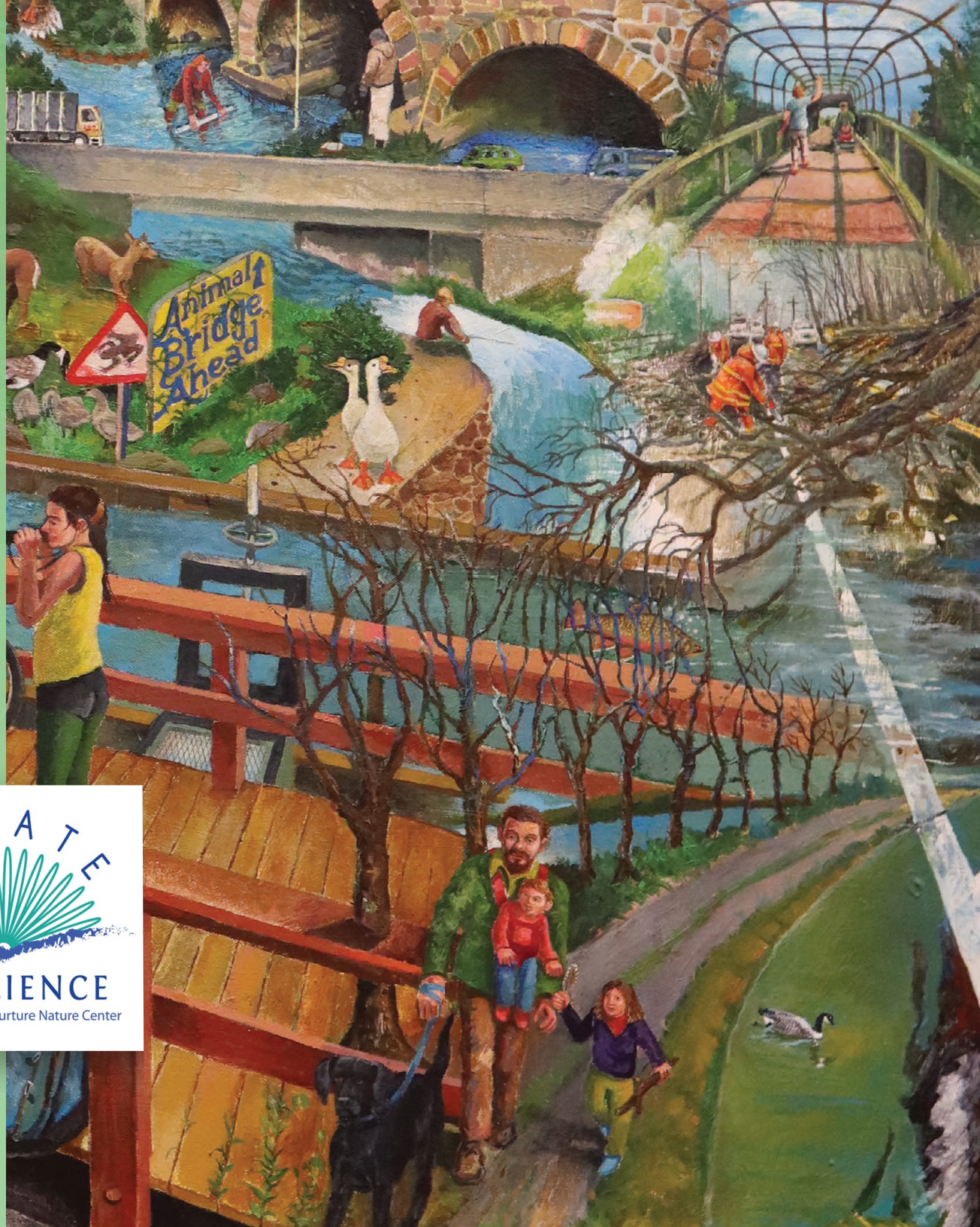


FRY'S RUN
PARK



CREATE Resilience:
Community Resilience
through Education, Art,
Technology and
Engagement



Project Guidebook

SUNDAY, APRIL 14
noon - 2pm

CREATE Resilience

EASTON - WILSON - BANGOR

Everyone has
a story to tell... and
we want to hear yours!

Have you experienced a local natural hazard such as
flooding, winter storm, sinkhole, or other?

Nurture Nature Center is working with talented
Easton area residents - tell us about it on
2 pm at Nurture Nature Center.

Local students, trained in story-gathering techniques,
hazards in their local community, which should on
photographs or mementos you are willing to share.

Your stories will help inform our CREATE Resilience
resilience. Your input is needed and appreciated and
an exhibit at Nurture Nature Center in September 2011.

For more information about
www.nurturenaturecenter.org



CREATE Resilience is a multi-disciplinary coalition
and community to increase knowledge of
risks from local hazards, and strategies for
and co-creating a vision for community resilience.

Building a Community



This guidebook is intended to provide an overview of the activities of the CREATE Resilience project, and to share a high-level look at some of the evaluation findings about the impact the program had on participants and the communities involved. This guidebook is designed for other science and community centers, libraries, municipalities or schools that might want to undertake a similar project to help educate about hazards and strategies for resilience, and/or to build a shared community vision of resilience within a region or institution, or otherwise engage their community in thinking about resilience.

The CREATE Resilience model continues to grow and evolve - it is continuing at NNC following the initial four-year grant-funded effort, with the formation of the CREATE Resilience Hub. Based on what we discovered in our first efforts, we are emphasizing our work with local municipalities as critical partners in community education, along with continuing to engage with high school youth as important spokespeople for resilience. We continue to infuse art and arts approaches to learning to reach a wide range of learners and to successfully address the complexity of issues surrounding

hazards and resilience – including the science, the impacts, and the consequences of actions and inaction. And we continue to root the project in local community needs, encouraging a diversity of voices in the conversations about resiliency in the Lehigh Valley.

We would love to hear from you with your questions, and to learn about your experiences if you apply, modify, or implement any of the CREATE Resilience process to develop programming.



Project Goals and Approach

CREATE Resilience is a multi-disciplinary collaboration between youth and community to increase knowledge of weather and climate science, the risks from local hazards, and strategies for hazard mitigation, while story-gathering and co-creating a vision for community resilience.

This project:

- shared the findings of the Lehigh Valley's regional hazard mitigation plan with residents of Easton, Wilson and Bangor and surrounding neighborhoods, and used the momentum of the planning process to drive community-wide engagement in hazards education and mitigation activities.

