



NORTH DAKOTA FOREST SERVICE

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Lewis & Clark Cottonwoods



Background

Cottonwood trees played a vital role in the success of the Lewis and Clark Expedition. The bicentennial of the expedition provides an opportunity to emphasize the historic importance of the cottonwoods and to reintroduce this native tree to North Dakotans and the landscape.

North Dakota was home to many tribes at the time of Lewis and Clark – the Mandan, the Hidatsa, the Arikara and the Teton Sioux. The Native Americans and early American explorers depended upon the cottonwoods for survival. The trees supplied building materials for their tools, lodges and forts. The trunks, branches and twigs were used as fuel for heating and cooking. The cottonwood forests along the Missouri River provided them with a place to hunt and fish.

Lewis and Clark camped near this historic 250-300 year-old cottonwood found at Smith Grove along the Missouri River south of Washburn. Smith Grove is a Wildlife Management Area owned by the ND Game and Fish Department.

During their winter in North Dakota, Lewis and Clark gained new information and learned many skills from the Native Americans that helped them survive their journey. Members of the expedition learned that cottonwood bark, twigs, young branches and saplings made better feed for horses than hay. People, too, could eat the inner bark for its nutritive value and sweetness.

The inner bark, which contains salicin, was also used as an anti-rheumatic drug, a disinfectant, an antiseptic and for eczemas.

The North Dakota Forest Service gratefully acknowledges the **USDA Forest Service-Region One** for the grant funds to produce this educational booklet.

Members of the expedition learned how to make clothes and moccasins out of buffalo, elk and deer hides that would be more suitable for their journey after their European clothing wore out. The hides used to make their clothing were made waterproof by smoking them with cottonwood. The smoke also gave the hides a nice tawny or light brown color.

One of the most significant things Lewis and Clark learned was how to make a dugout cottonwood canoe! A canoe that could maneuver around the numerous sandbars and snags and provide a speedier means of transportation up the Missouri River! Cottonwoods contributed more to the success of the Expedition than any other tree!



*Inside each cottonwood branch is a little star.
Photo courtesy of the
North Dakota Council on the Arts; Troyd Geist.*

Many of the Native American cultures share a similar story of how the cottonwoods came to the prairie. According to Native American storyteller Mary Louise Defender Wilson, a curious little star hid in the cottonwood tree so it could always be near the people on earth and listen to their beautiful music...the laughter and kind words they say to one another!

Cottonwoods in North Dakota

North Dakota is a prairie state which some say has little to block the view in any direction. Trees growing on the prairie provide a striking contrast. Most of the “lone trees” which guided travelers and explorers across the otherwise trackless prairies were cottonwoods.

However, most of the cottonwood trees are found in our native forests along the waterways and referred to as “riparian forests.” The majority of riparian cottonwood forests are found along the Missouri River and in the west.

When the large, old cottonwoods of Smith Grove were seeds, the Missouri was a much different river. It ran unchecked as it passed through the state, flooding frequently and

