

## The point of no return – social dimensions of losing salmon in two northern rivers

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**Abstract:** The construction of hydropower plants in Finland's Kemijoki and Iijoki rivers was a death blow to salmon migration in both stretches of water. Fishing migratory fish was an important source of livelihood to people living along and near the Kemijoki and Iijoki and one of the main reasons that once drew permanent settlement to the riversides. In this article we examine the meanings of migratory fish from the perspective of local people. We ask how local people have experienced the loss of salmon and how they have adapted to their new home environment that has radically changed due to alteration of the river. Besides the nutritional meaning, we have found many other aspects of migratory fish. Migratory fish and their annual rhythm belonged to the rivers' landscapes; they had aesthetic importance as well as a strong social aspect. Losing salmon has been a catastrophe that local people still, after 60 years, find hard to accept.

### Introduction

Migratory fish have had a major role in the history and development of societies and cultures in the Circumpolar North. The annual rhythm of villages was adapted to salmon migration, specific professions and skills were developed and buildings constructed to serve salmon fishing. Salmon shaped people's ways of life and their thinking. The construction of human-controlled watercourses to meet the need for hydro-electric power during the last 60 years has substantially changed freshwater ecosystems, as well as the socio-ecological and cultural dynamics of many local communities. Dam construction in northern Finland quickly led to the loss of migratory fish.

In this article we consider the significance and many meanings of salmon in order to understand the loss of salmon for local

people. We have conducted thematic interviews among old salmon fishermen living by the Kemijoki and Iijoki rivers who have experienced dramatic changes in their environment. Their stories about salmon fishing go back to the 1920s. The loss of salmon has not yet been studied from the local people's point of view and our research seeks to understand the variety of meanings of the fish described, and how people reacted and adapted to the loss of salmon in the changing conditions of a local social-ecological system.

### Research context and the Kemijoki and Iijoki rivers

When the harnessing of northern rivers in Finland started in the 1940s, the production of electricity was generally seen as a common, nationwide goal when the country was

suffering from a severe shortage of energy. Electricity was needed in the post-war reconstruction and war indemnity work. Those who endured losses had neither any chance to challenge this goal nor any way to articulate their interests and express criticism in the prevailing economic and political situation. Sixty years ago concern for social and environmental changes in Finland was minor; the main idea was that losses could be casually compensated by money. In the worst cases people who had no experience of monetary calculations lost both their homes and their livelihoods, as in the cases of the Lokka and Porttipahta reservoirs in the Kemijoki (Järvikoski 1979; Luostarinen 1982).

On the other hand, the building of hydroelectric plants offered employment for many local people, even though many of the workers came from previous construction sites, such as the hydropower plants in Oulujoki. In the building process the infrastructure developed and distances were shortened by the construction of new bridges along the dams. The construction work hastened the modernisation of northern Finland (Järvikoski 1979).

The planning and building of hydroelectric plants took place at the same time as other significant events in northern Finland. The rise of the forestry industry, the Second World War, post-war reconstruction and structural changes in society framed the electrification of northern rivers. Energy was crucial to the construction of a modern society, but modernisation, including technological and economic development, caused unemployment in rural areas (Kerckelä 2003). In the 1960s, due to unemployment the younger generation started to

migrate to Sweden or cities in southern Finland in order to gain a better standard of living (Granberg 1992). Compared to other European countries, the transformation from an agrarian society to a service- and information-society happened unusually fast in Finland.

The Kemijoki was one of the most significant salmon rivers in Europe and the Iijoki one of the most important in Finland (Vilkuna 1975; Hoffman 1993) (Figure 1). Harnessing the Kemijoki (the river is 550 km long and its basin covers an area of 51 000 km<sup>2</sup>) was one of the largest hydropower construction projects in Europe. Construction started in 1948 with the building of the Isohaara dam and power plant at the mouth of the Kemijoki. Since then a total of 17 large hydroelectric plants and two large water reservoirs have been constructed (Suopajärvi 2001; Kemijoki Oy 2012). Harnessing the Iijoki (which has a length of 370 km and a basin area of 14 191 km<sup>2</sup>) started with the construction of the Pahkakoski power plant in 1959. In 1971 the last of the five power plants, at Raasakka, was completed (Rusanen 1989). Nothing whatsoever was learned from the experiences of construction on the Kemijoki and Oulujoki rivers, at least not from the viewpoint of the fishing industry. Fish passages were neither planned, nor built.

