

Dancing Fires in Missouri River Country:

FireWorks "Story Time" for
The Northern Great Plains
and
Rocky Mountain Front

Jane Kapler Smith, Nancy McMurray, and Ilana Abrahamson



Part 1



Photos:

Rick Trembath

Wind Cave National Park (NPS photo)

Foreword: Fire patterns...what's natural?

Have you seen pictures of wildland fires on the news or in magazines? What did these fires look like? Fires that make the news are usually spectacular. They are huge, roaring, scary-looking fires... tall flames blazing up through trees... waves of flame rolling across the prairie... columns of smoke looming high above the mountain tops... animals running for their lives. Some wildland fires are like this, but not all of them, not everywhere, not all the time. A fire may burn through an open pine forest slowly, creeping through the fallen needles, blazing up occasionally in a bush or young tree. A fire may run very fast through the prairies, but its visible effects may last only a few weeks and rarely last more than one year. In the Missouri River Country, *fire is natural*—in a variety of sizes, frequencies, and patterns across the land.

Fire is bound to visit sooner or later to nearly every location in Missouri River Country. Over thousands of years, these ecosystems burned again and again. The effects of the fires were unique for each kind of ecosystem. Two important things shaped the natural fire pattern: the waiting time between fires, and how the fires behaved. Many plant communities growing where the summers are hot and dry had only a short wait between fires. Fires started easily; where there was enough fuel, they spread quickly across the land, and where fuel was sparse, they were patchy and small. Cool, wet forests high in the mountains could wait a long time between fires. It was hard for a fire to get started there, and sometimes a fire would start but couldn't spread in the moist fuels. But once in awhile, in a very dry summer, a fire got going and there was no stopping it.

Each kind of ecosystem developed its own way of living with its special pattern of fire. Plants and animals living in each community actually depended on these natural fire patterns for their well-being. *Dancing Fires in Missouri River Country* uses a feltboard, a binder containing dozens of hand-made felt figures, and a dramatic narrative to describe the varying patterns of fire that can be found in the ecosystems of this vast region. The story is divided into three chapters—

1. **SETTING THE STAGE** describes the land formations and plant communities in Missouri River Country as they occurred centuries ago, before Euro-American settlement and industrial agriculture.
2. **INTRODUCING THE ANIMALS** brings mammals, birds, insects, and Native people into this land and shows how they make a living here.
3. **THE FIRE DANCE** shows different kinds of fire, started in different ways, burning differently, through different ecosystems—and their effects on the land.

Use *Dancing Fires* as a classroom story, perhaps over a period of three class sessions; feel free to abbreviate the story as needed, or to elaborate and add more information, especially on the uses of specific plants and animals. Invite helpers to illustrate the story with felt pieces, or place individual students in charge of particular organisms. The children may be able to rehearse the story and motions, then present it to another class or family members. Above all, enjoy this lyrical, beautiful story about the Missouri River Country.

Dancing Fires in Missouri River Country

Fire patterns in the northern Great Plains

by Jane Kapler Smith, Nancy McMurray, and Ilana Abrahamson

This feltboard story describes the fire ecology of the Missouri River drainage. This region reaches from the Rocky Mountains to the lower reaches of the Missouri River, but the story here focuses mainly on the eastern slope of the Rocky Mountains and the vast shortgrass and mixed-grass prairies. The story is divided into three “chapters”, which can be used to tell the story in three separate sessions. This way, it will remain engaging for students and they will have time to absorb the complexity and/or investigate the ecology described here.

Format: Numbered headers below refer to photos of feltboard assembly in Appendix A. *Items in blue ink and bold italics* identify the first mention of each species incorporated in the story. Most of these species are described in greater detail in the *FireWorks Notebook*.

Directions to add or remove items from the feltboard are in the right-hand column.

SETUP: Put up the Missouri River country background. All materials on the background are glued in place. If necessary, use pins to attach additional pieces as you tell and illustrate the story. “Read” the feltboard as if you are looking north. Mountains are in the left (west), and prairies go from shortgrass to mixed-grass to tallgrass as you proceed right (east). Note: Where the story diverges for migratory people vs. village dwellers, **purple ink is used for migratory; red is used for village dwellers.**

HINTS:

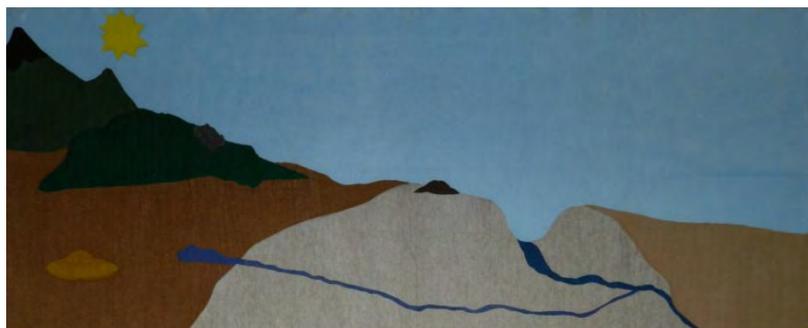
- The narrative refers repeatedly to “buried treasures” to describe surface and underground plant parts that can generate new growth or new plants. Buried treasures are shown on the feltboard with pink strips or circles. Students will get the most out of the story if they understand this concept. Buried treasures include rhizomes, corms, caudices, bulbs, tubers, seed (if buried or otherwise protected on the ground), roots (if they can generate new plants), and root crowns. After fires are shown on the feltboard, you may be instructed to remove green vegetation and even to replace it with gray or black, but *always leave the pink buried treasures in place.*
- When a felt piece contains several plants connected at the base by a colored strip of felt, match that color to the background color to get the plants in the right general area.
- Don’t cover up the sandy-colored oval in the lower left because it is the prairie dog town.
- Don’t cover up the little brownish bump in the center because it is a very important anthill.
- The background has 3 pockets to represent burrows: one for prairie dogs (in the town), one for the western mouse (lower left), and one for the eastern mouse (lower right). Don’t cover those either.
- After you remove things from the background, keep track of them; you’ll need almost all of those pieces later in the story.
- If felt pieces won’t stay in place on background, attach them with a pin. (These can be found in the *FireWorks Hardware Box*.)

CHAPTER 1. SETTING THE STAGE

1. INTRODUCTION

We live in Missouri River country. The rain and snow help this land grow grass and trees, animals, and People. The waters flow downhill and through the soil into creeks, ponds, and rivers, which travel hundreds of miles to finally reach the Mississippi.

In centuries past, many fires burned in Missouri River country. Fire visited the pine forests at the great river's headwaters, and it burned through the grasslands every few years. Fires were started by lightning and by the People who lived on the land. The People treasured fire and told stories about its importance in their lives. They used campfires for light, to cook their food, and to heat their homes. They carried fire with them when they moved from place to place. They used fire to increase berry crops and ensure plenty of food for grazing animals. They used it to herd animals and to defend themselves against enemies. Fire was at home in Missouri River country, and the plants and animals and People were at home with fire.



You could think of the Missouri River country as a beautiful quilt. Green bands of fabric in the west show where the dark pine forests grow in the mountains and hills. The eastern edge of the prairie is a land with of deep soil covered by tall prairie grasses. Across the wide center is a patchwork of

gold, green, and yellow with flashes of a hundred other colors, like the mixture of grasses, wildflowers, and woody plants that cover the Great Plains in endless variety. Ribbons of blue and green wind through the patchwork like the wooded ravines and tree-covered river bottoms that provide water, wood, and shelter for the People.

POINT OUT WATER—POND IS WIDE BLUE SPOT IN LEFT CENTER, CREEK GOES EAST FROM THERE, RIVER COMES THROUGH RAVINE AT CENTER RIGHT.

POINT OUT THE COMPASS ROSE IN SKY WITH CARDINAL DIRECTIONS. GIVEN THESE DIRECTIONS, WHICH DIRECTION ARE WE LOOKING? (NORTH)

THE QUILT METAPHOR PROVIDES AN OPPORTUNITY FOR STUDENTS TO DO AN ART PROJECT, POSSIBLY DESIGNING A CLASS QUILT OR BLANKET¹.

