Office of the Auditor General of Ontario
Bureau de la vérificatrice générale de l'Ontario

Climate Change Adaptation: Reducing Urban Flood Risk

2022 Value-for-Money Audit

Why we did this audit

- Climate change increases the likelihood of more frequent and severe rainfall events, which can overwhelm storm sewers and other stormwater infrastructure, and increase the risk of urban flooding. Taking steps to adapt to climate change can help reduce the risk of urban flooding.
- A number of provincial reports and plans have identified specific actions that need to be taken to reduce urban flood risk; however, the Province has never clarified provincial roles, so gaps in responsibility exist and many identified actions and commitments remain unfulfilled.

Why it matters

- Urban flooding is the most common form of flooding in Ontario. While less than 3% of Ontario's population live in areas that may be subject to river flooding, all Ontarians who live in a developed area—regardless of proximity to a waterbody, like a river or creek—may be at risk of an urban flood.
- Urban floods result in significant costs to homeowners, governments and insurers; insured losses due to extreme rainfall in urban areas are 10 times greater than losses from river flooding.

What we found

Homeowners Need Assistance to Protect Their Homes but Province is not Fulfilling Commitments to Help

- The government's 2018 Environment Plan committed to consult on tax policies to help homeowners protect their homes, and to work with real estate and insurance industries to educate homeowners on flood risk and protection. At the time of our audit neither of these commitments had been implemented.
- If installed at the time of construction, backwater valves are a relatively inexpensive (~$250) way to prevent stormwater and sewage from backing up into basements; they are, however, a costly renovation ($~2,800–$4,800).
  - Ontario's Building Code is ambiguous as to when installation of backwater valves is required; as a result, only 27% of chief building officials we surveyed require backwater valves for all new homes with basements, while 37% do not require them for any homes, and 37% require them in some.
  - Although it is updating the Building Code, the Municipal Affairs Ministry has not proposed changes to clarify when backwater valves are required.

RECOMMENDATION 2–4

Municipalities Need Better Information from Province to Help Prepare for Urban Flood Risk

- The Province is providing inconsistent guidance to municipalities on whether to use projected climate change data. As a result, many continue to rely on historical data. Infrastructure and buildings designed based on historical climate data may not be able to withstand future precipitation patterns.
- Climate service organizations in other provinces, supported by federal funding, assist decision-makers (such as municipalities, ministries, agencies, engineers) to access and apply relevant local climate change information. Ontario is the only province without an organization that provides climate services to the decision-makers that need them.
- The majority (77%) of municipalities we surveyed are unable to accurately map urban flood risk areas, in part due to a lack of provincial elevation data.

RECOMMENDATION 5–7

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Billions of Dollars are Needed to Update Stormwater Infrastructure, but Few Municipalities Have Reliable Funding Models

- Historical underinvestment in municipal stormwater infrastructure has resulted in a capital shortfall of several billion dollars.
- Municipalities have multiple competing expenses to be funded out of general revenues; 72% of municipalities with urban stormwater management operating expenses in 2020 did not collect any earmarked revenues.
- The Infrastructure Ministry's new asset management planning regulation is a step toward ensuring municipalities assess, financially plan for, and recover stormwater costs; however, the Ministry is not providing sufficient guidance to ensure effective financial planning for stormwater assets.

RECOMMENDATION 9, 10

Green Spaces, which Absorb Rain and Reduce the Risk of Flooding, are Being Lost

- Green spaces (such as wetlands, woodlands, and meadows) are important for flood reduction as they absorb water and reduce stormwater runoff. Wetlands are particularly important for reducing flood risk, due to their ability to provide short-term water storage during heavy rains. Despite provincial policies to protect them, wetlands and other green spaces continue to be lost:
  - Over the past 20 years, the percentage of urban land area classified as green has declined in 94% of Ontario's medium and large urban centres.
  - Between 2011 and 2015, southern Ontario lost an average of 1,825 hectares of wetlands per year. The highest level of protection is given to wetlands that are both evaluated and deemed provincially significant; however, almost half of wetlands in southern Ontario remain unevaluated and risk being lost.
  - No provincial strategy exists to conserve wetlands, and former targets to reverse their loss were abandoned in 2018.

RECOMMENDATION 11, 12

Gap in Provincial Regulation of Certain Flood-Control Infrastructure

- The Province does not regulate the structural design of large stormwater collection facilities that are built for flood control, away from lakes or rivers.
  - The Natural Resources Ministry issues approvals for flood-control facilities, but only for those that are on lakes or rivers. The Environment Ministry issues approvals for municipal stormwater infrastructure for the purposes of protecting water quality; however, because flood control is not within its mandate, the Environment Ministry does not require these facilities to obtain an approval. As a result, there is a regulatory gap for the design of these facilities.
  - A 2018 preliminary assessment of these facilities in 10 Ontario municipalities found that nine posed a risk to nearby populations and/or properties if they were to fail during an extreme rainfall event.

RECOMMENDATION 14, 16

Conclusions

- The Province has never clarified provincial roles for co-ordinating and managing urban flooding. This has resulted in gaps in responsibilities and unfulfilled provincial actions and commitments to manage the various aspects of urban flood risk.
- The Province does not have effective systems and processes to support and encourage municipalities and property owners to reduce the risk of urban flooding in Ontario, such as by providing information, guidance and incentives to act.

Read the report at www.auditor.on.ca