

This work is protected by copyright and other intellectual property rights and duplication or sale of all or part is not permitted, except that material may be duplicated by you for research, private study, criticism/review or educational purposes. Electronic or print copies are for your own personal, non-commercial use and shall not be passed to any other individual. No quotation may be published without proper acknowledgement. For any other use, or to quote extensively from the work, permission must be obtained from the copyright holder/s.

**Art and music as a means to  
communicate climate change issues to  
the general public**

*Francesca Evans*

**This thesis is submitted for the degree of Master of  
Philosophy**

**School of Geography, Geology and the Environment**

**Keele University**

**July 2016**

## **Abstract**

Climate change is a pressing global issue, but attempts to communicate climate change have not always been successful in engaging the public. This project aims to develop art and music as alternative methods of communication, instead of traditional science communication. Despite abundant research into the ineffectiveness of traditional science communication, research into alternative methods is limited. The inter-relationship between geography and art is widely recognised, but, research on its application to communicate current global issues is insufficient.

By means of systematic review, this project assesses academic research and projects conducted by climate change artists. Methods that both the research and the artists deemed effective for communication were drawn out and composed into a template. This template was then used to further develop four artists' projects previously assessed in the review. The artist's projects were modified and adapted as case studies to adhere to the template. The template was then reassessed and tested through an original project as an example of how the template could be applied to climate change communication. The template is designed to be used as a guide for those actively trying to communicate climate change issues to the general public. The template aims to help communicators create artwork that is both effective and engaging.

This project discovered that alternative methods of communication, especially art and music, can be effective as a new means of communicating climate change and should not be overlooked. It was found effective communication should not use fear to represent climate change and should use a combination of methods. There should also be assurance that the communication is trustworthy and appropriate for the intended target audience. An

explanation is also provided as to why traditional methods of communication appear ineffective, and how these methods can be adapted to engage the public.

## **Acknowledgements**

*Firstly, I would like to express my sincere gratitude to my lead supervisor Dr Peter Knight for the continuous support of my MPhil study and related research, for his patience, motivation and immense knowledge. His guidance helped me throughout, from the initial stages of creating the project, to research and the writing of this thesis. I would also like to thank Dr Alexandre Nobajas for his insightful comments and encouragement of the project. I could not have imagined a better supervising team for my MPhil study.*

*Besides my supervisors, I would like to thank Dave Emley for his contributions to this project and his encouragement to widen my research and Richard Burgess for all his help on the technical aspect of this project.*

*Last but not least, I would like to thank my friends and family for continuously supporting me throughout this journey.*

*“People have forgotten this truth,” the fox said. “But you mustn’t forget it. You become responsible forever for what you’ve tamed. You’re responsible for your rose.”*

**Antoine de Saint-Exupéry, The Little Prince**

## **Video Links**

Links to all videos included within this thesis can be found at:

*Communicating Climate Change* blog - <https://faevans.wordpress.com/2015/09/15/links-to-videos-in-thesis/>

Or YouTube links to each individual video are provided below:

Case Study 3: Adaptation of *A Song of Our Warming Planet* -

<https://www.youtube.com/watch?v=rd5EY8WGvR0>

Case Study 4: Adaptation of *The Last Song of the Glaciers* – Adaptation 1-

<https://www.youtube.com/watch?v=aVGLiJ73KHw>

Case Study 4: Adaptation of *The Last Song of the Glaciers* – Adaptation 2-

<https://www.youtube.com/watch?v=V1Y6G80ApdU>

Original Project - [https://www.youtube.com/watch?v=3KQXmL\\_Bv48](https://www.youtube.com/watch?v=3KQXmL_Bv48)

# **Contents**

## **Abstract**

### **1. Aims and Approach (9)**

### **2. Background and Literature Context (11)**

2.1 Relevance of project (11)

2.2 Art and Geography Collaboration (19)

2.3 Psychological and Theoretical Background (23)

2.4 Participatory Geography (25)

2.5 Conclusion (28)

### **3. Specific Objectives (30)**

### **4. Methodology (32)**

4.1 Process (32)

4.2 Data Collection (33)

4.2.1 Systematic Review (33)

4.2.2 Technical Literature (34)

4.2.3 Case Studies (34)

4.3 Steps (36)

### **5. Data (37)**

5.1 Analysis of Literature (37)

5.1.1 Introduction (37)

5.1.2 Cinema (38)

5.1.3 Television Documentaries (41)

5.1.4 Art & Visual Representations (42)

5.1.5 Music (47)



5.1.6 Soundscapes	(50)
5.1.7 Literature & Fictional Narratives	(52)
5.2 Issues arising from communication methods	(54)
5.2.1 Fear	(54)
5.2.2 Trust	(57)
5.3 Conclusion to Analysis of Literature	(61)
5.4 Analysis of Practice	(62)
5.4.1 Introduction	(62)
5.4.2 Common Climate Change Imagery	(63)
5.4.3 Environmental and Climate Change Art	(65)
5.4.3.1 Large Organisations	(65)
5.4.3.2 Individual Artists	(73)
5.4.4 Music	(84)
5.4.4.1 Large Organisations	(84)
5.4.4.2 Individual Musicians	(85)
5.4.5 Combination of Art and Music	(88)
5.5 Conclusion to Analysis of Practice	(90)
<b>6. Results</b>	<b>(91)</b>
6.1 Template 1	(91)
6.2 Template 2	(93)
6.3 Template 3	(95)
<b>7. Case Study Adaptations</b>	<b>(96)</b>
7.1 Table to show how practices adhere to Template 3	(96)
7.1.1 Large Art Organisations	(97)
7.1.2 Individual Artists	(98)

7.1.3 Music (99)	
7.2 Background to Case Studies (100)	
7.3 Case Study 1: Adaptation of <i>Postcards from the Future</i> (100)	
7.3.1 Background to <i>Postcards of the Future</i> Case Study (100)	
7.3.2 Flooding (104)	
7.3.3 Heatwaves (108)	
7.3.4 Conclusions to <i>Postcards of the Future</i> Case Study (111)	
7.4 Case Study 2: Adaptation of <i>Champs d'Ozone</i> (112)	
7.4.1 Background to <i>Champs d'Ozone</i> Case Study (112)	
7.4.2 Method (114)	
7.4.3 Adaptation 1 of <i>Champs d'Ozone</i> (116)	
7.4.4 Adaptation 2 of <i>Champs d'Ozone</i> (121)	
7.4.5 Conclusions to <i>Champs d'Ozone</i> Case Study (124)	
7.5 Case Study 3: Adaptation of <i>A Song for our Warming Planet</i> (126)	
7.5.1 Background to <i>A Song of our Warming Planet</i> (126)	
7.5.2 Method (127)	
7.5.3 Conclusions to <i>A Song of our Warming Planet</i> Case Study (134)	
7.6 Case Study 4: Adaptation of <i>The Last Song of the Glaciers</i> (135)	
7.6.1 Background to <i>The Last Song of the Glaciers</i> Case Study (135)	
7.6.2 Adaptation 1 of <i>The Last Song of the Glaciers</i> (136)	
7.6.3 Adaptation 2 of <i>The Last Song of the Glaciers</i> (142)	
7.6.4 Conclusions to <i>The Last Song of the Glaciers</i> Case Study (149)	
7.7 Conclusions from Case Studies (150)	
<b>8. Template 4 (151)</b>	
8.1 Process of Template 4 (151)	

8.2 Template 4 (153)

## **9. Original Project (154)**

9.1 Introduction (154)

9.2 Method (155)

9.3 Conclusions (172)

## **10. Discussion (173)**

10.1 Synthesis of Project (173)

10.2 Broader Implications of Research (174)

10.2.1 Trust (174)

10.2.2 Fear (177)

10.2.3 Combination of methods (180)

10.2.4 Target audience (182)

10.3 Original Project (184)

10.4 Importance of Art (186)

10.5 Dissemination (188)

10.6 Relevance of Project (189)

## **11. Conclusion (191)**

11.1 Key Points

11.2 Future Research

## **References (193)**

## **1. Aims and Approach**

This project aims to explore the ways in which art and music could be used as alternative and effective means to communicate climate change issues to the general public. Through a systematic review, academic literature and work conducted by climate change artists currently using alternative methods to communicate are assessed. Initially, this project assesses four alternative approaches to communicating climate change in the systematic review. These include cinema and narrative in addition to art and music to gain insight into a wide range of communication approaches. Methods which both the academic research and climate change artists deem essential for effective climate-change communication are drawn out and composed into a template. The project selects four artists' projects assessed in the systematic review to be modified and adapted. This project then creates case studies through changing and creating alternative versions of these selected projects to adhere to the template. The template is then reassessed and components which have been established as important through conclusions from the case studies are added into the template. The new template is then tested out through an Original Project. The Original Project is not an adaptation of previous artists work. Instead, the thesis chooses a local climate change issue in Staffordshire to address and engage the public with through artistic and musical means.

Specific aims for this project include:

1. To evaluate whether art and music can be used effectively as alternative means of communicating climate change science
2. To assess previous academic research into alternative communication methods of climate change
3. To assess the work of artists and communicators currently using artistic methods to communicate climate change

4. To provide reasons why current climate-change communication appears ineffective and suggest solutions to resolve this issue
5. To create a guide of effective communication techniques to be used by artists, the media and other individuals interested in communicating climate change

The project aims to bridge the gap between scientists and the general public by proposing effective techniques to engage the UK public with climate change issues. By suggesting alternative techniques, the template aims to act as a guide to assist communicators in the further development of climate-change communication. The project also aims to provide suggestions on how to adapt traditional science communication to improve its effectiveness.

This project uses key terms throughout including “acceptance”, “engagement” and “effective”. Despite having multiple definitions, for this project the word “acceptance” refers to those who accept that climate change is a reality, however are not motivated to combat the issues. Whereas the term “engagement” in this project refers to those who accept the reality of climate change and are interested in actively wanting to make a change. The word “effective” (in relation to communication) applies to communication which engages the public and motivates them to combat climate change issues.

## **2. Background and Literature Context**

*This section reviews the range of general background literature surrounding climate-change communication, specifically focussing on the ineffectiveness of traditional communication and therefore the need for alternative approaches. The widely recognised relationship between art and geography is assessed, as well as the psychological benefits of using art as a means of communication. Participatory geography is examined in this chapter as it is a distinguished aspect of the geography discipline most relevant to this project. This section does not look in depth at alternative approaches as these will be discussed in detail in Chapter 5.1.*

### **2.1 Relevance of Project**

Climate change represents a social, political and environmental global scale problem. Whilst the impact of climate change is accepted as an issue of urgency within scientific and academic communities, there is a real challenge of engaging with the public and raising greater awareness of the issue. This initial section provides an overview into the historical literature associated with climate change communication.

The Department for Environment, Food and Rural Affairs (DEFRA) found 99% of UK citizens surveyed recognised the term climate change (O'Neill & Nicholson-Cole 2009; DEFRA 2007a). However, the same DEFRA survey showed despite this recognition, climate change was ranked a low priority among the UK population who felt the government should address crime, health, education and economics before climate change. Poortinga and Pidgeon (2003) also conducted a survey of UK citizens regarding public perceptions of climate change and found the public ranked climate change a lower priority than concerns about GM foods and nuclear power. This shows that despite the wide recognition of the term “climate change” there is still a lack of public understanding of the topic.

This lack of public understanding is apparent as a survey of UK citizens found only 55% of the public accepts the reality of climate change (Marshall 2010) despite the broad recognition of the term. Weak public acceptance of climate change is not unique to the UK. The US and Australia both saw a significant dip in public acceptance to the reality of climate change towards the end of 2009 (Hansen 2009; Riddell & Webster 2009; Pew Research Centre 2009b). Lorenzoni, Nicholson-Cole and Whitmarsh (2007) conducted two studies in the UK and found the majority of participants were disinterested, denied or doubted the reality of climate change. They found that even those who were engaged with the subject were not deeply committed. To engage the public, Bord et al. (1998) suggests communicators need to understand public perceptions and prior knowledge of the subject. It is important to engage the public with climate change as input, support and consent are needed for significant behavioural change to improve the climate change situation (Dryzek et al. 2011).

From 2013 onwards, public knowledge towards the effects of climate change began to heighten and acceptance of the reality of climate change in the UK increased - perhaps due to the widespread flooding across the UK in 2012 (Table 1). Capstick et al. (2015) studied the change of public perceptions in the UK after the winter flooding of 2013/14. Their study found an increase in the percentage of the UK public who felt climate change was mainly or entirely a consequence of human activity (Table 2). The study also showed that the majority of the public surveyed felt climate change is partly natural and partly caused by human activity and this statistic has remained constant over the past 5 years (Table 2). This could explain public reluctance to accept the reality of climate change as people believe it is partly natural and therefore it is easier to blame natural causes instead of changing lifestyle habits. In addition, this study suggests the public may become more motivated to combat climate change after an extreme event such as flooding has happened- affecting them directly and the

adverse impacts appreciated, this is particularly concerning as by this stage it might be too late to take mitigating action.

	<b>2005</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Yes</b>	<b>91%</b>	<b>78%</b>	<b>80%</b>	<b>79%</b>	<b>72%</b>	<b>88%</b>
<b>No</b>	<b>4%</b>	<b>15%</b>	<b>13%</b>	<b>11%</b>	<b>19%</b>	<b>6%</b>
<b>Don't know</b>	<b>5%</b>	<b>6%</b>	<b>7%</b>	<b>11%</b>	<b>9%</b>	<b>6%</b>

*Table 1: Capstick et al (2015) Responses when UK public was asked "As far as you know, do you personally think the world's climate is changing?"*

	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Mainly or entirely human</b>	<b>31%</b>	<b>28%</b>	<b>32%</b>	<b>28%</b>	<b>36%</b>
<b>Partly human or partly natural</b>	<b>47%</b>	<b>46%</b>	<b>48%</b>	<b>46%</b>	<b>48%</b>
<b>Mainly or entirely natural</b>	<b>18%</b>	<b>20%</b>	<b>16%</b>	<b>17%</b>	<b>13%</b>
<b>No such thing as climate change</b>	<b>2%</b>	<b>2%</b>	<b>2%</b>	<b>2%</b>	<b>1%</b>

*Table 2: Capstick et al (2015) Responses to "Thinking of the causes of climate change, which best describes your opinion?" UK public*

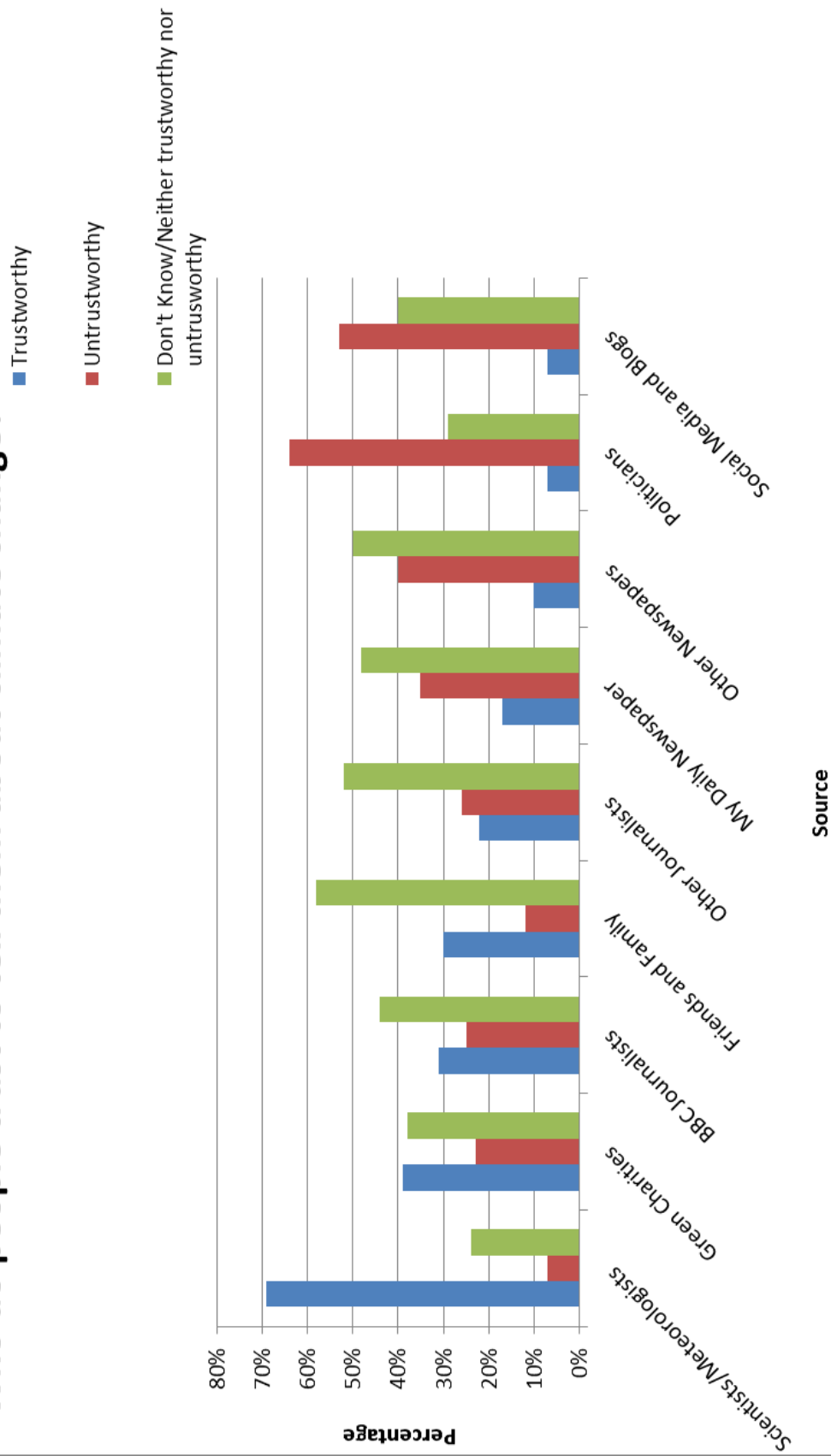
It has been questioned why people are reluctant to mitigate climate change when facts and figures are readily available over the internet providing them with an insight into the topic (Talking Climate 2012). The Guardian for example provides a webpage addressing frequently asked climate change questions; however the public remain reluctant to accept the reality of this issue (Talking Climate 2012). Research has suggested that lack of public acceptance could be attributed to the ineffectiveness of the information source, as studies have shown that certain sources of information are considered untrustworthy by the public. Stromso et al. (2011) studied Norwegian undergraduate students and found the students considered information from newspapers and media untrustworthy in comparison to textbooks and



official documents. These findings are not uncommon, with much research indicating that the media is generally regarded as an untrustworthy source of climate change information in comparison information obtained from scientists, family and friends (Leiserowitz et al. 2012, Donald 2013). Scientists are considered the most trustworthy source of climate-change information, with 67% of 1002 American citizens stating they trusted scientists completely (Associated Press USA 2012). Donald (2013) further investigated public perceptions of climate-change information sources in a study of 2000 UK citizens. The study revealed scientists were perceived the most trustworthy source of climate-change information whilst social media, blogs and newspapers were considered the least trustworthy (Graph 1).

This is a potential explanation as to why currently used traditional methods of climate-change communication are not engaging the public. For example, conveying information through newspapers such as the Guardian actually could be contributing to the lack of public acceptance and engagement. Graph 1 also shows that a significant proportion of people surveyed either did not know or thought the source of information was neither trustworthy nor untrustworthy. As the public are sceptical about the trustworthiness of traditional scientific communication, this project suggests alternative communication methods have much potential to be accepted and trusted by society. Research shows that trust needs to be taken into consideration when creating any type of communication, whether this is traditional or alternative, and information included must be from trustworthy sources.

## Who do people trust to tell them about climate change?



Graph 1: This graph based on a study conducted by The Carbon Brief (2013) - Question: How trustworthy do you think the following information sources are in providing you with accurate information about climate change? The blue columns indicate how trustworthy participants thought a source was. The red columns indicate how untrustworthy participants thought a source was. The green columns depicts those participants who answered "don't know" or "neither trustworthy nor untrustworthy".

Research has shown that honesty and transparency are two approaches essential to communicating climate change and ensuring credibility (Sustainability East 2014; Talking Climate 2012; Donald 2013). However in addition to these, there are many social and individual barriers that need to be addressed in order to engage and motivate the public (Lorenzoni et al. 2007). Nicholson-Cole (2004) found that climate change often appears an abstract and confusing topic for the general public; therefore the public find it easier to ignore the issue and do nothing. In addition, Lorenzoni et al. (2007) found barriers towards mitigating climate change included; a lack of knowledge; externalising responsibility and blame; uncertainty and reluctance to change a lifestyle. Social and individual barriers need to be considered when creating climate-change communication, as overcoming these barriers may lead to increased public engagement with the subject. Currently, communicators use methods such as providing more information; using fear as a motivator; scientific framing and mass communication (Dryzek et al. 2011). Public acceptance and engagement with climate change is still poor, therefore these methods used by communicators need to be reassessed or alternative methods considered.

Another reason as to why alternative approaches should be considered is because climate change specialists and scientists, although experts in their field, have sometimes been considered ineffective communicators. Mare (2014) conducted a survey of UK citizens and found 40% of the public believe scientists to be ineffective communicators. Donald (2013) suggested scientists are sometimes considered ineffective communicators as they can have an inability, ill-preparedness or an unwillingness to communicate in a way that can be readily understood by the lay person. Sternman (2011) stated that scientific literature must use minimal jargon and plain English to be considered effective and connect a wider audience. In addition, texts and graphs should be tested, revised and retested by communication professionals to ensure accuracy and effectiveness. In terms of communication and

accessibility Weigold (2001) suggested scientists may be perceived as ineffective as the media tends to devote less attention to scientific issues compared with sport, politics and entertainment. The public are therefore not immersed with scientific information on a regular basis. Dryzek et al. (2011) proposed it is the limited interaction the public have with climate change material that has led to scientists being considered ineffective communicators. Furthermore the lack of climate change information available to the public can result in limited public engagement as mass communication is important to the dissemination of climate-change information. Research has shown that providing facts alone is ineffective and non-persuasive for the public whose main concern is how climate change could impact their daily lives. However providing facts alone is the root of much current traditional scientific communication (Appel and Richter 2007). The public need background information and further explanation as just providing facts will not lead to a change in public behaviour (Hines et al 1987; Hungerford & Volk 1990).

It is not just scientists who have been considered ineffective communicators. Sternman (2011) highlighted avid climate change communicators, are rarely trained in science. Therefore communicators' understanding and interpretation of scientific research is similar to the general public's, which questions the accuracy of the information disseminated by these communicators. Research has identified the urgency to improve climate-change communication and public engagement by bridging the gap between scientists and the public (Nerlich and Koteyko 2009, Nerlich et al 2012, Featherstone et al 2014). However it may also be a case of bridging the gap between scientists and communicators. The public can choose to not study science and climate change but they cannot choose to ignore it (Fischhoff 2013), therefore alternative effective methods need to be developed to engage the public and educate them to diminish the effects of climate change in the future.

Traditional scientific communication can be dangerous as miscommunication and misunderstanding of scientific data has previously affected comprehension of issues surrounding natural disasters. Windh (2012) reviewed the 7.7 magnitude earthquake on British Columbia's Canadian northwest coast in October 2012. It was found that community officials had not understood the information provided by scientists; therefore no warnings were broadcast due to a lack of uncertainty. This resulted in mass confusion, with areas not knowing whether they were within a tsunami risk zone. So far these issues of miscommunication have only been connected to natural disasters, however with more extreme weather events happening due to climate change miscommunication could become a problem for climate change in the future (Windh 2012; BBC 2012).

97% of scientists agree that climate change is a result of human activity (NASA 2015) and significant consequences to human and environmental systems are to be expected if public attitudes do not change (Solomon et al 2007; Parry et al 2007). The lack of public acceptance and engagement frustrates climate change scientists who see the growing risks and understand a lack of action from the public will worsen the situation (Hansen 2009). Variations in public acceptance levels of climate change over the past ten years has questioned the effectiveness of twenty plus years of education, public outreach and communication (Dryzek et al 2011). The UK government had a target of reducing greenhouse gases by 60% by 2050 (Royal Commission of Environmental Pollution 2000). However, this target was superseded by the UK Climate Change Act (2008) which aspires to reduce greenhouse gases by 80% by 2050. If this target is to be met, public engagement and communication need to improve.

There is a clear gap for alternative approaches to be incorporated into society as scientific literature only provides a small component of how the general public establish opinions surrounding controversial areas of climate change (Allum et al 2008; Dunwoody et al 2009).

By finding alternative means to communicate climate change, public understanding could improve which in turn may increase acceptance of the issue and encourage behaviour change. This project attempts to address the issues of public engagement, understanding and acceptance of climate change by aiming to bridge the gap between scientists, communicators and the general public.

## 2.2 Art and Geography Collaboration

The inter-relationship between geography and art has developed considerably over the past two decades (Hawkins 2013). The Royal Geographical Society suggested this inter-relationship could be used for social engagement and to communicate information about climate change. However, the acceptance of the relationship between geography and art is fairly recent. In 1983, Meinig found little evidence for a firm relationship between the two, whilst Daniels in 1984 found the “common ground [between art and geography] is scarcely surveyed” (page 14). Despite not finding a firm relationship between geography and art, Meinig (1983), strongly supported the relationship stating art “not only provides essential clues about human experience with environment, it also contains models for dealing with some of the most difficult problems of descriptive synthesis” (Page 317). However, in the quarter of a century since Daniels’ and Meinigs’ observations, art and geography has become a field of its own, combining a variety of artistic formats with geographical themes.

Art is used to represent geography for a number of reasons. Meinig (1983) suggested that through describing and representing, artists can help to shape a place. Weber et al (2014) proposed visual representations of climate change could create social change through helping people realise the severity of the climate change situation by acting as a “wakeup call”. Weber et al (2014) also found western societies often feel disconnected or unaffected by major global climate change issues, potentially because the media focuses on areas such as

rising sea levels in the arctic or extreme drought in developing countries. Therefore art can act as a reminder to the public of these global issues. Weber et al (2014) also highlighted that art does not have to be about learning something new but instead about becoming more aware of and being able to identify with an already established issue. One example of this is “The Ice Watch” created by Oliafur Eliasson. 12 one hundred tonne blocks of ice collected from a fjord outside Nuuk, Greenland were left to melt in Copenhagen City Hall Square in October 2014 (Figure1). The art was created to coincide with the latest IPCC report (Fifth Assessment Report 2014) and intended to transform society’s climate change knowledge into climate change action. This is an example of how art can be used to increase public understanding of climate change issues. Scientists choose to communicate through graphs, charts and literature but there are different methods that should be considered such as art. It is simply an alternative way of telling the same story.



Figure 1: “The Ice Watch” Copenhagen City Hall Eliasson (2014) Image source: <http://images.vogue.it/gallery/22180/Big/e024842b-1305-4d08-b48f-520393a3c7e6.jpg>

Foster and Lorimer (2007) investigated the implications of using art to communicate geography. They found differences between the ethics of practice and the intentions of geography and art disciplines. Due to this, they suggested an informal guide may be needed to explain the purpose of the respective discipline. Competition, for artists especially, is stiff and breaking into the geographic world can be a challenge. They found that often art and geographic collaborations are one off projects and not sustained in the long term. According to these researchers, there is no ideal formula for art geographic collaborations due to individual differences between geographers and artists. Foster and Lorimer (2007) do not attempt to define art but observe that art is a broad subject which can include everything from music, to dance, to sculptures and acting as well as traditional artistic pieces. The Oxford English dictionary defines art as “The various branches of creativity such as painting, music, film literature and dance”. Tolia-Kelly (2012) is one academic who attempts to define art, in particular aims to differentiate between art and visual culture. Tolia-Kelly (2012) states that instead of geographic art, geography art collaborations should be defined as visual culture. Unlike Foster and Lorimer (2007), Tolia-Kelly (2012) tries to define art by categorising the discipline into strands such as political art and architectural art. Kindler (undated) has similar views to Tolia-Kelly (2012), highlighting the difference between art as a representation, and visual imagery designed for communication. She states it is difficult to understand the meaning of art – which could explain why many researchers have difficulty in defining the discipline. However Kindler (undated), found art can be used as a language for communication and critical awareness, especially photo journalism which is perceived as the most effective form of art communication. Kindler (undated) found issues with the public’s perceptions of art including the myth that art and peace go together which originated from Picasso’s image of the Dove. Kindler (undated) states this myth needs to be dismissed for art communication to be effective.



Crouch and Toogood (1999) showed artists perhaps do not need academic or geographic knowledge to use art to communicate a place to the public. They studied the abstract art of Cornish artist Peter Lanyon (Figure 2). Despite Lanyon not being a geographer he used his Cornish identity and attachment to the history, people and place to create abstract art that reflected the identity and culture of Cornwall. Crouch and Toogood (1999) understand that abstract art is a challenge to understand but highlight that art has potential.

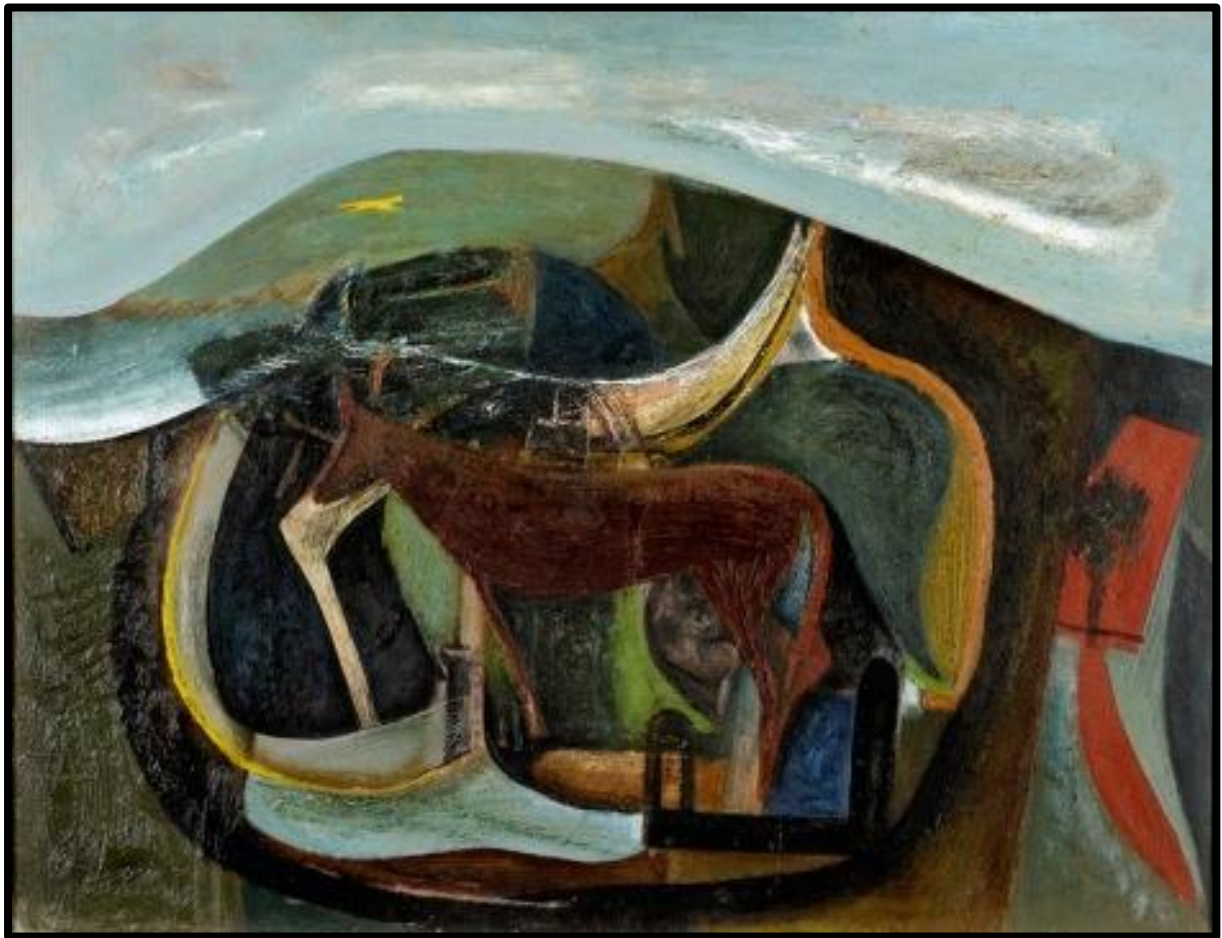


Figure 2: *The Yellow Runner*, Lanyon (1946) Image Source:

[http://images.tate.org.uk/sites/default/files/styles/grid-normal-8-cols/public/images/treves\\_07.jpg?itok=-jG\\_70zJ](http://images.tate.org.uk/sites/default/files/styles/grid-normal-8-cols/public/images/treves_07.jpg?itok=-jG_70zJ)

Dumcum (2004) stressed the importance of combining geographical information with visual images to enhance the viewer's understanding. Dumcum (2004) states it is important not to rely on images alone as this can lead to misinterpretation of both the image and the message

it aims to put across. Geographers are now collaborating with artists and creating projects to show the process of collaboration. Lovejoy and Hawkins (2010) created a project which aimed to expose the midway point of collaboration between geographers and artists. The project was in the form of an artist's notebook and highlighted where and how collaboration took place. They show that collaboration does not mean sweeping away differences but finding a joint pathway of production to create a project.

### 2.3 Psychological and Theoretical Background to using art as a tool for communication

Krauss (1979) identified the changing and expanding discipline of art, especially the changes made to art in post-war USA and Europe. Krauss found that art became more than just paintings and started to include all types of materials and practices. The geographies of art also changed, for example art became more than exhibitions in studios and galleries to include everything from performance to large landscape based pieces. This new found art was interpreted in the academic art world as minimalism, installation and environmental art. The aim of Krauss's studies was to make sense of this new found art after its post-war reconstruction – including how geography became a significant part. Hawkins (2013) identified a list of ways in which artists and researchers have expanded the discipline of art to incorporate geography (Table 3).

<i>Type of Art</i>	<i>Researcher</i>	<i>Example/ Area of Study</i>
<b>Painting</b>	Colls (2011)	Over-life-sized paintings by Jenny Saville
	Crouch (2010)	Abstract art of Peter Lanyon
<b>Installation</b>	Hawkins (2010a)	3D art that changes the perception of a space
<b>Sculpture</b>	Gandy (1997)	Conceptions of nature in the art of Joseph Beuys and Gerhard Richter
<b>Social Sculpture</b>	Cook (2000)	Shelly Sacks “Exchange Values”
<b>Participatory Work</b>	Parr (2007)	Collaborative film making
	Tolia-Kelly (2007a)	The “Englishness” of the Lake District through visual workshops
<b>New genre public art</b>	Mackenzie (2006a)	The public art of Sue Jane Taylor
	Pollock and Sharp (2007)	Constellations of identity: Place-ma(r)king beyond heritage
<b>Photography</b>	Vasudevan (2007)	Jeff Wall’s photographic materialism
<b>Sound Art</b>	Butler (2006)	A walk of art: The potential of the sound walk as a practice in cultural geography
<b>BioArt</b>	Dixon (2008)	Science, art and the creation of the lab-born monster. Creating art using live tissues, bacteria and living organisms
<b>Surrealist and Situationist inspired works and other urban practices</b>	Bonnett (1992)	Art, ideology and everyday space
	Bonnett (2009)	Psychogeography
	Pinder (2005)	Arts of urban exploration
Table 3: Hawkins (2013) - A list of ways in which artists and researchers have expanded the discipline of art		

Art is a useful communication technique which holds many psychological and educational benefits. Marks (1973) found that vivid imagery was more effective than poor imagery in securing information in participants' memories. Marks also found that females were able to recall more information from an image than males, which is important to consider when targeting communication at particular groups of people. Paivio (1969) showed that imagery has re-established itself as a scientifically useful concept, even in areas that have been heavily dominated by verbal mechanisms. In addition, Paivio (1969) found imagery plays an important role in the interpretation of a subject and therefore can help the viewer to distinguish meaning.

Lutz and Lutz (1978) found using a combination of methods is the most effective form of communication. They found presenting just a picture in an advertisement with no accompanying text was no more beneficial than a purely textual presentation, hence the need for a combination of methods. They stated a distinction must be made between imagery itself and how effective particular types of imagery are. For example an interactive image facilitates recall better than a non-interactive image, presumably by increasing the concreteness of the material to be learned. It is the association of the two items that determines how much information is absorbed - the more concrete the association is the more memorable the information becomes. Lutz and Lutz (1978) found that picture interaction is the most desirable type of imagery to use for understanding. Goldberg (1974) looked into incidental material and reading ability and found that illustration can facilitate the retention of incidental material in the classroom despite reading ability.

## 2.4 Participatory Geography

Participatory Geography is a strand of the Geography discipline which aims to involve the public with geographical matters. Irwin (2009) defined participatory geography as a method of public participation that has been introduced to create trust and diminish conflict. It is specifically aimed at controversial areas such as flooding defences, in order to get the public involved, to hear their opinions and educate them on the situation. Owens (2000) found that participatory geography is a necessary area of the geography discipline as it is needed to educate and persuade the public to produce community agreement regarding science based ideas and strategies. Owens (2000) also found that by encouraging the public to question and become involved in the decision making processes, public engagement, understanding and participation are increased.

Participatory geography has increased in popularity over the last decade with researchers including Stirling (2008) and Whatmore (2009) striving to achieve public participation in controversial matters. Callon et al (2009) found using controversies was effective in challenging already established knowledge and a key component to participatory geography strategies. As public participation is an essential part of climate-change communication, it is important to gain an insight and an understanding of participatory geographies.

There are three main models associated with participatory geographies. These include:

1. Participatory Modelling (PMs) – These are computer programs which aid collaborations between scientists and the general public in terms of environmental management. They aim to incorporate knowledge from “various stakeholders and research disciplines” (van Kouwen et al 2009 p.63)

2. Companion Modelling (ComMods) – These focus on local communities and aim to “facilitate dialogue between the different stakeholder concerned by given local issue of natural resource management” (Southere et al 2010 p.1360)
3. Competency Groups (CGs) – These evolved from PMs and ComMods and strive for public engagement

This project is going to specifically focus on CGs as they possess important characteristics that could be useful for public engagement and communication. The main difference with CGs is they require participants to be willing and concerned rather than representative. CGs use controversial environmental issues that affect the public such as flood risk management to engage communities. The aim of this model is to bring together scientists and concerned publics through producing and redistributing information about the controversy at a local level. This process requires scientists to engage with the public in new ways, and to understand the controversy from a different point of view. As Callon et al (2009) stated “researchers end up with eyes only for the problems born in their laboratories” (94-95), therefore this model helps to alleviate this issue. The collaboration aims to change the way scientists work by intending to form new relationships and connections with the public. CGs were not intended to bring local communities’ knowledge into the formal decision making process but to bring the science out of institutional networks that normally manage these controversial issues. CGs provide this project with important information regarding communicating and connecting with the public. Examples include, redistributing information at a local level to educate the public and weakening the scientist/public boundary. Both of these factors are essential in creating effective climate-change communication.

Landstrom et al (2010) created a case study significant to this area of research. They staged two CGs, one in the town of Pickering in Ryedale (North Yorkshire) and one in Uckfield

(East Sussex) to address the issue of flooding defences. Both CGs lasted 12 months and required that natural and social scientists involved in the project collaborated with the local communities by not dismissing local knowledge and values. To participate in the project, scientists had to be willing to allow their practices to be shaped by the new network of relationships created through CGs. CGs rely on controversy to prompt local residents to engage with scientists about local community problems. The results from Pickering (Ryedale) showed CGs were effective in bringing scientists and members of the public together in order to combine knowledge and overcome controversy.

This project focusses on finding effective methods to communicate climate change to the general public. Therefore, participatory geography will be considered when researching and writing the thesis, as components such as redistributing information at a local level to the public and focussing on controversial topics are core elements of climate-change communication.

## 2.5 Conclusion

The background research shows there is a need to bridge the gap between scientists, communicators and the general public. In particular there is a need to create greater awareness of scientific research and potential impacts of climate change. The literature has shown the importance of identifying a successful method of climate-change communication, as traditional methods used currently to communicate science appear ineffective. Research from Hawkins (2013), Tolia-Kelly (2012) and Meinig (1983) has suggested art could be used to represent the environment and climate change. Visual culture and art have been described as a “interdisciplines”, which are sites that are able to cross disciplinary lines (Mitchell 1995) and therefore could be ideal to use to communicate climate change science. This project aims to investigate art and music as an alternative means of communicating climate change and

assess whether these alternative methods could improve public engagement towards the subject. It is hoped an improvement in public engagement will lead to increased public motivation to change behaviours and lifestyle.

Art has the potential to create effective communication; however the literature has shown there are issues associated with using art to communicate scientific issues. MacFarlane et al (2005) and Nicholson-Cole (2005) highlighted the “dangers” and problems of using imagery such as misinterpretation and the fact no single image will appeal to everyone. Other issues include the difficulty in representing the uncertainty of climate change (Dockerty et al 2005) and the use of futuristic and imaginative representations (Nicholson-Cole 2005, Marshall 2010). There is contradicting research as to whether these types of images should be used or not – a concept this project will explore further. Although there is research into the “dangers” of imagery there is also much research into how to improve imagery (Nicholson-Cole 2005; Appleton and Lovett 2004). This project aims to investigate the issues associated with using art and strives to overcome these issues by suggesting solutions and modifications to aid the creation of effective climate change imagery. The dangers of using imagery and improvements that can be made to art will be further discussed in Chapter 5.1.4.

The background literature raised key points including using a combination of methods, making communication appropriate for a particular target audience and the importance of art as a communication technique.



