Field report of seal tagging March 2025

Part of Tagging seals project 2025-2026

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Wageningen Marine Research
report: C049/25A

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Contents

1 Introduction

The aim of this project is to collect data on the behaviour and recent distribution of harbour seals at sea. The tracking data can be used to improve the existing seal density maps that are used to estimate the overlap between the seal distribution and future offshore wind farms.

This is the second fieldwork reports on the tagging campaigns. Again, this report will include the number of seals tagged per category, time spent, materials used, and people involved, along with photographs.
In this fieldwork report we also provide a summary of the work carried out, highlight any notable observations, and outline key lessons learned for future tagging campaigns.

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2 Preparations

2.1 Choice of animals

This project concentrates on harbour seals, as their population has been declining since 2021. This focus was requested by RWS. Within this project, we aimed to equip a total 28 seals with GSM/GPS trackers in March and September 2025. Young of the year (seals that were born within a year prior the capture) were underrepresented in the existing data (2005-2017) and therefore, one of the aims of this project was to tag ten young of the year. To assure comparability with the existing data we also aimed to track six male adult seals, six female adult seals and six subadults (the gender of this latter group plays less of a role). In spring, 6 animals were tagged, comprising 1 young of the year; 1 (female) sub-adult; 4 adult females (***Table 2*****).** The aim in the autumn was to tag the remaining 22 seals.

2.2 Location and date

Initially, "Razende Bol" was selected as catch and tagging site, due to its proximity to active and future offshore wind farm locations. The waters around the Razende Bol, however, are rather treacherous, and the sandbank is unstable in the sense that its contour changes continuously, making it uncertain how it can be approached safely to capture the seals. Moreover, seals here either occur in mixed groups or (especially in March-April) are dominated by moulting grey seals. In conclusion, the Razende Bol was not the ideal catching location.

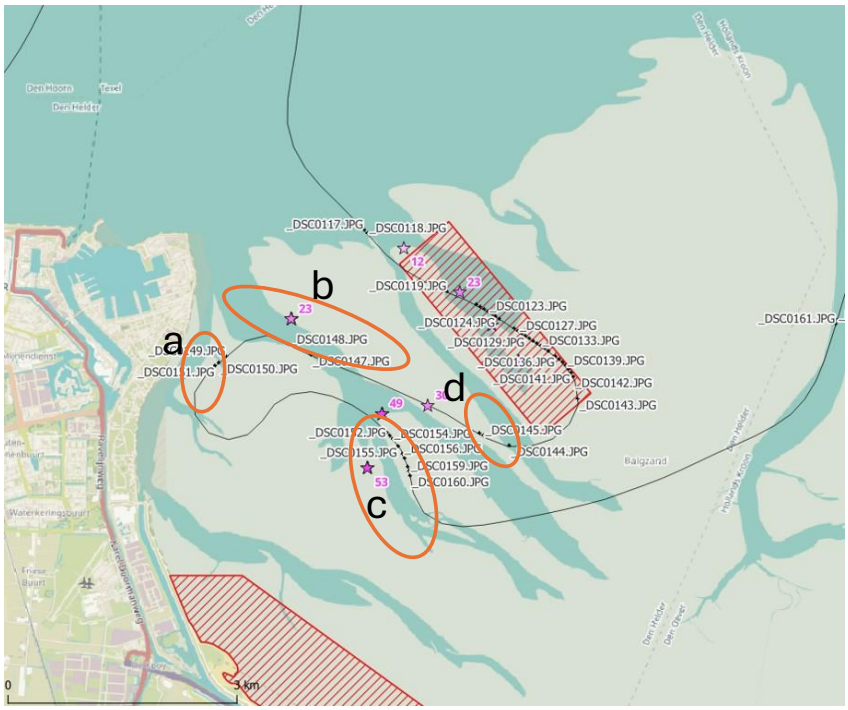


Figure 1. *The area of Balgzand and the four locations (a-d) deemed adequate to tag seals from. Note that the protected areas (hatched) are avoided (see Permits).*

Therefore, we agreed on "Balgzand", east of Den Helder, 10 km away from the Razende Bol, thus still in the Western Wadden Sea region, as a suitable alternative (***Figure 1***). There, the safety for both the catching team and the animals could best be guaranteed, and the chances of catching harbour seals were expected to be higher.
Due to the harbour seal birth and moulting period, May to August is generally avoided when trying to tag seals. Experience shows that the most suitable times in the year are either March or after September 1st.

March is the first suitable month in spring, and weather conditions are often unsuitable in the preceding months. . In June, female harbour seals may have advanced further into their pregnancy, furthermore, seals may also start moulting and the transmitters may fall off. To cover as much of the year as possible, additional tagging efforts will be made after September 1st as the moulting season is finished by then. The devices deployed in the autumn usually will remain active until the beginning of the next year.

2.2.1 Spring

A team went out to scout the area in February 2025, and they found several locations in Balgzand that seemed adequate for capturing and tagging seals. In addition, aerial survey data from former years were consulted to determine the potential presence of seals in March.

Due to the dependency on low tide in the middle of the day for uninterrupted catching and tagging, and the already scheduled tagging pilot of harbour porpoises in March, there was only one window of opportunity in March (26-29th) left (***Table 1***). In that period the necessary ships were available for 2 out of the 4 days.

Table 1. *Available catching dates in March 2025.*

DATE	TIDE	COMMENT
Mo 10 March	10:10	*Porpoise catching planned*
Tu 11 March	11:39	*Porpoise catching planned*
We 12 March	12:46	*Porpoise catching planned*
Th 13 March	13:34	*Porpoise catching planned*
Fr 14 March	14:12	*Porpoise catching planned*
Sa 15 March	14:44	*Porpoise catching planned*
Su 16 March	15:12	*Porpoise catching planned*
Mo 17 March	15:41	*Porpoise catching planned*
Tu 18 March	16:09	*Porpoise catching planned*
We 26 March	10:21	*Seal tagging day 1*
Th 27 March	11:47	*Seal tagging day 2*
Fr 28 March	13:03	*no ship available*
Sa 29 March	13:57	*no ship available*

2.2.2 Autumn

Like in spring, catching periods are dependent on low tide in the middle of the day for uninterrupted catching and tagging and availability of personnel. Moreover, as the aim is to select many young of the year, we aimed to wait to ensure these animals had grown sufficiently to be less affected by the catching and tagging than newborns. Therefore, catches were postponed to October.
It was decided to continue the autumn catches in the Balgzand area. Prior to these catches the m.s. Phoca scouted the area to ensure the presence of seals and check the accessibility of location C (***Figure 1***) for the catching boats.

2.3 Permits

As seals are vertebrates, and protected in the Netherlands, both the Environment and Planning Act "Omgevingswet" and the Experiments on Animals Act "Wet Op de Dierproeven" apply. For the Environment and Planning Act, WMR is in the possession of a permit to catch and handle seals in all applicable provinces, but we still needed to discuss the entry and working in protected areas in Noord-Holland. In February permissions were discussed and agreed upon with the provincial delegates. In the end, we chose to aim for areas with no specific protection. It must also be noted that if we would like to work on the Razende Bol in

the future, specific permits, related to the Environmental Law (Omgevingswet), are required which are quite complicated to obtain.
We worked closely with the crew of the WaddenUnit of the ministry of LVVN with whom we have cooperated in most previous tagging campaigns. As they are responsible for the wardening of the Wadden Sea area, they could directly oversee our activities in relation to environmental law and no other inspector was needed.