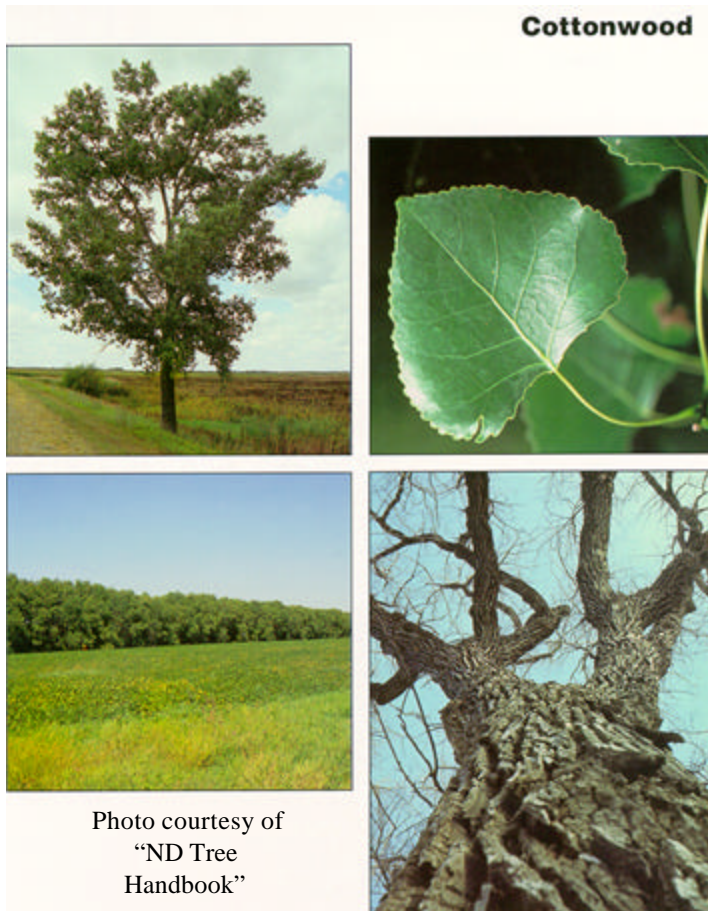


Photo courtesy of
“ND Tree
Handbook”

continually recreating itself through shifting channels and redposition of sandbars. The giant trees are living monuments to the changes in the river ecology over the past 200 years.

Cottony Seeds

When we think of cottonwoods we often think of the cottony seeds that float around like snow and collect in deep piles in early summer along the streets of our cities and towns. The fine hairs surrounding each tiny seed provide buoyancy in the air and on flowing water, ensuring that the seeds will reach the smallest and the remotest places.

The release of the cottonwood seeds in North Dakota coincides with the passing of the spring melt and flood waters from the Rocky Mountains in the West. The sandy banks along the Missouri River have traditionally formed sandbars and then exposed them when the river lowers in the spring. Cottonwood seedlings require bare, moist soil for the first week of growth, and the sandbars are perfect for getting them started. Cottonwoods are intolerant of shade and are unable to establish themselves under an existing stand of trees.

The same high flows in the spring that form new sandbars for seedlings, can also wash away or bury young cottonwoods the following year. However, the cottonwood survives where few other trees can by producing especially deep, binding roots and fast growing shoots that rise above the floodwaters. Even seedlings buried by several feet of silt can survive floods by sprouting and sending up new shoots.

Cottonwood Forests

Once forests form, shade and plant debris prohibit establishment of more cottonwood seedlings. The diversity of plants and animals in a cottonwood forest changes during the progression from sandbar to mature forest. A mature forest has the greatest variety of species and wildlife. More than 100 plant species are associated with cottonwoods through the succession from seedlings to maturity. The kind and number of plant and animal species associated with cottonwood forests continue to change throughout the forest's aging. The more varied the ages of cottonwoods in the forest, the greater number of combinations of plant and animal interactions that can occur.

The number of cottonwood trees in the forest declines with time, until after a century or so only a few large trees remain. When the last of these has fallen the cycle from sandbar seedling to mature forest will have been completed. The cycle is reinitiated when a changing river channel erodes the forest and new sandbars are deposited in its place.



This young cottonwood forest, which started on a sandbar, is progressing to a mature forest.

Cottonwoods Today

As we all know, the only constant thing is change. Our cottonwoods have seen a lot of change in the last century. The forest component of the Missouri River is largely gone today, and that which remains is mostly old and dying. The majority of what was the cottonwood forest of the Missouri River in North Dakota is inundated by water held by Garrison and Oahe dams. Dams have eliminated natural river flooding, shifting and meandering of channels and have significantly reduced creation of sandbar habitat—all processes needed to establish young cottonwoods.

Other factors contributing to the loss of our cottonwood forests include urban sprawl and community development, farming practices, browsing livestock and deer, and undesirable and very competitive species like Russian olive and brome grass. The interrelationships found in the cottonwood forests are complex, and the effects of changing or eliminating these interrelationships may be far reaching. In some cases it will not be possible to replace the lost cottonwoods due to all the changes in the last century, but it is essential that we conserve the remaining cottonwoods and replace those lost with new tree species in this century. So, what can we do to help restore the riparian forests to the beauty once discovered by our early explorers?



