Climate Ready Infrastructure and Strategic Sites Protocol (CRISSP)

A Simplified Method to Assess the Vulnerability of Municipal Assets to Extreme Weather

June 2016

Municipalities in the Great Lakes Region are already experiencing the effects of climate change – from flooding, to extreme temperatures, to winter storms, to high winds, Great Lakes cities are at different stages of preparedness for extreme weather associated with climate change.

Through a collaboration with AECOM, the City of Gary and University of Michigan's Great Lakes Integrated Science and Assessment office (GLISA), the Cities Initiative has developed the *Climate Ready Infrastructure and Strategic Sites Protocol* (CRISSP), which relies on available data and municipal staff's own knowledge of their facilities and infrastructure to assess their assets' vulnerability to extreme weather in a way that is both relatively quick and low-cost.

The CRISSP guides your municipality through a step-by-step process to assemble your CRISSP team, gather relevant information on hazards and climate data, identify municipal infrastructure, facilities and sites located in extreme weather hazard zones, and perform a vulnerability assessment on them. A key aspect of the CRISSP is a helpful, easy to use Risk Matrix tool that takes users through a series of critical questions to assess the vulnerability of municipal facilities, sites or infrastructure.

To access the CRISSP and Risk Matrix, please visit www.glslcities.org/initiatives/municipal-climate-adaptation/crissp.

"The CRISSP puts municipal staff in the driver's seat, helping them to understand how extreme weather could affect the operations of their facility or infrastructure. By drawing directly on staff knowledge and experience, the CRISSP helped me secure staff buy-in and build a shared sense of responsibility to be prepared for the next storm."

Brenda Scott Henry,
Director/MS4 Coordinator
City of Gary, Indiana
Green Urbanism/Environmental Affairs

CRISSP is a project of:

GLISA
A NOAA RISA TEAM

Great Lakes and St Lawrence Cities Initiative
Alliance des villes des Grands Lacs et du Saint-Laurent

CITY OF THE CENTURY
GARY INDIANA

AECOM

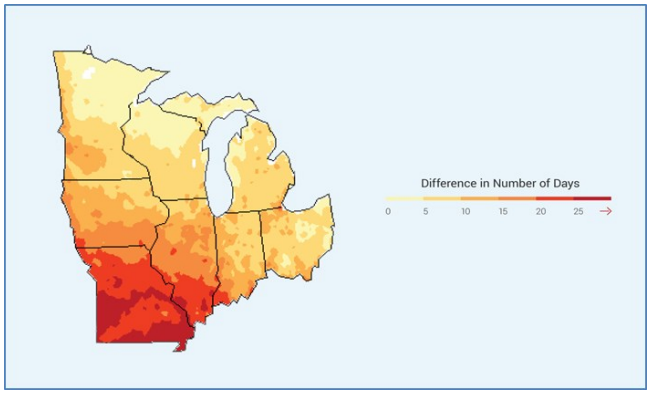
How does the CRISSP Risk Matrix work?

The CRISSP Risk Matrix is a questionnaire that guides municipal staff through a simplified vulnerability assessment, drawing out information related to

- The location of the site in relation to risk prone areas like floodplains
- The state of preparedness of the site in an emergency event
- The site's critical dependencies in relation to electricity generation and distribution, water and wastewater servicing, transportation networks, telecommunications, etc.
- Vulnerability to different types of extreme weather, such as extreme rain, wind, or temperatures.
- The full CRISSP Matrix can be found on page 32 of the CRISSP Technical Guide

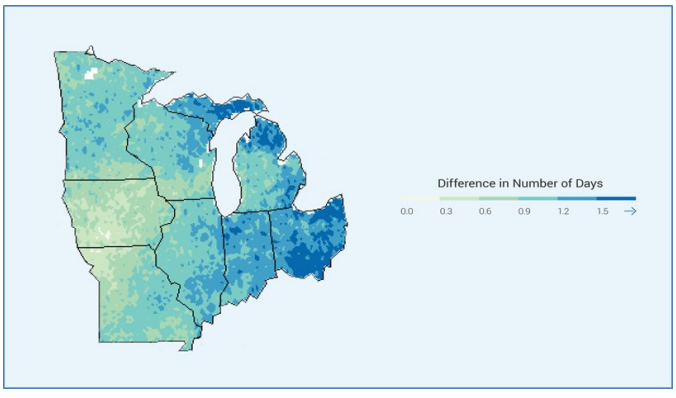
What type of infrastructure, facility or strategic site can be assessed using the CRISSP?

Critical Infrastructure	Strategic Sites
Water Supply Plants and Distribution Network	Cultural Heritage Sites (Historic, Religious, etc.)
Wastewater Treatment Plants and Collection Network	Natural Areas (Wetlands, Beaches, Parks)
Electric Power Generation Facilities, Transmission and Distribution Network	Environmentally Contaminated Areas (Brownfields, Superfund Sites)
Natural Gas Supply Facilities and Distribution Networks	
Communication Facilities	
Essential Government Facilities	
Transportation Infrastructure	
Hospitals and Public Health Centers	
Top Commercial Facilities/Employers	
Other (e.g. toxic waste storage facilities, any others, etc).	



Increase in Extreme Heat Days (Above 95 degrees Fahrenheit)

Credit : NCA report (original figure source: NOAA NCDC/CICS-NC)



Increase in Heavy Precipitation Days

Credit : NCA report (original figure source: NOAA NCDC/CICS-NC)

Who is involved in completing the risk matrix?

