Name of the case study	Teriberka – Gas and institutional drivers – Russia [Loss of Resilience]
What about this case makes it interesting? How does this case contribute to understanding of resilience and/or regime shifts in the Arctic?	Teriberka is an example of a system facing collapse due to a series of different drivers. While the village has had a past of high development, since the 1960s it has undergone a series of disturbances as a result of institutional changes that have greatly reduced the resilience of this village's ability to support its inhabitants. Since its establishment in the 1600s, the village has changed its economy based on the needs of the internal to also including the external market. It started off as a village with reindeer herding and coastal fishing as its main economic activities. In the Soviet Union, the village's main economic activities were transformed, due to collectivization and nationalization efforts of the government. First, it became the region's main hub for the fishing industry and later, it became an important location for the Russian fleet with the construction of a shipyard. After the dissolution of the Soviet Union, the village has been in constant decline and currently is characterized by: a huge outmigration; lack of jobs; transport isolation due to the poor quality of the roads; degrading infrastructure; high food prices; lack of health services; and landfills of waste. The reasons for this include the closing down of the shipyard and the near collapse of the local fishing industry. The village, once a success story, is now facing total collapse and the villagers who stayed are hoping for a new surge of economic development, among which possibilities include the potential development of the Shtockman gas field. Gazprom coined Teriberka as the site where the LNG processing plant would be located. Exploitation of the field would bring new job opportunities, investments and revenues to the village. In the plan, operational housing and social facilities are included. Potential exploitation would thus also include a reorientation of the economy in the region and a redefinition of the social composition of Teriberka. The Shtockman gas field appears to represent one of the largest discovered natural gas fields in the world. Since its discovery in 1988, there have been prospects for its exploitation. However, there have been a number of barriers (natural, technological, financial, etc.) associated with its development. In addition, recent changes in the global energy market (for example, the shale gas revolution) have made it less likely that the Shtockman gas field will be viable in the near future. These barriers have stopped investments in the region from the national level, as well as from private investors, even though these investments have fuelled the redevelopment of Teriberka. Currently, there is great uncertainty about the future among the locals in Teriberka and it is unsure if the village will be able to survive. If the gas field is not exploited, other industries will have to be attracted (e.g. tourism) if it is to survive. (1, 3, 4)

Template completed by:	Participants of the 2014 ACCESS course: Dries Stevens, Stockholm University Aliaksei Patonia, University of Liverpool Christopher Cosgrove, Uppsala University	**Key references: Cite in the text using (1), (2), (3) etc. and provide a reference list at the bottom of the template.** (1) Mikhailov, K. L. 2014. Social and environmental aspects of development of the stockman field and risks in the local population's perception. *Regional Research of Russia* 3(4): 442–446. (3) Mel'nikov, N. N., and A. I. Kalashnik. 2012. Geodynamic aspects of the development of offshore oil and gas deposits: Case study of Barents region. *Water Resources* 38(7):896–905. (4) Mineev, A. 2010. Development of Russian oil and gas regimes focusing on the Shtokman Field: Institutional drivers. *Journal of East-West Business* 16(4):303–339.

