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NINA Report

Monitoring otter activity in the routing area for a new power cable

Jiska van Dijk
Kristine Roaldsnes Ulvund

NINA

Norwegian Institute for Nature Research

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Aukra © Jiska van Dijk

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- Otertetthetsberegning
- DNA analyser

Abstract

Van Dijk, J. & Ulvund, K. R. 2018. Monitoring otter activity in the routing area for a new power cable. NINA Report 1533. Norwegian Institute for Nature Research.

The island Aukra, also known as Gossa, located in Aukra municipality, Møre og Romsdal County, is known for its industrial area at Nyhamna, which is operated by Shell Norge AS. The Aukra island holds portions of very good quality otter habitat and long-term monitoring of otters reveals that the otters use especially the coastal areas outside the industrial plant. The monitoring project started in 2008 with the first monitoring of otter activity and sampling of otter spraint (faeces) for DNA-analysis. The last four years, otter spraint have been sampled during early spring and late autumn, depending on the weather conditions, in order to analyse the local otter density estimation.

Plans for a new power cable has prompted the need for a more detailed otter study in the area that will be affected by building activities around this new power cable. NINA has been asked to examine the otter activity in the possible routing area for the new power cable. In the area around the potential routing for the new power cable, three individual otters have successfully been identified from the DNA analyses in 2015 and 2016. In samples collected in 2015 (February and October) and in 2016 (March and November) three individuals have been identified in at least three out of the four sampling rounds (Ulvund et al. 2016). In samples collected between November 2017 and February 2018 two individuals have been identified of which one was also identified between 2015-2016 and one was a new individual. This indicates that several individuals are resident in the area and are likely territorial individuals, but that it also varies over time with that new otter individuals come in and known individuals disappear (i.e. move to another area or die). Since otters can breed and rear young throughout the year, it is not possible to give advice on a certain time of year that will provide the least disturbance for the otters. We therefore suggest that the potential routing for the cable is based on the botanical findings and mapping of cultural heritage sites. When Shell has made the decision on the approximate route of the new power cable, we can map the otter den sites and day resting sites in this particular area precisely and study their use before the building activities starts, during the building activity and their use after the activity is finished (year 2021-2022).

Jiska van Dijk, Norwegian Institute for Nature research, PO 5685 Torgarden, 7485 Trondheim, Norway, Jiska.van.dijk@nina.no
Kristine Roaldsnes Ulvund, Norwegian Institute for Nature research, PO 5685 Torgarden, 7485 Trondheim, Norway, Kristine.Ulvund@nina.no

Sammendrag

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Øya Aukra, også kjent som Gossa, ligger i Aukra kommune, Møre og Romsdal fylke, og er kjent for sitt industriområde ved Nyhamna, som drives av Shell Norge AS. Aukra er preget av deler med gode oterleveområder og langsiktig overvåkning av oter viser at oterne bruker spesielt kystområdene utenfor industrianlegget Nyhamna. Overvåkingsprosjektet startet i 2008 med den første overvåkingen av oteraktivitet og prøvetaking av oteravføring for DNA-analyse. De siste fire årene har oteravføring blitt samlet i løpet av tidlig vår og sein høst, avhengig av værforholdene for å kunne identifisere individer og dermed lokal bestandsstørrelse fordelt på ulike kjønn.

Planer for en ny strømkabel har ført til behovet for et mer detaljert oterstudie i området som blir påvirket av bygningsaktivitetene for å realisere den nye strømkabelen. NINA har blitt bedt om å undersøke oter aktivitet i det potensielle området for den nye strømkabelen. I selve området for den nye strømkabelen, har tre ulike oterindivider med suksess blitt identifisert fra DNA-analysene i 2015 og 2016. I prøvene samlet inn i 2015 (februar og oktober) og i 2016 (mars og november), har alle de tre individene blitt identifisert i minst tre av fire innsamlingsrunder (Ulvund et al. 2016). Dette indikerer at disse tre oterne er bosatt i området og sannsynligvis territoriale dyr. I prøvene samlet inn mellom november 2017 og februar 2018 ble to individer identifisert hvorav ett individ også har blitt identifisert tidligere, i 2015 og 2016. Resultatene viser at ulike otere bruker samme området men at det varierer over tid med at nye individer etablerer seg og kjente individer forsvinner (dvs. dyrene enten dør eller flytter til et nytt område). Siden otere reproduserer gjennom hele året, er det ikke mulig å gi råd om hvilken årstid det er best å legge strømkabel for å unngå forstyrrelser på reproduserende otere. Vi foreslår derfor at traseen for kabelen blir vurdert ut fra botaniske funn og kartlegging av kulturarvsteder. Når Shell har bestemt hvor traseen kommer til å bli, kan vi kartlegge oterhiene og dagleiene, og undersøke om de er i bruk eller ikke. Dette bør/må gjennomføres før byggevirksomheten starter, under selve byggeaktiviteten og undersøkes etter at byggeaktivitetene er ferdig (år 2021-2022).

