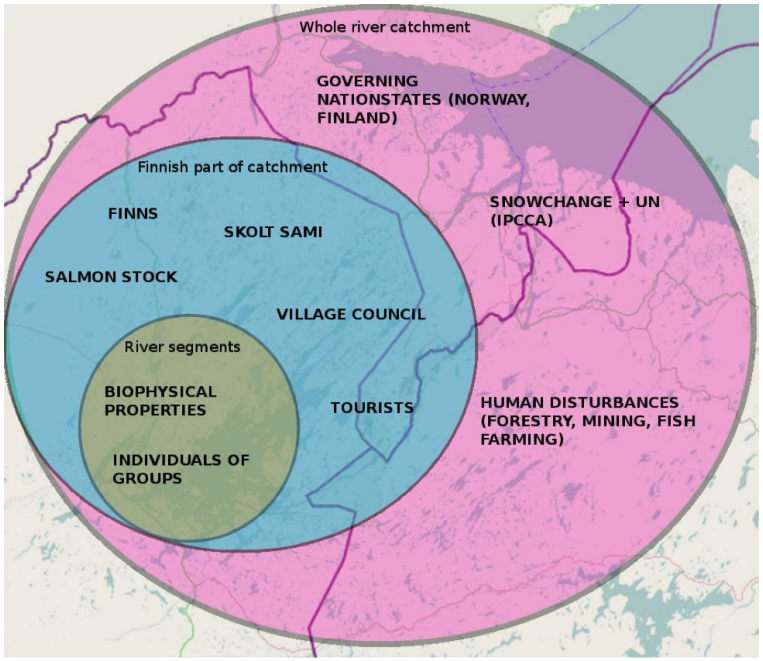
Name of the case study	Näätämö River - Skolt Sámi salmon fishing and river restoration - Finland [Resilience]		
What about this case makes it interesting? How does this case contribute to understanding of resilience and/or regime shifts in the Arctic?	Skolt Sámi traditional fishing communities have been reliant on the highly productive salmon population in the Näätämö River, bordering Finland and Norway, for decades. The present Skolts arrived in the basin in 1940s after the Second World War. In the 1800s another Skolt Sámi tribe had existed in the basin, but assimilated to the settler populations by early 1900s. Salmon not only act as a source of food for the Skolt Sámi, but salmon and salmon fishing are also deeply embedded within their traditions and cultural livelihoods. The Skolt Sámi's holistic view of nature makes this a strong social-ecological system (SES). Climate change impacts, development, and other environmental factors are now threatening the Näätämö River salmon population, and as a result, the Skolt Sámi's traditional way of life. How the Skolt Sámi cope with these external stresses will provide insight on their resilience as a community, one action is effort to restore the watershed.		
Template completed by:	Students from the 2014 *Systems Theory and Resilience Thinking* course at the Stockholm Resilience Centre (Stockholm University): Jessica Spijkers, Stockholm Resilience Centre Andrea Utas, Stockholm University Katja Malmborg, Stockholm Resilience Centre Gustav Grusell, Stockholm Resilience Centre Hannah Griffiths, Stockholm Resilience Centre Carmen Seco Pérez, Stockholm Resilience Centre Fernando Remolina, Stockholm Resilience Centre Lara Dominguez, Stockholm Resilience Centre Ashley Perl, Stockholm Resilience Centre		**Key references: Cite in the text using (1), (2), (3) etc. and provide a reference list at the bottom of the template.** (3) Mustonen, T. and Feodoroff, P., 2013. *Ponoi and Näätämö River Collaborative Management Plan*. Waasa Graphics Oy, Finland. [online] URL: http://www.snowchange.org/pages/wp-content/uploads/2014/05/Naatamo_sisus_1205_p.pdf (4) Mustonen, T. 2014. *Discussion on Skolt Sámi and Näätämö River fishing*. [Skype call] (Personal communication, 8/9 January 2014).
Reviewed by (Name and affiliation)	Tero Mustonen, Snowchange Cooperative		
Category	**Resilience/ Adaptability**	**Loss of resilience**	**Transformation**