2. PINE FORESTS ENTER

Let's explore the forests that grow at the headwaters of the Missouri River. The great river's water

POINT TO LODGEPOLE PINE

¹ Learn about Lakota star quilts and Navajo woven blankets at <http://www.wfu.edu/moa/pdf/AmIndianBlankets.pdf>

<p>comes tumbling out of the Rocky Mountains, where <i>lodgepole pines</i> blanket the hillsides. These trees are called “evergreens” because they keep their needles year-round. Their green branches catch a lot of snow in winter, but their pointy shape and flexible branches shed the snow when it gets too heavy. Don’t stand under a snow-covered pine tree on a sunny winter day! Lodgepole pines often grow in thick stands, with so many trees that it’s hard to walk through. People say they are “dog-hair stands” because the trees are “thicker than the hair on a dog’s back.”</p> <p><i>Ponderosa pines</i>, another species of evergreen, cover the Black Hills, the Sweetgrass Hills, and many mountainsides in the Rocky Mountains. Sometimes these trees grow in thick clusters, like the lodgepole pines, but often they grow far apart, with sunny openings between them. Their branches spread out from the trunk like big umbrellas over our heads, making pools of shade on the hot hillsides.</p> <p>Pine forests contain many other species of evergreen trees too. You may know some of their names: <i>Douglas-fir</i>, <i>Engelmann spruce</i>, <i>subalpine fir</i>, and <i>whitebark pine</i>.</p>	<p>FOREST, THE HIGHEST-ELEVATION GREEN.</p> <p>POINT TO PONDEROSA PINES, THE LOWER GREEN PATCH.</p>
<p><u>3. WESTERN PRAIRIE ENTERS WITH WILDFLOWERS</u></p> <p>What makes a prairie? Grass—short grass, tall grass, grass growing in bunches, grass growing in great blankets as far as the eye can see. These grasses are survival champions. They live in places with hot summers and bitter cold winters, where the wind blows every day. They live in places with rich soils as deep as a river, and they live in places with almost no soil at all. In the longest, hottest weeks of summer, they may live completely without rain. They survive droughts, fires, and grazing by pronghorn, elk, bison, and other animals. How do they do it? Grasses have many ways to survive, and each kind of grass fits into its habitat like a hand into a glove.</p> <p>In the western part of Missouri River country, summers are very dry and soil is shallow. Most of the <i>prairie grasses</i> here are <i>short</i>. Some are only ankle-high, and the tallest are about knee-high. Many of these grasses grow in bunches, where the outer stems protect the inner ones from the dry wind. Bunchgrasses are perennials, like most plants on the prairie. That means they can live for many years. Their roots grow deep into the soil to capture water even in the driest part of summer. They have buds hidden on the soil surface or lying just beneath the soil—buried treasures that will grow new stems and leaves if the top of the plant gets burned off or eaten. Some grasses grow new stems right along the top of the soil. These special stems, called “tillers”, start new plants all along</p>	<p>PUT UP SHORTGRASS STRIPS BELOW THE HILLS².</p> <p>PUT UP PINK STRIPS BELOW SHORTGRASS PRAIRIE STRIPS. (AVOID OVERLAPPING THEM BECAUSE THE PRAIRIE</p>

² MANY FELTBOARD PIECES ARE ATTACHED TO A STRIP OF TAN OR BROWN FELT. MATCH THIS COLOR TO THE BACKGROUND TO GET THEM IN THE RIGHT PLACES.

their length, producing a chain of plants that look like they're playing leapfrog.



Prairies are not all grass. Hundreds of kinds of wildflowers grow here too. Can you find the *plains prickly-pear* cactus mixed in with the grasses? This cactus has big yellow flowers and covers its round, juicy stems with spines that keep animals from eating them. Like the bunchgrasses, it can grow new leaves from buds at its base. It can also grow a whole new plant from one of its stems!

Look for *arrowleaf balsamroots* covering the hillsides with yellow flowers in spring. They have underground stems that are almost as tough as wood—nearly impossible to kill with fire.

STRIPS WILL COME OFF AFTER FIRE BUT THE PINK STRIPS WILL REMAIN.)

POINT OUT PRICKLY-PEARS EMBEDDED IN SHORTGRASS STRIPS.

PUT UP 1 STRIP OF BALSAMROOTS IN SHORTGRASS PRAIRIE. PUT UP PINK STRIP.

4. EASTERN PRAIRIE ENTERS WITH OAKS

If you go hundreds of miles to the east, Missouri River country looks very different. Here the *prairie grasses* grow dense and *tall*—some of them taller than a grown-up riding a horse! Their roots grow deep, like those in the shortgrass prairie, but their buried treasures are often different. Most of these grasses have thick underground stems called rhizomes that weave under and over one another and get tangled up with the roots, forming an underground layer that holds tight to the soil and may be more than a meter deep! Each rhizome can grow dozens of new plants. Some grasses grow rhizomes and grow in bunches. They are prepared for anything!

Many wildflowers and bushes can grow in the deep soils of the tallgrass prairie. The *black-eyed susan*'s bright yellow flowers glow among the grasses. This plant can sprout from its base after winter's cold and fire's heat, and it produces hundreds of seeds that will be scattered by the wind.



Plenty of these flowers will bloom among the grasses next year!

A few big, old trees are scattered across the tallgrass prairie. They are *bur oaks*. They have leathery leaves with wavy edges. The leaves live only one year, but they hang onto the branch on nearly all winter, falling off just before the new leaves grow out in spring. These old oaks have very thick bark and deep roots, which protect them from the heat of fires.

Oaks produce big seeds called acorns, sometimes millions in one year. Acorns are great food for

PUT UP TALLGRASS STRIP TO THE RIGHT OF THE BIG RIVER. PUT UP PINK STRIP.

POINT OUT BLACK-EYED SUSANS EMBEDDED IN TALLGRASS STRIP.

PUT UP 2 OAKS. PUT PINK CIRCLES AT THEIR BASES.

anyone who lives on the prairie, and lots of acorns also may mean lots of young trees. The little trees have thin bark and are easily damaged by fire, but the bases of their stems are treasures that can sprout new plants.

PUT UP 3 OAK SAPPLINGS & PINK CIRCLES AT THEIR BASES.

5. MIX UP THE PRAIRIES

There aren't just two kinds of prairie—west and east, short and tall. What happens in the huge area that covers the middle of Missouri River country? In this land, you can look west but you won't see mountains, and you can look east and not see any forests. What grows here in the *mixed-grass prairie*? First of all, there are more than a hundred kinds of grasses: short ones from the west and tall ones from the east, mixed with dozens of other kinds. Sometimes their names describe them. Sweetgrass, for example, has leaves that stay fresh and sweet-smelling for years. Needle-and-thread has a long, thin fiber on its seed that can thread its way into your clothes or a bison's hide. This "awn" helps deliver the seeds to new places and, when the seed finally lands on the ground, the awn helps drill it into the soil.

PUT UP MIXED-GRASS STRIPS NORTH OF (ABOVE) THE CREEK. PUT UP PINK STRIPS.

Which grasses will grow in a particular spot? It depends on many things: How deep is the soil? How often does it rain in summer? Did ants or wind drop some seeds here? How many seeds did the mice eat? All of these things make the land look like a crazy quilt, with big patches and small ones—grasses, shrubs, and flowers, all mixed up.

Dozens of kinds of wildflowers grow throughout the mixed-grass prairie. Did you notice the *western yarrow*, with its flat white flower on top, hiding among the grasses? How about the *prairie turnip* with its pointy blue flower and thick underground tuber that's delicious to eat?

POINT OUT YARROW & PRAIRIE TURNIP EMBEDDED IN MIXED-GRASS STRIPS.



Scarlet mallows are sprinkled nearly everywhere in the prairies, their reddish flowers shining among the grasses like stars in the sky. There are *wild onions* here too, great for adding flavor to your soup. All of these plants have buried treasures—bulbs, tubers, or thick underground stems—so they can survive long dry

PUT UP SCARLET MALLOWS, 1 IN EACH TYPE OF PRAIRIE. PUT UP ONION CLUSTER. ADD PINK CIRCLES.

spells, cold winters, and fire.

Snowberry bushes grow in all kinds of prairies. They're short, so you don't notice them much in summer. But in winter, they show off their round white berries, great food for wintering birds. Snowberry bushes grow long rhizomes underground so they can sprout new plants if their tops are broken or burned off.

PUT UP SNOWBERRY STRIP
SOMEWHERE IN MIDDLE.
PUT UP PINK STRIP.

