



Upper Spey Embankment Condition Assessment: Monitoring Year 1

Final Report

Cairngorms National Park Authority

cbec eco-engineering UK Ltd

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cbec eco-engineering UK Ltd

Suite MF04
Marr House
Beechwood Business Park,
Inverness, IV2 3BW

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Project Manager: Grace Prouse



Author(s): Grace Prouse



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1. INTRODUCTION

In 2023 the Cairngorms National Park Authority, herein referred to as the Park Authority, commissioned a six-year embankment condition assessment programme (2023 to 2028) to identify sections of riverbank and embankment at risk of erosion and/or breaching. The programme is focused on the River Spey and select tributaries between the Spey Dam and Grantown-on-Spey. Baseline condition assessments of these embankments were conducted over a 2-year period, 2023 to 2024, with the subsequent four-years of the programme intended for repeat monitoring. This report summarises the first year of monitoring (2025) to assess the level of improvement or degradation in the embankment condition including the risk of erosion.

This report is intended to be read as a supplementary document to the baseline condition assessment report,¹ which sets out the monitoring programme objectives and survey methodology in more detail.

1.1 MONITORING AREAS

The embankment condition assessment extends almost continuously from the Spey Dam, near Laggan to Grantown-on-Spey, covering ~68.3 km of channel.² The assessment area has been divided into three sub-sections as listed in Table 1.1 and illustrated in Figure 1.1:

Table 1.1 Survey areas included within the embankment and riverbank condition assessment.

Survey Area		Total Channel Length Surveyed (km) ³	Total Embankment Length Surveyed (km) ⁴
Number	Description		
1	Spey Dam to Kingussie	~27.9	~26.5
2	Kingussie to Aviemore	~18.5	~13.6
3	Boat of Garten to Grantown-On-Spey	~22	~26.8
Total (km)		~68.3	~66.9

In addition to the baseline survey extents, an additional channel length of ~0.68 km of the River Spey and 0.63 km of the River Druie at the Rothiemurchus Fishery was added to Area 2 in 2025. This

¹ CBEC Eco-Engineering UK Ltd. 2025. Upper Spey Embankment Condition Assessment. Final version. Available upon request from the Cairngorms National Park Authority.

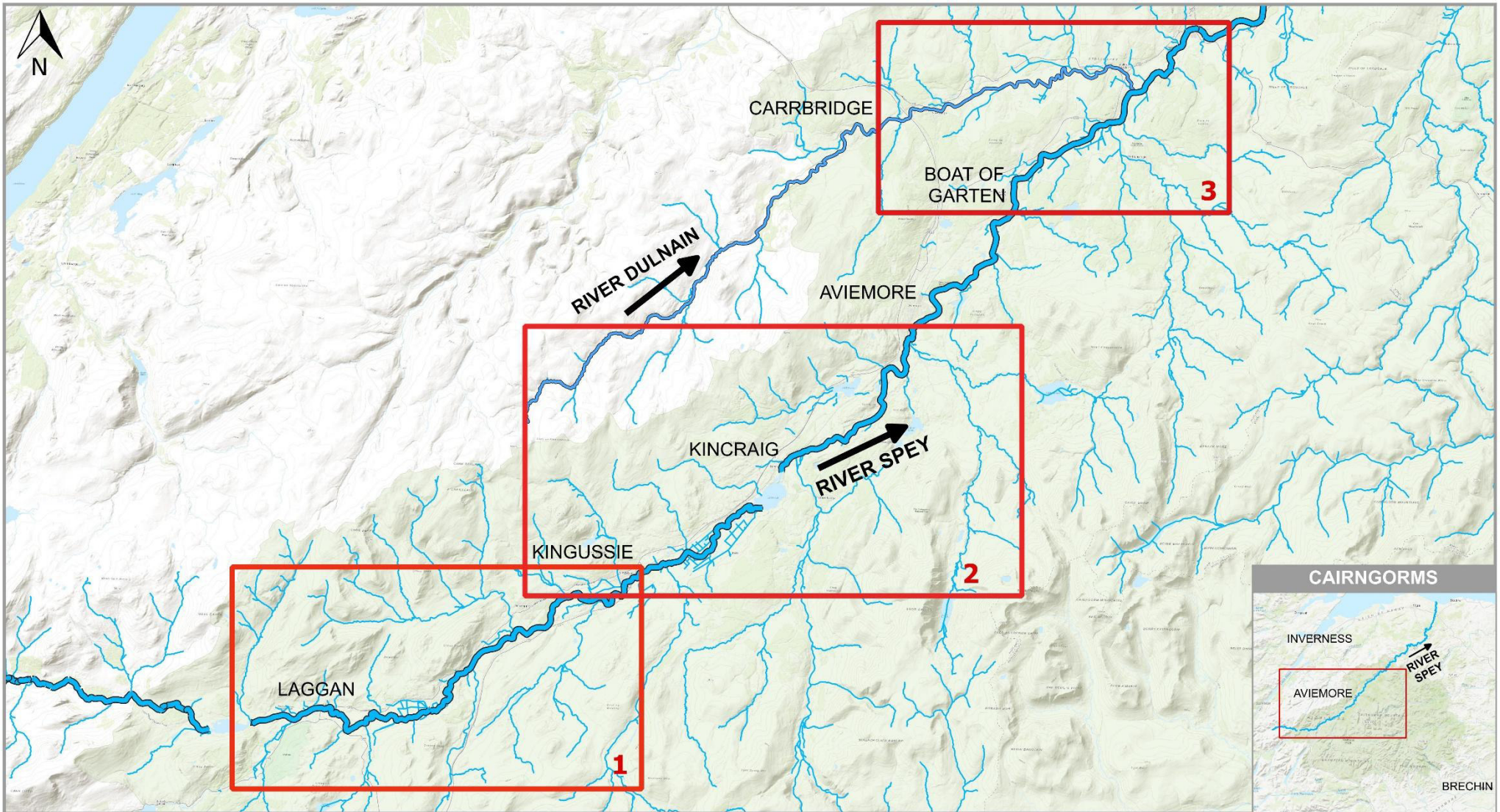
² The baseline assessment covered ~67.1 km of embankment, however the study site was extended by ~1.2 km in 2025 to incorporate the River Spey and River Druie around the perimeter of the Rothiemurchus Fishery. This additional area will be incorporated within all future surveys, giving a cumulative total of ~68.3 km of channel length assessed.

