

EAA 2025

BELGRADE VIRTUAL

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Summary of
session #157
Fishing
techniques in
river and
freshwater
environments of
Northern Europe

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Introduction

The session *Fishing techniques in river and freshwater environments of Northern Europe* brings together case studies from Finland, Lithuania, and Norway and a Europe-wide review to show that northern freshwater and salmon fisheries were long-lived, place-based, and technically sophisticated: exceptional organics at Järvensuo 1 reveal millennia of net fishing with bast cordage, bark floats, pebble sinkers, and sheet-bend knots; re-dating and targeted analyses at Šarnelė 1–2 refine wetland chronologies and document mixed economies; a reassessment of harpoons demonstrates earlier, wider spread tied to large-fish hunting and exchange networks; and a geomorphology–archaeology synthesis along Suldalslågen maps stone-built traps that organized regulated fisheries at predictable chokepoints. Shared funnelling- design logics link portable gear and fixed installations, and convergent methods (AMS dating, wood/fibre ID, micro-CT, 3D scanning, systematic survey) reconstruct practice rather than isolated finds. The session concludes that productive locations persisted even as methods shifted, cultural transmission was selective and local, and expanded dating plus regional prospection are key to quantifying scale, timing, and variability across northern freshwater systems.

Session	#157 Fishing techniques in river and freshwater environments of Northern Europe
Theme	5. Finding the way! Archaeological sciences and opening new research perspectives
Format	Discussion session (virtual)
Author	Kvæstad, Christopher Fredrik (Norway) - Stavanger maritime museum
Co-Author	Koivisto, Satu Mirjami (Denmark) - Museum Lolland - Falster
Date and time	03.09.2025, 08:30-10:30
Presenting authors (affiliation)	Satu Koivisto (Museum Lolland-Falster, University of Turku) Svein Nielsen (Stavanger maritime museum) Tomas Rimkus (Vilnius Academy of Arts, Klaipėda University) Christopher F. Kvæstad (Stavanger maritime museum)

Figure 1: Session details

Session abstract

#157

Fishing techniques in river and freshwater environments of northern Europe

Theme:

5. Finding the way! Archaeological sciences and opening new research perspectives

Author:

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Co-Author(s):

Koivisto, Satu Mirjami (Denmark) - Museum Lolland - Falster

This session will delve into traditional and historical fishing techniques specific to the freshwater and riverine environments of Northern Europe, using archaeological evidence and ethnographic records to illustrate these practices. We invite papers that examine diverse methods of fish trapping, netting, and line fishing, exploring how these techniques reflect technological advancements, dietary practices, and cultural values across various regions. Emphasis will be placed on identifying regional and chronological variations, dating techniques, and embedding these practices within broader subsistence strategies and environmental adaptations. Our goal is to foster a comprehensive understanding of fishing's historical importance, particularly how techniques evolved to adapt to the unique freshwater ecosystems across Northern Europe. Additionally, this session will consider how fishing practices shaped local economies, reinforced cultural identities, and promoted sustainable resource use. Interdisciplinary contributions that integrate perspectives from archaeology, anthropology, and environmental science are encouraged to enrich this exploration and expand our understanding of Northern European freshwater fishing traditions.

Keywords:

Fish traps and netting, Prehistoric and historical fishing practices, Traditional fishing techniques, Northern Europe

Session programme and schedule

Time	Item
08:30 – 08:40	Introduction – Christopher F. Kvæstad
08:45 – 09:00	#263 Deep Roots of Lake Fishing in the North – Satu Koivisto
09:00 – 09:05	Technical break & Q&A
09:05 – 09:20	#27 More Than Fish – Svein Nielsen
09:20 – 09:30	Technical break & Q&A
09:30 – 09:45	Thematic discussion
09:45 – 10:00	#1019 Fishing History in Lake Ertenis – Tomas Rimkus
10:00 – 10:05	Technical break & Q&A
10:05 – 10:20	#1875 Stone-Built Fishing Weirs in Suldalslågen – Christopher F. Kvæstad
10:20 – 10:30	Closing discussion & summary