WUR is holder of an animal ethics permit, under which we are eligible to conduct animal experiments such as the tracking of seals. We applied for a long-term plan including ethical commitments to track local, but also arctic seal species. This was approved by the animal ethics committee (DEC) for 5 years (until 2029). For the current project, a specific experimental setup was written and discussed with the responsible ethical committee (IvD (*Instantie voor Dierwelzijn*- Animal Welfare Authority) of the WUR). We received approval for 1 year, to ensure close ethical review. In addition, personnel qualifications with respect to the animal ethics requirements were discussed and approved.

2.4 Materials and Method

Tagging seals involves catching them on sandbanks using a specifically designed boat and a rubber dinghy. Seals were captured at low tide adjacent to sandbanks using a purpose-built seine-net of approximately 100m length and 8m drop. Material and personnel were transported to the sandbank with other small boats. Specially designed "cradles" allow us to fix the animals, while the trackers are glued to their fur and biomedical samples and measurements (length, weight) are taken. Within maximum 2 hours seals are released in the wild.

When tagging seals, the aim is to maximize data collection, while minimizing the number of animals tagged, since the act of catching and fixating is very stressful for the seals. This is the reason why we use trackers that not only collect location data, but also collect information on dive, transit and haul-out behaviour. Furthermore, we aim to do long-term tracking spanning several months. We therefore decided to continue to use tags that we have used before (Aarts, 2021; Brasseur et al., 2022; Aarts and Brasseur, 2024): SMRU GPS GSM data loggers. These tags collect GPS locations and detailed diving data (including for example depth and dive duration) and convey the data using the GSM network when the animal is within GSM coverage. Moreover, WMR has contributed to the improvement of the tracker, diminishing the drag it may cause to the animal (McKnight et al., 2024).

Despite the long waiting lists, we obtained seventeen gen II GPS Phone Tags in the beginning of March 2025 and we have ordered an additional 11 for September 2025. Once received, the tags were activated (no calibration was required) to test their functioning and the links to the Dutch GSM network. Test results were positive and discussed with the SMRU engineers.

***Figure 2**. GPS Phone Tag (photo Janneke Ransijn).*

To capture, fixate, sample and measure the seals, several techniques and specific contraptions (for example the holding nets and cradles) have been developed during the over 25 years of experience, to perfect the

tagging of the animals. All durable materials, including crates, cradles and nets were checked and repaired or replaced when needed. The catching ships were serviced.
Field material, including personal safety equipment such as life jackets, survival suits, were checked, replaced or repaired. Disposables - mostly for biological measurements, but also items like glue for the tags - were ordered.

2.5 Teams

The campaign team required personnel with shipping skills and skills regarding the animal experiment. The four small boats used for the catch were piloted by WMR personnel and WaddenUnit members.

The WMR team included 3 people with a so-called art.9 certificate, authorizing them to initiate the project and conduct the animal experiment. The other field personnel had obtained an exemption during earlier campaigns (5 persons) or were granted, based on their experience in the field, a so called "*kaderstelling*" (10 persons). The process of selecting the personnel for specific experimental tasks was subject to continuous discussion on their previous education and training and on the training during fieldwork with the IvD. Some of the selection criteria were for example previous experience with seal tagging; wildlife handling experience, specifically with marine mammals and being able to perform physically demanding tasks.

The tasks directly related to the animal experiment, such as the fixation and release of the seals, the glueing of the trackers and biological sampling, were carried out by the qualified team members. Measuring of length, weighing and keeping the animals cool was done by trained personnel with less experience. In addition, all details of the activities were recorded in the field, and all activities were supervised to ensure a coordinated process.

2.6 Field preparations

In the week prior to the catch, field materials were subjected to final inspections. Field equipment was placed in specific cases to facilitate fieldwork. Lists were made to indicate the content of each crate.
WMR boats were tested. The catching net was laid on the catching boat.
Personnel who were responsible for specific tasks related to the animal experienced and requiring specific training were retrained in their respective tasks. Since the last tagging expedition took place in 2019, all tasks had to be practiced or rehearsed. Unexperienced personnel were appointed to tasks that did not involve direct interaction with the animals.

Prior to the fieldwork, all personnel assembled in Den Helder harbour, from where departure was scheduled. A total of five vessels were involved in the catching during this event: one "mother" ship from the WaddenUnit (HMS Asterias in March; the HMS Phoca in October and the Harlingen 1 in November), serving as platform and transportation, and four boats supported the catching operation - two for setting and retrieving the net, and two for transporting personnel.

3 Seal Catches

A total of 28 seals were tagged in March, October and November 2025. Based on sex, length and weight the tagged animals coincide with the aim of the project: 10 young of the year; 6 sub adults; 6 adult females; 6 adult males (***Table 2***).

Table 2. *Overview of tagged seals (grey in spring, white in autumn).*

Seal number	Date	Sex	Age	Length tail (cm)	Length tot (cm.)	Weight (kg)	Net thrown out	Free time	Handling
PV86-452-24	26-3-2025	F	y	103	117	36	10:00	11:02	01:02
PV94-614-24	16-10-2025	M	y	100	108	20	10:50	11:59	01:09
PV94-470-24	16-10-2025	F	y	76	94	18	09:56	11:27	01:31
PV94-457-24	16-10-2025	F	y	84	107	21	09:56	11:52	01:56
PV94-497-24	17-10-2025	M	y	99	127	26	11:28	13:26	01:58
PV94-453-24	17-10-2025	F	y	93	110	29	11:28	13:30	02:02
PV94-602-24	5-11-2025	M	y	92	113	29	13:02	14:34	01:32
PV94-480-24	5-11-2025	M	y	98	116	47	13:02	14:39	01:37
PV94-603-24	5-11-2025	M	y	107	120	34	13:02	15:06	02:04
PV94-617-24	5-11-2025	F	y	113	129	32	13:02	15:02	02:00
PV94-495-24	16-10-2025	M	sa	118	147	49	09:56	11:38	01:42
PV94-472-24	16-10-2025	F	sa	113	137	44	09:56	11:47	01:51
PV94-604-24	17-10-2025	M	sa	113	138	40	11:28	12:45	01:17
PV94-615-24	5-11-2025	M	sa	126	139	40	13:02	15:10	02:08
PV94-613-24	5-11-2025	F	sa	132	145	56	13:02	14:56	01:54
PV94-610-24	5-11-2025	F	sa	131	145	65	13:02	14:30	01:28
PV86-505-24	27-3-2025	F	A	123	146	80	10:15	11:26	01:11
PV86-485-24	27-3-2025	F	A	139	157	80	11:35	12:32	00:57
PV86-502-24	27-3-2025	F	A	142	165	87	11:35	12:48	01:13
PV86-496-24	27-3-2025	F	A	147	164	79	10:15	11:32	01:17
PV94-483-24	16-10-2025	F	A	133	158	82	09:56	11:35	01:39
PV94-611-24	5-11-2025	F	A	141	158	76	13:02	14:53	01:51
PV86-494-24	27-3-2025	M	A	142	162	75	11:35	12:52	01:17
PV94-612-24	16-10-2025	M	A	136	162	78	09:56	11:48	01:52
PV94-637-24	17-10-2025	M	A	132	165	63	11:28	13:10	01:42
PV94-464-24	17-10-2025	M	A	140	170	73	11:28	12:59	01:31
PV94-492-24	17-10-2025	M	A	146	172	72	11:28	12:52	01:24
PV94-468-24	17-10-2025	M	A	147	182	101	11:28	13:03	01:35

3.1 Spring

On March 25th , the catching net was prepared for the catch on the WMR Doc in Den Helder.

