LEAF-Wisconsin's K-12 Forestry Education Program
College of Natural Resources
University of Wisconsin-Stevens Point

TRACK THAT PRODUCT

Nutshell:

In this lesson, students explore a forest product through a case study and class presentation. A product's journey is traced - from its growth in the forest, to processing, and as a finished product. Students will develop a model that tells a story of their product in relation to Wisconsin forests and economy. Future impacts to their product are also addressed.

Objectives:

Students will be able to…

- Complete independent research that tracks a forest product from its origin to finished product.
- Recognize the forest products industry's significance in Wisconsin.
- Identify three careers associated with production of an assigned forest product.
- Design and/or construct a model which communicates a natural resource message.
- List and describe uses for tree species.
- Research and debate current issues related to conversation or preservation of natural resources.
- Report on the significances of ecological change and its impact on Wisconsin forests and economy.

Wisconsin State, National Core, and NGSS Standards:

Agriculture:

- ESS2.a.11.h: Report on consequences of climate change and its impact on Wisconsin and globally
- NR1.a.5.h: Research and debate one of more current issues related to conversation or preservation of natural resources.
- NR3.a.16.h: List and describe uses of tree species and determine when to harvest forest products.
- NR5.a.3.h: Design and/or construct a display communicating a natural resource message for a media type.

Materials:

- Computers or tablets for research.
- LEAF's Forest Products Kit is optional but contains the various forest products highlighted for research.

Teacher Preparation:

- Explore the US Forest Service's Climate Change Tree Atlas. Familiarize yourself with the information within it.

Background:

The forest products industry is an important part of Wisconsin's economy and recognized for leadership in sustainability and strong stewardship. It ranks among the top 10 industries for output and value added in Wisconsin. Wisconsin is the number one papermaking state in the U.S. producing 5.3 million tons of paper annually. It produces products for local and global needs. According to the Wisconsin Department of Natural Resources, the average person employed in the forest products industry makes $47,000 annually. The forest industry provides close to 60,000 jobs and $23 billion for the economy directly. With over 1,200 companies in primary and secondary forest product businesses, the forest products industry shapes every corner of the state. For every job in forestry, it also supports 3.8 additional jobs in the state. Each case study will include information about tree species and the forest, how a product was made, and how the product is used. Associated information will help students see various forest products' industries and career opportunities associated with them.

Students will also assess how their forest product might be impacted by ecological changes in the future. Forest communities and species distribution are always changing, and it is important to think in 50-100(+) year life cycles when

thinking about forest management and forest products. The U.S. Forest Service has created a Climate Change Tree Atlas: https://www.fs.fed.us/nrs/atlas/tree/316. The atlas assesses the current status (year 2000) and potential future status (year 2100) of 134 tree species in the eastern United States (east of 100th meridian) following climate change. It uses US Forest Service inventory data with 38 environmental variables to generate models of current suitable habitat for each species. It then changes the climate according to three General Circulation Model (GCM) climate models (HADCM3, PCM & GFDL - see 3-GCMs for details) and two emissions scenarios (A1FI (Hi) = little conservation efforts to mitigate CO2 emissions, B1 (Lo) = significant conservation effort), and model the potential future species' habitats. These two emissions scenarios bracket most of the emission futures as outlined by the Intergovernmental Panel on Climate Change's (IPCC) evaluation of emission scenarios and end the 21st century at roughly double (550 ppm-B1) and triple (970 ppm-A1fi) the pre-industrial levels of CO2. General Circulation Model (GCM) is a complex mathematical model parameterized with information about the atmosphere, Earth, and oceans to simulate hourly or daily climatic conditions. GCMs are run for a length of time prior to the period of future simulations in order to assess the accuracy of known events. The Intergovernmental Panel on Climate Change (IPCC) has included results from many GCMs into their assessments. The Climate Atlas also predicts modification factors (such as drought, flood, harvest, fire, invasive species) on a graduated scale to see how these ecological factors may positively or negatively interact with the tree species.

Procedure

In this lesson students will track a forest product from the finished product itself back to the tree it came from.

A. Introduction—Forest Product Section

1. Ask students: Do you believe the forest products industry is important in Wisconsin? *Display Teacher Page 1: Wisconsin's Primary Forest Product Mills* and *Teacher Page 2: Forest Products Producers in Wisconsin By County* and discuss that throughout the state, the forest products industry plays an important role.
2. Ask students to make estimates on the Q and A questions on *Teacher Page 3: Wisconsin Forest Products Facts*. After they have made guesses, read the answers and have the class raise their hand if they guessed higher or lower and if they think any answers were surprising.
3. Play the video clip that tracks basketball floors for the NCAA finals from Menominee Nation's forest to the floor's installation for the tournament: Menominee Tribal Enterprises (Neopit, Wis.): https://vimeo.com/39374298. Emphasize that students will do a similar process to understand how their assigned product "came into being" and tell a similar story. Students will then present their assigned products "life cycle story" to the class.
4. Introduce the overarching student project which tracks a forest product from the finished product, back through processing, and eventually to the tree from which it came. Students will focus on associated careers and their product's contribution to Wisconsin's economy. Students will also look at future predicted forest ecology to see how their forest product may be impacted.
    - Hand out and go over *Student Page 1: Track That Product Rubric* and *Student Page 2: Prompt Questions Guide*.
    - Emphasize that in the end presentation model, three associated careers and 1 Wisconsin-based company that makes their product must be highlighted. An analysis of the tree species' forest cover in Wisconsin from which their product comes and an understanding of how changing ecology may impact their forest product needs to be included.
5. If you have access to LEAF's Forest Products Kit, display the different products. Have them sign up for a product on Teacher Page 4: Forest Product Sign Up. They will perform research to tell their forest products' story.
6. This research will guide their exploration towards the development of a 3-5 minute presentation and presentation object (poster, multimedia presentation, website, informational sheet etc.). In doing so, they will learn about various people resources and natural resources that make their forest product. The end product should include visuals and informational text. They can be creative in how they "track" their product visually.

Encourage them to use maps, pictures, charts, and creative textual layouts. They can think of their research process in 3 steps: Product, Processing, and Tree.

7. Prompt questions for their product should include the following: What is their product? How is it used? Who uses it? Is the market local, national, or global?

Recommended Resources for the Forest Products Section:

It is recommended to complete the other lessons, or parts of them in conjunction with this Forest Products Section.

