The City of Dayton, Ohio small grant award was provided to assess community beliefs, attitudes, knowledge, and behaviors as they relate to climate change. The present research was a partnership of a strategic team including the City of Dayton (Aviation, Economic Development, and Water), the Miami Conservancy District (MCD), the Miami Valley Regional Planning Commission (MVRPC), and Wright State University (WSU). We collected data from over 500 participants and summarized the findings in a technical report. These findings will be used to develop a persuasive message campaign designed to increase the likelihood of community engagement in specific behaviors that provide personal and regional resilience to climate change.

Project Process

The Wright State University group (Professor Schneider and Graduate Research Assistant Sarah Jackson) developed a climate survey by adapting items from the Yale and OSU Climate Change surveys, from previous persuasion research, and from team discussions (see Appendix A for the survey). Pilot testing ensured that items and their response formats were clear to various users. Regional partners (Ohio Department of Natural Resources, MVRPC, and MCD) collaborated on refinement of items and adding items pertinent to the region (e.g., querying the role of local government in climate change education efforts). Wright State University's Internal Review Board provided a review and approved the survey and approach for implementing the data collection. Many participants (e.g., those recruited at the UD River Summit, or airport) were given city water bottles or other city/airport-driven items as remuneration for participation. With the finalized survey in hand, team members who were going to recruit participants individually were trained by the WSU group. This training included an overview of guidelines for research with human subjects focusing on the nature of informed consent, the ethical treatment of humans in research including avoiding coercion and protecting confidentiality, and also provided information on avoiding experimenter and participant bias (see Appendix B for information on recruitment without bias and informed consent). An oral informed consent for inviting participation was created by the WSU group and shared during the team training to ensure that interactions with participants were in accordance with human-subjects guidelines, and were standardized.

The survey team solicited participation through multiple venues: 1) The Neighborhood Leadership Institute (NLI), 2) The University of Dayton River Summit, 3) The Dayton International Airport, and 4) an electronic survey of the City of Dayton employees.

Annually, the City of Dayton’s Department of Planning and Community Development hosts the Neighborhood Leadership Institute. NLI has played a key role in helping community members understand and participate in the dynamic process of making Dayton a better place to live. The Neighborhood Leadership Institute is an educational experience that gives participants insight into Dayton’s history, its governmental process and the inner workings of its neighborhoods. This year the Planning Department worked closely with the Water Department to provide a presentation to NLI on Climate Adaptation. Each of the 37 NLI participants completed a survey, and feedback from the survey and presentation was
overwhelmingly positive. Neighborhood leaders were impressed that the issue of climate change and sustainability practices were being addressed by the City.

The initial survey was launched at the annual River Summit hosted by the Rivers Institute at the University of Dayton. The project team had a booth at the summit and attendees were reminded throughout the event to fill-out a survey if they desired. In addition to the surveys completed at the booth, WSU students and other volunteers helped to administer the surveys to attendees at lunch. There was much interest and enthusiasm for the survey, with several attendees asking for results and details on the GLISA Dayton-specific climate projections. There were approximately 250 attendees to the summit and 108 chose to complete the survey. In addition 16 river stewards completed the survey during their weekly class following the River Summit.

Surveying the public travelling though the Dayton International Airport enabled our survey to have a regional focus. It also represented a group that had no known affiliations with either the City of Dayton or a group with a climate change or sustainability theme. In an effort to include passengers from the various flights, the survey was given in the different areas of the terminal at varying times over a five day period. In all, 63 passengers completed the survey. Another 40 passengers declined to complete the survey.

A total of 516 adults (18 years and older) participated, and provided responses on a paper-based or electronic survey from March 13, 2014 - April 4, 2014. Paper-based responses were obtained from various community groups (e.g., Neighborhood Leadership Institute, River Stewards, \( n = 55 \)), University of Dayton River Summit conference attendees \( (n = 108) \), and travelers in the Dayton International Airport \( (n = 63) \). Electronic surveys were provided to City of Dayton employees \( (n = 290) \). The content of the paper and electronic surveys was identical. The WSU team wrote up a technical report that included the procedure, findings, and survey itself to communicate the project goals and findings to the larger group and the public (see Appendix C). The findings were based on 500 respondents because one group \( (n = 16) \) differed significantly from the rest of the sample in most of their responses. The pattern of results did not change after removing these 16 participants.

Integration of Social, Cultural, and Climate Data

Our survey and the process of the project integrated the GLISA climate data that was specific to the Dayton region. This data allowed us to incorporate questions regarding current and future impacts of climate change in Dayton. We were also able to provide these Dayton-specific climate projections with survey respondents who asked for further information after taking the survey. Additionally the GLISA report was included at our River Summit booth, along with steps Dayton is working on to prepare for climate impacts.

As part of the survey we asked respondents to provide location, demographic, social, and economic information. This was gathered to help us better understand the population of respondents and to compare this with the demographics of the larger Dayton area.

Conditions that Enabled/Hindered Objectives

- Collaboration among the project team and regional partners was crucial to the success and relevance of the final deliverable, and potential for future projects
Utilizing an online survey for format for city employees allowed us to reach a larger number of respondents in a short amount of time
There was also a benefit of using the paper survey so we could get responses in other venues
Our remuneration for survey participants changed from gift cards to items we already had. This required no additional cost, and allowed us to leverage existing department promotional items (Aviation and Water department)
A diverse team of experts who worked well together was crucial, as all members brought a needed prospective to the project
We have a regional collaboration that is expanding with each project, and each project has built on the previous one so we are not starting from scratch
Different team members attended the conferences each year, which helps to broaden regional knowledge base
Dayton Metropolitan Housing Authority wanted to participate as an avenue to survey Dayton residents, but the short time frame of the project and grant hindered this collaboration. This would have been a way to include an underrepresented community
Our survey did not include citizens under 18 years of age due to consent needed from guardian
Results of survey may not be representative of the greater Dayton population due to sampling constraints, including the short time frame, ability to reach out to a representative sample, WSU graduate student time to compile results
For this project we did not create persuasive messages based on our survey results, but that will be the next step for our next climate adaptation project

GLAA-C Support

Including the graduate student in the budget, was key to the launch and compiling of the survey results
The GLISA created report of Dayton specific climate impacts was very useful in our understanding of how Dayton will be impacted by climate change, and allowed us to pass this information along to citizens
Help with reaching out to the contact for the Ohio State University climate survey and the chance to network with them
Travel funding allowed more project team members to attend the conference and participate in networking and discussions at the conference
Least accommodating was the short time frame of the grant and project

Outcomes and Next Steps

The findings from our regional survey, which assessed beliefs, attitudes, knowledge, and self-reported behaviors related to climate change, will be used to inform a persuasive and educational messaging campaign for the Dayton community (see Appendix C for the technical report with comprehensive findings, and Appendix D for follow-up comparative analysis of responses by different groups). The following are a
summary of the findings of our climate survey and are broken down into the different category areas that match the types of questions in the survey (see Appendix C for full report of findings)

Beliefs and attitudes

- 71% believe that people can reduce climate change, but that people are either not willing to do what it takes, or are unsure whether people will do what is needed.
- 65% believe that the scientific community agrees that climate change is happening, and most (63%) believe that climate change is negative.

Personal relevance and severity

- 69% believe that climate change is important, and 57% are concerned about climate change
- 74% believe climate change will harm future generations, and relatively fewer believe it will cause personal harm or is harming people now.

Impacts in Dayton, Ohio

- Most believe climate change will cause precipitation changes (54%), and more severe weather (51%), heat waves (50%), and extreme cold (47%).
- 69% said their work would be extremely affected if Dayton experienced natural disasters, severe weather changes (66%), or extreme cold (48%).
- More respondents believe their workplace is not preparing for climate change (40%), relative to those who believe their workplace is preparing (35%).
- 58% believe that our economy would benefit if Dayton increased its use of clean energy and reduced its use of fossil fuels.

Knowledge – causes and effects of climate change

- 83% of respondents believe that climate change is affected by a variety of factors, including the use of fossil fuels and cutting down forests (45%), aerosol spray cans and toxic waste (31%), and cows/livestock and nuclear power plants (21%).
- 77% of respondents believe that climate change has effects on human health, such as increased injuries/death (21%), incidence of insect-borne diseases (18%), asthma (17%), and heat stroke (14%).

Efficacy/actions

- 62% of respondents always recycle, 46% set their thermostat to 68 or less in the winter, 45% use energy-efficient light bulbs, and fewer combine stops to save gas (33%) or use cold water for laundry (31%).
- Most respondents plan to continue their energy-saving actions over the next 12 mos. However, many would like to do more: walk/bike instead of drive (40%), combine stops (34%), recycle (33%), and use energy efficient bulbs (31%).
- 82% believe their communities can prepare for climate change by planting more trees, 81% believe recycling will help, and 77% believe energy-saving bulbs will help.
- 62% believe that if most people in the U.S. engaged in energy-saving behaviors then climate change would be reduced, but only 38% thought their individual contribution will make a difference.
• 44% would be willing to give money to affect climate change, 37% would not be willing to pay anything.

As a follow up to the climate survey, we have submitted a GLISA grant proposal to reach out to businesses and neighborhood groups. This proposed project would include a climate adaptation messaging campaign, as well as emergency preparedness kits for business and neighborhoods. Additionally we are working to incorporate climate adaptation actions and preparedness into the regional Natural Hazard Mitigation Plan.

**Project Tools/Resources**

See the attached appendices for project tools and deliverables, including:

- Dayton Climate Survey (Appendix A)
- Final Report of Survey Findings and Recommendations (Appendix B)
- Consent Cover Letter (Appendix C)
- Oral Consent Script (Appendix D)
- Breakdown of survey groups responses (Appendix E)
- GLAA-C Conference PowerPoint (Appendix F)

**Media/Press**

Survey results were provided to participants who requested the final report, published to City social media pages, and highlighted in local media articles. Project members also presented the results of the survey at the GLAA-C conference in June 2014. Attached are the following media/press and Climate Resources documents shared with the public:

- City social media posts (Appendix G)
- WYSO article and social media posts (Appendix H)
- ClimateResources_CityofDayton (Appendix I)
- Presidential Task Force on Climate (Appendix J)
- CityBeat newsletter (Appendix K)
- Engage Dayton Abbreviated Survey (Appendix L)
- Mind Mixer Report (Appendix M)
Instructions: Please answer the following questions to the best of your ability. There are no right or wrong answers. We are interested in your own experiences and what you think, so be as honest as possible.

1. I get my water service from
   □ the City of Dayton
   □ some other city or municipality
   □ not sure

2. I get most of my news from (choose up to 2)
   □ Newspaper
   □ Television news program
   □ Online news source
   □ Social media (Facebook, Twitter, etc.)
   □ Mobile phone device
   □ Radio
   □ Word of mouth
   □ Other: ___________________

3. Rate your agreement with the following statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think about climate change often</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I am informed about climate change</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Climate change is important to me</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I am worried about climate change</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

4. I think climate change is

<table>
<thead>
<tr>
<th>Scale</th>
<th>extremely bad</th>
<th>somewhat bad</th>
<th>not good or bad</th>
<th>somewhat good</th>
<th>extremely good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

5. I think that, among the world’s scientists

   □ Most believe that climate change is happening
   □ There is disagreement over whether or not climate change is happening
   □ Most believe that climate change is not happening
   □ Not sure

6. I believe that

   □ Climate change isn't happening
   □ People can't reduce climate change, even if it is happening
   □ People can reduce climate change, but we’re not willing to change our behaviors
   □ People can reduce climate change, but I don’t know if we will do what's needed
   □ People can reduce climate change, and we are going to do so successfully

7. I think climate change will harm each of the following

<table>
<thead>
<tr>
<th>Category</th>
<th>strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me personally</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>My family</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>People in my community</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>People in the United States</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>People in developing countries</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Future generations</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

8. I think people will begin to experience harm because of climate change

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>never</th>
<th>happening right now</th>
<th>in 5 years</th>
<th>in 5 to 15 years</th>
<th>in 15 to 50 years</th>
<th>more than 50 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
9. Over the next 10 years, I think climate change will cause the following changes in Dayton

<table>
<thead>
<tr>
<th>Change</th>
<th>Very Unlikely</th>
<th>Somewhat Unlikely</th>
<th>Neutral</th>
<th>Somewhat Likely</th>
<th>Very Likely</th>
<th>Already Happening</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>More natural disasters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More severe storms or tornadoes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More heat waves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More extreme cold weather</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in surface water quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer local plants and animals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More allergies, asthma, diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower food supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. I believe that climate change is likely to increase which of the following (select all that apply)?

- Cancer
- Asthma
- Tuberculosis
- Insect-borne disease (e.g. West Nile Virus)
- Flu
- Heat stroke
- Frostbite
- Injuries or deaths from natural disasters

11. There are many actions people can take to address climate change. Below is a list of some of these actions. Right now, I personally do the following

In the winter, set my thermostat to 68 degrees or cooler  
- Never  
- Rarely  
- Sometimes  
- Often  
- Always  
- Not applicable  

Use public transportation or car pool  
Walk or bike instead of drive  
Use cold water instead of hot/warm water for laundry  
Eat meat less  
Contact city or state officials about climate change  
Recycle  
Use energy-efficient compact fluorescent light bulbs  
Drive less often by combining stops into one trip  

12. Over the next 12 months, I plan to do each of the following

In the winter, set my thermostat to 68 degrees or cooler  
- Do more  
- Do less  
- About the same  
- Not applicable  

Use public transportation or car pool  
Walk or bike instead of drive  
Use cold water instead of hot/warm water for laundry  
Eat meat less  
Contact city or state officials about climate change  
Recycle  
Use energy-efficient compact fluorescent light bulbs  
Drive less often by combining stops into one trip  

13. I believe that

If I did most of these energy-saving actions (from question 12), it would reduce climate change.
- Strongly disagree  
- Disagree  
- Neutral  
- Agree  
- Strongly agree  

If most people in the U.S. did these energy-saving actions, it would reduce climate change.
- Strongly disagree  
- Disagree  
- Neutral  
- Agree  
- Strongly agree
14. I believe that climate change is affected by (select all that apply)
- Aerosol spray cans
- Using fossil fuels for electricity or vehicles
- Cows and other livestock
- Cutting down forests
- Toxic waste
- Nuclear power plants

15. If people and businesses in Dayton used more clean energy (like solar and wind) and less fossil fuels (like coal and oil), I think our economy would experience

- a significant decrease
- a slight decrease
- no change
- a slight increase
- a significant increase
- not sure

16. My community could prepare for climate change by

- Establishing community gardens
- Increasing residential/commercial recycling
- Planting more trees
- Using more clean energy (e.g. solar, wind)
- Coming up with an emergency preparedness plan
- Providing more public transportation options
- Creating more bike lanes and routes

17. My work would be affected if Dayton experienced the following

- More natural disasters
- More severe storms or tornadoes
- More heat waves
- More extreme cold weather
- Changes in precipitation
- Changes in surface water quality

18. To do my job effectively, I rely on (select all that apply)
- past weather trends
- current climate data
- weather forecasting
- not applicable

19. My workplace is currently taking steps to be prepared for the effects of climate change

- strongly disagree
- disagree
- neutral
- agree
- strongly agree
- not sure
- not applicable

20. I believe the local government should educate the public about how they can address climate change

- strongly disagree
- disagree
- neutral
- agree
- strongly agree

21. I would be willing to pay $___________ to address climate change.
22. If you have any comments about climate change not addressed in this survey, please list them:
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

23. Age: _______ years

24. Primary employment status:
☐ Employed full-time
☐ Employed part-time
☐ Unemployed, seeking
☐ Not employed, not seeking work
☐ Retired
☐ Student

25. Area of employment:
☐ Military
☐ City of Dayton employee
☐ Government contracted employee
☐ Health care worker
☐ Private sector
☐ Non-profit organization
☐ Education
☐ Other

26. Permanent residence: ______________________, ______________________
City                                           State

27. Sex
☐ Man
☐ Woman

28. Ethnicity
☐ White, Caucasian (non-Hispanic)
☐ Black, African American (non-Hispanic)
☐ Hispanic
☐ Asian-American
☐ American Indian or Alaskan Native
☐ Pacific Islander
☐ Other: ____________________________

29. Highest level of education
☐ Some high school
☐ High school graduate or GED
☐ Some college, business, or technical school
☐ Associate’s degree
☐ Bachelor’s degree
☐ Master’s degree
☐ Professional degree
☐ Doctoral degree

30. Approximate annual household income
☐ Less than $10,000
☐ $10,000 - $29,999
☐ $30,000 - $49,999
☐ $50,000 - $74,999
☐ $75,000 - $99,999
☐ $100,000 or more
CLIMATE CHANGE in the DAYTON, OHIOAN MIND
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Executive Summary

Overview
This report presents findings from a regional survey which assessed thoughts and self-reported behaviors related to climate change. Dayton residents, employees, and travelers passing through the Dayton International Airport (N = 516) responded to the survey. These findings may be used to inform a persuasive and educational messaging campaign for the Dayton community.

