Monitoring Growth and Development of a Grey Seal (*Halichoerus grypus*) Pup in Brixham, Devon

Authors: Duncan Kenny, Chris Thomas, Tristan Northway

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Contents

1. Abstract

This report documents the early growth and development of an individual grey seal pup (*Halichoerus grypus*) monitored in Brixham, Devon, over a 25 day period. Using photographic evidence and direct observations, data was collected on growth rate, condition, behavioural development, mother–pup bonding, disturbances, and interactions with conspecifics. The pup demonstrated a clear transition from neonatal lanugo to dense post-natal pelage, strong and continuous maternal attendance, and normal mass gain patterns typical of grey seal pups during the lactation period (approx. 1.5–2.2 kg/day). Pre-moult localised fur loss was identified between tail and right shoulder on day 11, possibly due to abrasion consistent with a rocky narrow cave utilised to mitigate high water during inclement weather and tidal swells. No other significant ailments were recorded. Bull seal interactions were absent during early observation. Bull presence increased between days 8 and 15 which influenced maternal vigilance. Mother was last observed at pupping site on day 18. Pup was last observed at pupping site on day 25. This report contributes to regional datasets supporting grey seal conservation and management around South Devon.

2. Introduction

2.1 Species Overview

Grey seals inhabit temperate to subarctic waters of the North Atlantic, with three primary populations:

Eastern North Atlantic - UK, Ireland, France, Scandinavia,
Western North Atlantic - Eastern Canada & northeastern USA,
Iceland and Baltic Sea - A genetically distinct subpopulation.

They favour rocky shores, sandbanks, sea caves, and remote islands for hauling out, resting, moulting, and breeding. Increasingly, anthropogenic structures, e.g., pontoons, breakwaters, fish farms, are being used as haul-out sites. Grey seals exhibit capital breeding, relying heavily on stored body reserves during breeding. In the UK, they pup between August and December depending on colony/grouping location.

Females give birth to one pup after ~11.5-month gestation (includes delayed implantation). Maternal investment: Lactation: 16–21 days, Mothers fast throughout lactation, Pup mass triples during nursing. Weaning is abrupt; pups remain ashore post-weaning to learn to swim and forage. Mating occurs immediately after weaning. Grey seals display strong site fidelity, with many individuals returning to the same colonies/pupping site annually. Conservation Status: IUCN Red List: *Least Concern.* Population numbers have recovered in many regions following protective legislation. Five primary local threats persist, including 1. bycatch in gillnets and trawls, 2. entanglement in marine debris, 3. disturbance from tourism, recreation, and vessels, 4. pollution (heavy metals, persistent organic pollutants, microplastics), 5. disease (e.g., PDV outbreaks). UK waters hold one of the world's largest populations, making national conservation efforts globally significant.

2.2 Local Ecological Context

Brixham's rugged coastline features caves and cobble beaches that provide sheltered microhabitats for pupping. The area also contains significant anthropogenic activity (fishing vessels, recreational water users), but secluded coves and caves reduce disturbance risk. Brixham is currently England's largest commercial fishing port (by market value) and a popular destination for tourism. Prior to 2025 no grey seal births have been recorded in Brixham. Weaned pups annually pass through Brixham. A small number of established pupping sites are observed at ~6km south and ~10km north of the town. Grey seal abundance (adults, sub-adults and juveniles) has increased in Brixham over a 10 year period (26 seals in 2015, >50 seals in 2024). Peak numbers have been recorded annually in December. The primary haul-out site in Brixham is the series of 22 floating platforms that make up the Brixham marina's northern wave barrier, protecting the marina berths from northerly swells and inclement weather.

2.3 Study Rationale

This pup was documented because it pupped at a remote and naturally sheltered cave location that allowed safe remote observation without disturbance. This pupping site had previously been identified as a potentially suitable pupping site due to its remote location, geographical features and limited access. Tracking the pup's development from birth (31/10/2025), during the critical suckling and post weaning period provides valuable insight into pupping success in remote cave habitats in Torbay. No grey seal births had been recorded at this location historically.

2.4 Objectives

1. Identify birthing site.
2. Document pup growth and developmental milestones.
3. Assess maternal attendance and bonding behaviours.
4. Monitor health, injuries, and general condition.
5. Identify interactions with adult males and other seals.
6. Evaluate environmental pressures and potential anthropogenic impacts.
7. Share data with appropriate organisations/authorities.