Jiska van Dijk, Norsk institute for naturforskning, PO 5685 Torgarden, 7485 Trondheim, Norway, Jiska.van.dijk@nina.no
Kristine Roaldsnes Ulvund, Norsk institute for naturforskning, PO 5685 Torgarden, 7485 Trondheim, Norway, Kristine.Ulvund@nina.no

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1 Introduction

The island Aukra, also known as Gossa, located in Aukra municipality, Møre og Romsdal County, is known for its industrial area at Nyhamna, which is operated by Shell Norge AS. At Nyhamna, natural gas from the gas field Ormen Lange is led onshore, processed and redirected to Easington in England. The industrial facility has been operational since 2007. The Aukra island holds portions of very good quality otter habitat and long-term monitoring of otters reveals that the otters use especially the coastal areas outside the industrial plant.

The main goal of the long-term otter monitoring in and around Nyhamna is to gain knowledge on how industrial complexes such as Nyhamna affect the otter population in the surrounding area. The monitoring project started in 2008 with the first sampling of otter spraint (faeces) and monitoring of otter activity. To monitor the local otter population and obtain an estimate of the minimum number of animals living in the study area, we apply DNA-analysis of non-invasively collected faecal samples to identify individual otters. The last four years, otter spraint have been sampled during spring and autumn, depending on the weather conditions. In addition, a capture-mark-recapture method is then used to estimate otter abundance, sex distribution and presence/absence of individual otters. These analyses contribute to our understanding of the otter population size and potential changes in populations size.

According to Shell Norge AS there is a need for adding a power cable in order to provide grid-power to an offshore project (see figure 1). This new power cable will be placed in the same area as the old cable or in the vicinity of this area, depending on geographical conditions, botanic findings (i.e. special botanic species preferably to be avoided), cultural heritage sites that preferably should be avoided, and depending on otter activities in the area to avoid otter disturbance as much as possible.

NINA was asked to have a closer look at the otter activities in the possible routing area for the new power cable (see figure 3). For the long-term otter monitoring we are already monitoring along the coastline (0 to 50 meters from the ocean line), but for the power cable we also included the area stretching higher up towards the industrial plant (up to 100 meters from the ocean line). The area stretching further than 100 meters away from the ocean line is normally less used by otters. The exceptions are areas with freshwater streams, as otters are known to follow freshwater streams over long distances. Because there are no streams in this particular area where the new power cable will be placed, there was no reason to extend the search for signs of otters further into the area towards the industrial plant and we therefore stayed in the area between 0 and 100 meters from the coast line.

When the routing of the new power cable is defined, and permissions are given, the cable will be placed about 1 meter below the soil surface. A 1-meter wide trench will be dug from the coast towards the new transformation station (see figure 1 and 2). An additional width of circa 5 meters either side of the trench will be cleared and serve as access road for constructing the trench. According to Shell Norge the area affected by the building activities will

be left in such condition that the vegetation can recover, grow again and cover the barren ground.

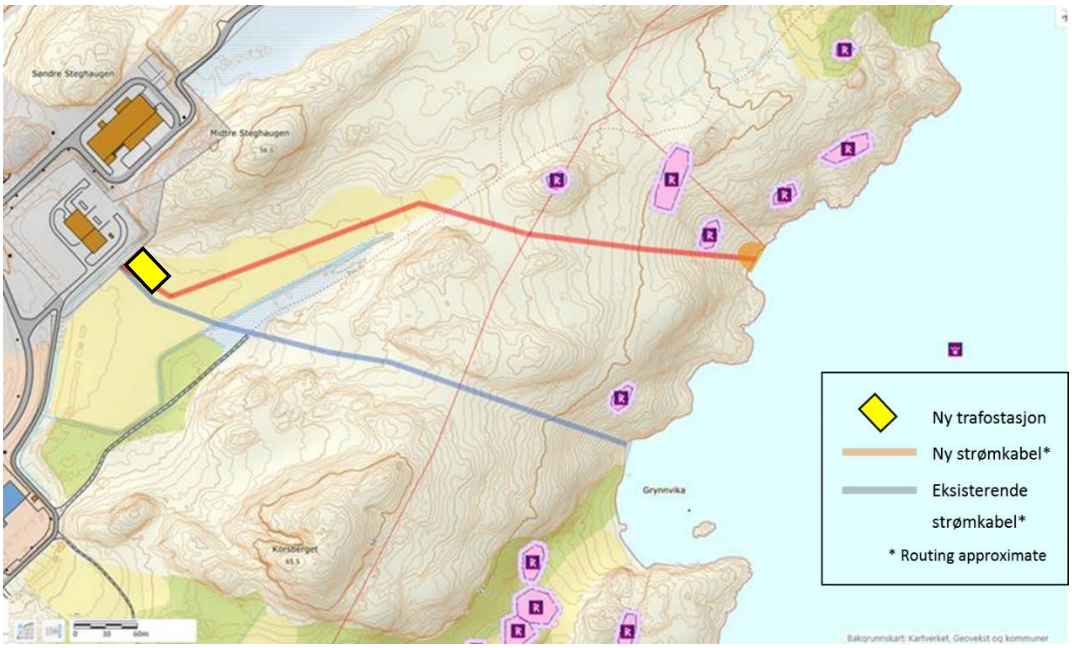

Figure 1. Existing (grey line) and possible new power cable (red line). The yellow square indicates the new transformation station.

