



### Northern Woodlands Goes To School

Welcome to the Winter 2007 edition of *Northern Woodlands* magazine. Within this issue, you'll find articles to inspire interdisciplinary studies, both in the classroom and out in the field. Learn how to prune apple trees for wildlife, read the story of a revolutionary approach to equitable forestland ownership, contemplate the return of wolves to the Northern Forest, and much more.

This teacher's guide serves as a companion to *Northern Woodlands* magazine. In it are several in-class and outdoor activities that expand upon ideas presented in some of the magazine's articles. For each activity, we offer recommendations of related publications, contacts, and websites, as well as Project WILD and Project Learning Tree activities that build upon each activity theme. We also indicate the state curriculum standards each activity fulfills.

We'd like to extend special thanks to the sponsors of this project. As a result of their support, over 5,000 students throughout the Northeast are able to participate in Northern Woodlands Goes to School this year. The sponsors are: Fountain Forestry, Inc., Frank and Brinna Sands Foundation, French Foundation, International Paper, Maine TREE Foundation, Merchants Bank, New England Forestry Foundation, Northeastern Lumber Manufacturers Assoc., Twinflower Farm, and Wells River Savings Bank.

We would love to know your thoughts about our teacher's guide. If you have comments or suggestions, or if you need more (or fewer) copies of the magazine for your students, just call or email Anne Margolis at (802) 439-6292 (email: [anne@northernwoodlands.org](mailto:anne@northernwoodlands.org)). Visit our Northern Woodlands Goes to School website at [www.northernwoodlands.org/goes\\_to\\_school.php](http://www.northernwoodlands.org/goes_to_school.php) (until our new site is up – check back for updates!), where you can also download each quarter's teacher's guide. We're hoping our new site will be a place where teachers can come together to discuss the magazine and share ideas and lesson plans. If you have resources or curriculum materials you think we ought to post, please contact Anne.

### Noteworthy News

If your students would like to take part in the **2008 Envirothon**, it's time to begin planning for this national competition. The Envirothon's mission is to develop knowledgeable, dedicated citizens willing to work towards achieving and maintaining a balance between quality of life and quality of the environment. Team members in grades 9-12 collaborate to develop an understanding of the ecology and management of soils, forests, wildlife, and aquatics. They also practice dealing with complex resource management decisions as they develop an oral presentation focused on a particular current environmental issue (the 2008 issue is the impacts of recreation on the natural world). If your students get involved, they will compete, usually in May, with other teams from your state. The winner of each state's Envirothon competes in the national Envirothon, which will be held July 28-August 3, 2008 at Northern Arizona University in Flagstaff, AZ. Visit [www.envirothon.org/competition/Canon2008](http://www.envirothon.org/competition/Canon2008) for information about the 2008 competition, and visit [www.envirothon.org/programs/index.php](http://www.envirothon.org/programs/index.php) to find contact information for your state's Envirothon coordinator.

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## 1. Conserving Wildlife in Your State

*Wildlife Action Plans*, by Jon Kart (pg. 17)

During the last few years, every state and territory in the United States developed a Wildlife Action Plan (WAP). The objective of these plans is to manage wildlife and habitats in ways that prevent species from becoming endangered, a strategy that makes both ecological and economic sense. After students read Kart's article, encourage them to become familiar with your state's WAP. Though they tend to be quite voluminous, WAPs contain a wealth of interesting information about wildlife populations, threats to these populations, and strategies for mitigating those threats. Invite a state wildlife agency representative involved in developing or carrying out the action plan to give an overview of the plan to your students.

What issues did your state's WAP identify as the most serious threats to wildlife in your state? What about in your particular region of the state? Find out what State Wildlife Grants (SWG) have been awarded in your area to meet the goals of your state's WAP. Have students work in groups to select a regional, SWG-funded initiative to assess its goals, strategies, current status, and level of success in achieving its goals. Encourage students to interview initiative participants to learn about each project.

**Website:** To find out more about your state's Wildlife Action Plan, go to [www.wildlifeactionplans.org/](http://www.wildlifeactionplans.org/).

