Insights and recommendations for involving young people in decision making for the marine environment

Authors

Emilie Devenport[1], Esther Brooker[2], Adam Brooker[3] and Chris Leakey[4]

[1] Independent

[2] Scottish Environment LINK

[3] Institute of Aquaculture, University of Stirling

[4] Scottish Natural Heritage

ABBREVIATIONS

eNGO – Environmental NGO

SYP – Scottish Youth Parliament

HIGHLIGHTS

- Young people are concerned about the future of Scotland's seas
- Visiting the coast is a major pre-cursor to spark interest in the sea
- Young people show high interest in marine decision making, but reported participation is low
- We need to help empower young people to participate in decision-making
- Dedicated platforms and purpose-built opportunities are recommended

Abstract

There is a growing movement to involve young people in decision making for the marine environment, with a wider trend towards public participation and greater accountability of environmental governance. Young people will inherit the consequences of decisions made today. In this paper, the authors provide an initial exploration of young people's views, awareness and participation (current and potential) in decisions and strategies for the marine environment, using Scotland as a case study. These discussions are based on the results of a survey of young people (aged 11–26) in Scotland, appraising levels of understanding and engagement with marine issues and exploring barriers to and opportunities for improved participation. This is set in the context of (a) the growth of local, national and global platforms for young people to express their views, and (b) the aspiration of many governments to empower the public, communities and young people in public decision making and marine stewardship. Education and ocean-literacy initiatives have a role to play, but there is also an aspiration for engagement mechanisms that accelerate a more

fundamental rebalancing in public process to safeguard environmental integrity (and therefore economic and social well-being) for future generations. The authors conclude that marine planning, specifically the development of regional marine plans in Scotland, can provide a mechanism to integrate young people's views and needs into marine decision making.

1. Introduction

Managing environmental resources to meet the needs of current *and* future generations is a defining feature of the Sustainable Development Goals [1]. As young people will inherit the responsibility to address any consequences of decisions made today, there is a growing movement in civic society to involve young people in decision making [2, 3]. Buoyed by the accessibility and global reach of modern social media, the opinions of young people on matters of the environment and society are also increasingly available. Youth groups and platforms at local, national and international levels enable discussion and foster advocacy. This trend is coupled with a wider movement for greater public participation and stewardship of environmental resources [4, 5, 6, 7] (e.g. in EU environmental decision-making[1], support for a Citizen's Assembly for Europe[2],[3]and in line with the Aarhus Convention [8]).

A primary tenet of young people's involvement in decision making is to achieve outcomes that reflect their needs and desires for their future. The extent to which their views are formally solicited and incorporated has not been fully explored (see Ho *et al.* [9] for an analysis of youth-led social change). In this paper, the authors provide an initial exploration of young people's views, awareness and participation (current and potential) in decisions and plans for Scotland's marine environment, based on the results of a survey of 11–26-year-olds in Scotland. These discussions are set in the context of (a) the growth of platforms for young people to express their views and (b) the aspiration of the Scottish government to empower the public, communities and young people in decision making and marine stewardship.

1.1 Understanding young people's involvement in the context of public participation and decision making

---

[1] https://www.unece.org/info/media/news/environment/2017/public-participation-for-a-safe-and-sustainable-future-for-all/doc.html and https://www.unece.org/info/media/news/environment/2019/furthering-effective-and-inclusive-public-participation-in-environmental-matters-2019-aarhus-week/doc.html (accessed 29/07/19)

[2] https://theconversation.com/how-an-eu-citizens-assembly-could-help-to-renew-european-democracy-98894 (accessed 29/07/19)

[3] https://www.citizensassemblies.eu/en (accessed 29/07/19)

Involving the public as a stakeholder group is recognised as a pre-cursor to successful policies [5, 10]. Public participation implies an informal, bottom-up process for citizens to voice their opinions. The related concept of public engagement is a top-down process of intentional and active dialogue between the public and decision-making authorities [11]. Both concepts seek to increase public understanding and acceptance of government policies and decisions. To be legitimate and influential, the public (including young people) must be engaged sufficiently early in the process [12, 13] and go beyond the standard obligation for consultation [14] in a way that is open and transparent (e.g. for development planning decisions). Through the active engagement of diverse stakeholders, public participation is broadly considered to integrate local knowledge [15], empower traditionally marginalised groups [16] and produce novel, resilient decisions that are representative of societal views [5], thereby increasing ownership of the outcomes.

In a marine context, public engagement processes can avoid conflict through greater inclusion, minimise social impacts through negotiation [17], and provide opportunities for communities to support marine management [18] and new infrastructure to deliver change [19]. The term 'marine stewardship' is used in this paper to denote a shared sense of responsibility and involvement in decision making for the marine environment. The authors also acknowledge the challenges of engagement and participation, which are often costly and time consuming. To be effective and democratic they must also be underpinned by adequate knowledge of the issues at hand, while ensuring a balance of views that can be considered representative of society. The marine environment presents a particular 'ocean-literacy' challenge in engaging broadly in issues that are largely 'out of sight' (e.g. impacts on the seabed) or intangible (e.g. ocean acidification). Citizens who are 'ocean literate' are considered to be able to make informed and responsible decisions regarding the ocean and its resources based on sound knowledge of the marine environment and an ability to communicate effectively about them [20].

The involvement of young people in marine decision making is a relatively new area of research. Their participation has been well explored within the context of education [e.g. 21, 22, 23] with some studies focused on perceptions and environmental awareness [24, 25, 26, 27, 28, 29]. A new body of literature considers the role of young people, typically regarding a local development plan [30, 31], while Ho *et al.* [9] consider the impact of youth-led initiatives on society. The process of engaging and empowering young people can benefit society: knowledge is generated in a way that is accessible to young people and, therefore, a broader section of society in general [32], and young people can advance skills that prepare them to become active members of society [33, 34]. An

empowered youth may also serve to accelerate desirable policy changes, shifting the power balance from shorter-term priorities driven by immediate economic interests. Caution is appropriate, though, to ensure the needs of future generations are safeguarded without burdening young people with the professional responsibilities of current decision makers.

1.2 Understanding opportunities for public participation and engagement in Scotland
Public participation is a defining feature of the Aarhus Convention [8], of which Scotland is one of many signatories. The Scottish Government's aspirations to enable public participation, accountability and local governance are further embodied in recent Acts of the Scottish Parliament, e.g. the Community Empowerment (Scotland) Act 2015 [35], the Islands (Scotland) Act 2018 [36] and the Planning (Scotland) Act 2019 [37]. The devolution of the management of Crown Estate assets (which includes most of the seabed, intertidal and foreshore) through the Scottish Crown Estate Act 2019 [38] provides a further example, requiring these assets to now be managed for environmental, social and economic outcomes.

We should be cognisant of differences between land and sea when examining the role of the public in matters of marine governance [39]. First, although there are large coastal human populations, most of the marine area is directly experienced only by those in marine industries. Another major difference is that the marine 'commons' exist at a much greater scale and level of complexity than most land-based resources. Consequently, meaningful input from the wider public is a particular challenge [40], but one that participatory approaches to marine planning are well placed to tackle.

In recent years, public participation in decisions affecting Scotland's marine environment has centred on either major development proposals (e.g. wind farm applications) or specific management measures (e.g. Marine Protected Areas), with a perception from some that earlier participation would enable greater influence. There is a broad shift to enable public (including youth) participation at the earlier strategic (plan/policy preparation) stages that guide decisions made on specific proposals and encourage marine stewardship more broadly. The development of marine plans at a suitable geographic scale provides opportunities for participation from the public and interested stakeholders [41, 14]. They also aim to shift away from sector-by-sector planning to an integrated and balanced approach across interests working to agree and deliver a stated vision for the future.

1.3 Understanding youth platforms as a springboard for young people's participation and engagement

From the international to the local level, there is now a plethora of youth groups (e.g. Climate 2050 Group[4], Global Youth Action Network), young professional networks (UN Youth Advocacy Group[5], Youth Innovation Forum on Plastic Pollution[6], Our Ocean Youth Leadership Summit[7]), youth focused initiatives (e.g. Youth Empowerment Project[8] and UN Strategy on Youth [42]) and youth advocacy icons (e.g. Greta Thunberg), all raising the profile of key issues and seeking to turn aspirations for young people's participation into reality [2]. However, the extent to which young people's views are formally incorporated into decision-making processes and the implications for marine management have not been explored.

Within Scotland, the Scottish Youth Parliament (SYP) exists to provide politically independent representation for Scotland's young people (aged 11–26) [33]. Ho *et al.* [10] make the distinction between youth-led engagement initiatives and youth engagement processes whereby non-youth organisations invite young people to participate. SYP provides a national and youth-led platform for discussion and campaigning on topics voted to be the most pressing for young people across Scotland each year. In this way, SYP can engage with the Scottish Parliament on pre-determined issues. However, their capacity to react to additional topics may be limited as all members of SYP are voluntary. Closer integration between parliamentary committees and their corresponding SYP committees has been proposed[9], although there could be benefit in creating further access points for young people to contribute (e.g. outwith parliamentary process or through local governments and public agencies).

The Scottish Government adopted 2018 as the 'Year of Young People', with the themes including *'Participation – looking at how young people can influence public services and decisions which affect their lives'* and an objective to establish a legacy of platforms from which young people can have their views heard and acted upon [43]. The *Sea Scotland 2018* conference sought to include youth views on the marine environment and explore their role as part of a wider theme on empowerment in marine stewardship [44]. This included an online survey to gather insights into youth views. The

---

[4] https://2050.scot (accessed 23/07/19)
[5] http://www.unesco.org/new/en/gefi/about/youth-advocacy-group/ (accessed 29/07/19)
[6] https://algalita.org/summit/ (accessed 29/07/19)
[7] https://ourocean2019.no/youth-leadership-summit/ (accessed 1/01/19)
[8] Youth Empowerment Project https://youthempowermentproject.org (accessed 02/09/19)
[9]https://d3n8a8pro7vhmx.cloudfront.net/scottishyouthparliament/pages/2805/attachments/original/150875
4368/PR_32.PDF?1508754368 (accessed 02/09/19)

survey results were shared at the conference by the SYP Vice-Chair. This paper analyses the results in more detail and aims to discuss current levels of understanding of marine environmental issues among Scottish young people, potential barriers to engaging in these issues and possible opportunities to improve young peoples' participation.

2. Methods

The authors conducted a survey of young people (11–26-year-olds) in Scotland to gather insights into young people's views and their current level of participation and interest in decision making for Scotland's marine environment. The survey examines:

1. Young people's views on Scotland's seas.

2. Young people's awareness of current marine policy and conservation issues and existing opportunities to take part in decision making.

