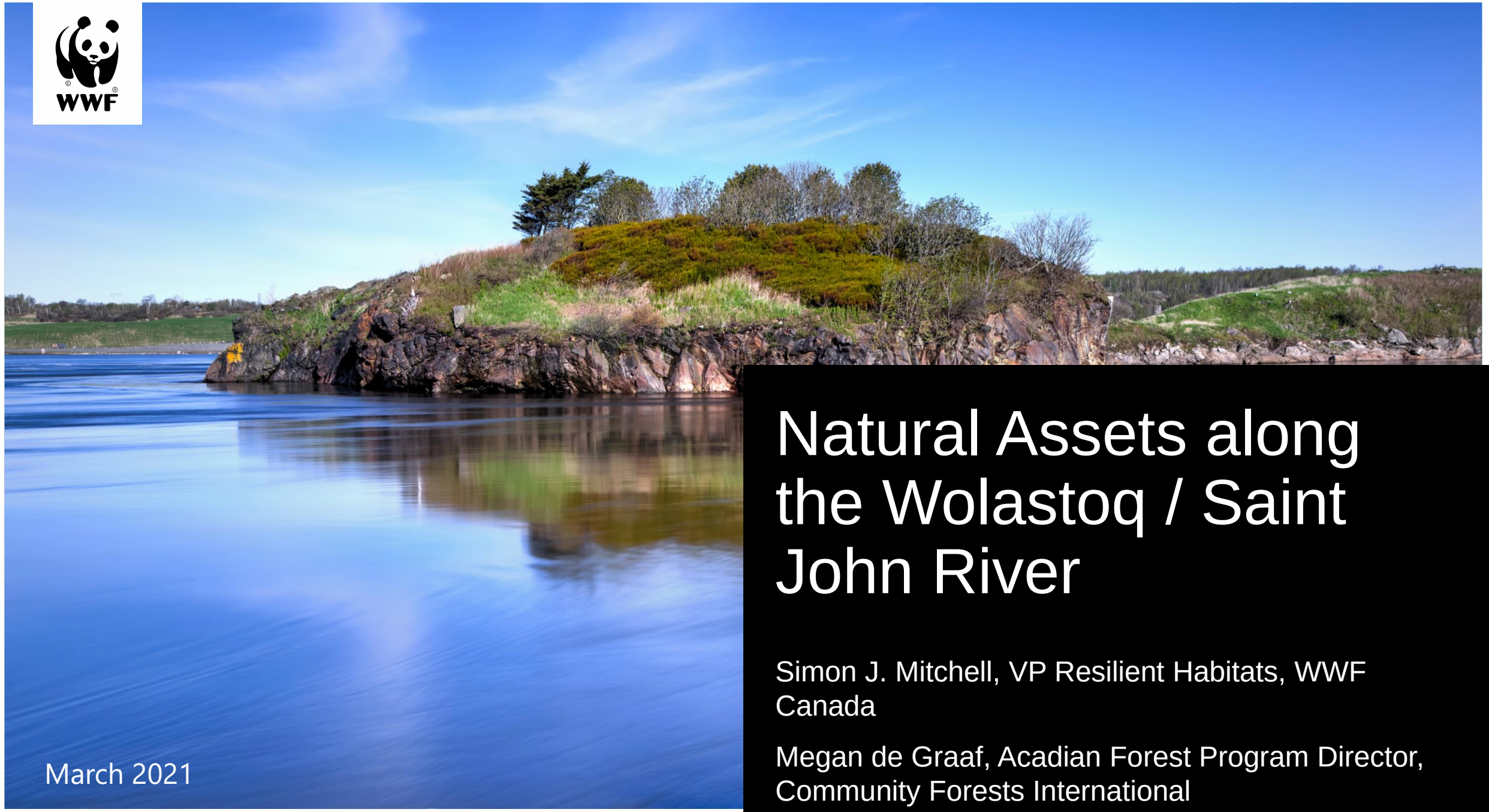

# Natural Assets along the Wolastoq / Saint John River

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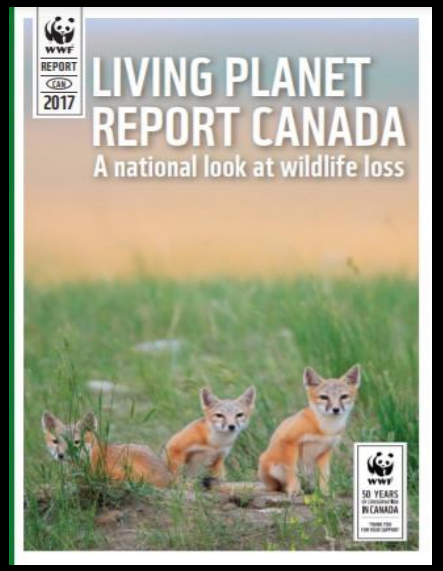
Canada Warbler © Shutterstock




