

Promoting Adaptation to Changing Coasts

Summary of the practical guide



Foreword and acknowledgements

Foreword

The Promoting Adaptation to Changing Coasts (PACCo) project is a cross-border initiative which is financially supported by the INTERREG VA France (Channel) England programme, co-financed by the European Regional Development Fund (ERDF).

The broad aim of PACCo is to demonstrate that it is possible to work with stakeholders in estuarine regions to deliver a range of benefits for people and the environment by adapting pre-emptively to climate change. It has a total value of €27.2m, with €18.8m coming from the ERDF.

The project focuses on two pilot sites in the Lower Otter Valley, East Devon, England) and the Saône Valley (Normandy, France).



Lower Otter



Saône Valley



Acknowledgements

We would like to thank all our project partners who contributed to the development of the guide:

- Environment Agency
- East Devon Pebblebed Heaths Conservation Trust (EDPHCT)
- Conservatoire du Littoral (CDL)
- Department for Environment and Rural Affairs (Defra)
- Communauté de Commune Terroir de Caux (TDC)
- Commune de Quiberville



We'd also like to thank the following contractors who've either helped write chapters or provided material for use in the report:

- ABPmer
- L'Agence Nature
- Bridget Beer PR
- Exeter University
- Jacobs
- Kier
- KOR Communication
- Lisode
- Manchester Metropolitan University
- Natural Capital Solutions



Our French PACCo partners would also like to thank some additional partner organisation who contributed to the guide:

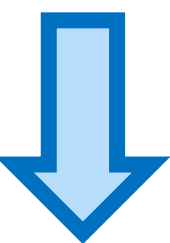
- Agence de l'eau Seine-Normandie
- Région Normandie
- Conseil Départemental de la Seine-Maritime
- Syndicat Mixte des Bassins Versants Saône Vienne Scie



Further reading

The document is a high-level overview of the PACCo guide. The full report can be accessed here: <https://www.pacco-interreg.com/download-categories/pacco-guide/>

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Parts

The guide is divided into the following 6 parts. Click on the part you are interested in to access a summary from the main report.

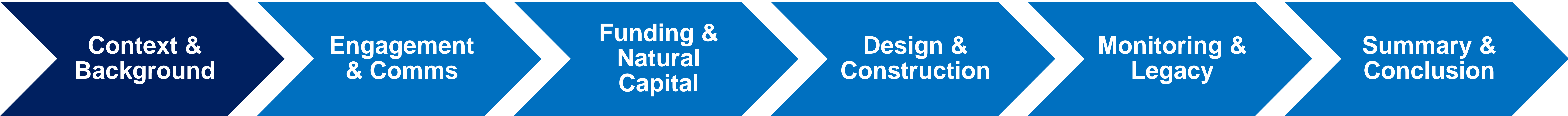


Chapters

The guide is divided into 10 chapters. Click on the chapter you are interested in to access a summary from the main report.

<div><u>Executive summary</u></div> <div><u>1. Introduction</u></div> <div><u>2. PACCo Vision</u></div>	<div><u>3. Engagement</u></div> <div><u>4. Communication</u></div>	<div><u>5. Funding & natural capital</u></div>	<div><u>6. Lower Otter</u></div> <div><u>7. Saâne Valley</u></div> <div><u>8. Risks & solutions</u></div>	<div><u>9. Monitoring</u></div> <div><u>10. Legacy infrastructure</u></div>	<div><u>11. Summary & conclusion</u></div> <div><u>PACCo reports</u></div> <div><u>References</u></div>
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Part A. Context and Background



Executive summary

Chapter 1. Introduction



Introduction

Global warming has led to ice cap melting and the expansion and warming of the oceans. At the same time, we have seen global sea level rise (SLR) of 15cm over the 20th century. The impacts of global warming and SLR pose an existential threat to low lying coastal areas. These impacts, twinned with unprecedented loss of biodiversity, are being felt now. We need to act immediately to address the problem.

This chapter summarises the impacts of the climate and biodiversity crises. It helps to set the context for the rest of the report which is focussed on describing practical climate change adaptation measures.

Climate and Biodiversity Crisis

The International Panel on Climate Change (IPCC) has demonstrated that climate change is both inevitable and irreversible. Across Europe the impacts of climate change are becoming more and more noticeable, with a greater number and frequency of natural disasters from flooding and coastal erosion, through to drought and wildfire.