- used a blend of community dialogue, art, and science approaches to develop interactive community meetings, interviews, surveys, educational events, story-gathering, community tours, murals, and creation of two CREATE ambassador youth teams from partnering high schools

- benefited from the active involvement of a diversity of partners both local and federal, along with NOAA Assets (MARFC, WFO, WPC, CCRUN, SOS, web resources)

- ▶ **Be intentional and clear about project goals and approaches**, communicate these broadly and often so everyone is on the same page and expectations are accurate.
- ▶ **Multi-disciplinary approaches are valuable** for engaging a diversity of community members and perspectives.

Tip:

Partner with other organizations to fill any expert/knowledge gaps your project team might have.



SCIENCE



ART



COMMUNITY



City of Easton municipal interviews

Partnerships

Diversity of partners and regular engagement is key to success.

- ▶ Invite advisors and partners to weigh in on approach to project activities – include them from the onset of the project, not just after the fact. Ask them for recommendations for speakers or to participate themselves. Ask them to help disseminate, share and promote – keeping them involved generates more motivation for support/buy-in.



Northampton County Emergency Management Coordinators

CREATE Resilience Partners

NOAA Partners:

(NOAA) NWS Mid-Atlantic River Forecast Center- Peter Ahnert, Hydrologist-in-Charge
Rob Shedd, Service Coordination Hydrologist

(NOAA) NWS Mt. Holly, NJ Weather Forecast Office- Joe Miketta; Ray Kruszdlo

(NOAA) NWS Weather Prediction Center- Jim Nelson

(NOAA) Regional Integrated Science Assessment team in the Northeast region,
Consortium for Climate Risk in the Urban Northeast (CCRUN)- William Solecki

External Evaluator:

Jessica Sickler Consulting, Inc.

Federal, Regional and Local Partners:

Federal Emergency Management Agency (FEMA) Region 3 Mitigation Division- Zane Hadzick

Pennsylvania Emergency Management Agency (PEMA)- Tom Hughes

Lehigh Valley Planning Commission (LVPC)- Becky Bradley and Geoff Reese

Northampton County Emergency Management Services- Tom Guth and Todd Weaver

Lafayette College Environmental Studies Department- David Brandes

Easton Area School District; Wilson Area School District; Bangor Area School District

Lehigh Valley Community Foundation- Bernie Story/Megan Briggs



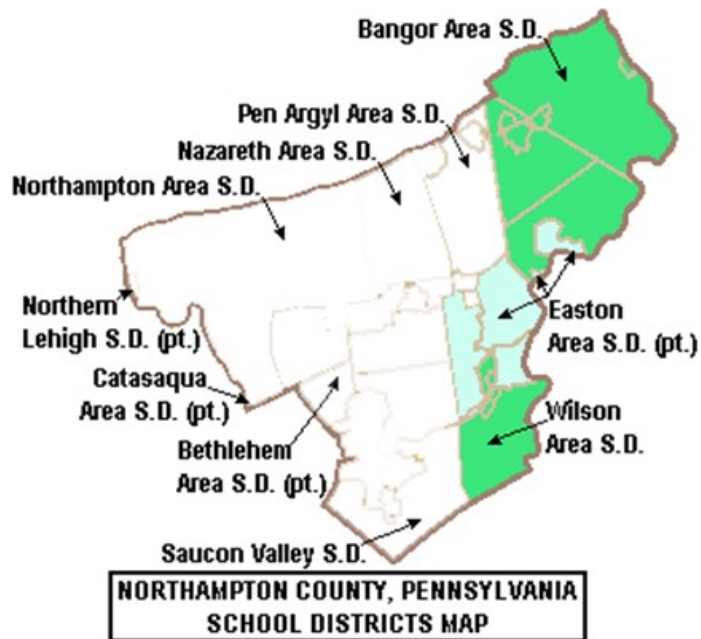
Location and Audiences

Locations:

Easton, Bangor and Wilson Area School Districts, Lehigh Valley, PA

Target audiences:

- 9-12th grade students
- Adults in communities
- Municipalities



- ▶ **Be specific and clear about target audiences and locations.** Don't overpromise on which audiences you can serve, but do consider if any of the resources you create could be made replicable for other regions after the project is over.



Timeline:

Be realistic about the time needed to engage community members and develop materials.

Regularly assess the project timeline internally and be flexible/adapt as needed (we had COVID hit halfway through the project and were able to pivot and continue to engage the communities in other ways than in-person events).

Some of these engagements included:

- self-guided tours of resiliency projects with virtual interviews of key project personnel
- online community mapping tools
- take home preparedness starter kits with “hazard cards”
- educational countertop displays for local stores



TIMELINE OF ACTIVITIES:

Year 1: Needs Assessment and Hazard Education

- Kick-off presentations summarize the findings of the new Lehigh Valley Hazard Mitigation Plan.
- Three public education events focus on priority hazards for each community.
- Youth ambassadors events gather stories and photographs from residents about their history with hazards.
- Youth ambassadors photo-document hazards/successful mitigation efforts on a resiliency tour.
- Risk to Resiliency Forum presents the year’s findings and photo and stories exhibit at NNC.

Year 2: Mitigation Strategies

- Training for the community highlights the range of mitigation strategies available for regional hazards.
- A series of “Hazard Cards,” detail the scientific nature of area hazards, as well as successful models for mitigation
- Community Mapping workshop and preparedness event focuses on household preparedness.
- Risk to Resiliency Strategies forum identifies key mitigation strategies that will be prioritized.

Year 3: Community Vision of Resiliency

- Partnering artists create three community-specific portable murals that represent the range of hazards and strategies for resiliency identified within each community.
- “Resiliency Guides” are created for each community to document the range of hazards, historical photos and stories, and steps to live more safely alongside the hazards.
- Educational events explore options for mitigation based on strategies identified by each community.
- Residents provide feedback to area decision-makers about community priorities at a final forum and discussion of the Vision of Resiliency Mural.

Year 4: Dissemination and Evaluation of Outcomes

- NNC develops a short Science on a Sphere film about the CREATE Resilience process.
- Lessons learned throughout the project are shared with other communities via a guidebook that accompanies the SOS film.
- A final report on community priorities and vision is delivered and presented to each community.

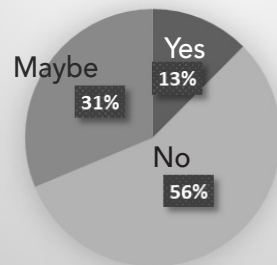
Interviewing Municipal Officials

Nurture Nature Center conducted eleven in-depth, in-person group interviews with local officials in the first year of the project to better understand the hazards, challenges and opportunities in each community, and gain a baseline perspective of what was of highest priority for municipal leaders. These interviews also provided insight into the level of preparedness and the capabilities of local officials, fire and police departments, and emergency managers to address natural hazard events. Later in the project, interviews were again held with municipal officials to share information collected from the community including priorities and concerns, and obtain feedback on the findings including any gaps noticed related to hazards and assets included.



