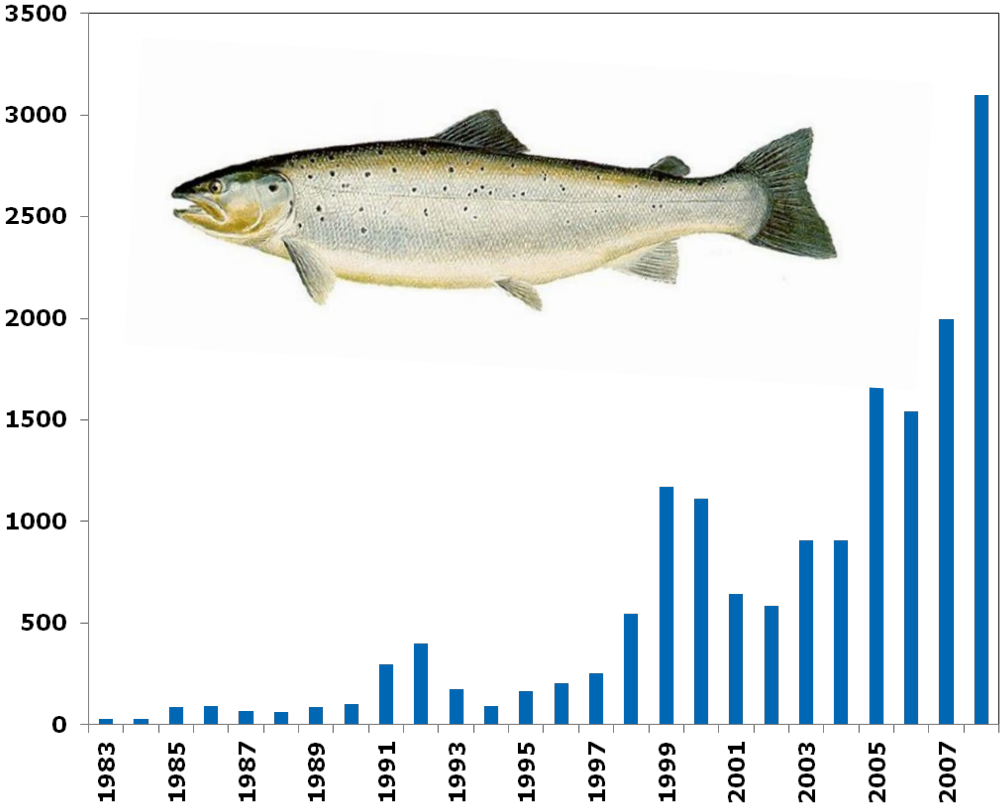
Recreational freshwater fishing and conservation of Salmon and Grayling - the Danish example



DTU Aqua
National Institute of Aquatic Resources

Niels Jepsen

Status

Grayling (*Thymallus thymallus*) is listed in Annex 5 on the habitats directive. *Also mentioned in the Bern and Helsinki Conventions*

Salmon (*Salmo salar*) also listed in Annex 5 and mentioned in the Bern Convention.

Grayling populations in EU are generally declining, in DK, very small populations now.

