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Monitoring of the Pasvik-Inari-Pechenga brown bear population in 2015 using hair-trapping

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TITTEL/TITLE

MONITORING OF THE PASVIK-INARI-PECHENGA BROWN BEAR POPULATION IN 2015 USING HAIR-TRAPPING

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SAMMENDRAG/SUMMARY:

SUMMARY: The trans-border brown bear population of Pasvik-Inari-Pechenga (Norway-Finland-Russia) has been monitored using genetic analyses of feces collection since 2005. In addition, in 2007 and 2011, hair traps were systematically placed out in the area to collect hairs for genetic analysis, to more precisely determine the minimum numbers of bears in the area. In 2015, we repeated this hair trap study, using the exact same methodology as in 2007 and 2011, to make a direct comparison of the results from all the 3 study years. Brown bear DNA was detected in 158 of 209 hair samples (76%) obtained from hair traps in 2015 and for 136 of these samples, a complete DNA profile could be determined. We identified 26 different bears in 2015, 17 females and 9 males. We detected 16 bears in Norway, 5 bears in Finland and 9 bears in Russia. Thirteen of these 26 bears were previously unknown, 7 were detected in Norway, 2 in Finland and 4 in Russia. A comparison to the results from 2007 and 2011 showed that we detected more bears in hair traps in 2015 (26 bears) than in 2007 (24 bears) and 2011 (20

bears). We observed an increase in the total yield of hair samples in the traps in 2015 (209 samples) compared to 2007 (196 samples) and 2011 (88 samples). Four (16%) and seven (35%) of the bears caught in hair traps in 2007 and in 2011, respectively, were also recaptured in 2015. Additional samples (scats and hair) collected opportunistically in the field within the Russian and Finnish parts of the study area in 2015 detected 4 male bears and 1 female bear in the Russian part leading to a total of 14 bears identified in Russia, of which 8 bears were detected for the first time. Additional scat and hair samples from the field in Norway were not included in our study and comparisons between the systematic hair-trapping and opportunistic sampling in the field were not performed. However, the results indicate that both methods combined are currently the optimal approach to monitor brown bear numbers in an area.

SAMMENDRAG: Den grenseoverskridende brunbjørnbestanden i Pasvik-Inari-Pechenga (Norge-Finland-Russland) har vært overvåket ved hjelp av genetiske analyser av ekskrement-prøver innsamlet i felten siden 2005. Videre, i 2007 og i 2011, ble hårfeller systematisk plassert ut i området for å samle hår til genetiske analyser, for mer presist å bestemme minimum antall brunbjørn. I 2015 gjentok vi denne hårfelle-studien med nøyaktig samme metodikk som i 2007 og 2011, for å gjøre en direkte sammenligning av resultatene fra disse årene. I 2015 ble brunbjørn-DNA påvist i 158 av 209 hårprøver (76%), og for 136 prøver kunne en fullstendig DNA-profil bestemmes. Vi identifiserte 26 ulike bjørner, 17 hunner og 9 hanner. Vi påviste 16 individer i Norge, 5 individer i Finland, og 9 individer i Russland. Tretten av disse 26 bjørnene var tidligere ukjente, 7 fra Norge, 2 fra Finland og 4 fra Russland. En sammenligning fra resultatene fra 2007 og 2011 viste at vi fant flere bjørner i 2015 (26 bjørner) enn i 2007 (24 bjørner) og 2011 (20 bjørner). Vi observert en økning av antall hårprøver i fellene i 2015 (209 prøver) sammenlignet med 2007 (196 prøver) og 2011 (88 prøver). Fire (16%) og 7 (35%) av bjørnene fanget i hårfeller i henholdsvis 20017 og 2011 gav gjenfangst i 2015. Ytterligere prøver (hår og ekskrementer) samlet opportunistisk i terrenget innenfor de russiske og finske delene av studieområdet i 2015 identifiserte 4 hannbjørner og en hunnbjørn i den russiske delen som ikke ble påvist i hårfellene (14 bjørner totalt i Russisk område; 8 nye individer). Tilleggsprøver samlet i felten (ekskrementer og hår) fra Norge ble ikke inkludert i dette studiet og sammenligninger mellom systematisk hårfellefangst og opportunistisk innsamling av prøver i felten er ikke utført. I midlertidig kan resultatene tyde på at en kombinasjon av begge metodene er for tiden den optimale fremgangsmåten for å overvåke brunbjørn i et område.

LAND/COUNTRY:	Norway/Norway, Finland/Finland, Russia/Russia
FYLKE/COUNTY:	Finnmark (NO), Lappland (FI), Murmansk (RUS)
KOMMUNE/MUNICIPALITY:	Sør-Varanger (NO), Inari (FI), Pechenga (RUS)
STED/LOKALITET:	Øvre Pasvik (NO), Inari (FI), Pechenga (RUS)

GODKJENT /APPROVED	PROSJEKTLEDER /PROJECT LEADER
SNORRE HAGEN	ALEXANDER KOPATZ

ABSTRACT

The trans-border brown bear population of Pasvik-Inari-Pechenga (Norway-Finland-Russia) has been monitored using genetic analyses of feces collection since 2005. In addition, in 2007 and 2011, hair traps were systematically placed out in the area to collect hairs for genetic analysis, to more precisely determine the minimum numbers of bears in the area. In 2015, we repeated this hair trap study, using the exact same methodology as in 2007 and 2011, to make a direct comparison of the results from all the 3 study years. Brown bear DNA was detected in 158 of 209 hair samples (76%) obtained from hair traps in 2015 and for 136 of these samples, a complete DNA profile could be determined. We identified 26 different bears in 2015, 17 females and 9 males. We detected 16 bears in Norway, 5 bears in Finland and 9 bears in Russia. Thirteen of these 26 bears were previously unknown, 7 were detected in Norway, 2 in Finland and 4 in Russia. A comparison to the results from 2007 and 2011 showed that we detected more bears in hair traps in 2015 (26 bears) than in 2007 (24 bears) and 2011 (20 bears). We observed an increase in the total yield of hair samples in the traps in 2015 (209 samples) compared to 2007 (196 samples) and 2011 (88 samples). Four (16%) and seven (35%) of the bears caught in hair traps in 2007 and in 2011, respectively, were also recaptured in 2015. Additional samples (scats and hair) collected opportunistically in the field within the Russian and Finnish parts of the study area in 2015 detected 4 male bears and 1 female bear in the Russian part leading to a total of 14 bears identified in Russia, of which 8 bears were detected for the first time. Additional scat and hair samples from the field in Norway were not included in our study and comparisons between the systematic hair-trapping and opportunistic sampling in the field were not performed. However, the results indicate that both methods combined are currently the optimal approach to monitor brown bear numbers in an area.

Svanvik, 22.01.16

Siv Grethe Aarnes and Alexander Kopatz

Cover photo taken with a wildlife camera at a hair-trap in Pechenga, Russia; Pasvik Strict Nature Reserve, Rajakoski, Russia.

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INTRODUCTION

Estimation of the number of brown bear in an area is notoriously difficult, since this animal is elusive and observations can lead to biased estimates. Therefore, genetic methods based on non-invasive genetic sampling of hairs and feces have been established to estimate bear abundance and numbers in both restricted and larger areas. In the recent past, so called hair-traps or hair-snares have shown their effectiveness in systematic collection of biological samples. Evenly distributed over a research area, hair-traps are successful in sampling more elusive and shy individuals, such as female bears (see e.g. Woods et al. 1999; Mowat and Strobeck 2000; Romain-Bondi et al. 2004, Kendall 1999; Bellemain et al. 2005; Thompson 2004, Waits & Paetkau 2005; Kendall et al. 2005, 2008a, 2008b; Kendall et al. 2009). Since 2005, NIBIO Svanhovd (formerly Bioforsk Svanhovd) has applied these methods in monitoring of brown bear populations in Norway, Finland, Russia and Sweden (see e.g. Smith et al. 2007; Smith et al. 2008; Wartiainen et al. 2008; Eiken et al. 2009a, 2009b, 2011, Kopatz et al. 2011, Kopatz et al. 2012a).

In 2007 and 2011, a tri-lateral project on monitoring and estimation of the minimum size of the brown bear population inhabiting the area of Pasvik (Norway), Inari (Finland) and Pechenga (Russia) was conducted. Samples were collected systematically over a two month period using hair-traps in a study area of 1400 km² divided into a grid of 56 squares. One square had the size of 5 km x 5 km and one hair trap was placed in each square (see Fig. 1). The hair-trap study in 2007 resulted in 196 hair samples that lead to the detection of 24 different bears (10 females, 14 males) (Smith et al. 2007). The study in 2011 resulted 88 samples and identification of 20 different bears (12 females and 8 males; Kopatz et al. 2011).