³ This total includes the cumulative longitudinal length of the River Spey and select tributaries within each survey area. Both banks of these watercourses have surveyed throughout this length as well as embankments assessed, where present.

⁴ Cumulative total of all sections of embankment on both banks of the channel, including natural and formalised breaches. This value differs from the total channel length surveyed because the flood embankments were discontinuous and not always parallel to the channel bank.

additional survey area is reflected in the cumulative total channel and embankment lengths outlined in Table 1.1.

Insh Marshes National Nature Reserve, located within Area 2, was omitted from the programme due to a separate, ongoing study that is exploring management options for the RSPB reserve. No embankments are believed to be present between Aviemore and Boat of Garten (between Areas 2 and 3), thus this section of the Spey was also excluded from the study.



Condition Assessment

- Survey Areas
- 1** Survey Area Number

Watercourses

- River Spey
- River Dulnain*
- Other Tributaries*

*Layers contain OS Data @ Crown Copyright and Database Right 2024

CLIENT CAIRNGORMS NATIONAL PARK AUTHORITY

PROJECT UPPER SPEY EMBANKMENT

0 2 4 6 8 10 km

Project no. 2150649
Date 10 NOV 2025
Drawn GP
Surveyed GP, OS, AE & GM
Reviewed KC
Scale @ A4 - 1:255,000
British National Grid
GCS OSGB 1936

Service Layer Credits: Main map and overview map sources - Service Layer Credits: Sources: Esri, HERE Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), © OpenStreetMap contributors, and the GIS User Community.

Figure 1.1 Overview map showing the three areas surveyed during the embankment conditions assessment programme.

1.2 APPROACH

Annual embankment condition assessments are planned for the six-year assessment period, 2023 to 2028. Each assessment year will employ one of two survey methodologies:

- **Targeted:** Priority areas will be spot-checked to determine any change (improvement, no change, degradation) compared to the previous year's categorisation of erosion/breach risk. This methodology will target the most vulnerable areas, based on the previous survey's findings and any areas of concern highlighted by the Park Authority, in liaison with the Cairngorms Crofters and Farmers Community (CCFC). Areas considered to pose low or no risk during the previous year's assessment will not be revisited during the targeted surveys.
- **Comprehensive:** a continuous survey of the riverbanks and embankments within the 3 study areas. All sections regardless of previously assessed risk of erosion/breach categorisation will be reassessed. This methodology was utilised for the baseline assessment.

Table 1.2 sets out how these methodologies will be employed throughout the course of this programme.

Table 1.2 Monitoring programme timeline and planned level of assessment.

Year	Condition Assessment		
	Type	Survey Level	Survey Areas
2023	Baseline	Comprehensive	3
2024			1 & 2
2025	Monitoring	Targeted*	All Areas
2026		TBC	
2027			
2028			

*A baseline continuous survey was undertaken for the additional area bordering the Rothiemurchus Fishery.

During the 2025 'targeted' monitoring assessment, the following areas were spot-checked based on the 2023/24 baseline survey results:

- **Embankments:** sections categorised as 'High' or 'Moderate' risk of erosion as well as 'Breach' areas, including both man-made (formalised) breaches and those of natural causes.
- **Riverbank:** sections categorised as 'High' or 'Moderate' risk of erosion.
- **Additional area:** Sections of the River Spey and River Druie, bordering the Rothiemurchus Fishery were added to the 2025 survey area. No baseline data is available for this area; therefore a continuous survey was undertaken for this section only.

Anecdotal evidence from the Park Authority and landowners encountered during the 2025 monitoring assessment, indicated that flood events experienced since the baseline assessment (i.e. winter 2024/25) have been less frequent and lower magnitude than on an average year, hydrologically. It is therefore anticipated that areas of embankments and riverbanks previously highlighted as at risk of erosion will show signs of stabilisation and an overall improvement in condition, given the lower flood

intensity of the last year. Additionally, baseline areas categorised as 'not at risk' are not expected to have changed significantly. Taking into consideration the below average hydraulic activity and limited negative change anticipated between the baseline and monitoring surveys, a targeted survey was deemed the most appropriate and efficient methodology for the first year of monitoring.