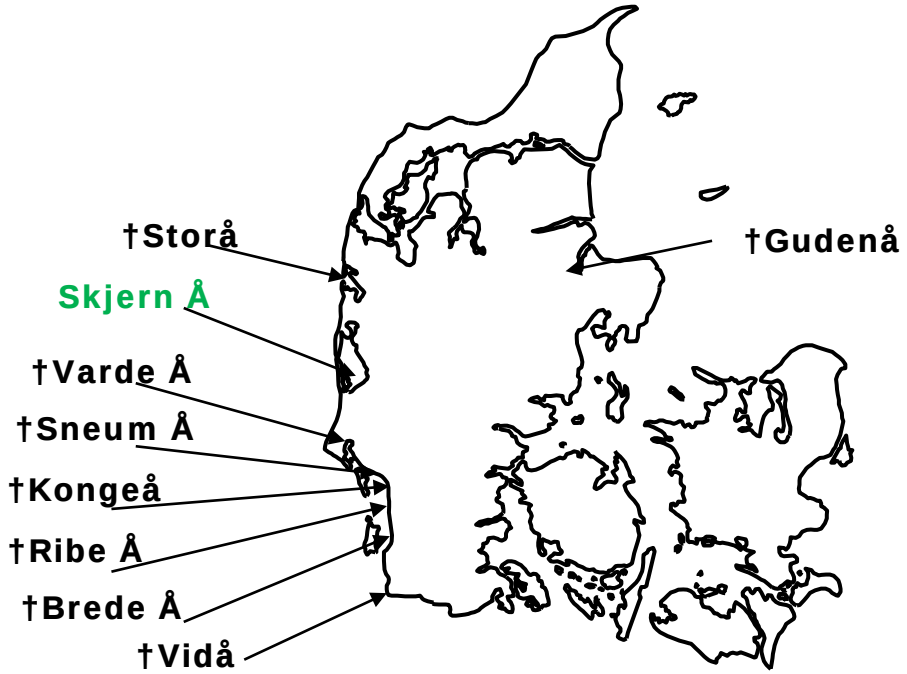
Salmon is globally declining, few populations left on the European main-land, France and Spain. In DK great increase, good status now.

Status of the Danish salmon populations in the 1980'ies

In the 1980'ies the salmon populations in Denmark were assumed extinct

- except for River Skjern (spawning-run 50 – 100 / year)

- Sporadic catches in other rivers believed to be strayers



River Skjern Å land claim project implemented in the 1960'erne

Spawning and nursery areas was destroyed, migration impaired

Loss of spawning and rearing habitat

Many small barriers – mills and fish farms

Fish farming (rainbow trout), 1894 – 1975.

Caused habitat loss, habitat degradation and impaired migration.

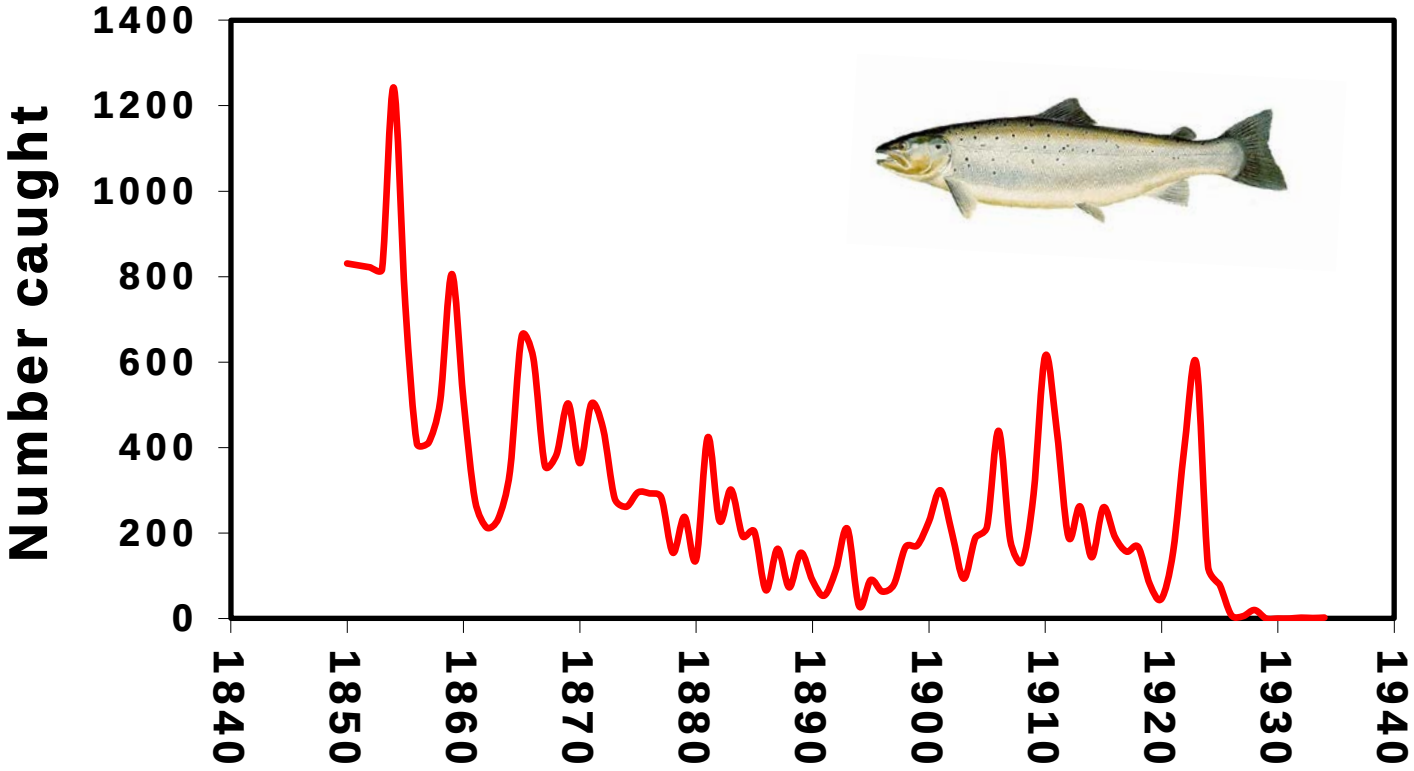
About 800 in 1970, 150 left today.

