

# Examining the Effectiveness of Different Stimulus and Medium Types on Environmental Decision-Making

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## I. Personal Section:

I had never heard of the term “climate stories” until I decided to log on to an online workshop. During the height of the pandemic, I began to participate in environmental organizations as a virtual volunteer to occupy my time. Although I have had many experiences volunteering in the comfort of my own home, an online workshop that I attended was the most memorable. This workshop, held on Zoom, aimed to help participants cultivate impactful messages about climate change by speaking from their own personal experiences of living with the global issue. To do so, the facilitator of this workshop shared her own “climate story” about a hurricane that destroyed her community. I was in tears by the end of her three-minute speech. Her story was so powerful, and I was intrigued to learn even more about climate stories as a result of the workshop. I soon learned that there are many websites dedicated to highlighting climate stories from around the world, and I became invested in understanding the diverse experiences of people in relation to their environments.

The websites that I came across presented climate stories as blogs and as SoundCloud audio files. I was interested in discovering the impacts that these different presentational styles of climate stories had on the viewers that interacted with them, and there was no better way of doing so than conducting an independent research project on the topic in my school’s social science research classroom. Although I had a strong understanding of my chosen topic, I needed to learn some new mathematical concepts to understand the data that resulted from my investigation. Interpreting the statistical data points that came along with my research project was a struggle at first, but I quickly became accustomed to the software that was used to analyze my results—IBM’s SPSS Version 24.0. As a result of completing this project, I have become less distant from the ideas of science and mathematics. I learned that research doesn’t need to be perfect, as my main hypotheses were not supported by the data that I collected. My advice to any high school student interested in completing a project combining science and mathematics is to continue working no matter the results. Just because a hypothesis isn’t supported, doesn’t mean that the project failed. The data that is collected is valuable and should be shared with the

scientific community. It is also important to ask for help if you are struggling with any aspect of your research project. Oftentimes, experienced people in your field of interest would love to assist you in your research journey.

## **II. Research Section:**

### **Abstract**

In a world with climate deniers, scientists have been trying to uncover the most effective way to present the scientific evidence of anthropogenic climate change to audiences. "Climate stories" are personal accounts that have been used in recent years to engage more people in the global issue of climate change from an emotional perspective. There are multiple ways in which "climate stories" are presented. The present study explored the effects of audio, written, narrative, and informational climate change passages on the environmental decision-making levels of individuals. The current study hypothesizes that participants who receive the audio narrative will have the greatest environmental decision-making levels. Participants first completed the Climate Change Perceptions Scale (van Valkengoed, 2021) to obtain participants' baseline views on climate change. Next, participants were randomly split into one of four groups, each presented with a different climate change passage: written narrative, audio narrative, written information, and audio information. After viewing the climate change passages, participants answered 5 scenario-based questions based on research reports to assess their environmental decision-making levels. The results of this study indicated that factual information is significantly more effective at influencing peoples' environmental decision-making levels than climate stories, and the formatting of climate stories (audio or written) has no significant impact on environmental decision-making. These findings suggest that scientists should use an informational approach when sharing climate change evidence with others.

### **A. Introduction**

Earth is warmer in the present day than it has been in over two thousand years (Matawal & Maton, 2013). This is largely in part due to climate change, a change in climate patterns attributed to the increased levels of atmospheric carbon dioxide arising from the use of fossil fuels in the mid to late 20th century onwards (Lineman et al., 2015). Since the Industrial Revolution, the levels of carbon dioxide in the atmosphere had a 100 parts per million increase,

from 280 ppm to 380 ppm (Newbury, 2013). This increase in carbon dioxide levels has exacerbated the greenhouse effect, thus substantially contributing to the changing climate. Climate change affects all lifeforms as it has led to land degradation, fresh water shortages, food shortages/ insecurity, flooding and shelter/ comfortable accommodation deficits, and health care challenges among other problems (Matawal & Maton, 2013). Ice fields on the highest crater of Mount Kilimanjaro have shown some of climate change's most profound effects with a loss of 85% of their coverage since the year 1912 (Thompson et al., 2009).