	X (possible decrease)					
Case study details:	**Country**	**Place**	**Scale – space**	**Scale – time**	**Sector(s)**	**Other (e.g. disturbance)**
	Finland (Norway downstream)	Inari Municipality, Villages along the river to Norwegian border	100 kms of river + watershed (50 kms river in Finland)	1947 to date	Salmon fishing for subsistence	Potential development and climate change impacts in the watershed are affecting the salmon stocks and habitats

Drivers (mark with X in appropriate boxes)	**Climate**	**Geopolitical**	**Mineral/ oil extraction & infrastructure**	**Tourism**	**Shipping**	**Biological invasion**	**Rapid demographic change**	**Other:** ***state here***
	x	X		X				

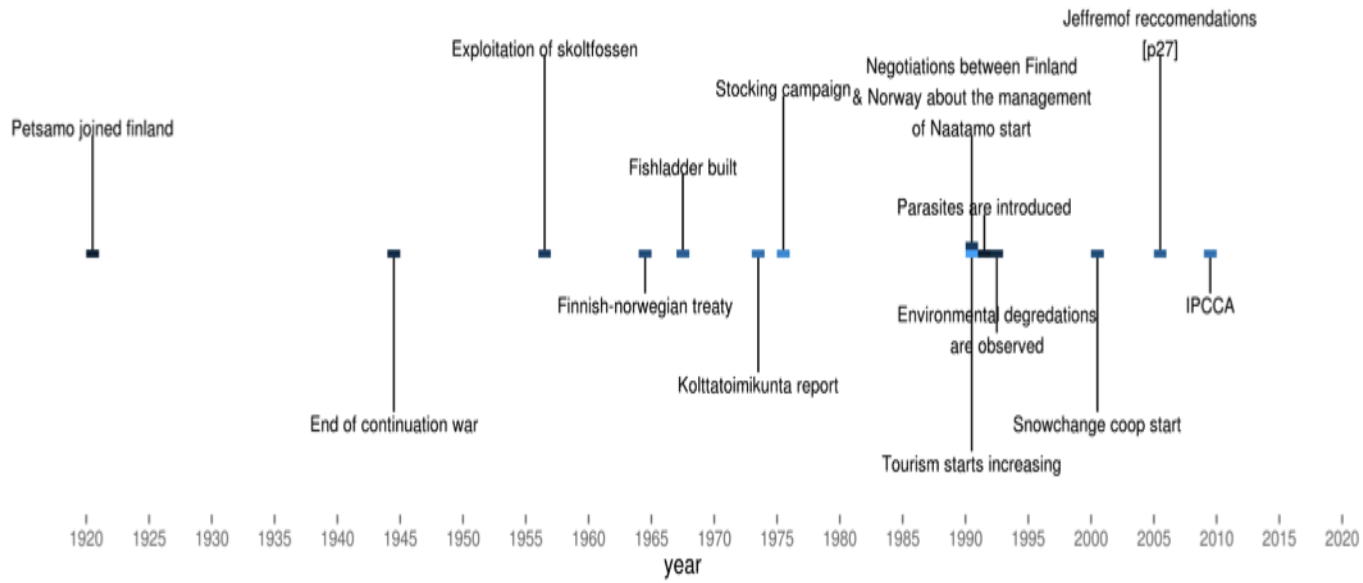
	Biophysical	**Social**
1. Basic description of coupled social-ecological system in focus **(**What are the key components and stake holders) If possible draw a systems diagram or conceptual map of the case – this can be a series of diagrams to capture different	a) What types of ecosystem(s) and other major biophysical features are present? - Waterways – Näätämö River - Tundra/Boreal/Coniferous forest b) How are the case boundaries defined in terms of ecosystems or biophysical characteristics? The biophysical boundaries include the Näätämö River, shoreline, and catchment area. Below is a systems diagram, including the major actors in the system. The Näätämö River flows through the Inari municipality in northern Finland, crosses the border to the Neiden fiord in	c) Who are the key groups of people in this case? Skolt Sámi – The indigenous people live along the coast of the Näätämö River. They act as both resource users and stewards of the Näätämö River and surrounding landscape. Skolt Sámi have a deep understanding of the Näätämö River area (called Neiden in Norwegian). Sámi also have a breadth of traditional ecological knowledge about toponymic place names, cosmologies, catch and weather statistics, salmon spawning sites, among other cultural and ecological facts (3). Non-indigenous residents – Finnish and Norwegian residents are also resource users and actors of the Näätämö