- As an introduction to forest products in Wisconsin have them complete Lesson 4: Forests Are Important to Me!, 2-3 LEAF Curriculum Lesson Guide. Students explore forest values and discover what forest products come from Wisconsin using a checklist. They should focus on Students Pages 1-3. This would be a great introductory activity before the video.
- *Lesson 4: The Forest Marketplace* in the *9-12 LEAF Curriculum Lesson Guide* as an introduction into Wisconsin forest economy. Students identify factors that influence the supply of and demand for forest resources using basic economic principles. Using veneer as an example, students use graphs to describe markets in different geographic regions and examine the relationship between Wisconsin's forest resources and those of the rest of the world.
- *Lesson 6: Making Broader Connections* in the *7-8 LEAF Curriculum Lesson Guide*. Students make connections between forests of Wisconsin and forests worldwide and discuss challenges to Wisconsin's forests by tracing the life cycle of a product and playing Forest Jeopardy. They also participate in a sustainability simulation to learn about demand.

B. Product Processing Section

During the processing portion of the research, students will investigate how their product is made. They should find at least one Wisconsin-based company that produces their product to highlight in their presentation. They should also pay particular attention to the careers associated with the production of their product.

1. Distribute the more detailed product guides from *Teacher Page 5: Forest Product Starter Sheet* so that each student has a strip with more information that matches their assigned product. Let students know that this will help guide their research in this portion, but if they find other companies or careers of interest that are not listed, they are welcome to use those as well.
2. Go over the prompt questions on *Student Page 2: Prompt Questions Guide*. Remind them that these are only starter questions and they may wish to pursue other questions related to their research. Also remind them to be collecting relevant sources of information that they can use in their presentation model. Remind students to keep a record of these information sources.
3. Play one or several of the career video developed by the Lake States Lumber Association to introduce students to career profiles:
   Head sawyer: https://www.youtube.com/watch?v=wdwZXRHtf-E
   Log scaler: https://www.youtube.com/watch?v=fmF0z2IrU_I
   Lumber inspector: https://www.youtube.com/watch?v=2KM0UvOv22U
   Saw filer: https://www.youtube.com/watch?v=JUnBwMQkDcg
4. View the following website for Besse Forest Products: http://www.bessegroup.com/ (or a company of your choice) to introduce them to a company profile. Take them through the various kinds of information on the company websites. If they have any job postings, show them this link.

Recommended Resources for the Product Processing Section:

It is recommended to complete the other lessons, or parts of them in conjunction with this Product Processing Section.

- *Lesson 5: Forest Science and Technology* in the *9-12 LEAF Curriculum Lesson Guide* to introduce concepts of life cycle analysis and environmental impacts of the forest industry. Students analyze the environmental impacts associated with wood, concrete, and steel by creating life cycle analyses. They study the role forest management, technology, and consumption play in sustaining forests and develop proposals to reduce the environmental impact of wood use. This environmental perspective can get factored into their forest product analysis.

C. Tree Species/Forest Ecology Section

1. Display *Teacher Page 6: Forests in Wisconsin*. This map shows forest type distribution in Wisconsin. Explain that in this portion of the research, students should identify where their tree species grow in Wisconsin. Explain that forests change over time. Foresters and land owners must think in time periods of 50-100 years because that is how long it takes for trees to grow for harvesting.
2. Using the USDA Forest Service Climate Change Tree Atlas: https://www.fs.fed.us/nrs/atlas/tree/316, students will investigate under low emissions scenarios (550 parts per million) and high emissions scenarios (970 parts per million) scenarios how their forest product may be impacted by climate change with projected changes in the particular tree species. Explain that they will be using a resource that uses a general circulation model and U.S. Forest Service tree inventory data, combined with 38 environmental variables to generate models of current suitable habitat for each species and future suitable habitat under the climate change scenarios as projected in 2100. They can then use this information to think about how changes in the future forest might impact their forest product.
3. Project *Teacher Page 7: Present Species Distribution* to explain the Climate Atlas and the information they will learn from it (or walk them through it on the website directly). Show them how to get to the list of trees in the bottom right corner. In the balsam fir example under current inventory and analysis tab, balsam fir is a relatively important species with relatively high population in northern Wisconsin. Explain the lighter colors mean there are little to no trees of that species in the area, and darker colors means there are more trees of that species in the area. The red line is the species range boundaries in the present. Point out the more detailed species information "About X species" that can be found on the right side of the screen
4. Project *Teacher Page 8: Future Species Distribution in 2100* (or walk through on the website directly). Explain that this is projected future species distributions. Show them how to change the climate scenarios in the drop-down menu. It is not important for the purposes of this study to use a specific scenario. They are just slightly different computational models. They should run a low and high scenario and stay consist within the model they use. Also point out ModFacs (Modification Factors) to the right of the screen.
5. Project *Teacher Page 9: Modification Factors* (or walk them through it on the website directly). Explain that there are many ecological factors that can be impacted positively and negatively. This graph shows some of these factors and rates them on whether they will be positively impacted or negatively impacted and to what extent in 2100. Point out the scale on the bottom of the page and explain that red means very negatively impacted and green is positively impacted. Students can use this information to assess why their assigned tree species might benefit from or be negatively impacted from climate change.

Recommended Resources for the Product Processing Section:

It is recommended to complete the other lessons, or parts of them in conjunction with this Forest Products Section.

- Field Experience 4: Timber Cruise in the *9-12 LEAF Curriculum Lesson Guide.* In this lesson, students conduct a timber cruise of their school forest to identify the species of trees, volumes of timber, and basal area on the property. Students work in small groups to collect data and use Kruzer software to analyze the complete class data set.
- *Lesson 6: What is Management?* In 5-6 LEAF Curriculum Guide. In this lesson, students explore events in Wisconsin's history that led to modern forestry. They learn about forest management techniques and read a "choose your own adventure" type story about management to learn what can happen if various management decisions are made.
- Leaf Lesson Guide 9-12 Lesson 2: A History of Succession. In this lesson, students work in small groups to create a descriptive timeline that illustrates how Wisconsin's forests have changed throughout history in response to disturbance. To gather information for the timeline, students listen to a short presentation on Wisconsin's natural history, read passages dealing with Native American relationships with the forest, and watch a video about influences on forests since European settlement. Groups then use a Wisconsin Land Cover Map to discuss the changes that have occurred in land use since European settlement. Students use the timeline and tree characteristics to deduce changes in the distribution of certain tree species. Students discuss current causes of change in Wisconsin's forests and discuss how the causes fit into the context of the forests' disturbance history.

