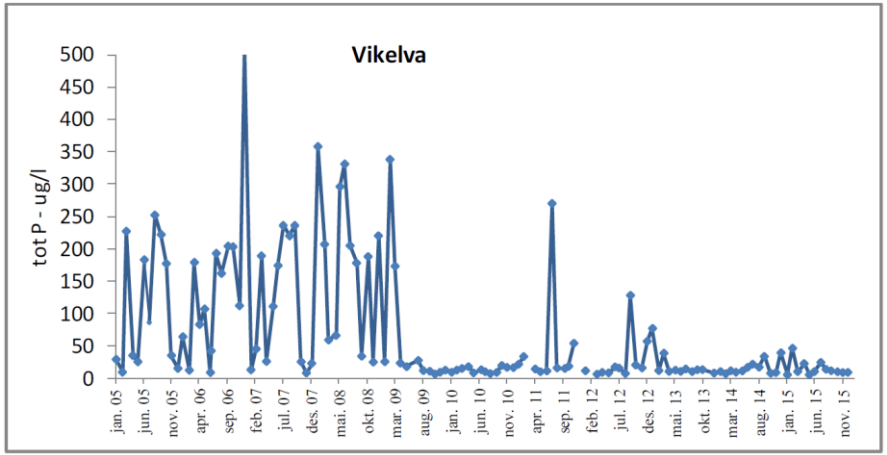
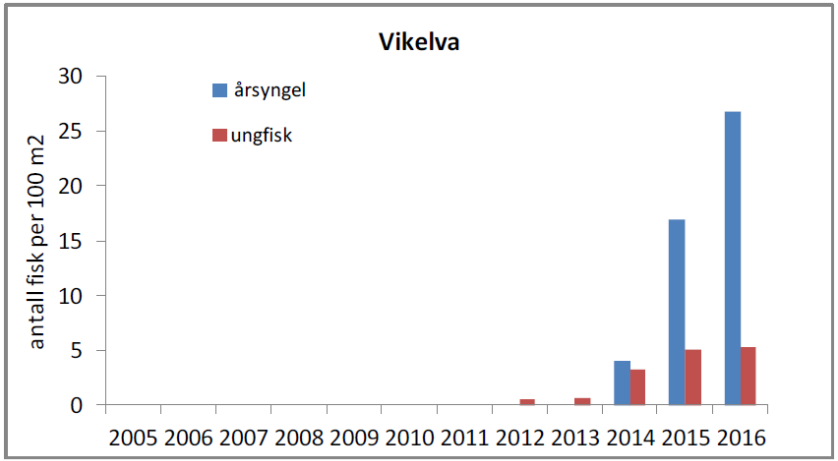
Kilde: Terje Nøst (Trondheim kommune)

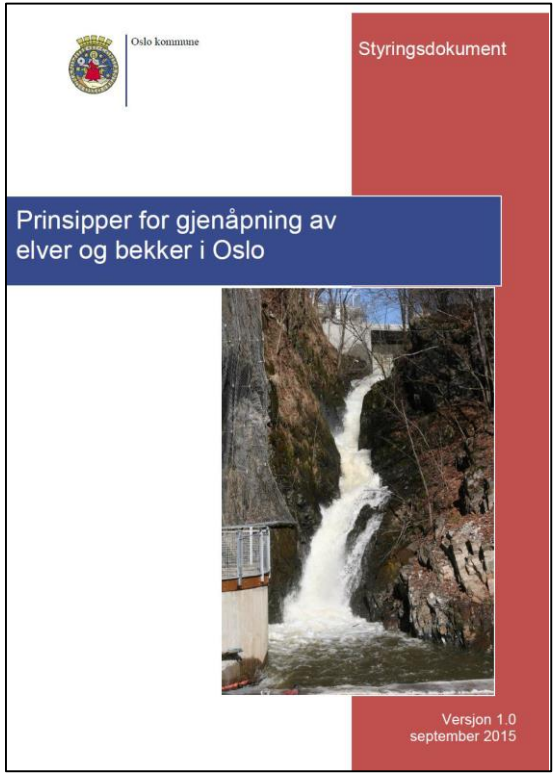
Re-opening of urban rivers (Vikelva)

