

# Community resilience to water-based risks: An analysis of the perceptions and actions of remote coastal communities



Authors: Carly Maynard, Hannah Grist, Kate Lamont, Alexa Green, David Conneely, Jane Atterton

Produced for Scottish Government under the RESAS Strategic Research Programme 2022–27, Theme D: Natural Resources

December 2024



## Acknowledgements

The authors would like to thank all individuals and communities who engaged as participants in this research for sharing their experiences and knowledge and welcoming us to their communities.

We would also like to thank our steering group who helped us to formulate appropriate questions and ensure relevant focus on the topic.

Photographs provided by Carly Maynard, Hannah Grist and Kate Lamont

This work was funded by the Strategic Research Programme 2022–27, Scottish Government Rural and Environment Science and Analytical Services Division. The Scottish Government funds a programme of strategic research through the Rural and Environment Science and Analytical Services (RESAS) division to advance the evidence base in the development of rural affairs, food and environment policies.

One of the themes of the research programme is on Natural Resources. This theme has 5 research topics: air quality, water; soil, biodiversity, and natural capital. This publication is created under the second theme, water.

## Contents

Acknowledgements .....	2
<b>1. Executive summary .....</b>	<b>6</b>
Why was the research needed? .....	6
What did we do? .....	6
What did we learn? .....	7
Recommendations .....	11
<b>1. Introduction .....</b>	<b>12</b>
Scotland's changing water landscape .....	12
Remote coastal communities and water management .....	13
Study aims.....	13
<b>2. Methods .....</b>	<b>15</b>
Q-method.....	15
Case Studies .....	17
Workshop .....	20
Limitations.....	21
<b>3. Findings: Perspectives on water-related issues: Q-method analysis.....</b>	<b>22</b>
Factor Distribution.....	22
Description of Discourses .....	22
<b>4. Findings: Community response to water-related issues: Case Study analysis .....</b>	<b>24</b>
<b>5. Discussion .....</b>	<b>31</b>
Cross-cutting themes .....	33
Workshop .....	43
<b>6. Conclusion and recommendations.....</b>	<b>48</b>
Conclusion.....	48
Recommendations .....	49

## List of Tables

Table 1: Q-sort participant affiliations.....	16
Table 2: Case studies selected.....	18
Table 3: Discourses identified through Q-method analysis of perspectives on water-related issues in remote coastal areas .....	22
Table 4: Case study participants .....	24
Table 5: Presence of key themes / challenges across case studies .....	32
Table 6: Policy links to research findings.....	46

## List of Boxes

Box 1: Example statements used in Q-method to gauge perspectives of residents, businesses and stakeholders in relation to water risks.....	16
Box 2: Tiree case study.....	26
Box 3: Luing case study.....	27
Box 4: Tobermory case study.....	28
Box 5: Skye case study.....	29
Box 6: Knoydart case study.....	30

# 1. Executive summary

## Why was the research needed?

Scotland is facing multiple water-related pressures, such as fluvial, pluvial and coastal flooding, coastal erosion, water scarcity and water pollution. All of these pressures risk being exacerbated by the predicted impacts of climate change such as increased average temperatures, drier summers, milder, wetter, winters and more extreme weather events. These direct impacts are also likely to result in broader impacts such as limitations on food production, restrictions on development, such as house-building, challenges to business and a healthy economy, and resulting population shifts. Furthermore, certain risks, such as water scarcity, rarely feature as a concern for many within what has traditionally been considered a 'water rich' country. Remote coastal communities are particularly vulnerable due to their exposure to both land-based (pluvial, fluvial flooding, pollution) and sea-based (coastal flooding, coastal erosion) pressures.

Action to deal with localised issues, especially in rural communities, often comes from within those communities, sometimes utilising support from wider agencies. There is a wealth of social capital within Scotland's remote and island communities but there are limitations in terms of time, resources, ability to act and the need to prioritise issues addressed. This study set out to:

- i) determine what perceptions exist in terms of water-related risks to remote coastal communities, for residents and other stakeholders
- ii) examine examples of what some communities are already doing to address these risks (including examples of success and barriers to achievement).

## What did we do?

The work was constituted of two key parts:

**1. Q-method analysis of perceptions** of water-related risks from residents and stakeholders of remote coastal communities. The process was carried out with 21 participants and used a number of carefully designed statements about water-related issues to gauge what kind of opinions the participants held about the existence of the risks, what could and should be done, the placement of responsibility and ways forward. Once participants had sorted the statements according to how strongly they agreed or disagreed with them, they took part in an interview which aimed to add context and reasoning to their responses.

**2. Case study analysis of five communities** which face water-related risks and what they are doing to address those risks, including what challenges they face. Case studies were selected based on outcomes from the Q-method analysis as well as consultation with the project's steering group and other relevant stakeholders, and focused on communities vulnerable to risks such as flooding, pollution, coastal erosion or water scarcity. The case studies selected for community action were in the locations of Tiree, Luing, Tobermory (Mull), Skye and Knoydart.

The case studies involved interviews with a total of 26 participants, including members of the community who are affected by water-related challenges and / or who have taken action to address the issues. A range of interview formats were used to best meet the needs of the participants, such as remote (online video interview or phone call), and in-person, and walking interviews. The interviews, along with any relevant documentation cited, were analysed using thematic analysis and grounded theory to identify themes common to multiple case studies as well as those unique to particular cases.

Finally, a deliberative workshop was held following all data collection and analysis to share initial results with participants and stakeholders, and to hold discussions around questions arising, and consider next steps.

## What did we learn?

### Perceptions of water-risk: Q-method analysis

The Q-method analysis grouped similar ratings of statements together to give an indication of types of perspectives which exist. This allowed the researchers to identify four discourses (or 'characterisations') of the types of perspectives which exist in relation water risks for remote coastal communities:

Factor no.	Discourse	Representation of participants aligned with this discourse
1	Times are tough, but coastal communities are tougher	Business owners, community representatives, statutory bodies
2	Access to water is an issue now and in the future	Community members, a local council member, a non-profit representative and 3 statutory body representatives
3	Why worry?	A business owner and statutory body representatives
4	Change is here, and we need to listen to the experts	A local councillor and a business owner

Discourses One and Two had the most participants aligned within them – in other words, there was a strong lean towards perspectives around communities having the capacity to deal with these challenges (Discourse 1) and there being concern around the impacts that water-related challenges will have on remote coastal communities (Discourse 2). There was no clear pattern in relation to which participant affiliation or role fell into which discourse, showing variation across sectors and stakeholders.



## Community action for water-related risks

The issues faced by the five case study areas, along with actions taken, were varied:

Case study	Issue(s)	Action(s)
Tiree	Limited water supply due to ageing infrastructure and seasonal demand peaks	Collaboration between community council and water provider to ensure effective supply planning and upgrade infrastructure
Luing	Coastal erosion around village, sea level rise, pluvial flooding	Community action to restore coastline, linked with additional project to reinstate quarry business which will i) provide economic stimulation, ii) provide spoil material for coastline replenishment
Tobermory	Coastal flooding especially due to rising sea level.	Installation of low flood wall to coincide with replacement of harbour railings. Personal flood protection measures (e.g. flood gates).
	Water supply vulnerability due to ageing infrastructure	Collaboration with water supply company to ensure efficient planning for supply/demand
Skye	Supply pressures related low resources and ageing infrastructure in some places; no mains water in some locations	Localised water conservation initiatives e.g. rainwater harvesting and community maintenance of private water supplies.
	Seasonal demand peaks which are substantially higher than rest-of-year demand, largely due to tourism	Balance of mains / private supplies where appropriate to cater for visiting guests as well as appetite for awareness-raising around consumption rates
Knoydart	No mains water provision; all water accessed by individuals or small numbers of collective households using personal equipment	Use of holding ponds, weirs, transfer pipes and some treatment equipment to supply small numbers of properties and businesses

Although there were some similar problems between the communities that were engaged, each was experienced differently due to the specific context of each location, community, resource, etc. and as a result, methods of dealing with the issues varied. For most communities, they were dealing with two or more water-related problems meaning that efforts were complicated or that work needs to be handled by more than one community member or group.

A number of broader themes were identified which cut across multiple case studies. These included:

- A strong sense of self-sufficiency in dealing with the issues identified
- Multiple links between water-related risks and other areas of community development, such as housing, economic development, population stability or growth
- Funding-related challenges or barriers for community initiatives
- The need to utilise multiple forms of knowledge in order to reach all relevant community members and stakeholders
- An indication that small and rural communities need to deal with risks in a different way to larger communities that may be better physically connected to resources (e.g. larger scale infrastructure, road networks, access to services, etc.)
- Different needs in messaging (e.g. about low water levels) for different locations and scales
- Small and remote communities often have good social capital but those who do not have this find community development very difficult; there is also a difficulty in maintaining community organisations in the long term – this needs to be actively managed by the organisations e.g. by investing in skills transfer between diverse community members
- Community actions on water-related issues appeared to often come down to the efforts of an individual or small group of people
- There was a sense of a lack of broader institutional support in some cases.