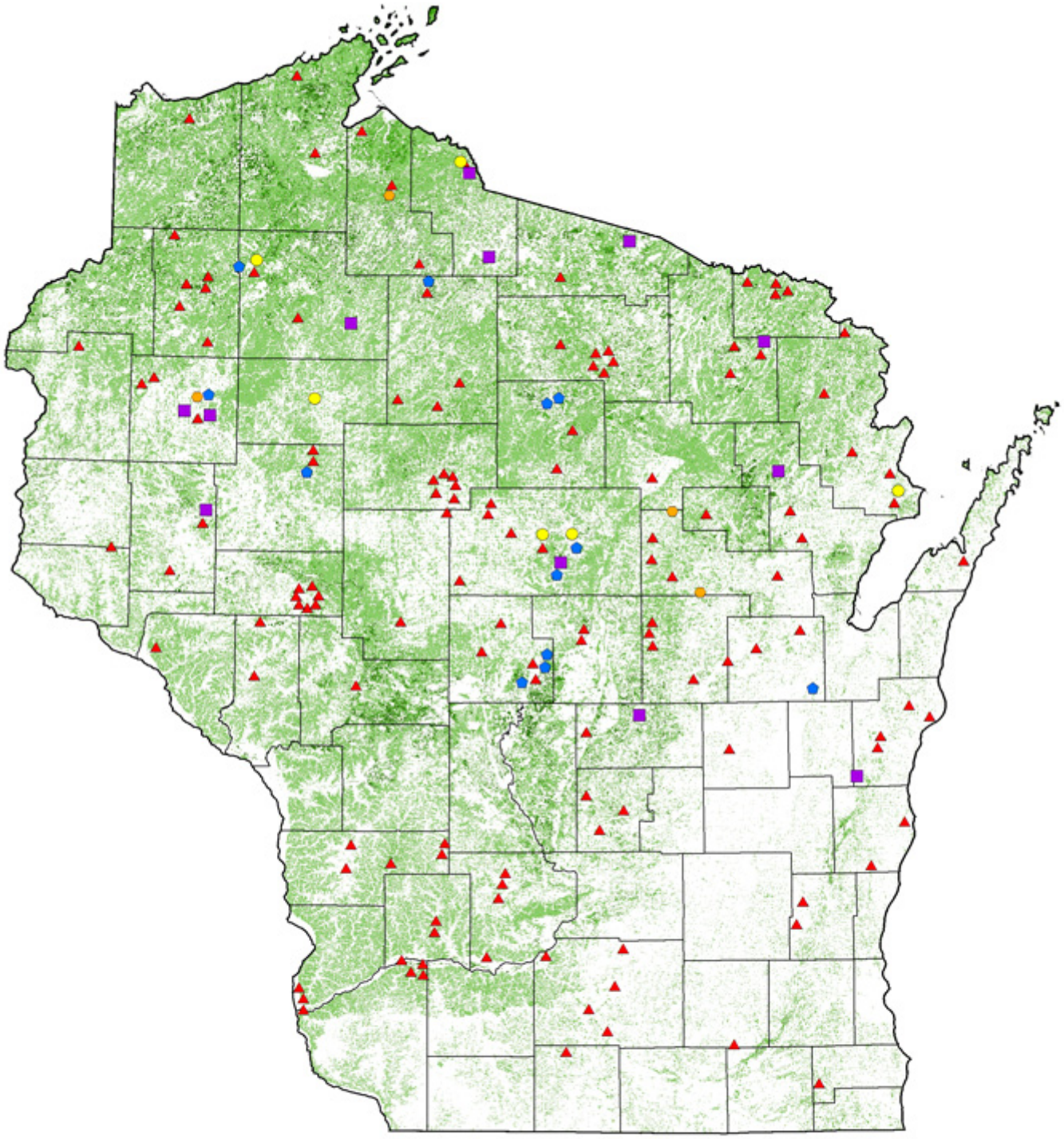
D. Product Research Presentation

Each individual student or team should present information gathered on the assigned forest product. The students' three-to-five-minute presentations should emphasize the uniqueness of their product, how it is made, how it might be impacted by ecological changes, and careers associated with it while highlighting a Wisconsin company which produces the product.

As a Summative Assessment, it is recommended to complete these lessons.

