**Prescribed Fire Module Script**

1. Howdy and welcome back to Wildlife Habitat Management. In this module, we will be discussing prescribed fire and its use in managing wildlife habitat. Prescribed fire has many proponents and just as many adversaries; however it continues to be one of the cost effective land management tools. The use of prescribed fire can be extremely beneficial to wildlife habitat but before you start lighting fires it is important to understand some basic principals such as your reason for conducting a prescribed fire, state and federal laws, safety, and several other topics which we will cover in this module. It is important to note that fire managers spend a lifetime learning and understanding fire ecology and there are entire courses dedicated to the subject. This module is simply a primer to the topic and if you wish to go further I would suggest attending a prescribed fire workshop.

2. Prescribed burning is a land treatment, used under controlled conditions, to accomplish natural resource management objectives. It is one of several land treatments, used individually or in combination, including chemical and mechanical methods. Prescribed fires are conducted within the limits of a fire plan and prescription that describes both the acceptable range of weather, moisture, fuel, and fire behavior parameters, and the ignition method to achieve the desired effects. Prescribed fire is a cost-effective and ecologically sound tool to manage wildlife habitat.

3. The use of prescribed fire has been around for centuries and can be used for many reasons. For the purpose of this class we are going to focus on the use of prescribed fire to re-establish or improve wildlife habitat. First of all, native vegetation is well adapted to fire and in fact many plant and animal species are dependent upon it. Prescribed fire is effective at suppressing woody plants particularly invasive species like eastern red cedar, while encouraging grass and forb production. It also promotes re-sprouting of browse species which produce tender, succulent stems for wildlife to consume. Fire can create snags or dead trees that can be used by cavity nesting birds and mammals. Fire can increase the amount of bare ground or open areas which create excellent brood rearing habitat for ground nesting birds. Fire also can help control ticks and internal parasites that negatively affect wildlife. Essentially prescribed fire is setting succession back to an earlier stage. Therefore, fire along with other treatments conducted on differing rotations will create a heterogeneous landscape or a mosaic of various successional stages that provide usable habitat for many wildlife species.

4. An important aspect to prescribed fire from a wildlife habitat perspective is the timing of the burn. Burning during different times of the year will select for or against certain plant species and therefore wildlife species. As wildlife managers, we want to use this knowledge to our advantage. For example, early to mid-winter burns result in late winter annuals and perennials. Typically annuals a produce high volume of seeds which are beneficial to wildlife. Late winter burns improve forage quality, provide rapid grass recovery and can control shrub encroachment. Early spring fires help stimulate forbs and grasses prior to spring green up. It is important to keep in mind the biology of wildlife species when burning. For example, spring time is often when ground nesting birds are building and incubating nests, also deer fawns are often hidden in tall grasses, and we want to be mindful of these processes and time our management actions, like burning accordingly so that we are not negatively impact the wildlife species that we are managing for.
5. The use of prescribed fire is becoming increasingly more difficult to implement. Burn bans seem to be more frequent, opposition to burning due to environmental concerns are more vocal, but according to landowners in several states, the primary reason they do not use prescribed fire as a management tool is the fear of liability. This is a very justifiable fear but it can be minimized by understanding prescribed fire laws and liability in your state as well as conducting a well planned and executed prescribed burn. There are 3 types of fire law in the U.S.: The first is strict or unlimited liability. In this situation the person setting the fire is liable and will have to pay for monetary damages that occur as a result of the prescribed fire. In the negligent unless proven otherwise law, you are guilty until you prove yourself innocent. And in the not negligent unless proven negligent law the burden of proving the prescribed burner is negligent rests on the victim, therefore the burner is innocent until proven guilty. I recommend exploring all the prescribed fire laws in your state.

6. Ultimately, managing liability is up to the person conducting the prescribed fire. Some states like Texas require all certified prescribed burners to have a $1 million liability policy. One of the big questions many people ask is “where their personal liability begins and ends”. If you are a private landowner and you conduct a prescribed fire then the liability rests with you. But say for example you work for a state or federal agency and part of your job responsibilities is to conduct prescribed fires. Does all the liability belong to you personally or to the agency you work for? The answer is it depends. An employer must be accountable for an employee’s actions however if that employee was negligent by for example, burning outside of the burn plan prescription, then the employee assumes their own liability. Again I highly recommend that you explore prescribed fire laws and liability in your state and with your employer.

7. As you might expect, a thorough prescribed fire plan is an important precursor. And rather than go through all the necessary information here, I want you to read the publication titled “Planning a Prescribed Burn” by Wayne Hanselka. This publication will provide you with all the necessary information to perform a safe and successful prescribed burn. The publication is located in the reading section of the prescribed fire lesson on the wildlife habitat management website. So either pause this module and read it or read it after watching this module.