### Collective reflections – workshop

The workshop discussion reinforced the idea that remote coastal communities are facing a plethora of challenges and that water-related risks often don't feature as challenges with greatest priority. It was noted that finding a way to engage with communities that is meaningful to them (i.e. via issues which are considered as priorities), is likely to facilitate work towards other, potentially less tangible, challenges such as water-related issues.

The issue of communication featured heavily in the discussions and it was noted that finding ways of streamlining communication within and across organisations and scales was necessary to support community development and resilience building.

## Recommendations

A number of recommendations emerging from the study focused around:

### **Engaging communities on water-related issues:**

- Addressing water issues to unlock some other rural development challenges such as housing, economy and population
- Making water-related challenges relevant and tangible for communities if engagement needs to be encouraged
- Raising awareness of water systems and challenges to help reduce consumption
- Ensuring messaging, management and policy are place-based or sufficiently adaptable to be relevant to remote coastal locations

### **Social development for communities:**

- Making community action more accessible for people with less time or experience
- Supporting communication between all groups involved in development e.g. community members, community councils, planners, housing developers, service providers, etc.
- Promote the sharing of experiences and knowledge between communities to support social learning
- Accounting for different knowledge types to make communication accessible and far-reaching
- Utilising collective knowledge or advice e.g. via an umbrella organisation to support communities in development projects

# 1. Introduction

## Scotland's changing water landscape

Scotland is vulnerable to a multiplicity of water-related pressures, including too much water, water in the wrong place (flooding, sea level rise, coastal erosion), insufficient water (water scarcity, ageing or lack of access to infrastructure) and water that is not of an appropriate quality (low supplies, pollution, increased demand for water treatment). Such issues feature in the most recent Programme for Government<sup>1</sup> as some of the climate change and adaptation priorities that need to be addressed, as well as in the National Performance Framework<sup>2</sup> (outcomes around Communities and Environment, Health, Human Rights, Poverty and Economy) and more broadly as part of the Sustainable Development Goals (particularly Goals 6: Water and 13: Climate Action). Given the predictions of increased average temperatures, drier summers, milder, wetter, winters and more extreme weather events<sup>3</sup>, we can expect to see a change in the way our hydrological system looks and an increase in events such as flooding, coastal erosion and drought, as a result. As well as the direct implications of having too much or too little water, there will be broader reaching impacts which may limit our ability to produce food, to provide homes, promote repopulation, stimulate economies and preserve culture.

It is well understood that action at the local level is often the underpinning support in times of crisis (whether those crises are discreet events or long term pressures). This has been observed repeatedly for flooding events in the UK and more recently, it has been seen as a widespread reaction to the Covid-19 pandemic. Within the academic literature, there is much discussion about the factors which influence the willingness and capacity to react in relation to water (and other environmental) issues<sup>4</sup>, and around the importance of collective action and collaboration among resources users<sup>5</sup>. Notwithstanding the productiveness of local social capacity, communities in Scotland face a plethora of challenges (e.g. in relation to healthcare, education, housing provision, the current cost of living crisis, etc.). There is therefore a need for local communities, however proactive, to be facilitated in their activities by policy and

---

<sup>1</sup> [Scottish Government Programme for Government 2023 to 2024](#)

<sup>2</sup> [Scotland's National Performance Framework](#)

<sup>3</sup> [Adaptation Scotland's Climate Projections for Scotland](#)

<sup>4</sup> [Lasram et al., 2018 Farmers' willingness to adapt to climate change for sustainable water resources management: a case study of Tunisia](#)

<sup>5</sup> [Iglesias and Garrot, 2018 Local and Collective Actions for Adaptation to Use Less Water for Agriculture in the Mediterranean Region](#)

institutional mechanisms, to support the development of sustainable, resilient and adaptive communities.

## Remote coastal communities and water management

Although all communities face some element of water-related pressure, remote coastal communities may be subject to a multiplicity of challenges, which are likely different in nature to more inland or urban communities. These can include issues of saline intrusion on agricultural land, disconnectedness from mains water supplies (especially in peripheral and island locations) and complex (multi-pronged) flooding risks.

### Study aims

Given the pressures that remote coastal communities face and the predicted changes in Scotland's water environment, there is room for an enhanced understanding of the ways in which communities are currently dealing with water-related issues, the challenges they're facing and the opportunities for enhanced support from a governmental and institutional perspective. In addition, there is scope to make use of the skills gained and lessons learned to date, and to share the experiential knowledge through social learning and collaboration.

To this end, the current study aimed to explore and evaluate community responses to water challenges by developing a number of case studies to address the following key objectives:

- Identify examples of good practice for community action on water-related challenges
- Contextualise the issue of water-related challenges among other social pressures such as economy, population, housing, healthcare, etc.
- Determine how governmental and institutional mechanisms are supporting or limiting community progress in this field
- Develop ideas for the sharing of knowledge and expertise between active communities and those which aim to address similar challenges in the future.

This report documents the details of a Q-method analysis of remote coastal stakeholders' perceptions of water risk and five case studies of communities which are experiencing and dealing with water-related challenges in remote and coastal areas. It sets out the contexts, the actions, the needs and the lessons learned as well as examining a number of cross cutting themes which link the case studies and have wider relevance to other communities in similar circumstances. The report may be of interest to policy makers, planners,

community support organisations, community members or anyone with an interest in community development and resilience.

## 2. Methods

### Q-method

Q-method is a mixed-method approach which has been used to gather data on environmental<sup>6</sup> and water-related<sup>7</sup> perspectives. The method systematically categorises perspectives of individuals on a given topic, making use of a range of pre-defined statements. The statements are designed by the researcher and articulate a range of different (including contrasting) statements which may be used to describe a topic or issue. Participants are asked to sort the statements according to how strongly they agree or disagree with them and the location of each statement within the sort-grid is assigned a numerical code which allows a quantitative analysis of how the statements are clustered for each participant. Participants also take part in a post-sort interview which allows the researchers to further explore the choices made and the participant's context, key values and motivations. The combination of the quantitative and qualitative approaches allows for a numerically-informed categorisation of perspectives across participants (often including clustering of certain values among participants based on the structure of their sort), and a more in-depth analysis of the motivations and drivers that have led to each perspective.

The design of the Q-statements was based on a combination of current research team understanding of water-related issues for remote coastal communities, consultation of relevant academic and policy-related literature, and discussion among the project's Steering Group. The Steering Group provided practice-based and community perspectives to compliment the more academically-informed perspective of the researchers and ensure the statements were relevant to the topic and to the stakeholders. The set of statements was iteratively tested (among the research team and Steering Group), to refine and re-word where appropriate and ensure statements were clear, direct and covered a broad range of perspectives. In total, 33 statements were designed, covering the main range of water-related issues (water scarcity, water quality, flooding, sea level rises and storms). A number of example statements can be seen in Box 1.

---

<sup>6</sup> [Sneegas et al., 2020 Making the Case for Critical Q Methodology](#)

<sup>7</sup> [Albizua and Zografos, 2014 A Values-Based Approach to Vulnerability and Adaptation to Climate Change](#)

*Box 1: Example statements used in Q-method to gauge perspectives of residents, businesses and stakeholders in relation to water risks*

"I do not believe a wet country like Scotland needs to worry about water scarcity."  
 "I know that coastal communities are innovative and can adapt to water challenges."  
 "Having to transport drinking water to coastal areas is a failure of management."  
 "I worry that coastal businesses will struggle to cope with increased flooding."  
 "I feel there is little hope in mitigating the effects that water challenges will have on coastal communities."

The Q-sort method was undertaken by a total of 21 participants representing residents, businesses and stakeholders from or working in a number of rural coastal communities on the East and the West coasts of Scotland. Participants were selected to represent a range of experiences and perspectives. The affiliations of each of the participants is outlined Table 1.

*Table 1: Q-sort participant affiliations*

Scottish Water	Scottish Water	Scottish Water
Oban Resident	Scottish Water	Permaculture Farmer
Argyll Bute Councillor	Consumer Scot	Aberdeenshire Councillor
Scottish Water	Mull Business Owner	Chartered Marine Surveyor
Atlantic Island Centre	Kerrera Marina	Aberdeenshire Council
Tobermory Community Council	Scottish Water/Flood Management	East Grampian Coastal Partnership
Oban Resident and business owner	Scottish Water	Appin Community Trust

Data analysis of the 21 Q-sorts involved a Factor Interpretation approach as is typical for Q-method analyses<sup>8</sup>, in the 'Q-method' package in R data analysis software. The factor interpretation analysis grouped together Q-sorts that presented similar patterns in the way the Q-statements were organised and suggested 'Factors' which are groupings of similar statements. Utilising the quantitative grouping of participants into factors, as well as the thematic analysis of the context provided in the post-sort interviews, the researchers were able to subjectively assign discourses to the perspectives presented. In other words,

<sup>8</sup> Stenner, P., Watts, S., and Worrell, M. 2012 "Q methodology." The SAGE handbook of qualitative research in psychology 215–239.



dominant perspectives among the participants were identified and a characterisation of each factor (or perspective category) could be written.

