

Community Capacity to Adapt to Climate Change: Fredericton

Conservation Council of New Brunswick

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Overview of presentation

- Project overview
- Project philosophy: Exploring community capacity
- Interview and citizen story results
- Climate literacy and Social capital survey results
- Recommendations
- Next Steps

Project Overview

- Funded by the Intact Foundation
- Builds on a community capacity to adapt to climate change assessment done for Keswick Ridge funded by the Environmental Trust Fund
- Research lens: Post-tropical Storm Arthur
- 14 Interviews
- 2016 Social capital Survey ($n = 120$)
- Citizen Arthur Stories
- Statistics Canada Household Survey



Post-tropical storm Arthur

- July 5th and 6th, 2014
- Spanned 400-km across NB, NS and PEI
- 195,000 NB Power customers without power, from 5,900 separate incidents, for hours to two weeks
- 42,000 calls to NB Power, 16,000 not directly related to storm
- 27-hour storm with 100 km winds; heavy rain
- \$12.6 million cost
- In Fredericton:
 - 1,000 street trees downed; 10,000 park trees affected
 - Power outages from hours to 10 days
- Event was predicted, but winds/rain stronger than expected

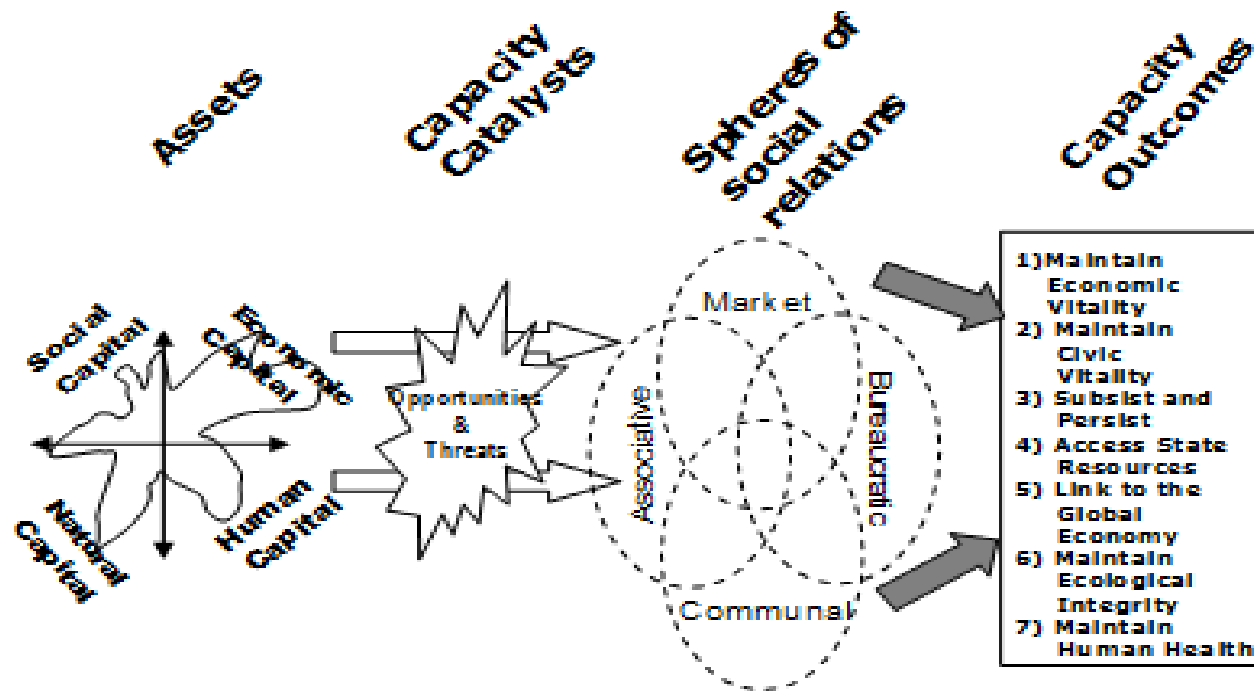
Project philosophy:

Community Capacity, social perspective

- Community capacity is the ability to get things done.
- More specifically:
 - Community capacity is the collective ability of a group (the community) to combine various forms of capital within institutional and relational contexts to produce desired results or outcomes: i.e., adaptation to climate change.
 - Involves distinct but related facets: (a) capital, assets, or resources; (b) catalysts; (c) mobilization of those resources through social organization and relationships; and (d) end results or outcomes.

Community Capacity Model can help bring social assets to adaptation

Assets, Catalysts, Relations, Outcomes



The Community Capacity Model is dynamic with social, economic, natural and human capital deployed in response to threats and opportunities using social relations to achieve desired outcomes([*Beckley, et al., 2008*](#)*).*

Capacity to adapt to climate change

- Project emphasizes social dimensions of climate change adaptation
 - We believe that “resiliency” and “adaptation” models already provide support to engineering and infrastructure assessments
- We used qualitative (interviews, stories) and quantitative (energy literacy and climate change survey of New Brunswickers ($n = 1,000$) and social capital survey of Fredericton ($n = 120$) residents
- Social capital survey based on 2013 Statistics Canada Social Capital survey

Officials Interviews

- City of Fredericton interviews:
 - Mayor
 - Chief Administrative Officer
 - Sustainable Development Manager
 - Chief forester
 - Engineering and operations (2)
 - City councilor
- NB Power
- Head of City Emergency Management Organization (EMO) committee

Officials interviews: Summary

- Major climate change concern for Fredericton:
 - Water (Effects of intense precipitation, flooding)
- Flooding not the issue with post-tropical storm Arthur:
WIND, TREES, POWER OUTAGES, and RISK of FIRE
- Summer event; previous events occurred in winter or spring
 - “The perfect storm. Trees were full of foliage, certain trees were more susceptible to wind and rain, limbs had a lot of weight; people don't always want trees trimmed.”

Officials interviews: Summary

- City and NB Power felt prepared for Arthur
- City officials believe flooding prevention actions/adaptation effective
 - Water infrastructure held in Arthur
 - Concerns remain that flood plain bylaws not enforced; zoning needs to be more stringent
- City developing an adaptation plan with ICLEI's BARC (Building Adaptive and Resilient Communities) tool
- Imagine Fredericton process considering climate change
- NB Power has instituted changes based on experience with previous ice storms

Officials Interviews: Summary

- Strong Emergency Management Organization (EMO) committee structure, post storm learning being incorporated:
 - EMO website/hotline improvements to take pressure off calls to NB Power; Parks and Trees department
 - EMO, however, had not had a briefing on climate change, was not yet considering implications of climate change impacts and adaptation risks in its planning/preparedness
- Collaboration and Relationships were critical:
 - Red Cross and provision of potable water and charging stations for surrounding rural areas on wells that had no water or power
 - JDI offered equipment; Quick Aquaculture provided ice

Officials interviews: Learned from Arthur

- Needed more back-up generators
- No electricity means no telecommunications:
 - Weekend: Radio stations were not live; Cell phones could not be charged
 - Alert Ready system now operational
 - Understand that wind-up/battery radios needed in homes and businesses
- There is a need to educate citizens about public safety
- Realized very strong “tree ethic” in the city
 - Potential for conflicts from increased NB Power “vegetation management”

Officials interviews: Learned from Arthur

- Risk to food supply was a ‘surprise’
- No back-up generators at Sobeys or Superstore
 - Progress has been made on installing back-up generators
 - Telecommunications companies now have generators
- Moving to create more community gardens
 - Jurisdictional issues: “food security” a provincial jurisdiction

Officials interviews: Learned from Arthur

- Communication and Operational Networks need ongoing improvement:
 - Continuing to improve processes to ensure care for the vulnerable (i.e., registry for the elderly; people requiring electricity to run health equipment)
 - NB Power working to improve Priority Code list and outreach capacity
 - Staffing an issue: not enough; no contractors for tree clearance; people risked safety from fatigue

Officials interviews: Biggest issue identified

- People were unprepared for Arthur
- Few people capable of 72-hour preparedness AND
 - 72 hours is not enough: need to prepare for a week or more
- People are not risk sensitive
 - Acted like the storm was a “spectator sport” increasing safety risks to themselves and workers
 - Slowed tree clearing and power repairs

Community leaders interviews

- International Council for Local Environmental Initiatives
- Downtown Fredericton
- Business owner/Imagine Fredericton
- Greener Village
- Chamber of Commerce
- United Way
- Greater Fredericton Social Innovation
- Fredericton MLA office staff

Community leaders interviews

- Most people interviewed perceive City of Fredericton in Greater Fredericton terms:
 - Keswick Ridge, New Maryland, Oromocto, Nackawic
 - Perspective confirmed in City-led provision of potable water to rural neighbours
- Trust charities, non-profits, and municipal government
 - “Churches get things done.”
- Appreciated City-sponsored charging stations and water distribution; Greener Village opened its doors, but
 - “It was short-lived; people forget.”

Community leaders interviews

- Climate change education is needed:
 - People do not understand how it will affect them
 - We need to make climate change personal; Make it visual
- People in Fredericton are not self-reliant enough:
 - “Pay taxes and want everything done for them.”
 - “Expect too much from NB Power.”
 - “People need to do more to take care of themselves.”
 - “Too reliant on government.”

Community leaders interviews

- Community needs to be:
 - More inclusive
 - Poor, young (especially students), seniors left out
 - “Need to change the conversation on aging.”
- More action needed on:
 - Sustainable food systems
 - Greening the city; incentives for zero carbon future
- Keep as is:
 - Green spaces
 - Sports and Recreation
 - Sense of community

Citizen Arthur stories

- CCNB invited people on its contact list to share stories of their experiences with post-tropical storm Arthur
- We received 15 responses; many rural but also Fredericton
- We were surprised by how excited people were to participate and to share their stories.
 - We were asked if they could tell us their stories about winter extreme events too!