Both rivers run across and through sparsely populated areas. Unemployment, migration, and gradually weakening services are the biggest challenges facing the local municipalities responsible for these areas today. Salmon are still expected to produce wealth in the river areas; this is one of the reasons the inhabitants of these

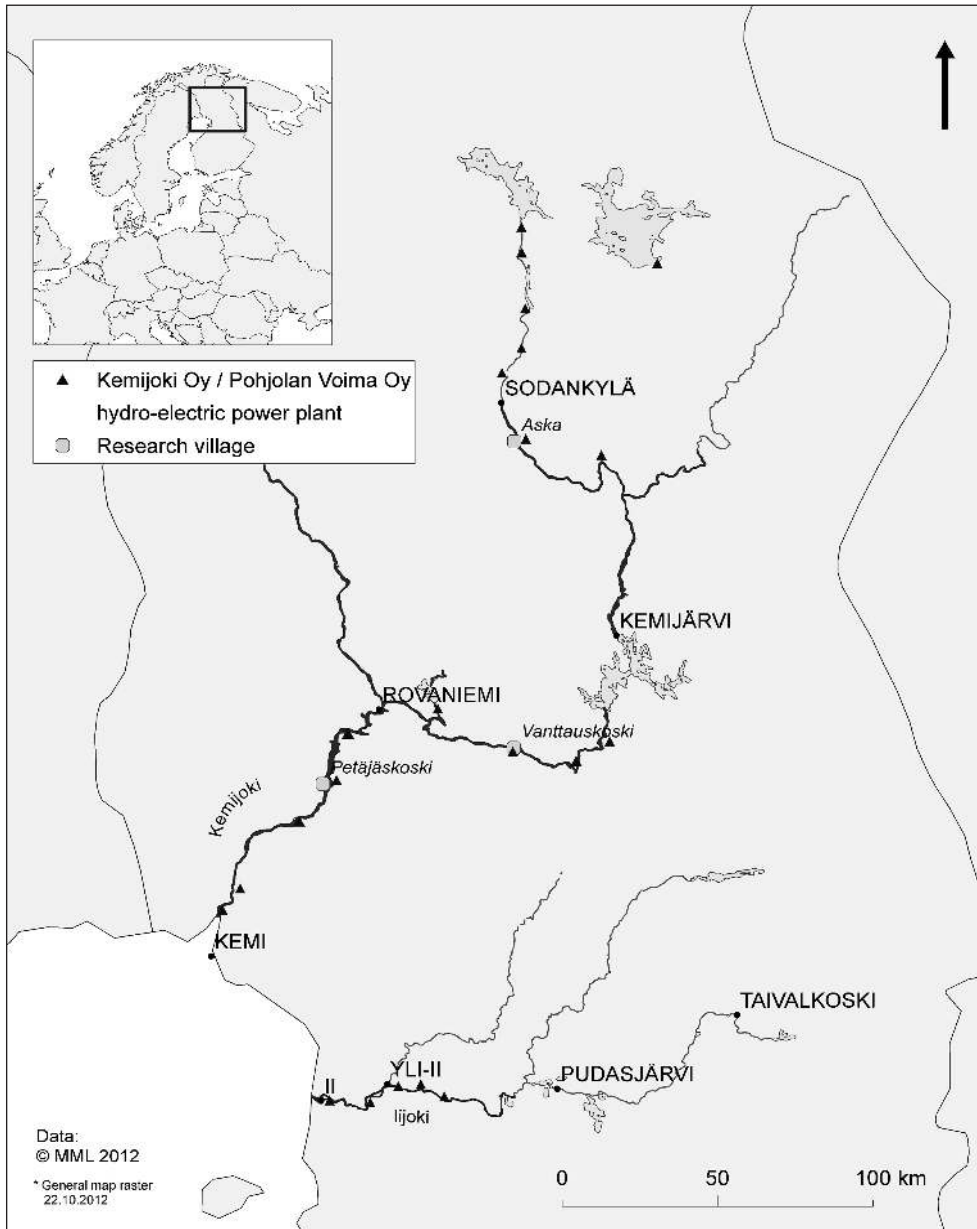


Figure 1. The Kemijoki and Iijoki River and the locations of the hydro-electric power plants (Map: Juhani Päivärinta).

places struggle in their promotion of the improvement of the salmon stocks and for developing infrastructure around fishing tourism (Haapasaaari & Karjalainen 2010).