Although climate change has clear effects on society and the environment, public engagement with the issue of climate change remains low (Jones et al., 2016). Engagement is defined as an individual state of involvement at cognitive, affective and behavioral levels (Morris et al., 2019). The reason for this lack of engagement from the general public on climate change is primarily due to the fact-based information that is associated with the issue (Whitmarsh et al., 2013). Fact-based information lacks an emotional appeal, and public perceptions on risks are based on emotions. Consequently, people are less likely to perceive a significant risk in regards to climate change when presented with fact-based climate change information (Reynolds, 2011).

Those who want to share information on climate change, including environmental scientists, decision makers and risk communicators, are learning that providing more detailed and factual information is not sufficient to generate appropriate public concern for risks, and that risk perception and behavior are guided by emotion (Leiserowitz, 2006). Experiments conducted have indicated that emotional intensity reduces perceived psychological distance, marking one's risk perception as greater (Boven et al., 2010). Therefore, people have been called on to utilize storytelling, which is the vivid description of ideas, beliefs, personal experiences, and life lessons through stories or narratives that evoke powerful emotions and insights (Serrat, 2008). However, skepticism to associating climate science with storytelling has been raised, as storytelling has been noted to be a form of manipulation used by corporations to convey a false "authenticity" with consumer's personal values (Salmon, 2017).

Nevertheless, stories are necessary for relating to people who may be opposed to climate science (Harris, 2019). This information-based climate science can be crafted into relatable and concrete personal experiences known as climate stories (Van der Linden et al., 2015). Climate stories have seen prior success, as they were successful in changing the beliefs and risk perceptions of climate change that moderate and conservative participants held (Gustafson et al.,

2020). The true success of climate stories however, is measured by the action that is taken after engaging with them, as emotional narratives elicit prosocial behaviors (Bagozzi & Moore, 1994). Climate stories have shown success in these regards as well. In the same study, participants presented with a climate story were 2.00 times more likely to subscribe to a Greenpeace newsletter and 1.72 times more likely to respond to a follow-up survey than participants shown information on climate change (Gustafson et al., 2020). In another study, narrative climate stories influenced most of the pro-environmental behaviors exhibited by participants (Morris et al., 2019).

The pro-environmental behaviors that participants illustrated in Gustafson and Morris's studies required high levels of environmental decision-making, which can be defined as the decisions relevant for climate change in individuals and organizations (Orlove et al., 2020). While both experiments examined the environmental decision-making of participants after being presented with the stimuli, the experiments did so through different mediums. Whereas Gustafson showed participants a climate story on the radio, utilizing an audio medium type, Morris presented participants with a textual climate story, using a written medium type. Nevertheless, the climate stories remained successful, eliciting pro-environmental actions thus high environmental decision-making. Similar to the studies conducted, websites on the Internet have presented climate stories through different medium types as well, with Climate Stories Project presenting narrative climate accounts through SoundCloud (Climate Stories Project, 2022) and Climate Generation doing so by written means through a blog collection of these stories (Climate Generation, 2022).

### A.1 The Present Study

The present study attempts to examine the effects of audio, written, narrative, and informational climate change passages on environmental decision-making. Although there is research on the effectiveness of climate stories, the effectiveness of different medium types through which climate stories are shared has not been investigated. Thus, this study will address the gap in knowledge relating to the effects of audio and written climate change passages, both informational and narrative, on environmental decision-making. More specifically, the present study seeks to predict the effects of written narrative, audio narrative, written information, and

audio information climate change passages on the environmental decision-making of participants.

### A.2 Research Question

What is the effect of audio, written, narrative, and informational climate change passages on environmental decision-making?

### A.3 Hypothesis

The present study hypothesizes the following:

1. Participants who receive the narrative stimulus type will report a significantly higher total choice score, as compared to participants who receive the informational stimulus type.
2. Participants who receive the narrative stimulus type will report a significant relationship between their Climate Change Perceptions Scale score and total choice score.
3. Participants who receive the audio medium type will report a significantly higher total choice score, as compared to participants who receive the written medium type.