### **3. Specific objectives**

The specific objectives of this project are:

1. To investigate alternative methods of communication which academics feel have the potential to communicate climate change
2. To identify methods of communication have been deemed ineffective by academic literature
3. To assess common climate change imagery used currently in traditional communication
4. To identify alternative methods of communication currently used by artists to communicate climate change
5. To test out research from the literature and practitioners by selecting four case studies originally created by climate change artists and modifying them to ensure they contain key components drawn out from the research
6. To create an original project which according to the literature and artists should be a successful and effective piece of communication
7. To create a template which lists effective methods of communicating climate change
8. To provide adaptations and information on how to improve currently used traditional methods of climate change communication

This project focusses on art and music, but also initially looks at cinema, documentaries, literature and narratives as well to establish a broad understanding of the discipline before focussing specifically on art and music. Cinema, art, music and narratives have all been studied by this project as there is limited research into communicating climate change through these methods. This project aims to identify which methods are deemed successful in terms of public engagement but also of outreach and impact.

## **4. Methodology**

### **4.1 Process**

The data for this project is collected from an analysis of both academic literature and of current artistic practice addressed in Chapter 5 (Data). The project mines the literature and artistic practices separately to identify methods deemed effective for communicating climate change.

The effective methods identified in the academic literature are combined to create Template 1, which is essentially a list of effective communication components. Similarly, the effective methods used by climate change artists are combined to create Template 2. From this, Templates 1 and 2 are analysed and methods that occur in both are drawn out to create Template 3. The term “Template” is used to describe these lists as it is the most accurate description for outcome of this project. This is because it is intended that the final Template (Template 4) is to be used as a check list or guide by communicators creating climate-change communication.

Four artistic projects were then selected from the Analysis of Practice (Chapter 5.4) in the systematic review, to be developed and modified. These artistic projects become case studies as alternative versions of the initial projects are created to adhere to the components in Template 3. The case studies chosen are projects which do not fulfil the majority of components in Templates 3.

The project is then reanalysed. Templates 1, 2 and 3 and the conclusions from the case study adaptations are reassessed to create Template 4 – the final template. Template 4 is then tested out through an Original Project as an example of how the template can be used. Unlike the case studies, the Original Project is not an adaptation of a previous artistic project. It uses

a local issue in Staffordshire in an attempt to engage the public through means of art and music.

As this project focuses on art, music and alternative methods of communication it was important to provide examples of the artistic work created by this project. The Case Study Adaptations (Chapter 7) and the Original Project (Chapter 8) are two chapters which include these artistic examples through video format. A link to a YouTube video is provided with each example, however the links to all of the video examples in this project are provided on the blog “*Communicating Climate Change*” which can be accessed at: <https://faevans.wordpress.com/2015/09/15/links-to-videos-in-thesis/>

## 4.2 Data Collection

### 4.2.1 Systematic Review

This project does not follow a traditional format and instead encompasses a variety of data collection methods, for example using literature as a source of data. Comersamy (2012) noted how literature-based methodology is often referred to as a “literature review”, which has created a blurred understanding between literature review as a methodology and literature review as a background survey of research. There is a need to differentiate, and one example of this is a systematic review. A systematic review is defined as a “scientific tool which can be used to summarise appraise and communicate the results and implications of otherwise unmanageable quantities of research” (CRD Report 4:2001). It is described as a quantitative approach that involves meta-analysis - a method of combining and collating results from different studies to create a single summary (Comersamy 2012).

The research process for this method begins with a research problem and question, in order to extract particular data from the literature. This project used two questions to extract data –

“What types of communication are considered effective?” and “What types of communication are deemed ineffective?” It was only data that answered these two questions that was extracted from the literature. An inclusion and exclusion criteria is also required for a systematic review. For example the time frame for this review was 1946-2015; therefore any data from before 1946 was excluded. Then, the data from the literature is searched, critically analysed and the data synthesised. Essentially, this method involves extracting data from the literature and then reanalysing the results and findings. This approach is often used in medical studies, and there is a lack of geographical examples which use this method.

#### 4.2.2 Technical Literature

Strauss and Corbin (1998) showed how technical literature (scientific writing) can be used as a research methodology. They stated that literature can be used as secondary sources of data – for example quotations from interviews or statistics produced can complement own materials and work. In addition, they highlighted the efficiency of using literature in research, stating it can help to understand own material or can be used to confirm or overcome findings.

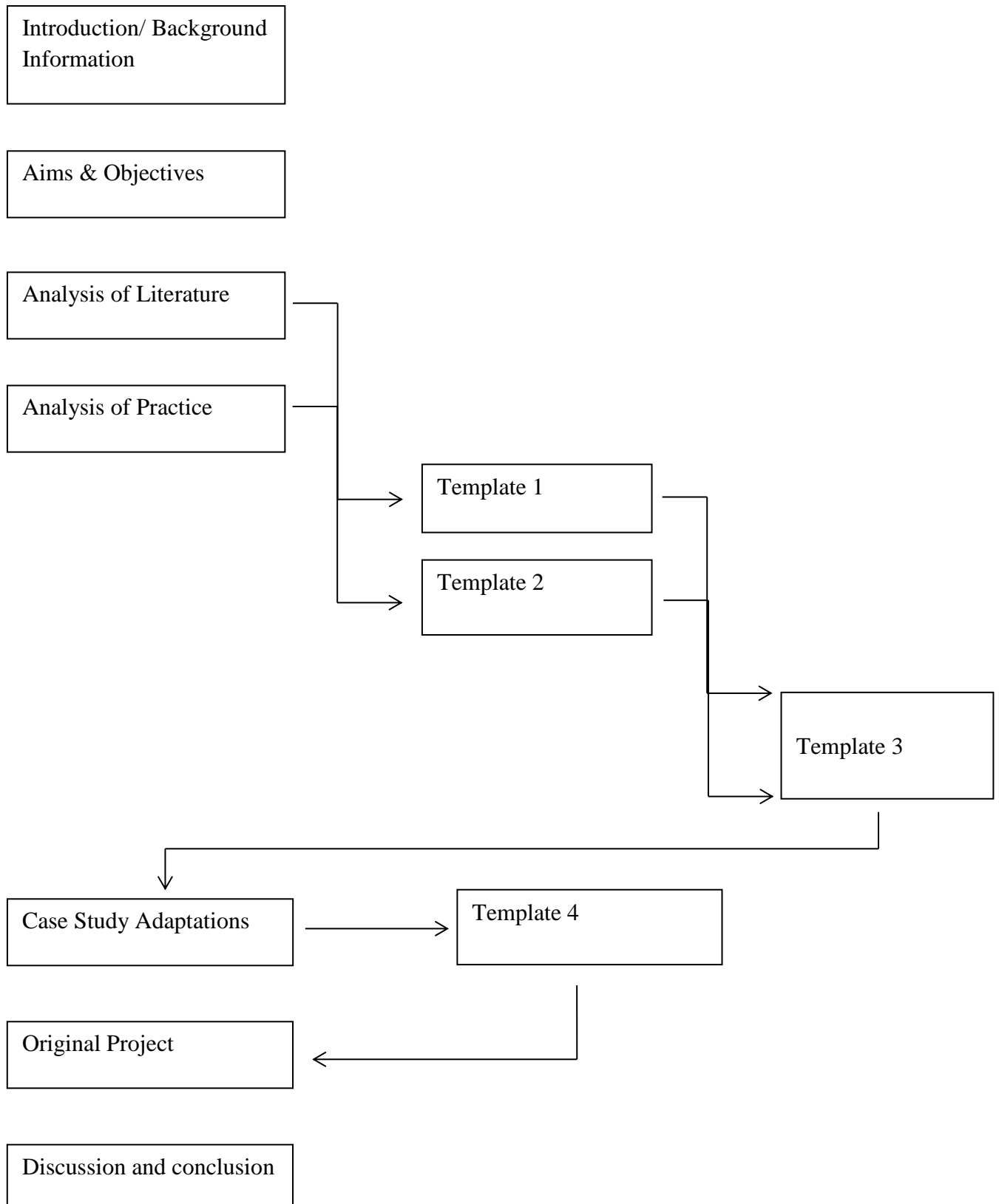
#### 4.2.3 Case Studies

A case study as a research method is defined as “an empirical inquiry about a contemporary phenomenon (e.g., a “case”), set within its real-world context—especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2009a, p. 18). According to Yin (2012) a case study should be used when addressing either a descriptive question or an explanatory question. Yin (2012) also stated an advantage to using case studies is they are not limited to a single source of data, and can use multiple sources of evidence. For example, direct observations, documents and archival records.

This project questions what elements are needed to create successful climate-change communication. This project uses case studies to adapt, modify and change four artistic projects selected from the Analysis of Practice (Chapter 5.4) in the systematic review, to adhere to Template 3. The case studies investigate the initial artist's project, - what the project is, the artist's motives for the creation of the work and how it was disseminated. The case study then compares the artist's project to Template 3 to assess which components the project is missing in its primary state. From this, the case study states how it is going to adapt the project in order to fulfil the components of Template 3. The methodology, reasoning behind decisions and process of the adapted project is also included in the case study. The case study concludes with an example of the adaptation and an assessment as to whether the project now adheres to more or all the components in Template 3. This thesis also decided to use case studies as the entire project covers variety of formats including literature, statistical work and interviews therefore case studies appeared an appropriate method.

### 4.3 Steps

Below shows the basic steps which will be undertaken to complete this project, showing where each template will be formed.



## **5. Data**

*This chapter analyses the literature associated with alternative ways to communicate climate change and the practitioners currently using these methods. The templates corresponding to each analysis are in the “Results” Chapter.*

### **5.1 Analysis of Literature**

#### **5.1.1 Introduction**

Climate change is an issue of global urgency, but public acceptance towards the reality and potential effects of climate change appears to be limited. The Environmental Change Institute (2011) found policy-makers play a key role in helping to combat climate change. Policy-makers choose how climate change information is distributed, which determines the public’s response, the action they take and policy discourse. Currently climate change information is distributed through a number of platforms, including the media and internet as well as art and sculptures. However it is unclear what the most effective form of communication is that policy-makers should instead be pursuing to effectively engage the public with climate change issues.

The media and government are two major distributors of climate change information, but are widely criticised. Donald (2013) found the public put little trust in climate change information from the media and government and are not encouraged by either to engage with climate change issues. Schroth et al (2014) suggested the public are reluctant to accept the reality of climate change as greenhouse gases are invisible. As the public cannot see these gases they struggle to see the potential impacts caused by greenhouse gases. Alternative approaches therefore need to be investigated and assessed to determine a method of climate-change communication that will both educate and engage the public.

This section focuses on four alternative approaches- Cinema, Art & Visual Representations, Music and Literature & Narratives. These four were chosen as they are not often considered first points of call for climate-change communication but are very prominent in today's society. However, in recent years climate change has become a more prominent theme in these approaches. Ortiz (2013) stated that with an increasing frequency of extreme weather conditions, climate change may receive a higher profile in terms of alternative communication approaches. This section reviews the varied research into each of these methods, highlighting what appears effective and what does not.

### 5.1.2 Cinema

There is contradicting research into the effectiveness of popular climate change related films and their impact upon the general public. Sakellari (2014) found that although concern, motivation and awareness are increased after watching a film of this type, public behavioural change is short term. This section specifically looks into three films – *The Day After Tomorrow*, *The Age of Stupid* and Al Gore's *An Inconvenient Truth*. These three films were chosen due to their popularity and the extensive research into the impact of these films on the general public. Sakellari (2014) highlighted that all three aim to put across the same message but through different methods and framing.

It has been suggested that films could have great potential to communicate climate change. Howell (2014) stated films are able to present complex information, in a short space of time, through emotionally engaging large audiences and allowing them to feel "right at the scene". Bahk (2010) found that narrative films could be effective in educating and motivating the public due to their ability to provoke emotions, which in turn should help raise awareness of climate change issues. Films have a large scope in terms of the size of their potential audience. According to *The Age of Stupid* Publication (AoS undated), *The Age of Stupid*



attracted a wide audience of 1 million viewers in 63 countries, plus extensive media attention. In addition it was shown at the UN Climate Conference in Copenhagen in December 2009. AoS (undated) emphasised the aim of the film was to “turn 250 million people into climate activists”, which is relevant because the film did not reach its target number of viewers as it was only watched by 1 million people. Howell (2014) found *The Age of Stupid* had an impact on UK viewers through heightening concern, increasing motivation to act and sense of agency. However these impacts were short lived, especially when behaviours were reassessed 10-14 weeks later which showed motivation and concern towards the topic had faded (Howell 2014). Howell (2011) and Howell (2014) both found public motivation and behaviour change are short lived responses to watching a climate change film.

*An Inconvenient Truth* had a larger reach than *The Age of Stupid*. Jacobsen (2011) documented the film was shown in over a thousand theatres with approximate sales of 12 million dollars in the first month plus it won an Academy Award for the best documentary of the year. The film appeared to motivate the public within the first two months of release. Jacobsen (2011) discovered that postcodes within a ten mile radius of theatres showing the documentary experienced a 50% increase in the purchase of voluntary carbon offsets. Again, as with *The Age of Stupid*, Jacobsen (2011) found these impacts did not sustain. Abrahamse et al (2005) provides further evidence for this, stating that impacts of climate change films are unlikely to persist in the long term.

There are similar findings for *The Day After Tomorrow*. Using UK participants, Lowe et al (2006), found despite showing initial increased levels of concern and motivation after watching *The Day After Tomorrow*, both had been forgotten in focus groups one month later and no long term behavioural changes occurred. These results are not unique to the UK. Studies of the same nature were conducted for *The Day After Tomorrow* in different countries and similar results were found by Leiserowitz (2004) in the US, Reusswig et al

(2004) in Germany, Lowe et al (2006) in Japan and Balmford et al (2004) in another location in the UK. However, Howell (2014) noted that no study has investigated whether viewers were taking any type of action that resulted from having watched a climate change based film. Howell (2014) stressed that effectiveness of a method is determined by the long term impacts on an individual's behaviour and attitudes therefore by this definition, none of these films could be deemed effective. From this Steg & Vlek (2009) stated an agenda is needed to encourage long term behaviour changes surrounding environmental issues.

However, both Bamberg (2000) and Cobern et al (1995) found films coupled with other interventions can increase public motivation and concern. Other interventions could include public pledges, goal setting and formulating behaviour intentions. Howell (2014) found *The Age of Stupid* used this technique. Screenings within the first week of release were accompanied by environmental talks, information stalls and leaflets to encourage active involvement from the audience. Howell (2014) suggested that behaviour change and motivation is more likely to happen if people are encouraged to make specific plans and pledges.

Cinema should not be overlooked as there are positives that can be drawn from cinematic approaches, such as mass messaging and reach. Mass messaging and reach have been shown to be effective when communicating environmental topics. Reiss and White (2008) discovered a drop in energy consumption in San Diego during the 2001 Californian energy crisis after public appeals from the state were made regarding energy conservation. In addition Cutter and Neidell (2009) found a decrease in San Franciscan traffic on days when "Spare the Air" announcements were publicly made advising residents not to drive. Furthermore, Bergstrom et al (1990) found individuals were more willing to protect wetlands when information was made publicly available regarding recreational activities that can be undertaken in wetland environments. This shows that when information is made public and

has a maximised reach similar to cinema – individuals are more inclined to change behaviours and attitudes. This could be why Nolan (2010) suggested *An Inconvenient Truth* should be included in the school curriculum to increase the audience figures and education.

### 5.1.3 Television Documentaries

There is little literature specifically looking at environmental documentaries and climate change. However, Frewer et al (1996), Rosati and Saba (2004) and Hunt and Frewer (2001) found that television documentaries are a highly trusted source of information among the general public. Despite this trust Barbas et al (2009) found that the contribution of nature documentaries to environmental education remains unknown. Barbas et al (2009) studied two types of environmental documentaries to assess their impact on student sensitivity and knowledge of environmental issues. They found traditional nature documentaries to have a positive effect on student sensitivity to environmental issues, whereas non-verbal and less conventional documentaries had a positive effect on enhancing student environmental knowledge. However both types of documentary were found equally effective in terms of changing attitudes and beliefs.

Giddon (2014) stated environmental education needs the support of young people as they are an age group who are more likely to learn through documentaries. Giddon (2014) noted it remains unknown what makes environmental documentaries effective, informative and inspiring. Giddon (2014) conducted a study solely looking into the educational value of environmental documentaries in comparison to a traditional lecture. Interestingly, it was found that students wanted and needed a combination of a documentary and a lecture for maximum learning and understanding. Similar research comes from Yardimic and Leblebicioglu (2011) who investigated whether a nature trip or a nature documentary was more effective in enhancing environmental education. The results from this study showed

that both a combination of a trip and a documentary was the most effective method. Furthermore, Harness and Drossman (2011) found that students who produced a short environmental documentary film had a heightened awareness of environmental issues through using multiple platforms to complete the task. The literature indicates a combination of methods can increase the effectiveness of environmental documentaries.

#### 5.1.4 Art & Visual Representations

Hawkins (2013) identified how geographical art has been used to represent knowledge on the subject area for centuries; for example through cartography and landscape paintings. Imagine 2020 (2012) proposed art can act as a catalyst for social change and is an effective alternative platform on which to communicate climate change. Novelist Philip Pullman stressed that despite often being used to present beauty, art can be used to warn and educate. Furthermore Groz (2008) suggested art can be used to slow down the chaos of textual information.

The benefits of using visual representations to communicate climate change have been studied extensively. Nicholson-Cole (2005) found visual representations have more value than textual; further evidenced by Tufte (1992) who showed information presented visually is easier for the brain to absorb. Appleton & Lovett (2004) and Trumbo (1999) found relying of visual communication is an ideal and adequate method to increase public engagement. Furthermore, King et al (1989) stated “visualisation is the only common language which both technical and non-technical participants can relate to” (p.164). Nicholson-Cole (2005) found visualisations can encourage the general public to change their behaviours and lifestyle and by representing climate change information in an artistic manner, the public could have an increased sense of awareness and understanding of climate change issues.

There is much scope for using art to communicate climate change; however research has identified several issues with using visual representations as a communication method.

Nicholson-Cole (2005) and MacFarlane et al (2005) found “dangers” of using imagery to communicate a topic. These dangers include; prior knowledge is often needed to understand the message; diverse interpretations can be made; no single image will appeal to everyone, and images are often generalised therefore do not equate to reality.

Further research into the dangers of using imagery is provided by Hallegatte (2009) who found using imagery to represent the uncertainty of climate change is a problem. Climate change is unpredictable and has a range of outcomes, which proves difficult when communicators intend to use one image to represent the issue. Dockerty et al (2005) found that this representation of uncertainty a significant issue in communicating climate-change. MacFarlane et al (2005) states creating imagery requires particular decisions to be made with regards to the geographical extent, colour, seasonality and futurism. Nicholson-Cole (2005) stated futuristic and imaginary representations could be a reason why the public are not engaging with climate change information. Marshall (2010) suggested these fantasy images will add to existing prejudices and encourage public misconceptions about climate change. Furthermore Nicholson-Cole (2005) proposed dramatic futuristic imagery could be too overwhelming for the viewer creating a sense of powerlessness which does not lead to behaviour change. However, climate change is often represented through fantasy imagery to address the uncertainties of climate change. Doyle (2007) and Adam (1998) both highlighted researchers should not overlook art as a communication method but should be attempting to communicate to the public that not all climate change problems can be seen.

Dockerty et al (2005) highlights although there is still much to learn about creating successful imagery, there is evidently scope for art to communicate and convey climate change information in the future. There is literature on improving imagery as a communication tool. Nicholson-Cole (2005) and Appleton and Lovett (2004) found that questioning viewpoint choice, the amount of information presented and whether it fits into societies culture all can

create more effective imagery. They also state images must be realistic and easy to understand. Franke James (350 Art Project 2015) created a guide with six tools on how to create effective climate change imagery.

This list includes:

- Symbols
- Metaphors
- Helping the viewer see what the artist sees
- Showing how it will affect their everyday life
- Touching a nerve
- Creating something that will cause action.

All of the above can contribute to improving imagery, but Nicholson-Cole (2005), Dockerty et al (2005), UKCIP (2000) and Sheppard (2012) have all shown that making imagery local is central to effective climate-change communication. Nicholson-Cole (2005) designed a study to draw out the public's spontaneous views on climate change. She found national and local imagery appealed most to individuals, however personal experience also played a significant role in their perceptions. Dockerty et al (2005) found climate change knowledge and representation on a local scale are lacking, which could be a reason for a currently unmotivated public. Furthermore, Sheppard (2012) stated that in order to bridge the gap between science and the community, communication needs to be local, visual and connected – showing the causes, effects and impacts. Despite this, Doyle (2007) found Greenpeace has focused on melting ice in Antarctica and habitat loss since the early 90's. Doyle (2007) states Greenpeace uses photographs as “proof” that climate change is happening. According to research, communication by Greenpeace therefore could be considered ineffective as imagery

does not include a local factor. Whether Greenpeace communicators are aware of this research remains unknown.

A number of researchers turned artists have been using local imagery in their work since the early 80's. Benefield and Bunce (1982) created a series of drawings to represent the Institute of Terrestrial Ecology's land classification system to show the generalised views of the community. O'Riordan et al (1993) created "Landscapes for Tomorrow" , a series of watercolour paintings as a means for engaging the public, landowners, farmers and communicators with the possible changes that could occur within the Yorkshire Dales, National Park (Figure 3).

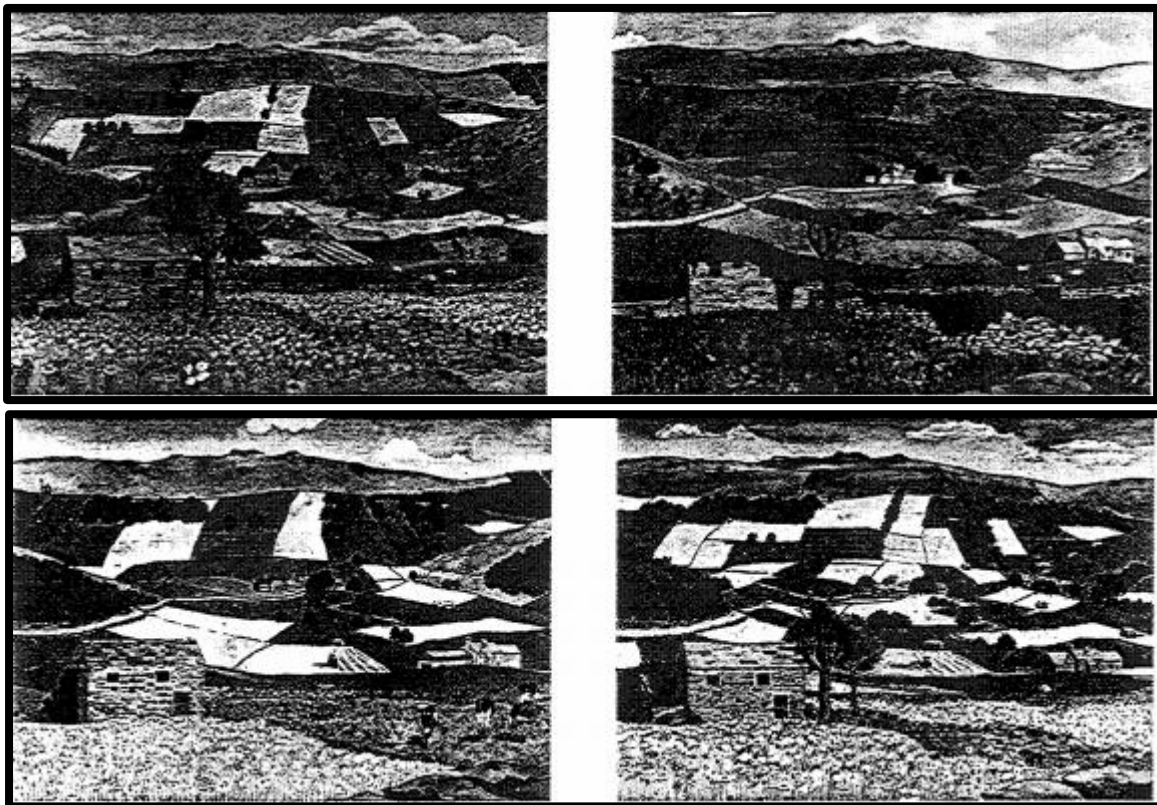
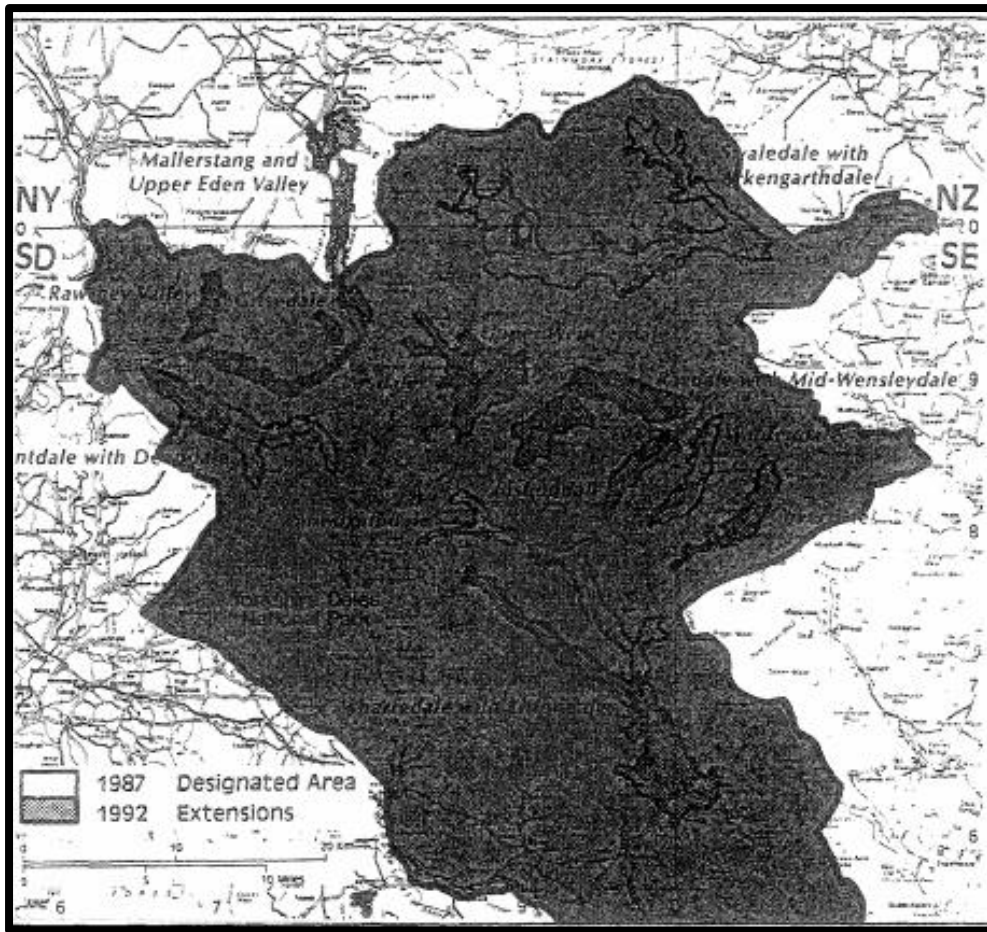


Figure 3: Selection of images from "Landscapes for tomorrow" O'Riordan et al (1993) Image Source: <http://www.tandfonline.com/doi/pdf/10.1080/09640569308711934>

Computer aided visualisations have received much attention over the last decade. Although these visualisations may not be considered traditional art, computer aided visualisations have great potential to create effective communication. Lovett (2005), Dockerty et al (2005), MacFarlane et al (2005) and Trumbo (1999) all found much scope for using computer visualisations and GIS (Geographical Information Systems) to tackle today's environmental problems. Appleton and Lovett (2004) furthered this point stating technology is rapidly advancing and is more frequently used than traditional artistic approaches. Examples of computer visualisations include Dockerty et al (2005) who focused on Norfolk's agricultural landscape. Using GIS and photorealistic image rendering software, effects on the landscape due to climate change were predicated for the year 2020. O'Riordan et al (2000), Dolman et al (2001) and Lovett et al (2002) all used GIS and digital technologies, specifically AO maps and Virtual Reality, to formulate future scenarios for landscapes in Oxfordshire (Figure 4).

Despite having great potential, there are issues associated with using computer aided visualisations. MacFarlane et al (2005) noted technologies still remain highly expert orientated whereas Appleton and Lovett (2004) highlighted these technologies are fast emerging into society with little research into how individuals are going to react to them. However, Dockerty et al (2005) states these problems can be easily overcome through interactivity and therefore computer aided visualisations should not be overlooked. As there is much ongoing research into this area, this project chooses not to focus on computer aided visualisations in favour of less researched alternative approaches.





*Figure 4: A map produced by ADAS Cartography Gloucester 1992 – The Pennine Dales Environmentally Sensitive Area in the Yorkshire Dales National Park – English Nature Research Reports (1993)*

### 5.1.5 Music

Connections have been established between geography and music. Byklum (1994) found song subjects and lyrics often include geographical concepts, from recently written music such as Bastille’s “Pompeii” to classical music such as Hovhaness’s 1982 symphony “Mount St Helens”. Harrington (2013) suggested that weather is a topic in many compositions due to the drama that is often intertwined with severe events. Byklum (1994) proposed music as a powerful source of imagery and symbolism to which individuals feel they can relate. This research provides policy-makers with an alternative effective way to engage society with climate change information. Keeling (2011) coined the term “geo-musicologists” to define

musicians influenced by geography. Ortiz (2013) suggested climate change may become an occurring theme in future music and the number of “geo-musicologists” will increase, due to a rise in extreme climatic events.

There is an issue of reach for climate change musicians. To overcome the issue of reach Boykoff et al (2010) showed how celebrities and famous musicians have started to engage with climate change – taking it from a distant issue and into the public’s living rooms. Furthermore, Boykoff et al (2010) stated celebrities have the ability to shape public perceptions and actions due to their influential nature and therefore are ideal advocates for educating the general public on climate change. However, Gelbard (2009) highlighted that although musicians are focussing on creating “green” tours to reduce their personal carbon footprint, many in the music industry are not talking to or educating their fans on climate change, perhaps due to a lack of time and resources. In addition, Aidt (2014) stated that musicians began to react and take action on climate change issues in the 1980’s. During the 1980 droughts in Ethiopia and Sudan, pop artists in the US and UK recorded “We are the world” which raised millions to save citizens from starvation. However Aidt (2014) noted that since 2000 when global warming and climate change became forefront issues, musicians have become almost silent with very little interest.

Gelbard (2009) believes using celebrities to advocate climate change has future potential. Carole King is one celebrity attempting to advocate climate change. She is a successful musician and song writer with a large following; however she stands out through taking a clear stand and spreading a message through statements not song. She has raised more than \$1.5 million for environmental groups including NRDC and has a powerful voice for wilderness protection.

Mawanda (2012) and Busiinge (2014) question whether music communication could be culturally bound. Mawanda (2012) found communities in Uganda and Kenya use music and dance daily as a powerful way of communicating. Music has been described as “Infectious” and an efficient way to spread a message in the Philippines as stated by policy maker Donna Lagdameo. Busiinge (2014) reviewed the Kabarole Research and Resource Centre’s Annual Street Arts Festival (2012). The festival, in Fort-Portal Uganda revolved around climate change issues through debates, music, films and dramatic performances all of which encouraged public participation. The festival was deemed a success. Although these methods have been very successful in non-western societies there is some promise for using these techniques in western societies. One example is an event created by the Climate & Development Knowledge Network (2012) involving 60 participants from disaster risk reduction agencies and climate and development organisations from a range of countries. The day consisted of unconventional activities such as singing, playing games and improvisation tasks to engage participants with climate change issues.

Data sonification is the transformation of data into music. One example of data sonification is Marty Quinn’s “The Climate Symphony” (2001). Quinn derived data from the Greenland Ice Sheet Project (2). The presentation of the “symphony” was central to the theme of ice in order to make the audience feel engaged and “at the scene”. However, one issue highlighted in the article was the lack of 3D placement of sound. Frazier (2013) states that given correct and detailed information anyone could interpret the status of sonification data, therefore this type of data could be used in the future as an early warning system for both climate change and natural disasters.

### 5.1.6 Soundscapes

Soundscapes and acoustic ecology are not new concepts in themselves but recently their potential to be used as communication methods has been recently investigated. Pijanowski et al (2011) defined soundscapes as “the collection of biological, geophysical and anthropogenic sounds that emanate from a landscape which vary over space and time reflecting important ecosystem processes and human activity” (2011 p.2). Farina (2014) confirmed this definition, stating soundscapes are composed of the overlap of three distinct sonic sources - biophony, geophony and anthrophony. There is much debate over what should be included in a soundscape. Marler and Slabberkoorn (2004) stated soundscapes must include sounds of flora and fauna, whereas Bottledoorn et al (2004) and Raimbault and Dubois (2005) highlighted the importance of urban sounds. On the other hand, Swanson et al (1988) emphasised the need for the inclusion of the geophysical motion of the atmosphere and water. However, Pijanowski et al (2011) stated it is all these components combined which create a soundscape. Schafer (1994) further described the components of soundscape in his book “The Tuning of the World” stating significant features include dominant, numerous and missing sounds. According to Shafer (1994) soundscapes also have themes. These include ‘Keynotes’ which are the fundamental tone of the soundscape created by the geography of the landscape and the climate. ‘Foreground sounds’ are those which are listened to consciously such as horns, bells and sirens and ‘sound marks’ which are sounds which are unique to a community.

Sounds of nature and environmental quality were first linked in Rachel Carsons’ book *Silent Spring* (1962) and from then acoustic ecology, according to Pijanowski et al (2011) has become a fundamental property of nature. Dumyahn and Pijanowski (2011) suggested soundscapes could be used to research and monitor long term temporal changes including climate change impacts. According to Matsinos et al (2008) soundscapes reflect ecological processes and can be considered ecological patterns in themselves. Furthermore, Pijanowski

et al (2011) showed an understanding of sound can help aid understanding of natural-human dynamics across both spatial and temporal scales. Before soundscape research was fully established, scientists since the late 1990's used similar techniques of bioacoustics to protect marine animals. This questions whether similar methods can be used to understand climate change. Dunn and Crutchfield (2006) found bioacoustics of insects can warn the public about climate change in forest ecosystems but highlighted this type of research must be incorporated with other methods.

There is little literature into using soundscapes for climate-change communication, however researchers have found potential in using sound. Urban planner Southworth (1969) was the first to use the term soundscape to explain how different communities and cities have different acoustic properties. His method of identifying how blind people create a “sonic identity” in areas of Boston could be used for climate change research, by identifying the changes in sound in local areas due to climate change. Schafer (1977) formalized the term soundscape when he became concerned about noise pollution and the lack of awareness communities have for their acoustic surroundings. Shafer et al (1994) therefore devised the World Soundscape Project which aimed to increase public awareness of issues that can be identified with acoustic ecology. These issues include the preservation of natural soundscapes and limiting the spread of noise pollution.

Recently research has developed regarding the use of soundscapes as a resource. Jensen and Thompson (2004) showed areas are losing their natural sounds; therefore soundscapes are becoming an endangered resource. Dumyahn and Pijanowski (2011) suggested soundscapes possess both ecological and social values and are therefore natural resources worthy of conservation. They were able to state that although a fairly new concept, soundscapes provide both human and ecological benefits. Shafer (1994), Krause (2002) and The National Park Service (2002) all emphasised the benefits of soundscapes as a valuable resource. However it

has been noted that if soundscapes are to be used as a resource then guidelines should be put in place. Both Soule (1985) and Groom et al (2006) stated guidelines must have principles, common vocabulary and a classification system which then allows climate change scientists and researchers to set goals and predict outcomes.

Dumyahn and Pijanowski (2011) and Groom et al (2006) have classified types of soundscapes into; natural; quiet; sensitive; threatened; unique; recreational; representative; cultural and every day. At present, Representative Soundscapes of environments which include desert, taiga, grasslands and coral reefs are the only soundscape to consider climate change as a threat. This shows a clear gap in research which needs further investigation.

#### 5.1.7 Literature & Fictional Narratives

It has been suggested that literature and fictional narrative are the most effective method of communicating climate change. Appel and Richter (2007) found facts within fictional narratives can encourage a significant attitude and behaviour change in the reader. In addition, Gerrig (1993) and Green and Brock (2002) have shown that not only do fictional narratives change attitudes and behaviours but the magnitude of the change may increase over a period of time. Trexler and Johns-Putra (2011) found an increase in the amount of climate change fiction in the past two decades, with noteworthy increase in the last 10 years. Appel and Richter (2007) suggested fictional narratives are more effective than fictional films at communicating climate change as they appear more legitimate. Fictional books about climate change are often aimed at children as children have been suggested as one appropriate target audience, for example Sedgwick's 2001 novel "Floodland". Narratives have been found to be persuasive (Gerrig 1993) and stories can be strongly secured in a reader's memory (Appel and Richter 2007, Singhal et al 2004 Green and Brock 2002 and Vaughan et al 2000). This method of communication has been neglected in terms of

portraying climate change, but research into the benefits of using narrative to communicate in general provides much scope for narratives to be used as climate-change communication in the future.

Until 2007 only a small number of studies including Green, Garst and Brock (2004) could provide evidence for short term persuasive effects of fictional narratives. From this Appel & Richter (2007) devised a study of 81 participants to investigate the short term effects of narratives. They found information in narratives to have short term persuasive effects on individuals. The study also found that information learned from reading the narrative was then integrated into the individual's long term memory and knowledge. Further evidence from Appel and Richter (2007) and Marsh et al (2003) showed individuals appear to retain information from narratives to answer questions about the topic area.

The literature on narratives altering individual beliefs is vast including Fazio & Marsh (2008), Marsh & Fazio (2006), Strange & Leung (1999), Gerrig & Bailis (1997) and Gerrig & Prentice (1991). All have shown that either reading or listening to a narrative can alter an individual's views about the world despite characters, places and events being completely fictitious. Gerrig & Prentice (1991) were one of the first to investigate the impact of fictional narratives on the public's beliefs. They found stories had an impact on the reader's beliefs but the time it took for the reader to transfer the facts within the story to real world scenarios depended on how facts in the story were portrayed. Appel (2008a), Appel & Richter (2007), Green & Brock (2000), Wheeler, Green & Brock (1999) and Prentice et al (1997) have all shown that effects from reading a narrative are persuasive and last if information is presented as the central theme or as a side plot line.

Literature into art communication strategies implies realistic situations are the only effective method of communicating climate change; however Green, Garst and Brock (2004) found

fictional characters and worlds exhibited in narratives can alter the public's beliefs. Another contrast between narratives and art communication is the emphasis on locality. Prentice et al (1997) found that narratives designed to enhance personal relevance where the plot took place in the readers university actually lowered persuasion and change of beliefs. Clearly this is an area which requires further research.

The reason for this belief, behaviour and attitude change in individuals after reading narratives can be attributed to a state called "transportation" defined by Green and Brock (2002) and Gerrig (1993). "Transportation" causes the readers beliefs to become more susceptible after reading. The "Transportation-Imagery Model" coined by Green and Brock (2000) shows the mental journey taken by a reader when reading a fictional narrative as "all mental systems and capacities become focused on the events occurring in the narrative" (p. 701). The mental state when reading a narrative encompasses imagery, emotions and attention, which is potentially why Green (2004) and Green and Brock (2000) find narratives an effective method. The idea of transportation and the Transportation-Imagery Model is supported by studies including Vaughn et al (2009), Escalas (2004), Green (2004), and Green & Brock (2000).

## 5.2 Issues arising from communication methods

### 5.2.1 Fear

Research from Doulton and Brown (2009), Hulme (2008) and Moser (2007) indicates representations of fear and catastrophe are encouraged by science consultants to communicate climate change. There is still much uncertainty as to whether fear works as a motivator to change behaviours and attitudes but as Howell (2014) noted, it is often used. Kirby (2011) found that scientists and policy-makers working on disaster films feel climate



change is such an important issue that bringing attention to it by any means is justified, for example the use of exaggeration.

There is contradicting evidence regarding the effectiveness of fear. Meijinders, Middelem & Wilke (2001a & 2001b) found fear is successful in communicating climate change and Roser and Thompson (1995) and Sherer and Rogers (1984) found fear to be an effective way to promote behaviour and attitude changes. However, O'Neill and Nicholson-Cole (2009) found contradicting evidence, stating that fear is ineffective in creating long lasting impacts. Howell (2014) suggested this mixed uncertainty could be due to the unknown long term impact of fear on the general public. Research from Lowe et al (2006) and O'Neill and Nicholson-Cole (2009) have shown that although fear through cinema may have an initial effect on individual behaviour and attitudes, it is difficult to sustain the message of fear in the long term. Therefore climate change representations in this way are unlikely to have a long lasting impact.

In addition, Spence and Pidgeon (2010) showed positive framing of climate change can create positive attitudes towards wanting to combat the issue than negative framing. Further evidence for positive framing comes from Morton et al (2011). They found positive framing combined with uncertainty of outcomes increased the public's intentions in comparison to negative framing.

Fear is not only used in cinematic climate-change communication, but in many artistic representations (O'Neill and Nicholson-Cole 2009). Both O'Neill (2008) and Christian Aid (2008) established the forefront images of climate change intend to produce a sense of fear including polar bears on melting ice and starving children in developing countries. Hastings et al (2004) stressed that this type of communication can lead to individuals becoming desensitised to the issue, and therefore fear becomes ineffective in changing the general

public's behaviour and attitudes. Another issue with using fear in artistic communication is the representation of the future. Graves and Madoc-Jones' (2010) "Postcards from the Future" is one of many future representations of the planet. Research has shown images such as the ones used by Graves and Madoc-Jones (2010) including London underwater in 50 years are ineffective. Lorenzoni and Pidgeon (2006) found futuristic representations are an impersonal and distant issue for many. This is because, according to Lowe et al (2006) and O'Neill (2008) people feel the issue is too far into the future to be concerned about or that the government will find a solution in time. In addition, Tonn, Hemrick and Conrad (2006) found many people have difficulties visualising the future beyond approximately 20 years, therefore climate change appears almost fictional.