Citizen Arthur stories

- Issues for urban residents: power, food and trees
- Outside Fredericton: add no water, blocked roads
- Lots of frustration with NB Power:
 - “We live in the middle of Fredericton, and with Arthur we lost electrical power for nine days. Given how much our household depends on electricity we were happy that this sustained blackout was not in winter. NB Power revised and revised (upward) the estimated time for restoring electricity incrementally, so we stayed in our home rather than sought alternate housing. Since we have no family in the region and don't own a second property (camp, cottage, trailer, etc.) **it was frustrating to be told nearly every day that power would be restored "tomorrow." Eight tomorrow's came and went.**”

Emotional Reactions

- “One of the things I remember best about tropical storm Arthur is how all the leaves were ripped off the trees. It was like an **eerie autumn out of time, to see all those green leaves carpeting the ground.** Of course, it wasn't just leaves that fell. In my city of Fredericton, over a thousand trees came down, and many more were damaged. In our own yard, the neighbour's tree fell on our garage, and our lilac bush cracked at the root. It had already been having problems with a turkey-tail mushroom infestation; Arthur dealt it the *coup de grace.*”

Emotional reactions

- “Something that surprised me about my experience of the storm was how strongly I reacted emotionally. **I felt betrayed and abandoned.** I knew that no one had deliberately taken away our electricity, that indeed people were working long hard hours to bring it back, yet the feeling persisted. **I felt resentful** towards those who didn't lose power, and simultaneously embarrassed with myself for having these feelings.”

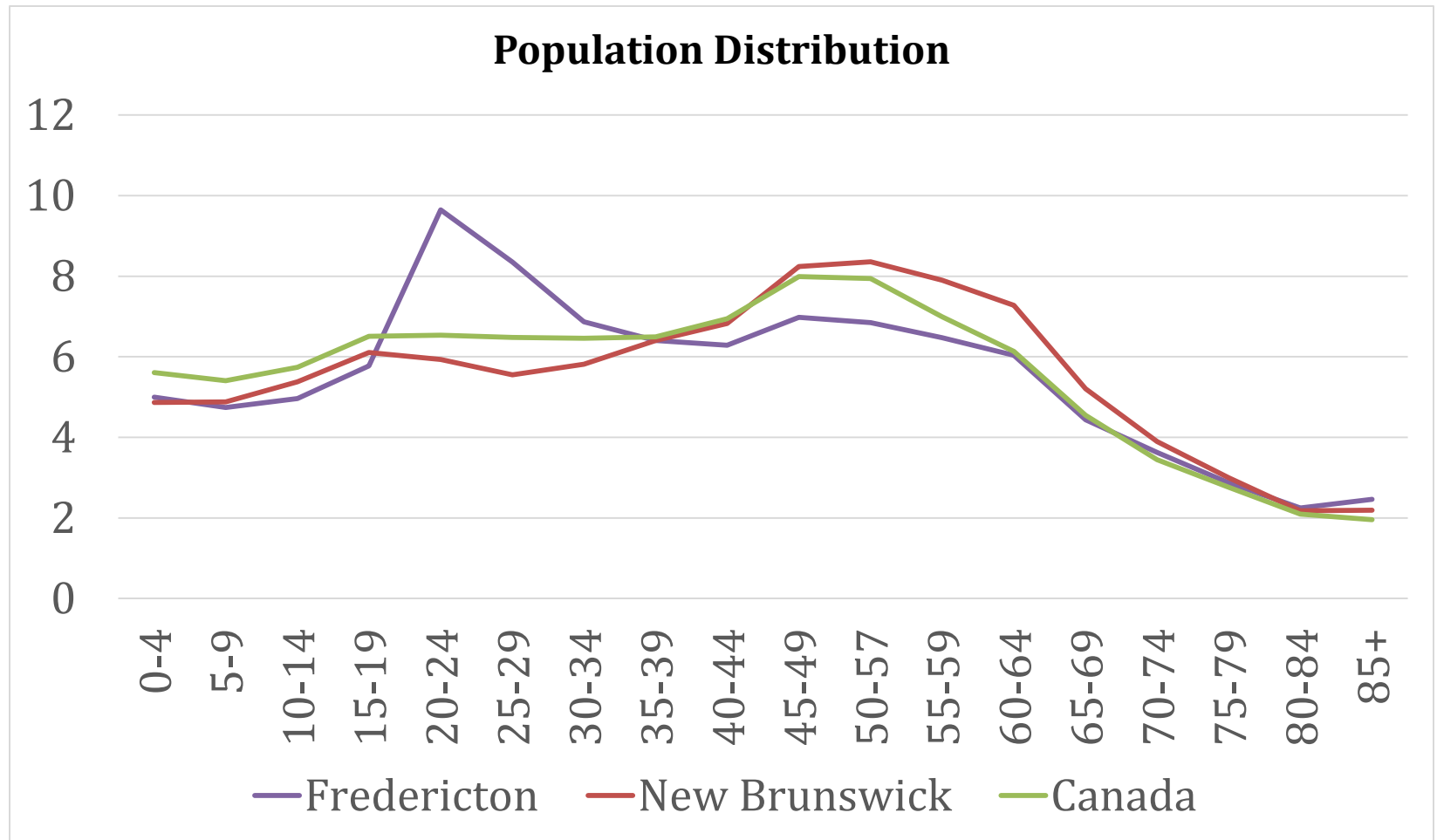
Have citizens learned anything?

- There was a view that we won't be more prepared next time because people perceive that:
 - It “won't happen again, [I've] bought a nice generator. Nothing else has been done to be prepared.”
- This perspective confirmed in social capital survey with high number of Arthur actions focused on “bought generator”

Community profile, social capital, energy and climate change literacy surveys

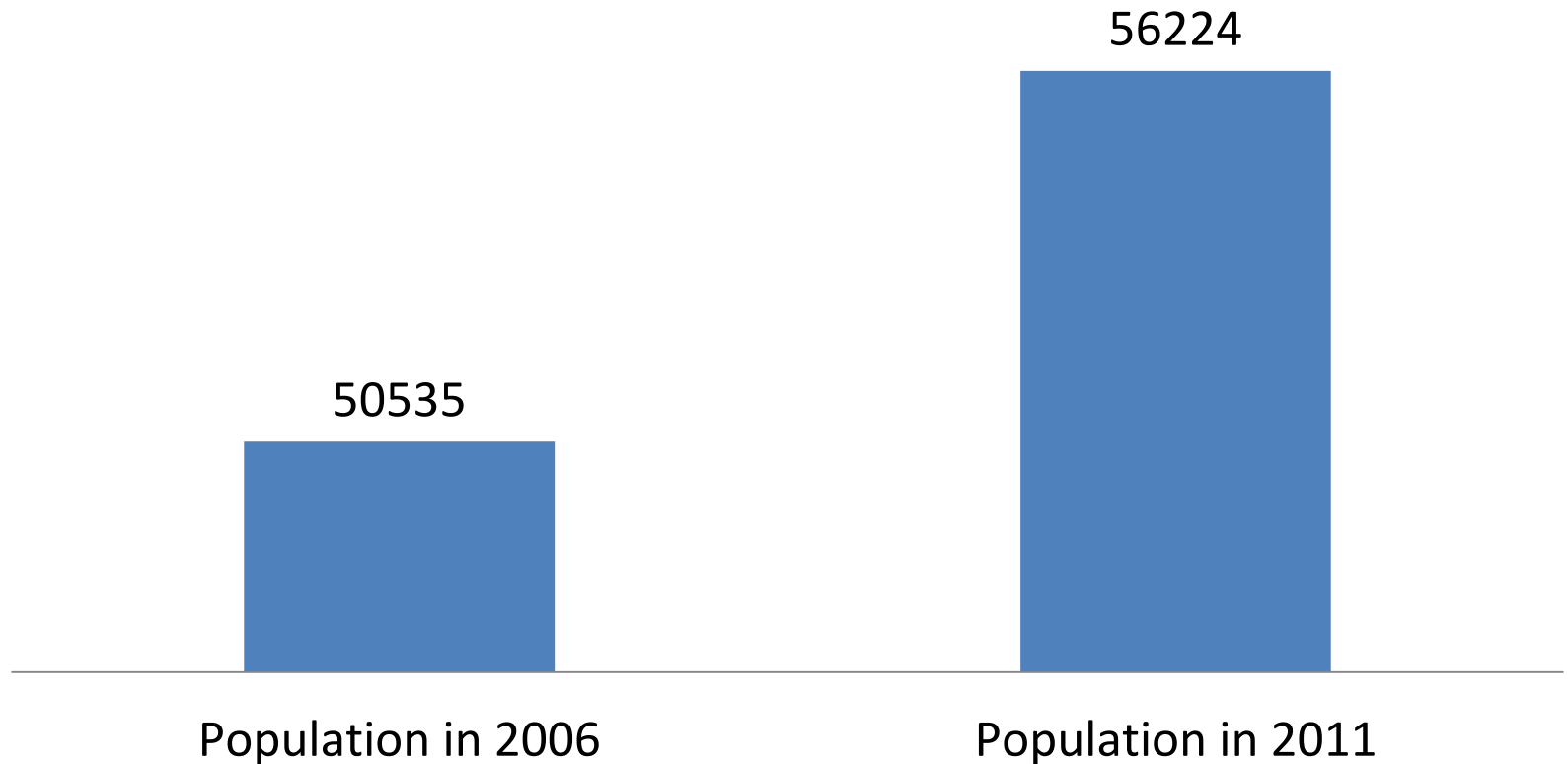
- Community profile and social capital survey affirms many of the observations made in the qualitative interviews
- There is a low level of climate change literacy
- The lack of understanding of climate change causes and processes is an issue for policy support
- Citizens are concerned about climate change, however, and worried about specific impact risks