## **B. Methods**

### B.1 Participants

Participants in this study were recruited through Mechanical Turk (MTurk.com), an online work distribution site powered by Amazon. A total of 87 participants completed the experiment. Participants' ages ranged from 16-77 years old with 44 females (50.6%) and 43 males (49.4%) with a mean age of 35.33.

### B.2 Material and Instruments

#### **Climate Change Perceptions Scale**

The Climate Change Perceptions Scale (van Valkengoed, 2021) is a 14-Item instrument which measures how participants perceive the issue of climate change through *Reality*, *Causes*, *Valence of consequences*, *Spatial distance*, and *Temporal distance* using a 7-point Likert scale with 1 representing 'strongly disagree' and 7 representing 'strongly agree'. The validity of this questionnaire has been widely recognized, having an overall Cronbach alpha of .80. The

subjects' climate change perception scores were calculated by finding the arithmetic mean of the combined items; the higher the score, the more concern they had for climate change.

### **CLIMATE CHANGE PERCEPTIONS SCALE (Van Valkengoed, 2021)**

*Thank you for answering the demographic questions. I would now like to ask you 14 questions regarding your opinions on climate change. Please read the following 14 statements carefully and indicate how much you agree with each statement on a 1 to 7 Likert Scale where 1 - strongly disagree to 7 - strongly agree.*

*Please be as honest as possible. There are no wrong or right answers.*

*Thank you*

1. I believe that climate change is real. \_\_\_
2. Climate change is NOT occurring. \_\_\_
3. I do NOT believe that climate change is real. \_\_\_
4. Human activities are a major cause of climate change. \_\_\_
5. Climate change is mostly caused by human activity. \_\_\_
6. The main causes of climate change are human activities. \_\_\_
7. Overall, climate change will bring more negative than positive consequences to the world. \_\_\_
8. Climate change will bring about serious negative consequences. \_\_\_
9. The consequences of climate change will be very serious. \_\_\_
10. My local area will be influenced by climate change. \_\_\_
11. The region where I live will experience the consequences of climate change. \_\_\_
12. Climate change will also influence the place where I live. \_\_\_
13. It will be a long time before the consequences of climate change are felt. \_\_\_
14. The consequences of climate change will only be experienced in the far future. \_\_\_

### **B.3 Procedure**

Upon opening the project survey, powered by [SurveyMonkey.com](https://www.surveymonkey.com), the participants were met with an informed consent page and asked to provide informed consent by typing the following: "I agree to participate in this study." Participants then answered demographic questions including information regarding their age and gender identity. The participants were

then asked to complete the Climate Change Perceptions Scale (van Valkengoed, 2021) as shown in *B.2 Material and Instruments*.

Following the completion of the Climate Change Perceptions Scale, [SurveyMonkey.com](https://www.surveymonkey.com) randomly assigned participants into one of four stimuli and medium categories: Written Information, Audio Information, Written Narrative, or Audio Narrative. The Written Information group received an article with text containing information about the impact of climate change on the Adirondacks (Appendix A). The Audio Information group received audio containing information about the impact of climate change on the Adirondacks (Appendix B). The Written Narrative group received an article with text containing a personal account of the impact of climate change on the Adirondacks (Appendix C). The Audio Narrative group received audio containing a personal account of the impact of climate change on the Adirondacks (Appendix D). Lastly, after exposure to the article or audio medium type, all groups received five scenario-based questions to assess their environmental decision-making. The participants' environmental decision-making was represented by their total choice score ranging from 5 to 25 points; the higher the score, the greater environmental decision-making they held. Participants' written choice score was represented by the total choice score of participants in the written medium type group, and their audio choice score was represented by the total choice score of participants in the audio medium type group.