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<b>WILD</b>	Improving Wildlife Habitat in the Community Sustainability: Then, Now, Later Planning for People and Wildlife
<b>PLT</b>	Improve Your Place Life on the Edge
<b>ME</b>	Science and Technology B English Language Arts A, D, E, G, H
<b>NH</b>	Science 3a English Language Arts 1, 2, 3, 5, 6
<b>NY</b>	MST 1 Scientific Inquiry MST 4 The Living Environment MST 7 Strategies CDOS 3 Managing Information ELA Listening & Reading
<b>VT</b>	1.5 Writing Dimensions 1.8 Reports 1.13 Clarification and Restatement 1.19 Research 4.6 Understanding Place 6.2 Uses of Evidence and Data 7.13 Organisms, Evolution, and Interdependence

## 2. Forest Ownership and Social Justice

*Hiking to Little Hogback*, by John Elder (pg. 36)

The Little Hogback Community Forest project offers a whole new way to approach forest ownership and stewardship. In order for your students to understand why Deb Brighton's project is so revolutionary, they need to have a good grasp on forest ownership trends in your state. Have them research statewide forest ownership trends and ponder their ramifications. They may discover such trends as increasing forestland value, decreasing forest lot acreage, and increasing forest landowner income levels. What might these trends indicate? Does your state have a tax incentive program to help forestland owners afford to maintain undeveloped forestland? Invite a representative from your state forestry agency to discuss these issues with your students.

In the Little Hogback Community Forest, landowners pay either \$1,425 (for low-income participants) or \$2,850 to own an undivided share of 115 acres. How much does 115 acres of undeveloped forestland cost in your state? Low-income residents rarely have the possibility of land ownership and forest management. This project makes that impossibility a reality.

Does it matter that lower-income people increasingly have less access to forestland ownership and management? Why? Have your students write an essay that contemplates these questions.

**Website:** The Vermont Family Forests website offers much more information about the Little Hogback project, from a general overview to the nitty gritty of shareholding: [www.familyforests.org/research/comm-equity.shtml](http://www.familyforests.org/research/comm-equity.shtml).

<b>PLT</b>	Community Character (PLT High School Module, <i>Places We Live</i> ) Planning the Ideal Community
<b>ME</b>	English Language Arts A, D, E, H Science and Technology B Economics A
<b>NH</b>	English Language Arts 1, 2, 5 Social Studies 11 Science 3a Social Studies 5, 9
<b>NY</b>	MST 1 Scientific Inquiry MST 4 The Living Environment ELA 2 Speaking & Writing SS 3, 4
<b>VT</b>	1.12 Personal Essays 1.19 Research 3.9 Sustainability 4.6 Understanding Place 6.3 Analyzing Knowledge 6.15 Knowledge of Economic Systems 6.19 Identity and Interdependence 7.13 Organisms, Evolution, and Interdependence

### 3. Wood Fashions

*Where the Trees Grow Tall and Straight*, by Tovar Cerulli (pg. 26)

Like many commodities, wood marketing is subject to changing public aesthetic preferences. Where oak was once the wood of choice for cabinetry, flooring, and other millwork, now sugar maple reigns supreme. Not just any kind of sugar maple, but top-grade, clear-grained lumber. Although many other hardwoods common to the Northern Forest yield beautiful lumber—like ash, birch, and beech—they command only a small fraction of the lumber marketplace. What effect might such market tastes have on the ecology of the Northern Forest?

Have your students survey lumber yards in your region to find out what hardwood species they sell most. Students can then compare those figures with your state forestry department's statistics on the relative abundance of those species in your state. Are the numbers significantly different? Have your students hypothesize some possible effects of disparity between relative hardwood species abundance and market demand.

<b>PLT</b>	Far-Reaching Decisions (PLT High School Module, <i>Places We Live</i> )
<b>ME</b>	Science and Technology B Economics A English Language Arts A, D, H
<b>NH</b>	Science 3a, 4c Social Studies 5, 9 English Language Arts 1, 5
<b>NY</b>	MST 4 The Living Environment SS 3, 4 CDOS 3 managing Information
<b>VT</b>	1.19 Research 3.9 Sustainability 6.3 Analyzing Knowledge 7.13 Organisms, Evolution, and Interdependence 7.16 Natural Resources and Agriculture

**Website:** The Vermont Family Forests website offers extensive information on the interplay of forest economics, consumer choices, and forest ecology. Webpages devoted to the Middlebury College Bicentennial Hall Building Project explore this idea in depth: [www.familyforests.org/research/bicentennial.shtml](http://www.familyforests.org/research/bicentennial.shtml).