Figure 3. *Loading and preparations of the catching boats.*

3.1.1 26th of March

Table 3. *Timetable 26th of March.*

TIME	ACTIVITY	COMMENT
8:00	Departure from Den Helder	
10:00	Start catching attempt	
11:00	Release after successful tagging	One seal caught
12:00-14:00	Scouting of catch sites	
15:00	Return in Den Helder	
16:00-19:00	Notes are transcribed and samples processed	

Figure 4. *On board the Asterias instructions are given to the team.*

All personnel boarded and material was loaded on either the Asterias or the catching boats, afterwards, the ships left the harbour for Balgzand.

After anchoring, the project leader and captain of the Asterias selected the exact catching site, taking into account the weather conditions, presence of seals, and tide. Area B was free of seals, therefore, Area A (see ***Figure 1***) was chosen as there were approximately 10 seals and the site seemed readily approachable for the catching team. The personnel were instructed for their specific tasks (Fig. 3), which included the safety

procedures for the catch and the watch who remained on board the Asterias. Personnel were designated to one of the boats.

Figure 5. *Material and personnel are loaded on the catching boat.*

Personnel and material were loaded into the catching boats, and the net was successfully deployed, encircling approximately five seals. However, the net became stuck at the bottom, and the catch was aborted after a 1-2 mins attempt to pull the net ashore. A boat was dispatched to release the net. The obstruction was caused by a large bolder of peat. When the net was released, most seals swam away (3-4 animals). However, one seal was entangled underwater in the net. After the seal was released from its entanglement and inspected, it appeared unharmed, and the animal was tagged, measured and sampled. See ***Table 3*** for seal details.

Despite the difficulties with the net, the total handling time from deployment of the net to release lasted approximately 1:00 hour. This was well under the 2 hours limit for the seals' captivity. See ***Table 2*** for seal details.

Figure 6. *The seal is taken out of the net, tagged and weighed before release.*

After all material was collected from the sandbank, the crew returned to the Asterias.
A scouting team then set out in a boat to examine the possibility to approach the seals in area C (see ***Figure 1***). As it was low tide it was clear that the entrance to the gully was not straightforward and a route to the seals had to be marked in a GPS.

Upon arrival in Den Helder, the crates were cleaned and, where needed, material was replaced for the next days' catch. Notes were transcribed and the samples were processed and stored in a -20℃ freezer.

Conclusion of the day:

- Area A was unfit for catching, as large lumps of peat in the area prevented the net from being hauled ashore. This area will not be used in following catches.
- The teams quick and adequate actions prevented the seal from drowning.
- With only one seal to tag, the different teams had time to practice their skills, and the untrained personnel had the opportunity to observe.

3.1.2 27th of March

Table 4. *Timetable 27th of March.*

TIME	ACTIVITY	COMMENT
8:00	Departure	
10:15	Start catching attempt	
11:25	Release after successful tagging	Two seals caught and processed
11:35	Start 2nd catching attempt	
12:50	Release after successful tagging	Three seals caught and processed
14:15	Return in Den Helder	
15:00-21:00	Notes are transcribed and samples processed	

After all personnel boarded and material was loaded on either the Asterias or the catching boats, the ships left the harbour for Balgzand.

Upon anchoring, the best catching site and location were chosen based on the weather conditions, presence of seals and tide. Again, no seals were present in the nearby Area B, hence, Area C (see ***Figure 1***) was chosen. Approximately 20-30 seals were counted, and the team had scouted the area the day before, to determine the approach. Personnel were reminded of their specific tasks, including the safety procedures. Instructions, detailing the roles and details of the day were given and personnel are designated to one of the boats. Personnel and material were loaded into the catching boats.

Figure 7. *The seals are transferred to a small net, then fixed in a "cradle" to allow measurements and tagging.*

1st catch: The net was successfully deployed, but this time care was taken not to encircle all the seals, as this would be too many to pull in. Only two seals were captured. Most of the seals swam away and hauled-out a bit further north on the same sandbank.

Figure 8. *As soon as the seals were released, the capture net was ready and pushed into the water for a second catch.*

Both seals were chosen to be handled. See table 2. *Overview of tagged seals* for seal details. Once the seals were fixed and while being processed it was decided that a second catch would be attempted. Personnel not directly involved in the tagging or sampling were asked to prepare the second catch. After the two seals were released, all material was put back on the boats and personnel was ready for the second attempt.

The total handling time, from the deployment of the net to release, lasted ~1:15 hours. This is well within the 2 hours that is considered the limit for the seals' captivity as defined in the animal experiment protocol.

2nd catch: A total of approximately 10 seals were hauled out at the new catching site, ~500m north of the first site. The net was successfully deployed. In this catch 3 more seals were captured.
All seals were chosen to be handled. See ***Table 2*** for seal details. After the three seals were released, all material was put back on the boats and all personnel returned to the Asterias.
The total handling time, from the deployment of the net to release, lasted again ~1:15 hours.