1.3 ASSUMPTIONS AND LIMITATIONS

This study has been undertaken based on the following assumptions:

- Qualitative assessments, such as this visual embankment and riverbank condition assessment, can be subjective. Whilst this limitation cannot be completely removed, it has been reduced by producing assessment criteria for each erosion/breach risk category, which will be utilised throughout the course of the programme to facilitate comparability of annual surveys. Additionally, the same lead surveyors, with experience in assessing river processes and condition of flood assets, have been involved throughout the programme to date.
- Condition assessment is based on a single visual assessment undertaken annually in the Autumn. Therefore, data collected is based on visual indicators at a particular moment in time and, as such may not be representative of all factors influencing bank or embankment condition. For example, a bank eroded during high water or flood events last winter may have stabilised following summer vegetation growth, therefore would be classified as being at lower risk of erosion than if the survey was undertaken in the latter winter months. This limitation has been reduced as much as possible by using experienced surveyors to conduct the surveys and incorporating input from landowner's liaison, where possible.
- Conducting the survey in early-Autumn (September 2025) means that summer vegetation growth has not yet died back and may obscure some signs of erosion and/or instability.
- The targeted survey may have missed new areas of erosion which have formed since the baseline survey. However, these will get picked up in the next monitoring survey, scheduled for September 2026.
- Sections of bank erosion risk are marked as a linear feature. Therefore, change in condition is quantified as an adjustment in the length of bank from upstream to downstream recorded as a particular risk category, as opposed to recording the distance that the bank has retreated into the floodplain due to erosion. Given the large study area and the purpose of the data collection, this was deemed to be the most efficient and effective method of assessment.
- A hydrological assessment of the Spey catchment, to compare annual variations in the hydrological regime with the level of erosion risk and change in bank/embankment condition, is beyond the scope of this work and has not been undertaken. Therefore, conclusions drawn in relation to the embankment not being impacted by below average magnitude and frequency flood events are based on anecdotal evidence only. However, this additional assessment could be carried out retrospectively, utilising SEPA water level gauge and rainfall data, to enable these comparisons.

2. MONITORING ASSESSMENT

CBEC undertook a targeted monitoring survey of Areas 1 to 3 in September 2025. In addition, a continuous survey was undertaken for the additional area bordering the Rothiemurchus Fishery. Weather conditions were generally dry, and river levels were within the lower half of the normal range.⁵ As outlined in Section 1.2, this first year of monitoring targeted all sections of bank and embankment with a baseline category of Moderate erosion risk or higher.

2.1 ASSESSMENT CRITERIA AND METHODOLOGY

All targeted sections were assessed relative to the range of conditions observed throughout the full study site, Spey Dam to Grantown, regardless of Survey Area or landownership boundaries. This approach enabled the collection of comparable, site-wide data. The same criteria for assessing erosion/breach risk, employed during the baseline assessment, has been applied during the targeted monitoring survey to ensure comparability between these annual assessments. A visual assessment, based on these criteria, was undertaken to assign an erosion risk category, Low, Moderate or High, to sections of riverbank, as well as Breach and Formalised breach for embankments. The criteria for these categories are set out in Table 2.1 for riverbank erosion risk and Table 2.2 for embankment erosion/breach risk.

This criterion is intended to provide a broad representation of key factors influencing erosion/breach risk, making this approach applicable across large-scale study areas such as in the present study. One or multiple of these factors may be applicable at any given location, therefore the assignment of an erosion/breach risk category is based on the combination of factors present and the knowledge of river processes held by CBEC's experienced surveyors. The key factors impacting riverbank and embankment stability are expanded upon within the baseline report.¹

In addition to reassessing and updating the riverbank and embankment erosion/breach risk categorisation, during the monitoring survey, the degree of change in condition since the previous assessment was also noted. Improvements in condition (i.e. stabilisation and revegetation), no change in condition and/or degradation of the condition of the riverbank and/or embankment (i.e. increased severity of erosion or increased likelihood of embankment breach) was recorded, based on the criteria outlined in Figure 2.1.

⁵The nearest gauge for Area 1 and the upstream half of Area 2 (i.e. upstream of Loch Insh) was Invertruim, which recorded water levels ranging between 0.38–0.52 m during this part of the survey. For the downstream half of Area 2 the Kincaig gauge was consulted, recording a range of 0.24 to 0.74;. The Grantown gauge, situated ~3 km downstream of Area 3, recorded 0.45 to 0.6 m. Water levels recorded at all 3 gauges, during the course of the survey indicate that water levels were at the lower bound of the normal range for this section of the River Spey. Gauge levels were obtained from the Shoothill Ltd. Gauge Map: <https://www.gaugemap.co.uk/#!Map>

Table 2.1 Factors influencing the riverbank condition and risk of erosion.