While this approach allows a multi-faceted analysis of perspectives, there are some limitations which should be noted. The sample size of 21 clearly leaves room for representation of a larger group of perspectives and ideally, the process would continue to recruit participants until a point of saturation had been achieved, in which it can be considered that no new perspectives are coming forward. This is not feasible for most studies with set resources (including this one) and so processes which worked to ensure the best possible range of responses were followed to minimise the impact of limited sample numbers. This included consulting Steering Group members and other relevant contributors on who to include as participants and a sampling approach which purposely targeted varied perspectives.

## Case Studies

### Research Design

Five case studies were conducted to explore in-depth accounts of the experience of communities in water-related challenges, actions that have been taken and limiting factors, outcomes and lessons learned.

The selection of the case studies was centred around a number of criteria:

- The communities needed to be located in rural remote coastal areas (according to the Scottish Government classification of population lower than 3000, and 30 minutes drive from nearest town of population 10,000<sup>9</sup>)
- There needed to be at least one water-related challenge (e.g. unreliable water supply, vulnerability to flooding, poor water quality) in each case study
- There needed to be more than one (and ideally, around five) community member(s) willing to participate in an interview, with a range of perspectives represented, where possible
- It was preferable, but not essential, that the community / area could be visited for site contextualisation and in-person interviews
- Collectively, the case studies should address some of the key concerns raised as part of the Q-method analysis (i.e. coastal flood risk and limited water resources).

---

<sup>9</sup> [Scottish Government Urban Rural Classification 2020](#)

Table 2: Case studies selected

Case Study location	Key water issues
<b>Tiree</b>	Vulnerable water supply related to ageing infrastructure
<b>Luig</b>	Coastal erosion, sea level rise, pluvial flooding
<b>Tobermory (Mull)</b>	Sea level rise and related flooding, vulnerability of water supply due to island location, population and ageing infrastructure
<b>Skye (Broadford)</b>	Water supply vulnerabilities related to seasonal spikes in demand, varied infrastructure and awareness of water users
<b>Knoydart</b>	Water supply and water quality vulnerabilities related to no mains access to water and ungoverned management approaches

Once each case study site had been selected, community members were invited to take part in interviews either by direct invitation to individuals, or via connections who had knowledge of relevant potential participants. Most invitations were issued by email originally and many (particularly initial contacts) were followed up with phone conversations to explain more about the study and what would be involved in case study participation. Initial contacts for each case study were identified through a range of means, including interested participants from earlier processes within this broader study, recommendations of communities from colleagues in the field, the project's steering group and discussion with local organisations such as community development trusts or community councils.

Care was taken to ensure invited participants were aware that they were in no way required to take part (even if others in their community were), and to avoid communities that have been previously or are currently involved in research processes, unless there was a specific appetite for further involvement. It was also considered important to ensure participants understood the purpose of the research and had the opportunity to ask questions before engaging. This communication took place through the formal participant information sheet (which received SRUC and RESAS ethical approval prior to the work commencing) and was repeated on each personal interaction that followed.

### Data Collection

The primary form of data collection was through interviews which were either semi-structured and traditional (i.e. one to one conversations) or followed a

'walking interview' format in which the participant and the researcher visited the site of interest and discussed the situation, actions, challenges, etc. with the landscape or site as a prompt. This form of interview was utilised as it can place participants at ease and can act as a stimulation for conversation. It also provides the researcher with visual context for the issues, processes and systems being discussed.

Most interviews took place on a one-to-one basis, except where there was a collective effort from participants, who then conversed with the interviewer as a team. Participants were given the option of whether to engage with the interviews in person, online (e.g. via Microsoft Teams video call), by phone or as a walking interview. Around half of the participants engaged in remote interviews (online or by phone) and the other half engaged in in-person discussions.

The interviews took place between June and December 2023 and in total, 26 participants were interviewed across the five case studies. Where interviews took place online, they were recorded and transcribed (with participants' permission). In-person interviews were recoded via manual note-taking and subsequent write-up by the researcher. Where possible, written notes were returned to the interviewees for optional checking and approval.

The content of the interviews was designed carefully to capture the experiences of the interviewees and the itinerary was discussed with and guided by the research team (to ensure consistency across case studies) and the project's steering group. Questions were organised into categories in order to address the key aims of the case study research. The categories include:

- Background information e.g. the role of the participant in the community
- Summary of water-related (and other relevant community) issues
- Actions that have been or are being undertaken to address the water challenges set out
- Challenges, barriers and requirements which may have been or be hindering the process
- Perceptions of the issue, lessons learned, elements to change, etc.
- Influence of policy, organisations, networks, etc. on the work of the community in relation to the water challenges

The core interview guide was used to shape all interviews as a starting point, but there was a deliberate allowance for the introduction of new questions to explore any points of interest that were relevant to individual interviews, or to gather more detail where needed.

Where relevant, documents or other sources were obtained to provide contextual details about the issues and in order to reduce the required time from

participants where information could be sought elsewhere. Some of the types of documents obtained included commissioned reports relating to the water issues, community development or place plans, community charters, news articles, etc.

After all of the case study data had been collected and synthesised, a dissemination and discussion workshop was held which allowed the research team to describe the findings, offer participants an opportunity to engage with the findings and with one another, and to present some follow-up questions to participants and other relevant stakeholders in the field, based on the themes emerging from the case study analysis. A summary of the points of discussion from the workshop is included in the discussion section (Section 5) of this report.

## Data Analysis

For the interview transcriptions and notes collections, a combination of thematic analysis and grounded theory analysis were applied. The thematic analysis allowed the researchers to identify data in relation to the pre-defined themes that guided the original design of the research, while the grounded theory analysis created space for new and unexpected themes to be documented. A number of rounds of coding were carried out, using coding software NVivo, to document, link and populate themes. Coding was first carried out for each separate case study, and then applied across the five case studies, to identify cross-cutting themes, shared points of interest or contrasting perspectives / experiences.

## Workshop

Once all of the case study data had been collected and analysed a workshop was held, with two key purposes:

- To disseminate findings to any case study participants, stakeholders and other interested parties
- To stimulate conversation on the topics raised and gather collective reflections on the findings and ways forward (potential actions needed, anticipated future challenges, etc.)

The workshop was held online due to the geographically broad nature of the case studies and other participants (to allow as many as possible to join) and also based on experience from the case studies where there was a clear preference from many participants to engage in the process remotely. The workshop took place on 13<sup>th</sup> March 2024, with 18 live attendees and a number of requests for slides / notes due to inability to make the scheduled timeslot.

The workshop format was a presentation overview of the key case study and Q-method findings, small group discussion of a number of follow-up questions and plenary discussion of the topics covered and points raised in the group sessions.

## Limitations

It was hoped that some of the case studies would make use of more novel or collaborative approaches to data collection e.g. through community meetings, focus groups, participant documentation etc. However, in the post-covid period, and as a result of significant time pressures for interviews, there was more of an appetite for the traditional (and largely remote) interview format. While data were still successfully obtained in this way, the more collaborative approaches may have allowed us to gather richer, broader perspectives.

Related to these time and resource pressures was a difficulty in reaching community members beyond those who were directly and intricately involved in the action on water management, in most cases. Whilst we managed to speak to the most central players for each case study, we failed to obtain as many wider perspectives as we had hoped for. This itself is a symptom of the difficulty in engaging communities on water issues, which is discussed in Section 5.

There is a notable clustering of case studies around the west coast of Scotland and Western Isles. This is partly a result of the criteria for case study selection (remote, coastal) and of the availability of projects and communities available to explore. Discussions with national community development organisations were carried out to try and address the spatial imbalance and while some communities in the east and south west of Scotland were contacted, no successful examples were secured.

### 3. Findings: Perspectives on water-related issues: Q-method analysis

#### Factor Distribution

The Factor Analysis of the Q-sorts grouped similar ratings of statements together to give an indication of types of perspectives which exist. This allowed the researchers to identify four discourses which described perspectives held by the Q-method participants, as outlined in Table 3.