#### B.4 Scenario-Based Questions

*You will now read a brief summary of 5 recent research reports that were published in the past year. Each study was conducted on how human behavior increases the carbon dioxide levels (CO<sub>2</sub>) in the atmosphere. Rising CO<sub>2</sub> levels have been found to negatively influence climate change. Please read each summary very carefully and report on how likely you are to partake in the daily behaviors in the various situations presented. Please answer each question honestly. There are no wrong or right answers.*

- 1. According to a recent study conducted by BlaBlaCar, carpooling saves more than 1.6 million tonnes of CO<sub>2</sub> a year.*

*How likely are you to have a conversation with a co-worker during the next 6 months to discuss planning a car pool schedule?*

1. *Very unlikely*
2. *Unlikely*
3. *Neither likely nor unlikely*
4. *Likely*
5. *Very Likely*

2. *According to the National Renewable Energy Laboratory, when you produce about 1000 kWh of electricity using solar panels, you reduce emissions by more than 1,400 pounds of carbon dioxide.*

*How likely are you to put solar panels on your home (assuming that tax credits would cover the entire out of pocket cost of the installation)?*

1. *Very unlikely*
2. *Unlikely*
3. *Neither likely nor unlikely*
4. *Likely*
5. *Very Likely*

3. *According to TheEcoGuide.org, heating 1 gallon of water produces, on average, 0.18 lbs of CO<sub>2</sub>. A five-minute shower creates 2.25lbs of CO<sub>2</sub> and a ten-minute shower 4.5 lbs of CO<sub>2</sub>.*

*How likely are you to switch one hot shower to one cold shower at least once a week?*

1. *Very unlikely*
2. *Unlikely*
3. *Neither likely nor unlikely*
4. *Likely*
5. *Very Likely*

4. *The New York Times recently released a report that found that air-conditioning releases about 100 million tons of carbon dioxide each year.*

*How likely are you to set your air conditioning units thermostat two degrees higher (warmer) this summer?*



1. *Very unlikely*
2. *Unlikely*
3. *Neither likely nor unlikely*
4. *Likely*
5. *Very Likely*

5. *According to the Environmental Protection Agency (EPA), one gas lawn mower emits 89 pounds of CO<sub>2</sub> and 34 pounds of other pollutants per year.*

*How likely are you to switch from mowing your lawn from once a week to once every two weeks this season?*

1. *Very unlikely*
2. *Unlikely*
3. *Neither likely nor unlikely*
4. *Likely*
5. *Very Likely*

## **C. Results**

All data was analyzed using IBM's SPSS Version 24.0. Tests of statistical significance were performed at the  $p < 0.05$  level to observe statistically significant differences between target variables.

### **C.1 Impact of Stimulus Type on Total Choice Score**

A nonparametric Mann-Whitney U test was performed in order to evaluate whether significant differences in total choice score existed between those receiving the narrative stimulus type versus the informational stimulus type. Participants in the narrative stimulus type group ( $n=45$ ) had a significantly lower mean rank of 38.86 as compared with participants in the informational stimulus type group ( $n=42$ ) who had a mean rank of 49.51 ( $Z = -1.977$ ,  $p = .048$ ). These findings indicate that participants who received the informational stimulus type had higher total choice scores than participants who received the narrative stimulus type. Results rejected hypothesis 1 and found that participants who received the informational stimulus type had higher

levels of environmental decision-making than participants who received the narrative stimulus type.

### C.2 Impact of Climate Change Perceptions Scale Score on Total Choice Score

A nonparametric Spearman Rank Correlation test was performed in order to evaluate whether significant relationships existed between Climate Change Perceptions Scale score and total choice score. Results indicated no significant relationships between Climate Change Perception subscale scores (n=87) and total choice score (n=87) for participants in the narrative stimulus type group (n=45). This rejects hypothesis 2 and found no correlation between Climate Change Perceptions Scale score and total choice score. However, results indicated significant relationships between Climate Change Perception subscale scores and total choice score for participants in the informational stimulus type group (n=42). Significant relationships between Climate Change Perceptions Scale score and total choice score were examined between Climate Change Perceptions Scale subscores *Causes* ( $r=.333$ ), *Valence of consequences* ( $r=.518$ ), and *Spatial Distance* ( $r=-.365$ ). The p-values for each of the subscales were  $p=.03$ ,  $p<.001$ , and  $p=.01$  respectively. These findings indicate that participants who received the informational stimulus type were influenced by the stimulus they received.