Reviewed by (Name and affiliation)								
Category	**Resilience/ Adaptability**		**Loss of resilience**		**Transformation**			
			X					
Case study details:	**Country**	**Place**	**Scale – space**	**Scale – time**	**Sector(s)**	**Other (e.g. disturbance)**		
	Russia	Teriberka	local	1600-present	Oil/gas; fishing	External market; rapid outmigration		
Drivers (mark with X in appropriate boxes)	**Climate**	**Geopolitical**	**Mineral/ oil extraction & infrastructure**	**Tourism**	**Shipping**	**Biological invasion**	**Rapid demographic change**	**Other: *state here***
		X (national)	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 periods in the case and the drivers/ actors/ events that characterize the period.	***a)*** What types of ecosystem(s) and other major biophysical features are present? - Barents' Sea: harbouring important fish stocks, such as cod, as well as large amounts of natural gas in the basin. - Teriberka River - Coastal Zone (which remains ice-free throughout the year due to warm currents, making fishing possible all-year round) - Tundra ***b)*** How are the case boundaries defined in terms of ecosystems or biophysical characteristics? In this case, the village of Teriberka constitutes the scope of the study. Teriberka is located at the coast on the Teriberka river east of the Kola Fjord. Coordinates of Teriberka: 69°10′N 35°10′E	***a)*** Who are the key groups of people in this case? - Village residents of Teriberka (+/- 1000 residents). Includes indigenous Pomor and migrants from other parts of Russia - Multinational Oil Companies (MNE), most important is Gazprom - Russian Government, more specifically the Ministry of Natural Resources and Environment ***b)*** What kinds of livelihoods are important in the system? - Employment in the settlement is provided by budgetary organizations, such as educational and medical institutions, cultural centres, libraries, post offices, municipal administration, and municipal housing and utilities infrastructure (1) - Agriculture - Fishery industry: Currently, there is one fish processing plant left which provides a limited number of jobs. Since the transformation of the economy of the country, these two sectors in the village have had difficulties adapting and are in constant decline. Traditionally, agriculture and fisheries were organized in Kolkhoz, i.e. collective farms. The transformation of the Soviet economy to a neoliberal one, forced these industries to reorganize (1, 5, 6).

		- Due to high unemployment and limited job opportunities, many are drawn back to traditional means of sustenance such as fishing, hunting and berry picking. (1) - The Sámi in the village (2008) have refrained from reindeer herding, as they have assimilated in society, giving up their traditions (and thus losing their concomitant ecological memory). ***e)*** **What institutions are key to this case? If possible, define what scale it addresses**. - 1991: Dissolution of the Soviet Union. Far-reaching effects on both the national and the local levels. State-farms became privatized (no more welfare and direct revenues to the community). In the sea cod fishery sector, rights were allocated by means of auctions and other bidding mechanisms (1, 2) - Teriberka and Båtsfjord cooperation agreement, resulted in migration to Norway - Development consortium for the Shtockman gas field, resulting in investments in Teriberka - Federal law: 'on fisheries…": mechanism for coastal cod quota distribution was transferred to the federal level. This deprived the local government from the decision making process - MNEs in the oil sector, such as Gazprom and Statoil - Sevryba: responsible regional body for the fishing industry, right under the Ministry of Fisheries (1, 3, 5, 6)

		f) **How are the case's boundaries socially defined, and how do these social boundaries relate to biophysical boundaries**? The case is delimited by the village of Teriberka. Teriberka is a rural locality, *selo* in Russian, in the Kolsky district of Murmansk Oblast in Russia. Throughout history, Teriberka has been characterised by a high degree of multiculturalism, with Finnish, Norwegian, Russian, as well as indigenous Sámi and Pomor inhabitants. Nowadays, the population of roughly 1200 mostly consists of ethnic Russians and some who identify themselves as Pomor or Sámi (1). Self-government of the village was established in the early 1990s after the collapse of the Soviet Industry in the form of a village council, consisting of nine members working on a voluntary basis. The mayor plays an important role. However, their influence is limited as most decisions come from the federal and regional level (6).