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### 4. Local Warming with Wood Energy

*Will Pellets Prevail?* By Craig Idlebrook (pg. 44)

Idlebrook's article describes how the great popularity of pellet stoves has created an enormous demand for the wood fibers used in making pellets. While early pellet manufacturing used "waste wood" (sawdust and chips) from local sawmills, big demand has prompted manufacturers to utilize raw logs for fiber. Given growing interest in finding local sources of energy and the increasing popularity of wood energy to heat schools, public facilities, industries, and homes, is it possible to lean too heavily on the region's forests in our search for local alternatives to fossil fuels? How do we safeguard the ecological health of forests while meeting our energy needs locally? Invite a state forestry official to discuss the current status of wood energy usage and forest health in your state.

Have students research the history of logging in the Northeast, particularly during the industrial revolution of the late 1800s and early 1900s, when demand for forest products exceeded the forests' capacity for self-renewal. What lessons can we learn from that history?

<b>PLT</b>	In the Good Old Days (gr. 6-8)
<b>WILD</b>	Sustainability: Then, Now, Later (gr. 9-12)
<b>ME</b>	English Language Arts B History B Science and Technology B
<b>NH</b>	Social Studies 11, 17 Science 3a, 4c
<b>NY</b>	SS 1, 3 MST The Living Environment
<b>VT</b>	4.6 Understanding Place 6.4 Historical Connections 6.19 Identity and Interdependence 7.13 Organisms, Evolution, and Interdependence 7.16 Natural Resources and Agriculture

**Website:** [www.fs.fed.us/r9/gmfl/about/index.htm](http://www.fs.fed.us/r9/gmfl/about/index.htm). The U.S. Forest Service provides an excellent description of the changes to the Green Mountain National Forest caused by late-nineteenth-century logging practices.

[www.fs.fed.us/ne/newtown\\_square/publications/technical\\_reports/pdfs/2006/342papers/ke/ky342.pdf](http://www.fs.fed.us/ne/newtown_square/publications/technical_reports/pdfs/2006/342papers/ke/ky342.pdf). This U.S. Forest Service publication gives a concise overview of northeastern logging history.

## 5. Forest Dynamics

*Doing the (Fir) Wave*, by Madeline Bodin (pg. 18)

Bodin’s fascinating article illuminates one example of how forests are constantly changing. The article describes the obvious, but easy-to-forget, notion that forests are much more than trees, and that the natural dynamics that affect tree health and mortality have ripple effects upon many forest species. What are the primary natural forces acting upon northeastern forests, now and historically? Have your students select a natural force that acts upon these forests (for example, the natural death of individual trees, insect infestation, wind throw, ice storm, hurricane) and explore the impacts of that event on the forest community. Have them create a fictional story of such an event and of the many rippling effects of that event throughout the forest community.

**Website:** The Forest Service offers a research document on northeastern fire ecology and bird populations. For upper-level high school students only.  
[www.fs.fed.us/ne/newtown\\_square/publications/other\\_publishers/OCR/ne\\_2005\\_artman001.pdf](http://www.fs.fed.us/ne/newtown_square/publications/other_publishers/OCR/ne_2005_artman001.pdf)

**Book:** *Wetland, Woodland, Wildland*, by Elizabeth Thompson and Eric Sorenson. 2000. Describes the ecological history of Vermont’s forest communities.

<b>PLT</b>	Tree Lifecycle Nothing Succeeds Like Succession Story of Succession (PLT High School Module, <i>Forest Ecology</i> )
<b>ME</b>	Science and Technology B English Language Arts A, D, E, H
<b>NH</b>	Science 3a English Language Arts 1, 2, 5
<b>NY</b>	MST 1 Scientific Inquiry MST 4 The Living Environment ELA 2 Speaking and Writing CDOS Managing Information
<b>VT</b>	1.9 Narratives 1.19 Research 6.2 Uses of Evidence and Data 7.13 Organisms, Evolution, and Environment

## 6. Modeling Climate Change

*Too Hot for Krummholz?*, by Jason Townsend (pg. 56)

Townsend’s article describes a scientific study predicting the impacts of climate change on Bicknell’s thrush. Have students investigate other recent scientific papers on the current and predicted ecological effects of climate change on particular wildlife species—from bats to polar bears. Have students select a particular plant or animal from the Northern Forest, and create a presentation on its ecological niche and the potential impacts of climate change on that species. Encourage them to utilize photographs, their own illustrations, and graphs to illustrate their presentation.