In this study in 2015, we have conducted an exact repetition of the monitoring action in 2007 and 2011. The objectives of this third hair trap project were to obtain a new estimate the minimum number of brown bears in the trans-border area of Pasvik-Inari-Pechenga and to identify possible changes in bear numbers and bear activity during a new four year period. The use of the same methodology facilitated a direct comparison of the results from these three projects, thus allowing for more reliable assessment of possible changes and their biological significance. This hair trap project represents the continuing and international collaboration of monitoring and research of the trans-border population of brown bears by Norwegian, Finnish and Russian managers and scientists.

MATERIALS AND METHODS

Permissions

For Norway, permissions for this experiment were obtained from the National Animal Research Authority (Forsøksdyrutvalget), The Finnmark County Governor (Fylkesmannen i Finnmark), Finnmarkseiendommen (FeFo, public land administrators) and the leading board of the Øvre Pasvik National Park (Øvre Pasvik nasjonalparkstyre). No special permissions were needed in Finland and Russia.

Study Area

The study area was located in the border areas of Norway, Finland and Russia at approximately 69.4° North and 29.8° East. The study area in consisted of 53 squares à 5 km x 5 km (with one hair-trap in each square, see 2.3 Sample collection for details) that were located as follows: 23 squares were in Finnish jurisdiction (Lapland, Inari municipality), 20 in Norwegian jurisdiction (Finnmark, Sør-Varanger) and 10 squares within Russian jurisdiction (Murmansk, Pechenga) (Fig. 1). The study area is dominated by both arctic and northern boreal ecosystems, represented by a mosaic of peat land and forest. Areas without forest can be described as low arctic and sub-arctic, while areas with tree growth belong to the north boreal forest type, characterized by large areas of downy birch (*Betula pubescens*) and Scots pine (*Pinus silvestris)*.

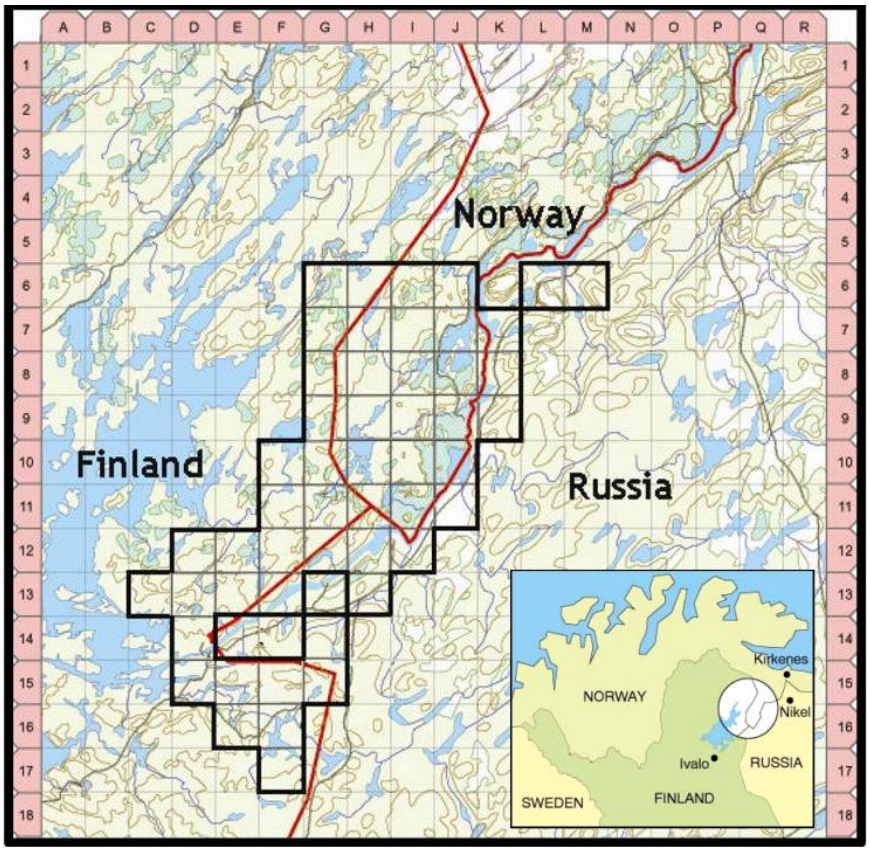

Figure 1: Study area in the trans-border area around Pasvik and the Øvre Pasvik National park in Norway (Sør-Varanger) including areas in Finland (Inari) and Russia (Pechenga). The study area was divided in 53 squares a 5 km x 5 km with one hair-trap in each (grid square nr. G6, G7 and G8 were excluded in 2015). Hair-traps were moved to a second location within the same square half-way through the collection period (after four weeks). The squares in the grid are marked from C13 in the west to M6 in the east.

Sample collection

On June 14th 2015 we started by placing one hair-trap in each grid square, except grid square nr. G6, G7 and G8 in Finland, which were excluded from the 2015 survey due to logistical constraints. A hair-trap or snare consisted of barbed-wire stretched approximately 40 cm above the ground among several trees encircling a strong smelling scent-lure (1.5 liters). The scent-lure was made of ground fish waste, mostly heads, which was mixed with cattle blood in about equal volumes of each section. The mixture was allowed to ferment for several months until the mixture was liquefied. Then it was stored in airtight containers until usage. It was important that the scent-lure was in the thin liquid form, to ensure that the bears were attracted without food and protein reward. Bears are attracted to the scent-lure and when they investigate the source they must climb over or under the barbed wire. The result is that the bears will leave hair on the wire when entering the hair snare (Fig. 2). The bear's thick hide will not be damaged by the barbed wire and in other hair trap studies injuries have never been reported or documented (see e.g. Woods et al. 1999, Mowat and Strobeck 2000; Kopatz et al. 2011 & 2012a).

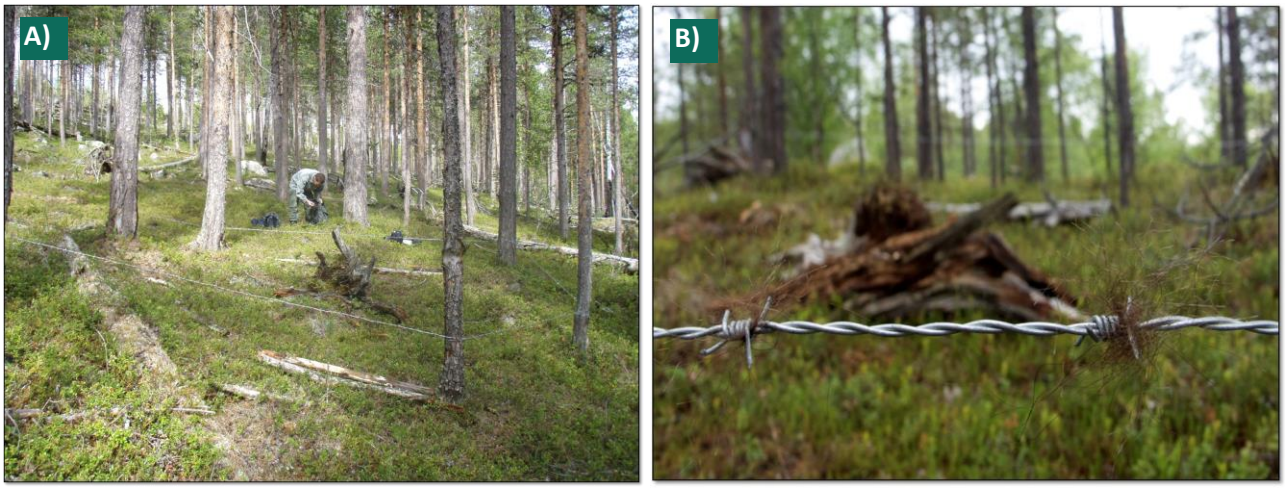

Figure 2: A) A typical hair snare with scent lure in the center ringed by a single barbed wire strung between trees at 40-50 cm from the ground. B) Hairsample on a wire. Photos: Sari Magga (left), Alexander Kopatz (right).

Every second week between Mid-June and Mid-August, each hair snare was inspected for hairs (see Table 1 and Figure 2) and supplied again with 1.5 liters of lure to maintain the same level of attraction throughout the sampling period. Half-way through the collection period (after four weeks), the hair-traps were moved to a second location within the same square (Table 1). Experience and other studies have shown that translocation of hair-traps during the season increases the probability of detecting more brown bears in an area (Mowat and Strobeck 2000; Boulanger et al. 2006). After two months, in Mid-August, the traps were taken down and removed from the forest (Table 1), which concluded the field part of the project.

Table 1: Schedule and sessions of the hair-trapping project in the area of Pasvik-Inari-Pechenga in 2015.

Day 1	Set-up	scent lure
Day 14	1st check	scent lure
Day 28	2nd check	translocation/scent lure
Day 42	1st check	scent lure
Day 70	2nd check	removal

Additional samples

In the Russian and Finnish parts of the study area, fecal and hair samples were also collected opportunistically in the field throughout the study period. The location and date were recorded for these additional samples before they were subjected to DNA analysis. In the Norwegian part of the research area, a similar, opportunistic field sampling was conducted as part of the national monitoring project of brown bears in Norway, but these samples were not included in this work, as they will be first published in a national report next year.