***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 of system to another, transformations?	The history of the village of Teriberka can be divided roughly into three major parts. **1. Pre-soviet era (1600-1922)** Prior to Soviet times, Teriberka was considered one of the wealthier villages of the region. The literature reviewed tends to disagree about the village's origin, but some reports suggest that the village goes back to the 17th century, when it was inhabited by indigenous Pomor, who made it a trade centre. The indigenous Pomor were fishers and there was a reindeer herd. At the end of the 19th century the village had a church and the first weather station of the Murman region (1, 5, 6). **2. Soviet era (1922-1991)** - 1922: Start of Soviet industrialization process - End 1920s: Teriberka became an important place for the Soviet fleet due to the establishment of a shipyard*. A newly established fish processing plant* also created job opportunities - 1929: Soviet Collectivization Process: Farms became collectivized (*Kolkhoz)*, as well as the fishing fleet, reindeer herding and the mink farms - 1940s-1960s: Teriberka experiences economic and population growth - 1960s: Population in Teriberka peaked at 12,000*. An important cultural and economic centre in the Soviet Union due to its fisheries and fleet. Large communal farms - End of the 1960s: Period of downfall. Second Soviet industrialization wave. Ships became too big to be constructed in Teriberka and thus a large part of the shipyard was moved to Murmansk. The reindeer herd was moved (reason for this was not mentioned in the literature reviewed) to the neighbouring Lovorezo district. There was a reduction of agriculture. Very soon 75% of the population emigrated - 1980s: Aid from NGOs, such as the Red Cross, and investments from companies, such as Murman, created a better social and economic status of Teriberka. Why they became involved was unclear from the literature reviewed. - 1980s: During the construction of the Kaskad Serebryanskikh GES plant, the salmon stock in the Teriberka river was annihilated - 1981: Discovery and first exploration of the Shtockman gas* field by geophysicists, etc. - 1988: First drilling samples and first well - 1990: Technical-Scientific Catch council get the responsibility for quota distribution. Consisted out of Sevryba members (1, 5, 6) **3. Post-Soviet Era**

Identify disturbances or events that challenged, built, or reduced resilience or adaptive capacity in the system	- 1991: Dissolution of the Soviet Union* Kolkhoz system was abolished, however, there are still Kolkhozes under a different form. Communal farms became private. Unemployment started to rise. Welfare cut-backs followed - 1993: Official closing of the Teriberka shipyard*. About half of the jobs of the fish processing plant* were lost. A class of 'new poor' evolved, consisting of well-educated people - 1993: New national customs ruling that enforced the building of local customs checkpoints. Teriberka could not afford this infrastructure - 1994: Introduction of stronger policies towards fishery-dependent communities. A fisheries department was established giving the regional administration responsibility for the total Russian share of the Barents Sea quota - 1994: Fish processing plant semi-closed - 1995: First negotiations about the future of the Shtockman project - 1996: New representative body for village governance: the village council. This council consists of nine elected members working on a voluntary basis. The mayor plays an important role - 1996: Regional fishery department started to issue quota decrees - 1997: New budget code of the Russian government. Withdrew the rights of local communities to exercise their own taxation policy - 1997: Only a small amount of fish fingers produced - 1998: Devaluation of the rouble (currency), rise in unemployment (20% of the region became unemployed) - 1999-2002: Establishment of a migration agreement for labourers in the fishing industry between Teriberka and Båtsfjord in Norway. 40-50 Teriberka citizens moved to Norway (9% of the workforce at that time) 2000: Dismissal of *Sevryba.* Quota allocation process became federal again. Small firms and fishery cooperatives suffered as they couldn't afford the expensive cod quotas (5) - 2004: Introduction of the federal law 'On Fisheries…', mechanism for coastal cod quota distribution was transferred to the federal level. This deprived the local government from the decision making process (6) - 2007-2008: Framework convention with international partners signed and the Shtokman development consortium established - 2010: Postponement of the project because of shale gas revolution in the US - 2012: Suspension of the Shtockman project - 2014: New treaty between Båtsfjord and Teriberka. - 2014: Press announcement stating that Gazprom wants to continue with the project. (1, 5, 6)

- **Disturbances** What are the key disturbances in the system (present and past)	a) Have there been any major biophysical disturbances that are relevant for this case? - The **destruction of the salmon and cod** in the Teriberka river due to the establishment of the GES plant described above - **Increase of icebergs in the Barents Sea as a result of climate change** - **Increased pollution** due to a lack of waste disposal services in the village	b) Have there been major social disturbances that are relevant for this case? - **Psychological disturbance**: Due to the high unemployment rate and the limited or degrading infrastructure, combined with the lack of future prospects, the inhabitants are suffering psychologically. Alcoholism is high. - **Collapse of the Soviet Union:** Caused a transformation of the way in which resources were utilized. Previously, this was done collectively under a *Kolkhoz* system. Nowadays, this is in the hands of the private sector. - **Suspension of the development of the Shtockman gas field:** As a result of the shale gas revolution in the US, exploitation of the Shtockman gas field was not deemed viable anymore in the near future. With the suspension of this project, investments from Gazprom were halted leaving infrastructure incomplete, etc. This also contributed to psychological stress, as the planned economic revenues and job creation stopped. - **Rise of Health Issues:** Due to rising poverty and limited health service infrastructure, the number of inhabitants with health problems is rising - **Shutdown of the shipyard**: resulted in a rise in unemployment - **Collapse of the local fishery industry**: Due to the rising competition, the local fish processing plant lost its viability. In addition, fishing in the sea close to Teriberka is done by external fishermen. - **Båtsfjord agreement:** good for individual poverty reduction, but resulted in outmigration of roughly 9% of the active population

