ADAPTATION CO-CREATION SERIES

The space where innovation and climate resilience meet

www.adaptationprofessionals.org
/adaptation-co-creation-series
ADAPTATION CO-CREATION SERIES

Webinar 6: Visualizing Change

How interactive platforms bring climate planning to life

KLA | KIM LUNDGREN ASSOCIATES, INC.
Customized Solutions for the Community You Want

Hazen

APA
Sustain
Tech Check!

- Microphones Off
- Cameras off or on
- Questions posted in chat or via Q&A Box

Contribute ideas, questions, suggestions for the group.

Or pass notes and insights directly to other participants.
ASAP Mission

Connect and support climate change adaptation professionals to advance innovation and excellence in the field of climate change adaptation.
American Society of Adaptation Professionals

► ASAP Connects
Bringing members together on critical topics including: Professional education, Climate Migration, Public Policy, and Justice Equity, Diversity & Inclusion

► Adaptation Voices
Share member accomplishments, best practices in the adaptation and resilience field, and lift diverse stories of leadership and expertise.

► Adaptation Careers
Assisting members to excel in their current jobs through mentorship and access to peer learning; explore new opportunities through weekly jobs and boards

www.adaptationprofessionals.org

Upcoming Activities

ASAP Network Meeting
September 13-15, 2021

ASAP Private Sector Climate Service Providers Academy

www.adaptationprofessionals.org
Join us in driving forward transformative adaptation & resilience
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What to Expect

- Innovative & Effective Adaptation Practices
- Diverse project teams
- Justice and equity woven throughout

Past Webinars

- Reducing flooding through updated design codes & standards
- Innovations in Adaptation Finance
- Practicing Racial & Environmental Justice in Climate Adaptation
- Corporate Adaptation & the TCFD Journey
- Bridging the Partisan Divide with Climate Resilience Solutions

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Webinar 6: Visualizing Change
How interactive platforms bring climate planning to life

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KLA

Customized Solutions for the Community You Want

Sustain
BWSC Collection System

• 1,536 miles of sewer and drain pipes
• (156 miles combined, 710 miles sanitary, 670 miles storm drain)
• Sewers range from 8 inch to 108 inch
• Drains range from 12 inch to 240 x 186 inch
• 9 pump stations
• 586 outfalls total
• 201 tidegates
• 50,605 manholes
Outfall Screening
Storm Drain Outfall at Low Tide

Storm Drain Outfall at High Tide without Tide Gate

Storm Drain Outfall at High Tide with Tide Gate
NEW TIDE GATES
MT. WASHINGTON AVE
Outfall Inventory – 586 – Commission GIS

BPRD – 5
BWSC - 271
CAT - 1
DCR - 53
DOT - 27
MBTA - 1
MHD - 29
Milton - 1
MPA - 11
MWRA - 15
Private - 172
Stormwater Detention
CHALLENGE:
RISKS OF FLOODING WITH SEA LEVEL RISE AND STORM SURGE – YEAR 2060

YEAR 2060 RAIN
SEA LEVEL RISE, NO STORM SURGE

YEAR 2060 RAIN
SEA LEVEL RISE, WITH STORM SURGE
Inundation Model - Project Overview

1. Develop 2D model that will estimate and graphically display inundation information using most current projections available.
2. Model will allow identification of land area, buildings and roads impacted by major events.
3. Model can be used as an early warning tool to pre-evacuate potentially impacted areas.
4. Estimate the projected depth and duration of inundation
5. Estimate potential population impacted
6. Identify critical facilities impacted by inundation
7. Utilize model as a collaboration tool with other agencies with data available and accepted by other entities
8. Have the information Peer Reviewed by outside entity.
The Inundation Model considers the impact of coastal flooding and inland stormwater flooding.
Wet Weather Events

Thunderstorm

Storm Motion

Sea Level Rise (SLR)

Storm Accumulation

Storm Direction: 66.0 degrees | Northeast
Speed: 25 miles per hour

Foot Above Present Day High Tide

0
1
2
3
4
5
6
7
8
9
10

1.3'

4.3'

Rainfall

0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

Percentage of Storm Completed

Hazen
Wet Weather Events

Frontal

Storm Motion

Sea Level Rise (SLR)