# SPECIES PROTECTED UNDER SARA

28%

between 2002 - 2014



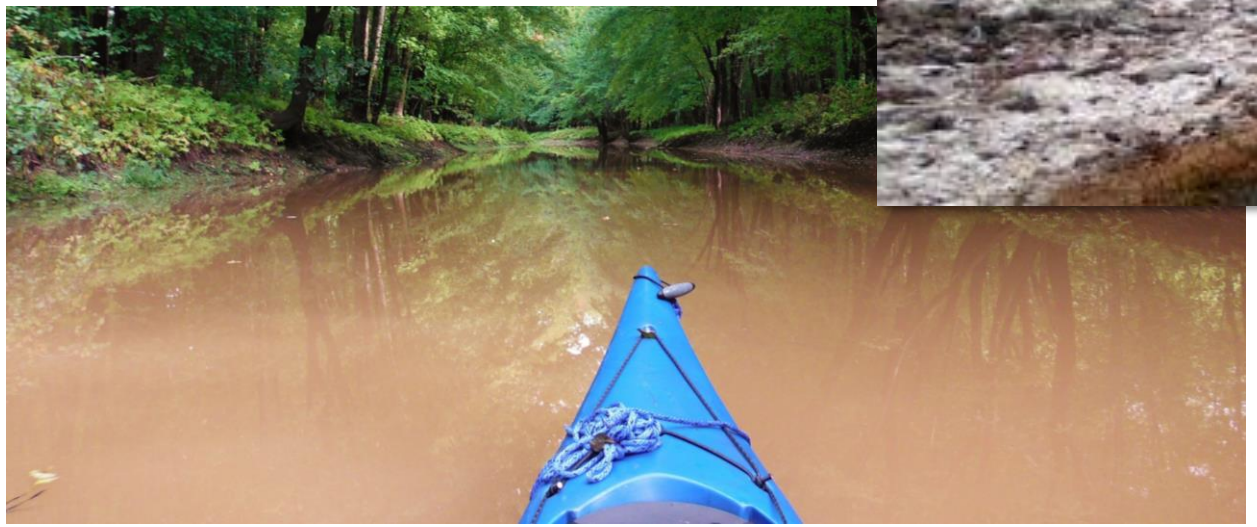
## DUAL CRISIS OF CLIMATE CHANGE AND BIODIVERISTY LOSS

# What does climate change mean for the Wolastoq-SJR?

**The changing frequency of temperature and precipitation extremes is expected to:**

- Increased occurrence and risk of ice-jams from increasing freeze-thaw events.
- Increased risk of flooding from increasing precipitation.
- Increased risk of water contamination and habitat degradation from overland flooding that creates sediment and nutrient overloading of the SJR system.
- Increase risk of BG algal blooms from hotter/drier weather in summer.