Figure 2: Session programme

Satu Koivisto - Deep roots of lake fishing in the north: Stone Age freshwater fishing techniques and the use of organic raw materials

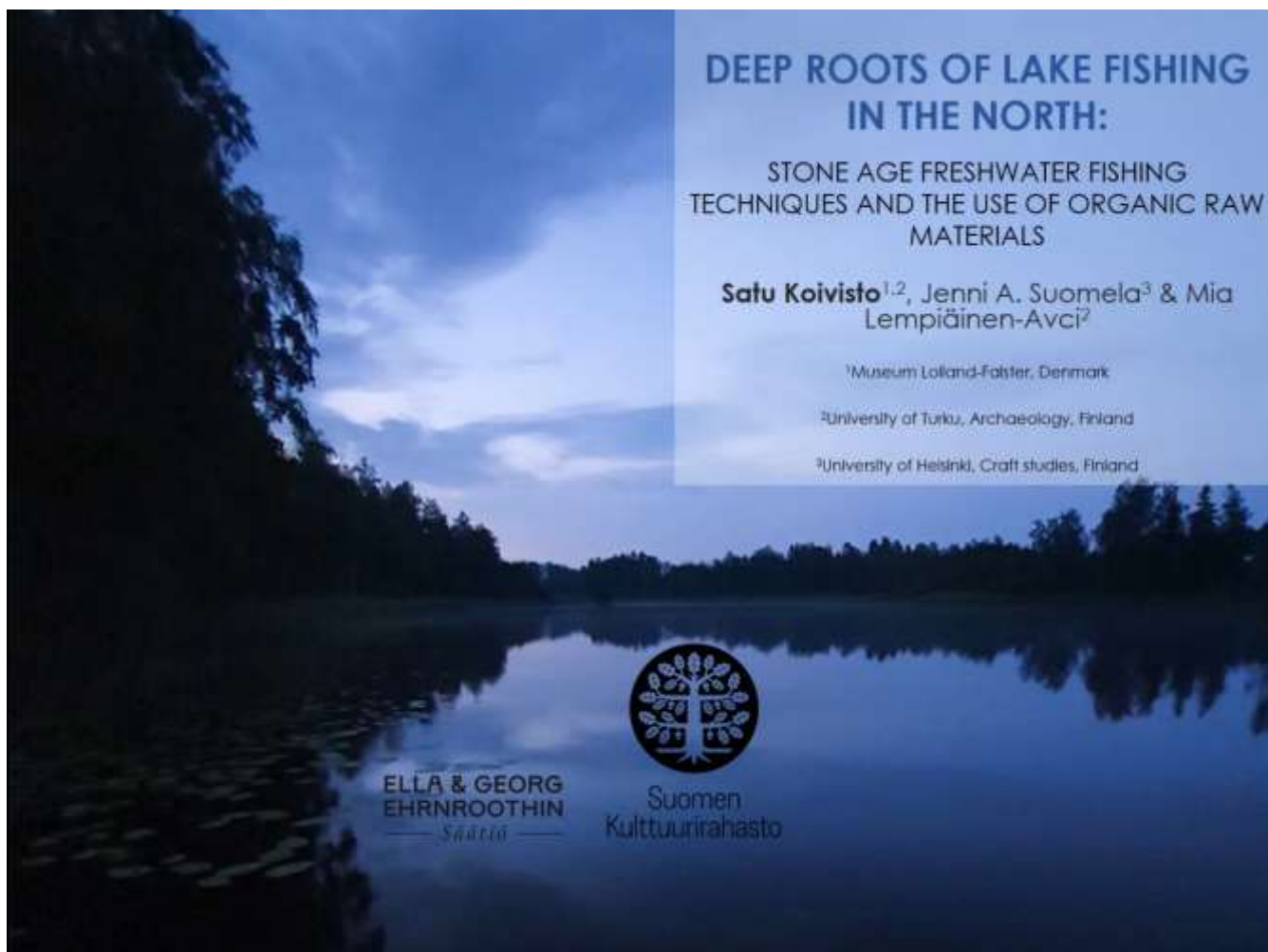


Figure 3: Front page Koivisto

The talk presents an ongoing, multidisciplinary study of Stone Age organic fishing gear from a waterlogged site in southwest Finland, asking what these materials reveal about early lake-fishing practices and technological know-how among northern hunter-fisher-gatherers.