- ▶ Make sure community and municipal leaders are aware of and involved with the project. This ensures that actionable outcomes have a higher likelihood of being implemented.

Do you feel that residents in your community are knowledgeable about the priority natural hazards?



Community Hazard Kickoff Meetings

The CREATE Resilience project started with a focus on the bi-county hazard mitigation plan for Lehigh and Northampton Counties (Pennsylvania), kicking off with a community meeting in Easton, Wilson, and Bangor communities at which the hazard mitigation plan was presented and feedback gathered from participants. These meetings were conducted in partnership with the Northampton County Emergency Management Services (Hazard Mitigation Plan details) and the Lehigh Valley Planning Commission (status report on Plan's adoption in each community).

- ▶ **Get a baseline based in the community** – ask for priorities, perspectives and ideas. Use a variety of ways for collecting feedback – surveys, discussion forums.



Easton area* residents:
* Easton Area School District (see website below for Wilson and Bangor meeting dates)

What hazards do we face in our city and townships?
What mitigation steps should we take to be more resilient for the future?

Nurture Nature Center is hosting a public meeting to learn more about the recently updated Lehigh Valley Hazard Mitigation Plan, and to announce a new community project that will help us to learn the science of hazards, identify steps we can take in our homes and community to reduce losses and develop a shared vision of resilience for our area

Hear from Northampton County Emergency Management Agency and Lehigh Valley Planning Commission about the hazards in our area, and steps identified to mitigate them. Learn how area high school students will help develop community events with your input.

Enjoy light refreshments, and be part of the start of an ongoing community education and dialogue process that will make us stronger and more resilient to natural hazards.

Thursday, February 21, 7- 8:30 p.m.
Nurture Nature Center

THE NURTURE NATURE CENTER
518 Northampton Street
Easton, PA
610-253-4432
www.nurturenaturecenter.org

This flyer was prepared by the Nurture Nature Center, Inc., under award NA110570200001 from the Environment's Library Program of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. The statements, findings, conclusions and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce.



Engaging the Community - Surveys

Input from the community was collected via two online surveys: one for residents and one for municipal officials. The surveys gathered information about natural hazards, considered priorities, critical needs, and preparedness levels for each community—this information served as a baseline for natural hazard understanding and perceptions. Postcards and flyers were designed, and a social media and outreach campaign conducted to solicit responses to the surveys.



Nurture Nature Center is leading a new project called CREATE Resilience, a collaboration to increase knowledge of risks from local hazards and strategies for mitigation and we need to hear from you. Please let us know about what issues are a priority in your community and what would create a more resilient future.

Participants that complete this short online survey will be entered to win a basket of treasures from local organizations and businesses.

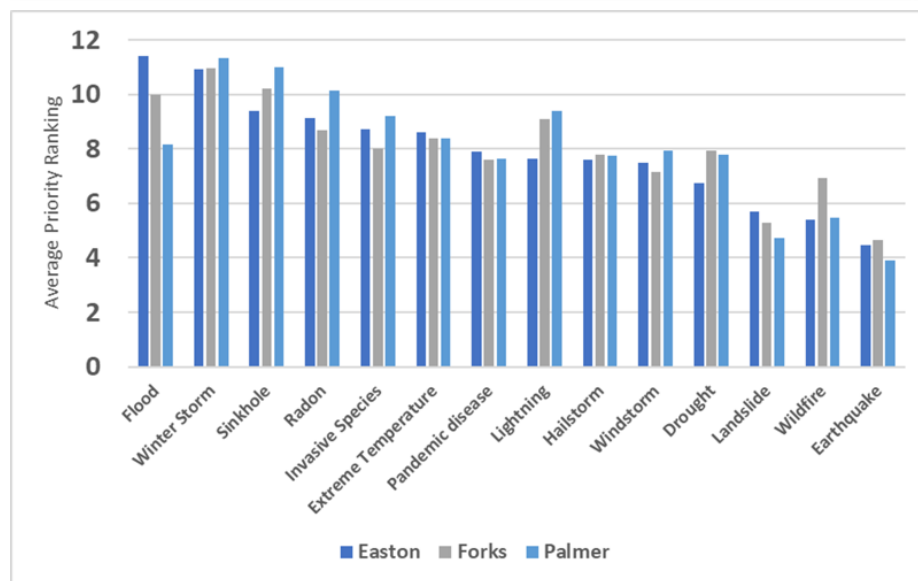
The survey closes February 15th so fill out your response today!
<https://tinyurl.com/CREATEResilience>

For more information about the Nurture Nature Center and the CREATE Resilience project visit <http://nurturenaturecenter.org/create-resilience/>.

THE NURTURE NATURE CENTER

This was prepared by the to Nurture Nature Center, Inc. under award NA18SEC0080005 from the Environmental Literacy Program of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce.

Nurture Nature Center, 518 Northampton Street, Easton, PA



Public Survey: 100s of responses helped us to understand community priorities for hazard education

Youth Ambassadors

NNC worked with two cohorts (12-14 students from each of the three area schools) of high school youth, educating them about related topics, but also having them gather stories, research hazards and mitigation strategies, and help us plan our first Youth Climate Summit. These “Youth Ambassadors” had various interests, ranging from weather and other science topics to community and civic engagement.

Our Youth Ambassadors helped us...

- connect with the community and gather personal stories about hazard experiences
- research and create educational materials related to hazards and climate change and participate in community education event
- engage with city officials and county emergency management, among others during hazard and resiliency tours.

- facilitate community discussions during public forums about hazards and resiliency and helped us get the word out about events
- plan for, organize, and recruit participants to our first annual Youth Climate Summit, now an annual event
- present on inspiring youth-led climate action examples too



Engaging youth in a meaningful way brings energy, fresh perspectives, and more diversity to the project.



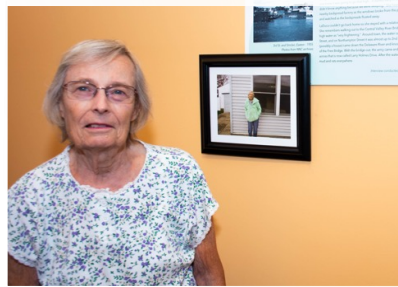
First cohort of Youth Amabassadors at community forum.