periods in the case and the drivers/ actors/ events that characterize the period.	Norway, and enters the Atlantic Ocean.  	River system and salmon resources (3). Kven – A marginalized group of minority Finnish-speaking Norwegian residents who live along the watershed of the Näätämö River. Traditionally, Kven people operate a small seine fishery, originally developed by the Skolts. They are important actors to the SES because they have a specialized set of local traditional knowledge that provides insights on the salmon and Näätämö River (3) and have some authority in issuing fishing permits (4). Industry – Tourism has been booming around the Näätämö River. Mining remains a potential driver of major changes, even though no mines operate yet. Forestry in 1900s changed some habitats in the basin and downstream (Norway). A segment of the catchment area was diverted for hydropower purposes on the headwaters (in Norway). A large hydropower development was planned for the whole basin in 1940s and 1950s, but was not implemented. State forest authority Metsähallitus dredged and altered subcatchment areas such as Vainosjoki for boat access in 1968-1972, thus affecting negatively to the trout and grayling spawning ecosystems. Infrastructure has contributed to a number of environmental changes over the past decades (3). While the basin remains relatively intact in terms of ecology, potential for a railroad, mines and other future land uses remains high. Norwegian fish farms – Fish farmers contribute as actors to the SES through creating potential for wild and farmed salmon (3). NGO’s – In this region there are NGO’s working with

		salmon conservation as well as Sámi rights (4). <u>Governing actors:</u> Skolt Sámi Village Council – Indigenous governance system based Skolt laws that date back thousands of years. Village Council is recognized by the Finnish government and has agreement signing privileges when it comes to salmon resources in Näätämö River (4). Inari municipality – One of the political bodies responsible for Näätämö River management. They are also responsible for communicating Finnish laws and environmental management practices (3). Sámi parliament – Autonomous national party made up of Sámi people from Norway, Sweden, and Finland. Democratic group that has a legal mandate to deal with the state in question when it comes to issues that will impact Sámi culture, languages, or livelihoods (4). d) What kinds of livelihoods are important in the system? The Skolt Sámi's sustenance, economy, and cultural livelihoods are dependent on a health of a sustainable salmon population (3). The Sámi reindeer herding also uses the catchment area through the year to maintain this traditional economy. Minority Kven and Inari Sámi residents also rely on healthy salmon populations as a means for sustenance (7). Some non-indigenous residents, from both Norway and Finland, operate small-scale commercial fisheries in the

		Näätämö River basin. Their economic livelihoods partially rely on the salmon populations (4). e) What institutions are key to this case? If possible, define what scale it addresses. *Skolt Sámi* – Traditional ecological knowledge about how to deal with the land, water, and salmon populations (3). *Regional* – Tero Mustonen has been bringing stakeholders together with the Snowchange Cooperative (4). *Finnish Government* – Legal ownership of the river and land belongs to the Finnish government (4); fishing permits sold to tourists by the Finnish forest authority (4). *Transnational agreements* – The UN created the Indigenous Peoples' Biocultural Climate Change Assessment Initiative (IPCCA) to help bridge the gap between indigenous and state governance (4); Formalized agreement between Finland and Norway (3) which aims to preserve transboundary waterways (3). f) How are the case's boundaries socially defined, and how do these social boundaries relate to biophysical boundaries? The Skolt Sámi live along Näätämö River, and require resources from the river, shoreline, as well as the greater catchment area. Biophysical boundaries far exceed the social boundaries, largely due to the migratory nature of salmon (4). Therefore, effects that are taking place at a location away from the Näätämö River could influence the

		social system of the Skolt Sámi and the Näätämö River.