Beliefs and attitudes
- 71% believe that people can reduce climate change, but that people are either not willing to do what it takes, or are unsure whether people will do what is needed.
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- Most respondents plan to continue their energy-saving actions over the next 12 mos. However, many would like to do more: walk/bike instead of drive (40%), combine stops (34%), recycle (33%), and use energy efficient bulbs (31%).
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- 62% believe that if most people in the U.S. engaged in energy-saving behaviors then climate change would be reduced, but only 38% thought their individual contribution will make a difference.
- 44% would be willing to give money to affect climate change, 37% would not be willing to pay anything.
Introduction

Great Lakes Adaptation and Assessment for Cities (GLAA-C)

GLAA-C is supported by the University of Michigan Graham Sustainability Institute and the Kresge Foundation, and collaborates with the Great Lakes Integrated Sciences and Assessment (GLISA) to work with scientists and practitioners to develop climate adaptation programs for cities in the Great Lakes region. These efforts are supported by University of Michigan faculty with expertise in public health, public policy, governance, urban planning, and climate science. GLAA-C works with cities to support decision making about climate adaptation needs, opportunities for action, and estimated costs of action plans; and integrates social and climate science to develop appropriate strategies.

Climate Change in Dayton, Ohio

Changing climate patterns have resulted in increased frequency and intensity of extreme weather events and significant temperature changes around the world (Carmin et al., 2012). Developing adaptive measures begins with assessments conducted at the local level to identify place-based climate impacts and response strategies (GLAA-C, 2014). According to GLAA-C, Dayton, Ohio is most at risk for extreme heat events, severe wind storms, and ice storms. The City partnered with Wright State University to survey community members and employees. We assessed their knowledge, attitudes, and behaviors related to climate change, with a future goal of developing persuasive messages that increase public awareness and the motivation for individuals and communities to engage in resilient behaviors. These efforts will help to develop sustainable practices that mitigate risks and address long-term needs resulting from climate change.

Current Study

Partners: The present research, funded by GLAA-C, was a partnership of the City of Dayton, the Miami Conservancy District (MCD), the Miami Valley Regional Planning Commission (MVRPC), the Dayton International Airport, and Wright State University (WSU).

Sample: The sample represents a broad cross-section of community members from the greater Dayton area, and travelers. Participants comprised 516 adults (18 years and older) who provided responses on a paper-based or electronic survey from March 13, 2014 - April 4, 2014. Paper-based responses were obtained from various community groups (e.g., neighborhood leadership, river summit stewards, n = 55), University of Dayton River Summit conference attendees (n = 108), and travelers in the Dayton International Airport (n = 63). Electronic surveys were provided to City of Dayton employees (n = 290). The content of the paper and electronic surveys was identical.

Method: This survey was adapted from prior climate surveys (Yale, Ohio State University), and additional items that addressed the unique goals of the regional partners. Pilot testing ensured clarity of items. Team members (see acknowledgements) who administered surveys attended a human-subjects training by the WSU PI and graduate student. The training provided information on the nature of informed consent, the ethical treatment of human participants, and ways to reduce participant and experimenter bias. A script was shared to ensure that interactions with participants were in accordance with human-subjects guidelines, and were standardized.

Findings: The findings presented here include 500 respondents because one group differed significantly from the rest of the sample in most of their responses. The pattern of results did not change after removing these 16 participants.

Tables and Figures: The original wording of each item is provided below each table or figure in quotation marks. The number of people responding to each question is provided below each table or figure in brackets, "[n = ]." Percentages do not always add to 100% due to rounding, or for items that permitted multiple responses. The latter items are marked with an asterisk.
**Project Team**

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Economic Development

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Economic Development
Beliefs and attitudes

The figure below shows that 72% of respondents think people can reduce climate change, but are either unsure whether people will do what is needed (42%), or believe that people will not be willing to take the necessary actions to reduce climate change (30%). 26% of respondents believe either that climate change is not happening (7%), or it cannot be reduced by human involvement (19%), and about 3% believe that people can and will reduce climate change.

![Beliefs about climate change graph]

*“I believe that...” [n = 494]*

Shown below, most (65%) believe that the world’s scientists agree that climate change is happening, 32% believe scientists disagree over whether climate change is happening, and only 3% believe that most scientists do not believe climate change is happening.

![Beliefs about scientific opinion graph]

*“I think that, among the world’s scientists...” [n = 482]*
The figure below illustrates that most respondents believe that climate change is extremely or somewhat bad (63%), about a third believe that it is neither good nor bad (31%), and 7% believe it is good.

"I think climate change is..." [n = 493]

**Personal relevance and perceived severity**

The table below shows that over half of the respondents (57%) report that they are worried about climate change and almost half (49%) report thinking about climate change often. Over two-thirds (69%) believe that they are informed about climate change and report that it is personally important.

<table>
<thead>
<tr>
<th>Personal Relevance</th>
<th>Disagree/ Strongly Disagree</th>
<th>Agree/ Strongly Agree</th>
<th>Mean (SD) out of 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think about climate change often</td>
<td>24%</td>
<td>49%</td>
<td>3.25 (1.22)</td>
</tr>
<tr>
<td>I am informed about climate change</td>
<td>8%</td>
<td>69%</td>
<td>3.80 (0.94)</td>
</tr>
<tr>
<td>Climate change is important to me</td>
<td>15%</td>
<td>69%</td>
<td>3.70 (1.16)</td>
</tr>
<tr>
<td>I am worried about climate change</td>
<td>27%</td>
<td>57%</td>
<td>3.38 (1.36)</td>
</tr>
</tbody>
</table>

"Rate your agreement with the following statements..." [n = 494]
As illustrated below, less than half of the respondents (47%) believe that they would be personally harmed by climate change. In contrast, most respondents (74%) believe that future generations would be harmed by climate change. Reports of harm increase as the rating target becomes more distant from the self, as illustrated in the table and figure below.

<table>
<thead>
<tr>
<th>Who will climate change harm?</th>
<th>Disagree/ Strongly Disagree</th>
<th>Agree/ Strongly Agree</th>
<th>Mean (SD) out of 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me personally</td>
<td>29%</td>
<td>47%</td>
<td>3.19 (1.24)</td>
</tr>
<tr>
<td>My family</td>
<td>25%</td>
<td>52%</td>
<td>3.31 (1.25)</td>
</tr>
<tr>
<td>My community</td>
<td>23%</td>
<td>58%</td>
<td>3.40 (1.26)</td>
</tr>
<tr>
<td>U.S. citizens</td>
<td>20%</td>
<td>65%</td>
<td>3.57 (1.26)</td>
</tr>
<tr>
<td>Developing countries</td>
<td>17%</td>
<td>67%</td>
<td>3.73 (1.29)</td>
</tr>
<tr>
<td>Future generations</td>
<td>16%</td>
<td>74%</td>
<td>3.96 (1.31)</td>
</tr>
</tbody>
</table>

“I think climate change will harm each of the following...” [n = 494]
Nearly half (47%) of the respondents believe that climate change is harming people now, over a third (38%) believe that people will experience harm in the future, and 15% believe it will never cause harm.

**Impacts in Dayton, Ohio**

Most people report that climate change would be likely to cause changes in Dayton over the next 10 years, including precipitation changes (54%), more severe weather (51%), more heat waves (50%), and more extreme cold (47%). Over one in five respondents believe that climate change is already causing extreme cold (24%), allergies, asthma, & disease (22%), heat waves (22%), and severe weather (21%). People are less likely to say that climate change is affecting surface water quality (15%), plants and animals (15%), natural disasters (13%), and the local food supply (13%).

<table>
<thead>
<tr>
<th>Effects of climate change in Dayton</th>
<th>Somewhat unlikely / very unlikely</th>
<th>Somewhat likely / very likely</th>
<th>Already happening</th>
</tr>
</thead>
<tbody>
<tr>
<td>natural disasters</td>
<td>31%</td>
<td>43%</td>
<td>13%</td>
</tr>
<tr>
<td>severe weather</td>
<td>21%</td>
<td>51%</td>
<td>21%</td>
</tr>
<tr>
<td>heat waves</td>
<td>21%</td>
<td>50%</td>
<td>22%</td>
</tr>
<tr>
<td>extreme cold</td>
<td>19%</td>
<td>47%</td>
<td>24%</td>
</tr>
<tr>
<td>precipitation changes</td>
<td>19%</td>
<td>54%</td>
<td>19%</td>
</tr>
<tr>
<td>surface water quality</td>
<td>24%</td>
<td>44%</td>
<td>15%</td>
</tr>
<tr>
<td>plants and animals</td>
<td>39%</td>
<td>40%</td>
<td>15%</td>
</tr>
<tr>
<td>allergies, asthma, disease</td>
<td>22%</td>
<td>40%</td>
<td>22%</td>
</tr>
<tr>
<td>food supply</td>
<td>29%</td>
<td>43%</td>
<td>13%</td>
</tr>
</tbody>
</table>

“Over the next 10 years, I think climate change will cause the following changes in Dayton…” [n = 479]
More than half of the respondents (58%) believe that if Dayton uses more clean energy and relies less on fossil fuels, then our local economy would be enhanced. Fewer than one in five (24%) believe that our economy would experience a decline.

"If people and business in Dayton used more clean energy (like solar and wind) and less fossil fuels (like coal and oil), I think our economy would experience...”  \[n = 419\]

Most respondents report that their work would be extremely affected by natural disasters (69%), severe weather changes (66%), or extreme cold (48%). Less than half report that heat waves, precipitation changes, or surface water quality would have an extreme impact on their work.

<table>
<thead>
<tr>
<th>Effects on work in Dayton</th>
<th>None</th>
<th>Little / Some</th>
<th>Much / Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>natural disasters</td>
<td>8%</td>
<td>26%</td>
<td>69%</td>
</tr>
<tr>
<td>severe weather</td>
<td>6%</td>
<td>28%</td>
<td>66%</td>
</tr>
<tr>
<td>heat waves</td>
<td>16%</td>
<td>39%</td>
<td>45%</td>
</tr>
<tr>
<td>extreme cold</td>
<td>12%</td>
<td>40%</td>
<td>48%</td>
</tr>
<tr>
<td>precipitation changes</td>
<td>14%</td>
<td>43%</td>
<td>43%</td>
</tr>
<tr>
<td>surface water quality</td>
<td>18%</td>
<td>40%</td>
<td>43%</td>
</tr>
</tbody>
</table>

“My work would be affected if Dayton experienced the following...”  \[n = 430\]
Most respondents use weather forecasting for work, but few rely on past trends.

To do my job effectively, I rely on...

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>past weather trends</td>
<td>58</td>
</tr>
<tr>
<td>current climate data</td>
<td>113</td>
</tr>
<tr>
<td>weather forecasting</td>
<td>230</td>
</tr>
</tbody>
</table>

*To do my job effectively, I rely on...* [n = 489]  *able to select more than one response

The proportion of people who report that their workplace is not preparing for climate change (40%) is about comparable to the proportion who report that their workplace is taking appropriate steps to prepare (35%).

My workplace is currently taking steps to be prepared for the effects of climate change...

<table>
<thead>
<tr>
<th></th>
<th>Percent of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>20</td>
</tr>
<tr>
<td>Disagree</td>
<td>20</td>
</tr>
<tr>
<td>Neutral</td>
<td>25</td>
</tr>
<tr>
<td>Agree</td>
<td>26</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>9</td>
</tr>
</tbody>
</table>

*My workplace is currently taking steps to be prepared for the effects of climate change...*  
[n = 341]
Knowledge (see Appendix D for information about current scientific knowledge)

Of respondents who believe that climate change is affected by human behavior, almost half (45%) believe that cutting down forests (23%) or the use of fossil fuels (22%) have an effect. 31% believe that toxic waste (16%) or aerosol spray cans (15%) affect climate change, while fewer attribute climate change to nuclear power plants (13%) or cows and livestock (12%).

![Climate change is affected by]

“I believe that climate change is affected by...” [n = 413]
*able to select more than one response

When considering health outcomes, respondents agree that climate change will cause more injuries/death (21%), increased incidence of insect-borne diseases (18%), asthma (17%), and heat stroke (14%). People are less likely to agree that climate change will increase flu (8%), cancer (7%), or tuberculosis (4%).

![Climate change increases]

“I believe that climate change is likely to increase which of the following...” [n = 383]
*able to select more than one response
Efficacy and Actions

Most respondents always recycle (62%). Many respondents set their thermostat at or below 68 in the winter (46%), use energy-efficient light bulbs (45%), combine stops to save gas (33%), and use cold water for laundry (31%). Relatively few eat less meat (11%), use public transportation or carpool (4%), walk or bike instead of drive (2%), or contact officials about climate change (1%).

