NOBLE**NEWS**&**VIEWS**

ECONOMICS

End-of-Year Tax Planning for Farmers and Ranchers

by Dan Childs, senior agricultural economics consultant | mdchilds@noble.org

Good income and expense records provide decision-makers with a tremendous amount of information. This information can be useful in several ways, including:

1. To compare actual to budget.
2. To compare current year to last year or to the average of the last three.
3. To calculate net income to date.

Once net income to date is known, then it can be combined with a projection of income and expenses for the remainder of the year to arrive at an estimate of taxable income for the year.

WHY IS IT IMPORTANT TO ESTIMATE TAXABLE INCOME?

Each citizen of this country has the obligation to pay their fair share to the government — but no more. An estimate of taxable income before the end of the year provides a taxpayer with the knowledge to manage their taxable income and thereby only pay for their fair share of government.
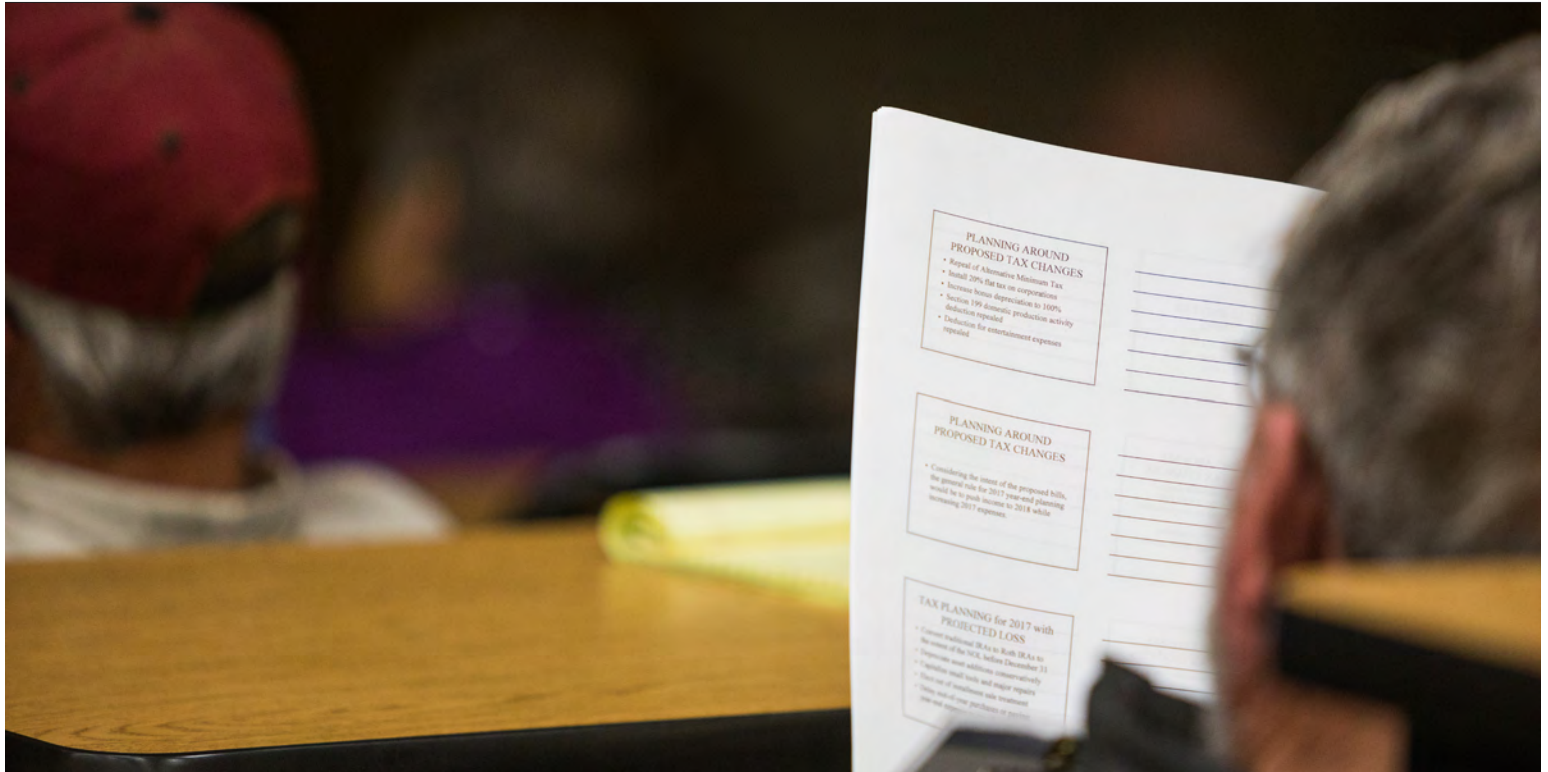
The Internal Revenue Service (IRS) provides taxpayers with many ways to manage taxable income. However, a taxpayer must have an estimate of taxable income before the end of the year and take action before the end of the year, assuming a taxpayer is a cash-basis calendar-year taxpayer. Otherwise that ability to manage taxable income stops at midnight Dec. 31.