The North Dakota Forest Service is committed to wisely managing the remaining cottonwood forests for future generations to enjoy. State and Private Forestry Programs offer several solutions and approaches to promoting conservation and restoration of our riparian forests. State forestry personnel are working with landowners and communities compiling management plans that result in economic, social and environmental benefits from riparian forests and individual trees. They

have devised Best Management Practices to provide land-use approaches that conserve the integrity of the landscape. They offer a variety of site options that can minimize disturbance and damage to trees during development.

Conserving and improving the condition of our riparian forests will require a combined effort by natural resource personnel, citizens, landowners, community leaders and elected officials. Solutions lie in our ability to return traditional characteristics along the waterways by implementing management practices that will mitigate the loss and fragmentation of our riparian forests. Our success in conserving the riparian forests for tomorrow will hinge on community leaders and landowners having the technical and financial assistance necessary to implement management practices and conservation plans.

Robert F. Kennedy said, “Few will have the greatness to end history itself, but each of us can work to change a small portion of events, and in the total of these acts will be written history of this generation.”

Lewis & Clark Cottonwood Forestry Activities

School Tree Program – Historic Cottonwoods

In honor of the Lewis and Clark Bicentennial, the North Dakota Forest Service has collected seed from the historic cottonwood trees at Smith Grove and is growing 500 “Lewis & Clark Historic Cottonwoods.” One five-foot tree will be offered to each elementary school in North Dakota and 100 have been set aside for communities. A certificate of authenticity, a plaque to mount on a post next to the tree and this educational booklet accompany each tree. Planting the historic trees will leave a **“living legacy of this legendary event!”**

ND Lewis and Clark Dugout Canoe

Another bicentennial effort by the North Dakota Forest Service has been to secure a large cottonwood tree from the Missouri River to create a life-sized model dugout canoe, a replica of those used by Lewis and Clark. The enormous dugout canoe is being used to increase awareness and educate North Dakotans about cottonwoods. The canoe is 16 feet long, weighs 740 pounds, has 1-1/4 inch walls and a bottom that is approximately 4 inches thick. Watch for the dugout canoe during the ND State Fair and parade.



The ND Forest Service made a replica cottonwood dugout canoe and mounted it on a float for the State Fair Parade. Sam Claeys and Austin Fauske portray Lewis and Clark going up the Missouri River.

Lewis and Clark Video

The North Dakota Forest Service partnered with the North Dakota Department of Tourism and Prairie Public TV to develop a short educational video, “Exploring Lewis and Clark’s North Dakota,” which is being made available to each school. The video can be used to supplement the following learning activities in your classroom.

ND Champion Cottonwood

Cottonwood trees may live from 80 to 300 years and reach a height of around 100 feet. North Dakota’s champion cottonwood tree is owned by Tim Spiekermeier of Sheldon and is located in Ransom County along the Red River. It has a circumference of 25 feet 4 inches, is 110 feet tall and has an average crown spread of 94 feet. The North Dakota Forest Service maintains the “Register of Champion Trees” at their headquarters. To nominate a possible new champion or to obtain a copy of the register, call (701) 228-5446.

Pictographs

Pictographs are pictures used by a variety of cultures as a way to tell a story without words. Pictographs help us to understand what people did before alphabets were invented. Pictographs serve as memory aids to correctly and completely tell the traditional stories through an elaborate series of symbols. The stories are usually expressions of culture to teach lessons, morals and values to children as well as to adults. Make up a story using pictographs. For example, if you wanted to say it was a nice day you could draw a sun. See how long of a story you can tell with just pictures. You may want to tell the story of Lewis and Clark visiting North Dakota. When you are done drawing your story take turns guessing what each other's stories say.



North Dakota Pictographs

An exhibit of rare traditional Ojibway stories scribed on birch bark scrolls and made by Ojibway traditionalist, Richard LaFromboise (Miskomin) and a teachers guide were put together by the North Dakota Council on the Arts and is handled by the North Dakota Art Gallery Association. For information on booking "Spirit Trails and Sky Beings: Mythical Scrolls of the Ojibway Nation" contact: North Dakota Art Gallery, 412 Nineteenth Ave. SW, Minot, ND 58701; Tel: (701) 858-3242 or ndaga@ndaga.org.