Remote wildlife cameras

In order to learn more on the activities of brown bears and other species at the hair-traps, motion-triggered wildlife cameras (mainly Scout Guard SG550M MMS camera) were mounted in several square grids. Additional remote photo cameras were provided by the Øvre Pasvik National Park, which were mounted at hair traps within the national park.

DNA-extraction

DNA was extracted from the hair samples using reagents from Qiagen (DNeasy Tissue Kit). The root tip from 5 to 10 hairs were cut and transferred to a 1.5 ml test tube together with a lysis-buffer (180 µl ATL buffer and 20 µl Proteinase K) and incubated for one hour at 55 degree centigrade. Extraction of DNA then follows the procedure described by the manufacturer. We also used the same techniques to analyze samples composed of fewer than 5 hairs. When the hair samples obtained were very small or matted together the extraction was conducted on 0.3 to 0.5 cm wide section of the matted hair or the entire hair straw. DNA was eluted in 100 µl of buffer solution. In some cases, when only a few or even a single hair was available in the sample, the volume of elution buffer was reduced to 30 µl (1 to 2 hair) or 50 µl (3 to 4 hairs). DNA extraction is further described in Eiken et al. 2009 as well as Smith et al. 2007 and DNA isolation from feces were as previously described (Tobiassen et al. 2011).

Analysis of DNA profiles and gender

Genetic analysis of STRs (short tandem repeats) on the brown bear followed a modified protocol from Taberlet et al. (1997). We have used eight different genetic markers Mu05, Mu09, G10L, Mu10, Mu23, Mu50, Mu51 and Mu59, to construct DNA profiles (Paetkau and Strobeck 1994, 1995; Paetkau et al. 1995; Taberlet et al. 1997; see Eiken et al. 2009 and Andreassen et al. 2012). Sex determination was based on the X-and Y-specific DNA sequences of the amelogenine gene (Yamamoto et al. 2002). The PCR protocol, capillary electrophoresis and the determination of DNA profiles and comparisons with DNA profiles in Svanhovd Genetic database have been described (Tobiassen et al., 2011). All procedures were done under the strict conditions of the ISO/IEC 17025 accreditation of our laboratory and in accordance to the guidelines of the analysis of forensic animal material, recently published by Linacre et al. (2011).

RESULTS AND DISCUSSION

Hair samples collected at hair-traps

We obtained 209 hair samples by hair-trapping: 142 hair samples originated from Norway, 20 from Finland and 47 samples from Russia. Out of 20 squares in Norway, we obtained hair samples with identification in 15 grid squares; in Finland 9 out of 23; and in Russia 7 out of 10 (Figs. 4 and 5). In summary, we sampled hairs from more than half of the grid squares (31 of the 53, see also Appendix 1). The yield of samples showed that the hair-traps captured an average of 1.97 samples per trap per month.

DNA analysis of the hair samples collected at hair-traps

The following DNA analysis detected brown bear DNA in 158 of 209 hair samples (76%). For 136 of samples (65%) we were able to determine a complete DNA profile and identity (Appendix 2). These successfully genotyped samples identified 26 different brown bears, 17 females and 9 males (Table 2).

We detected 16 different individuals in Norway, 5 different individuals in Finland and 9 different individuals in Russia. Two individuals (MO08/LL44/FI177 and FI123/LL43/MO50) were detected in two countries. One individual (FI116/LL49/MO48) was detected in grids in all three countries (see Table 2 and Figure 5).

Hair-trapping detected 12 (46.1%) individuals twice or more times and 14 (53.9%) bears once (Table 2).

Thirteen (50%) of the 26 bears detected by hair-trapping were previously unknown (Table 2).

Identity and gender for the 27 different brown bears documented by hair-trapping in 2015 are shown in Table 2 and the distribution of samples over the research area in Figure 5.

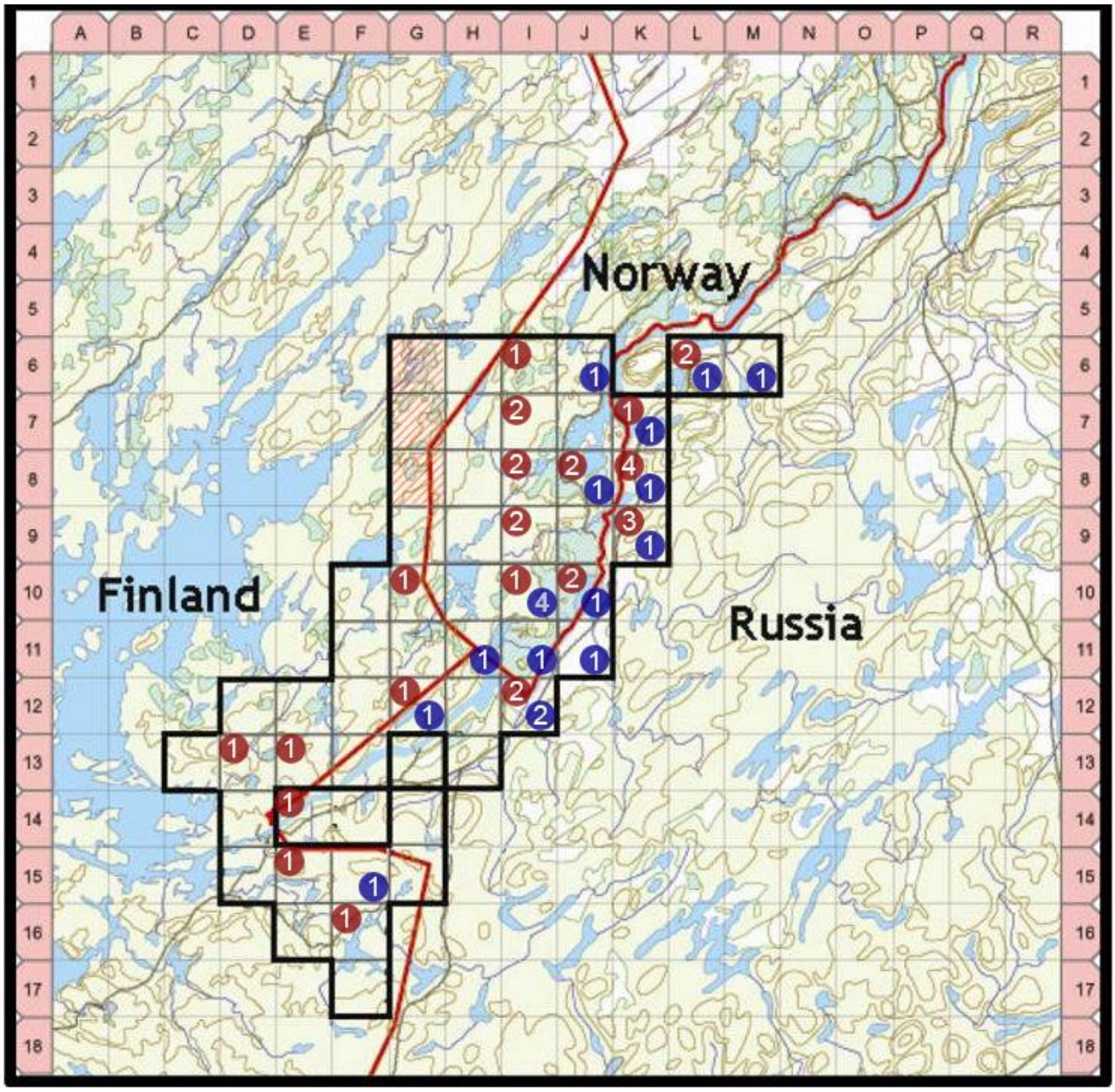

Figure 4: Results of the hair-trapping project to monitor brown bears in the trans-border area of Pasvik (Norway), Inari (Finland) and Pechenga in 2015, divided into a 5 km x 5 km grid. The red shaded grid squares indicate the grids, in which no hair traps were set-up in 2015 (see Materials and Methods). The number represents the number of individual bears identified and the gender is indicated by the colored dot (red = females, blue = males). The figure includes only individuals that have been identified by a full DNA-profile.

Table 2: Identity and gender for the 26 different brown bears documented by hair-trapping 2015 in Pasvik-Inari-Pechenga (Norway, Finland and Russia), country of registration, and the years of previous registration; F = females, M = males.