<table>
<thead>
<tr>
<th>Personal actions: Right now</th>
<th>Never / Rarely</th>
<th>Sometimes / Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermostat to 68 in winter</td>
<td>18%</td>
<td>36%</td>
<td>46%</td>
</tr>
<tr>
<td>Public transportation/carpool</td>
<td>75%</td>
<td>31%</td>
<td>4%</td>
</tr>
<tr>
<td>Walk or bike instead of drive</td>
<td>55%</td>
<td>44%</td>
<td>2%</td>
</tr>
<tr>
<td>Cold water for laundry</td>
<td>19%</td>
<td>51%</td>
<td>31%</td>
</tr>
<tr>
<td>Eat less meat</td>
<td>39%</td>
<td>50%</td>
<td>11%</td>
</tr>
<tr>
<td>Contact city/state officials</td>
<td>88%</td>
<td>11%</td>
<td>1%</td>
</tr>
<tr>
<td>Recycle</td>
<td>8%</td>
<td>29%</td>
<td>62%</td>
</tr>
<tr>
<td>Energy-efficient light bulbs</td>
<td>9%</td>
<td>46%</td>
<td>45%</td>
</tr>
<tr>
<td>Combine stops into one trip</td>
<td>8%</td>
<td>59%</td>
<td>33%</td>
</tr>
</tbody>
</table>

*There are many actions people can take to address climate change. Below is a list of some of these actions. Right now, I personally do the following..." [n = 487]

Most respondents plan to do these energy-saving actions about the same amount over the next year. Many plan to increase certain actions: walk or bike instead of drive (40%), combine stops (34%), recycle (33%), and use energy-efficient bulbs (31%). Less than 6% of respondents report that they would engage less in energy-saving personal actions in the coming year.

<table>
<thead>
<tr>
<th>Personal actions: Intentions in next year</th>
<th>do less</th>
<th>do about the same</th>
<th>do more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermostat to 68 in winter</td>
<td>2%</td>
<td>78%</td>
<td>20%</td>
</tr>
<tr>
<td>Public transportation/carpool</td>
<td>4%</td>
<td>79%</td>
<td>17%</td>
</tr>
<tr>
<td>Walk or bike instead of drive</td>
<td>3%</td>
<td>57%</td>
<td>40%</td>
</tr>
<tr>
<td>Cold water for laundry</td>
<td>2%</td>
<td>74%</td>
<td>24%</td>
</tr>
<tr>
<td>Eat less meat</td>
<td>6%</td>
<td>65%</td>
<td>29%</td>
</tr>
<tr>
<td>Contact city/state officials</td>
<td>6%</td>
<td>73%</td>
<td>20%</td>
</tr>
<tr>
<td>Recycle</td>
<td>1%</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Energy-efficient light bulbs</td>
<td>2%</td>
<td>67%</td>
<td>31%</td>
</tr>
<tr>
<td>Combine stops into one trip</td>
<td>2%</td>
<td>64%</td>
<td>34%</td>
</tr>
</tbody>
</table>

*Over the next 12 months, I plan to do each of the following..." [n = 479]
Of those who believe that climate change is happening, a large proportion (62%) believe that if most people in the U.S. engaged in energy-saving behaviors, climate change would be reduced. However, only 38% believe that their individual contribution would make a difference.

<table>
<thead>
<tr>
<th>Beliefs about individual and large-scale actions</th>
<th>Disagree/Strongly disagree</th>
<th>Agree/Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My personal actions will reduce climate change.</td>
<td>30%</td>
<td>38%</td>
</tr>
<tr>
<td>If most people take action, we will reduce climate change.</td>
<td>22%</td>
<td>62%</td>
</tr>
</tbody>
</table>

"I believe that if I did most of these energy-saving actions...it would reduce climate change."
"I believe that if most people in the U.S. did these energy-saving actions, it would reduce climate change." [n = 491]

The majority of respondents agree that the community can prepare for climate change, especially by planting more trees (82%), increasing residential/commercial recycling (81%), using more clean energy (77%), establishing community gardens (68%), coming up with an emergency plan (67%), creating more bike lanes and routes (65%), and providing more public transportation options (62%).

<table>
<thead>
<tr>
<th>Community preparedness</th>
<th>Disagree/Strongly disagree</th>
<th>Agree/Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community gardens</td>
<td>15 %</td>
<td>68%</td>
</tr>
<tr>
<td>Increased recycling</td>
<td>11%</td>
<td>81%</td>
</tr>
<tr>
<td>Planting trees</td>
<td>10%</td>
<td>82%</td>
</tr>
<tr>
<td>Clean energy</td>
<td>14%</td>
<td>77%</td>
</tr>
<tr>
<td>Emergency plan</td>
<td>14%</td>
<td>67%</td>
</tr>
<tr>
<td>More public transportation</td>
<td>18%</td>
<td>62%</td>
</tr>
<tr>
<td>More bike lanes/routes</td>
<td>16%</td>
<td>65%</td>
</tr>
</tbody>
</table>

"My community could prepare for climate change by..." [n = 474]
70% of survey takers responded to the item about their willingness to pay money to address climate change. Of these, 44% report that they would be willing to give a monetary amount to address climate change, but 37% report that they would not be willing to give any money. Another 10% offered donations of time or pledges of increased sustainable actions. 11% indicated that they were unsure or needed additional information.

![Graph showing willingness to pay](image)

Mean dollar figure reported: $778.89. \[n = 350\]

Most respondents (65%) agree that the local government should educate the public about climate change.

![Graph showing government education](image)

“\[I believe the local government should educate the public about how they can address climate change...\]” \[n = 487\]
Summary

The City of Dayton and its regional partners are in the beginning stages of climate change adaptation planning, with major concerns including heat events, severe wind storms, and ice storms. The current research was conducted to survey our residents, employees, and travelers about their beliefs, knowledge, and priorities. These findings may be used to inform the creation of persuasive messages to provide motivation for action via an education and awareness campaign throughout the community. The following summary includes additional information and recommendations pertaining to this goal, situated in the context of the current survey findings.

1. **Finding**: Most respondents believe that people can reduce climate change, but that people will not be willing or able to do so.  
**Recommendations**: This suggests that persuasive messages should provide a variety of clear, manageable steps that people can take to help reduce climate change. These steps can provide people with greater self-efficacy beliefs (confidence in their ability to act), which can increase the probability that people will engage with recommendations (Bandura, 1997; Schneider, Rivers, & Lyons, 2009).

2. **Finding**: Most respondents believe that scientists agree that climate change is happening.  
**Recommendations**: To the extent that the public respects scientists, they serve as a credible source for persuasive messages. Credible sources increase attention to messages and the processing of the information within, increasing their effectiveness (Petty & Cacioppo, 1986).

3. **Finding**: Most respondents believe that climate change is important and are concerned about it.  
**Recommendations**: Because some concern about climate change already exists, respondents will be attentive to messages and should be provided with detail about recommended behaviors. It is important to not exacerbate worry about climate change (e.g., via fear-based messages) as this could reduce attention to the issue and ways to manage the demands of climate change (Schneider et al., 2009). Most survey respondents were city employees or were attending environment-related meetings. Consequently, the extent to which our respondents represent the general population of Dayton is unclear. To motivate a wider range of people, both worry- (fear-evoking) and challenge- (moderate worry) messages may be most effective, with a predominance of challenge-evoking messages that note the personal relevance of climate change and provide simple recommendations for action (see Schneider et al., 2009). Worry could be increased through messages that focus on issues that are personal or hit “closer to home”.

4. **Finding**: While people generally agree that climate change could affect them personally, they are even more likely to agree that climate change would harm future generations.  
**Recommendations**: Education regarding the proximal effects of climate change may increase the motivation to act on recommendations. However, given a majority of our respondents already have concerns about climate change, worry-evoking messages should be used sparingly as they can cause inattention to messages (see Schneider et al., 2009).

5. **Finding**: Respondents endorse various impacts of climate change.  
**Recommendations**: The impacts people already endorsed could be acknowledged in messages, which would add to their confidence in their knowledge about climate change. However, added emphasis and focus should be on the specific threats that exist for the City, as identified by GLISA, with a focus on specific actions that people can take to foster individual, community, and regional resilience during times of crisis.

6. **Finding**: Respondents are less likely to report that climate change will influence natural disasters, surface water quality, plants and animals, and our available food supply.  
**Recommendations**: These areas represent opportunities to increase awareness and knowledge about the ways that climate change can affect our community. However, key areas for regional concerns (GLAA-C, 2014) should be a primary focus for community campaigns.
7. **Finding:** Most respondents believe that the region’s economy will be enhanced by increased use of clean energy and decreased use of fossil fuels.

**Recommendations:** Education and persuasion campaigns should aim to encourage residents and businesses to adopt environmentally friendly, sustainable practices. Messages can inform the public on the ways in which sustainable actions are a good investment for individuals and the region.

8. **Finding:** Most respondents always recycle and many set their thermostat to 68 degrees or less in the winter. Fewer respondents use efficient bulbs and even fewer combine stops to save gas or use cold water for laundry. The majority of respondents believe that planting trees, recycling, and using efficient bulbs would help to reduce climate change.

**Recommendations:** Messages can encourage people to take the latter actions by focusing on the cost savings to individuals and businesses who engage in these behaviors. Because most respondents would like to walk/bike more, combine stops, recycle, and use energy efficient bulbs, focusing on simple tips to move people toward engaging in these behaviors would help.

9. **Finding:** Most respondents believe that if most people in the U.S. engaged in helpful behaviors then climate change could be reduced, but only 38% believe their personal contribution matters.

**Recommendations:** Persuasive messages can focus on the additive effect of renewable, sustainable actions, and that every person’s contribution helps, no matter how small (Cialdini, 2009).

10. **Finding:** Although about half of respondents are willing to fund climate change efforts, a large minority are not willing to pay anything.

**Recommendations:** Transparent information about the economic impact and other implications of funding climate change efforts would be of help.

11. **Finding:** Most respondents agree that the local government should educate the public about climate change.

**Recommendations:** People’s beliefs about the causes and effects of climate change, as illustrated in this report, represent opportunities to acknowledge the current state of the public and also to increase specific areas of knowledge and awareness related to regional resilience. If most people believe a supported fact, then providing that normative information can help to increase other people’s receptivity to that information.

These survey findings illustrate areas that might be helpful to educate and persuade individuals and their local businesses to foster a more climate-change resilient region. There are many people in Dayton, Ohio who understand the impacts of climate change and are willing to take actions to address it. These findings should be used to inform the development of an education and awareness campaign that facilitates individual and community actions that mitigate risks resulting from climate change and to respond adaptively when the effects of climate change are experienced in the community.

**Acknowledgements**

This study was funded in part by a grant provided to the Principal Investigators by GLAA-C. We greatly appreciate the assistance of our Dayton regional partners and the support provided by GLAA-C. GLAA-C support was provided by Elizabeth Gibbons (Project Manager), Missy Stults (Research Fellow), and Ashlee Grace, M.S. (Project Manager), and by Kristina Slagle (graduate student) and Dr. Robyn Wilson (Professor, Ohio State University) who facilitated the development of our survey. We also appreciate the assistance of those who helped us administer surveys: Jennifer Baumgartner and Chataun Heflin (Wright State University Department of Psychology), Katie Norris and Victoria Redden (City of Dayton), and Erin Murray, Samantha Palko, Carol Thomas, and Laura Zeck (Dayton International Airport).
References


Appendix A

Select Comparisons between City of Dayton and State of Ohio

A statewide survey of Ohio residents’ beliefs, attitudes, and knowledge was conducted by the Yale Project on Climate Change Communication (Leiserowitz et al., 2013). There was some overlap with items used in that survey and the survey used for the current report. Comparisons of these overlapping items are summarized below.

**Beliefs about climate change (global warming)**

Dayton: I believe that [n = 494]
Ohio: Which one of the following statements comes closest to your view? [n = 800]

(Leiserowitz et al., 2013, p. 5)

**Beliefs about scientific opinion regarding climate change (global warming)**

Dayton: I think that, among the world’s scientists [n = 482]
Ohio: Which of the following statements comes closest to your own view? [n = 800]

(Leiserowitz et al., 2013, p. 5)
Dayton: I think climate change is bad.
Ohio: Do you think global warming is a bad thing or a good thing? [n = 493]
(Leiserowitz et al., 2013, p. 17)

Dayton: I am worried about climate change.
Ohio: How worried are you about global warming? [n = 800]
(Leiserowitz et al., 2013, p. 5)
Dayton: I think climate change will harm each of the following

Ohio: Please tell me whether you think global warming will harm each of the following

(Leiserowitz et al., 2013, p. 6)

Dayton: If people and businesses in Dayton used more clean energy (like solar and wind) and less fossil fuels (like coal and oil), I think our economy would experience

Ohio: If Ohio were to switch from fossil fuels like coal and oil to clean energy sources like solar and wind, do you think it would

(Leiserowitz et al., 2013, p. 7)
Dayton: Right now, I personally do the following [n = 487]
Ohio: How often do you do each the following? [n = 800]
(Leiserowitz et al., 2013, p. 9)

Dayton: If I did most of these energy-saving actions, it would reduce climate change.
If most people in the U.S. did these energy saving actions, it would reduce climate change. [n = 491]
Ohio: If you did most of these things, how much do you think it would reduce your personal contribution to global warming?
If most people in the United States did these same actions, how much do you think it would reduce global warming? [n = 534]
(Leiserowitz et al., 2013, p. 9)
Some items in the current and Ohio surveys assessed similar outcomes, but the differences in wording prevented direct comparison. Page and question numbers for correspondent items are listed in the table below.