# All climate impacts are experienced through freshwater



# Florenceville-Bristol Municipal Natural Assets project components

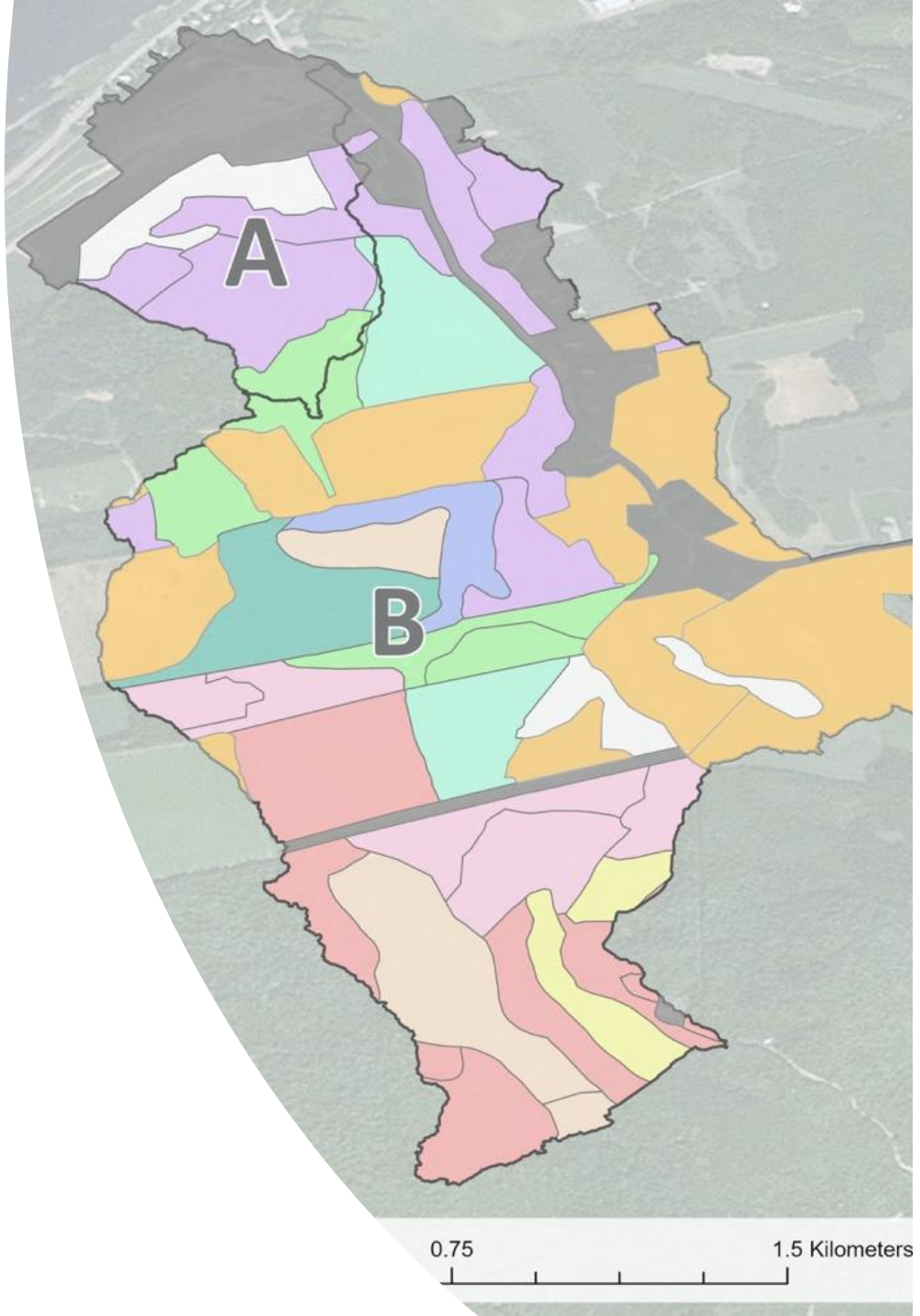
- Community Engagement Session
- Condition assessment
- Beneficiary analysis
- GIS mapping
- Flows modelling and analysis
- Quantification of service level from natural asset
- Develop operation and management approach based on existing conditions, risk and desired trajectory
- Reporting and next steps

# Study site

A riverside subdivision that is gradually expanding leading to issues with roads and culverts down slope.

And, sediment being deposited into the Saint John River.

Condition assessment: Understand current condition of the natural asset - hillside, forested area, riparian corridor, development and their influences.



# Beneficiary considerations

Beneficiary considerations explore the assets, beneficiaries, drivers of demand and associated indicators

| Asset component | Benefit | Beneficiary |
|---|---|---|
| **Water quality improvement** | Taxpayers, river users, river-based businesses, stakeholders valuing clean water | Down river water users, biodiversity / aquatic species. (Sensitivity of water users downstream of natural asset to increases in sediment loads or water quality impairment), current biological state of stream / river waters |
| **Water quantity improvement (decrease) / flood mitigation** | Taxpayers, river users, river-based businesses, Public Works, Emergency Services (those responding to road detours as a result of washouts) | Contribution to water levels, presence of infrastructure and landowners (incl. homes) to uncontrolled flows and their impact |
| **Soil retention / erosion control** | Subdivision residents and the broader community and businesses, land users | Green space, retention of built infrastructure, impact on landowners in areas prone to flooding |
| **Infrastructure retention (culverts, ditches, roadways, etc.)** | Tax payers, Municipal / Provincial budgets, residents, businesses and others impacted by infrastructure damage | Retention of built infrastructure, no disruption to service provision / access |

# Scenarios

Scenario 1 examined the flooding that could occur in the forested region as it currently exists.

Scenario 2 examined the flooding that could occur if the predominantly forested land changed to agricultural land.