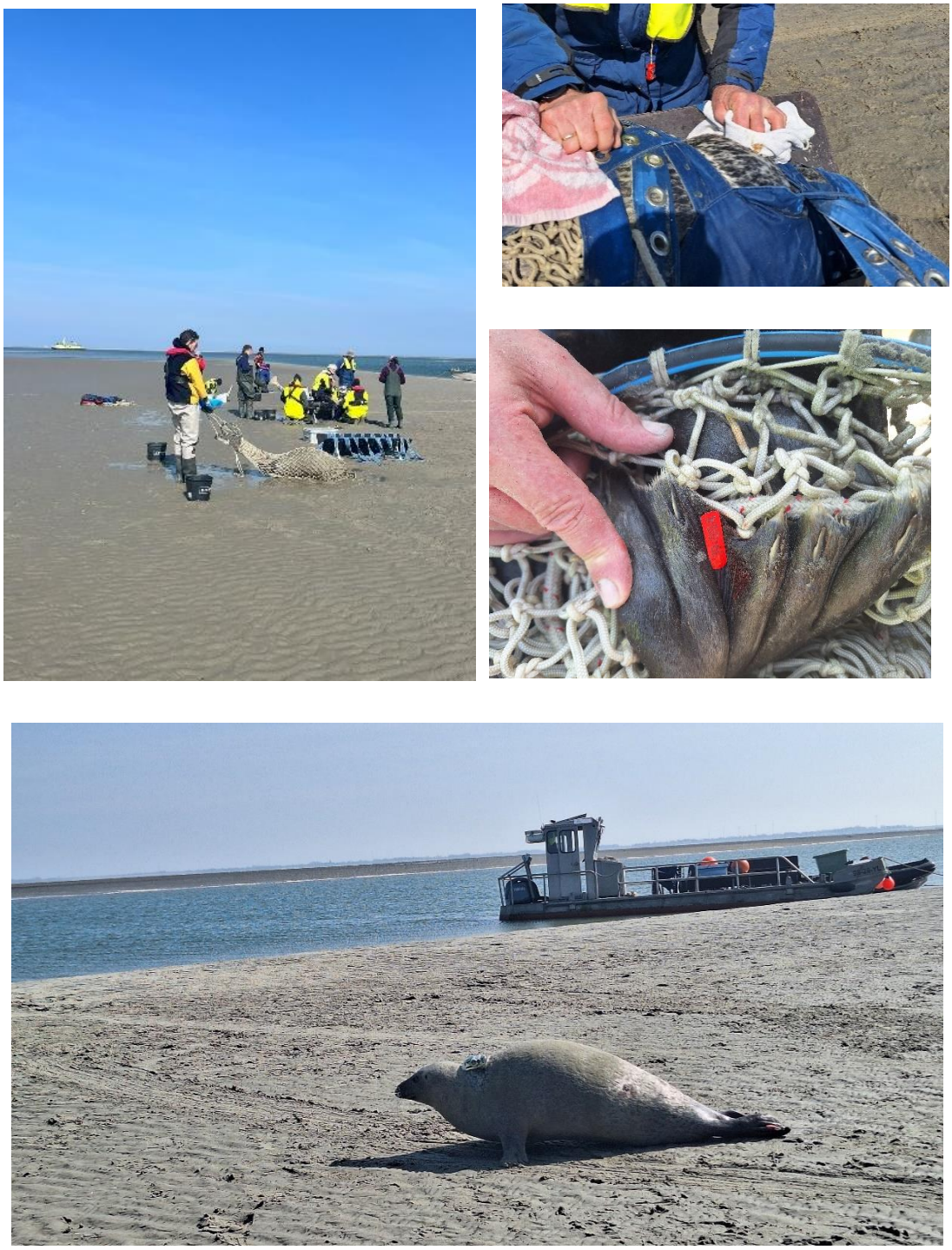


Figure 9. *The tree last seals were fixed in the cradles one by one; the fur is cleaned before tagging, the seals are given a flipper tag to enable recognition even after the tag falls off. As soon as all is done the seal is released.*

Conclusion of the day:

- Area C is suitable for catching. It is however difficult to enter the creek, but the team took advantage of the previous day's scouting and managed even to do a second catch.
- On this second day, the personnel worked together more effectively.
- Though care should be taken not to capture too many seals, capturing only two the first catch was not expected. As the team gets more experienced, it might be possible to gauge this more precisely.

3.2 Autumn

3.2.1 16th of October

After all personnel boarded and material was loaded on either the Phoca or the catching boats, the ships left the harbour for Balgzand.

Table 5. *Timetable 16th of October.*

TIME	ACTIVITY	COMMENT
8:00	Departure from Den Helder	
10:00	Start catching attempt	9 seals caught, 3 released
10:50	Capture of extra seal	
12:00	Release after successful tagging	7 seals released with a tag
14:00	Return in Den Helder	
15:00-19:00	Notes are transcribed and samples processed	

Upon anchoring, the best catching site and location were chosen based on the weather conditions, presence of seals and tide. Again, no seals were present in the nearby Area B, hence, Area C (see ***Figure 1***) was chosen. Approximately 20-30 seals were counted. Personnel were reminded of their specific tasks, including the safety procedures. Instructions outlining the roles and plans for the day were provided, and personnel were assigned to one of the boats. Then, personnel and material were loaded into the catching boats.

Figure 10. *A young seal hauled out while the other seals were being processed. The seal was caught and tagged as well.*

Nine seals were caught in the net, and three of them were released as they did not match the required category. However, after less than an hour, a young seal hauled out while the other seals were being processed. As it was quite naïve, the young seal could be caught by hand. So, in total, seven out of the ten seals were chosen to be handled (see ***Table 2***) for seal details. After the seals were released, all material was put back on the boats and all personnel returned to the Phoca.
The total handling time, from the deployment of the net to release, lasted ~2 hours.

3.2.2 17th of October

After all personnel boarded and material was loaded on either the Phoca or the catching boats, the ships left the harbour for Balgzand.
In trying to avoid recatching in area C, an attempt was made to capture in area D. Personnel were again reminded of their specific tasks, including the safety procedures. Instructions, detailing the roles and details of the day were given and personnel are designated to one of the boats. Personnel and material were loaded

into the catching boats. Area D had been scouted by the Phoca the week before. However, though there were enough seals (10-20), they were now dispersed in small groups of 1-2 seals throughout the area and therefore it was not suitable to catch them. Again, no seals were present in the nearby Area B (***Figure 1***), and hence, we returned to Area C. Approximately 20-30 seals were counted, and the team was well acquainted with the area and how to do the approach.

Table 6. *Timetable 17th of October.*

TIME	ACTIVITY	COMMENT
8:00	Departure from Den Helder	
10:00	Start catching attempt area D	
10:30	Move to area C	
11:30	Start catching attempt area C	12 seals caught, 5 released, of which 2 seals recaught (PV94-470-24 & PV94-614-24)
13:30	Release after successful tagging	7 seals tagged
15:00	Return in Den Helder	
16:00-18:00	Notes are transcribed and samples processed	

A total of approximately 25 seals were hauled out at the catching site C. The net was successfully deployed. In this catch 12 seals were captured of which 7 seals were chosen to be handled, the other 5 were released. This included 2 seals that were recaught from the previous day (PV94-470-24 & PV94-614-24). See ***Table 2*** for seal details. After the 7 seals were tagged and released, all material was put back on the boats and all personnel returned to the Phoca.

The total handling time, from the deployment of the net to release, lasted ~2 hours.

After returning to the lab samples were analysed, processed and stored. All materials were cleaned, inspected and repaired for the next catch if needed.

Figure 11. *Catching boats assemble around the Phoca before and after the catch.*

3.2.3 5th of November

After all personnel boarded and material was loaded on either the Harlingen 1 or the catching boats, the ships left the harbour for Balgzand.

Table 7. *Timetable 5th of November.*

TIME	ACTIVITY	COMMENT
8:00	Departure from Den Helder	
13:00	Start catching attempt area C	31 seals caught, 23 released of which 1 seal1 recaught (PV94-604-24)
15:00	Release after successful tagging	8 seals tagged
17:00	Return in Den Helder	
17:00-18:30	Notes are transcribed and samples processed	

After anchoring, the optimal catch site was selected based on weather conditions, seal presence, and tide. Once again, Area C (see ***Figure 1***) was chosen, as no seals were observed in Area B. In addition, roughly 50 seals were counted in Area C, and the team was familiar with how to approach this site. Personnel were reminded of their specific tasks, including the safety procedures. Instructions outlining the roles and plans for the day were provided, and personnel were assigned to one of the boats. Personnel and material were loaded into the catching boats.
When approaching, it was clear that a total of approximately 50-60 seals were hauled out at the catching site. The net was successfully deployed. In this catch 31 seals were captured. One of these had been tagged previously (PV94-604-24). It was released as soon as possible.

Figure 12*. Seals are taken one by one out of the large net, different groups are formed to tag, sample and measure the seals; after the last seal is released, all material is brought back to the boats.*

Eight seals were chosen to be handled. See table 2. *Overview of tagged seals* for seal details. After the eight seals were released, all material was put back on the boats and all personnel returned to the Harlingen 1. The total handling time, from the deployment of the net to release, lasted ~2 hours.