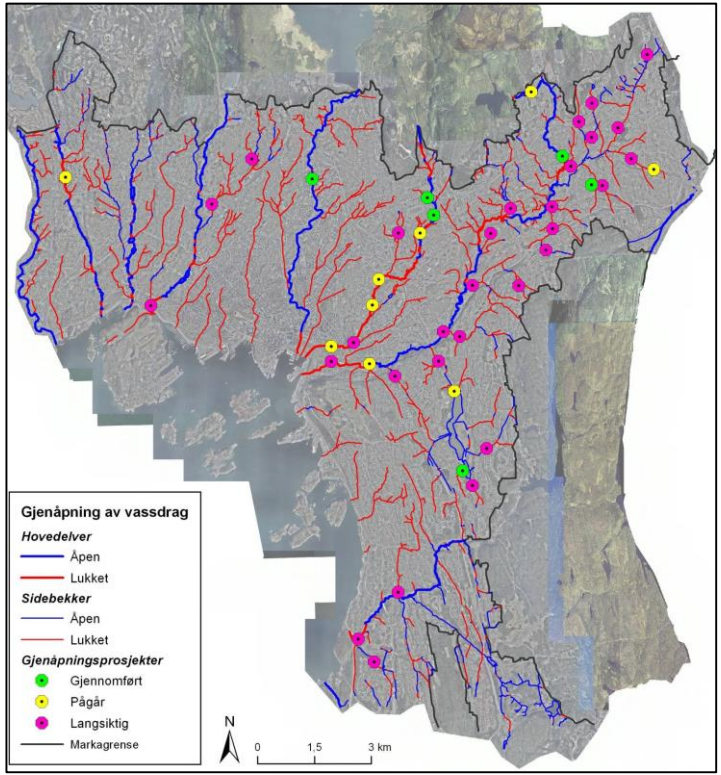




Kilde: Terje Nøst (Trondheim kommune)

Re-opening of urban rivers in Oslo





Kilde: Kjetil Lønborg Jensen

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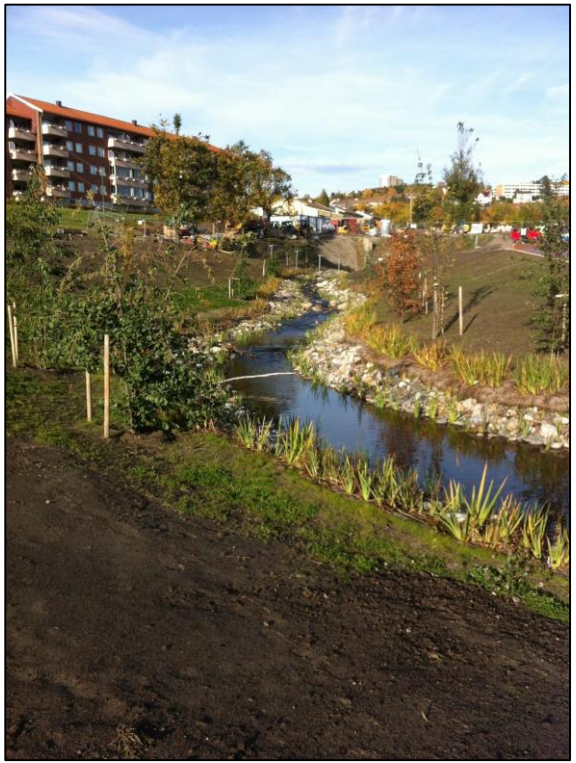
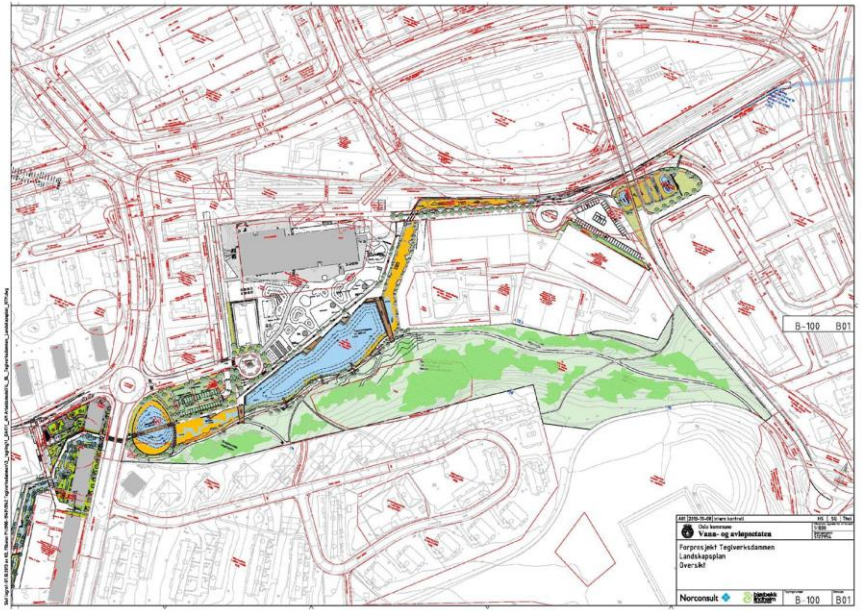
Re-opening of urban rivers (Hovinbekken)