Feature/Factor	Risk of Riverbank Erosion			
	None/Negligible	Low	Moderate	High
Signs of Erosion	None/Negligible	Evidence of past erosion, now stabilised Or Small/localised area of erosion on bank face	Actively eroding up to half the bank face	Actively eroding more than half the bank face
Vegetation Cover: Bank Face	Full bank face covered with grass or other ground flora.	Partial to full bank face cover	Partial bank face cover	Little to no bank face cover
Vegetation Cover: River Corridor	Scrub or trees present continuously along the top of bank.	Scrub or trees present semi-continuously along the top of bank.	Scrub or trees occasionally present along the top of bank.	Scrub or trees largely absent from the top of bank.
Bank Slope	N/A	Low Gradient (~45-60°)	Moderate Gradient (~60-70°)	Steep Gradient (>70°)
Bank Height	N/A	<1 m	>1 m	>1 m
Bank Toe Stabilisation	N/A	Deposition providing bank stabilisation	Some/discontinuous deposition providing stabilisation	No bank toe deposition
Signs of Animal Activity (molehills, burrows, livestock trampling)	None/Negligible	Occasional /scattered, Minimal impact on vulnerability to erosion	Frequent, Moderate impact on vulnerability to erosion	Dense, Significant impact on vulnerability to erosion
Bank Protection (e.g. rip-rap)	Not present, but bank is stable, Or, Present and intact (good condition).	Minor signs of disrepair.	Partially intact	In a state of disrepair

Table 2.2 Factors influencing embankment condition and risk of erosion or breaching.

Feature/Factor	Risk of Embankment Erosion/Breach					
	None/Negligible	Low	Moderate	High	Breached	Formalised Breach
Distance to the Riverbank and Riverbank Condition	> ~5 m from the bank and no signs of erosion	<~5 m from the bank and Low-severity bank erosion >~5 m from the bank and Low/Moderate-severity bank erosion	<~5 m from the bank and Moderate-severity bank erosion >~5 m from bank and Moderate/High-severity bank erosion	<~5 m from the bank and High-severity bank erosion	N/A	N/A
Setting	N/A	N/A	Within ~10 m of a stabilised breach	Within ~10 m of an actively eroding breach Position in relation to the channel planform ⁶	N/A	N/A
Signs of Instability (e.g. bare ground, cracks, crumbly surface)	None/Negligible	Small/ localised on crest or face	Extends across up to half of one face/the crest	Extends across more than half of one face/the crest	N/A	N/A

⁶ For example, this may be opposite a confluence or in a location where unconstrained out-of-bank flow may erode the embankment regardless of distance from the top of the riverbank

Feature/Factor	Risk of Embankment Erosion/Breach					
	None/Negligible	Low	Moderate	High	Breached	Formalised Breach
Vegetation Cover: Grasses and Ruderal Vegetation ⁷	Continuous cover	Small/ localised gaps in cover on crest or face	Patchy - gaps in cover extend across up to half of one face/the crest	Sparse - gaps in cover extend across up to half of one face/the crest	Little/no vegetation cover , if recently breached Or, Continuous cover if the breach has been recolonised/stabilised.	Limited/none , if the breach is covered by hard protection (e.g. concrete) Or Continuous cover , in the absence of hard protection.
Vegetation Cover: Trees/Scrub ⁸	Absent Or Continuous cover	Absent Or Semi-continuous	Absent Or Occasional clumps	Absent Or Isolated/scattered individuals or clumps	Little/no cover. Vegetation is likely to have been washed away when breached	Absent
Signs of Animal Activity (molehills, burrows, livestock trampling)	None/Negligible	Occasional/ Scattered, Minimal impact on vulnerability to erosion	Frequent, Moderate impact on vulnerability to erosion	Dense, Significant impact on vulnerability to erosion	N/A	N/A
Modifications	The following factors are relevant to all levels of erosion/breach risk and may result in this risk being reduced or completely removed: Remedial works to repair previously breached or at-risk sections. Embankment protection may have been installed to protect vulnerable areas (e.g. green or hard engineering measures)			- Embankment crest lowered or a section of embankment purposefully removed. - Green or hard engineering to protect the breach.		

⁷ Grasses and ruderal vegetation form a mat of roots across the surface of the embankment, securing the soil surface and reducing the vulnerability of the embankment face/crest to erosion.

⁸ Trees and scrub species are associated with a variety of root depths that, when vegetation coverage is continuous across an embankment, provide increased stability not only to the surface, but also the internal structure of the embankment. Additionally, these species increase the ground surface roughness of the embankment, helping to dissipate the energy from flood flows, thus reducing the erosional power. Contrastingly, if trees or scrub grow in isolation or small clumps along an embankment, these can present focal points for erosion. For example, the force of flood water flowing around these isolated specimens/clusters may cause the plants to be pulled out of the ground, bringing with it some of the embankment material, exacerbating erosion to the embankment. The criteria used within this embankment condition assessment has focused on the latter mechanism of erosion.