Fredericton has a younger population

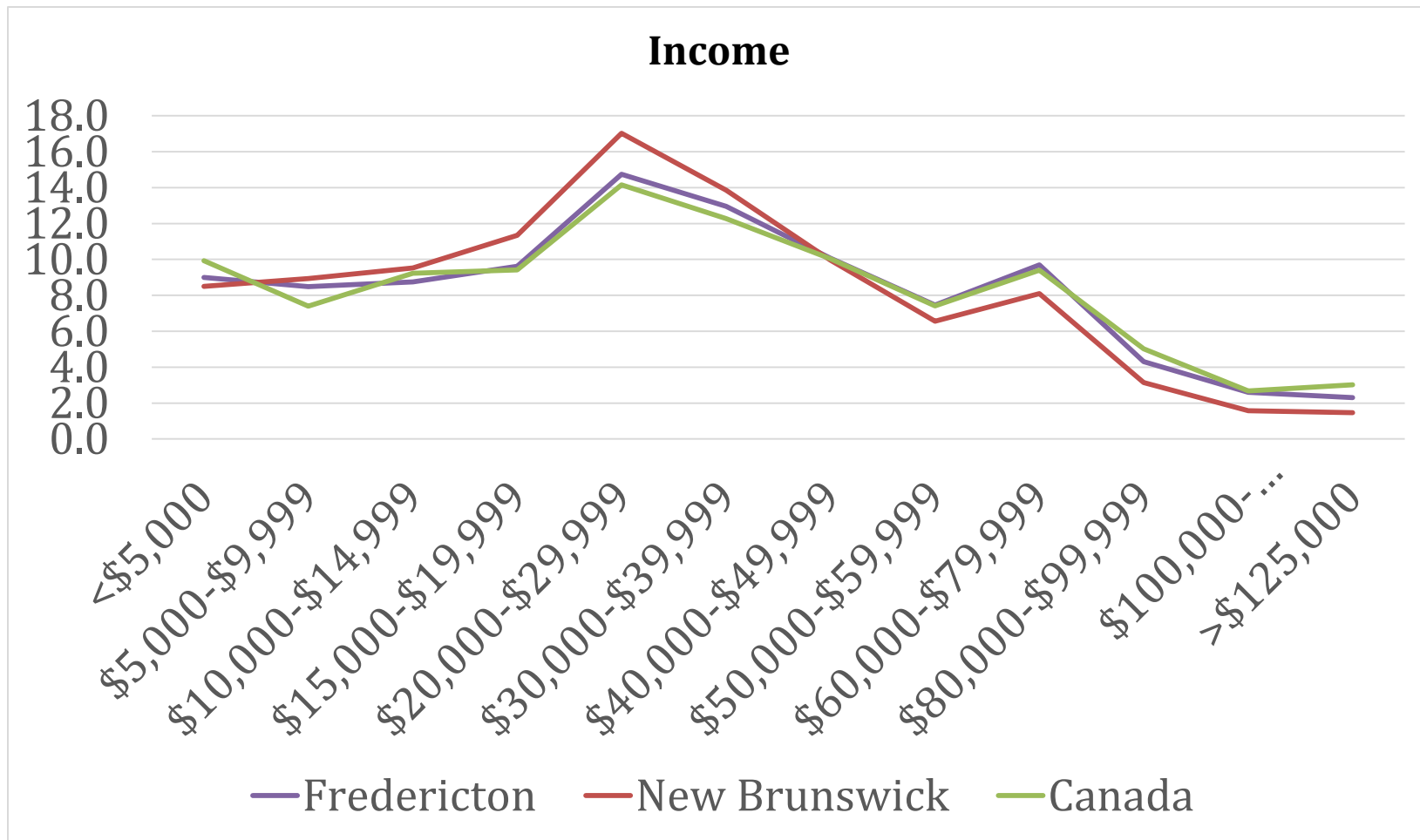


Fredericton has a growing population

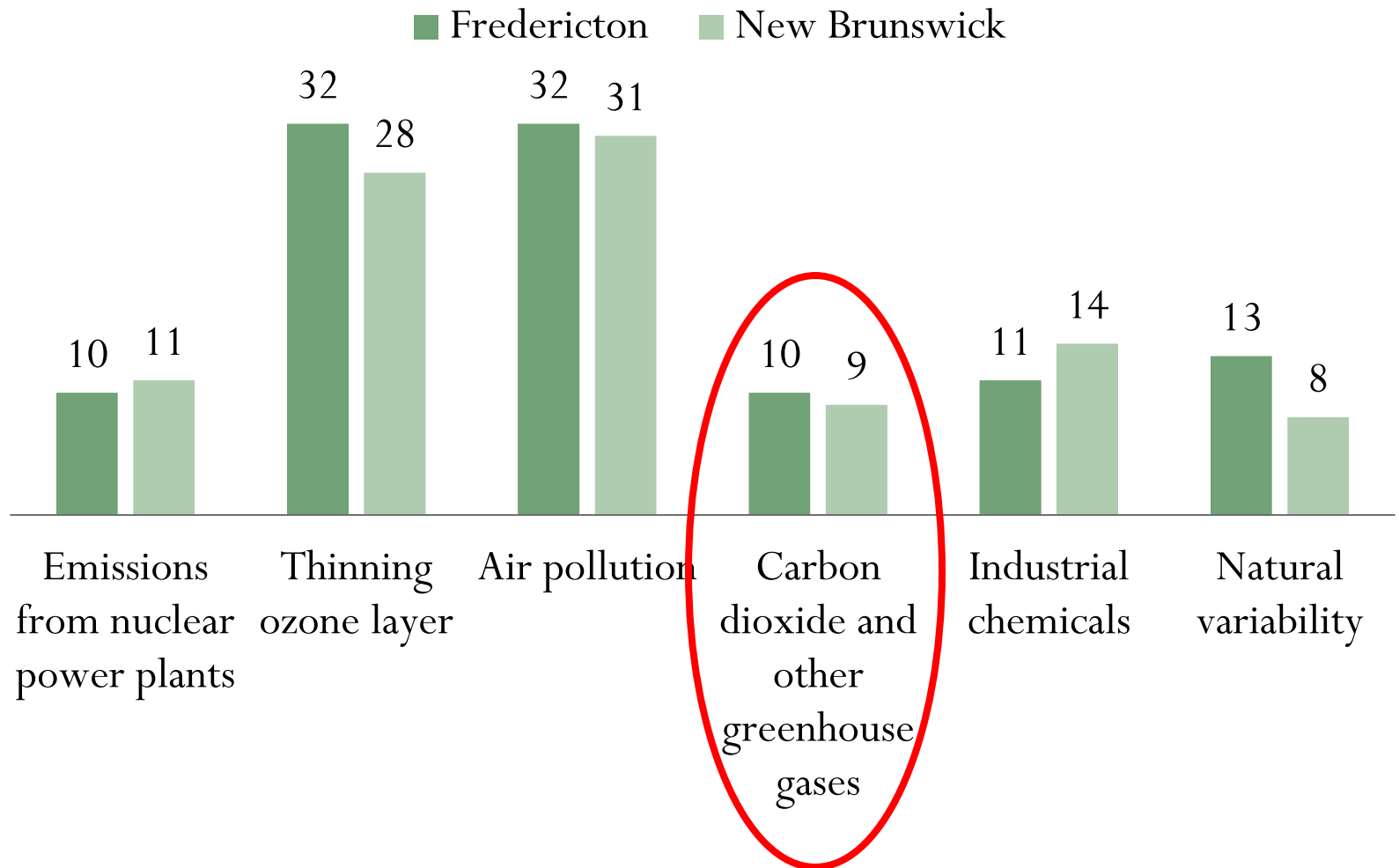
Population increased 11% from 2006 to 2011 and is projected to continue growing to 2030



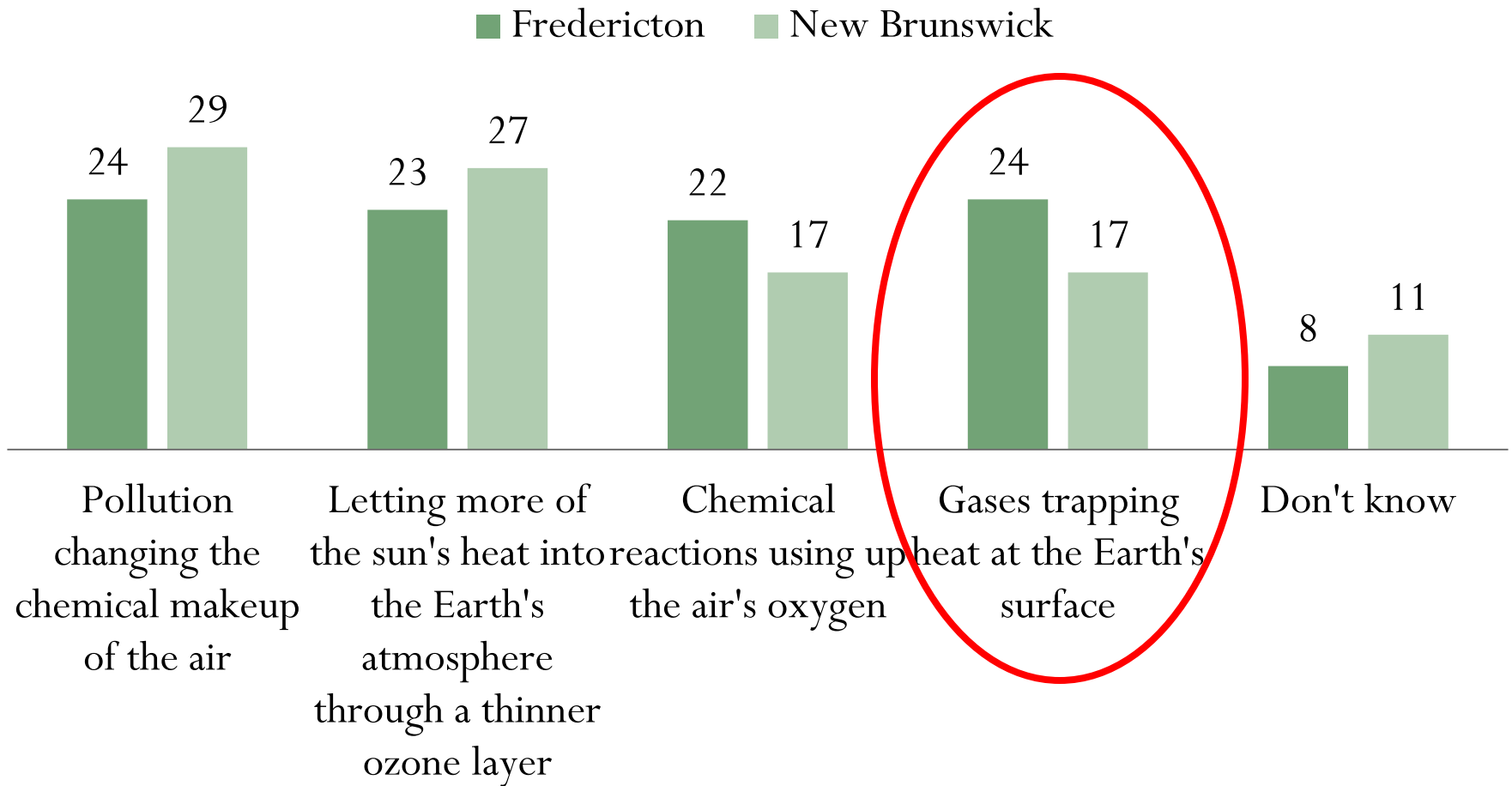
Citizens are educated, wealthier, service oriented



Climate change is caused by...