## Research method and materials

Data for this study were collected in 2009. Thematic interviews were conducted among 23 elderly salmon fishermen living alongside the Kemijoki and Iijoki rivers. The interview material collected along the Iijoki is part of a wider Social Impact Assessment (SIA) completed for a river restoration project entitled 'Migratory Fish Return to the River Ii' (Karjalainen *et al.* 2011). Along the Kemijoki the interviewees were found by asking the municipalities' home help service for contacts. We also used snowball sampling (Metsämuuronen 2006). The interviews were recorded on audiotape and then transcribed, and the analysis was based on content analysis (Neuendorf 2002). NVivo was used as a tool to analyze the topics in the data (Bazeley 2007).

Thirteen of the interviewees lived beside the river Kemijoki, 10 beside the Iijoki. Six were female, 17 male. The interviewees were elderly people aged between 60 and 91 years old: the interviews were carried out 60 years after the building of the Isohaara dam, and 50 years after the building of the Pahkakoski dam. The interviewees were asked to recount their experiences concerning fishing migratory fish, the activities that fishing and the use of fish included and, in the end, about the changes they had experienced in their environment.

## Findings

Fishing migratory fish (Figure 2) was one of the major factors that attracted permanent Finnish settlement to northern riversides. Salmon was the most significant fish, even though whitefish was also valued. The resource was substantial: salmon fishing was an important source of living downstream, but also had much significance upriver. Fishing migratory fish was an important part of the annual rhythm of earning one's keep. Salmon started the climb to their breeding areas annually in June, and the fishing continued until autumn with the fishing of migratory whitefish. The catch was prepared for food, sold or stored for later use. Salting or freezing the catch made it available year round.

The intensity of fishing migratory fish varied in different parts of the Kemijoki and the Iijoki. According to the interviewees migratory fish also had significance as livelihood upriver, even though much less than in the lower parts of the river. At the lower course of these rivers fishing was often the main source of livelihood and more organized with weir fishing and weir co-operatives than at the mid-course and upper-course (Vilkuna 1975).

Salmon and whitefish were fished by those who lived near the river bank and had an interest in fishing. Salmon fishing was a valuable and productive source of living, but it was also demanding. It required wide knowledge and significant fishing skills, as well as organization skills, co-operation and effort (Vilkuna 1975). Building weirs, seines and traps required special knowledge and skills. The fishing style used depended on the amount and behaviour of the salmon, as



Figure 2. Fishermen in Taivalkoski, Iijoki. (Photo: Veijo Jussila)

well as the features of the river at the fishing ground. The current and depth of water, and the river bed of the fishing ground, determined which type of trap was used. Different methods were used in rapids and in quiet waters.

### Variety of meanings of migratory fish

Before the hydropower construction the local residents obtained their livelihoods from different sources. In the 1950s Finland was still an agrarian society, and the settlement policy had increased the resettlement plots and strengthened the agrarian structures of society. A land acquisition law was promulgated in 1945, and it helped to resettle immigrants and veterans after the Second World War (Kietäväinen 2009). Most interviewees had worked in agriculture and forestry, but also always made their living

from other sources, like fishing, hunting, berry-picking and so on.

*“[I] can still remember, right till the end, when there was still fish in the Kemijoki River, that even during the last autumn we went out fishing, even torch-fishing, and caught fish. During the best nights, after dusk, we might have caught about ten fish, about nine to ten kilos worth on average. That really did help the food situation of the household.”*  
– 80-year old man, Lower Kemijoki.

The most significant meaning of salmon to the locals was nutritional and big salmon, up to and even over 20 kilograms, were an important source. The fish were preserved with salt and ice. Going towards the upper reaches of the rivers, the amount of migratory fish, and also its significance, decreased. At the mid-course of the rivers

salmon fishing was still described as “half a livelihood” and hard-working fishermen and their families in upper parts of the river got a good addition to their dinner tables.