Hydropower development, 1920 – 1970

Power plant development in 1921

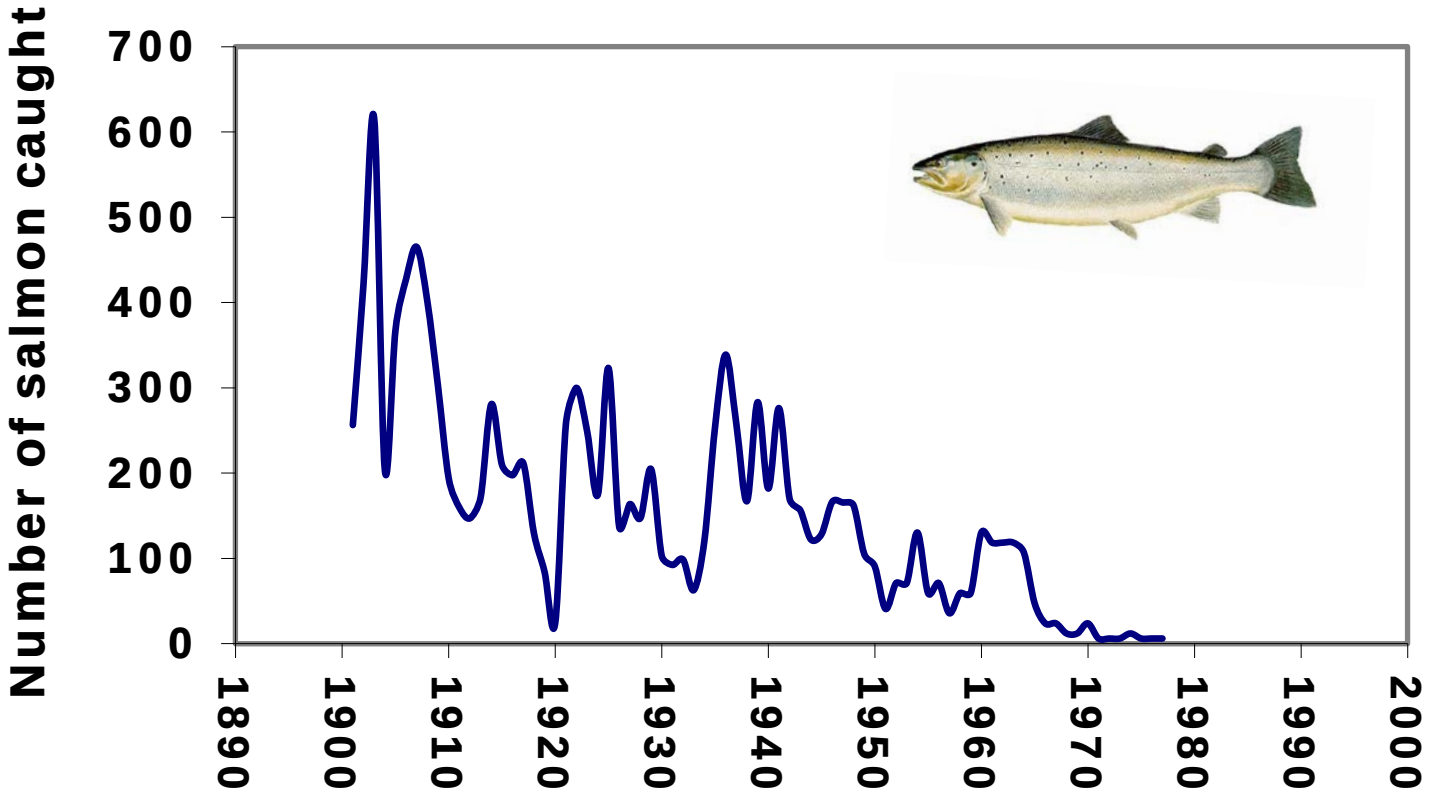
River blockage prevented the salmon in reaching the spawning areas - the River Gudenå salmon went extinct