6. MORE TREES AND SHRUBS ENTER

Like colored ribbons sewn into a quilt, Missouri River country is laced with ravines and rivers. A low, wet spot may be covered with *willows* so dense that you can't walk through them.

Along the river bottom, you'll find *cottonwood* trees. They smell sweet in the spring because of their sticky sap, and they send their downy seeds off with the wind and flood waters in early summer. One of them has a dead top that broke off in a storm. After many years of rain and snow, the wood is soft and rotten inside.

Shrubs grow in gullies and other sheltered spots. Here are *chokecherry* and *Saskatoon serviceberry* bushes. How do all of these plants survive drought, cold, browsing animals, and fire? They all have buried treasures that can grow new plants.

PUT UP WILLOWS BY THE
POND. ADD PINK CIRCLES.

PUT COTTONWOODS NEXT
TO RIVER (NOT CREEK). ADD
PINK CIRCLES.

PUT CHOKECHERRIES ON
EAST BANK OF RIVER
(RIGHT) & SERVICEBERRIES
ON STEEP SLOPE ABOVE
WEST BANK. ADD PINK
CIRCLES.

Fingers of *quaking aspen* reach out from the mountains and stretch along damp spots in the prairie.



Aspens can grow almost anywhere in Missouri River country, as long as their roots can find some water. If an aspen tree is cut, dozens of new stems will sprout from its strong roots.

PUT UP SLANTED ASPEN
STRIP NEAR HORIZON AT
EDGE OF PONDEROSA
FOREST. PUT UP LEVEL
ASPEN STRIP SOUTH OF
CREEK. PUT UP PINK STRIPS.

If you visit the hilltops and rocky cliffs in the West, you'll find clusters of *limber pines*. They can grow in windy, rocky places where no other tree survives. Their cones hold big, fat seeds—rich food for both animals and People.

Missouri River country is complicated and beautiful, a patchwork quilt with rich variety in color and pattern. When clouds move across the sky, their shadows change the colors on the quilt. When the wind sails over the grasses, the fabric ripples. When the seasons change, the colors change completely—green to gold, then white, then green again. In the next chapter, we'll meet some of the animals who live here.

PUT UP LIMBER PINE ON
ROCK OUTCROP OF HILLS.
NOTHING PINK THOUGH;
THESE TREES CAN'T SPROUT
AFTER FIRE.

CHAPTER 2. INTRODUCING THE ANIMALS

7. MAMMALS STEP IN

Plants of all shapes and sizes cover the land in Missouri River country. The habitat is ready. Where are the animals?

Listen—there's a sound like thunder! Closer and closer, louder and louder—it's a herd of **bison**! There must be thousands of them, all running and raising a huge cloud of dust. Gradually the bison slow down, then stop. Now that the dust has settled, we see that they're grazing on the prairie grasses.



Who lives in this open, bare patch on the prairie? Why does the grass look like it's been mowed off? This is a **prairie dog** town, and hundreds of them live here! They've built a mound around the entrance to their burrow, so

sentries can stand guard on top. They're like watchdogs. Maybe that's how they got their name!

Do you hear a whistle and a barking sound? Uh-oh, a bison wants to take a dust bath in the dry soil of the prairie dog town. The sentry warns everyone on that side to get out of the way.



Who's resting in the grass near the prairie dog town? It's **Coyote**. Maybe he's hoping a prairie dog will wander away from its burrow looking for fresh plants to eat. As the prairie dog looks for food, it could turn into someone else's dinner! If Coyote gets tired of waiting, he might try to catch one of the **deer mice** that live all over Missouri River country. What do they eat? Almost any kind of plant. Insects too. Today the tiny seeds of grasses are on the menu in for a deer mouse living in the shortgrass prairie, and another is nibbling acorns under the oak trees of the tallgrass prairie.

STUDENTS STAMP FEET FOR TRAMPLING SOUND, THEN SLOW & STOP. PUT UP BISON SCATTERED ACROSS PRAIRIES. CALVES TOO.

POINT OUT THE OVAL AT LEFT, BELOW THE HILLS. PUT UP PRAIRIE DOGS.

STUDENTS MAKE SOUNDS. TURN BISON UPSIDE-DOWN ON MOUND. PUT NEAREST PRAIRIE DOGS INTO POCKET.

PUT UP COYOTE.

PUT 1 MOUSE IN SHORT GRASSES & 1 UNDER OAK TREE IN TALL GRASSES.

Many other animals live on the prairie. Can you find *Black bear* slurping berries and leaves from the branches of the serviceberry bushes? The *pronghorns* are nibbling on scarlet mallows in the mixed-grass prairie. This is one of their favorite flowers. But they're watching and listening all the time. If they sense danger, they can probably outrun it. They're the fastest mammal in all of North America!

PUT UP BEAR.
 PUT UP 2 PRONGHORNS IN MIXED-GRASS. THEY TRAVEL IN HERDS, SO ALWAYS KEEP THEM TOGETHER.

8. BIRDS ENTER

Sharp-tailed grouse is eating leaves from the short grasses today. She eats almost every kind of plant that grows in this country and many of the insects too. Tomorrow she may feed on serviceberries or beetles. In winter, she'll eat freeze-dried snowberries. She'll eat the buds of aspen trees in late winter, when other foods are covered with snow.

Over in the tall grasses, you'll find *Wild turkey* scratching under an oak tree for acorns.

Bald eagle floats high over the river, looking for a fish dinner. She has a big stick nest in a cottonwood tree.

A flock of *Clark's nutcrackers* sails over a ridge in the western forests and lands in the limber pine to harvest its big seeds. These birds will eat some of the seeds and bury the rest so they can have food all winter long.

Northern flicker pounds on the cottonwood tree with the broken top. He can easily make a nest hole in its soft wood. Flicker's dinner table is down on the ground, where he eats hundreds of insects every day.



PUT UP GROUSE IN SHORTGRASS PRAIRIE.

PUT TURKEY UNDER OAK.

PUT UP EAGLE & NEST.

PUT NUTCRACKERS ON LIMBER PINE.

PUT FLICKER ON BROKEN-TOPPED COTTONWOOD.

9. THE INSECTS COME

Insects are the most plentiful animal in Missouri River Country. They may be small, but they find hundreds of things to eat here, both living and dead. Aphids poke through grass

stems to drink the juices inside. Grasshoppers eat the grass leaves and stems. Butterflies and bees eat the pollen of wildflowers and drink their nectar. Dung beetles have a very special diet. Can you tell from their name what it is?

Have you noticed little bubbles of sap on some of the pines in the hills and mountains? The sap leaked out through little tunnels made by *mountain pine beetles*. If we peel the bark off and look inside, we can see that the beetles bored through the bark to lay their eggs. The eggs will hatch soon into little white larvae; if they survive the winter, they'll feed on the tree's cambium next summer and may kill the tree.

Ants are some of the prairie's most important insects. Their homes are like underground palaces, where thousands of them live and work together. Ants will eat almost anything that they can cut up and carry back to their underground home. They love to harvest seeds.



Some plants package their seeds with a little bubble of nutritious fat so ants will carry them back home. They'll eat the bubble of fat and leave the seed alone, so it can grow a new plant.

Flicker thinks ants are delicious. He flies down to the ground for a snack.

PUT UP PINE BEETLES ON LODGEPOLE PINE FOREST.

PUT UP ANTS BELOW BROWNISH ANTHILL, WHICH IS AT SKYLINE IN CENTER OF BACKGROUND.

MOVE FLICKER TO ANTHILL.

10. THE PEOPLE ARRIVE

We have met many plants and animals in Missouri River country, but a very important kind of animal is still missing-- the People! The People understand the diversity of living things here and know how to use these plants and animals to meet their needs.

Many tipis/lodges have been set up/built on the west bank of the river. It is cool near the cottonwood trees, and water is plentiful. The People can fish here, and there is plenty of firewood. They dig up the buried treasures of prairie turnips and other plants. They gather berries. They grow corn and squash in the fields. They hunt pronghorn and bison, and their horses graze on the prairie grasses.³

PUT UP TIPI/LODGE⁴ BETWEEN THE CREEK AND THE RIVER.

³ Recommendation for curriculum: Combine "Story Time" with study of the particular Indian Nation where it is being taught. What was life like for this specific Nation? What materials can students look at? Can a guest presenter come to the class? Can students visit a traditional lodge or museum? How are the Nation's traditions part of today's culture?