Many taxpayers have no idea what their tax bill or refund will be until their tax preparer notifies them of the results. If a tax bill is due, it could cause cash flow issues or the untimely need to market products in order to generate enough revenue to pay for the tax obligation. Both of these issues might be alleviated with previous knowledge of an estimate of the tax owed.

MANAGING TAXABLE INCOME

One sometimes misunderstood way to manage taxable income is to increase income. When would a taxpayer want to increase income? It would typically be when deductions are greater than W-2 income, business income and the standard deduction. If this is the case, the additional income generated is basically tax free. Most would agree that is a good deal!

The many ways to increase income include:

- Sell more products (calves, grain, etc.).
- Use a slower rate of depreciation for any assets purchased during the year.
- Be judicious in choosing to use Section 179 or bonus depreciation.
- Capitalize instead of deduct the purchase of small tools and major repairs.
- Postpone purchases planned for the end of year, and pre-pay expenses that will not be used until next year.

MANY TAXPAYERS HAVE NO IDEA WHAT THEIR TAX BILL OR REFUND WILL BE UNTIL THEIR TAX PREPARER NOTIFIES THEM OF THE RESULTS. IF A TAX BILL IS DUE, IT COULD CAUSE CASH FLOW ISSUES OR THE UNTIMELY NEED TO MARKET PRODUCTS IN ORDER TO GENERATE ENOUGH REVENUE TO PAY FOR THE TAX OBLIGATION.

Another excellent option to increase income is to convert a portion of a traditional IRA (depending on amount of income needed) to a Roth IRA. Some limitations apply, so be sure the conversion is within the guidelines.

MANAGING EXPENSES

If a taxpayer happens to be in the enviable situation where they have more income than expenses, the IRS also provides many ways to increase expenses. And is it not this situation where many justify the purchase of a new pickup or other business assets? Yes, indeed, purchasing assets and choosing to expense a portion or all of the purchase price is a valid way to increase expenses. However, be cautious in doing this. Be sure the purchase is a good business decision and not just a means to reduce the tax obligation.

For all assets purchased during the year, choose faster rates of cost recovery, such as making wise use of Section 179 and bonus

depreciation. Both of these are powerful choices and great ways to manage taxable income if asset purchases are made during the year.

Also, consider delaying the sale of calves, grain and other farm products until after the first of the year.

Paying for some expenses that will not be used until next year can also be done if the prepayment meets the necessary guidelines.

The key to being able to manage one's taxable income is to know what the income and expenses are a couple of months before the end of the year, then determining what the projected income and expenses might be for the remainder of the year. This knowledge will allow a taxpayer to have the information needed to make prudent tax management decisions.

IMPLICATIONS OF CORONAVIRUS STIMULUS PROGRAM

One last item to be aware of that is unique to this year but may have lingering consequences into next year is related to the Coronavirus Aid, Relief and Economic Stimulus Act (CARES).

If a taxpayer is the recipient of a CARES stimulus program, such as the Payroll Protection Program (PPP) and/or Coronavirus Food Assistance Program (CFAP), this may complicate making the estimate. The reason is that the possibility exists that a portion or all of the PPP funds received as a loan will be forgiven and may not count as income.

In addition, the expenses paid by the PPP funds may not be deductible as a business expense, such as pasture or crop rent and utilities. However, CFAP funds will likely be taxed as other government payments in the past, so do not forget to include these funds as income.

Cleaning Up Pecan Orchards Hit by Ice Storms

by Will Chaney, senior pecan operation associate | jwchaney@ noble.org

Pecan growers in southwest, central and north-central Oklahoma as well as northwest Texas are facing yet another challenge. Growers looking to start harvest soon are faced with the task of cleaning up ice damage in orchards hit by an early ice storm.

On Oct. 26, 2020, a strong winter storm pushed through these areas. Temperatures dropped to record lows in some areas. Several areas had the lowest temperatures ever recorded for the entire month of October.

This storm resulted in the earliest ice storm in Oklahoma's history. Areas that had the most ice accumulation also received between 2-5 inches of rain.