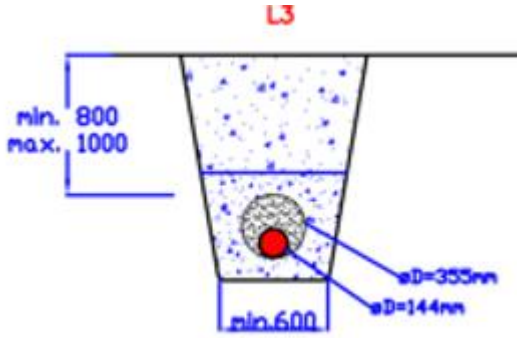

Figure 2. Approximate dimensions of the trench, pipe and cable that is needed for the new cable.

2 Monitoring otter activity and individual otters

The long-term monitoring project started in 2008 (Landa et al. 2009) and surveys were again carried out in 2010 and 2011. The monitoring project continued in 2015 with finances for another four-year period. To monitor the local otter population and obtain an estimate of the minimum number of animals living in the study area, we apply DNA-analysis of non-invasively collected faecal samples to identify individual otters. A capture-mark-recapture method is then used to estimate otter abundance, sex distribution and presence/absence of individual otters (Ulvund et al. 2017).

When we collect fresh faecal samples along the coast lines north-west and north-east from Nyhamna and inside Nyhamna, we also collect information about otter activities such as day resting areas, den sites, otter trails, food leftovers and old faecal samples which are too old for DNA-analysis.

Figure 3 shows the area where an intensified search for otter activities took place in February 2018. Because otters tend to use the area towards the coast line most intensive, especially when no fresh water stream is in the vicinity, there was no need to extend this area further up in the direction of Nyhamna. Because the intensive search in February 2018 was only conducted once, we have also included our findings from 2015-2016 in this report to give a better idea of otter activity in the area over the years.

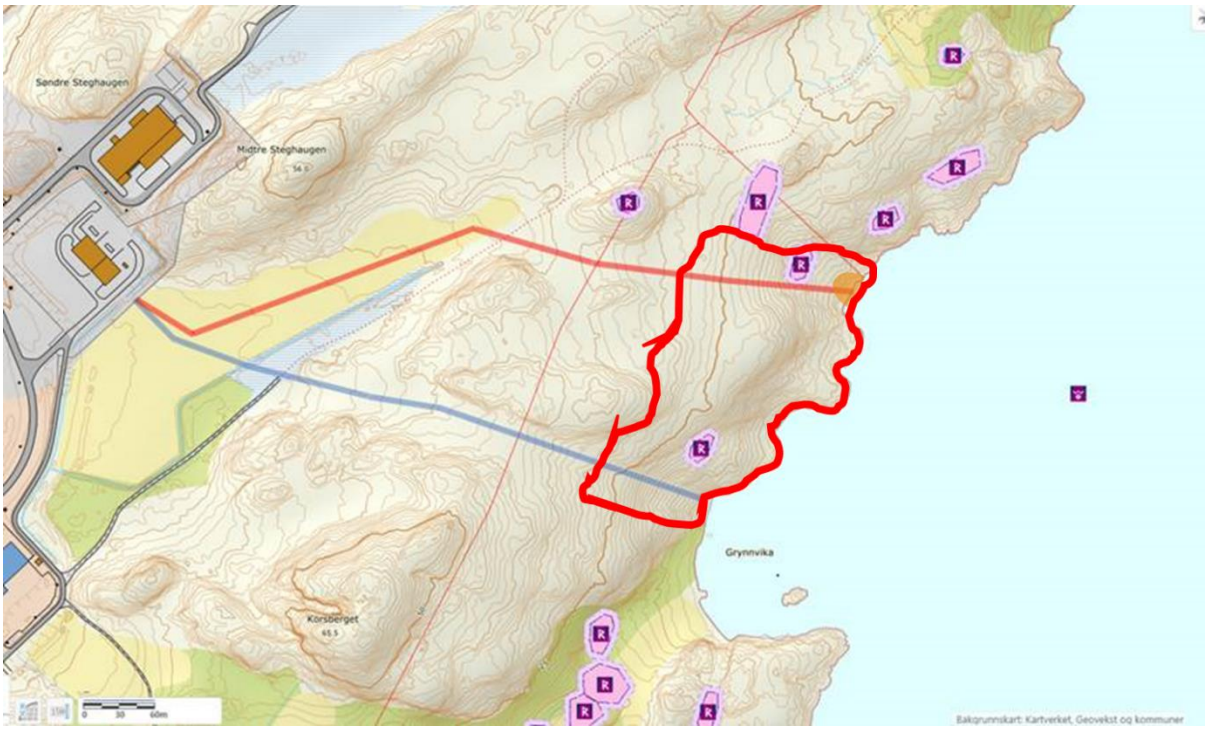

Figure 3. The red line shows the area where a new power cable is planned, the grey line shows the existing power cable. The study area is circled in red.