3. Implications and ideas for improved future youth involvement in decision making about marine management.

2.1 Survey design and statistical analysis

The survey was designed by members of the Sea Scotland conference series steering group in partnership with representatives from Young Scot, a national youth information and citizenship charity for 11-26 year olds in Scotland. To enable quick response times and thereby encourage full responses, the survey was designed as a self-complete survey for individuals and as a one-off study. A disclaimer on the survey declared anonymity with no personal data collected, and it provided a contact for enquiries, transparency regarding the organisations involved and information on how survey responses would be used. None of the questions were compulsory. Questions were phrased assuming a non-technical background; for example, the concept of 'participation' was phrased as 'have a say in decision making'. Several question formats were used, including single answer, multiple-choice, multiple-answer, Likert scales and free text. Responses on the Likert Scale were scored as 5 = strongly agree, 4 = agree, 3 = don't know, 2 = disagree and 1 = strongly disagree, and it was used for questions with multiple options or statements for the respondents to rank. A shorter 5-point scale (in comparison to other studies using larger scales, e.g. 10-point scale, [45]) was used as a simpler and less time-consuming approach for the youth audience. The full survey design is detailed in the Annex.

The survey included twenty-six questions, grouped into five sections for analysis:

1. **Visiting Scotland's coast and seas** (4 questions) – Questions 1 and 2 aim to understand whether living distance from the coast determines the frequency of visits, correlated using a Chi-Squared test of independence with Cramér's V test to measure the level of association between the variables.

2. **Interest and understanding of Scotland's Seas** (5 questions) – The objective of this section is to determine respondents' positions on current events. A Mann-Whitney U-test was used to test for a significant relationship between how well respondents think the seas are currently managed and whether they feel more needs to be done. The issues were grouped into two categories for the purpose of testing the hypothesis outlined in section 3.1: 'environmental' (statements 1–5, 7 and 8) and 'social' (statements 6 and 9–11). An Aligned Ranks Transformation ANOVA was used to test for a significant difference in the way respondents considered these two categories of issues and whether there is a difference between respondents' age and ranking.

3. **How decisions are made about our seas** (6 questions) – This section aims to understand the relative importance that respondents place on environmental and social issues and to indicate how well they feel they are represented in decision making.

4. **Learning about Scotland's seas** (3 questions) – The purpose of these questions is to gain insight into how young people want to access information and how they learn about current issues relating to Scotland's seas.

5. **About respondents** (6 questions) – These questions determine the demographics and background of the respondents.

2.2 Procedure

The survey was hosted on the online platform SurveyMonkey for two weeks in May 2018 and shared on social media by Young Scot, SYP and the Sea Scotland conference Twitter account. Conference delegates (including academics, young people, local authorities and community and industry representatives) were encouraged to disseminate it further within their networks and Young Scot supported the survey as an activity that would earn the respondent credits through their award card scheme, Young Scot Rewards.

High-level reporting of key messages at the *Sea Scotland 2018* conference was supported by the SurveyMonkey analytical tools. Further analysis for this paper was undertaken in R [46] and QGIS [47].

Results for the question 'What are the names of the coastal places in Scotland you've visited for leisure and recreation in the last year?' were filtered either because the sites named could not be identified (e.g. due to local colloquial names) or because they referred to large or unspecific geographic locations (e.g. Clyde, Fife Coastal Path). Filtered locations were mapped by count in QGIS; the total number of locations plotted was 214 (out of a total 242 unique named places).

3. Results

A total of 342 responses were received. Four responses included inappropriate answers and were removed, so 338 responses were analysed. There were 163 respondents aged 11–16 years, 106 aged 17–22 and 54 aged 22–26. Fifteen respondents did not state their age category. Response rates for all the questions are summarised in Table 1. While this is a limited sample of young people across Scotland (in 2017 there were 628,679 children aged 5–15; National Records of Scotland 2017 [48], this response rate in just a fortnight demonstrates the potential to easily gather young people's views. However, several factors may have limited the potential participant pool of the study. While the survey was designed for young people from age 11, a wider age range could include views of younger people. As with all stakeholder groups, capturing the views of people who are not actively engaged is difficult, and the survey was only available online, which may have excluded participants with limited access to the Internet, especially social media.

Question

How close do you live to Scotland's coast

How often do you visit Scotland's coast or seas for leisure and recreation (e.g. to go for a walk, meet up with friends, visit the be part in water sports)?

What are the names of the coastal places in Scotland you've visited for leisure and recreation in the last year?

Who do you visit these places with? Please tick all that apply.

Thinking about the last year, what sorts of activities have you taken part in on the Scottish coast? Please tick all that apply.

What sorts of activities would you like to try (or just do more of) in future? Please tick all that apply.

How much do you agree or disagree with each of the following statements about Scotland's seas?

In your opinion, how important is it to address these challenges facing Scotland's seas and coastal communities?

Are there any other challenges which you think need to be addressed?

How much do you agree or disagree that the people/groups below should have a say in how Scotland's seas are used?

Are there any other groups or bodies you think should have a say in how Scotland's seas are used?

Are you aware that events and meetings are sometimes held to enable members of the public and others to have a say about developments or proposals which might impact on Scotland's seas (e.g. meetings to discuss windfarm of fish farm proposals; me discuss Marine Protected Areas)?

Have you ever attended an event or a meeting about a development or proposal which might have an impact on Scotland's seas meeting to discuss a windfarm of fish farm proposal, a meeting to discuss a Marine Protected Area)?

How interested would you be in attending an event or meeting like this in future?

Do you think the views of young people on Scotland's seas are currently well represented when decisions are made?

If you answered 'no' or 'don't know' to Q15, have you any ideas for how the views of young people could be collected more effe

Which of the following sparked your interest in Scotland's seas? Please tick all that apply.

Are you currently on a course of study or working in a job/placement related to the sea (e.g. tourism, fishing, fish farming, marine, marine science, marine conservation)?

How easy is it to find the information you want about the health of Scotland's seas and how our seas are used?

Do you have any suggestions about the best way to share information about Scotland's seas with young people or to get more young people involved in helping to look after Scotland's seas?

Your age

Your current education or employment status (Please tick all that apply)

Are you a member of any organisation which helps look after wildlife or the natural environment (e.g. local or national wildlife o

In the last year, have you signed a conservation petition or participated in a conservation campaign (on-line or other) ….

Please tell us how you heard about this survey.

Other

Finally, can you use just one word to describe what Scotland's seas mean to you?

Table 1. List of questions and response rates from a survey of Scottish young people's views on Scottish seas in 2018 (n = 338 respondents).

3.1 Visiting Scotland's Coasts and Seas

Figure 1 shows the geographic distribution in Scotland of the 214 named coastal areas visited by the respondents. Coastal visits tend to be concentrated to the west and east of the Central Belt, areas that are relatively easy to access from the most populated areas. However, respondents also referenced coastal areas and beaches in Northern Ireland, Wales and the south coast of England.
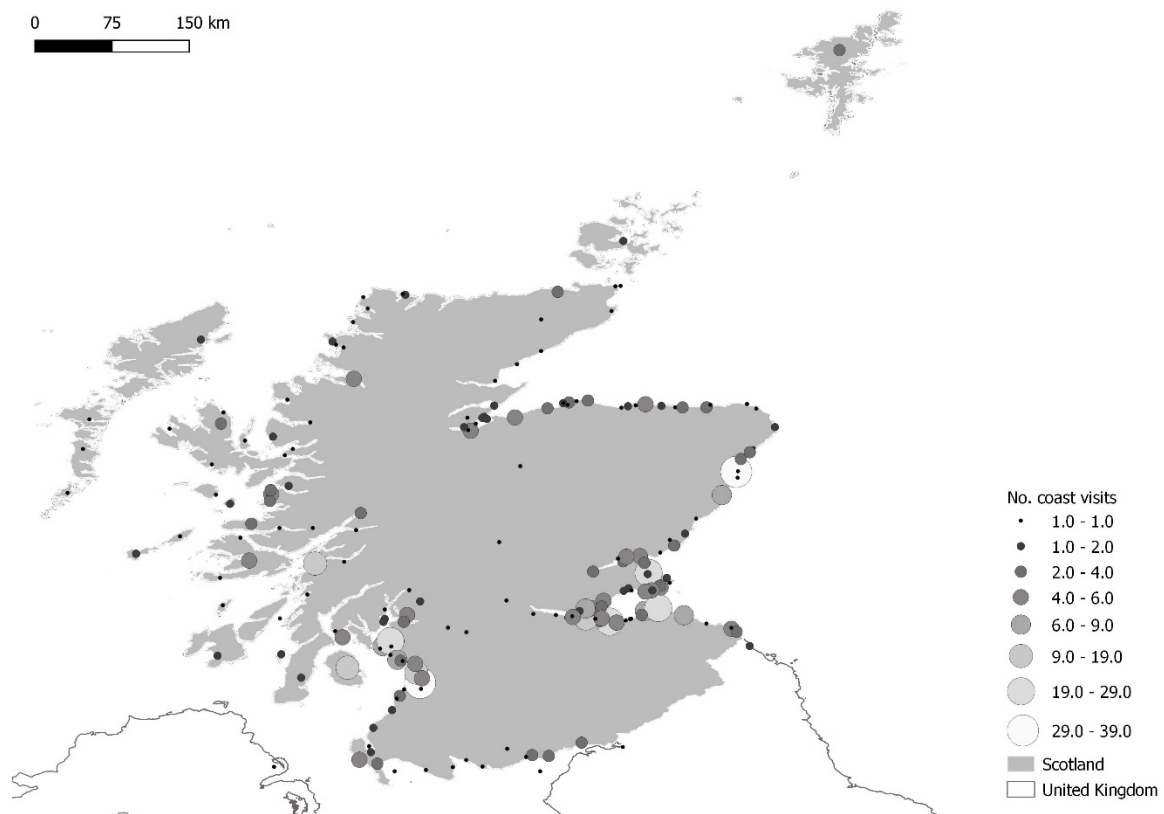
Figure 1. Map showing the frequency of visits to 214 coastal locations of 338 young people surveyed in Scotland in 2018.