ID	Gender	Country	Detected in grid	Previous detection
FI111	F	NOR	I7, I8, I9	2010, 2011
FI116/LL49/MO48	F	NOR, FIN, RUS	G10, I10, I12, G12	2010
FI123/LL43/MO50	M	NOR, RUS	I11, J10, K7, J11	2011, 2012, 2013, 2014
FI160	F	NOR	J8, K8	2013
FI166	M	NOR	I8	2007, 2008
FI167	F	NOR	I6, I7	2014
FI180	F	NOR	I12	**NEW**
FI181	F	NOR	J10	**NEW**
FI182	M	NOR	I12	**NEW**
FI183	M	NOR	I10, H11	**NEW**
FI184	M	NOR	I12	**NEW**
FI185	F	NOR	I9	**NEW**
FI186	F	NOR	I8	**NEW**
FI38/MO18	F	RUS	K8, L6	2005, 2007, 2011
FI43/MO3	F	NOR	J8, K7, K8,	2005, 2007, 2008, 2009, 2010, 2011
FI69	M	NOR	I10	2007, 2011
FI70	M	NOR	I10, I8, J6, J8	2007, 2008, 2009, 2010, 2011
LL37	F	FIN	E15	2011
LL47	F	FIN	D13, E13, E14	**NEW**
LL48	F	FIN	F16	**NEW**
MO41	M	RUS	K8, K9, L6, M6	**NEW**
MO46	F	RUS	K9	**NEW**
MO47	F	RUS	K9	**NEW**
MO49	F	RUS	L6	**NEW**
MO8/LL44/FI177	M	RUS, FIN	F15, G12	2007, 2011
MO9	F	RUS	K8	2007, 2008

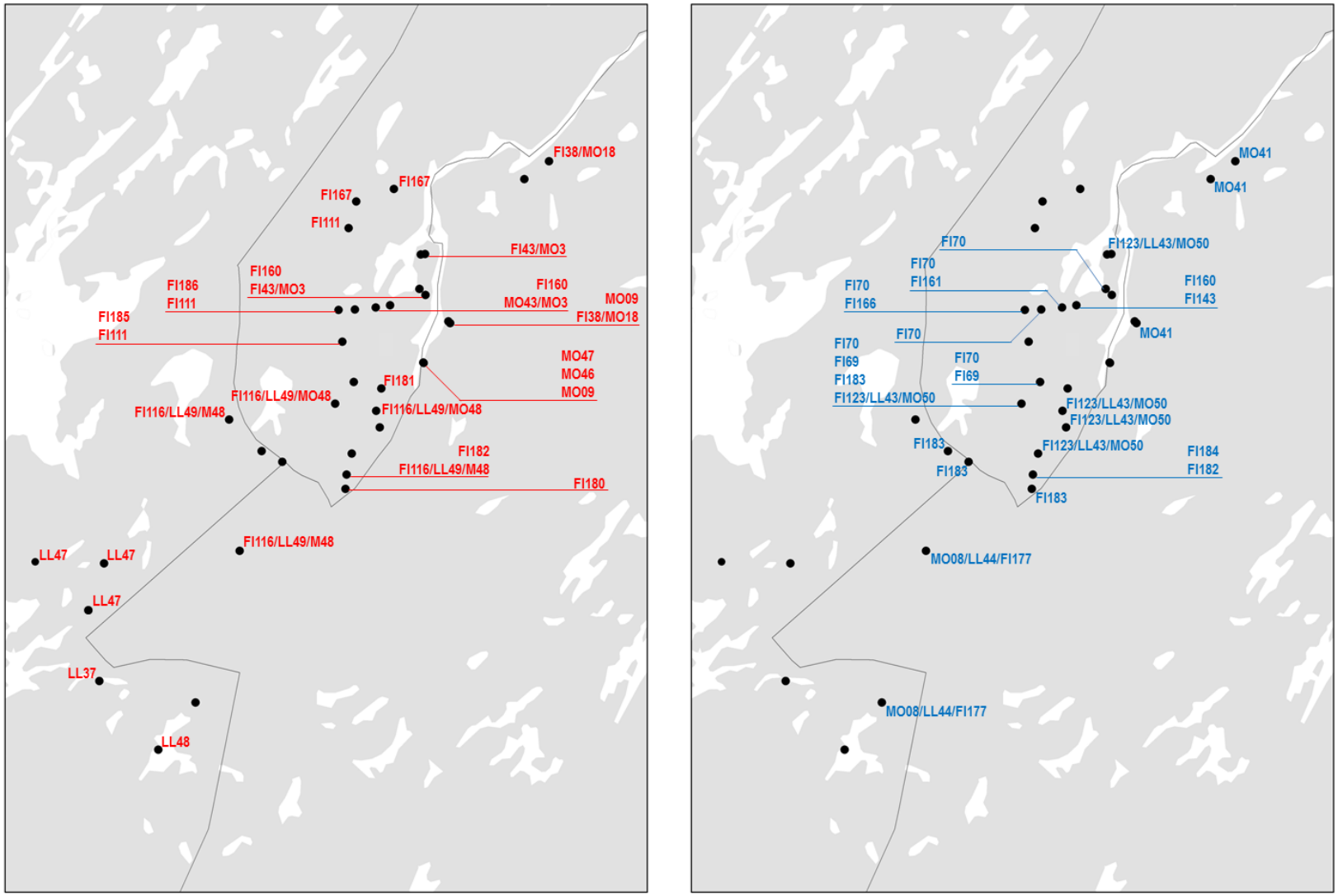

Figure 5: Identity and gender for the 26 different brown bears documented by hair-trapping 2015 in Pasvik-Inari-Pechenga (Norway, Finland and Russia), country of registration, and the years of previous registration; Every dot represents a sample collected and the ID of the bear. Both maps are similar but highlight the females (red, A) and males (blue, B).

Comparison of hair-trapping results from 2007, 2011 and 2015

This monitoring effort was performed as an identical repetition of the hair trap studies in 2007 and 2011, except for the exclusion of three hair traps/sampling grid squares in Finland. In 2007, 196 samples were captured in the hair traps and 129 (66%) of these samples were successfully genotyped, resulting in the identification of 24 individuals (10 females, 14 males; Smith et al. 2007). In 2011, we obtained 88 hair samples, of which 56 (64 %) were successfully genotyped, and identified 20 individuals (12 females and 8 males; Kopatz et al. 2011). In 2015, we therefore collected more samples and identified slightly more bears (209 samples, 26 bears) than in the two previous surveys (see Table 3).

Table 3: Number of samples collected and induviduals identified from hair-trapping in 2007, 2011 and 2015 in Pasvik-Inari-Pechenga (Norway, Finland and Russia).

Year	Country	Number of grids	Number of samples collected	Number of individuals identified
2007	Norway	23	124	9
	Finland	23	56	9
	Russia	10	16	6
	Total	**56**	**196**	**24***
2011	Norway	20	66	11
	Finland	26	14	7
	Russia	10	8	6
	Total	**56**	**88**	**20***
2015	Norway	20	147	16
	Finland	23	20	5
	Russia	10	42	9
	Total	**53**	**209**	**26***

* Unique profiles, which do not include individuals registered in more than one country.

Seven (35%) of the 20 identified bears in 2011 were resampled in 2015 (see Table 2), which is an increase compared to the resampling in 2011 (21%). Four (16.7%) of the 24 identified bears in 2007 were resampled in 2015 (FI38/MO18, FI43/MO3, MO8, MO9). While overall we newly detected 4 bears in 2011, we identified 13 (50%) new bears in 2015, which were not detected previously by hair-trapping as well as feces collection. This demonstrates that the systematic sampling approach of hair-trapping is crucial for the sampling and identification of all bears in an area, which would remain difficult with opportunistic sampling of feces alone.

A total of 14 bears (53.8%) were identified once only, while 4 bears (15.4%) were recaptured twice, 3 (11.5%) were recaptured three times and 4 bears (19.3%) were recaptured four times. Overall recapture rates were lower than in 2007 and in 2011 (see Kopatz et al. 2012b).

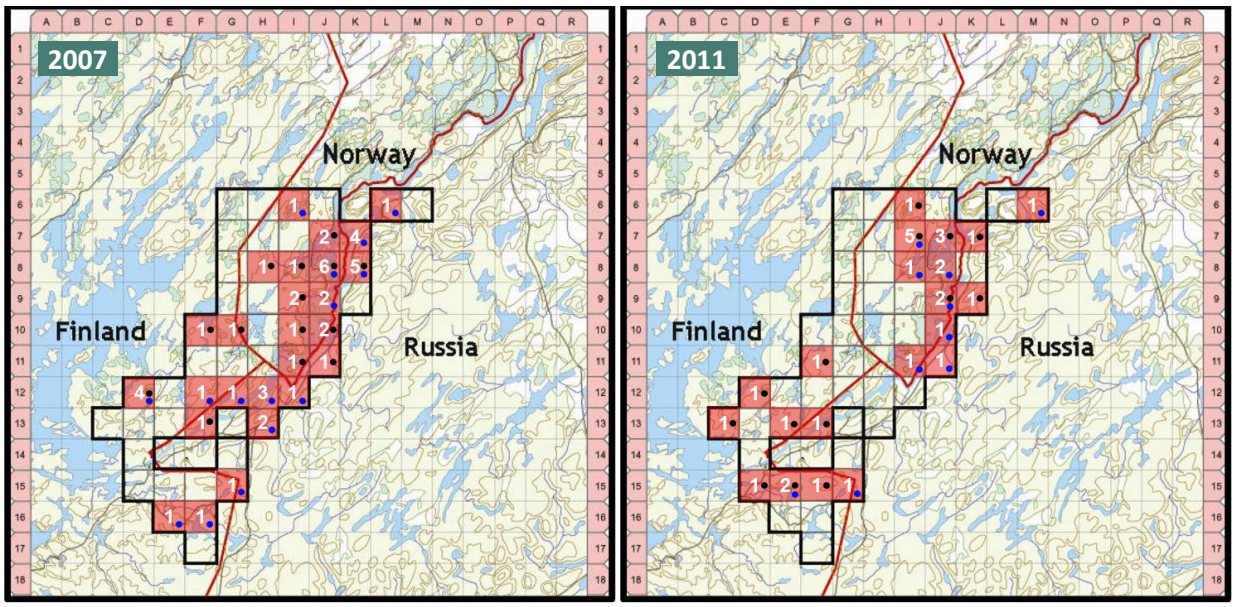

Figure 5: Monitoring of brown bears in the trans-border area of Pasvik-Inari-Pechenga in Norway, Finland and Russia in 2007 (left) and 2011 (right). Red squares represent bear activity detected by hair-traps. The number are the identified individuals and the gender is indicated by the colored dot (black = female, blue = male).