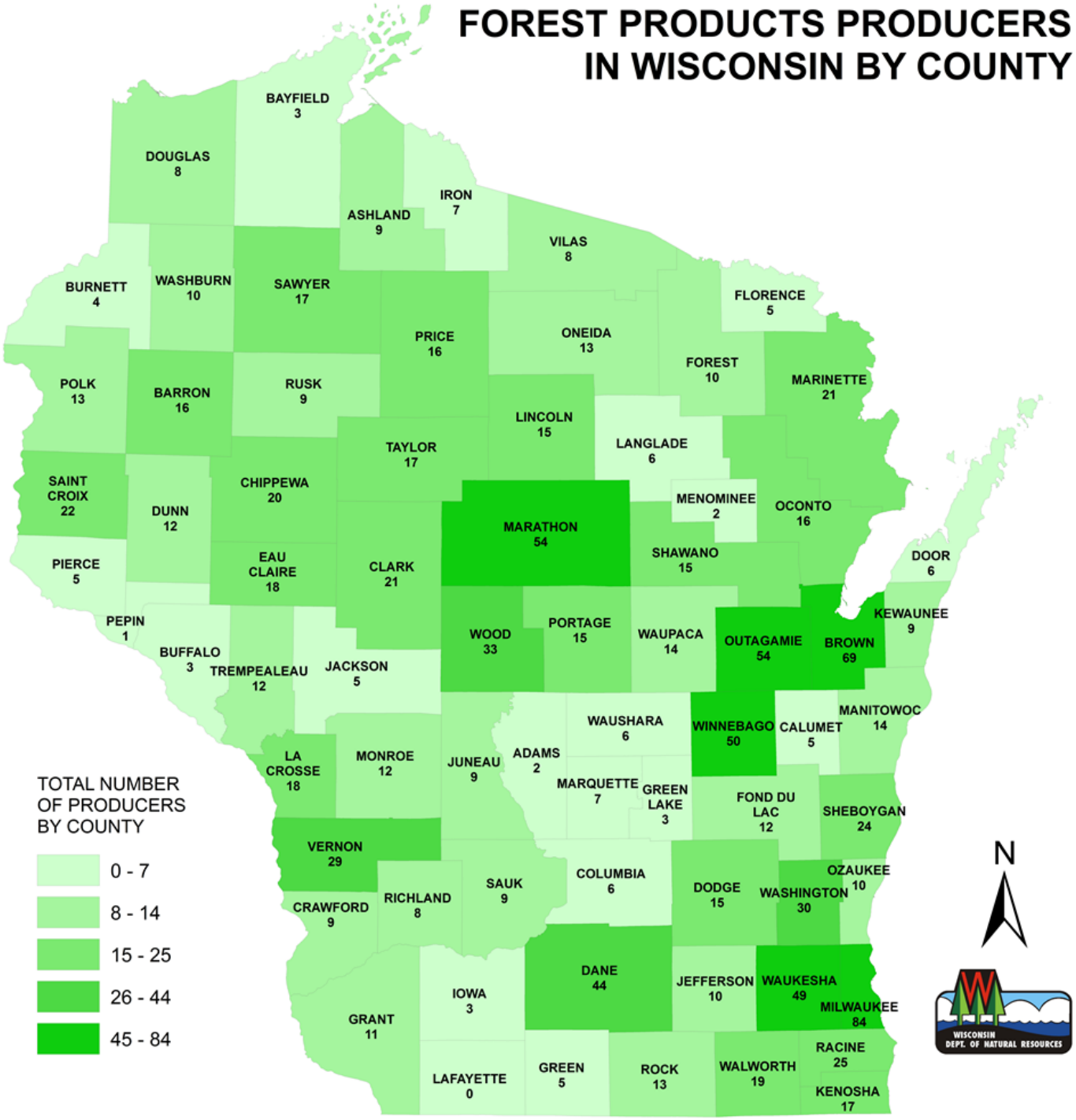
- Lesson 5: Many Forests, Many Values, Many Reasons in 7-8 LEAF Curriculum Lesson Guide. Students assess forest values and discover how forests shape the economy, environment, and society using games, story analysis, and brainstorming. They should compare these many values with their focus on economic values and career foci.
- *Field Experience 6: Community Assets* in *9-12 LEAF Curriculum Lesson Guide* to begin to think about "community" and forest products which link some of the forest products, careers, economic benefits, other non-economic values, and perspective into community forums and community asset maps in Wisconsin. In this lesson, students describe their community's assets, stakeholders, and critical issues. Students use an economic flow diagram to understand the relationships between people and valuable resources. They work as a group to identify assets and stakeholders in their local community. Students organize a community forum in which they interview local leaders to identify important issues and the actions being taken. They work individually to map community assets in the context of a specific issue. In conclusion, students reflect on their experience and identify opportunities to learn more and become involved.

WISCONSIN'S PRIMARY FOREST PRODUCT MILLS



Based on data from the 2013 Timber Products Output survey and 2010 National Pulpwood Consumption.

Date: 09/01/2016


FOREST PRODUCTS PRODUCERS IN WISCONSIN BY COUNTY
BAYFIELD 3
DOUGLAS 8
IRON 7
ASHLAND 9
VILAS 8
BURNETT 4
WASHBURN 10
SAWYER 17
FLORENCE 5
PRICE 16
ONEIDA 13
FOREST 10
MARINETTE 21
POLK 13
BARRON 16
RUSK 9
LINCOLN 15
LANGLADE 6
TAYLOR 17
SAINT CROIX 22
CHIPPEWA 20
DUNN 12
MENOMINEE 2
OCONTO 16
MARATHON 54
PIERCE 5
EAU CLAIRE 18
CLARK 21
SHAWANO 15
DOOR 6
KEWAUNEE 9
PEPIN 1
WOOD 33
PORTAGE 15
WAUPACA 14
OUTAGAMIE 54
BROWN 69
BUFFALO 3
TREMPEALEAU 12
JACKSON 5
WAUSHARA 6
WINNEBAGO 50
CALUMET 5
MANITOWOC 14
LA CROSSE 18
MONROE 12
JUNEAU 9
ADAMS 2
MARQUETTE 7
GREEN LAKE 3
FOND DU LAC 12
SHEBOYGAN 24
VERNON 29
COLUMBIA 6
SAUK 9
DODGE 15
WASHINGTON 30
OZAUKEE 10
CRAWFORD 9
RICHLAND 8
DANE 44
JEFFERSON 10
WAUKESHA 49
MILWAUKEE 84
IOWA 3
GRANT 11
LAFAYETTE 0
GREEN 5
ROCK 13
WALWORTH 19
RACINE 25
KENOSHA 17
TOTAL NUMBER OF PRODUCERS BY COUNTY
0 - 7
8 - 14
15 - 25
26 - 44
45 - 84
N
WISCONSIN DEPT. OF NATURAL RESOURCES

Teacher Page 3: *Wisconsin Forest Products Facts*

Q: How many people does the forest products industry employ in Wisconsin?

A: More than 64,000 people (including logging and support).

Q: How many acres of forested land does Wisconsin have?

A: More than 17 million acres.

Q: To how many countries do Wisconsin forest products usually travel per year?

A: 117 countries around the world.

Q: How many dollars worth of forest products does Wisconsin export annually?

A: About $1.4 billion.

Q: What is the top forest product export in Wisconsin?

A: Paper and paperboard make up about 60%, followed by printed books and newspapers at about 20%, and wood, articles of wood, and wood furniture at about 20%.

Q: What is the average wage of someone working in the forest products industry?

A: About $47,000. With total wages contributing $3.4 billion total wages per year to the total economy.

Q: Is Wisconsin the number one paper producing state?

A: Yes. Since 1953.

Q: How much capital do Wisconsin's public and private lands generate through forest products?

A: $22.9 billion.