*Table 3: Discourses identified through Q-method analysis of perspectives on water-related issues in remote coastal areas*

Factor no.	Discourse
1	Times are tough, but coastal communities are tougher
2	Access to water is an issue now and in the future
3	Why worry?
4	Change is here, and we need to listen to the experts

#### Description of Discourses

Based on the combined analysis of the Factors (groupings) produced in the Factor Analysis and the context provided by the interviews from participants which aligned to those groupings, discourses around water issues were established. The following sections describe the characteristics of the four discourses.

##### **Discourse 1: Times are tough but coastal communities are tougher**

This discourse included participants from business owners, community representatives (e.g. community councils) and statutory bodies. The discourse describes a perspective in which there is a motivation to use the resources, pride passion of local communities to work to mitigate water-related risks. There is an acknowledgement that risks from events such as storm surges and flooding are part of the nature of living by the coast line but a consideration that these risks are acceptable. They demonstrate concern about the impact of events such as flooding on local businesses but show willingness to be involved in processes (e.g. decision-making) to help alleviate risks. There was less concern in this group

in relation to water resources but this group showed faith in the ability of the communities to build resilience.

### **Discourse 2: Access to water is an issue now and in the future**

This discourse included community members, a council member, a non-profit representative and three statutory body representatives. There was a greater level of concern within this group about water resources (in relation to quantity as well as pollution issues) and also about coastal flood risk. Like Discourse 1, there is an agreement that some coastline impacts are inevitable, but they are less confident in the ability of communities to deal with these impacts. They do agree that everyone should take some degree of responsibility to mitigate impacts e.g. of limited water supply.

### **Discourse 3: Why worry?**

There were fewer participants in this group but they were represented by a business owner and statutory body representatives. The primary perspectives in this group was that Scotland is privileged to have good quality drinking water and that everyone should play a role in reducing water usage. A lack of understanding or awareness of water shortages for Scotland was noted as being a cause for concern and there was agreement that coastal communities should not need to retreat from their home locations due to changing coastal pressures (e.g. flooding). There is an agreement with Discourse 1 that the benefits of living on the coastline outweigh the risks.

### **Discourse 4: Change is here and we need to listen to the experts**

Participants in this discourse included a local councillor and a business owner. This group also agreed that flooding is an acceptable risk for living on the coastline and that coastal erosion is to be expected. Notably, they do agree that managed retreat may need to be considered as an option for adaptation. There is an agreement within this group that communities need the support of agency intervention to help deal with these risks. There was limited concern within this group over water resource issues e.g. lack of drinking water.

## 4. Findings: Community response to water-related issues: Case Study analysis

The study participants are outlined in Table 4. In total, 26 participants engaged in interviews.

*Table 4: Case study participants*

<b>Case study</b>	<b>Participant code</b>	<b>Participant role / affiliation</b>	<b>Interview format</b>	<b>Data recording format</b>
<b>Tiree</b>	Ti1	Community council member	Phone, in-person	Note-taking
	Ti2	Community council member	In-person	Note-taking
	Ti3	Local resident	In-person	Note-taking
	Ti4	Local resident	In-person	Note-taking
	Ti5	Water provider representative	Online	Note-taking
<b>Luig</b>	L1	Member of community organisations and local resident	Online & in-person	Transcription & notes
	L2	Member of community organisations and local resident	Walking interview	Note-taking
	L3	Member of community organisations and local resident	Online	Transcription
<b>Tobermory</b>	To1	Local business	Online	Transcription
	To2	Tobermory Harbour Association	Online	Transcription
	To3	Mull Museum	Online	Email notes
	To4	Mull Community Council	Online	Note-taking
	To5	Water management organisation	Online	Note-taking
	To6	Water management organisation	Online	Transcription
	To7	Water management organisation	Online	Transcription



<b>Skye</b>	S1	Employed in conservation; local community organisation member	Online & in-person	Note-taking
	S2	Member of community development organisation	In-person	Note-taking
	S3	Employed in hospitality	In-person	Note-taking
	S4	Resident	In-person	Note-taking
	S5	Resident with a community private water supply	In-person	Note-taking
	S6	Water management organisation	In-person	Note-taking
<b>Knoydart</b>	K1	Knoydart Climate Action Group	Online	Transcription
	K2	Knoydart Climate Action Group; Knoydart Renewables; Knoydart Forest Trust	Online	Transcription
	K3	Knoydart Community Council and Knoydart Renewables (hydro) and Knoydart Forest trust	Online	Transcription
	K4	Local business owner	Phone	Note-taking
	K5	Local business owner	Email & phone	Email notes & note-taking for phonecall

A summary account of the situation for each of the five case studies is included in Boxes 2 to 6. A detailed interpretation of the key themes is included in Section 5.

## Box 2: Tiree case study

### Tiree



#### **Key Issues:**

- Capacity of mains water supply & treatment infrastructure lower than optimal for community
- Infrastructure vulnerable to mineral build-up and leaks from collapsed pipes due to sandy nature of substrate on island
- Also influxes of agricultural runoff due to cattle grazing
- Seasonal variability in demand due to tourism / visitor activity, in particular, music festival on weekend in the summer which can bring around 2000 visitors to an island with 600 permanent residents

#### **Actions:**

- Actively engaging water provider for support and to co-develop solutions including upgrade of infrastructure and information sharing on demand reduction, review of resource use and planning

#### **Cross-cutting themes:**

- Difficulty in balancing supply & demand
- Seasonal variability in demand
- Water quality challenges related to environment, infrastructure and supply
- Sense of pro-activeness and self-sufficiency
- Links between water risks and wider community development (e.g. housing, economy)
- Small & remotes communities deal with water issues in different way to larger communities
- Community catalysts make big changes to resource issues

### Box 3: Luing case study

#### Luing



#### **Key issues:**

- Coastal erosion and regression due to storm damage
- Sea level rise & associated flood risk
- Pluvial flooding from hillside, exacerbated by blocked drainage channels
- Support from local council not available due to land being community owned

#### **Actions:**

- Community commissioned technical report on erosion risk and options for management
- Intermediate option of shoreline replenishment chosen for implementation
- Funds raised / being raised from Historic Environment Scotland, local donations, crowdfunding, re-establishment of local slate quarry as a community-run business
- The material used for shoreline replenishment is also planned to come from the local slate quarry
- Pluvial flooding being managed locally by residents but issue is overshadowed by coastal erosion risk

#### **Cross-cutting themes:**

- Multiple pressures related to water risks for this community
- Water-based and community development challenges are intertwined and influence one another
- Funding mechanisms for community projects can be hard to come by and conditions can be inhibitory
- There is an absence of higher-level support for some small and remote communities
- There is a place for different forms of knowledge in addressing water risks (e.g. need community knowledge of how the coastline changes but community responded well to technical report outlining risks)

#### Box 4: Tobermory case study



#### **Key Issues:**

- Vulnerable to coastal flooding on Main Street, especially at high Spring Tides
- When flooding occurs, water overtops harbour wall and flows up slipways and through drains. Street, businesses, residences and car park vulnerable
- High tide is usually around 5am and 5pm meaning that (especially in the early morning), residents may not be aware of risk / available to respond
- Water supply vulnerability from ageing treatment and distribution infrastructure, exacerbated by growing population and pressure to increase housing and business provision in the area, as well as summer demand peaks

#### **Actions:**

- Personal and individual business-based flood protections such as sand bags and door flood gates are used
- The recent replacement of the harbour railings was combined with the introduction of a low flood wall and flood gates at access points (with the aim of balancing the aesthetic of the harbour and providing some level of flood risk in line with increasing sea levels)
- Water management company is considering the town within its normal processes of planning but the local community council have also engaged the water company to work with them collaboratively, to ensure planning process is utilising most up to date and accurate social data, including local knowledge

#### **Cross-cutting themes:**

- Need for joined up thinking to make best use of resources and knowledge
- Small and/or remote communities may need to manage multiple risks collectively, needing clear communication and support for community action
- Funding challenges can inhibit resilience actions and development – need to be ready with projects for when funding becomes available
- Simple resource pressures (e.g. access to water supply) can expand into many other areas of rural life / development



## Box 5: Skye case study

### Skye



#### Key Issues:

- Supply vulnerabilities related to low resources in drought periods, seasonal demand peaks and ageing / damaged infrastructure
- Demand pressures related to seasonal peaks exacerbated by limited visitor awareness of need to conserve
- Mixture of private and mains water supplies depending on location
- Increases in demand due to changing use of water (e.g. washing dishwashers, larger houses, etc.) and increase in housing stock

#### Actions:

- Water management organisation working within their normal planning process to ensure reliable supply to the area, including transfer of water by tanker
- Awareness-raising for both residents and visitors is noted as one of the key methods to conserve consumption & inform on supply issues (or lack of)
- On a smaller scale, residents use mains and private supplies to find optimum balance (e.g. use private supply to cater for residents but use mains supply when hosting visitors (to ensure highest water quality); rainwater harvesting)

#### Cross-cutting themes:

- Varied perceptions around risk of drought / low water supply
- General feeling from residents that the water management company are competently managing supply and demand in the area
- Strong sense of self-sufficiency from residents in terms of managing and ensuring supply, maintaining infrastructure and collective community effort
- Call for awareness-raising around the need for conservative water use, and the ways in which resources are currently being managed
- Belief that national-scale messaging not always relevant for remote contexts
- Difficulty, especially for young people, to become involved in community action, with impacts for community cohesion and resilience building

## Box 6: Knoydart case study

### Knoydart



#### Key issues:

- There is no mains supply of water (or power) in the area; all private supplies
- Interruptions to supply have come from drought / low flow conditions in some cases, but the greater concern is the capacity of the supply equipment (pump, filters, storage, etc.)
- No mains supply means no formal support from national provider (Scottish Water).
- Few participants reported substantial back-up strategies in case of low water levels, issues with supply infrastructure, increased demand, etc.
- Main power supply is from hydro-scheme meaning indirect vulnerability
- Flooding from sea level rise is a threat given the proximity of the main populated area Inverie to the coast and events in last 20 years or so have caused damage to sea walls, roads, bridges and private water supplies.