3 Results

3.1 Monitoring

As a result of the long-term monitoring, otter activities are found in the entire study area (Figure 4, see also Ulvund et al. 2017). Otters thrive along the coastlines and use the habitat close to the sea for passing through and access to fishing grounds. Areas higher up are especially interesting for otters to choose as their day resting sites and den sites. In the extended area we also found otter day resting sites and den sites higher up. In the area in question we found several places with otter spraints, food leftovers, otter trails, resting sites and den sites (Figure 5), consistent with the other areas within the long-term monitoring study. However the search in January 2018 was a one-moment search only, not designed for confirming the actual intensity of otter use of these sites (i.e. if they use the sites daily or weekly).

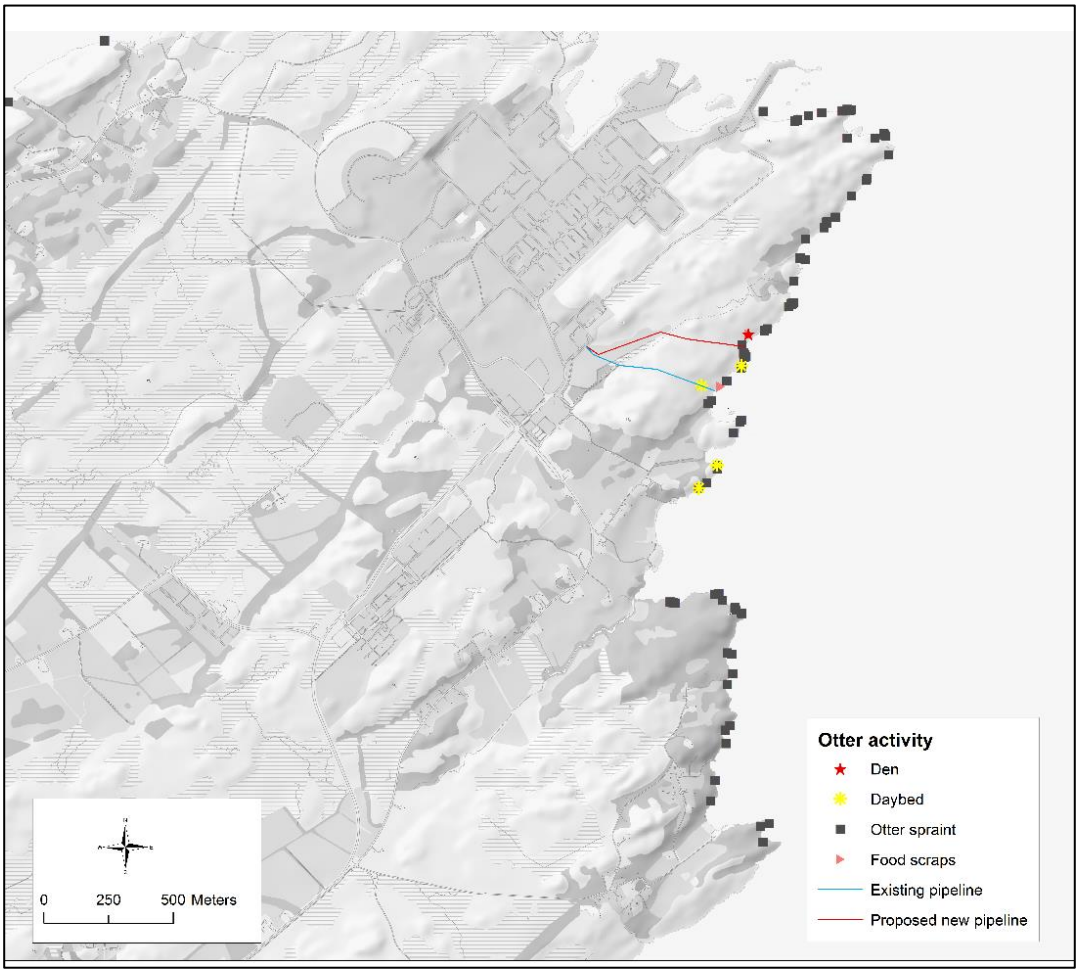

Figure 4. Results from monitoring of otter activity east from the Nyhamna facility in November 2017 and January-February 2018. Red stars indicate otter den sites, yellow stars otter daybeds and resting sites, orange triangle food leftovers from otters and black squares indicate otter spraints. Red line and blue line indicate the proposed new pipeline and the existing pipeline respectively.