Howell (2014) stated fear may not be entirely ineffective, if used in combination with other interventions. There is evidence from Lewis, Watson and White (2010), Moser (2007) and Witte and Allen (2000) which states combining fear with high-efficiency messages on how to avoid the threat will avoid maladaptive responses to the issue at hand. Further evidence for this comes from Rogers (1983) Protection Motivation Theory, which also states that fear needs to be combined with solution methods to heighten public participation and motivation. It has also been suggested by O'Neill and Nicholson-Cole (2009) that dramatic, threatening representations need to be partnered with something that help an individual understand the causes and consequences of climate change in order to see the importance in their own lives.

This knowledge has not been used by communicators and the media to deliver climate change information. Hart and Feldman (2014) looked specifically at framing impacts and behaviour adjustments. They found recent media coverage of climate change in the US focused on the threats and negativity of climate change, which are shown to be unlikely to increase public engagement. Further evidence from Trumbo and Shanahan (2000) stated public concern was decreased when climate change information was presented in a negative way, especially

when dramatic coverage fades. Hulme (2007) found that even language uses fear and can alter the meaning behind scientific facts, for example newspapers using words such as “devastating”, “catastrophic” and “terrifying” to exaggerate findings of the IPCC 1 report.

### 5.2.2 Trust

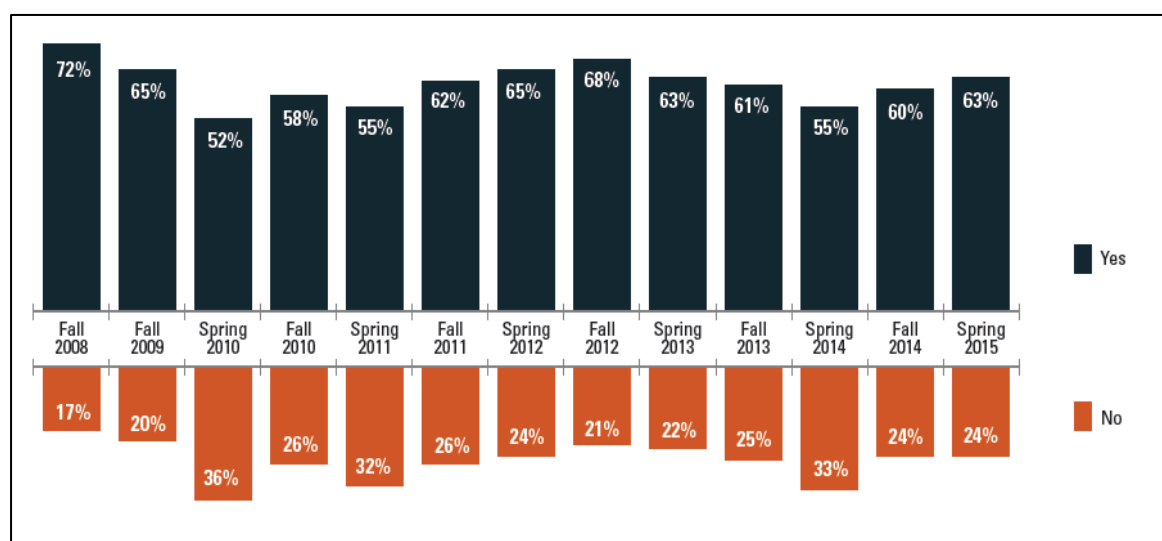
*“Trust is more easily eroded than created”* (Slovic 1999)

Lorenzoni and Pidgeon (2006) highlighted the finding that individuals connect with climate change through knowledge, personal experience and importantly – trust. Cvetkovick & Lofstedt (1999) studied social trust and risk management and found trust a significant influence on an individual’s response to risk. Goodwin and Dahlstrom (2013) found climate change scientists and policy-makers need the trust of the public in order to combat climate change and communicate knowledge. Lofstedt (2003) and Slovic (1999) also found public trust and confidence in the communicator is essential, however, Weingart (2002) stressed public trust should not be taken as a given. Trust, according to Cicerone (2012) is unequally distributed and considered “fragile” amongst communities, but Weingart (2002) implies trust is a valuable resource that needs to be monitored and actively maintained. Recently, Goodwin and Dahlstrom (2013) showed that trust in association with climate change research has received attention after being established as an effective method of promoting science.

Trust itself has been defined as important in association with climate change communication. Earle (2010) states this includes confidence in a communicator’s abilities, such as the knowledge, experience and skills. Laurian (2009) and Luhmann (1988) found the role of trust of significant importance when facilitating social interactions to combat climate change amongst the public, organisations and the government. The importance of trust within communities has been investigated. Jones and Clark (2013; 2014) found higher levels of public trust in institutions lead to greater support for climatic coastal policies. Rohrman &

Renn (2000) conducted a survey of empirical studies found trust a main influence on the public's response to risk in institutional settings. Siegrist, Earle and Gutscher (2007) found trust especially important in situations and events where the outcome of an issue is uncertain.

However, Weber & Stern (2011) and Malka & Krosnick (2009) found climate-change communication to the public is currently being affected by the issue of trust. Researchers including Alaszewski & Brown (2007) and Stebbing (2009) have investigated whether the public are ignoring climate change due to a knowledge deficit or a trust deficit. Trust is declining annually in America with Maibach et al (2009) documenting 83% of the population trusted in climate change in 2009, which Leiserowtiz et al (2012) found decreased to 73% in 2012. Shuckburgh et al (2011; 2012) provided similar results for the UK. Graph 2 is taken from a survey by Borick et al (2015) who studied American views on solid evidence for the existence of climate change between 2008 and 2015. The graph shows that Americans' confidence in climate change data significantly dropped from fall 2008 to spring 2010 but steadily rose between spring 2010 and fall 2012. The graph also shows belief in climate change declined between fall 2012 and spring 2014 but is now steadily increasing. However American views on evidence for climate change has not yet re-achieved the peak trust of 72%



in the fall of 2008.

*Graph 2 – A graph to show Americans' confidence in data about climate change. Borick et al (2015) - American view on the existence of evidence for global warming 2008-2015 "From what you've read and heard, is there solid evidence that the average temperature on Earth has been getting warmer over the past four decades?" Note: "Not Sure" responses are not shown.*

trusting governments, business, industries and even scientists regarding environmental risk communication. Lorenzoni & Pidgeon (2006) found that successful climate change mitigation will only occur if the public feel a need to make a change to their lifestyles based upon guidance and trust from the government and institutions. Lorenzoni & Pidgeon (2006) also found that mistrust in governments is a factor which prevents public support and engagement. They highlighted if mitigation efforts are to increase, the issue of trust needs to be addressed. There have been increasing efforts to explore the relationship between public perceptions of climate change and trust in the information disseminated by the government with research from Zahran et al (2008), Bord, O'Connor & Fisher (2000) and O'Connor et al (1999). Poortinga & Pidgeon (2003) found that the public have little trust in government policies and regulations whilst Dietz, Dan & Swihom (2007) and O'Connor et al (1999) discovered that an improvement in government trust can lead to an increase in public support of mitigation policies. Furthermore, there is evidence from Leiserowitz et al (2008) to suggest that public resistance to climate-change mitigation is a result of government regulation and control. However, Kettle & Dow (2014) highlighted these studies focused on mitigation rather than adaptation. From research by Kettle & Dow (2014), it has been established that research into the understanding of risk, trust and uncertainty vary greatly and is an area which needs further exploration.

However, Lorenzoni & Pidgeon (2006) found mistrust towards the government and climate change may not be due to policies and regulations. Poortinga & Pidgeon (2003b) have suggested distrust in the media and government may not be as much of a serious issue as first assumed as they suggest there is a healthy type of distrust. Poortinga & Pidgeon (2003b) coined the term "critical distrust" which essentially is where an organisation in an expert

manner presents an authority driven regulation of an issue, with the public's interest in mind that allows for some scepticism.

Interestingly, it appears that despite a lack of trust in the government and media, Zwick & Renn (2002), Leiserowitz et al (2008) and Rabinovich et al (2012) found the public exhibit a significant amount of trust in, scientists, friends and family. Whitmarsh (2009) provides additional evidence stating that scientists, friends and family have been established as the most trusted and influential sources of climatic information to encourage willingness to participate in climate mitigation activities. Research from Goodwin & Dahlstrom (2013) indicates that roughly three quarters of Americans are trusting of climate scientists as sources of information for global warming issues; however it was found that trust is not evenly distributed. A recent survey by Leiserowitz et al (2012) found that of the American audience who doubt climate change, 36% actively distrust climate change scientists, which accounts for roughly 20% of the American public over the last 5 years. Nature (2010) highlighted that “scientists will be only as persuasive as they are trusted”, indicating that maintaining and encouraging the public's trust is a top priority for mitigation and communication (Goodwin & Dahlstrom 2013). Goodwin & Dahlstrom (2013) concluded that it is therefore climate change scientist's responsibility to secure the trust of the public. Research from Ensminger (2001) has shown that appropriate methods of communication can help with the issue of trust whereas ineffective communication can actually cause distrust and deter public motivation.

Lorenzoni & Pidgeon (2006) stressed the role of trust in relation to the public's perceptions of climate change is an area which needs further research as it could be responsible for the public's climate change actions. Trust in relation to cinema has already been established as a problem in terms of climate-change communication. Examples of this include Lowe et al (2006) and Howell (2011) who both found exaggeration a problem when communicating climate change through cinematic methods as impacts are perceived as too futuristic therefore

are believed to be unlikely. Howell (2011) says the public need to perceive any type of communication as realistic for it to be effective and trustworthy. Research from Goodwin & Dahlstrom (2013) has shown that for improvements in climate-change communication to occur, climate change scientists need to present themselves in way which is deemed trustworthy by the public. However, Wynne (2006) has suggested that scientists may struggle with this due to an already doubting and dismissive public.

### 5.3 Conclusion to Analysis of Literature

There is much research into alternative approaches for communicating climate change. Although cinematic approaches did not appear to modify behaviours in the long term, mass messaging and reach of cinematic communication provide much scope for this method. It is important to consider that Howell (2014) discovered no study has yet investigated whether the public take any type of action as a result of watching environmentally based films. On the other hand, documentaries appeared more legitimate than films and were highly trusted. However documentaries need to be used in combination with other techniques such as an educational trip or a lecture in order to be an effective communication technique. The literature has shown that a combination of communication techniques is the most appropriate method for all alternative approaches, for example, combining music with poetry or art. This project will therefore focus on two methods to encompass the need for a combination of techniques.

It is apparent that the use of music in terms of communication needs further investigation, especially the impact of music on the public. It needs to be established whether music is a culturally bound communication technique or whether it can be applied to the western world. As there is little research into music and climate-change communication, this project will focus on music. It is interesting that according to the literature, narratives appear the most

successful method of communicating climate change. Narratives appear legitimate to the public, and either reading or listening to a narrative can alter the participants' opinion. Information presented in narratives appears to secure strongly in the reader's memory, and they use information learned from stories in real world scenarios. This project chooses not to focus narratives as there is already substantial research into the effectiveness of narratives as a communication technique.

Although there is much scope to using art to communicate climate change, "dangers" of visual representations of climate change have been identified. Issues include, viewpoint choice, the need of prior knowledge and the fact no single image will appeal to everyone. The literature identified artistic representations as the most ineffective way out of the four approaches chosen, to communicate climate change. However, there is also research looking into improving imagery and strong relationships between geography and art have been identified. Therefore this project will continue to focus on art.

## 5.4 Analysis of Practice

### 5.4.1 Introduction

The Analysis of Practice looks into the ways in which practitioners and organisations from music and artistic backgrounds have created projects that attempt to address climate change to engage the general public.

Art has been chosen due to the already established relationship between art and geography. Art is often used to represent dynamics of human geography such as a sense of place, identity and culture, but this section aims to explore whether art can be used to represent physical geography issues as well, such as climate change. This section investigates how different forms of art are being used to represent climate change. The analysis also touches upon the most common images associated with climate change, such as those used to represent climate



change in the media. This section also looks at music organisations that are attempting to communicate climate change. Unlike art, the research into music and geography is limited however there are many practitioners aiming to communicate climate change in this manner. The overall aim of this section is to provide examples of art and music projects, explaining how, why and what methods artists have used to communicate climate change to the public. This chapter aims to answer whether alternative methods of climate-change communication have potential to increase public engagement and motivation.

#### 5.4.2 Common Climate Change Imagery

An efficient way to assess the most common images associated with climate change is to google image the word “climate change”. Below are the top three images as a result of that search and show potentially why there are many misconceptions and distrust from the public towards climate change.

This first image of a polar bear balanced on a piece of ice is one of the most common images associated with climate change. The image is taken from a news article in The Telegraph entitled “The US election has put climate change back on the political agenda”.



Figure 5: The Telegraph, Chivers (2012) Image source:  
<http://blogs.telegraph.co.uk/news/tomchiversscience/100188288/the-us-election-has-put-climate-change-back-on-the-political-agenda/>

The next image is also a common media representation of climate change, showing factory smoke being churned out into the atmosphere. This image was found on the United States Environmental Protection Agency website under an article entitled “Climate Change is happening”.



Figure 6 Environmental Protection Agency (2015) Image source: <http://www.epa.gov/climatechange/basics/>

The third image is taken from the blog – 2<sup>nd</sup> Green Revolution. The image, often entitled “Angry Hot Planet” and most commonly used by the Green Party to depict the Earth on fire.



Figure 7: Johnston (2013) Image Source: <http://2ndgreenrevolution.com/2013/08/30/when-i-say-climate-change-how-does-it-make-you-feel/>

Using these types of images to portray climate change causes misconceptions and can lead to public distrust in communicators. Not only do they not provide an explanation as to what is happening, they use the element of fear and often exaggerate the issue. As these are the most common images used, these are the images that the public now associate with climate change. This could explain why the public are not engaging or accepting the reality of climate change.

Below are a collection of artists and musicians, from both large organisations and individual artists who attempt to communicate climate change through methods of art and music. When examining the artists' projects it is evident there is a clear divide between highly publicised climate change (such as that in the media) and climate-change art by large organisations and individual artists which aims to educate and explain.

#### 5.4.3 Environmental and Climate Change Art

##### 5.4.3.1 Large Organisations

This section focuses on large organisations that currently use art to communicate climate change issues.

##### a) Cape Farewell

The first example of a large art climate-change organisation is Cape Farewell. Cape Farewell was created by David Buckland in 2001 to initiate a response from the public to the climate change issue. The Cape Farewell project aims to engage artists, scientists and policy-makers to compose projects that inspire and encourage people to take action for a sustainable future. Cape Farewell states that artists are important as they communicate on a “human scale” using “creative language” to increase the public’s knowledge of climate change.

"Climate change is a reality. Caused by us all, it is a cultural, social and economic problem and must move beyond scientific debate. Cape Farewell is committed to the notion that artists can engage the public in this issue, through creative insight and vision." (David Buckland 2007)

One recent project by Cape Farwell entitled *Sea Change* (2010-2014), was a four year programme researching the western and northern isles of Scotland. Initially the project began in 2010 with 50 artists and scientists. From then, an expedition took place in 2011 on a marine conservation vessel around the Scottish Isles accompanied by UK and International artists and scientists. From the information collected on the expedition, scientists and artists collaborated to produce workshops, work-in progress presentations and a variety of art exhibitions. Whilst creating these projects they wanted to consider the impact of climate change on local communities, places and resources. The aim of this project was to encourage communities to exchange this information. Another goal was to raise awareness of popular and national initiatives and apply these to local communities. These included the use of advanced technology and new research into social and ecological initiatives. The project also aimed to widen participating artists' metaphors, methodologies and language to find new ways to express the stories and experiences of the local island communities.

A well-known Cape Farewell project is *Burning Ice* (2006). *Burning ice: Art & Climate Change* was the first major book produced by Cape Farewell to accompany an exhibition called *The Ship*. The book contains over 200 colour photographs and illustrations (Figure 8) as well as featuring essays from climate change specialists and scientists to accompany the photographs. In addition to the essays, extracts from appropriate literature and narratives were also included. The use of both textual and visual information implies artwork is more effective through using a combination of methods.



Figure 8: Cape Farewell – Burning Ice (2006) Image source:  
<http://www.capefarewell.com/images/articles/pics100/med/pic132.jpg>

b) Imagine 2020

Imagine 2020 is an organisation composed of ten art groups spread across nine European countries. The “2020” part of the name is a realistic and necessary date the organisation feels it needs to work towards in order to stabilise the climate to create a sustainable future. The work of this art organisation is based around a quote from the novelist Philip Pullman.

*“Artists of every kind have one overriding moral duty, which is to do their work as well as possible. But since that work partly consists of responding to what the world itself is up to, it would be strange if the best work being produced didn’t take some account, in some way, of what’s happening to our climate. Art is not only about beauty: sometimes it has to warn.”*

From this quotation Imagine 2020 states art can be used to confront issues of importance head on and can act as a catalyst for social change. Imagine 2020 questions whether art can reflect beauty and warn at the same time.

Imagine 2020 wants to use art to raise awareness among the general public and local communities by specifically targeting particular audiences – for example young people. They aim to use art in fun but serious ways to engage young people to provide hope for the future of the planet. Imagine 2020 suggests that art creates an opportunity for people to engage with one another through sharing ideas. The desired outcome of using art in this manner is to increase public knowledge of climate-change issues. Imagine 2020 produces and presents art that has a minimal impact on the environment.

One project created by Imagine 2020 is by Elizabeth Ogilvie. Ogilvie is a Scottish environmental artist who created her project *Out of Ice* in 2014. She uses a combination of art, architecture and science to create an exhibition of video projections, a film, sculptures and photographs. The project focuses on ice and water and aims to show the physical state as well as the psychological and poetic connotations that can be associated with water. Below are photographs Ogilvie took on her travels to Greenland to create this project (Figure 9).



Figure 9: *Out of Ice* Ogilvie (2014) Image Source:

[http://www.elizabethogilvie.com/proj\\_uploads/IMG\\_3624%20copy%202.jpg](http://www.elizabethogilvie.com/proj_uploads/IMG_3624%20copy%202.jpg)



Another project by Imagine 2020 is by Amy Sharrocks. Sharrocks (2014) in combination with LIFT and Artsadim created the project *Museum of Water*, based in London's Somerset House (Figure 10). Her project relied heavily on public participation through asking people to bottle up water which is considered precious to them. The participants sent the bottled water to Imagine 2020 with an explanation as to why they had chosen that particular water. The bottled water was then displayed in the Museum of Water. The aim of the project was to engage the public with the fragile state of water. For example, rainforests are disappearing at an alarming rate and fertile lands are becoming deserts due to climate change. These fragile environments shows there could be a reduction in the supply of freshwater in the near future which will become a key issue in society.



Figure 10: Museum of Water, Sharrocks (2014) Image Source: <http://www.museumofwater.co.uk/wp-content/uploads/MuseumOfWater-slide2.jpg>

### c) Climarte

Climarte uses art to inform, engage and encourage public action on climate change through producing and promoting art exhibitions and events. It provides an opportunity for people and artists to exchange ideas and information on climate change issues and sustainable art practices. Climarte has created a group of art practitioners and an organisation that promotes immediate, effective and creative action on climate change issues – a forum for learning.

They have showed the importance of art, especially how art has played a crucial role in portraying society's relationship with the environment throughout history.

One project by Climarte art is entitled *Art+Climate=Change* (2015). The project used artistic methods and the environment to address the environmental issues of the 21<sup>st</sup> century. The project was in the form of a festival which took place in Melbourne from the 11<sup>th</sup> April to 17<sup>th</sup> May 2015. The festival included climate change art and ideas from over 20 artists as well as local and international climate change specialists who provided lectures on these issues. The aim of the project was to attract a wide audience and provide an opportunity for people to discuss the challenges, impacts and solutions that have arisen from climate change.

d) Artists Project Earth (APE)

Artists Project Earth (APE) is composed of artists, scientists, journalists, environmentalists, film makers and authors. The organisation has five clear aims including:

1. Raising awareness – APE believes the public are unaware of what climate change means for both the world and for their personal lives. They also believe people need to learn how their personal emissions contribute to climate change issues.
2. Overcoming obstacles – To combat climate change it has been suggested the public need to reduce their carbon footprint. However, the main issue is encouraging people to adopt this low carbon emission lifestyle. APE believes people are not adopting this lifestyle as the public feel information is not accessible, is too difficult to understand or is hard to translate into their personal lives. APE believe the biggest obstacles are that people feel isolated, there is a lack of encouragement and there is little contact with people taking similar environmental steps



3. Achieving goals – APE suggests if the public work together and share experiences of what they are doing to improve the climate change situation, goals can be achieved such as increasing the number of people who aim to mitigate climate change
4. Education – APE feels that knowledge and personal experiences can help to encourage people to take action hence why education is at the forefront of APE activities
5. Support – APE believe people need a clear framework provided by the government to guide their actions and teach them of the steps they need to take. The public need both policies and incentives that reward personal resourcefulness. APE highlights that present government support is inadequate, incoherent and rarely relevant to people's needs. In terms of commodities, they suggest companies need to provide information for customers on alternative products and provide a greater transparency on availability of new products.

One project by APE is the *Blue Whale Project* which is part of the Bristol Green Capital 2015 programme. The exhibition involved a walk-in sculpture of the world's largest mammal – The Blue Whale. Inside the whale there were audio-visual displays which portrayed the beauty and fragility of the world's oceans. One part of the exhibit included soundscapes of whale song and ocean sounds. The exhibition was located in an accessible pedestrian area in Bristol's Harbour side and aimed at people of all ages.

APE Trustee and Co-Founder, Herbert Girardet stated

*“The fate of the oceans and that of humanity is inextricably linked. The damage we are doing to world’s oceans affects both aquatic life and human life alike. The Blue Whale project will be an inspirational exhibition and experience designed to motivate people to be part of the solution.”*

e) 350 Art

350 Art is an organisation that combines land, aerial, mural and street art as well as concerts and flash mobs to engage people globally on the issues of climate change

The first global climate art project was completed in 2014 taking place in a dozen places across the world with citizens and artists creating giant public art installations. The art was created to show how climate change is already impacting the world as well as offering ideas on how to solve the crisis. The art was large enough to be seen and photographed from space and documented by satellite provided by Digital Globe. People around the world are invited to take part in the event and offer ideas on how to overcome climate change problems in their areas.

Below are two organisations who aim to promote artists and their climate change projects instead of creating projects themselves.

f) Tipping Point

Tipping Point was launched in 2009 and aims to expose all types of artists to the pressing issue of climate change in order to work in conjunction with climate change scientists. This organisation aims to act as a catalyst for social change by increasing engagement with artists to find new ways to address climate change. They aim to connect with the artistic and scientific worlds. A main event connected to Tipping Point is the *International Programme*. It consists of a 2 day gathering where artists and scientists participate in an informal but

intense series of meetings and exercises created to provoke and encourage collaborative thinking and creative work. In addition to the 2 day events, Tipping Point also hosts one day events, conferences and public debates.

#### g) Project Dirt

Project Dirt is an active network that strives to connect and resource community projects. It focusses on social media as a way to connect and promote people and their projects in order to improve the flow of climate-change information. This organisation works by providing members with a profile page where they can inform a community about themselves, find friends and engage with other members projects. People can also set up project pages where they can invite local communities, arrange events and promote activities. In addition the organisation provides a forum where members can write blogs and discuss their ideas.

#### 5.4.3.2 Individual Artists

This section focuses on individual artists who have all taken different approaches to communicating climate change.

#### a) Basia Irland

Basia Irland (2009) is an artist, poet and sculptor whose work has focused on rivers for the past thirty years. One example of Irlands work is her project *Ice Books*. To complete this project, Irland collected local river water, froze it and then carved it into the form of a book. The books also contained “text” made out of seeds from local plants, which Irland defined as an “ecological language”. The aim of this project was to release these books into rivers so that when the ice melts the seed text is released to encourage plant growth along river banks. This project is not only creative but highlights the need for communal effort and local

scientific knowledge to deal with the local consequences of climate change. This project also helped to restore the environment. The releasing of seeds results in the growing of plants which can help to reduce the risk of flooding, slow down erosion, provide habitats and can act as a filter of water pollutants and debris. Irlands main aim for this project was to connect communities to their local rivers, waters and watersheds to increase concern, appreciation and to push the need to mitigate climate change. Irland worked with biologists, stream ecologists and environmental officials to determine which seeds were most appropriate to use for each area. For instance, the example below (Figure 11) is of a girl named Cleo reading “Tome II”. The seeds used for text are Fremont Cottonwood Seeds which are native to the Rio Grande River in Albuquerque, New Mexico which is where this book was released.



*Figure 11: Ice Books, Irland (2009) Image Source:*

<http://voices.nationalgeographic.com/files/2014/01/1.-Irland.-cleo-and-book-594x446.jpg>

b) United Visual Artists

United Visual Artists (2011) created an interactive exhibition *High Arctic* displayed at the National Maritime Museum (Figure 12). The exhibit was set in the year 2100 AD, and gave visitors the opportunity to interact with approximately 3000 glaciers that will have melted away to nothing by this point in time. The exhibit aimed to highlight the fragility of Arctic environments, especially in terms of human impact on these regions and the contribution of climate change. Not only this, but United Visual Arts also wanted to show the beauty and scale of these areas to help the audience have a heightened appreciation for Arctic regions. *High Arctic* was an interactive exhibit with sculptures, lights and sounds. Visitors were invited to interact with the exhibit through using UV torches which showed animations of how this landscape will change in years to come. United Visual Artists also used extracts from the poem “The Farwell Glacier” by Nick Drake throughout the exhibit. This exhibition was based on a Cape Farewell expedition to Svalbard by United Visual Artists director Matt Clark who was accompanied by poet Nick Drake in September 2010.

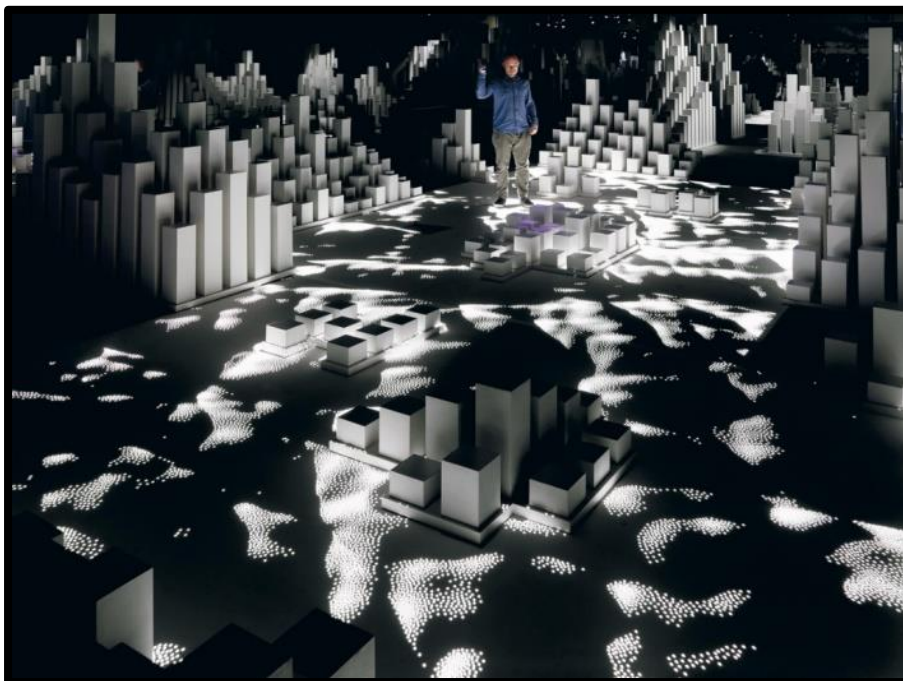


Figure 12: *High Arctic*, United Visual Artists (2011) Image Source: <http://static.guim.co.uk/sys-images/Guardian/Pix/pictures/2014/5/8/1399563245684/8636e633-347c-4a93-9d19-fe9ca950dc21-2060x1539.jpeg>

c) Katie Paterson

The next individual artist this project studies is Katie Paterson, who created the exhibition (*the sound of*) *Vatnajokull* (2007) (Figure 13). Paterson left the gallery empty apart from a phone number on the wall. Visitors to the gallery who called the number were connected to an underwater microphone in the Jokulsarlon lagoon which is an outlet glacial lagoon of Vatnajokull. When visitors phoned the number (which could be called from any location in the world) all they were able to hear was the creaking of ice and the melting of water. Vatnajokull is Europe's largest glacier which has been eroding since 1930, therefore by being able to phone and listen to the glacier visitors were able to connect with and hopefully become concerned with this issue.

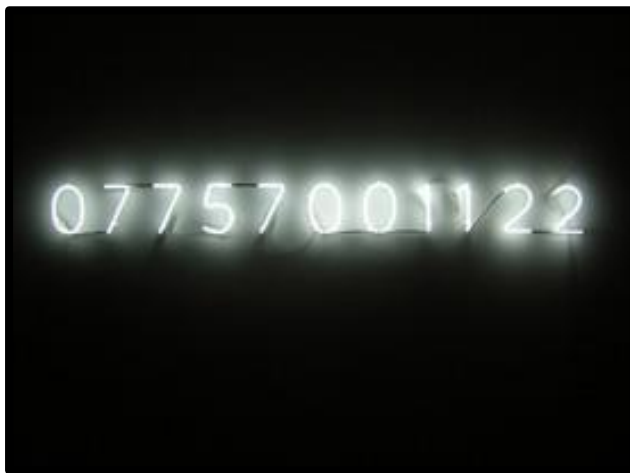


Figure 13: *Vatnajokull (the sound of)*, Paterson (2007)

Image Source: <http://katiepaterson.org/vatnajokull/>





d) Tim Knowles

Tim Knowles (2012) created *Dragon Spruce* as part of his Tree Drawings series (Figure 14). This is very different from other projects assessed in this section. Instead of Knowles creating the artwork, he attached drawing implements to the branches and tips of trees, which were attached to canvasses. From this the environmental characteristics and weather that affected the trees - such as wind was recorded on the canvasses. Knowles compared the tree drawings to signatures, stating how each canvas drawing showed the individual characteristics of the tree. It has been suggested that Knowles was handing back control to nature, showing nature's art without human interference.



Figure 14: *Dragon Spruce*, Knowles (2012) Image Source:  
<http://www.timknowles.co.uk/Portals/9/Tree%20Drawings/TDDragonSpruce3LR.jpg>

e) Evans and Hansen

One issue highlighted in the literature is the difficulty in engaging the public with something they cannot see – carbon emissions. To overcome this, artists Helen Evans and Heiko Hansen created *Champs d'Ozone* (2007) part of Paris based art and design partnership – HeHe (Figure 15). They overlaid vibrant colours onto images of the Parisian skyline to show the pollutants in the sky which are invisible to the naked eye. The colours used were adapted to show real time pollution in the city of Paris. As well as this, they placed sensors around the city to provide information of live air quality data throughout the day.



Figure 15: *Champs d'Ozone*, Evans and Hansen (2007) Image Source:  
<http://hehe.org.free.fr/hehe/champsdozone/index.html>



f) Diane Burko

Diane Burko (2014) believes that the best way to communicate climate change is through large scale images. Burko has two recent projects – *Politics of Snow* and *Polar Investigations* both of which emphasize the magnitude of climate change and the immediate steps communities need to take reduce the issue. *Politics of Snow* was a result of Burko learning how snowy landscapes were disappearing as a result of fossil fuels. Burko began the project by creating paintings based on geological maps created by scientists from around the world. She stated that this project was based on her personal experience with the landscape and environment. Her final piece for this project was creating large canvases that showed the tracking of glacial degradation (Figure 16)



Figure 16: *Politics of Snow*, Burko (2014) Image Source: <http://www.percontra.net/archive/Politics-of-snow.jpg>

*Polar Investigations* (Figure 17) is Burko's second recent project beginning in 2013 after taking part in a number of expeditions from the North Pole to the Antarctic Peninsula. She used photography and wrote extracts about each of her travels, in particular reflecting the rapid melting of ice. Below are some examples of the Ilulissant Glacier on Greenland's west coast which is one of the fastest moving glaciers in Greenland. In 14 years Greenland's ice sheet which covers around 80% of the surface has lost approximately 739 gigatons of ice. Burko's photographs reflect this high rate of melting and changes to the glacier.



Figure 17: *Polar Investigation*, Burko (2013) Image Source:  
<http://www.dianeburko.com/polarinvestigations/>

g) Stibbon and Brown

Artist Emma Stibbon and scientist Dr Giles H Brown (University of Bristol) collaborated to create *Glacial Shifts* - part of a Changing Perspectives project. In 2007, Stibbon wanted to create a visual representation of the cycle of glaciers, both the physical effect of glaciers on the landscape and what is imagined. Stibbon sought her information by drawing and photographing locations from walking in the Alps. Importantly she collaborated with Dr Brown in order to provide further information on scientific monitoring methods, understanding field sketches and research into climate change. This project aimed to investigate how our environment can be displayed in alternative ways. This project wanted to show scientific information with artistic methods to help shed light on issues as well as improve understanding. The images below show a threatened landscape that is fragile (Figure 18).



*Figure 18: Glacial Shift, Stibbon and Brown (2007) Image Source:*  
<http://www.bris.ac.uk/changingperspectives/projects/glacial-shift/>

#### h) Graves and Madoc-Jones

Graves and Madoc-Jones are two artists concerned with the workings of the world and world cities- in particular how these world cities may face significant changes in the immediate future due to the impact of climate change. The artists recognised that with climate change becoming such a pressing issue they needed to move away from their usual framework of art to use their skills to visualise climate change issues in a different way to teach and engage the public. The artists created an exhibition called *London Postcards from the Future*. They decided to use the format of postcards as this is considered a universally accepted form of communication. In addition, postcards are used to show everything from landmarks, to national identity and culture to myths and legends of an area. Essentially they are a way of describing an area within a single image. Graves and Madoc-Jones found that typical London postcards contained images of red telephone boxes and busses, which interestingly are both rapidly disappearing from the city. They took the idea of postcards and expanded on it. They created imagined environments of what London could look like in a matter of years. They did not focus on one outcome but portrayed six different outcomes of climate change impacts on the city. These included:

1. Flooded London (London as Venice (Figure 19) and Piccadilly Circus Water Lilies)
2. Frozen London (Glacial Thames and Skating at Tower Bridge)
3. Hot London (Camel Guards Parade, Notting Hill Carnival, St Paul's Monkeys)
4. Self Sufficient London (Parliament Square Paddy Fields and Hyde Park Palm Oil)
5. Living in London (Parliament Square Water Crisis Centre, Buckingham Palace Shanty, Trafalgar Square Shanty, The Gherkin)
6. Powering London (The Mall – Royal Power, Thames Tidal Power, Kew Nuclear Power Station)

All images are available at [http://www.london-futures.com/postcard\\_images/](http://www.london-futures.com/postcard_images/)





*Figure 19: London Postcards from the Future, Graves and Madoc-Jones (2010) Image Source:*  
<http://www.postcardsfromthefuture.co.uk/>

The exhibition ran from October 2010 to March 2011 at the Museum of London, however due to its popularity and controversial nature it was moved to London's National Theatre where it ran from March 2011 to June 2011. The exhibition drew much public and global media interest and now Graves and Madoc-Jones are using the idea of imagined environments and transferring it to other world cities. For example their latest project – RIO+20+20.

#### 5.4.4 Music

##### 5.4.4.1 Large Organisations

###### a) Hard Rain Project

*The Hard Rain Project*, by Mark Edwards was an exhibition launched in 2006. The project stemmed from Bob Dylan's song "A Hard Rains A-Gonna Fall" which is littered with lyrics such as "Sad forests", "dead oceans" and "where the people are many and their hands are all empty". Edwards took Dylan's descriptions and illustrated each lyric with images and photographs that adhere to the main challenges of the 21<sup>st</sup> century. To do this, Edwards travelled the globe on projects that allowed him to capture images of these challenges. The exhibition has been viewed by 15 million people globally at both universities and the United Nations headquarters in New York. It has been considered one of the most successful photography exhibitions created and was later turned into a book and DVD through working with renowned artists and scientists. The project is critically acclaimed, had huge public acceptance and is praised by environmental leaders worldwide. The main goal for the project is to suggest solutions to these challenges of poverty, climate change and environmental protection. It has been suggested that the project is influential due to the powerful images in conjunction with Dylan's song lyrics. Edwards stated the project was effective due to the stillness of a picture with the urgency of a ballad.

#### 5.4.4.2 Individual Musicians

##### a) Mason Bates

Mason Bates noticed how water influenced many musicians, however for him; it was not until he lived on Berlin's Lake Wannsee that he too was also inspired by the idea. During his stay in Berlin he noticed that over a period of less than two months the lake transformed from a thick cold ice sheet to a swimming destination with very heavy humidity. From this, he wanted to create a piece of music that addressed water in a variety of forms and to show the sudden changes climate can have on water. Therefore he composed a symphony entitled *Liquid Interface* which he describes as a symphony that "heats up with each movement".

There are four movements in total and the piece uses an orchestra and electronics to portray water in both calm and threatening forms. The first movement is "Glacier Calving" which uses the orchestra to create huge blocks of sound as well as using clips of actual recordings of glaciers breaking in the Antarctic and falling into the ocean. From this, the piece moves into "Sherzo Liquido" which highlights water on a micro level. For example looking at droplets and splashes from the melting ice as the climate gets warmer. This is played through "drops" of electric beats which are engulfed by an orchestral background. The piece then moves into the main movement – "Crescent City" which represents the destructive force of water on both small and large scales. To do this, Bates composed the music to be more melodic and lyrical, with the movement beginning quiet and increasing in sound throughout to show the increase in heat. Electronic echoing is also played in the background to immerse the audience in sound similar to the effect of humidity. In this movement the music begins to "lose control" with orchestral improvisation and electronics in the background to hint at the idea of a distant storm. This movement shows the unpredictability of climate and nature. The piece ends with

“On the Wannsee” which comprised of lazy melodies to show the ever increasing heat and finishes when the music (water) finally “evaporates”.

b) Daniel Crawford

Another musician who has represented climate change through composition is Daniel Crawford, a student at the University of Minnesota. The project created by Crawford and his supervisor Scott St. Georges aims to represent the rising temperature of the climate through data sonification. St. George, a geography professor at the University said “Data visualizations are effective for some people, but they aren’t the best way to reach everyone... Instead of giving people something to look at, Dan’s performance gives them something they can feel.” Using temperature data for the last 100 years, Crawford composed *A Song of our Warming Planet* to show the increase in temperature including how the average global temperature has risen by approximately 0.8 degrees Celsius since 1880. Crawford used surface temperature data from the NASA Goddard Institute of Space Studies and to compose the piece, he assigned each note to a year between 1880 and 2012. Low notes were assigned to cooler years whilst higher notes were assigned to warmer years. The piece is played on the cello; the lowest note on the cello is an open C therefore this note corresponded to the coldest year on record – 1990 and each semitone up the scale equalled roughly 0.03 degrees Celsius. The song increases in pitch throughout to show the increase in temperature. The scale is not a perfect scale as climate does not correspond in that manner but the trend is evident. The piece is not only an example of data sonification but reflects the past, present and future state of our planet. Crawford highlighted that the worrying aspect is that if temperatures continue to rise at the rate they are, in years to come temperatures will be too high to correspond to notes on the cello.



c) John Luther Adams

Another musician who uses music to express climate change, in particular focussing on sea level rise is John Luther Adams. An environmental activist in his 20's and early 30's, weather and climate change remained at the core of Adams' work for over 40 years. After his move to northern Alaska in 1970, many of his works were centred around and represented the Alaskan landscape. Adams was inspired by the subtle and obvious climate changes that occur in Alaska. For example the dramatic increase in the duration and intensity of Alaskan wildfire seasons. Adams states that for him, weather and climate are most explicitly shown in his piece *Earth and the Great Weather* – a piece that blends sounds recorded in the field into his composition – which Adam calls “sonic geography of the Arctic”. However his latest climate change piece focuses in on sea level rise – a 42 minute orchestral ensemble called *Become Ocean*. Adams stated on his website “As the polar ice melts and sea level rises, we humans find ourselves facing the prospect that once again we may quite literally becomes ocean” showing both inspiration and justification for creating this piece. The title of the piece comes from a poem written by John Cage, who was inspired by musician Lou Harrison. Cage compared Harrison's music to a river in a delta where a range of currents and waters come to confluence in a big sweep of music. The last line of Cages poem reads “Listening to it, we become ocean”. When Adams created “Become Ocean” he wanted the listener to be immersed by music - similar to the consequences of rising sea levels – so the listener feels the “depth of the waves and the spray of the sea”. The piece reflects planetary warming and sea level rise, something that the composer feels connected to especially through his move to Alaska.

d) Nora York

Nora York also looked into the issues of climate change and water. She composed her own music and combined it with Handel's "Water Music" Suite to spread the message of climate change. She wanted to show how climate change affects all forms of water from oceans, to rivers to aquifers and lakes and how this affects human society. Through doing this she aimed to get the audience to understand the value of water. The piece is poetic in its own right but is also defined as a "wakeup call" to the public about current climate change issues. To compose her piece, York engaged with climate scientists and activists before composition and then used both her and Handel's interpretation of water to create the piece of music. As well as this she identified common images, metaphors and concepts related to water to use in her composition. For live performances of this piece she selected visual images to accompany the piece including images by artists Kiki Smith, Kate Teale, Judith Belzer and Jerry Kearns. After the performance she encouraged the audience to engage with environmental scientists and activists as well as each other in informal conversation to enhance knowledge and make people more aware of pressing climate change issues.

#### 5.4.5 Combination of Art and Music

This section looks at practitioners who have used a combination of art and music to address the issue of climate change.

a) Osborn and Shenai

*Change Ringing* is a project by Laurence Osborn and Peter Shenai that is a sonic representation of rising temperatures over the last 100 years. Osborn and Shenai sculpted "data bells" using 3D printing technology and shaped the bell using mathematically derived data from graphs that show the changes in global temperature over the last century. The data represented the mean global summer temperatures at 17 year intervals from 1912 to 2013.