Salmon catches in River Gudenåen 1850 - 1930



Poulsen 1935

Annual catches of Salmon in the estuary of River Skjern, 1900 - 1978



Otterstrøm (1938) and Statistic yearbooks, the Ministery of Fisheries

The causes were identified and documented by research.

Example - negative effects of weirs and barriers

- Loss and delay of smolts
- Loss and delay of spawners
- Loss of habitats

Jepsen, Nielsen & Deacon (2005)

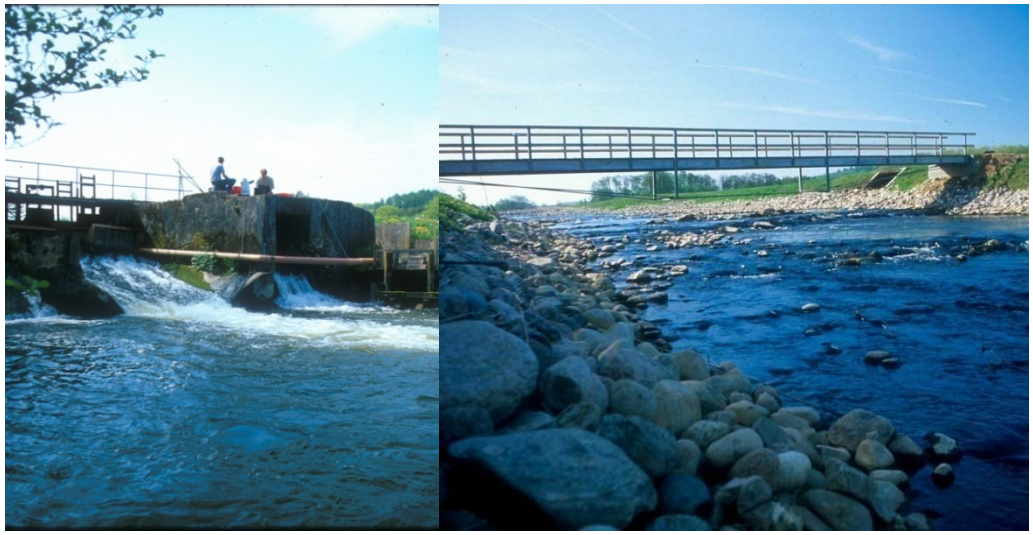
Svendsen, Koed & Aarestrup (2004)

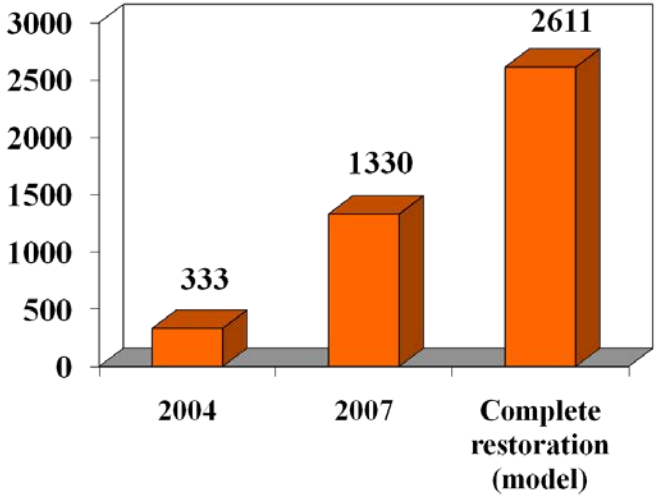
Aarestrup & Koed (2003)

Koed, Jepsen, Aarestrup & Nielsen (2002)

.....the negative trend can be reversed .....