Normally, ice storms occur during the winter after trees have become dormant and leaves have fallen off the trees. This storm occurred while most trees still carried a full leaf load. Additionally, there was less disease pressure from the drier-than-normal summer and fall, which added to the leaf load.

Since it was still too early to harvest, an additional obstacle some growers encountered was a good crop of pecans that added weight to the trees, resulting in more damage.

LATE-SEASON ICE STORM CAUSES DEVASTATING RESULTS TO PECAN HARVEST

IS CLEANUP WORTH THE COST?

Oklahoma growers may remember the ice storms in 2000 and 2001 and the two from 2007. These storms hit parts of the state and devastated pecan trees in the impacted areas. The one thing that growers learned going through previous disasters is that pecan trees are resilient and will eventually return to production.

Growers may question if the cost of cleaning up orchards is worth it. If the trees were worth managing before the storm, then I would say that cleaning up is worth it. Cleanup will be very labor intensive and will cost a fair amount of money per acre, depending on the amount of damage.

Following the ice storms in 2007, cleanup costs were reported for two orchards in Skiatook and Collinsville, Oklahoma. The cost, adjusted to 2020 values, would range from $250 to $506 per acre. In both of these orchards, the owners supervised the labor and had the resources to obtain sufficient equipment needed to facilitate the cleanup. Reports from the same ice storm for growers who had to hire custom crews to cleanup orchards ranged from $604 to $967 per acre.

OPPORTUNITIES FOR A BETTER ORCHARD

For some orchards, especially older planted orchards and native groves, this will give a grower the chance to thin out crowded trees. It can also help rejuvenate the trees. The downside is that the thinning patterns may not be what you planned and production may be decreased for a few years.

In the case of natives where large branches are removed from the tree, several new branches will emerge. This will increase the total fruiting wood, resulting in potentially larger yields in the future.

HOW TO START CLEANING THE ORCHARD

Cleaning up the orchard starts with clearing the downed limbs from the orchard floor.

After the limbs are removed, a grower needs to evaluate each individual tree to develop a plan for that tree. Each tree will have a different strategy for cleanup. Pecan trees can sustain significate loss to their canopy and survive. Shoots will regrow proportionally to the degree of canopy removed. The compensatory growth that results from the canopy loss can be extremely vigorous. The key to future production is to limit this growth to ensure a strong shoot.

PRUNE WITH CAUTION

The only pruning that should be done at the start of or during winter is the removal of split or broken limbs. This will allow harvest to proceed. All other cuts should be made later.

Cuts made in the winter will dry out, but dieback can be minimized by making the final pruning just before the tree begins to grow in spring. Damaged limbs will wall-off the injury, and several sprouts will develop as these branches return to production.

In spring, the sprouts should be thinned out. This allows growers to select the sprouts they want to develop into shoots. The most vigorous shoots will eventually shade out the less vigorous shoots.

Limbs that are broken but remain attached to the tree should be removed at a lateral branch or the trunk. The collar of the limb should be left intact for cuts made at the trunk. Limbs that have pulled away from the trunk should be removed from the bottom of the bark split.

NUTRIENT CONSIDERATIONS FOR DAMAGED TREES

Once the orchard is clear, it is imperative to think about future growth on the trees. Balancing nitrogen fertilization is important. If too much nitrogen is applied, the shoot will be more vigorous, resulting in long, weak growth. If these shoots produce a large crop after the third or fourth year, the shoots will not be able to support the weight of the nuts and leaves and may break.

Knowing how much nitrogen to apply will depend on the orchard site, soil type, ground cover type and orchard management. Use your leaf sample results from the past year and amount of canopy loss to determine how much fertilizer you should apply prior to budbreak.

If tree nutrient levels were good the previous year and you had severe damage, I would recommend cutting the application rate by at least 40-60%.

Evaluate the growth of the trees during the spring. If trees are not growing well, then another nitrogen application should be applied in early summer. If the shoots produce too much growth, do not apply additional nitrogen until the fall.

The other important thing to keep in mind is that these vigorous shoots will be growing longer into the year than normal tree growth. Therefore, new leaves will develop throughout the spring and summer.

In areas where zinc deficiency is observed, additional zinc application should be made. Begin zinc application at budbreak and apply every two weeks through the end of June to ensure that the leaves are not zinc deficient. This will help strengthen the shoots and allow the tree to store more carbohydrates.

PROPER MANAGEMENT SUPPORTS FUTURE GROWTH

Just remember, pecan trees are resilient and can return to normal production following an ice event. The recovery times will be directly related to the amount of canopy lost. However, it will typically take three to five years to return to previous production amounts. Proper tree management will facilitate the development of strong growth that will support future production.