Figure 2 summarises the frequency with which the respondents visit the coast. A total of 17.8% of respondents only visit the coast occasionally (once or twice a year) and 8.6% have never visited the coast. The Chi-squared correlation found a highly significant positive relationship between living distance from the coast and the frequency of coastal visits (χ^2 = 139.07, P < 0.001). Cramér's V test also indicated a very high level of association (V = 0.74, DF = 12). Living further from the coast results in a higher proportion of young people never visiting the coast or only visiting once or twice a year.
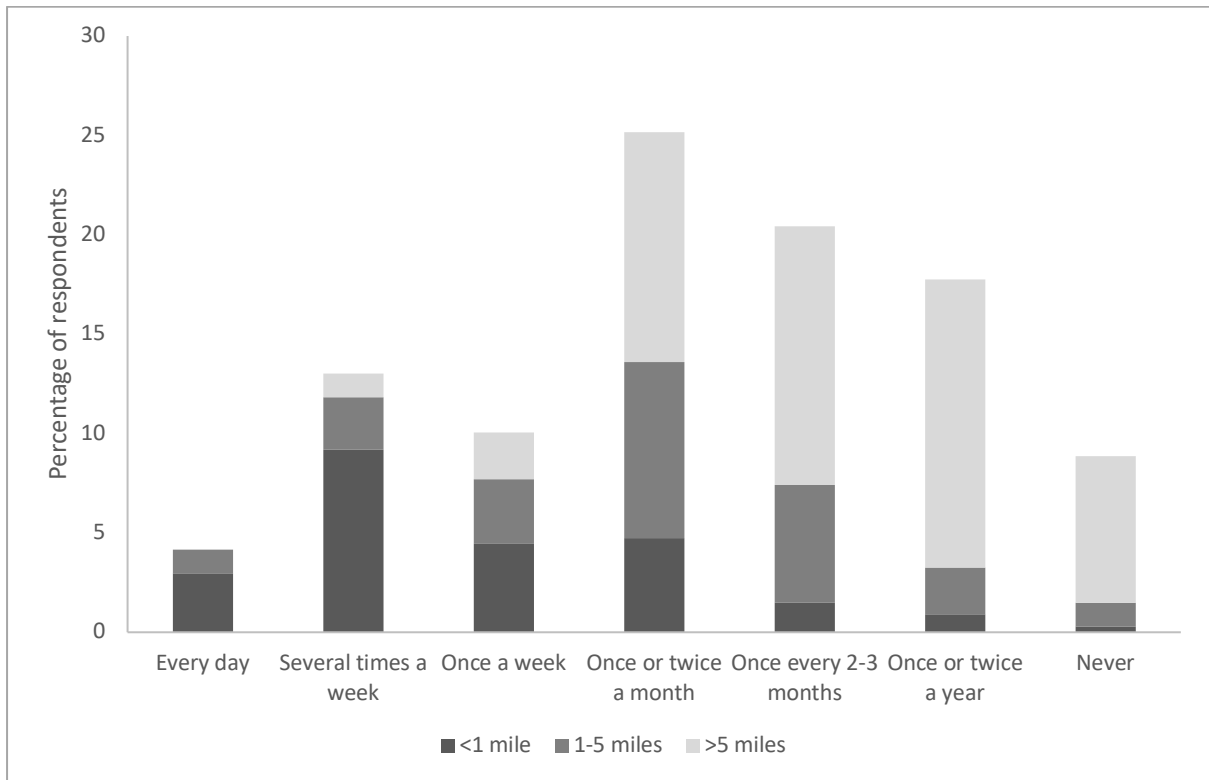
Figure 2. The relationship between frequency of visits to the coast and living distance from the coast of 338 young people surveyed in Scotland in 2018.

3.2 Interest and understanding of Scotland's seas

3.2.1 Interest in Scotland's seas

An average of 3.72 activities were cited per respondent in the first question, 'Thinking about the last year, what sorts of activities have you taken part in on the Scottish coast?' and 5.88 activities per respondent for the second question, 'What sorts of activities would you like to try (or just do more of) in the future?', indicating that aspirations for future coastal activities are greater than current levels of engagement. Figure 3 summarises these responses, expressed as a percentage of the total number of respondents. More than 20% of respondents take part in the following activities at the beach: walking, time with family, socialising, running/jogging and swimming in the sea. The same proportion identified several activities that they would like to do more of, including sporting, boating and volunteering activities.

The activities to which respondents aspire the most are shown in Figure 3, which are canoeing and kayaking, diving and snorkelling, surfing, windsurfing and kite surfing and water skiing or wakeboarding. Environment-based activities, including bird/wildlife-watching, beach cleaning and citizen science were also popular.
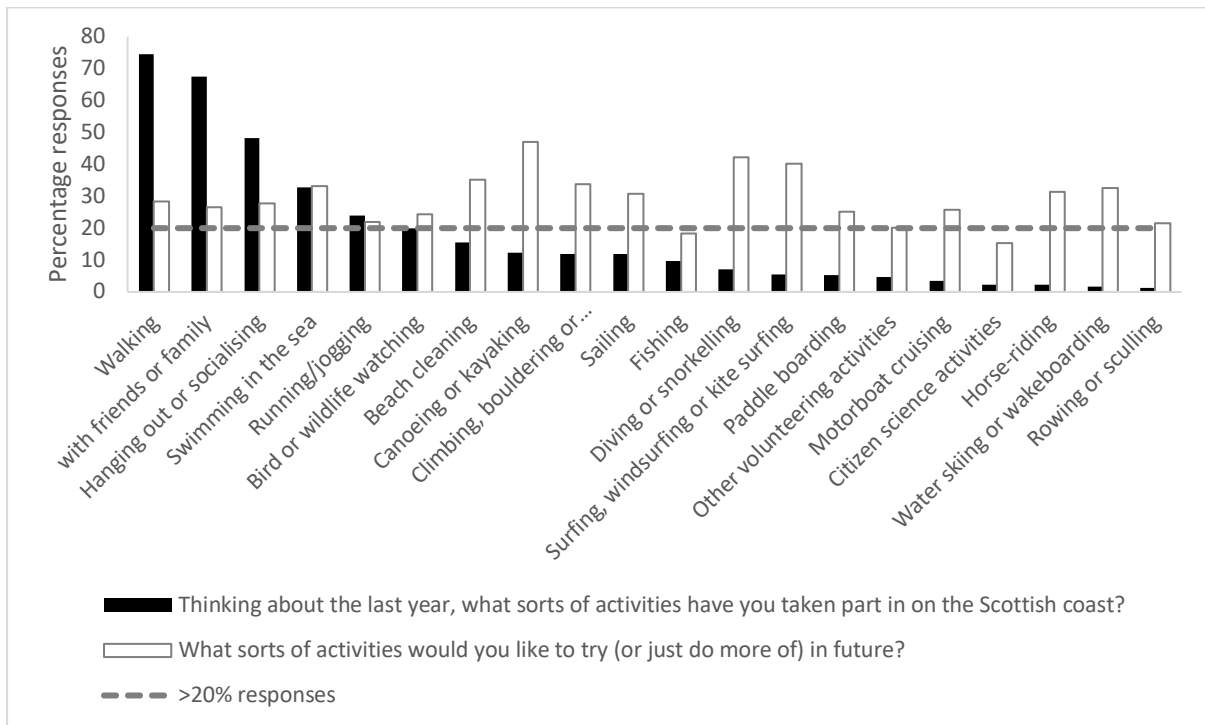
Figure 3. Percentage of responses to a multiple-selection question about activities engaged in and aspirations for future engagement by 338 young people in Scotland surveyed in 2018. Dotted line indicates activities cited by >20% respondents. NB Total > 100% as the question allowed multiple answers.

A further multiple-selection question, 'Which of the following sparked your interest in Scotland's seas? is summarised in Table 2. Twenty-six other answers were given, including 'live in a coastal town', 'conservation/marine enthusiast', 'curiosity of the unknown', 'family history and stories', 'friends', 'grew up by the sea', 'grew up on an island' and 'work'.

Options	Positive responses (%)
Visits to the coast	59.00 (n=209)
Family and Friends	42.60 (n=144)
Studies	39.35 (n=133)
TV	34.32 (n=116)
Activities	29.88 (n=101)
Social media	24.56 (n=83)
Books	22.49 (n=76)

Websites	18.64 (n=63)
Museums	17.75 (n=60)
Clubs and societies	15.98 (n=54)

Table 2. Summary of responses to the question 'Which of the following sparked your interest in Scotland's seas' in a survey of 338 young people conducted in 2018. NB Total > 100% as the question allowed multiple answers.

3.2.2 Views on the key issues for the marine environment and coastal communities

Figure 4 illustrates responses on a Likert scale to 11 statements to which respondents could select how strongly they agreed with them. The highest percentage where respondents strongly agreed with a statement was in respect to 'Scotland's seas should be protected' (78.7%). The highest percentage where respondents strongly disagreed (9.6%) related to, 'I feel well-informed about the issues affecting Scotland's seas', with a further 36.84% also disagreeing with this statement.

A further question asked, 'How easy is it to find the information you want about the health of Scotland's seas and how our seas are used?' to which 24% felt it was 'quite difficult' or 'very difficult' to find information, compared to 42% who thought it was 'very easy' or 'quite easy'. Eighty respondents (23%) stated that they are members of an organisation that looks after wildlife or the natural environment, which may be a source of information on environmental issues.
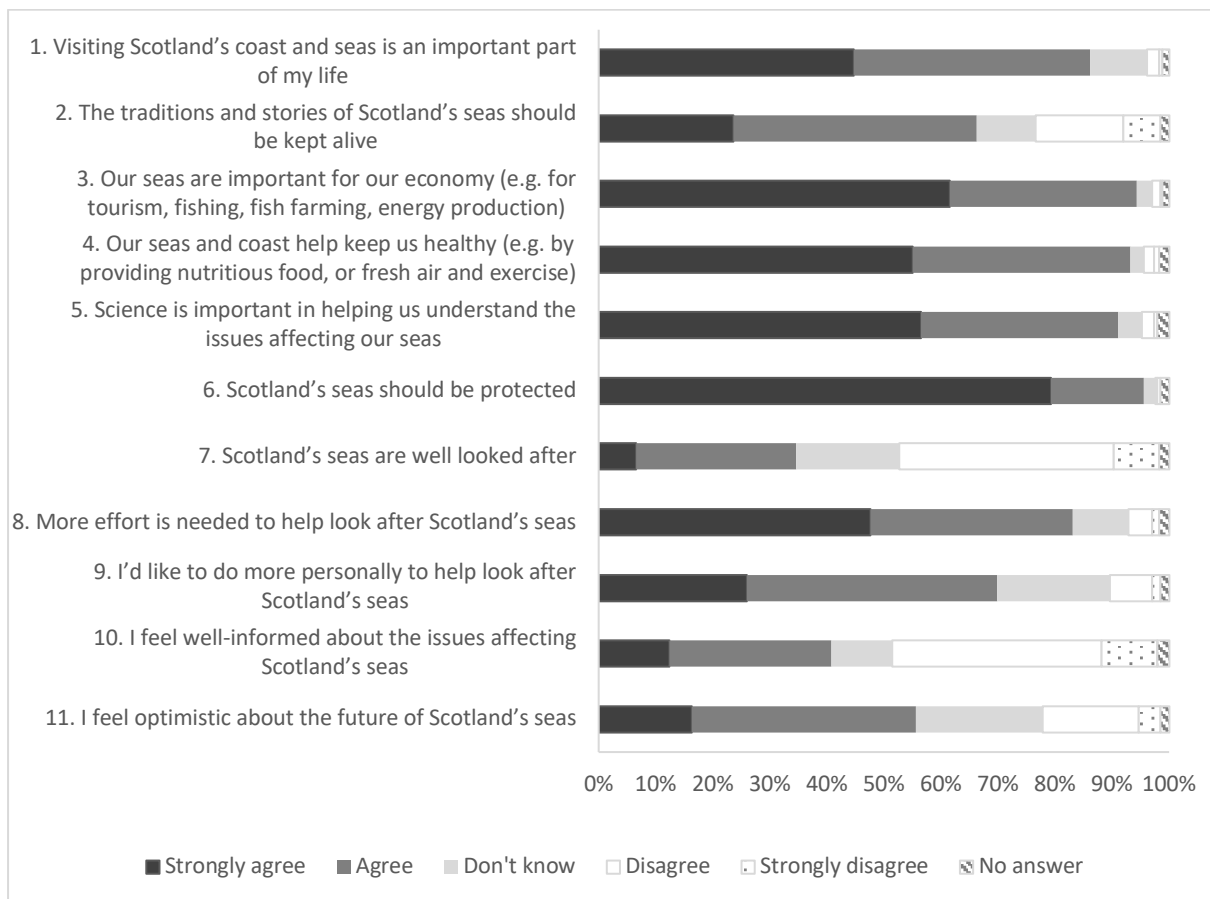
Figure 4. Percentage of responses to a multiple-selection question showing the views of 338 young people in Scotland surveyed in 2018 on how important Scotland's seas are, how well they feel they are protected and whether more needs to be done.