#### Actions:

- Water supply is obtained on an individual or small community level by use of holding ponds, weirs, feed-pipes, valves, etc. which take water from burns or springs
- Water is treated in some households e.g. using UV light filtration, chlorination; some household choose to use water untreated
- Businesses which serve paying customers treat water using UV filters and are subject to quality testing by the local authority on a regular (usually annual) basis
- Larger abstractions (e.g. for business use) are subject to abstraction approval by SEPA: 10-50m<sup>3</sup>/d must be registered; >50m<sup>3</sup>/d need licence

#### Cross-cutting themes:

- There is a sense of pride around the high quality of the untreated water that residents have access to; residents appeared to feel privileged to live in an area where such natural resources are available. Linked to this is self-sufficiency
- Despite some note of observed reduction in rainfall in the area over past decades, there is little concern overall in relation to water supply. Most interruptions to supply cited as leaks, blockages and burst pipes
- Any funding for community projects has come from non-governmental organisations (e.g. Coastal Communities Network)

## 5. Discussion

A number of key themes have emerged from the five case studies and despite the different contexts and challenges faced in each, there are some commonalities. Table 5 demonstrates the themes arising from the case study analysis and indicates which are common to multiple case studies. Examples of commonly occurring themes include a sense of self sufficiency when it comes to managing water and other pressures in remote areas; small and remote communities tend to deal with risks in a different way to larger or more connected communities; communities face (and address) multiple pressures with one or projects (i.e. obtaining multi-faceted benefits), water-related risks have a direct influence on community development and economy; accessing and maintaining funding for small communities can be difficult and complicated; much of the community action is linked to a small number of community members.

Table 5: Presence of key themes / challenges across case studies

	Theme	Tiree	Luig	Tob	Skye	Knoydart
<b>Directly water-related</b>	Flooding		x	x		x
	Supply & demand	x		x	x	x
	Variability in demand (e.g. seasonal)	x		x	x	x
	Water quality	x		x	x	x
	Infrastructure challenges	x		x	x	x
	Coastal erosion		x			
	Multiple pressures		x	x		x
	Need for awareness-raising around water issues				x	
<b>Broader themes</b>	Sense of self-sufficiency	x	x	x	x	x
	Link between water risks and community development	x	x	x	x	
	Funding challenges for community initiatives		x	x	x	
	Need to utilise multiple knowledge forms		x	x	x	
	Small / remote communities deal with risks in different way to larger or more connected communities	x	x	x	x	x
	Different needs in messaging / policy for national and local scale issues		x		x	
	Difficulty in maintaining social capital and the need to invest in young peoples' involvement in community groups / initiatives		x		x	
	Actions come down to small number of community catalysts	x	x	x		x
	Lack of broader or institutional support		x			x

As can be seen from Table 5, many of the dominant themes do not relate to water directly but to the broader social, economic and cultural implications of water-related issues. The rest of this chapter will explore some of the cross-cutting themes in more detail.



## Cross-cutting themes

### Perception of risk and approach to resilience building

Concern about the risk of interrupted water supplies seemed to be limited, even within groups that are vulnerable to drought, low flows or infrastructure issues. Participants who made use of private water supplies demonstrated attitudes of self-sufficiency and resilience, as well as a lack concern that supplies would become limited in future. This is especially the case for Knoydart, one example being of a business owner who noted that they were not concerned about availability of water due to the volume of rainfall received in the area, but also noting that a low water supply would, for their business, mean “*game over*” (Participant K5).

However, the perspectives in the Skye case study were more varied. A number of participants (S2, S3 and S5) stated that they had had experience of limited water supply at some point in their lives while participants S1 and S4 had not. Those who noted personal experience of the issue (especially those who relied on private water supplies e.g. S3 and S5) presented with more conservative approaches to water consumption, suggesting that personal experience of an issue can influence one’s perspective and behaviour. Bronfman et al., 2000<sup>10</sup> identified that an emotional experience of a natural hazard can in fact result in later positive impacts as a result of worry around the hazard recurring – in other words, an initial experience of something can cause pro-active and preventative behaviour later.

Across all of the case studies which addressed water availability (Skye, Knoydart, Tiree and Tobermory), the primary concerns were with the capabilities of the infrastructure to continue to treat and distribute water in the volumes needed to meet demand. For a number of the case studies, working directly with the mains water provider, Scottish Water, was the primary course of action to ensure this risk was not realised. However, this option is only available to those who are currently supplied with mains water by Scottish Water and there is no obligation for Scottish Water to install supplies to households or communities not already connected (although they aim to help where possible) (Participant To6).

These moderated perceptions of risks related to water supply indicate that there may be a difference between remote and more urban / physically well-connected parts of the country and how risks are perceived and managed. Issues which may be alarming e.g. in a large urban area, such as having no water supply for multiple days, were received by many of the interviewees as a way of

---

<sup>10</sup> [Bronfman et al., 2000 Understanding the Relationship Between Direct Experience and Risk Perception of Natural Hazards](#)

life and one of the concessions made for being able to live in areas which they considered to be unique. It is suggested by Lo and Chan<sup>11</sup> that social networking and community engagement are likely to engender action on risk issues (e.g. drought, flooding), which may be an indication of why the case studies (which largely represent pro-active and well-organised communities) evoke less emotional response than might be expected in urban areas.

These findings require us to consider that rural and urban communities may need to consider and address challenges differently. This was a concept supported by many of the participants e.g. participants from Tobermory who campaigned for the council to integrate a sea wall into the new railing structure, Knoydart who receive no external support in relation to securing water supply and Luing who feel they have to generate their own avenues to resilience in the face of coastal erosion:

*“We also found out that as a community we had been missed off the SEPA flood register, we had been missed off the Argyle flood risk register. We had been missed by Dynamic Coast, who didn’t research the coast here at all, and there was no data or information or even knowledge that people lived in this island and were affected by coastal change.” (Participant L1).*

Each of these communities has taken a pro-active approach to their own improvement and in some cases, survival of their settlements.

### Funding challenges for community initiatives

Access to sufficient and appropriate funding for communities to take action on their respective water-related challenges was one of the most frequently cited challenges. Many participants offered comments related to funding as their first response when asked about the limitations or barriers for communities taking action, e.g.:

*“It’s relatively easy to get [the] first grant, but then to follow things on it ... then it gets progressively harder and harder..... And then an interesting point is if you successfully get a grant, the funders then insist that you use professional people to sign off the project, which you didn’t budget for. Oh, well, so you need more money because you’ve been given money.” (Participant L1).*

---

<sup>11</sup> [Lo & Chan, 2017 Preparing for flooding in England and Wales: The role of risk perception and the social context in driving individual action](#)

*“money nowadays, as you know it’s all last minute money. ... Everything is short term-ism and that is driving us to get things wrong because nobody’s having long term vision.” (Participant To2).*

The Skye case study highlighted that people who live and work in rural areas possess the initiative and passion for supporting their natural environment and preserving natural resources, but they need to be supported with guidance, advice and funds as they have limited resources from which they can draw (Participant S3).

Restrictions and requirements placed on funding offers (e.g. when or how to spend money, additional conditions or standards of reporting) mean that sometimes the funding does not cover its original intended aims and communities then need to be creative in how they spend it, for finding additional resources to meet the conditions (see quote above from Participant L1). These challenges are not limited to grant funding, funds from organisations or local authorities, etc. but can also apply when the community itself generates funding. It was noted in some cases that community donations had been offered with conditions, such as using the money to address one issue so that the proposed solution could be redesigned, or with expectations that certain individuals within a community should be making contributions:

*“And then you have .. people who think that fixing the shore is a one off event. Once you’ve done it ... we could stand back and look ... we can’t go “well, we’ve done that, we don’t need to do anymore and you don’t need your quarry” (Participant L1).*

These conditions have resulted in the abandonment of seeking localised funds for a localised problem and community representatives are having to search more broadly, spending more time on funding applications as they do.

