

# Søndre Rena

## Strongly influenced by human activities - yet a recreational jewel

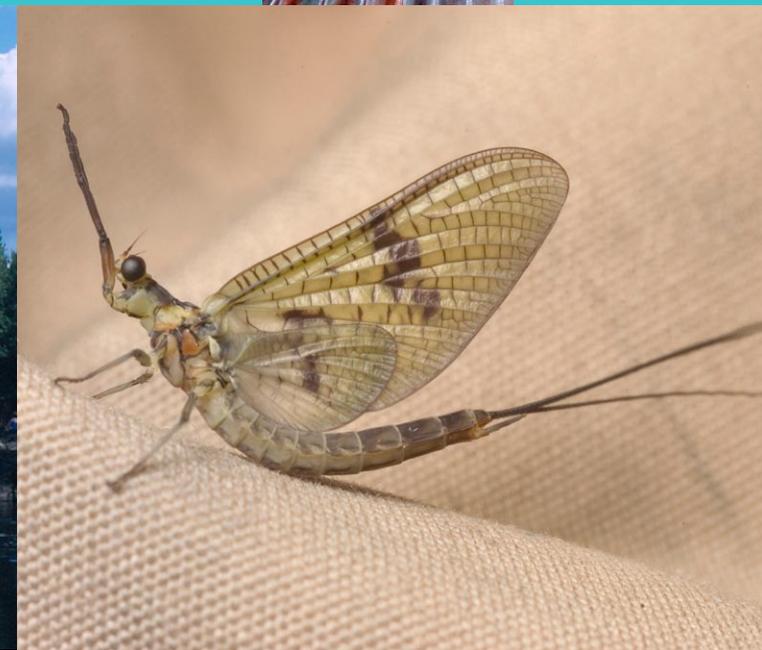
Over the years, the river Søndre Rena has been strongly influenced by human activities. Canalisation, hydropower development, including transfer of water from the river Glomma, have changed and modified Søndre Rena in aspects of river morphology, water temperature, water chemistry and discharge. In addition, future military exercise activities will include boat and vehicle traffic, noise and construction of physical structures.

Is it possible to predict the combined effects from these activities on aquatic flora and fauna? Through several projects on effects of large hydroelectric dams and effects of military activities in Søndre Rena new knowledge has been gained. This pamphlet communicates some of the results from these projects.

*Photos: B. Dervo, NINA and O.T. Ljøstad*



*Photo: O. T. Sandlund, NINA*



*Photo: B. Dervo, NINA*

## Fish migrations in the river Søndre Rena - past and present patterns

Before the hydroelectric development in the river Søndre Rena and the Glomma watercourse, the brown trout and grayling were known for their long distance migrations. The number of migratory fish caught when passing the fish ladders (associated with the hydroelectric dams) has been very modest and there is little exchange of fish between the different fish ladders in the watercourse. When tracking grayling with radio tags, it was found that grayling probably has evolved a more local migratory pattern, using Løpsjøen as an over-wintering refuge and the upstream river for feeding and spawning. In addition to increased mortality when passing through Løpsjøen (due to predatory pike and perch), migratory fish probably will suffer increased mortality when moving downstream through the hydroelectric turbines. Further, the dams will restrain migration even if fish ladders are available. These combined effects have probably put an end to the famous fish migrations in the watercourse.

## Military activity in the river Søndre Rena

Future military training will include traffic in the watercourse with boats and crossing of river sections with armoured cars (tanks). To protect river life, the environmental authorities have restricted army activities on the river to a total 37 days per year.

The armoured cars will cross the river in specially designated sections. This action will affect fish through physical change of the river bed and disturbance through noise and movements of vehicles (boats and armoured cars). Surveys on the effects of disturbance from boats with powerful engines on spawning fish revealed no large-scale movements of spawning brown trout and grayling. However, brown trout tended to reduce movements whereas grayling tended to increase movements during exposure to boat noise. It is uncertain how this disturbance will impact the spawning success of grayling and brown trout.

