

# Unique research ENVIRONMENT

THE KAINUU FISHERIES RESEARCH STATION FOCUSES ON APPLIED EXPERIMENTAL RESEARCH IN FISH AND AQUATIC ECOLOGY AND MANAGEMENT. OUR RESEARCH FACILITIES ARE UNIQUE IN THAT THEY ARE EQUIPPED WITH VERSATILE MICRO- AND MESOSCALE SEMI-NATURAL STREAM CHANNELS AND PONDS, AND A FULL PRODUCTION-SCALE AQUACULTURE UNIT. THE RESEARCH ARENAS HAVE ALSO TELEMETRY- AND CAMERA-BASED MONITORING SYSTEMS. NO OTHER COMPARABLE FACILITY IS AVAILABLE IN THE EUROPEAN UNION. THE STATION IS ADMINISTERED THROUGH THE NATURAL RESOURCES INSTITUTE FINLAND.



The experimental research carried out at the station is based on practical fisheries management or conservation issues. Comprehensive, multiple-scale experimental research at the station and in natural and managed aquatic habitats creates sound applicable knowledge. For example, by applying enriched rearing procedure, a recent innovation developed and tested in the research station, it is possible to produce economically young fish that are more viable and better adapted to natural environmental conditions compared to fish produced by standard rearing methods, contributing to better results in fish stocking and conservation.

#### Wide spectrum of research activities

Kainuu Fisheries Research Station's experimental research produces important knowledge for everyday decision-making in fisheries management and conservation. Studies conducted in the station are crucial in the recovery of threatened fish species populations in waterways

harnessed for hydropower, and to the National Fishway Strategy. The recent research activities have also included the impacts of harvesting-induced selection on fish populations, habitat selection and the preferences of young lotic fish, rehabilitation of degraded stream habitats, the impacts of climate change, and the effects of alien fish species in streams. The Research station also conducts other experimental research in aquatic ecology, freshwater biodiversity, and the functions of stream ecosystems. Lake Oulujärvi, one of the biggest lakes in Finland of great value to Finnish inland fisheries and fish markets, is located near the station. The time-series of fisheries statistics and fish population dynamics collected from Lake Oulujärvi since the start of the 1970s form an indispensable data base to extend the research actions from small-scale artificial and semi-natural arenas in the station to real-scale natural habitats, offering opportunities for studies and solutions of practical fisheries management and conservation topics.

# Joint efforts to promote THE WELL-BEING OF FISH STOCKS

IN THE KAINUU FISHERIES RESEARCH STATION OUTSTANDING RESEARCH IS PERFORMED TO PROMOTE THE CONSERVATION, DIVERSITY AND MANAGEMENT OF FINNISH FISH SPECIES, MANY OF THEM CLASSIFIED AS THREATENED. THE STRENGTH OF THE RESEARCH LIES IN EXTENSIVE CO-OPERATION WITH LEADING RESEARCH TEAMS IN AQUATIC ECOLOGY IN THE FINNISH UNIVERSITIES OF EASTERN FINLAND, OULU, HELSINKI AND JYVÄSKYLÄ.



[www.kfrs.fi](http://www.kfrs.fi)  
[www.luke.fi](http://www.luke.fi)



## Kainuu Fisheries Research Station



# Superb facilities for fish and AQUATIC ECOLOGY RESEARCH

KAINUU FISH HATCHERY, FOUNDED IN 1935 BY VARISJOKI RIVER FLOWING INTO LAKE OULUJÄRVI, WAS MODERNIZED IN THE 1990S AND 2000S INCLUDING NOT ONLY A STATE-OF-THE-ART AQUACULTURE FACILITY BUT ALSO AN OUTSTANDING SELECTION OF AQUARIUMS, POOLS AND STREAM CHANNELS FOR EXPERIMENTATION. THE RESEARCH FACILITY, COVERING AN AREA OF ABOUT 7 HECTARES, HAS BEEN FULLY DEDICATED TO EXPERIMENTAL RESEARCH PURPOSES SINCE 2005. STUDENTS HAVE ALSO MADE THE STATION THEIR OWN THROUGH EXTENSIVE CO-OPERATION INVOLVING FINNISH UNIVERSITIES. IN CONSEQUENCE, THE KAINUU FISHERIES RESEARCH STATION HAS GENERATED THE RESULTS OF NUMEROUS MASTER AND PHD THESES.