The case study is Järvensuo 1, a peatified lakeshore occupied ca. 6000–2000 cal BCE. Discovered during peat drainage in the 1950s, notably with a wooden paddle, the site saw test work in 1985 and renewed investigations in 2020–2021. Over 70% of finds are organics—cordage and net knots, bark floats, wooden tools and structures, and carved figurines—offering an unusually detailed window on lake-based lifeways.

The project combines macroscopic and microscopic wood and fibre identification, direct radiocarbon dating of cordage, floats and posts, 3D scanning, and micro-CT of knot structures. Archaeobotany reconstructs plant use, vegetation, and raw-material availability, while comparative archaeological and ethnographic analysis supports functional and technological interpretations.

Pine and birch dominate the raw materials: pine was used for split laths, carved tools, stakes, and pierced bark net floats; birch for posts and stakes, rolled bark floats, sheathing of sinker pebbles, and birch-bark pitch adhesive. Cordage derives from tree bast, such as lime, willow, and poplar. Material selection reflects deep ecological knowledge and cultural aesthetics, with carefully finished pebble sinkers exceeding purely functional needs.

Micro-CT analysis shows the sheet-bend as the principal netting knot, with some overhand knots; the smallest knots are about 2 mm in diameter. Cordage was spliced by twisting one or two bast strands, and species identifications are underway using reference collections and light/polarised microscopy.

Evidence indicates rectangular nets set vertically in shallow water, fixed to stakes or used as drift nets, equipped with bark floats and pebble sinkers. Direct dates place a pine-bark float in the Late Neolithic and a cordage knot at the Mesolithic–Neolithic transition, implying more than 2,000 years of net use. Fragmentary pine-lath structures likely formed guiding fences or chambers or worked with nets; posts date passive wooden-structure fishing from Early to Final Neolithic, with strong ethnographic analogues in small, shallow lakes.

Woodworking techniques such as faceting, dimpling, hewing, and grooving, bast extraction including retting and fibre preparation, as well as knotting and net-making, required complex, learned skills, large quantities of cordage, planning, and intergenerational knowledge transfer.

Despite small excavations, Järvensuo 1 yields one of Boreal Fennoscandia's richest organic records, exposing sophisticated, effective, sustainable, and culturally embedded organic technologies. Ethnographic parallels suggest functional plant categorisation by use and products. The team continues analysis and publication, and advocates for wetland archaeology as key to understanding northern European prehistory.

Svein Nielsen - More than fish: On the social life of a Chalcolithic fishing tool



Figure 4: Front page Nielsen

The talk reviews the emergence, spread, and social meaning of Neolithic–Chalcolithic toggling (conical/socketed) harpoons in Europe using new direct radiocarbon dates and contextual synthesis. These harpoons have a conical body with one or more drilled holes, a hollow socket, and a distal spur. The earliest European occurrences appear toward the end of tell-settlements in Southeast Europe, with an eastward spread around 4500 BC across the Danube–Black Sea region and a westward reappearance around 4000 BC in the eastern Alps. Direct dates indicate arrival around 3500 BC in northern Germany, Lithuania, and Norway, and a related rod-harpoon appears in eastern Sweden by about 3000 BC. Finds come chiefly from hunter-fisher-gatherer settlements and graves located near—but outside—farming communities of the megalithic tradition, overlapping with exchange networks that circulated copper, stone scepters, and battle-axes. In coastal Scandinavia, faunal remains (including large pelagic fish and marine mammals) coincide with the harpoon technology and signal a subsistence focus on large fish, a practice that wanes with the Corded Ware/Battle Axe horizon.