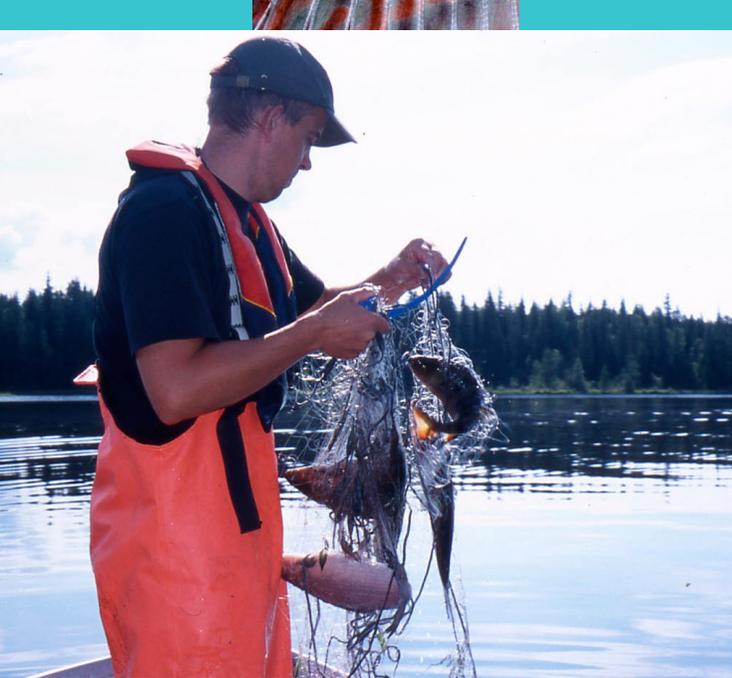


Foto: O. T. Sandlund, NINA

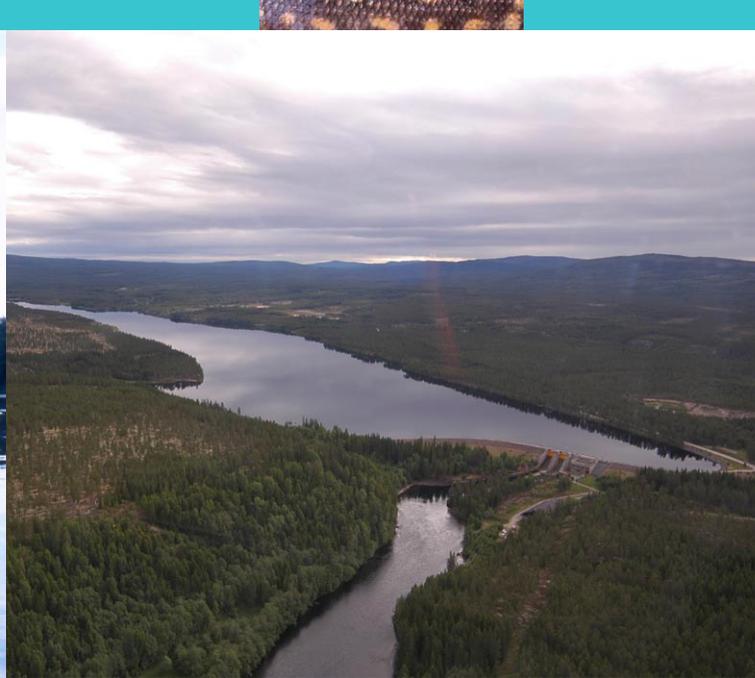


Foto: O. Andersen, NINA

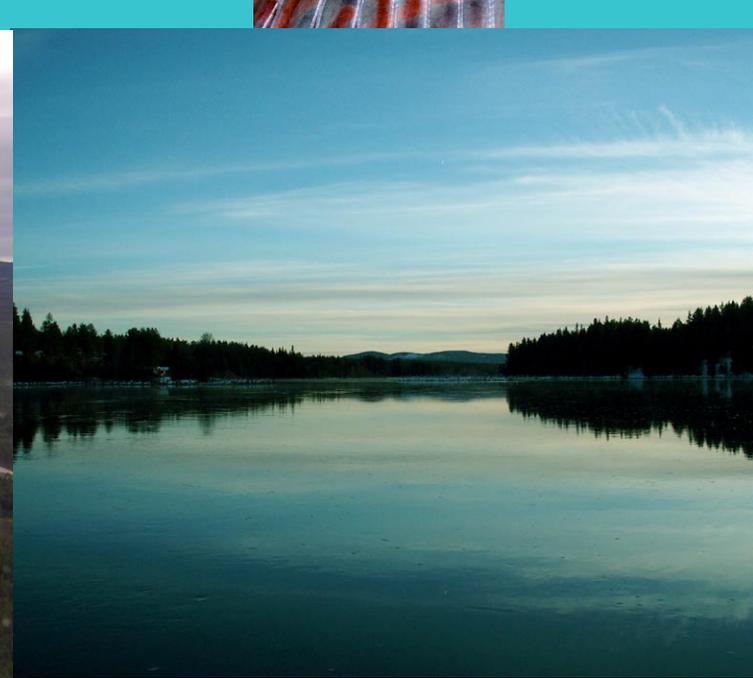


Foto: A. I. Petersen.

## The fish community of Løpsjøen

The change from a fast running river to a shallow productive lake has resulted in profound changes in the fish community in Løpsjøen. The previously predominant grayling and brown trout are replaced by lake-dwelling species like perch, whitefish, roach and pike. Survey catches in 2003 yielded less than 3% of grayling and brown trout. In addition to this local effect, migratory brown trout and grayling probably suffer increased mortality when passing through Løpsjøen, due to the dense populations of predatory pike and perch. This increased mortality will probably impact migratory fish stocks over a larger part of the watercourse.

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## Lake Ecosystem Løpsjøen

Dams and hydroelectric reservoirs will totally change the ecosystem in the river, and may have impacts on a larger geographical scale. On one hand, the dams in the watershed have probably led to the collapse of migratory fish populations. Further, in the hydroelectric reservoir Løpsjøen the predominant fish species have changed from grayling and brown trout to lake-dwelling species. On the other hand Løpsjøen has become a regionally important area for aquatic vegetation and water birds.

Due to relatively fast through-flow, the abundance of small planktonic animals are low in Løpsjøen. However, in northern shallow areas, the abundance of benthic animals is high.

## Facts about the river Søndre Rena and the hydroelectric reservoir Løpsjøen

The river Søndre Rena runs from the outlet of the lake Storsjøen 31 km downstream to the confluence with the river Glomma. In 1971, as a part of the hydroelectric development of the river, about 40 % of the annual discharge from the upper Glomma catchment (up to 55 m<sup>3</sup>s<sup>-1</sup>) was transferred to the Rena watercourse, increasing the catchment area of Søndre Rena from 3 795 to 10 355 km<sup>2</sup>. In addition, two dams were constructed. In 1969, the Storsjø dam changed the natural lake Storsjøen into a hydropower reservoir and in 1971 the Løpet dam created a river reservoir in Søndre Rena. The construction of the Løpet dam resulted in damming up about 5 km of a fast flowing river section, forming a shallow and productive lake. The hydroelectric reservoir Løpsjøen is about 4 km in length with an area of 1.5 km<sup>2</sup> and a maximum depth of 18 m.