2. Timeline Draw a timeline of *key* events/ developments to the case. Points to include: Make clear the period of time over which the change is being considered. Provide a brief description of event/ actors, and ecological impacts. Mark particularly significant events with *. Consider both biophysical and social dimensions. Additional points that can be considered: Is it possible to identify periods of change from one type	CORRECTION: In figure below: Jeffremof should read: Jefremoff recommendations 

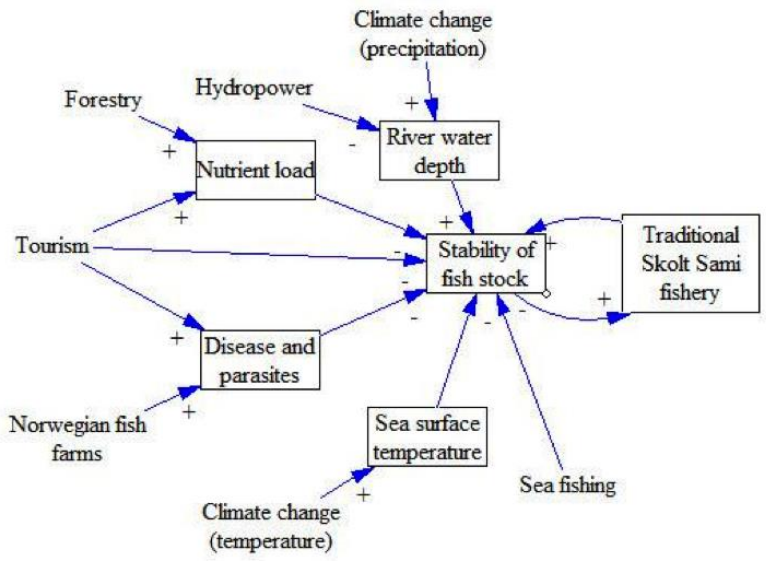
of system to another, transformations?

Identify disturbances or events that challenged, built, or reduced resilience or adaptive capacity in the system.

PERIOD	YEAR	LOWER SCALE*	FOCAL SCALE	UPPER SCALE
	2013		New collaborative management plan for the Näätämo river released in Finland (r)	
	2012		Monitoring Näätämö river with Skolt Sámi (r)	
	2011			
	2010			
	2009		Project "Skolt Sámi Survival in the middle of rapid change" (r)	
2000	2000		1. SnowChange Cooperative foundation (r) 2. Changes in weather started to being noticed (Ω).	
	1996		Mine released some toxins to the fjord (Ω)	
	1995			1. Finland becomes part of the EU (K) 2. Finland recognizes the right of Sami to maintain and develop their culture and language (K)
	1987			NFTWC prepared a multiple-use plan for the river (K)
	1980			Norweigan-Finnish Transboundary Water Commission (NFTWC) (K)
	1978			Fishing rights protectec in the Constitution Act of Finland (K)
	1977			Bilateral agreement on fishing between Norway and Finland (r)
	1972			Finnish Sami Parliament (r)
	1960		Snowmobile (α)	
	1956		Skolt Council founded (r)	
1950	1950		Arrival of tourism (α)	
	1947		Second relocation of Skolt Sámi (α)	
	1945			
	1944			
	1943			
	1942			World War II: iron ore mining in Sámi territory (Ω)
	1941			
	1940			
	1939			
	1917		First relocation of Sami (α)	Independence of Finland (Ω)
	1916			
	1915			World War I (Ω)
1900	1914			
Last glaciation				Arrival of Sami (α)

* There is no available data about dates of major events at lower scale. However, there are local events such as organic discharges, tributaries removed, spawning sites removed, mining, and urine discharges.

