Pictou County Forest School Climate Change Post-Visit Lesson Plans

Activity: Climate Change Adaptation: "Schoolyard Woodland"
Curriculum Outcomes: Middle School
Materials:
Resources: Report on the vulnerability of tree species to climate change ; Trees of the Acadian Forest; NS Tree ID ; Silvics Modules on NS Tree Species ; acadian forest climate change resilience ; **Climate Change Resiliency of Tree Species in the Fundy Biosphere ...**
Apps: iNaturalist ; PictureThis
Organisations: UpLift NS has grants for learning gardens and outdoor classroom development; Clean Nova Scotia offers climate action grants

Intro/Minds On:
- Draw a map of your school yard (you can either print a template for the kids or have them draw their own by tracing the aerial view of the school yard on Google Earth).
- Walk around the schoolyard and draw/count the trees nearby, whether they are coniferous or deciduous trees.
  - Take photos of the trees, take leaf samples (off the tree or from the ground around the tree) for identification purposes in the classroom, or proceed with the identification activity outdoors.

Action:
- Using the apps, the silvics guides and/or the tree ID guides in the resources list above, identify tree species in your school yard.
  - The resource links above contain guides or "keys" for tree identification. Following the key, you can typically come pretty close to identifying any native trees.
  - The app links might be helpful in identifying any "landscaping" trees, or trees that are not species that are native to the Acadian-Wabanaki forest. If you are unable to identify them, move on to planning a native woodland restoration step.
  - Identify native trees vs. non-native trees (for example, sugar maple is native; basswood is not native to here but is in southern New Brunswick and may migrate here over time/with climate change, etc.; Norway Maple is non-native and invasive. Eliminating invasives could be a side project.)
- In groups, have the kids make a tree-ID poster for each **native** tree species, adding the shape of the leaf, the tree shape, and facts about each tree. They can utilise the guides and the silvics websites as resources.
- Referencing the paragraphs in the appendix of this lesson plan, identify which tree species from your schoolyard will be helpful to climate change adaptation of your school's "woodland".
- Brainstorm ways that you could acquire or fundraise for some trees to be planted in your schoolyard to aid in climate change adaptation for your school's "woodland".

- Charlie the Tree Guy in Truro has some native species, small ones are a reasonable price
- Tree nurseries in the area might be able to donate a tree, Scott and Stewart is based in Antigonish
- Your class could email businesses in the area such as plant and garden centres for a tree donation
- The Truro Agricultural college might have resources or contacts for your school
- If the class can be very responsible and detail oriented, you could try germinating some cones, samaras or acorns yourself to be planted by your class. This is the most difficult way to acquire a new tree, but it is completely free and the most educational. It may require cold-stratification of seed and consistent babysitting of your nursery. If the school has a greenhouse, it will be beneficial for this project.

Consolidation and Next Steps:
- Plan a school planting day, invite other classes or community members to participate/volunteer (and/or any organisations that have helped/donated/contributed)
- Make plaques to identify the native trees
  - Cross-curriculum connections: these could be painted rocks for art class, or made with wood by tech ed/wood shop class
- Have outdoor education with the trees, inviting the school to use the space as an outdoor classroom or an expansion to a pre-existing outdoor classroom space
- Any invasive species that are identified can be removed and re-purposed (a Norway Maple could be cut down and turned into a bench or table, a large stump can become an outdoor chess or checker board by wood-burning squares into it, etc.)
- Learn about tree species that have been affected by disease, invasive insects, colonisation, logging in Nova Scotia:
  - Dutch Elm, Emerald Ash Borer, Hemlock Woolly Adelgid, Beech Canker
  - Black Ash and White Cedar populations steep decline - both of which are important to the Mi'kmaq. See Black Ash COSEWIC; Mikmaq Report ; Wisqoq Black Ash

Appendix

"The Atlantic Maritime ecozone covers all of Nova Scotia, New Brunswick, Prince Edward Island, and part of Québec. The Atlantic Ocean creates a cool, moist maritime climate. The ecozone is heavily forested with mixed stands of conifers (notably balsam fir) and deciduous species (such as maple and birch). It contains elements of the Acadian, the Great Lakes–St. Lawrence, and boreal forest regions. Examples of tree species in this region include red, black, and white spruce, balsam fir, sugar maple, yellow birch, and beech. This ecozone has

the highest percentage of private woodlots in Canada, as well as one of the longest histories of tree harvesting and land clearing. This forest is known as the Acadian-Wabanaki forest.

Over the next several decades, the climate in Canadian forests will shift northward at a rate that will likely exceed the ability of individual tree species to migrate. While most tree species can migrate naturally up to a few hundred metres per year via seed dispersal, the climatic conditions in which each species thrives may move north by several thousand metres annually.5 This will put pressure on the southern end of each species' range, but it could create opportunities for tree species to establish at the northern edges of their range. In addition, a changing climate will affect the success of insects and diseases that attack tree species, and it will cause changes to tree physiological processes, seedling survival, growth, and productivity."
- **Report on the Vulnerability of Tree Species to Climate Change**

"The Acadian Forest Region (AFR), [that] is comprised of boreal tree species and more southerly affiliated tree species to form a unique mixed forest type, is widely considered to have been simplified, degraded, and borealized through decades (even centuries) of intensive forest management. Results from three recent research projects into the resilience of this forest type, and its constituent tree species, to the effects of climate change have come to some consensus: that only nine species will likely persevere in the long-term (2011-2100): eastern hemlock, eastern white cedar, red maple, red oak, red spruce, sugar maple, white ash, white pine, and yellow birch.

Another fourteen species were identified by one or two (but not all three) of the research projects as having moderate to high resilience to climate change: American beech, American mountain ash, balsam poplar, black cherry, bur oak, butternut, ironwood, mountain maple, mountain paper birch, pin cherry, serviceberry, silver maple, striped maple, and white elm."
- **Report on Climate Change Resilient Species in the Acadian Forest**