Over the last 300 years, human activity along our estuaries and coasts has led to habitat loss, resulting in over 65% of seagrass/wetland habitats being destroyed and over 90% of formerly important species being depleted (Lotze, et al., 2006).

Inter-tidal habitats provide a wide range of ecosystem services (Hudson, Kenworthy, & Best, 2021) (Burgess-Gamble, et al., 2017). These include acting as carbon sinks and helping coasts and estuaries become more resilient to the impacts of climate change.

Protecting, preserving and restoring salt marsh is vitally important in combatting the twin biodiversity and climate crises.

Policy Context

European policy drivers

In Europe over 100,000 citizens are at risk of coastal flooding each year. If no adaptation measures are put in place this figure could reach 3.9 million by the end of the century (Vousdoulas, et al., 2020). Recognising the existential threat posed by climate change, the European Commission has put in place a green deal (European Commission, 2019) which commits the EU to becoming climate neutral by 2050.

English policy drivers

In England, 247,000 homes and business are at high risk of coastal flooding and by 2030 over 700 properties could be lost due to coastal erosion (Environment Agency, 2015). English national strategies and policies describe the need to adapt to and become more resilient to the impacts of climate change.

French policy drivers

In France, a quarter of the developed coastline is at risk of erosion, 270km of which is retreating more than 50cm per annum (DGALN, 2021) with over 850,000 jobs at risk of coastal flooding (Bafoil, 2022). French national strategies and policies help protect the coast of France from development and set out a list of priority locations where communities need to be protected.

Franco-English Context

The EU INTERREG funded Living with a Changing Coasts (LiCCo) (LiCCO, 2014) project ran from 2011 to 2014 brought together partners from across Devon and Normandy who were united by similar coastal climate change challenges.

The purpose of LiCCo was to help coastal communities better understand, prepare for and adapt to the impacts of climate change, sea level rise and erosion on the natural and human environment. The project developed best practice for engaging coastal communities enabling them to understand the predicted impacts of climate change.

In France, the Saône Valley (Normandy) was a LiCCo pilot site. Initial work in this catchment through LiCCo led to it being taken forward as part of the PACCo project where climate change adaptation measures are now being implemented.

In Devon, the River Exe was also a LiCCo pilot site. However, the estuary was not taken forward in the PACCo project because the Exe Estuary Strategy (Environment Agency, 2014) demonstrated that compensatory habitat creation was not possible. Instead, the Otter Estuary was identified as a potential site.

LiCCo was a pre-cursor to PACCo, and it helped cement the Anglo-French partnership whilst also identifying two catchments on either side of the channel with similar problems and challenges.

Focus of the report

The report describes the PACCo project's climate change adaptation strategies which included:

- Awareness raising
- Protecting and restoring nature
- Relocating businesses and amenities
- Resilient design

Lessons Learnt and Recommendations

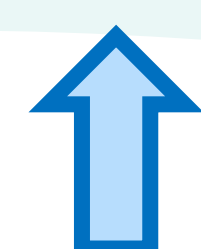
Understand the scientific and policy context at the start of your project as this will help you to:

- Identify suitable funding sources
- Identify potential project partners
- Develop an adaptation solution which is in line with current scientific and political needs

Further Reading

[Promoting Adaptation to Changing Coasts – a practical guide](#)

[Promoting Adaptation to Changing Coasts – a practical guide summary document](#)



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Chapter 2. The PACCo Vision

Introduction

The Lower Otter and the Saône Valley have been physically modified, resulting in both rivers being disconnected from their floodplains. On the River Otter, an embankment was built during the early 19th century turning a large area of the floodplain into agricultural land. In the Saône Valley, dykes/embankments were created during the 18th century draining the land for agricultural use diverting the river through a culverted pipe into the sea.

These historical modifications have affected both rivers from an ecological standpoint, leading to a loss of intertidal habitat.