The main process behind climate change is...? Similar lack of understanding



Knowledge of climate change and processes

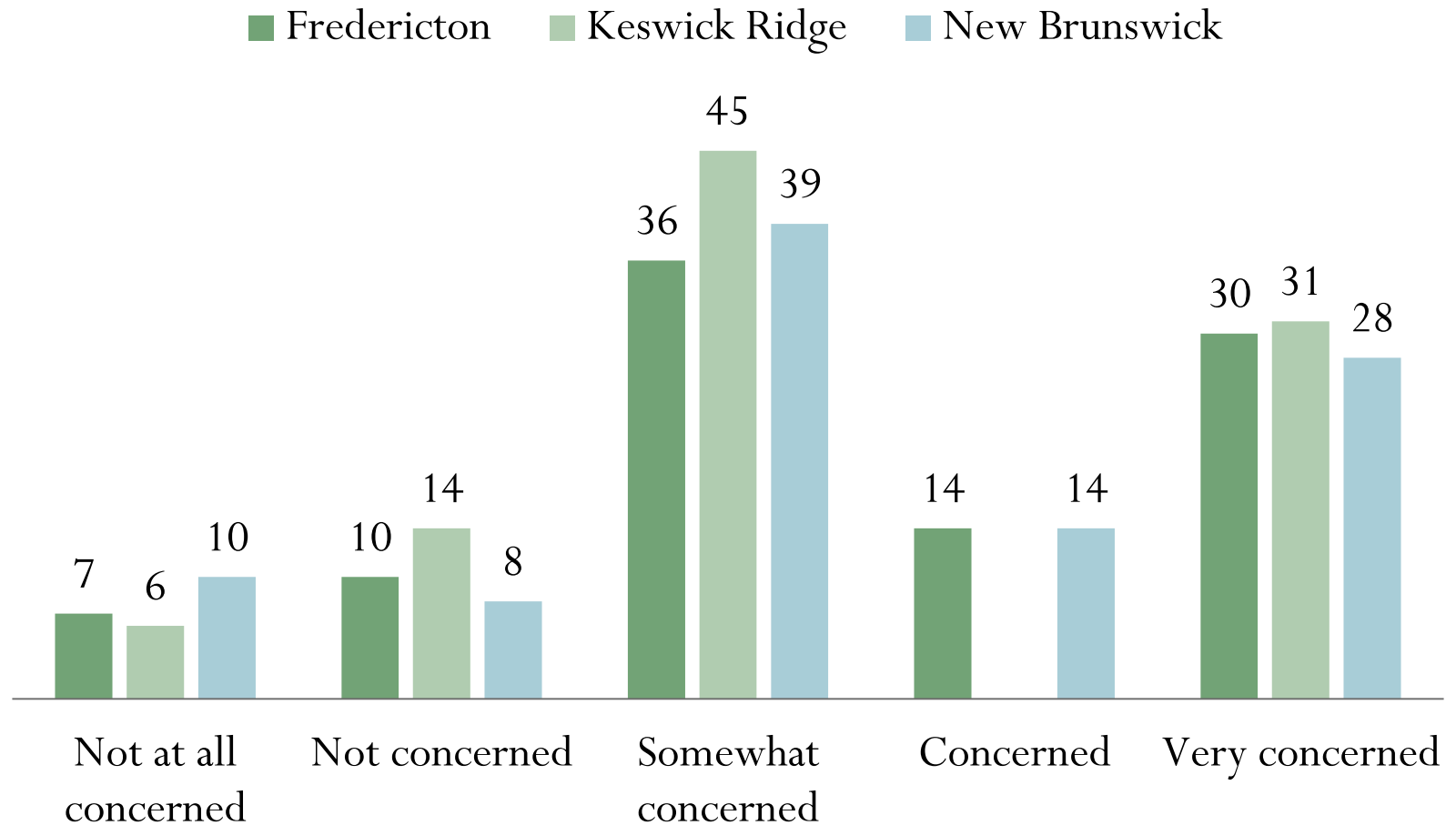
- The need for climate change education is high
- Making the link between human-caused climate change and the potential for lowering climate change risk are important to increasing support for climate change mitigation and adaptation policies. *
- Climate Change science is unequivocal: to say climate change is human-caused is to speak to the facts.

*Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change*, 2493, 5. Retrieved from <http://www.nature.com/articles/nclimate2943.epdf?>

Climate Change is Human-Caused

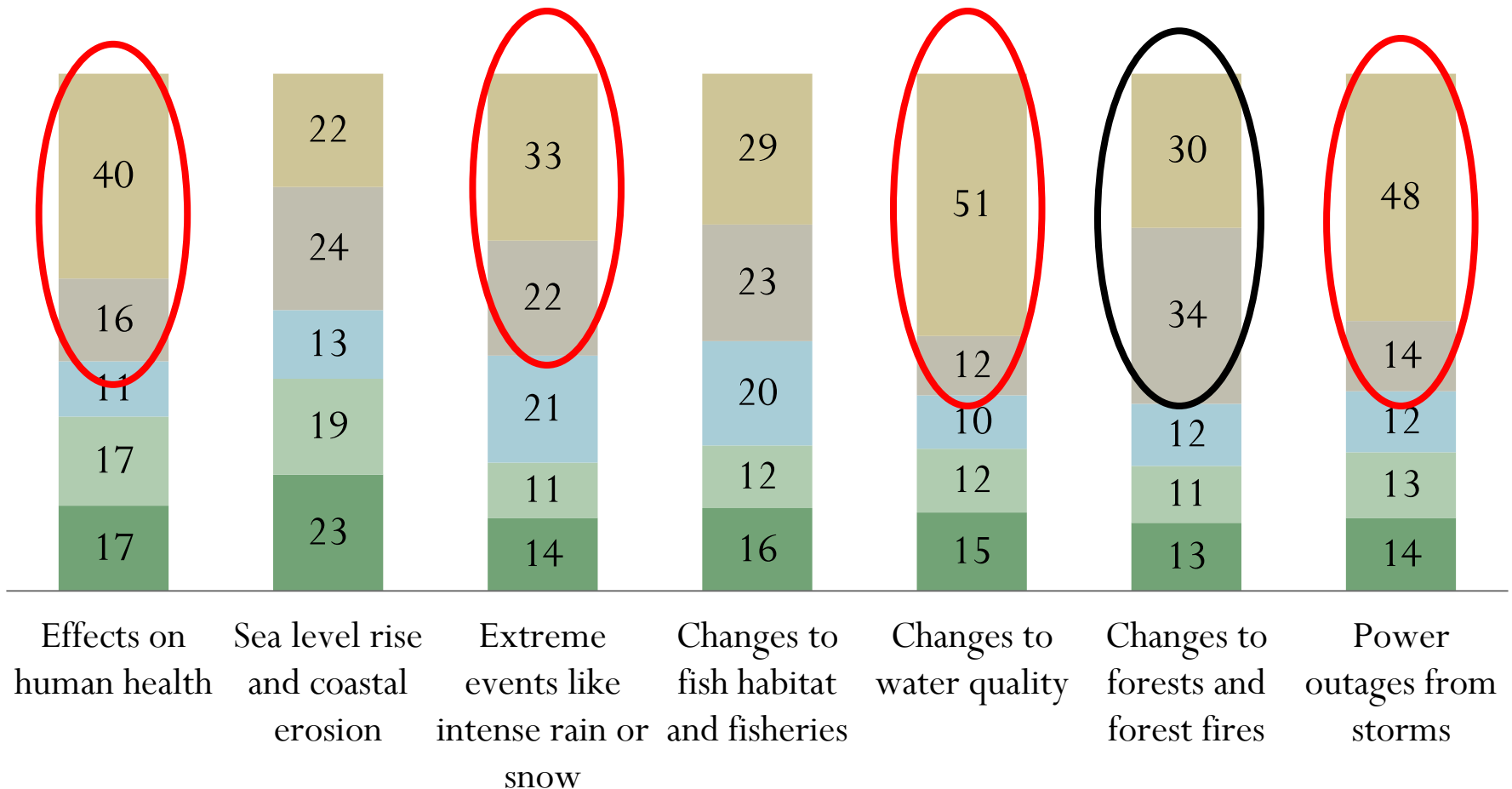
“Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven **largely by economic and population growth**, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other **anthropogenic drivers**, have been detected throughout the climate system and are *extremely likely (95 to 100%) to have been the dominant cause of the observed warming since the mid-20th century*” (Intergovernmental Panel on Climate Change, Core Writing Team, Pachaur, & Meyer, 2014, p. 3).