A Mann-Whitney U-test showed a significant difference between answers to statements 7 ('Scotland's seas are well looked after') and 8 ('More effort is needed to protect Scotland's seas') (w = 92,601, P < 0.001). This reflects the clear majority of answers suggesting that Scotland's seas are not well looked after and that more needs to be done (Figure 4).

3.2.3 Knowledge of threats to the marine environment
Respondents were asked, 'In your opinion, how important is it to address these challenges facing Scotland's seas and coastal communities?' and to respond on a Likert scale how strongly they agreed with a list of environmental, social and political issues relating to marine conservation in Scotland, with a free-text option to name other issues that concern them.
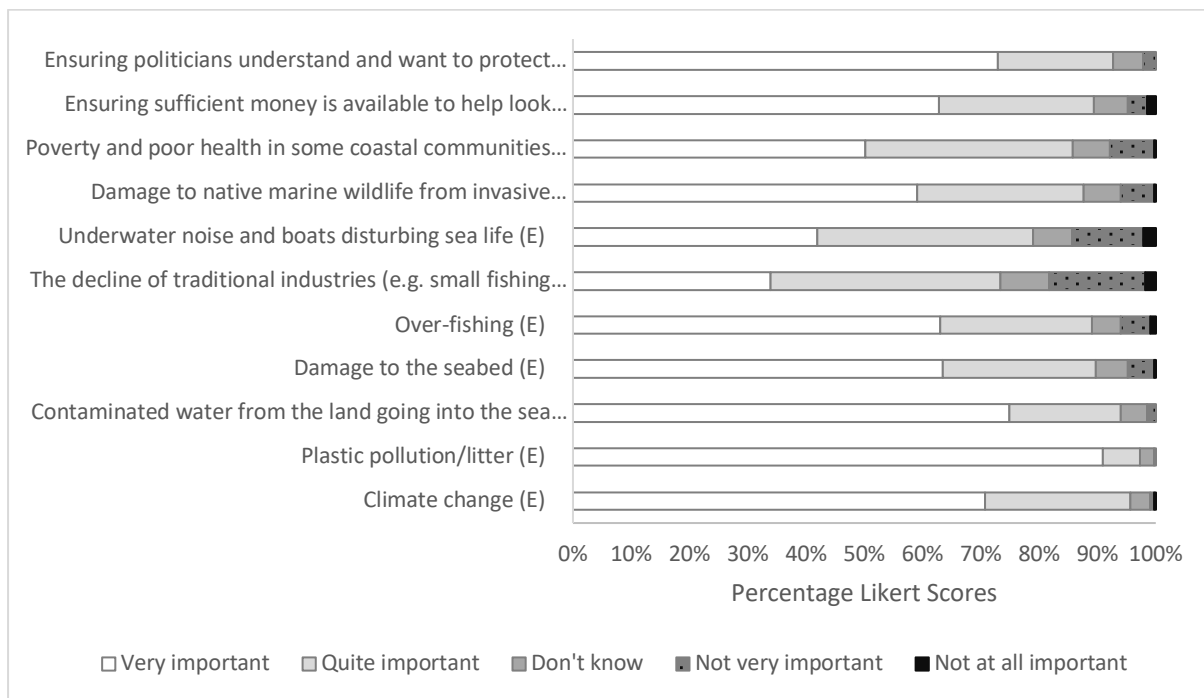
Figure 5. Percentage of responses to a multiple-selection question showing the views of 338 young people in Scotland surveyed in 2018 on environmental and social issues relating to Scotland's seas.

This question was answered by 329 respondents. Most responses (64.1%) considered that it is 'very important' or 'quite important' to address the environmental challenges presented in the survey (plastic pollution, climate change, contaminated water pollution, seabed damage, overfishing and invasive species). Plastic pollution received the most responses as 'very important' (90.9%), followed by contaminated water (74.92%) and climate change (70.7%).

A free-text box allowed respondents to identify other important issues. These included:

- Increasing public engagement in marine conservation,
- Improving marine literacy, including for non-coastal communities
- Ensuring environmental protections in a post-Brexit scenario
- Addressing the decay of coastal industrial landscapes
- Finding ways to protect the environment while supporting remote communities
- Environmental pollution (e.g. oil spills)
- Other development impacts (e.g. fish farming and offshore power generation)
- Fisheries by-catch and discards
- Improving access to the coast, (e.g. parking)
- Securing more funding for research

The average of the total scores of the responses on the Likert scale was greater for the environmental statements (146.93) than the social statements (84.13). An Aligned Ranks Transformation ANOVA showed that respondents feel significantly stronger about environmental issues than social issues (F = 26.96, P < 0.001, DF = 1). A significant difference was also found in the interaction between the importance of the statements (environmental and social) and the age group of the respondents (F = 6.88, P < 0.001, DF = 2). This indicates that young people consider both environmental and social issues less important as they get older.

3.3 How decisions about our seas are made

3.3.1 Views on the role of different organisations, groups and other stakeholders

In answer to the question, 'How much do you agree or disagree that the people/groups below should have a say in how Scotland's seas are used?', most agreed that all of the listed groups should have a say to some extent; responses are summarised in Figure 6. The highest proportions of respondents strongly agreeing that a group should have a role in decision making were for business interests (74.61%) and environmental groups (68.42%).
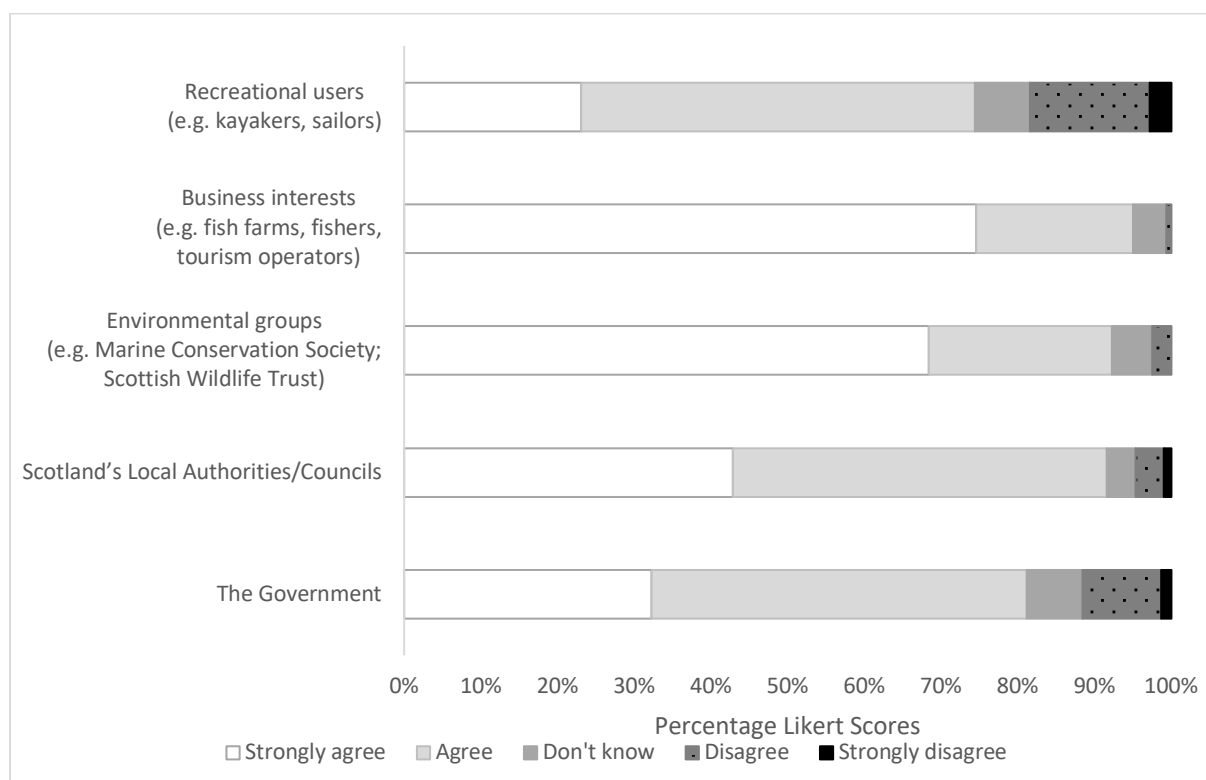

Figure 6. Percentage of responses to a multiple-selection question showing the views of 338 young people in Scotland surveyed in 2018 on which stakeholder groups or sections of civic society should be consulted on decision making in Scotland's seas.

However, an average of 15% respondents disagreed that the government (national) and recreational groups should have a role in decision making, with 11.73% respondents disagreeing or strongly disagreeing that the government should have a role and 18.83% having the same views for recreational users.

A free text box allowed respondents to identify other groups that should have say in decisions, and responses included:
- Young people
- Universities and scientific experts
- The EU and UK governments
- Community councils
- Tourists who visit our coasts
- Islanders

3.3.2 Experience of young people participating in formal decision-making processes
Respondents in all three age categories had a relatively low awareness of formal events about developments or proposals at sea (Figure 7a) and fewer have attended such an event (Figure 7b). Respondents in all age categories largely indicated they do not believe their views are well represented in decision making (Figure 7c), with the relative percentage of respondents with this opinion increasing with age (11–16 = 45%; 17–21 = 61.32%; 22–26 = 73.08%).