Storm Accumulation

Storm Direction: **56.3 degrees | Northeast**
Speed: **26.4 miles per hour**

Foot Above Present Day High Tide

- 1.3' 2030 SLR
- 4.3' 2070 SLR

Rainfall

Percentage of Storm Completed
**Wet Weather Events**

**Nor’easter**

**Storm Motion**

**Sea Level Rise (SLR) and Storm Surge**

- 1.3’ 2030 SLR
- 4.3’ 2070 SLR
- 4.0’ 2070 SLR + 100-yr Surge
- 7.0’ 2070 SLR + 100-yr Surge
- 4.7’ 2030 SLR + 500-yr Surge

**Storm Accumulation**

Storm Direction: 270.0 Degrees | West
Speed: 21.1 miles per hour
Wet Weather Events

Tropical

Storm Motion

Sea Level Rise (SLR) and Storm Surge

Storm Accumulation

Storm Direction: 270.0 Degrees | West
Speed: 24.8 miles per hour

Hazen
2D Waterfront Boundaries

Tidal conditions applied along all waterfront boundaries
Extent of Citywide Model

Red = 1D sewer model
Blue = 1D drain model
Gray = 2D model zones
Simulation Strategy

Challenge: Model Run Time – Simulating a 48-hour storm requires almost 5 days
Solution: Utilize multiple virtual machines to run different 2D models simultaneously – avoided over 365 days of continuous model simulation time!

Model Scenario

Virtual Machine 1  Virtual Machine 2  Virtual Machine 3  Virtual Machine 4  Virtual Machine 5  Local Desktop 1

Model Results
Database
(PowerBI and GIS)
Inundation Model Analysis

Critical Facilities in Each Region

<table>
<thead>
<tr>
<th>Emergency Centers</th>
<th>EMS/Fire Stations</th>
<th>Government Buildings</th>
<th>Health Facilities</th>
<th>Police Departments</th>
<th>Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<td>30</td>
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<td>2</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>1</td>
<td>14</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>
Interpretation of Model Results

Audience
- BWSC Internal
- External

Requirement
- Project Background/Details
- Analysis, Mapping & Visualization
- Mapping & Visualization

Deliverable
- GIS Database
- Final Report
- PowerBI & Inundation Model Viewer
- Inundation Model Viewer
Next Steps

- Evaluate coastal infrastructure
- Plan for stormwater discharge
- Continue development of tools for education/communication
- Stakeholder coordination
Acknowledgements

**Boston Water & Sewer Commission**
John Sullivan
Charlie Jewell

**Hazen and Sawyer**
Chuck Wilson
Ben Agrawal

**University of Massachusetts**
Ellen Douglas
Adaptation Co-Creation Series

Speaker Transition

Open Access
Freely share information and knowledge

Member Driven
Members lead by voting with their feet

Trust
Members share successes and failures

Something for Everyone
Not everything for everyone

Reciprocating
You give, you get, everyone benefits

Trust
Members share successes and failures

Something for Everyone
Not everything for everyone

Reciprocating
You give, you get, everyone benefits
Education & Empowerment: Essential to Climate Action in San Antonio

“Educating residents and businesses about climate action as well as enabling San Antonians to make behavioral and technological changes is an essential element of reducing greenhouse gas emissions. This can be accomplished through policy, training, incentives, financing, and tracking.”

- 28 Community mitigation strategies,  
- 13 Municipal mitigation strategies  
- 45 Adaptation strategies  
- Emphasis on climate equity  
- Co-benefits include air quality, ecosystem services, quality jobs, health outcomes, affordability
Goals of Climate Education & Empowerment

• **Align** around a shared vision for implementing the CAAP

• **Understand the context** of climate change and what it means for San Antonio, including what might happen if no action is taken

• **Speak clearly and fluently** about the CAAP (and develop talking points for key constituencies)

• **Guide current and future** policies, projects, programs and budgets to maximize efficiency and accelerate outcomes
Multi-faceted Climate Education Program

SA Climate Ready Education & Empowerment Program

- Greater Community Engagement
- SA Climate Ready Advisory Committees
- Elected Leadership & Municipal Staff
- Mayor’s Youth Engagement Council for Climate Initiatives
- Business Community

- Public Information Campaign
- SA Climate Reach Dashboard Website
- Executive Team Training
- Municipal Staff Mandatory Training Modules
- Cross-departmental Delivery Teams

- Attitudes & Awareness Study
- Grassroots CBO Engagement through mini-grants
- Social Media Campaign
- EVSA Electric Vehicles San Antonio Education & Outreach