- **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? **Global Climate Change** is coined as one of the main biophysical drivers of change in the region of Teriberka, but it is currently unsure how it will play out in the future. It is possible that a regime shift, following out of climate change, will bring a lot more fish to the regime. This would require investment in the local fishing fleet, as currently it is external fishers fishing in the area. Also, with potential further development of the Northern Sea route, it is possible that more ships will frequent the region. However, it is unsure how this would influence the village of Teriberka.	b) What are the key social drivers of change? Drivers such as the **Russian government and MNE's in the resources and fishery industry** have a big influence on the development of Teriberka. Their influence can spark economic opportunities as well as investments in the infrastructure in the village. **Global Resource Market**: Potential development of the Shtockman gas field is dependent on the global energy prices. At the moment, exploitation of the gas field is coined to be economically unviable due to the shale gas revolution in the US. **Fishery industry**: At the moment, fishing in the region is mostly done by external actors. Collaborations in the future might create job opportunities in Teriberka. **Demographic changes**: Due to a lack of employment possibilities, the village is currently being characterized by a high number of outmigration, under official schemes such as the Båtsfjord-Teriberka agreement, but also on an individual basis. Besides, the remaining population is aging, as it is generally the younger generation that migrate.

6. 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)	b) Within the ecosystem? No sources of adaptive capacity within the ecosystem were identified in the literature reviewed.	c) Within society (e.g. people, social capital, management, institutions, infrastructure): **(+ and -) Social capital**: Due to the high unemployment rate, there are a lot of people willing to work. Besides, many of the unemployed are schooled in certain sectors (+). However there is currently a shortage of employment (-). **(-) Traditional knowledge**: There are indigenous Pomor and Sámi residing in Teriberka. However, they have stopped carrying out traditional activities, such as reindeer herding (since 2000), meaning they are losing ecological knowledge in the landscape (-). **(-) Collectivisation**: Sharing of benefits and resources proved to be beneficial for the development of Teriberka and with the transformation of the economy into a neoliberal one, Teriberka suffered its biggest economic downturn (-), this may also have been due to a dependence of external/top-down management. (1, 4, 6)
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** can be found in the locally observed decrease in fish and game animals (1). In addition, change can be found as a result of global climate change. Currently, as temperatures increase, more icebergs are in the Barents Sea, and it is possible that climate change will bring more fish to the region. No sources of resilience within nature identified in the literature reviewed.	b) Within society **Change** can be found in the way in which resources are dealt with. A shift from resources collectively managed under *the Kolkhoz* system to a neoliberal system, where resources are taken up in the (inter)national market. The village is now entirely dependent on decisions made at higher levels. The policy framework has changed accordingly. In addition, the village is being characterized by a huge outmigration and an aging population. The Sámi have refrained from reindeer herding as they have become assimilated in society. The discovery of the Shtockman gas field made the village a potential site for a LNG processing plant. The village is in constant economic decline and reaching collapse. Local fishery businesses became controlled by outsiders.