⁴ Remember that purple ink is for migratory people and red is for people who built permanent lodges and villages.

CHAPTER 3. THE FIRE DANCE

11. WEATHER CHANGES

It has been a quiet day in Missouri River Country, but it doesn't stay quiet. Thunderclouds are building up in the west.

With a blinding flash and a crash of sound, lightning strikes in the ponderosa pine forest deep in the hills.

PUT UP CLOUD, HIDING SUN.
PUT UP WIND COMING OFF
HIGHEST MOUNTAIN.
STUDENTS MAKE SOUNDS.

PUT UP LIGHTNING FROM
CLOUD TO PONDEROSA PINE
FOREST (THE LOWER PATCH
OF GREEN). STUDENTS MAKE
THUNDER.

12. FIRE DANCES THROUGH THE WESTERN PRAIRIE



The lightning starts a fire at the base of a tree. It burns along the ground among the ponderosa pines, feeding on dry grass. Where the trees stand close together, it sometimes climbs into the treetops. The wind pushes the fire to the edge of the aspen grove, where it stops.

PUT UP FLAMES IN
PONDEROSA PINE FOREST.
ADD FLAMES AT EDGE OF
ASPENS.

ADD FLAMES IN
SHORTGRASS & WESTERN
HALF OF MIXED-GRASS
PRAIRIE.

The fire continues to burn east. It goes partway across the mixed-grass prairie before it stops.

The fire spreads toward the prairie dog town, but they aren't worried. They'll stay safe in their burrows until things cool off. Mouse runs into her burrow too.

ADD THE REST OF FLAMES
TOWARD PRAIRIE DOG
TOWN & WILLOWS. PUT
REMAINING PRAIRIE DOGS
INTO THEIR POCKET. MOVE
WESTERN MOUSE INTO ITS
POCKET.

Coyote heads up into the hills.

The pronghorns can see and smell the fire approaching, so they run into the willows to escape. The bison move into an aspen grove. Bear heads to the river. If the fire burns that far, it will slow down in the shade of the cottonwood trees.

Grouse flies into the aspen trees to escape the fire. Flicker watches from his cottonwood, but Eagle wants to get closer. She hovers around the fire's edge, hoping to catch small animals as they try to outrun the flames. It's a good thing Mouse is hiding underground!



The ants have all gone underground too. They'll wait until the fire has passed, then come out right away to search for food.

The fire goes out in the wet soil near the pond. It only gets part-way to the big river before the wind changes and pushes it off to the north. The flames are going out. It is quiet on the prairie.

MOVE COYOTE TO UNBURNED PLACE IN HILLS.

MOVE PRONGHORNS TO WILLOWS. MOVE BISON THAT ARE NEAR THE FIRE TO ASPENS. MOVE BEAR.

MOVE GROUSE & FLICKER. PUT EAGLE IN SKY ABOVE FIRE.

REMOVE CLOUD, LIGHTNING, WIND, & ALL FLAMES⁵.

13. AFTER FIRE IN THE WESTERN PRAIRIE

A day goes by. The fire has gone out, and the wind has cleared the smoke away. Let's see what has changed.

The tops of the grasses have burned to ash, and the spines on the prickly-pear stems are scorched. The wildflowers have disappeared from above ground, but all of their buried treasures remain.

REPLACE BURNED VEGETATION STRIPS WITH BLACK STRIPS. REMOVE BURNED WILDFLOWERS. LEAVE PINK STRIPS & CIRCLES.

⁵ Keep track of all pieces you remove, because you'll need most of them again later in the story.

Stick skeletons are all we can see of the snowberry bushes, but their rhizomes are still alive in the soil. Most of the willow bushes and aspens are still green, although a few have scorched leaves.

The land looks different from the top of the anthill, but the ants don't mind. They'll find plenty of food in the burned prairie.

The pronghorns come back. They may lick up the ashes, which are rich in minerals that they need. Within a week or two, bison are grazing on tiny sprouts of grass.

Bear wanders over to the anthill for a snack.

Coyote is back, watching for prairie dogs and mice to come out in search of food. Mouse comes out of her burrow and looks for seeds, but there's not much for her to eat here. She moves into the aspen grove.



Where the ponderosa pine trees grew close together, the fire traveled from crown to crown, and now most of the trees are blackened and dead. But the trees that grew in openings, with only grass beneath, have hardly changed at all. Their crowns are green and growing.

REPLACE SNOWBERRY BUSHES WITH BLACK STICKS. LEAVE PINK STRIP.

MOVE PRONGHORNS & BISON INTO BURNED AREA.

MOVE BEAR.

MOVE COYOTE. MOVE MOUSE INTO ASPENS.

PUT BLACK PATCH OVER PART OF PONDEROSA PINE FOREST.

14. FIRE DANCES IN THE ROCKY MOUNTAINS

It is another windy day. Weeks ago, a fire started west of the mountaintops. Today's wind lifts the flames up into the treetops and carries burning branches and pine cones far east, ahead of the flames. They start a fire in the lodgepole pine forest. In just one day, it runs across the mountainside, through the tree crowns, and out of sight to the north.

PUT WIND BACK UP ON MOUNTAIN TOP. PUT CROWN FIRE IN LODGEPOLE PINE FOREST JUST BELOW BROWN PEAK. (CROWN FIRE HAS TALLER FLAMES & IS BRIGHTER ORANGE THAN OTHER FLAMES.)



After a few days, the flames have gone out. It takes several weeks for the smoldering to stop and the smoke to clear away. Big patches of lodgepole pine have burned. The trees that are killed won't house any mountain pine beetles next year, but they will be food for thousands of other insects. In fact, a different kind of beetle already senses this hot fire

REPLACE CROWN FIRE WITH BURNED PATCH (LINE UP WITH BOTTOM OF BROWN PEAK AND) RIDGELINE OF LODGEPOLE FOREST. REMOVE WIND.

from miles away and is coming to investigate!

15. FIRE DANCES IN THE MIXED-GRASS PRAIRIE

Many quiet weeks go by. Summer is coming to a close. Bear, birds, and the People have harvested most of the berries.

Two young eagles have fledged from the nest in the cottonwood tree. The grasses have turned from green to gold.

The People are ready to move from the river to a new camp. They will travel west for many weeks—to the pine forests, where they'll cut tipi poles and find fresh berries. They take down their tipis and pack everything to be moved. They even pack their campfire, carefully placing hot coals into a Fire Carrier. They will keep the coals smoldering until they can build a fire in their next camp.

The river valley has been a good place to camp. The People want to come back next year, but they need to make sure there will be plenty of grass to attract the bison herds, and they'll need good pasture for their horses. To prepare this camp for next year, they start a fire on the east side of the river.

It has been a good summer in the village by the river. The People have harvested crops, dried berries and meat, and made flour from prairie turnips. They have stored plenty of food in their lodges. Now it is time to prepare for next year. How can they help the land grow abundant food next summer? How can they make sure the bison and pronghorns will come to graze nearby? How can they provide good pasture for their horses? When the autumn wind is coming from the west, they start a fire east of the river.

MOVE BEAR TO BUSHES. TURN BUSHES OVER SO BERRIES ARE GONE.

MOVE EAGLE TO COTTONWOOD.

MOVE TIPI TO WESTERN EDGE OF PONDEROSA PINE FOREST. DO NOT REMOVE LODGE.

PUT UP FLAMES NORTH & EAST (TO THE RIGHT) OF RIVER.

(SAME AS FOR TIPI.)

Flicker stays on his perch above the fire, ignoring the flames. Mouse runs down into her burrow. Eagle soars above the flames watching for prey.



The bison east of the river smell smoke, so they graze their way further east, moving out of sight. Turkey may be big and heavy, but he's not slow. He flies up into the oak tree to watch the fire burn underneath.

Flames race through the grasses. Soon the fire has moved out of sight.

MOVE EASTERN MOUSE INTO POCKET. MOVE EAGLE OVER FIRE.

REMOVE BISON FROM TALLGRASS PRAIRIE. MOVE TURKEY.

ADD LOTS MORE FLAMES TO TALLGRASS PRAIRIE.

16. AFTER FIRE IN THE EAST

Let's check on this burn a week later. The fire has gone out completely.