Households in rural areas were mostly self-sufficient, thus salmon and whitefish were almost the sole sources of spending money. Salmon was valuable, and proceeds from the sale of the catch could bring the fishermen good money. Interviewees along the Iijoki talked about youngsters who were able to earn enough money for a moped with just a few fishing trips.

Besides the economic importance of migratory fish, salmon and whitefish formed an important factor in the cultural and human capital of the area. Migratory fish and their annual rhythm belonged to the river landscape. It was an important builder of local and collective identity, as well as a significant part of the fishermen’s personal identities. Local people had grown up inside a salmon fishing culture, and the traditions passed on from one generation to another had impacted on their growth and sense of belonging (see Krause, this volume). According to Relph (1976) the identity of place is based on the physical setting of the place, activities, situations and events taking place and on individual and group meanings created through people’s experiences and intentions in regard to the place. Rose (1995) adds that the meanings given to a place may be so strong that they become a central part of the identity of the people experiencing them. Identity refers to lived experiences and all the subjective feelings associated with everyday consciousness, but it also suggests that such experiences and feelings are embedded in wider sets of social relations.

Activities concerned with fishing made the river environment familiar, while through fishing itself one learned much about the features of the river. Fishing activities strengthened the “insiderness” of a riverman: the degree of attachment, involvement, and concern that a person has for a particular place (Relph 1976).

A person’s identity and idea of self are built in relation to one’s relationship to a place and to acting in that place (Malpas 1999). Senses of place may be very personal, but they are not entirely the result of one individual’s feelings and experiences. Such feelings and meanings are shaped by the relevant social, cultural and economic circumstances. Migratory fish were also an important part of the family histories of many interviewees. There was a strong social aspect in salmon fishing, and seine fishing in particular was connected with the communal and social aspect. The fishing culture shaped the personal as well as the local identities of rivermen: who I am and where I belong. The chain of generations was perceived as a significant shaper of these identities: fishing was quickly taught to small children and they, in their turn, passed on the tradition to their children. Fishing was seen as a bloodline, and continuing salmon fishing was often considered as a matter of honour.

*“[I]ndeed, my father was a fisherman, and he took me along to the river from a very early age. Since I started fishing as a little boy, fishing for all kinds of fish in the river, of course it went all the way to my blood, you couldn’t help it.”*  
– 80-year old man, Lower Kemijoki.

Migratory fish also had aesthetic value. A salmon jumping in the rapids was a magnificent sight. A wanderer on the river bank appreciated the beauty and the diversity of the river environment, but it seems that the value of the scenery was not always recognized before it was too late. A person's relationship with a place is both complex and so obvious that it is often unconsidered. Places live with us and frequently become prominent only when something unusual occurs (Malpas 1999). Torch-fishing is remembered by the interviewees as an exciting, phenomenal fishing experience. The combination of aesthetics of a darkling autumn night, the beauty of water and fire as well as the excitement of getting caught – torch fishing was forbidden – made many interviewees talk about torch-fishing as an unforgettable memory.

Fishing included excitement that is also familiar and much emphasised in fishing today. The thrill was maybe greater, because salmon were especially big. They were considered strong and wise animals, almost as equals. If one did not have a fishing permit, the thrill rose not only from the competition with the fish, but also with the fishing supervisors. Fish-poaching was common, and the authorities often even turned a blind eye to it. It was commonly agreed that salmon and whitefish were fished by locals in order to feed their families. Getting caught was no big deal, and the cost of the fine was usually earned by more fish-poaching.

### The end of the salmon era

The interviewees talked variably about the end of salmon migration. All tell about the bitterness and discontent felt by local people. The biggest reasons for discontent were loss of livelihood, loss of an important and enjoyable activity, and the loss of a whole culture of fishing. But locals also felt betrayed. Many interviewees say that even though they had knowledge of the electrification of the river, they could not imagine the impact of losing salmon. Their fishing equipment became obsolete and often, mainly because of the hydropower plants that were built and their impact on the river environment, people had no reason to go to the river anymore. If the river had been transformed into a dry channel, boating or spending time by the river was neither possible, nor made any sense.