Cultural transmission shows low to moderate variation within sites but higher variation between groups while retaining the toggling template; the Norwegian series likely spans roughly 500–700 years, indicating slow evolutionary change. Current understanding is limited by few direct dates, and targeted dating of curated collections would refine both chronology and routes. Overall, toggling harpoons appear earlier and spread more widely than previously assumed, reaching parts of northern Europe around 3500 BC via exchange zones at the margins of farming communities, linked to specialized aquatic strategies and locally varied adoption.

Tomas Rimkus - Fishing history in Lake Ertenis, northwestern Lithuania



Figure 5: Front page Rimkus

The talk synthesizes new and legacy research on fishing and broader subsistence activity around Lake Ertenis in northwest Lithuania, focusing on the Šarnelė 1 and newly found Šarnelė 2 sites to reassess chronology, fishing gear, and faunal evidence in a drained, wetland-rich glacial landscape.

Šarnelė 1 was excavated in 1973 and 1981–1982, yielding exceptional organic preservation. Earlier ideas about a pile-dwelling and early husbandry or agriculture are now rejected or heavily revised. Only three legacy radiocarbon dates existed and appeared too young, motivating a comprehensive re-dating and technological review.

A 2024 project on hunter-gatherer adaptations in western Lithuanian wetlands selected Lake Ertenis as a key case study. Since 2023, work has combined small-scale excavation, intensive sampling including wet screening, and targeted analyses of osseous, wooden, and stone artifacts.

Fishing-related finds at Šarnelė 1 include two barbed osseous point fragments, multiple pine-bark floats, and stone net sinkers, some of which show edge-chamfering or “capping” to secure organic bindings. New excavations recovered additional modified stones likely used as sinkers, one bark float, and a tiny worked wooden fragment of uncertain function.

Of about 320 wooden stakes recorded historically, 11 preserved museum pieces were sampled. Nearly half were identified as European ash, with others in hazel or spruce, while some could not be determined due to preservation issues. AMS dates cluster in the 3rd–2nd millennia BC, with examples extending into the Late Bronze Age and even the Early Roman period. A nearby hazel stake was independently dated to the Early Bronze Age.

Faunal evidence from Šarnelè 1 (2023–2025) shows large terrestrial mammals dominate, while fish remains are present but modest, currently represented by European pike and composing around 11% of the assemblage. Loss of some 20th-century zooarchaeological materials constrains comparisons.

Šarnelè 2, discovered in 2024, produced 67 animal bones, one human bone, coarse pottery including food-crusted sherds, and a Corded Ware fragment. Fauna again was dominated by terrestrial mammals, with only two pike bones. One residue sample showed a strong freshwater signal, consistent with earlier work in the area that indicated freshwater resource processing on porous pottery.

The combined evidence indicates multi-phase activity from the Final Paleolithic and Mesolithic through the Sub-Neolithic into the Early Bronze Age, with sporadic use in later periods. The most intensive human impacts occurred between the Late Mesolithic and Early Bronze Age.

Lake Ertainis hosted mixed economies in a wetland setting. Fishing is documented by floats, sinkers, barbed points, pike bones, and freshwater residues, but terrestrial hunting was a major subsistence component. The wooden stakes likely relate to water-edge installations, though their exact functions and temporal phasing require continued dating and integration.

The scale and timing of fishing remain under refinement due to restricted exposures, missing legacy fauna, and ongoing laboratory work. Integration of 2025 materials and expanded AMS dating is expected to clarify the chronological distribution of fishing gear and fish remains.

Christopher F. Kvæstad - Stone-Built Fishing Weirs in Suldalslågen, Southwest Norway



Figure 6: Front page Kvæstad

The talk synthesizes geomorphology, archaeology, and early written sources to explain how Suldalslågen's broad, slow river created predictable salmon-fishing spots and how stone-built weirs, known as sløe downstream and laksekjær upstream, structured long-term fishing practices and regulation.

Suldal, Rogaland, is the setting. The c. 20 km river drops only about 67 m from Suldalsvatnet to the sea, with falls concentrated at Juvet and Sandsfossen. These chokepoints shaped fish movements and the placement of installations.