Office of Sustainability
### Municipal Climate Training Platform

#### Executive Team Training
Establish a shared and personal vision for SA Leadership on the CAAP value to SA through live facilitated webinars

<table>
<thead>
<tr>
<th>Executive Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Potential Impact to City assets &amp; operations</td>
</tr>
<tr>
<td>Climate Action across the U.S.</td>
</tr>
<tr>
<td>Implementation Scenarios</td>
</tr>
<tr>
<td>Reflections &amp; Next Steps</td>
</tr>
</tbody>
</table>

#### Delivery Team Training
Supporting the Delivery Team in developing a plan to implement the CAAP strategies through live and recorded sessions

<table>
<thead>
<tr>
<th>Delivery Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Climate Projections for SA</td>
</tr>
<tr>
<td>Potential Impact to City assets &amp; operations</td>
</tr>
<tr>
<td>Overview of Effective Implementation Strategies in US &amp; European Cities</td>
</tr>
<tr>
<td>Increase Carbon Free Energy</td>
</tr>
<tr>
<td>Reduce Building Energy Consumption</td>
</tr>
<tr>
<td>Reduce Transportation Consumption</td>
</tr>
<tr>
<td>Promote Biodiversity &amp; Healthy Ecosystems</td>
</tr>
<tr>
<td>Adaptation Strategies</td>
</tr>
<tr>
<td>Activity Session – Individual Action Plan</td>
</tr>
<tr>
<td>Reflections &amp; Next Steps</td>
</tr>
</tbody>
</table>

#### All CoSA Staff Training
Building awareness and capacity for all SA City staff through mandatory online training modules

<table>
<thead>
<tr>
<th>All CoSA Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to the SA CAAP</td>
</tr>
<tr>
<td>Urgent need, topics, desired outcomes, etc.</td>
</tr>
<tr>
<td>CC action, adaptation and social equity</td>
</tr>
<tr>
<td>Link to the CAAP Climate Equity Indicator and the public engagement process</td>
</tr>
<tr>
<td>Understanding GHGs</td>
</tr>
<tr>
<td>Detail of SA’s GHG inventory, sources and change over time. CoSA strategies that result in fewer emissions.</td>
</tr>
<tr>
<td>Climate shocks and stresses</td>
</tr>
<tr>
<td>Deeper look at urban systems thinking and understanding shock disruptors and chronic stresses</td>
</tr>
<tr>
<td>Resilience Dividend</td>
</tr>
<tr>
<td>Focus on co-benefits of integrated solutions (complexity of cross-sector solutions)</td>
</tr>
<tr>
<td>Onboarding Session</td>
</tr>
<tr>
<td>Intro to the SA CAAP for New Hires</td>
</tr>
</tbody>
</table>
SA Climate Ready Sustainability Dashboard

www.sasustainability.com

www.sanantonio.gov/sustainability

Julia.murphy@sanantonio.gov
Reflection & Discussion

Karla Ebenbach
Secretary-Treasurer, American Planning Association
Sustainable Communities Division President, Ebenbach Consulting

WWW.ADAPTATIONPROFESSIONALS.ORG
Thank you to our experts!

Charlie Jewell, Boston Water & Sewer Commission (BWSC)
Benjamin Agrawal, Hazen & Sawyer
Chuck Wilson, Hazen & Sawyer
Kim Lundgren, KLA Founder and President
Julia Murphy, City of San Antonio
Karla Ebenbach, Ebenbach Consulting/ APA Sustainable Communities Division
Get Involved!

Interested in presenting in a future Co-Creation Webinar Session?
Contact Beth Gibbons at Bgibbons@adaptpros.org
Or share your project:
https://forms.gle/d73avFjsDfmaPdxc7

Support this program & other ASAP programs by donating today:
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**Co-Creation Webinar Series**
Building Resilience: Design Solutions
August 2021

**Climate Service Provider Academy**
October 14 - 28

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**Co-Creation Webinar Series**
Designing Utilities of the Future
October 2021

www.adaptationprofessionals.org/adaptation-co-creation-series/
Join Us

When you become a member of ASAP, you get access to our resources as well as our network of professionals who are tackling climate change challenges every day, just like you.

- Individual Memberships begin at $150
- Customized Sponsorships & Organizational Packages that fit any need and budget.

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The climate is changing.
Now is the time for action. This is the place for you.

Learn More: www.AdaptationProfessionals.org
Beth Gibbons, Bgibbons@adaptpros.org