3. Disturbances What are the key disturbances in the system (present and past)	a) Have there been major biophysical disturbances that are relevant for the case? *Disease and parasites* from farmed salmon affect wild salmon populations. Industry could also play a role in infecting salmon populations (4). Pacific Salmon, introduced by Russians to the Barents Sea ecosystem as invasive species, are also coming to spawn in the Näätämö River.	b) Have there been major social disturbances that are relevant for the case? *Relocation events* – Skolt Sámi have had to deal with at least two relocation events. First relocation took place after WWI in 1917, and coincided with the independence of Finland (3, 4). Second relocation event took place after WWII in 1944 when the Russian government found minerals on Sámi land, in present-day Kola Peninsula (Petsamo Area) and forced them to relocate closer to Ivalo and Näätämö River (4), into Sevettijärvi and other villages.
4. Drivers of change Clarify what impacts these drivers have on the SES and if these are direct or indirect	a) What are the key biophysical drivers of change? Two major drivers, related to *climate change*, are influencing the Näätämö River system: i) *Increased variability in precipitation* – more variability in amount of river water depth and flow (4). ii) *Increased temperatures* – Above a certain temperature salmon's living conditions deteriorate (6). *Smaller catch salmon catch sizes* – Smaller sized salmon are being taken from the river, possibly contributing to a overall decrease in salmon harvests in the Näätämö River (3). *Water depth and flow* – If water levels are too low, salmon may not be able to swim upstream due to the river being too shallow or the river freezes over during winter (4).	b) What are the key social drivers of change? *Geopolitics* – Skolt Sámi do not have legal ownership rights over the land, and therefore are at the mercy of the national governments natural resource management decisions (3, 4) *Human influence* – Industries have developed around Näätämö River and have contributed to a number of ecological and social changes. - Hydropower has affected river depth and flow (3) in the headwaters and partly in the main river course - Tourism (3), past land use practices (reindeer feeding on ponds, dredging, loss of Vainosjoki and other ecosystems) and Forestry (4) industries have contributed to an increase in nutrient and organic matter input into the Näätämö River. *Norwegian fish farms* are an important for Norway's economy, but there are negative environmental impacts for

	Nutrient and organic matter loading, from past and present land uses in the Näätämö River, is a press disturbance in this system. Above a certain level it becomes eutrophicated, which causes insufficient oxygen levels for salmon spawning (4). While the Näätämö system retains many characteristics of a wilderness basin, climate change will have negative cascading impacts on euthrophication and other drivers.  **Figure:** Diagram of drivers (not boxed in), controlling variables (in boxes) and how they are affecting each other. Note: forestry and hydropower are past land uses: these have affected the river in the past, but are not currently major drivers.	wild salmon from farmed fish that escape (4).

	The only identified feedback is between the traditional Skolt Sámi fishery and stability of the salmon fish stock, which is based on the assumption that the salmon over time benefits from the Skolt's way of managing the resource.	
5. Sources of adaptive capacity: What factors allow(ed) the system to adapt to disturbances in the past and present? Give a brief assessment of recent or on-going changes (+/-/0 = increasing/ reducing/ not affecting adaptive capacity)	a) Within the ecosystem? (-) Climate change – Climate change affects precipitation and contributes to droughts, which affects water temperature and flow. This in turn reduces the Atlantic salmon's spawning capacity and survival (4). (-) Nutrient and organic loading – Nutrient and organic loading from past forestry, other land uses, erosion and tourism around the Näätämö River has contributed to the degradation of salmon spawning sites and loss of salmonid habitats, such as Vainosjoki river (3, 4).	b) Within society (e.g. people, social capital, management, institutions, infrastructure): (+) Skolt Sámi alternative fish stocks – Skolt Sámi also fish other species of fish, such as pike, whitefish and char, therefore increasing their resilience to a drastic change in salmon availability (3). Moreover, the increased pike and burbot harvests remove predator fish from the system, thus assisting smolt salmon survival in the middle of the changes. (+) Skolt Sámi catch sizes – Sámi alter their catch sizes per season based on their observations of changes in salmon behaviour and abundance (3). In 2016, Skolt Sámi have engaged in a pilot style ecosystem and spawning area restoration in the Vainosjoki and Kirakkajärvi sub-catchment areas, slated for completion in 2017 and mostly improving trout and grayling habitats at first. (+) Local Skolt Sámi government – local populations have a governance system of rules and norms that are engrained in their culture (3). (-) Skolt Sámi and national authorities – the two groups are in a "simmering" " non-dialogue regarding the question of restitutive rights on the river management. Parties meet and discuss, but power-sharing is limited. National authorities do not recognize Skolt Sámi traditional management