*"[I]t was a total, a complete... It was a total disaster. Back when people were selling those rapids they didn't know how terribly they were being betrayed."  
– 77-year old man, Middle Iijoki.*

*"[W]hat a horrible loss it was to the Iijoki river valley that the fish were gone, the sea fish. The fish had been like the voice of the world to the people along this river, to the people who live here. It was like the spring of life, because that's what people mainly lived on around here, on fish. And so it was robbed from them just to serve the interest of man. Isn't that depressing?"  
– 91-year old man, Upper Iijoki.*

The beauty of the river environment has been taken for granted. Only the loss of salmon and the change in the river environment have awoken locals to look at their environment with a different perspective. Only now do they see what a unique occasion the fish migration has been, and today one can only witness it on television:

*“[A]nd many a time we watched [the salmon] simply jump over the entire rapids, as we had two of them right there, rapids I mean. Now you sometimes see them jumping on the television.”*  
 – 79-year old woman, Lower Kemijoki.

Some interviewees also mentioned the good aspects of losing salmon. One fisherman recounted how he worked long hours during the day, and in the evening went fishing. He was able to rest for only a few hours a night. When the salmon migration ended he no longer had this problem and was able to sleep through the night. Moreover, the threat of getting caught for fish-poaching stressed him. Later in the interview he anyhow reveals that losing salmon was indeed a shock. He refuses to admit he had any difficulties in accepting and adapting to the loss of the salmon, but these words indicate something else about his profound sense of loss:

*“[I] couldn't even go to the fish market in Oulu to look at salmon. I just couldn't. Now that's forgotten. Now I can.”*  
 – 79-year old man, Upper Iijoki

The data show three different responses to the loss of the salmon:

1. Some of the interviewees turned their backs on losing salmon. They answered very curtly and turned the conversation to other matters. They denied their involvement and were unwilling to talk about it.

*“ - How did you feel when the fish stopped coming?”*

*- Empty, just empty. You had to come up with something else. The saltwater whitefish used to rise, like we just talked about, to the so-called Murhejoki (Grief River). It is a part of the Iijoki River and there were great whitefish spawning beds there. I used to go torch-fishing there and catch plenty. It is a magnificent fish.”*  
 – 91-year old Man, Upper Iijoki.

Those who turned their backs on this difficult matter wanted to portray a complete, harmonious picture: everything is fine and everyone is content. They had either not been able to process their loss, or they strongly stood up for the electrification of the rivers. They mollified the loss of salmon and mentioned the compensation procedure as a benefactor which brought compensation money to the fishermen. However, they did not mention the length of the compensation procedure and other negative sides of the matter. They also praised the fish farms: sometimes, if you're lucky, some rainbow trout fish will escape from the farms and the locals are able to fish it. The locals should be happy, because electrification of the rivers has brought them money and better living conditions.

These interviewees played down the difficulties by diminishing the importance of migratory fish. Those who downplayed it did not mention their feelings or emotions



at all. Their view was purely economic: there has been work for everyone, so everyone is content, they state.

2. Those alienating themselves from the situation had adapted to the loss of salmon, but still missed the migratory fish. They also did not attempt to conceal these feelings: by the very force of the dream of seeing a salmon jump in the river they gained the strength to keep on going.

Unlike the interviewees that have totally turned their backs to the matter, the people resigned to the loss of the fish had processed the matter in their thoughts and discussed it with their families and friends. They talked about the reasons that ended salmon migration, using the arguments of the hydropower company, which they did not oppose by any means. The greater good of society argument gave these people some peace of mind and some kind of comfort.

*“[B]ecause the river has been used for construction, the forests farmed, and the swamps trenched and used for thermal plants, well, it is what this day and age requires and where society is headed. There’s little use crying about it, you just have to adapt.”*  
– 60-year old man, Lower Iijoki.

The rivermen felt they had to participate in the voluntary work for the whole nation’s well-being. These interviewees pondered the different perspectives of hydropower construction. Even though the arguments

for the greater good of society were strong and widely accepted, they did not cover everything and failed to convince the locals completely.

*“[W]ell, the government and others were so much for it, and it is true that money and electricity were needed after the evacuees came, oil power and that. And there were also the war debts and everything, so it was necessary for the national economy to dam the river. And I’m still not against the need for power plants. And water power is, after all, clean energy. But there’s no denying that a lot of people are against the damming of rivers.”*  
– 72-year old woman, Upper Kemijoki.