The sound of the bells highlighted the changes shown in the graphs, essentially narrating the story of climate change. The volume of the bell exactly matched the average temperature therefore the pitch of the bell indicates the average temperature of a particular period. The timbre of the music reflects the unpredictability of the temperature for the same period. The composition was 25 minutes long and composed for 9 solo string instruments and a percussionist playing the six bells suspended from strings. The methodology and thought process behind the project is further explained on their website – <http://www.change-ringing.co.uk/>

b) [Julia Calfee](#)

Julia Calfee used art and music to communicate climate change. She created a project called *The Last Song of the Glaciers* which used a combination of photography, music, soundscapes and poetry to portray the issue of glacier melting and temperature rising in Switzerland. The two year project focussed on the Latana Glacier in Switzerland. During her expedition she recorded over 200 sounds of ice and glaciers melting away as well as taking over 800 photographs of the glacier and its surroundings. To obtain aerial photos and recordings, Calfee used containers suspended from helicopters which enabled sound recordings and photographs of the underneath of the glacier. The photographs were abstract and taken in black and white to show the natural features found in high Alpine valleys and mountains. She also used the sounds heard to make the “music” for her project. She noticed the unique sounds of glaciers such as strange helicopter like sounds and rhythms similar to a beating drum. In addition to the photographs and music, Calfee added a poetic element to the project. Through listening to the sounds she recorded she distinguished “water voices”, noticing how ice caves, ice tunnels and avalanches all had significantly different sounds. One example was the sound of running water. Calfee imagined the brook sounding sad and lost as it flowed from the river into the glacier and recognised the sounds of water rushing away forever as the

glacier melted. She talked about the glacier as if it was a living being, hinting at an almost spiritual connection. For example she compared the melting glacier to the carcass of a dead elephant. Calfee combined the photographs, music and spoke in a poetic manner in an art documentary film. Calfee highlighted in the documentary that the project was not talking about the future but talking about the present and the fact future generations not having the opportunity to see a glacier. This is a link to Calfee's documentary: <http://vimeo.com/79198315>

### 5.5 Conclusion to Analysis of Practice

The Analysis of Practice highlights the difference between images commonly used in the media to communicate climate change, and art created by large organisations and individual artists. Common climate change imagery in the media uses images that provoke fear such as animals in distress or factories churning out smoke. Whereas, climate change art created by artists appears to be more in depth. For example the majority of projects created by large organisations and individual artists are not simply an image. They include descriptions, exhibitions and performances to increase potential engagement with the public.

Interestingly, this section has shown many of the artists either use techniques that have been discouraged by the literature or lack components which have been deemed essential by the literature. For example many of these projects only use one method of communication such as a piece of artwork and collaborating appears to be lacking in this area. Furthermore fear is used in a number of these projects to express climate change. This will be assessed in Chapter 6 (Results), to determine which components should be included in the Templates.

## **6. Results**

*This chapter uses the information mined from the analysis of literature and analysis of practice to create corresponding templates*

### **6.1 Template 1**

Template 1 draws out information from the Analysis of Literature. It was important to address the Analysis of Literature as these are the methods of communication which have been tested, analysed and assessed by academics. This template is divided into “What makes climate-change communication effective?” and “What has been deemed ineffective in communicating climate change?” as both were issues addressed in the literature. The most significant aspect found in the literature and shown in this template is the inclusion of trusted and scientific data in communication – an issue addressed by many researchers.

There were areas of controversy that arose when creating this template. For example, artwork that shows the distant future or imagined environments portraying a fictional world is deemed ineffective. However reading or listening to a narrative can alter an individual’s perceptions on the world despite being fiction (Fazio & Marsh 2008, Marsh & Fazio 2006, Strange & Leung 1999, Getting and Bailis 1997, Getting and Prentice 1991). Another interesting issue raised is the need for communication to be local. Many studies have shown that the key to effective communication is to make it local and relate to communities. However, Prentice (1997) found university students persuasion and beliefs were lowered when a narrative was centred on their university. Fear is also an element which caused controversy. Although fear alone has been established as ineffective by literature, researchers have found that fear in combination with high efficiency messages on how to avoid a threat could be a powerful

communication technique (Lewis et al 2010, Moser 2007, and Witte & Allen 2000). Fear is often used in climate communication at present but research has shown that it may be only effective if used in a particular way.

<b>TEMPLATE 1</b>	
<i>What makes effective climate-change communication?</i>	<i>Evidence</i>
The ability to emotionally engage large audiences in a short space of time	Howell (2014)
Making the audience/public feel right at the scene	Howell (2014)
Reach/Mass Messaging	Reiss & White (2008), Cutter & Neidell (2009), Nolan (2010)
The combining of methods/interventions	Bamberg (2000), Cobern et al (1995), Giddon (2014)
The use of trusted information	O'Connor et al (1999), Slovic (1999), Zwick & Renn (2002), Lofstedt (2003), Lorenzoni and Pidgeon (2006), Appel & Richter (2007) Dietz et al (2007), Leiserowitz et al (2008), Rabinovich (2012)
The communication must be local	Byklum (1994) Nicholson-Cole (2005), Dockerty (2005), UKCIP (2005), Shepard (2012)
The communication must be visual	Nicholson-Cole (2005), Tufte (1992)
The use of unconventional/ alternative activities	Climate & Development Knowledge Network
The inclusion of solutions	Rogers (1983)
Positive framing of climate change	Spence and Pidgeon (2010)
The use of fictional narratives	Gerrig (1993), Green & Brock (2002)
The use of literature	Vaughan et al (2000), Singhal et al (2004), Appel & Richter (2007)
The understanding the causes and consequences	O'Neill & Nicholson-Cole (2009)
<i>What has been deemed ineffective in communicating climate change?</i>	<i>Evidence</i>
Fear	O'Neill & Nicholson -Cole (2009)
Using images to show the distant future/ imagined environments	Hastings et al (2004), Lorenzoni & Pidgeon (2006), Hemrick & Conrad (2006)

## 6.2 Template 2

Template 2 draws out information from the Analysis of Practice. The Analysis of Practice was important to address, as these are the methods of climate-change communication that are already being used by artists. This template is divided into “What does art need to have/include?” and “What should the aim of climate change art be?” as these were the significant questions addressed in this review. The main point drawn from this template is that art needs to be combined with other methods but must remain scientific in order for communication to be effective.

Interesting points from this template include that there is a clear divide between practitioners. For example, some artists believe that large scale scientific pieces of art that heavily involve the public are the way forward. Whereas, some feel no need to include science but to use their own interpretations and opinions to create art that needs a detailed explanation to accompany it to decipher the meaning behind the piece. From looking at practitioners work, it is evident that some pieces, although they do address climate change, are too abstract or poetic that the piece loses its meaning. This highlights the difference between artists who wish to create art for themselves, and artists who create art to enforce a widespread message.

<b>TEMPLATE 2</b>	
<i>What does art need to be effective?</i>	<i>Evidence/ Researcher / Practitioner</i>
A collaboration of science and art	Cape Farwell
Making it local	Cape Farewell, 350 Art, Irland (2009)
The use of a combination of methods	Cape Farwell, Imagine 2020, APE, UVA (2011), Osborn and Shenai, Julia Calfee
The targeting a particular audience	Imagine 2020
Public participation	Imagine 2020, APE, 350 Art, Irland (2009)
Making art large	250 Art, APE, Climarte, Burko (2014)
Making art interactive	UVA (2011)
The suggestion of solutions	Hard Rain Project (2006)
The use of fear	Graves and Madoc-Jones
The use of imagined Environments	Graves and Madoc-Jones
Making art scientific/using scientific information	Daniel Crawford, Nora York, Osborn and Shenai
The use of poetry/ poetic elements	Mason Bates, Julia Calfee, John Luther Adams
<i>What should the aim of climate change art be?</i>	<i>Evidence/ Researcher / Practitioner</i>
To connect with people and make people concerned	Paterson (2007)
To engage the public with something they can't see	Evans and Hansen (2007)
To maximise the reach to be viewed by maximum amount of people	Hard Rain Project (2006)



### 6.3 Template 3

To complete the case study adaptations, Templates 1 and 2 were combined. To do this, elements that overlapped between Templates 1 and 2 were drawn out to create Template 3. For example, both Templates 1 and 2 stated that to create effective climate-change communication one must use a combination of methods and/or interventions; therefore this was added to the combined template.

The list below shows the combination of templates, now Template 3. In order to create effective climate-change communication the project must:

<b>TEMPLATE 3</b>	
<b>1</b>	Use a combination of methods/interventions
<b>2</b>	Be made local
<b>3</b>	Suggest solutions
<b>4</b>	Use literature and/or poetry
<b>5</b>	Be able to relate it to/target certain age groups
<b>6</b>	Include trusted information (e.g. scientific)
<b>7</b>	Use some format of visual
<b>8</b>	Involve the public through public participation

Template 3 was needed as it includes both the information from the literature and from practitioners. It also provided a condensed list to aid the adaptation of the case studies.

## **7. Case Study Adaptations**

*This chapter reviews the findings of the Results section (The Templates) to assess how each project addressed in the Analysis of Practice (Chapter 5.4) adheres to these findings. From this 4 case studies have been selected for adaptation in order to comply with the findings. Through this, Template 4 is created which takes into consideration the literature, the results section and the findings from the case study adaptations.*

### **7.1 Tables to show how practices adhere to Template 3**

The tables below assess the projects created by artists, both individual and large organisations addressed in the Analysis of Practice. The tables aim to show if current alternative communication relates to research from the literature assessed in the systematic review, in particular to assess whether projects fulfil the components in Template 3. The Analysis of Practice projects have been divided into 3 tables for the assessment – Large Art Organisations, Individual Artists and Music. The key below explains the symbols used in the assessment tables.

<b>KEY</b>	
Symbol	Explanation
✓	Indicates a components the practitioner DID address
X	Indicates a component the practitioners did NOT address

### 7.1.1 Large Art Organisations

Template Information <b>LARGE ART ORGANIZATIONS</b>	Cape Farewell (2010-2014) <i>Sea Change</i>	Cape Farewell (2006) <i>Burning Ice</i>	Imagine 2020 (2014) <i>Out of Ice</i>	Imagine 2020 (2014) <i>Museum of Water</i>	Climarte (2015) <i>Art + Climate = Change</i>	APE (2015) <i>Blue Whale Project</i>	350 Art (2014) <i>Large Art</i>
Uses a combination of methods/interventions	✓	✓	✓	✓	✓	✓	X
Must be made local	✓	X	X	✓	X	X	X
Needs to suggest solutions	✓	X	X	X	✓	X	✓
The use literature/poetry	NA	✓	✓	X	X	X	X
Must be able to relate to it/target certain age groups	X	X	X	X	X	X	X
Must include trusted information (e.g. scientific)	✓	✓	X	X	✓	X	X
Use some format of visual	✓	✓	✓	✓	✓	✓	✓
Public Participation	✓	X	X	✓	✓	✓	✓

Table 1: Large Art Organisations

### 7.1.2 Individual Artists

Template Information <b>INDIVIDUAL ARTISTS</b>	UVA 2011 <i>High Arctic</i>	Katie Paterson 2007 <i>Vatnajökull</i>	Evans and Hansen 2007 <i>Champs d'Ozone</i>	Diane Burko 2014 <i>Politics of Snow</i>	Diane Burko 2014 <i>Polar Investigations</i>	Stibbon and Brown 2007 <i>Glacial Shifts</i>	Graves and Madoc-Jones 2010 <i>London Postcards from the Future</i>	Knowles 2012 <i>Dragon Spruce</i>	Irland 2009 <i>Ice Books</i>
Uses a combination of methods /interventions	✓	X	✓	X	✓	X	X	X	✓
Must be made local	X	X	✓	X	X	X	✓	✓	✓
Needs to suggest solutions	X	X	X	X	X	X	X	X	✓
The use literature /poetry	✓	X	X	X	✓	X	X	X	X
Must be able to relate to it/target certain age groups	X	X	X	X	X	X	X	X	X
Must include trusted information (e.g. scientific)	X	X	X	✓	X	✓	X	X	✓
Use some format of visual	✓	X	✓	✓	✓	✓	✓	✓	✓
Public Participation	✓	✓	X	X	X	X	X	X	✓

Table 2: Individual Artists

### 7.1.3 Music

Template Information <b>MUSIC</b>	Hard Rain Project 2006	Mason Bates <i>Liquid Interface</i>	Daniel Crawford <i>A Song of Our Warming Planet</i>	John Luther Adams <i>Become Ocean</i>	Nora York <i>Water Music</i>	Osborn and Shenai <i>Change Ringing</i>	Julia Calfee <i>The Last Song of the Glaciers</i>
Uses a combination of methods/interventions	✓	X	X	X	X	✓	✓
Must be made local	X	✓	X	✓	X	X	X
Needs to suggest solutions	X	X	X	X	✓	X	X
The use literature/poetry	✓	✓	X	X	X	X	✓
Must be able to relate to it/target certain age groups	X	X	X	X	X	X	X
Must include trusted information (e.g. scientific)	X	X	✓	X	✓	✓	X
Use some format of visual	✓	X	X	X	✓	X	✓
Public Participation	X	X	X	X	✓	X	X

Table 3: Music

### 7.2 Background to Case Studies

Four projects from the Analysis of Practice have been selected for adaptation to adhere to the components in Template 3. The four projects that have been selected are:

1. Graves and Madoc-Jones, Postcards from the Future (2010) - Art
2. Evans and Hansen, Champs d'Ozone (2007) – Art
3. Daniel Crawford, A Song of our Warming Planet (2012) – Music
4. Julia Calfee, The Last Song of the Glaciers (2010)- Art and Music

These projects were chosen to adapt to cover a variety of alternative methods through selecting two art, one music and one combination (art and music) project. These projects were also chosen because they appear to lack the components in Template 3 that have been deemed essential for effective climate-change communication. Each case study adaptation begins with an extract from the appropriate assessment table above. This is to show which components the case study is missing in its original state. A table is also provided at the end of the adaptation to show how or if the adaptation has improved the project from its initial state by making it into a more effective method of climate-change communication. The methodology for each case study has been included to show the process and decisions behind the adaptation.

### 7.3 Case Study 1: Adaptations of *Postcards from the Future*

#### 7.3.1 Background to *Postcards of the Future* Case Study

The original project created by Graves and Madoc-Jones entitled “London Postcards from the Future” portrays potential images of London in 50 years. Graves and Madoc-Jones used imagined environments to create six scenarios of future London if current climate change issues continue at the rate they are. Figure (20) is an example of one of the postcards – London Underwater.

This adaptation aims to investigate the use of fear in communicating climate change especially as there have been a number of conflicting views as to its use as an effective method. Researchers including Meijinders et al (2001a & 2001b) and Roser and Thompson (1995) found fear to be a suitable method of communication, whereas O'Neill and Nicholson-Cole (2009) found fear to be ineffective when communicating climate change. However, Spence and Pidgeon (2010) and Morton et al (2011) proposed that fear can be effective when used in combination with positive framing. This concept is important to this adaptation, as fear is central to the original project by Graves and Madoc-Jones. Therefore images of fear and the extreme will be used but in conjunction with solutions to the problem and positive framing.



Figure 20: *London Postcards from the Future*, Graves and Madoc-Jones (2010) Image Source: <http://www.postcardsfromthefuture.co.uk/>

In its original state, this project only complies with two components from Template 3 - making it local and making it visual.

<b>Components</b>	<b>Graves and Madoc-Jones</b>
Uses a combination of methods/interventions	X
Must be made local	✓
Needs to suggest solutions	X
The use literature/poetry	X
Must be able to relate to it/target certain age groups	X
Must include trusted information (e.g. scientific)	X
Use some format of visual	✓
Public Participation	X

Table 3: Extract from Table 2

To fulfil the criteria of Template 3 this case study adaptation will:

- Use futuristic imagery but no more than 20 years into the future
- Use fear but suggest solutions and use positive framing
- Add in literature and/or poetry therefore using a combination of methods
- Base the image on scientific facts
- Create an image that will appeal to a particular age group
- Involve the public by encouraging them to send the postcard on


This case study adaptation focuses on current climate change research to assess the realistic outcomes of climate change over the next 20 years. Through researching ideas for this project, two significant issues that could impact the UK in 20 years were established - flooding and heatwaves.

The original idea for this adaptation was to use an image of Keele. The image was to be adapted using scientific research to create an image showing what the area could look like in 20 years under current climate change conditions. However, research showed that the UK is already experiencing extreme climatic events of flooding and heatwaves. This adaptation therefore uses recent photographs and imagery from areas around the UK that have already



suffered from extreme climatic events. These types of images were used to ensure the project would be seen as realistic and locations would be recognised. However the date was changed from the original image to be no more than 20 years into the future.

This is the format for the back of the postcards (Concept 1). It will be filled in appropriately with solutions for the particular climate change issue that features on the picture side of the card.

<div style="border: 1px solid black; height: 250px; margin-bottom: 10px; position: relative;"> <span style="position: absolute; top: 5px; left: 5px;">Solutions</span> </div>	<div style="text-align: right; margin-bottom: 20px;">  </div> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/>
---	--

*Concept 1: Back of postcard for Postcards of the Future Adaptation*

### 7.3.2 Flooding

Data for occurrence of flooding is provided by the Environment Agency which denotes contingency allowances for net sea level rise relative to 1990. The “2025” data set was used for this adaptation as it was under 20 years into the future therefore adhering to a component in Template 3. Table 5 is an extract taken from “Table 1: Recommended contingency

allowances for net sea level rises (Net sea level rise (mm per year) relative to 1990)” from the 2013 Environment Agency Climate Change allowances for planners.

<b>The Environment Agency</b>	<b>Net sea level rise -1990 to 2025 (mm per year)</b>
East of England, east midlands, London, south-east England (south of Flamborough Head)	4.0
South-west England	3.5
North-west England, north-east England (north of Flamborough Head)	2.5

*Table 5: Recommended contingency allowances for net sea level rises (Net sea level rise (mm per year) relative to 1990) – Environment Agency (2013)*

These figures show an increase in the occurrence of extreme climatic events such as flooding by 2025. This is due to an adjustment of high water levels and an increase in the intensity of rainfall and river flow. Furthermore, the average height of waves will increase due to an increase in water depth as well as an increase in the frequency, duration and severity of storms.

Although an increase in storms cannot be directly linked to climate change, the occurrence of flooding and heavy rainfall can be. As temperatures rise, physics shows that a higher amount of atmospheric moisture will cause an increase in heavy rainfalls in the future. Future rainfall periods can be expected to be prolonged and more intense. In addition, scientists are confident that the heating of oceans and melting of land ice will lead to sea level rise which will cause an increase in the amount of coastal flooding.

The image chosen for the first postcard (Image 1) is a photograph taken of the UK May 2012 floods in Worcester. Through using imagery of extreme events that have occurred recently, it is hoped the public will want to connect more with the art or project. At present, these extreme climatic events are rare; however scientists have predicted these extreme events are likely to become a common occurrence in the near future. The date written on the postcard is “May 2025”. This date was chosen as May as this was when the UK 2012 floods occurred

and 2025 is 10 years into the future from now (2015). The public therefore could see this project as a realistic. The date on the postcard is not considered futuristic so the public can see flooding as a pressing issue and hopefully have greater engagement with the project.

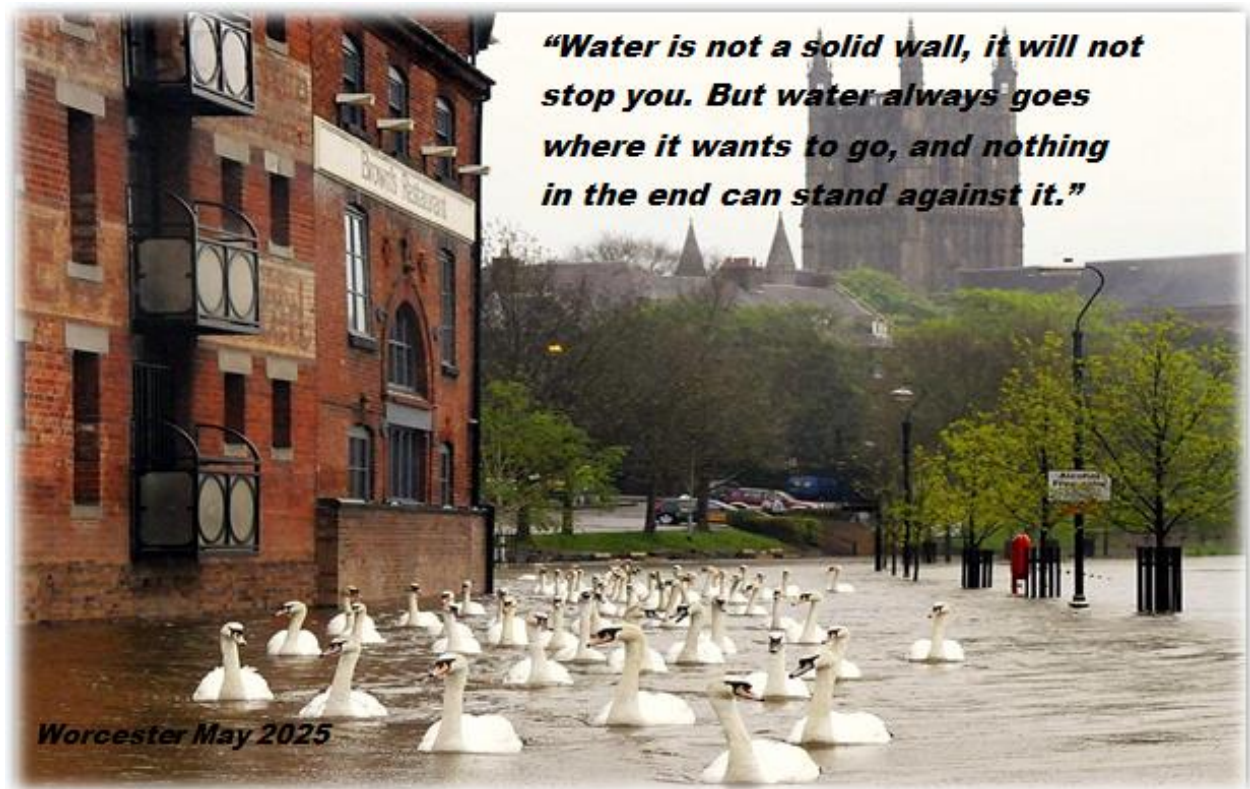


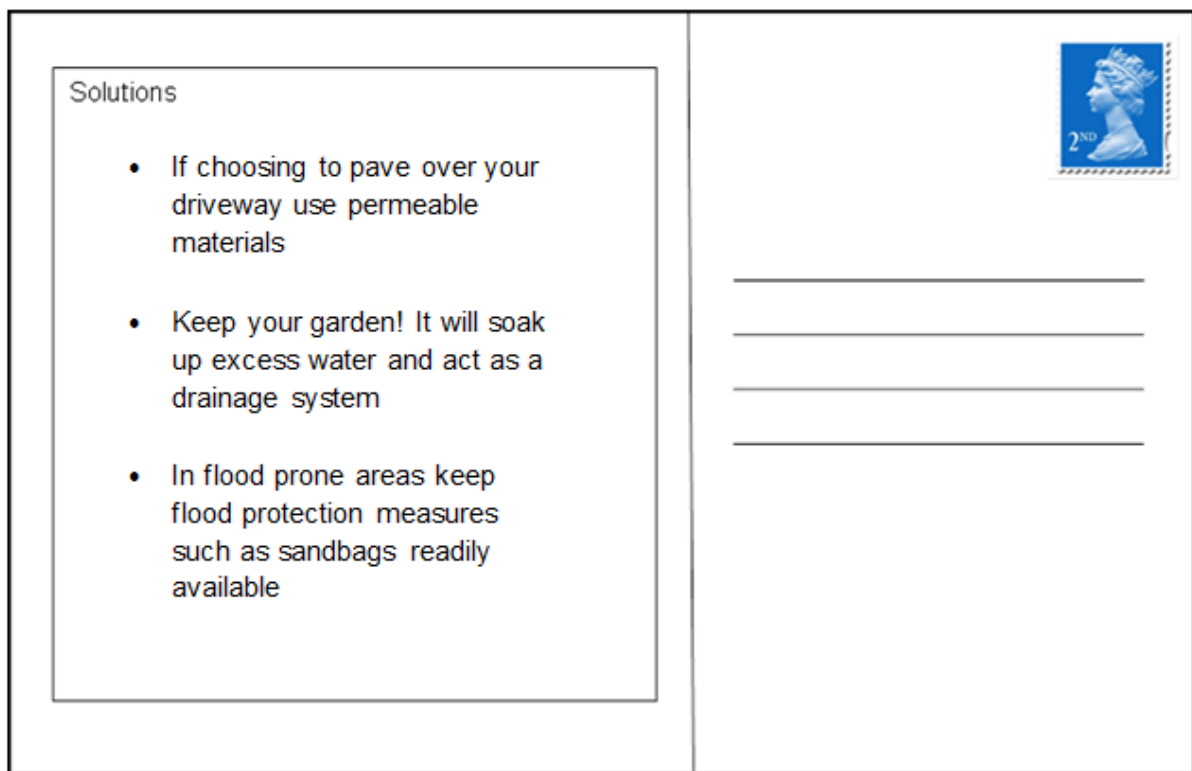
Image 1: Postcards of the Future Adaptation, Image Source: <http://img.chan4chan.com/img/2012-05-04/CwKeO.jpg>

One element that needed addressing was the inclusion of narrative or literature. To incorporate this element, it was decided a quotation that was relevant to the image and message of the project would be included. The quotation chosen for the first postcard is "Water is not a solid wall, it will not stop you. But water always goes where it wants to go, and nothing in the end can stand against it." (Margaret Atwood, *The Penelopiad*). The quote complements the image, as it implies nature has control especially as there are no people in the photo- just swans. It shows water cannot be tamed by humans and will go wherever it

wishes with no buildings providing an obstacle. The border of this postcard appears to fade, to show water has no restrictions.

The second flooding postcard (Image 2 - overleaf) contrasts dramatically with the first. Once again it uses a photograph from the UK May 2012 floods in Worcester; however this photograph is much darker and could be considered sinister. This postcard uses the quote “He stretched out his arms toward the dark water in a curious way, and, far as I was from him, I could have sworn he was trembling” from Fitzgerald’s *The Great Gatsby*. It was appropriate for this postcard because it makes the water appear mysterious and something to worry about. The lack of people or animals in the photograph also adds to this sinister appeal, almost as if the water has taken over. The back of the postcard showing the solutions is also below (Image3). As the same issue is addressed in each postcard the solutions on the back of the postcards are the same.





*Image 3: The back of postcards 1 and 2 providing explanations on how to combat flooding issues*

### 7.3.3 Heatwaves

The next two postcards aim to address a significant problem that according to the government will occur in around 10 years' time – rising temperatures and heatwaves. The Government, in conjunction with the Environment Agency provides information regarding heatwaves. They focus on 5 years (2020) and 35 years (2050) into the future. They have predicted that summers across the UK are going to get hotter by approximately 1.6°C by 2020 and 2.7°C by 2050. Due to an increase in heat, summers will also get drier by approximately 7% in 2020

and 19% by 2050 and winters will be warmer and wetter by 6% in 2020 and 14% in 2050. Increases in hotter, drier summers and warmer winters could cause extreme climatic events including flooding, drought and heatwaves. For the adaptation, only the predicted 2020 data is used to comply with the components of Templates 3.

The occurrence of extreme weather events is predicted to increase. The photograph on the front of the first heatwave postcard (Image 4) is taken from the heatwaves of July 2013 in Nottingham, England. An urban beach was set up in Nottingham to cope with the first prolonged heatwave in seven years prior to 2013. This heatwave took the country by surprise so much so that shops sold out of electric fans and summer supplies. Scientists estimate that this sudden surge in temperature could have caused hundreds of premature deaths. Using a genuine photograph of an extreme climatic event from recent years it is hoped the public understand the reality of climate change. The aim for this project was for people to understand that although the heatwave of July 2013 lasted a month, this type of weather is predicted to become a regular occurrence hence the caption on the postcard “Nottingham, March 2025”. March is typically a spring month therefore showing this environment in almost a foreign climate was an attempt to highlight the potential extreme future weather event.

To address the missing element of narrative or literature this postcard also uses the quote “It was always so hot, and everyone was so polite, and everything was all surface but underneath it was like a bomb waiting to go off” (James McBride *The Colour of Water*). This quotation sums up climate change. The public appear not to be worried about rising temperatures - some even see it as an improvement - whereas in reality there are severe consequences resulting from rising temperatures and extreme climatic events.





Public risk to disease from air quality complication is increased by the occurrence of heatwaves. Although disease from air quality complications has not yet been an issue in the UK, heatwaves doubled the death rates in Moscow, Russia from around 360 per day to 700 in August 2010 (Miller 2010). With rising temperatures and extreme events, disease and death tolls are set to increase in the UK and sights of people in gas masks will not just be a common sight in places such as Japan and China (which already suffers air quality complications) but for the UK and surrounding countries. The second heatwave postcard (Image 5) uses a photograph of people in gas masks taken from the heatwaves in Moscow in 2010. The photograph was photo shopped for this postcard to remove elements that related to Russia in an attempt to make it relevant to the UK public to increase engagement.

To address the element of literature, this postcard uses the quote “She glanced outside at the sky, filled with clouds and smog. All the pollution, all that hell—even the stars didn’t stand a chance.” (Katherine McIntyre, *Poisoned Apple*). This quotation fitted with the black and white theme of the postcard as it highlights the issue of smog and pollution. London,

September 2025 is the date on the postcard. September was the month the original event happened in Moscow 2010 and 10 years into the future from now aligns with information from the government and the publics' ability to assess future impacts.

The back of the heatwaves postcards is seen in Image 6. It shows how simple everyday solutions can improve air quality in the long term.



Image 5: Postcards of the Future Adaptation 4, Image Source:

[http://archivoimagenes.heraldo.es/uploads/imagenes/bajacalidad/2010/08/06/mosccu\\_fedba685.jpg](http://archivoimagenes.heraldo.es/uploads/imagenes/bajacalidad/2010/08/06/mosccu_fedba685.jpg)



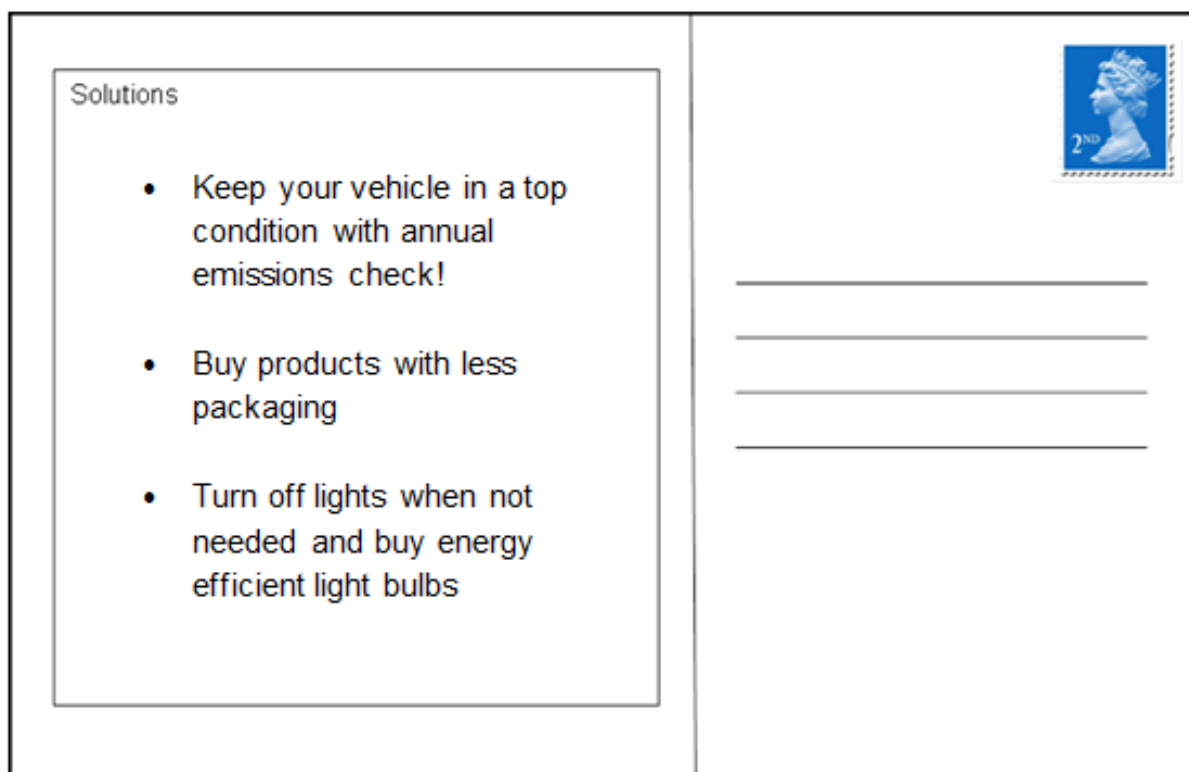


Image 6: Back of postcard for adaptations 3 and 4 with solutions on how to combat heatwaves

#### 7.3.4 Conclusions to *Postcards of the Future* Case Study

A general internet search for solutions to combat the effects of climate change proved difficult when creating this case study. Solutions did not appear readily available and required further researching in journals and articles. There was however considerable information available as to the effects of climate change and what plans the governments and scientists propose to combat these effects. It is evident further research is needed into this area.

Another issue that arose with this case study was fulfilling the component – “Must be able to relate it to/target certain age groups”. Although this project adaptation does not specifically relate to a target age group, this case study could be turned into an exercise to be used in schools. Another way to target a particular age group is to change the quotation on the front of the postcard. For example using quotations from well-known children’s novels such as the Harry Potter series would appeal to children.

Table 5 shows the components this project fulfils after adaptation

<b>Components</b>	<b>Graves and Madoc Jones Postcards from the Future</b>
Uses a combination of methods/interventions	✓
Must be made local	✓
Needs to suggest solutions	✓
The use literature/poetry	✓
Must be able to relate to it/target certain age groups	X
Must include trusted information (e.g. scientific)	✓
Public Participation	✓

*Table 5: Postcards of the Future Adaptation components*

#### 7.4 Case Study 2: Adaptations of *Champs d'Ozone*

##### 7.4.1 Background to *Champs d'Ozone* Case Study

This case study is based on Evans and Hansen's 2007 project, *Champs d'Ozone* (Figure 21). Using images of the Parisian skyline they overlaid bright colours to represent pollutants in the sky which are invisible to the naked eye.

This project was chosen as Evans and Hansen wished to make the unseen, seen. An issue with climate-change communication is not being able to see carbon emissions in the atmosphere, a potential reason why the public are distant from the issue. The aim for this case study is to adapt Evans and Hansen's idea to communicate the effects of greenhouse gases. Table 6 is an extract from Table 2 showing which components were and were not addressed in the primary state of Evans and Hansen's project.

Although this adaptation is not directly related to climate change, it provides an example of how the template and communication techniques can be applied to other environmental messages.



Figure 21: Champs d'Ozone, Evans and Hansen (2007) Image Source:  
<http://hehe.org.free.fr/hehe/champsdozone/index.html>

"Ozone"

Uses a combination of methods/interventions	✓
Must be made local	✓
Needs to suggest solutions	X
The use literature/poetry	X
Must be able to relate to it/target certain age groups	X
Must include trusted information (e.g. scientific)	X
Use some format of visual	✓
Public Participation	✓

To fulfil the criteria Template 3 this case study adaptation will:

- Include a caption to accompany the image with an explanation and solutions to the issue
- Use either literature or poetry, potentially something as simple as “London 2015” in order to give the image perspective
- Use scientific data
- Change the location from Paris to London
- Have a target audience of 18 and above

#### 7.4.2 Method

This case study uses data from Nowcast, which provides an overview of current pollution levels across London on an hourly basis. Readings from monitoring stations generally only report pollutants for a particular place, whereas Nowcast combines a variety of measurements with a model of London to show predictions of overall air quality. Nowcast, show four pollutants – Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), PM<sub>10</sub> particles, PM 2.5 particles. These

*Table 6: Extract from Template 2*

pollutants have been chosen as they have been proven to have an effect on health, particularly

in London. Figure (22) shows the current combined air pollution index levels, taken at 10:00 on Monday 13th April 2015. It may be questioned why, when looking at Figure 22 the lowest pollutants appear to be in the centre of London. This is because certain pollution emitted and created by cars reacts with ozone (O<sub>3</sub>) causing it to change to other chemicals which are not included in the Nowcast data. Due to this, the ozone (O<sub>3</sub>) level in central London is on average lower due to the number of busy roads.

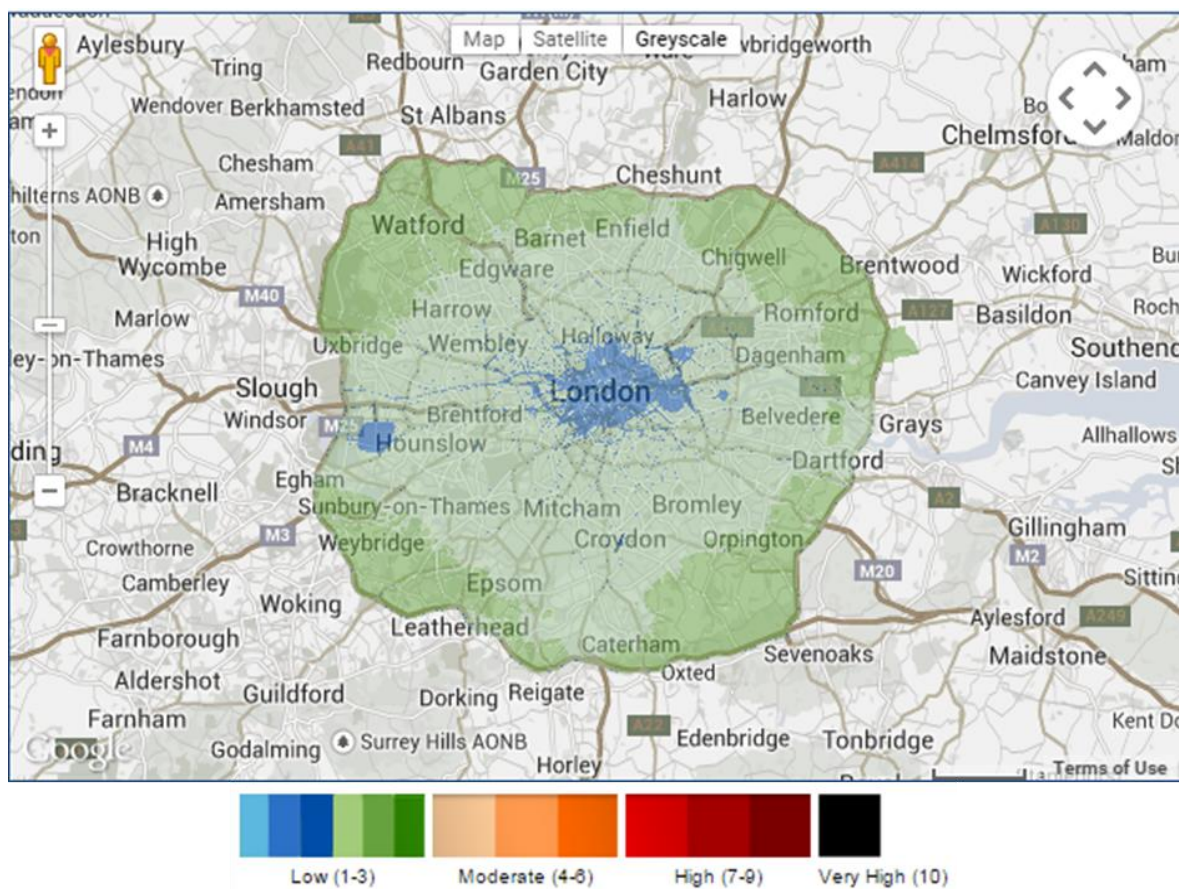


Figure 22: Nowcast data showing the area of London and its pollutants

Figure 22 suggests that overall pollution is low across London. This questions whether climate change initiatives need to be implemented if pollution is low. However, air pollutant levels in the majority of London are sufficiently small enough to be classified as low in accordance with the air quality index. When the index was initially created these levels were considered to be sufficiently low enough not to cause serious health effects. However there is

currently much debate as to whether there can be a safe level for any of these pollutants. Although the overall view of London shows low levels of pollution, when examining particular roads and areas increases in pollution can be detected.

For example, Marylebone Street in central London is considered one of the most polluted areas as it is a main artery road into the city. Figure 23 is a zoomed in image of the area with all pollutants shown on the map. This shows there is variability in levels of pollution along Marylebone Street, with areas around Regents Park and Baker Street station emitting high quantities of pollutants.

