From the editor:

Spring is arriving slowly this year. However, as the snow melts, many areas in the state are going right to high fire danger. Extreme care will be needed again this year.

The fire and state burn permit season officially began April 1. Burn permits are required. See the article within about obtaining a state of Alaska burn permit.

This edition also contains articles and information about a new mapping/GIS class offered fall term at UAF; the U.S. Forest Service’s 10-year wildfire plan; ongoing nationwide improvements in the use of biomass; spring 2022 wildfire red card classes are still available; our featured tree is the Alaska willow and its importance to wildlife; we take a glimpse of the unique skunk cabbage; and then some suggestions on collecting and using spruce tips to liven up your menu this spring.

We also take a look at the Western Aspen Alliance, which handles research and management issues related to Western aspen forest communities in wake of concern that this very important ecosystem is in decline.

Have an excellent spring and burn safe as the snow finally melts!

Glen Holt
UAF RREA Forestry Program Forester
Wildfire season arriving late this year

Glen Holt
UAF RREA Forestry
Program Forester

Some places still have snow, but within days after it melts we can be in spring fire season. This year is proving to be the beginning of an early dry fire season as the snow leaves. Accumulations of winter-killed grass prior to green-up, warm days with lower humidities, dry weather, and wind can lead to high fire danger in many locations.

Extreme care with open burning of any kind is called for. Regardless of when your snow finally leaves, the Alaska statewide wildfire season and burn permit season begins April 1. A state of Alaska burn permit is required to legally use a burn barrel or burn brush piles on state, municipal or even your own private lands.

Burn permits are free and available online at https://dnr.alaska.gov/burn. You can pick up a hard copy at state forestry offices in Anchorage, Fairbanks, Palmer, Glennallen, Delta Junction, Tok, Soldotna and Ketchikan. Many local fire departments have them, usually in a small box attached to the outside of their building.

The burn permit program requirement helps minimize the number of human-caused wildfires in Alaska by providing guidelines for permit holders related to the size of burn piles, what materials may be burned and other safe burning requirements that reduce the chance of a fire escaping your control.

Wildland firefighter classes
Alaska’s wildland fire season is upon us and the State of Alaska Division of Forestry has been getting a lot of calls asking about wildland firefighter training classes.

View the statewide schedule of Red Card and Refresher classes being held at various DNR Division of Forestry Area offices.

You can also find the schedule on their website at: http://forestry.alaska.gov/training.

You, as the landowner on which the burn originates are ultimately responsible for the damage your fire could inflict on other ownerships.

Never leave a burn unattended and always call the number on the permit to see if local conditions allow burning that day.
Carbon loss and Alaska boreal forest fire study

Northern Arizona University

More frequent and severe wildfires in Alaska are emitting into the atmosphere huge amounts of stored carbon and nitrogen from burned trees and soil. Some scientists are concerned this trend could accelerate climate warming.

New published research in the journal Science shows that deciduous trees replacing burned spruce are more than replacing that loss and that they are storing more carbon and accumulating it four times faster over a 100-year fire interval.

The study, led by researchers at the Center for Ecosystem Science and Society at Northern Arizona University, suggests that these faster-growing, less flammable deciduous forests may act as a stabilizing ‘firebreak’ against escalating fire patterns and nutrient loss in the Alaskan boreal forest region.

The study began after the huge Alaska wildfire season in 2004 when an area seven times larger than average burned. More than half that area was black spruce. Wildfires often foster faster-growing hardwoods like aspen and birch, and these are replacing some of the black spruce stands after the 2004 fire season.

A team of researchers from Northern Arizona University, the University of Alaska Fairbanks, Auburn University, and University of Saskatchewan surveyed 75 black spruce stands burned in 2004 and followed their recovery over the next 13 years collecting data from trees and soils of different ages and burn severities to construct what they term a chronosequence. This is a scientific time-lapse allowing a fast-forward glimpse of what a 100-year fire cycle might look like, predicting forest recovery and change.

Researchers found that the new aspen and birch replacing the black spruce accumulated carbon and nitrogen more quickly than the original stand and most of it was being stored in their wood and leaves rather than the soil organic layer. They projected that at the end of a 100-year cycle, the deciduous stands will have recovered as much nitrogen as was lost to fire, and more carbon and that this should result in an increase in net ecosystem carbon. Calculating this balance could be critical to understand boreal forest change, and how changes could affect the global carbon picture.