Teacher Page 4: *Forest Product Sign Up*

Tree	Product	Student's Name
White pine (Pinus strobus)/ Red pine (*Pinus resinosa*)	Construction framing	
Aspen (*Populus tremuloides*)	OSB or engineered wood siding	
Northern red oak (*Quercus rubra*)	Crown molding and trim	
Sugar maple (*Acer saccharum*)	Flooring/sports flooring	
Pulp-based product	Wood flour	
Pulp-based product	Reese's peanut butter cup wrapper	
Pulp-based product	Cardboard	
Pulp-based product	Paper pad/post-it notes	
Pulp-based product	Toilet paper	
Pulp-based product	Paper towel	
Pulp-based product	Coffee filters	
Wood-residue product	Animal bedding	
Various	Fuel pellets	
Various	Chips and mulch	

Teacher Page 5: *Forest Product Starter Sheet*

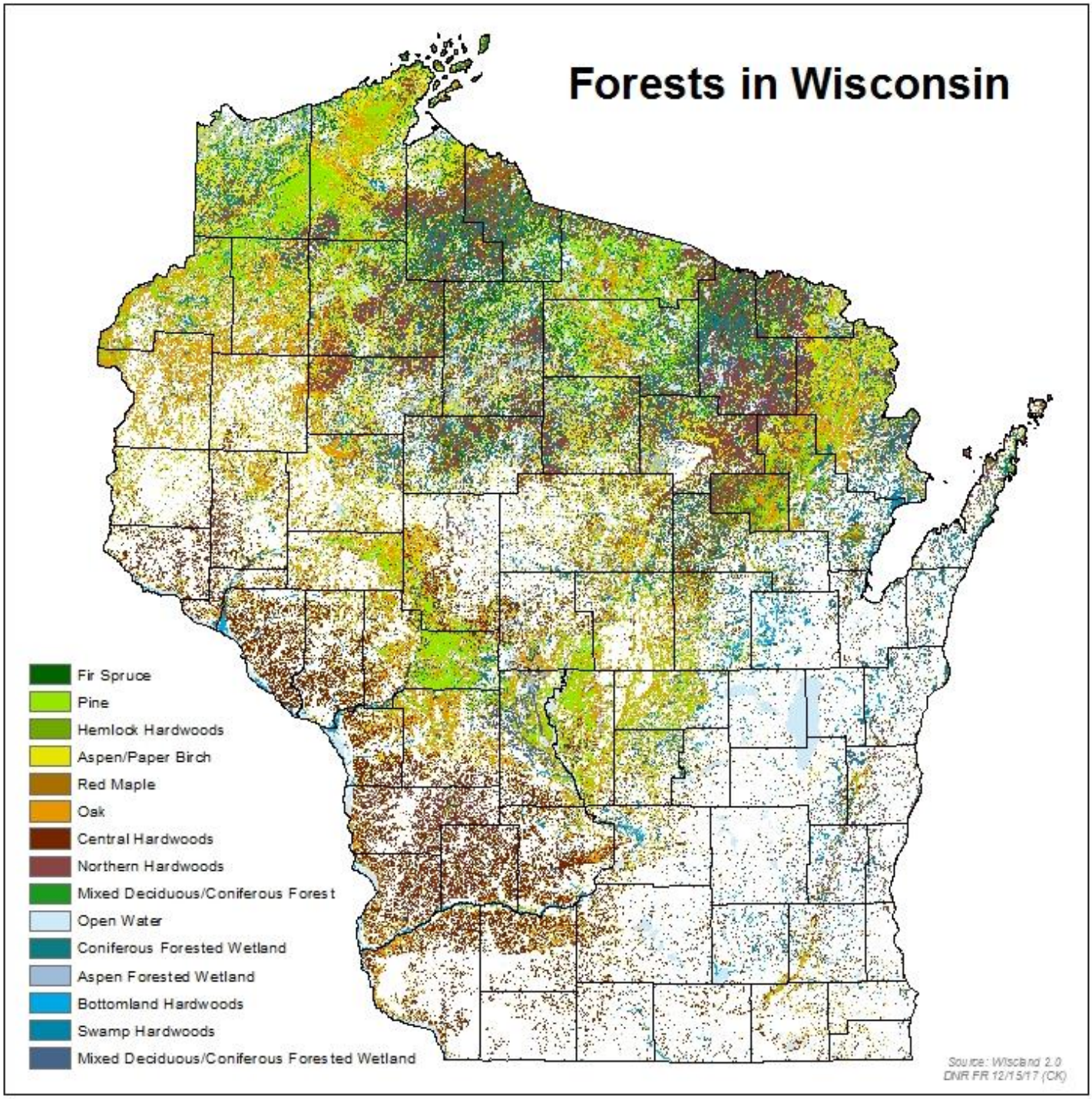
Tree	Product	Wisconsin Companies	Careers Associated
Red pine (*Pinus resinosa*)	Construction framing lumber (2x4-8, 2x6-10)	• Biewer Lumber (Prentice and Spencer, Wis.) • Pukall Lumber (Arbor Vitae, Wis.)	• Log scaler • Sawmill machine operator • Saw filer • Lumber inspector • Maintenance technician • Dry kiln manager • Heavy equipment operator • Sales representative • Safety coordinator • Truck driver • Accountant/Controller • Accounting Clerk • Human Resource Manager • Plant Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Aspen (*Populus tremuloides*)	OSB or engineered wood siding	• Louisiana-Pacific (Hayward, Wis.) • Louisiana-Pacific (Tomahawk, Wis.)	• Maintenance technician • Heavy equipment operator • Electrician • Quality control specialist • Machinist • Millwright • Equipment operator • Dryer operator • Sales representative • Safety coordinator • Truck driver • Forester • Yard/scale manager • Wood room supervisor • Chemical Engineer • Civil Engineer • Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Plant Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Northern red oak (*Quercus rubra*)	Crown molding and trim	• Menzner Hardwoods (Marathon City, Wis.) • Menominee Tribal Enterprises (Neopit, Wis.) • Enterprise Wood Products (Rhinelander, Wis.) • Shawano Wood Products LLC (Shawano, Wis.)	• Moulder technician • Assembler • Finisher • Machinist • CNC programmer • Designer • Plant Manager Maintenance technician • Heavy equipment operator • Electrician • Quality control specialist • Sales representative • Safety coordinator • Truck driver