Do not be discouraged if you have damage; take it one step at a time. Develop a plan of action for the entire orchard. Remember, each tree will require a different strategy to return to production. 🐂

Photo by Dr. Timothy Brenneman, University of Georgia

PECANS

Add Income With Pecan Truffles

by Charlie Graham, Ph.D., senior pecan specialist | cjgraham@noble.org

With the holiday season approaching, the mere mention of pecan truffles brings thoughts of decadent chocolate caramel candies meant to share with someone special. While that does sound good, it's not quite what this article is about. The kind of truffle I am talking about is typically searched out by specially trained dogs or pigs rooting around in the soil where tree roots grow. So I guess for this to all make sense, we need to start with: What exactly is a truffle, and what is its relationship with a pecan tree?

To answer these questions, we first must have a lesson in symbiosis and mycorrhizal fungi.

SYMBIOTIC RELATIONSHIPS

Symbiosis is the ecological interaction between two dissimilar organisms intimately living together with one or both receiving benefits. When both members of the association benefit, the symbiotic relationship is called mutualistic.

This concept applies to mycorrhizal fungi, which colonize plant roots. In exchange for carbon from the plant, mycorrhizal fungi facilitate the transfer of soil nutrients (phosphorus, nitrogen, micronutrients and water) from the soil into the plant roots.

TYPES OF MYCORRHIZAL FUNGI

Mycorrhizae are divided into different types. One major group of mycorrhizae is the endomycorrhizae, which grow within the root cells and are typically associated with grasses, row crops, vegetables and shrubs. Another type is called the ectomycorrhizae. They grow on the surface layers of the roots and have a Hartig net of hyphae that physically extends into the root but between the cells. This type is most commonly associated with trees.

IMPORTANCE OF MYCORRHIZAE

Mycorrhizal infections are important to plants because their associations have been shown to decrease root pathogen attacks and increase the tolerance of the plant to adverse environmental conditions, such as heavy metals, drought and salinity.

In general, mycorrhizas play an important role in sustainable plant productivity and maintenance of soil structure. They can increase plant uptake of phosphorus and trace elements, such as copper and zinc. They do this by extending the volume of soil explored by the plant. These effects on plant growth combine to make the associated plant more robust and to increase its chances of survival.

TRUFFLE HISTORY

Truffles could be considered the "caviar" of the fungal world. Even though humans have enjoyed truffles for centuries, their high price has meant few could afford them. The lack of availability, as well as their unique flavor and aroma, have only added to the allure, mystery and fascination of them. Indeed, most of us are content with the chocolate truffles that are readily available without realizing that the term "truffle," which comes from the Latin word "tūber," originated from a fungal fruiting body.

TRUFFLES IN AMERICA

Prized European truffles, such as black, burgandy and white truffles, are the most common ones used in fine cuisine. However, there are a few native species found in North America. One such truffle is called the pecan truffle (scientific name: *Tuber lyonii*, earlier known as *Tuber texense*) because it frequently grows in association with the roots of both native and cultivated pecan (*Carya illinoinensis*) trees.

The ectomycorrhizal nature of truffles is ecologically important for trees but can also be economically important when the truffle is partnered with an important tree crop. In this case, growers can economically benefit from the pecan nuts produced above ground and the truffles produced below the ground.

The native range of pecan truffles stretches across most of eastern North America, from northern Mexico to Quebec and along the Gulf Coast to Florida, to as far west as the Rocky Mountains, according to a 1996 article by J.M. Trappe, et al., published in *Mycotaxon*, an international scientific journal focused on the taxonomy and nomenclature of fungi.

Pecan truffles have been found in native

Photo by Dr. Timothy Brenneman, University of Georgia

FOR MORE INFORMATION

Learn more in the University of Florida Extension publication, "The Pecan Truffle (*Tuber lyonii*): A Gourmet Truffle Native to the Southeastern US," at bit.ly/pecan-truffle.

oak-hickory forests, as well as under pecan or oak trees in home yards and cultivated pecan orchards. Ripe truffles have a strong aroma that attracts mammals that eat them and subsequently spread the spores.

COLLECTING THE TRUFFLES

The process of collecting pecan truffles by hand involves individual collectors using hand rakes, walking up and down pecan tree rows, and raking the surface of the soil to reveal the hidden truffles.

A more successful approach uses the services of a trained truffle-hunting dog. Just as dogs can be trained to track humans or locate drugs, dogs can also be trained to locate the elusive underground truffles. The trick is to keep the animals from eating the truffles once they find them. A trained dog finds truffles more efficiently than raking and generally only harvests mature truffles due to a much stronger aroma than immature truffles.