<table>
<thead>
<tr>
<th>Dayton survey Items</th>
<th>Page and question numbers for Ohio survey items (Leiserowitz et al., 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beliefs and Attitudes</strong></td>
<td></td>
</tr>
<tr>
<td>Beliefs about climate change</td>
<td>Page 28: Question 26</td>
</tr>
<tr>
<td>Beliefs about scientific opinion</td>
<td>Page 20: Question 11</td>
</tr>
<tr>
<td>Is climate change good or bad?</td>
<td>Pages 17, 18: Questions 6a, 6b, 6c</td>
</tr>
<tr>
<td><strong>Personal Relevance and Perceived Severity</strong></td>
<td></td>
</tr>
<tr>
<td>Personal relevance</td>
<td>Pages 23, 25, 26: Questions 15, 20, 21, 22</td>
</tr>
<tr>
<td>Who will climate change harm?</td>
<td>Page 23: Question 16</td>
</tr>
<tr>
<td>When will people experience harm?</td>
<td>Page 24: Question 17</td>
</tr>
<tr>
<td><strong>Impacts in Dayton, Ohio</strong></td>
<td></td>
</tr>
<tr>
<td>Effects of climate change in Dayton</td>
<td>Pages 17, 24, 25: Questions 5, 18, 19</td>
</tr>
<tr>
<td>Effect of clean energy use on Dayton’s economy</td>
<td>Page 36: Questions 41, 42</td>
</tr>
<tr>
<td>Effects on work in Dayton</td>
<td>N/A</td>
</tr>
<tr>
<td>Reliance on weather/climate data for work</td>
<td>N/A</td>
</tr>
<tr>
<td>Work preparedness</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>Climate change is affected by</td>
<td>N/A</td>
</tr>
<tr>
<td>Climate change increases</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Behaviors and Actions</strong></td>
<td></td>
</tr>
<tr>
<td>Personal actions: Right now</td>
<td>Pages 15, 16, 33: Questions 1, 3, 35</td>
</tr>
<tr>
<td>Personal actions: Intentions in next year</td>
<td>Pages 15, 16, 34: Questions 2, 4, 37</td>
</tr>
<tr>
<td>Beliefs about individual and large-scale actions</td>
<td>Pages 21, 22: Questions 12, 13</td>
</tr>
<tr>
<td>Community preparedness</td>
<td>N/A</td>
</tr>
<tr>
<td>What I would pay to address climate change</td>
<td>N/A</td>
</tr>
<tr>
<td>Should the government educate the public about climate change?</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Appendix B

**Participant Demographics**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>265</td>
<td>55%</td>
</tr>
<tr>
<td>Female</td>
<td>217</td>
<td>45%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>37</td>
<td>8%</td>
</tr>
<tr>
<td>25-34</td>
<td>74</td>
<td>17%</td>
</tr>
<tr>
<td>35-44</td>
<td>95</td>
<td>22%</td>
</tr>
<tr>
<td>45-54</td>
<td>104</td>
<td>24%</td>
</tr>
<tr>
<td>55-64</td>
<td>106</td>
<td>24%</td>
</tr>
<tr>
<td>65 or older</td>
<td>26</td>
<td>6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>392</td>
<td>84%</td>
</tr>
<tr>
<td>Black</td>
<td>49</td>
<td>10%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>24</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school</td>
<td>2</td>
<td>0%</td>
</tr>
<tr>
<td>High school graduate or GED</td>
<td>31</td>
<td>6%</td>
</tr>
<tr>
<td>Some college, business, or technical school</td>
<td>98</td>
<td>20%</td>
</tr>
<tr>
<td>Associate's degree</td>
<td>57</td>
<td>12%</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>163</td>
<td>34%</td>
</tr>
<tr>
<td>Master's degree</td>
<td>103</td>
<td>21%</td>
</tr>
<tr>
<td>Professional degree</td>
<td>14</td>
<td>3%</td>
</tr>
<tr>
<td>Doctoral degree</td>
<td>15</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $10,000</td>
<td>11</td>
<td>2%</td>
</tr>
<tr>
<td>$10,000-$29,999</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td>$30,000-$49,999</td>
<td>61</td>
<td>13%</td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>137</td>
<td>30%</td>
</tr>
<tr>
<td>$75,000-$99,999</td>
<td>97</td>
<td>21%</td>
</tr>
<tr>
<td>$100,00 or more</td>
<td>118</td>
<td>26%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment status</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed FT</td>
<td>397</td>
<td>76%</td>
</tr>
<tr>
<td>Employed PT</td>
<td>43</td>
<td>8%</td>
</tr>
<tr>
<td>Unemployed, seeking</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>Not employed, not seeking work</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>Retired</td>
<td>36</td>
<td>7%</td>
</tr>
<tr>
<td>Student</td>
<td>34</td>
<td>7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area of employment</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>City of Dayton employee</td>
<td>218</td>
<td>45%</td>
</tr>
<tr>
<td>Government employee</td>
<td>20</td>
<td>4%</td>
</tr>
<tr>
<td>Health care worker</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>Private sector</td>
<td>58</td>
<td>12%</td>
</tr>
<tr>
<td>Non-profit organization</td>
<td>38</td>
<td>8%</td>
</tr>
<tr>
<td>Education</td>
<td>45</td>
<td>9%</td>
</tr>
<tr>
<td>Other</td>
<td>83</td>
<td>17%</td>
</tr>
</tbody>
</table>
### Place of residence

<table>
<thead>
<tr>
<th>Place of residence</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Dayton Area</td>
<td>368</td>
<td>81%</td>
</tr>
<tr>
<td>Ohio, not Dayton</td>
<td>42</td>
<td>9%</td>
</tr>
<tr>
<td>Ohio, city not specified</td>
<td>15</td>
<td>3%</td>
</tr>
<tr>
<td>United States, not Ohio</td>
<td>28</td>
<td>6%</td>
</tr>
<tr>
<td>Outside United States</td>
<td>2</td>
<td>0%</td>
</tr>
</tbody>
</table>

### I get my water service from

<table>
<thead>
<tr>
<th>Service</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Dayton</td>
<td>277</td>
<td>55.51%</td>
</tr>
<tr>
<td>Other city/municipality</td>
<td>189</td>
<td>37.88%</td>
</tr>
<tr>
<td>Well</td>
<td>16</td>
<td>3.21%</td>
</tr>
<tr>
<td>Not sure</td>
<td>17</td>
<td>3.41%</td>
</tr>
</tbody>
</table>

### I get my news from

<table>
<thead>
<tr>
<th>Source</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newspaper</td>
<td>137</td>
<td>15%</td>
</tr>
<tr>
<td>TV news</td>
<td>237</td>
<td>25%</td>
</tr>
<tr>
<td>Online news</td>
<td>236</td>
<td>25%</td>
</tr>
<tr>
<td>Social media</td>
<td>109</td>
<td>12%</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>63</td>
<td>7%</td>
</tr>
<tr>
<td>Radio</td>
<td>110</td>
<td>12%</td>
</tr>
<tr>
<td>Word of mouth</td>
<td>34</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>1%</td>
</tr>
</tbody>
</table>
Appendix C
Survey

Instructions: Please answer the following questions to the best of your ability. There are no right or wrong answers. We are interested in your own experiences and what you think, so be as honest as possible.

1. I get my water service from
   □ the City of Dayton
   □ some other city or municipality
   □ not sure

2. I get most of my news from (choose up to 2)
   □ Newspaper
   □ Television news program
   □ Online news source
   □ Social media (Facebook, Twitter, etc.)
   □ Mobile phone device
   □ Radio
   □ Word of mouth
   □ Other:

3. Rate your agreement with the following statements

<table>
<thead>
<tr>
<th>strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>strongly agree</th>
</tr>
</thead>
</table>
   I think about climate change often
   I am informed about climate change
   Climate change is important to me
   I am worried about climate change

4. I think climate change is

   | extremely bad | somewhat bad | not good or bad | somewhat good | extremely good |

5. I think that, among the world’s scientists
   □ Most believe that climate change is happening
   □ There is disagreement over whether or not climate change is happening
   □ Most believe that climate change is not happening
   □ Not sure

6. I believe that
   □ Climate change isn’t happening
   □ People can’t reduce climate change, even if it is happening
   □ People can reduce climate change, but we’re not willing to change our behaviors
   □ People can reduce climate change, but I don’t know if we will do what's needed
   □ People can reduce climate change, and we are going to do so successfully

7. I think climate change will harm each of the following

<table>
<thead>
<tr>
<th>strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>strongly agree</th>
</tr>
</thead>
</table>
   Me personally
   My family
   People in my community
   People in the United States
   People in developing countries
   Future generations

8. I think people will begin to experience harm because of climate change

   | never | happening right now | in 5 years | in 5 to 15 years | in 15 to 50 years | more than 50 years |

   □ □ □ □ □ □ □ □
9. Over the next 10 years, I think climate change will cause the following changes in Dayton

<table>
<thead>
<tr>
<th>Change</th>
<th>Very unlikely</th>
<th>Somewhat unlikely</th>
<th>Neutral</th>
<th>Somewhat likely</th>
<th>Very likely</th>
<th>Already happening</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>More natural disasters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More severe storms or tornadoes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More heat waves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More extreme cold weather</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in precipitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in surface water quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer local plants and animals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More allergies, asthma, diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower food supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. I believe that climate change is likely to increase which of the following (select all that apply)?
- Cancer
- Asthma
- Tuberculosis
- Insect-borne disease (e.g. West Nile Virus)
- Flu
- Heat stroke
- Frostbite
- Injuries or deaths from natural disasters

11. There are many actions people can take to address climate change. Below is a list of some of these actions. Right now, I personally do the following

<table>
<thead>
<tr>
<th>Action</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the winter, set my thermostat to 68 degrees or cooler</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use public transportation or car pool</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk or bike instead of drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use cold water instead of hot/warm water for laundry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat meat less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact city or state officials about climate change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use energy-efficient compact fluorescent light bulbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive less often by combining stops into one trip</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Over the next 12 months, I plan to do each of the following

<table>
<thead>
<tr>
<th>Action</th>
<th>Do more</th>
<th>Do less</th>
<th>About the same</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the winter, set my thermostat to 68 degrees or cooler</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use public transportation or car pool</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk or bike instead of drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use cold water instead of hot/warm water for laundry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat meat less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact city or state officials about climate change</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use energy-efficient compact fluorescent light bulbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive less often by combining stops into one trip</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. I believe that

<table>
<thead>
<tr>
<th>If I did most of these energy-saving actions (from question 12), it would reduce climate change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If most people in the U.S. did these energy-saving actions, it would reduce climate change.</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
</tr>
</tbody>
</table>

14. I believe that climate change is affected by (select all that apply)

- Aerosol spray cans
- Using fossil fuels for electricity or vehicles
- Cows and other livestock
- Cutting down forests
- Toxic waste
- Nuclear power plants

15. If people and businesses in Dayton used more clean energy (like solar and wind) and less fossil fuels (like coal and oil), I think our economy would experience

<table>
<thead>
<tr>
<th>a significant decrease</th>
<th>a slight decrease</th>
<th>no change</th>
<th>a slight increase</th>
<th>a significant increase</th>
<th>not sure</th>
</tr>
</thead>
</table>

16. My community could prepare for climate change by

- Establishing community gardens
- Increasing residential/commercial recycling
- Planting more trees
- Using more clean energy (e.g. solar, wind)
- Coming up with an emergency preparedness plan
- Providing more public transportation options
- Creating more bike lanes and routes

17. My work would be affected if Dayton experienced the following

<table>
<thead>
<tr>
<th>More natural disasters</th>
<th>none</th>
<th>a little</th>
<th>some</th>
<th>very much</th>
<th>extremely</th>
<th>not sure</th>
<th>not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>More severe storms or tornadoes</td>
<td>none</td>
<td>a little</td>
<td>some</td>
<td>very much</td>
<td>extremely</td>
<td>not sure</td>
<td>not applicable</td>
</tr>
<tr>
<td>More heat waves</td>
<td>none</td>
<td>a little</td>
<td>some</td>
<td>very much</td>
<td>extremely</td>
<td>not sure</td>
<td>not applicable</td>
</tr>
<tr>
<td>More extreme cold weather</td>
<td>none</td>
<td>a little</td>
<td>some</td>
<td>very much</td>
<td>extremely</td>
<td>not sure</td>
<td>not applicable</td>
</tr>
<tr>
<td>Changes in precipitation</td>
<td>none</td>
<td>a little</td>
<td>some</td>
<td>very much</td>
<td>extremely</td>
<td>not sure</td>
<td>not applicable</td>
</tr>
<tr>
<td>Changes in surface water quality</td>
<td>none</td>
<td>a little</td>
<td>some</td>
<td>very much</td>
<td>extremely</td>
<td>not sure</td>
<td>not applicable</td>
</tr>
</tbody>
</table>

18. To do my job effectively, I rely on (select all that apply)

- past weather trends
- current climate data
- weather forecasting
- not applicable

19. My workplace is currently taking steps to be prepared for the effects of climate change

<table>
<thead>
<tr>
<th>strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>strongly agree</th>
<th>not sure</th>
<th>not applicable</th>
</tr>
</thead>
</table>

20. I believe the local government should educate the public about how they can address climate change

strongly disagree  disagree  neutral  agree  strongly agree

21. I would be willing to pay $___________ to address climate change.

22. If you have any comments about climate change not addressed in this survey, please list them:
________________________________________________________________________
________________________________________________________________________

23. Age: ______ years

24. Primary employment status:
☐ Employed full-time
☐ Employed part-time
☐ Unemployed, seeking
☐ Not employed, not seeking work
☐ Retired
☐ Student

25. Area of employment:
☐ Military
☐ City of Dayton employee
☐ Government contracted employee
☐ Health care worker
☐ Private sector
☐ Non-profit organization
☐ Education
☐ Other

26. Permanent residence: ______________________, ______________________

City
State

27. Sex
☐ Man
☐ Woman

28. Ethnicity
☐ White, Caucasian (non-Hispanic)
☐ Black, African American (non-Hispanic)
☐ Hispanic
☐ Asian-American
☐ American Indian or Alaskan Native
☐ Pacific Islander
☐ Other: _________________________

29. Highest level of education
☐ Some high school
☐ High school graduate or GED
☐ Some college, business, or technical school
☐ Associate's degree
☐ Bachelor's degree
☐ Master's degree
☐ Professional degree
☐ Doctoral degree

30. Approximate annual household income
☐ Less than $10,000
☐ $10,000 - $29,999
☐ $30,000 - $49,999
☐ $50,000 - $74,999
☐ $75,000 - $99,999
☐ $100,000 or more
Appendix D

Current Scientific Knowledge

In the current study, most respondents (65%) believe that the world’s scientists agree that climate change is happening, 32% believe scientists disagree over whether climate change is happening, and 3% believe that most scientists do not believe climate change is happening. Despite the perception of disagreement held by the public, there is considerable consensus among the scientific community (IPCC, 2014). In fact, over 97% of scientists believe that climate change is happening, and that humans play a significant role (Cook, 2013). Furthermore, there is general agreement that climate change has already begun to affect us on a global scale.

Some people incorrectly attribute climate change to certain factors that have little to no effect on climate change (e.g. toxic waste), or to factors that represent outdated knowledge (e.g. aerosol sprays). Additionally, a number of respondents failed to consider other factors that do have an impact (e.g. cows and livestock). People may also have misconceptions regarding the health outcomes of climate change. These responses can help identify opportunities for education. The following tables depict a brief summary of current scientific understanding regarding factors that contribute to climate change, and resulting health outcomes.