Tree	Product	Wisconsin Companies	Careers Associated
Sugar maple (*Acer saccharum*)	Flooring/sports flooring	• Aacer Flooring (Peshtigo, Wis.) • Action Flooring Systems (Mercer, Wis.) • Infinity Wood Floors (Crandon, Wis.)	• Lumber inspector • Maintenance technician • Dry kiln manager • Heavy equipment operator • Plant Manager • Sales representative • Safety coordinator • Truck driver • Accountant/Controller • Accounting Clerk • Human Resource Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Various species	Veneer	• Great Lakes Veneer (Marion, Wis.) • Wisconsin Veneer & Plywood (Mattoon, Wis.) • Birchwood Manufacturing – Besse (Rice Lake, Wis.) • Bayland Veneer (Green Bay, Wis.) • Saunders Wood Specialties (Park Falls, Wis.)	• Lumber inspector • Log Yard Scaler • Maintenance technician • Dry kiln manager • Heavy equipment operator • Sales representative • Safety coordinator • Truck driver • Accountant/Controller • Accounting Clerk • Human Resource Manager • Plant Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Maple and pine	Wood flour	• Marth Wood Supply (Marathon City, Wis.) • Ellinger's Agatized Wood Inc. (Sheboygan, Wis.) • North Wood Plastics, Inc. (Sheyboygan, Wis.)	• Salesman • Machine operator • Truck driver • Administration • Maintenance technician • Plant Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Pulp-based product (Some of the most commonly used softwood trees include spruce, pine, fir, larch, hemlock, and hardwoods such as aspen and birch)	Reese's peanut butter cup wrapper	• Expera Specialty Solutions, (De Pere, Wis.)	• Chemical Engineer • Civil Engineer • Plant Manager Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Forester • Yard/scale manager • Wood room supervisor • Heavy equipment operator • Maintenance technician • Safety coordinator • Quality control specialist • Environmental manager • Millwright • Electrician • Pipefitter • Paper chemist • Sales Representative

Tree	Product	Wisconsin Companies	Careers Associated
Maple, hemlock, and pine	Chips and mulch	• Marth Wood Supply (Marathon City, Wis.) • Dejnos, Inc. (Kenosha, Wis.) • Hay Creek Companies (Pittsville, Wis.)	• Salesman • Machine operator • Truck driver • Administration • Plant Manager • Human Resources Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Pulp-based product (Some of the most commonly used softwood trees include spruce, pine, fir, larch, hemlock, and hardwoods such as aspen and birch)	Wrapping paper	• Verso (Stevens Point, Wis.)	• Chemical Engineer • Civil Engineer • Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Maintenance technician • Safety coordinator • Quality control specialist • Environmental manager • Millwright • Electrician • Pipefitter • Paper chemist • Sales Representative • Plant Manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Pulp-based product (Some of the most commonly used softwood trees include spruce, pine, fir, larch, hemlock, and hardwoods such as aspen and birch)	Cardboard	• Packaging Corp of America (Green Bay, Wis.) • Menasha Packaging (Neenah, Wis.) • Wisconsin Packaging Corp (Fort Atkinson, Wis.)	• Chemical Engineer • Civil Engineer • Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Forester • Yard/scale manager • Wood room supervisor • Heavy equipment operator • Maintenance technician • Safety coordinator • Quality control specialist • Environmental manager • Millwright • Electrician • Pipefitter • Paper chemist • Sales Representative • Plant Manager

Tree	Product	Wisconsin Companies	Careers Associated
Pine, aspen, and other assorted species	Animal begging--Premium pick bedding, Easy pick bedding, pine and aspen shavings.	• Marth Wood Supply (Marathon, Wis.) • Dejnos, Inc. (Kenosha, Wis.) • Hay Creek Companies (Pittsville, Wis.)	• Salesman • Machine operator • Plant Manager • Truck driver • Electrician • Accountant • Human resource manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Pulp-based product (Some of the most commonly used softwood trees include spruce, pine, fir, larch, hemlock, and hardwoods such as aspen and birch)	Toilet paper and paper towel	• Kimberly-Clark (Neenah, Wis.)	• Chemical Engineer • Civil Engineer • Plant Manager • Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Maintenance technician • Safety coordinator • Quality control specialist • Environmental manager • Millwright • Electrician • Pipefitter • Paper chemist • Sales Representative
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Hardwood and softwoods	Wood fuel pellets	• Marth Wood Supply (Marathon, Wis.) • Indeck Biofuels (Ladysmith, Wis.) • Great Lakes Renewable Energy (Hayward, Wis.) • American Wood Fibers, (Wausau, Wis.) • Dejnos, Inc. (Kenosha, Wis.)	• Salesman • Plant Manager • Machine operator • Truck driver • Electrician • Accountant • Human resource manager
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Pulp-based product (Some of the most commonly used softwood trees include spruce, pine, fir, larch, hemlock, and hardwoods such as aspen and birch)	Paper pad/post-it notes	• Verso (Wisconsin Rapids, Wis.) • Domtar (Nekoosa, Wis.)	• Chemical Engineer • Civil Engineer • Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Plant Manager • Forester • Yard/scale manager • Wood room supervisor • Heavy equipment operator

			• Maintenance technician • Safety coordinator • Quality control specialist • Environmental manager • Millwright • Electrician • Pipefitter • Paper chemist • Sales Representative
Tree	**Product**	**Wisconsin Companies**	**Careers Associated**
Pulp-based product (Some of the most commonly used softwood trees include spruce, pine, fir, larch, hemlock, and hardwoods such as aspen and birch)	Coffee filters	• Shawano Specialty Papers (Shawano, Wis.)	• Chemical Engineer • Civil Engineer • Mechanical Engineer • Electrical Engineer • Process Engineer • Purchasing Manager • Computer Systems Analyst • Plant Manager • Computer Technician • Accountant/Controller • Accounting Clerk • Human Resource Manager • Maintenance technician • Safety coordinator • Quality control specialist • Environmental manager • Millwright • Electrician • Pipefitter • Paper chemist • Sales Representative


Forests in Wisconsin
Fir Spruce
Pine
Hemlock Hardwoods
Aspen/Paper Birch
Red Maple
Oak
Central Hardwoods
Northern Hardwoods
Mixed Deciduous/Coniferous Forest
Open Water
Coniferous Forested Wetland
Aspen Forested Wetland
Bottomland Hardwoods
Swamp Hardwoods
Mixed Deciduous/Coniferous Forested Wetland
Source: Wiscland 2.0
DNR FR 12/15/17 (CK)