Bark Rubbing

Lay a sheet of paper over the bark of a tree and rub a crayon over it. Try this on several different trees to see the different patterns you can make. What other things will show a pattern when you rub them using a crayon and paper?

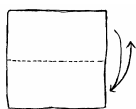
Leaf to Leaf

How many different kinds, colors and shapes of leaves can you find? Collect samples of leaves that have fallen, or draw their shape on a piece of paper. See if you can find out what kind of a tree each leaf is from by talking to your parents and neighbors, looking in a book, or by asking someone who works with trees.

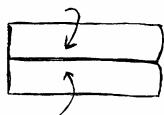
Floating Canoe

Origami is an ancient Japanese art of folding paper into shapes. A replica of a cottonwood dugout canoe can be made by cutting an 8-1/2" x 11" piece of paper in half the long way (you should have two pieces of paper 4-1/4" x 11"). The boat floats best if you put a tiny rock in it.

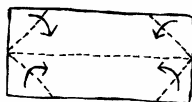
Make a center fold. Unfold it.



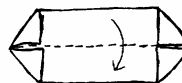
Fold both sides to the center fold.



Turn over. Fold corners to center fold.



Fold in half



Turn over, pressing boat into shape with fingers.



Lewis & Clark Cottonwoods Ceremonial Tree Planting

Objective:

Students will plan and participate in a Lewis and Clark Ceremonial Tree Planting and learn how to correctly choose a site and to plant a tree.

Time Recommended:

A minimum of one class period.

Materials Needed:

Will vary with the celebration scope, but all will require a shovel, a tree and a bucket of water.

Used with Permission from:

National Arbor Day Foundation

Getting Ready

A celebration can be as simple as one class period out on the school grounds planting a tree in honor of a school event or an elaborate community event. Decide beforehand if you will involve just the class, the school or the community. Consider the time, educational benefits and resources before you make your decision.

After the scope of the celebration is determined, consider opportunities to discuss stewardship, tree planting, conservation and environmental issues within your curriculum and community.

Make a list of needed resources and begin to request or gather them. Alter your lesson plans to reflect the changes. Now talk to your class or school about the following things to consider:

- Who must give permission to plant the tree where you want it planted?
- Who chooses the exact spot? Look up, look down, look around. A cottonwood tree may be 100 feet tall eventually. Not too close to the road, sidewalk or a building or under a powerline.
- What tree is best to plant there?
- Who will dig the hole and plant the tree? Before digging any holes, ND has a law that **North Dakota One-Call (1-800-795-0555)** must be notified- to ensure safety and that no power lines are to be cut.
- Who will take care of it once it's planted? How long must it be maintained?
- What happens if it rains on the tree-planting day?

Can the students do most of it? How will they benefit from the experience? Eliminate any suggestions that you don't feel are appropriate. Ask students to volunteer to address the various questions. Maybe recruit parents or community members to participate on the committees, too. Oversee the committees to make sure everyone stays on task. Below are some ceremony suggestions:

- Arrange for welcoming comments by a school principal or community leader.
- Read information stressing the importance of planting and caring for trees.
- Sing songs, read poems or present a play about trees.
- Recognize or thank those involved or someone special.
- Plant a tree.
- Make a commitment to future care.

Lewis & Clark Cottonwoods

Adopt a Tree

Activity Overview:

This activity will encourage students' awareness of individual trees over time, as well as incorporate various other subjects. By adopting individual trees, students will gain greater awareness and appreciation of their local environments.

Levels:

Grades 3-8

Variation 1: Grades PreK-1

Variation 2: Grades K-4

Subjects:

Science, Math, Language Arts, Visual Arts, Social Studies

Objectives:

Students will (1) describe a chosen tree using personal observation and investigation, and organize information about the tree; (2) identify relationships between their tree and other organisms; and (3) put together a book or portfolio about their tree.