a)

b)

c)

d)
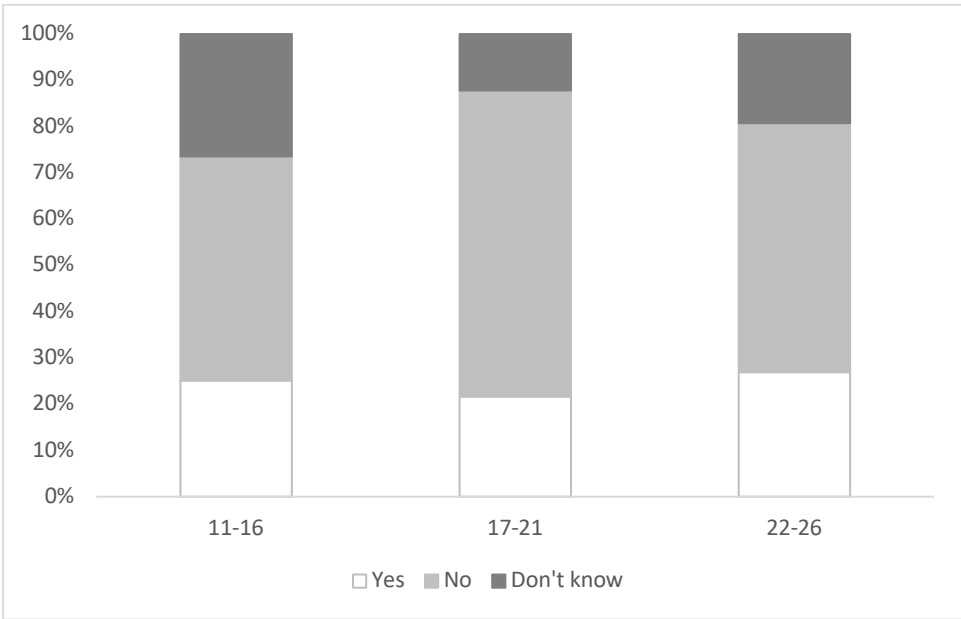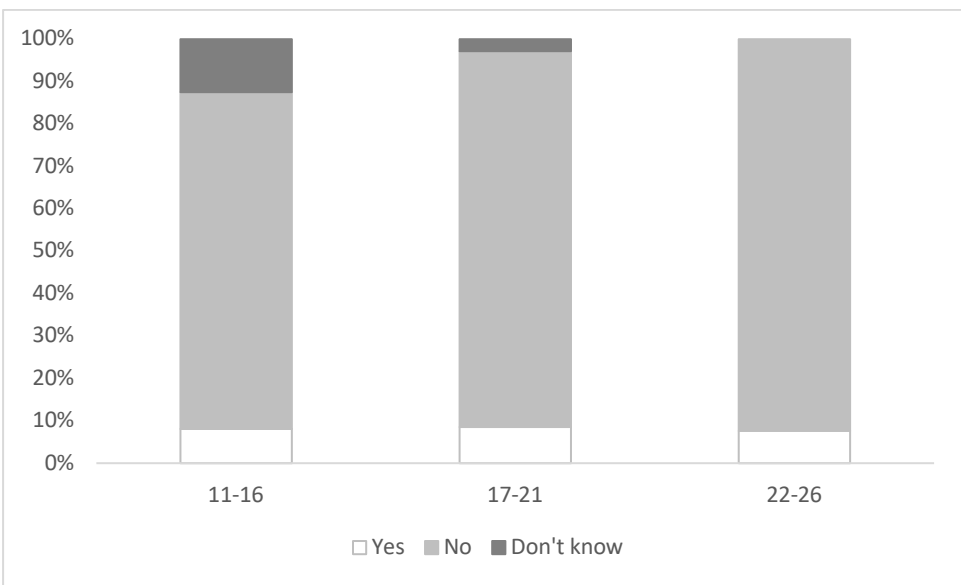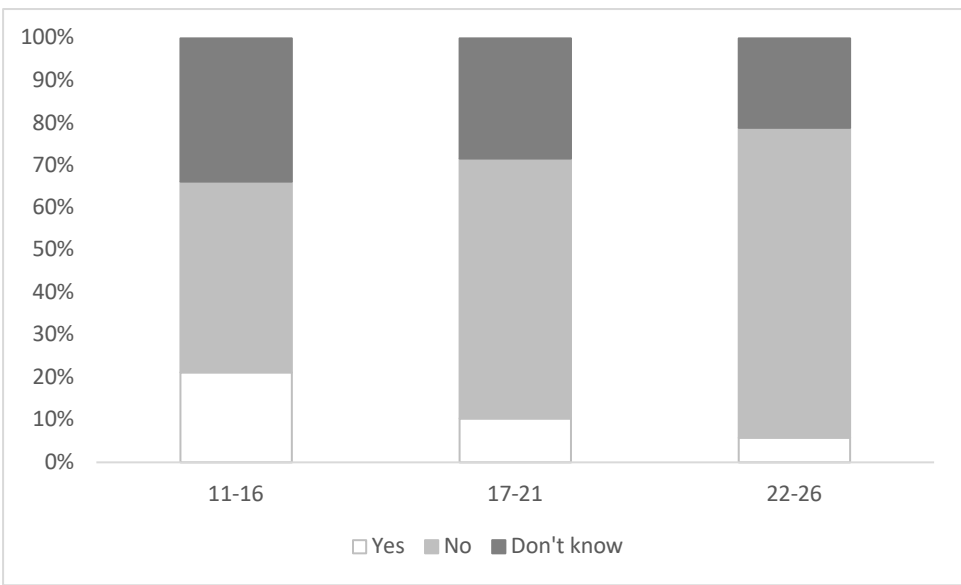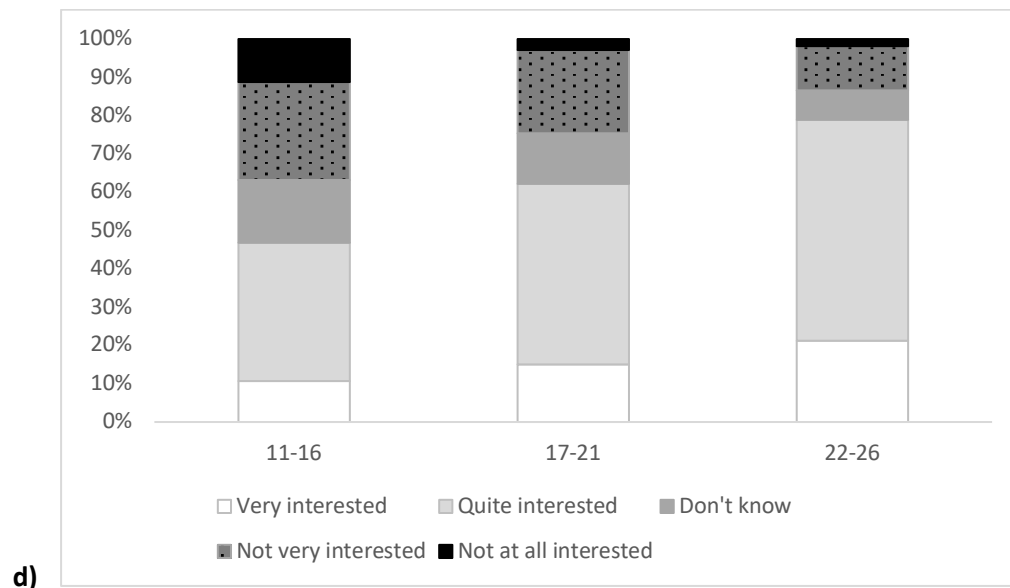
Figure 7. Responses to a) *Are you aware that events and meetings are sometimes held to enable members of the public and others to have a say about developments or proposals which might impact on Scotland's seas (e.g. meetings to discuss windfarm of fish-farm proposals; meetings to discuss Marine Protected Areas)?* b) *Have you ever attended an event or a meeting about a development or proposal that might have an impact on Scotland's seas (e.g. a meeting to discuss a windfarm or fish-farm proposal, a meeting to discuss a Marine Protected Area)?* c) *Do you think the views of young people on Scotland's seas are currently well represented when decisions are made?* and d) *How interested would you be in attending an event or meeting like this in future?*

The number of respondents indicating that they would be 'interested' or 'very interested' in attending events or meetings to discuss proposals or developments of the seas increased with age (11–16 = 46.88%; 17–21 = 62.26%; 22–26 = 78.85%).

The open question 'Have you any ideas for how the views of young people could be collected more effectively?' elicited 162 free-text responses, four of which were considered not relevant, and 101 respondents did not answer. The responses were grouped into themes, summarised as follows:

- More surveys (like this, but particularly aimed at schools)
- Keep voting age at 16
- Stronger role for Scottish Youth Parliament
- Social media, phone-apps and online forums
- Increasing awareness of issues to encourage engagement
- Public meetings, conferences and events only for young people

- Target junior members of sports or activity clubs (e.g. sailing)

- University societies and courses

- Youth employment opportunities (e.g. work experience in marine sectors or government departments)

- Wider advertisement of public events/meetings

- Offer incentives for participation (e.g. Young Scot Rewards)

3.4 Learning about Scotland's seas

Answers to the question, 'How easy is it to find the information you want about the health of Scotland's seas and how our seas are used?' suggest that information on Scotland's seas could be made easier for young people (very easy = 7.10%, quite easy = 34.91%, don't know = 30.47%, quite difficult = 20.41%, very difficult = 3.55%). In response to the question, 'Are you currently on a course of study or working in a job/placement related to the sea?', 32 respondents (9.47%) were studying a related course, 10 (2.96%) were in a related job and 285 (84.32%) were engaged in neither. The responses to this question are likely influenced the majority being school-aged, 11–16-year-olds. Of the 32 stating they were studying a related course, 6 were aged 11–16, and of the 10 who stated they were in a related job, 8 were 17 years old or over.

Eighty respondents were members of an eNGO, which can be a key regular source of information on environmental issues. As an indication of how such information might influence young people, 16% of respondents who said they had responded to a conservation campaign or petition were members of an eNGO, whereas almost 40% of respondents who had not engaged in a conservation campaign or petition were not members of such organisations. Whether respondents have not engaged in campaigns or petitions through lack of information or lack of inclination is unclear.

In response to the open question, 'Do you have any suggestions about the best way to share information about Scotland's seas with young people or to get more young people involved in helping to look after Scotland's seas?', 149 unique answers (out of 164 responses) were provided. A further 73 responses were disregarded as inappropriate or negative answers and 102 respondents did not answer the question. The majority referred to online internet-accessible materials (e.g. social media platforms, online videos).

Other suggestions are summarised as follows:
- School events and curriculum (including field trips and talks/presentations from experts)

- Television and adverts

- Practical action (e.g. beach cleans, volunteering opportunities)

- Incentives for learning about or participating in ocean-related issues or events (e.g. Young Scot Rewards)

- Youth conferences

- Non-technical summaries of scientific papers

- Schools 'sponsorship' of stretches of coast

- Posters, leaflets, regular newsletters and updates

- Providing young people with ocean-related jobs, apprenticeships or work experience

3.5 Demographic and experiential characteristics of respondents

The survey allows the demographic characteristics of respondents to be considered. The 23% of respondents that were members of environmental NGOs exceeds the 10% reported in a previous UK-wide NGO membership survey [47]. It could be assumed the survey introduces some over-representation of individuals already predisposed to have a pro-environment position on particular issues. NGO membership was relatively even across age groups: 11–16 = 7.69%, 17–21 = 8.58%, 22–26 = 7.40%. While 12.99% of respondents reported that they were involved in studies or a job related to the sea, the remaining 87% reported that they were unconnected to marine jobs or education. Promotion through Young Scot is considered to have facilitated broad outreach of the survey among young people across Scotland. Approximately 50% of respondents were aged between 11 and 16 years old, and it is debatable to what extent this younger age group have formed views based on their own experiences and expectations. Future studies should aim for larger sample sizes and interrogate responses by age band.

4. **Discussion**

The present study aimed to explore youth views on Scotland's seas and understand the current level of awareness and participation in decision making for the marine environment in Scotland. To collect a snapshot of youth perspectives and awareness, an online survey of young people (aged 11–26) in Scotland was held for two weeks in June 2018. The survey results suggest that young people are interested in the future of Scotland's seas and wish to influence decisions that affect it. The implications of these results are discussed here in the context of the growing appetite for public participation and youth involvement in environmental governance to identify methods to improve youth involvement in marine decision making.