Storygathering


► Listen to the community. Elevate their voices.

Hear their stories and share them (if they are comfortable sharing). Showing community shared experiences both visually, through words and in discussion brings the community together to help build a shared vision of resilience moving forward.

Youth ambassadors participated in a story gathering workshop that covered best practices and ethical guidelines for gathering stories, and each student was given a recorder and camera to capture the stories and images of interviewees in the community. A community story gathering event was held in each location and collected stories were edited and included in a photovoice exhibit that was revealed during the first forum event.



SUNDAY, APRIL 14
noon - 2pm



Everyone has a story to tell... and we want to hear yours!

THE NURTURE NATURE CENTER

Have you experienced a local natural hazard event, such as flooding, winter storm, sinkhole, or extreme temperatures?

Nurture Nature Center is working with teens in your local community to collect stories about local hazards. How were you impacted? How did you prepare and respond?

Easton area residents - tell us about it on Sunday April 14th anytime between noon and 2 pm at Nurture Nature Center.

Local students, trained in story-gathering techniques, will collect resident stories, like yours, about natural hazards in their local community, which should only take 15-20 minutes of your time. Please bring any photographs or mementos you are willing to share that will help tell your story.

Your stories will help inform our CREATE Resilience project that seeks to develop a vision of community resilience. Your input is needed and appreciated and your community's stories will be displayed as part of an exhibit at Nurture Nature Center in September 2019.

Knowing that the climate change trends may continue, Dan is considering another unheated greenhouse, **“moving towards a more protected growing environment”** for his crops.




... they are very proactive, watching the weather and being prepared for that period in summer when it gets super-hot. Janice has become a “little weather person” to try to stay ahead of the heat wave so people are comfortable and not passing out, but there is not much more they can do with limited resources and an older building.

But heat rises, so being on the upper floors still makes it “feel like you are going to literally melt”

Excerpts from photovoice exhibit.

Educational Events/Presentations

Several educational events were held for the community throughout the course of the CREATE Resilience project including a Mitigation Mixer which gave an introduction to the range of mitigation options related to local hazards and provided time for participants to meet and talk with experts and local organizations working in the field of hazard mitigation. Other educational events included a webinar series and in-person presentations on topics related to mitigation such as climate toolkits, flooding, and planning.



Climate, Hazards and Resilience: November 19th, 2020
What can we do locally?

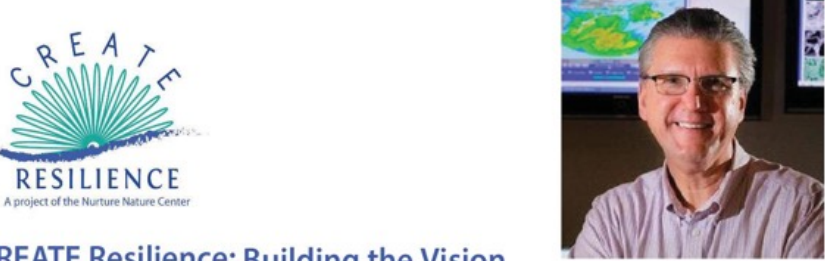
Join Nurture Nature Center for an evening of conversation about the strategies our community can use to build resilience to hazards.

What is mitigation exactly? What kinds of approaches can help us as individuals? As communities? How can we build resilience to hazards? Hear a panel presentation and then visit one-on-one with representatives from FEMA, Northampton County Management Services, and other regional and local organizations who can help. Have your questions answered on topics ranging from flood insurance to mitigation grants and community infrastructure to projects you can do on your own property.

This event is part of the CREATE Resilience project funded under award NA18SC00080005 from the Environmental Literacy Program of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. The statements, findings and recommendations are those of the author(s) and do not necessarily reflect NOAA or the U.S. Department of Commerce.

THE NURTURE NATURE CENTER
 Nurture Nature Center
 518 Northampton St
 Easton, PA
www.nurturenature.org

▶ CREATE Resilience online resources, including recorded presentations, can be found here: <https://nurturenaturecenter.org/create-resilience/>



CREATE Resilience: Building the Vision
 Community Discussion Forum
with guest speaker: Meteorologist Gary Szatkowski

Tuesday, September 29th, 2020, 6:30-8:30pm
Easton, Wilson, Bangor area residents:
Strong communities with good planning can become more resilient in the face of natural hazards. What are the areas of need in our communities? How can we become more resilient to weather and climate-related hazards?

Keynote presentation by Gary Szatkowski, meteorologist, OurWeather US, LLC: "Watching the Weather: Lessons From the Past, Visions for the Future."

Recognized as a "Hurricane Sandy Hero" by the Newark Star-Ledger newspaper for his work as a National Weather Service meteorologist during Hurricane Sandy, Gary Szatkowski has more than 35 years of public service in weather forecasting and leadership in flood risk mitigation. He began his career with the National Weather Service in 1980 in San Juan, Puerto Rico, followed by assignments in Oklahoma City, OK, Washington, DC, and New Jersey. He served as the Chief of the New Jersey State Office of Emergency Management and was the Chief of the Pennsylvania State Office of Emergency Management. He received the 2012 National Weather Service Professional Award for his work in weather forecasting and leadership in flood risk mitigation.

WEBINAR SERIES
 Take a tour and learn about our projected climate future: **Introduction to the U.S. Climate Resilience Toolkit and Climate Explorer**

The U.S. Climate Resilience Toolkit represents an effort by the federal government to help people, businesses, and municipalities acknowledge and respond to their changing climate conditions. Users can find plain-language overviews and respond to their changing climate describing how people build resilience to these hazards, and freely-available digital tools that can help communities move toward resilience. You'll also check the site's Climate Explorer tool to explore what climate projections indicate for future decades in the Lehigh Valley.

About the speaker:
LuAnn Dahlman serves as a Co-Managing Editor for the U.S. Climate Resilience Toolkit. A former educator and curriculum developer, she contributes to *Climate.gov* and serves as a user-advocate for interactive tools such as *Climate Explorer*.

Tuesday Jan. 21st 2020, 4-5:30 pm ET

The Role of the American Society of Civil Engineers in Hazard Mitigation

When hazards occur, our infrastructure can be greatly impacted. The American Society of Civil Engineers (ASCE) has many initiatives that seek ways to improve the resiliency of our infrastructure, such as the Infrastructure Report Card, which evaluates multiple types of infrastructure, looks at current and perceived future conditions, and provides recommendations to improve efficiency. This webinar will take a dive into Pennsylvania's Report Card and discuss the current condition of infrastructure and what needs to be accomplished to improve resiliency.