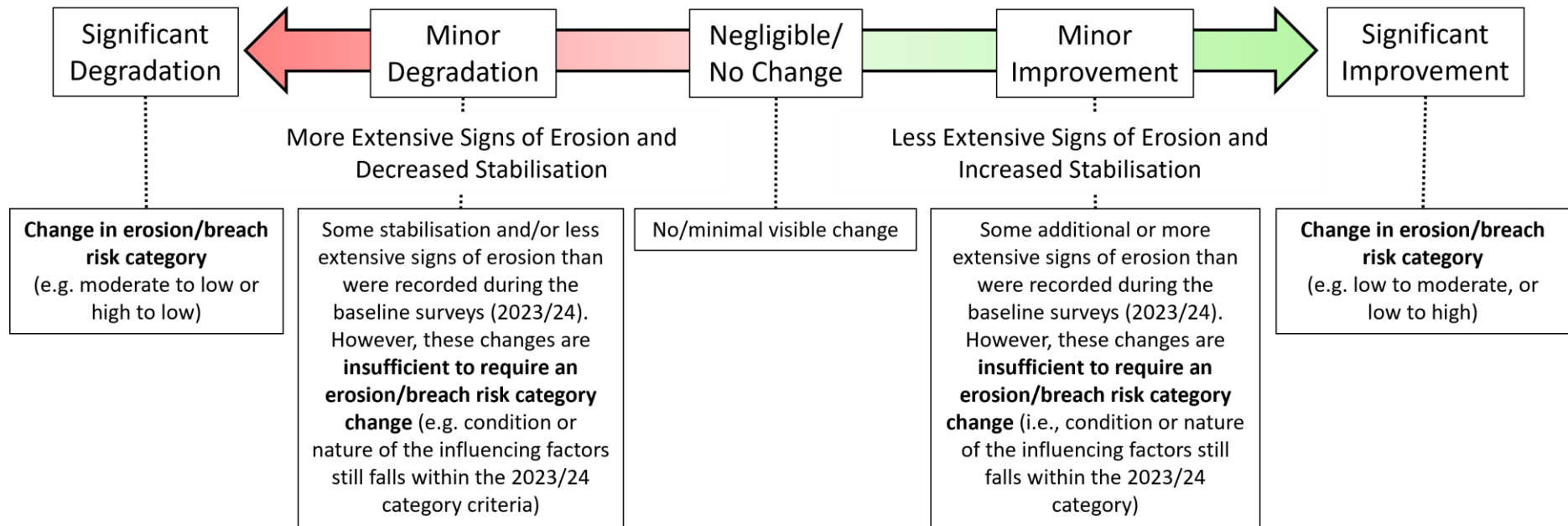


Figure 2.1 Degree of change in erosion/breach risk observed between the present and previous year's categorisation.

2.2 KEY FINDINGS

Data presented in the subsequent sections provides an overview of improvement, no change and degradation of the riverbank (Section 2.2.1) and embankment (Section 1.1.1) that have occurred between the baseline and monitoring surveys. A full breakdown of the results for each assessment year has been provided in Appendix A. Comparative maps of the changes in spatial extent of at-risk areas and level of erosion/breach risk assigned, are presented by Survey Area in Appendices B to D.

Additional sections of channel around Rothiemurchus Fishery, not previously included within the baseline assessment, were surveyed in 2025 extending the total length of the monitoring survey area. To enable comparison between the baseline and monitoring data sets, despite the larger survey area covered in 2025, the percentage of the total riverbank/embankment length that has changed in erosion/breach risk level was assessed, as opposed to the gross length.

2.2.1. Riverbank Condition Results

Table 2.3 outlines the total percentage change in riverbank length and erosion risk categorisation that were recorded between the baseline and year 1 monitoring surveys.

The general trend observed during the 2025 riverbank condition assessment was a reduction in erosion risk, compared to the baseline condition (2023/24). Section of bank that have remained under the same categorisation showed, in some cases, to have increased in stability but insufficiently to result in a change in erosion risk level at this time (minor improvement). Some sections were subject to further erosion, due primarily to the bank height, slope, position within the channel planform or trampling, increased in erosion risk level (significant degradation). Overall, most locations showed a substantial level of improvement (significant improvement) resulting in a reduction of risk level.

This general trajectory of improvement in bank condition may, in part be due to anecdotal evidence received from the Park Authority and landowners spoken to during the survey, that the winter 2024-25 season has seen less frequent and lower magnitude flood events than in recent years. Therefore, it correlates that fewer flood events have provided the banks with time to recover from past erosion and enabled vegetation to colonise.

Based on these calculations (Table 2.3) and observations made during the 2025 monitoring assessment, the following key findings in relation to riverbank condition were identified:

- The length of riverbank classified as at **High risk of erosion was found to have increased** by less than ~1% of the total channel length assessed in each Survey Areas, between the baseline and monitoring surveys. Reasons for this increase included:
 - **Natural river processes dictate that certain sections of channel are at greater risk of erosion than others**, such as the outside of meander bends or opposite confluences. In these areas, the risk of bank erosion tended to remain High, or increase from Moderate to High.
 - Some sections of **High erosion risk (baseline) have increased in length**, due to sections of bank at the upstream and downstream end of an existing section of erosion being more vulnerable to erosive processes.
- The length of riverbank classified as at **Moderate risk of erosion decreased** by up to ~3% of the total channel length assessed in each Survey Area. Reasons for this decrease include:

- Change from **Moderate to Low** bank erosion risk. Significant improvement in bank condition was observed throughout the study site, with the majority of Moderate (baseline) risk of erosion banks reduced to Low risk of erosion in 2025, given signs of stabilisation and revegetation observed.
 - Change from **Moderate to High** bank erosion risk, as outlined above, were occasionally noted.
- **Low risk of bank erosion sections increased** by up to ~2% of the total channel length assessed in each Survey Area. Reasons for this increase include:
 - Change from **Moderate to Low** bank erosion risk, as outlined above, were frequently noted.
 - **Low risk bank erosion areas** from the baseline survey (2023/24) **were not reassessed as part of this targeted monitoring survey** (Section 1.2). Therefore, the length of any sections reduced from High or Moderate to Low risk in the 2025 survey were added on to the existing Low erosion risk data set from the baseline assessment.
 - Given the general trend observed of riverbanks showing signs of stabilisation since the baseline assessment, it is likely that these areas will remain Low risk or will have improved sufficiently to be classified as no longer at risk of erosion during the next monitoring assessment (2026).
- **Riverbanks around the Rothiemurchus Fishery**, were not assessed during the baseline assessment, thus a continuous survey of the riverbanks of the River Durie and Spey around the Fishery were undertaken in 2025. Riverbanks along the River Druie were observed to be in good condition with only occasional, short sections (less than 5 m in length) of Low-risk bank erosion recorded. Moderate and High risk of bank erosion were noted along the River Spey, coinciding with footpath access, indicative of trampling by pedestrians and dogs, as well as around the outside of meander bends. However, given the position of these sections of bank erosion, these areas at risk of riverbank erosion are not thought to impact the Rothiemurchus Fishery.

Table 2.3 Change in riverbank erosion risk between baseline and monitoring assessments. Negative values (shaded green) indicate a cumulative reduction in bank length of this erosion risk category. Conversely, positive values (shaded orange) refer to a cumulative increase in bank length.

Survey Area	Total Length of Riverbank Surveyed (km) ⁹	Change in Riverbank Erosion Risk (km)							
		High		Moderate		Low		Total at risk in each Area	
		Length (km)	% total	Length (km)	% total	Length (km)	% total	Length (km)	% total
1	55.8	0.40	0.71	-1.58	-2.82	1.27	2.27	0.08	0.15
2	37	0.31	0.85	-0.13	-0.36	0.12	0.33	0.30	0.81
3	44	0.05	0.12	-0.65	-1.47	0.73	1.67	0.14	0.32
Total (km)	136.8	0.76	0.56	-2.36	-1.72	2.12	1.55		

⁹ Both banks of the channel throughout the study site were surveyed. Therefore, these values represent two times the channel length specified in Section 1.1.

2.2.2. Embankment Condition Results

Table 2.4 outlines the total percentage change in riverbank length and erosion risk categorisation that were recorded between the baseline and year 1 monitoring surveys.

Based on these calculations and observations made during the 2025 monitoring assessment, the following key findings in relation to embankment condition were identified:

- **The total cumulative length of embankment at risk of breaching has reduced negligibly**, decreasing by less than 0.2% across the whole study site.¹⁰ However, within the sections at risk of breaching, an **overall improvement in embankment condition** was observed, with multiple High and Moderate risk areas reduced to Low risk of breaching. This is evidenced by an increase in section of embankment classified as at Low risk of breaching in all 3 survey areas (Table 2.4).
- The total length of sections of embankment classified as at **Low risk of breaching have increased across the study area**. This is due to:
 - Overall trend towards improvements in the embankment stability, as outlined above.
 - The proximity to an eroding bank. For example, embankment breach risk has been reduced to Low, in sections where the bund is situated within ~10 m of an eroding riverbank and the bank condition has shown significant improvement.
 - **Low risk of embankment breach areas** from the baseline survey (2023/24) **were not reassessed as part of this targeted monitoring survey** (Section 1.2). Therefore, the length of any sections reduced from High or Moderate to Low risk in the 2025 survey were added on to the existing Low breach risk data set from the baseline assessment.
- Sections of embankment at **Moderate risk of breaching have reduced in length across the study site** overall, except for a ~50 m cumulative increase in Area 2. Examples of changes in embankment condition that have contributed to this increase in Moderate breach risk within Area 2 include:
 - **Increase in length of existing sections** of Moderate embankment erosion, such as along the river right bank of the Raitts Burn.
 - **Reduction in riverbank erosion risk level and length of bank effected**, resulting in sections of embankment at High breach risk being reduced to Moderate. For example, downstream of the River Tromie confluence on the River Spey, a ~18 m section of embankment was reduced to Moderate risk owing to the change in condition of the adjacent bank.
 - **Stabilisation of existing breach areas**, through vegetation growth the area of previous erosion, reduces the risk of this breach widening and thus lowers the erosion risk to the adjacent sections of embankments. This was observed in multiple locations between Inshriach House and Kinara, near Kincaig, where sections of embankment either side of an existing breach were reduced from High to Moderate risk of breaching.

¹⁰ In 2023/24 of the total ~66 km of embankment assessed, ~11.7km were deemed as breached or at risk of breaching, equivalent to ~17.8% of the total area surveyed. In 2025 of the total ~67 km of embankment assessed, ~11.8km were deemed as breached or at risk of breaching, equivalent to ~17.6% of the total area surveyed. A ~0.2% reduction in total length of embankment at risk of breach between the baseline and monitoring survey.