Collection and analysis of additional samples from the field

A total of 18 samples (11 feces and 7 hair samples) were collected in the terrain within and around the study area during the same period in Finland and Russia. Out of these 18 samples, 1 fecal sample was collected in Finland and 17 (7 hair samples and 10 feces) in Russia. The hair samples were collected by the Russian border authority.

The feces found in Norway during this field work were not included into this study and report, since they will be analyzed under the national monitoring project of brown bears in Norway.

From the 18 additional samples, 9 samples (50 %) could be successfully genotyped with the eight genetic markers to determine the bear identity. For 3 samples we could confirm that they were from bears, but no identity could be assigned due to low sample quality. All these samples were from Russia.

The DNA analysis of the additional samples detected 5 other brown bears (4 males and one female) within the Russian part of the research area, which were not detected by hair-trapping (Fig. 6). FI38/MO18 and FI43/MO3 were captured both in hair-trapping and additional samples.

Results from the additional samples are shown in Appendix 2.

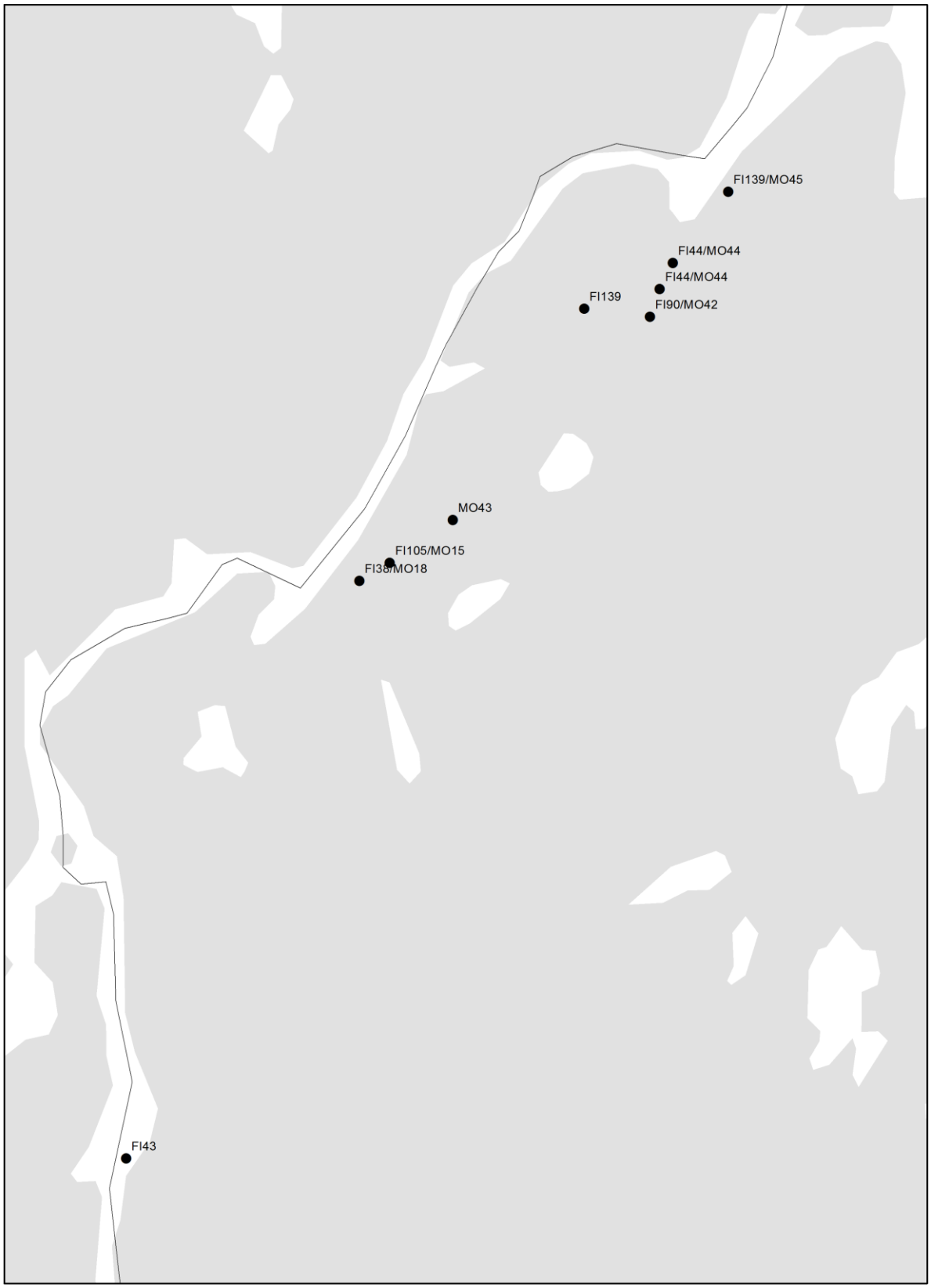

Figure 6: Brown bears identified from the additional samples collected in this project in the Russian part, and the geographical location.

Remote wildlife cameras

Remote wildlife cameras have been mounted in 13 different grids to observe bears and other wildlife approaching or entering the hair trap. In the event a bear has been sampled the camera recorded the visit, however, again, as described in previous projects, the cameras seem not fully suitable to be triggered by brown bears. It may, that some bears enter the trap just too gentle and therefore with too slow motion in order to switch on the camera. On multiple occasions hair has been sampled but the camera failed to record, although all camera settings were the same and the batteries were fully loaded. We did not observe any notable, different behavior than expected and no harm or danger to wildlife could have been observed. Rather the opposite occurred and several cameras observed playing behavior of bears at the trap as well as rubbing on the spot with the scent lure. All footage has been compiled and can be viewed here: http://vimeo.com/144482693. See also Figure 7 for a collection of stills as well as the photo on the cover of this report.

Figure 7: Selection of stills of brown bears filmed at the hair-traps during the period mid-June to mid-August in 2015.

CONCLUDING REMARKS

During the last years and projects, hair-traps have shown their power in detecting bear abundance and individuals. This monitoring effort was performed as a nearly identical repetition of the hair trap studies in 2007 and 2011. In 2015, we detected 26 different brown bears by hair-trapping in a study area of 1400 km² at the trans-border area of Pasvik, Norway (16 bears), Inari in Finland (5 bears) and Pechenga in Russia (9 bears). In accordance to our results we can conclude:

Hair-trapping:

- Compared to 2007 and 2011, the total number of identified individuals in 2015 increased, respectively with 3 and 7 individuals.
- Seven (35%) individuals, detected in 2011, were recaptured in 2015. Four (16.7%) bears, detected in 2007, were recaptured in 2015.
- Two individuals were detected in two countries, and one individual were detected in grids in all three countries.
- The higher number of samples and detected brown bears in 2015 may be caused by more bear activity within the study area, compared to 2007 and 2011.
- A total of 13 new bears were identified in 2015 as compared to 4 in 2011. Hair-trapping can lead to a substantial increase in the number of detected bears in the area.
- As is previous studies, no harm to wildlife was documented or observed.

Additional sampling in the terrain in Finland and Russia:

- With the help of additional, opportunistic collected samples we detected 4 male and 1 female bears within the Russia part of the research area, which were not sampled by hair-trapping.
- No additional samples from Norway were included into this analysis and therefore the interpretation will be done later, when the results of the national monitoring in Norway are published.

Considering all identifications by hair-trapping and feces collection together we can conclude:

- Overall, two bears identified in 2005 were recaptured in 2015. Seven bears detected in 2007 were recaptured in 2015. Also seven bears detected in 2011 were recaptured in 2015.
- Within the Norwegian part of our study area we identified a total of 16 different individuals, of which 7 were detected for the first time and 9 were captured previously.
- Within the Russian part of our study area we identified a total of 14 different individuals, of which 8 were detected for the first time in Russia and 6 have been detected previously.
- Within the Finnish part of our study area we identified a total of 5 different individuals, of which 2 were newly identified and 3 were previously known.