About ASCE:
The American Society of Civil Engineers (ASCE) is the oldest national engineering society in the United States. It has a current membership of approximately 152,000 located across 177 countries. Closer to home, the Lehigh Valley Section has more than 700 members.

About the speaker:
David Wieller serves as President of the ASCE, Lehigh Valley Section and is the Water & Municipal Professional Regional Leader for Borton-Lawson Engineering in Bethlehem, PA. He is a licensed Professional Engineer in Pennsylvania and Iowa and has 17 years' experience in a wide variety of water-related projects including drinking water, wastewater, stormwater, and flood risk mitigation infrastructure.

Tuesday Feb. 18th 2020, 4-5:30 pm ET

To register for either webinar, email ksemmens@nurturenature.org
 Remote viewing will be through GoToMeeting. Webinars are free and open to all interested.

This webinar series is part of the CREATE Resilience project funded under award NA18SC00080005 from the Environmental Literacy Program of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. The statements, findings, conclusions and recommendations are those of the author(s) and do not necessarily reflect the view of NOAA or the U.S. Department of Commerce.

Hazard and Resiliency Tours

Community hazard tours were held in each community to visit local areas that had been affected by hazards, including such stops as the Public Works facility that had been configured to be ready to evacuate after being flooded in 2004, and a streamside area that was affected by intense rain storms causing flash flooding. A follow-up virtual resilience tour was created by compiling interviews, videos, and photos from community leaders into an online story map that demonstrated successful mitigation projects, including streambank restoration for flood mitigation and shade tree plantings to mitigate extreme heat. The tour, available at <https://nurturenaturecenter.org/create-resilience/>, was shared with community residents and leaders.

- ▶ **Get out in the community and observe firsthand areas that have been impacted or are critical to understanding the needs of the community.**

We did this through both physical and virtual tours of actual locations of hazard impacts as well as projects that help with mitigation and building resilience.



CREATE Resilience: Community Resiliency Tour

A virtual tour of hazard mitigation projects in the Lehigh Valley's Easton, Wilson and Bangor areas.

Nurture Nature Center, Easton PA

June 26, 2020

CREATE Resilience Forum and Exhibit Opening

Three community forums were held during the project - these roughly two hour events were held in the first three years of the project, one each fall - some in-person and some virtually. The events started with a short topical presentation, followed by a series of questions that small groups discussed and reported out to the full group at the end. The first forum focused on hazards, sharing the experiences of hazards in the community, establishing priorities for future learning, and building a base for a shared vision of resilience. The second forum included a speaker from the local National Weather Service Weather Forecast Office, and results from a community mapping exercise were shown, along with discussion. The third forum revealed the murals and fostered discussion about them and the community visions of resiliency.



- ▶ **Center community in all the activities and efforts** – elevate the community voice and give space for community members to share their stories, concerns, and ideas.
- ▶ **Facilitate open dialogue** that seeks understanding not necessarily consensus. Value all voices equally.

Community forums are a great approach for engaging community, allowing voices to be heard, and facilitating critical discussion around issues of importance to the community.



Forum attendees view photo exhibit.



How do these stories resonate with you?

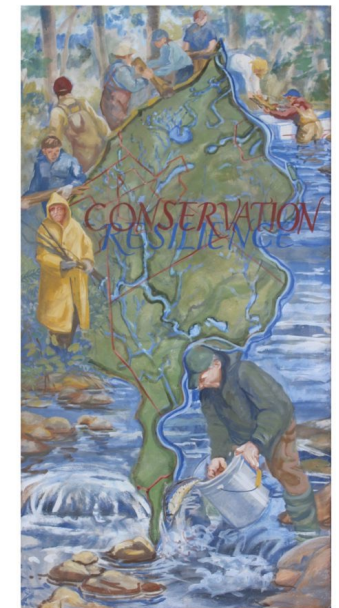
- My heart goes out to the people impacted.
- I want to help.
- This makes me worry.
- I have experienced something like this.
- I am familiar with this hazard and impact.
- I want to find out more about hazards and mitigation strategies.
- I need an emergency plan for

Engaging Artists to Represent the Community's Vision

A key highlight of the CREATE Resilience project was the integration of art and engaging local artists throughout the process to understand and visualize each community's vision of resilience. The murals that were created serve as a lasting message of community sharing, understanding, and hope and helped reach and significantly impact a broader audience by more personally connecting community members.

Artists were selected on the following criteria: residency and engagement in the community they represent, skillset in the arts and ability to visually communicate concepts, and an interest in learning about environmental hazards.