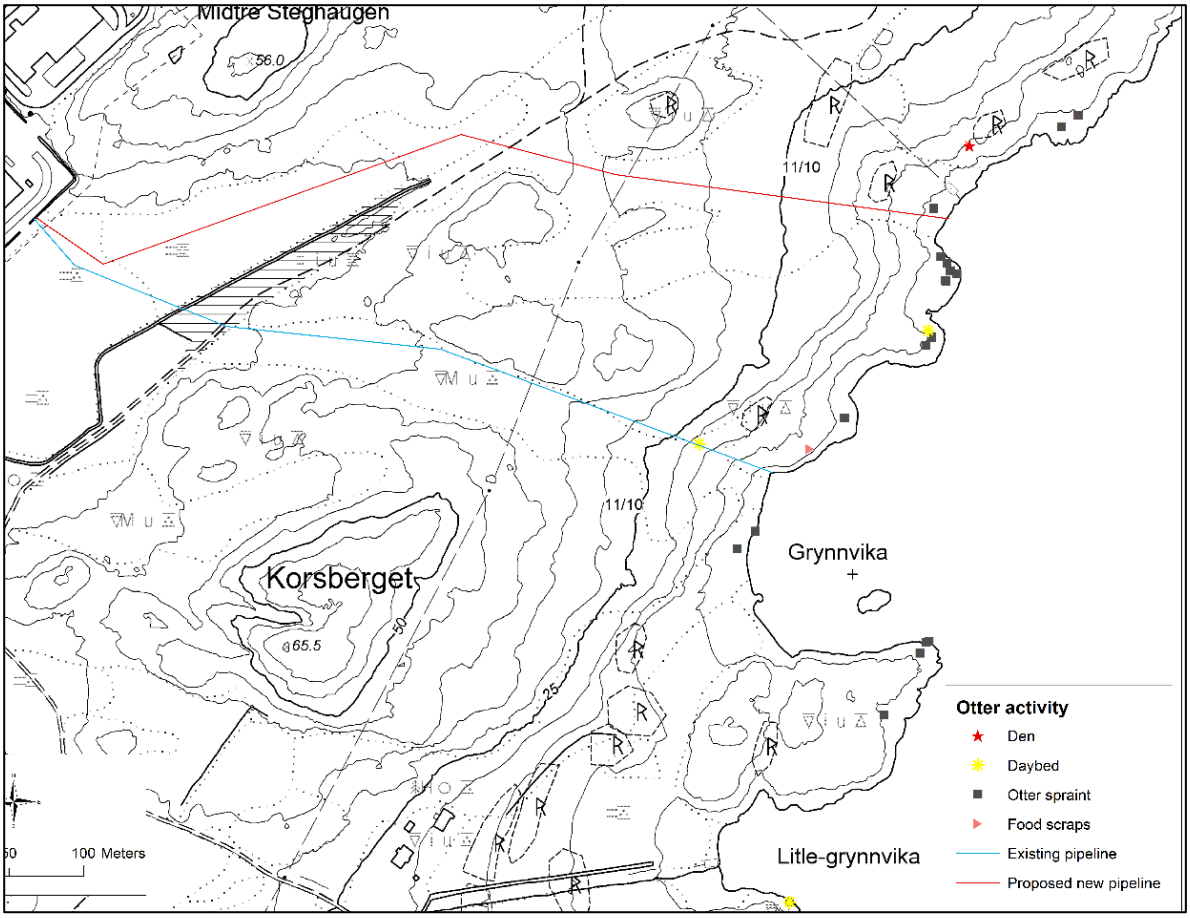

Figure 5. Results from monitoring of otter activity (November 2017 and January-February 2018) in the area potentially affected by the new power cable. Red stars indicate otter den sites, yellow stars otter daybeds and resting sites, orange triangle food leftovers from otters and black squares indicate otter spraints. Red line and blue line indicate the proposed new pipeline and the existing pipeline respectively.

3.2 Otter individuals

In the area around the potential routing for the new power cable, four individual otters have successfully been identified from the DNA analyses. Because not all collected otter spraints result into successful identification, there might be more otters in the area which we don't know of. However from the samples collected in between 2015 and 2016 three individuals have been identified in at least three out of the four sampling rounds (Ulvund et al. 2016), one of them even again in 2018 and one new individual in 2018 only. This indicates that around two to four individuals are likely to be resident in the area and likely territorial individuals (two females Ind003, Ind005 and one male Ind001 between 2015-2016 and one female Ind005 and one male Ind049 still in 2018) (Figure 6 and 7). It also shows that animals leave the area, may die, and that new individuals come into the area again.