### C.3 Impact of Medium Type on Total Choice Score

A nonparametric Mann-Whitney U test was performed in order to evaluate whether significant differences in total choice score (n=87) existed between those receiving the written medium type (n=28) versus the audio medium type (n=59). Results indicated no significant differences between the two medium types on participants' environmental decision-making. This rejects hypothesis 3 and found no significant difference between medium type and total choice score.

## **D. Discussion**

The results of the current study highlight the significant positive impact that informational stimuli can have on environmental decision-making. In addition, the results of my study have shown that the medium through which climate change information is presented does not influence environmental decision-making. The study's first main finding was that

participants asked to complete the scenario-based questions after being presented the informational stimuli were found to have significantly higher total choice scores as compared to those who received the narrative stimuli. This finding rejects hypothesis one which stated that participants who receive the narrative stimulus type will report a significantly higher total choice score than participants who receive the informational stimulus type. This finding contradicts the results of prior experiments that showed that participants who were exposed to climate stories were more likely to perform environmentally-friendly actions. For instance, an experiment in which a climate change story was presented on the radio positively influenced the beliefs and risk perceptions of climate change that moderate and conservative participants held. The study also showed that participants who were exposed to the climate story were more likely to subscribe to a Greenpeace newsletter and respond to a follow-up survey than participants presented with information on climate change (Gustafson et al., 2020). However, the informational stimuli may have positively influenced participants' total choice score more than the narrative stimuli did because of the story-based nature of the narrative stimuli. Stories can reduce people's general processing of information. Stories aid in persuasion when facts embedded in stories are weak, but stories can also hurt persuasion if they are presented with strong facts (Krause & Rucker, 2019). Relating this to my current study, the participants receiving the narrative stimulus type may not have processed the information in the climate story that they were presented with. Therefore, they may not have been persuaded by the climate story, and their total choice scores may have been compromised as a result. Furthermore, participants in the informational stimulus type group likely had higher total choice scores because they were presented with strong facts that helped to persuade them.

Another statistically significant finding was the relationship between climate change perceptions and environmental decision-making for participants in the informational stimulus type group, refuting hypothesis two. Hypothesis two stated that participants who received the narrative stimulus type will report a significant relationship between their Climate Change Perceptions Scale score and total choice score. The results of the current study showed that the informational stimulus type made participants' initial climate change perceptions more profound. Informational stimuli types with strong facts help persuade people (Krause & Rucker, 2019). Thus, participants in the information stimulus type group may have felt more obligated to

express their true climate change perceptions as a result of the high persuasion that the informational stimuli provided.

The current study found no significant differences between written choice score and audio choice score, refuting hypothesis three which stated that participants who receive the audio medium type will report a significantly higher total choice score than participants who receive the written medium type. These results contradicted the results of a previous experiment in which participants were presented testimonials. The experiment found that audio messages were more convincing than written messages (Braverman, 2008). However, audio has more requirements that need to be met in order to maximize its effectiveness, including audio quality. Results from an experiment found that audio quality had a significant impact on the believability that people had of the information that scientists stated when presenting their work (Newman, 2018). In the present study, the audio of the narrative stimulus in the audio medium type group may have been poor as the audio was transferred from two different technology sources. Therefore, participants in the audio medium group may have had lower total choice scores because they may not have believed the narrator of the climate story thus having lower environmental decision-making.

### **E. Implications**

Based on the findings of the current study, scientists should employ an informational approach when sharing information on climate change. By presenting climate change information in a straightforward way, scientists can maximize the environmental decision-making of their audience members. This is especially important as many people possess climate change helplessness—the belief that one’s actions cannot affect climate change (Salomon et al., 2017). Information stimuli can provide a high level of persuasion on the issue of climate change, which can reduce climate change helplessness and mobilize people to act on this urgent crisis (Krause & Rucker, 2019).