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APPENDIX 1

Locations and results from hair-trap inspections of 53 grid squares within trans-border area of Pasvik-Inari-Pechenga in Norway, Finland and Russia in 2015. Hair-traps were relocated within each 5 x 5 km squares in the grid after the second inspection; I6-F15 = grid numbers; Y = samples collected, NS = no samples collected. The total number of collected samples at hair-traps was 209.

Grid	Location	UTM	X	Y	1st check	2nd check	Country
H07	1		28,95431	69,24699	No	No	Norway
	2		28,960782	69,259885	No	No	Norway
H08	1		28,53931	69,13022	No	No	Norway
	2		28,898151	69,22537	No	No	Norway
H09	1		28,934341	69,151749	No	No	Norway
	2		28,943554	69,159047	No	No	Norway
H10	1		28,936413	69,131099	No	No	Norway
	2		28,868444	69,112239	No	No	Norway
H11	1		28,92013	69,057165	No	Yes	Norway
	2		28,873503	69,085592	No	No	Norway
I06	1		29,02472	69,27774	No	No	Norway
	2		29,120085	69,281628	No	Yes	Norway
I07	1		29,06249	69,25901	No	No	Norway
	2		29,099079	69,258619	Yes	Yes	Norway
I08	1		29,068282	69,187768	No	Yes	Norway
	2		29,10824	69,187678	Yes	Yes	Norway
I09	1		29,07517	69,159951	No	Yes	Norway
	2		29,03551	69,146742	No	No	Norway
I10	1		29,05299	69,106329	Yes	Yes	Norway
	2		29,09992	69,12464	Yes	No	Norway
I11	1		29,089509	69,062559	No	Yes	Norway
	2		29,081931	69,084482	No	No	Norway
I12	1		29,075527	69,044443	Yes	Yes	Norway
	2		29,07159	69,031947	Yes	Yes	Norway
J06	1		29,17667	69,29032	No	No	Norway
	2		29,213459	69,291468	Yes	No	Norway
J07	1		29,150934	69,239829	No	No	Norway
	2		29,152919	69,26369	No	No	Norway
J08	1		29,194446	69,190316	No	Yes	Norway
	2		29,159027	69,188906	Yes	Yes	Norway
J09	1		29,181415	69,156196	No	No	Norway
	2		29,162906	69,163931	No	No	Norway
J10	1		29,151817	69,099017	Yes	Yes	Norway
	2		29,166502	69,118411	Yes	No	Norway
J11	1		29,14188	69,08273	No	No	Norway
	2		29,159283	69,084522	Yes	Yes	Norway

Grid	Location	UTM	X	Y	1st check	2nd check	Country
K07	1		29,284065	69,23392	No	Yes	Norway
	2		29,273644	69,233653	Yes	Yes	Norway
K08	1		29,281533	69,198239	No	Yes	Norway
	2		29,267359	69,203712	Yes	Yes	Norway
C13	1		28,1878	68,974324	No	No	Finland
	2		28,258098	68,964331	No	No	Finland
	3		28,216355	68,962209	No	No	Finland
D12	1		28,429875	68,997649	No	No	Finland
	2		28,396431	68,990927	No	No	Finland
	3		28,413143	68,992712	No	No	Finland
D13	1		28,353232	68,953036	No	No	Finland
	2		28,316333	68,975167	Yes	No	Finland
	3		28,424712	68,943705	No	No	Finland
D14	1		28,377269	68,917842	No	No	Finland
	2		28,339592	68,91016	No	No	Finland
	3		28,378261	68,931278	No	No	Finland
D15	1		28,403026	68,877728	No	No	Finland
	2		28,333719	68,856524	No	No	Finland
	3		28,401024	68,865647	No	No	Finland
E12	1		28,568072	68,988656	No	No	Finland
	2		28,539512	69,001626	No	No	Finland
	3		28,53626	68,988564	No	No	Finland
E13	1		28,471522	68,949782	No	No	Finland
	2		28,441481	68,957796	No	No	Finland
	3		28,482632	68,972775	Yes	No	Finland
E14	1		28,437344	68,925241	No	No	Finland
	2		28,422978	68,923475	No	No	Finland
	3		28,424415	68,898298	Yes	No	Finland
E15	1		28,46553	68,870378	Yes	No	Finland
	2		28,419083	68,869021	No	No	Finland
	3		28,521558	68,864031	No	No	Finland
E16	1		28,452936	68,811989	No	No	Finland
	2		28,451956	68,829776	Yes	No	Finland
	3		28,529842	68,803312	No	No	Finland
F10	1		28,722976	69,111896	No	No	Finland
	2		28,683546	69,102082	No	No	Finland
	3		28,666549	69,082761	No	No	Finland
F11	1		28,704697	69,049844	No	No	Finland
	2		28,619026	69,057473	No	No	Finland
	3		28,586656	69,034899	No	No	Finland
F12	1		28,644608	68,98696	Yes	No	Finland
	2		28,670711	69,01221	No	No	Finland

Grid	Location	UTM	X	Y	1st check	2nd check	Country
F15	1		28,695233	68,869408	No	No	Finland
	2		28,616932	68,838678	No	No	Finland
	3		28,69551	68,849939	Yes	No	Finland
F16	1		28,668649	68,83628	No	No	Finland
	2		28,603255	68,809686	No	No	Finland
	3		28,608228	68,828458	No	No	Finland
F17	1		28,610803	68,749447	No	No	Finland
	2		28,6018	68,772023	No	No	Finland
	3		28,68533	68,770204	No	No	Finland
G10	1		28,794153	69,095151	Yes	No	Finland
	2		28,801473	69,123376	No	No	Finland
	3		28,830126	69,085366	No	No	Finland
	4		28,75046	69,111215	No	No	Finland
	5		28,749096	69,112157	No	No	Finland
	6		28,731394	69,119191	No	No	Finland
G11	1		28,727315	69,035386	No	No	Finland
	2		28,728177	69,047962	No	No	Finland
	3		28,836555	69,038562	No	No	Finland
	4		28,832397	69,035925	No	No	Finland
G12	1		28,739295	69,006729	Yes	No	Finland
	2		28,722363	69,007044	No	No	Finland
	3		28,754088	69,007246	No	No	Finland
G15	1		28,773837	68,866817	No	No	Finland
	2		28,727431	68,864129	No	No	Finland
	3		28,740631	68,862758	No	No	Finland
G9	1		28,78945	69,1355	No	No	Finland
	2		28,74238	69,12604	No	No	Finland
H11	1		28,870877	69,067024	No	No	Finland
	2		28,907332	69,055645	No	No	Finland
	3		28,877827	69,057754	No	No	Finland
M6	1		29,591374	69,310821	Yes	No	Russia
	2		29,59577	69,310539	Yes	No	Russia
L6	1		29,533628	69,295866	No	No	Russia
	2		29,540498	69,296556	Yes	No	Russia
K7	1		29,35867	69,227002	Yes	No	Russia
	2		29,359214	69,226463	Yes	No	Russia
K8	1		29,334929	69,174691	Yes	No	Russia
	2		29,339544	69,17309	Yes	No	Russia
K9	1		29,27033	69,139715	Yes	No	Russia
	2		29,271324	69,139218	Yes	No	Russia
H13	1		28,868909	68,948295	No	No	Russia
	2		28,822579	68,944024	No	No	Russia

Grid	Location	UTM	X	Y	1st check	2nd check	Country
G14	1		28,750535	68,941472	No	No	Russia
	2		28,751532	68,942917	No	No	Russia
F13	1		28,676249	68,935738	No	No	Russia
	2		28,67808	68,93432	No	No	Russia
G12	1		28,811011	68,980723	No	No	Russia
	2		28,806216	68,97853	No	No	Russia
H12	1		28,845704	68,992796	No	No	Russia
	2		28,855477	68,995096	No	No	Russia

APPENDIX 2

Overview of all samples collected in this project, the results of DNA analysis and individual determination.