<table>
<thead>
<tr>
<th>Contributing Factor</th>
<th>Current Scientific Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol sprays</td>
<td>CFC’s contribute to ozone layer depletion, which is a different problem than that of green house gases (GHGs) contributing to climate change; most CFC’s are banned today</td>
</tr>
<tr>
<td>Fossil fuels</td>
<td>Burning of fossil fuels causes carbon emissions (CO2/Methane), which are GHGs that contribute to climate change</td>
</tr>
<tr>
<td>Cows / livestock</td>
<td>Methane emissions from livestock are GHGs</td>
</tr>
<tr>
<td>Cutting down trees</td>
<td>Non-sustainable forestry reduces natural processing of CO2</td>
</tr>
<tr>
<td>Toxic waste</td>
<td>Impacts human health, wildlife, and the environment; lesser impact on climate change</td>
</tr>
<tr>
<td>Nuclear power plants</td>
<td>Produce lower direct GHG emissions than fossil fuels; however, higher risk of detrimental effects to human health and the environment in the event of catastrophic incident</td>
</tr>
</tbody>
</table>

Sources: Dicks (2008); EPA, GLISA, IPCC, NASA, Pryor et al., 2014

<table>
<thead>
<tr>
<th>Health Outcomes</th>
<th>Current Scientific Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>Increased exposure to carcinogens in the environment, depletion of the protective ozone layer, and decline in air quality increase the risk and incidence of cancer. Changes in air quality and behavior changes (e.g. more time spent outside, more exposure to harmful UV rays) can increase cancer risks.</td>
</tr>
<tr>
<td>Asthma</td>
<td>Increased allergens, surface-level ozone concentrations, fine particles, and dust in the air can trigger and worsen asthma and other respiratory problems. Climate change does not directly increase the incidence of asthma, but changes in air quality, seasonal changes that affect plants, and behavior changes can increase exposure to triggers and can worsen the effects of triggers.</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Diseases that are spread directly through human contact are less likely to be affected by climate change, but changes in human behavior that are impacted by climate change, such as migration patterns and overcrowding, can increase incidence.</td>
</tr>
<tr>
<td>Insect-borne disease</td>
<td>Climate changes impacting precipitation, surface water, and agriculture can increase breeding sites and lengthen breeding time and survival rates for mosquitoes and other vectors of disease</td>
</tr>
<tr>
<td>Flu</td>
<td>Similar to tuberculosis, incidence of flu can increase in response to human behaviors, such as crowding indoors during cold weather, suggesting an indirect link to climate change.</td>
</tr>
<tr>
<td>Heat stroke</td>
<td>Increasing Urban Heat Island (UHI) effects, loss of urban tree canopy, increased competition for water, and risk of power disruption, all of which are consequences of climate change, result in greater incidence of heat-related morbidity &amp; mortality.</td>
</tr>
<tr>
<td>Frostbite</td>
<td>General warming trends may actually decrease incidence of frostbite and other cold-related events. However, unseasonably warm weather followed by a freeze can result in damage to plant-life, including food sources.</td>
</tr>
<tr>
<td>Injuries / death</td>
<td>Increases in extreme weather events can lead to injuries and death from a variety of risks, including flooding, tornadoes, or wind storms. Effects can be direct or indirect, as is the case when there is structural damage or collapse.</td>
</tr>
</tbody>
</table>

Sources: CDC, EPA, GLISA, IPCC, McMichael et al. (2012), NASA, NCEH, NIEHS, WHO
Cover Letter

Title: Thoughts about the Dayton Climate

Purpose of study: I am being invited to participate in a study interested in people’s thoughts about climate change. The aim of this study is to understand what people think about climate change and what people might do about climate change.

Procedure: I will be asked to complete a brief survey. The survey will take about 5-10 minutes to complete.

Benefits and risks: There are no direct benefits that will come from taking this survey. The information I share may let the Dayton regional partners know how best to help our community address climate change. There are no risks to my participating in this study.

Remuneration: In exchange for participating in this survey, I will receive a City of Dayton water bottle.

Confidentiality: My name is not collected and my identity will remain anonymous. My responses will be kept in a secure locked cabinet, and only averages across people (not individual data) will be made public.

Voluntary consent: My participation is completely voluntary. I have the right to not answer questions, and to not participate in this study or to stop participating at any time. If I decide to not participate, I will not experience harm because of that decision. Completing the survey implies my consent to participate.

If I would like a copy of the group results (available Summer 2014) or if I have any questions or concerns about my rights as a research participant in this project, I can contact Dr. Tamera Schneider at 937-775-2391 in the Department of Psychology at Wright State University. If I have general questions about giving consent or my rights as a research participant in this research study, I can also call the Wright State University Institutional Review Board at 937-775-4462.

Thank you for your time.
**Oral Consent**

* Would you be willing to share your thoughts about climate change in a brief survey? We’ve found that it only takes about 5 to 10 minutes to finish. In exchange, we’ll give you a water bottle to keep.
  * **if NO, then:** Thank you for your time anyway. Have a good day.
  * **if YES, then:** Before we begin, I need to ensure you’re at least 18 – are you?
    * **If younger than 18:** Unfortunately, we can only survey people who are 18 or older. Thank you for your time anyway. Have a good day.
    * **If 18 or older:** proceed to next section

* We appreciate you taking time to complete this survey. This study is interested in what people think about climate change. We are interested in your own thoughts, there are no right or wrong answers.

* Here’s a cover letter for you to keep. I’ll go over the key points out loud.

* The survey takes about 5 to 10 minutes to finish. We’ll give you a water bottle in exchange for participating.

* There’s no direct benefit to you for taking this survey, but your responses may help the Dayton region know how to address climate change better. There are no risks in participating.

* We don’t collect your name; your responses will be kept confidential and anonymous. All of your answers will be kept in a locked file cabinet. We don’t report individual’s responses. Rather, reports focus on combining responses across the people who took the survey.

* You don’t have to answer any question you don’t want to, and can stop participating at any time, and keep the water bottle.

* If you would like to see a report of the findings or if you have questions or concerns, you can contact the lead researcher or Wright State University’s Institutional Review Board. Their contact information is on your cover letter.

* Finally, if you see this survey about thoughts about the Dayton climate in another location in the next few weeks, please don’t take it again. The results will be inaccurate if we get multiple responses from the same person. Our goal is to understand thoughts across different people.

* Do you have any questions?

---

**Regional partners (in case anyone has questions about who our partners are):**

**Municipal Departments:**
Aviation, Economic Development, Planning and Community Development, Public Works, Water, Office of Management Budget

**External Stakeholders:**
Miami Valley Regional Planning Commission, Miami Conservancy District, Wright State University, Central State University, University of Dayton, Sinclair Community College, Partners for the Environment

**Funding provided by:**
Great Lakes Adaptation Assessment for Cities
Graham Sustainability Institute at the University of Michigan
**Dayton GLAA-C Report: Group Differences Comparison**

**Summary:** The overall pattern when comparing sample groups revealed that Dayton Neighborhood / Community Groups and University of Dayton River Summit attendees had higher scores than City of Dayton employees and partners and Travelers at Dayton International Airport. This translates to greater sense of concern and personal relevance, greater belief that climate change is happening and is affected by people, greater sense of immediacy of threat, and greater likelihood of negative impacts. They were also more likely to engage in energy-saving behaviors, and to express intentions to increase these behaviors in the next year.

**Note:** only statistically significant differences are described in the following paragraphs.

Regarding personal relevance and concern, compared to City of Dayton employees and partners and Travelers at Dayton International Airport: Dayton Neighborhood/Community Groups, University of Dayton River Summit attendees, and 3 agreed more that they think about climate change, they feel that climate change is important, and they are worried about climate change. University of Dayton River Summit attendees and City of Dayton employees and partners also indicated that they are informed about climate change, both of which were significantly greater than Travelers at Dayton International Airport.

![Personal Relevance Chart](chart.png)

When asked whether climate change was good or bad, Dayton Neighborhood/Community Groups, and University of Dayton River Summit attendees were more likely to describe it as bad compared to Travelers at Dayton International Airport, and University of Dayton River Summit attendees was also more likely to rate climate change is being bad compared to Travelers at Dayton International Airport.

![Is Climate Change Good or Bad? Chart](chart2.png)
Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were more likely to believe that climate change is happening and is affected by people, compared to City of Dayton employees and partners and Travelers at Dayton International Airport.

University of Dayton River Summit attendees were more likely to state that scientists agree that climate change is happening, compared to City of Dayton employees and partners.
When asked about the effects of climate change (ranging from ‘me personally’ to ‘future generations’, indicating less immediacy in harm), Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were all significantly more likely to agree that climate change would harm each level, compared to City of Dayton employees and partners and Travelers at Dayton International Airport.

![Who will climate change harm?](image)

Compared to City of Dayton employees and partners and Travelers at Dayton International Airport, Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were more likely to agree that climate change would result in each of the following changes in Dayton: natural disasters, storms or tornadoes, heat waves, precipitation, surface water quality, and plants & animals. Dayton Neighborhood/Community Groups were more likely than City of Dayton employees and partners and Travelers at Dayton International Airport to agree that climate change would result in changes in extreme cold weather and allergies, asthma, or other infectious diseases.

![Effects of climate change in Dayton, OH](image)
Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were more likely to report that they are already engaged in energy-saving actions now compared with City of Dayton employees and partners and Travelers at Dayton International Airport, especially use public transportation, walk or bike instead of drive, and recycle. Dayton Neighborhood/Community Groups were also more likely to indicate that they planned to do these behaviors more in the coming year. In particular, this was the case for using public transportation, driving less by combining stops, recycling, and using energy-efficient light bulbs.

![Personal actions: Right now](chart1.png)

![Personal actions: Intentions in next year](chart2.png)
Compared to City of Dayton employees and partners and Travelers at Dayton International Airport, Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were more likely to agree that the community could prepare for climate change by establishing community gardens, increasing recycling, planting trees, and using more clean energy. There were also significant differences by group for developing an emergency preparedness plan (Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees greater than City of Dayton employees and partners; Dayton Neighborhood/Community Groups greater than Travelers at Dayton International Airport), providing more public transportation (Dayton Neighborhood/Community Groups greater than City of Dayton employees and partners; University of Dayton River Summit attendees greater than City of Dayton employees and partners and Travelers at Dayton International Airport), and adding more bike lanes (Dayton Neighborhood/Community Groups greater than City of Dayton employees and partners; University of Dayton River Summit attendees greater than City of Dayton employees and partners and Travelers at Dayton International Airport).

For most items relating the effects of climate change on work in Dayton, there were no significant differences by groups. However, Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were more likely to agree that heat waves would affect their work in Dayton more than Travelers at Dayton International Airport; and Dayton Neighborhood/Community Groups and University of Dayton River Summit attendees were more likely to agree that changes in surface water quality would affect their work in Dayton, compared to City of Dayton employees and partners and Travelers at Dayton International Airport.
When asked whether their workplaces were taking steps toward preparing for climate change, Dayton Neighborhood/Community Groups agreed more than City of Dayton employees and partners and Travelers at Dayton International Airport, and University of Dayton River Summit attendees agreed more than City of Dayton employees and partners.

On the topic of the belief that the local government should educate the public on climate change, Dayton Neighborhood/Community Groups were more likely to agree than University of Dayton River Summit attendees, City of Dayton employees and partners, and Travelers at Dayton International Airport. University of Dayton River Summit attendees were more likely to agree than City of Dayton employees and partners.
Climate Change in the Dayton, Ohioan Mind

Building a Community-Informed Climate Awareness Campaign
GOAL: To Encourage Regional Sustainability and Climate Adaptation in the Dayton Community

• Local assets and challenges
  – Active organizations, 3 universities, culture of innovation
  – Median income $28,595

• Bring together many different organizations
  – Each working on similar issues
  – Pool resources and leverage efforts
Vision
The region’s nationally recognized provider of premier water services.

Mission
As guardians of public health, we are devoted to providing high quality and affordable regional water services.
Dayton Drinking Water

Two Water Treatment plants with capacity of over 90 million gallons/day

Provider of drinking water to over 400,000 in Montgomery County
Dayton Water Assets

- Over 21,000 catch basins
- 600 miles of storm sewer pipes
- 700 miles of sanitary sewer pipes
- Water Reclamation Facility capacity to treat over 70 million gallons/day of wastewater
- Over 550 outfalls along the 4 major rivers
Dayton Workshop
(June 5, 2013)

Partners: Aviation, Economic Development, Fire, Planning, and Water Departments, and MCD
Dayton Staff Priorities

Five Key Service Areas (Systems) Identified:

- Water
- Public Health
- Infrastructure/Transportation/Energy
- Emergency Management
- Natural Systems

Top Ranking Strategies

- Investing in infrastructure improvements, rehabilitation, and replacement
- Update codes and ordinances to allow for green infrastructure (green roofs, permeable surfaces, water reclamation)
- Ensure we have people and equipment available to respond to a disaster
Community Climate Survey

- Evolved from need for public input and buy-in
- Over 500 participants surveyed
  - Neighborhood Leadership Institute
  - City of Dayton Employees
  - Dayton International Airport
  - University of Dayton River Summit
  - On-Line (Engage Dayton)
It's not happening: 7%
People can't reduce it: 19%
People can reduce, not willing: 30%
Can reduce, unsure if will: 42%
People can and will reduce: 3%
Most believe it’s not happening:

- 3

There is disagreement:

- 32

Most believe it is happening:

- 65

Beliefs about scientific opinion
People will begin to experience harm from climate change

Percent of respondents

- Happening right now: 47%
- in 5 years: 5%
- in 5 to 15 years: 12%
- in 15 to 50 years: 12%
- in more than 50 years: 9%
- Never: 15%
Climate change increases
What I would be willing to pay to address climate change

- Nothing: 130
- Some money: 153
- No taxes: 2
- Taxes: 15
- Time: 5
- Actions: 5
Should the government educate the public about climate change?

- Strongly disagree: 12%
- Disagree: 7%
- Neutral: 16%
- Agree: 41%
- Strongly agree: 24%
Climate Change in the Dayton, Ohioan Mind

BELIEFS & ATTITUDES

69% believe that climate change is important

CONSSENSUS

65% believe that the scientific community agrees that climate change is happening

32% - believe scientists disagree
3% - think scientists do not believe climate change is happening
TAKE ACTION!
Dayton citizens are already doing their part to live more sustainably

- 62% always recycle
- 45% use energy-efficient light bulbs
- 46% set thermostat at 68° or less in winter
- 40% want to walk/bike more
- 33% combine stops to save gas
- 31% use cold water for laundry

58%
Lessons Learned

- Partner’s input improved survey
- Pre-survey training for administering survey
- More accurate cross representation of community
- Provide electronic climate background on-line
- Have press conference with city leaders
- Create community climate library
Media Coverage & Synergy

Survey Of Dayton Residents Finds Climate Change Concerns

By LEWIS WALLACE

Our Mission
To promote greener government, business, and personal practices throughout the Montgomery County and Dayton region to ensure the environmental sustainability of our region and enhance the quality of life for our citizens.

State, Local, and Tribal Leaders Task Force On Climate Preparedness and Resilience
Dayton Climate Messaging Campaign

- **Heat Waves**
  - [Image](http://archive.courier-journal.com/html/2012/10/global-warming/)

- **Wind Storms**
  - [Image](http://www.daytondailynews.com/news/news/derecho-damage-approached-half-a-billion-dollars-i/nQ9rd/)

- **Ice Storms**
  - [Image](http://archive.courier-journal.com/html/2012/10/global-warming/)

- **Flooding Events**
  - [Image](http://archive.courier-journal.com/html/2012/10/global-warming/)
Other Examples

EXTREME HEAT

Though Wisconsin is notorious for frigid winters, extreme heat kills more people in the state than all other weather disasters (e.g., tornadoes, floods, blizzards) combined. Just as the human body can freeze to death when temperatures are too cold, it can also stop functioning properly when it
Big, fast carbon surge:
Ice melts, oceans heat and rise.
Air warms by decades.

Glaciers melt, seas warm,
giant polar ice sheets stir:
Seas may rise faster.

Forty years from now
children will live in a world
shaped by our choices.
DON’T JUST STAND THERE. STAND THERE AND HELP KEEP TAHOE’S WATER CLEAN.