After returning to the lab, samples were analysed, processed and stored. All materials were cleaned, inspected and repaired for the next catch if needed. For example, during the operation one of the boats had hit an obstruction damaging the propellor and some of the catching gear needed repair.

Conclusion of autumn catches:

- Compared to March the team was now well trained and worked together well and effectively. This is demonstrated for example in the way they managed to tag a larger number of seals per day.
- Area C is most suitable for catching. Despite the shallow entrance, the seals are most predictable and approachable at this site. There are however some obstructions underwater that should be avoided next catch.
- Despite the very large catch of 31 seals on the last day, the seals were all processed or released relatively calmly. The team still managed to do so within 2:05 hours after the release of the net, demonstrating great cooperation. Within the team, we concluded that the growing experience and the relative calmth of the group was key to this.

4 Preliminary results

4.1 Functioning of the tags

In addition to the regular GPS locations (max 210/day, average 108), information is collected on the individual dives of the seals. This includes dive depth (***Figure 13***) at the most significant change-points in the dive (determined using the so-called broken-stick method). Typically, 18 measurement points are recorded within a dive; however, in shallow dives, this may drop to 8.

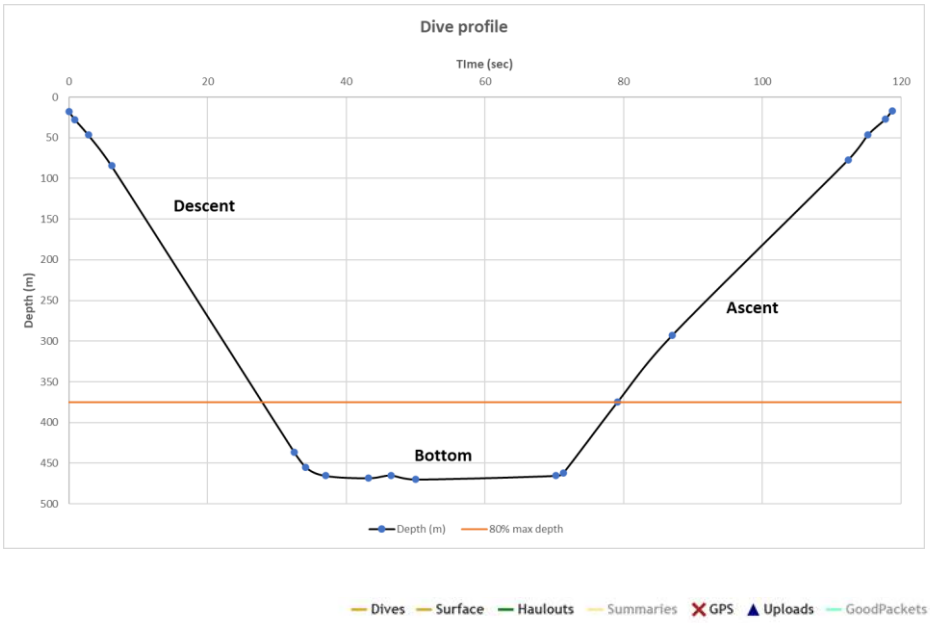


Figure 13.
Left: Example of a dive showing the measured points, and the three phases in the dive (adapted from SMRU).

Below: example of the dive record for seal No 494 on the 16th of April 2025

The data shows for example the intensity of diving at different depths for the six seals (***Figure 14***).

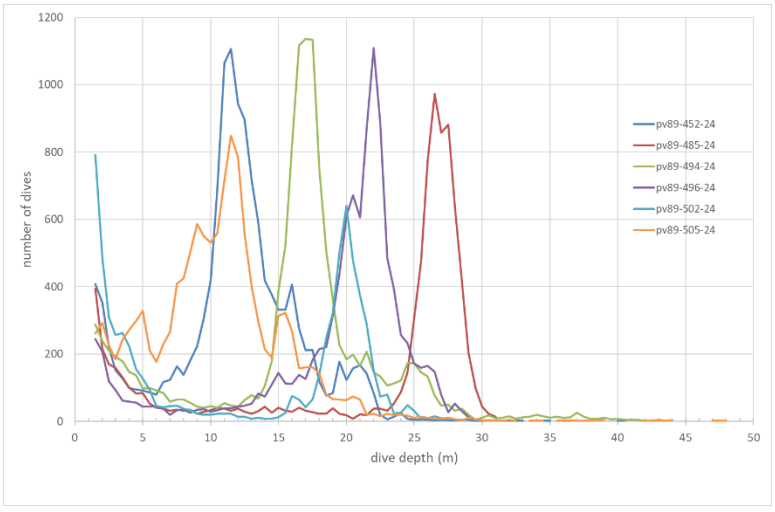


Figure 14. *Number of dives recorded after 45 days of tracking per seal in relation to the maximum depth of the dive.*

In contrast to the previous tags, The GEN II tag now also includes accelerometery. This includes swim-effort (g), average pitch (degrees), max jerk in (g per sec), and assumed prey capture attempt during the descending, bottom and ascending part of the dive. This will, for example, allow us to identify which dives are likely to be feeding dives.