8. We will now shift gears and begin discussing the parameters associated with conducting a prescribed fire. And by far the most important aspect of conducting a prescribed fire is weather. Weather is dynamic and having reliable, timely information is a must, not just prior to but during and after the prescribed burn. The most important aspects of fire weather include temperature, relative humidity, and wind speed which we will discuss individually. Weather information can now be easily accessed online from several reliable sources. It can also be measured in the field with certain equipment which we will discuss monetarily.

9. Ambient temperature plays a large role in prescribed burning. Time of year has an impact on temperature; obviously summer temperatures will be higher than winter temperatures. Ambient temperature has an impact on the temperature of the fuel or the vegetation you are burning. The later in the day the more time vegetation has to heat up. It is important to monitor temperature while conducting the burn because as the temperature changes so will the dynamics of your burn.
10. Next, the amount of moisture in the air or relative humidity can affect several factors of your burn such as flame length, rate of spread, energy released, and the amount of smoke produced. Relative humidity is usually inversely related to temperature so as temperature rises, relative humidity drops and vice versa. A general rule of thumb is that for every 20°F increase in temperature, relative humidity is reduced by half. Often conducting a prescribed burn requires optimal temperature and relative humidity to achieve desired results and a safe prescribed fire.

11. Wind speed is another critical factor in conducting prescribed fires. Wind speed is necessary to push the fire, without wind the fire would lack direction. However, too much wind can lead to fire jumping the fire breaks, high intensity fires and other unacceptable issues. A desirable wind speed is between 5-10 mph depending on the type of area you are burning. Up to date knowledge of wind direction is absolutely critical. A shift in wind direction during a prescribed burn can lead to unsafe conditions. Somebody on the burn team should be in charge of monitoring weather conditions before, during and after the prescribed burn. There are many other aspects to fire weather but understanding the role of temperature, relative humidity and wind is critical. And as you might expect getting optimal conditions for all 3 can be difficult, particularly if you plan on burning multiple units in a season.

12. There are 3 elements that must be present for a fire to occur: fuel to burn, oxygen for the flame, and an ignition source to start the combustion process. Without 1 of these elements there is no fire. This is called the fire triangle and our knowledge of this helps us understand the process of fire but also we can eliminate fire by removing one of these elements.

13. There are 3 basic types of prescribed fire, the headfire, the backfire and the flank-fire. Let's discuss each one and how they might be used.

14. A headfire moves with the prevailing wind. Headfires are typically intense fires with high temperatures that can spread rapidly. Therefore they are difficult to control and contain thereby being dangerous and should only be conducted by experienced professionals. Headfires can damage shrubs and trees, therefore headfires are effective at maintaining early successional wildlife habitat.

15. A backfire moves against or into the wind. Backfires are slow moving and less intense than headfires and are generally less damaging to trees and shrubs. Because backfires move slowly the ground temperatures can be quite high and potentially damage root systems and stem tissues. Backfires are often set around firebreaks to provide an additional buffer around your burn unit. This adds an additional layer of safety. Backfires are the best type of fires for beginners or where fire hazards exist.

16. A flank-fire moves parallel to the wind. Its behavior is similar to a backfire. A word of caution though, flank-fires can easily turn into headfires. As far as intensity, a flank-fire is somewhat between a headfire and a backfire. Flank-fires are often used when fuel is relatively light.

17. Conducting a prescribed burn can be both mentally and physically demanding and it is imperative to make safety a priority for yourself and other crew members. This begins by understanding the burn plan, how it is being executed on the ground and everyone's role. Understand this can keep yourself and others out of dangerous situations. Because of the physical demands and heat associated with the fire several health issues can arise such as cramps, heat exhaustion and heat stroke. Become familiar with how to prevent
these issues as well as the symptoms associated with them so that you can recognize them when you observe them. Obviously being well hydrated before, during and after is crucial.

18. Smoke kills! Obviously most are concerned with the dangers of the fire itself but the affects of smoke are just as dangerous. It is important to protect yourself from those dangers by using a respirator or something to cover your mouth and nose. Protective clothing is also necessary. Be sure to wear natural fiber clothing like cotton and wool as synthetic fibers tend to melt and can stick to your skin. Long sleeves, pants and leather boots are a good choice. You will also want to have leather gloves, eye protection and possibly a hardhat.

19. Fire breaks are one of the most important aspects of a prescribed fire. A firebreak is a man-made or natural strip that serves to stop the advance of a fire and contain it within the specified burn unit. Firebreaks can encompass the entire burn unit or be placed in strategic areas such as the downwind area where the fire will be spreading. Firebreaks also allow vehicle access to supply equipment to crew members or to patrol the area.