		practices, and Sámi user- and ownership-rights (4). Formalised co-management would help to improve the adaptive capacity of the Skolt Sámi. (0/+) Sámi Parliament – Legal mandate requires this group to deal with issues that will affect Sámi culture (4). Issues that affect salmon and the landscape could be addressed by this parliament, as it would affect Sámi culture. (-) State governance – Regional governance by Finnish Forest authority and Norwegian actors are economic and power driven, and do not consider indigenous management practices (3).
The next two sections break down the information in Section I. While it is not necessary to fill these sections, if you have additional information pertinent to specific rows below feel free to enter the material.		
II.1-8 SES, resilience and adaptive capacity		
	Biophysical	**Social**
II.1. Where do we find changes and resilience in the face of change?	a) Within nature Change: Climate change and resulting changes in river depth and flow; nutrient and organic loading (3, 4). Resilience: No biophysical sources of resilience identified. Ecological restoration of lost habitats potential tool.	b) Within society Change: Relocation events from Russian government Resilience: Skolt Sámi's TEK and understanding of the Näätämö River; In order to be resilient, Skolt Sámi need to be resilient to changes happening in the Näätämö River area (3); Skolt Sámi alternate their traditional fishing practices depending on the behaviour and abundance of salmon (4).
II.2. What are the system's key components?	a) Key Ecological components (e.g. lakes, coastal zones, caribou)	b) Actors in society (e.g. individuals, groups, public or private organizations)? How are people organised – by geography, livelihood, family, etc.?

	- Näätämö River - Shoreline - Catchment area - Salmon (3, 4)	- Industry - Indigenous groups (Sámi) and local minorities (Kven) - Mainstream populations Finns and Norwegians (3, 4)
II.3. What are the key linkages? E.g. ecosystem services, resource extraction. These linkages should exist. If there are not mutual links between social and ecological components the case is not a social-ecological system.	a) From nature to society (e.g. ecosystem services) Salmon, and other fish species, provide <u>provisioning</u> and <u>cultural</u> ecosystem services for the Skolt Sámi, and other peoples, in the Näätämö River area (3, 4).	b) From society to nature – modifying nature, extracting resources (e.g. hunting, mining, water pollution) A headwaters segment of the Näätämö River has been used for small-scale hydropower purposes (4) on the Norwegian side. The area around the Näätämö River has been used by the forestry industry (4). Currently no industrial logging happens. Tourism and past land uses as well as erosion contribute to nutrient and organic loading input, resulting in water quality degradation, in the Näätämö River and other parts of the basin (3, 4). The potential for mining and other large-scale land uses is significant, including a plan for a railroad through the basin. With a permit, tourists can fish for sport in the Näätämö River (4).
II.4. What are key interactions?	a) What are the key ecological interactions within the case? Climate change contributes to changes in the Näätämö River, such as increased variability in precipitation and	c) What collaborations, conflicts, or other key linkages exist between actors? Skolt Sámi Village Council uses laws dating back thousands of years to help govern salmon populations.