Using a dog is less destructive to the orchard floor and tree roots than hand raking. Because the soil is not disturbed during truffle hunting with a dog, the same orchard can be visited and harvested several times during a growing season.

In contrast, raking interrupts the production of truffles for that growing season, so harvesting is limited to one event. Also, raking results in mixed collections

of mature truffles and immature truffles, according to the *Georgia Pecan Magazine* article "Pecan Truffles (*Tuber lyonii*) What We Know and What We Need to Know" in 2012.

IDENTIFYING A TRUFFLE

Pecan truffles are produced over the course of many months in the southeastern United States but are strongly dependent on soil moisture. If conditions remain moist, fruiting often continues through the fall until December.

The pecan truffle has several physical characteristics that aid in its identification. For instance, it has a rounded, subterranean fruiting body that can be lobed with shallow to deep furrows, and it has yellowish, tan to dark brown skin. The interior of a pecan truffle is solid, light brown to greyish when young but becomes deeper brown at maturity. The interior is always marbled with narrow, white veins that tend to radiate from the base, and mature specimens have a pungent, rich smell, according to the Mycotaxon article.

USES FOR PECAN TRUFFLE

The pecan truffle is desirable because it has a distinct flavor (nutty and earthy) and is currently more affordable than most imported truffle species (i.e., $10-20 per ounce vs. $69-225).

The aromatic compounds produced by mature truffles are destroyed during drying or cooking, so truffles are typically consumed fresh or made into infused oils.

Truffles are also typically cooked at low temperatures with butter, cream or other fatty substances, so that the fat captures and preserves the aromatics.

Additionally, they can be sliced thin and used as a topping on many dishes, such as pasta.

Figure 1: Spring whistle counts for northern bobwhite quail that compared two survey techniques — human observers versus the passive acoustic monitors.

RESEARCH

Capturing Bird Calls and Other Wildlife Sounds With Bioacoustics

by Mike Proctor, senior research associate | mdproctor@noble.org
Stephen Webb, Ph.D., staff scientist | slwebb@noble.org

Eavesdropping sounds like such an unacceptable thing to do. But that is exactly what researchers are doing to learn more about the living world. To be clear, we are not talking about listening to human conversations but rather to birds, frogs, insects, bats, whales and any other species that makes a sound. This is nature's orchestra, known as "biophony."

Researchers use acoustics to study living things by deploying bioacoustic monitors. These monitors also are referred to as passive acoustic monitors (PAM) or autonomous recording units (ARU) (see the small, green PAM mounted on the white post in Figure 1).

If it chirps, squawks, crows, howls, whistles, peeps, croaks, gurgles or belches, then the PAM can capture the sound, which is stored on a memory card and then analyzed using image recognition software. Yes, sounds are analyzed as images.

IF IT CHIRPS, SQUAWKS, CROWS, HOWLS, WHISTLES, PEEPS, CROAKS, GURGLES OR BELCHES, THEN THE PAM CAN CAPTURE THE SOUND.
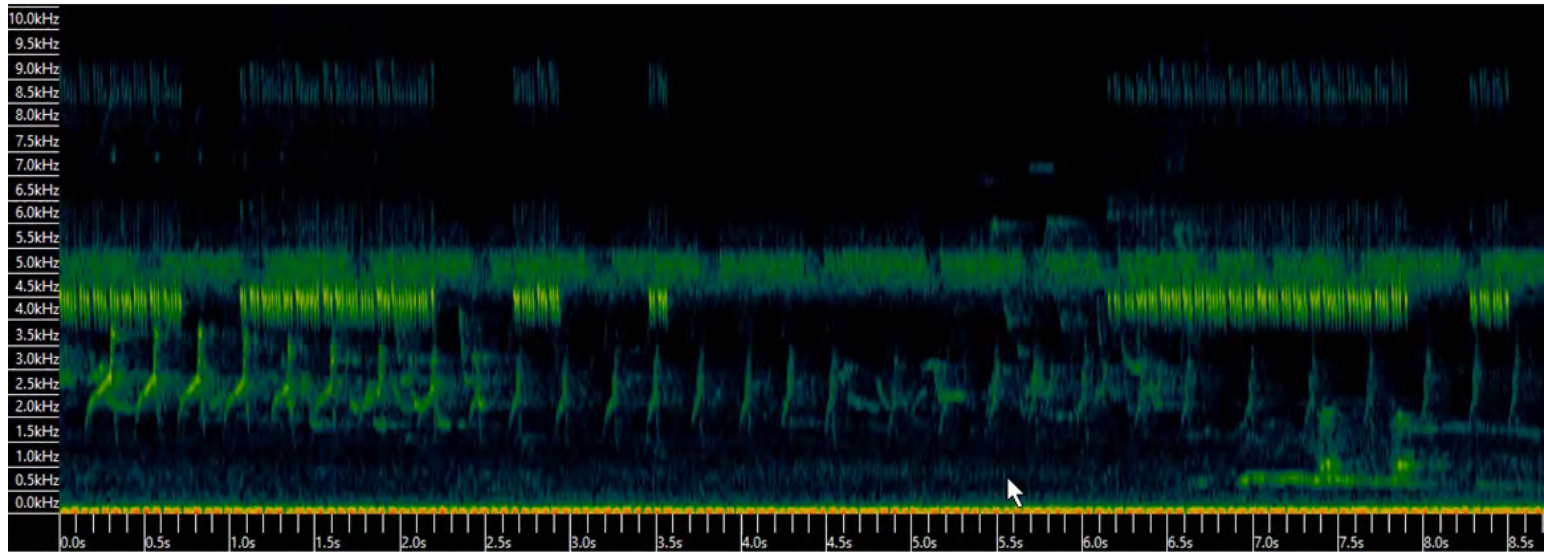
Figure 2: Spectrogram of multiple species. The Y-axis (left) depicts the frequency (kHz), and the X-axis (bottom) shows the duration of the call.