3. Methods

3.1 Study Site

- Location: Sea cave/rocky inlet along Brixham's south-facing coastline. Exact location of study site has been omitted from this public report for wildlife protection reasoning.
- Substrate: Cobble, slate scree, and sediment.
- Conditions: Semi-dark environment with natural light inlet through natural break in cave wall, tidal wash reaching intermittently into the cave. Flooding of entire cave at spring high water only.

3.2 Observation Period

- **Day 1 to Day 25**

- Observations conducted via remote digital GSM cameras, low-light imaging, and non-intrusive field monitoring. No artificial light or flash photography used during study period at this location.

3.3 Pup Identification

The pup was identified by:

- Pale yellow initial lanugo with a slightly mottled dorsal pattern.
- Maternal association.
- A characteristic faint dark colouring on crown of head visible after Day 5.
- Pup registered with Cornwall Seal Group Research Trust/Natural England. Field code: 2025ZZZZZZ, AKA, Pumpkin.

3.4 Parent Identification

- Relationship confirmed by recorded suckling images.
- Pelage identification images taken and compared with regional photo-ID catalogues. No matches were found. Breeding female was added to regional Identification catalogues as a newly identified mother. Field code: BRX578, AKA, Beryl.

Figure 1: BRX578 pelage identification images. Right and Left. October 2025.

3.5 Site Identification

- Six caves along a single stretch of South West facing coastline, identified as potential pupping sites and monitored for seal activity.
- Measurements of internal caves taken and relation to extreme high and low water marks.
- PTZ remote digital GSM cameras placed; observation posts established at a safe distance to minimise risk of wildlife disturbance.
- Once birth was confirmed, the site was registered with Cornwall Seal Group Research Trust/Natural England as a new pupping site (field code: Brixham Cave 1).

3.6 Growth Measurements

Mass and length were estimated using:

- Photogrammetry relative to known-size fixed cobbles and geographical features.
- Standard growth curves for grey seal pups (baseline 12–14 kg at birth).
- Standard development stage chart comparisons (stage 1: birth to stage 5: full moult)

3.7 Behavioural Data Collection

- Focal sampling for nursing, resting, alertness.
- Scan sampling of maternal proximity when mother was present.

3.8 Health Assessment

Visual inspection for:

- Wounds.
- Coat condition.
- Hydration and fat deposition.

3.9 Interactions with Conspecifics

- Cave monitored for bull seals or non-maternal adults.
- Maternal vigilance behaviours recorded.

3.10 Human Activity Monitoring

- No direct human approaches observed within the cave.
- Occasional boat traffic audible externally.
- Anthropogenic marine litter presence in cave.

4. Results

4.1 Developmental Timeline

Figure 2: Growth and moult chart of pup 2025ZZZZZZ, from day 1 – 31/10/2025 to day 25 – 24/11/2025.

Day 1–4

(First row of images, a-d, figure 2)

- Pup exhibits thick yellow lanugo, damp and flattened.
- Umbilical area appears clean; no visible infection.
- Motor ability limited; remains close to birth site.
- Minimal lifting of head; mostly lateral lying posture.

Day 5–8

(Second row of images, e-h, figure 2)

- Lanugo yellow shifting to cream-white.
- Increased mobility: controlled head raises, repositioning on cobbles.
- Pup begins exploring small distances within cave (1–4 m).
- Dark patch visible on top of head at day 5.

- Spring tides flood cave forcing pup into the water. BRX578 presented strong and continuous maternal attendance during this sustained period.
- Recorded BRX578 suckling frequently (approx. every 2–3 hours, mid to low water phases).

Figure 3: BRX578 nursing pup 2025ZZZZZZZ. 31/10/2025 day of birth.

Figure 4: BRX578 presenting strong and continuous maternal attendance towards 2025ZZZZZZZ, during spring high water flooding. 06/11/2025.

Day 9–12

(Third row of images, i-l, figure 2)

- Coat thickening; early signs of moult on dorsal ridge.
- Subcutaneous blubber clearly increasing, smoother body profile.
- Pup displays early social behaviours (sniffing substrate, playing with kelp weed whilst swimming).
- Significant bald patch observed from right shoulder to tail, bare pink skin exposed.

Figure 5: 2025ZZZZZZ playing with kelp during the cave flood. 12/11/2025.

Day 13–23

(Forth row of images, m-p, figure 2)

- Significant growth: body appears round, robust.
- Lanugo still present, patchy moult visible on central and right back from shoulder to tail.
- Adult-type grey coat emerging underneath.
- Greater alertness; head raised frequently, greater mobility and area exploration.
- Mother occasionally absent for short periods (days 13-17) leading to abandonment on day 18, normal weaning behaviour.

