Climate Change and Manoomin (wild rice) at Fond du Lac (FDL) WS
Activity Plan

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INSTRUCTIONS

Audience: Upper elementary and early middle school

Instructions: Break students out into groups of about 4 students with a teacher/mentor guide. We used Ojibwe names for colors to designate groups:

Ozhaawashkwaa (Green), Ozawaa (Yellow)
Waabishkaa (White)
Ozhaawashkwaa (Blue)
Makadewaa (Black)
Miskwaa (Red)

Materials Needed (see attached materials)
1. Instructions & Question Master to hand out to students
2. Maps /figure Master Page to help answer questions
3. "Cheat sheet" from G-WOW website (www.g-wow.org) to help facilitate student learning (like a Key)
4. Student response ideas from group presentations

Instruct groups to work on each question one at a time and then present their findings to the entire group after each question. A note taker should record the student responses and the entire group review the results.

Note: In Question #2 students explore the G-WOW site (www.g-wow.org) to answer the question.

Question Master

Question 1:
Based on the climate change predictions shown in the maps, how would you describe FDL's future environment? Use at least five sentences.

Question 2:
Based on your own research on manoomin (work in computer lab using the G-WOW website www.g-wow.org), how do you predict the future environment at FDL will affect manoomin? Use at least five sentences.

Question 3:
What can you do to sustain manoomin at FDL or elsewhere?

Continued

MAPS AND FIGURES FOR CLIMATE CHANGE AND MANOOMIN LESSON

Map 1: Wild Rice Distribution in the MN/WI/MI Area (http://www.g-wow.org/)

Figure 1: Past and Projected Global Surface Warming (several climate model scenarios shown)

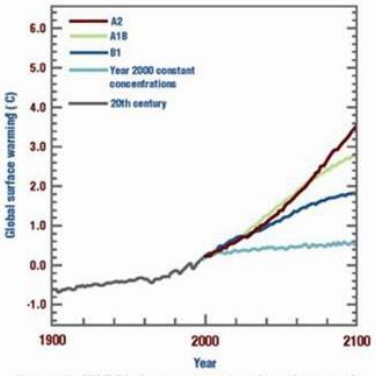
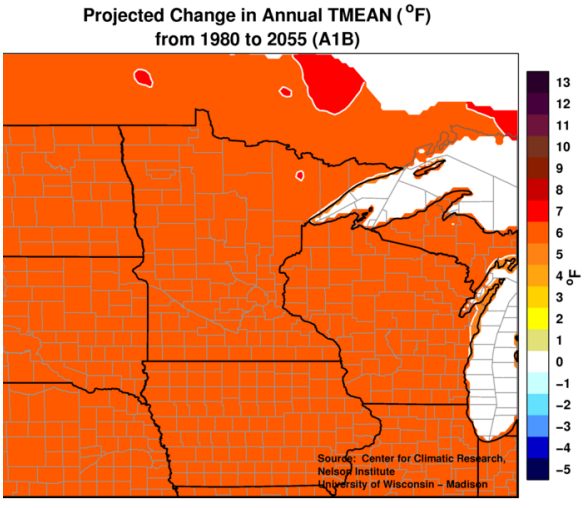


Figure 8. WICCI climate projections have been made using the A2 (high end), B1 (low end) and A1B (middle) carbon emissions scenarios developed by the Inter-governmental Panel on Climate Change. Projections shown in this report represent only the A1B scenario, which assumes continued reliance on fossil fuels.

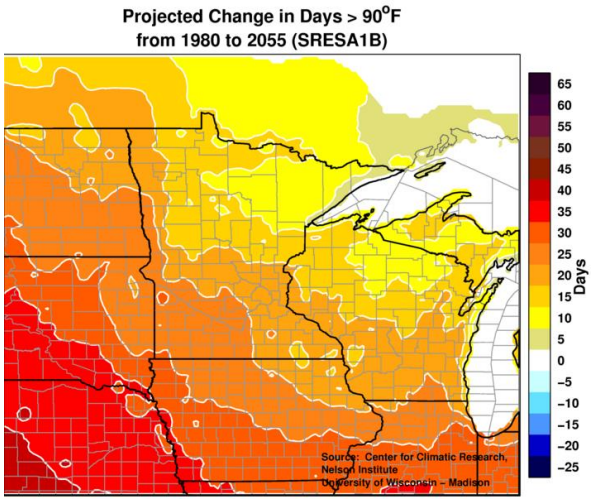
Source: Adapted from Intergovernmental Panel on Climate Change, 2007.