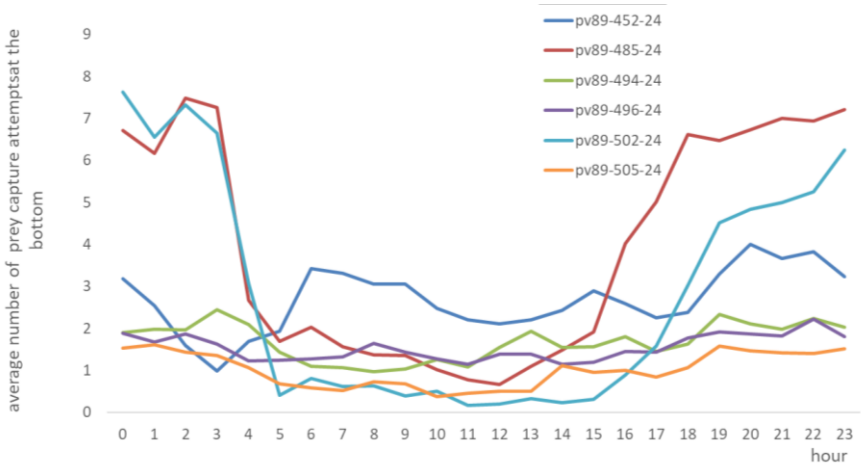
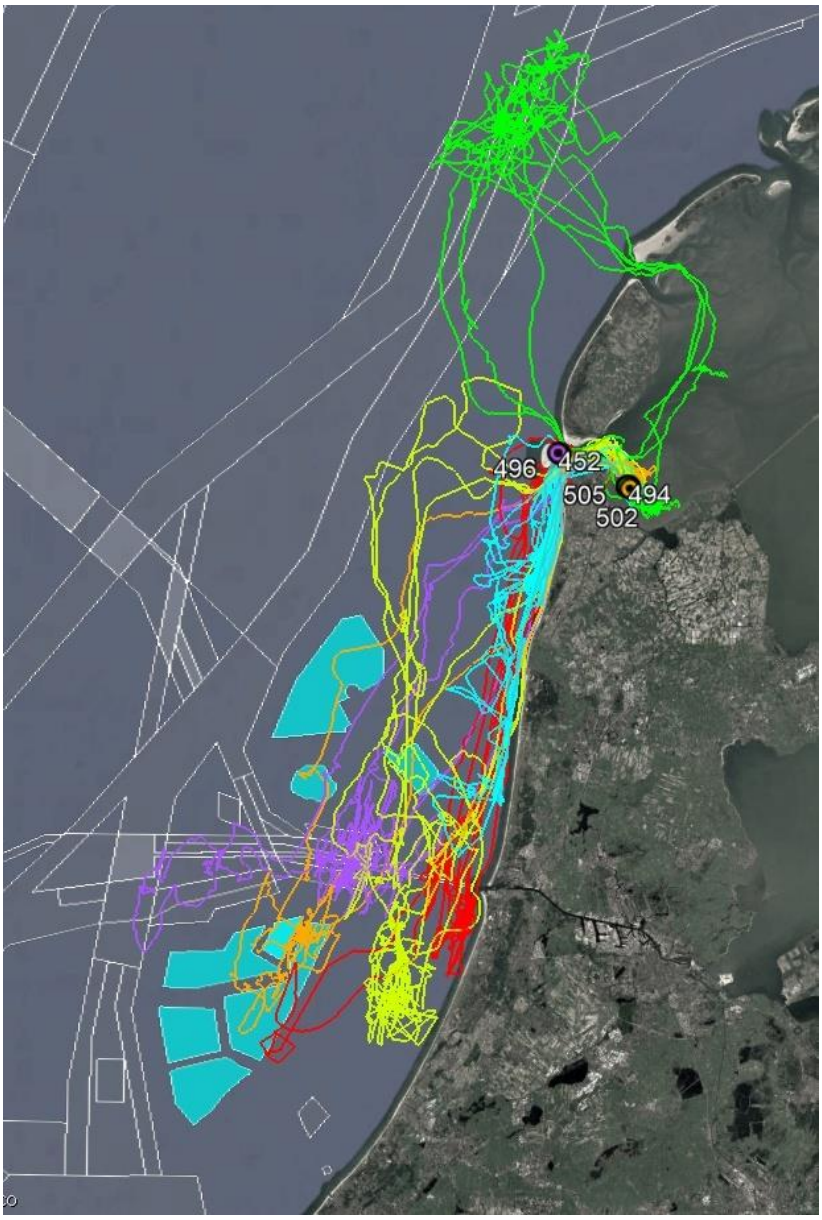


Figure 15. *Average assumed prey capture attempts per dive by the different seals at the different hours of the day.*

4.2 Maps



overview of seal tracks

#452 female young of the year

#485 female adult

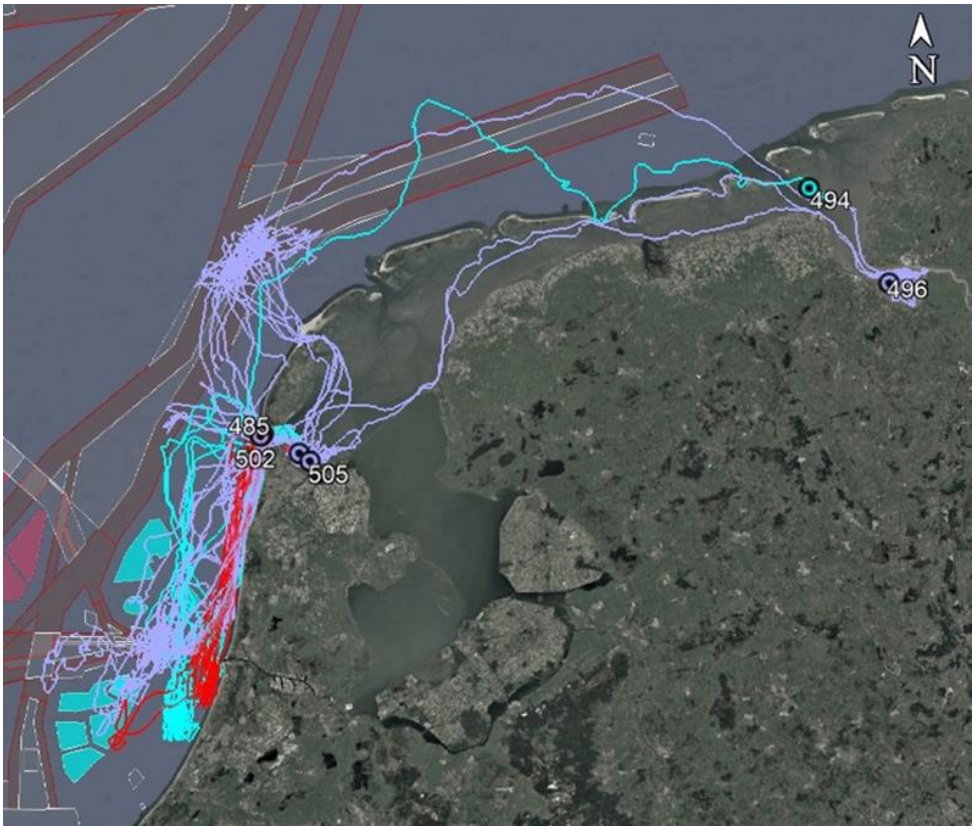
#494 male adult

#496 female adult

#502 female adult

#505 female adult

Figure 16. *Maps of the tracking data of the 6 harbour seals tracked in March. Figures not renewed: these were made 1.5 months after tagging. White lines represent shipping lanes, turquoise polygons represent windfarms, individual seal tracks are represented in coloured lines.*



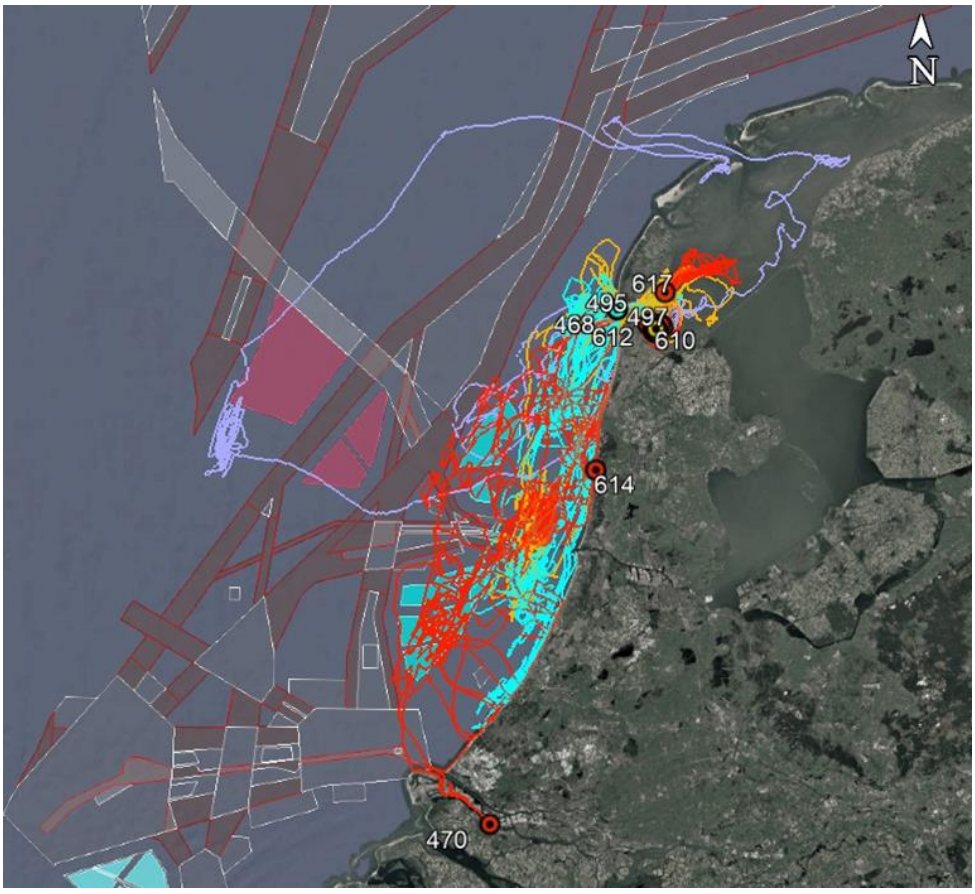


Figure 17. *Tracks from the seals.*

Top: tagged in March. (n=6)