20. Natural barriers make excellent firebreaks given that they are wide enough and that you can get through, around, or over it if necessary. Man-made firebreaks can be created and maintained several ways but it is important to remember that you don’t want any material that could potentially burn in the firebreak. Therefore if you are dozing or disking lines it is necessary to get down to the mineral soil or bare ground. The width of firebreaks is also important and obviously the wider the better. The actual width will be determined by the height of the vegetation you’re burning, weather conditions, and other factors but generally, firebreaks may be anywhere between 6 and 30 feet wide.

21. Within the next few slides we will go over some of the basic equipment you might come in contact with on a prescribed fire. The first piece of equipment is a weather meter. This can give you current wind speed, temperature, and dew point. You may see the person in charge of weather conditions taking repeated measurements before, during and after the burn. The next piece of equipment is a drip torch. It is filled typically with a mixture of diesel and gasoline. You light the tip and when turned over it will drip fire on the vegetation thus as you walk you create a line of fire.

22. Some equipment necessary for putting out fires are rakes and flappers. Rakes can help break up smoldering vegetation or cover burning debris in soil thereby removing the oxygen. Flappers despite their name are used to suppress small flames by using it like a mop to smother flames. Chainsaws can be used to cut up downed trees or brush.

23. Being able to suppress fire with water or foam is a must. Backpack sprayers, atv’s equipped with sprayer tanks, and large water trucks can be valuable in suppressing fires and in the postburn mop-up phase.

24. And finally, some basic equipment includes a first aid kit. Keep a bottle of water on you to stay hydrated. A box of matches may be useful to quickly burn a firebreak for your own safety. It also is a good idea to have some form of communicating with other crew members in the event of an emergency or to stay on top of changing conditions. This not a comprehensive list but it does give you some of the basic equipment necessary in conducting a prescribed burn.

25. Smoke management is another important issue to consider. As stated earlier, smoke can cause profound health issues for crew members but also for citizens downwind of the burn. Smoke can create visibility issues for example if smoke covers a road it poses a
significant safety issue to motorists and these issues need to be discussed and addressed prior to the fire. There are a few things you can do to minimize smoke issues such as burning during proper weather conditions, reducing fuel loads or burn more frequently so that fuel loads are lower. The type of fire that you use can have an impact on smoke, for example backfires tend to produce less smoke. Also doing a good postburn mop-up will reduce residual smoke. And lastly, notify residents in the area when and where you are conducting the burn well in advance. This will allow them to leave the area ahead of time and avoid any smoke related health issues.

26. I have mentioned the term postburn mop-up a couple times so let’s discuss exactly what that is. A postburn mop-up is the act of extinguishing any residual fires within the burn unit to prevent the fire from jumping across fire lines as well as to reduce smoke related problems. Mop-up actually begins with the fire ignition, crew members should be extinguishing fire within the fire breaks and the perimeter of the burn unit. Once the prescribed burn is complete, crew members will start on the boundary edge of the unit and work their way towards the interior, extinguishing fires and cleaning up problem areas such as downed trees, brush piles, etc. Depending on the size of the fire a postburn mop-up could take several days. It is critical to remain alert during this time because changes in weather conditions could result in fires re-igniting and spreading.

27. Ok so we have covered several aspects of prescribed fire but lets walk through a basic scenario on how to conduct one. We will start by preparing a detailed burn plan and establish our goal and objectives for the burn. Within the plan we will determine optimal weather conditions and the type of burn we plan on conducting. Weeks or months in advance, we will establish firebreaks or use existing natural breaks. It is a good idea to alert local law enforcement, fire departments and your neighbors or those that may be affected by the fire or smoke in advance. On the day of the burn if conditions are within our specified ranges, we will conduct a test burn or a small fire to judge existing conditions. Then we will begin using backfires to provide an additional buffer to our firebreaks. Backfires may only be a few feet wide and you establish them by walking parallel to the firebreak. Each successive backfire burns into the previous one until you have a sufficient blackline as depicted in this diagram. Mop-up crews will be extinguishing residual fires around the edges. Given that conditions are still optimal you can then start igniting a headfire or flank-fires which will burn with the wind and into the blackline. The postburn mop-up crew then begins extinguishing residual fires along the edges and work towards the interior. By the end, hopefully we have put out all fires and had a safe and successful burn.

28. This concludes the module on prescribed fire and hopefully you have a better idea of how to conduct a prescribed fire and its benefits in wildlife management. Again this is not a comprehensive discussion on fire but merely some of the basics on the process and benefits. If you would like to learn more I would recommend attending a prescribed fire workshop.