**Website:** Excellent 6-page report by the Congressional Research Service on the effects of global climate change on wildlife,  
<http://fpc.state.gov/documents/organization/80675.pdf>

### Wildlife Connection

*When the Wolf Returns*, by Susan C. Morse (pg. 55)

Morse’s article offers your students an angle on Vermont’s extirpated predator—the timber wolf—that they might not have encountered before; it’s not a matter of *if* wolves will return to the northeastern states, but *when*. Have students research the natural history of timber wolves and the cultural history that led to their extirpation in the northeastern states, as well as many other parts of the country. Though students are not likely to see the timber wolf tracks that Morse describes, winter is the perfect time for students to discover tracking in general. If you’re not comfortable leading a tracking field trip, invite a local naturalist/tracker to join you.

<b>PLT</b>	The Global Climate Our Changing World
<b>ME</b>	Science and Technology B, J English Language Arts A, D, E, H
<b>NH</b>	Science 2c, 3a English Language Arts 1, 2, 5, 6
<b>NY</b>	MST 1 Scientific Inquiry MST 4 The Living Environment MST 6 Models MST 7 Strategies
<b>VT</b>	1.5 Writing Dimensions 1.8 Reports 1.17 Notation and Representation 1.19 Research 1.20 Communication of Data 6.2 Uses of Evidence and Data 6.3 Analyzing Knowledge 7.13 Organisms, Evolution, and Interdependence

**Book:** *Of Wolves and Men*, by Barry Lopez. Touchstone Press: 1978. Drawing on literature, history, science, and mythology as well as considerable personal experience with captive and free-ranging wolves, Lopez explores the wolf's world, the relationship between people and wolves, and the need for its preservation. National Book Award finalist.

*Tracking and the Art of Seeing*, by Paul Rezendes. Harper Collins: 1999.

*Guide to Animal Tracking and Behavior*, by Donald and Lillian Stokes. Little, Brown, and Co: 1986.

*Mammal Tracks: Life-Size Tracking Guide*, by Lynn Levine and Martha Mitchell. Heartwood Press: 2001.

<b>WILD</b>	Tracks! (gr. 5-8)
<b>ME</b>	Physical Education A Science and Technology B, J
<b>NH</b>	Science 1a, 2a, 3a
<b>VT</b>	3.5 Physically Active Lifestyle Choices 7.2 Investigation 7.13 Organisms, Evolution, and Interdependence

### Career Connection

*At Work Managing a Preserve with Dylan Horvath*, by Stephanie Specchio (pg. 50)

“Some people complain that work interferes with their lives. I spend my days doing exactly what I would do if I didn’t have to work,” says Dylan Horvath. Have your students read about Horvath, then write an essay about their own career aspirations. What work do they think they will do as adults? What would they do with their lives if they didn’t have to work? Are the two answers different? Why? In his poem, *Two Tramps in Mud Time*, Robert Frost wrote, “...My object in living is to unite/ My avocation and my vocation/ As my two eyes make one in sight.” Can students conceive of a way to merge their career and their most passionate interests?

<b>ME</b>	Career Preparation A English Language Arts E
<b>NH</b>	Career Learning 7 English Language Arts 2
<b>NY</b>	CDOS 1 HPHE 3 Home Economics ELA 2 Speaking & Writing
<b>VT</b>	1.12 Personal Essays 3.15 Career Choices

### Calendar Connection

*Tending Wild Apple Trees for Wildlife*, by Carl Demrow (pg. 73)

Winter’s the time for pruning wild apple trees for wildlife. Identify wild apple trees in your community that could benefit from pruning. Obtain landowner permission, and work with students to hand-prune the trees. Invite your county forester or a representative of a local wildlife conservation organization, like Audubon or National Wildlife Federation, to join you and discuss the significance of apple trees to wildlife. Have students draft management recommendations to the landowner for future work on the apple trees.

**Website:** The University of Maine’s Cooperative Extension agency offers an excellent publication, *Wild Apple Trees for Wildlife*, which discusses the origins of apple trees (which are not native to the U.S.), wildlife species that eat wild apples, and stewardship techniques.  
[www.umext.maine.edu/onlinepubs/htmpubs/7126.htm](http://www.umext.maine.edu/onlinepubs/htmpubs/7126.htm).