How concerned are you about climate change? Minor differences



New Brunswick 2016: From what you know about the effects of climate change, would you say...

■ Not at all concerned
 ■ Not concerned
 ■ Neither concerned nor unconcerned
 ■ Concerned
 ■ Very concerned



Concern about climate impacts: Fredericton

- More concerned about:
 - Changes to forests and forest fires: 70%, NB: 64%
 - Power outages: 66%, NB: 62%
 - Changes to fish habitat/fisheries: 59%, NB: 52%
- Somewhat less concerned about:
 - Changes to water quality: 58%, NB: 63%
 - Human health: 53%; NB: 56%
 - Extreme events: 53%; NB: 54%
- No difference on sea level rise: 46%; NB: 46%

Social capital survey

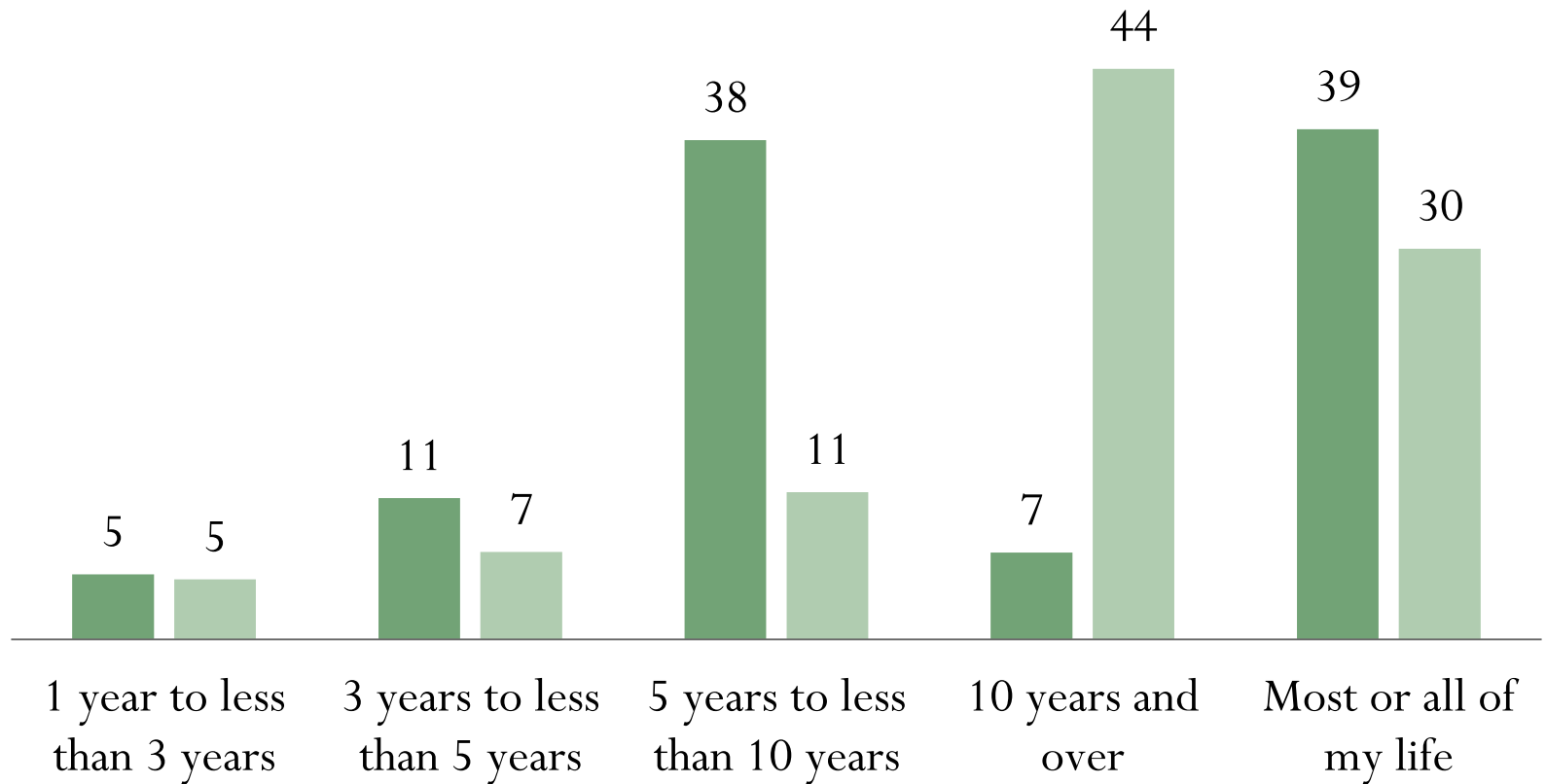
- Similar questions asked in the social capital survey of people living in Fredericton and Keswick Ridge
- Survey included questions from a Statistics Canada 2013 social capital survey
- Allows for some comparisons across jurisdictions
- Results in line with observations from Statistics Canada surveys and the Conservation Council interviews

Social capital survey results overview

- Trust is high despite a less “connected” population
- Younger, more mobile population, lots of newcomers
- Citizens want the City to move forward on improving preparedness for extreme events
- There is support for renewable energy making a contribution to community resiliency
- There are strong social capital assets in local merchants, community non-profits, school and neighbourhood groups

Length of time living this community (%)

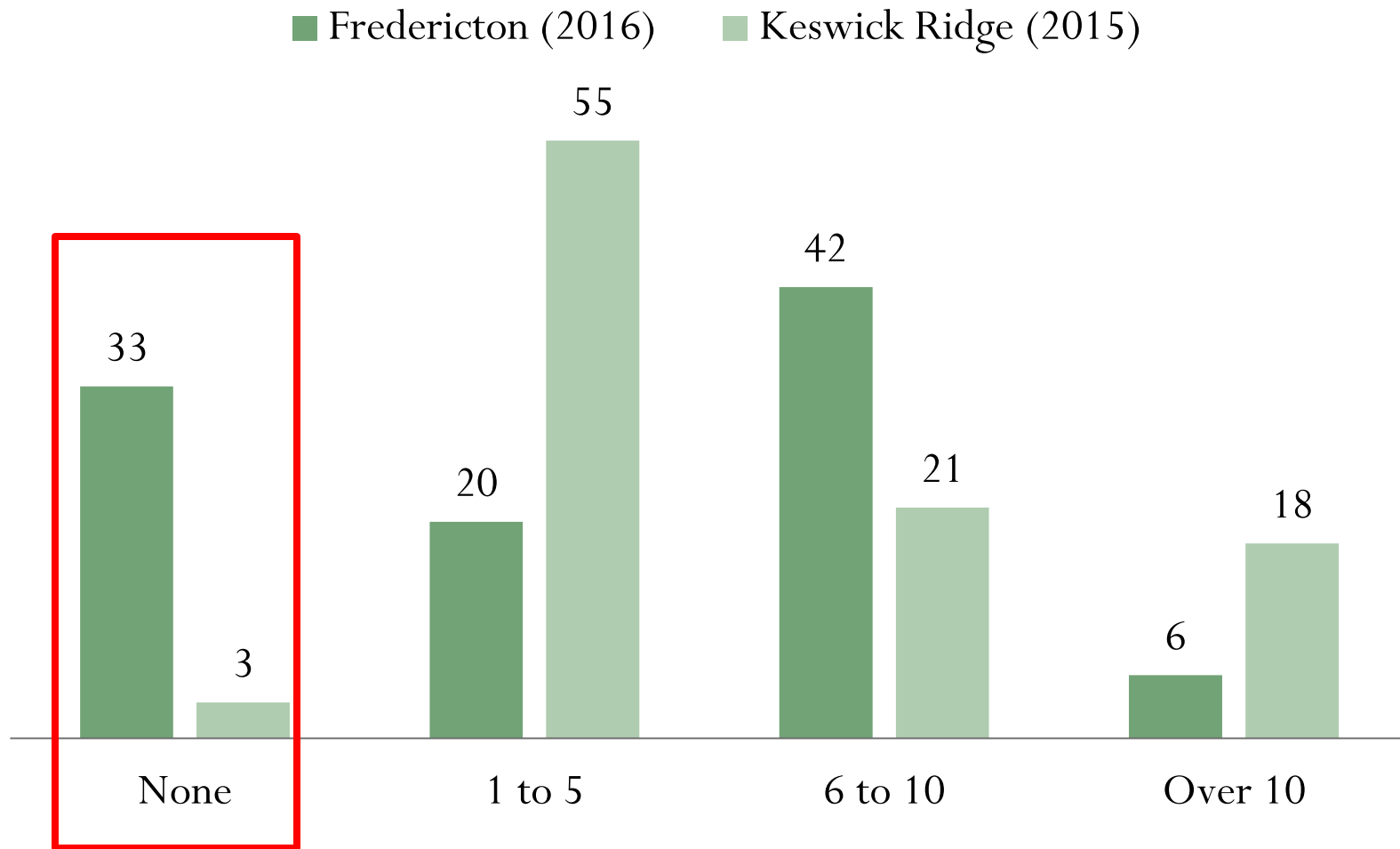
■ Fredericton(2016) ■ Keswick Ridge (2015)