Skills:

Observing, Concept Forming, Reasoning, Organizing Information

Time Considerations:

Preparation: 15 minutes

Activity: 50 minutes (longer projects can be done throughout the year)

Materials Needed:

Notebooks, pencils, drawing paper, crayons or markers, and a camera.

Copied with Permission:

American Forest Foundation,

copyright 1993/1994/1995/1996/1997/1998, Project Learning Tree (PLT) Environmental Education PreK-8 Activity Guide. The complete Activity Guide and High School Modules can be obtained by attending a PLT workshop. For more information, visit the Project Learning Tree website at www.plt.org.

Getting Ready

Have students make "Adopt a Tree" notebooks for recording information. Students can fold a sheet of construction paper in half, insert blank pages and staple the book along the folded edge. They can draw or paste a photo of their adopted tree on the cover.

Doing the Activity

1. Ask students to name something that is their very own or is special to them in some way.
2. Explain that each person will choose his or her very own special tree to adopt. For younger students, or if there is a shortage of trees, you may want to adopt the "Lewis & Clark Historic Cottonwood."
3. Students will observe their tree throughout the school year, or for however long you decide to conduct the activity. How they select their tree is up to them. No matter which tree is picked students should be able to say why they chose it.
4. Have the students visit their tree and write answers to the following questions:
 - Where is your tree? Draw a map to show its location.
 - Is your tree alive? How can you tell? Is it healthy? In what ways are people helping or hurting it?
 - Draw a picture of your tree.
 - Write a paragraph or poem describing your tree.

(continued)

- Do you know what kind of tree you have adopted? Does your tree have any fruits, nuts, or seeds that help identify it? Older students may use a field guide to look it up.
- Make a rubbing of your tree's leaf or bark. How does the bark feel? How does it smell?
- Are any animals on or near your tree? Don't forget to look for insects, spiders and other small animals. Are there any signs that animals have used your tree in the past? Look for holes, nests, trails and other animal signs.

5. You might want to design an "Adopt a Tree" certificate for the students to fill out after they have chosen their tree. Include: Official Tree Name, Nickname, Birthplace, Identifying Characteristics, Adopted By (name), Date and maybe a picture or drawing.

6. Have the students visit their trees on a regular basis and describe any changes they notice. You might make up additional questions as different seasons come and go. Have the students guess the causes of these changes and predict future changes; or take photographs of their tree.

Variation 1

1. Take the class to an adopted tree. Ask students how they know the tree is alive or not. Give them a few minutes to use their sense of smell, touch, hearing and seeing to get acquainted. How does the tree look when you are sitting? When you are lying on your back?
2. Ask students to volunteer to describe the tree using their senses. Ask them to complete the sentence: "The tree is _____."
3. Use discussion questions like: How are all the trees alike? How are they different? Are they all alive? What are the benefits these trees provide for them and the environment?
4. Share the tree with others (invite parents) and have a picnic.



Variation 2

1. Have the students work in pairs to measure the height, circumference and crown of their trees. Afterwards, have each pair use those measurements to design several math problems. Have the pairs share their math problems with the rest of the group.
2. Have students create a picture of the tree with flip-up windows portraying life on the tree, in the tree and among the tree's roots.
3. Create a "whole language tree." Use a large, bare tree painted or modeled in the classroom as a focal point for various curriculum topics. Throughout the year have students show how the tree is constantly changing. You can also use the tree to demonstrate ideas associated with plants, wildlife, holidays and social and environmental issues.
4. Have a "Lewis & Clark" picnic by the tree and eat foods the explorers would have eaten.

Assessment Opportunity

Younger students – can create books or portfolios about their tree.

Older students – can write an essay about life from the tree's perspective.

Lewis & Clark Cottonwoods

Leaf Art

Spatter Prints

Materials: 9" x 12" (23 cm – 30 cm) wire, plastic or nylon net screen; toothbrush; straight pins; tempera paint; and paper.

Directions: Place a leaf on a sheet of paper and secure it with pins. Then place the screen over the leaf and paint across the screen using a toothbrush. Afterward, lift off the screen, unpin the leaf, and carefully lift the leaf away.