4.1 Young people's views about Scotland's seas

Understanding people's views about the marine environment can provide insights into how to engage them in decision making [19] and develop future-proofed governance. The survey results demonstrate that young people value spending time at the coast and see it as an important space for recreation, leisure and social activities and an important activity to spark their interest in the sea. This was true for respondents regardless of distance from the coast. Previous research similarly indicates that young people focus on social activities [49] and social interactions within the natural environment [32]. Youth appreciation of the marine environment is a positive indication of potential interest that could be utilised to encourage active participation in marine decision making. Understanding the relationship of young people with the sea through visioning exercises can provide useful insights to guide decision-making processes, such as marine planning [49], although translating young people's interest and values into decision-making processes can be challenging when competing priorities come in to play. This is an important consideration when social and cultural benefits are not easily quantifiable [50, 51]. Undertaking sampling or role-play exercises could provide an opportunity to identify and explore young people's priorities and trade-offs in an experimental environment. Recognising young people as interested stakeholders in marine management processes is an important step to future-proofed governance.

Spending time at the coast can bring benefits for personal health and conservation [52]. Indeed, visiting the coast was considered an important pre-cursor to becoming interested in the sea by the most survey respondents. The frequency of visits [53] and level of interaction with ocean-related activities have been found to correlate with higher levels of knowledge about the marine environment [54]. Similarly, a UK study found that respondents with limited interaction with the coast had lower levels of knowledge and interest in the sea [55]. This suggests that interaction with the marine environment is an important step towards developing informed and engaged marine citizens in Scotland. Improving public access to the coast was highlighted as an important consideration for the future management of Scotland's seas, echoing the findings of the Clyde Marine Planning Partnership (CMPP) youth outreach project [49]. Although the majority of respondents reported visiting the coast at least once a month or more, the results indicate that access to the coast is not yet uniform with 8.6% of respondents reported never having visited the coast. The factors why people had not visited the coast were not explored in this survey. A positive correlation was found between distance from the coast and frequency of visits, with coastal visits concentrated along the eastern and western coast of the central belt. The most popular activities cited by respondents (>20%) are all easy access, low-tech and inexpensive, suggesting that young

people may face economic or physical barriers to access the coast and more can be done to specifically engage inland communities with the coast.

When considering methods to engage a diverse section of the population in the marine environment, schools provide a conduit to connect young people to the marine environment. Beach adoption was suggested by one participant as a means for schools to interact with an area of the coastline. Informal beach 'adoption' is possible through schemes such as the Marine Conservation Society's *Beachwatch* programme. This programme enables sustained interaction with a discreet area of coastline and increased opportunities to spend time at the coast, while also encouraging integration of marine education into the formal curriculum. With adequate resourcing to support schools to engage in such marine programmes, regardless of their location, could enable equal and sustained access to the coast. Improving public transport, disabled access, parking spaces, pedestrian access and green infrastructure have also been highlighted by young people to enable greater youth access to the coast [49]. Alternative interactive tools, such as visits to aquariums or using touch tanks, can also provide important learning opportunities [54]. Investment in public accessibility to the coast and participatory activities could go a long way to facilitate sustained engagement in the marine and coastal environment across a diverse section of Scotland's young people.

The survey results indicated concern among young people about the future of Scotland's seas. There was strong agreement that Scotland's seas should be looked after (95%) and more effort is needed to look after Scotland's marine environment (83%) indicating a shared concern among young people. The diverse views about how well Scotland's seas are currently looked after could be due to a lack of information about the full extent and impact of conservation measures and/or that the measures are considered insufficient. Securing political interest and science funding were also noted as important for the future of Scotland's seas, suggesting that young people would like more to be done to support marine conservation more broadly.

4.2 Opportunities to improve ocean literacy in Scotland

Improving ocean literacy, namely the ability to make informed and responsible decisions based on sound knowledge of the marine environment and its resources [20], is an important step towards effective marine stewardship and participation in marine decision making [56, 57]. Indeed, good stewardship of marine resources relies on an understanding of the challenges [58] and of the role of human behaviour in creating and resolving these challenges [19]. The survey results are indicative of

a general awareness of marine issues among young people in Scotland and the impact of humans on the ocean. Respondents demonstrated an understanding of and concern for both specific environmental issues (e.g. oil spills, the impacts of developments, fisheries by-catch) and contextual issues (e.g. legal protections, education, research funding).

The relative focus on plastic pollution identified in the survey, broadly reflects responses from perceptions surveys of adults and young people around the world where pollution has been consistently selected as an issue of greater concern than climate change [59, 60, 54]. Similarly, plastic pollution was considered the strongest indicator of marine health in a UK survey of adults [19]. The disconnect between public perceptions around climate change and the scientific community, who recognise it as the most pressing issue facing marine ecosystems, has been recognised [61]. The high visibility of plastic pollution in the coastal environment that is reflected in the media and through personal experience, both important information sources for the public [60, 62], may contribute to this focus on plastic pollution. Plastic pollution was prevalent in the news during the survey period following the BBC's *Blue Planet II* series and may have contributed to the strong agreement that plastic pollution is an important issue facing Scotland's seas. Additionally, Stafford and Jones argue that the ability to address plastic pollution through personal lifestyle choices and technical fixes may lead to the perception that it is more important than larger marine issues [63]. The results highlight the need to improve the knowledge of ocean science and relative importance of issues facing the marine environment.

Ensuring shared access to ocean science is an important step to towards an ocean-literate citizenry [54]. The survey results underline the need to improve access to information about Scotland's marine environment: over a third of respondents did not feel well informed about the issues affecting Scotland's seas and there was notable disparity in the ease of access to information among respondents. De Santo [6] notes that making communication accessible to a public audience can be just as important as the volume and content of information provided. It is likely that respondents who are undertaking a maritime internship, job or education and those with environmental NGO membership are likely to have greater access to information. 50% of respondents were aged 11–16 years suggesting that more could be done to improve awareness within this age group in particular. Integrating marine science into school curriculum in Scotland could help to disseminate this information to a broad range of young people across Scotland, echoing previous calls to address ocean science within formal education [24, 64, 65]. Generating youth-specific content such as plain-

English summaries of scientific papers, and youth-specific information resources would help to ensure that information is provided in a way that is meaningful for young audiences.

Improving sign posting of existing initiatives and platforms could also go far to help young people access a broader range of information sources. Indeed, social media platforms provide a means for the public to access information directly from scientific sources, such as marine scientists and marine education centres [56]. Additionally, apps, magazines, television and adverts provide means through which to share such youth-specific ocean content. School events, youth conferences and volunteering opportunities were identified as knowledge-sharing opportunities in the survey. Engagement processes can also provide experience and education opportunities to inform decision making [5]. Regularly involving young people in decision-making processes would present important opportunities to ensure that they are well informed and their concerns are understood. Further, producing information about marine decision making that is understandable for young people can also confer the additional benefit of making this information more accessible to the public [32].

Respondents also demonstrated an awareness of the need to balance societal, economic and environmental needs. In particular, respondents noted the cultural value of Scotland's seas, the importance of keeping traditions and stories alive, and addressing the decline of traditional industries. Traditional industries, primarily fishing, have played an important historical role in the development of Scotland's culture and economy. The past 50 years have seen declines in Scotland's fishing stocks and active fleets [66] as a result of human-induced environmental changes. Respondents recognised the need to balance environmental protection with the needs of remote communities and felt more strongly about environmental issues than cultural values. Young people tend to display more openness to new ideas and experiences than older generations [67] and can be an important driver of social change through their openness learning [68]. Diversifying the business base of remote coastal communities has been noted as important to increase their resilience to change [69]. Young people's acceptance of change could be a significant factor in supporting the transition toward the more sustainable use of marine resources, and including them in decision making provides an opportunity to support the shift to more resilient marine economies.

4.3 Improving youth awareness and level of participation in marine decision-making
Diverse stakeholder involvement is fundamental for meaningful public participation [18, 41]. Balanced representation of society's interests is challenging, with many individuals not being part of a formal grouping or a representative body [70, 71]. Survey respondents felt that a wide cross

section of society should be involved in decision making, including young people, academics, community councils, tourists and islanders. Most respondent supported the role of central government while others suggest local democracy and community input could be prioritised. The high agreement that business interests and environmental groups should be involved in decision making reflects the respondents' desire to incorporate diverse needs and interests.

The challenge of representation also applies to young people who have been identified as a missing stakeholder in UK Coastal Partnerships, which are regional forums for marine decision making [72]. Though several survey respondents did not feel adequately represented as a stakeholder group, there was a high level of interest from respondents, although they had a low awareness of formal events where they could take part in decision making. This indicates that more effort is required to create opportunities and raise awareness of decision-making processes among young people to encourage their participation. Wide advertisement of opportunities across diverse media, such as through social groups (e.g. sports clubs, schools and universities) and online tools, as well as incentives such as the Young Scot Rewards scheme will be required to encourage participation from a wide range of socio-demographic backgrounds. Youth employment opportunities and maintaining the voting age at 16 could also encourage youth participation in formal decision-making processes. Additionally, youth-led action groups such as the Scottish Youth Parliament and Climate 2050 group, provide avenues through which to solicit and represent young people's views.

Online forums, social media, surveys and smartphone apps were all proposed by respondents as methods to engage young people, with young people considered sufficiently 'tech-savvy' for such tools [73]. Social media platforms enable citizen participation, allowing participants from a broad geographic area to contribute in a sustained manner [74]. Technology can facilitate information sharing and capture through the use of visual information, virtual environments and games [75] and a space for individuals to interact with each other to gain new insights [74]. Online citizen-science engagement tools have emerged to readily engage the public, including young people, in data collection for the marine environment (e.g. *Seagrass Spotter*[10], *Marine LitterWatch*[11], *iNaturalist*[12], *CoastXplore* App[13]). The *Marine Spatial Planning Game*, a web-based, role-playing tool trialled in the Clyde Schools project for marine planning, enabled students to explore the process of marine

---

[10] https://seagrassspotter.org (accessed 02/09/19)
[11] https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/marine-litterwatch (accessed 02/09/19)
[12] https://www.inaturalist.org (accessed 02/09/19)
[13] https://www.capturingourcoast.co.uk (accessed 02/09/19)

planning in the context of a fictional geography [49], helping to create dialogue and appreciation of the deliberation process. However, a reliance on online forums for youth participation may disadvantage individuals and communities with limited access to the Internet. Digital connectivity is still an issue in remote communities in Scotland, although action is being taken to address this [76]. The implementation of web-based participation methods should, therefore, be considered carefully, potentially as a part of broader engagement processes [77].

4.4 Methods to improve the nature of youth involvement

The nature of existing decision-making processes and their suitability for meaningful youth involvement requires consideration. Young people are likely to experience additional barriers to participation that are unique to their age group. These include limited financial resources for sustained attendance [3] and feeling uncomfortable participating in formal meetings [31]. Decision-making processes that seek to involve young people should, therefore, be designed to meet the needs of the age group [78, 31]. The present study did not consider different socio-demographic groups within the 11–26 age range. However, a survey of secondary school students in Scotland found that girls, young people with health conditions and older students showed greater awareness of barriers to feeling heard or having their views acted upon [79]. Creating opportunities that facilitate peer-to-peer discussion and decision making, for example, in a classroom context, can encourage young people to collectively negotiate to reach joint decisions in an environment that is truly empowering for the participants [22, 31, 80].