Summary

Climate change and sea level rise are already affecting both valleys, flooding businesses and infrastructure. Adaptation to the impacts of climate change is needed in both locations to help protect communities, livelihoods and wildlife into the future. PACCo is important because it:

- Minimises future costs associated with the repair/maintenance
- Provides increased socio-economic benefits
- Provides public health cost savings
- Increases natural capital value
- Demonstrates that pre-emptive adaptation is possible

In both estuaries, adaptation has implemented four different strategies:

1. Awareness raising
2. Habitat creation
3. Relocating businesses and amenities.
4. Resilient design

Lower Otter

The climate change adaptation strategy has involved:

- Working with the communities in the Lower Otter to develop a long-term solution
- Restoration of 55 hectares of lost intertidal habitats
- Moving the local cricket club out of the floodplain
- Raising a road and protecting an historical tip



Awareness raising



Habitat creation



Relocation



Resilient design

Saône Valley

The climate change adaptation strategy has involved:

- Working with the communities in the Saône Valley to develop a long-term solution
- Restoration of 50 hectares of lost intertidal habitats by reconnecting the river to its floodplain
- Moving the municipal campsite from the coast to an in-land site out of the floodplain
- Installing a new sewage treatment facility and network



Awareness raising



Habitat creation



Relocation



Resilient design

Lessons Learnt and Recommendations

- Place the site in its historical context
- Understand the reasons why your site was modified in the past
- Develop a suitable restoration plan to address these modifications
- Explain to stakeholders why change is needed now
- Engage with local communities early and understand the issues from their perspective
- Building a strong partnership early can help secure land and funding
- Develop an achievable adaptation strategy
- Securing funding can take time

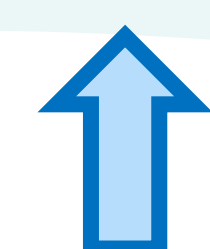


Further Reading

[The history of both estuaries - Lower Otter and Saône Valley](#)

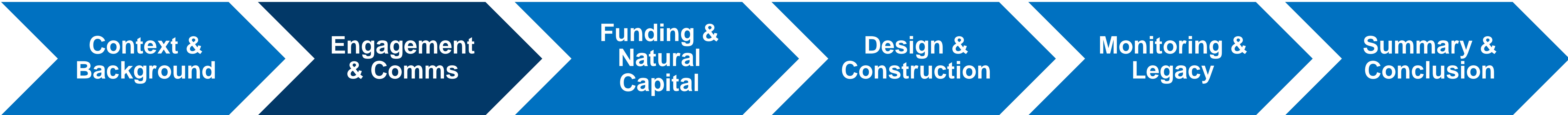
[Disused tip case study – Lower Otter](#)

[Methodology for evaluating and managing man made historical threats](#)



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Part B. Engagement and Communication



Chapter 3. Engagement

Chapter 4. Communication

Introduction

Communications (or comms) is frequently used as a catchword for all public relations, stakeholder engagement and communications activities. Communication connects people with information, increases understanding or prompts action.

Communication is essential for effective engagement. Effective communications use a variety of channels and methods to reach specified target audiences. These are identified during the communications planning stage, which researches the most effective and relevant communications channels.

Summary

Communications goals and objectives - At the start of the project, we defined our main communications objectives and goals, including:

- Raising awareness of the impact of climate change on coastal communities
- Promoting cross-border ways of working to enable pre-emptive adaptation.

Strategy - The PACCo Communication and Engagement Strategy set out the project’s key climate change adaptation messages to be conveyed in all communications.

Tools - A communications log was used to record how the partners were involved, when and what communication was taking place, and by whom it was delivered.

Branding - We developed consistent project branding to be used by all partners in all our comms and project materials.

Translation and interpretation - On international projects, buying in professional language and translation service is important to enable smooth project delivery.

Printed Media

We developed written materials to describe the project or to make announcements to celebrate key milestones such as:

- Articles and blogs
- Information packs
- Leaflets
- Newsletters
- Posters



On-line Media

We developed a digital presence through a bilingual website and active and frequent use of Facebook, LinkedIn and Twitter accounts to reach the wider public and industry contacts, sharing news and images at key project stages.

We developed a series of videos and animations to show how adaptation can be achieved. On both sides of the channel drone footage and fixed-point drone photos helped demonstrate project progress in both estuaries.



Newspapers, Television and Radio

On both estuaries we made regular press releases to keep the local public aware of progress on-site or to flag up issues for their awareness. We also seized the opportunity to promote the project on local radio and national television in England and France.



Face to Face Events

The project has been disseminated at virtual and face-to-face exhibitions, conferences and workshops. The team also led numerous site visits for a wide range of different groups including schools. A closing conference attracted over 200 delegates, from over 50 different types of organisations from 5 different countries.