II.2. What are the system's key components?	a) Key Ecological components (e.g. lakes, coastal zones, caribou) Key ecological components include: - **Barents Sea**: harbouring important fish stocks, such as cod, as well as large amounts of natural gas in the basin - **Teriberka River** - **Coastal Zone** (which remains ice-free throughout the year due to warm currents, making fishing possible all-year round) - **Tundra** (1, 2)	b) Actors in society (e.g. individuals, groups, public or private organizations)? How are people organised – by geography, livelihood, family, etc.? The case is delimited by the village of Teriberka. Teriberka is a rural locality, *selo* in Russian, in the Kolsky district of Murmansk Oblast in Russia. Throughout history, Teriberka has been characterised by a high degree of multiculturalism, with inhabitants being Finnish, Norwegian, Russian, indigenous Sámi and Pomor. Nowadays, the population of roughly 1200 mostly accounts ethnic Russians and some who identify themselves as Pomor or Sámi (1). Self-government of the village was established in the early 1990s after the collapse of the Soviet Industry in the form of a village council, consisting of nine members working on a voluntary basis. The mayor plays an important role. However, their influence is rather limited as most of the decisions are coming from the federal and the regional level (6).

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) Many of the livelihoods are dependent on the ecosystems provided: - Fishing: both on an individual self-sustaining basis as well as industrial fishing connected to the fish processing plant. - Hunting - Berry picking - Agriculture In addition, the Shtockman gas field is a large gas reservoir in the Barents Sea. This can provide with economic revenues for the village in the future. Teriberka used to be called “the pearl of the Murman region” because of the high **aesthetic value**.	***b)*** From society to nature – modifying nature, extracting resources (e.g. hunting, mining, water pollution) - Hunting and fishing have influence on the number of available game - The village is currently characterised by an increased pollution due to a lack of waste disposal services and a “disrespectful view of nature by the inhabitants” (1) Exploitation of the Shtockman gas field would have consequences on the fish stocks in the region as well as leakages can damage the Sea basin (1, 6)

II.4. What are key interactions?	***a)*** What are the key ecological interactions within the case? Potential for exploitation of the gas field will cause disturbance to fish species in the region (1). ***b)*** What are the most important biophysical tele-connections to distant systems? The fish species in Barents Sea are migratory, shifting their migrations based on the availability of food and sea water temperatures. Sea water temperatures are increasing as a result of global climate change.	***c)*** What collaborations, conflicts, or other key linkages exist between actors? - Fishing industry collaboration between Båtsfjord and Teriberka, resulted in a migration from a large share of the active population to Båtsfjord. - Potential: Conflict between Teriberka and Murmansk: "great investment projects like the Stockman field may leave a number of production sectors in Murmansk oblast without skilled labour force" (1) ***d)*** Between local actors and distant actors? The development of the Shtockman gas field is mostly dependent on external actors, such as international MNE's in the fossil fuel sector willing to invest. The dissolution of the Soviet Union and its concomitant changes has made Teriberka increasingly connected to the external markets, as goods have become more export-oriented. This offers conflicts with the locals as they feel that 'foreigners are robbing their coast,' (1, 5, 6).

II.5. Culture	***b)*** How is the relationship between society and nature viewed? ***c)*** What meanings are attributed to nature and to interactions with nature? Teriberka has been coined "the pearl of our Murman". High aesthetic value of the region.	***c)*** What are key cultural features of relevance for the case? Even though the Soviet Union officially does not exist anymore, the *kolkoz* still plays a very important cultural role. "*The kolkhoz continues to play a most important role in the community, both with regard to employment and to social functions, which, though partly transferred to the local administration, largely remain the kolkhoz's responsibility. It sells milk, fish and meat at cheaper prices to villagers; it takes children abroad on excursions and pays higher pensions to its former workers*" (6). ***d)*** What are key cultural practices and beliefs related to nature? "Disrespectful view of nature is resulting into pollution" (1).