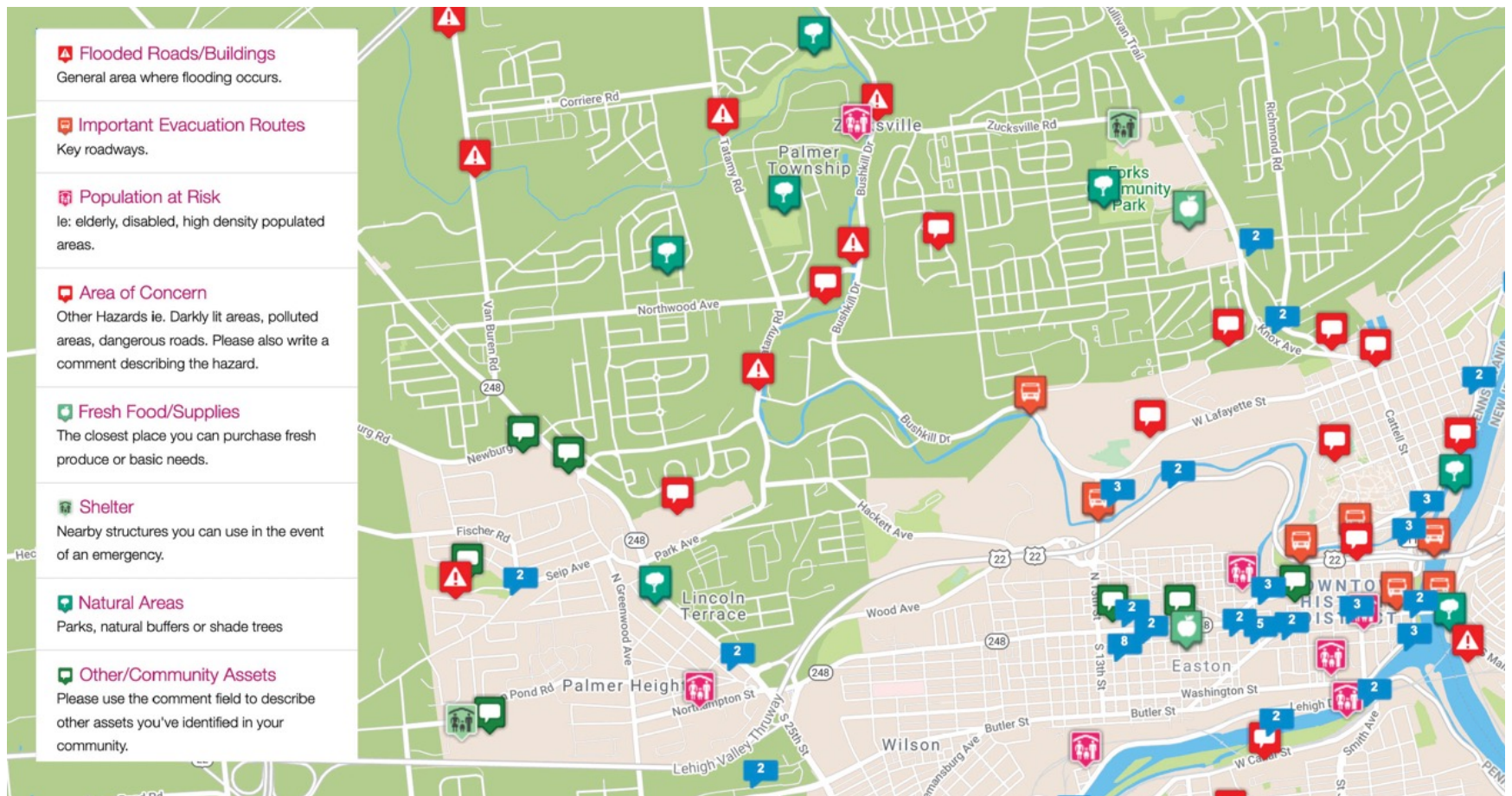
- ▶ **Engage artists that live in the community they are creating for;** it increases both the artist's commitment to the project and the residents' pride and ownership in the resulting work of art.
- ▶ The resulting murals were exhibited in various locations within each community to allow for maximum exposure to a diverse audience. After one year, the murals were given on permanent loan to schools and hospitals, extending the impact of the whole process.



Community Mapping Exercise

Community members were asked to participate in an online community mapping exercise (using the Community Remarks platform) as part of a brief survey prior to participating in the second year forum. The poll (available here <https://nurturenaturecenter.org/create-resilience-poll/>) helped identify needs, challenges, and important resources to improve resilience to natural hazards. Participants placed over 200 pins on a local map and left information about needs or resources.

- ▶ Finding creative, interactive ways to engage the community and collect feedback and data strengthens support of the project while providing needed information. NNC used the Community Remarks platform to solicit responses from the community on assets and vulnerabilities in the area.



Adapting

As COVID restrictions kept us from gathering, we adapted our plans and used community outreach strategies to continue the dialogue with residents about the need to prepare. Hazard information gathered by the youth ambassadors was made into countertop “hazard card” displays that were shared through many locations including municipal offices and local stores. Additionally, approximately 300 emergency preparedness kits were distributed to the residents of Easton, Bangor and Wilson areas.



- **A critical element of community engagement is to be flexible and adaptable.** Starting a collaboration and outreach effort requires the openness to shift pre-conceived notions or plans in order to address community needs. NNC shifted its approach due to the COVID pandemic and provided asynchronous learning opportunities and free preparedness kits to the communities we were working with.

Are You Ready?

In the event of an emergency or natural hazard, do you have supplies ready to go quickly?

Nurture Nature Center is helping Bangor area residents get ready by distributing Ready Kits – free!

Our 2-gallon pails will contain starter items for your household emergency supplies, and we'll also include information about the other items you should add.

Our kits include:

- Carrying bucket with lid
- Emergency flashlight
- Flash drive for storing important documents
- Emergency blankets
- Handwarmers
- Whistles
- Shelf-stable snacks
- Flood preparedness coloring books
- Supply lists and Educational Resources

CREATE Resilience together and swing by (location) between (time) on (date) to pick up your Ready Kit!

While supplies last.

Being ready means that when an emergency comes, you can protect yourself and others in your household, and be available to help neighbors, too.

CREATE Resilience is a project of Nurture Nature Center, working with residents, municipal leaders and youth in the Easton, Bangor and Wilson Area School Districts to learn about hazards and strategies for resilience and mitigation. **To learn more visit nurturenaturecenter.org/create-resilience/**



Nurture Nature Center
518 Northampton St.
Easton, PA

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www.nurturenaturecenter.org

RADON

A CREATE Resilience Resource

The hazard...

Radon is a naturally occurring radioactive, odorless, colorless gas that is a decay product of uranium, which is a decay product of radium, which is a decay product of uranium. Radon is present at low concentration in the environment, but high levels can cause lung cancer. Certain underlying rock layers have more radon than others and a radon potential map can identify areas of highest risk. The maximum amount of radon a home can have is 4 pCi/L.

Some solutions...

The best way to prevent radon exposure is to first know the level of exposure. Families can purchase a radon test kit that is placed in the basement or crawl space for a period of time and determines the level of radon. Individuals can also install a system of pipes and vent fans from the home. These vent pipes and fans are "sub-slab depressurization" systems and do not require much change to living conditions. They cost from \$1,000 to \$4,000, but are the most effective. For more, see:

► <https://www.epa.gov/sites/production/files/2016-03/4/radon-test-kit.pdf>

WINTER STORMS

Winter storms are one of the leading hazards in the Lehigh Valley.



A CREATE Resilience Resource

The hazard...

A winter storm is a weather system that forms at low temperatures in which the main types of precipitation are snow, sleet, or freezing rain.

"Make aware the day and how that ar"

CLIMATE CHANGE

"The Lehigh Valley is one of the fastest warming regions in Pennsylvania."

The hazard...

Climate change is the change in long-term trends and patterns of average weather for a given place. As human use of fossil fuels leads to an increase of carbon dioxide in the atmosphere, the global average temperature increases, changing weather patterns and creating more extreme weather events that can affect human and ecosystem health. 2019 was the 2nd warmest year since 1880 with the upper ocean the warmest on record. Nine of the 10 warmest years occurred since 2005, with the five warmest occurring since 2015. The Lehigh Valley is one of the fastest warming regions in Pennsylvania.

► For more see <https://www.climate.gov/> or <https://climate.nasa.gov/>

The impacts...