Both scenarios modeled results from three increasingly intense storm conditions: a 1-in-5-year storm, a 1-in-100-year storm, and a 1-in-100-year + 20% storm. This increased intensity takes climate change into consideration.

| INCREASE (%) IN PEAK FLOW RATES BETWEEN SCENARIOS BY STORM | | | |
|---|---|---|---|
| Storm | Peak Flow ($m^3/s$) | | % Increase |
| | Scenario 1 | Scenario 2 | |
| 1:5 Year | 1.85 | 3.59 | 94 |
| 1:100 Year | 5.23 | 8.64 | 65 |
| 1:100 Year + 20% | 7.49 | 11.88 | 59 |


In Florenceville-Bristol, forests provide stormwater management services worth $3.5 million – a figure that increases as storms become more frequent and intense

COMMUNITY FORESTS INTERNATIONAL

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WWF

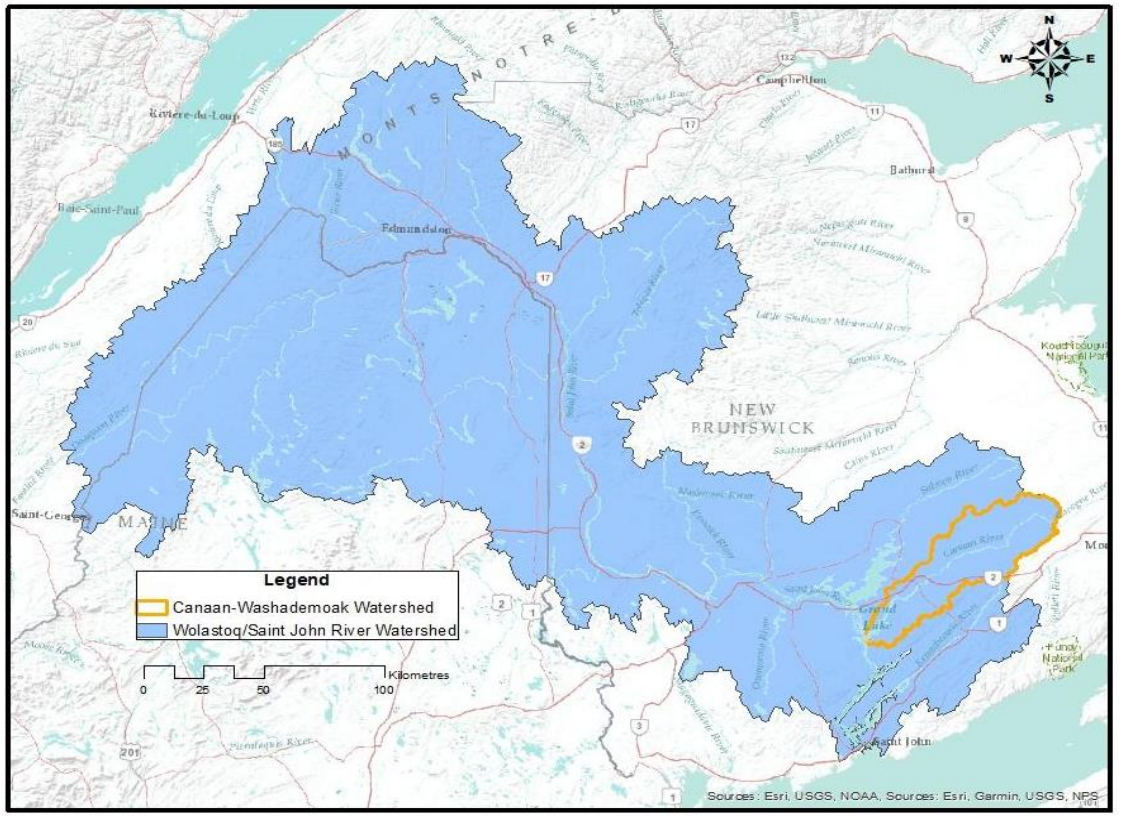
**Megan de Graaf**
Director
Acadian Forest Program

*"Protect and restore Earth's climate*
*by enabling communities*
*and forests to thrive together."*

# Cambridge-Narrows case study

COMMUNITY FORESTS INTERNATIONAL

- Role of deforestation in flooding is hotly debated (but see Dr. Bourque's most recent research)
- Natural infrastructure vs. built (grey) infrastructure: effective AND cost-effective
- Our question: what is the flood abatement role of intact old forest?