1. Check in now on foursquare at “Earthjustice Ad”

2. Every time you check in, an Earthjustice donor will donate $10 to protect Tahoe’s water quality.

EARTHJUSTICE
Because the earth needs a good lawyer

One check-in per person per day. Max donation $50,000.
Adaptation Solutions For a Changing Climate

Engineered & built-environment solutions
- Coasts: Sea walls & coastal protection structures, Flood & cyclone shelters
- Urban: Improved energy transport, water infrastructure, Power plant & electricity grid enhancements
- Institutional solutions: Community, National, regional & local adaptation plans, Land zoning & building codes, Insurance

Technological solutions
- Buildings: New building materials, improved building insulation and heating/cooling, Hazard mapping & monitoring, Early warning systems, Emergency response and recovery management

Agriculture
- New crop varieties & animal breeds, Efficient irrigation, Flexible farm management, Food & storage preservation facilities

Disaster risk reduction
- Conservation: Reduce existing ecosystem stressors, Assisted migration or managed translocation, Ex-situ conservation & seed banks, Community-based natural resource management

Ecosystem-based solutions
- Fisheries: Sustainable fisheries management, Mangrove conservation & replanting
- Urban & Coasts: Green infrastructure & spaces

Learn more about these and other solutions for Australia, visit http://www.csiro.au/climate-response.com

Building Business Resilience to Climate Change

WEATHERING THE STORM

In 2012, 800+ major weather-related disasters worldwide led to more than $130 billion in losses, with the most costly events (Hurricane Sandy and the Midwest drought) occurring in the United States. Climate scientists tell us to expect more frequent and intense heat waves, higher sea levels, and more severe droughts, wildfires, and downpours. These extreme weather events can severely disrupt a company's operations, facilities, logistics and supply chains.

EXTREME WEATHER IS COSTLY

$65 billion
Estimated damages from Hurricane Sandy in the U.S. Northeast in October 2012.

$20 billion
Overall U.S. crop losses in drought-ravaged 2012, more than twice an average year's losses.

$1 billion
Losses associated with wildfires in Texas, New Mexico and Arizona during 2011.

$15-$20 billion
Losses from extensive flooding in Thailand in 2011 that badly damaged global automotive and electronics suppliers.

FORGET SUPERHEROES: LOCAL GOVERNMENT TO THE RESCUE!

CLIMATE CHANGE RISKS TO CITIES
PHYSICAL RISKS TO CITIES ARE SERIOUS AND URGENT:

- 92% of cities are at risk due to climate change
- 40% of cities are already dealing with the effects of climate change in their area
- 77% believe climate change could affect the ability of businesses to operate successfully in their cities

WHAT ARE CITIES DOING?

- 92% of cities report the involvement of senior leadership in tackling climate change
- 63% of cities have developed a climate change action plan
- 58% of cities have GHG reduction targets for city-wide emissions

CITIES AROUND THE WORLD REPORT THE FOLLOWING RISKS

- 65% hotter temperatures/heatwaves
- 56% increased precipitation/floods
- 46% sea level rise
- 38% urban heat island
- 38% intense/large storms
- 33% decreased precipitation/drought

HOW INDIVIDUAL CITIES TAKE ACTION

- Copenhagen: Building dykes and raising parts of the coastline
- Jakarta: Restoring coastal mangrove belt
- Caracas: Increased capacity and improved maintenance of stormwater drains in the city
- Melbourne: Creating urban and rooftop gardens, lighter buildings, and lightening roof and road colors to lessen urban heat island effect
- Toronto: Will double the tree canopy to increase shade and lessen the urban heat island effect
- Seoul: Focusing on mosquito control system to prevent the spread of new contagious diseases
- London: Identifying and promoting the location of heatwave "refuges" during heatwaves

Data is compiled from the responses of 48 global cities to CDP-Cities 2011, the climate change reporting platform for city governments. The reporting cities span 6 continents and range in population from 80,000 to 13 million people. Find out more at www.cdp-evs.org.

CARBON DISCLOSURE PROJECT
How do we help Dayton adapt to changing climate? What are your ideas? How do we get the message out?

Ideas?
Contact katie.norris@daytonohio.gov
Thank You!  Grant and Project Partners
Scientists around the country are ringing alarm bells about climate change, and some of the effects are already hitting the Dayton area. A local study of attitudes on climate change finds many people are concerned, but it also finds people are not sure what to do about climate change nor confident that it will be addressed.

In the coming decades, Dayton is likely to see an increase in heat waves and extra hot days, air quality and health problems associated with heat, changes in precipitation including an increase in flooding, and increasing numbers of extreme weather events such as wind storms and tornadoes, according to a general assessment of the potential impacts of climate change in Dayton by the Great Lakes Adaptation Assessment for Cities (GLAA-C). Just last week, the National Climate...
Assessment spearheaded by the federal government found immediate and potentially dire consequences for failing to curb climate change will likely touch every region of the country, changing everything from shipping patterns to the farming season.

A new study, *Climate Change in the Dayton, Ohioan Mind*, which is still in draft form, found most respondents believe that people can take action to reduce climate change, but most also think that decisive action is unlikely. Respondents were split on the issue of cost: 44 percent said they’d give money to address climate change, while 37 percent said they were unwilling. A majority think the scientific consensus is that climate change is happening, while 32 percent said “there is disagreement” among scientists, and just 3 percent said most scientists don’t believe in it.

The surveys were gathered from 516 people who were travelers at the Dayton International Airport, members of local priority boards or attendees at a river summit in the city, so the respondents aren’t a representative sample of all Daytonians. Its purpose in part is to inform the city about how to do outreach in the future, particularly as the costs of climate change become real.

Michele Simmons, Dayton’s environmental manager for water, says the city will have to work to manage flooding and water quality, among other things; all this comes as Dayton is trying to use the river more as an economic driver.

“This will be a sustainable resource, this will be something that can bring businesses and jobs back to the Dayton region, it will be something that can bring recreational tourism to our region so that we can both appreciate and use our rivers,” Simmons said.

The Dayton study, due to be finalized this week, was a collaboration between the city of Dayton, Wright State University and the Graham Environmental Institute at the University of Michigan; Tamera Schneider of Wright State’s Department of Psychology joined Simmons as a principal investigator.

*Lewis Wallace is WYSO’s economics reporter. Follow him [@lewispants](http://twitter.com/lewispants).*

**TAGS:** Climate Change, Climate, Weather, Great Miami River, Environment

**Related Content:**

<table>
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<th>Origins Podcast</th>
<th>Health, Science &amp; The Environment</th>
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<tr>
<td>Climate, Human Population and Human Survival: What the Deep Past Tells</td>
<td>2012 Among Hottest Years On Record In Ohio Cities</td>
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</table>
The Potential Impacts of Climate Change on Dayton, Ohio

Key Challenges

Known as the birthplace of aviation, Dayton is a community rich in history and innovation. Located in the Miami-Valley, Dayton serves as the county seat of Montgomery County and a key economic engine for much of Ohio. The larger Dayton Metropolitan Statistical Area is the fourth largest contributor to statewide gross domestic product.iii

Recognizing the importance of Dayton, Site Selection magazine ranked the region as the #1 medium-sized metropolitan area in the United States for economic development in both 2008 and 2009.ii Additionally, in 2010, Bloomberg Businessweek ranked Dayton as one of the best places for college graduates to find employment.iii

Unfortunately, changing weather and long-term climate conditions could reduce the vitality of the Dayton region, presenting new or enhancing existing challenges. While Dayton will face many of the same changes in climate as the surrounding area, the city’s specific vulnerabilities will be determined primarily by factors such as land use and zoning, existing infrastructure design, current policies, the socioeconomic capacity of residents, the flexibility of businesses, and the strength of existing social networks. The presence or absence of these characteristics (as well as others) will either help Dayton build its resilience or pose obstacles to the city’s efforts to prepare for climate change.

There are many existing and potential future impacts of climate change that could affect Dayton, including:

- As temperatures rise, the probability of heat waves and hot days will grow, increasing the risk of heat-related illnesses.
- Declining air quality, leading to significant public health impacts.
- As severe rainstorms become more frequent and intense, there may be an increased risk of sewage overflows and water contamination.
- Changes in the productivity and distribution of agriculture and natural systems.
- Direct damage to infrastructure from more extreme weather events and increasing demands for services during extreme events.

Heat Waves and Hot Days

In Ohio, the average annual temperature has increased by 0.07°F per decade over the last century (Figure 1).iv Over the next few decades, temperatures are projected to continue rising, with an increase between 3°F to 4°F expected by mid-century and a 12°F increase in average summer temperatures expected by end of this century (Figure 2).v

![Figure 1: Changes in observed average annual temperature from the Dayton International Airport between 1950 and 2010. Open circles represent annual average temperatures observed and the red line represents the nine-year running average. Over this time period, there has been a roughly 0.2°F increase in average annual temperature, with the greatest increase noticeable in winter (0.8°F increase in average annual winter temperatures). Data source: NCDC, Station ID 332075.](https://www.graham.umich.edu/glaac)
Small increases in average annual temperatures over time can greatly increase the probability of heat waves and hot days. While no specific data was available for Dayton, data for Cincinnati and Cleveland show that these cities are projected to experience more than 85 days and 60 days, respectively, of temperatures over 90°F by end of the century (Figure 3). Temperature increases of this magnitude will likely lead to at least two heat waves per summer in Cincinnati of similar intensity to the 1995 Chicago heat wave that caused hundreds of deaths. Given the geographic proximity to Cincinnati and the similarity in climate projections for the region, it is likely that Dayton will also experience a heightened risk of heat waves due to increasing temperatures. With more frequent and more intense heat waves, there is a greater risk of heat-related illness and death.

In addition, increases in temperature combined with changes in humidity can alter the way outdoor temperatures “feel”. Figure 4 demonstrates how summer temperatures in Ohio could change under both a low and a high greenhouse gas emissions scenario.

Heat-related Illness and Death

Health conditions that can be triggered or exacerbated during hot weather range from mild heat-rashes to heat exhaustion, heatstroke, and death. Rising overnight temperatures during heat waves present the greatest risk for more severe illnesses, since residents are less able to find relief from sweltering temperatures.

A number of factors raise the risk of heat-related illness in urban environments. People of lower socioeconomic status and people that live in areas of higher population density are at greater risk of exposure to extreme heat. In these neighborhoods, heat island effects amplify hot weather, vegetation tends to be sparse and provides little natural shade, and homes...
are less likely to have air conditioning.\textsuperscript{x,xi,\textit{xii},xiii} In Dayton, the median household income is only $28,843 (nearly $24,000 less than the U.S. national average), 26.5 percent of families live below the poverty line (the national average is 10.5 percent), and a significant portion of the population spends more than 30 percent of their income on rent or monthly mortgage payments.\textsuperscript{xv} All of these factors combine to enhance the vulnerability of many of Dayton’s residents to heat by reducing their economic ability to effectively respond during heat waves.

**Air Quality**

Ground-level ozone is a dangerous air pollutant and the main component of photochemical smog. Elevated ground-level ozone concentrations reduce lung function while aggravating heart and respiratory conditions. As ozone levels rise, so too does the number of hospitalizations for respiratory and cardiovascular conditions.\textsuperscript{xvi}

The production of ground-level ozone increases with the presence of local sources of fossil fuel emissions and by temperatures over approximately 90°F.\textsuperscript{xvii} With high vehicular emissions and a projected increase in the number of hot days, Dayton and the broader metropolitan region will likely see more days of unhealthy ozone levels.\textsuperscript{xviii} Moreover, a study by the Natural Resources Defense Council found that the larger Cleveland area (no data was available specifically for Dayton) is projected to have approximately 11 more days per summer that exceed the U.S. Environmental Protection Agency’s air quality standards.\textsuperscript{xix} Changes such as these will have significant ramifications for the health and wellbeing of all Dayton residents, especially the young, elderly, infirm, homeless, and other vulnerable populations.

**Changes in Precipitation**

The Dayton region has seen a 5.6 percent increase in total annual precipitation from the 1951-1980 average to the 1981-2010 average (Figure 5).\textsuperscript{x} Most of this increase has been during the spring (Figure 6).

The majority of climate models project that precipitation will continue to increase in the Dayton region. Winters, springs, and falls are projected to be wetter, but summers are projected to be up to 5% drier.\textsuperscript{x} Spring and winter rainfall is projected to increase almost 15 percent over the next several decades and by approximately 30 percent toward the end of the century (under a high greenhouse gas emissions scenario) (Figure 7).\textsuperscript{xx}

These changes in precipitation may lead to more flooding, delays in the planting of spring crops, and
declining water quality in rivers, streams, and storage reservoirs. In addition, when precipitation falls, it is more likely to come in heavy rainfall events. In fact, in Dayton there was an 88 percent increase in the number of storms exceeding the 1951-1980 99th percentile.\textsuperscript{xxiii} Going forward, Day Dayton’s future 100-year flood will most likely increase by 10-20% in the coming decades, leading to further implications to economic, social, and natural systems.\textsuperscript{xxiv} The Dayton region, and Ohio as a whole, is also projected to face longer periods without rainfall, which could enhance the risk of short and medium-term drought.\textsuperscript{xxv} Projections show that 80 percent of Ohio’s counties will face a higher risk of water shortages by mid-century as a result of climate change.\textsuperscript{xxvi}

### Flooding and Stormwater Management

An increase in the number and intensity of severe storms may affect Dayton’s stormwater system and management techniques, as well as the community’s overall water quality. An increase in multi-day and heavy rain events across the Midwest has already been observed, leading to a number of stormwater management challenges.\textsuperscript{xxvi,xxvii,xxviii} With more intense and more frequent severe storms, Dayton could see more localized flooding, especially if the stormwater system becomes overwhelmed.

Additionally, an increase in the amount of rain falling in heavy precipitation events can enhance erosion rates and increase the amount of pollutants that run off from impervious surfaces. Impervious surfaces, such as paved parking lots, can also exacerbate stormwater issues by channeling flows into concentrated areas.\textsuperscript{xxx}

In regards to surface water, increasing temperatures will likely cause more evaporation and snow melt, thereby reducing Ohio’s surface water levels during the next century. Decreased water availability (i.e., lower groundwater recharge, potentially contaminated surface waters) timed with increased demand (due to rising temperatures) could also lead to new or enhanced water conflicts.\textsuperscript{xxxi}

### Agriculture

Warming winters are already changing the length of the growing season in Dayton (Figure 8). Today’s growing season is 1-2 weeks longer than it was at the turn of the century, with an earlier last front in spring and a later date of first frost in winter.\textsuperscript{xxxii} With projected changes in climate, the growing season will likely be up to six weeks longer than it currently is. This type of change could mean greater economic opportunities through greater crop yields or the potential for additional plantings, but could also lead to an expansion of pests into new ranges (Figure 9).\textsuperscript{xxvii,xxviii} Additionally, longer growing seasons and increased heat may expose crops and livestock to an increased risk of heat stress, leading to lower livestock productivity and a reduction in crop yields.\textsuperscript{xxxiv,xxv}

### Natural Systems

With increasing temperatures and changes in precipitation, combined with changes in land-use, natural systems could experience significant climate
impacts. Increasing temperatures could result in range shifts and altered fish habitat, in many cases enhancing the risk of extinction. These impacts could also effect recreation and commercial fishing and hunting, visitation to parks and natural spaces, nature-based tourism, and reduce the overall quality of life of local residents.

Increases in temperature and changes in precipitation can also lead to reduced soil moisture, which can, in turn, lead to changes in tree species composition, changes in the geographical distribution of fauna, and a reduction in the overall health of natural systems such as forests. In fact, changes in climate are projected to cause a decline in Ohio’s forests of up to 50 percent, which could amount to $8 billion in economic costs and the loss of tens of thousands of jobs.