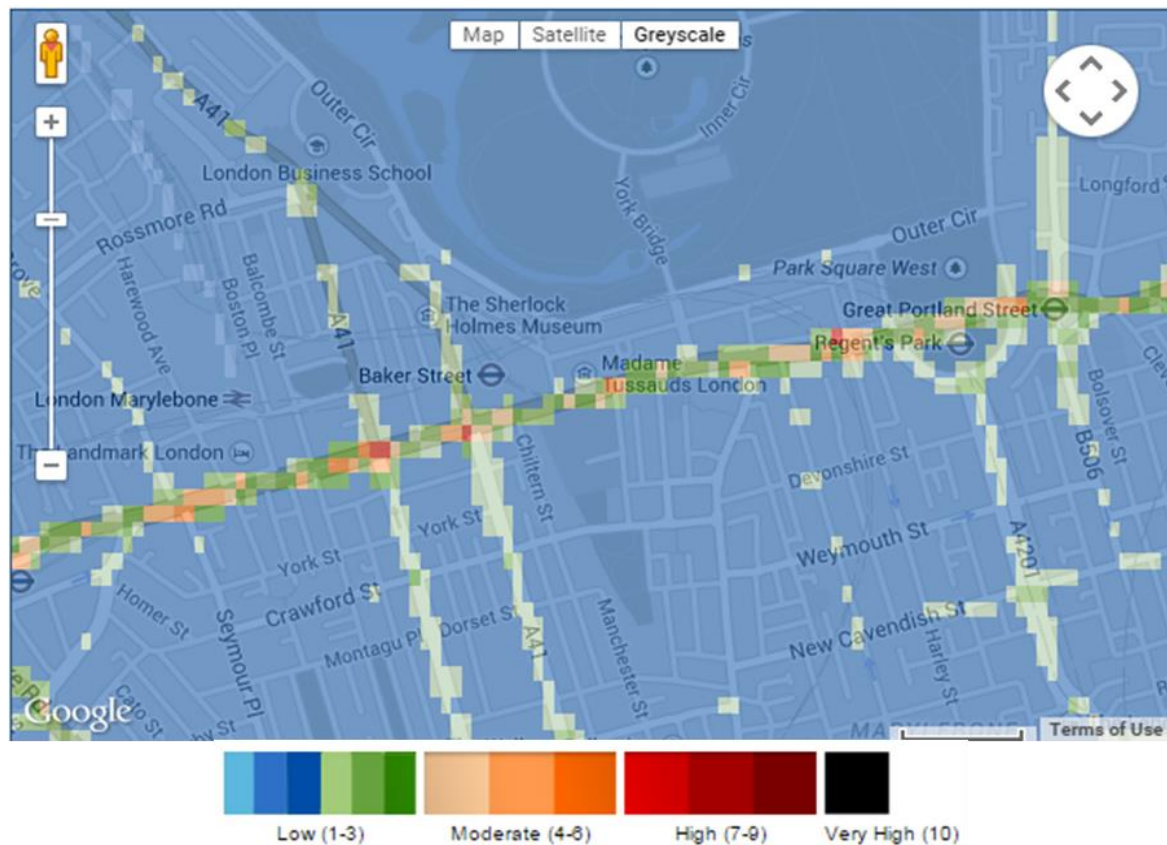


Figure 23: Nowcast data showing a zoomed in image of Marylebone Street

#### 7.4.3 Adaptation 1 of *Champs d'Ozone*



The aim for this case study is to use Nowcast data for Marylebone Street to create an artistic representation of the unseen atmospheric pollutants. Figure 24 is a satellite version of Figure 23 to show the study area. This project established that using satellite imagery instead of generic map views would be more beneficial to the viewer as satellite imagery provides a linking context with locality and realism.

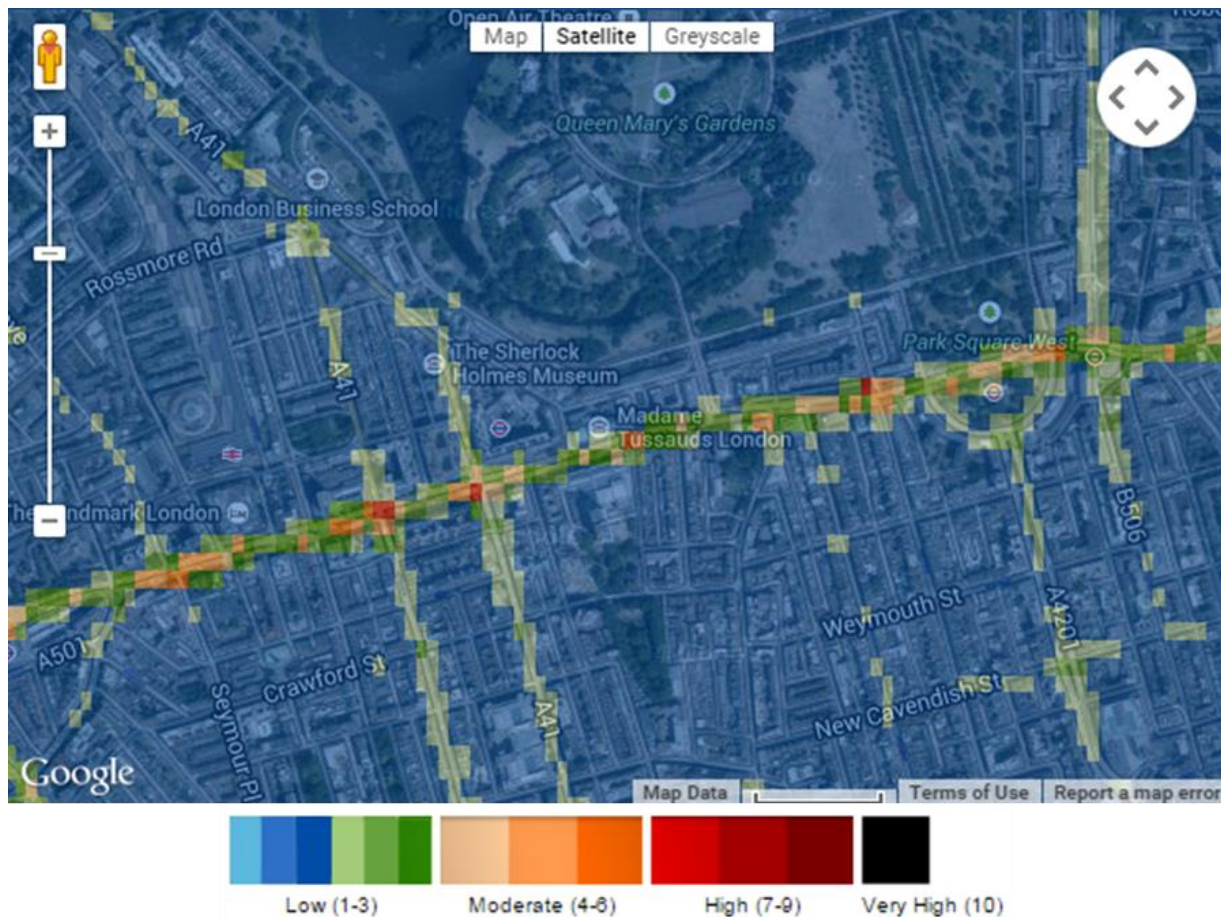


Figure 24: Nowcast satellite image of Marylebone Street

Figure 25 is a zoomed in image of Figures 23 and 24, specifically focussing on an area near to Baker Street station. The zoomed in image emphasises the variability of pollutants in one area, highlighting those areas are most affected by air pollutants. The intensity (or amount) of air pollutants is indicated by the key at the bottom of Figure 25.

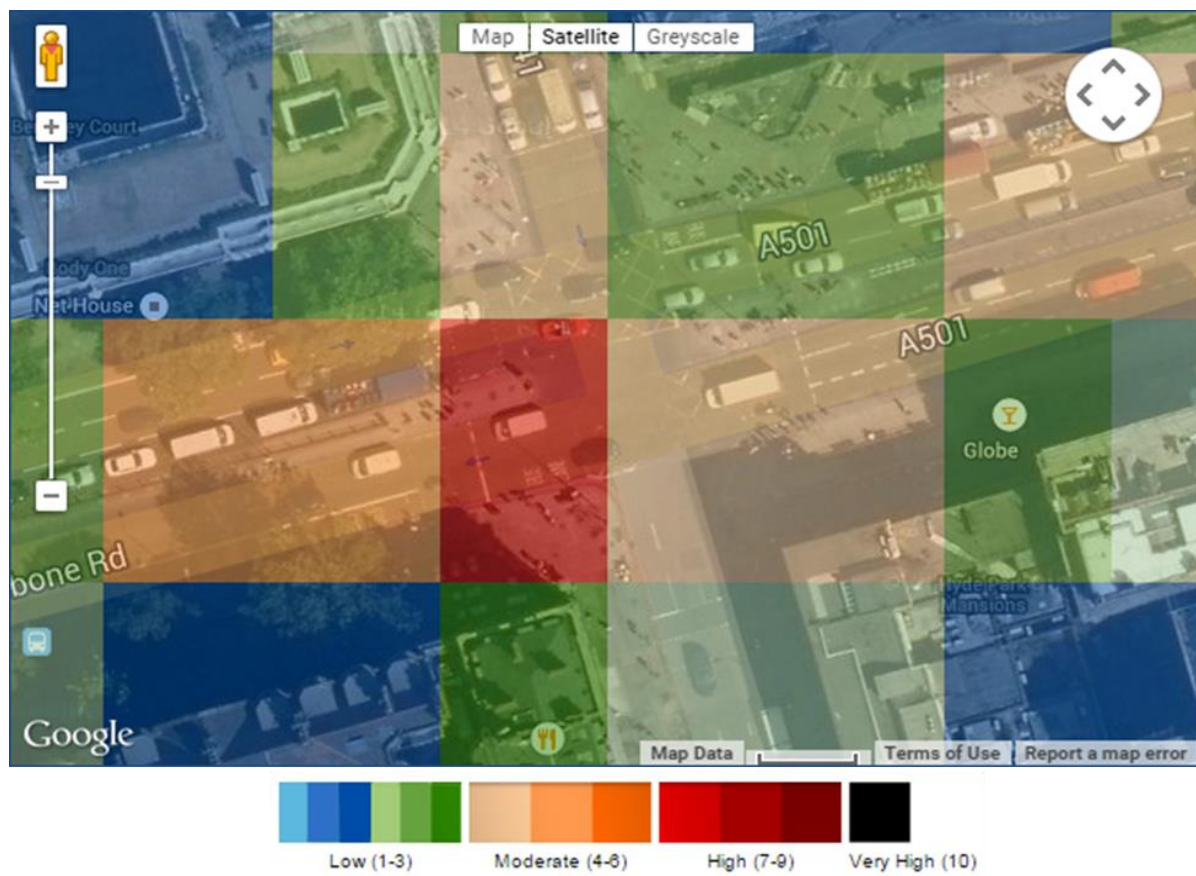


Figure 25: Nowcast zoomed in image of Figures 23 and 24



Figure 26 is a further zoomed in image of the same area in Figure 25, which will be used for this case study adaptation.

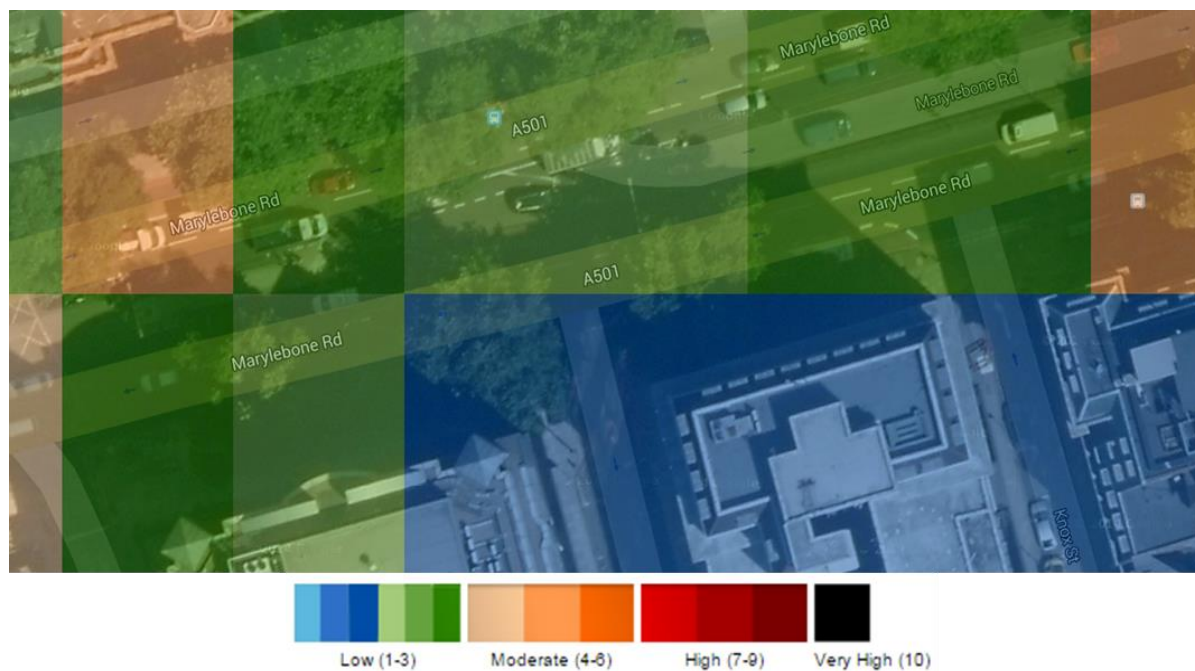


Figure 26: Nowcast data – further zoomed in image of the study area

Image 7 is an example of how the image in Figure 26 could be used. It is both artistic and educational. The example does not include map labels, but instead includes the location and the actual month for the pollutants in the image. By using a map in satellite format, it is easier for the viewer to relate to as it adds both locality and realism. To incorporate literature and narrative into this project, this case study uses both a caption and a quotation appropriate for the image. The caption gives the image a title “Love is in the air. Love and Pollution” taken from Kintz novel *The Book Title is Invisible*. The caption provides an explanation for the image as well as solutions on how to reduce air pollution. The caption includes “simple” solutions, instead of solutions such as purchasing a biofuel, hybrid or electric car. The idea behind realistic solutions was to encourage public participation and engagement. The caption also aims to explain the issue at hand by giving the public a brief insight into the background information surrounding this topic. Public participation is one aspect this project struggles to

tackle – it hints at public participation through the solutions however there is not an interactive aspect to the project.

Solutions in the caption could include any from the following:

- Using energy efficient appliances and devices in the home
- Renewable technology
- Recycling and reusing products
- Using eco-friendly building materials
- Eating organic, locally grown foods
- Vehicles – adopting clean technologies – electric, hybrid or biofuel
- Walk, carpool or use public transportation
- Not leaving vehicles idle



**Love is in the air. Love and Pollution** (Kintz *This Book Title is Invisible*). This image shows an overview of Marylebone Street, London – one of the most polluted areas of the Capital. The key below shows the variation in air pollutants across this area ranging from low (blue) to high (red). Pollution rates are high in this area due to the number of vehicles on the road. To improve air quality and health easy solutions include:

- Turn off the engine instead of leaving the car idling
- Reduce car use by carpooling, walk or use public transportation



Image 7: Adaptation 1 of Champs d'Ozone

These solutions were collected and collated from a generic “climate change mitigation” internet search. For this project, two solutions were chosen that required the least amount of lifestyle change. However, the solutions in the caption could change dependent on target audience.

#### 7.4.4 Adaptation 2 of *Champs d’Ozone*

Another idea for adaptation, either to accompany the previous example or as a separate project is to use the Nowcast data to show the atmospheric conditions and pollutants surrounding famous landmarks. Through using famous landmarks, the public should be able to recognise and connect with the image even if the landmark is not near to them, for example - Buckingham Palace. Figure 27 uses the Nowcast data to show an overview of Buckingham Palace. On the key associated with Nowcast data, light blue and green indicate areas of low pollution, therefore the pollution levels for this area can be deemed as low.

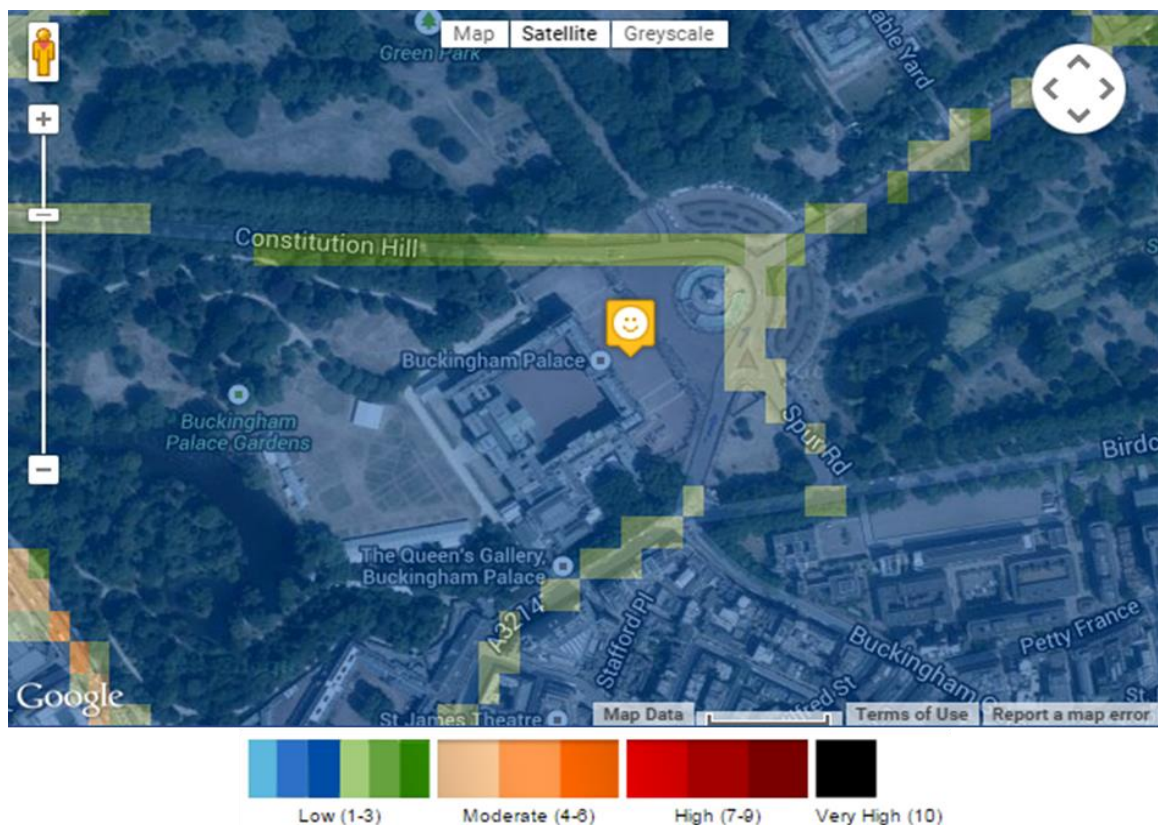


Figure 27: Nowcast data to show an overview of Buckingham Palace



From the overview of Figure 27, it was established that Buckingham Palace was in the “blue” low pollution zone according to the Nowcast data. Therefore an image of Buckingham Palace was chosen, and a blue filter was overlayed to emphasise the low pollution in this area (Image 8)



*Image 8: Adaptation 2 of Champs d'Ozone of Buckingham Palace, Image Source: Daily Mail: [http://i.dailymail.co.uk/i/pix/2013/12/04/article-2517765-1AAC9530000005DC-701\\_964x503.jpg](http://i.dailymail.co.uk/i/pix/2013/12/04/article-2517765-1AAC9530000005DC-701_964x503.jpg)*

Figure 28 shows an overview of the area surrounding Somerset House, London. Unlike the area surrounding Buckingham Palace, this area shows a lot more variability in pollutants ranging from low to high. As the majority of pollutants surrounding Somerset House are on the top end scale of “low” – Image 9 therefore shows an image of Somerset House with a green filter.

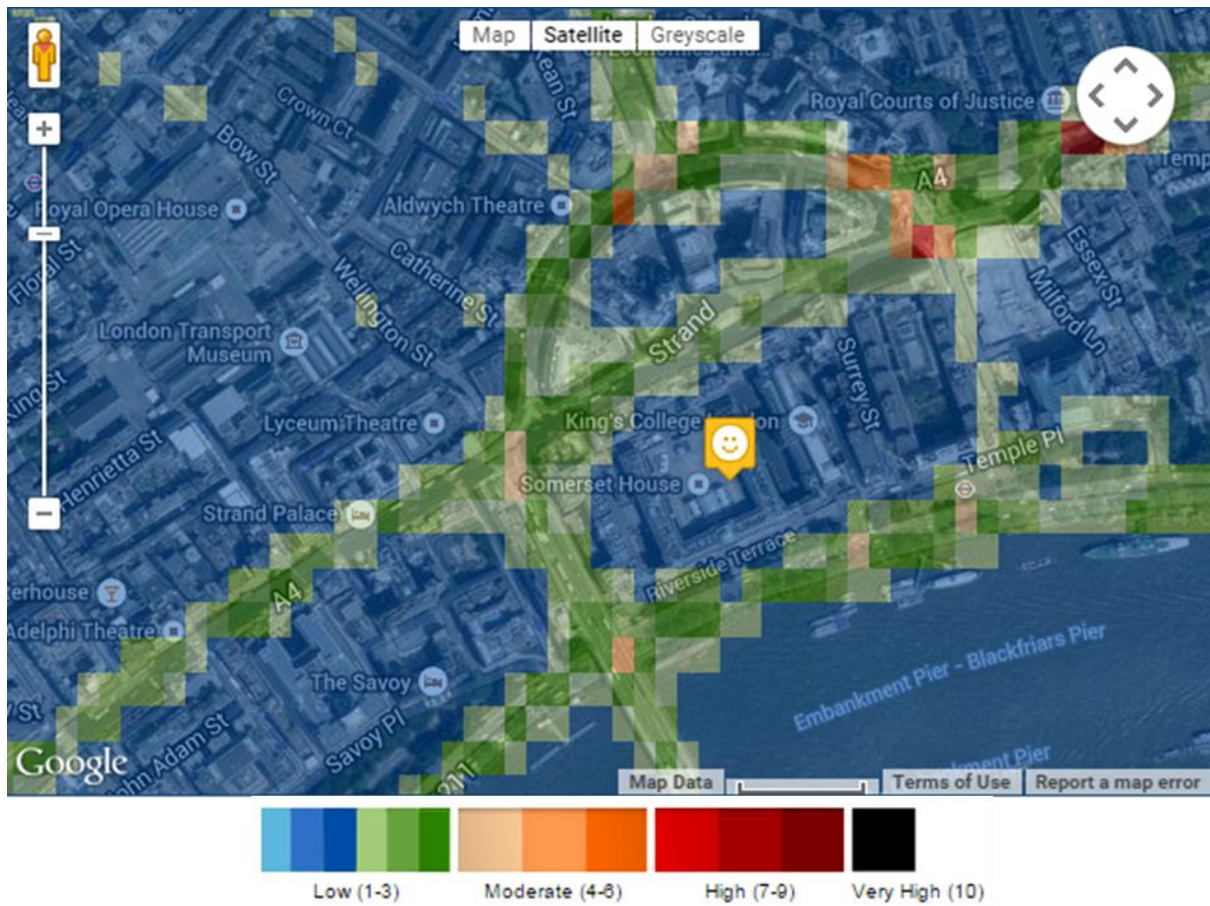


Figure 28: Nowcast Data to show an overview of the area surrounding Somerset House



Image 9: Adaptation 2 of Champs d'Ozone of Somerset House, Image Source: <http://www.pre-construct.com/Projects/Images/Somerset-hse/somerset-house-trust.jpg>

This case study would be most successful if used in exhibition form. A single image will not provide adequate information about the issues or pollutants and the message could be overlooked. Furthermore the public may not understand what the image is trying to portray or misinterpret it. Therefore by creating a poster or an exhibition, keys and explanations can be included. Using an exhibition would be useful to incorporate both adaptations. The second adaptation at present would not work successfully by itself, as it requires background information and detailed explanation.

#### 7.4.5 Conclusions to *Champs d'Ozone* Case Study

An issue encountered with this case study was the severity of air pollution. Both Nowcast and DEFRA (Figure 29) show air pollution levels across the UK as low, with only specific areas on certain days reaching moderate. Even in central London aside from main roads, the pollution levels are low and not considered a threat to human health. Although Evans and Hansen's project aided people to see the unseen, this questions whether air pollution really needs to be prioritised through art. Difficulties will arise in attempting to engage the public with an issue that is not considered serious according to data. Despite the data, it is a known fact that London has one of the highest pollution levels in the country. City councils, for example Westminster, where national air quality objectives have been exceeded have created action plans in an attempt to combat this issue. This shows that councils are attempting to improve pollution levels and have the information readily available; however the dissemination of this material needs to be improved.

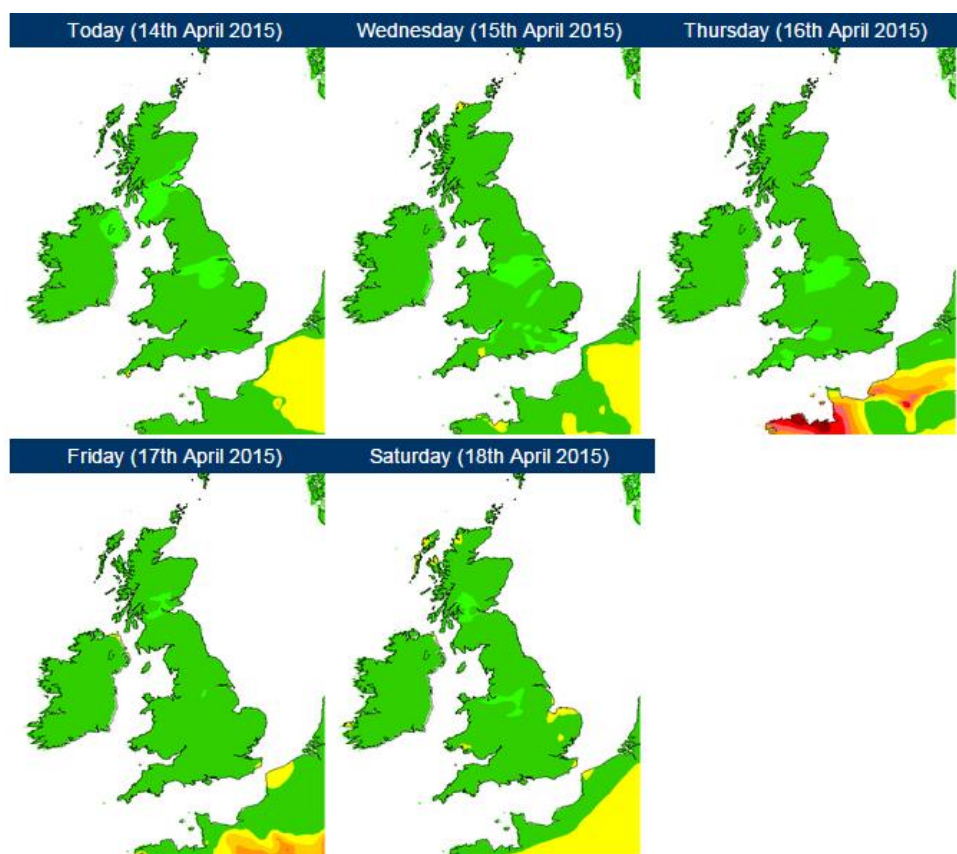


Figure 29: Air Pollution Data for April 2015 DEFRA (2015)

Components	Evans and Hansen 2007 <i>Champ d'Ozone</i>
Uses a combination of methods/interventions	✓
Must be made local	✓
Needs to suggest solutions	✓
The use literature/poetry	✓
Must be able to relate to it/target certain age groups	X
Must include trusted information (e.g. scientific)	✓
Use some format of visual	✓
Public Participation	✓

Table 7: Components Champs d'Ozone adaptation now adheres to



## 7.5 Case Study 3: Adaptation of *A Song of Our Warming Planet*

### 7.5.1 Background to *A Song of Our Warming Planet* Case Study

University of Minnesota student, Daniel Crawford (Figure 30) attempted to communicate climate change through data sonification. The project created by Crawford and supervisor Scott St. Georges aimed to create a musical representation of rising global land and sea temperatures.



Figure 30: Still from "*A Song of Our Warming Planet*" Crawford (2013), Image Source: <http://thisgivesmehope.com/wp-content/uploads/2013/07/737-Daniel-Crawford.jpg>

Table 8 is an extract from Table 3 to show the components the project adheres to in its original state.

Components	Daniel Crawford's <i>A Song of Our Warming Planet</i>
Uses a combination of methods/interventions	✓
Must be made local	X
Needs to suggest solutions	X
The use of literature/poetry	X
Must be able to relate it to/target certain age groups	X
Must include trusted information (e.g. scientific)	✓
Use some form of visual	✓
Public Participation	X

Table 8: Extract from Table 3

To fulfil the criteria of Template 3 this case study adaptation will:

- Use a combination of methods of music, video and photographs to show temperatures rising
- Be narrowed to the UK
- Use a caption to provide solutions to decrease the rate of temperature rise
- Use literature within the caption
- Provide a YouTube link for the communication to be shared

#### 7.5.2 Method

This case study used the same elements Crawford used including extracting data from the NASA Goddard Institute of Space Studies. The data ranges from 1880 to 2015 (then 2012 when Crawford's project was created). The column "December – November (D-N)" was chosen over "January- December (J-D)". Crawford wrote in the accompanying notes to his project that the coldest year on record was 1909 with a temperature of  $-0.47^{\circ}\text{C}$  which was in the D-N column. However, although the temperature in 1909 was  $-0.47^{\circ}\text{C}$ , the coldest year on record was in fact 1911 with a temperature of  $-0.49^{\circ}\text{C}$ . The warmest year on record is 2010 with a temperature  $0.67^{\circ}\text{C}$ . The NASA data included 135 years and shows the average global temperature has risen by  $0.8^{\circ}\text{C}$  since 1880. Using this information the project assigned each year on record to a note on a keyboard – starting with the lowest note E. As with Crawford's piece, the case study is not a perfect musical scale however, there is a clear trend of temperature rising. The beginning of the piece begins in a lower register while the end of the piece reaching the top notes of the keyboard.

The video differs from Crawford's version as the case study adaptation attempts to suggest reasons for the warming. It is essentially a historic timeline of the last 135 years showing reasons for potential warming such as an increase in factories, traffic and pollution.

Below are selections of video stills from the case study adaptation of Crawford's project. The stills chosen show some of the locations represented in the video. The stills are in chronological order (Image 10; Image 11) and show how changes in society have caused the climate changes seen today. Increased numbers of cars on the road (Image 12; Image 13; Image 15; Image 17) and increased air pollution (Image 14) are both potential reasons why there has been an increase in extreme climatic events (Image 16). The final image in the video (Image 18) is of a graph that puts the images and story of the video into data format. The graph also shows future predictions.



*Image 10: Video still 1 from case study adaptation 3 video*



*Image 11: Video still 2 from case study adaptation 3 video*



*Image 12: Video still 3 from case study adaptation 3 video*



*Image 13: Video still 4 from case study adaptation 3 video*



*Image 14: Video still 5 from case study adaptation 3 video*





*Image 15: Video still 6 from case study adaptation 3 video*



*Image 16: Video still 7 from case study adaptation 3 video*



Image 17: Video still 8 from case study adaptation 3 video

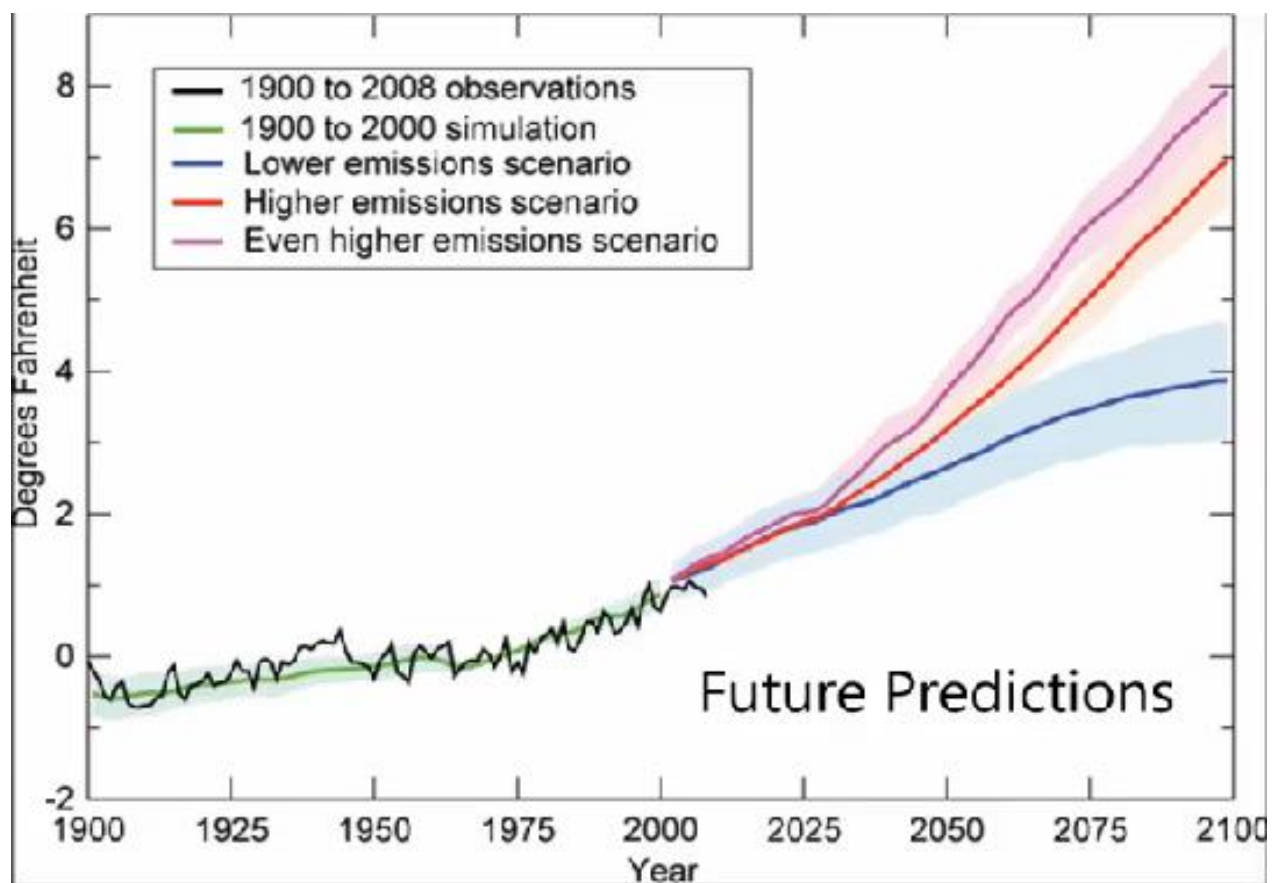


Image 18: Video still 9 from case study adaptation 3 video

This caption is to accompany the video. It explains the purpose of the video, the process of the project and solutions to rising temperatures:

This Case Study Adaptation is a take on Daniel Crawford's "A Song of our Warming Planet".

This Case Study uses NASA global temperature data for the past 135 years to create a piece of data sonification - essentially where data becomes a piece of music. The data stretches from 1880 to present day (2015). To create this piece, lower notes are assigned to colder temperature data and higher notes are assigned to warmer temperature data and then the piece is played. Although it is not the most musical piece of music it is accurate and a clear change can be heard between the beginning (when it was colder) to the end of the piece (when temperatures have risen) as the music gets higher. Despite being global temperature data, this project specifically focuses on the UK. The video to accompany the music is an historic timeline of the last 135 years to show not only the changes of the country over time but reasons for why this may have affected temperatures. For example, the video shows an increase in cars, factories, pollution and people. The worrying aspect of this video is if temperatures continue to rise at the rate they are doing there is not going to be enough notes left on the piano to play the data...

How to help?

3 easy steps to help to reduce greenhouse gases (the culprit of temperature rising!) taken from [environment.about.com](http://environment.about.com) include:

- 1) Reduce, Reuse, Recycle
- 2) Drive Less and Drive Smart - e.g. Make sure your tires are properly inflated
- 3) Always turn off appliances (including lights!) when not in use



A link to the video and caption is here: <https://www.youtube.com/watch?v=rd5EY8WGvR0>

Or can be accessed through ‘*Communicating Climate Change*’ blog here:

<https://faevans.wordpress.com/2015/09/15/links-to-videos-in-thesis/>

### 7.5.3 Conclusions to *A Song of Our Warming Planet* Case Study

Challenges that arose when creating this case study included making it local and addressing a target audience. As it was global temperature data, it was difficult to address a particular area. However, the project focuses on the UK as the video shows multiple areas of the UK that present reasons for rising temperatures – from traffic in London to an increase in factories in Staffordshire. To connect to the public more, the project has a link provided for the video to be shared on social media or via the internet. Although this project does not relate to a particular target audience, this project could be conducted in a school environment.

<b>Components</b>	<b>Daniel Crawford’s <i>A Song of our Warming Planet</i> Adaptation</b>
Uses a combination of methods/interventions	✓
Must be made local	✓
Needs to suggest solutions	✓
The use literature/poetry	✓
Must be able to relate to it/target certain age groups	X
Must include trusted information (e.g. scientific)	✓
Use some format of visual	✓
Public Participation	✓

Table 9: Table to show how adaptations adheres to components

## 7.6 Case Study 4: Adaptations of *The Last Song of the Glaciers*

### 7.6.1 Background to *The Last Song of the Glaciers* Case Study

Calfee's project was selected for adaptation due to its originality and use of soundscapes. Calfee used a combination of photography, music, soundscapes and poetry to convey the issue of melting glaciers in Switzerland, in particular the Latana Glacier. The final piece was in the form of a video documentary where Calfee presented her photographs, soundscapes and insights into the Latana Glacier.

Table 10 is an extract from Table 2

<b>Components</b>	<b>Julia Calfee <i>The Last Song of the Glaciers</i></b>
Uses a combination of methods/interventions	✓
Must be made local	X
Needs to suggest solutions	X
The use literature/poetry	✓
Must be able to relate to it/target certain age groups	X
Must include trusted information (e.g. scientific)	X
Use some format of visual	✓
Public Participation	X

Table 10: Extract from Table 2

This case study adaptation provides two ways in which Calfee's project could be adapted. The first adaptation is in a very similar style to Calfee's which aims to highlight the beauty of nature while showing the effects of human intervention. The second adaptation still uses the same style of Calfee but specifically looks at the vulnerability of the Common Whitethroat (bird).

To fulfil the criteria of Template 3 this case study adaptation will:

- Be made local by using Keele woods and the flora and fauna of Staffordshire
- Have an accompanying piece of writing/caption to address issues and solutions, instead of combining everything into one video
- Aim to be relatable to Keele University students
- Include scientific data in both the video and the caption
- Be shared in Keele Facebook groups as it will appeal to the target audience this project is aimed at.

#### 7.6.2 Adaptation 1 of *The Last Song of the Glaciers*

To create this project, a walk was undertaken around Keele woods. On this walk a variety of photographs were taken, including close ups of plants plus areas of human intervention and destruction. In addition, sound clips were recorded throughout the duration of the walk. To create the video, images and sound clips were selected in a chronological order to show the journey through the woods.

The video is in the style of Julia Calfee. It begins with a title of “Keele Woods in the style of Julia Calfee”, (Image 19) followed by images to set the scene and give the audience perspective (Image 20; Image 21). All photographs were taken in black and white and were often close up shots similar to Calfee’s style (Image 22; Image 23). The images aimed to show the disappearing woodland and human interventions – from trees that had been cut down, to vegetation trampled pathways. The video uses nature as an instrument by using soundscapes to create an almost musical piece. Calfee addressed in her video the “clicks and pops” of nature, which this project also shows when soundscape recordings are amplified. The project was not only created to show human interference on woodlands but to help the

audience to gain a heightened appreciation for nature through sound and images. For example, some images are of cut down trees and litter in water systems, whilst others are of close ups of the beauty and detail of nature. The video is a walk through the woods, and the images, sounds and atmosphere change throughout. The piece begins with bird calls and images of the general surroundings; it then changes to fallen down trees and human created pathways and the sound of the M6 motorway can be heard in the background. The piece then heightens with sounds of rushing water and images of litter in water (Image 24; Image 25) and ends with sounds of calming water.

Although deforestation is not a serious issue in Keele Woods, trees are still regularly cut down. More recently, trees have been continued to be felled to be “Christmas Trees”. Since 1986 trees around Keele have been felled to either to create space for new buildings, to replant native trees or to introduce new species such as Pedunculate Oak, Hornbeam and Sweet Chestnut (Emley 1986). The woodland has a diverse range of flora especially trees which are both native and exotic. Interestingly there is also a wide variety of fauna from birds to insects. Below are selections of stills from Adaptation 1.



*Image 19: Video still 1 from case study adaptation 1*



*Image 20: Video still 2 from case study adaptation 1*



*Image 21: Video still 3 from case study adaptation 1*



*Image 22: Video still 4 from case study adaptation 1*



*Image 23: Video still 5 from case study adaptation 1*





*Image 24: Video still 6 from case study adaptation 1*



*Image 25: Video still 7 from case study adaptation 1*

This is the caption to accompany the video:

This case study adaptation is a take on Julia Calfee's "The Last Song of the Glaciers". This project focusses on Keele, in particular Keele Woods. It aims to show the beauty of nature through images of scenery and close ups of plants and animals. However this project wants to address the issue of human intervention on nature. Whilst watching the video you will see and hear a change from peaceful sounds and beautiful imagery to sounds of the M6 motorway and images of litter. This project wants to show the impact of humans on this environment.

What can you do to help?

- 1) Don't drop litter! Always take it with you and dispose of appropriately
- 2) Reduce your carbon footprint – Avoid using your car for short journeys

***"One touch of nature makes the whole world kin" William Shakespeare***

Below is a link to the full video Adaptation 1:

<https://www.youtube.com/watch?v=aVGLiJ73KHw>



### 7.6.3 Adaptation 2 of *The Last Song of the Glaciers*

The second adaptation focusses on the bird, the Common Whitethroat which is part of the Warbler family. They are often found among thick brambles and scrub and feed off a diet of insects and berries. Once the commonest warbler in Britain, the whitethroat experienced a steep decline in numbers (around 70%) in the late 1960's and early 1970's (BBC Springwatch 2009, Winstanley et al 1974) due to droughts in sub Saharan Africa. Although whitethroat numbers are slowly rising, with climate change becoming a pressing issue, these numbers are at risk of coming to a standstill or begin to decrease again, which this video aims to address. Background information and justification for this project is provided below.