II.6. Disturbance What are important types of stress & shock	***a)*** Describe important biophysical or ecological shocks and stresses (e.g. floods, storms, etc). - Salmon in the Teriberka river annihilated due to the construction of a plant in the river in the 80s - Residents in Teriberka consider pollution as well as the reduced game and fish stocks as the most important problems characterising the village - Deer have disappeared from the region due to overhunting (1)	***c)*** Describe important social shock and stresses (e.g. austerity policies, changes in government policy, introduction of new technologies, etc.) - Dissolution of the Soviet Union: Huge transformation* of the market system. From a collective economy to a neoliberal one. This changed the way in which one deals with resources. Previously, *kolkhoz* system with shared revenues. Nowadays, the village's economy is dependent on market actors coming from the (inter)national level. - Traditional reindeer herding has not been exercised since 2000, traditional Sámi (approx. 28 people) have assimilated and do support traditional way of life anymore - New budget code of the Russian government. Withdrew the rights of local communities to carry out their own taxation policy - Suspension of the Shtockman project: Withdrawal of investments and concomitant loss of development opportunities. - Treaty between Shtockman and Båtsfjord; resulted in a migration of a large share of the population to Båtsfjord in Norway. - Closing of the shipyard and loss of half of the jobs in the fish processing plant. Collapse of the local fishery industry. Rise in unemployment. - Introduction of the federal 'on fisheries…' legislation; management regime for the distribution of cod quota. Negative effect on local fishermen. (1, 4, 5, 6)

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** is currently influencing the species composition of the region. It is possible that the region will be characterised by an increase in commercially interesting fish species. However, the influence for Teriberka is unknown, as fishing quotas are distributed from the federal level.	***b)*** What types of slow social processes (e.g. aging, population growth, loss of language) are driving important changes in social institutions and behaviours? - Teriberka is characterised by a **demographic change.** Due to the treaty with Båtsfjord in Norway and the general loss of prospects, there is an outmigration of the active population taking place. In addition, and as a result, the resting mean population is aging. - **Loss of traditional ecological knowledge** (TEK) as local indigenous Sámi population has refrained from reindeer herding - **Psychological stress**: Loss of future prospects and uncertainty about redevelopment has resulted in a psychological stress on the locals. High number of alcoholics (1)
II.8. Relationships with ecological regime shifts	***a)*** Are ecological regime shifts driving further ecological change or pressure? ***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? ***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 services substantially impacted by regime shift	***a)*** Changes in ecological processes that produce ecosystem services	***b)*** Changes in demand for ecosystem services (market and 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

REFERENCES/ SOURCES CITED:

(1)	Mikhailov, K. L. 2014. Social and environmental aspects of development of the stockman field and risks in the local population's perception. *Regional Research of Russia* 3(4):442–446. [online] URL: http://link.springer.com/10.1134/S2079970514010079 [Accessed 3 November 2014].
(2)	Henriksen, T., and G. Ulfstein. 2011. Maritime delimitation in the Arctic: The Barents Sea Treaty. *Ocean Development & International Law* 42(1-2):1–21. [online] URL: http://www.tandfonline.com/doi/abs/10.1080/00908320.2011.542389 [Accessed 3 November 2014].

(3)	Mel'nikov, N. N., and A. I. Kalashnik. 2012. Geodynamic aspects of the development of offshore oil and gas deposits: Case study of Barents region. *Water Resources* 38(7):896–905. [online] URL: http://link.springer.com/10.1134/S0097807811070104 [Accessed 3 November 2014].
(4)	Mineev, A. 2010. Development of Russian oil and gas regimes focusing on the Shtokman Field: Institutional drivers. *Journal of East-West Business* 16(4):303–339. [online] URL: http://www.tandfonline.com/doi/abs/10.1080/10669868.2010.534020 [Accessed November 3, 2014].
(5)	Eikeland, S., and Riabova, L. 2002. Transition in a cold climate: Management regimes and rural marginalisation in northwest Russia. *Sociologia Ruralis* 42(3):250-266.
(6)	Nystein-Haarala, S., editor. 2009. *The changing governance of renewable natural resources in northwest Russia*. Ashgate Publishing Limited, Surrey, England.
(7)	Söderbergh, B., K. Jakobsson, and K. Aleklett. 2010. European energy security: An analysis of future Russian natural gas production and exports. *Energy Policy* 38(12):7827–7843. [online] URL: http://linkinghub.elsevier.com/retrieve/pii/S0301421510006579 [Accessed 3 November 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.