Just as in the west, the tops of the wildflowers and grasses have burned off. The burned bushes look like dead sticks. Fire burned the tops off the little oaks but only scorched the big oaks.



Turkey is back down on the ground, looking for insects and seeds. He's staying away from Bear, who is fattening up on acorns before winter.

REMOVE ALL FLAMES.

REMOVE BURNED WILDFLOWERS⁶. REPLACE BURNED GRASS STRIP WITH BLACK STRIP. REPLACE BURNED BUSHES WITH BLACK STICK CLUSTERS. REMOVE LITTLE OAKS BUT LEAVE PINK CIRCLES.

MOVE TURKEY & BEAR.

17. A YEAR GOES BY

Let's visit Missouri River country a year later. What has happened in the burned forests? Some of the dense patches of ponderosa pines in the hills are gone, replaced by grasses and thousands of balsamroots. They must like these new patches of sunlight! Where the trees were widely spaced, the fire hardly left any evidence of its passing.

REPLACE BLACK PATCH IN PONDEROSA PINE WITH BALSAMROOTS & PINK STRIP.

⁶ Remember to set them aside carefully; you'll need them again.



Fire killed a lot of lodgepole pines up in the Rocky Mountains, but millions of seedlings have already shown up. They grew from seeds that fell from tree-top cones opened by the fire's heat. Some of the dead trees will remain standing for years, providing food for millions of insects, which will feed thousands of birds.

REPLACE BLACK PATCH IN LODGEPOLE FOREST WITH LIGHT GREEN SEEDLINGS PATCH.

MOVE NUTCRACKERS TO NEW GROWTH IN LODGEPOLE FOREST.

REPLACE BLACK GRASS STRIPS WITH ORIGINAL STRIPS THROUGHOUT. REPLACE ALL BURNED FLOWERS. MOVE PRONGHORNS TO GRAZE ON PRICKLY-PEARS.

MOVE BISON TO NEW GRASS. MOVE MICE INTO GRASSES. MOVE GROUSE INTO GRASSES.

REPLACE PRAIRIE DOGS.

REPLACE ALL BURNED BUSHES WITH ORIGINAL PLANTS.

The cluster of limber pines grows in a dry, rocky place, where fuel is sparse. Last year's fires never reached these trees. Nutcrackers have harvested seeds from their cones and are storing them in a burned clearing. They'll eat many during the winter, but some will be left behind and may develop into seedlings in the next few years.

It's hard to tell that the prairies burned at all. The grasses are as thick as they were last year, maybe even thicker and greener. The pronghorns are eating one of their favorite foods-- prickly-pears! They get this treat only only after fire has burned off the cactus's protective spines. And they'll find more scarlet mallow and other wildflowers than ever this year. The black-eyed susans and prairie turnips are in full bloom.

The bison have been here since early spring, when the sun warmed the ash-covered soil and the grass sprouted early. Mice have come back to the grasses, looking for seeds. Grouse is chowing down on tender new grass leaves.

The fire didn't change the prairie dog town. Most of those plants were grazed short before the fire, so there wasn't much fuel to burn. Now prairie dogs are back above ground, eating some of that fresh, new grass. Do you see "watchdogs" on the mound again?

The burned bushes are sprouting new stems from their root crowns and rhizomes. In a few years, there will be more berries than before the fire.

New cottonwoods are sprouting from the base of a scorched tree. Aspens and willows are sprouting where a few were killed by fire.

Oaks are sprouting from their buried treasures.



The flickers raised four chicks in their nest in that old cottonwood tree this year. It took a lot of ants to feed their big family!

The People are back to their camp on the river bottom./The People planted their crops early this year because the

snow melted quickly from the fire-blackened soil. Their horses have plenty to eat this summer, and the bison and pronghorns will graze in this fresh burn for a long time.

It's hard to find any evidence of last year's fires in the grasslands of Missouri River country. The prairie is more likely to be damaged if fire does *not* visit for a long time than if it comes through regularly. Without fire, the grasses would develop thick mats of dead stems and leaves, making it hard for new stems to sprout. More and more trees would grow here, shading out the sun-loving grasses and wildflowers. The shrubs would grow tall, out of the reach of grazing animals. Then the prairie dogs, pronghorns, grouse, and bison would move away in search of better habitat, and the People would follow, looking for a place where the prairie is healthy and fires are common.

ADD SMALL COTTONWOOD AT BASE OF EXISTING ONE.

REPLACE SMALL OAKS.

MOVE FLICKER BACK TO ANTS.

REPLACE TIPI.

THE END



1 strip of balsamroot flowers
1 pink Buried Treasures strip



1 tallgrass prairie strip

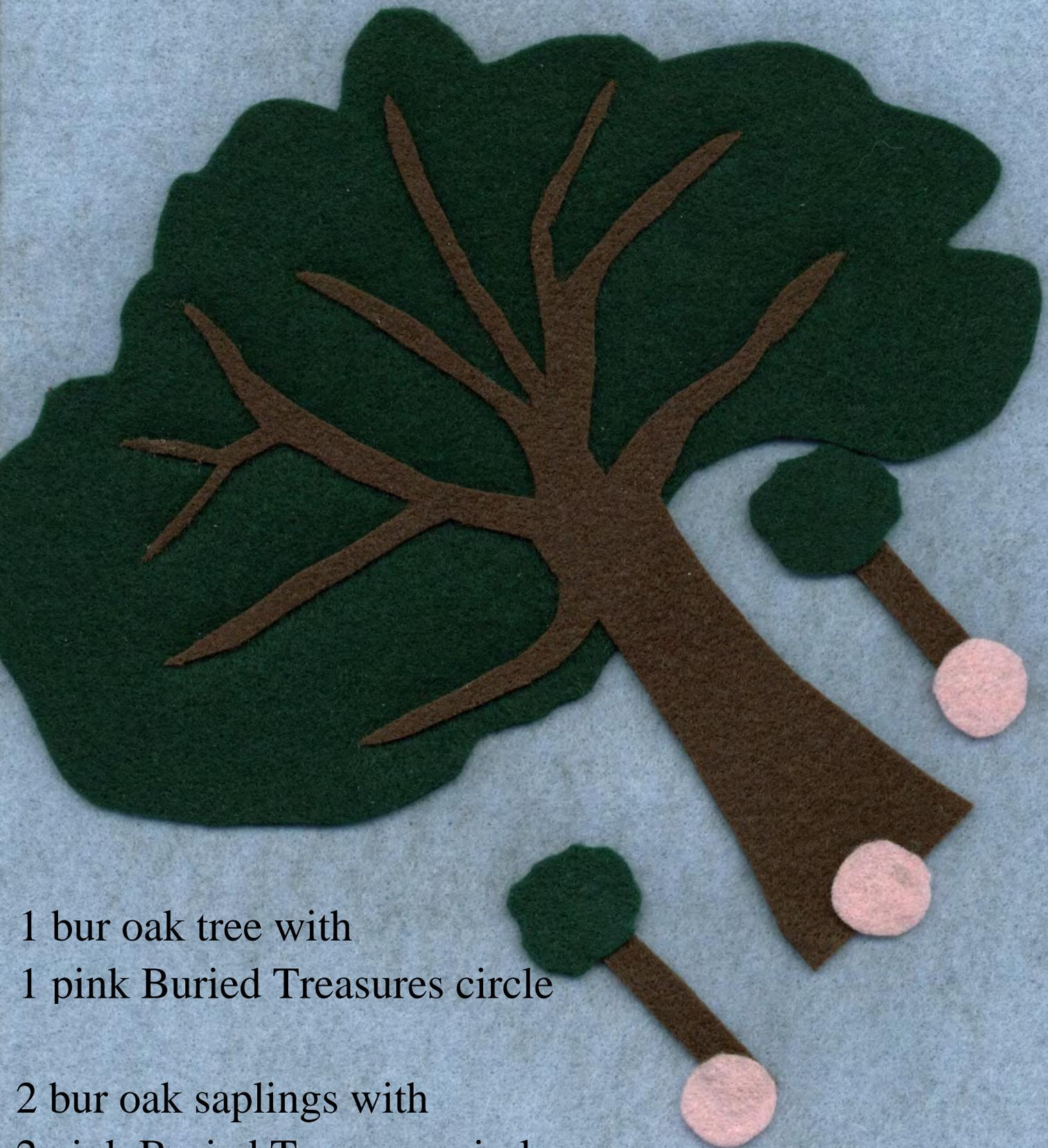
1 pink Buried Treasures strip





1 bur oak tree with
1 pink Buried Treasures circle

1 bur oak sapling with
1 pink Buried Treasures circle



1 bur oak tree with
1 pink Buried Treasures circle

2 bur oak saplings with
2 pink Buried Treasures circles

1 mixed-grass prairie strip
1 pink Buried Treasures strip

24



1 mixed-grass prairie strip
1 pink Buried Treasures strip



3 scarlet globemallows
3 pink Buried Treasures circles



3 willows
3 pink Buried Treasures circles



1 wild onion clump with pink Buried Treasures strip



1 snowberry clump with pink Buried Treasures strip





2 cottonwood trees (1 with a broken topped snag) with
2 pink Buried Treasures circles