Climate change affects many of the other natural hazards we experience, leading to increased frequency of heavy precipitation events, more intense storms, higher risk of flooding, more days of extreme heat, and more variability in winter storms. Loss of property and life result from these events, costing billions. The U.S. experienced 119 billion-dollar natural disasters in the 2010s compared to just 59 in the 2000s. In the Lehigh Valley the economic impact of high heat and strong storms is seen in agriculture losses and property damage, but disruptions to ecosystem health and habitats can have lasting impacts as well.



Flooding along Route 611 north of Easton (2006). Photo courtesy of Patty Caffrey.

EXTREME TEMPERATURES

WARNING
DANGEROUS
HEAT/COLD

The hazard...

Extreme cold temperatures are temperatures at or below freezing for an extended time period. Extreme hot temperatures are considered temperatures 10 degrees or more above average that last for several days or weeks. Heat waves can occur.

The impacts...

Both extreme heat and cold can result in serious illness or injury due to rapid increase or decrease in body temperature when one is unprepared and exposed to extreme temperature. Heat-related illnesses are a leading cause of death from natural weather-related hazards. The human body has to work extra hard

FLASH FLOODING

The increased occurrence of heavy precipitation events associated with climate change raises the risk of flash flooding

TURN
AROUND
DON'T
DROWN

The hazard...

Flash flooding is the rapid flooding (in less than six hours) of low-lying areas, such as streams, washes, rivers,

The impacts...

Flash flooding in the Lehigh Valley generally occurs on smaller tributaries and in some urban environments

RIVERINE FLOODING

NO DUMPING
DRAINS TO CREEK

The hazard...

Riverine flooding occurs when a river overflows its banks because of excess water flowing down the river. Causes include: high-intensity rainfall from tropical systems; persistent, heavy precipitation events; and rapid snow-melt and ice dams. Flooding along larger rivers, such as the Delaware, usually can be forecast a day or more in advance, and will cause a rise and peak that will last for a number of hours before receding.



Flooding at the confluence of the Lehigh and Delaware Rivers in 2006. Photo courtesy of Frank Chisell

In the event of a flood, community members should listen to evacuation orders and never drive into a flooded roadway.

The impacts...

The Lehigh Valley has experienced the environmental and economic impacts of flooding, including property damage and loss, streambank erosion, disruption to businesses and households and temporary loss of electricity and running water. The highest recorded flood was in 1955 but recent floods in 2004, 2005 and 2006 brought much damage and loss. Climate change is expected to increase the frequency of heavy precipitation events in the region, leading to a higher risk of flooding. Human development can exacerbate flooding impacts by increasing impervious surfaces.

INVASIVE SPECIES



The hazard...

Invasive species are any non-native species (not typically found in an area) that out-compete native plant/animal populations for resources. Historically, invasive species have been spread accidentally or on purpose to well-intended

The impacts...

Invasive species can result in mortality of other native species of flora and fauna, and can impact an area's agriculture and local economy. When a new species is introduced it often has no predators so that it can quickly spread and out

STORMWATER RUNOFF

DUMP
NO WASTE
DRAINS TO
WATERWAYS

The hazard...

In urban communities, as green space is replaced with asphalt and concrete, rain and meltwater can't be absorbed. The excess water, including any pollutants, is carried away to larger bodies of water, flooding homes and roads and contaminating drinking water. The accumulating volume of stormwater causes rivers to overflow and flood surrounding areas.

The impacts...

Stormwater runoff can impact the Lehigh Valley by bringing pollutants into rivers, affecting the health of the local fish population within the Delaware River as well as the people living around the area. Runoff can also cause localized flooding.

To help prevent localized flooding, it is important to keep storm drains and gutters clear of debris.