Lessons Learnt and Recommendations

- Every piece of communication must consider the audience and timing, as well as the key project messages, plus the specific information and action.
- Researching into how and where stakeholders get their news provides valuable insights as to which channels to utilise to reach your target audience.
- Plan and map out communications activities to spot gaps, overlaps and to streamline.
- Partnership projects lead to large stakeholder networks/contacts which should be used effectively.
- During a project, audiences’ interest will ebb and flow – use a mix of communications channels irrespective of whether they are active or not.
- Put yourself in the stakeholders’ shoes to consider how you would feel about your project if you lived there and use this insight to refine communications.
- Work with partners and funders to develop a brand and recognisable logo.

Further Reading

Reports

[Communications and engagement strategy](#)
[PACCo Final Conference Report](#)

Social media

[PACCo Facebook page](#)
[PACCO LinkedIn account](#)
[PACCo Twitter account](#)

Videos, animations, drones

[Cross-border exchange – Natural capital and socio-economic](#)
[Cross-border exchange - Virtual tour of the Lower Otter](#)
[Lower Otter drone Flyover](#)
[PACCo videos and animation](#)
[PACCo YouTube channel](#)

Webpages

[Basse Saône 2050 webpage](#)
[Lower Otter webpage](#)
[PACCo webpage](#)

Blogs, Newsletters, leaflets
[Leaflets and information packs](#)
[Newsletters](#)
[PACCo blogs posts](#)

Part C. Funding and Natural Capital



Part D. Design and Construction



Chapter 6. Lower Otter Design & Construction

Introduction

On the Lower Otter, the project's design and construction adopted a three-pronged adaptation strategy which included:

- Protecting and restoring nature
- Relocating businesses and amenities
- Resilient design

An overview of the scheme is provided below.

Relocating the Cricket Club

The cricket club was originally located close to the sea in a location which flooded regularly. The cricket pavilion was demolished as part of this project and relocated to a flood-free location to the north of Budleigh. The new grounds include an improved adult pitch, new junior pitch and a new multifunctional two storey clubhouse.

The old cricket pitches now form part of the new creek network and are close to the location of the breach and a new 70m footbridge crossing the breach.