**Public Health**

Climate change poses an array of challenges to public health. Increasing temperatures can lead to short and long-term heat waves that threaten the young, elderly, infirm, homeless, and socially isolated. Increases in precipitation can lead to localized flooding of homes, businesses, transportation routes, and public spaces. Among other impacts, flooding can affect the ability of emergency service personnel to quickly respond in cases of emergency or lead to the spread of disease vectors and contaminants. Climate change will also worsen smog and likely increase in the amount of pollen produced by plants. Both of these changes can negatively affect residents, especially those with respiratory problems.

**Transportation**

There is a wide array of concerns about the impacts of rising temperatures and more extreme precipitation on transportation infrastructure. Although little research has focused directly on the effects of climate change on roadways in the Midwest, damage to paved surfaces, including expansion buckling during extreme heat events, softening of asphalt, and increased stress on bridge joints will become more probable as the number of extremely hot days increases. With increasing precipitation and stronger storms, flooding risks to roadways are also a concern. The impacts associated with cold-weather events, such as freeze-thaw damage, remain largely unstudied.

**Other Extreme Events**

In addition, it is possible that a number of extreme events could be affected by changes in climate. For example, derechos (widespread, severe wind events) and tornadoes are both extreme weather events that may be getting more frequent or intense. While it is unclear how much climate change is or will affect these events, it is important that Dayton be aware of these potential changes and take proactive steps to prepare for the impacts associated with these and other types of extreme events.

**Building Resilience**

A number of strategies exist to help the City of Dayton build resilience toward existing weather impacts as well as future changes in climate. Strategies that focus on increasing the amount of green infrastructure, encouraging the use of pervious surfaces, on-site stormwater management through rain gardens and bioswales, urban forestry, green and white roofs, energy efficiency, renewable energy, land-use planning, updated zoning policies, the use of reflective pavement, strategies to increase adaptive capacity of residents and businesses, and enhancing community engagement and empowerment are all strategies that can help the City of Dayton and the broader region build resilience towards climate change.

Deciding which strategies make the most sense for Dayton will be a critical next step in the city’s climate efforts. Understanding the local community’s needs, abilities, interests, and capabilities will be necessary to determine which strategies are most appropriate for Dayton at this time.
References

20 Great Lakes Integrated Sciences and Assessments (GLISA) Center, 2013: Historical Climatology: Dayton, Ohio. www.ucsusa.org/mwclimate
23 National Climate Assessment. 2013. Draft Chapter of the Midwest Chapter of the National Climate Assessment
28 Wuebbles, D.J. and K. Hayhoe, Year: Climate change and Chicago: projections and potential impacts. in 20th Conference on Climate Variability and Change. 2008.
31 Based on data from the National Climatic Data Center for the cooperative observer network and updated from Kunkel et al. (2004)
34 Union of Concerned Scientists. 2009. Confronting Climate Change in the Midwest: Ohio. www.ucsusa.org/mwclimate
38 Transportation Research Board, 2011: Adapting transportation to the impacts of climate change. Special Task Force on Climate Change and Energy. Transportation Research Circular E-C152.
Climate Change and Ohio
Summary of Projected Changes in Climate and Associated Impacts

Changes in Temperature

- Average annual temperatures for the southern Great Lakes region have increased by 1.3°F since 1895.
- By mid-century, annual temperatures are expected to rise by 3°F to 4°F, with the greatest increases in winter and spring.
- By end of the century, average summer temperatures could rise by 12°F (Figure 1).

These changes in temperature would mean that:

- Cincinnati would experience more than 85 days per year with highs over 90°F and almost a month of days over 100°F. Cleveland would experience more than 60 days over 90°F and three weeks of days over 100°F.
- Air quality would deteriorate as hotter weather causes more severe smog. This would have serious consequences for public health, including a greater incidence of asthma attacks and other respiratory conditions.
- Increasing temperatures could result in range shifts and altered fish habitat – which could affect recreational and commercial fishing and hunting. Some effects could be positive, many will be negative.
- Cincinnati would face at least two heat waves per summer like the ones that killed hundreds in Chicago in 1995. Cleveland would face at least one heat wave of this magnitude per summer.
- Crops and livestock would face substantially more heat stress, decreasing crop yields and livestock productivity.
- Warmer winters and a growing season up to six weeks longer would enable pests to expand their range.

- Summers are projected to be as or more humid than the historical average, meaning that the way it feels outside could more closely resemble the climate of Virginia or Arkansas, depending on the greenhouse gas emissions scenario (Figure 2).
- Warming will cause a 28 percent drop in the number of clean air days per summer in Columbus.

Figure 1: Degrees Fahrenheit above the average of 1961-1990 summer temperatures

Figure 2: Map indicating what summers in Ohio might "feel" like under a low and high greenhouse gas emissions scenario
Changes in Precipitation

- Across Ohio, winters, springs, and falls will be wetter, but summers will be drier. Summers will see 5 percent less rain. Spring and winter rainfall is projected to increase almost 15 percent over the next several decades and about 30 percent toward the end of the century (under a high-emissions scenario) (Figure 3). These changes in precipitation may lead to:
  - More flooding, delays in the planting of spring crops, and declining water quality in rivers, streams, and storage reservoirs. Crop production would be inhibited by changing rain patterns such as wetter springs (which delay planting and increase flood risk) and less rain during the increasingly hot summers.

Changes in Extreme Precipitation Events

- The future 100-year flood for Dayton will most likely increase by 10-20% with a high likelihood of an increase in annual peak flow. Precipitation is more likely to come in the form of heavy rains. Heavy downpours are already twice as frequent in the Midwest as they were a century ago.
- Under the higher-emissions scenario Cincinnati is projected to experience a 30 percent increase in heavy rainfalls (defined as more than two inches of rain in one day) over the next few decades. Toward the end of the century, heavy rainfalls are projected to occur more than twice as frequently under the higher-emissions scenario.

More heavy rainfall events would lead to:
  - A greater incidence of flash flooding.
  - An increase in the value of the property at risk and the costs of emergency response systems and flood control measures.
  - More combined sewer overflows (CSOs).
- Ohio could also face longer periods without rainfall. This can create a greater risk of short and medium-term drought. About 80% of the state’s counties now face higher risks of water shortages by mid-century as the result of climate change.

Cross-Cutting Impacts

www.graham.umich.edu/glaac
Flooding and erosion damage transportation infrastructure, interfere with traffic, and cause economic disruption. More frequent flooding also poses numerous public health concerns.

Although precipitation is projected to increase, higher temperatures will cause more surface water evaporation and snow melt, reducing Ohio’s surface water levels during the next century.

Decreased water availability (lower groundwater recharge) timed with increased demand (due to rising temperatures) could lead to new or enhanced water conflicts.

Reduced soil moisture can cause changes in tree species composition, geographic range, and overall forest health and productivity, leading to a decline in Ohio’s forests of up to 50 percent. A decline of 50 percent of existing forest cover would amount to $8 billion in economic costs and the loss of tens of thousands of jobs.

Warmer temperatures may increase some crop yields, however, higher ozone and severe weather could decrease overall productivity.

Climate change will worsen smog and causes plants to produce more pollen, thereby increasing respiratory health threats, particularly for people with allergies and asthma.

Residents will experience greater health risks from increasing dangerous heat waves, storms and flooding, waterborne illnesses, infectious diseases, declining air quality, and drought.

References:
8. National Climate Assessment. 2013. Draft Chapter of the Midwest Chapter of the National Climate Assessment
10. U.S. Environmental Protection Agency. 1998. Climate Change and Ohio
Historical Climatology: Dayton, Ohio

Overview

Dayton’s climate features hot, humid summers and cold, dry winters. Winter temperatures are somewhat moderated by the downward slope of the Miami River, and cold polar air from the Great Lakes enhance cloudiness and increase the number of snow flurries, but snow accumulation is usually low. Dayton experiences severe weather typical of the Midwestern United States. Powerful thunderstorms occur more commonly than in areas to the north in the Great Lakes Region. Tornadoes are possible from the spring to the fall. The data reported here was collected at the Dayton International Airport, at an elevation of approximately 1,000 ft (304.8 m) and roughly 10 mi (16 km) to the north of downtown Dayton, which lies within the Miami Valley. As such, temperatures at the airport are often cooler than in downtown.

Geography

Dayton is situated near the center of the Miami River Valley, surrounded by a flat plain that is slightly below the elevation of the adjacent rolling countryside. The Mad River, the Stillwater River, and Wolf Creek, all tributaries of the Miami River, join the master branch inside the city boundary.

1981-2010 Temperature and Precipitation Summary

<table>
<thead>
<tr>
<th>Summary</th>
<th>Value</th>
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<tbody>
<tr>
<td>Mean Annual Temperature (°F)</td>
<td>52.2</td>
</tr>
<tr>
<td>Mean Annual Minimum Temperature (°F)</td>
<td>42.9</td>
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<tr>
<td>Mean Annual Maximum Temperature (°F)</td>
<td>61.6</td>
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<tr>
<td>Mean Number of Days per Year that exceed 90°F</td>
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<tr>
<td>Mean Number of Days per Year that fall below 32°F</td>
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<tr>
<td>Highest Mean Annual Temperature (°F)</td>
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<tr>
<td>Mean Annual Total Precipitation (inches)</td>
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<tr>
<td>Highest Mean Total Precipitation (inches)</td>
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</tr>
<tr>
<td>Mean Number of Days/Year with &gt; 0.1'' Precip.</td>
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</tr>
<tr>
<td>Mean Number of Days/Year with &gt; 0.25'' Precip.</td>
<td>50</td>
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<tr>
<td>Mean Number of Days/Year with &gt; 0.5'' Precip.</td>
<td>25</td>
</tr>
<tr>
<td>Mean Number of Days/Year with &gt; 1'' Precip.</td>
<td>9</td>
</tr>
</tbody>
</table>

Mean monthly high, average, and low temperatures for the period 1981-2010.

Mean monthly total precipitation with the 25th and 75th percentiles for the period 1981-2010.
### Changes in Mean 1981-2010

**Temperature from 1951-1980 (°F)**

<table>
<thead>
<tr>
<th>Season</th>
<th>Change</th>
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</thead>
<tbody>
<tr>
<td>Annual</td>
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</tr>
<tr>
<td>Winter, December-February</td>
<td>0.9</td>
</tr>
<tr>
<td>Spring, March-May</td>
<td>0.4</td>
</tr>
<tr>
<td>Summer, June-August</td>
<td>-0.2</td>
</tr>
<tr>
<td>Fall, September-November</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### Change in Mean 1981-2010

**Total Precipitation from 1951-1980 (%)**

<table>
<thead>
<tr>
<th>Season</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
<td>17.4</td>
</tr>
<tr>
<td>Winter, December-February</td>
<td>5.9</td>
</tr>
<tr>
<td>Spring, March-May</td>
<td>8.3</td>
</tr>
<tr>
<td>Summer, June-August</td>
<td>2.4</td>
</tr>
<tr>
<td>Fall, September-November</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Mean annual temperatures from 1900 to 2010. An open circle represents the average temperature of a single year. The solid line represents the 9-year running mean.

Mean annual precipitation totals from 1900 to 2010. An open circle represents the total precipitation for a single year. The solid line represents the 9-year running mean.

Mean annual high temperatures from 1900 to 2010. An open circle represents the average high temperature of a single year. The solid line represents the 9-year running mean.

Mean annual low temperatures from 1900 to 2010. An open circle represents the average low temperature of a single year. The solid line represents the 9-year running mean.

Unless otherwise stated, daily observations are used to calculate quantities in this document only if they satisfy a number of quality control tests and there is a high level of data coverage for the period in question. Nine-year running means are calculated for periods only when at least 5 of the 9 years are available. For more information on quality controls and data reliability requirements please see the *Historical Climatologies: Quality Control* document available on the GLISA website or email GLISA-info@umich.edu.

Many factors can influence long-term trends in precipitation and temperature. While human-caused climate change may be a major driver, other factors, such as natural variability, changes in nearby land use, urban heat-island effects, movement of the exact location of the observing station, and changes in measurement procedure can also play a role in climate trends over the station record.

The measurements of a single station do not necessarily represent global or regional trends in temperature and precipitation. Each station records the conditions at a given place over time.
Mean seasonal temperatures from 1900 to 2010. An open circle represents the average seasonal temperature of a single year. The solid line is the 9-year running mean.

Open circles represent the first (left) and last (right) winter freeze of the year (daily low temperature < 32°F) from 1900-2010. The solid line is the 9-year running mean.

Open circles represent the number of days per year in which the daily high temperature exceeded 90°F (left) and where the daily low temperature dropped below 32°F (right) in a single year. The solid line is the 9-year running mean.
Mean total precipitation by season from 1900 to 2010. An open circle represents the total seasonal precipitation for a single year. The solid line represents the 9-year running mean of the total seasonal precipitation.

Number of days per year that exceeded the indicated daily precipitation totals. The solid line represents the 9-year running mean. Days that exceeded a higher threshold are included in days exceeding lower thresholds.
From: Hall, Tyler  
Sent: Monday, June 23, 2014 8:51 AM  
To: Simmons, Michele; Graham, Felicia; Norris, Katie  
Cc: Lamees Mubaslat; Winchester, Donna; Riordan, Tim; Taulbee, Bryan; Bankston, Toni  
Subject: Climate Change in Dayton: Feedback on Feedback

All,

This weekend, the results from the GLAA-C climate change survey (via Water in conjunction with WSU et. al) were publicized on City of Dayton social media channels. The Facebook post has been garnering the most attention, not necessarily on the results themselves but simply commenting on the legitimacy of climate change in the first place. Lots of back and forth shows that certain citizens feel strongly about this topic on both sides of the issue.

[https://www.facebook.com/cityofdayton/posts/10150438287619956?comment_id=10150438304234956&reply_commen
t_id=10150439190174956&offset=0&total_comments=29&notif_t=share_comment](https://www.facebook.com/cityofdayton/posts/10150438287619956?comment_id=10150438304234956&reply_comment_id=10150439190174956&offset=0&total_comments=29&notif_t=share_comment)

Tyler Hall  
Social Media Specialist  
City of Dayton  
Division of Public Affairs, M25  
101 W. Third St.  
Dayton, OH 45402  
937-333-3346  
tyler.hall@daytonohio.gov
Survey: Climate Change Survey

Question: I get my water service from:

The City of Dayton : 30

Some other city or municipality : 8

Not sure : 0

Question: Over the next 10 years, I think climate change will cause the following changes in Dayton (check all that you think would be a result of climate change):

More natural disasters : 20

More severe storms or tornados : 30

More heat waves : 31

More extreme cold weather events : 32

Changes in precipitation : 28

Changes in surface water quality : 16

Fewer local plants and animals : 14

More allergies, asthma, diseases : 22

Lower food supply : 16

None of the above : 1

Question: If people and businesses in Dayton used more clean energy (like solar and wind) and less fossil fuels (like coal and oil), I think Dayton’s economy would experience:

A significant decrease : 0

A slight decrease : 2
No change : 2

A slight increase : 17

A significant increase : 12

Not sure : 5

Question: I believe my community could prepare for climate change by... (check all that apply)

Establishing community gardens : 26

Planting more trees : 26

Using more clean energy (solar, wind, etc.) : 34

Developing an emergency preparedness plan : 16

Providing more public transportation options : 23

Creating more bike lanes and routes : 23

Increasing residential and commercial recycling : 28

Question: My work would be affected if Dayton experienced the following (check all that apply):

More natural disasters : 23

More severe storms or tornados : 25

More heat waves : 20

More extreme cold weather : 28

Changes in precipitation : 17

Changes in surface water quality : 14
Comments

Number of Comments 2

Comment 1: Most of these questions would be very difficult for a layman to answer. Even the scientists don’t know the answers and weathermen don’t know what the weather will be like from year to year, let alone week to week. I think all the suggestions in question 4 are good ideas, that could help save money and energy. Climate is a serious concern but the experts are the ones to ask on how to prepare for it.  | By Lindy M

Comment 2: Shame on whomever designed this survey!!
The assumption is that ‘climate change’ is un-natural/
To the question "Over the next 10 years, I think climate change will cause the following changes in Dayton (check all that you think would be a result of climate change):" where is NONE OF THE ABOVE?
To the question "I believe my community could prepare for climate change by…".. it ASSUMES climate change is detrimental and not cyclical!
It is shameful that this was not an UNBIASED survey!!
Please give us an OPEN, HONEST, and UNBIASED survey!! | By Joe G
FYI. Dayton’s response to the Presidential Task Force on Climate.