<b>WILD</b>	Improving Wildlife Habitat in the Community
<b>PLT</b>	Improving Your Place
<b>ME</b>	Science and Technology B English Language Arts E, H
<b>NH</b>	Science 3a, 4c English Language Arts 2, 6
<b>NY</b>	MST 4 The Living Environment MST 7 Strategies
<b>VT</b>	1.8 Reports 7.13 Organisms, Evolution, and Interdependence 7.16 Natural Resources and Agriculture

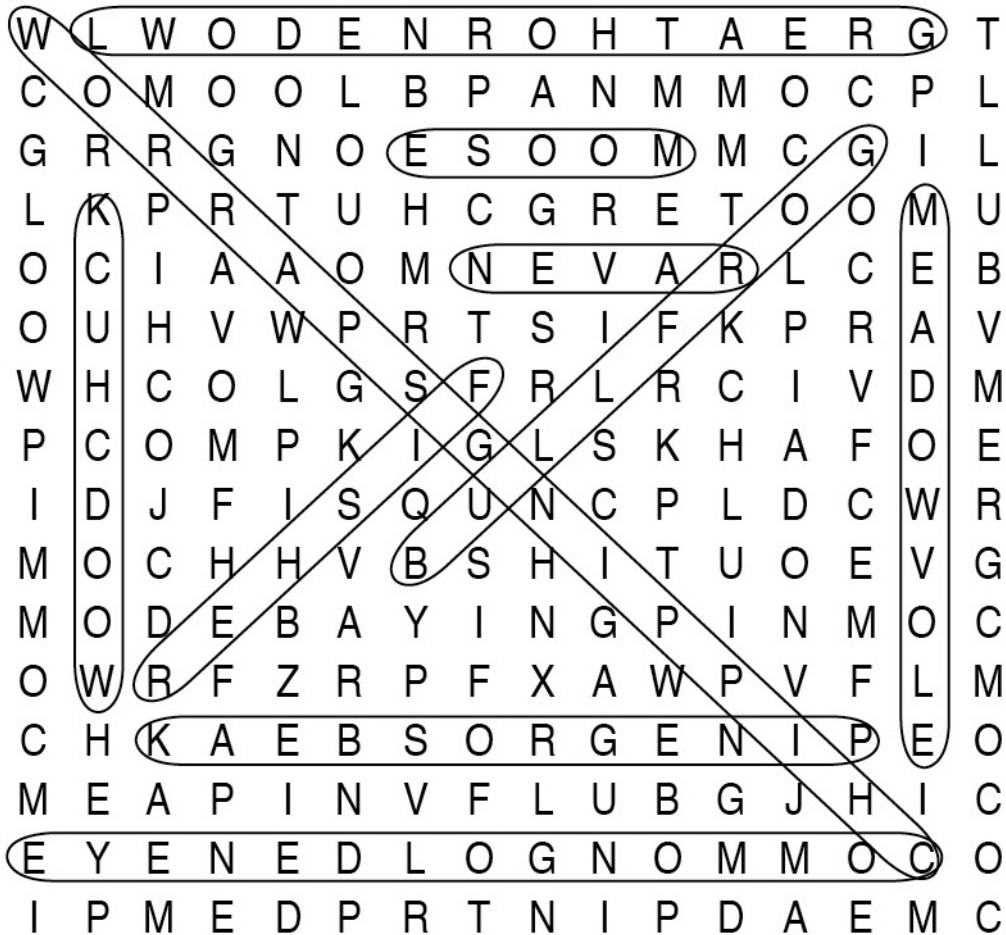


# Word Search

## Animals of the Northern Forest

Winter Calendar (p. 4)

1. This bird species eats 160 times its weight in seeds during the winter (two words). CHIPPING SPARROW
2. Though some frogs hibernate underground, this frog spends the winter in the water beneath an insulating layer of ice. BULLFROG
3. When you find the hulls of white ash seeds on the ground, it may be a sign that this bird species has been feeding (two words). PINE GROSBEAK
4. This hibernating mammal raises its body temperature more than 50°F every few days in winter. WOODCHUCK
5. This mammal's long legs can easily step through more than two feet of snow. MOOSE
6. This bird species begins its courtship activity in January (three words). GREAT HORNED OWL
7. Mammal commonly eaten by hawks and owls (two words). MEADOW VOLE
8. This bird may fly more than 50 miles in a day to reach food. RAVEN
9. This forest-dwelling mammal's bounding gait leaves paired tracks in the snow. FISHER
10. This bright-eyed waterfowl species returns in February to ice-free stretches of northern rivers (two words). COMMON GOLDENEYE



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W L W O D E N R O H T A E R G T  
C O M O O L B P A N M M O C P L  
G R R G N O E S O O M M C G I L  
L K P R T U H C G R E T O O M U  
O C I A A O M N E V A R L C E B  
O U H V W P R T S I F K P R A V  
W H C O L G S F R L R C I V D M  
P C O M P K I G L S K H A F O E  
I D J F I S Q U N C P L D C W R  
M O C H H V B S H I T U O E V G  
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# Crossword Puzzle