PAMs have many uses and applications, but one of the primary goals for ecologists is being able to collect and analyze data at large spatial scales to monitor status, trends, distribution and habitat use of wildlife species — all of which are important targets of management or indicators of successful management.

HOW ACOUSTIC MONITORS WORK

Think of PAMs like game or trail cameras. Game cameras are set out to collect pictures of many different wildlife species to estimate presence, population size or habitat use. PAMs can generate these same types of survey data. Cameras are better at capturing larger, moving objects, whereas the PAMs can capture any sound but are better for more vocal species like birds, bats and frogs.

The current PAMs on the market (see sidebar) are easily programmable, like cameras, and offer much flexibility to meet specific survey needs. For example, PAMs can be scheduled to turn on multiple times per day and for varying lengths of time and can collect hundreds of hours of audio.

Most PAMs will be manufactured to record across two frequency ranges. The first is the ultrasonic range in which the echolocation calls of bats can be recorded. The second range can typically capture very low frequency calls, such as whales, and mid-frequency calls that will record most insect, bird, frog and animal sounds. Just like adjusting picture quality, users of PAMs can adjust the sampling rate and the type of output audio file (.wav or .w4v).

HOW SPECIES IDENTIFICATION WORKS

At the end of the day, when users start to analyze data from PAMs, the process ends up being similar to camera images. The audio files are converted to a spectrogram, which is a visual representation of the spectrum of frequencies of a signal as it varies with time.

RESOURCES FOR BIRD SOUNDS
Merlin® (www.MerlinBirdID.com) is a phone app developed by the Cornell Lab of Ornithology (www.birds.cornell.edu/home/). Merlin draws on data from All About Birds (www.allaboutbirds.org/news/) and has the ability to filter species by location and time of year.

BirdNET (www.birdnet.cornell.edu) allows users to record a call with their phone. After the call is recorded, the app displays a spectrogram of the call. Then, using machine learning, it identifies the species and provides links to multiple resources for that species.

Macauley Library (www.macaulaylibrary.org), also available through the Cornell Lab of Ornithology, is a media archive for wildlife, including maps, statistics, photographs and sounds.

Xeno-canto (www.xeno-canto.org) is a curated repository of bird calls and images from all over the world.

RESOURCES FOR ACOUSTIC MONITORS
Wildlife Acoustics (www.wildlifeacoustics.com) produce several types of monitors, including some that record higher frequencies for detecting bats. They also produce a device (Echo Meter Touch 2) that turns a smartphone into an interactive bat detector.

SWIFT (www.birds.cornell.edu/ccb/swift/) is a terrestrial passive acoustic recording unit produced by the Cornell Lab of Ornithology.

Audiomoth (www.openacousticdevices.info) is a unit developed by Open Acoustic Devices. The unit is a full-spectrum acoustic logger than can detect a wide range of frequencies. However, users must devise a method of housing the logger for protection.

Frontier Labs (frontierlabs.com.au) produce advanced bioacoustic audio recorders (BAR) that are versatile with a built-in GPS.

Spectrograms may also be referred to as sonograms or spectrographs. An image, or spectrogram, is shown in Figure 2, depicting many different species identified on one PAM during a short window of time (less than 10 seconds).