“In a region with only five common tree species, this study shows how changes in tree composition can dramatically alter patterns of carbon storage in boreal forests,” said Jill Johnstone, a northern researcher at University of Alaska Fairbanks and co-author of the study.

Wildfires give off into the atmosphere huge amounts of carbon and nitrogen all at once.

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“Carbon is just one piece of the puzzle,” said M.C. Mack, principle researcher from Northern Arizona University. “Deciduous forests have other important interconnected effects, on climate. We know these forests help cool regional climate, that they are less ignitable, and so fires are less likely to spread. Taken together, these effects create a relatively strong set of stabilizing climate feedbacks in the boreal forest.”

Researchers don’t as yet know the fate of these new deciduous boreal forests. Questions posed include: When those mature deciduous trees die, will they be replaced with trees with the same structure, composition, and carbon storage abilities, and will they recover from fire with the same carbon storage capacities?

Mack said continued climate warming may undo the carbon-sequestering gains these trees represent. “The carbon should reside longer on the landscape because deciduous forests are less flammable. The climate (may) pass a threshold where things get so hot and dry, even deciduous forests will burn. So, one question we need to ask is, how strong will the mitigating effect of low flammability be, and how long will it last?”

**Explore further**

**Wildfires are changing forest communities in interior Alaska**


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**Biomass Innovations**

**Glen Holt**  
UAF RREA Forestry Program Forester

In the past, many tons of wood that previously had no use needed disposal. This “waste wood” was either burned or buried. Ongoing innovative research in wood technology is adding to an ever-expanding list of new and more efficient uses of waste wood and below-grade wood. New products such as laminated timbers have been invented and new uses are being developed all the time. Some of these new uses and wood products include:

- **Biochar**, which is used for:
  - **Soils**: forest and agricultural soils are made more productive.
  - **Feedstocks**: used in concrete, bioplastics and...
Biomass, continued from page 4

Biomass, continued from page 4

green steel production.


• Cellulosic Nanoparticles were developed to produce new and improved materials used in the aeronautical and auto industries. Cellulosic nanoparticles are improving the durability and energy efficiency of aircraft, trucks, buses, and cars by reducing their weight while making them stronger. They are also used in manufacturing “green” tires that get better mileage and store carbon.

• Wood-Fiber Insulation. Rigid board, batt and blown-in cellulose insulations are replacing foam, polystyrene and other fossil-fuel intensive insulations. Cellulose insulation can be made less flammable, and without “off-gassing” of noxious fumes common to petroleum-based products. Wood-fiber insulation is safer, stores carbon for long periods of time and reduces building heating and cooling requirements through greater long-term efficiency.

• Glass manufacture is now utilizing cellulose and replacing traditional manufacture methods. Significant energy is saved in the cellulosic glass manufacturing process. Cellulosic glass increases the insulative quality of glass and its use further conserves energy during the life of that product.

• Windmills are again being made of wood, which has been found to reduce the total long-term energy output used in windmill construction, operation and maintenance.

• Biomass Heating and Electrical Co-generation is becoming increasingly functional and continues to utilize more waste wood sources and raw wood not suited for other purposes (lumber, etc.). The increased development and utilization of biomass energy sources limits the use of costly fossil fuels and conserves their use for more appropriate energy. Biomass utilization often allows local sourcing of viable energy resources and replaces the use of fossil fuel energy; drilled, mined and transported from elsewhere.

• Biogas research and utilization is being considered for many means of transportation. Efficient biogas production research and its efficient operation in current means of transportation is in the developmental phase. New innovations will evolve in the future with current plans to utilize biogas for air travel and other transportation options.

Wood technology research and development is ongoing. Timely innovations are occurring as more wood is available from waste sources and the very real need to reduce forest fuels and fire danger around our homes and communities.

Forest fuels reduction along with appropriate utilization should go hand in hand with the appropriate scientific management of lands surrounding human habitation. Our changing climate dictates that we adapt our ways of thinking and living within the environment.