One major issue associated with whitethroats and climate change is migration of birds. Scientists at the University of Durham have found that flights undertaken by birds to reach their spring breeding grounds in Europe could increase up to as much as 250 miles as a result of climate change. This is due to birds needing places with a suitable climate and food supply to stop along the way. This added distance is a considerable threat especially for the common whitethroat. Migration birds have to put on a large amount of weight to survive the journey, sometimes double their size. The Whitethroat is one species of bird that shrinks some of its internal organs in order to become more fuel efficient for the journey. Professor Rhys Green of Cambridge University and RSPB said:

"These tiny birds make amazing journeys, pushing themselves to the limits of endurance. Anything that makes those journeys longer or more dependent on rare and vulnerable pit-stop habitats used for refuelling on migration could mean the difference between life and death."

It has been estimated that the average distance for the Whitethroats migration will increase from around 3417 miles to between 3541 to 3759 miles.

In addition to longer migration journeys, environmental change in the Sahel is also affecting the Common Whitethroat. The Sahel (Africa) is important for migrating birds in the European winter, however many of these species including the whitethroat are declining. This is due to land use changing socially, economically and environmentally. In the Sahel birds live on farmland, grasslands and woodlands. However the extent of trees and scrub (home to the whitethroat) in rural landscapes are declining. Although this is negatively impacting upon some species it is positively helping others. It is evident more research is needed into this area.

As well as land use change, rainfall in the Sahel has a major impact on migrant bird numbers. It is highly variable usually between 200-600 mm annually (Cambridge Geography 2012). As mentioned previously, the Sahel experienced an intense drought from 1968-74 and another in the early 1980's. This has implications for migrant birds, for example the number of Common Whitethroats in Europe declined remarkably in the 1970s. Rainfall in the Sahel is directly linked to the survival and population size for approximately 13 migrant species. Birds arrive in the Sahel at the end of the wet season which is from July to September and stay throughout the dry season. However the climate of the Sahel is under pressure from human influenced climate change and economic exploitation. These human impacts are likely to increase the variability of rainfall which in turn is going to have negative effects on humans and birds. At present Whitethroats are benefiting from increased rainfall in the Sahel where they are spending the winter, but with such uncertainty into rainfall future numbers of Whitethroats are unknown.

Video stills of Adaptation 2 of Julia Calfee's project are supplied below. The video is divided into four parts, with each part explained and accompanied with a video still.

Beginning: The video begins (Image 26) with a graph to show the decline of the Whitethroat from 1966-2012 (Image 27). The graph shows a significant dip in 1970. From 1970 onwards numbers stay low but steadily start to rise from 1995. Beginning the video in this way sums up the themes and trends for the project and gives the audience perspective on the issues at hand.



Image 26: Video Still 1 from case study adaptation 2

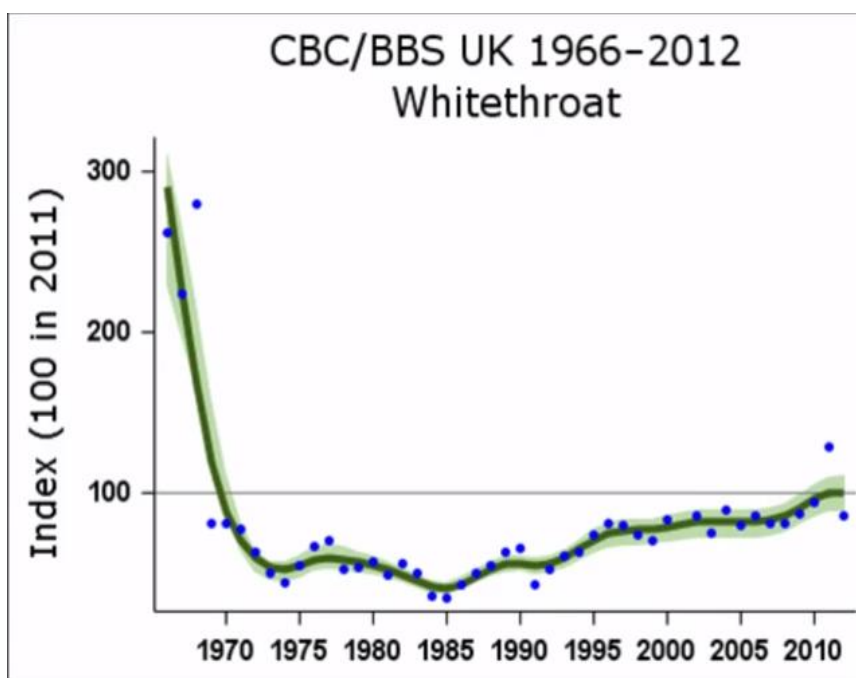
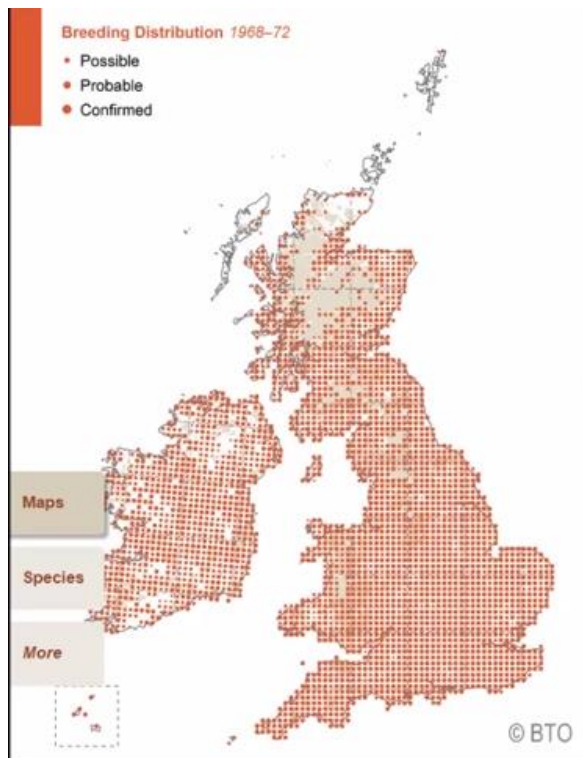


Image 27: Video Still 2 from case study adaptation 2 BTO (2014) Image Source: <http://blx1.bto.org/birdtrends/species.jsp?year=2014&s=leswh>

Part 1: This section begins with a bird distribution map from 1966-1972 (Image 28). This time period was when Whitethroat numbers were at their peak in England. This is followed by video clips with close up shots of the birds (Image 29) and an abundance of common whitethroat song in the background. This was done to show to the audience that during this time Whitethroats were everywhere



*Image 28: Video Still 3 from case study adaptation 2 Image Source: BTO (2014)*



*Image 29: Video Still 4 from case study adaptation 2*

Part 2: This shows the decline stage of the Common Whitethroat with a bird distribution map of 1988-91 (Image 30). The video clips show less images of the Whitethroat and more of the habitat they live in (Image 31). Then images of the Whitethroat disappear and images of empty woodlands remain. There are no soundscapes in this section but the sound of silence is used to heighten the message that the whitethroats have disappeared.

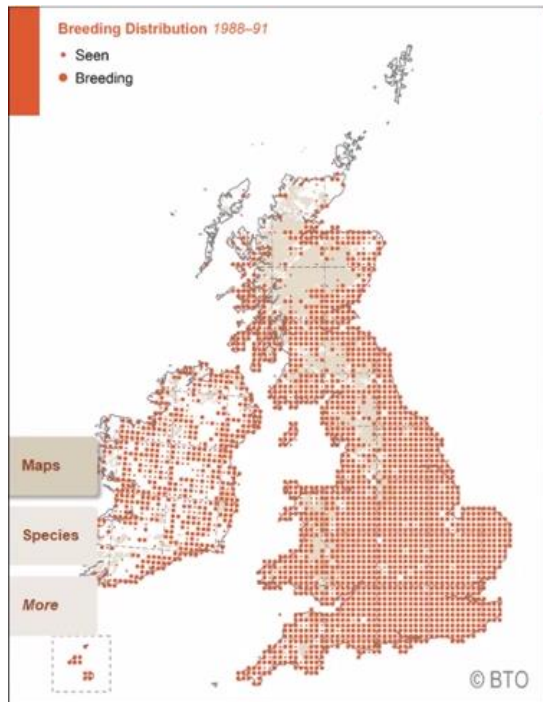


Image 30: Video Still 5 from case study adaptation 2 Image Source: BTO (2014)



Image 31: Video Still 6 from case study adaptation 2

Part 3: This section shows a bird distribution map of 2008-2011 to emphasise the slow increase and re-introduction of the Whitethroat back into the UK (Image 32). There are a few video clips of birds (Image 33) but not as many as Part 1 and quieter sounds of the Whitethroat to show the reintroduction of the bird in Europe.

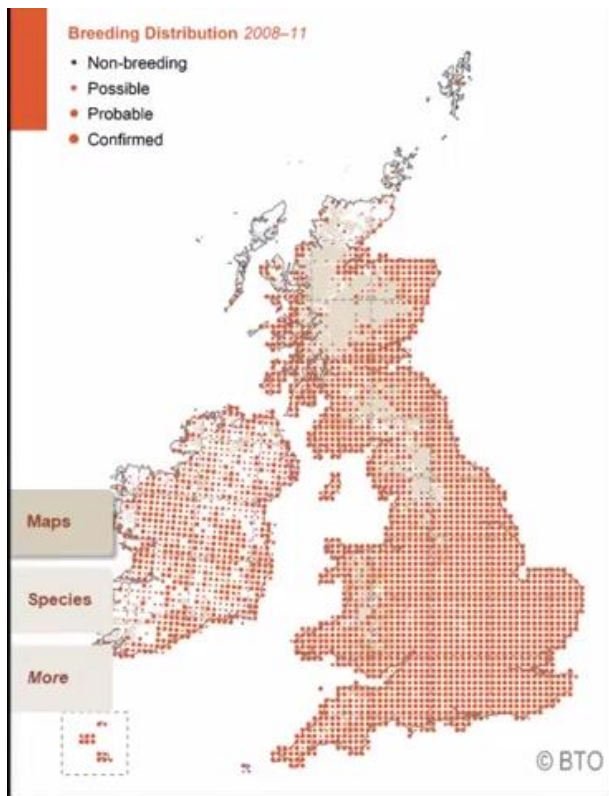


Image 32: Video Still 7 from case study adaptation 2, Image Source: BTO (2014)



Image 33: Video Still 8 from case study adaptation 2

This is the caption to accompany the video:

This case study adaptation 2 is a take on Julia Calfee's "The Last Song of the Glaciers". This video entitled "The Last Song of the Whitethroats" focuses on the disappearance of the bird The Common Whitethroat in Britain over the past 50 years. The Common Whitethroat is part of the Warbler family of birds and was once the most common Warbler in Britain. However due to climate change there was a steep decline in numbers of this bird in Britain in the late 60's and early 70's. Although numbers have started to rise, with climate change being a pressing issue these birds are at risk of disappearing again.

What can you do?

- 1) Provide a habitat for these birds to live in when they migrate to Britain for example planting bushes and shrubbery in the garden
- 2) Help to decrease extreme climatic events by reducing ones carbon footprint

***"If you're a bird, I'm a bird" Nicholas Sparks***

Below is the link to the full video of Julia Calfee Adaptation 2:

<https://www.youtube.com/watch?v=V1Y6G80ApdU>

#### 7.6.4 Conclusions to *The Last Song of the Glaciers* Case Study

Challenges when creating this case study adaptation included the component of locality. For adaptation 1 this was not an issue as the video reflected human intervention in Keele Woods. However adaptation 2 which addressed the disappearance of the Warbler is an issue not unique to one area of the UK, therefore locality here was an issue. Adaptation 1 could be related to the target group of Keele University students as issues raised in this video are relevant to them. The Whitethroats adaptation on the other hand could be aimed communities in the UK where the Whitethroats thrive.

<b>Components</b>	<b>Julia Calfee <i>The Last Song of the Glaciers</i> Adaptation</b>
Uses a combination of methods/interventions	✓
Must be made local	?
Needs to suggest solutions	✓
The use literature/poetry	✓
Must be able to relate to it/target certain age groups	✓
Must include trusted information (e.g. scientific)	✓
Use some format of visual	✓
Public Participation	✓

Table 11: Table to show how Calfee case study adaptation now adheres to the components



## 7.7 Conclusions from Case Studies

An issue found when adapting the case studies was fulfilling the component “Must be able to relate it to/target certain age groups”. Each project struggled to comply with this component. In order to overcome this issue, each adaptation is able to be shared via social media or the internet. In addition, explanations behind the case studies and the simplicity of these projects enable the public to recreate their own version if they wish to do so. Although this does not specifically relate to a particular target audience, a follow up study could analyse which projects particular age groups are drawn to and wish to test out.

Another issue that arose, not directly connected to the templates, was the lack of climate-change communication readily available over the internet. For example, for Case study adaptation 1 (Postcards from the Future) there was a lack of solutions for combatting the issues raised in this project. In addition, when looking for solutions and data for Case Study Adaptation 2 (Air Pollution) the information appeared either very general or focused on London. When looking at air pollution for the UK it appeared low, until specific areas were examined. This information is not only misleading but could cause people to become distant to climate change. This shows that projects need to provide more information about the issues surrounding climate change. They should not assume that the public already know the background information to the issue and should focus on educating and informing them.

## **8. Template 4**

*This chapter explains the process behind creating Template 4. Template 4 is created out of Templates 1, 2, 3, the literature and the conclusions from the case studies. Template 4 takes all of these into consideration to create a guide on creating climate change communication that is deemed effective by both practitioners and the literature.*

### **8.1 Process of Template 4**

After completing the case studies it was important to assess the findings so far by reassessing Templates 1, 2 and 3. From the findings it is evident that relating art to a particular target age group is a challenge. Measures such as providing the participant with an instruction sheet to create their own art or providing a means to share the communication could be a method of overcoming this issue. Template 4 is created through reassessing Templates 1, 2 and 3 and the conclusions from the case studies.

Firstly, to create this new template, Templates 1 and 2 are to be reassessed. This is because Template 3 solely looked at components which overlapped and therefore overlooked other elements which were included within these templates. Extra components to be added from these previous templates include:

1. Understanding the causes and consequences of climate change
2. Positive framing of climate change

Understanding the causes and consequences of climate change from Template 1 was added to Template 4 due to difficulties in finding basic information on the internet. Research claims that the public are already well educated in the area of climate change and that climate change information is readily available over the internet. After searching the internet for solutions to combat climate change, it was evident that this information is not readily

available. What is out there is not clear cut information, and is often more what governments are doing to either combat climate change or how they aim to deal with the consequences. Therefore by providing the public with information about the causes and consequences of climate change through art, public education and engagement should increase and communication should be more effective.

Positive framing of climate change has also been included from Template 1. The Analysis of Literature expressed that fear is an ineffective method of climate change. However the case studies have shown that fear can be effective if made realistic and combined with solutions. This could be useful for climate change art as it widens the scope of climate-change communication art. Therefore it has been included in Template 4.

The conclusions from the case studies showed components that needed to be included in Template 4. The first component to be added was the element of reach. It appears that climate-change communication should be able to be shared via the internet to increase the reach or mass messaging element. This can relate to any form of communication, from a video, to a piece of art, to music as long as it holds an interactive element. Although some may disagree that the internet is the correct route, without it only very select groups of people and small audiences are able to view it.

Another component which was added after the completion of the case studies was making sure the form of communication had a clear aim or message. For instance, a piece of art can be interpreted in a number of ways and if an intended message is to be understood by the viewer then an explanation is needed.

## 8.2 Template 4

Therefore to create effective climate-change communication a project must:

<b>TEMPLATE 4</b>	
<b>1</b>	Use a combination of methods/interventions
<b>2</b>	Be made local
<b>3</b>	Suggest solutions
<b>4</b>	Use literature and/or poetry
<b>5</b>	Include trusted information (e.g. scientific)
<b>6</b>	Use some format of visual
<b>7</b>	Involve the public through public participation
<b>8</b>	Help the public understand the causes and consequences of climate change
<b>9</b>	Positive framing of climate change
<b>10</b>	Must be able to be shared via the internet
<b>11</b>	Must have a clear message/aim

## **9. Original Project**

*This chapter aims to test out Template 4 as an example of how this template can be used for communication.*

### **9.1 Introduction**

The purpose of the Original Project is to test out Template 4 – the template created from assessment of Templates 1, 2 and 3 and the conclusions from the case study adaptations. The aim of the Original Project was to fulfil all the components in Template 4 and to assess whether this template can be used to create successful means of climate-change communication. Unlike the case study adaptations the Original Project is not based on an alternative version of previous artists' works.

Climate change is a global issue of urgency. If the situation is to improve, climate change needs public support and involvement. However, the majority of climate change information currently available is in a form that is difficult to understand. In particular it seen as being too scientific or focussing on issues that do not appeal to the general public. A significant amount of existing communication solely focuses on the causes of greenhouse gasses and does not provide realistic solutions to improve the situation. For example, asking the public to stop using their car is unrealistic and impractical for the majority of the general public. As a result of this, there appears to be a lack of engagement from the public and mitigation has not become a reality. The aim of the Original Project is to provide the public with simple solutions and lifestyle changes with which they feel they can engage to alleviate the effects of climate change.

This project focuses on the disappearance of green space, in particular how landscape and green space has drastically changed over the last century. Similarly to Case Study 2, this original project is not directly related to climate change but is an example of how these

communication techniques could be used for a slightly different environmental message. The project is entitled “Keep your garden, Keep your planet” and aims to encourage people to keep, improve or add a garden to their home. Gardens have many benefits. A garden can soak up excess water to reduce the risk of flooding; absorb carbon dioxide and provide a home for wildlife. The project aims to show the public that through taking steps such as using permeable surfacing if paving over driveways; planting hedges; putting in a pond or composting can all make a significant difference to the environment. The project aims to show that contributing to climate change mitigation does not have to involve drastic lifestyle changes and simple steps can also improve the planet. This project is designed so that people can try the project out for themselves.

The study area for this project is the Westlands in Staffordshire. This area was chosen due to its proximity to Keele University, which strives to develop an environmentally aware and sustainable campus through its “Green Keele” programme. This area was also chosen due to the extensive development of housing that has occurred over the past sixty to seventy years.

## 9.2 Method

The project is comprised of multiple parts – a data collection activity, data sonification (music) and a video.

The activity aspect of the project involved downloading historic maps from Digimap. This project focused on the last century, with analysis starting from 1900. From 1900, historic maps were assessed in 20 year periods to present day. Therefore maps for 1900, 1920, 1940, 1960, 1980 and present day were all downloaded. Images of the maps used with the area of study circled are provided below.

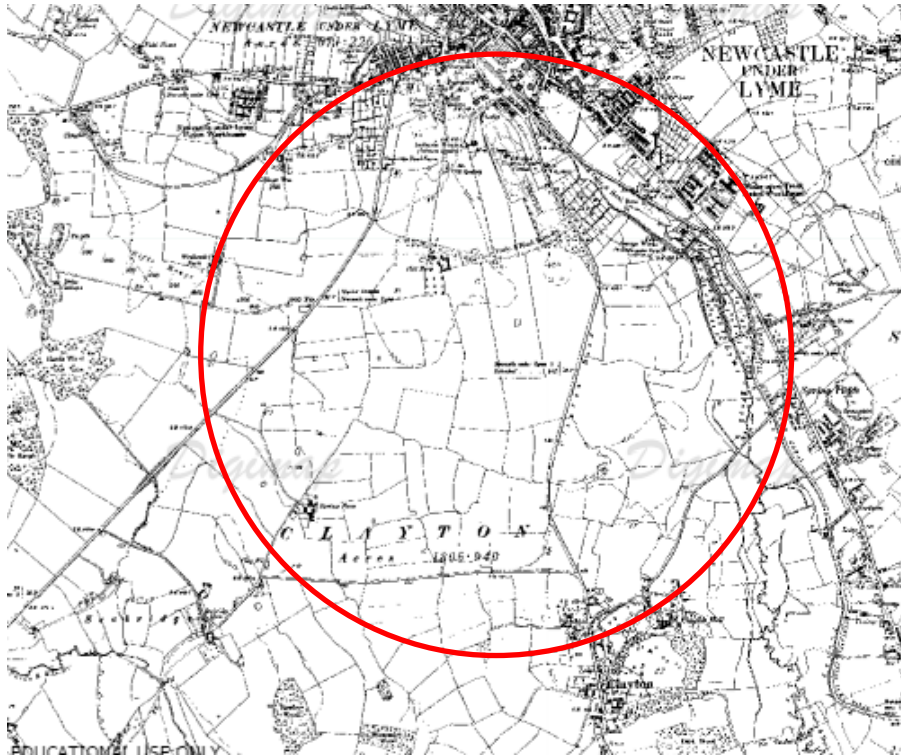


Figure 31: Westlands, Staffordshire 1900 (Digimap)

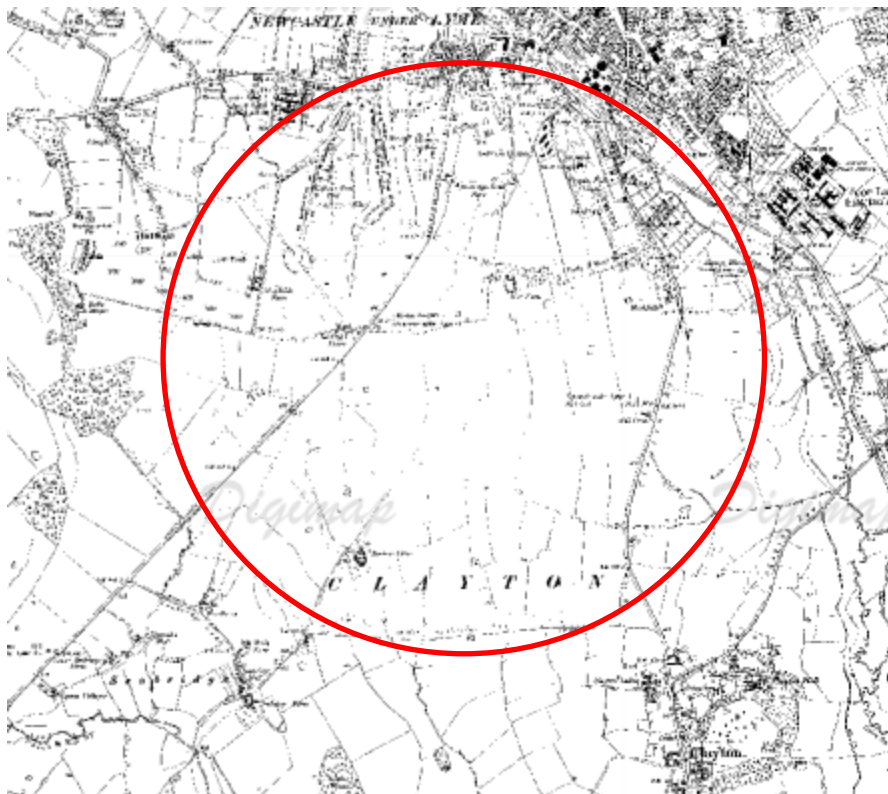


Figure 32: Westlands, Staffordshire 1920 (Digimap)

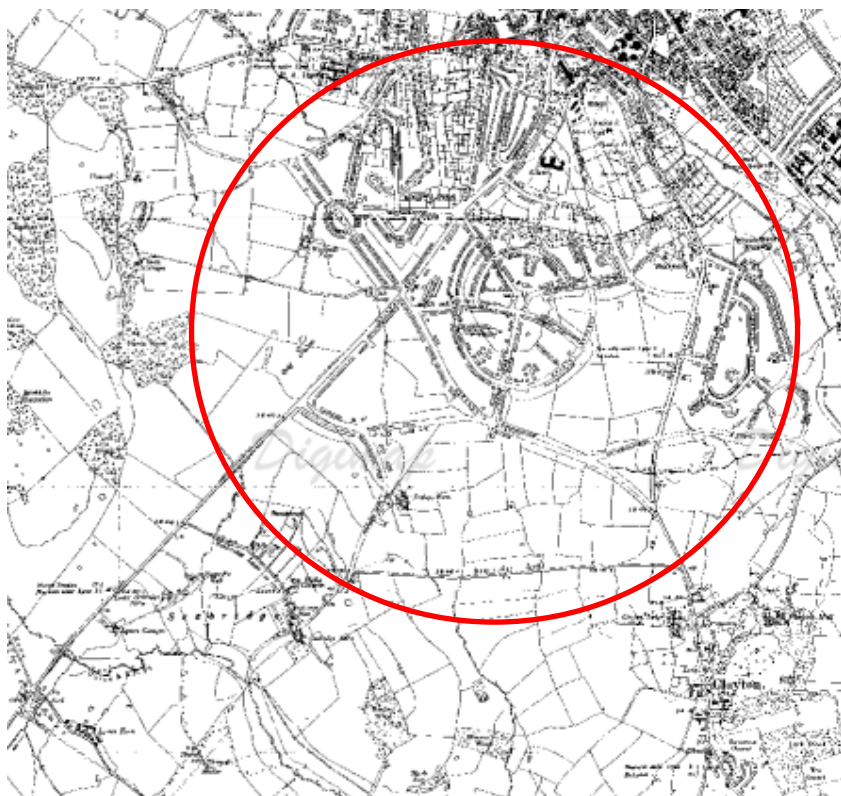


Figure 33: Westlands, Staffordshire 1940 (Digimap)



Figure 34: Westlands, Staffordshire 1960 (Digimap)





Figure 35: Westlands, Staffordshire 1980 (Digimap)

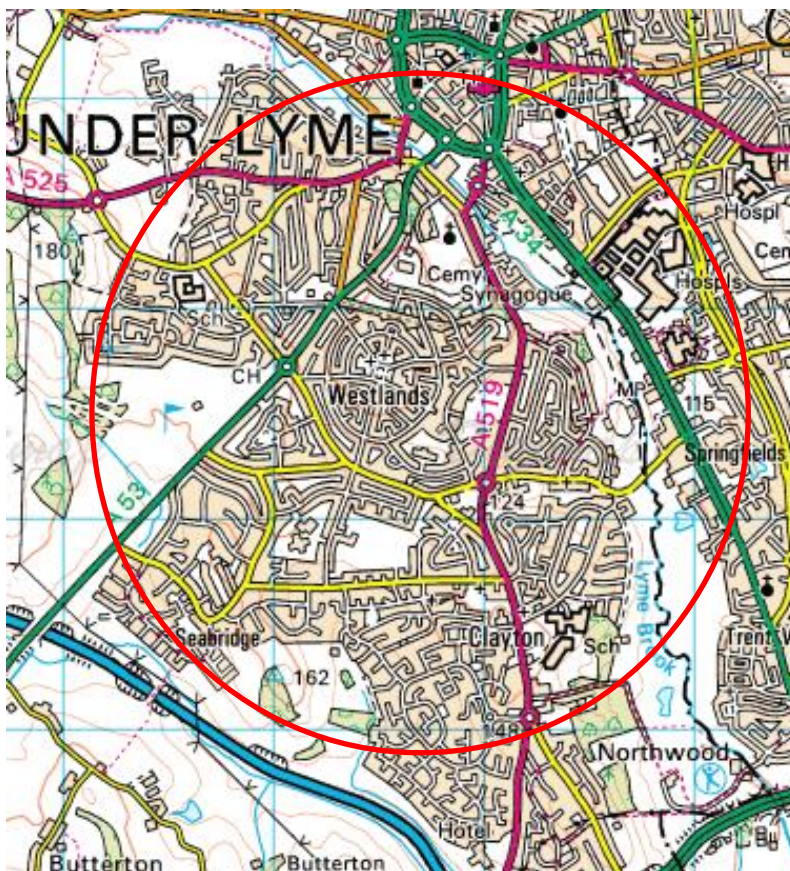


Figure 36: Westlands, Staffordshire Present Day/2015 (Digimap)

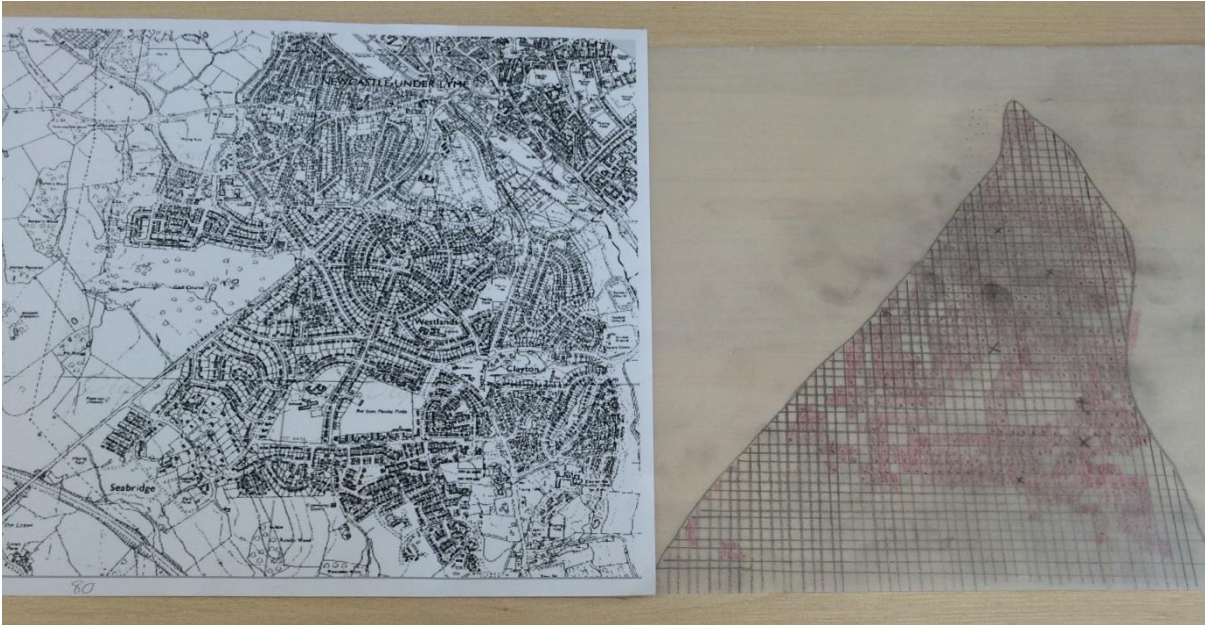
There is much uncertainty regarding a particular target audience for climate-change communication, therefore this project aimed to attempt to address that challenge. The project has many different aspects and target audiences. The activity part of the project is intended to be created by primary school children specifically age 9-11 (years 5 and 6). For this reason, analysis was conducted using tracing paper. Once the maps had been downloaded and printed, grid lines and the study area were drawn onto tracing paper. The tracing paper was then overlaid onto the printed map and grid squares where half or more of the square contained housing were coloured in (Figure 37 and Figure 38). This produced a map of housing for each twenty year period.

The results from this activity would then be compiled into video format (by myself) with accompanying narrative. This would be communicated to an intended audience of adults who would be able to comprehend the narratives and notions used.



*Figure 37: Printed 1940 map with tracing paper overlay*





*Figure 38: 1940 map and overlay*

From this, the amount of green space could be calculated for each time period, shown below in Table 12. To determine the amount of green space for each time period a percentage was calculated by finding the difference between the total number of grid squares and the number of coloured in squares (houses). This number was then divided by the total number of grid squares and multiplied by 100 to give a percentage. 1900 was used as a control year therefore the amount of green space for this time period is classed at “100%”.

The next step was to relate the data to music, also known as data sonification. This part of the project also aims to target primary school children; therefore the nursery rhyme “Twinkle Twinkle Little Star” was chosen as the musical piece to which the data should relate. The nursery rhyme is played for each time period; however each time it is played the nursery rhyme loses the percentage of notes which correlates to the percentage of green space left in that time period. Twinkle Twinkle Little Star has 42 notes; therefore for 1900 all notes are played as it is the control year with 100% green space. However in 1920, there is 97% green space which meant only 97% of the notes were played. The number of notes to be played is

shown in the far right hand column of Table 12. For example, 97 percent of 42 is 40.7 which was then rounded up to 41 notes.

<b>Year</b>	<b>Total no. of squares</b>	<b>Total no. of coloured squares (houses)</b>	<b>Percentage of green space</b>	<b>No. of notes to be played</b>
1900	CONTROL YEAR		100%	All
1920	1654	46	97%	41
1940	1590	233	85%	36
1960	1532	583	62%	26
1980	1610	762	53%	22
Present day (2015)	406	313	23%	9

*Table 12: Table to show the amount of green space for each 20 year period and the number of notes to be played when data is translated into music*

Table 13 shows the music notes by letter, with a “-“ indicating where notes have been taken out. Figures 39 to 44 show the sheet music for each time period, with the musical rest symbol indicating where notes have been taken out. It was important to include both versions to engage both music and non-music readers.

1900	1920	1940	1960	1980	Present Day
CCGGAAG	CCGGAAG	CCGGAAG	C-GG-AG	C-GG-AG	C-----
FFEEDDC	FFEEDDC	FFEEDD-	--EEDD-	--EE-D-	--E--D-
GGFFEED	GGFFEED	G-FFEED	G---E-D	G-FFE-D	G---E--
GGFFEED	GGF-EED	GGF-EED	-G--EED	-G--E-D	-G--E--
CCGGAAG	CCGGAAG	CCGG--G	-CGG--G	-CGG--G	-----G
FFEEDDC	FFEEDDC	FFE-DDC	--E-DDC	--E---C	--E----

Table 43: Table to show the music notes by letter. An “-” indicates where notes have been removed



Figure 39: Version 1 of Twinkle Twinkle Little Star (complete) to represent the green space in 1900



Figure 40: Version 2 of Twinkle Twinkle Little Star to represent the green space in 1920



Figure 41: Version 3 of Twinkle Twinkle Little Star to represent the green space in 1940



Figure 42: Version 4 of Twinkle Twinkle Little Star to represent the green space in 1960



Figure 43: Version 5 of Twinkle Twinkle Little Star to represent the green space in 1980



*Figure 44: Version 6 of Twinkle Twinkle Little Star to represent the amount of green space today*


The results from the activity and the data sonification were then published in a video. The video acts as a visual aid so the public can see and hear the disappearing green space. Each version of the nursery rhyme is played and accompanied with images and maps of the area during that time period. The video itself is basic, as the project did not want imagery to distract from the music but simply to accompany it. The last version of Twinkle Twinkle Little Star is the final part of the video. This version contains few notes and does not resemble the original version at all, finishing with silence. The idea behind this was to leave a strong, clear message in the listeners mind. Below are stills from the video.



A black rectangular slide with white text. The text is centered and reads: "The disappearance of green space in Westlands Staffordshire".

# *The disappearance of green space in Westlands Staffordshire*

Image 34: This is the title slide for the video. It tells the viewer what the video is about and where in the UK the project focuses on.

A black rectangular slide with white text. The text is centered and reads: "Can you hear the green space disappearing?".

## Can you hear the green space disappearing?

Image 35: This part of the video attempts to engage the viewer by giving them a task whilst watching the video and a brief insight into the project

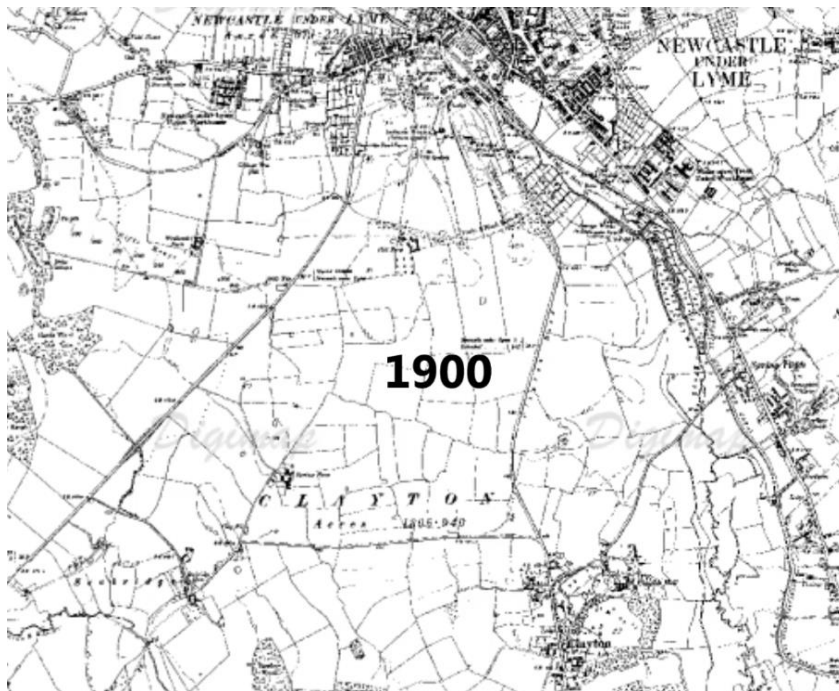


Image 36: This is an example of the 1900 part of the video. Whilst this slide is being shown Version 1 of Twinkle Twinkle Little Star is played (the original version), so the viewer can hear the amount of green space and see the reasons behind the music.



Image 37: This is a continued example of the 1900 section of the video. Whilst the viewer is hearing the music and seeing the image, they are then shown the percentage of green space on screen. This has been done to reinforce the message of the video and to ensure the viewer is taking away the correct information.

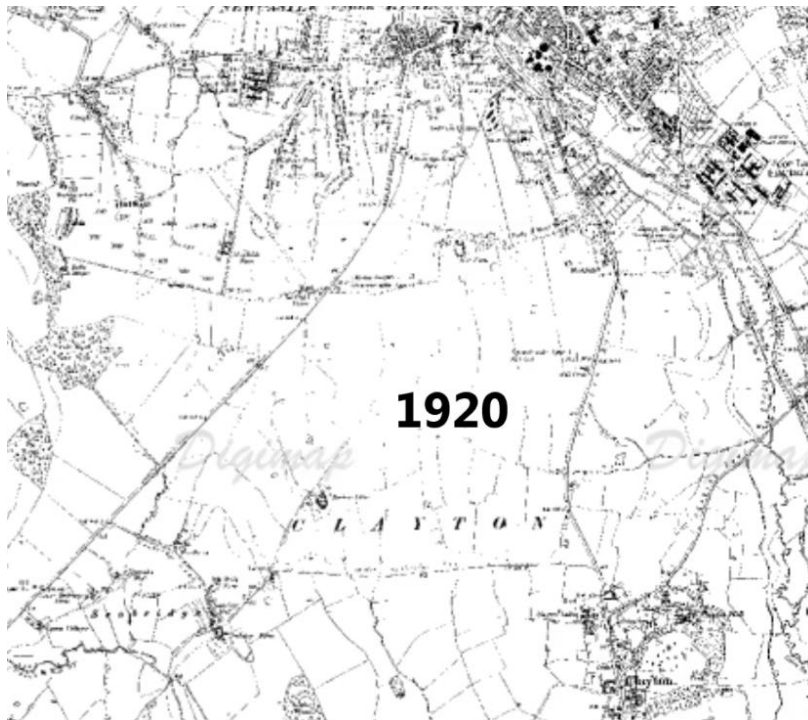


Image 38: This is a still from the 1920 section in the video. This is the first time in the video the viewer will hear a difference in the music.



Image 39: This is a further example of the 1920 section in the video. This still was chosen to show examples of other images that have been used to accompany the music. This is an aerial photograph of the Westlands taken in the 1920's.

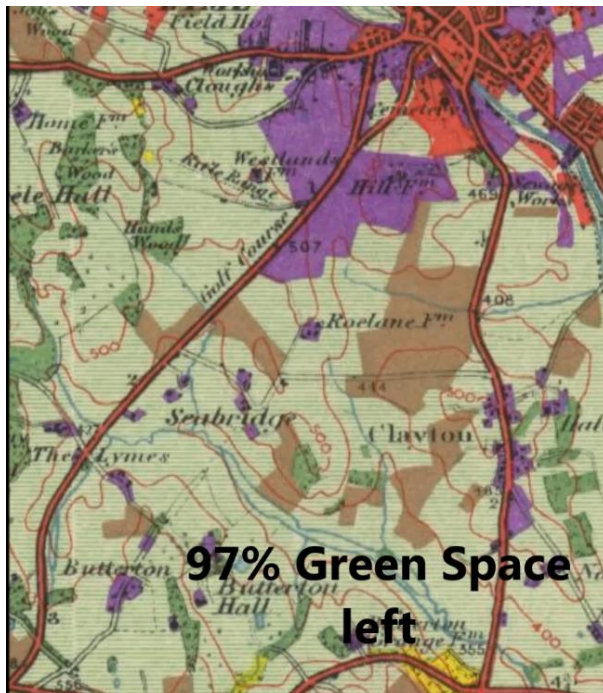


Image 40: This still shows the amount of green space left in 1920. Each time period contains a map, further imagery and the percentage of green space left to accompany each version of Twinkle Twinkle Little Star.

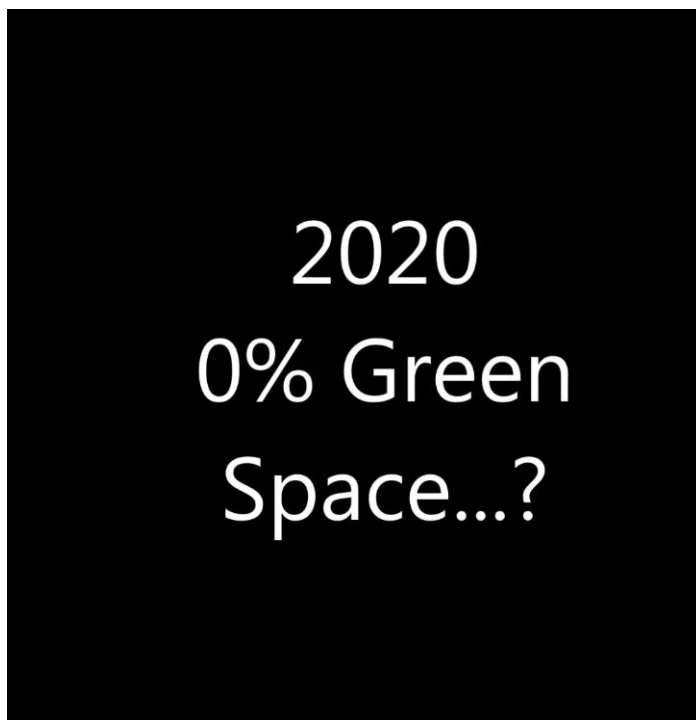



Image 41: After each version of Twinkle Twinkle Little Star has been played with accompanying images and percentages this is the message displayed. This message is shown after the final version of Twinkle Twinkle has been played and ended in silence. This was done to reinforce the message as the viewer reads this in silence.