1 cottonwood sapling with NO Buried Treasures circle

2 Saskatoon serviceberry bushes
2 pink Buried Treasures circles



2 chokecherry bushes
2 pink Buried Treasures circles



1 aspen clump on flat ground

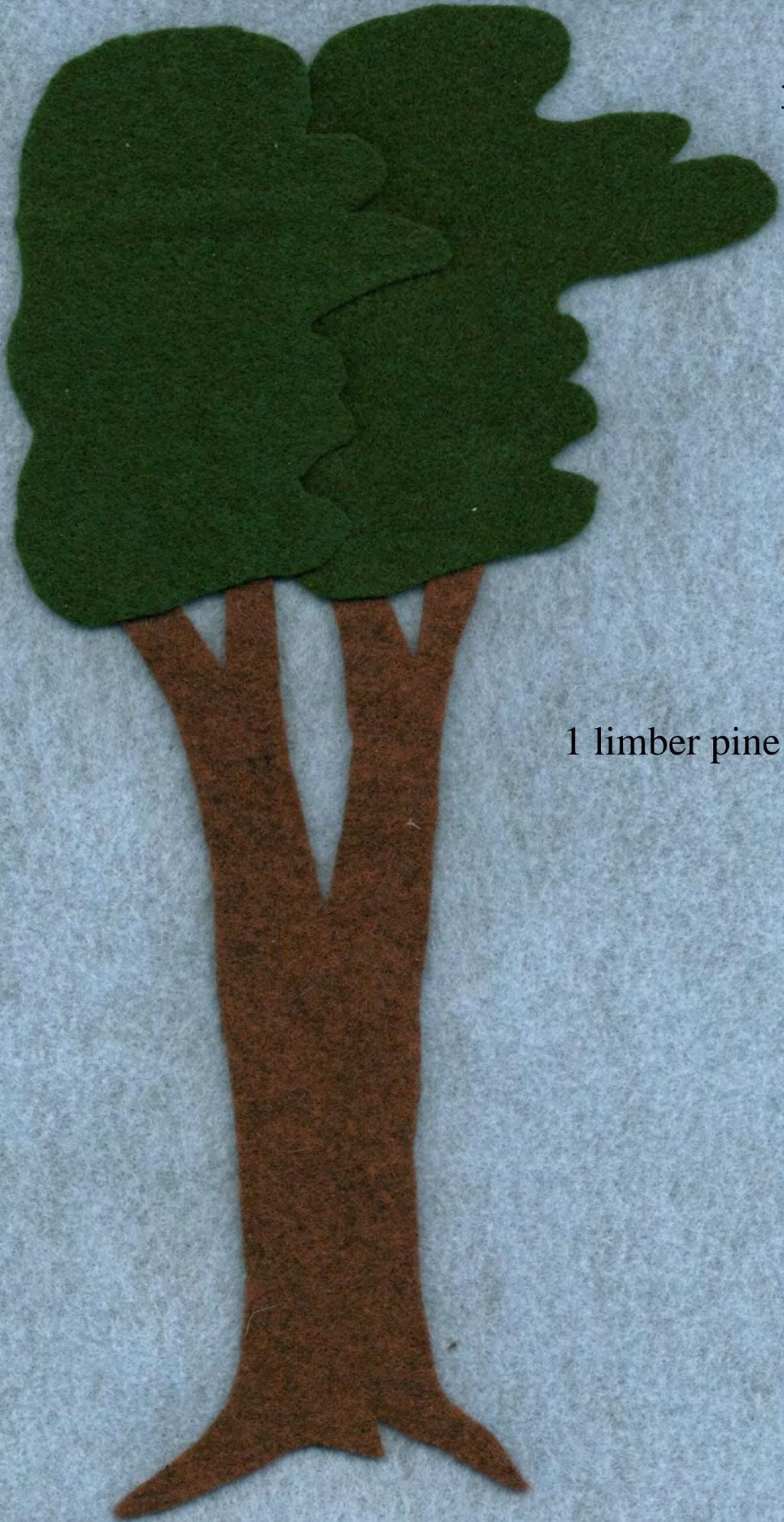
29



1 aspen clump
on slope

30





1 limber pine clump

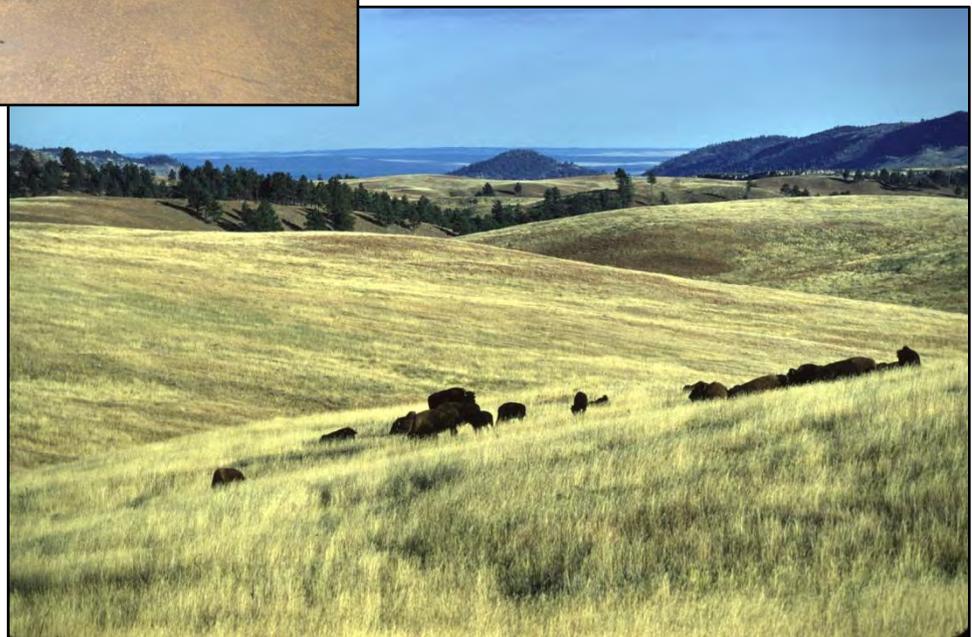
Dancing Fires in Missouri River Country:

FireWorks "Story Time" for
The Northern Great Plains
and
Rocky Mountain Front

Jane Kapler Smith, Nancy McMurray, and Ilana Abrahamson



Part 2



Photos:

Rick Trembath

Wind Cave National Park (NPS photo)