Those who remained resigned stated arguments both for and against hydropower, but their involvement and the subjectivity of losing salmon were still marginal. They did not totally agree with the hydropower company, but not with the opposition either. The matter is so politically charged that only two sides are visible. Occupying the middle ground is no option, and experiences and thoughts rising from there are not noted. This leaves the “middle ground people” as bystanders, who gradually alienated themselves from the matter. Many interviewees distanced themselves from their own involvement, referring to local residents as “them” even though they are locals themselves. Their involvement in their own home environment was diluted by talking on a general level, pleading for the greater good of society, or talking about changes in the environment as if they had happened to someone else. (“people used to talk”, “some stated that”, “they demanded”).

Their own involvement was denied, the personal level (*me, we*) and ownership of the matter remained rather insignificant in the way they talked.

The reason for their distancing of themselves is the powerlessness that locals felt when opposed by powerful and dominating hydropower companies. They did not see that they had a chance against them. Local people considered their own experiences and thoughts to be useless arguments compared to the companies.

*"[I]t really was, and that's what folks talked a whole lot about. It was great for food, for providing people with food, for example. People didn't have to buy much from the shop because there was fish in the river and there were cows to butcher and calves and all, and it was good. But the powers that be made the decision, so what was there to do. Nothing at all."*  
– 79-year old woman, Lower Kemijoki.

3. Some of the people interviewed were embittered and kept up the fighting spirit in order to get the salmon back. These people persevered in their involvement in the matter and their right to demand the salmon back, or at least to receive a decent compensation. Compared to the ones turning their backs on the issue and those alienating themselves, the opposers were strongly involved on a personal level. The ones fighting for the salmon considered themselves as owning the matter and felt they had to be heard. In the following example the wife is a bystander, while her husband refuses to give up:

*"Wife: But I don't think there's anything we can do, that he's always..."*

*Husband: Well there isn't anything we can do if we don't demand anything, that's clear as day. I've been telling people that it doesn't matter what we say here around the coffee table when we don't make our concerns public and demand our rights. These days you can make demands, you've got the EU courts and all. It might take a few years, but it's taken 70 years already so what's another 5 or 10 as long as there's some progress. That's what I think."*  
– Elderly couple, Lower Kemijoki.

Even after all these decades without migratory fish the opposers believed that reintroducing salmon to their home river was just a matter of time. This self-confidence and their involvement in the discussions and work concerning the reintroduction keep them going. The opposers were strongly involved, they were the owners of the matter, believing that their side had to be taken into account and heard out. They felt that the injustice concerning the salmon had to be repaired even after all these years.

In some interview radical and extreme actions were mentioned. Blowing up the hydropower plants was one of them. Some said there were plans to blow up Isohaara, the power plant at the mouth of the Kemijoki, with the bombs the Germans left while pulling out of northern Finland towards northern Norway during the Second World War. These plans were abandoned, people said, because no human victims were wanted. Another idea was to separate Lapland from the rest of the nation and gain autonomy for the province.

In this way the advantages of hydropower build-up would remain in the area that was now being exploited.

Even the most critical opposers understood the argument of the greater good of society. They agreed that the nation needed energy in order to build a modern society, but they did not understand the way it was to be completed. The fact that no functioning fish ladders were built is, they said, a disgrace to society, and taking away the salmon from local people's dinner tables was a legalised robbery that still continues.

## Conclusions

The data show a diversity of local meanings and understandings of migratory fish than just an economic one. In addition to the obvious meanings – nutrition and a source of cash – migratory fish had a great impact on local cultures. Fishing culture shaped both local and shared identities of the communities, as well as people's personal identities.

The change in the home environment as a result of development and the loss of fish penetrated every aspect of the lives of the rivermen. The physical setting, local culture, social relations, sources of livelihood and the surrounding society changed in a short period of time. The electrification of the rivers hastened the modernisation in the area, and the rapid change forced locals to adapt to the new environment in a short space of time.

Some people have never managed to handle the loss of salmon on an emotional level. Still, after 60 years, they find it hard

to talk about it. Some have found comfort in the arguments of the greater good of society and feel they have to do their bit in transforming Finland into a modern society. Some have not yet given up the fight to get the salmon back, and these people have the strongest involvement in the matter and in their lived environment.