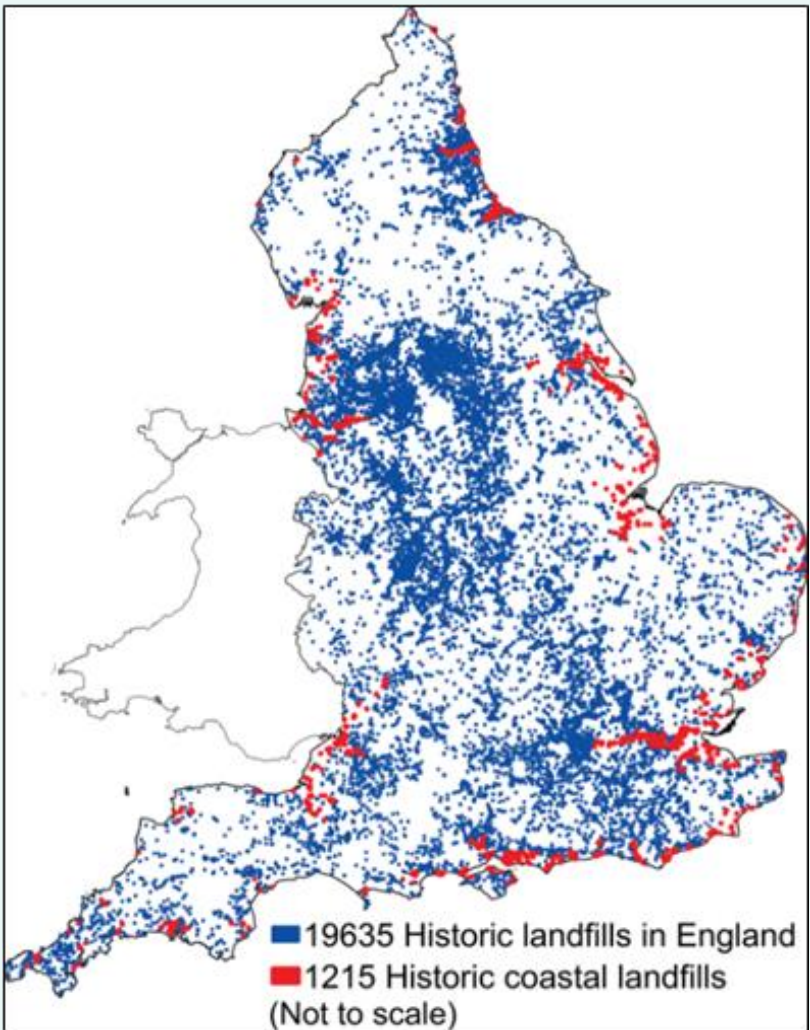


Protecting the Historic Landfill

The coast of the UK is home to numerous historic landfill sites. The Lower Otter is no exception; the tip was active from 1928 to 1978 receiving inert and household waste and small amounts of industrial and commercial waste.

Flooding in 1968 resulted in rubbish being carried into adjacent farmland, and the uncertainty of the tips contents and proximity to water abstraction boreholes meant that its protection needed to be considered.

Protection was achieved by capping the site and constructing shallow slopes over the landfill site to dissipate water energy, reducing the risk of erosion. An orange geotextile layer notifies future subcontractors to not disturb the area.



Source: Brand et al., 2017



Footbridge and Highway Bridge Construction

Two new bridges have been constructed:

- Footbridge - crossing the location of the breach
- Highway bridge - over the creek network at South Farm Road

The footbridge spans 70 metres across the location of the breach retaining pedestrian access along the popular South West coastal path.

A road bridge and a raised road embankment on South Farm Road enable vehicular access along the road at high tide. The bridge connects the northern and southern creek networks without restricting access.



Creek Network and Budleigh Brook

The River Otter was disconnected from floodplain with land being drained for agricultural purposes. As part of this project 55ha of intertidal habitat has been restored.

This involved excavating a new creek network extending 2.2km from the northern extent of the site (Little Bank) to the sea at Lime Kiln Car Park. Existing agricultural drainage ditches running west to east across the floodplain were utilised to reduce the cut and fill. The creeks cross through what was once agricultural land and the old cricket pitch. Twice a day the tide will drain in and out of the 70m breach.

The Budleigh Brook Aqueduct has also been removed and the brook restored and connected into the creek network.



Chapter 7. Saâne Valley Design & Construction

Introduction

In the Saâne Valley, the project's design and construction adopted a three-pronged approach which included:

- Protecting and restoring nature
- Relocating businesses and amenities
- Resilient design

An overview of the scheme is provided below.

Relocating the Campsite

The campsite is located to the east of Quiberville on the coast where the Saâne meets the sea. The site has been subjected to fluvial flooding in the past and the risk will only increase with climate change and sea level rise.

The campsite is a vital socioeconomically to the community. It generates 40% of the income for the municipality through direct and indirect employment.