Fire danger and its catastrophic threat to safety and property are becoming more severe in the wake of climate change, which is causing larger, more frequent wildfires, and often later flooding and landslides within human-populated landscapes.
Wildfires: Confronting the crisis

Glen Holt
UAF RREA Forestry Program Forester

The U.S. Forest Service formulated a 10-year wildfire strategy to address the nation’s wildfire crisis. The strategy is called “Confronting the Wildfire Crisis: A Strategy for Protecting Communities and Improving Resilience in America’s Forests.”

This program will combine congressional funding with years of scientific wildfire research and planning toward a national effort to significantly increase the scale of forest health treatments over the next decade. This need to significantly increase on-the-ground work managing millions of acres of national forests across the American West has been made very apparent during the last decade of wildfire activity. The Forest Service is partnering with states, tribes, and local communities to implement this new strategy across jurisdictions and land ownerships to protect lives, communities, critical infrastructure, watersheds, habitats, and recreational areas.

“Overgrown forests, a warming climate, and a growing number of homes in the wildland-urban interface, following more than a century of rigorous fire suppression, have all contributed to what is now a full-blown wildfire and forest health crisis.”

The Forest Service and partners will work strategically on fuels and forest health treatments guided by the best available science. The plan calls for treating up to an additional 20 million acres on national forest system lands and 30 million acres of other federal, state, tribal, and private lands.

Wildfires know no boundaries: Fires don’t stop at the border of a national forest, private land, or city limit. Cooperative work among all agencies, communities, and landowners will be essential to creating fire-resilient forests on a national as well as local scale.

To assist with plan development and implementation, the Forest Service through the National Forest Foundation is convening virtual roundtable events to engage employees and partners. These roundtables will commence in February 2022 and conclude May 2022.

Roundtable goals are to:

• Share information, goals, and timelines for the 10-Year Strategic Implementation Plan;
• Collect partner and employee input to inform the plan;
• Provide an opportunity for dialogue among Forest Service leaders and partners to identify key needs and opportunities of the plan; and
• Gauge ongoing levels of interest and determine ways to leverage that interest and energy.

Visit the National Forest Foundation website to learn more and how to get involved

For more information:

• Confronting the Wildfire Crisis: A New Strategy for Protecting Communities and Improving Resilience in America’s Forests
• A Chronicle from the National Fire Plan to the Wildfire Crisis Strategy
• Implementation

1. U.S. Forest Service “managing the wildfire crisis”
Featured tree species: Alaska willows

Glen Holt  
UAF RREA Forestry Program Forester

The willow family (Salicaceae) is a tree/shrub species including more than 37 native species in Alaska ranging in size from small creeping, dwarf-like shrubs to larger shrubs and as large as small trees. Eight of these species can attain tree-like stature. The Salix genus comprises the largest number of trees and shrubs in the state. ¹

Distinguishing characteristics of willow include:
• Leaves are single, alternately placed on branches, with leaf margins that may be evenly toothed or smooth.
• Flowers are arranged in upright catkins and form (depending on species) what are known as pussy willows in early spring. Flowers develop cottony seed that is later disseminated by the wind, regrowing willow usually on bare mineral soil, sand and gravel areas.

Many Alaskan willows begin growth in early spring noted by the emergence of “pussy willows,” which become flowers later. Photo by Misty McNellis

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Introduction to GIS

NRM F338, 3 CR, Fall 2022, CRN 75757 (001); 75771 (002); 75770 (003); 76883 (004)

Lecture: MW 9:15 - 10:45
Lab T (001; 002): 2 - 5 pm
or
Lab W (003): 11:15 - 2:15 pm
Asynchronous (004)

Instructions
LMS: Canvas
In person: WRRB 004
Remote: Zoom

This class covers introduction to GIS concepts and applications. It includes applications of points, lines, polygons, and raster image and elevation data in Esri ArcGIS Pro software. While the focus of the class is on the application of GIS in the field of natural resources, the methods taught are applicable to a wider range of fields, such as geography, biology, fisheries, geology, geophysics, oceanography, civil and geological engineering.

Register at UAO
Syllabus

2019 Shovel Creek Burn Severity Map
Global COVID19 Map

Instructor: Santosh Panda, skpanda@alaska.edu, Ph: 907-474-7539
Alaska willows, continued from page 7

Willow leaves are characteristically narrow, grow from short petioles and affixed to very slender twigs and branches. 1

Shrubby willows are widely distributed throughout Alaska extending in elevation up beyond tree-line and north all the way to the Arctic coast, the Bering Sea and westward out to the end of the Aleutian Islands.