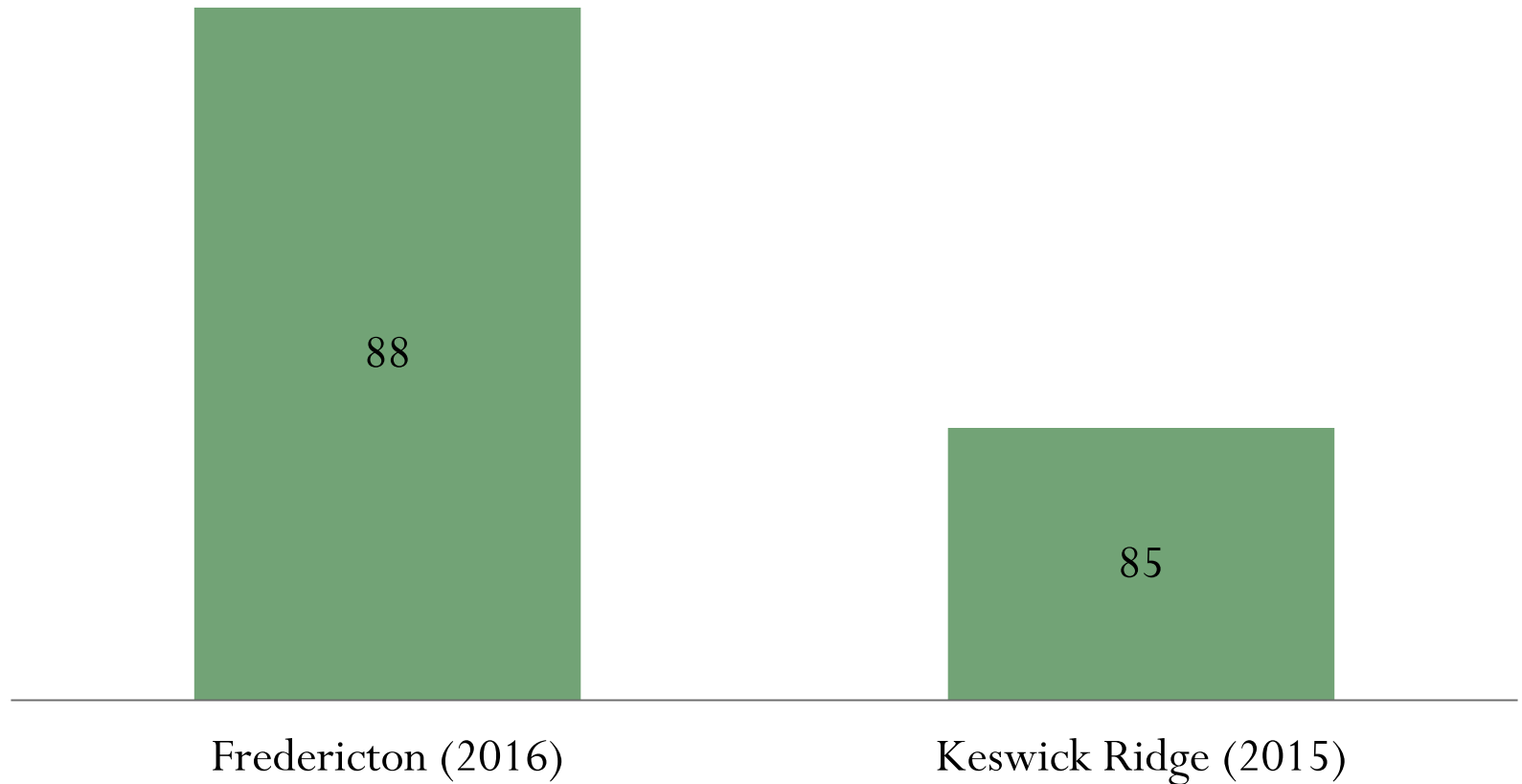
Know most or many of the people in their neighbourhood (%)



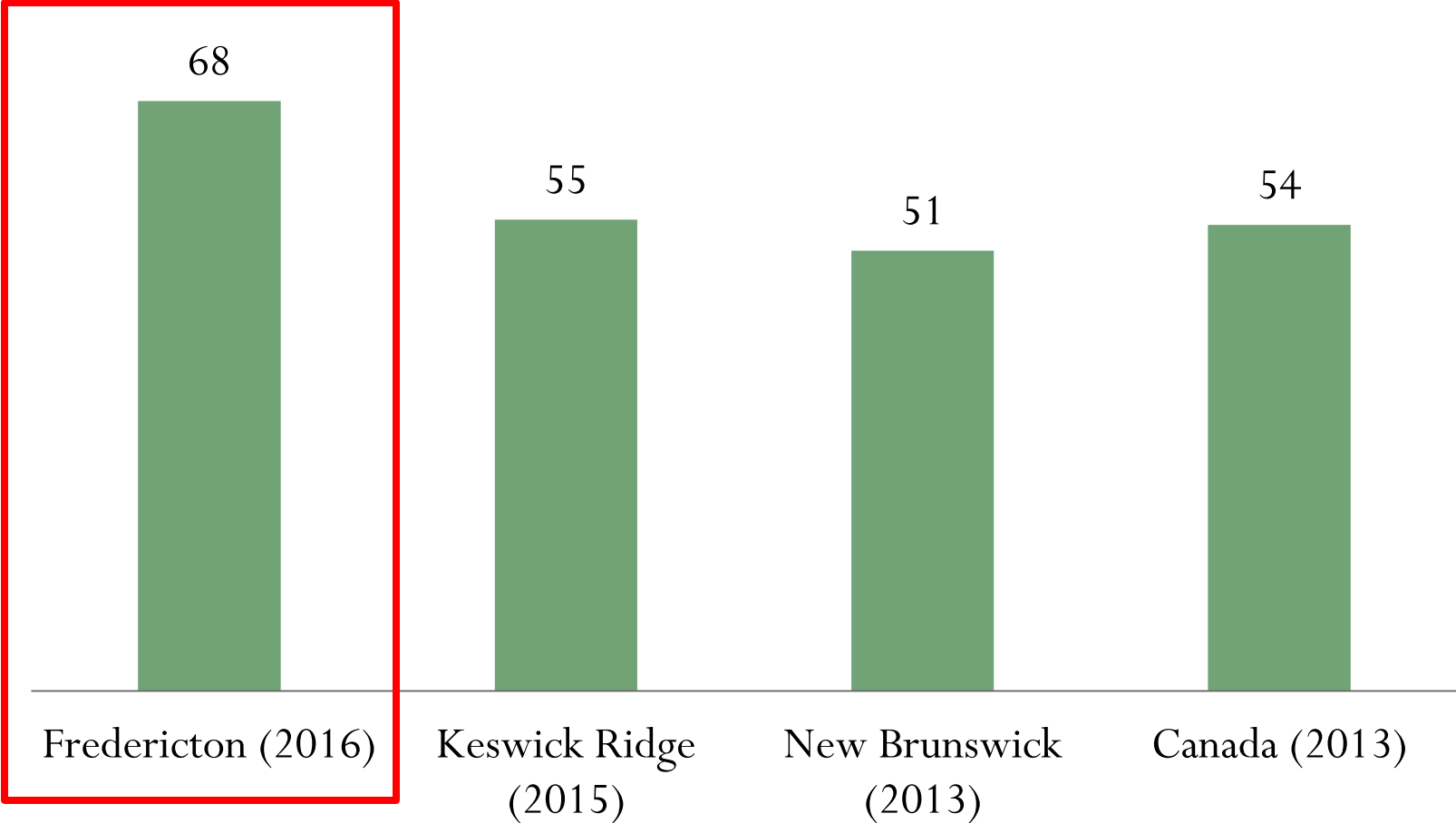
Number of people residents know well enough to ask a favour (%)



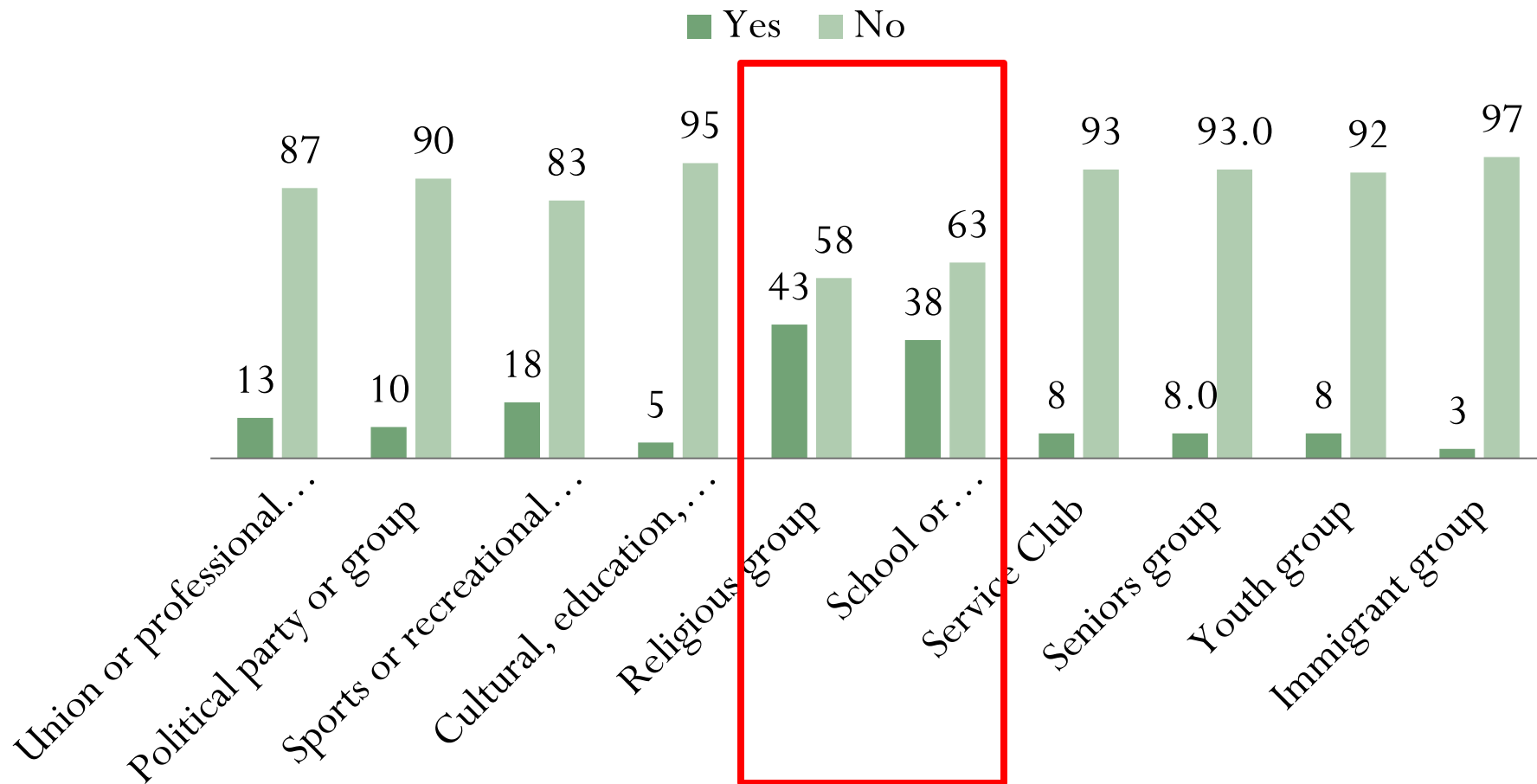
Believe their community is a place where people help each other (%)