The issues of timing and communication were raised across multiple case studies as important influencing factors in terms of the success of funding applications. It was noted that funding calls can be difficult to identify or filter down and are often issued with little time to prepare and submit applications.

*“We had to go looking for it [specific types of funding] or [rely on] individuals and other places to inform us about it. And then you know we’re always having to be the ones that are keeping an eye out for it.” (Participant L3)*

Where communities are showing initiative in combining projects to gain multiple benefits (for example, Luing’s aim to reinstate the quarry business, in part, to support the shoreline replenishment), the funding streams are not broad or adaptable enough to be able to support these approaches:

*“The other lesson is being clear on the separation of things, so the quarry is the quarry, and the shore is the shore. They are two separate entities, but it's very difficult when you're doing a grant application or you're bidding for funding – funding pots for both are very, very different as well, but they [the two projects] have this cross-over and that actually confuses everything. It conflicts with everything because one policy might say ‘well we can't fund this’ [and we say] ‘But that's just a byproduct.’” (Participant L3)*

One strategy to deal with these issues of timing and awareness of appropriate funding sources, as highlighted in the Tobermory case study, was to have projects ‘shovel ready’, i.e. projects already conceptualised or even written up so that when the right funding or other resource opportunity becomes available, the community is in a good position to make a strong application.

*“It's about having things on reports ready and you're just waiting for that moment, that it's all the coincidences come together.” (Participant To2).*

The completion of funding applications was also cited as a major barrier to communities who wish to make changes for the better. Applicants are required to be able to plan and manage budgets, to be able to meaningfully predict costing and to know what will engage the funders' attention. Some communities have members who are skilled in this process (often as a result of their own professional training, or from long-term experience of working in a community development capacity). But for those who do not have the professional training or experience (often younger people or those with other forms of work-based skills), the world of funding can be exclusive and difficult to access. This situation risks further separating those communities which have, from those which do not, and support for ‘non-expert’ community members in obtaining funding could help address this gap. The skills required for successful community projects are discussed further later in this chapter.

### **Water issues infiltrate social and economic development**

Despite the focus of this research on water-related issues, conversations inevitably turned to issues around wider social development and economic concerns. These issues were raised in almost all of the 26 interviews which took place, demonstrating the strength of the link between water and wider community resilience. The key areas in which water issues were stated as having broader negative impacts were in the pursuance of new home building, economic stimulation (e.g. the ability to support businesses which may be impacted by limited access to water, or vulnerable to flood risk), the role of tourism in both influencing water risks, as well as being impacted by water supply issues or

flooding. Connecting all of these elements is the challenge of population (either depopulation as a result of housing / employment issues, or difficulties in repopulation due to the same).

*“In the 2011 census there were 653 people living on the island, but this number is reducing census by census. The depopulation is leading to problems maintaining services e.g. the school. Compounding this is a lack of affordable housing on the island – 45% of the houses are second homes. There is some new building of homes taking place on the island – crofters there are selling rural coastal plots, but new developments will bring increased water demand.”* Note based on phone interview with Participant T11.

## **Housing**

Multiple interviews focused on the challenges that water-related issues can bring for the advancement of housing stock in rural and island locations. For some, there were reports that planning applications for new homes had been rejected or delayed due to concerns over there being sufficient capability to supply the new homes with potable water, and for others plans were rejected for homes which were proposed to be developed in proximity to a changing coastline.

*“For some, the difficulty in buying a house is so great (and this is in some part related to reliable water supply) that there is a barrier for people wishing to return to live or work in the area.”* Note based on in-person interview with Participant S3.

*“But Toberonochy is interesting they’ve already had planning permission rejected on 2 sites because of course you know how they changed the rules of at sea level rise. ... you have to be – is it 5 metres above low water or something? Two properties in Toberonochy, who went for planning were rejected or modified because of the change [in sea level]. That’s probably the first practical impact [of sea level rise] that people of noticed.”* (Participant L1)

While it is important that any new building opportunity is cognisant of its wider environmental and resource impacts, the management or impact of water supply and flood risk are directly contradicting the current imperative of encouraging and supporting population growth or repopulation in these areas. For most of the areas studied, there is reference to population growth in their local development plans<sup>12,13</sup> or the broader place plans<sup>14,15</sup> commissioned by the government. Many interview participants pointed to the need for more affordable housing in their

---

<sup>12</sup> [Framework for Luing’s Future](#)

<sup>13</sup> [Mull Community Development Plan](#)

<sup>14</sup> [Argyll and Bute Local Development Plan 2](#) (LDP2)

<sup>15</sup> [National Plan for Scotland’s Islands](#)

locales in order to be able to encourage young people and families to stay / move there (with wider implications for stimulating the economy, making a case for local education provision, provision and staff available for care in the community, etc.).

*“We’re trying to do that actually by building another set of houses on a bit of higher land, modern houses – conservation houses and that, that hopefully people will either move into or we can attract people to come and live here.”*

(Participant L1)

Indeed, the Tobermory case study highlighted plans for the creation of around 90 new affordable homes which currently are not addressed in their [plan] and therefore risk being uncatered for in Scottish Water’s supply planning strategy:

*“There are plans to build a further 90+ social housing houses on the island and some of the money assigned for this will deal with water supply but we can’t expect funding for housing to overhaul the whole water supply system”* Note

based on in-person interview with Participant S3.

The community council in Tobermory is now working closely with Scottish Water to ensure they receive up to date and accurate information for predicting demand. This is an example of how open and clear communication between stakeholders is essential for effective and sustainable development, but also highlights the vulnerability of communities who do not have the strategic view of their whole environment, good working relationships with service providers or even just whose timing is not as fortuitous (e.g. when issues are identified too late be addressed within wider planning processes).

## **Economy & Tourism**

Stimulating economy in the areas studied was also cited as something which is necessary for making the areas more sustainable (e.g. to encourage people to move there, they need a robust economy but that in itself requires reliable income from residents and visitors, as well as a population from which a workforce can be drawn). Many of the small businesses involved in the case study research rely heavily on tourism and are vulnerable to loss of income as a result of issues with water supply, water quality or flood risk (which can cause damage expenses, closure of business, etc.).

It was also noted that the tourism industry can impact on an area’s resilience to water issues, for example, visitors to places such as Skye or to Tiree’s summer music festival may not apply the same behaviours to water use that local residents would, meaning greater consumption per person for visitors than for residents.

*“2000 people attend Tiree Music Festival each year. This means a major population boom in summer (normal no. of island residents is around 600). Water sports are also very popular. For these, people expect to have access to showering facilities etc. – the island can’t provide for the peak demand in water resources in the summer”* Note based on phone interview with Participant T1.

*“Water supply is not something that is discussed with tourist visitors – they add to the demand for water and usually come in the drier times of the year.”*  
(Participant S1)

*“(it is) harder to manage the demand of visitors than it is of residents and locals, because they don’t really understand. They’re on holiday so they don’t want to have to constrain their activities. If you live in the place and you understand how it works, then you might be willing to do that”* (Participant K2)

Limited availability of a clean and clear water supply was noted to have a direct impact on visitor experience, which directly influences income and business sustainability. Some of the business owners interviewed showed a commitment to both conserving water and providing good visitor experience through suggestions for communication campaigns and sharing of the local water experiences.

*“In the hospitality industry there is a pressure to meet customer expectations. If provision falls below this expected level, they have to drop prices to compensate ... but that is often not enough to prevent complaints and cancellations (including if there was an issue with water supply). A tourist tax is a good mechanism to pay for the infrastructure for tourism – because the community (local council tax payers) can’t afford to pay for that level of infrastructure.”* Note based on in-person interview with Participant S3.

Tourism businesses which operate from private water supplies (e.g. all of those in the Knoydart case study and some from the Skye case study) are required to treat the water they provide to paying guests / customers. New government regulations<sup>16</sup> around the way in which water is treated (e.g. paying for installation and upkeep of UV filters), and being subject to annual water quality inspections has directly elevated costs for such businesses. Therefore, a lack of mains water supply is noted as applying a direct cost to the small business owners who deal with visiting guests or customers.

*“The short term let legislation has meant that a plumber is required to install the UV filter in at each house – [Participant S5] received an £800 grant to help cover the costs involved in installation. The UV light and filter require to be changed*

---

<sup>16</sup> [Mygov.scot: Guidance on treatment of private water supplies for paying visitors](https://www.mygov.scot/guidance-on-treatment-of-private-water-supplies-for-paying-visitors)

*every year. [Participant S5] lets one room in her house for B&B and believes that smaller businesses are being disproportionately impacted by the requirements"*

Note based on in-person interview with Participant S3.