There is scope to go beyond traditional arrangements to seek young people's perspectives and create empowering opportunities for young people to be formally integrated into decision making for Scotland's seas. Public participatory processes can be designed as enabling environments for youth participation with space and time for young people to learn, debate issues and explore individual and collective priorities. Public consultation and stakeholder engagement (e.g. for marine protected areas, marine planning and specific development decisions) typically involves online consultation responses, public information meetings and national stakeholder workshops [41]. The authors suggest that organisers tailor the design of events to the circumstances likely to provide the best conditions for youth participation. Youth-specific events, such as public meetings and conferences proposed by survey respondents, could be adopted to explore competing and collective youth views. The development of marine plans with sessions focused on understanding young people's perspectives and priorities could be one such opportunity. In order for young people to feel empowered through their participation, it is important that youth-specific sessions should have clear

links to the formal process, involve important figures of authority and have clear channels for feedback [31]. Adequate resourcing to increase the number of young participants that can be involved and supported sustained interaction between young people and authorities will be required to improve the nature of youth involvement.

A fundamental shift in societal expectations of the role of young people in society and the role of decision makers may be needed in order to enable meaningful participation of young people in decision making. Though perhaps more challenging, it is important that young people are invited into traditional spheres of power to address the current imbalance. Power dynamics play an important role in public-participatory processes and are likely to be amplified for young people in mixed-age-group sessions. Wright [2] notes that a power shift is required to create a shared learning space and enable meaningful youth participation in events traditionally designed for adults. Aston and Lambert [22] invite decision makers to move beyond tokenistic processes where young people are invited to 'hear and, one sometimes suspects, *agree* with decisions that have been made by the key adults around them' to focus on creating a positive decision-making context (p. 42). Inviting adults into events designed for young people and spheres where young people typically hold more social power, may help to address this power imbalance.

5. Conclusions and recommendations

The themes explored in this paper provide a starting point for improved participation of young people in decision making for the marine environment in Scotland and can be applied to decision making more broadly. Significantly, young people are interested in the future of Scotland's seas and wish to influence decisions that affect it. There is a need to improve ocean literacy through the quantity, quality and accessibility of information to young people on the state of Scotland's seas to encourage marine stewardship. This can be supported through the integration of ocean content into school curriculums and media campaigns, but also crucially by involving young people in decision-making processes, as well as supporting schools and youth groups to take an active role in marine stewardship. Additionally, there is scope for investment in a greater diversity of activities that encourage young people to spend time at the coast and greater effort to connect inland communities to the coast. Collectively, these efforts could improve young people's understanding of the relative significance of issues facing the marine environment and increase their confidence to participate in decision-making processes.

Marine planning provides a unique opportunity to capture and integrate young people's perspectives and priorities early in the planning process, which can start to support a broader shift towards the inclusivity of public process and an expectation for long-term, sustainable outcomes for future generations. Additionally, the formation of a joint youth focus group between, for example, the Scottish Youth Parliament and youth networks such as the Climate 2050 Group, could increase access points to engage with a diverse range of young people. This could spread the burden of proactive participation with the Scottish Government and other authorities from these groups, enabling sustained youth engagement beyond discreet participation events.

The authors provide the following recommendations for youth participation in decision making for the marine environment:

- The development of marine plans with youth-specific sessions focused on understanding young people's perspectives and priorities and clear links and feedback to the formal process.
- Adequate resourcing to improve the nature of youth involvement and enable sustained interaction between young people and authorities.
- More broadly, public participatory processes that are designed to be enabling environments for youth participation are encouraged, with space and time for young people to learn, debate issues and explore individual and collective priorities.
- Youth-engagement processes should consider how to provide sufficient information in a way that can be easily understood to ensure that young participants feel confident to fully participate and are able to make informed decisions.
- Wide advertisement of opportunities for young people to take part in decision-making processes across diverse media. This includes engagement through social groups (e.g. sports clubs, schools and universities) and online tools to encourage participation from a wide range of socio-demographic backgrounds.

5.1 Future research
Several avenues for further research have been identified. In particular, remaining questions around why some respondents had never visited the coast should be explored as a significant step to improve ocean literacy across Scotland's young people. Furthermore, the differences in perception of how well Scotland's seas are looked after, young people's perspectives of different governance mechanisms and conservation measures, and young people's relative priorities for the marine environment would benefit from further investigation. Future studies could also consider a longer

response period, and consider adapting the survey content or format to enable responses from younger age groups. A significant avenue for additional research will be continued assessment and application of methods to integrate young people's views into decision-making processes, such as marine planning, with a focus on addressing existing power imbalances. More broadly, assessment of tools to maintain the cultural identity that originates from traditional industries while enabling coastal communities and maritime industries to adapt to changing environmental and policy conditions are recommended. Furthermore, the authors propose an examination of the distinction between knowledge and interest in the marine environment, as precursors to active and engaged marine citizens.

References

[1] UN Sustainable Development Goals <https://www.un.org/sustainabledevelopment/youth/>. (accessed 23 July 2019)

[2] L.H.V. Wright, Creating space for children and young people's engagement in international conferences, The International Journal of Human Rights, 21 (1) (2017) 47-58. DOI: 10.1080/13642987.2016.1248123.

[3] H. Thew, Youth Participation and agency in the United Nations Framework Convention on Climate Change, International Environmental Agreements, 18 (2018) 369-389. DOI:/doi.org/10.1007/s10784-018-9392-2.

[4] P. Bishop, G. Davis, G., Mapping public participation in policy choices, Australian Journal of Public Administration, 61 (2002) 14–29. DOI: 10.1111/1467-8500.00255.

[5] M.S. Reed, Stakeholder participation for environmental management: a literature review, Biological conservation, 141 (10) (2008) 2417-2431.

[6] E.M. De Santo, Assessing public "participation" in environmental decision-making. Lessons learned from the UK Marine Conservation Zone (MCZ) site selection process, Marine Policy, 64 (2016) 91-101. https://doi.org/10.1016/j.marpol.2015.11.003

[7] E. E. Brooker, C. R. Hopkins, E. Devenport, L. Greenhill, C. Duncan, Civil society participation in the Scottish marine planning process and the role of Environmental Non-Governmental Organisations, Journal of Environmental Planning and Management, (2019) 1-23. DOI: https://doi.org/10.1080/09640568.2018.1532876.

[8] Aarhus Convention < https://ec.europa.eu/environment/aarhus/legislation.htm> (accessed 29/07/19)

 [9] E. Ho, A. Clarke, I. Dougherty, Youth-led social change: Topics, engagement types, organizational types strategies and impacts, Futures, 67 (2015) 52-62.

[10] H.K. Lotze, M. Coll, A.M. Magera, C. Ward-Paige, L. Airoldi, Recovery of marine animal populations and ecosystems, Trends in Ecological Evolution, 26 (2011) 595-605.

[11] Citizenlab, What is the Difference between Citizen Engagement and Participation? 2017. <https://www.citizenlab.co/blog/civic-engagement/what-is-the-difference-between-citizen-engagement-and-participation>. (Accessed 28 July 2019).

[12] M. Gopnik, C. Fieseler, L. Cantral, K. McClellan, L. Pendleton, L. Crowder, Coming to the table: early stakeholder engagement in marine spatial planning, Marine Policy, 36 (5) (2012) 1139–1149. DOI: 10.1016/j.marpol.2012.02.012

[13] *G.* Smith, Good governance and the role of the public in Scotland's marine planning system, Marine Policy, 94 (2018) 1-9. DOI:10.1016/j.marpol.2018.04.017.

[14] S.R. Arnstein, A Ladder Of Citizen Participation, Journal of the American Planning Association, 35 (4) (1969) 216-224. DOI: 10.1080/01944366908977225.

[15] J. Kearney, F. Berkes, A. Charles, E. Pinkerton, M. Wiber, The role of participatory governance and community-based management in integrated coastal and ocean management in Canada, Coastal Management 35 (2007) 79–104.

[16] E. Jupp, Participation, Participation, local knowledge and empowerment: researching public space with young people, Environment and Planning, 39 (2007) 2832-2844. DOI: 10.1068/a38204.

[17] M. Voyer, W. Gladstone, H. Goodall, Methods of social assessment in Marine Protected Area Planning: is participation enough? Marine Policy, 36 (2012) 432-439. DOI: 10.1016/j.marpol.2011.08.002.

[18] E. McKinley, S. Fletcher, Individual responsibility for the oceans? An evaluation of marine citizenship by UK marine practitioners, Ocean and Coastal Management, 53 (2012) 379–384.

[19] R. Jefferson, E. McKinley, S. Capstick, S. Fletcher, H., Griffin, M. Milanese, Understanding audiences: Making public perceptions research matter to marine conservation, Ocean and Coastal Management, 115 (2015) 61-70.

[20] COSEE (Centers for Ocean Sciences Education Excellence). Ocean literacy: the essential principles and fundamental concepts for learners of all ages. Pamphlet resulting from the 2-

week on-line workshop on ocean literacy through science standards; published by the National Geographic Society, National Oceanic and Atmospheric Administration, National Marine Educators Association, College of Exploration, 2013. <http://www.coexploration.org/oceanliteracy/documents/OceanLitChart.pdf > (Accessed 24 April 2020).

[21] I.S. Gersch, Involving children in assessment. Educational and Child Psychology, 13 (2) (1996) 31–40.

[22] H.J. Aston, N. Lambert, Young people's views about their involvement in decision-making, Educational Psychology in Practice, 26 (1) (2010) 41-51. DOI: 10.1080/02667360903522777.

[23] R. Parnell, M. Patsarika, Young people's participation in school design: exploring diversity and power in a UK governmental policy case-study. Children's Geographies. 9 (3-4) (2011) 457-475. DOI: 10.1080/14733285.2011.590715.

[24] R. Ballantyne, J. Packer, Teaching and learning in environmental education: developing environmental conceptions, Journal of Environmental Education, 27 (2) (1996) 25–33.

[25] R. Ballantyne, J. Fien, J. Packer, School environmental education program impacts upon family learning: a case study analysis, Environmental Education Research, 7 (1) (2001) 22–37.

[26] T. Loughland, A. Reid, P. Petocz, Young People's Conceptions of Environment: A phenomenographic analysis, Environmental Education Research 8 (2) (2002) 187-197. DOI: 10.1080/13504620220128248.

[27] T. A. Barbas, S. Paraskevopoulos, A.G. Stamou, The effect of nature documentaries on students' environmental sensitivity: a case study, Learning, Media and Technology, 34 (1) (2009), 61-69. DOI: 10.1080/17439880902759943.

[28] H. Guest, H.K. Lotze, D. Wallace, Youth and the sea: ocean literacy in Nova Scotia, Canada. Marine Policy, 58 (2015) 98–107.

[29] C. L. Chen, C. H Tsai, Marine environmental awareness among university students in Taiwan: a potential signal for sustainability of the oceans, Environmental Education Research, 22 (7) (2016) 958-977. DOI: 10.1080/13504622.2015.1054266

[30] S.J Wilson, C. Snell, 'Bad for the penguins ... because they need ice and that to live on': an exploratory study into the environmental views, concerns and knowledge of socially disadvantaged young people, Journal of Youth Studies, 13 (2) (2010) 151-168. DOI: 10.1080/13676260903233704.