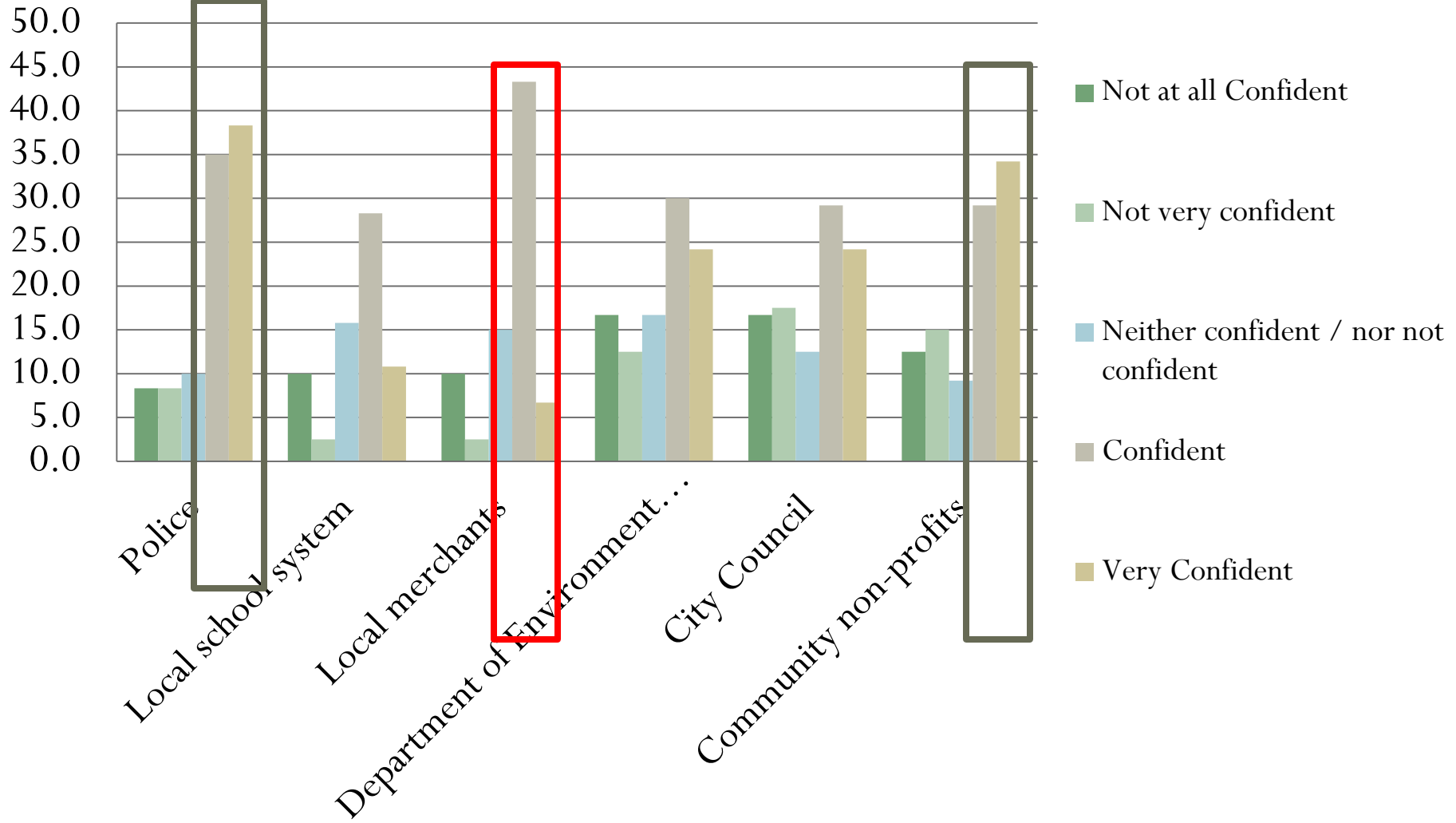
Trust most of the people in your neighbourhood (%)



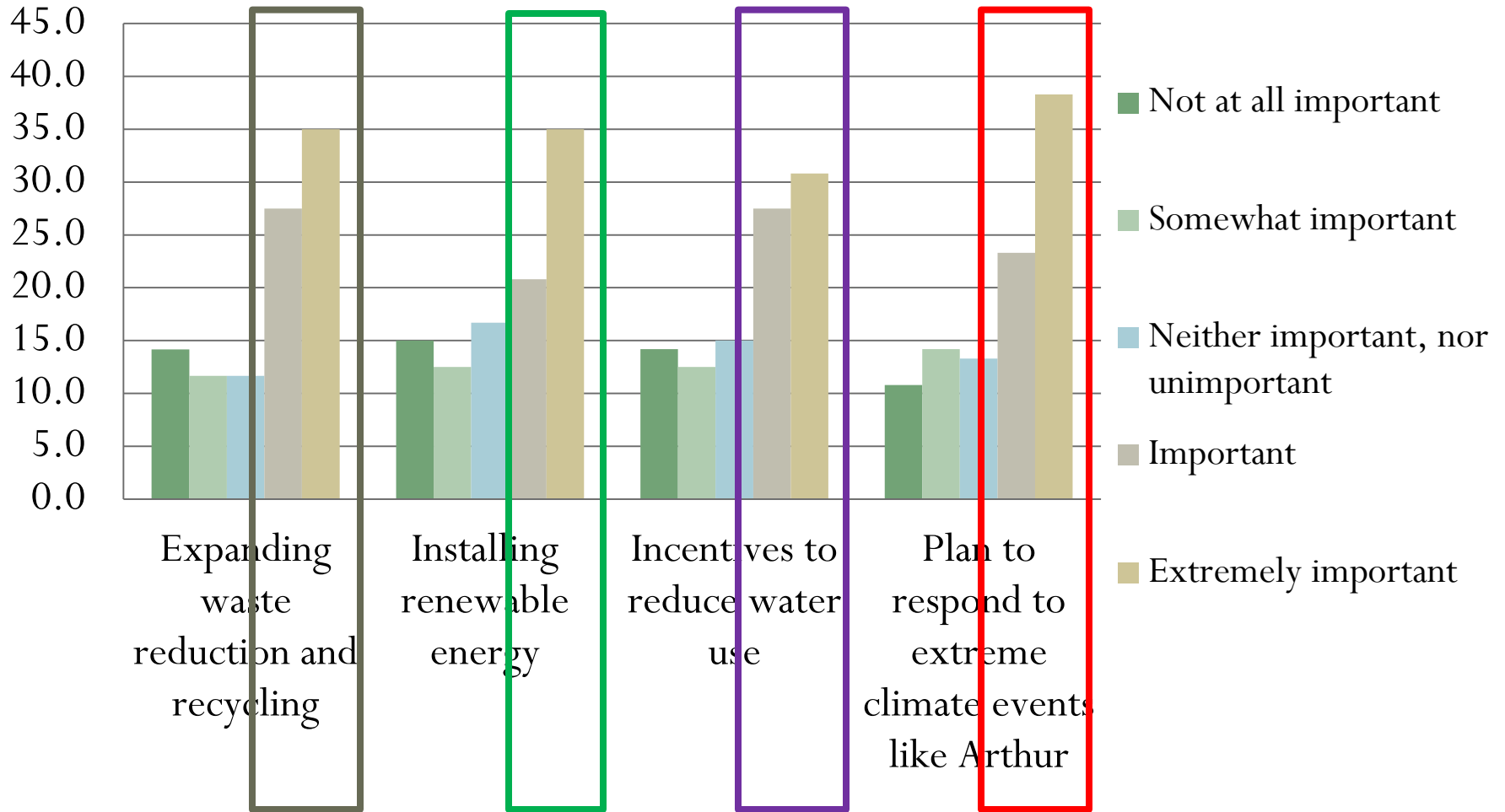
Involved over the past 12 months volunteered (%)