There are also examples of how water issues are being integrated into broader economic endeavours. The Luing case study identified a challenge for those embarking on projects that need to be maintained over time (for Luing, this will be the ongoing shore replenishment, as slate material will be applied, eroded, reapplied). As noted by Participant L1, they were granted funding for scoping reports, expert guidance, etc. but obtaining funding to maintain work that has already been done does not tend to excite funders as much as new or interesting projects. Consequently, the community in Luing are working to find alternative sources of income for the shoreline replenishment. One of their proposed approaches is the reinstatement of the local slate quarry business as a community business interest to generate both income and material for the shoreline (from the quarry process waste). The community is having to adapt and show creativity in how it addresses the area's problems, but in doing so it is generating multi-level benefits by combining efforts to address a number of challenges (the quarry reinstatement is hoped to provide employment, income and encourage families to move to the area).

### There is space (and need) for different forms of knowledge

Accounting for different knowledge types within community projects is essential to capturing as many relevant perspectives as possible. Establishing which stakeholders need to utilise which kinds of knowledge, and then creating the space for that knowledge to be collated and heard, underpins the success of community projects and goals such as those outlined in the current case studies. There are relevant examples from all of the case studies.

In Luing – the local community needed to hear from the experts and so expert reports on the situation were commissioned.

*"So the report draws lines on the map of where the sea is going to be in 2018, and it's in the middle of the village. So assuming worst case, and assuming we don't do anything, so that crystallized opinion."* (Participant L1)

In Tobermory – engineers needed to understand the timing of flooding and the movements / capabilities of the community at those times in order to design the most suitable form of flood defence. Additionally, Scottish Water needed to be aware of local housing development plans in order to be able to develop their supply strategy for the area.



*“Our storm surges could be always at 5:30 / 6:30 in the morning. Well, I can guarantee that apart from a couple of old fisherman and myself, nobody else is looking out the window, everybody’s asleep ... and when the guys came about these new stone boards [the [proposed flood wall], they’re going to put at the top of the pier here, they said we’ve changed the spec and I said, fine. They were [originally] to be aluminium. They [the engineers] say ‘we’re going to use stainless steel now’. They’ll last a lot longer’ and I said, ‘well, how heavy are they? And they said, well, ‘they’ve only gone up from 20 to 40 kilos each.’ ‘I said, well, that’s a two man job to put in position, but this is at 5:30 in the morning and nobody else is around. Who do we get at 5:30 in the morning to put these new storm boards up?” (Participant To2)*

On Skye, local knowledge is used within a private community water supply to locate and fix leaks but there is no formal documentation of that knowledge or of the process that should be followed. There is also knowledge of how visitors engage with water use and what their expectations are of water services. The business owners use this to plan for and allocate water resources to different tasks.

*“Their aim has been to be off [mains water] grid – but they realised they needed facilities. So they use mains water for drinking water for users of the facilities and people who attend workshops.”* Note based on in-person interview with Participant S2.

For Knoydart, people utilise local knowledge of the water system (it’s pathways, peak times, what a rainfall event or drought event means in terms of water availability, etc.) to determine how to manage their own water supplies.

*“Participant K4 described their system as including a main storage reservoir of around 200 litres of water, a back-up 600 litre tank which could be used for both their home and tourist accommodations”* Note based on in-person interview with Participant K4.

Collaboration between different forms of stakeholders and an open sharing of knowledge (not just on the systems themselves, but also around the policy landscape, legislative requirements, funding streams, etc.) can help make community endeavours more locally relevant, resilient and sustainable.

## **A note on community structure and key players central to addressing water (and other) community challenges**

A number of the examples studied in this work were driven by an individual or a small number of people who possessed a special combination of characteristics.

These include a passion and drive to take action to improve their living environment for themselves and for others. They also include particular skills such as understanding business, knowledge of budgeting accountancy, familiarity (or confidence) with applications e.g. for funds or planning permission, connectivity with a broad range of contacts in order to distil information and apply it appropriately to their context, etc. Finally, they need to be amenable to their wider community and be able to facilitate, accommodate and mediate. These skill requirements mean that often, when exploring cases such as the ones addressed in this research, there can be a limited pool of people sufficiently engaged enough to be able to get a wide range of voices on the topic. On a number of occasions it was found that we were able to speak with the community members who were heavily involved with the project but struggled to gain wider perspective due to a lack of engagement or interest from the wider community. This raises a broader question of what it takes to trigger a 'tipping point' in which a person or community become motivated to action by an issue. Understanding this can help us as researchers and decision-makers to know how best to engage with communities and make our engagement processes relevant and productive for those communities.

It was found that within the case studies, communities which were divided on relevant courses of action would experience some level of friction or resistance. This can be incredibly damaging to both the project and to the wider community structure and it was flagged as a point of learning in a few cases that space should be made for understanding what a community needs in order to reach agreement on a strategy or goal. The Luing case study demonstrated a good example of how a community can seek to reach agreement by conducting collaborative and iterative processes to identify community-level goals (e.g. through the development process for their community strategy: 'Framework for Luing's Future'<sup>12</sup>). It also demonstrated what can be applied at the project level e.g. listening to community concerns over how decisions were being reached, and enlisting the appropriate type of information or evidence to address those concerns – in this case, it was the commissioning of an expert report on the issue and available options (see quote from Participant L1 above).

Realising the vulnerability that comes with having a small number of people managing some of the community's biggest projects and challenges, the Luing Community Trust are pro-actively working to 'back-up' their social capital by investing time and money in transferring skills between more and less senior members of the community and actively encouraging younger members of the community to become involved in community development and resilience matters.

*“Actually, if I think about the challenges and not just the sustaining of the shore but sustaining of the of the, the organizational piece behind that, so we have you know as the Trust is successful if the trust [of the community] is in place then we can make it you know like a duty, a duty if you like of the trust to keep that activity going. And our succession planning for the board etcetera, we try to bring people in, who are you know, younger people – so two of our board members are under 30.” (Participant L1)*

It is recognised by the group that this is challenging given the work and life pressures on younger members of the population, but the efforts are being rewarded with younger members joining the board and, if their ambitions are realised, they will carry the projects into the coming decades.

## Workshop

Following the presentation of the key findings to workshop participants, there were a number of small-group discussions and a plenary session guided by a number of key questions arising from the work. The questions presented in the discussions were:

- What are the main challenges for coastal communities?
- What do communities need to help them succeed in managing risks and enhancing resilience?
- How can we best share experiential knowledge between communities (and how can this be supported)?

*It should be noted that the points covered below are by no means considered exhaustive, but were the issues of relevance to our attendees at the time of discussion.*

## Challenges for coastal communities

This question was intentionally not limited to water-related challenges. During the course of the case study work, it became apparent that water-related were rarely the primary concern for many of the communities involved which raised the question of ‘*how can communities be engaged on water-related issues when there are other, more pressing challenges*’. One approach to this is to make the water issue relevant or link it to something which of importance to the community. Therefore, the discussion session was aimed at working out what it is that communities need to focus on, so that water issues can be evaluated within that context.

The themes raised within the discussion around challenges include:

**Mobility:** challenges in moving people, goods, resources etc. provide limitations to what can be achieved in remote locations as well as underpinning some of the key challenges such as employment and housing. The energy required to focus on this issue of mobility leaves such community with little space to address other challenges.

**Tourism:** the seasonal change in pressure on resource demand brought about by tourism in rural areas (including spikes in seasonal water demand) can have implications for the tourism sector and therefore for the economy. Tourism can also alter the social dynamics of a location, for instance, if a large proportion of households in an area are occupied for only part of the year, this can influence the level of community cohesion, social capacity, commitment to addressing local issues and investment in an area.

**Complexity of issues faced:** There is a connection between many of the different issues faced by rural and remote communities and understanding how smaller issues fit in with bigger issues (e.g. population, employment, housing) can help us to understand how to make those smaller issues more relevant within the bigger scale, and can help us to understand how to effectively communicate with communities on the range of issues faced. This is reflected in a number of the case studies in which communities use multi-pronged projects to try and address a range of challenges, rather than having discrete action on a single challenge.

### What do communities need to help them manage risks and enhance resilience? + How can we best share knowledge between communities?

Questions two and three can be considered together since they both focused around communication.

When asked about what communities needed to help them manage risks and enhance their resilience, the conversation was dominated by needs that were related to **communication**. Ways to effectively communicate at a range of levels were cited, for example, it was noted that we need to understand how to communicate between the government level and the community level, with reference made to gaps in communication channels and mixed-messaging being problematic. The lack of stable and well-documented channels of communication were mentioned on several occasions, for example, it was noted that access to phone numbers and contact details could be difficult to obtain, the high turnover of local council staff meant that problems were difficult to escalate and that communication *within* larger organisations seemed to be limited (from the community perspective), giving a sense that effective

collaboration with larger organisations is difficult to achieve, especially over longer timescales.