[31] V. Derr, E. Tarantini, "Because we are all people": outcomes and reflections from young people's participation in the planning and design of child-friendly public spaces, Local Environment, 21 (12) (2016) 1534-1556. DOI: 10.1080/13549839.2016.1145643.

[32] J.L. Powers, J.S. Tiffany. Engaging Youth in Participatory Research and Evaluation, Public Health Management Practice, November (Suppl) (2006) 79- 87.

[33] Scottish Youth Parliament <www.syp.org.uk/about_syp>. (Accessed 14 June 2019)

[34] S.J. Wilson, Schooling for democracy: issues on student participation, Youth Studies Australia, 19 (2) (2000) 25-31.

[35] Community Empowerment (Scotland) Act 2015 < http://www.legislation.gov.uk/asp/2015/6/contents>

[36] Island (Scotland) Act 2018 < http://www.legislation.gov.uk/asp/2018/12/enacted>

[37] Planning (Scotland) Act 2019 <http://www.legislation.gov.uk/asp/2019/13/contents/enacted>

[38] Scottish Crown Estate Bill 2019

<https://www.parliament.scot/parliamentarybusiness/Bills/107415.aspx>

[39] R. Kelly, G.T. Pecl, A., Fleming, Social license in the marine sector: A review of understanding and application, Marine Policy, 81 (2017) 21-28.

[40] F. Berkes, From community-based resource management to complex systems: the scale issue and marine commons, Ecology and Society, 11 (1) (2006) 45.

[41] G. Smith, Jentoft, S., Marine spatial planning in Scotland. Levelling the playing field? Marine Policy, 84 (2017) 33-41. DOI: 10.1016/j.marpol.2017.06.024.

[42] Youth 2030: The United Nations Strategy on Youth <https://www.un.org/youthenvoy/youth-un/> (Accessed 28 June 2019).

[43] Year of Young People, 2018 < https://young.scot/yoyp2018/yoyp-articles/what-is-year-of-young-people/ > (Accessed 28 June 2019).

[44] Sea Scotland 2018 Empowerment in Marine Stewardship: Emerging opportunities for citizens and communities in Scotland 20-21st June 2018 Conference Report, 2018. <http://www.seascotland.scot/wp/wp-content/uploads/2018/10/SS18-conference-report-1.pdf> (Accessed 28 June 2019).

[45] Cvitanovic, C., Putten, E.I., Hobday, A.J., Mackay, M., Kelly, R., McDonald, J., Waples, K. and Barnes, P. Building trust among marine protected area managers and community members through scientific research: Insights from the Ningaloo Marine Park, Australia. Marine Policy, 93 (2018) 195-206. DOI: 10.1016/j.marpol.2018.04.010.

[46] R Core Team, R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria, 2019. <https://www.R-project.org/>

[47] QGIS Development Team, QGIS Geographic Information System. Open Source Geospatial Foundation Project, 2019. <http://qgis.osgeo.org>

[48] National Records of Scotland <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/vital-events/general-publications/vital-events-reference-tables/2017/section-1-summary> (Accessed 09 September 2019).

[49] C. Paris, Clyde Schools Engagement Project: Final Report. Exploring coastal community visions of young adults, The Clyde Marine Planning Partnership, 2018.
<https://www.clydemarineplan.scot/wp-content/uploads/2018/03/Clyde-Schools-Engagement-Final-Report.pdf> (Accessed 24 June 2019).

[50] A.I. Milcu, J. Hanspach, D. Abson, J. Fischer, Cultural ecosystem services: a literature review and prospects for future research, Ecology and Society, 18 (3) (2013) 44. DOI: 10.5751/ES-05790-180344.

[51] S. Sanna, P. Eja, Recreational cultural ecosystem services: How do people describe the value? Ecosystem services, 26 (2017) 1-9. DOI: 0.1016/j.ecoser.2017.05.010.

[52] K.J. Wyles, S. Pahl, R. Thompson, Perceived risks and benefits of recreational visits to the marine environment: Integrating impacts on the environment and impacts on the visitor, Ocean and Coastal Management, 88 (2014) 53-63. DOI: 10.1016/j.ocecoaman.2013.10.005.

[53] B.S. Steel, C., Smith, L. Opsommer, S., Curiel, R., Warner-Steel. Public ocean literacy in the United States. Ocean Coastal Management, 48 (2) (2005) 97–114. DOI: https://doi.org/10.1016/j.ocecoaman.2005.01.002

[54] H. Guest, H.K. Lotze, D. Wallace, Youth and the Sea, Marine Policy, 58 (2005) 98-107. DOI: http://dx.doi.org/10.1016/j.marpol.2015.04.007

[55] R.L. Jefferson, I. Bailey, D. Laffoley, J.P. Richards, M.J. Attrill Public perceptions of the UK marine environment. Marine Policy 43 (2014) 327–337. DOI: https://doi.org/10.1016/j.marpol.2013.07.004

[56] G. Fauville, S. Dupont, S. von Thun, J. Lundin. Can Facebook be used to increase scientific literacy? A case study of the Monterey Bay Aquarium Research Institute Facebook page and ocean literacy. Computers and Eduction, 82 (2015) 60-73. DOI: http://dx.doi.org/10.1016/j.compedu.2014.11.003

[57] McKinley E, Fletcher S. Individual responsibility for the oceans? An evaluation of marine citizenship by UK marine practitioners Ocean Coastal Management 2010;53 (7):379–84. https://doi.org/10.1016/j.ocecoaman.2010.04.012

[58] S. Fletcher, J. Potts, Ocean Citizenship: An Emergent Geographical concept, Coastal Management, 35 (4) (2007) 511-524. DOI: 10.1080/08920750701525818.

[59] T. Potts, C. pita, T. O'Higgins, L. Mee, Who cares? European attitudes towards marine and coastal environments, Marine Policy, 72 (2016) 59-66. http://dx.doi.org/10.1016/j.marpol.2016.06.012

[60] H.K. Lotze, H. Guet, H., J. O'Leary, A. Tuda, D. Wallace, Ocean and Coastal Management, 152 (2018) 14-22. DOI: https://doi.org/10.1016/j.ocecoaman.2017.11.004.

[61] J. Chilvers, I. Lorenzoni, G. Terry, P. Buckley, J. Pinnegar, S. Gelcich, Public engagement with marine climate change issues: (Re)framings, understandings and responses, Global Environmental Change, 29 (2014) 165-179. DOI:10.1016/j.gloenvcha.2014.09.006

[62] S. Gelcich , P. Buckley, J. Pinnegar, J. Chilvers, I. Lorenzoni, G. Terry, M. Guerrero, J.C. Castilla, A. Valdebenito, C.M. Duarte. Public awareness, concerns and priotities about anthropogenic impacts on marine environments. Proceedings of the National Academy of Sciences of the United States of America. 111 (42) (2014) 15042-15047. DOI: doi/10.1073/pnas1417344111.

[63] Stafford, R. and P. J. S. Jones (2019). "Ocean plastic pollution: A convenient but distracting truth?" Marine Policy 103: 187-191. https://doi.org/10.1016/j.marpol.2019.02.003

[64] Cummins S, Snively G. The effect of instruction on children's knowledge of marine ecology, attitudes toward the ocean, and stances toward marine resource issues. Journal of Environmental Education, 5(1) (2000) 305–24.

[65] Brody MJ, Koch H. An assessment of 4th-, 8th-, and 11th-grade students' knowledge related to marine science and natural resource issues. Journal of Environmental Education (1990)21(2):16–26.

[66] S.P.R. Greenstreet, A.M. Shanks, B.E. Buckett, Trends in fishing activity in the North Sea by UK registered vessels landing in Scotland over the period 1960 to 1998. Fisheries Research Services Collaborative Report No 02/06, 2006.

[67] I. Cornelis, A. van Hiel, A. Roets, M. Kossowska, Differences in Conservatism: Evidence on the Mediating Effects of Personality and Cognitive Style, Journal of Personality, 77 (1) (2009) 51-88. DOI:10.1111/j.1467-6494.2008.00538.

[68] A. Acerbi, S. Girlanda, M. Enquist, Old and Young Individuals' Role in Cultural Change, Journal of Artificial Societies and Social Simulation, 15 (4) 1 (2012) DOI: 10.18564/jasss.2023

[69] S.M. Stead, Changes in Scottish coastal fishing communities – Understanding socio-economic dynamics to aid management, planning and policy, Ocean and Coastal Management, 48 (9-10) (2005) 670-692. DOI:10.1016/j.ocecoaman.2005.08.001.

[70] B. Maguire, J. Potts, S. Fletcher, Who, when, and how? Marine planning stakeholder involvement preferences - A case study of the Solent, United Kingdom, Marine Pollution Bulletin, 62 (2011) 2288–2292.

[71] P. Gazzola, M. H. Roe, P. J. Cowie. Marine spatial planning and terrestrial spatial planning: reflecting on new agendas, Environment and Planning C: Government and Policy, 33 (2015) 1156–1172. DOI: https://doi.org/10.1177/0263774X15612317

[72] S. Fletcher, Stakeholder representation and the democratic basis of coastal partnerships in the UK, Marine Policy, 27 (2003) 229-240. doi:10.1016/S0308-597X(02)00085-4.

[73] D. A. Padgett, Technological methods for improving citizen participation in locally unacceptable land use (LULU), Decision making, Computers, Environment and Urban Systems, 17 (6) (1993) 513–520.

[74] J. Evans-Cowley, J. Hollander, The New Generation of Public Perception: Internet-based Participation Tools, Planning Practice and Research. 25 (3) (2010) 197-408.
https://doi.org/10.1080/02697459.2010.503432

[75] E. Gordon, S. Schirra, J. Hollander, Immersive Planning: A Conceptual Model for Designing Public Participation with New Technologies, Environment and Science Planning B: Urban Analytics and City Science, 38 (3) (2011) 505-519. DOI:https://doi.org/10.1068/b37013

[76] UK Parliament, Digital Connectivity in Scotland Report, published 13 July, 2018 < https://publications.parliament.uk/pa/cm201719/cmselect/cmscotaf/654/65402.htm>

[77] O. Devisch, Should planners start playing computer games? Arguments from SimCity and Second Life, Planning Theory and Practice, 9 (2) (2008) 209–226.
https://doi.org/10.1080/14649350802042231

[78] C. Freeman, K. Nairn, J. Sligo, 'Professionalising' participation: from rhetoric to practice, Children's Geographies, 1 (1) (2003) 53–70.   DOI:10.1080/14733280302182

[79] Scottish Government IPS Group, Children, Education and Skills. Young People's participation in decision making in Scotland: Attitudes and Perceptions, 2018. <https://publicinformationonline-com.ezproxy.is.ed.ac.uk/download/172656 >. (Accessed 3 September 2019).

[80] R. Hart, Children's participation. From tokenism to citizenship. Florence: UNICEF International Child Development Centre, 1992. < https://www.unicef-irc.org/publications/pdf/childrens_participation.pdf> (Accessed 28 July 2019).