## 1. OFFICES

Offices, an excellently equipped laboratory, and other staff premises are located in the main building. A conference room, for up to 30 people, is available for meetings, lectures and seminars in the hub of research! The station's metal and wood workshop and skilled staff ensure that your study designs can be adapted to the facilities and devices in the station if new technical solutions are required.

## 2. INDOOR RESEARCH HALL

A variety of boxes, troughs, aquariums and tanks, from 0.4 to 15 m<sup>2</sup> in size, are optimal for egg, larval and young phase fish studies. 144 indoor tanks enable versatile study designs for fish breeding and rearing experiments or the construction of other test arenas with good repeatability. The hall also boasts other equipment e.g. swimming endurance test devices or small-scale flow-through troughs (fluviariums) equipped with camera or telemetry-antenna arrays for monitoring fish individually. Fish individuals for experimentation are either raised in the station's own aquaculture unit or transported from other Finnish aquaculture stations and natural waterways.

## 3. OUTDOOR FLOW-POOL PONDS

A total of 40 outdoor ponds with a flow-pool structure are located at the station. 24 of them have a 10 m long stream section with stone bed at the

outer edge and in the middle of the pond there is a pool section (35m<sup>2</sup> in size). There are 16 bigger ponds with a 30 m long stream section and 45 m<sup>2</sup> pond in the middle, respectively. The ponds have a variety of solutions for adjusting incoming flow, water depth, and bed structure, and for incorporating automated fish monitoring systems. The ponds support benthic invertebrate communities, thus enabling a natural food supply. The flow-pool ponds are excellent for study designs that need adjacent near-natural stream and pool conditions.

## 4. OUTDOOR REARING PONDS

Our concrete outdoor rearing ponds enable commercially production-scale experiments under controlled conditions. The high number of ponds makes it possible to highly replicate treatments: there are thirty-six 50m<sup>2</sup> ponds and eight 75m<sup>2</sup> ponds. These ponds enabled the production-scale development of the enriched rearing system. The ponds can also be used in many other ways; such as dividing them into several, separate smaller test environments.

## 5. OUTDOOR SEMI-NATURAL PONDS

Six natural gravel-bed ponds of 400 m<sup>2</sup> in size and a maximum water depth of 2 m are available for studies focusing on lentic species. These ponds can maintain fish populations all the year round. A clear indication of the ponds' qualified test site potential is the re-

search conducted on the susceptibility of fish individuals to harvesting, and the effects of harvesting-induced selection on fish populations.

## 6. SEMI-NATURAL STREAM CHANNELS

The six 30 m long and 1.5 m wide semi-natural stream channels have an adjustable bed (from sand to boulders) and incoming flow valve regulation (maximum inflow per channel, 70 l s<sup>-1</sup>). The set-up has an efficient freely adjustable monitoring system (up to 72 RFID-tag antennas connected to control/reader units, 18 black-white underwater video-cameras + recording unit). Semi-natural stream channels are an outstanding arena for lotic fish ecology studies, on e.g. young lotic fish habitat selection, competition and preference, rehabilitation of degraded stream habitats, impacts of climate change and alien fish species.

## 7. ACCOMODATION

Long and short-term accommodation is provided for up to 14 people in two apartments in a semi-detached building by River Varisjoki and two guest rooms in the main building.

## 8. FISH MONITORING DEVICES

Radiotelemetry technology with antenna and software applications ([www.pitdata.net](http://www.pitdata.net)) provides a variety of methods to monitor, sample and analyze RFID-tagged (PIT (Passive Integrated Transponder)-tag) fish. Fish behavior

can also be monitored via video cameras placed above or under the water.

## 9. WATER INFLOW CAPACITY

The temperature or oxygen levels of incoming water (maximum flow 750 l s<sup>-1</sup>) to the station can be regulated with intake from Lake Kivesjärvi's surface and/or deep water column. It is possible to add oxygen to, heat or cool the water of the indoor research facilities. 5 l s<sup>-1</sup> of spring water is also available.

## 10. RIVER VARISJOKI

Kainuu Fisheries Research Station stands by River Varisjoki, a free-flowing river of great natural beauty which after several sections of rapids, flows into Lake Oulujärvi, about 3 km away. The River Varisjoki river system is the last spawning site of Lake Oulujärvi's threatened adfluvial brown trout, the subject of much research.