Svanhovd Number*	Country	Date of sampling	Material	Grid	P/N	Gender**	Identity
15FF001	Finland	06.08.2015	Feces	-	N		
15FH001	Finland	24.08.2015	Hair	F11	N		
15FH002	Finland	07.07.2015	Hair	D13	P	F	LL47
15FH003	Finland	07.07.2015	Hair	D13	P	F	LL47
15FH004	Finland	07.07.2015	Hair	D13	P	F	LL47
15FH005	Finland	07.07.2015	Hair	D13	P	F	LL47
15FH006	Finland	06.07.2015	Hair	F16	P	F	LL48
15FH007	Finland	06.07.2015	Hair	F16	P	F	LL48
15FH008	Finland	06.07.2015	Hair	F16	P	F	LL48
15FH009	Finland	24.06.2015	Hair	F12	N		
15FH010	Finland	22.07.2015	Hair	E13	P	F	LL47
15FH011	Finland	22.07.2015	Hair	E13	P	F	LL47
15FH012	Finland	22.07.2015	Hair	E13	N		
15FH013	Finland	06.08.2015	Hair	E14	P	F	LL47
15FH014	Finland	06.08.2015	Hair	E14	P	F	LL47
15FH015	Finland	06.08.2015	Hair	E14	P	F	LL47
15FH016	Finland	23.06.2015	Hair	E15	P	F	LL37
15FH017	Finland	23.06.2015	Hair	E15	P	F	LL37
15FH018	Finland	02.07.2015	Hair	G10	P	F	FI116/LL49/MO4
15FH019	Finland	21.07.2015	Hair	F15	P	M	MO8/LL44/FI177
15FH020	Finland	06.08.2015	Hair	D13	N		
15NH196	Norway	01.07.2015	Hair	I10	P	M	FI183
15NH197	Norway	01.07.2015	Hair	I10	N		
15NH198	Norway	01.07.2015	Hair	J10	N		
15NH199	Norway	01.07.2015	Hair	J10	N		
15NH200	Norway	04.07.2015	Hair	I12	P		Ingen ID
15NH201	Norway	04.07.2015	Hair	I12	P	M	FI182
15NH202	Norway	04.07.2015	Hair	I12	P		Ingen ID
15NH203	Norway	04.07.2015	Hair	I12	N		
15NH204	Norway	04.07.2015	Hair	I12	P	M	FI182
15NH205	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH206	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH207	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH208	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH209	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH210	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH211	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH212	Norway	14.07.2015	Hair	J8	N		
15NH213	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH214	Norway	14.07.2015	Hair	J8	P		Ingen ID
15NH215	Norway	14.07.2015	Hair	J8	N		
15NH216	Norway	14.07.2015	Hair	J8	N		

Svanhovd Number*	Country	Date of sampling	Material	Grid	P/N	Gender**	Identity
15NH217	Norway	14.07.2015	Hair	J8	N		
15NH218	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH219	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH220	Norway	14.07.2015	Hair	J8	P	F	FI43/MO3
15NH221	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH222	Norway	14.07.2015	Hair	J8	P	F	FI160
15NH223	Norway	14.07.2015	Hair	K8	N		
15NH224	Norway	14.07.2015	Hair	K8	P	F	FI160
15NH225	Norway	14.07.2015	Hair	K8	P	F	FI160
15NH226	Norway	14.07.2015	Hair	K8	N	F	FI160
15NH227	Norway	14.07.2015	Hair	K8	P	F	FI160
15NH228	Norway	14.07.2015	Hair	K8	P	F	FI160
15NH229	Norway	14.07.2015	Hair	K8	P	F	FI160
15NH230	Norway	14.07.2015	Hair	K8	N		
15NH231	Norway	14.07.2015	Hair	K8	P	F	FI160
15NH232	Norway	14.07.2015	Hair	K8	N		
15NH233	Norway	14.07.2015	Hair	K7	P	F	FI43/MO3
15NH234	Norway	14.07.2015	Hair	K7	P	F	FI43/MO3
15NH235	Norway	14.07.2015	Hair	K7	P	F	FI43/MO3
15NH236	Norway	14.07.2015	Hair	K7	P	F	FI43/MO3
15NH237	Norway	14.07.2015	Hair	K7	P	F	FI43/MO3
15NH238	Norway	15.07.2015	Hair	I9	P	F	FI111
15NH239	Norway	15.07.2015	Hair	I9	N		
15NH240	Norway	15.07.2015	Hair	I9	P	F	FI111
15NH241	Norway	15.07.2015	Hair	I9	P	F	FI185
15NH242	Norway	15.07.2015	Hair	I9	P	F	FI111
15NH243	Norway	15.07.2015	Hair	I8	P	F	FI111
15NH244	Norway	15.07.2015	Hair	I8	P	F	FI186
15NH245	Norway	15.07.2015	Hair	I8	P	F	FI111
15NH246	Norway	15.07.2015	Hair	I8	P	F	FI111
15NH247	Norway	15.07.2015	Hair	I8	P	F	FI111
15NH248	Norway	15.07.2015	Hair	I10	N		
15NH249	Norway	15.07.2015	Hair	I10	P	F	FI116/LL49/MO4
15NH250	Norway	15.07.2015	Hair	I10	P	F	FI116/LL49/MO4
15NH251	Norway	15.07.2015	Hair	I10	P	M	FI123/LL43/MO5
15NH252	Norway	15.07.2015	Hair	I10	P	F	FI116/LL49/MO4
15NH253	Norway	15.07.2015	Hair	I11	N		
15NH254	Norway	15.07.2015	Hair	I11	P	M	FI123/LL43/MO5
15NH255	Norway	15.07.2015	Hair	I11	N		
15NH256	Norway	17.07.2015	Hair	H11	P		Ingen ID
15NH257	Norway	17.07.2015	Hair	H11	P	M	FI183
15NH258	Norway	17.07.2015	Hair	H11	P	M	FI183
15NH259	Norway	17.07.2015	Hair	H11	P	M	FI183
15NH260	Norway	17.07.2015	Hair	H11	P	M	FI183
15NH261	Norway	17.07.2015	Hair	H11	P	M	FI183
15NH262	Norway	17.07.2015	Hair	I12	P	M	FI184
15NH263	Norway	17.07.2015	Hair	I12	P	M	FI184

Svanhovd Number*	Country	Date of sampling	Material	Grid	P/N	Gender**	Identity
15NH264	Norway	17.07.2015	Hair	I12	P	M	FI184
15NH265	Norway	17.07.2015	Hair	I12	P	M	FI184
15NH266	Norway	28.07.2015	Hair	I6	P	F	FI167
15NH267	Norway	28.07.2015	Hair	I7	P	F	FI167
15NH268	Norway	28.07.2015	Hair	I7	P	F	FI167
15NH269	Norway	28.07.2015	Hair	I7	N		
15NH270	Norway	28.07.2015	Hair	I7	P	F	FI167
15NH271	Norway	28.07.2015	Hair	I7	P	F	FI167
15NH272	Norway	28.07.2015	Hair	I7	N		
15NH273	Norway	28.07.2015	Hair	I7	P	F	FI167
15NH274	Norway	28.07.2015	Hair	K8	P	F	FI160
15NH275	Norway	28.07.2015	Hair	K8	P	F	FI160
15NH276	Norway	28.07.2015	Hair	K8	N		
15NH277	Norway	28.07.2015	Hair	K7	P	F	FI43/MO3
15NH278	Norway	28.07.2015	Hair	K7	N		
15NH279	Norway	28.07.2015	Hair	J8	P	M	FI161
15NH280	Norway	28.07.2015	Hair	J8	P	M	FI161
15NH281	Norway	28.07.2015	Hair	J8	N		
15NH282	Norway	28.07.2015	Hair	J8	P		Ingen ID
15NH283	Norway	28.07.2015	Hair	J8	P	M	FI161
15NH284	Norway	30.07.2015	Hair	I8	N		
15NH285	Norway	30.07.2015	Hair	I10	N		
15NH286	Norway	30.07.2015	Hair	I10	P	M	FI70
15NH287	Norway	30.07.2015	Hair	I10	P	M	FI70
15NH288	Norway	30.07.2015	Hair	I10	P	M	FI70
15NH289	Norway	30.07.2015	Hair	I10	P	M	FI70
15NH290	Norway	30.07.2015	Hair	I10	P	M	FI70
15NH291	Norway	30.07.2015	Hair	I10	P	M	FI70
15NH292	Norway	30.07.2015	Hair	I10	P	(M)	FI69
15NH293	Norway	30.07.2015	Hair	I10	P		Ingen ID
15NH294	Norway	30.07.2015	Hair	I10	P	(M)	FI69
15NH295	Norway	30.07.2015	Hair	I12	P	F	FI180
15NH296	Norway	30.07.2015	Hair	I12	P	F	FI180
15NH297	Norway	30.07.2015	Hair	J10	P	F	FI181
15NH298	Norway	04.08.2015	Hair	J11	N		
15NH299	Norway	04.08.2015	Hair	J11	P	M	FI123/LL43/MO5
15NH300	Norway	10.08.2015	Hair	I7	P	F	FI111
15NH301	Norway	10.08.2015	Hair	I7	P		Ingen ID
15NH302	Norway	10.08.2015	Hair	J6	P	M	FI70
15NH303	Norway	10.08.2015	Hair	J6	P	M	FI70
15NH304	Norway	10.08.2015	Hair	I6	P		Ingen ID
15NH305	Norway	10.08.2015	Hair	I6	P	F	FI167
15NH307	Norway	10.08.2015	Hair	I6	P	F	FI167
15NH308	Norway	11.08.2015	Hair	K7	P	F	FI43/MO3
15NH309	Norway	11.08.2015	Hair	K7	N		
15NH310	Norway	11.08.2015	Hair	K8	P	F	FI43/MO3
15NH311	Norway	11.08.2015	Hair	K8	P	F	FI160