The fact that the subject is still, after so many decades, so sensitive, represents the painfulness of losing salmon. Losing salmon has been a trauma that had to be hidden in order to serve the whole nation's best interests. The data reveal the sides that either defend or oppose the building of hydropower plants, but also a forgotten group of bystanders. As they have lost their home environment, they have stepped back from the river and denied their involvement in this environment. The personal, experienced and lived bond to their environment has been broken. The personal bond has been replaced by the ethos of common good, where rivermen have to share their home environment with the rest of the nation. Adapting to this change has been difficult, and some have never been able to process their loss.

## References

- Bazeley, P. (2007). *Qualitative data analysis with NVivo*. SAGE, Los Angeles.
- Granberg, L. (1992). Vaikea rooli – pienviljelijän tie asutustoiminnan ajalta tietoyhteiskuntaan. In Rahikainen, M. (ed.): *Suuri muutos. Suomalaisen yhteiskunnan kehityspiirteitä*, 52–67. Helsingin yliopiston Lahden tutkimus- ja koulutuskeskus, Lahti.

- Haapasaari, P. & T. P. Karjalainen (2010). Formalizing expert knowledge to compare alternative management plans: sociological perspective to the future management of Baltic salmon stocks. *Marine Policy* 34, 477–486.
- Hoffman, K. (1993). *Pohjolan Voima 1943–1993*. Kaleva, Oulu.
- Järviöskoski, T. (1979). Vesien säännöstely ja paikallisyhteisö. *Turun yliopisto, sosiologian tutkimuksia B* 19.
- Karjalainen, T. P. & T. Järviöskoski (2010). Negotiating river ecosystems: impact assessment and conflict mediation in the cases of hydro-power construction. *Environmental impact assessment review* 30(5), 319–327.
- Karjalainen, T. P., A-M. Rytönen, M. Marttunen, A. Mäki-Petäys & O. Autti (2011). *Monitavoitearviointi lijoen vaelluskalakantojen palauttamisen tukena. Suomen ympäristö* 11. Suomen ympäristökeskus, Helsinki.
- Kemijoki Oy (2012). Voimalaitokset. [http://www.kemijoki.fi/kejo-fi/sp\\_Content650AC](http://www.kemijoki.fi/kejo-fi/sp_Content650AC). Accessed 17.9.2012.
- Kerkelä, H. (2003). Teollistuva Lappi osana maailmantaloutta. In Massa I. & H. Snellman (eds): *Lappi – maa, kansat, kulttuurit*, 129–159. SKS, Helsinki.
- Kietäväinen, A. (2009). Talonpojasta yrittäjäksi. In Kinnunen, M & J. Autto (eds): *Tänään töissä. Sosiologisia näkökulmia työhön*, 75–98. Lapin yliopistokustannus, Rovaniemi.
- Luostarinen, M. (1982). A social geography of hydro-electric power projects in Northern Finland. Personal spatial identity in the face of environmental changes. *Acta Universitatis Ouluensis series A Scientiarum rerum naturalium* 130 Geographica 7.
- Malpas, J. E. (1999) *Place and experience: A philosophical topography*. University Press, Cambridge.
- Metsämuuronen, J. (2006). *Laadullisen tutkimuksen käsikirja*. Gummerus, Jyväskylä.
- Neuendorf, K. A. (2002). *The content analysis guidebook*. SAGE, London.
- Relph, E. (1976). *Place and placelessness*. Pion Limited, London.
- Rose, G. (1995). Place and identity: a sense of place. In Massey, D & P. Jess (eds): *A place in the world? The shape of the world. Explorations in human geography*, 87–132. Oxford University Press, New York.
- Rusanen, J. (1989). Role of the local people in the utilization of water resources. A case study of the river Iijoki in Northern Finland. *Nordia* 23(3), 120–208.
- Suopajärvi, L. (2001). *Vuotos- ja Ounasjokikamppailujen kentät ja merkitykset Lapissa*. Acta Universitatis Lapponiensis 37. Lapin yliopisto, Rovaniemi.
- Vilkuna, K. (1975). *Lohi. Kemijoen ja sen lähialueen lohenkalastuksen historia*. Otava, Keuruu.