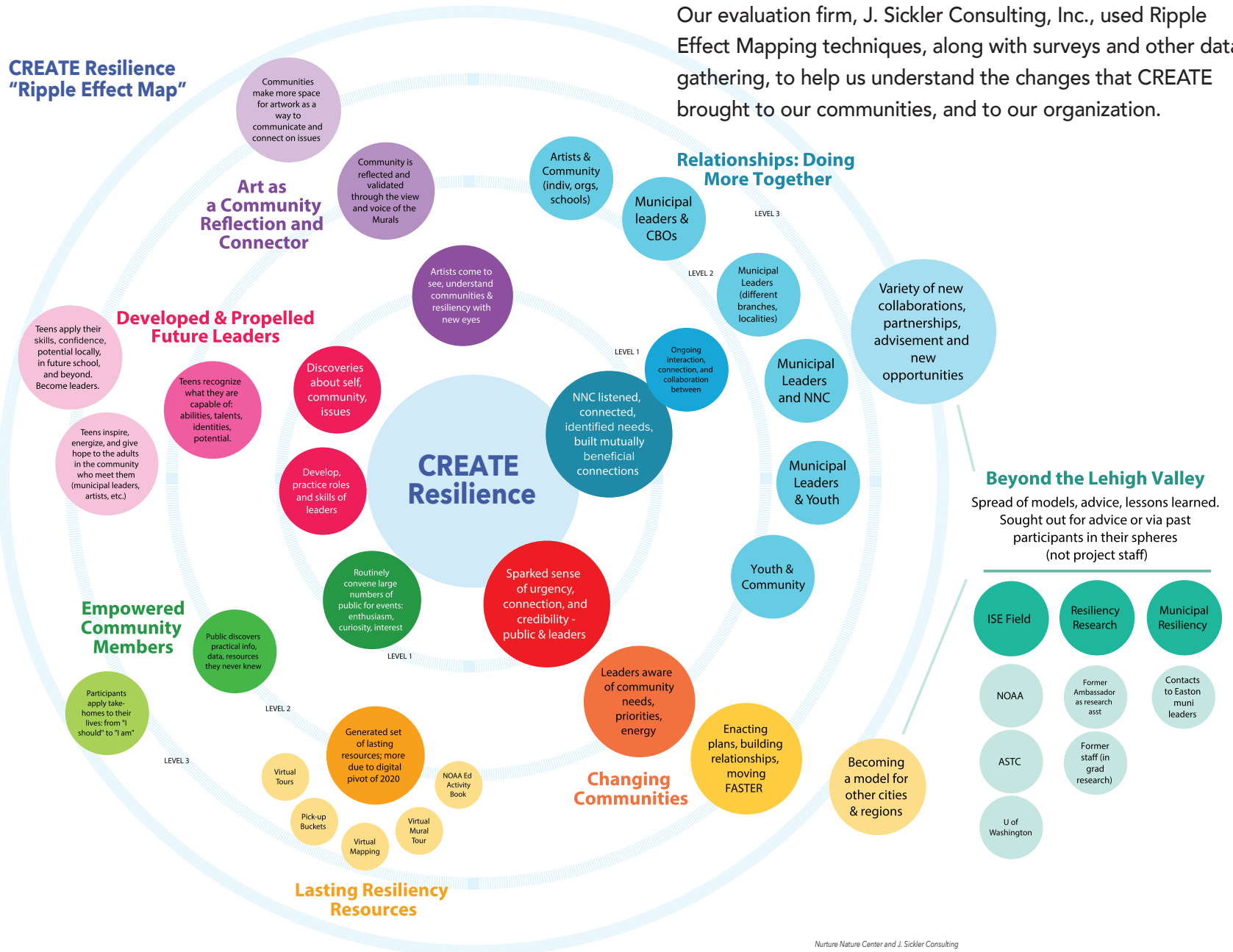


A "storm drain" or "storm sewer" carries polluted stormwater underground away from roads and property. These systems often release the untreated water directly into nearby rivers and streams.

A series of "hazard cards" were developed and handed out within the communities. Find the hazard cards here: <https://nurturenaturecenter.org/create-resilience/>

What Did We Learn Through This Process?

Our evaluation firm, J. Sickler Consulting, Inc., used Ripple Effect Mapping techniques, along with surveys and other data gathering, to help us understand the changes that CREATE brought to our communities, and to our organization.



Nurture Nature Center and J. Sickler Consulting

- ▶ Measuring impact of a community project is not always easy – immediate feedback at events through short surveys can be supplemented by longer term measurements such as with Ripple Effect Mapping. The CREATE Resilience project used both surveys, interviews, and REM to understand the ripples that emanated from project activities.



- ▶ Read the final evaluation report here: <https://osf.io/dn28p/>

Share and Celebrate!

Highlight the great work you and your partners do in the community. NNC developed community guidebooks and a Science on a Sphere® film to share about the CREATE Resilience project.



Nurture Nature Center's Science on a Sphere® exhibit.

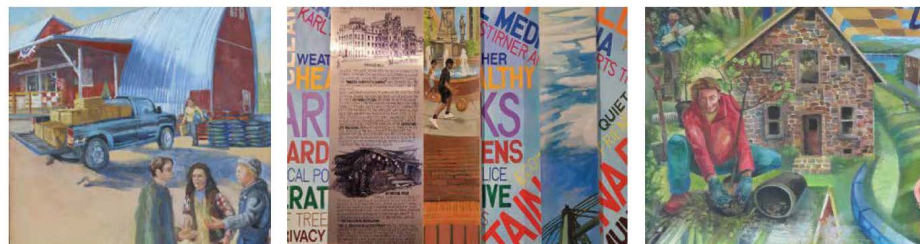
- ▶ Read our journal article here:
<https://onlinelibrary.wiley.com/doi/10.1029/2023CSJ000028>



The community guidebooks, along with other resources from this project, can be found at: <https://nuturenaturecenter.org/create-resilience/>

BANGOR • EASTON • WILSON

Come see your community's vision for resiliency!



► **Plan for sustaining efforts, next steps, and continued action from the beginning, not just at the end.**

NNC is continuing its CREATE efforts through additional funding and addressing gaps and needs that were identified in the first CREATE project. In a follow on project called the CREATE Resilience Hub, NNC is working with educators, youth, and municipal leaders to provide relevant resources and templates, especially for smaller municipalities with less resources and staff available for creating resiliency plans.

The Hub will build on CREATE Resilience to provide knowledge, resources, and connections so communities can make informed decisions about the challenges they face and will provide education and resources to residents to enable them to better partner with their municipalities in planning for resilience.



THE NURTURE NATURE CENTER

About NNC Local Programs Projects/Research News/Vie

CREATE Connections – a new grant project linking a vision of resilience to action

Nurture Nature Center is excited to continue and expand our **CREATE Resilience** efforts with the announcement of a new grant from NOAA's Office of Education Environmental Literacy Program. This funding supports a four year project called CREATE Connections: Linking a Vision of Resilience to Action which starts October 2023.

This next phase of CREATE focuses on climate action plans (CAPs) adopted in Easton and Bethlehem, PA. CREATE Connections will work to build and strengthen local social connections through a multi-pronged educational approach related to climate action by expanding and supporting partners, including municipal leaders, colleges and universities, public libraries and community organizations, in order to increase environmental literacy.

The project's goals are to develop accessible educational materials about climate, and community-specific strategies related to climate action, to enable community-based organizational partners (including libraries, students, and artists); to become effective disseminators of climate action information; and to create pathways and support for communities to implement their CAPs.

To achieve these, NNC will develop active learning programming for youth and their families in collaboration with the local public libraries. Climate strategy spotlights, storefront educational campaigns, public art installations, climate-friendly kits and annual Youth Climate Summit events will provide further opportunities to engage with the community. All programs will include science, art, and community dialogue elements, incorporate civic learning opportunities and integrate NOAA assets and subject matter experts. Local college students will help implement the programs, and community partners, including Community Bike Works, will help reach and engage with local youth.



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Cover: Wilson Area Community Resilience Mural, artist Don Wilson

This guidebook was prepared by the Nurture Nature Center, Inc., under award NA18SEC0080005 from the Environmental Literacy Program of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. The statements, findings, conclusions and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce

SUNDAY, APRIL 1st
noon - 2pm

CREATE Resilience

EASTON - WILSON - BANGOR

Everyone has
a story to tell... and
we want to hear yours!

Have you experienced a local natural hazard, such as flooding, winter storm, sinkhole, or other?

Nurture Nature Center is working with the Easton area residents - tell us about it on Sunday, April 1st at 2 pm at Nurture Nature Center.

Local students, trained in story-gathering techniques, will be gathering stories about local hazards in their local community, which should include photographs or mementos you are willing to share.

Your stories will help inform our CREATE Resilience exhibit. Your input is needed and appreciated and an exhibit at Nurture Nature Center in September 2011.

For more information about the exhibit, visit www.nurturenaturecenter.org



CREATE Resilience is a multi-disciplinary collaboration between the Nurture Nature Center and community to increase knowledge of local hazards and risks from local hazards, and strategies for resilience. It is a vision for community resilience.



Building a Community Resilient to Local Hazards



THE
NURTURE
NATURE
CENTER



MEUSER PARK

ENTER TO LEARN

W
WILSON

MEMORIAL TO
THE GRAND ARMY
OF THE REPUBLIC

HUGH MOORE