# Cambridge-Narrows case study

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# Cambridge-Narrows case study

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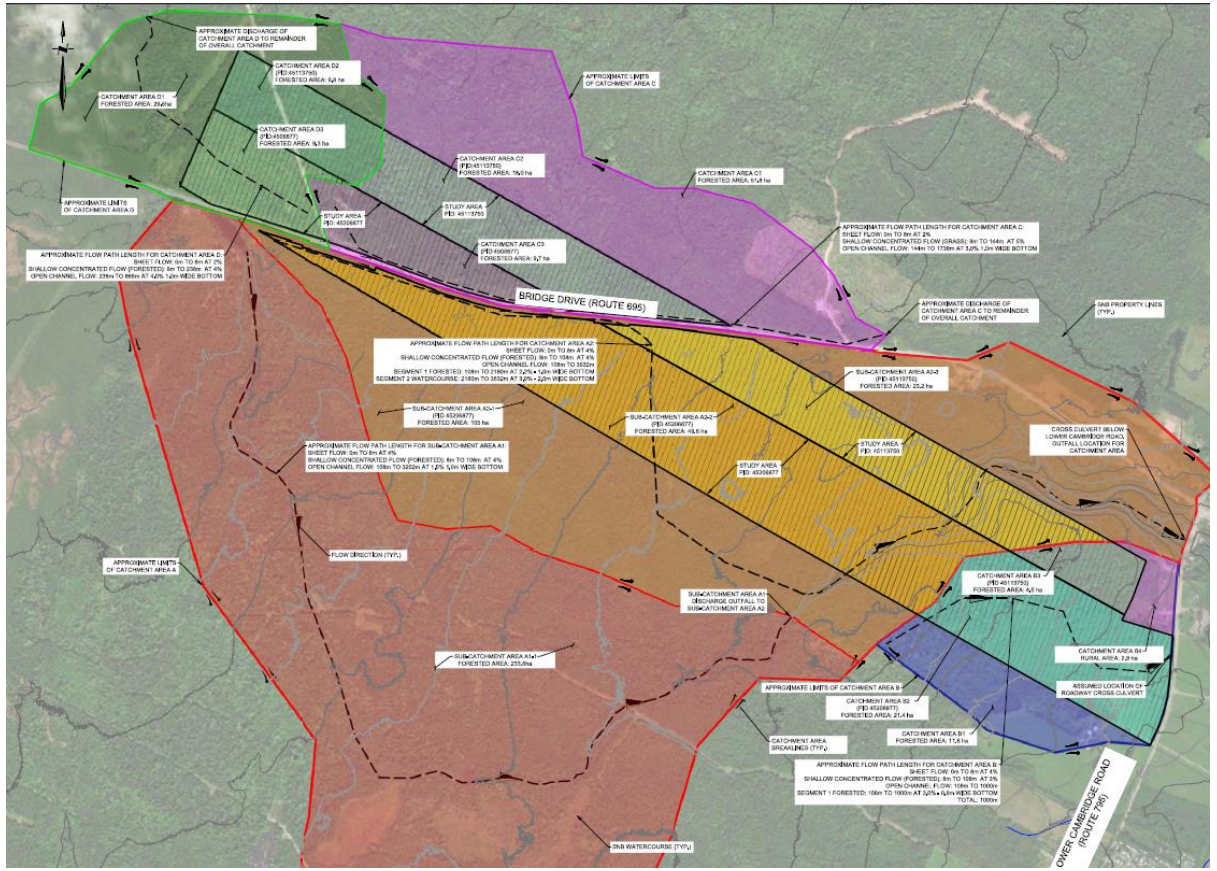
Hydrologic Analysis:
**Scenario 1**. Existing Condition (forest)
**Scenario 2**. New Condition (field/clearcut)

Peak flows were evaluated for each of the scenarios which included
1 in 5 Year
1 in 50 Year
1 in 100 Year
**1 in 100 Year + 20%** and
1 in 100 Year + 40% storm events.



# Cambridge-Narrows case study

COMMUNITY FORESTS INTERNATIONAL

For the 1:100 year storm event where climate change increases rainfall intensity by 20%, built infrastructure in the form of catchment ponds would need to exceed **25,900 cubic meters** to replace the flood mitigation role of the forest in the study area alone.

Taking this one step further, a cost analysis revealed that 4 catchment ponds would be necessary to capture this amount of water across this landscape, and their construction would cost a total of **$1,042, 526.76.**

Compare this to the value of the property and timber (as per the inventory we had done in 2019), which is **$324,099.**

| Catchment Area | Peak Flow (m3/s) | | Assumed Length x Width (m x m) | Peak Depth (m) | Approximate Volume (m3) |
|---|---|---|---|---|---|
| | Scenario 1 Pre-condition | Scenario 2 Post Condition | | | |
| A | 37.92 | 40.65 | 90 x 90 | 1.97 | 16000 |
| B | 4.43 | 5.28 | 35 x 35 | 2.03 | 2500 |
| C | 9.36 | 10.44 | 35 x 35 | 2.12 | 2600 |
| D | 4.04 | 6.62 | 45 x 45 | 2.34 | 4800 |

# Thank you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COLLABORATING FOR CLIMATE-RESILIENT COMMUNITIES