Pressed Leaves

Materials: Iron, towel, and wax paper.

Directions: Place a leaf between two layers of wax paper and then cover with a towel. Press the towel with a warm iron, being sure to iron over the entire area of wax paper. (This will seal the leaf between the two layers of wax paper.)

Afterward, you can cut out each leaf, leaving a narrow margin of wax paper around the entire edge of the leaf. Then you can punch holes through the wax paper at the top margin of the leaf and hang the pressed leaf. Use several leaves to make a hanging leaf mobile.



Leaf Printing

Materials: A medium-sized, flat-headed hammer or a flat rock will also work; masking tape; a large, flat board; a supply of newspapers; wax paper; pieces of white cloth or clothing to print on (100% cotton or unbleached muslin works best); use leaves from trees, carrot tops, or marigolds.

Directions: The idea is to transfer the natural dyes from a leaf to a fabric. Do this by beating the leaf's chlorophyll directly into the cloth, which will set the dye through natural chemical action. Use this technique to decorate any natural cloth surface. Lay several thicknesses of newspaper on a flat board. Spread your cloth, right side up, on top of the newspaper. Put leaves on the cloth in a pattern of your choice. Place wax paper over the leaves and tape it around the edges. Use a hammer/rock to pound the leaf until the color transfers to the cloth. Pound evenly for a good print. To help retain the natural colors, you can soak the finished piece in ½ cup (120 ml) of salt to 2 gallons (7.51) of water for 10 minutes or in a solution of 3 tablespoons (44 ml) of baking soda to 1 gallon (3.81) of water. Rinse and dry as directed above.

Lewis & Clark Cottonwoods

Nature Activities

How Seeds Travel

Some trees produce seeds with wings that flutter like a helicopter, while a dandelion seed has a fuzzy parachute that carries it on air currents. Some produce seeds with hooks, spines, or gooey coatings that catch on an animal's fur or people's clothing and are carried to distant places. Some develop seeds within an attractive, tasty fruit. The best time to look for seeds is in the summer or fall, but if you look hard, you can find them at other times of the year, too. Look for different kinds of seeds and the many ways seeds are spread in nature. How many seeds can you find? Check your clothing when you get home to see if any seeds found you first!

A Tree Ruler

Find something from a tree that is an inch long, perhaps a small twig. Then find something that is two inches long, perhaps a small cone and so on. Draw a ruler on a piece of paper, but instead of using a number at each inch mark replace it with your tree part. Then find some bigger things to measure (like a long feather). Is it six twigs long?

Musical Beat

Many things from trees and nature are used as musical instruments. You can tap two sticks together or rub two rocks. See how many instruments you can make from natural items found in a forest. You can play the instruments while singing a song you all know.

Nature Writing

Gather a variety of things from nature like leaves, twigs, stems, rocks, etc. Have each student spell out their name. You could even have them glue their name to a white piece of paper. For something tougher, try spelling out a sentence.

Creative Inventions

Many things from nature have inspired inventions. Select different things from nature and brainstorm some ideas of other ways they could be used. A cook might use a rock to grind up some corn or wheat for flour. Could a big leaf be used as a plate? See what things you can think of and then give your invention a name.

Touch Down

Go into the forest or a park or schoolyard and clear a bit of ground and lay down. Close your eyes and reach out and touch five things around you. Just by their feel, can you identify them?
The Star in the Cottonwood Tree

Mary Louise Defender Wilson, also known as Gourd Woman, is a Dakotah elder and a traditionalist born into a family of storytellers on the Standing Rock Indian Reservation. The Makoche Recording Company and the North Dakota Council on the Arts have recorded on an enhanced compact disk traditional Dakotah stories told by Defender Wilson entitled, “My Relatives Say.” One of the stories tells how the star came to be in the cottonwood tree. Mary Louise credits Dale Childs for giving the story to her. To obtain this CD and hear the full story, contact Makoche Recording Company at 1-800-637-6863 or www.makoche.com.

In Recognition and Appreciation

Thank you to the individuals and organizations below for assisting the North Dakota Forest Service with our Lewis and Clark Bicentennial forestry projects:

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