..migration barriers have been removed and habitats restored





Habitat restoration

… using original fish in original habitats…

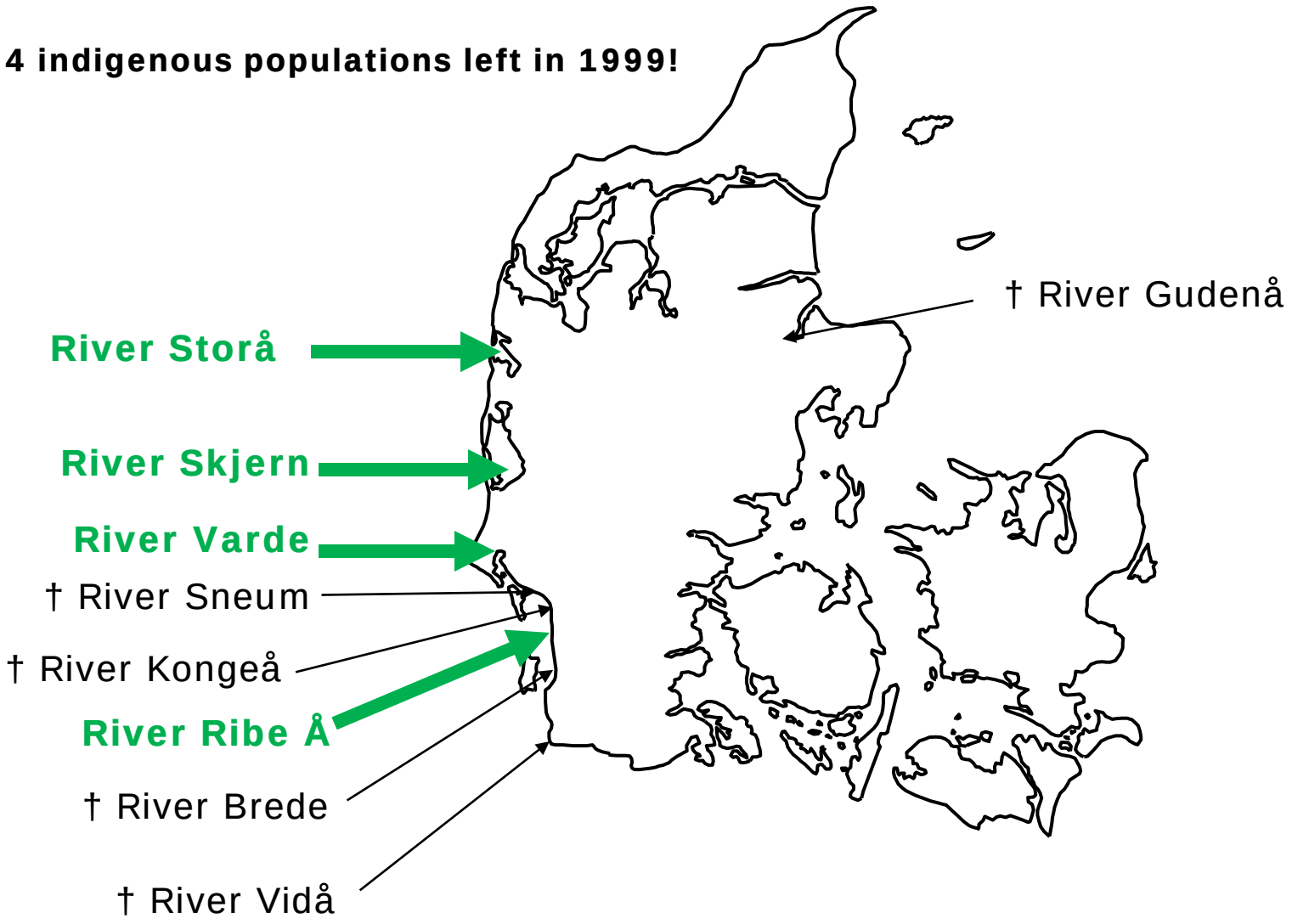
DNA from old scales compared with DNA collected during 1993-2003