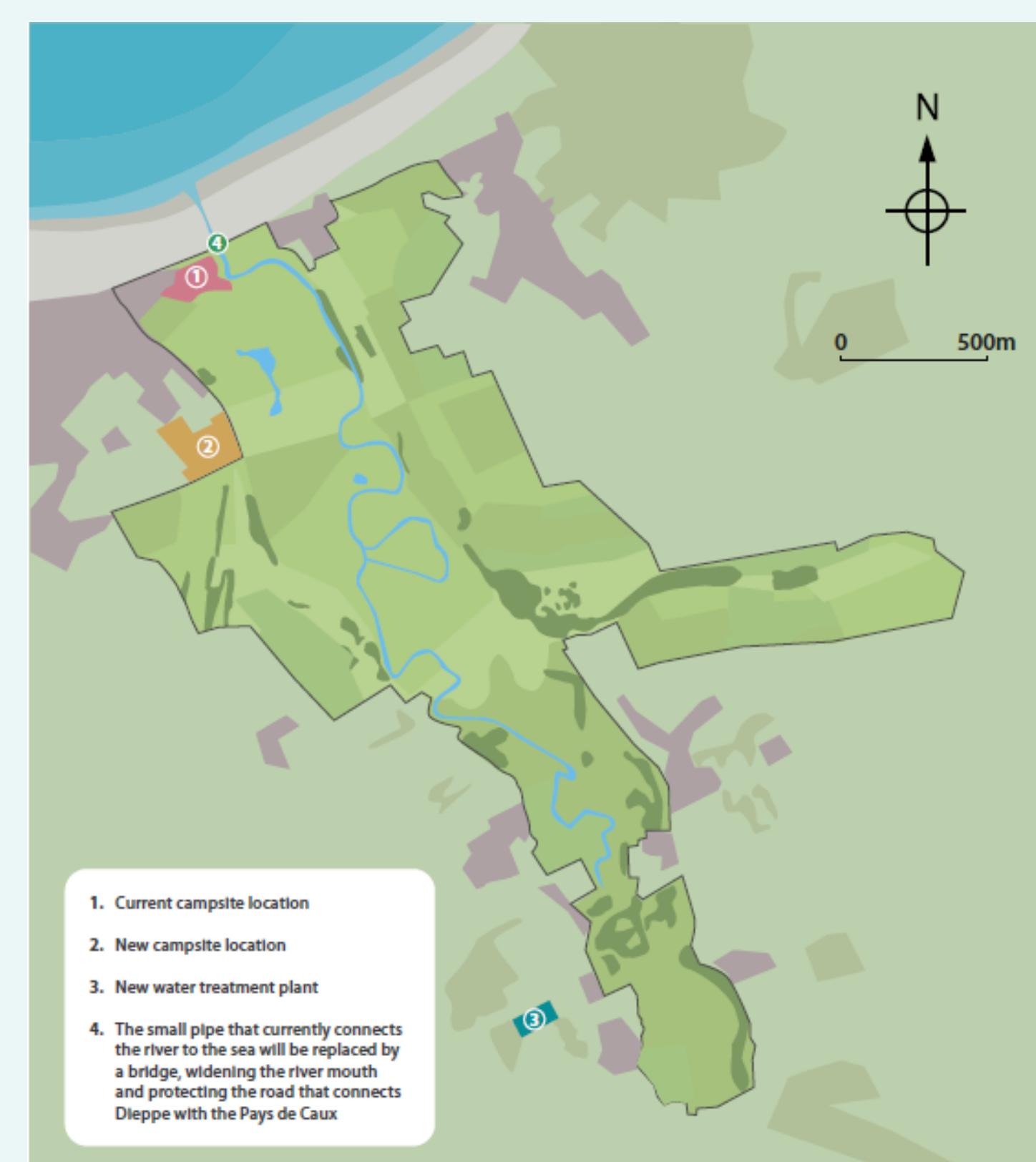
To relocate the campsite out the floodplain it had to remain on municipality-owned land. A site was found on the adjacent hill outside of the floodplain, that is within walking distance of the coast and Quiberville, with easy access to the road network. It aims to improve the tourism service and integrate into the surrounding landscape better than the existing campsite.

New Sewage Treatment Plant and Network

The new wastewater treatment works are located 200m west of village of Longueil.

Studies had found that the water quality of the Saâne required improvement to meet EU water quality standards. This was primarily due to the existence of septic tanks with inconsistent treatment levels and accidental discharging of sewage during flood events.

A new high performance collective wastewater treatment plant has been built, replacing five failing treatment sites. The new network connects 4,300 homes.



Restoring the Intertidal Habitat

The Saâne Valley drains into the channel between the settlements of Quiberville-sur-Mer and Sainte Marguerite-sur-Mer. The road embankment and culvert prevent the efficient flow of water out of the valley and into the sea, and during flood events, waterlog the floodplain and flood properties and infrastructure.

The restoration of the floodplain is enabled through PACCo as relocating the municipal campsite creates the space for intertidal habitat. The habitat creation will be delivered by the Basse Saâne 2050 project and will entail:

- A larger outlet to the sea
- Lowering embankments and constructing new meanders
- Renaturation of Longueil poplar grove and planting of native species
- Creation of foot and cycle paths
- Change in land use practices



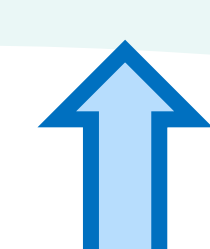
Lessons Learnt and Recommendations (Chapters 6 and 7)

- Ensure you know what the key constraints are
- Know your site's history to shape its future design
- Be realistic about project phasing, especially if there are multiple dependencies
- Do not under-estimate the degree to which habitat and protected species constraints may impact on project delivery (time and cost)
- Conduct a detailed site wide ground investigation and surveys of species present on site
- Show foresight and accommodate future engineering projects
- Be vigilant to continually changing climatic and ground conditions during construction. Working in flood plains can be very challenging
- Anticipate problems and resolve them collectively
- Think about the project's legacy when developing signage and infrastructure