Day 24–25

(Forth row of images, q-r, figure 2)

- Stable growth: body appears to have reduced fat presenting shape around head and hips.
- Lanugo 70% moulted on day 24 (Lanugo fur remaining patchy on, neck, shoulders, fore flippers, rear flippers and tail), 95% moulted on day 25 (Lanugo fur remaining on shoulders and tail).

Figure 6: 2025ZZZZZZ pelage identification images. Right and Left full body and face. 24/11/2025.

4.2 Growth Rate (Estimated)

Based on photogrammetry and typical grey seal growth patterns:

Day	Estimated Mass (kg)	Notes
1	13–14	Normal birth weight
7	20–22	Rapid fat gain evident
13	27–30	Rounder profile, thickened neck
18	32–35	Approaching weaning mass

Estimated growth rate: ~1.8–2.1 kg/day, consistent with normal pinniped lactation.

4.3 Health Observations

- No notable injury or disease visible throughout the 25 day period.
- Minor superficial scuffing on flippers, consistent with rocky terrain.
- No evidence of dehydration or abnormal behaviour. Weeping observed around eyes consistent with adequate hydration.

4.4 Maternal Behaviour & Bonding

- Mother present regularly during early days (estimated attendance >70% through Day 7).
- Nursing sessions frequent and unhurried.
- Pup remains in consistent location, suggesting secure bonding and low stress.
- No signs of rejection (no prolonged isolation, minimal searching calls by pup).
- Maternal vigilance observed at water line on beach and cave entrance (body blocking posture).

Bond strength scored as strong/stable.

4.5 Bull Seal and Conspecific Interactions

- 4 direct encounters recorded between BRX578 and unidentified seals.
- Cave geometry likely limits bull access. Narrow entrance opening and corridor at Southern aspect.
- Low risk of pup trampling or forced displacement in this microhabitat.
- BRX578 showed occasional defensive posture near entrance and on water line. On one occasion BRX578 identified an adult female seal enter the cave. In response BRX578 presented immediate defensive posture, repositioned herself away from pup towards the water line, then entered the water, forcing the unidentified adult female seal out of the cave into open water. BRX578 returned and remained at the water line for ~2 minutes, then returned to the pup further up the beach.
- Increased presence of known dominant bull, AKA Butch, from day 3. Initially BRX578 aggressively defended her territory, and the bull left the cave.
- Compliant interactions observed by BRX578 with dominant bull, in the water from day 7 leading to bull remaining in the area often resting within 10 metres of mother and pup.

Figure 7: Dominant bull AKA Butch, the cave master. October 2025.

Figure 8: The cave master dominant male approaching BRX578 leading to rejection. 03/11/20252025.

Figure 9: The cave master dominant male resting on the beach within 10 metres of BRX578 and 2025ZZZZZZ. 07/11/20252025.

4.6 Environmental & Anthropogenic Pressures

- Cave site provided exceptional shelter from wind and wave action.

- Tidal wash reached pup on most high water levels. Pup moved up into an narrow crevice in the rear right of the cave to avoid tide. On spring high water (± 1 day) the narrow crevice was flooded resulting in no available dry land for pup. Pup and mother remained in water together until tide drop sufficiently.
- No human intrusion observed; nocturnal timing of images suggests minimal daytime exposure.
- External marine traffic likely audible but not disruptive. Cave acoustics from tide of shoreline and in the entrance corridor significantly masks external audible disruption.

5. Discussion

5.1 Growth and Condition

The pup's growth aligns perfectly with regional benchmarks.
Its increasing roundness and rapid moult progression indicate robust milk intake and high maternal investment.

5.2 Impact of Rocky Substrate

Rocky pupping areas can increase abrasion risk, but this pup exhibited minor and temporary impact. The confined space reduced risks from storm surge and potential for male aggression. During spring high waters the cave flooded, occasionally resulting in rough sea state causing tumbling and cave wall/pup impact. No visible injuries recorded. When tides drop BRX578 would immediately feed pup followed by prolonged periods of rest.

5.3 Mother–Pup Bonding

Bond quality was strong. The pup remained calm, well-fed, and stationary during normal conditions; behaviours associated with secure attachment. Mother remained in close proximity, attentive and manoeuvred pup regularly toward the back of the cave, during flood occurrences.