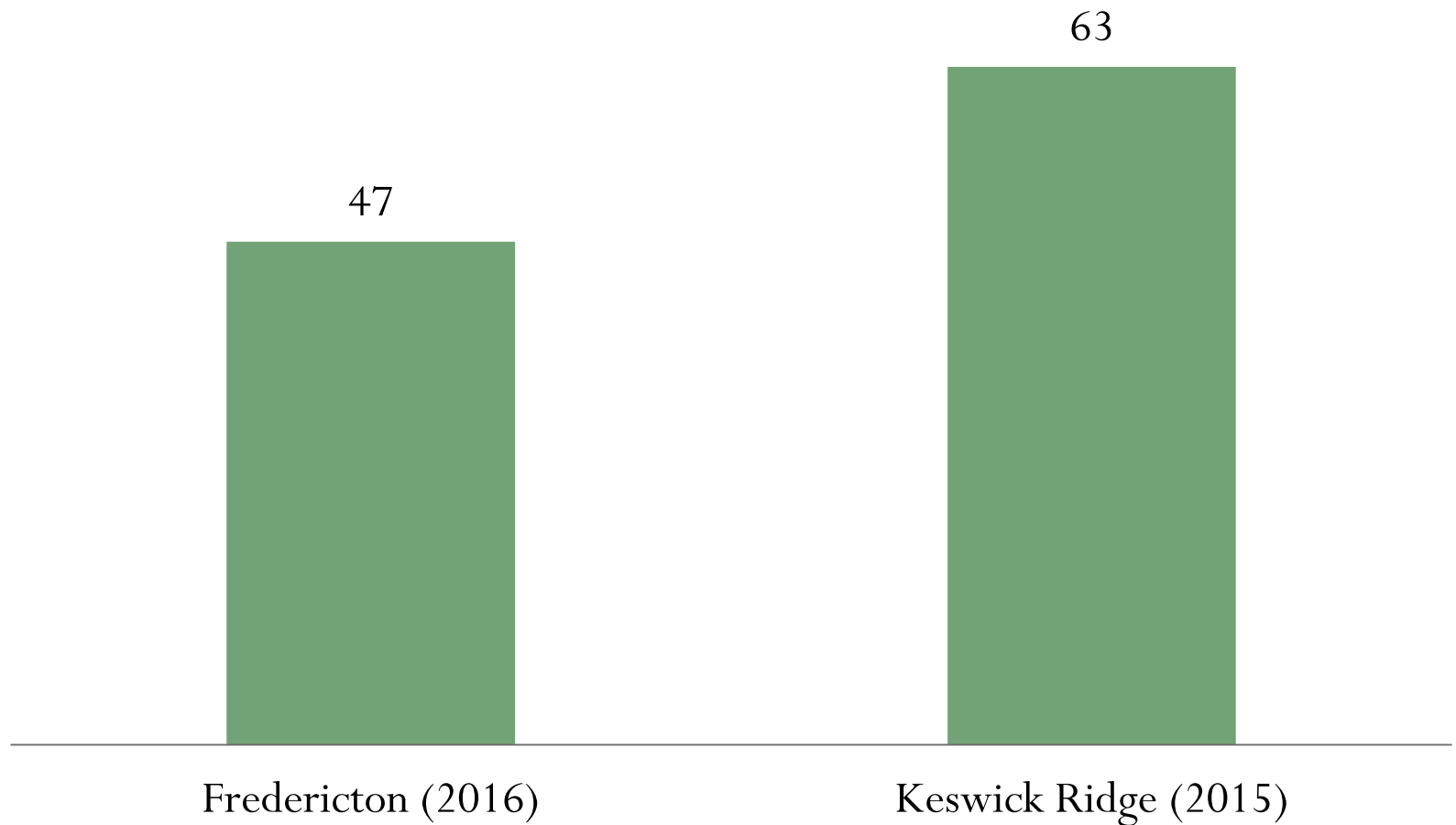
Level of Confidence (%)



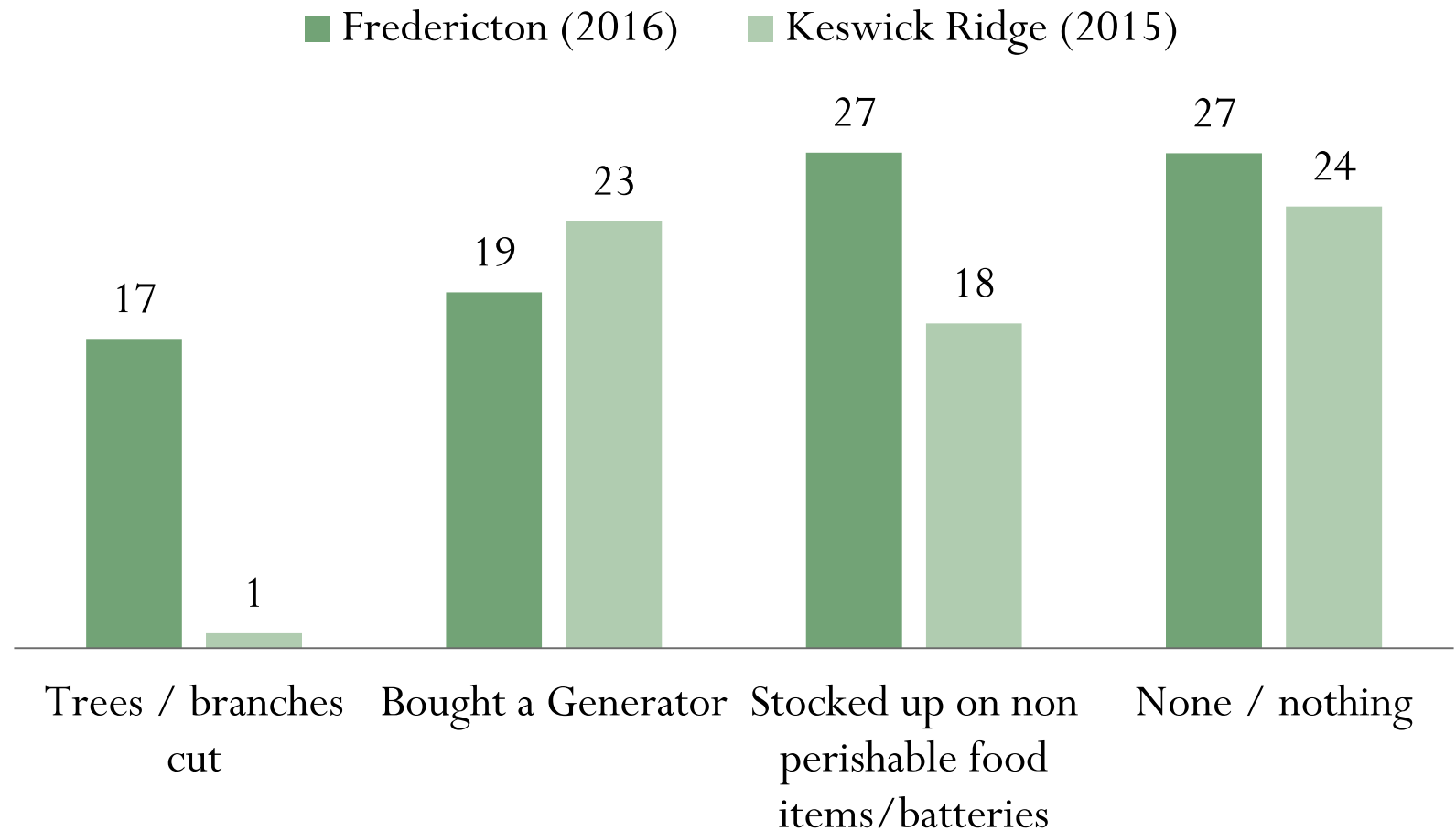
Ranking of Community Issues



Believe they have skills, resources or abilities to help the community in an emergency (%)



Actions taken since post-tropical storm Arthur to increase preparedness (%)



Recommendations

1. Take advantage of the social capital assets at the City's disposal, including:
 - Ensure insurance, financial institutions, small businesses (Downtown Fredericton), telecommunications firms, and churches are represented on the Fredericton's Emergency Management Organization (EMO) committee
 - Continue to increase efforts to ensure youth, seniors, poor, sick reached
2. Ensure the EMO committee receives regular briefings on climate change with the goal of increasing understanding of community climate change-related risks and impacts that must be managed and minimized

Recommendations

6. Adapt the emergency preparedness mindset to move beyond the “event” to prepare for and reduce the impacts of chronic extreme events
 - Increase citizen/business outreach and education regarding risk awareness and requirements for longer-term preparedness:
 - Emphasize the need for some self-reliance; generators not enough
 - Emphasize need for battery/wind up radios to ensure communications capacity during power outages
 - Safety around downed power lines
 - Food safety

Recommendations

3. Prepare for both the Physical and Mental health effects associated with climate change induced extreme events
 - First responders who work long hours and may witness suffering
 - Citizens from displacement, emotional response to loss of loved trees, wild places; treasured possessions, security

4. Change rules and practices so that:
 - Disaster relief policies reduce exposure to chronic flood risks
 - Bylaws/zoning are enforced to reduce exposure to flood plains

5. Significantly increase outreach and education to citizens on:
 - The causes of, and solutions to, “human-caused” climate change

Recommendations

7. Break down barriers to “not my jurisdiction” mindset. Example is food security is “provincial jurisdiction”
 - Food security is everyone’s business
 - Community gardens will not be enough
 - Local food supply and increased education about food requirements needed for longer-term emergency preparedness are required
 - This issue likely needs its own multi-stakeholder process to explore options, build relationships

Recommendations

8. Plan for climate change adaptation and emergency preparedness on a Greater Fredericton basis
 - We will all need each other as demonstrated with Arthur and as the City of Fredericton showed in its provision of potable water and charging stations to citizens outside city boundaries

9. Nurture Fredericton's greatest assets: Perceived trust and the strong belief by people interviewed that this community is:
 - "Caring, friendly, safe, clean, green, well-managed, has good infrastructure, with a strong history and culture"

 - In conclusion: **NURTURE THE SENSE OF COMMUNITY**

Programs to consider

- **Home Adaptation Assessment Program (HAAP)**- helps homeowners identify, install and maintain cost effective measures to reduce their risk of basement flooding. Burlington, Ontario pilot under way. Could partner with University of Waterloo Intact Centre on Climate Adaptation to pilot in Fredericton.
- **Natural Infrastructure Adaptation program (NIAP)**- looks at community-level flooding resilience through three areas of focus, including 1) advancing the design and implementation of characteristics for new building communities that are more resilient to flooding, 2) evaluating the potential of natural infrastructure (e.g., wetlands) to reduce the impact of flooding and 3) researching the impacts of changing climate and extreme weather for the financial services sector.

Next steps

- CCNB will:
 - Share results with project contributors for feedback
 - Finalize report
 - Provide report to Imagine Fredericton process, the Intact Foundation, and the Centre on Climate Adaptation
 - Explore opportunities to incorporate research findings into citizen engagement efforts, including the potential for a Home Adaptation Assessment program pilot in Fredericton