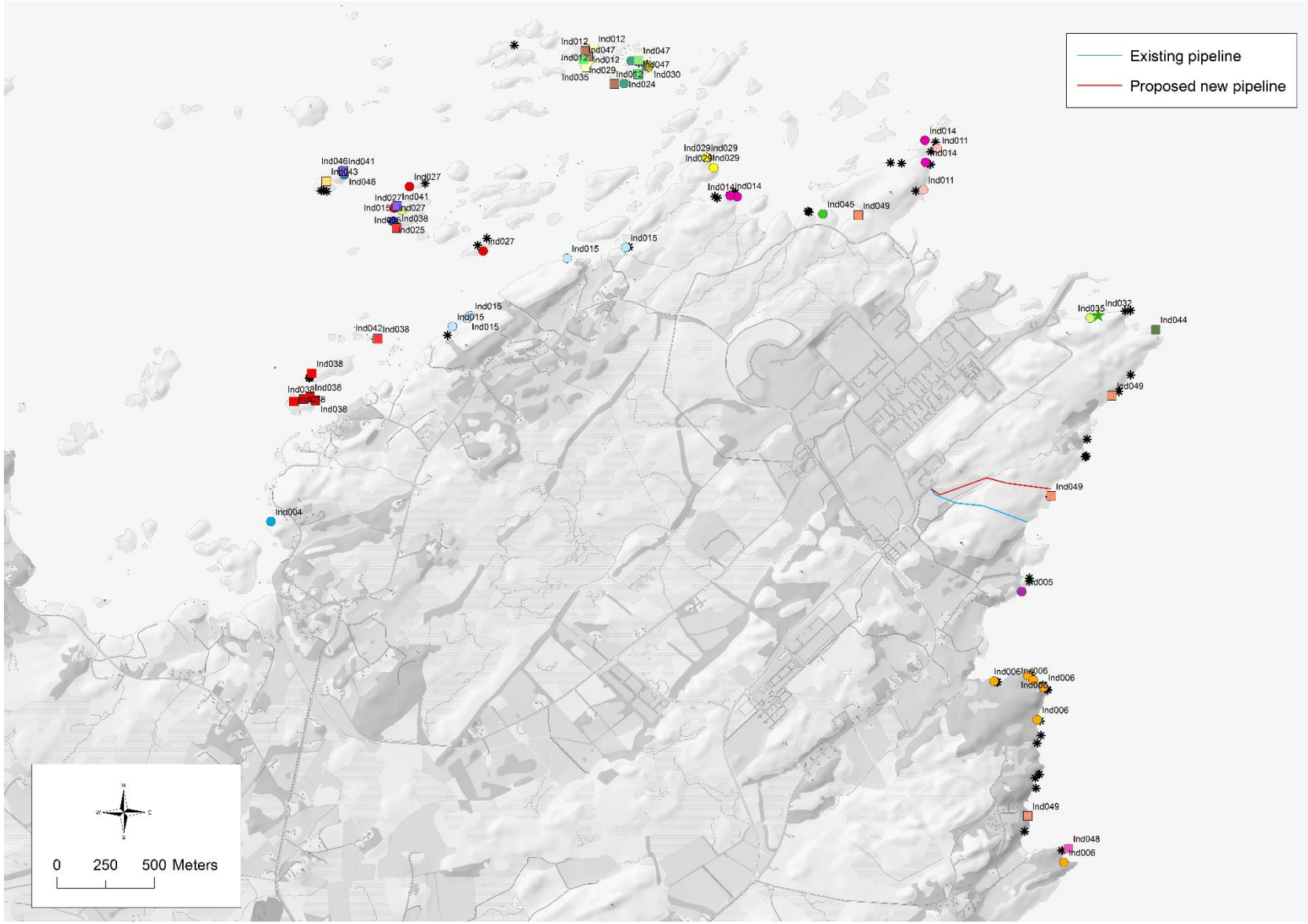

Figure 6. Overview of otter spraint and jelly samples analyzed to individual otters. The samples were collected in November 2017 and January and February 2018 near the Ormen Lange gas field on the Island of Aukra (Gossa), Aukra municipality. Circles indicate females, squares indicate males, while different colors indicate different individuals. Black stars indicate samples analysed and identified as otter, but where the DNA quality was not good enough to identify the individual. The green star marks an otter with unknown sex (In032).