Current Distribution | Projected Future Habitat | Predictor Maps

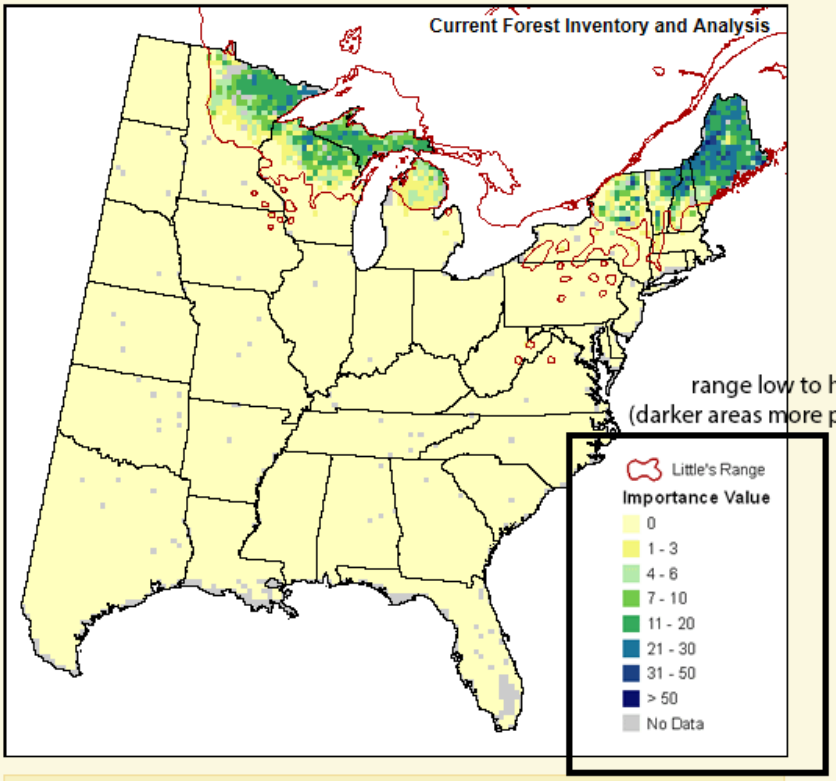
current/future disctribution tabs

Current Distribution Maps for balsam fir

Help »

Current Forest Inventory and Analysis

Compare Two Species



range low to high
(darker areas more populated)

Potential Changes in Abundance and Range (Future)

GCM SCENARIO	% Area Occ	Ave IV	Sum IV	Future/Current IV
Actual FIA	8.8	11	9,442	NA

go back to list of tree species

Cautions & Model Info

Notice:

This is an updated version of the Climate Change Tree Atlas. You can view the previous balsam fir page, or browse the previous Tree Atlas.

About balsam fir

Family: Pinaceae
Guild: persistent, slow growing understory tolerant
Functional Lifeform: small to medium-size evergreentree

- Life History and Disturbance Response
- Silvics Manual
- Photos of balsam fir in USDA Plants Database
- View current and modeled balsam fir distributions in Google Earth (146 KB)

Download Google Earth for free

Climate Change Adaptability

Summary of Predicted Changes

Range and Niche Maps

Predictor Analysis

Search for Trees & Birds:

Enter a common or scientific name

List of Trees | List of Birds

Current Distribution | Projected Future Habitat | Predictor Maps

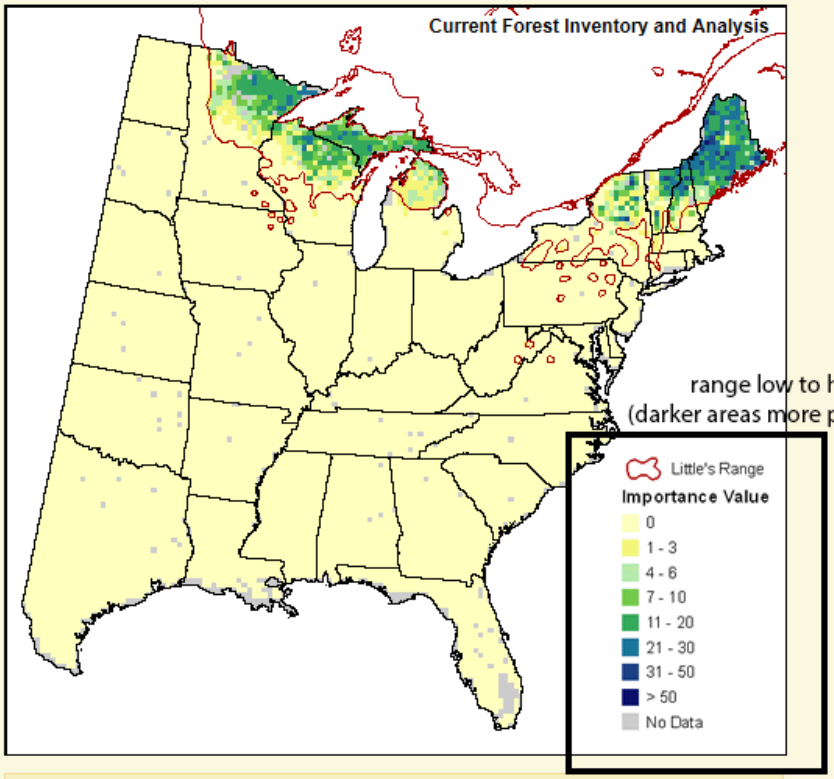
current/future disctribution tabs

Current Distribution Maps for balsam fir

Help »

Current Forest Inventory and Analysis

Compare Two Species



range low to high
(darker areas more populated)

Potential Changes in Abundance and Range (Future)

GCM SCENARIO	% Area Occ	Ave IV	Sum IV	Future/Current IV
Actual FIA	8.8	11	9,442	NA

go back to list of tree species

Cautions & Model Info

Notice:

This is an updated version of the Climate Change Tree Atlas. You can view the previous balsam fir page, or browse the previous Tree Atlas.

About balsam fir

Family: Pinaceae
Guild: persistent, slow growing understory tolerant
Functional Lifeform: small to medium-size evergreentree

- Life History and Disturbance Response
- Silvics Manual
- Photos of balsam fir in USDA Plants Database
- View current and modeled balsam fir distributions in Google Earth (146 KB)