# Keep Your Garden, Keep Your Planet

Image 42: This is the final slide in the video. This message, similar to the one before, is shown in silence. This aims to reiterate the message of the video and encourage the viewer to take action to help improve the climate change situation.

Despite the video providing information, it was important to write a caption to accompany it. This was done to add further information, provide background research and to reiterate the message of the video. The caption begins by giving the reader a brief insight into the climate change challenge by explaining what is meant by climate change and how it can impact the public. The caption then explains why it is important to keep a garden and how it could benefit the viewer. It also explains the idea behind the video, especially why notes disappear through the century. Furthermore the caption includes a quote from Douglas Adams to add the element of literature.

This is the caption to accompany the video.

Keep your garden, Keep your planet

Climate change is a much talked about topic in today's society, but what does it really mean? What simple and realistic steps can you take to help the problem? Climate change happens when carbon dioxide and other gases (known as greenhouse gases) are released into the atmosphere and it is the amount of these gases released that is proving a significant issue for the planet. For the majority of the United Kingdom, climate change will affect people by causing severe and extreme weather conditions. For example, winters are going to get wetter which will result in more flooding, while summers are going to become much drier resulting in drought. There are simple steps to take to reduce the impact of climate change. One example is by having a garden and greening your house. More and more people are starting to pave over their gardens and driveways despite the fact gardens will help your area in a number of ways. Gardens soak up excess water to reduce the risk of flooding; they absorb carbon dioxide and provide a home for wildlife. Anything from using permeable materials to pave over your driveway, to planting hedges, to something simple such as growing tomatoes on your window sill will all help the planet. The video above shows how green space, such as fields, gardens and farmland has disappeared over the last century to be replaced with houses, buildings and roads. The video plays the well-known nursery rhyme "Twinkle twinkle little star" however notes are removed on each round of the tune to reflect the percentage of green space lost during a 20 year period. The video is accompanied with maps and images of the surrounding area.

*"Isn't it enough to see that a garden is beautiful without having to believe that there are fairies at the bottom of it too?"*

Douglas Adams

This is the link to the video: [https://www.youtube.com/watch?v=3KQXmL\\_Bv48](https://www.youtube.com/watch?v=3KQXmL_Bv48)

### 9.3 Conclusions

The aim of the original project was to test out Template 4 by fulfilling all the components. This project uses a combination of methods by using music and video as well as art and photographs to address the visual component. The project focuses on a local area – Westlands, Staffordshire and the video uses imagery and maps from the surrounding area to aid locality and perspective of where the area is. This was done to help the viewer relate to the issue more. By using maps, the element of using scientific data is fulfilled, whilst the use of tracing paper offers public participation through interactivity. The caption to accompany the video provides solutions and aims to help the public understand the causes and consequences of climate change. It also frames climate change in a positive manner by stating how these simple lifestyle changes can improve the situation. The caption also includes a quote by Douglas Adams that seemed to fit the project. Finally the video is able to be shared via the internet and the project has a clear aim and message.

<b>Components</b>	<b>Original Project</b>
Uses a combination of methods/interventions	✓
Must be made local	✓
Needs to suggest solutions	✓
The use literature/poetry	✓
Must include trusted information (e.g. scientific)	✓
Use some format of visual	✓
Public Participation	✓
Help the public understand the causes and consequence of climate change	✓
Positive framing of climate change	✓
Must be able to be shared via the internet	✓
Must have a clear message/aim	✓

*Table 13: Table to show how the original project adheres to the components*

## **10. Discussion**

### **10.1 Synthesis of Project**

This project aimed to establish whether art and music could be used as an effective means of communicating climate change to the general public. Furthermore this project aimed to overcome the issues with climate-change communication in today's society by suggesting realistic solutions and adaptations to develop methods already in place. To begin with, this project assessed previous academic literature (Analysis of Literature Chapter 5.1) to determine which communication methods have been deemed both effective and ineffective. From this, practitioners who currently communicate climate change through art and music were also assessed (Analysis of Practice, Chapter 5.4) to see whether their practices complied with information from the literature. The Analysis of Literature produced Template 1 which is a list combining communication techniques deemed effective in the literature, whilst the Analysis of Practice produced Template 2 which combined the methods found effective by artists. Templates 1 and 2 were assessed for overlaps and similarities which were then extracted to create Template 3. From this, four case studies from the Analysis of Practice were selected to be developed. Each case study was adapted with the intention of fulfilling each component in Template 3. The case study adaptations revealed issues with practitioners' communication methods of art and music as before being adapted; none of the case studies fulfilled all components in Template 3. At this point in the project, the template was reassessed in order to adhere to conclusions from the case study adaptations and a reassessment of Templates 1 and 2, producing Template 4. Template 4 was tested out with an original project, as an example of how the template could be used for policy makers, practitioners and councils.



The project has identified a number of possible reasons as to why climate-change communication techniques currently used could appear ineffective. The literature shows that the media is considered an untrustworthy source of information, whilst use of fear has been deemed an ineffective tool of communication. However, these are the two most common types of climate-change communication and information. This project is not suggesting these methods should be discontinued but instead, should be adapted to correspond to findings from the literature. Issues including identifying an appropriate target audience and using a combination of methods to communicate climate change have been addressed as well as the importance of art and the issues associated with this method. This chapter also looks at dissemination, in particular seeks to identify the best outlet for climate-change communication.

## 10.2 Broader Implications of Research

The Analysis of Literature (Chapter 5.1) identified issues with current climate-change communication methods and offered explanations as to why today's efforts appear ineffective. This project addressed these findings and proposed solutions to overcome the lack of engagement between the public and climate change science.

### 10.2.1 Trust

The project found trust is an essential means of creating effective climate-change communication, as trust is a major influence on how the public respond to climate change. This project found the biggest outlet of climate change information is the media; however the media is considered the most untrustworthy form of communication. This contradiction is a reason why current communication is appearing ineffective. This project identified much research into which sources of communication the public find untrustworthy (for example the media), however, found little research into why these sources are considered untrustworthy.

This project established reasons why these sources are deemed untrustworthy and provided solutions to overcome these issues, notably through Template 4.

Despite being considered untrustworthy, the media should be praised for raising public awareness of an issue that often appears “elitist”. For individuals who are not engaged with climate change research, information sources tend to be through the media (Smith and Joffe 2009). It is a difficult obstacle to overcome as mass media communications play a key role in public understanding of the subject (Wahlberg and Sjoberg 2000) and it is clear that climate change policy and mitigation will not improve without public engagement and involvement (DiFrancesco and Young 2010). This project has shown that despite issues of untrustworthiness, there are positives to using the media as a distributor of climate change policy. These positives include, reach, mass messaging and how the media is the most common means by which the public learn about climate change. Therefore the media needs to be adapted in order to be an effective and engaging source of information to the public.

This project found that by changing the way information is presented, the media could become a trustworthy source of information. This project identified that scientific articles directly written by climate scientists are considered trustworthy sources of information. The project suggests that publicising these scientific articles will help to establish the media as a trustworthy form of communication. Research from this project has shown that scientists are considered ineffective communicators, due to the scientific language often used within these articles. To overcome this issue, this project suggests a collaboration needs to occur between scientists and policy makers when writing articles and presenting climate change information in the media. This will ensure that articles will contain correct information from a trustworthy source, but are presented in a way that the public can understand.

Further evidence for collaboration of scientists and policy makers comes from Stromso et al (2011) who researched issues of trust and the dissemination of information. They found that despite the public being more likely to trust an article in a research magazine than an article in a newspaper, the public were more likely to understand a newspaper article as the argument and points are clearer. Therefore despite trusting the media less, this is the main source of the public's information and knowledge of climate change issues. In addition, Stromso et al (2011) found that students who had a little knowledge into climate change issues were more likely to trust less trustworthy sources such as the media.

This indicates that collaboration is needed, as climate change scientists have the knowledge and trustworthy information whereas policy makers excel in the dissemination of material. It is important to stress that greater collaboration is needed, rather than policy makers receiving information and interpreting the material themselves - which is current procedure. This will ensure that the information is correct and the policy maker has not misunderstood the information. Current research focusses on what forms of communication are deemed untrustworthy whereas this project aims to suggest solutions and adaptations to overcome this issue. This project suggests that for the media to be considered trustworthy there needs to be collaboration between scientists and policy makers to provide clear, honest information. This is one method of ensuring media information is trustworthy. In addition, this project suggests policy makers should follow the guidelines provided in Template 4 to ensure the communication is effective and engaging. This project understands that for something such as a newspaper article there may be an issue with fulfilling some components however stresses the importance of following the Template as closely as possible.

This project has also established fear to be a reason for the lack of trust from the public. Research has shown fear to be a significant factor in ineffective media communication. Striking headlines, images printed to induce fear and exaggeration are all common techniques

used by the media to highlight climate change issues. The Analysis of Literature (Chapter 5.1) identified these techniques are used by policy makers as they consider attention should be brought to climate change issues by any means (Kirby 2011). However further research through this project has shown that using these techniques can make climate change impersonal to the reader (Lorenzoni & Pidgeon 2006), as issues are too far into the future (Lowe et al 2006; O'Neill 2008). The media uses fear continuously which makes climate change appear fictional to the public (Tonn et al 2006). Furthermore the literature established that the public have difficulties in visualising the future beyond 20 years (Tonn et al 2006). The project suggests that by removing futuristic imagery from media publications, the effectiveness and trustworthiness of communication could improve. The use of fear will be discussed further in the "Fear" (10.2.2) section of this chapter.

This project has shown that trust is an essential element in communication. This project suggests that collaboration between scientists and policy makers and removing futuristic images and false information from the media could improve the trustworthiness of this source of information. These adaptations will not only portray the media as trustworthy but engage, educate and motivate the public on climate change issues.

#### 10.2.2 Fear

Using fear as a method of climate-change communication has been briefly discussed in the "Trust" section. The literature has established fear as an ineffective method of communicating climate change. This is because fear is unlikely to have long term impacts on the public and the public become desensitised to images and headlines of fear (O'Neill and Nicholson-Cole 2009, Hastings et al 2004, Tonn et al 2006). However, this project found fear common in all representations of climate change from the media to alternative approaches. The media's main method of communication is through images which often accompany

textual or statistical information. When analysed, impacts of melting ice and retreating glaciers were most dominant among the media (Smith and Joffe 2009) as well as associated images such as polar bears struggling to swim to safety and futuristic representations. However, literature has established that these types of images do not create long lasting impacts (O'Neill and Nicholson-Cole 2009) as the public become desensitized by these types of images (Hastings et al 2004). This project shows why fear is considered ineffective but also suggests solutions to overcome this issue. For example, by adapting the images the media uses, the trustworthiness and effectiveness of all communication techniques could be improved.

Stating this, there have been improvements in media communication in recent years by bringing the issue closer to home, through using images of extreme climatic events such as flooding and heatwaves from areas around the UK. For example between 2000 and 2006 images of glaciers and melting ice decreased from 48 % to 42%, images of flooding and local impacts increased from 30% to 40% to visually bring the threat closer to home (Smith and Joffe 2009). Another change in media representation has been the change in the central focus of the image. The media has moved from images of landscape to images of people and how they have been affected by extreme weather changes. This has been done to convey an “it could be you” sentiment to provoke an emotional response from the viewer, as well as to show the inconvenience and disruption climate change impacts can have on their lifestyle. In addition Small et al (2007) found that people are significantly more willing to donate money to charity when presented with pictures of victims as opposed to statistical and textual information alone. This indicates that images of people evoke a higher emotional response from the viewer. Therefore this project suggests using climate change images with the use of people could help to develop media communications.

Although these show there have been some improvements in the images associated with climate change used in the media, there are other issues that need to be addressed. For example, despite improvement in images such as using people, the element of fear has not been eliminated. Forefront articles use words like “catastrophic” with accompanying images of towns underwater and peoples’ lifestyles disrupted. Often these images are captioned with fear probing phrases such as “rescuing people trapped in their homes” and “costs estimated at millions”. Instead of focussing on the negative, the media would benefit from using these incidences of flooding to educate the public on ways in which they can reduce the likelihood of future flooding. The literature found if fear is combined with high-efficiency messages on how to avoid the threat in the future the public are more likely to engage with the information. Therefore images of fear are used in the media they need to be accompanied with a positive message article on how to prevent such events in the future.

As mentioned it is not just the media which uses fear as a method to communicate climate change. The Analysis of Practice (Chapter 5.4) has shown that fear is a common theme in film, art, narrative and music. Fear is often used to engage people, especially in terms of film and narratives where fear and climate change are being portrayed as entertainment rather than learning material. Climate change disaster films are common and although research has shown they produce short term impacts, they are deemed ineffective alone. Similar to the media, it has been suggested that combining films with other interventions such as public pledges and goal setting could improve learning and understanding. Art and imagery, despite being considered effective also often uses fear, futuristic representations and fantasy images which are considered “dangers” (O’Neill and Nicholson-Cole 2009). This project found that a number of art exhibitions and individual artists used fear to represent climate change. An example of this is “Postcards from the Future” exhibition by Graves and Madoc-Jones. The exhibition was highly regarded and drew much public and media attention, however further

study into the information retained by the public would be useful. Even musical representations have used fear to communicate climate change, with either sombre music, accompanying fear provoking images or the descriptions that accompany them.

This project established that all forms of climate-change communication, whether traditional or alternative, use fear as a method of communication. In addition, the majority of communication uses fear to present climate change in a negative manner – which according to the literature is why fear is not effective alone. This project has found that current communication presents climate change in a negative manner which in turn gives the impression that the public are helpless towards alleviating the issue. This project found similar findings to Spence and Pidgeon (2010) and Morton et al (2011) in terms of positive framing. This project found positive framing through traditional or alternative methods of communication is essential to effective communication, therefore should be incorporated more often.

### 10.2.3 Combination of methods

The literature suggests that a combination of methods is the most effective way to communicate climate change, however most policy makers continue to use one method to communicate. For example artists –both independent and organisations –prefer to use purely art rather than combining art with other interventions. One example of this is Linda Mackey, an artist who has worked both independently and as a part of a large organisation, is most notably known for her glacier artwork in Greenland. Although her artwork is an eye-catching and detailed representation of the effect of climate change on glaciers, it does not offer an accompanying caption to explain and educate an audience on what the message of the painting is, nor uses additional methods. It is understandable that artists who aim to communicate climate change prefer to use methods with which they are comfortable and

have great knowledge; however these policy makers should be encouraged to branch out to include other methods. This project found that other methods do not necessarily mean a different type of art. For example, something as simple as using a caption to accompany a painting, piece of music or photograph is a sufficient and effective way to ensure the audience interprets the art correctly. This project found that although many artists prefer their audience to create their own interpretation of a painting, this can sometimes lead to misunderstanding or a message being lost within the art, therefore a simple caption can rectify this.

The combination of methods is not only important to discourage misinterpretation; it can also be beneficial to multiple alternative communication strategies. As previously stated, many researchers have suggested that by combining methods such as fear, which has been deemed ineffective on its own, could become an effective form of climate-change communication when combined with high-efficiency messaging (Lewis et al 2010, Moser 2007, and Witte & Allen 2000). A combination of methods can be important in many environments. Education may need to be reassessed as the literature has shown that scientific documentaries appear more effective when combined with a trip or a lecture. The film industry could also benefit from using a combination of methods when producing climate change related films. It has been suggested that films coupled with other interventions can motivate the public to change their behaviours to adhere to climate change, as behaviour change from films at present are short term. This shows that policy makers need to take advice from the literature and use a combination of methods. In addition the policy makers need to ensure that their communication is consistent and easy to understand, with a clear aim and message.

Further evidence for the successfulness of a combination of methods comes from the case study adaptations and the original project. The case studies were all adapted to use more than one method. Although some of the case studies already used two methods, for example



Daniel Crawford's video musical representation of increasing surface temperatures, it was further adapted to include captions and additional explanation. The original project used multiple methods not only to ensure the components in the template were covered but to guarantee that the message the project aimed to convey could be clearly understood. The case studies and original project have shown that even if a project already uses two or more methods, a caption to accompany the project is always useful for clarity and understanding.

However, communication outlets such as the media have attempted to use a combination of methods but have shown how it is not effective if done incorrectly. The media (especially newspapers) often use a combination of methods such as an image with an accompanying news article. However, DiFrancesco and Young (2010) found that images used in newspaper articles do not always relate to the accompanying text. They stated that images have the last word in delivering an ultimately one sided climate change narrative to audiences. They found the image and the article frequently referred to completely different dimensions of the climate change issue, thus presenting multiple and sometimes competing narratives to readers. In addition they found that often emotionally provoking images were used even if they were not directly related to the accompanying text. This project has shown that the combined methods need to be able to relate to each other, as contradicting images and text can lead to confusion and misinterpretation. The media can improve its communication strategy by ensuring the image and the texts accompanying it are conveying the same topic. The use of morally edgy images is beneficial for attracting attention but can lead to distrust from the public when the image does not match the text.

#### 10.2.4 Target audience

There remains much uncertainty as to the specific target audience to which climate-change communication should be aimed. Maibach et al (2008) defined the ultimate target audience as

people whose decisions control the attributes of a place. They stated first priority should be elected officials including all levels of government and governmental organisations and second priority should be decision makers in a wide range of business and nongovernmental organizations. On the other hand Climate Access aimed their campaign – Climate Reality Project: Why? Why not? – At people across the globe aged 13 to 21. Their project involved submitting a one minute video to world leaders asking why they continue to do so little to act on climate change and to give suggestions as to what other and better things they could be doing. The idea behind the campaign was to engage young people with the subject of climate change as they will be between the ages of 49 and 57 in 2050 when the globe will have reached 2°C of warming. The literature has shown that children have been suggested as a target audience. That is why many climate change narratives are aimed at children, for example Marcus Sedgwick’s book “Floodland”. Contradicting research further comes from newspapers. Taylor (2014) conducted a survey of 100 UK residents to determine the average age of UK newspaper readers. Studying six national newspapers they discovered the average age range was between 43 and 61. Newspapers provide much information on climate change therefore they are targeting a different audience.

This project encountered issues with the target audience. The literature highlighted that selecting a target audience was an essential means to climate-change communication; therefore this component was included in Template 3 – the template which the case studies were adapted to adhere to. When adapting the case studies, selecting a target audience proved a challenge, as it was difficult to assess to whom the project would be most useful and relevant. To overcome this issue, measures such as providing a means to share the communication for example via the internet were included. Although having a particular target audience was taken out of the final template (Template 4) it should not be disregarded. It should be noted that a project can have multiple target audiences. For example the final

project has more than two audiences which it intends to target. The initial activity is aimed at primary school children – it is simple activity that is not only fun and interactive but also educational. The result of this activity – a musical video representation – was made to be shared through social media and the internet to connect people of all ages.

Due to the uncertainty surrounding targeting a particular audience for climate change information, it has been suggested that the target audience should be dependent on the message that is being communicated (Schweizer et al 2009). This suggests that the target audience should vary depending on which aspect of climate change is being addressed. Schweizer et al (2009) therefore stated the policy maker needs to know and understand the audience well to be able to select a credible message for that particular audience. For example if the target audience is educators and students in a learning environment, messages such as “Climate change is real, and specific impacts are occurring” should be chosen. As well as this any related information or activity should be kept simple and be made fun and relevant to the audience.

This project has shown this information will be particularly useful to policy makers, artists and musicians involved with climate change. By tailoring activities and information to particular age groups, education and understanding of climate change could be increased as different areas of the climate change dilemma could be more relevant to certain age groups than others. Throughout this project, identifying a target audience presented a problem. After being indicated by the literature as a key component therefore being included in Template 3 - having a clear target audience became a problem throughout the case study adaptations. However, after reassessing it is clear that each case study could have had a different target audience and therefore this component should not be completely disregarded.

### 10.3 Original project

The original project was created to test out the final template (Template 4) as an example of how the template could be used. The original project is a visual and musical representation of how the area of the Westlands in Staffordshire has declined in the amount of green space since 1900. The project assessed the amount of green space lost within the area in 20 year intervals from 1900 to 2015. The project aims to encourage people to keep their gardens instead of paving them over with concrete. This will benefit communities by reducing the risk of flooding, reducing the amount of CO<sub>2</sub> in the air and benefitting native wildlife. At first it may appear that the project does not directly link to climate change, however the aim of the project is to show that there are everyday small things the public can do to mitigate climate change.

The project was intended to be an activity for primary school children, which is why one part of the activity involved using tracing paper and grid paper to calculate the amount of green space on maps. The use of tracing paper could be questioned, when electronic and more accurate methods such as GIS are available. However, due to the target audience and the environment, this project used tracing paper instead of GIS as it is easily accessible and appropriate for the age group. It has also been suggested by Sternman (2011) that communication should avoid technical jargon and be able to be understood by someone without a scientific background, therefore using tracing paper instead of GIS is ideal for this activity.

The original project was successful as it fulfilled all the components in the Template 4. It was a local issue, which used scientific data to explain the issue at hand and give solutions on how to improve the situation. It is also successful because it was easy to create and the activity was suitable for those not already engaged in the topic of climate change. The original project attempted to address the target audience challenge by tailoring each activity to a different age group.

However, the project could be improved through creating a video of better quality, for example a video which looks professional. In addition, the video could incorporate more data and information instead of the majority of information being in the caption. The project could also be adapted for a professional environment. For example it could be used as an activity for geography students in a university environment who are already familiar with GIS, or for local councils to establish how much green space has already been lost before plans to build new developments are established. Overall, the project showed how the components of Template 4 were able to be fulfilled through creating a piece of alternative climate-change communication.

#### 10.4 Importance of Art

This project has shown the importance of using art as a communication method, through the literature, the case studies and the original project. The literature and case studies have shown that visual communication is the most important source of information for the public when engaging with climate change issues (DiFrancesco and Young 2010). For this reason all the case studies were adapted to include the visual – whether this was an image or a video representation. In addition the literature has provided multiple explanations as to why art is an effective means of communication. The main benefit to using art is the power imagery has to combine fact and emotion to engage and involve the public with the science rather than relaying facts and information (DiFrancesco and Young 2010). The case studies and original project in particular also found that by using imagery to represent climate change, especially the consequences that could occur in 10 to 20 years, portrays climate change as a real threat and no longer a distant and potential future issue.

Art is a frequently underestimated contributor to social and scientific communication, but is essential for condensing these types of information to make it understandable to the general

public (DiFrancesco and Young 2010). This project has shown how the arts have long been used to communicate issues, have influenced and educated people and have challenged typical scientific communication methods (Curtis et al 2012). This project has shown how the incorporation of arts which include music, theatre and dance to convey scientific research can have a positive effect on an audiences learning and education. This is because art reduces the complexity of scientific research by synthesising, conveying and condensing scientific information (Curtis et al 2012; DiFrancesco and Young 2010). Through using imagery to represent these scientific issues, scientific uncertainties which are often found with traditional climate change information are removed and the main message is reinforced (Smith and Joffe 2009). Communicating information through art encourages a new way of looking at global problems for example visual information has the ability to provoke emotion and risk perception (Joffe 2008; Smith and Joffe 2009) which in turn stimulates a response from the viewer (Perlmutter and Wagner 2004). Art especially through exhibitions creates a different atmosphere than science alone – as Curtis et al (2012) stated a “celebratory atmosphere” (p.1). This new atmosphere provides the audience or public with a different way to engage with science. This project has shown that art is not just restricted to paintings but should include all types of visual, music and performing arts to spread the climate change message.

This information is of particular importance to policy makers especially relating to the media and information disseminated by local councils. Climate change information is often presented through articles with a graph sometimes to accompany the text. Although this is one way of communicating, it is not always deemed effective as often the text can be unclear, confusing or contradicting; however the use of an image eliminates this issue. Using imagery can also be beneficial when creating activities to use in schools, as imagery is easier for children to connect with and create.

Although art has many effective qualities, this project has highlighted issues with the current use of climate change art. The first issue established in the Analysis of Practice (Chapter 5.4) is locality. Much art focusses on glaciers, melting ice and rising sea levels. Although these are important aspects of climate change, for the communication to be effective the art needs to adhere to local issues that will impact the public directly – issues they can see happening around them. This is an issue that this project has attempted to overcome by stating in the final template that locality is important to effective communication. Another issue with art, as briefly mentioned in the “combination of methods” section is confusion. Sometimes artists create abstract pieces of art that could be perceived as difficult to understand, especially as often artists prefer their work to be interpreted by the individual thus leading to multiple interpretations, which is not beneficial for communication purposes. This project also found another problem with art is the issue of reach. There are a number of individual artists who are trying to communicate climate change however these struggle for their work to be noticed. Therefore, festivals, exhibitions and events where people can get more involved with the art appear the most effective method of art communication. This is because discussions about the art are provoked, questions can be answered and the public are educated in a fun and interactive way.

### 10.5 Dissemination

The issue of reach and dissemination is one this project has briefly discussed. It has been established that individual artists, as well as musicians struggle for their work to be noticed. Aside from the traditional media, it is important to find new ways for attention to be brought to artists’ work. One idea is the use of social media and the internet, hence the inclusion of the “must be able to be shared via the internet” component in the final template. Social media and the internet is a way in which climate-change communication through art, music, video and news articles can be shared on a global scale. Though social media has not been

discussed in this project and may have similar problems to traditional media in terms of trustworthiness, further study into this outlet of information should be considered for the future.

This project has also shown how one project can be disseminated differently, therefore reaching different target audiences. For example the original project was a school activity but the final result was able to be shared across the internet. Another example is Al Gore's film "An Inconvenient Truth". The film, shown globally attracted a vast amount of attention but was specifically aimed at the US market. However, Nolan (2010) suggested concepts within the film should be included in schools curriculum, as school children have been suggested as an appropriate target audience for the information within the film. This shows that communication can be disseminated and adapted to reach a larger audience and a variety of target ages.

#### 10.6 Relevance of Project

This original project shows the importance of Template 4 and how it can be applied to climate change projects. This project understands that not all components of the template can be fulfilled when creating a piece of climate-change communication, however it aims to show that by simply adjusting currently available climate change information, communication in general could be improved. Although according to the literature all the components extracted will help to develop successful means of climate-change communication, this project has shown that some elements appear more important than others. For example a critical matter to address is the element of fear as well as explaining and educating the public on climate change issues instead of immersing them with statistics and fear provoking images.

This type of communication will be useful for policy makers, educators and scientists all who strive to communicate scientific and world issues. The final template is adaptable, flexible



and easy to achieve, therefore will be especially useful to policy makers who are believed to have the same understanding as the general public on scientific issues. Furthermore, the template does not have to specifically relate to climate change research; it can be used to communicate any type of science or world issue. For example, Brian Foo used a combination of music and maps to create a video representation of the past four decades of the global refugee movement. The project, entitled “Distance from Home” uses world refugee data with the intended result being “for the listener to intuitively and viscerally experience the sheer volume of displaced populations and the distance they travel from their home country”. The amount of instruments used, the duration, the pitch and the variety of instruments indicate different aspects of the refugee migration. This project shows similarities to climate change activist Daniel Crawford’s “A Song of Our Warming Planet”, which was also a musical representation of data. This shows that the template and this type of communication can be used to communicate other world issues, other than climate change research.

It has been established that scientists find it difficult to communicate pressing issues often complex to the general public; therefore art is now being considered a worthy source of communication amongst many scientists. Curtis et al (2012) assessed the response of professional ecologists to the role of artists communicating science through performances and exhibitions at a national ecological conference. They found that over half the delegates said that elements of the arts program provided a receptive atmosphere for obtaining information. The exhibition encouraged them to reflect on alternative ways to communicate science and persuaded them that the arts have a role in helping people understand complex scientific concepts. It was found 24% of delegates said the exhibition encouraged them to consider incorporating art into outreach of their work. Although 24% is not a vast majority, this shows that through exhibitions and collaboration between scientists and artists, there is a higher chance of art being used to communicate science.

## **11. Conclusion**

This project has shown the potential value of art as an effective communication technique and the prospect of being a better method than traditional approaches. Art is beneficial as it engages the public on a new level by condensing information about global issues into an understandable format. However, this project has shown that current art communication needs to be improved to become more effective. There are still issues associated with this method - for example using fear and the multiple interpretations that can arise from viewing a piece of art. This project provides a template with components that have been deemed effective by the literature, climate change artists and conclusions formed through work undertaken by this project. The template is intended to be used as a guide by artists and policy makers when they are creating a piece of climate-change communication. The template is designed to help policy makers create a piece of alternative effective communication that overcomes the current issue of public engagement and climate change science information.

It is evident that trust is essential for climate-change communication, but in order for this trust to produce correct, clear and scientific information, collaboration between scientists and policy makers is needed. This is important for climate communication through the media, as this collaboration could help to portray the media as a trustworthy source of information. This collaboration is also important for alternative approaches, such as art and music, to ensure that the message they are giving is correct and in line with current climate change science research.

This project found that fear is used amongst all types of climate-change communication. However, fear has been deemed ineffective when used alone, as the impacts from fear are short lived and often the public feel problems are exaggerated and too far into the future for

their concern. Nevertheless, popularity of using fear to communicate scientific issues has led to much research into this area. It has been found that although ineffective when used alone, fear can be an effective means of communication when combined with other interventions such as positive framing and high-efficiency messaging.

Using a combination of methods (such as art and music or an image and an article) has proved to be an effective means of communicating as it reduces misinterpretation. It can also engage a wider audience through using a variety of methods and make the communication more appealing. However it is important to ensure each part of the combination addresses the same aspect of climate change to avoid confusion and mistrust.

The target audience for climate change has been heavily researched over the past decade; however a specific target audience is still unknown. This project has found that a target audience for climate change can change depending on what you are trying to communicate. Climate change should not be related to one particular age or social group due to the amount of issues within the topic. Although target audiences can change, it is essential to know and understand the audience to which the project is directed, to ensure the communication is appropriate for them in terms of language, imagery and clarity.

Through providing a template and information, this project aims to improve current communication from traditional methods such as the media to alternative methods of art and music. The template is a guideline for any policy maker, scientist or member of the public to create a piece of climate-change communication. This project highlights the importance of using alternative methods of art to communicate whilst suggests ways in which the media and traditional methods of communication can be adapted to become effective.

### 11. 1 Key Points

This project recommends that for effective and engaging communication, individuals who are interested in communicating climate change should address these guidelines to create effective communication:

- 1) Ensure the information is trustworthy
- 2) Avoid using fear unless it is combined with high-efficiency messages
- 3) Use a combination of methods – whether that is an image and text or art and music
- 4) Although a target audience is unknown ensure communication targets an age group and is not generic

### 11.2 Future Research

There are many directions future research from this project could take. One method would be to test the effectiveness of the original project in terms of public engagement and target audience. Through testing the project, improvements or adjustments could be made with the intention of finding whether certain types of art are more engaging for certain age groups. These findings could improve the overall effectiveness of current and new climate-change communication which in turn could improve public engagement with the subject.

## References

- 350 Art (2015) Online - Date Accessed 11/08/15 <http://art.350.org/home/>
- Abrahamse W, Steg L, Vlek C, Rothengatter J. A (2005) A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology* 25:273-291
- Adam B (1998) *Timescapes of Modernity: The Environment and Invisible Hazards* (London: Routledge)
- Adams J.L (2014) *Become Ocean*. Online - Date Accessed 13/08/15 <https://johnlutheradams.bandcamp.com/album/become-ocean>
- Aidt M (2014) Concerned musicians communicate climate problems. *Centre for Climate Safety World News*. 20<sup>th</sup> September 2014. Online - Date Accessed 17/12/14 <http://climatesafety.info/concerned-musicians-communicate-climate-problems/>
- Alaszewski A, Brown P (2007) Risk, uncertainty and knowledge. *Health, Risk and Society* 9(1):1-10
- Allum N, Sturgis P, Tabourazi D, Brunton-Smith I (2008) Science knowledge and attitudes across cultures: A meta-analysis. *Public Understanding of Science* 17(1): 35-54
- AoS. (undated) *Age of Stupid* website. Online - Date Accessed 16/12/14 <http://www.spannerfilms.net/films/ageofstupid>.
- Appel M (2008a) Fictional narratives cultivate just-world beliefs. *Journal of Communication* 58:62–83
- Appel M, Richter T (2007) Persuasive effects of fictional narratives increase over time. *Media Psychology* 10:113-134
- Appleton K, Lovett A (2004) GIS-based visualisation of development proposals: reactions from planning and related professionals. *Computers, Environment and Urban Systems* 29(3): 321-339
- Artists Project Earth (2014) *The Blue Whale Project*. Online - Date Accessed 13/08/15 <https://www.apeuk.org/blue-whale-project-2>
- Artists Project Earth (2015) *Artists Project Earth (APE)*. Online - Date Accessed 13/08/15 <http://www.apeuk.org/>
- Associated Press (2012) *The AP-GfK Poll, November 2012, Conducted by GfK Roper Public Affairs & Corporate Communications*. A telephone survey of the American general population (ages 18+). Online - Date Accessed: 31/08/15 [http://ap-gfkipoll.com/main/wp-content/uploads/2012/12/AP-GfK-Poll-November-2012-Final-Topline\\_CLIMATE-CHANGE.pdf](http://ap-gfkipoll.com/main/wp-content/uploads/2012/12/AP-GfK-Poll-November-2012-Final-Topline_CLIMATE-CHANGE.pdf)
- Atwood M (2008) *The Penelopiad: The Myth of Penelope and Odysseus (Myths)*. Canongate Books
- Bahk M.C (2010) Environmental Education through Narrative Films: Impact of Medicine Man on attitudes toward forest preservation. *The Journal of Environmental Education* 42 (1):1-13

- Balmford A, Manica A, Airey L, Birkin L, Oliver A, Schleicher J (2004) Hollywood, Climate Change and the Public. *Science* 305:1713
- Bamberg S (2000) The Promotion of New Behaviour by Forming an Implementation Intention: Results of a Field Experiment in the Domain of Travel Mode Choice. *Journal of Applied Social Psychology* 30:1903-1922
- Barbas T.A, Paraskevopoulos S, Stamou A.G (2009) The effect of nature documentaries on students environmental sensitivity: a case study, *Learning, Media and Technology* 34(1):61-69
- Bates M (2007) Liquid interface. Online - Date Accessed 13/08/15  
<http://www.masonbates.com/work/work-liquidinterface.html>
- BBC (2009) Springwatch – Whitethroat. Online - Date Accessed 13/08/15  
<http://www.bbc.co.uk/springwatch/meettheanimals/whitethroat.shtml>
- BBC (2012) L'Aquila quake: Italy scientists guilty of manslaughter. BBC 22<sup>nd</sup> October 2012. Online - Date Accessed 16/12/14 <http://www.bbc.co.uk/news/world-europe-20025626>
- Benefield C.E, Bunce R.G. H (1982) A preliminary visual representation of lad classes in Britain. ITE Merlewood Research and Development Paper No.91 Institute of Terrestrial Ecology, Merlewood Cumbria
- Bergstrom J.C, Stoll J.R, Randall A (1990) The impact of information on environmental commodity valuation decisions, *The American Journal of Agricultural Economics* 72(3):614-621
- Bonnett A (1992) Art, ideology and everyday space: Subversive Tendencies from Dada to Postmodernism. *Environment and Planning D: Society and Space* 10:69-86
- Bonnett A (2009) The dilemmas of radical nostalgia in British psychogeography. *Theory, Culture, Society* 26:45-70
- Bord R, O'Connor R.E, Fisher A (2000) In what sense does the public need to understand global climate change? *Public Understanding of Science* 9:205-218
- Bord R.J, Fisher A, O'Connor R.E (1998) Public perceptions of global warming: United States and international perspectives, *Climate Research* 11:75-84
- Borick, C, Mills S, Rabe, B (2015) Belief in Global Warming Among Americans Gradually Increases Following the Winter of 2015. Issue in Energy and Environmental Policy. Number 24, July 2015. Online - Date Accessed 7/09/15 <http://closup.umich.edu/files/ieep-nsee-2015-spring-climate-belief.pdf>
- Botteldooren D, Coensel B, De Meur T (2004) The temporal structure of the urban soundscape. *J Sound Vib* 292(1–2):105–123
- Boykoff M, Goodman M, Littler J (2010) “Charismatic megafauna” The growing power of celebrities and pop culture in climate change campaigns. Environment, Politics and Development Working Paper Series, Department of Geography, King's College London

- BTO (2014) BTO, Looking out for birds. Online - Date Accessed 13/08/15  
<http://www.bto.org/>
- Burko D (2013) Polar Investigations. Online - Date Accessed 13/08/15  
<http://www.dianeburko.com/polarinvestigations/>
- Burko D (2014) Politics of Snow. Online - Date Accessed 13/08/15  
<http://www.percontra.net/archive/Politics-of-snow.jpg>
- Busiinge C (2014) Uganda: Is art the answer to communicating about climate change? International Institute for Environment and Development 10th September 2014. Online - Date Accessed 17/12/14 <http://www.iied.org/uganda-art-answer-communicating-about-climate-change>
- Butler T (2006) A walk of art: The potential of the sound walk as practice in cultural geography. *Social and Cultural Geography* 7:889-908
- Byklum D (1994) Geography and Music: Making the Connection. *Journal of Geography* 93:6
- Calfee J (2010) The Last Song of the Glaciers. Online - Date Accessed 13/08/15  
<http://www.juliacalfee.com/#Glaciers>
- Callon M, Lascoumes P, Barthe Y, (2009) *Acting in an Uncertain World: An Essay on Technical Democracy*: MIT Press, Cambridge, MA
- Cambridge Geography (2012) Migrant birds and environmental change in the Sahel. Online - Date Accessed 13/08/15  
<http://www.geog.cam.ac.uk/research/projects/landusemigrantbirds/SahelBirds3.pdf>
- Cape Farwell (2015) About, An Introduction – David Buckland 2007. Online - Date Accessed 11/08/15 <http://www.capefarewell.com/about.html>
- Cape Farwell Sea Change (2010-2014) A four year Programme of Research and Making Across Scotland's Western and Northern Isles. Online - Date Accessed 11/08/15  
<http://www.capefarewell.com/latest/projects/sea-change.html>
- Cape Farwell (2006) Burning Ice – Art and Climate Change. *Bullet Creative*. Online - Date Accessed 13/08/15 <http://www.capefarewell.com/images/articles/pics100/med/pic132.jpg>
- Capstick S.B, Demski C.C, Sposato R.G, Pidgeon N.F, Spence A, Corner A (2015) Public perceptions of climate change in Britain following the winter 2013/2014 flooding. Understanding Risk Research Group Working Paper 15-01, Cardiff University, Cardiff, UK
- Carson R (1962) *Silent Spring*. Penguin Classics
- Centre for Reviews and Dissemination (2008) *Systematic Reviews: CRD's guidance for undertaking reviews in health care*. CRD University of York
- Chivers T (2012) "The US election has put climate change back on the political agenda". *The Telegraph* November 7<sup>th</sup> 2012. Online - Date Accessed 11/08/15  
<http://blogs.telegraph.co.uk/news/tomchiversscience/100188288/the-us-election-has-put-climate-change-back-on-the-political-agenda/>

- Christian Aid (2008) The issues: climate change. Online - Date Accessed 14/08/15  
<http://www.christianaid.org.uk/issues/climatechange/index.aspx>
- Cicerone R.J (2012) Ensuring integrity in science. *Science* 327:624
- City of Westminster (2013) Air Quality Action Plan 2013-2018. Online - Date Accessed 13/08/15  
[https://www.westminster.gov.uk/sites/default/files/uploads/workspace/assets/publications/AQAP\\_2013-2018\\_FinalDraft\\_V1-re-1368525818.pdf](https://www.westminster.gov.uk/sites/default/files/uploads/workspace/assets/publications/AQAP_2013-2018_FinalDraft_V1-re-1368525818.pdf)
- Climarte (2015) Climarte, Arts for a safe climate. Online - Date Accessed 11/08/15  
<http://climarte.org/>
- Climate UK (2014) Building a Resilient Environment – sector tools and resources. Online - Date Accessed 16/12/14 <http://climateuk.net/>
- (The) Climate Reality Project (2014) Why? Why not? Online - Date Accessed 13/08/15  
<https://www.climateRealityproject.org/initiative/why-why-not>
- Cobern M.K, Porter B.E, Leeming F.C, Dwyer W.O (1995) The Effect of Commitment on Adoption and Diffusion of Grass Cycling. *Environment and Behaviour* 27:213-232
- Colls R (2011) BodiesTouchingBodies: Jenny Saville’s over-life-sized paintings and the “morpho-logics” of fat, female bodies. *Gender, Place and Culture*.  
doi:10.1080/0966369X.2011.573143
- Cook I (2000) Social sculpture and connective aesthetics: Shelley Sacks’s “Exchange values”. *Cultural Geographies* 7:337-343
- Comerasamy H (212) Literature based research methodology. University of Brighton UK. Presentation
- Crawford D (2013) A Song of Our Warming Planet. Online - Date Accessed 13/08/15  
<http://artistsandclimatechange.com/2013/08/01/a-song-of-our-warming-planet/>
- Crouch D, Toogood M (1999) Everyday abstraction: geographical knowledge in the art of Peter Lanyon. *Cultural Geographies* 6 (1):72-89
- Crouch D (2010) Flirting with space: Thinking landscape relationally. *Cultural Geographies* 17:5-18
- Curtis D.J, Reid N, Ballard G (2012) Communicating ecology through art: what scientists think. *Ecology and Society* 17(2):3.  
<http://dx.doi.org/10.5751/ES-04670-170203>
- Cutter W.B, Neidell M (2009) Voluntary information programs of environmental regulations: Evidence from “Spare the Air”, *Journal of Environmental Economics and Management* 58(3):253-265
- Cvetkovich G, Lofstedt R (1999) Social trust and the management of risk, Earthscan, London
- Department for Environment, Food and Rural Affairs. (2007a). Attitudes and behaviour in relation to the environment report. London: Author