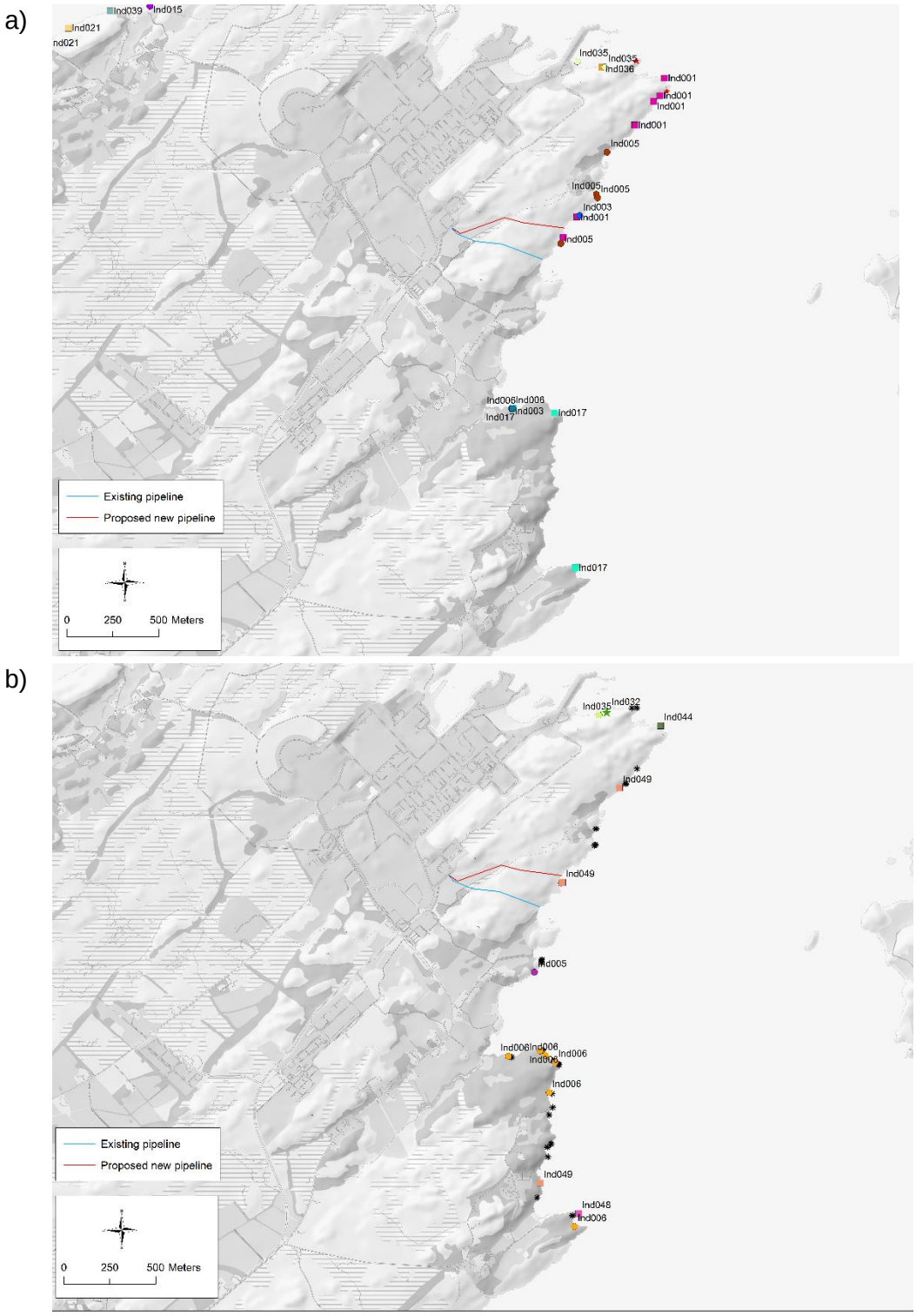

Figure 7. Overview of otter spraint and jelly samples identifying individual otter (circles indicate females and squares indicate males). The samples were collected east from the Nyhamna facility on the island of Aukra (Gossa) in November 2016 (a) and between November 2017 – February 2018 (b). The different colours indicate different individuals. Black asterix indicates samples analysed and identified as otter, but where the DNA quality was not good enough to identify the individ. The star marks an otter with unknown sex (In032).

Table 1. Individual otters identified from otter spraint and jelly collected between 2015 and 2018. The different numbers indicate the total number of samples that could be assigned to that particular otter individual. For one otter (Ind032) identified in February 2008 sex could not be determined from the DNA samples and is not included in this table. Female otter Ind005 and male otter Ind049 would be affected by the building activities around the new power cable if building activities would start this year, but also female otter Ind003 and male otter Ind001 might still be in the area. These four are indicated in yellow.