Download Google Earth for free

Climate Change Adaptability

Summary of Predicted Changes

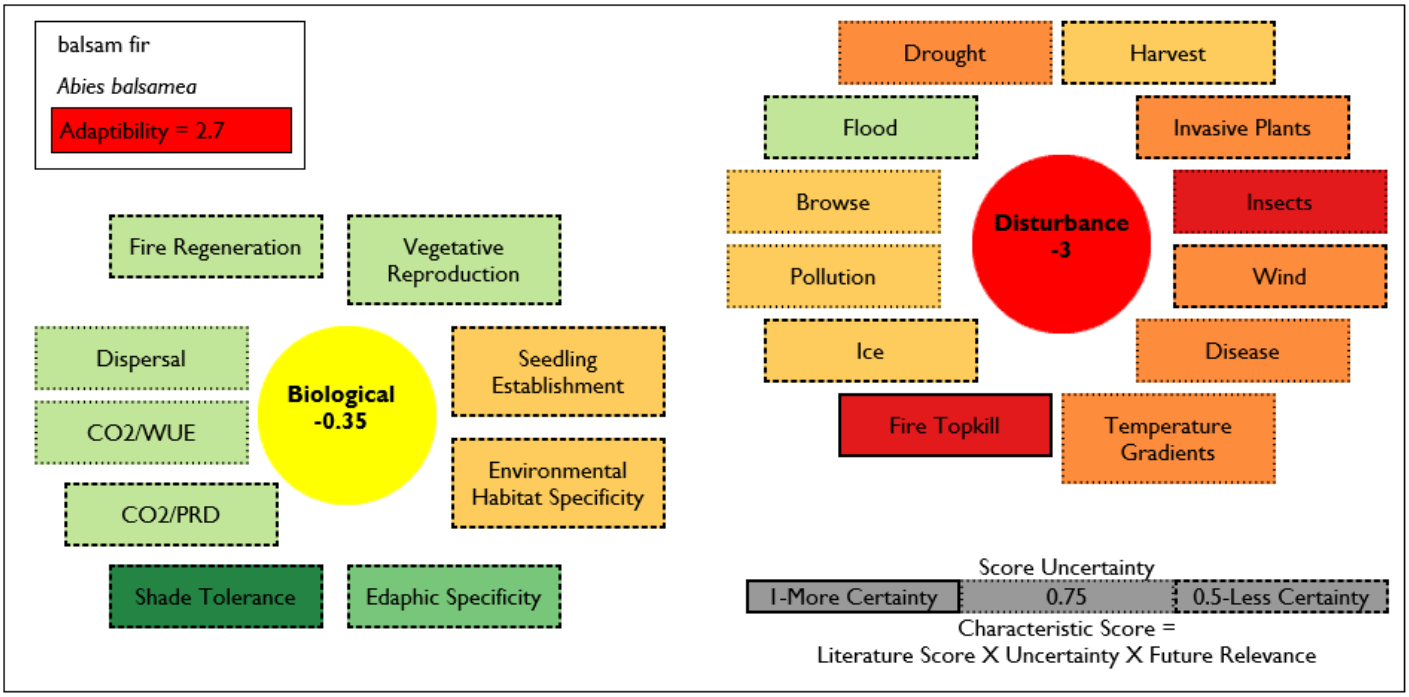
Range and Niche Maps

Predictor Analysis

Search for Trees & Birds:

Enter a common or scientific name

List of Trees | List of Birds



V Hi Pos +3	High Pos +2	Low Pos +1	Minimal 0	Low Neg -1	High Neg -2	V Lo Neg -3

scale (red are modication factors that will be negatively impacted by climate change, green will be positively impacted by climate change)

Modification Factors (MODFACs) for balsam fir

Student Page 1: *Track That Product Rubric*

Criteria	Professional	Experienced	Developing	Novice
Content The Presentation Model 60 points	The forest product, processes used to make it, and the tree from which it is derived is clearly identified and explained in detail, especially how ecological changes may impact the forest product in the future.	The forest product, processes used to make it, and the tree from which it is derived is clearly identified and somewhat explained, but further detail is required, especially how ecological changes may impact the forest product in the future.	The forest product, processes used to make it, and the tree from which it is derived is identified but not explained.	The forest product, processes used to make it, and the tree from which it is derived is not identified or explained.
	The forest product presentation model is unique and educational.	The forest product presentation model is educational but not unique.	The forest product presentation model is somewhat unique or educational.	The forest product presentation model is not unique, and/or educational.
	Presentation model clearly and concisely explains three careers that are associated with making the forest product.	Presentation model explains three careers that are associated with making the forest product, but some clarification is required.	Presentation model only includes and explains one career that are associated with making the forest product.	Presentation model doesn't include any examples of careers that are associated with making the forest product.
	Presentation model successfully identifies and highlights at least one Wisconsin-based company that makes the forest product.	Presentation model identifies and highlights one Wisconsin-based company that makes the forest product but misses key information about the company.	Presentation model identifies Wisconsin based one company that makes the forest product but does not highlight any aspects of the business.	Presentation model does not identify one Wisconsin-based company that makes the forest product.
	Information in the presentation model is accurate and relevant.	With few exceptions, the information in the presentation model is accurate and relevant.	Most of the information in the presentation model is accurate but irrelevant.	Information in the presentation model is overwhelmingly inaccurate.

Criteria	Professional	Experienced	Developing	Novice
Communication Ability to express oneself to be understood by others 30 points	Ideas are expressed clearly and are easy to understand.	Ideas are expressed clearly with only a few words being difficult to understand.	Both ideas and words require effort to understand.	Ideas are vague and elusive, and language is difficult to understand.
	Presentation model is neat, contains no misspelled words, and is grammatically correct.	Presentation model is neat but contains minor spelling and/or grammatical errors that are not distracting.	Presentation model is neat but contains spelling and/or grammatical errors that are distracting.	Presentation model is messy, with many errors in spelling and grammar.
	Visual aids support, focus, clarify, and reinforce information given.	Visual aids add some support to the information given.	Visual aids are related to the information given but do not clarify or reinforce it.	Visual aids detract from the information given, raising many questions.
Organization How the information is put together 10 points	Components are clearly identified and titled, and material is easily located.	Components are clearly identified and titled; only a few items are difficult to locate.	Some components are not identified or titled, and several items are difficult to locate.	Components run together or are not identified or titled; material is difficult to locate.

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Student Page 2: *Prompt Questions Guide*

Forest Product:

1. What is my product?
2. How is it used?
3. Who uses it?
4. Is the market local, national, or global?

Processing:

1. How is my product made?
2. What is at least 1 Wisconsin-based company that makes my product?
3. How does this company contribute to the Wisconsin economy?
4. What are some careers associated with making my product?
5. What are the skills and qualifications for these careers?
6. What kind of benefits does such a career have?
7. Consider, Description of Position, Location, Education/Skills Required, Salary, Prior Experience Needed, Job Title, Why it interests you, Current skills you have that would help you in the job, Additional skills you need to get the job

Tree/Forest:

1. What tree species or species make my product?
2. Where in Wisconsin does this forest cover type exist?
3. Does this forest cover type exist near your company that you are profiling?
4. Using the U.S. Forest Service Climate Change tree atlas, will that tree species or species be the same in 2100?
5. How might this change impact your forest product?