### **F. Limitations and Future Work**

Although certain aspects of the present study presented significant results, a limitation prohibiting a set of important measures was the sample size. More specifically, the uneven distribution of participants in the written and audio medium groups. In this study, 28 participants

were placed into the written medium group and 59 participants were placed into the audio medium group. Therefore, hypothesis 3 could not be properly tested. In order to properly assess whether medium type influences environmental decision-making, future research should ensure that an equal number of participants are assigned to the audio and written medium groups.

Additionally, another limitation of the present study was the large age range of 16-77 years old. This age range consists of members from multiple generations, including those of the vastly different Generation Z and Baby Boomer Generation. Members of Generation Z typically generate more concern over climate change than those of the Baby Boomer Generation (Swim et al., 2022). Consequently, the total choice score of participants belonging to Generation Z would more likely be influenced by their initial perceptions on climate change, as indicated by the Climate Change Perceptions Scale (van Valkengoed, 2021), than any of the stimuli presented to them. Therefore, future research should aim to have an age range of 57-75 years old.

Lastly, the quality of the audio utilized for the audio medium group in the present study was lessened, as it was transferred from multiple technology sources. This factor may have influenced the total choice score of participants in the audio medium group, as stronger audio quality generates higher believability in what is being heard (Newman, 2018). Future research should ensure that all audio sources utilized be derived from their original sources.

## **G. Conclusion**

In order to enhance environmental decision-making, the present study states the following:

- The informational stimuli were more effective at causing participants to choose environmentally-friendly actions than the narrative stimuli, and made participant's initial climate change perceptions more profound.
- The audio and written medium types had no difference in their effectiveness at causing participants to choose environmentally-friendly actions, but this could have been affected by the quality of the audio presented to the participants.
- Scientists should employ an informational approach when sharing information on climate change to maximize the environmental decision-making of their audience members.

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## **I. Appendices**



## Appendix A: Written Information

*Thank you for answering the questions from the Climate Change Perceptions Scale. You will now be asked to read a passage that shows the recent effects of climate change on the Adirondack Region in Northern New York State; a protected area spanning over 6 million acres of mountain peaks, sparkling lakes, and wild spaces. Please read the passage carefully as there will be questions that follow.*

*Thank you*

### Climate change Impacting The Adirondacks

For most of the winter months, the high peaks are still among the coldest places on earth. But over the past several decades, the length of the winter season in the Adirondacks is getting shorter.

“The largest warming that we've experienced is during the winter time.” Dr. Eric Leibensperger, an atmospheric scientist at SUNY Plattsburgh, has spent the last several years recording and tracking air and water temperatures in the Adirondacks in Lake Champlain. After last summer's dire warning by the United Nations that many spots on earth could feel the significant effects of climate change within the next couple of decades, Leibensperger and Alexandria Elliot, one of his earth science students, started analyzing just how much the temperatures in the Adirondacks in North Country have changed.

Pouring over data from the past century, they found the Adirondacks are warming faster than many other parts of the planet. “The temperatures have gone up about two degrees Celsius, or about 3.6 degrees Fahrenheit, which is a big number. It sounds like a small number but it's a big number and our warming so far on the global scale is about one degree Celsius, or one point eight degrees Fahrenheit, so the warming that we've experienced in the Adirondacks is about double that.” Leibensperger believes that increase may double again within the next three or four decades if carbon emissions remain as they are which he says could be a game changer for the alpine landscape and the high peaks for certain fish in wildlife, and even winters as we know them in the Adirondacks. “And so changing it just even a degree, you know, we've seen

noticeable changes in snowpack across the Adirondacks, the spread of invasive species, and some of the ecosystem struggling to adapt as the climate warms. We have been able to detect a number of impacts that we know that are caused by climate change, not by something else.