- **A2 Scenario**- This model is characterized by a future with intensive fossil fuel use and high carbon emissions, higher than today's rate.
- **A1B Scenario**- This model uses a middle level rate of fossil fuel use where future carbon emissions remain similar to what we are experiencing today.
- **B1 Scenario**- This model is characterized by a future with lower fossil fuel use and lower carbon emissions than today's rates.

Map 2



Map 3



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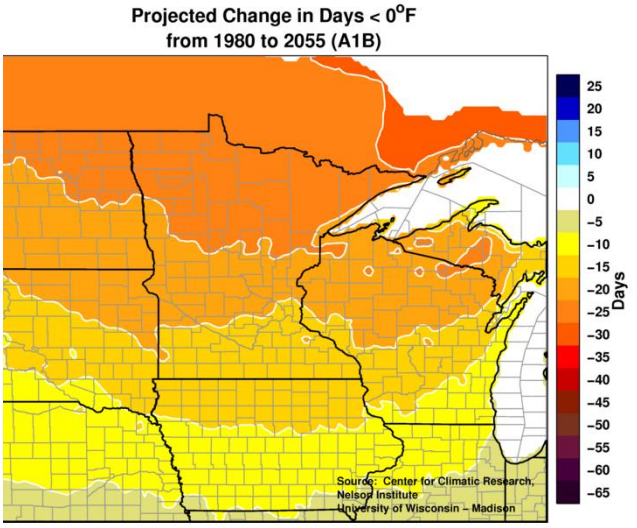
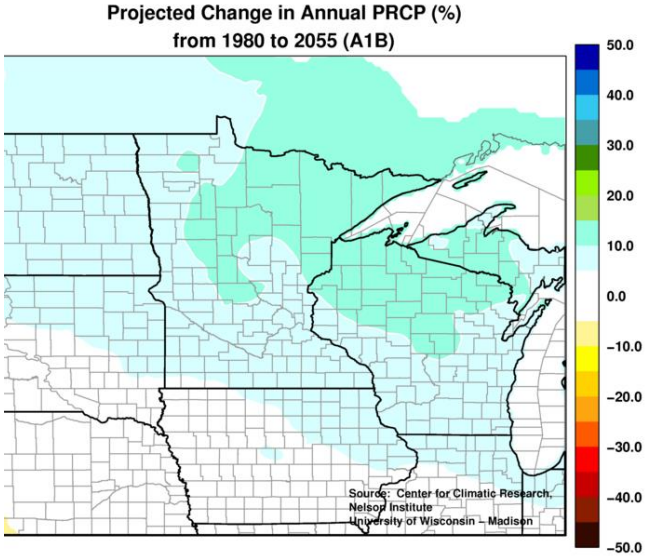
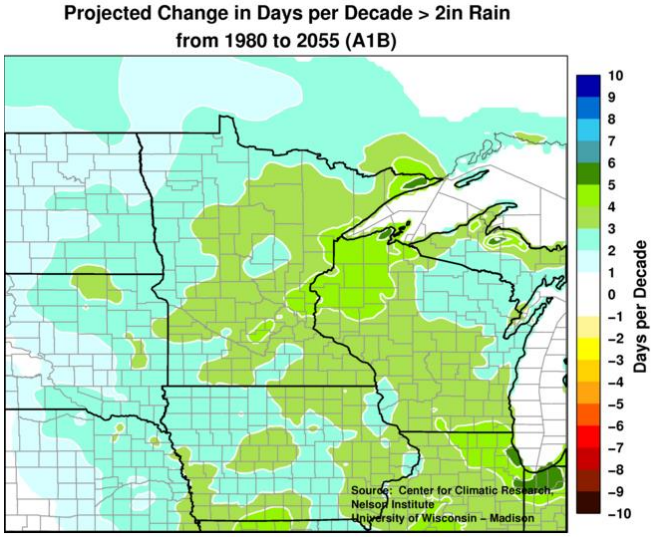
Map 4



Map 5



Map 6



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Student Response Ideas from
Climate Change and Manoomin at Fond du Lac WS Activity

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These are examples of student responses to the each of the three "master questions" used in this activity to explore the relationship between climate change and manoomin based on cultural and scientific evidence. Use them to prompt responses from your students.