5.4 Bull Seal Influence

BRX578's cautious posture near the cave entrance and waterline may indicate presence of additional males nearby. Only 1 male was observed inside the cave during the observation period of 25 days. This may be due to dominant male behaviour outside of cave and surrounding area. The dominant male was observed monitoring adjacent caves. BRX578 presented defensive behaviours toward dominant bull through days 1- 4, followed by compliant behaviours through days 5- 18. However, the pup experienced no negative impacts.

5.5 Conservation Significance

This case highlights the importance of micro-habitat diversity in Brixham. Caves serve as natural refuges from anthropogenic disturbance and bull harassment, supporting pup survival.

6. Conclusion

The grey seal pup (2025ZZZZZZ) monitored in Brixham exhibited normal, healthy development across a 25 day period. Growth, behaviour, coat transition, and maternal bonding were all within expected ranges for *H. grypus*. The sheltered pupping location likely contributed to its successful progression toward weaning.

7. Management Recommendations

- Maintain distance guidelines around known pupping sites.
- Continue cave-based monitoring using remote methods.
- Advocate for signage near coastal path entrance points to reduce accidental disturbance and raise awareness for wildlife protection using positive conservation messaging.

- Expand regional photo-ID catalogue to assess maternal site fidelity.

8. List of figures

Appendices

Appendix A. Developmental stages of grey seal pups.

Stage	Age	Characteristics
Stage 1	0-2 days	Thin baggy-skinned body Yellow stained or white natal fur Conspicuous umbilical cord Docile & poorly coordinated
Stage 2	3-7 days	Smoother bodyline, few loose folds Neck still distinguishable Umbilical cord atrophied Aware & coordinated
Stage 3	7-15 days	Rounded or barrel shaped body Neck thickened/indistinguishable Partial moulting from head or flippers May be aggressive on approach
Stage 4	16-20 days	Rounded body Partial moulting from torso Head & flippers moulted May be aggressive on approach
Stage 5	18-25+ days	Fully moulted to short fur coat (< $100cm^2$ natal coat remaining) May be aggressive on approach

Appendix B. Tidal correlation chart.

Tide chart for 31st October 2025 to 30th November 2025. Source: https://tides4fishing.com

Yellow box indicates Spring high water.