Archaeological surveys mapped 31 sites: nine downstream-facing sløe and one upstream-facing laksekjær in the river, plus 13 stone spurs, one combined spur and boat landing, five landings, and one net cairn along the banks. Traps cluster upstream of Juve and Sandsfossen, while spurs and landings follow flat margins, showing systematic reuse of slow-flow stretches.

Installations lie at or just below low-water level and include guiding walls, stone spurs, recessed boat slips, net-anchoring cairns, and composite traps forming shallow basins. Stones of 0.2–0.9 m were dry-laid with edging and infill; several structures show erosion or modern alteration.

Sløe worked by forcing fish into a slatted ramp, draining water and sliding fish into a chest or pond. Laksekjær used the opposite principle: fences led fish to an artificial fall where salmon leapt into a container they could not escape.

The Krune sløe survives as a 22.5 × 5 m wall guiding fish into a 6 × 12 m pool, with a second wall continuing ~55 m. Timber and organics are gone, but it likely included a filtering gate and live-holding basin. Functionally active at high water, it targeted downstream-migrating, post-spawning salmon.

Written evidence from 1283 shows a valuable, tightly regulated fishery, especially at Sandsfossen. Medieval rights tied to Flaxtad farm were contested between Halsner Abbey and Stavanger Cathedral; a 1306 ruling in favor of the Cathedral sparked conflict and later royal enforcement. After the Reformation, rights shifted to the Crown. In 1884–1924, Archer consolidated leases and replaced fixed gear with sport fishing, later formalized under rod-only rules.

Fishing left a clear footprint—sløe, laksekjær, and spurs concentrated above Juvet and Sandsfossen, while estuary beaches formed netting grounds. Iron Age settlement clustered on farmland with little overlap with river installations, suggesting long-term reuse of fishing spots.

Suldalslågen's morphology created a predictable fishing landscape exploited from prehistory to modern times. Methods changed, but locations and logic persisted. The fishery was likely regulated before medieval records, and more fieldwork is needed to assess its full extent and chronology.

Synthesis and Outlook

Across the four papers, a consistent picture emerges of freshwater and salmon fishing in Northern Europe as long-lived, place-based, and technically sophisticated. All contributions show communities matching fishing methods to local hydrology and ecology, investing in durable know-how (woodworking, cordage, knotting, installation building), and repeatedly returning to productive locations over centuries or millennia. Each study also combines multiple lines of evidence—material culture, dating, environmental data, and landscape analysis—to reconstruct practice rather than isolated finds.

Stakes and other fixed points recur in lakes and rivers alike; portable gear (nets, floats, harpoons) and fixed installations (weirs, spurs, landings) operate on the same principles at different scales. Socially, the studies meet in showing fisheries embedded in wider networks—through exchange and technological uptake at the margins of farming societies, and through formal regulation once predictable hotspots became highly valued.

Key differences reflect environment, target species, material choices, and social regimes. Lakes in Finland and Lithuania emphasize nets, bark floats, and modest fish bone assemblages within mixed economies, whereas the Norwegian river case highlights large, stone-built traps and a documented legal framework. The harpoon study isolates a specialized, portable technology linked to large-fish hunting and long-range transmission, contrasting with the heavy, in-channel architecture of Suldalslågen. Preservation biases also diverge: organics dominate the lake sites; stone structures dominate the river.

Taken together, the papers support several conclusions: freshwater fishing was central—not peripheral—to subsistence and identity; technologies were adaptive, efficient, and often sustainable; productive places persisted even as methods shifted (from fixed traps to rods); and cultural transmission was selective and local rather than a single top-down diffusion. Methodologically, targeted radiocarbon dating, fine-grained materials analysis, and systematic river-landscape survey are decisive for refining chronologies and mapping spread. Future work should expand dating of curated collections and regional prospection for unrecorded installations to quantify the true scale, timing, and variability of Northern Europe's freshwater fisheries.