	increased temperatures (see box #4 above). b) What are the most important biophysical tele-connections to distant systems? Speculative: An important tele-connection of this system is that Näätämö River is a spawning ground for salmon. Salmon are known to go back to the spawning grounds that they were born in, and if spawning grounds disappear, it could affect the salmon population. As mentioned above, global climate change is linked to changes in the Näätämö River (see box #4).	Recognized by Finland as a form of governance (4). Discrepancies between state agencies and the Skolt Sámi regarding the ecological state of the Näätämö River (3). Tourists can buy fishing permits from the Finnish Forest authority to be able to fish for sport in Näätämö River. However, profits go to the Finnish government and not the Skolt Sámi who are losing provisioning ecosystem services (4). d) Between local actors and distant actors? Some degree of conflict between the Skolt Sámi and national authorities (see box #5). Global market expansion for natural resources (4).
II.5. Culture	a) How is the relationship between society and nature viewed? The Skolt Sámi salmon traditional fishery is dependent on a healthy and abundant salmon population, and they regard nature and its resources highly (3). b) What meanings are attributed to nature and to interactions with nature? Skolt Sámi have preserved traditional beliefs and cosmologies of nature. They are considered to be amongst most traditional of Sámi communities, including preserving endemic governance of waters and lands.	c) What are key cultural features of relevance for the case? On-going cultural fishery and other iconic land use practices, such as reindeer herding in the basin. d) What are key cultural practices and beliefs related to nature? Skolt Sámi traditional pre-Christian beliefs and Russian Orthodox religion provide for a synchretic worldview and cosmology. Nature is seen as sacred, a provider and to be respected in all possible ways. Sámi endemic governance of natural resources still practiced, even though often hidden.

II.6. Disturbance
What are important types of stress & shock
	a) Describe important biophysical or ecological shocks and stresses (e.g. floods, storms, etc).
	
	- Disease and parasites in salmon
	- Climate change
	  o Variability in precipitation
	  o Warmer temperatures
	- Water depth and flow
	- Nutrient and organic matter inputs
	- Algae blooms
	- Smaller salmon sizes
	(See boxes #3 and #4 above for more detail)
	- Deforestation in the past in the lower Näätämö
	- Droughts and floods as extreme events
	(references: 3, 4, 8)
		b) Describe important social shock and stresses (e.g. austerity policies, changes in government policy, introduction of new technologies, etc)
		
		- Geopolitics
		- Human influence and industry
		- Norwegian fish farms
		
		(See questions #3 and #4 above for more detail)
		
		- Non-ecologically sound tourism
		- Increased fishing
		- Sámi relocation
		(references: 3, 4, 8)

II.7. What are key slow variables Changes that occur over decadal or longer time scales	a) What types of ecological processes (e.g. loss of permafrost, shifts in species composition) are driving important long-term changes in ecological structures and processes? Climate change (see box #4). Declining salmon stocks, due to poor environmental conditions, such as loss of breeding grounds, changes in water depth and flow (3, 4, 6).	b) What types of slow social processes (e.g. aging, population growth, loss of language) are driving important changes in social institutions and behaviours? Speculative: due to declining salmon stocks, traditional knowledge about the fisheries could also be in decline, as fish are no longer as abundant. The NGO Snowchange is starting to bridge the gap between local and national policy (4). Decision making at the Sámi parliament level are slow and resource-hindered, resulting in management outcomes that have little effect on the local scale (4). In 2016, severe loss of Sámi rights on the national level due to the legal reforms for the role and position of Sámi and the Metsähallitus state forest enterprise.

II.8. Relationships with ecological regime shifts	a) Are ecological regime shifts driving further ecological change or pressure? Speculative: river degraded could lead to the Näätämö River not being suitable for salmon populations. b) Are external or internal ecological dynamics potentially or actually producing ecological regime shift(s)?	c) Can social stresses or major changes be attributed to ecological regime shifts? Speculative: loss salmon populations could lead to loss or decline of traditional fisheries. d) Are there specific social practices that might be contributing to ecological regime shifts
II.8 Regime shifts	**If a regime shift exists and is important to this case describe it below.** Please indicate whether the regime dynamics are well-established, contested, or speculative.	
II.8.a. Detailed description of alternate regime shifts A case study can contain more than one type of regime shift	Briefly describe the structure of each regime. What does each regime look like? What are differences in ecosystem structure and function? (e.g. permafrost loss, vegetation change)? How do the properties and behaviours of regimes differ? e.g. collapse of subsistence food sources, fundamental change in types of livelihoods, change in governance institutions, new actors with significant political power who transform decision making)	
II.8.b. Feedback mechanisms within the system that maintain each regime	Ecological feedback mechanisms	Social feedback mechanisms
II.8.c. What key changes drive regime shifts? Describe how these changes alter the state of the system or feedback processes.	a) Drivers of ecological regime shifts (either social or ecological). b) How do these changes alter biophysical feedback processes?	c) Drivers of social regime shifts (either social or ecological). d) How do these changes alter the social feedback processes?
II.8.d. Ecosystem	a) Changes in ecological processes that produce ecosystem	b) Changes in demand for ecosystem services (market and