Old DNA (1910 - 1913)

=

Present

… using original fish in original habitats…

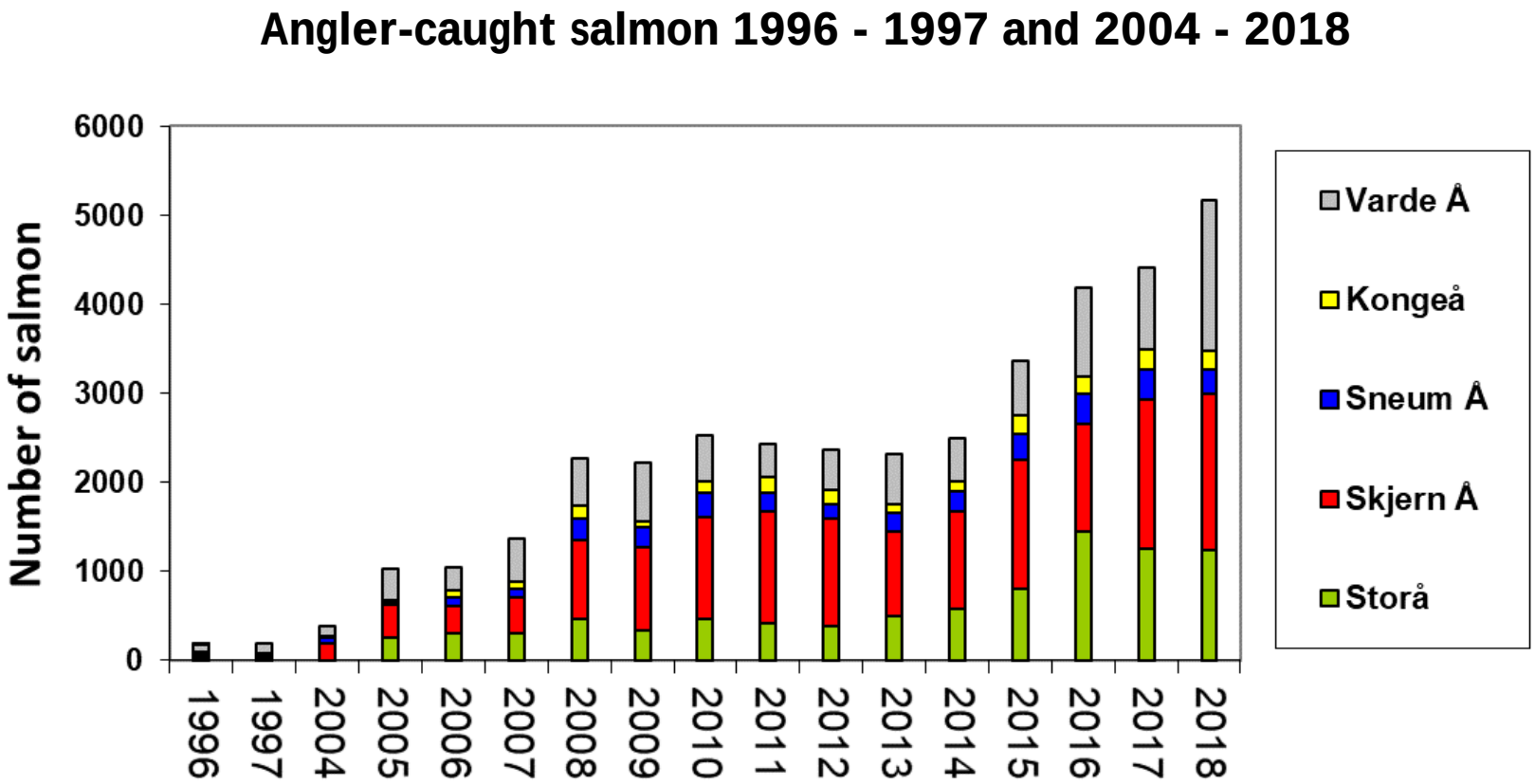


Nielsen, Hansen & Bach (2001)

Research based management is central for successful restoration of fish populations – this has saved the Danish wild salmon:

- River restoration, e.g. removing obstacles.
- Cormorant regulations, both breeding and non-breeding birds
- Regulation of the gear fishery and a quota system in the rivers.
- Assessment programme of the population size – quarto-annual.
- A focused and knowledge based stocking programme.