6 bison
2 bison calves

1 black bear



1 coyote



2 antelope



2 deer mice



4 black-tailed prairie dogs





1 common flicker



1 wild turkey



1 bald eagle



2 Clark's nutcrackers
(in one piece)

1 sharp-tailed grouse



1 bald eagle's nest

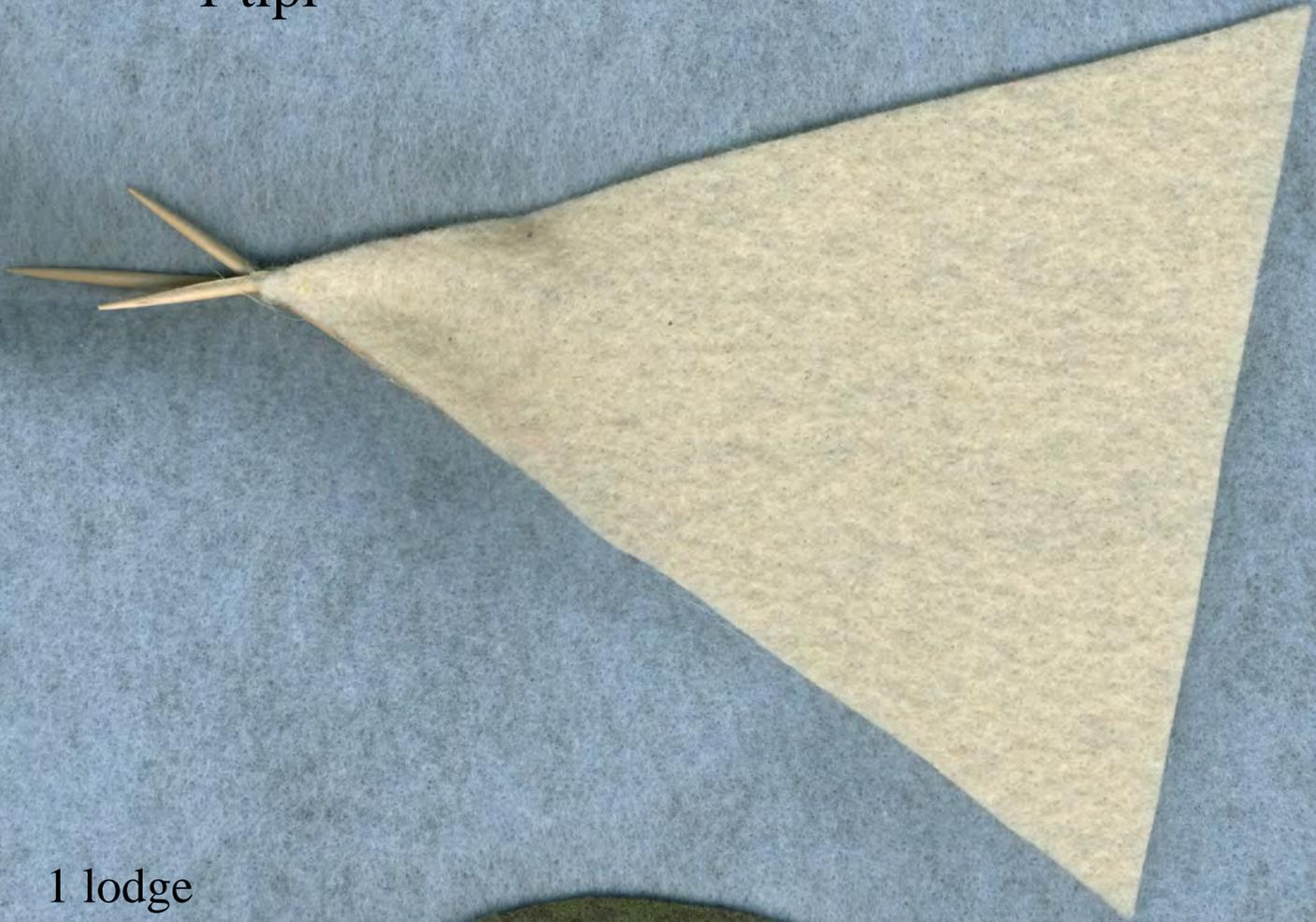


1 large bark beetle attached to blowup of egg gallery



1 large ant attached to blowup of colony

1 tipi



1 lodge



1 gray thunderhead cloud

1 lightning bolt



1 wind

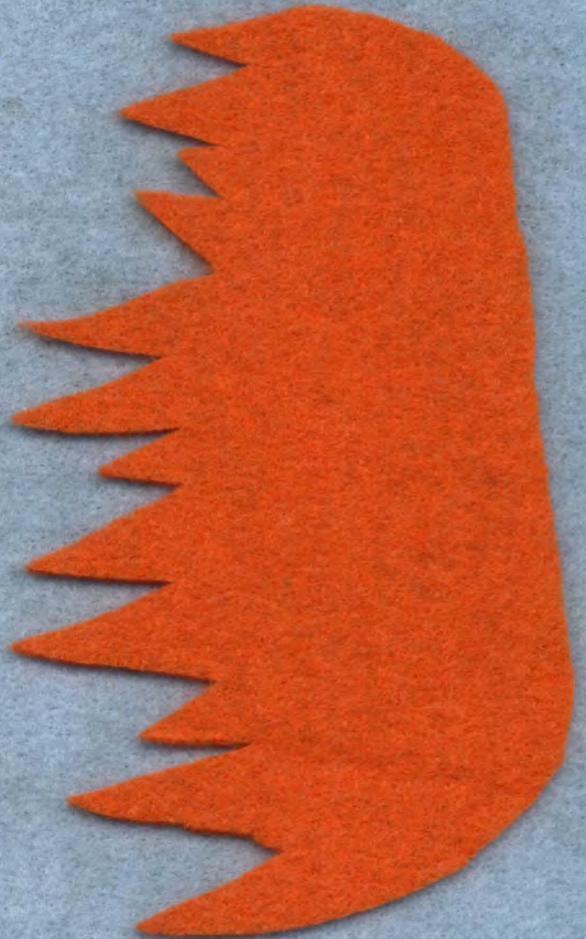


8 surface flames

39