- Dietz T, Dan A, Swihom R (2007) Support for climate change policy: Social psychological and social structural influences. *Rural Sociology* 72:185-214
- DiFrancesco D.A, Young N (2010) Seeing climate change: the visual construction of global warming in the Canadian national print media, *SAGE* 18(4):517-536
- Dixon D (2008) The blade and the claw: Science, art and the creation of the lab-born monster. *Social and Cultural Geography* 9:671-692
- Dockerty T, Lovett A, Sunnenberg G, Appleton K, Parry M (2005) Visualising the potential impacts of climate change on rural landscapes. *Computers, Environment and Urban Systems* 29(3):297-320
- Dolman P.M, Lovett A, O'Riordan T, Cobb D. (2001) Designing whole landscapes, *Landscape Research* 26:35-335
- Donald R (2013) The Carbon Brief - Polling reveals public trusts scientists most on climate change. April 2nd 2013. Online - Date Accessed: 02/02/15  
<http://www.carbonbrief.org/blog/2013/04/polling-reveals-public-trusts-scientists-most-on-climate>
- Doulton H, Brown K (2009) Ten years to prevent catastrophe? Discourses of climate change and international development in the UK press. *Global Environmental Change* 19:191-202
- Doyle J (2007) Picturing the Clima(c)tic: Greenpeace and the Representational Politics of Climate Change Communication, *Science as Culture* 16(2):129-150
- Dryzek J, Iorggard R, Schlosberg D (2011) *The Oxford Handbook of Climate Change and Society*. Oxford University Press
- Duncum P (2004) Visual Culture isn't just visual: Multiliteracy, Multimodality and Meaning. *Studies in Art Education. A Journal of Issues and Research* 45(3):252-264
- Dunn D.D, Crutchfield J.P (2009) Entomogenic Climate Change: Insect Bioacoustics and Future Forest Ecology. *Leonardo* 42(2):239-244
- Dunwoody S (2008) Science journalism. In Bucchi and Trench (Eds) *Handbook of Public Communication of Science and Technology*. London and New York: Routledge.
- Dumyahn S.L, Pijanowski B.C (2011) Soundscape Conservation. *Landscape Ecology* 26:1327-1344
- Green R (2009) Durham University News - Climate change makes migrations longer for birds. Online - Date Accessed. 13/08/15  
<https://www.dur.ac.uk/news/newsitem/?itemno=7825>
- Earle T.C (2010) Trust in risk management: A model-based review of empirical research. *Risk Analysis* 30:541-574
- eARTh 350 (2014) eARTh 350. Online - Date Accessed 16/12/14 <http://art.350.org/>
- Edwards M (2006) Hard Rain Project. Online - Date Accessed 13/08/15  
<http://www.hardrainproject.com/>

- Eliasson O (2014) The Ice Watch Copenhagen City Hall. Online - Date Accessed 13/08/15  
<http://images.vogue.it/gallery/22180/Big/e024842b-1305-4d08-b48f-520393a3c7e6.jpg>
- Emley D.W (1986) A Guide to the Grounds of Keele University. Online - Date Accessed 13/08/15  
<https://www.keele.ac.uk/media/keeleuniversity/arboretum/downloads/keele%20grounds.pdf>
- English Nature Research Reports (1993) No. 63 Upland Resource Survey Consolidation Project Phase 1: Dartmoor, Culm Measures, The Peak District. English Advisory Service Keighley, Final Report (Contract F72-18-18)
- English Oxford Dictionaries (2015) Definition of Art. Online - Date Accessed 19/09/15  
<http://www.oxforddictionaries.com/definition/english/art>
- Ensminger J (2001) Reputations, trust, and the principal agent problem. In: Cook KS, ed. Trust in Society. New York, NY: Russell Sage Foundation 185-201
- The Environment Agency (2013) Climate Change Allowances for planners. Online - Date Accessed 13/08/15  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/296964/LIT\\_8496\\_5306da.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296964/LIT_8496_5306da.pdf)
- Environmental Change Institute (2011) Climate Research Topics: Stakeholder Engagement and Communication. University of Oxford, School of Geography and the Environment. Online - Date Accessed 02/02/15  
<http://www.eci.ox.ac.uk/research/climate/communication.php>
- Environmental Protection Agency (2015) Humans are largely responsible for recent climate change. Online - Date Accessed: 11/08/15 <http://www.epa.gov/climatechange/basics/>
- Escalas J.E (2004) Imagine yourself in the product: Mental simulation, narrative transportation, and persuasion. Journal of Advertising 33:37-48
- Evans H, Hansen H (2007) Champs D'Ozone. Online - Date Accessed 13/08/15  
<http://hehe.org.free.fr/hehe/champsdozone/index.html>
- Farina A (2014) Soundscape Ecology, Principles, Patterns, Methods and Applications. Springer Netherlands
- Fazio L.K, Marsh E.J (2008) Slowing presentation time increases, rather than decreases, errors learned from fictional stories. Psychonomic Bulletin and Review 15:180-185
- Featherstone H, Manners P, Nerlich B, James H (2014) Science Communication: Bridging theory and practice. In: Science Communication: State of the Nation 2013, Essays inspired by the annual Science Communication Conference (British Science Association)
- Fischhoff B (2013) The Sciences of Science Communication. PNAS 2013. 110:3
- Fitzgerald F.S (2004) The Great Gatsby. Scribner
- Foo B (2012) Distance from home – Translating four decades of global refugee movement into song. Online - Date Accessed 13/08/15 <https://datadrivendj.com/tracks/refugees>

- Foster K, Lorimer H (2007) Cultural geographies in practice: Some reflections of art-geography as collaboration. *Cultural Geographies* 14 (3):425-432
- Frazier S (2013) Sonification: Data like you've never heard before. *Articles, Technology in Earth Zine*, 23<sup>rd</sup> July 2013. Online - Date Accessed: 17/12/14  
<http://earthzine.org/2013/07/23/sonification-data-like-youve-never-heard-before/>
- Frewer J.L, Howard C, Hedderley D, Shepherd R (1996) What Determines Trust in Information About Food-Related Risks? Underlying Psychological Constructs, *Risk Analysis* 16:4
- Gandy M (1997) Contradictory modernities: Conceptions of nature in the art of Joseph Beuys and Gerhard Richter. *Annals of the Association of the American Geographers* 87: 636-665
- Gelbard J (2009) Musicians inspiring fans to act on climate change. *Yale Climate Connections*. Online - Date Accessed 13/11/14  
<http://www.yaleclimateconnections.org/2009/10/musicians-inspiring-fans-to-act/>
- Gerrig R.J (1993) *Experiencing narrative worlds: On the psychological activities of reading*. New Haven, CT: Yale University Press
- Gerrig R.J, Bailis D.S(1997) *Psychonomic Bulletin and Review* 6:136–141
- Gerrig R.J, Prentice D.A (1991) The representation of fictional information. *Psychological Science* 2:336–340
- Giddon A (2014) Do Documentary Films Play an Integral Role in Environmental Education? *EcoWatch: Transforming Green*, May 9th 2014. Online - Date Accessed 07/01/15  
<http://ecowatch.com/2014/05/09/documentary-films-environmental-education/>
- Goldberg F (1974) Effects of imagery on learning incidental material in the classroom. *Journal of Educational Psychology* 66(2):233-237
- Goodwin J, Dahlstrom M (2013) Communication Strategies for earning trust in climate change debates, *WIREs Climate Change* 2014 5:151-160
- Graves R, Madoc-Jones D (2010) Postcards from the Future. Online - Date Accessed 16/12/14 <http://www.postcardsfromthefuture.co.uk/>
- Green M.C (2004) Transportation into narrative worlds: The role of prior knowledge and perceived realism. *Discourse Processes* 38:247–266
- Green M.C, Brock T.C (2002) In the mind's eye: Transportation-imagery model of narrative persuasion. In M.C Green, J.J Strange, & T.C Brock (Eds.) *Narrative impact: Social and cognitive foundations* (pp. 315–342). Mahwah, N.J: Lawrence Erlbaum Associates, Inc
- Green M.C, Brock T.C (2000) The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology* 79:701–721
- Green M.C, Garst J, Brock T.C (2004) The power of fiction: Determinants and boundaries. In L. J Shrum (Ed.) *Blurring the lines: The psychology of entertainment media* 161–176 Mahwah, N.J: Lawrence Erlbaum Associates Inc.

- Groom, M. J., Meffe, G. K, Carroll C.R (2006) *Principles of Conservation Biology*. Third Edition Sinauer Associates
- Groz E (2008) *Chaos, Territory, Art – Deleuze and the framing of the Earth*. Columbia University Press, New York
- Hallegatte S (2009) Strategies to adapt to an uncertain climate change. *Global Environmental Change* 19(2):240-247
- Hansen J (2009) *Storms of my grandchildren*. New York, NY: Bloomsbury
- Hanson F (2009) *Australia and the world: Public opinion and foreign policy*. The Lowy Institute Poll 2009
- Harness H, Drossman H (2011) The environmental education through filmmaking project. Special Issue: The media, animal conservation and environmental education, *Environmental Education Research* 17:6
- Harrington D (2013) Violinist of Kronos Quartet in *Taking the World by Storm*. Weather inspired Music – Oritz (2013)
- Hart P.S, Feldman L (2014) Threat without efficacy? Climate change on U.S. network news. *Science Communication* 36 (2): 1–27
- Hastings G, Stead M, Webb J (2004) Fear appeals in social marketing: Strategic and ethical reasons for concern. *Psychology & Marketing* 21:961-986
- Hawkins H (2010a) The argument of the eye: Cultural geographies of installation art. *Cultural Geographies* 17: 1-19
- Hawkins H (2013) *For Creative Geographies: Geography, Visual Arts and Making of Worlds*, Routledge
- Hines J.M, Hungerford H.R, Tomera A.N (1987) Analysis and Synthesis of research on responsible environmental behaviour. A meta-analysis. *Journal of Environmental Education* 18(2):1-8
- Howell R.A (2011) Lights, camera ... action? Altered attitudes and behaviour in response to the climate change film *The Age of Stupid*. *Global Environmental Change* 21(1):177-187
- Howell R.A (2014) Investigating the long-term impacts of climate change communications on individuals' attitudes and behaviour. *Environment and Behaviour* 46(1):70-101
- Hulme M (2008) The conquering of climate: discourses of fear and their dissolution. *The Geographical Journal*, 174:5-16
- Hulme M (2007) Newspaper scare headlines can be counter-productive. *Nature*, 445:818
- Hungerford H.R, Volk T.L (1990) Changing learner behaviour through environmental education. *Journal of Environmental education*. 21(3):8-21
- Hunt S, Frewer L.J (2001) Trust in sources of information about genetically modified food risks in the UK. *British Food Journal* 103:46–62

Imagine 2020 (2012) Art and Climate Change. Online - Date Accessed 16/12/14

<http://www.imagine2020.eu/>

IPCC (2013) Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535

Irland B (2014) Ecological Artist Basia Irland and her “Ice Books” engage communities and restore rivers. National Geographic. Sandra Postel. Online - Date Accessed 13/08/15

<http://voices.nationalgeographic.com/2014/01/09/ecological-artist-basia-irland-and-her-ice-books-engage-communities-and-restore-rivers/>

Irwin A (2009) “Moving forwards or in circles? Science communication and scientific governance in an age of innovation”, in Investigating Science Communication in the Information Age: Implications for Public Engagement and Popular Media Eds R Holliman, E Whitelegg, E Scanlon, S Smidt, J Thomas (Oxford University Press, Oxford) 3-17

Jacobsen G (2011) The Al Gore Effect: An Inconvenient Truth and Voluntary Carbon Offsets, Journal of Environmental Economics and Management 61:67-78

James F (2009) Six tools you need for Climate Change Art (and Action). Online - Date Accessed 16/12/14 <http://www.frankejames.com/can-you-make-climate-change-art/>

Jensen M, Thompson H (2004) Natural sounds: An endangered species. The George Wright Forum 21(1):10-13

Joffe H (2008) The power of visual material: Persuasion, emotion and identification. Diogenes 55: 84–93

Johnston L (2013) When I say “climate change”, How does it make you feel? 2<sup>nd</sup> Green revolution. Online - Date Accessed 11/08/2015

<http://2ndgreenrevolution.com/2013/08/30/when-i-say-climate-change-how-does-it-make-you-feel/>

Jones N, Clark J.R.A (2013) Social capital and climate change mitigation in coastal areas: A review of current debates and identification of future research directions. Ocean & Coastal Management 80:12-19

Keeling D (2011) Iconic Landscapes: The Lyrical Links of Songs and Cities. Focus on Geography 54(4):113-125

Kettle N, Dow K (2014) The Role of Perceived Risk, Uncertainty and Trust on Coastal Climate Change Adaption Planning, Environment and Behaviour, 1-28, Sage Publishing

Kindler A (undated) Art as a Language for Communication and Critical Awareness (or not?)-and some reflection on the relevancy of this question to art education. Online - Date Accessed 11/08/2015

[http://portal.unesco.org/culture/en/files/30172/11414748751anna\\_kindler.pdf/anna%2Bkindler.pdf](http://portal.unesco.org/culture/en/files/30172/11414748751anna_kindler.pdf/anna%2Bkindler.pdf)

- King S, Conley B, Latimer B, Ferrai D (1989) Co-design: a process of design articulation, Van Nostrand Reinhold, New York
- Kintz J (2012) This Book Title is Invisible. Kindle Edition
- Kirby D (2011) Lab Coats in Hollywood: Science, Scientists and Cinema. Cambridge, MA: The MIT Press
- Knowles T (2012) Dragon Spruce. Online - Date Accessed 13/08/15  
<http://www.timknowles.co.uk/Work/TreeDrawings/DragonSpruce/tabid/282/Default.aspx>
- Krause B.L (2002) Wild soundscapes: discovering the voice of the natural world. Wild Sanctuary Books, Berkeley
- Krauss R (1979) "Sculpture in the expanded field" October, MIT PRESS. United States 8:30-44
- Landstrom C, Whatmore S, Lane S, Odoni N, Ward N, Bradley S (2011) Coproducing flood risk knowledge: re distributing expertise in critical "participatory modelling". Environment and Planning A 43:1617-1633
- Lanyon P (1946) The Yellow Runner. Online - Date Accessed 13/08/15  
[http://images.tate.org.uk/sites/default/files/styles/grid-normal-8-cols/public/images/treves\\_07.jpg?itok=-jG\\_70zJ](http://images.tate.org.uk/sites/default/files/styles/grid-normal-8-cols/public/images/treves_07.jpg?itok=-jG_70zJ)
- Laurian L (2009) Trust in planning: Theoretical and practical considerations for participatory and deliberative planning. Planning Theory & Practice 10:369-391
- Leiserowitz A (2004) Before and After the Day after Tomorrow: A U.S. Study of Climate Change Risk Perception. Environment 46: 22-37
- Leiserowitz A, Maibach E, Roser-Renouf C (2008) Climate change in the American mind: Americans' climate change beliefs, attitudes, policy preferences, and action. Center for Climate Change Communication, George Mason University
- Leiserowitz A, Maibach E, Roser-Renouf C, Hmielowski J (2012) Global Warming's Six Americas, March 2012 & November 2011. Yale Project on Climate Change Communication, Bridging Science and Society. George Mason University, Center for Climate Change Communication
- Lewis I.M, Watson B, White K.M (2010) Response efficacy: The key to minimizing rejection and maximising acceptance of emotion-based anti-speeding messages. Accident Analysis and Prevention 42:459-467
- Lofstedt R (2003) Risk communication: Pitfalls and promises. European Review 11(3): 417-443
- London Air (2015) London Air Quality Network - Nowcast. Online - Date Accessed 13/08/15 <http://www.londonair.org.uk/london/asp/nowcast.asp>
- Lorenzoni I, Langford I (2001a) Dealing with climate change: the role of institutions in the eyes of the public. In Proceedings of the 2001 Berlin conference on the human dimensions of global environmental change 7-8 December 2001

- Lorenzoni I, Langford I (2001b) Climate change now and in the future: a mixed methodological study of public perceptions in Norwich (UK). CSERGE Working Paper ECM 01-05
- Lorenzoni I, Pidgeon N.F (2006) Public views on climate change: European and USA perspectives. *Climatic Change* 77:73-95
- Lovejoy A, Hawkins H (2010) *insites: An Artists' Book*. Artefact
- Lovett A, Kennaway R, Sunnenberg G, Cobb D, Dolman P, O'Riordan T, Arnold D (2002) Visualising sustainable agricultural landscapes, P Fisher, D Unwin (Eds), *Virtual reality in geography*, Taylor & Francis, London 129-156
- Lovett A (2005) *Futurescapes*, *Computers, Environment and Urban Systems* 29(3):249-253
- Lowe T, Brown K, Dessai S, de Franca Doria M, Haynes K, Vincent K (2006) Does tomorrow ever come? Disaster narrative and public perceptions of climate change *Public Understanding of Science* 15:435-457
- Luhmann N(1988) Familiarity, confidence, trust: Problems and alternatives. In D.Gambetta (Ed.), *Trust: Making and breaking cooperative relations* 94-108 Oxford, UK: Basil Blackwell.
- Lutz K, Lutz R (1978) Imagery-Eliciting Strategies: Review and Implications of Research. *Advances in Consumer Research* 5:611-620
- MacFarlane R, Stagg H, Turner K, Lievesley M (2005) Peering through the smoke? Tensions in landscapes visualisation. *Computers, Environment and Urban Systems*, 29(3):341-359
- Mackenzie A.F.D (2006a) Claims to place: The public art of Sue Jane Taylor. *Gender, Place and Culture* 13:605-627
- Mackey L (date unknown) Polar Artists Group in partnership with international polar year – Arctic Light. Online - Date Accessed 13/08/15  
<http://polarartists.com/artists/LMackey/LMpgs/ArcticLt.html>
- Maibach E.W, Roser-Renouf C, Leiserowitz A (2008) Communication and Marketing as Climate Change- Intervention Assets: A Public Health Perspective, *American Journal of Preventive Medicine* 35(5):488-500
- Maibach E, Roser-Renouf C, Leiserowitz A (2009) Global warming's Six Americas 2009: An Audience Segmentation Analysis. Yale project on Climate Change, George Mason University Center for Climate Change Communication
- Malka A, Krosnick J. A (2009) The association of knowledge with concern about global warming: Trusted information sources shape public thinking. *Risk Analysis* 29:633–647
- Mare D (2014) Progress in science communication but problems remain. *The Guardian* 7<sup>th</sup> April 2014. Online - Date Accessed 16/12/14 <http://www.theguardian.com/science/lost-worlds/2014/apr/07/progress-in-science-communication-but-problems-remain>
- Marks D.F (1973) Visual imagery differences in the recall of pictures. *British Journal of Psychology* 1:17-24



- Marler P, Slabberkoorn H (2004) *Nature's music: the science of birdsong*. Elsevier Academic Press, San Diego CA
- Marris C, Langford I, Saunderson T, O'Riordan T (1998) A quantitative test of the cultural theory of risk perception: Comparison with the psychometric paradigm, *Risk Analysis* 18(2):635–647
- Marsh E.J, Meade M.L, Roediger H.L (2003) Learning facts from fiction. *Journal of Memory and Language* 49:519–536
- Marsh E.J, Fazio L.K (2006) Learning errors from fiction: Difficulties in reducing reliance on fictional stories. *Memory and Cognition* 34:1140–1149
- Marshall G (2010) *How to engage your community and communicate about climate change*. Energy Saving Trust. Climate Outreach and Information Network
- Matsinos Y.G, Mazaris A.D, Papadimitriou K.D, Mniestris A, Hatzigiannidis G, Maioglou D, Pantis J.D (2008) Spatiotemporal variability in human and natural sounds in a rural landscape. *Landscape Ecol* 23:945–959
- Mawanda S (2012) Music offers a breakthrough for communication on climate change in Climate & Development Knowledge Network. Online - Date Accessed 17/12/14 <http://cdkn.org/2013/11/music-offers-a-breakthrough-for-communicating-on-climate-change/>
- McBride J (1997) *The Colour of Water: A Black Man's Tribute to His White Mother*. Riverhead Trade
- McIntyre K (2015) *Poisoned Apple*. Decadent Publishing
- Meijinders A, Midden C.J.H, Wilke H.A.M (2001a) Communications About Environmental Risks and Risk-Reducing Behaviour: The Impact of Fear on Information Processing. *Journal of Applied Social Psychology* 31:754-777
- Meijinders A.L, Midden C.J.H, Wilke H.A.M (2001b) Role of Negative Emotion in Communication about Co2 Risks. *Risk Analysis* 21(5):955
- Meinig D.W (1983) Geography as an Art, *Transactions of the Institute of British Geographers, New Series*, The Royal Geographical Society (with the Institute of British Geographers) 8(3):314-328
- Miller T (2010) Heat Wave, Wildfires Pummel Russia. *The Rundown*, PBS News hour. Online. - Date Accessed 13/08/15 <http://www.pbs.org/newshour/rundown/heat-wave-wildfires-raise-deaths-in-moscow/>
- Mitchell W.J.T (1995) *Interdisciplinary and Visual Culture. Range of Critical Perspectives*. Art Bulletin December 1995 Volume LXXVII Number 4
- Morton T.A, Rabinovich A, Marshall D, Bretschneider P (2011) The future that may (or may not) come: How framing changes responses to uncertainty in climate change communications. *Global Environmental Change* 21:103-109
- Moser S.C (2007) More bad news: the risk of neglecting emotional response to climate change information. In S. C Moser & L. Dilling (Eds.), *Creating a Climate for Change*:



Communicating Climate Change and Facilitating Social Change. New York: Cambridge University Press

National Park Service (2006) National park service management policies. Washington, DC

NASA Goddard Institute of Space Studies (2015) Global Land-Ocean Temperature Index. Online - Date Accessed 13/08/15

[http://data.giss.nasa.gov/gistemp/tabledata\\_v3/GLB.Ts+dSST.txt](http://data.giss.nasa.gov/gistemp/tabledata_v3/GLB.Ts+dSST.txt)

NASA (2015) Consensus: 97% of climate change scientists agree. Global Climate Change, Vital Signs of the Planet. Online - Date Accessed 11/08/2015

<http://climate.nasa.gov/scientific-consensus/>

Nature (2010) A question of trust 466:7

Nerlich B, Koteyko N (2009) Compounds, complexity and communication in climate change communication: The case of 'carbon indulgences'. Global Environmental Change, 19(3):45–353

Nerlich B, Forsyth R, Clarke D.D (2012) Climate in the news: How differences in media discourse between the US and UK reflect national priorities Environmental Communication: A Journal of Nature and Culture 6(1): 44-63

Nicholson-Cole S (2005) Representing Climate Change Futures: A critique on the use of images for visual communication, Computers Environment and Urban Systems, Futurescapes 29(3):255-273

Nolan J.M (2010) "An Inconvenient Truth" Increases Knowledge, Concern, and Willingness to Reduce Greenhouse Gases. Environment and Behaviour 42:643-658

O'Connor R.E, Bord R.J, Fisher A (1999) Risk perceptions, general environmental beliefs and willingness to address climate change. Risk Analysis 19:461-471

Ogilvie E (2014) Out of Ice, Imagine 2020. Online - Date Accessed 11/08/15

<http://www.imagine2020.eu/expand/elizabeth-ogilvie-out-of-ice/>

O'Neill S, Nicholson-Cole S (2009) "Fear Won't Do It" Promoting Positive Engagement with Climate Change through Visual and Iconic Representations, Science Communication 30(3):355-379

O'Neill S (2008) An iconic approach to communicating climate change. Unpublished PhD thesis, School of Environmental Sciences, University of East Anglia, UK. Online - Date Accessed 09/12/09 [www.cru.uea.ac.uk/~saffron](http://www.cru.uea.ac.uk/~saffron)

O'Riordan T, Lovett A, Dolman P, Cobb D, Sunnenberg G (2000) Designing and implementing whole landscapes. Ecos 21:57-68

O'Riordan T, Wood C, Shadrake, A(1993) Landscapes for tomorrow, Journal of Environmental Planning and Management 36:123-147

Ortiz E (2013) Taking the World by Storm? Weather Inspired Music. San Francisco Classical Voice. Online - Date Accessed 13/11/14 <https://www.sfcv.org/article/taking-the-world-by-storm-weather-inspired-music>

- Osborn L, Shenai P (2014) Change Ringing. Online - Date Accessed 13/08/15  
<http://www.change-ringing.co.uk/>
- Owens S (2000) Commentary - 'Engaging the public': information and deliberation in environmental policy. *Environment and Planning A* 32:1141- 1148
- Paivio A (1969) Mental imagery in associate learning and memory. *Psychol. Rev.* 76:241-63
- Parr H (2007) Collaborative film-making as process, method and text in mental health research. *Cultural geographies* 14:114-138
- Parry M.L, Canziani O.F, Palutikof J.P, Van Der Linden P.J, Hanson C.E (eds) (2007) Contribution of Working group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge: Cambridge University Press
- Paterson K (2007) Vatanjokull (the sound of). Online - Date Accessed 13/08/15  
<http://www.katiepaterson.org/vatnajokull/>
- Perlmutter D, Wagner G.L (2004) The anatomy of a photojournalistic icon: Marginalization of dissent in the selection and framing of 'a death in Genoa'. *Visual Communication* 3:91–108
- Pew Research Centre (2009b) Fewer Americans See Solid Evidence of Global Warming: Modest Support for 'Cap and Trade' Policy, Washington DC: The Pew Research Centre for the People and the Press
- Pidcock R (2014) Academics urge scientist to do more to engage the public on climate change. *The Carbon Brief*. Online - Date Accessed 13/11/14  
<http://www.carbonbrief.org/blog/2014/06/academics-urge-scientists-to-do-more-to-engage-the-public-on-climate-change>
- Pijanowski B.C, Farina A, Gage S.H, Dumyahn S.L, Krause B.L (2011) What is soundscape ecology? An introduction and overview of an emerging new science. *Landscape Ecology* 26(9):1213-1232
- Pinder D (2005) Arts of urban exploration. *Cultural Geographies* 12:383-411
- Pollock V, Sharp J (2007) Constellations of identity: Place-ma(r)king beyond heritage. *Environment and Planning D: Society and Space* 5:1061-1078
- Poortinga W, Pidgeon N.F (2003a) Public perceptions of risk, science and governance—Main findings of a British survey on five risk cases, Technical Report, Centre for Environmental Risk, University of East Anglia, Norwich, UK
- Poortinga W, Pidgeon N.F (2003) Public perceptions of risk, science and government: Main findings of a British survey of five risk cases. Norwich, UK: University of East Anglia, Centre for Environmental Risk
- Poortinga W, Pidgeon N.F (2003) Exploring the dimensionality of trust in risk regulation, *Risk analysis* 23:961-972
- Poortinga W, Pidgeon N.F (2003b) 'Exploring the dimensionality of trust in risk regulation'. *Risk Analysis* 23:5:961–971

Prentice D.A, Gerrig R.J, Bailis D.S (1997) What readers bring to the processing of fictional texts *Psychonomic Bulletin and Review* 4:416–420

Project Dirt (2015) What is Project Dirt? Online - Date Accessed 13/08/15  
<http://www.projectdirt.com/>

Public Health England (2015) Heatwave plan for England: Protecting health and reducing harm from severe heat and heatwaves. NHS England. Online - Date Accessed 13/08/15  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/429384/Heatwave\\_Main\\_Plan\\_2015.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/429384/Heatwave_Main_Plan_2015.pdf)

Quinn M (2001) Research Set to Music: The Climate Symphony and other sonifications of ice core, radar, DNA, seismic and solar wind data. Proceedings of the 2001 International Conference on Auditory Display, Espoo, Finland, July 29<sup>th</sup> – August 1<sup>st</sup> 2001

Rabinovich A, Morton T.A, Birney M (2012) Communicating climate science: The role of perceived communicator's motives. *Journal of Environmental Psychology* 32:11

Raimbault M, Dubois D (2005) Urban soundscapes: experiences and knowledge. *Cities* 22(5):339–350

Reiss P, White M (2008) What changes energy consumption? Prices and Public Pressure, *Rand Journal of Economics* 39(3):636-663

Reusswig F, Schwarzkopf J, Pohlenz P (2004) Double Impact: The Climate Blockbuster The Day After Tomorrow and its Impact on the German Cinema Public. Potsdam, Germany: Potsdam Institute for Climate Impact Research Report 92

Riddell P, Webster B (2009) Widespread scepticism on climate change undermines Copenhagen summit. The Times Online. Online – Date Accessed 16/12/14  
<http://www.timesonline.co.uk/tol/news/environment/article6916510.ece>

Rogers R.W (1975) A Protection Motivation Theory of Fear Appeals and Attitude Change. *Journal of Psychology* 91:93

Rohrmann B, Renn O (2000) 'Risk Perception Research—An Introduction', in Renn O and Rohrmann B (eds.), Cross-cultural risk perception—A survey of empirical studies, Technology risk and society: An international series in Risk Analysis. Mumpower J and Renn O. (eds.). Kluwer Academic Publishers the Netherlands 13:11–54

Rosati S, Saba A (2004) The perception of risks associated with food-related hazards and the perceived reliability of sources of information, *International Journal of Food Science and Technology* 39:491-500

Roser C, Thompson M (1995) Fear Appeals and the Formation of Active Publics. *Journal of Communication* 45:103-121

Royal Commission on Environmental Pollution (2000) Energy – The Changing Climate, 22<sup>nd</sup> Report. Presented to Parliament by Command of Her Majesty June 2000

- Sakellari M (2014) Cinematic climate change, a promising perspective on climate change communication, *Public Understanding of Science* 1-15 Sage publishing
- Schafer R.M (1994) *The soundscape: the tuning of the world*. Inner Traditions International Limited, Rochester
- Schafer R.M (1977) *Tuning of the world*. Alfred Knopf NY
- Schroth O, Angel J, Sheppard S, Dulic A (2014) Visual Climate Change Communication: From Iconography to Locally Framed 3D Visualization. *Environmental Communication: A Journal of Nature and Culture* 8(4)
- Schweizer S, Thompson J, Teel T, Bruyere B (2009) Strategies for Communicating about Climate Change Impacts on Public Lands, Sage Publications, *Science Communication* 31 (2):266-274
- Sedgwick M (2001) *Floodland*. Orion Children's
- Shakespeare W (1795) *Troilus and Cressida* Act 3, Scene 3, 169-179
- Sharrocks A (2014) Museum of Water in LIFT 2014, Imagine 2020. Online - Date Accessed 11/08/15 <http://www.imagine2020.eu/uncategorized/museum-of-water-in-lift-2014/>
- Sheppard S.R.J (2012) *Visualising Climate Change: A Guide to Visual Communication of Climate Change and Developing Local Solutions*. Routledge
- Sherer M, Rogers R.W (1984) The Role of Vivid Information in Fear Appeals and Attitude Change. *Journal of Research in Personality* 18:321-334
- Shuckburgh E, Robison R, Pidgeon N.F (2012) Climate science, the public and the news media: summary findings of a survey and focus groups conducted in the UK in March 2011:2012
- Siegrist M, Earle T.C, Gutscher H (2007) *Trust in cooperative risk management*, London, England: Earthscan
- Singhal A, Cody M.J, Rogers E.M, Sabido M (2004) *Entertainment-education worldwide: History, research, and practice*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc
- Slovic P (1999) Trust, emotion, sex, politics and science: Surveying the risk-assessment battlefield. *Risk Analysis* 19(4):689–701
- Small D.A, Loewenstein G, Slovic P (2007) Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behaviour and Human Decision Processes* 102:143–53
- Smith N.W, Joffe H (2009) Climate change in the British Press: the role of the visual. *Journal of Risk Research* 12(5):647-663
- Solomon S, Qin D, Manning M, Marquis M, Avery K, Tignor M.M.B, Le Roy Miller H, Chen Z (eds) (2007) *Climate Change 2007: The Physical Basis*. Cambridge: Cambridge University Press

- Souchevre V, Millair L, Echeverria J, Bousquet F, Le Page C, Etienne M (2010) 'Co-constructing with stakeholders a role-playing game to initiate collective management of erosive runoff risks at the watershed scale' *Environmental Modelling and Software* 25:1359-1370
- Soule M.D (1985) What is Conservation Biology? *BioScience, The Biological Diversity Crisis* 35(11):727-734
- Southworth M (1969) The sonic environment of cities. *Environment Behaviour* 1:49–70
- Sparks N (2007) *The Notebook*. Sphere
- Spence A, Pidgeon N.F (2010) Framing and communicating climate change: The effects of distance and outcome frame manipulations. *Global Environmental Change* 20:656-667
- Stebbing M (2009) Avoiding the trust deficit: Public engagement, values, the precautionary principle and the future of nanotechnology. *Bioethical Inquiry* 6:37–48
- Steg L, Vlek C (2009) Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology* 29:309-317
- Sternman D (2011) Communicating Climate Change risk in a sceptical world. *Climate Change* 108:811-826
- Stibbon E, Brown G (2007) Glacial Shift Changing Perspectives. Online - Date Accessed 13/08/15 <http://www.bris.ac.uk/changingperspectives/projects/glacial-shift/>
- Stirling A (2008) 'Opening up' and 'closing down': power, participation, and pluralism in the social appraisal of technology *Science, Technology and Human Values* 33:262-294
- Strange J.J, Leung C.C (1999) How anecdotal accounts in news and in fiction can influence judgments of a social problem's urgency, causes, and cures. *Personality and Social Psychology Bulletin*, 25:436–449
- Strauss A, Corbin J (1998) *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage
- Stromso H.I, Braten I, Britt M.A (2011) Do students beliefs about knowledge and knowing predict their judgment of texts' trustworthiness? *Educational Psychology: An International Journal of Experimental Educational Psychology* 21:(2)
- Sustainability East (2014) Incorporating Climate East. Online - Date Accessed 16/12/14 <http://www.sustainabilityeast.org.uk/>
- Swanson F.J, Kratz T.K, Caine N, Woodmansee R.G (1988) Landform effects on ecosystem patterns and processes. *BioScience* 38(2):92–98
- Talking Climate (2012) *Language: words & phrases: The gateway to research on climate change communication*. Online - Date Accessed 13/11/14 <http://talkingclimate.org/guides/language-words-phrases/>

Taylor H (2014) How old are you again? UK newspaper age demographics in 4 charts. The Media Briefing. Online - Date Accessed 13/08/15  
<http://www.themediabriefing.com/article/youth-audiences-newspaper-old-demographics-advertising>

Tipping Point (2015) Tipping Point, Energising the creative response to climate change. Online- Date Accessed 13/08/15 <http://www.tippingpoint.org.uk/>

Tolia-Kelly D.P (2007a) Fear in Paradise: The affective registers of the English Lake District landscape re-visited. *The Senses and Society* 2:329-351

Tolia-Kelly D.P (2012) The geographies of cultural geography II: Visual culture. *Progress in Human Geography* 36:135-142

Tonn B, Hemrick A, Conrad F (2006) Cognitive representations of the future: Survey results. *Futures* 38:810-829

Trexler A, Johns-Putra A (2011) Climate Change in literature and literacy criticism. *Wiley Interdisciplinary Reviews: Climate Change* 2(2):185-200

Trumbo C.W, Shanahan J (2000) Social research on climate change: Where we have been, where we are, and where we might go. *Public Understanding of Science* 9:199-204

Trumbo, J (1999) Visual Literacy and Science Communication, *Science Communication* 20:409-425

Tufte E.R (1992) *The Visual Display of Quantitative Information*, Graphics Press, Cheshire, Connecticut

UK Climate Change Act (2008). Online- Date Accessed 11/06/16  
<http://www.legislation.gov.uk/ukpga/2008/27/contents>

UK Climate Impacts Programme (2000) Socio-economic scenarios for climate change impact assessment: A guide to their use in the UK Climate Impacts Programme. UKCIP, Oxford, UK

United Visual Artists (2015) United Visual Artists. Online - Date Accessed 13/08/15  
<https://uva.co.uk/>

United Visual Artists (2011) High Arctic. Online - Date Accessed 13/08/15  
<http://static.guim.co.uk/sys-images/Guardian/Pix/pictures/2014/5/8/1399563245684/8636e633-347c-4a93-9d19-fe9ca950dc21-2060x1539.jpeg>

Van Kouwen F, Dieperink C, Schot P.P, Wassen M. J (2009) "Computer-supported cognitive mapping for participatory problem structuring" *Environment and Planning A* 41:63- 81

Vaughan P.W, Rogers E.M, Singhal A, Swalehe R.M (2000) Entertainment education and HIV/AIDS prevention: A field experiment in Tanzania. *Journal of Health Communication* 5:81-100



- Vaughn L.A, Hesse S.J, Petkova Z, Trudeau L (2009) 'The story is right on' The impact of regulatory fit on narrative engagement and persuasion. *European Journal of Social Psychology* 39:447–456
- Vasudevan A (2007) The photographer of modern life: Jeff Wall's photographic materialism. *Cultural Geographies* 14:563-588
- Wahlberg A.F, Sjoberg L (2000) Risk perception and the media. *Journal of Risk Research* 3:31–50
- Whatmore S (2009) Mapping knowledge controversies: science, democracy and the redistribution of expertise. *Progress in Human Geography* 33:588- 598
- Weber E, Stern P (2011) Public Understanding of Climate Change in the United States. *American Psychologist* 66(4):315-328
- Weber E, Bauman I, Olafur E (2014) Can art inspire climate change action? An ice installation aims to do just that, *The Guardian*, Thursday 23rd October 2014. Online - Date Accessed 04/02/15 <http://www.theguardian.com/sustainable-business/2014/oct/23/climate-change-ice-watch-installation-art-greenland-copenhagen-ipcc>
- Weigold M (2001) Communicating Science: A Review of the Literature. *Science Communication* 23(2):164-193
- Weingart P (2002) The moment of truth for science: the consequences of the “knowledge society” for society and science. *Eur Mol Biol Organ Rep* 3:703–706
- Wheeler S.C, Green M.C, Brock T.C (1999) Fictional narratives change beliefs: Replications of Prentice, Gerrig & Bailis (1997) with mixed corroboration. *Psychonomic Bulletin and Review* 6:136–141
- Whitmarsh L (2009) What's in a name? Commonalities and differences in public understanding of “climate change” and “global warming.” *Public Understanding of Science* 18:401-420
- Windh J (2012) Poor Communication obscures emergency warnings. *The Guardian* 1<sup>st</sup> November 2012. Online - Date Accessed 16/12/14  
<http://www.theguardian.com/commentisfree/2012/nov/01/poor-communication-emergency-weather-warnings>
- Winstanley D.R, Spence D.R, Williamson K (1974) Where have all the Whitethroats gone? *Bird Study* 21:1-14
- Witte K, Allen M (2000) A Meta-Analysis of Fear Appeals: Implications for Effective Public Health Campaigns. *Health Education and Behaviour* 27:591-615
- Wynne B (2006) Public engagement as a means of restoring public trust in science: hitting the notes, but missing the music? *Community Genetics* 9:211–220
- Yardimic E, Leblebicioglu G (2011) Relative Effectiveness of Nature Trips and Nature Documentaries on Developing Pre-Service Elementary Science Teachers Connectedness

toward Nature, Conference ECER 2011, Environmental Educational Research Association,  
1.1 Educational Effectiveness and Quality Assurance

Yin R.K (2009) Case Study Research: Design and Methods (Applied Social Research Methods). SAGE Publications, Inc: Fourth Edition edition (29 Dec 2008)

Yin R.K (2012) Applications of Case Study Research. SAGE Publications, Inc Third Edition

York N (2013) Water Water Everywhere, Nay Any Drop To Drink. Online - Date Accessed 13/08/15 <http://artistsandclimatechange.com/2013/11/07/water-water-everywhere-nay-any-drop-to-drink/>

Zahran S, Brody S.D, Vedlitz A, Grover H, Miller C (2008) Vulnerability and capacity: Explaining local commitment to climate-change policy. Environment and Planning C: Government and Policy 26:544-562

Zwick M.M, Renn O (2002) Perception and Evaluation of Risks. Findings of the Baden-Wurttemberg Risk Survey 2001 joint working report by the Centre of Technology Assessment in Baden-Wurttemberg and the University of Stuttgart, Sociology of Technologies and Environment, Germany

Image sources from case studies:

Postcard 1 - <http://img.chan4chan.com/img/2012-05-04/CwKeQ.jpg> Date Accessed 13/08/15

Postcard 2 - [https://runnerbeanblog.files.wordpress.com/2013/10/44993733\\_liamflood1.jpg](https://runnerbeanblog.files.wordpress.com/2013/10/44993733_liamflood1.jpg)  
Date Accessed 13/08/15

Postcard 3 - <http://i.guim.co.uk/img/static/sys-images/Guardian/Pix/pictures/2013/7/19/1374238046861/1c2ad0c4-2a1d-4984-988b-58ecfffb0138-2060x1428.jpeg?w=620&q=85&auto=format&sharp=10&s=cc41f8149caaa8950481d703c4a183db> Date Accessed 13/08/15

Postcard 4 - [http://archivoimagenes.heraldo.es/uploads/imagenes/bajacalidad/2010/08/06/mosccu\\_fedba685.jpg](http://archivoimagenes.heraldo.es/uploads/imagenes/bajacalidad/2010/08/06/mosccu_fedba685.jpg) Date Accessed 13/08/15

Buckingham Palace [http://i.dailymail.co.uk/i/pix/2013/12/04/article-2517765-1AAC9530000005DC-701\\_964x503.jpg](http://i.dailymail.co.uk/i/pix/2013/12/04/article-2517765-1AAC9530000005DC-701_964x503.jpg) Date Accessed 13/08/15

Somerset House <http://www.pre-construct.com/Projects/Images/Somerset-hse/somerset-house-trust.jpg> Date Accessed 13/08/15

Daniel Crawford <http://thisgivesmehope.com/wp-content/uploads/2013/07/737-Daniel-Crawford.jpg> Date Accessed 13/08/15