		2015		2016		2017-2018
		February	October	March	November	Nov, Jan, Febr
Females	Ind003	3	2	3	2	
	Ind004	2				1
	Ind005	2		2	4	1
	Ind006	3		1	2	6
	Ind007	3	2			
	Ind010	5	2		1	
	Ind011	5	2	1		2
	Ind013	6			5	
	Ind014	1	1	2	2	4
	Ind015	5	4	3	10	6
	Ind018	2				
	Ind024		2	4		3
	Ind025		3	1		1
	Ind027		1		2	4
	Ind028		1			
	Ind029		1	2		6
	Ind030			1	2	1
	Ind035				2	4
	Ind045					1
	Ind046					2
Males	Ind001	4	1		6	
	Ind002	7			1	
	Ind008	4				
	Ind009	3		7		
	Ind012	3		1	1	5
	Ind017	1	1	1	3	
	Ind019		1			
	Ind020		1			
	Ind021		4	3	16	
	Ind022		1			
	Ind023		2			
	Ind026		1	1		
	Ind031			1		
	Ind033				1	
	Ind034				2	
	Ind036				1	
	Ind037				1	
	Ind038				2	7
	Ind039				1	
	Ind041					2
	Ind042					1
	Ind043					1
	Ind044					1
	Ind047					3
	Ind048					1
	Ind049					4

4 Proposal

Because otters are using their den sites and day resting sites intensive, these areas are in particularly most vulnerable to disturbance by the planned building activities. To move the building activities to another area will however lead to other otters being disturbed, because other otters are found along the coast-line around Nyhamna as well (see Table 1 and Ulvund et al. 2017). Otters along the Norwegian coast are known to be able to have their young all year round (Heggberget 1988) and there is therefore not a particular period of the year that could be avoided to minimize disturbance level in this respect. However because otters change their den sites and day resting sites during the different seasons and over the years, they are able to move to other potential den sites and day resting sites in the vicinity when they are disturbed. When otters have young they are however restricted to their den site for several weeks up to two months (Kruuk 2006). In case reproduction is observed building activity can be hampered and even be stopped at the County level due to the implementation of the Nature Diversity Act and the fact that otters are a red list species (Wiig et al. in Henriksen and Hilmo 2015).

We therefore think it is best to define the potential routing based on the botanical findings and mapping of the cultural historical sites. When Shell has made the decision on the potential route of the new power cable, we can map the otter den sites and day resting sites in this particular area adequately and study their use before the building activities start (year 2021-2022). This to get an accurate overview of den sites and day resting sites that are being used versus den sites and day resting sites that are potential available for otters to move to in case they are disturbed. In addition we can use wildlife cameras at the den sites and day resting sites (those sites that are in use and those sites that are potentially available for otters to move to in case they are disturbed) before the construction activities starts, continuing through the construction period till after the work has been finished. By including wildlife camera we can monitor the temporal disturbance effect, if there is any, and get detailed data on when the otters are using the area again after the work is finished to prove the temporality of the disturbance and to show that the area is again suitable for otters also after the building activities.

Because Shell is planning to implement the building activity to be finished in a relative short period and because Shell will leave the building area such that vegetation can easily re-grow after the construction work, we assume that non reproducing otters are able to move to other potential den sites and day resting sites when they are disturbed. They are also likely to return to their original sites after the work has been finished. However by following our proposal and monitor closely the sites that are in use, we are able to report on possible reproduction and Shell can delay the building activities by take action to it adequately by postponing the building activities until the mother has given birth and can move the young otters to

another place. Such delay needs then to take into account at least a period of 63 days gestation time and at least 2 months after birth. After 2 months female otters are able to take their young out of their den site (Kruuk 2006).

Time and work schedule:

1) Map the area for its den sites and day resting sites (those sites potential for use and those sites that are in use) after Shell has made the decision on the exact route of the new power to see where the different den sites and day resting sites are exactly.
2) Set out wildlife cameras (motion triggered) close to known den sites and day resting sites. Approximately one month prior to start of construction work.
3) Sample otter spraints and jelly minimum once, preferably twice before start of the construction work (can be done one month before and a few days before).
4) Wildlife cameras will be left out at least two-three months after the construction work has finished.
5) Sample otter spraints and jelly for DNA-samples twice after the construction work has finished – for example one month after and 3-6 months after.

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NINA Report

The Norwegian Institute for Nature Research, NINA, is as an independent foundation focusing on environmental research, emphasizing the interaction between human society, natural resources and biodiversity.

NINA was established in 1988. The headquarters are located in Trondheim, with branches in Tromsø, Lillehammer, Bergen and Oslo. In addition, NINA owns and runs the aquatic research station for wild fish at Ims in Rogaland and the arctic fox breeding center at Oppdal.

NINA's activities include research, environmental impact assessments, environmental monitoring, counselling and evaluation. NINA's scientists come from a wide range of disciplinary backgrounds that include biologists, geographers, geneticists, social scientists, sociologists and more. We have a broad-based expertise on the genetic, population, species, ecosystem and landscape level, in terrestrial, freshwater and coastal marine ecosystems.

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Norwegian Institute for Nature Research
NINA head office
Postal address: P.O. Box 5685 Torgarden,
NO-7485 Trondheim, NORWAY
Visiting address: Høgskoleringen 9, 7034 Trondheim
Phone: +47 73 80 14 00
E-mail: firmapost@nina.no
Organization Number: 9500 37 687
http://www.nina.no

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