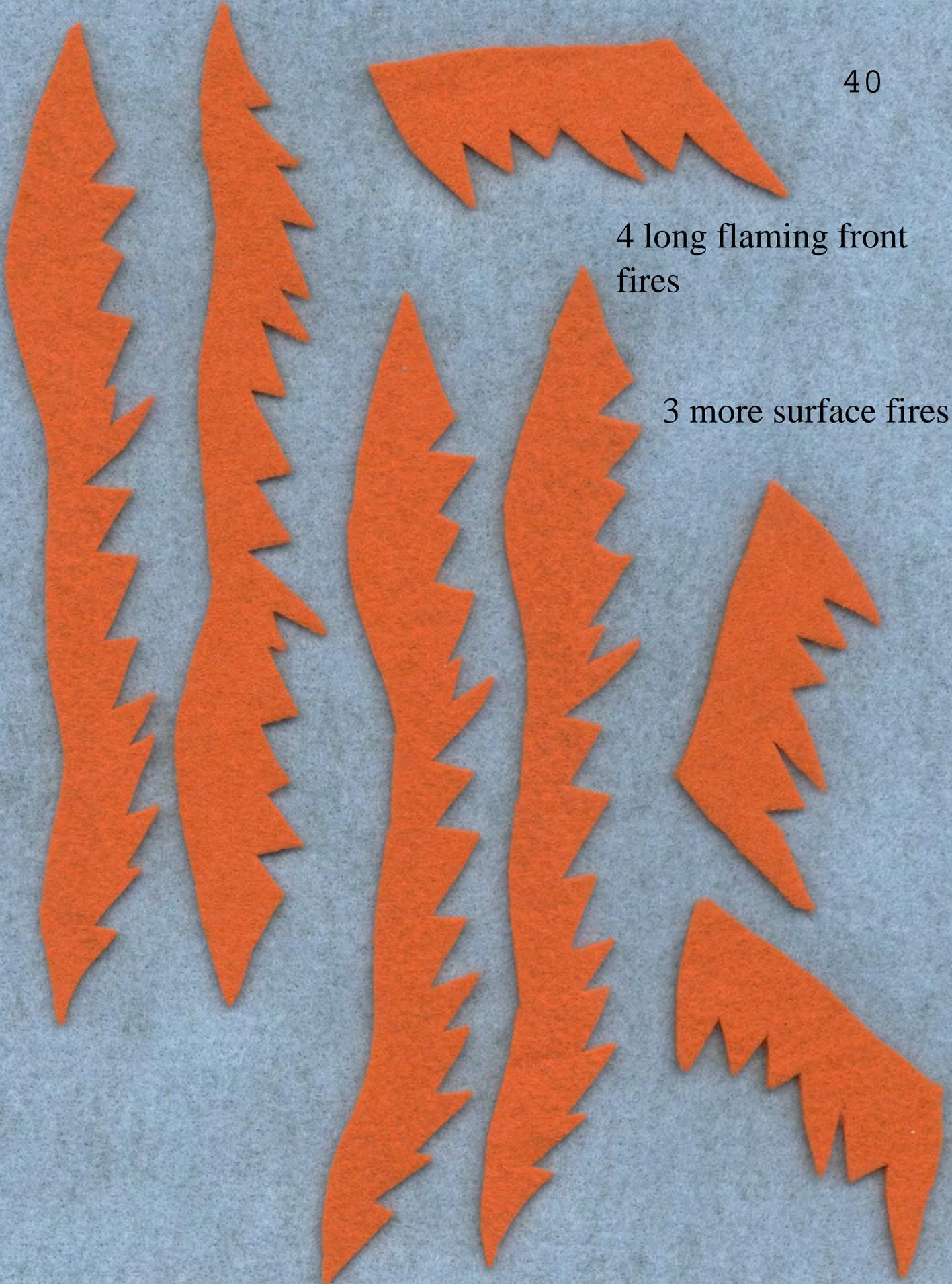


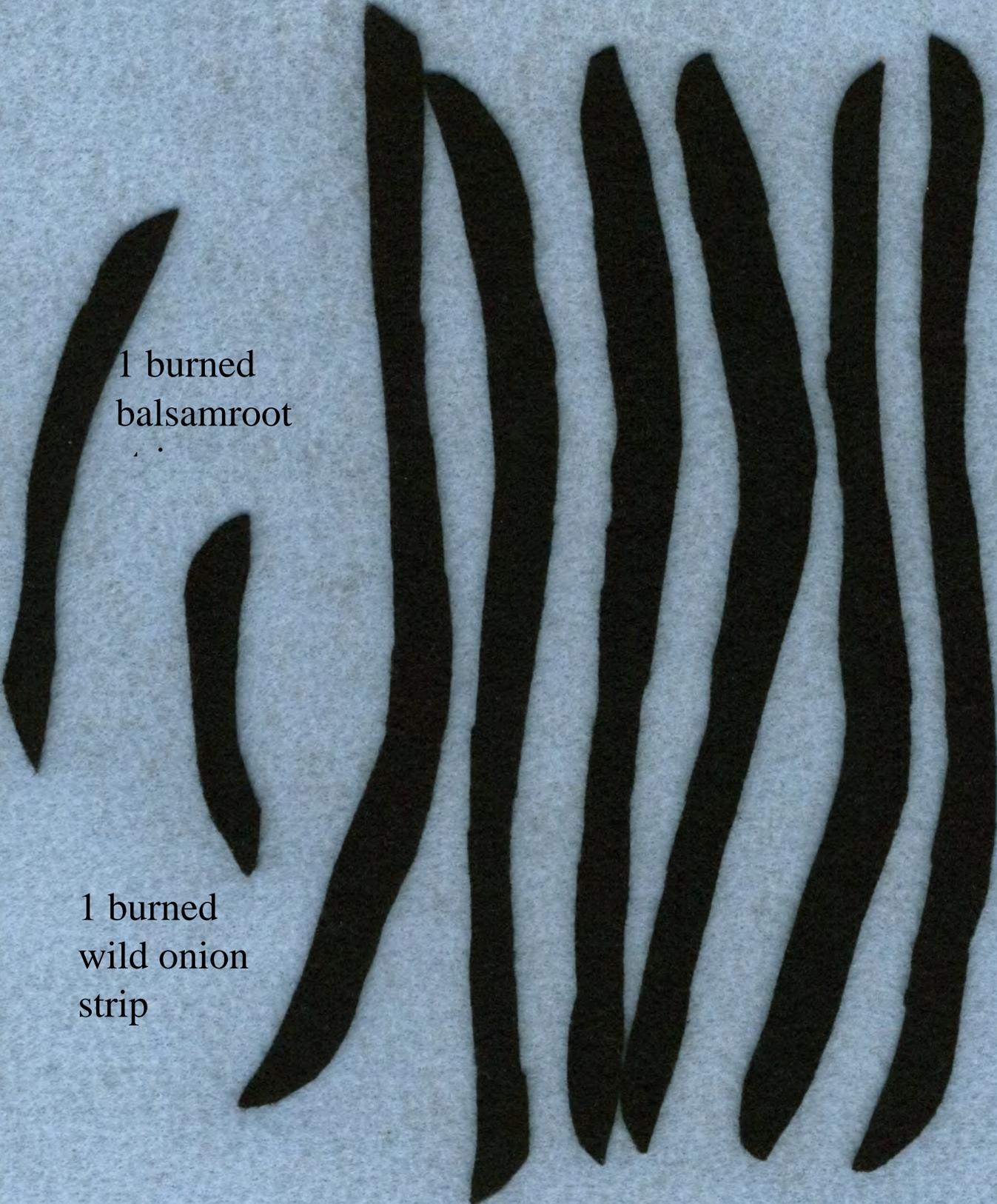
1 lodgepole crown fire
(a brighter orange than rest)



4 long flaming front
fires

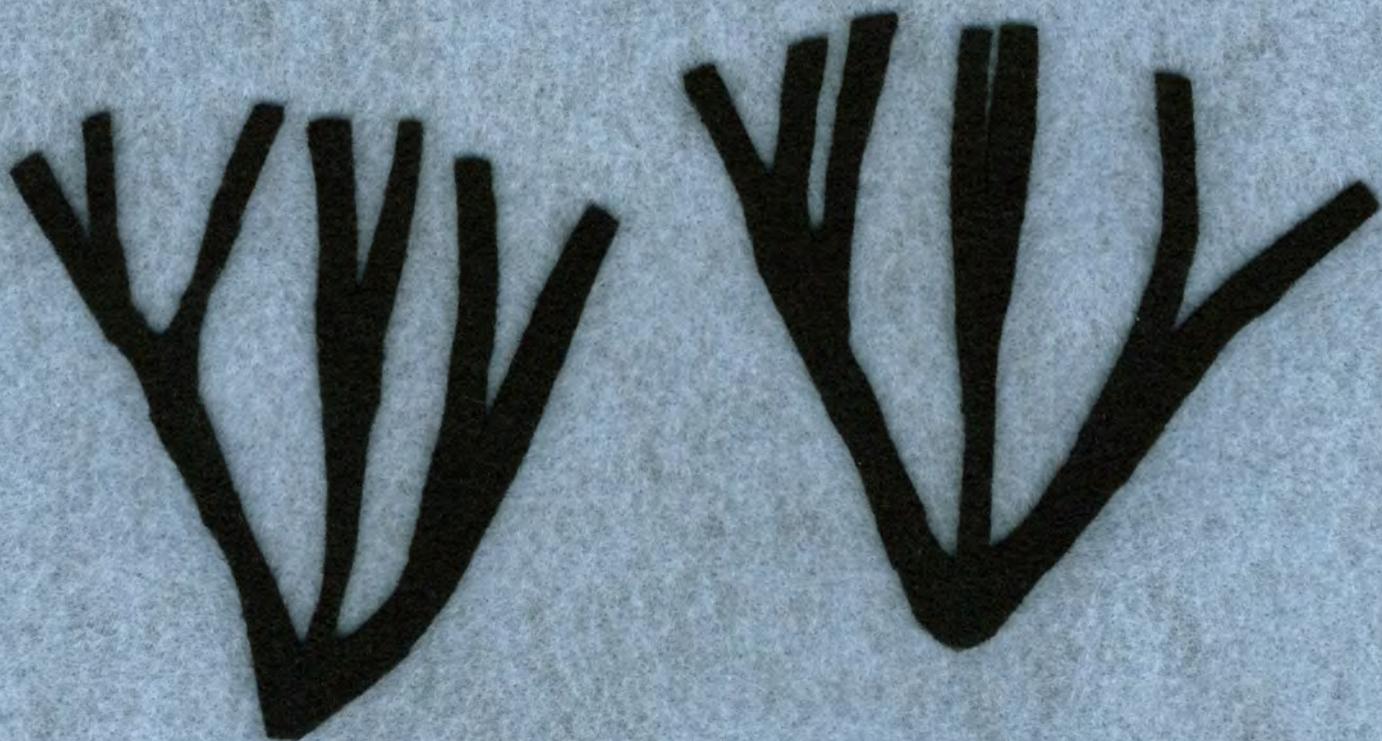
3 more surface fires





1 burned
balsamroot

1 burned
wild onion
strip



2 chokecherry stick skeletons

1 snowberry stick skeleton



1 burned patch of ponderosa pine forest



1 balsamroot clump for the ponderosa pine forest
1 pink Buried Treasures strip

1 burned lodgepole pine forest

1 lodgepole pine forest
with new trees growing