Several Alaska willow species are very important to certain wildlife that depend on them as preferred food habitat for summer and winter browse. Moose and ptarmigan are noted to feed heavily on willow during most of the year. 2

Ptarmigan eat willow leaves during the summer and subsist on their buds during winter. Moose eat willow twigs and branches, browsing them sometimes down to a twig nearly a half-inch in diameter.

Willows are important to many Alaskans because game species such as moose and ptarmigan feed on them. Photo by Meg Burgett

One can see that the value of willow, which seldom grows large enough to produce a log or allow the manufacture of any kind of lumber, is in its value to moose as critical winter browse. It enables a local, value-added resource of organic meat and local food security. Moose are a very valuable non-timber forest product by the protein they provide and they are most

Willows can become over-browsed by moose.

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Alaska willows, continued from page 8

abundant in areas of significant willow growth.

Other wildlife benefited by the prolific presence of willow include snowshoe hare and lynx. Lynx are a high-value sustainably renewable economic fur trapping resource providing seasonal, yearly income. Lynx rely predominately on snowshoe hare as their preferred food. Snowshoe hare depend on an abundance of available willow for year-round food and their abundance is dependent on the availability and condition of the willow shrub resource.

In the future, we will look at various ways of propagating willow to plant for habitat, erosion control and methods to regenerate older decadent willow stands for habitat improvement and landscape diversity.


Skunk cabbage, a rainforest plant

Glen Holt
UAF RREA Forestry Program Forester

Skunk cabbage (Lysichiton americanus), also called western skunk cabbage, is one of the first spring perennial flowering plants to appear in Southeast Alaska rainforests. There, it may be found in swamps and wet woods along streams and other wetland areas. In Alaska it is tied mainly to coastal wetland areas and may be found as far north as Kodiak Island and occasionally up into Cook Inlet.

As its name implies, this plant gives off a skunk-like odor, which is most prevalent when blooming but evident also during the growing season.

The western skunk cabbage flower color progresses to a bright yellow and their leaves grow from a light to later darker green color. Certain flies, beetles and bees are attracted to their odor and crawl on the flowers helping the plant pollinate and produce seed. Skunk cabbage loses its leaves annually after the plant

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Skunk cabbage, continued from page 9

goes dormant in the fall.

Wikipedia reports that the roots are food for bears who eat it in early spring after hibernation and that it may act as a laxative. Sitka black-tailed deer commonly eat its leaves prior to leaf fall. The plant may have been used by indigenous people for medicines but their leaves should not normally be eaten by people or pets as they can make some sick or cause death in some cases.

This Alaska Department of Fish and Game’s website link: [http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=518](http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=518) has excellent progressive photos taken by photographer Joe Piston of Ketchikan. Joe used one or more trail cameras, and his photos show direct utilization of a lush stand of mature skunk cabbage over a summer by feeding Sitka black-tailed deer.

The stalked flowers become yellow as they mature and develop. The photo was taken in early May along the Thorne River in southern Southeast Alaska, surrounded by the Pacific coastal temperate rainforest. Photo by Rose Holt

Spruce up your spring snacks

Alda Norris
UAF – Extension Evaluation Specialist

Two years ago, I mustered the courage to eat part of a tree. Since then, I’ve learned a lot about edible wild plants. I didn’t have to wander any farther than my backyard to become a forager of nontimber forest products, or NTFPs.

The spruce tips found on my property near Fairbanks are delicious, with an aftertaste like a lemony carrot. My taste buds revel in spruce-tipped smoothies and added to salsa on my scrambled eggs.

The Forest Service describes three species of spruce: black, white, and Sitka. Sitka spruce, *Picea sitchensis*, is the longest living and happens to be Alaska’s state tree.

The spruce behind my house are *Picea glauca*, the white spruce, and they are native to much of Interior and Southcentral Alaska.

While spruce cones are more of a squirrel thing, humans continue to invent new uses for spruce tips and spruce needles and they have worked their way into several local drink menus. The Alaskan Brewing Co.’s blog states they use more than 5,000 pounds of tips to make infused hard seltzers and specialty beers. That’s a lot of picking and research on when to start recruiting a group of gatherers.