Further Reading

[The history of both estuaries - Lower Otter and Saâne Valley](#)

[Methodology for evaluating and managing man made historical threats](#)



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Chapter 8. Risks and solutions

Part E. Monitoring and Legacy



Chapter 9. Monitoring

Introduction

Monitoring is often an overlooked activity but is necessary to:

- Demonstrate success
- Learn from mistakes
- Know when adaptive management is needed
- Fill known research gaps
- Help demonstrate a project's success

Developing a Monitoring Plan

One of the first steps when developing a monitoring programme is to articulate the overall aim of the project, describing what you are trying to achieve.

Defining clear objectives ensures monitoring is cost-effective and aligned to the project's targets. It also identifies the required baseline data and resources for monitoring.

Monitoring should primarily focus on demonstrating that project objectives have been achieved. The figure below, adapted from RRC (2017), sets out the steps needed to develop a monitoring plan.



Why Monitor?

On projects such as the Lower Otter and Basse Saône, environmental monitoring and evaluation is particularly important to understand the environmental and social benefits and disbenefits of the project. The monitoring is undertaken for many reasons such as:

- Statutory/legal
- Managing an environmental risk
- Adaptative management
- Long-term learning to demonstrate the value of a project

It is important to note these reasons as they help shape what you monitor, how you monitor it and when you monitor. The PACCo environmental monitoring report describes the monitoring undertaken across both estuaries.

Lower Otter and Saône Valley

On the Lower Otter, steering and working groups were set up to help develop monitoring objectives, priorities, reporting format and timescales.

In both estuaries, monitoring was undertaken across three phases of the project's lifecycle:

- Phase 1 - Project development
- Phase 2 - Construction/delivery
- Phase 3 - Legacy

Monitoring data collected during Phases 1 and 2 helped develop the project's design, planning application, environmental permits and its subsequent delivery. It has also provided a baseline upon which to base future legacy monitoring to understand what has changed post project.



Lessons Learnt and Recommendations

- Identify the need for monitoring at the outset of a project and secure budget for it
- Develop a monitoring plan with SMART monitoring objectives. This will enable you to ensure that your monitoring answers specific questions.
- Prioritise monitoring activities based on available budget
- There may be a statutory requirement for your project to be monitored
- There will be different reasons for monitoring and your monitoring plan will help ensure you are collecting the right types of data for the right purpose



Further Reading

[Summary of environmental monitoring & evaluation tools](#)

[Summary of visitor surveys – Lower Otter and Saône Valleys](#)

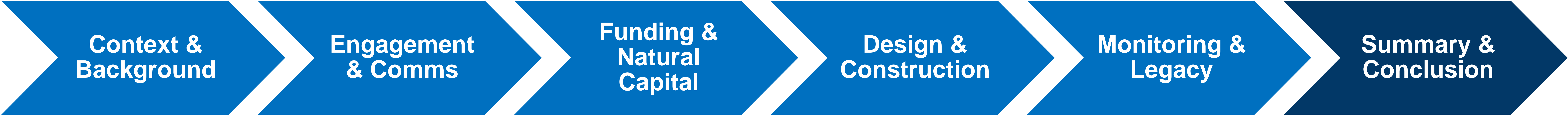
[Visitor Survey – Full Report Lower Otter](#)

[Visitor Survey – Full Report Saône Valley](#)

[Carbon assessment – Lower Otter](#)

[Fish surveys - Lower Otter](#)

Part F. Summary and Conclusion



Chapter 11. Summary and Conclusion

Blogs, Newsletters, leaflets:

[PACCo blogs posts](#)

[Leaflets and information packs](#)

[Newsletters](#)

Communication:

[Communications and engagement strategy](#)

Education:

[Educational resources Lower Otter](#)

[Educational resources Saâne Valley](#)

[PACCo educational pack](#)

[PACCo educational resources](#)

Social media:

[PACCo Facebook page](#)

[PACCO Linkedin account](#)

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[PACCo YouTube channel](#)

[Cross-border exchange – Natural capital and socio-economic](#)

[Cross-border exchange - Virtual tour of the Lower Otter](#)

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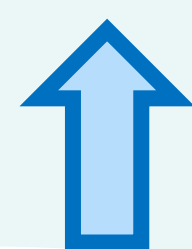
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