- Sections of embankment at **High risk of breaching have reduced in length across the study site**, except for a increase of ~120 m cumulatively in Area 1. Factors contributing to this increase in High breach risk within Area 1 include:
 - **Expansion of existing breach risk sections**, due to an increase in the surface area of embankment crest of face erosion. For example, this was noted along short sections (less than 10m) along the river right (eastern) embankment at Breakachy farm.
 - **Extension of area effected or increase in erosion risk level of a riverbank**, with potential implications on the adjacent embankment. For example, on the Allt Dobhrain left bank, near Auchmore and the River Calder right bank, near Newtonmore.
 - Additionally, an increase in the length of bank at Moderate risk of erosion was noted downstream of the Nuide Farm breach, resulting in an extension of the adjacent embankment section classified as High breach risk.
- The total cumulative length of embankment which have already breached showed no change in Area 1 and an improvement in Area 3 due to remedial works, whilst **breaches in Area 2 were found to have increased by a cumulative length of ~60 m**. This was due to:
 - **Expansion of existing breaches** (less than 5 m increase), such as the right bank breach on the River Gynack, Kingussie and on the River Spey left bank just upstream of the River Tromie confluence.
 - **Additional breaches**, not previously noted, where the embankment is less distinct, such as on the river left bank near the Boring Mill, Aviemore.
- In Area 3, Boat of Garten to Grantown-on-Spey, **3 previously breached sections of embankment have been repaired** since the baseline assessment; Mains of Garten and Balliefurth on the River Spey as well as near Mullochard on the Dulnain. These areas equate to a cumulative total of ~90 m of embankment, which has been reduced from 'Breach' to 'Low' risk of breaching during the 2025 monitoring assessment. These areas will remain at 'Low' risk of breach whilst the embankment surface revegetates following construction. At present there are areas of the bund crest and/or face which are still revegetating, thus more vulnerable to erosion. Once recolonised with vegetation this erosion risk will be removed at Mains of Garten and Mullochard. Balliefurth Farm's 'ex-breach', will always remain as a breach risk due to its position opposite the Dulnain-Spey confluence, however remedial works have strengthened the breach reducing the overall risk to Low.
- **High and Moderate risk areas reduced in Area 3, due to breach remedial works**. The areas adjacent to the breach were previously classified as at risk of erosion due to breach widening, however following breach repairs the risk to the adjacent sections of embankment has been mitigated against, thus removed.
- **No additional formalised breaches have been created** since the baseline assessment (2023/24).
- **Embankments along the River Druie at Rothiemurchus Fishery**, not previously surveyed, **were observed to be in a good stable condition**, owing to the well vegetated banks with continuous coverage of bankside trees. Occasional, short sections (less than 2 m in length) were classified as Low risk of breaching due to the presence of minor erosion, either to the crest or the embankment face. Minor signs of animal activity (digging, thought to be by badgers) were noted occasionally on the crest of the bund surrounding the fishing ponds

however, this was not deemed to be negatively impacting the structural integrity of the embankment at the time of survey. This will be monitored in future surveys to capture any further degradation.

Table 2.4 Change in embankment erosion/breach risk between baseline and monitoring assessments. Negative values (shaded green) indicate a reduction in the cumulative embankment length of this erosion risk category. Conversely, positive values (shaded orange) refer to an increase in the cumulative embankment length.

Survey Area	Total Length of Embankment Present (km)	Embankment Erosion/Breach Risk									
		Formalised Breach		Already Breached		High		Moderate		Low	
		Length (km)	% total	Length (km)	% total	Length (km)	% total	Length (km)	% total	Length (km)	% total
1	26.46	0.00	0.00%	0.00	0.00%	0.12	0.46%	-0.18	-0.69%	0.09	0.33%
2	13.63	0.00	0.00%	0.06	0.40%	-0.06	-0.46%	0.05	0.39%	0.06	0.42%
3	26.80	0.00	0.00%	-0.09	-0.34%	-0.12	-0.44%	-0.30	-1.10%	0.45	1.66%
Total (km)	66.89	0.00	0.00%	-0.04	-0.05%	-0.06	-0.09%	-0.43	-0.64%	0.59	0.88%