Ideal harvest time varies from year to year. In Fairbanks they start showing up in early May. Spruce tips are the “flushing” of new shoots that emerge after trees exit dormancy. Flushing and green-up depends on several factors including elevation. Spruce at a higher elevation may flush weeks later than spruce in the valley, according to the Forest Service.

Weather, temperature and length of daylight also affects the flushing new spruce tip. The Forest Service notes, “within a stand, there can also be as much as a three-week difference among individual trees.” Alaska’s spring days have a longer length of daylight, termed photoperiod, than in the Lower 48. So, spruce tips here may complete their growth in a shorter

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Spruce tip snacks, continued from page 10

stretch of time.

Shoots are most tender when about an inch long. That’s one of the tips about tips I’ve learned through groups like Alaskan Harvesters on Facebook. Another is “don’t overharvest.” Leave a few tips here and there so the tree still has growth. Be wary of pollution and stay away from trees near roadways. Same goes for stands that may have been sprayed for insects.

Backyard foraging is like a treasure hunt. You can make an entire salad out of the edible leaves, flowers, mushrooms and other growing things in many Interior yards. In particular, spruce tips are a celebrated part of the new season. They are chewy and refreshing. Health-wise, the citrusy flavor comes from Vitamin C. Alaska’s Farm to School program notes that spruce tips also contain carotenoids. Such pigments perform functions like absorbing light for photosynthesis or combating cell damage.

My favorite culinary experiment so far has been spruce tip shortbread. My daughter Leilani helped me stir the shoots into the batter. The rolling pin slightly splayed the soft new needles. The tips stood out like little green fans on the pale vanilla dough. We cut the cookies into hearts and counted the minutes until they were baked. I was a little sad to see the needles had yellowed from the heat. But the sweet and earthy cookie flavor made up for its faded flourish.

A food blogger for the Juneau Empire once suggested spruce tips as a Rice Krispie treat topper. I haven’t gone that far yet.

The examples given here have been for spruce tips consumed immediately, fresh or baked. If you are going to attempt to preserve spruce tips through methods like pickling or canning, please get expert advice. Talk to a Cooperative Extension agent about the right ratios, temperatures, can headspace and other issues that affect product longevity and safety.

Here’s to once again being surrounded by edible signs of spring!

Alda Norris is an evaluation specialist with the Institute of Agriculture, Natural Resources, and Extension. This story was written as part of a Science Writing class through the UAF Department of Communication and Journalism.

Western Aspen Alliance
Glen Holt
UAF RREA Forestry Program Forester

Alaskans living in the Interior are generally aware of the aspen (Populus tremuloides) tree. Its smooth, pale-at-times, almost white bark, may be confused with birch, which always have peeling, papery bark.

Aspen is a relatively short-lived tree found most commonly within 100 years after wildfire. Fire activity in the hotter, drier Interior of Alaska is much more prevalent than elsewhere in the state. Aspen trees are a pioneer species that seed in and regrow on bare mineral soil exposed by wildfires. In burned stands that have only a few remaining aspen, they can regenerate to many hundreds or thousands per acre. They can

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regrow a dense stand from a few roots.

Regenerating aspen stands stabilize soils after wildfires and protect the sites from water and wind erosion. Aspen can be critical habitat to certain wildlife that depend on aspen stands for parts of their food and cover and is important to landscape biodiversity.

We look for other useful and interesting forestry and forest management materials to share that help us increase our knowledge and understanding of forestry elsewhere that may apply directly to Alaska. The Western Aspen Alliance (WAA) is one organization we encountered professionally through the Society of American Foresters, our professional forestry organization.

The WAA is an organization formed to “provide a network of technical expertise that uses past and current research, management practices, and policy to address aspen ecosystem concerns.”

“The goal of the WAA is to improve management of aspen by linking ecological, social, and economic sciences through collaboration and information sharing. We believe in levering partnerships to preserve and restore healthy aspen ecosystems.”

The organization is partially funded by grants through the Utah State University’s College of Natural Resources and the USDA Forest Services, Rocky Mountain Research Station. They initiated the alliance to facilitate and coordinate research and management issues related to Western aspen forest communities in the wake of concern that this important component of the entire Western forest ecosystem appeared to be in decline.

For more information, technical reports, research and management options of the aspen species and the aspen forest component present even on our landscape, I highly recommend the following WAA link: http://www.western-aspen-alliance.org/