The matrix requires expertise from several city departments, but any staff person with knowledge of strategic sites and infrastructure can facilitate the assessment.

Possible departments involved may include: Wastewater Treatment, Water Treatment, Power, Emergency Planning, Mayor's office, CAO/City Manager, Parks, Commerce, Empowerment, Fire, Airport, Public Sanitary District, Traffic/Vehicles, Transit, Housing (specifically for flood maps), Public Health, Environmental Affairs, Planning, Police, Public Works

What should I do before starting the risk matrix?

- Generate Buy-In across municipal departments and external agencies with key information or interest in the asset
- Decide on the focus on the assessment, whether it be infrastructure, a facility or strategic site, or a combination

What is involved in the risk matrix process?

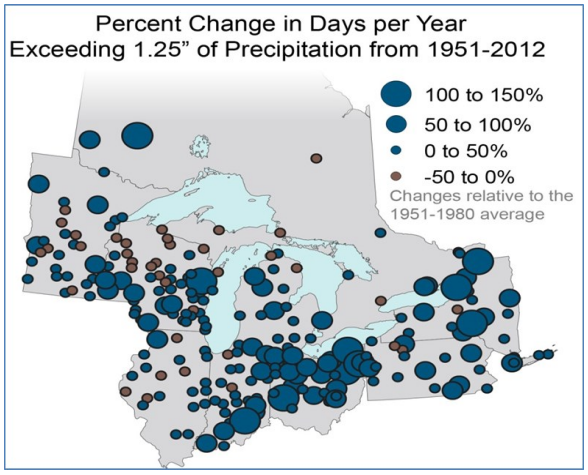
- Gather stakeholders with expertise on the strategic site or critical infrastructure for one or several meetings to work through the risk matrix
- Compile relevant information from local, state/provincial, and federal governments (see links below)

How long will the risk matrix take?

Past participants have found that the matrix itself can be completed in several 2-hour meeting sessions. These sessions could be combined to occur over the course of only two days or could be broken up over time to accommodate schedules. The pre-matrix process of gathering stakeholders and information could take anywhere from a few days to several weeks.

CRISSP in Practice: City of Gary, Indiana

The City of Gary, Indiana served as a pilot site for the CRISSP Matrix, which they tested on the Gleason Park Athletic Complex. More information about this project can be found starting on page 49 of the CRISSP Technical Paper.



2008 Flood in Gary, IN

Credit : The Times of Northwest Indiana

What resources can my municipality access when conducting a CRISSP vulnerability assessment?

There are a number of resources that are available publicly that may be used to help assess the vulnerability of your municipal assets. See below for suggested State, National, and Local resources.

State or National Resources

National Climate Assessment: http://nca2014.globalchange.gov/highlights/regions/midwest
NOAA Storm Prediction Center: http://www.spc.noaa.gov/
"Blackout: Extreme Weather, Climate Change and Power Outages: Climate Central's "Blackout: Extreme Weather, Climate Change and Power Outages"
FEMA Flood Maps: https://msc.fema.gov/portal
Great Lakes Coastal Study: http://www.greatlakescoast.org/
Great Lakes Water Levels (US and Canada): http://www.glerl.noaa.gov/data/wlevels/
NOAA Lake Level Viewer: https://coast.noaa.gov/llv/
FEMA wind zone maps: http://www.fema.gov/media-library-data/20130726-1501-20490-5921/fema_p85_apndx_g.pdf
EPA Air Quality Data: https://www3.epa.gov/airdata/
CIAT/GLISA : http://graham.umich.edu/glaac http://graham-maps.miserver.it.umich.edu/ciat/home.xhtml
NOAA National Weather Service's Hydrometeorological Design Studies Center (portal for NOAA Atlas 14 data and export): http://www.nws.noaa.gov/ohd/hdsc/
National Climatic Data Center (NCDC): http://www.ncdc.noaa.gov/
National Wetlands Inventory: http://www.fws.gov/wetlands/
NOAA Great Lakes Environmental Response Management Application (ERMA): http://response.restoration.noaa.gov/maps-and-spatial-data/environmental-response-management-application-erma/great-lakes-erma.html

Local Resources

Local emergency management plans
Local comprehensive or master plans
Local flood plain data
Local basement flooding data
County data
State data
Indiana: NIRPC: Northwestern Indiana Regional Planning Commission http://www.nirpc.org/
State and local hazard mitigation plans

- MN: https://dps.mn.gov/divisions/hsem/hazard-mitigation/Pages/state-hazard-mitigation-plan.aspx
- WI: http://emergencymanagement.wi.gov/mitigation/planning.asp
- IL: https://www.illinois.gov/iema/Mitigation/Documents/Plan_IllMitigationPlan.pdf
- IN : http://www.savi.org/savi/documents/Polis%20docs/Indiana%20SHMP%20FINAL.pdf
- PA: http://www.pema.pa.gov/responseandrecovery/Disaster-Assistance/Documents/General%20Mitigation%20Forms%20and%20Information/Pennsylvania%20State%20Hazard%20Mitigation%20Plan%20-%20Oct%2031%202013.pdf
- OH : http://ema.ohio.gov/Mitigation_OhioPlan.aspx
- NY: http://www.dhses.ny.gov/recovery/mitigation/plan.cfm
- MI: https://www.michigan.gov/documents/msp/MHMP_480451_7.pdf

Thank you for using the CRISSP Matrix! To access the Risk Matrix and further information, please visit www.glslcities.org/initiatives/municipal-climate-adaptation/crissp and consult the Technical Guide.

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