services substantially impacted by regime shift	services	non-market) c) Changes in the institutional context of ecosystem services e.g. changes in access and changes in how ecosystem services are valued as expressed by rules and regulations.
II.8.e. What is (+/-) impacted by changes in ecosystem services directly or indirectly	a) Impacts from regime shift on ecological components	b) Impacts from regime shift on social actors
II.8.f. Potential cascading effects	Describe, if any, the likelihood of potential ecological cascading effects to other SES	Describe, if any, the likelihood of potential social cascading effects to other SES
II.8.g. Where do actors intervene to alter regime shift dynamics and who can do the intervening?	Ecological oriented interventions	Socially oriented interventions

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	[Accessed 8 January 2014].

GLOSSARY OF TERMS IN THE TEMPLATE

Actor	We use this term generally to look for individuals, groups, organisations, and so on that structure actions and/ or are stakeholders.
Adaptive capacity	Is the capacity of actors in the system to manage resilience in order to stay within a desired state during periods of change. This is related to the diversity in the system behind the provision of a function.
Disturbance	This refers to any disturbance to the system, regardless of scale, duration, intensity and frequency. See shock and stress.
Driver	Actor or process that directly or indirectly affects change in a social-ecological system. External means that the system in question (the scale being looked at) is unable to affect the driver in question – there is no feedback from the system to the driver.
Ecosystem services	The goods and services humans derive from ecosystems. These include: provisioning, regulating, cultural ecosystem services respectively.
Feedbacks	A change within a system that occurs in response to a driver, and that loops back to control the system. A feedback can help to maintain stability in a system (negative or balancing feedback), or it can speed up processes and change within the system (positive or enhancing feedback). Feedback processes play a very important role in determining system thresholds and in maintaining system resilience.
Institution	Here we refer to the humanly devised constraints that shape human interactions, such as rules, norms and laws. These can be formal or informal. Note that we are not referring here to institutions as organisations.
Regime shift	For complex systems, a substantial and enduring reorganization of the system, where the internal dynamics and the extent of feedbacks undergo change.
Resilience	This is a property, in this context of social-ecological systems. It relates to the capacity of a system to cope with disturbances and recover in such a way that they maintain their core function and identity. It also relates to the capacity to learn from and adapt to changing conditions, and when necessary, transform.
Shock	A sudden, unexpected disturbance. This kind of disturbance is often punctual, and has important impacts on large parts of the system.
Slow variable	When analysing complex system is often useful separating “fast” and “slow” variables. Fast variables often represent the primary concern of ecosystem users, for instance game or crop production. Slow variables shape the behaviour of fast ones but change slowly with respect to the overall dynamics of the system. Examples of slow variables might include permafrost thawing for a social-ecological system of Arctic hunters where the fast variable is game, or soil organic matter for an agricultural system where the fast variable is crop production.
Stress	This is a disturbance that has long persistence and often low intensity in impact.
Social-ecological system	This is an interwoven system of human societies and ecosystems. This concept emphasises that humans are part of nature and that these components function in interdependent ways. In the template identifying these interactions between the components

	aims to identify the processes and actors/ components that interact and particularly the feedbacks between the human-related components and the ecosystems/ biophysical components.
Stakeholder	See “actor”
Systems Diagram	This is using a diagram to illustrate the configuration of a system. This is done by defining its structure, function, and feedbacks. For a case there may be more than one diagram if the system changes in character (actors, processes, drivers, disturbances, feedbacks etc.) over time.
Timeline	The goal with the timeline is to capture important events – both punctual and over longer periods of time, identifying the causes of these events and the actors/ processes involved. This should be done chronologically and distinguishing events.