Kilde: Kjetil Lønborg Jensen

Re-opening of urban rivers (Hovinbekken)



Kilde: Kjetil Lønborg Jensen

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Re-opening of urban rivers (Hovinbekken)

Kilde: Kjetil Lønborg Jensen

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Re-opening of urban rivers (Hovinbekken)

Foto: Anders Iversen

Re-opening of urban rivers (Hovinbekken)

Foto: Anders Iversen

NORWEGIAN ENVIRONMENT AGENCY

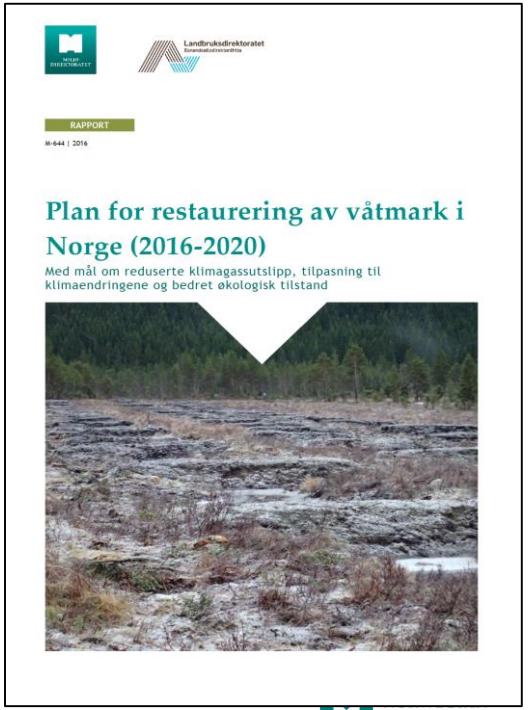
Local information and participation is a key

Kilde: Kjetil Lønborg Jensen

NORWEGIAN ENVIRONMENT AGENCY

Restoration of wetlands (including mires)

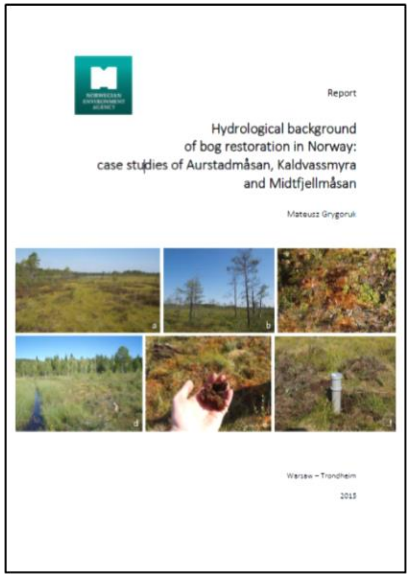
- National polan developed by the Norwegian Environment Agency ands the Norwegian Agriculture Agency in cooperation
- Aim: to restore areas in order to transform nature *towards* an earlier ecological reference state
- Division between mires and other wetlands



ENVIRONMENT AGENCY

Restoration of wetlands (including mires)

- Objectives
  - Climate change mitigation
  - Climate adaptation
  - Improvement of ecological status
- Requirements to be fulfilled
  - Cost-effective
  - Voluntary
  - Without compromising the interests of agriculture and forestry
- Improved science base
  - Reports, workshops, expert meetings



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Restoration of wetland (Slevdalsvannet)

1958 (Foto: Kåre Olsen)

2014 (Foto: Terrateknikk)

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Restoration of wetland (Slevdalsvannet)

2015 (Foto: Seabed Services)

2016 (Foto: Lister Filmklubb)

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Norwegian research - ongoing

Nature restoration in a changing landscape.

Effective restoration of aquatic ecosystems.

Environmental design for hydropower.

Fish habitat restoration.

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How we hope to continue:

- Increase follow-up monitoring and systematic learning form experiences
- Database of examples and lessons learned (river wiki)
- Work with research institutions
- Promote river/wetland restoration: Disseminate knowledge, share experiences
- Improve coordination of planning and financing (sector integration)
- Participate in European networks
- *More restoration in next cycle of WFD RBMPs (2022-2027)!*

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www.miljødirektoratet.no