The Danish salmon populations - development



Annual run of ***wild salmon*** is well over 10,000

…this has taken us here….

In Skjern river alone the salmon brings in 18 million DKK/year

It was estimated that the value of recreational fishing in DK is 2.85 Billion/year

The Danish salmon quota system

Salmon are protected, so no take from rivers unless:

- A quota (number of individuals) is given
- The quota is still ”open”
- All gear restrictions are followed
- All fish caught (including C&R) are reported

Quotas are divided between grilse (<73 cm) and MSW (> 73 cm)

Quotas will not remove more than 10% of the spawning run.

Warm water-restrictions (due to C&R mortality)

C&R-effects and hooking injuries are monitored

Only rivers with public access to the fishing and a common ”salmon guild” can get a quota.

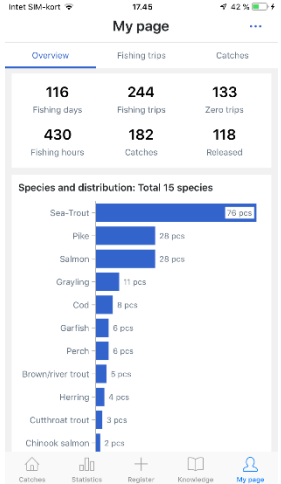
Only fishing with barbless hooks permitted to allow C&R.

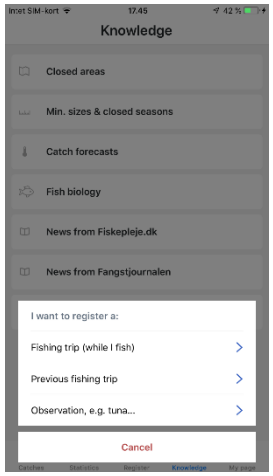
The river associations are responsible for reporting and for detailed rules.

Data collection through “Fangstjournalen”

Digital Citizen Science platform, where Danish anglers can report trips and catches (if any), and inform about data poor fisheries

- Developed by DTU Aqua with support from ministries and angling associations
- Smartphone app and computer platform
- Data is increasingly being used to inform management and research.
- Anglers get various benefits from reporting
- Many collaborations with angling clubs





More info

- Launched in 2016
- Currently 13,000 participants~60,000 Fishing trips reported
- Several scientific publications

Grayling fishery

Grayling is found in the same rivers as salmon (9 in total)

Grayling are targeted mainly with fly-fishing

High abundance in all rivers at suitable stretches

Public availability – not expensive

60 cm grayling from River Gudenå

Before 2010:

Very abundant fish, captures of 10 + fish/day

One month of protection (spawning period)

Legal size limit of 30 cm

No bag limits (unless clubs decide)

Regular river restaurations

No stocking

After 2010:

Very few individuals around

Zero catches from several rivers

Total protection – all year

Monitoring

No fish harvested

More restoration efforts – no effect

Organized cormorant shooting

No stocking

Development of volunteer-based management

Old days: Shooting competitors: Predators, other anglers

1910 - 1940: Same as above, but also maintaining rivers (removing stuff)

1950 – 1990: Catching broodstock, rearing fish and stockings

1990 – present: Initiation of restoration projects

1995 – present: Stop stocking, more restoration, removal of barriers

2010 – present: Regulating cormorants, shooting teams, seek permission

In the examples here, angling and protection of fish goes well hand-in-hand and the fishing is not causing negative impact on the fish populations – quite the contrary.

The salmon fishery has a high fishing pressure and need regulation, the grayling fishing has low/no pressure, but still angling plays a (positive) role.

The involvement of researchers with managers and stakeholders is very important for such systems to work positively.

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ORIGINAL ARTICLE

Fisheries Management and Ecology WILEY

From endangered to sustainable: Multi-faceted management in rivers and coasts improves Atlantic salmon (*Salmo salar*) populations in Denmark

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Abstract

The status of Atlantic salmon, *Salmo salar* L., over the last decades has been of con-