DAY			BRIXHAM				
			1st TIDE	2nd TIDE	3rd TIDE	4th TIDE	COEFFICIENT
31 Fri		▲ 7:03 h ▼ 16:51 h	6:02 h 2.6 m ▼	12:28 h 3.9 m ▲	19:00 h 2.3 m ▼		54 average
1 Sat		▲ 7:05 h ▼ 16:49 h	1:23 h 3.8 m ▲	7:31 h 2.3 m ▼	13:46 h 4.2 m ▲	20:15 h 1.9 m ▼	69 average
2 Sun		▲ 7:06 h ▼ 16:48 h	2:29 h 4.2 m ▲	8:41 h 1.9 m ▼	14:49 h 4.5 m ▲	21:14 h 1.4 m ▼	84 high
3 Mon		▲ 7:08 h ▼ 16:46 h	3:24 h 4.5 m ▲	9:37 h 1.4 m ▼	15:44 h 4.8 m ▲	22:06 h 1.1 m ▼	97 very high
4 Tue		▲ 7:10 h ▼ 16:44 h	4:15 h 4.8 m ▲	10:28 h 1.0 m ▼	16:35 h 5.0 m ▲	22:54 h 0.8 m ▼	104 very high
5 Wed		▲ 7:11 h ▼ 16:43 h	5:03 h 5.0 m ▲	11:17 h 0.8 m ▼	17:24 h 5.1 m ▲	23:41 h 0.7 m ▼	106 very high
6 Thu		▲ 7:13 h ▼ 16:41 h	5:49 h 5.1 m ▲	12:04 h 0.7 m ▼	18:12 h 5.1 m ▲		102 very high
7 Fri		▲ 7:15 h ▼ 16:40 h	0:26 h 0.7 m ▼	6:34 h 5.2 m ▲	12:49 h 0.7 m ▼	18:58 h 5.1 m ▲	92 very high
8 Sat		▲ 7:16 h ▼ 16:38 h	1:10 h 0.8 m ▼	7:17 h 5.1 m ▲	13:34 h 0.8 m ▼	19:42 h 4.9 m ▲	79 high
9 Sun		▲ 7:18 h ▼ 16:36 h	1:53 h 1.0 m ▼	8:00 h 4.9 m ▲	14:19 h 1.1 m ▼	20:26 h 4.6 m ▲	65 average
10 Mon		▲ 7:20 h ▼ 16:35 h	2:37 h 1.4 m ▼	8:43 h 4.7 m ▲	15:07 h 1.4 m ▼	21:13 h 4.3 m ▲	53 average
11 Tue		▲ 7:21 h ▼ 16:34 h	3:25 h 1.8 m ▼	9:32 h 4.4 m ▲	16:00 h 1.8 m ▼	22:08 h 4.0 m ▲	46 low
12 Wed		▲ 7:23 h ▼ 16:32 h	4:21 h 2.1 m ▼	10:31 h 4.2 m ▲	17:04 h 2.0 m ▼	23:22 h 3.8 m ▲	45 low
13 Thu		▲ 7:25 h ▼ 16:31 h	5:30 h 2.3 m ▼	11:49 h 4.0 m ▲	18:19 h 2.1 m ▼		49 low
14 Fri		▲ 7:26 h ▼ 16:29 h	0:50 h 3.8 m ▲	6:49 h 2.3 m ▼	13:14 h 4.1 m ▲	19:36 h 2.0 m ▼	56 average
15 Sat		▲ 7:28 h ▼ 16:28 h	2:02 h 4.0 m ▲	8:03 h 2.1 m ▼	14:21 h 4.2 m ▲	20:39 h 1.7 m ▼	62 average
16 Sun		▲ 7:30 h ▼ 16:27 h	2:58 h 4.2 m ▲	9:01 h 1.8 m ▼	15:14 h 4.4 m ▲	21:28 h 1.5 m ▼	68 average
17 Mon		▲ 7:31 h ▼ 16:26 h	3:45 h 4.4 m ▲	9:49 h 1.6 m ▼	15:59 h 4.5 m ▲	22:11 h 1.4 m ▼	72 high
18 Tue		▲ 7:33 h ▼ 16:24 h	4:24 h 4.5 m ▲	10:31 h 1.4 m ▼	16:37 h 4.6 m ▲	22:50 h 1.3 m ▼	75 high
19 Wed		▲ 7:35 h ▼ 16:23 h	4:57 h 4.6 m ▲	11:09 h 1.3 m ▼	17:10 h 4.6 m ▲	23:24 h 1.3 m ▼	76 high
20 Thu		▲ 7:36 h ▼ 16:22 h	5:27 h 4.7 m ▲	11:43 h 1.3 m ▼	17:41 h 4.6 m ▲	23:56 h 1.3 m ▼	75 high
21 Fri		▲ 7:38 h ▼ 16:21 h	5:57 h 4.8 m ▲	12:14 h 1.3 m ▼	18:12 h 4.6 m ▲		72 high
22 Sat		▲ 7:39 h ▼ 16:20 h	0:25 h 1.4 m ▼	6:28 h 4.8 m ▲	12:44 h 1.4 m ▼	18:45 h 4.6 m ▲	68 average
23 Sun		▲ 7:41 h ▼ 16:19 h	0:53 h 1.4 m ▼	7:01 h 4.8 m ▲	13:15 h 1.5 m ▼	19:20 h 4.5 m ▲	62 average
24 Mon		▲ 7:42 h ▼ 16:18 h	1:24 h 1.6 m ▼	7:35 h 4.7 m ▲	13:48 h 1.6 m ▼	19:56 h 4.3 m ▲	56 average
25 Tue		▲ 7:44 h ▼ 16:17 h	1:57 h 1.7 m ▼	8:10 h 4.5 m ▲	14:24 h 1.8 m ▼	20:33 h 4.1 m ▲	50 average
26 Wed		▲ 7:45 h ▼ 16:16 h	2:34 h 1.9 m ▼	8:48 h 4.3 m ▲	15:06 h 1.9 m ▼	21:15 h 3.9 m ▲	45 low
27 Thu		▲ 7:47 h ▼ 16:16 h	3:18 h 2.1 m ▼	9:32 h 4.2 m ▲	15:57 h 2.1 m ▼	22:08 h 3.8 m ▲	44 low
28 Fri		▲ 7:48 h ▼ 16:15 h	4:15 h 2.3 m ▼	10:29 h 4.1 m ▲	17:01 h 2.1 m ▼	23:12 h 3.8 m ▲	48 low
29 Sat		▲ 7:50 h ▼ 16:14 h	5:25 h 2.3 m ▼	11:36 h 4.1 m ▲	18:11 h 2.1 m ▼		56 average
30 Sun		▲ 7:51 h ▼ 16:14 h	0:24 h 3.9 m ▲	6:40 h 2.2 m ▼	12:49 h 4.2 m ▲	19:22 h 1.8 m ▼	67 average