Question 1: Based on the climate change predictions shown in the maps, how would you describe FDL's future environment? Use at least five sentences.

Ozhaawashkwaa (Green):

1980-2055 there will be 10-15 days above 90 deg. F

10% change in precip (2055)

Warmer means no more wild rice

Ozawaa (Yellow):

More rain may cause floods threat of more pollution

Temperature will increase in our area

Floods will cause damage to wild rice and animals

Waabishkaa (White):

In 2055…

warmer by about 6 deg F

10 more days of temps over 90 deg F

10% more precip

4 more days per decade with heavy rain

Ozhaawashkwaa (Blue):

More rain, more flash floods, less cold days in the winter, warmer overall, hotter

Makade (Black):

Continued

means warmer, more rain, less cold days in winter, more floods

Miskwaa (Red):

6 degrees warmer (avg by 2055), more floods damage rice, 15 more days over 90 deg F

Question 2: Based on your own research on manoomin (work in computer lab), how do you predict the future environment at FDL will affect manoomin? Use at least five sentences.

Ozhaawashkwaa (Green):

Too little or too much water can harm manoomin

Manoomin can only grow in shallow water

Increased flood events can kill manoomin in floating leaf stage

Lifestyle of Anishinaabe will change with loss of manoomin

Ozawaa (Yellow):

Invasive species will move in that outcompete manoomin

Water depth could not be right for manoomin

Habitat can change so manoomin doesn't grow

Need to make changes or will lose manoomin

Waabishkaa (White):

Manoomin won't grow if rains too much (could flood out)

Winter season length and temperatures will affect manoomin

Too much water can affect water

Brown spot disease likes warmer climates

Continued

Ozhaawashkwaa (Blue):

Water level changes (too much) can harm the rice

Increases in insects that harm manoomin

Shorter winter bad, more insects and disease

Floods bad for rice

Manoomin is delicate

Makadewaa (Black):

Water rise can drown rice

Disease increase

Need freezing in winter for rice

Less rice is bad for animals

Floods will make rice wash away

New plants will take place

Habitat for manoomin decreased, invasive plants can take over

Fish and birds and other animals affected

Rice in Great Lakes region

Miskwaa (Red):

Manoomin has big part in culture

Manoomin healthy helps with diabetes

Floating leaf stage is critical and floods can wash out during this stage

Other ideas:

Carp like warmer water, they uproot rice

Invasive bugs like warmer weather and some eat the rice

More insect outbreak

Rice worms can affect seed growth

Manoomin can handle some water level change but not a lot

Question 3: What can you do to sust Continued **n at FDL or elsewhere?**

Ozhaawashkwaa (Green):

Control water levels w/ dams, ditch levels, beaver dams

Keep water clean, get rid of invasive species that win against manoomin

Vegetation cut away

Chemicals on rice worms that eat manoomin (but will it hurt the manoomin or other things too?)

Ozawaa (Yellow):

Any person that breaks the law against manoomin has to pay money

Every small step can help protect the rice

It teaches us about our culture

Diseases and invasive species…

Waabishkaa (White):

FDL Reservationcontrols water levels so manoomin doesn't drown

FDL controls water with dams

Removing invasive species with cookie cutter, and reseed with manoomin (successful but lots of areas remain)

Ozhaawashkwaa (Blue):

1933 state conservation corps noticed manoomin was decreasing

Two technicians handle water level management for manoomin

Build dam on Deadfish Lk to help with flooding

Since 1922…

Trapping beaver to help with water levels because dams hold back water

Makade (Black):

Dams to control water levels

Fdl natural resources in charge of managing the rice: control water levels… technicians work on this. Also cookie cutter and airboats used to restore rice

Beaver dams and beavers removed if creating problem w/ water levels.

Remove extra plants

Miskwaa (Red): Continued

Recede lakes

Help regulate the water levels

We can build dams

The FDL Rice Committee (made up of elders) makes decisions on when to go out ricing, and observe if issues, etc. to direct resource management on direction. Caretakers of a lake to watch what is happening. This has been a tradition and continues today to direct science.

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