Regards,

Michele Simmons
Environmental Manager
City of Dayton
Department of Water
Division of Environmental Management
(937)333-3796

Thank you for this opportunity to participate in the Presidential Task Force Survey to gauge preparedness needs of communities dealing with the impacts of climate.

Please find the attached responses for both Natural Resources and Built Systems for Dayton, Ohio.

I have created a Word Document for each response due to having technical difficulties with the Built Systems Template.

I have also attached a community survey developed with a goal to educate the community about potential impacts and increase the knowledge of multiple City departments in mitigation and adaptation strategies and techniques, to improve the regional capacity for addressing potential climate change challenges. Results will be used to develop a persuasive messaging campaign to the Dayton community.

Feel free to call or email for additional information.

Thank you,

Michele Simmons
Environmental Manager
City of Dayton
Department of Water
Division of Environmental Management
(937)333-3796
Request for Input
Consider a challenge you have encountered or an opportunity you have identified relating to climate preparedness planning and efforts to build resilience within the areas of agriculture and/or natural resource management.

1. Describe the challenge/opportunity as it pertains to needs of State, local, or Tribal governments. Describe any steps taken locally to address this challenge/opportunity.

Infrastructure Vulnerability Reduction and Emergency Preparedness:

The City of Dayton, Department of Water is the Regional provider of premier water services and is devoted to providing high quality, affordable water services through responsible stewardship, and serving as guardians of public health. We provide high quality drinking water to over 400,000 customers in Dayton and Montgomery County. The source of our drinking water is the Great Miami Buried Valley Aquifer. The aquifer is the largest and most prolific groundwater system in the state of Ohio and one of the largest groundwater systems in the country. The Department of Water operates two Water Treatment Plants with the capacity to treat over 90 million gallons of water per day and a Water Reclamation Facility with capacity to treat over 70 million gallons of wastewater per day. In addition to providing the regions drinking water and wastewater services, the Department of Water maintains over 750 miles of water mains, 700 miles of sanitary sewer pipes, 600 miles of storm sewer pipes, 14 storm water and flood control pump stations, and 16 sanitary sewer pump stations. Identifying and addressing infrastructure vulnerabilities, securing energy resources, equipping emergency responders in preparation for severe weather events and empowering citizens with knowledge to protect themselves for other climate related experiences are challenges in the Dayton community.

As stewards of this massive collection of infrastructure, the Department of Water in collaboration with our public emergency service partners, (Public Works, Police and Fire Departments) and through assistance from the University of Michigan, Graham Sustainability Institute, Great Lakes Adaptation Assessment for Cities (GLAA-C), has begun regional strategies preparation. A climate change workshop was sponsored in 2013 which included over 65 City of Dayton staff, elected officials and key community stakeholders. Local partners were invited to discuss how climate and severe weather affect the public health and safety through deteriorating air quality, water quality and quantity and recreational activities. Five key service area priorities were identified by City staff: Water, Public Health, Natural Systems, Emergency Management, and Infrastructure/Transportation/Energy Systems. Ranking of these key service areas resulted in the following: Investing in infrastructure improvements/ rehabilitation/ replacement as the number one City Priority; Update codes and ordinances to allow for green infrastructure, ensure we have people and equipment available to respond to a disaster, and empower community members to respond to emergencies. In preparation to advance the prioritized key service areas, the City applied for and was awarded a small grant to complete a community survey and messaging initiative. The community survey was developed in collaboration with Wright State University, Department of Psychology, with a goal to educate the community about potential impacts and increase the knowledge of multiple City departments in mitigation and adaptation strategies and techniques, to improve the regional capacity for addressing potential climate change challenges (See the attached survey). Results of the survey are being interpreted and the output will be used to
develop a persuasive messaging campaign to the Dayton region and will be included in a white paper as deliverable for the GLAA-C small grant.

2. What specific actions can be taken at the Federal level to assist you in addressing this challenge/opportunity?

Identify and earmark funding to apply towards hardening community water distribution infrastructure and ensuring redundancy in the water supply, distribution and treatment process. Provide funding to secure energy supply redundancy for critical water infrastructure, and for protection of the region’s source of drinking water before and during extreme weather events.

3. Which category(ies) do your recommendations fall into (circle/highlight all that apply)

† Recommendations should focus on opportunities within existing authorities that can be taken to:
  1. remove barriers to resilient investments
  2. modernize grant and loan programs to better support local efforts
  3. develop information and tools to better serve communities

† Recommendations can be: short-term (1-3 yrs.), medium term (3-5 yrs.), and/or long-term (5+ yrs.)

† They can be specific to a Federal department or agency, cross-departmental, and/or relevant to Federal grantees (please list all that apply).

† Recommendations can also be specific to affected: regional, statewide, or local communities, or specific populations (i.e., coastal or inland, low-income, or otherwise vulnerable communities)

Recommendation topic area(s) (circle/highlight all that apply):

- Ocean and coastal resources – sea-level rise, loss/restoration of coastal wetlands, coastal erosion, coral reefs, ocean acidification, marine fisheries and other ecosystem/subsistence-based food supplies, marine invasive plant species, tourism
- Agriculture – food security, sustainable agriculture, urban agriculture, farmland preservation, pollinators, pests, invasive species, livestock health (i.e. cooling needs, disease)
- Forest, grassland, and other terrestrial resources – conversion of forestland/natural lands to other uses, wildlife habitat, tourism, cooperative management of neighboring public lands, ecosystem/subsistence-based food supplies, wildfire, riparian habitat/lands, urban green space
- Freshwater resources – droughts, flooding, rivers, lakes, freshwater wetlands, blue-green algae, tourism, clean water (i.e. forests to faucets connection), fisheries and other ecosystem/subsistence-based food supplies, reclaimed/recycled water, riparian habitat/lands
- The use of traditional knowledge in natural resource management – availability of ecosystem/subsistence-based food supplies and other subsistence resources, food security, and related American Indian issues (i.e. access to/use of cultural resources)
Biodiversity and overall ecosystem health – wildlife (terrestrial and/or aquatic, freshwater and/or marine) and associated habitat(s)

Overlap with other subgroup(s) (circle/highlight all that apply):
- Disaster Recovery and Resilience
- Communities: Human Health and Community Development

4. Contact Information
Name: Michele Simmons
Title: Environmental Manager
Affiliation: City of Dayton, Department of Water
Phone number: 937-333-3796
E-mail address: Michele.simmons@daytonohio.gov
Request for Input
Consider a challenge you have encountered or an opportunity you have identified relating to climate preparedness planning and efforts to build resilience within the built environment.

1. Please describe the challenge or opportunity as it pertains to the needs of local, state, and tribal governments. (Please limit response to 1,200 characters.)

Infrastructure Vulnerability Reduction and Emergency Preparedness:

The City of Dayton, Department of Water is the Regional provider of premier water services and is devoted to providing high quality, affordable water services through responsible stewardship, and serving as guardians of public health. We provide high quality drinking water to over 400,000 customers in Dayton and Montgomery County. The Department of Water operates two Water Treatment Plants with the capacity to treat over 90 million gallons of water per day and a Water Reclamation Facility with capacity to treat over 70 million gallons of wastewater per day. In addition to providing the regions drinking water and wastewater services, the Department of Water maintains over 750 miles of water mains, 700 miles of sanitary sewer pipes, and 600 miles of storm sewer pipes. Identifying and addressing infrastructure vulnerabilities, securing energy resources, equipping emergency responders in preparation for severe weather events, and empowering citizens with knowledge to protect themselves for other climate related experiences are challenges in the Dayton community.

2. What specific actions can be taken at the federal level through Executive Order or existing federal agency authority to encourage and support local, state, and tribal governments in these efforts? (Please limit response to 1,200 characters.)

Identify and earmark funding to apply towards hardening community water treatment and distribution infrastructure, and ensuring redundancy in the water supply, distribution and treatment process. Provide funding to secure energy supply redundancy for critical water infrastructure, and for protection of the region’s drinking water (ground water) resource before and during extreme weather events.

3. What specific benefits can be gained by implementing this action, such as improved public health and safety, jobs and economic opportunities, reduces risk and economic losses, cost-savings? (Please limit response to 1,200 characters.)

Known as the birthplace of aviation, Dayton is a community rich in history and innovation. Located in the Miami-Valley, Dayton serves as the county seat of Montgomery County and a key economic engine for much of Ohio. The larger Dayton Metropolitan Statistical Area is the fourth largest contributor to statewide gross domestic product. Unfortunately, changing weather and long-term climate conditions could reduce the vitality of the Dayton region, presenting new or enhancing existing challenges. While Dayton will face many of the same changes in climate as the surrounding
area, the city’s specific vulnerabilities will be determined primarily by factors such as land use and zoning, existing infrastructure design, current policies, the socioeconomic capacity of residents, the flexibility of businesses, and the strength of existing social networks.

As temperatures rise, the probability of heat waves and hot days will grow, increasing the risk of heat-related illnesses. Declining air quality, leading to significant public health impacts. Direct damage to infrastructure from more extreme weather events and increasing demands for services during extreme events.

4. Please share examples where this action has been successfully implemented which could serve as a model for broader implementation. (Please limit response to 1,200 characters.)

As stewards of a massive collection of infrastructure, the Department of Water in collaboration with our public emergency service partners, (Public Works, Police and Fire Departments) and through assistance from the University of Michigan, Graham Sustainability Institute, Great Lakes Adaptation Assessment for Cities (GLAA-C), has begun regional strategies preparation. A climate change workshop was sponsored in 2013 which included over 65 City of Dayton staff, elected officials and key community stakeholders. Local partners were invited to discuss how climate and severe weather affect the public health and safety through deteriorating air quality, water quality and quantity and recreational activities. Five key service areas were identified: Water, Public Health, Natural Systems, Emergency Management, and Infrastructure/Transportation/Energy Systems. Ranking of these key service areas resulted in Investing in infrastructure improvements/rehabilitation/replacement as number one priority. In 2014 a community survey was developed and results will be used in developing a persuasive messaging campaign.

5. Select the topic to which this issue most directly relates (check box):
   - X Water Infrastructure
   - Transportation Infrastructure
   - X Energy Infrastructure
   - Facilities Infrastructure
   - Coastal Infrastructure
   - Program/Agency Administration

4. Contact Information
   Name: Michele Simmons
   Title: Environmental Manager
   Affiliation: City of Dayton, Department of Water
   Phone number: 937-333-3796
   E-mail address: Michele.simmons@daytonohio.gov
Hello Paula,
Thank you for the opportunity to participate in this very important undertaking. We know that these efforts are only possible through federal support and community collaborations.

Please feel free to call or email with any questions.

Regards,

Michele Simmons
Environmental Manager
City of Dayton
Department of Water
937-333-3796 office
937-470-8283 cell

Sent from my iPad

Begin forwarded message:

From: "Norris, Katie" <Katie.Norris@daytonohio.gov>
Date: June 26, 2014 at 8:55:48 AM EDT
To: "Simmons, Michele" <Michele.Simmons@daytonohio.gov>
Subject: RE: Requesting input for White House Task Force on Climate Preparedness and Resilience recommendations

Hi Michele,
Here is our matrix.
-Katie

-----Original Message-----
From: Simmons, Michele
Sent: Mon 6/23/2014 4:02 PM
To: Norris, Katie
Subject: FW: Requesting input for White House Task Force on Climate Preparedness and Resilience recommendations

Hi Katie,

As we discussed, please review and we can speak more in the next few days.
Thank you,

Michele

From: Brooks, Paula L. [mailto:plbrooks@franklincountyohio.gov]
Sent: Friday, June 20, 2014 10:27 AM
To: Simmons, Michele
Subject: Requesting input for White House Task Force on Climate Preparedness and Resilience recommendations

MEMO

To: Michele Simmons, Environmental Manager, City of Dayton Water Department
From: Commissioner Paula Brooks, Franklin County, Ohio
Member, White House Task Force on Climate Preparedness and Resilience
Date: June 20, 2014
Re: High Priority - Assistance Needed by 6 p.m. June 26

Dear Michele:

I would like to sincerely thank you for sharing your input for the recommendations that our bipartisan White House Task Force on Climate Preparedness and Resilience will be submitting to the President this fall. You have been invaluable throughout this process of drafting our preliminary recommendations. I am extremely grateful for all your assistance, and guidance, provided thus far. Today, I ask for your expert opinion once again.

Attached you will find the latest draft of recommendations regarding Built Systems as well as Natural Resources and Agriculture. We are working on an expedited timeline and I ask you to review and prioritize these draft recommendations, specifically as they relate to the Energy Sector or Food System Security and Sustainability, as well as provide any comments or feedback, by no later than close of business next Thursday, June 26.

For your convenience, I have also attached an easy-to-use Recommendation Comment Matrix to help you categorize and identify the following:

? 3 "Must Include" recommendations - critical to include in final product
? 15 "Tier One" recommendations - strongly prefer to include
? 15 "Tier Two" recommendations - worth including, but less noteworthy
? Approximately 25 "Low Priority" recommendations - suggest eliminating
When prioritizing your recommendations, please assess and focus on ways the federal government can remove barriers to resilient investments; modernize grant and loan programs to better support local efforts; and develop information and tools to better serve communities, all without additional tax dollars.

Additionally, we seek strategic actions that will help the most people, and communities, become more resilient toward climate impacts, while also recognizing the need to address specific vulnerable regions and populations.

As I mentioned, we have a condensed review period, and in order to ensure that your input is included, I ask that you return your recommendations to me by email by the close of business next Thursday, June 26. Please submit your priority recommendations to me c/o Brook Kohn (brookkohn@franklincountyohio.gov) and Bart Logan (bart.logan@franklincountyohio.gov). Additionally, please note that these are confidential draft documents, and not for distribution. However, we will be happy to address any additional questions you may have.

Thank you again for your contributions thus far, and I look forward to your continued support in these efforts.