The work of community councils was raised as something which is imperative to the development of many communities, but that the work done is voluntary and that funding for community councils to exist (i.e. not for specific projects, but simply to allow them to convene, communicate, etc.) is extremely limited (quoted at around £400/year). This challenge undermines the contribution that community councils and similar organisations are seen to deliver within this study (most of the key projects evaluated have been led or facilitated by the community councils in the respective areas). Greater support of this type of organisation may allow communities to take more ownership of the challenges that they wish to address.

In relation to specific ways in which communication can be supported, suggestions related to organisational as well as event-based opportunities. In terms of organisational opportunities, some kind of umbrella organisation was seen as an appropriate way to facilitate communication between and across scales. This could be in the form of a person / role or a tool such as a web page which provides information on community projects (to connect communities facing similar challenges), funding streams according to different criteria e.g. range of topics covered, eligibility, source, relevant contacts within larger organisations, etc.

Event-based suggestions included support for events which had key 'hooks' e.g. a conference which has speakers well-known and relevant enough for a particular topic to draw participants in (e.g. perhaps make use of a champion or local peer – someone the participants are aware of and can relate to), but then also build in lots of time for communication, networking, knowledge sharing, etc. Working groups were also discussed as a way of involving communities in larger projects and bringing different communities together to share their experiences.

## Policy relevance

The findings from this report offer insights for a range of policy spheres, from water management, to planning, to climate change adaptation. The below table sets out some of the most relevant policy links and the implications of this study's findings for them.

Table 6: Policy links to research findings

Policy / legislation	Learning
<b>Water</b>	
<b>Water, wastewater and drainage policy</b> (consultation closed in February 2024, policy in development)	<ul style="list-style-type: none"> <li>- Access to private water supplies is valued on multiple levels, not simply as access to a resource. When considering connection of private supply users to the mains, this value complexity should be explored.</li> <li>- Water scarcity continues to be perceived as a distant risk. Communities may need to be supported in understanding and planning for this risk in coming years.</li> <li>- More pressing than the issue of volume of water available, was the concern around the capacity to treat and distribute water sufficiently for many of our participants. Examples of effective engagement between water providers and communities showed increased levels of confidence and so this model should be considered when working to reassure communities and when looking for public buy-in to schemes and initiatives.</li> </ul>
<b>Scotland's first Flood Resilience Strategy</b>	The findings in this study show that resilience is to a large degree a product of community structure and social capacity. The Flood Resilience Strategy consultation notes that future resilience requires cross-sector working, conscious spatial planning and community engagement. This study reinforces these needs and would further promote the need for community strengthening activities which can enhance local resilience efforts.
<b>Hydro Nation Strategy</b>	<p>A CREW report on "<i>Climate Crisis: Informing Scotland's actionable mitigation and adaptation response to water scarcity</i>" concluded that greater application of joined-up governance is necessary for making links with other policy areas of relevance.</p> <p>Based on the results of our own study, this would come in the form of linking policy on planning and development with planning for the effective delivery of water resources.</p>
<b>Planning and development</b>	
<b>National Performance Framework</b>	The focus on the value of social capital in this study reinforces the importance of community cohesion and empowerment, as highlighted in the Framework's ' <i>Communities</i> ' outcome which promotes ' <i>inclusive, empowered, resilient and safe</i> ' communities. In the case of this study, resilience comes in the form of communities which are able to recognise and act on threats posed by flooding, erosion, water scarcity. As set out in the Performance Framework, supporting more communities to be resilient and empowered will help address risks locally.
<b>National Planning Framework 4</b>	A number of policies within the NPF4 are relevant and inter-related. Policies on Flood risk and water management, Coastal development, Rural homes, Climate mitigation and adaptation and Design, quality and place cross paths here. For instance, there is a need to develop more rural housing, but this cannot be done in areas where there is an existing flooding or water supply risk (without robust mitigation). This study suggests that engaging with local communities to design the right kind of development, and in appropriate locations will utilise local experiential as well as professional knowledge for the best outcome.
<b>Local Place Plans and Local Development</b>	LDPs and LPPS are designed to give local communities, as well as local authorities, a channel through which to state their desires for development of a location. For a number of this study's participants, there was a desire to integrate multiple outcomes within single projects (e.g. combine enterprise with increased housing stock). Where local authorities can work closely

	with local communities, these multi-layered benefits are more likely to be realised.
<b>Climate change</b>	
<b>National Adaptation Plan</b>	<ul style="list-style-type: none"> <li>- Focus on building resilience through local action – small and rural communities can demonstrate good examples of how this can be done. Sharing knowledge and expertise can help these actions spread throughout more communities.</li> <li>- Focus on ability to deal with both too much and too little water. This was a challenge for a number of the study’s participants. Supporting multi-faceted projects, as well as building social connectedness can help enhance responsiveness and adaptability.</li> </ul>

## 6. Conclusion and recommendations

### Conclusion

This study sought to determine the perspectives and actions of local communities and stakeholders in relation to water-based challenges in remote and rural coastal locations. What we established was there are a range of perspectives based on responsibility and best forms of action for water challenges in these areas, but a general agreement that we are facing increasing pressures due to changes in water availability, flood risk, coastal erosion, etc. Some consider that living near the coast is a privilege that should (and can) be fought for), while others are more daunted by the prospect of the impending changes and their ability to continue to live as they are.

The case studies highlighted the strength of many remote coastal communities and the benefits that are brought about by the energy and action of (often) a small group of people within a community. The water-related challenges faced in the remote coastal communities we worked with were often complex, with more than one key issue to address (e.g. water scarcity + coastal flood risk). These complexities are challenge enough in themselves but the connection between water related issues and wider social challenges were also impossible to ignore. For instance, on multiple occasions it was seen that some key challenges common in remote and rural areas (housing, employment, skills gaps, population levels) were directly impacted by ability to secure sufficient water supplies or protect against encroaching coastlines.

Gaps were also highlighted in relation to community resilience, such as the pre-requisite of possessing certain skills (e.g. funding applications, project management, budgeting, communication, etc.) before being able to act on behalf your community, as well as the vulnerability of community organisations when younger members of the population struggle to find time and space to be involved with such groups, and the challenges that come with funding requirements.

Many of the communities demonstrated innovative ways to deal with these challenges, indicating a strong sense of ownership and agency, which are key to enhancing resilience. Finding opportunities to share these pathways to resilience could help more communities to take action on water-related and other challenges, which may allow for more robust remote communities which can grow more stable and more resilient in time.



## Recommendations

A number of recommendations have been developed in response to the findings from this study:

### Engaging communities on water-related issues

- Working on addressing water issues (e.g. securing supply or reducing flood risk) could unlock many opportunities in relation to economic growth and re/population ambitions, including increased housing stock and employment opportunities, leading increased investment in an area
- Personal experience can influence one's perspective, so when we want to make a connection with people based on a certain issue, it is important to identify what matters to them, and how we can address their primary concerns (e.g. may be the broader issues of finances, education, conservation, community resilience...)
- Awareness-raising is an important tool which can be used to help focus attention on the issues that matter and away from issues that are less problematic (e.g. awareness-raising about the need to use water conservatively can help reduce consumption while awareness-raising about the reasons for tankering of water on islands can help reduce anxiety around water supply issues)
- There is a need for people to see that nationally-distributed messages (e.g. around conservative water use) are relevant to them, or, if the messages are not nationally relevant, for there to be place-based adaptability within those messages. Adaptability in messaging, funding and policy will allow communities to design their own strategies for resilience (i.e. things that allow them to integrate different types of funding or project)

### Social development for communities

- Support for young or less experienced communities that don't have the networks, skills or confidence to act for change should make community action accessible to wider parts of the community. This may be in form of training, mentoring, networking, funding time to allow young people to be able to make such commitments, etc.
- There is a need for consistent communication between groups like community councils, planners, housing developers and service providers to ensure all have the correct information to best allow for resource planning
- One of the ways that communities could support one another could be through sharing experiences and expertise in addressing similar problems.

A process of social learning could empower small communities and make more effective use of the resources which sit in each of them

- Accounting for different knowledge types is essential to 'bringing everyone along' on a project – working out who needs to use which kind of knowledge and making space for that knowledge to be created and heard, really underpins the success of projects like this. Where relevant, this should be considered an acceptable part of a project's development and reflected e.g. in funding guidelines
- Umbrella organisations to support communication across and within groups will help to facilitate flow of information and make more efficient use of skills, knowledge and experience that have already been earned

For more information on this work, please contact Carly Maynard:  
[carly.maynard@sruc.ac.uk](mailto:carly.maynard@sruc.ac.uk)