PAMs are great. They collect a lot of data. However, this brings up a new problem. How do you sort, process and identify all of the species in the data? After converting the audio files to spectrograms, there are various commercial software programs available to help sort and identify calls.

Commercial packages go beyond playback and viewing of spectrograms by providing methods for detection, measurement and other analyses. Kaleidoscope by Wildlife Acoustics uses cluster analysis to do detection, while Raven by the Cornell Lab of Ornithology uses energy detection (see sidebar).

Figure 3. Female and male northern bobwhite quail in a predominately native grassland. Populations of bobwhite have declined range-wide by 85% since the 1960s. Clean agriculture, fire suppression and general habitat loss are the greatest threats.

There also are custom programs written in R or Python that use artificial intelligence techniques known as deep learning to identify the species, but this process is generally restricted to savvy computer programmers (see sidebar).

Each program and method has advantages and drawbacks, and their utility depends upon the user's intended application. With commercial software, it can be difficult to efficiently analyze all of the data because of the sheer volume of data (gigabytes to terabytes) and such a large number of sounds in each recording. However, because of the increased focus on large-scale, biodiversity monitoring, great headway is being made at improving efficient and accurate identification of species.

EXAMPLE: NORTHERN BOBWHITE QUAIL

Populations of northern bobwhite quail (Figure 3) have been declining across their range, with declines ranging from 68-75% in Oklahoma and Texas during the past five decades.

From 2008 to 2018, Noble Research Institute conducted spring whistle counts for bobwhite to look at trends in populations as they relate to environmental and habitat conditions. Starting in 2019, PAMs replaced traditional human surveys, allowing researchers to monitor 29 sites simultaneously across two study sites. PAMs collected data for three days during four separate sessions (12 days total) during the spring of 2019 and 2020, which coincides with the calling activity of many species of birds.

Because bobwhite were a primary target for monitoring status and long-term trends in population size, distribution and habitat use, researchers developed their own recognition software that efficiently identifies and records all bobwhite calls from hundreds of hours of recordings. When the male bobwhite call is converted from audio to a spectrogram, it creates a very unique signature (Figure 4), which looks a little like a checkmark.

The PAMs now offer a permanent record of all recorded species that are important for understanding biodiversity, changes in populations and habitat use. Current research is developing acoustic matching templates for other species of conservation concern, or that are considered game, indicator or umbrella species. For example, dickcissels (Figure 5) and eastern meadowlarks (Figure 6) also have been experiencing long-term
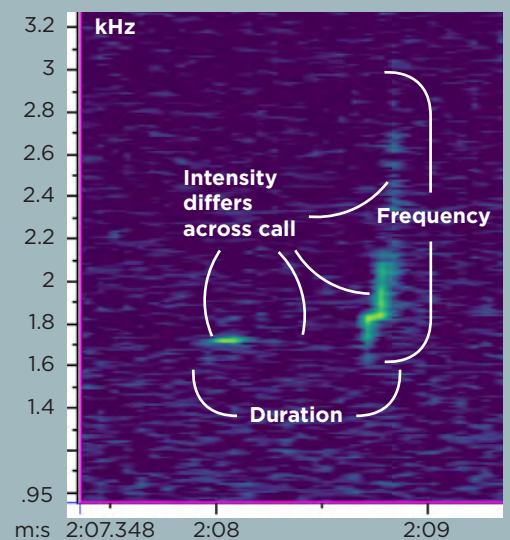
Figure 4. Spectrogram depicting the "bob" "white" whistle of the male bobwhite quail.

ANALYSIS SOFTWARE

Kaleidoscope (www.wildlifeacoustics.com/products/kaleidoscope) is a software produced by Wildlife Acoustics. There is a free version (Lite) and a professional version (Pro) that aid in sound analysis for identifying species.

Raven (ravensoundsoftware.com/software/) was developed by the Cornell Lab of Ornithology. Raven Lite is a free version, but for full capabilities, Raven Pro offers more flexibility and analysis.

R (www.r-project.org/packages) packages are available for analyzing acoustic data, but these require more programming and coding experience. Packages include: warbleR, Rraven, monitoR, and soundecology.

Python also has libraries available for image analysis: OpenCV, Numpy, and scikit-image.

Other options that allow viewing and playback of spectrograms from recordings include Audacity and WavePad.

Figure 5. Male dickcissel perching on a barbed wire fence in an area predominated by grasslands interspersed with some brush species. Populations of dickcissels have been declining but not as dramatically as other grassland species.

by Stephen L. Webb.