One of the examples, a shortening of the winter period. So, fall was lasting longer into the later part of the year and spring is coming a little bit earlier and it might not seem like it's coming earlier but, you know, we do remind ourselves that things were actually quite different 50-100 years ago.” And along with the shorter winters the other seasons may see more severe rainstorms, like those that devastated the mountain valley towns of Keen and Jay in 2011. And while there hasn't been as much temperature change in the spring and fall, the change during the winter months has been the most significant, especially over the past 40 years since The Olympics were in Lake Placid.

#### Appendix B: Audio Information

*Thank you for answering the questions from the Climate Change Perceptions Scale. You will now be asked to listen to an audio passage that shows the recent effects of climate change on the Adirondack Region in Northern New York State; a protected area spanning over 6 million acres of mountain peaks, sparkling lakes, and wild spaces. Please listen to the passage carefully as there will be questions that follow.*

*Thank you*

Climate Change Impacting The Adirondacks

<https://soundcloud.com/-----256608302/climate-change-impacting-the-adirondacks-2-audio-trimmercom>

#### Appendix C: Written Narrative

*Thank you for answering the questions from the Climate Change Perceptions Scale. You will now be asked to read a passage that shows the recent effects of climate change on the Adirondack Region in Northern New York State; a protected area spanning over 6 million acres of mountain peaks, sparkling lakes, and wild spaces. Please read the passage carefully as there will be questions that follow.*

*Thank you*

Climate Change, the Joseph Dumoulin Story

I am Joseph Dumoulin. I now live in Jay, New York, but I grew up in Rouses Point, NY on the Canadian border.

My father played ice hockey in Quebec. He got me really involved (this was back in the 50's) with hockey. He would take me out to the backyard and we would build a rink. Backyard rinks were pretty common. It takes a lot of work. You've got to build a good base and build up the banks around it and put in the goals, usually just metal sticks, metal poles, but you need to go out every night and just take a very fine spray off the hose and just try to keep building up that ice.

I always thought that was just normal, that everyone did that. I guess in Minnesota and Michigan and Quebec, everyone did do that back then. We also had a lake, Lake Champlain, where we kids would get together and shovel off a big patch and then we'd have more community hockey.

Backyard hockey was more your relatives or the kids that lived next to you. So, if you wanted to get into a big game, you'd go out and help shovel and you'd play on the lake.

It was never a problem with ice.

My father and I used to go ice fishing. He'd drive his car out over the big pressure hills. He knew the routes so we would go out there for hours ice fishing. But ice is what I remember most about my youth. It was my favorite time of year. I would strap on those skates. I was a terrible student. I'd come home, strap the skates on, go out in the backyard, and skate. It was just a way of life that I thought would never end.

Later I went to school at Plattsburgh State College and then went into the air force and I came back and decided I wanted to live in the Adirondacks.

I noticed that that way of life was gone. If you're an outdoors person, you don't need anyone to tell you that the climate is warming in the North Country. It's warming dramatically. In the winters that I grew up in, and I know we glamorize things because we're young and everything looks deep, but I'm talking about ice. I mean snow, I don't know how much, how deep that snow

really was because I was a little guy. But ice, you can tell the difference now. People don't go out on the lake with their cars much anymore, and the minute you get some openings when the ice won't freeze, the wind breaks up any new ice that tries to freeze.

As I've lived up here now as an adult, after coming up in 93...94, one of my traditions was to go out on our pond near the house when there was two inches of ice. And it's blue because you can see right through it, and the light will come through and hit the water and it's just crystal. I mean, you can see everything. You can see the weeds underneath, you can see leaves that are frozen into it, but the ice is like a mirror, and that first skate when you cut that ice and you look back and see your tracks, and it's the first tracks, there is nothing like it. And it's why people enjoy pond hockey so much. I don't think pond hockey will ever die because there is something about that blue sky, that wind in your face, that 20 degree temperature.

It just is magical.

#### Appendix D: Audio Narrative

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*Thank you*

Climate Change, the Joseph Dumoulin Story

<https://soundcloud.com/-----256608302/climate-change-joseph-dumoulin-story>