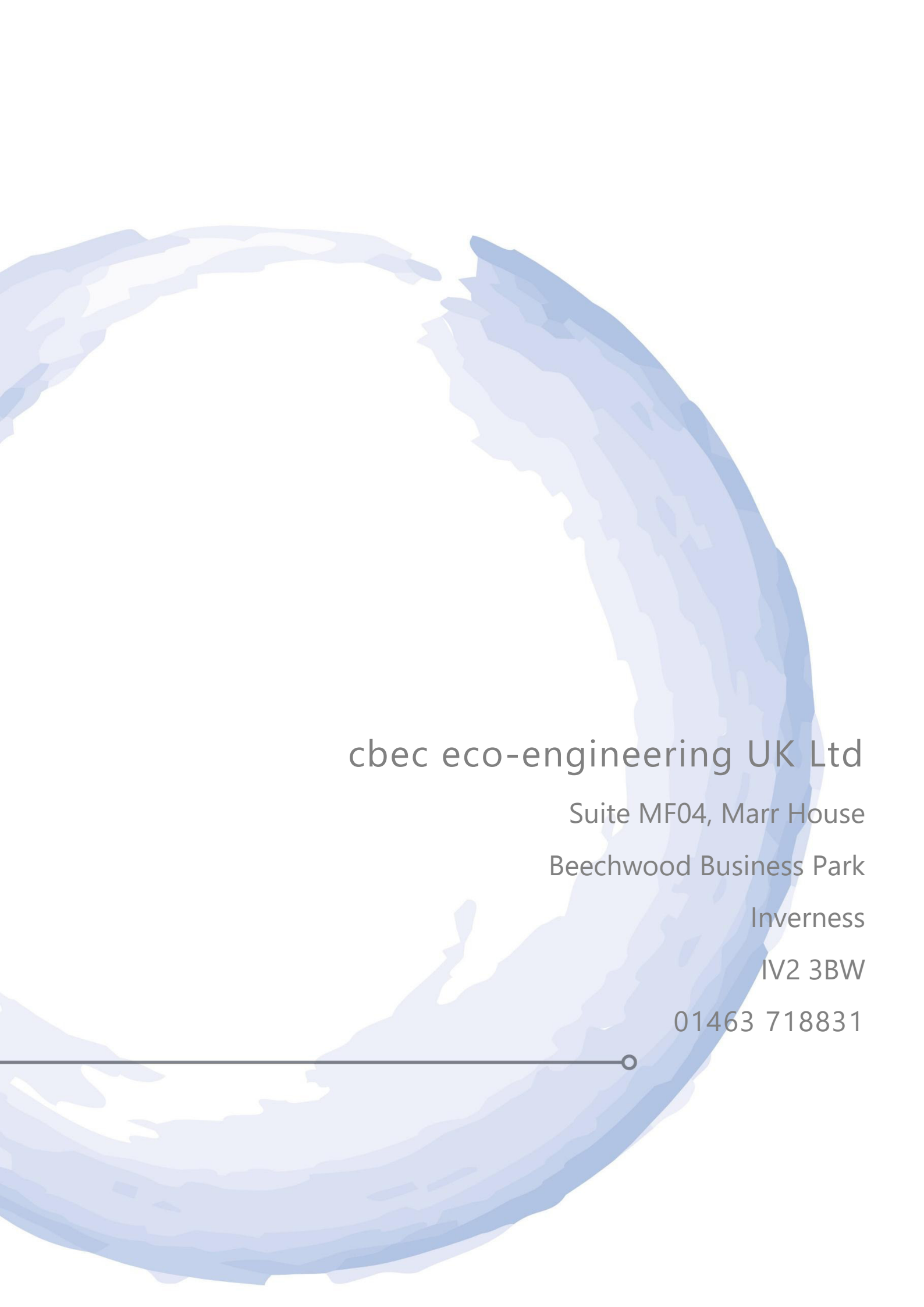
3. SUMMARY

Less than 25% of the total length of riverbanks surveyed were found to be at risk of erosion (all categories) in both the baseline (2023/24) and monitoring year 1 (2025) assessments. Between these surveys, the total length of riverbank at risk of erosion were calculated to have increased by ~0.04% of the total study site (~167 km of riverbank in 2025), which is equivalent to ~500 m of bank length cumulatively. Despite this minor increase in length, the overall trend observed was an improvement in bank condition and stability, with most targeted sections reducing by at least one (e.g. High to Moderate) or two (High to Low) erosion risk category levels. Multiple sections classified as at Low erosion risk during the 2025 survey are anticipated to be classified as 'no risk' in 2026, should stabilisation processes such as recolonisation of vegetation continue. Contrastingly, the main sections of riverbanks recorded as showing signs of degradation or no change, were typically along sections of channel where natural river processes dictate that erosional forces are greater, such as opposite confluences or around the outside of meander bends.

The total length of embankment at risk of breach reduced negligibly (less than 0.2%) across the whole study site, between the baseline and monitoring surveys. However, within the sections at risk of breaching a general improvement in embankment condition was observed, thus an overall trend towards reduction in breach-risk level categorisation. Where sections of embankments did not change category or were reclassified at a higher level of breach-risk, this was typically due to a handful of influencing factors. These included an increase in erosion risk to an adjacent riverbank, extension of existing erosion to the embankment face or crest (typically through livestock/deer trampling, slumping, or erosion by floodwater) or an expansion of an existing breach area.

Most of the breaches identified during the baseline assessment have remained stable. Between Boat of Garten and Grantown, 3 embankment breaches have been repaired since this initial survey, providing examples of how remedial works could be undertaken elsewhere within the study site. These breached areas are now classified as at Low risk of breaching whilst they revegetate following their reconstruction and will continue to be monitored during subsequent annual assessments of this programme.

The next survey will be undertaken in September 2026. This survey will be the second of four monitoring assessments proposed as part of the River Spey Embankment Condition Assessment Programme, commissioned by the Park Authority. As a minimum, a targeted survey will be carried out, focusing on High and Moderate areas of breach/erosion risk highlighted in the 2025 assessment. These areas may be expanded further dependent on the frequency and magnitude of flood events experienced over winter 2025/26, which may dictate the degree to which erosion and breach risk will be impacted as well as any additional areas of concern highlighted by landowner/tenants ahead of the next survey.



cbec eco-engineering UK Ltd

Suite MF04, Marr House
Beechwood Business Park

Inverness

IV2 3BW

01463 718831