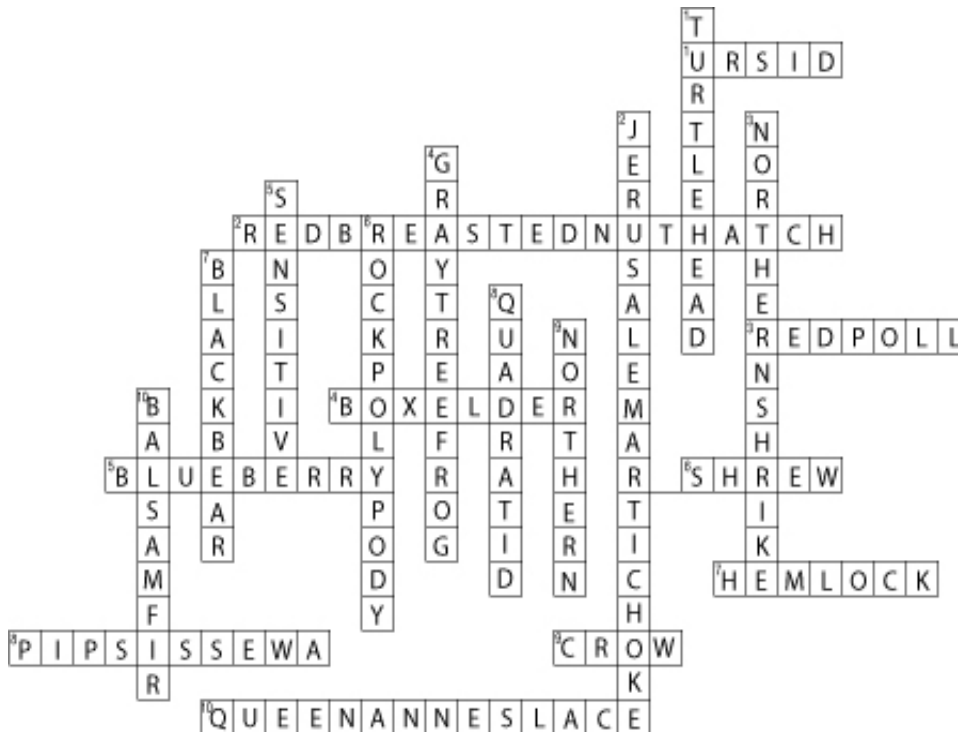
*Northern Woodlands Winter Calendar* (p. 4)

## Across

- December meteor shower that originates in the Big Dipper. **URSID**
- While many bird species are territorial only during the mating season, this species remains territorial throughout the winter (three words). **RED-BREASTED NUTHATCH**
- In winter, you can see this bird traveling in flocks of over 100 individuals. **REDPOLL**
- Because this maple holds its seeds all winter, it provides important winter food for wildlife, including evening grosbeaks. **BOXELDER**
- Deer like to browse this fruit-bearing shrub before deep snows bury it. **BLUEBERRY**
- This small mammal stays warm on cold winter days by burrowing beneath the snow. **SHREW**
- Golden-crowned kinglets eat the seeds of this conifer species. **HEMLOCK**
- This evergreen plant's botanical name means "to love winter." **PIPSISSEWA**
- Animals killed along roadways are an important food source for this bird. **CROW**
- The big, cup-shaped seed heads of this flower provide emergency, late-winter food for birds (three words). **QUEEN ANNE'S LACE**

## Down

- This water-loving flower gets its name from the shape of its flowers and opened seedpods. **TURTLEHEAD**
- Many bird species eat the seeds of this yellow sunflower (two words). **JERUSALEM ARTICHOKE**
- This bird sometimes impales its prey on a hawthorn before eating it (two words). **NORTHERN SHRIKE**
- This amphibian can withstand body temperatures of as low as 21°F for at least five days (two words). **GRAY TREEFROG**
- The fertile brown fronds of this species of fern will release spores in spring. **SENSITIVE**
- You can find this evergreen fern on rocky outcrops (two words). **ROCK POLYPODY**
- This mammal's heart beats just five times per minute during winter hibernation (two words). **BLACK BEAR**
- January meteor shower. **QUADRANTID**
- This flying squirrel species prefers to live in evergreen forests. **NORTHERN**
- Heavy snows slide off this tree's tapered form, protecting the tree's limbs from breakage (two words). **BALSAM FIR**



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