Bottom: tagged in Oct./Nov.(N=22; data to 20-11-2025).

(red = young of the year; orange= sub adults; purple= adult females; blue= adult males)

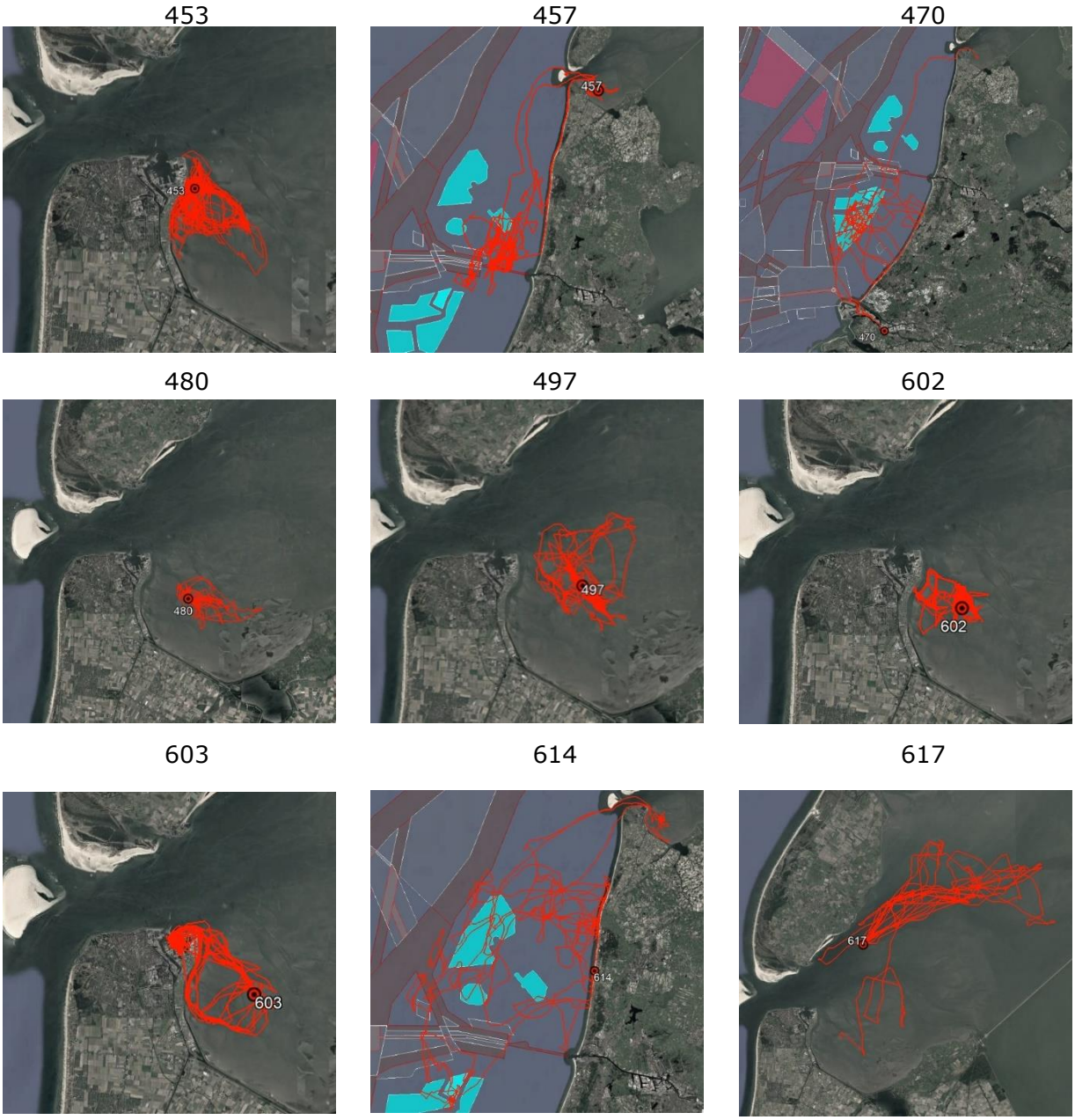


***Figure 18**. Overview of the tracks of the young of the year seals tagged in autumn. Mark that some of the are only running two weeks (see Table 2 for details).*