Figure 6. Eastern meadowlark shown in its preferred grassland habitat. Populations of eastern meadowlarks have declined nearly 90% since the 1960s, primarily because of habitat loss.

declines in their populations, so managers may want to keep a close eye on whether these species are present and in what numbers if present.

USES AND APPLICATIONS

There are many uses and applications of PAMs for research, management and the casual birding enthusiast. As mentioned earlier, many species of grassland birds are experiencing range-wide declines so having a tool that can be deployed across large areas is crucial to documenting and understanding the causes for the decline. Many times, this is linked to the loss of habitat or even degradation of potential habitat. Researchers can use the data from PAMs to estimate population size, distribution and habitat use, which are critical pieces of information required for managing any species.

Managers or biologists can use the information about whether or not a species is present to help determine the current condition of the landscape. These species are known as indicator species, and their absence usually is the first indication that something is broken or missing in the system.

The number and particular species of birds (or even frogs or insects) that show up in the PAM data gives insight into the larger community of plants, animals and soil, which ultimately contributes to ecosystem health and functioning. Biodiversity, or the number of species present, is often used as an indicator of ecosystem health, which then can provide many ecosystem services (e.g., pollination, insect/pest control).

CONCLUSION

Everything on the landscape is changing, although we may not be able to see it until years down the road.

Change may occur naturally because of weather, climate or succession, but the most predominant source of change is associated with humans. Land conversion and development or implementation of management practices (e.g., prescribed fire, brush control) are sources of human-caused change.

The most important aspect of change is that change doesn't affect just one species; it can affect an entire population, community or ecosystem. For example, removing fire from a landscape sets off a cascade of changes to the plant, animal and invertebrate communities. Another example is grazing by large herbivores, which impacts the ecosystem, but usually in a positive way when integrated properly.

Bringing this full circle, we can tell a lot about the health of the land and plant community by knowing what bird species are present.

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IN THIS ISSUE

CHECK NOBLE.ORG FOR EVENT CANCELLATIONS
All educational events will move to live online learning for the remainder of 2020. Please check www.noble.org/events for the most current information on times and dates and to register for log-in information.

LEVEL **4** MASTER
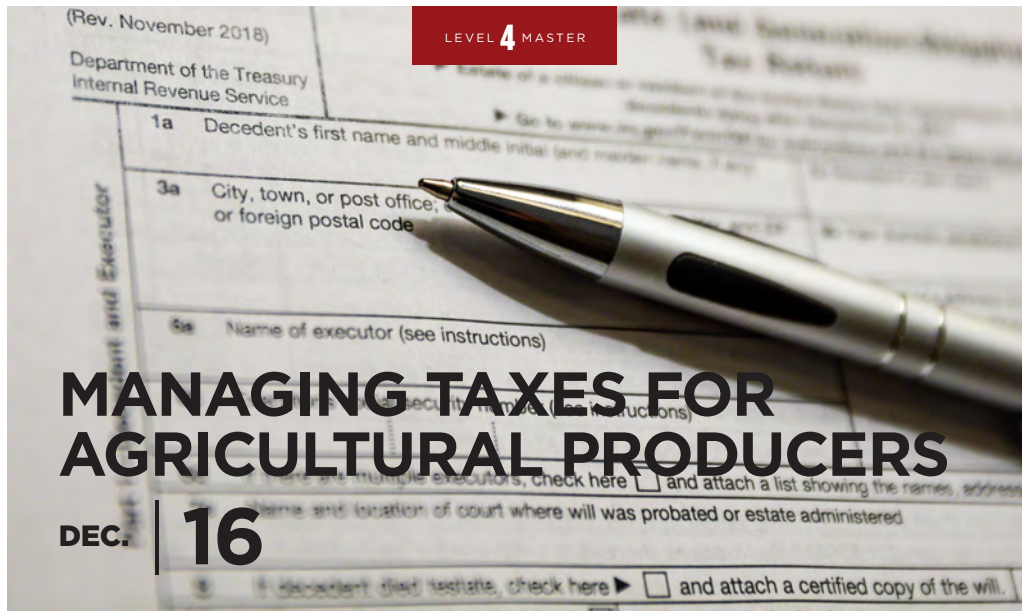
MANAGING TAXES FOR AGRICULTURAL PRODUCERS

DEC. | **16**

The Internal Revenue Service has issued many changes to certain regulations as a result of COVID-19. It is important for taxpayers to stay informed of these changes in order to do the best job of managing their taxable income. These details will be discussed at this seminar. Tax professionals will be present to help answer questions.

Check noble.org/ events closer to event date for times and registration