Svanhovd Number*	Country	Date of sampling	Material	Grid	P/N	Gender**	Identity
15NH312	Norway	11.08.2015	Hair	K8	N		
15NH313	Norway	11.08.2015	Hair	K8	P	F	FI43/MO3
15NH314	Norway	15.08.2015	Hair	J8	P		Ingen ID
15NH315	Norway	15.08.2015	Hair	J8	P	M	FI70
15NH316	Norway	15.08.2015	Hair	J8	P	M	FI70
15NH317	Norway	15.08.2015	Hair	I8	P	M	FI70
15NH318	Norway	15.08.2015	Hair	J8	P	M	FI70
15NH319	Norway	15.08.2015	Hair	J8	P	M	FI70
15NH320	Norway	15.08.2015	Hair	J8	P	M	FI70
15NH321	Norway	15.08.2015	Hair	J8	P	M	FI70
15NH322	Norway	15.08.2015	Hair	I12	P	F	FI116/LL49/MO4
15NH323	Norway	15.08.2015	Hair	I12	N		
15NH324	Norway	15.08.2015	Hair	I12	N		
15NH325	Norway	15.08.2015	Hair	I12	P		Ingen ID
15NH326	Norway	15.08.2015	Hair	I12	N		
15NH327	Norway	15.08.2015	Hair	I12	P	F	FI116/LL49/Mo48
15NH328	Norway	15.08.2015	Hair	I8	P		Ingen ID
15NH329	Norway	15.08.2015	Hair	I8	P	M	FI166
15NH330	Norway	15.08.2015	Hair	I8	P	M	FI166
15NH331	Norway	15.08.2015	Hair	I8	N		
15NH332	Norway	15.08.2015	Hair	I8	P	M	FI166
15NH333	Norway	15.08.2015	Hair	I8	P	M	FI166
15NH334	Norway	15.08.2015	Hair	I8	P		Ingen ID
15NH335	Norway	15.08.2015	Hair	I8	P		Ingen ID
15NH336	Norway	15.08.2015	Hair	I8	N		
15NH337	Norway	15.08.2015	Hair	I8	N		
15NH338	Norway	15.08.2015	Hair	J11	P		Ingen ID
15RF129	Russia	27.07.2015	Feces	Additional sample	N		
15RF130	Russia	06.08.2015	Feces	Additional sample	N		
15RF131	Russia	06.08.2015	Feces	Additional sample	N		
15RF132	Russia	27.06.2015	Feces	Additional sample	N		
15RF133	Russia	23.06.2015	Feces	Additional sample	P	F	FI43/MO3
15RF134	Russia	06.08.2015	Feces	Additional sample	N		
15RF135	Russia	06.08.2015	Feces	Additional sample	P	F	FI139/MO45
15RF136	Russia	15.06.2015	Feces	Additional sample	P		Ingen ID
15RF137	Russia	27.06.2015	Feces	Additional sample	P		Ingen ID
15RF138	Russia	14.07.2015	Feces	Additional sample	P		Ingen ID
15RH001	Russia	01.07.2015	Hair	M12	N		
15RH002	Russia	01.07.2015	Hair	G12	P	M	MO8/LL44/FI177
15RH003	Russia	01.07.2015	Hair	G12	P	F	FI116/LL49/MO4
15RH004	Russia	01.07.2015	Hair	G12	P	F	FI116/LL49/MO4
15RH005	Russia	01.07.2015	Hair	G12	P		Ingen ID
15RH006	Russia	01.07.2015	Hair	G12	P	M	MO8/LL44/FI177
15RH007	Russia	30.06.2015	Hair	K9	N		
15RH008	Russia	30.06.2015	Hair	K9	P		Ingen ID
15RH009	Russia	30.06.2015	Hair	K9	N		
15RH010	Russia	30.06.2015	Hair	K7	N		

Svanhovd Number*	Country	Date of sampling	Material	Grid	P/N	Gender**	Identity
15RH011	Russia	30.06.2015	Hair	K7	N		
15RH012	Russia	30.06.2015	Hair	K8	P	M	MO41
15RH013	Russia	30.06.2015	Hair	K8	N		
15RH014	Russia	30.06.2015	Hair	K8	P	F	FI38/MO18
15RH015	Russia	15.07.2015	Hair	M12	N		
15RH016	Russia	14.07.2015	Hair	K8	N		
15RH017	Russia	14.07.2015	Hair	M6	N		
15RH018	Russia	14.07.2015	Hair	L6	P	F	FI38/MO18
15RH019	Russia	14.07.2015	Hair	L6	N		
15RH020	Russia	14.07.2015	Hair	L6	P	F	MO49
15RH021	Russia	14.07.2015	Hair	L6	N		
15RH022	Russia	14.07.2015	Hair	L6	P	M	MO41
15RH023	Russia	14.07.2015	Hair	K7	P	M	FI123/LL43/MO5
15RH024	Russia	14.07.2015	Hair	K7	P	M	FI123/LL43/MO5
15RH025	Russia	14.07.2015	Hair	K7	P	M	FI123/LL43/MO5
15RH026	Russia	28.07.2015	Hair	M6	N		
15RH027	Russia	28.07.2015	Hair	M6	P	M	MO41
15RH028	Russia	28.07.2015	Hair	K8	P	F	MO9
15RH029	Russia	28.07.2015	Hair	K8	P	F	MO9
15RH030	Russia	28.07.2015	Hair	K8	P	F	MO9
15RH031	Russia	28.07.2015	Hair	K8	P	F	MO9
15RH032	Russia	10.08.2015	Hair	K9	N		
15RH033	Russia	10.08.2015	Hair	K9	P		Ingen ID
15RH034	Russia	10.08.2015	Hair	K9	P	F	MO46
15RH035	Russia	10.08.2015	Hair	K8	P		Ingen ID
15RH036	Russia	10.08.2015	Hair	K9	P	F	MO47
15RH037	Russia	10.08.2015	Hair	K9	P	F	MO46
15RH038	Russia	10.08.2015	Hair	K9	P		Ingen ID
15RH039	Russia	10.08.2015	Hair	K9	P	M	MO41
15RH040	Russia	10.08.2015	Hair	K9	P		Ingen ID
15RH041	Russia	10.08.2015	Hair	K9	N		
15RH042	Russia	10.08.2015	Hair	K9	N		
15RH043	Russia	10.08.2015	Hair	K9	P		Ingen ID
15RH044	Russia	10.08.2015	Hair	K9	P	M	MO41
15RH045	Russia	10.08.2015	Hair	K9	P		Ingen ID
15RH046	Russia	06.06.2015	Hair	Additional sample	P	M	FI90/MO42
15RH047	Russia	07.06.2015	Hair	Additional sample	P	M	MO43
15RH048	Russia	07.06.2015	Hair	Additional sample	P	M	FI105/MO15
15RH049	Russia	09.06.2015	Hair	Additional sample	P	M	FI44/MO44
15RH050	Russia	10.06.2015	Hair	Additional sample	P	F	FI139/MO45
15RH051	Russia	10.06.2015	Hair	Additional sample	P	M	FI44/MO44
15RH052	Russia	31.07.2015	Hair	Additional sample	P	F	FI38/MO18
15RH053	Russia	27.06.2015	Hair	K8	P	F	MO9
15RH054	Russia	07.07.2015	Hair	K9	P	F	MO9

P=positive, N=negative *NF= feces sample, NH= hair sample **M = male, F = female ***A = Accredited test results
***IA= the analysis are performed by accredited method, but the loss of alleles or markers makes the output not meet the requirement for accredited test results.
No ID= Proven DNA of bears, with incomplete DNA profile.
Explanation notes: 1 = Allele Loss on one or two markers 2 = Partial profile (3-5 markers) 3 = uncertain DNA profile due to multiple allelic loss 4 = Mixture of hair from two or more individuals.

NIBIO
NORSK INSTITUTT FOR BIOØKONOMI

Norsk institutt for bioøkonomi (NIBIO) ble opprettet 1. juli 2015 som en fusjon av Bioforsk, Norsk institutt for landbruksøkonomisk forskning (NILF) og Norsk institutt for skog og landskap.

Bioøkonomi baserer seg på utnyttelse og forvaltning av biologiske ressurser fra jord og hav, fremfor en fossil økonomi som er basert på kull, olje og gass. NIBIO skal være nasjonalt ledende for utvikling av kunnskap om bioøkonomi.

Gjennom forskning og kunnskapsproduksjon skal instituttet bidra til matsikkerhet, bærekraftig ressursforvaltning, innovasjon og verdiskaping innenfor verdikjedene for mat, skog og andre biobaserte næringer. Instituttet skal levere forskning, forvaltningsstøtte og kunnskap til anvendelse i nasjonal beredskap, forvaltning, næringsliv og samfunnet for øvrig.

NIBIO er eid av Landbruks- og matdepartementet som et forvaltningsorgan med særskilte fullmakter og eget styre. Hovedkontoret er på Ås. Instituttet har flere regionale enheter og et avdelingskontor i Oslo.