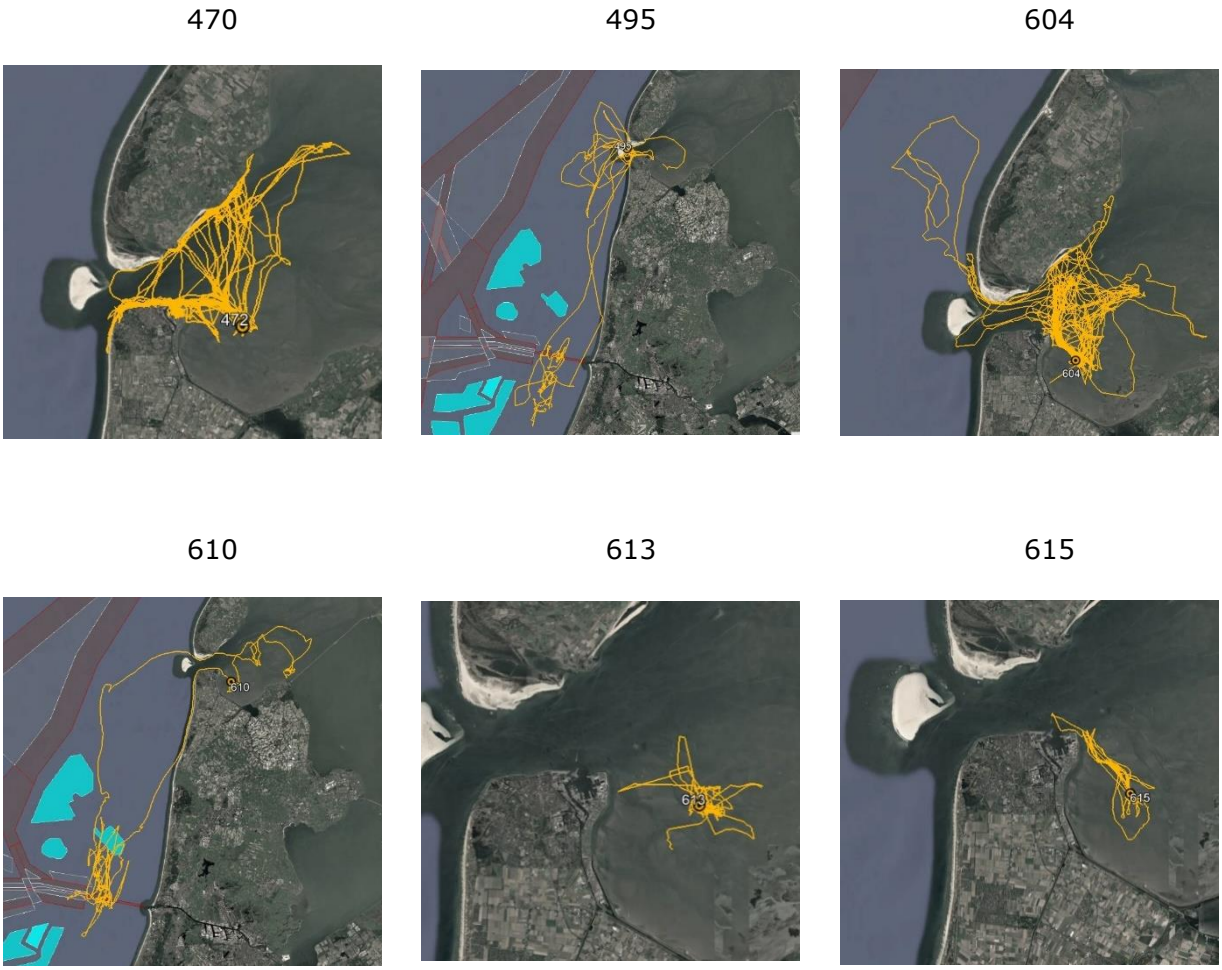


***Figure 19**. Overview of the tracks of the sub adult seals tagged in autumn. Mark that some of the are only running two weeks (see Table 2 for details).*

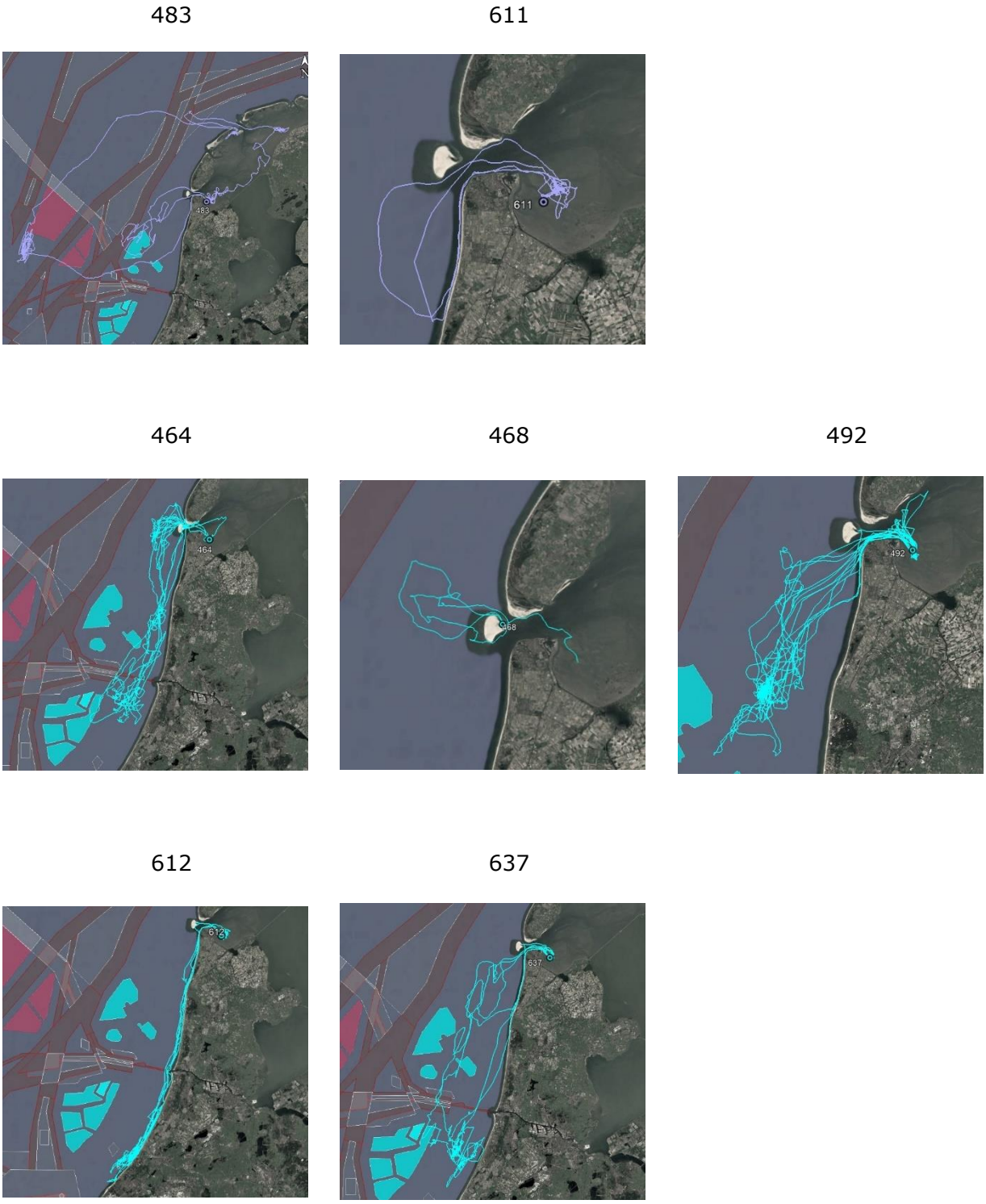


***Figure 20**. Overview of the tracks of the adult seals tagged in autumn (purple= adult females; blue= adult males). Mark that some of the are only running two weeks (see Table 2 for details).*

5 Conclusion

As mentioned, the aim of the project is to tag ten young of the year harbour seals, six male adult harbour seals, six female adult harbour seals and six subadult harbour seals. In March, we were able to tag 6 of those. The tagging went well, and the results were promising. Out of the six seals, 3 (two adult females and a male) moved to the east during the breeding season one of which was actually observed with a pup.

In autumn, we managed to complete the series, catch the 22 remaining seals. Though still early days, results demonstrate the individual variation: some seals operating locally, while others roam over large distances. Despite the relatively small sample size, we expect to be able to compare this data to our previous tracking results, potentially ameliorating the understanding of how the recent changes in the seals' environment influenced the distribution and use of the North Sea.

6 Quality Assurance

Wageningen Marine Research utilises an ISO 9001:2015 certified quality management system. The organisation has been certified since 27 February 2001. The certification was issued by DNV.

References

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Aarts, G., and Brasseur, S. 2024. Moving towards an Agent-based model for harbour seals in the Netherlands: Definition of knowledge gaps and initial development of AgentSeal NL. ICES Document report C054/23. 69 pp.

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Justification

Report: C049/25A
Project Number: 4312100159

The scientific quality of this report has been peer reviewed by a colleague scientist and a member of the Management Team of Wageningen Marine Research

Approved:	dr. ir. G.M. Aarts Researcher
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Date:	24 November 2025

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Date:	24 November 2025

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