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**Insights and
Suggestions for
Certified Prescribed
Burn Manager Programs**

REPORT

INSIGHTS AND SUGGESTIONS FOR CERTIFIED PRESCRIBED BURN MANAGER PROGRAMS

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List of acronyms

General terms

CPBM	Certified Prescribed Burn Manager
DNR	Department of Natural Resources
FTE	Full-time equivalent
IQCS ¹	Incident Qualifications and Certification System
IQS ¹	Incident Qualification System
NWCG	National Wildfire Coordinating Group
WUI	Wildland-urban interface

NWCG positions²

FIRB	Firing Boss
ICT4	Incident Commander Type 4
RXB1	Prescribed Fire Burn Boss Type 1
RXB2	Prescribed Fire Burn Boss Type 2
RXB3	Prescribed Fire Burn Boss Type 3

NWCG courses

I-100	Introduction to Incident Command System
RX-301	Prescribed Fire Implementation
RX-310	Introduction to Fire Effects
RX-341	Prescribed Fire Plan Preparation
RX-410	Smoke Management Techniques
S-130	Firefighter Training
S-190	Introduction to Wildland Fire Behavior
S-300	Extended Attack Incident Commander
S-390	Introduction to Wildland Fire Behavior Calculations
S-490	Advanced Fire Behavior Calculations

¹The Incident Qualification System is a web-based database administered by the National Association of State Foresters and is used by state agencies to track firefighter qualifications and experience. The Incident Qualifications & Certification System is a database used for federal partners of the National Wildfire Coordinating Group (NWCG).

²NWCG leadership positions for prescribed fire operations include Prescribed Fire Burn Boss Type 1 (RXB1), Prescribed Fire Burn Boss Type 2 (RXB2), and Prescribed Fire Burn Boss Type 3 (RXB3). Certification requires coursework and completion of task books unique to each position ([see requirements online](#)). RXB1's are certified to plan, oversee, and conduct low, moderate, and high-complexity burns based on the [NWCG Prescribed Fire Complexity Rating System Guide](#). RXB2s are qualified to conduct low- to moderate-complexity burns, and Prescribed Fire Burn Boss Type 3 are qualified to conduct low-complexity pile burns.

SUMMARY

Prescribed burning is an effective method to reduce hazardous fuels and restore ecological conditions across a variety of ecosystems. Twenty-one states have laws or policies that direct state agencies to oversee formal training programs to certify individuals in safe burning techniques. Fifteen of these states have active certified prescribed burn manager programs (CPBM). Michigan and Oregon did not implement certification programs due to lack of funding, and California, Minnesota, Washington, and West Virginia are currently developing CPBM programs.

The Washington State Legislature charged the Department of Natural Resources (DNR) to develop a certified prescribed burn manager program under Washington House Bill 2733 of 2018. The Washington DNR, Washington Resource Conservation & Development Council, and Washington Dry Forest Fire Learning Network contracted the Forest Stewards Guild to compile information about existing CPBM programs and provide guidance for Washington's CPBM program. Findings and recommendations in this report are broadly applicable to other states considering new CPBM programs or revising existing programs.

Key aspects of CPBM programs are objectives, benefits of certification, target audience, prerequisites, required coursework, required burning experiences, length of certification, decertification standards, and program administration. The mechanics of existing CPBM programs vary widely among states. For example, Pennsylvania and Colorado have rigorous certification requirements congruent with National Wildfire Coordinating Group standards. Certification programs in Alabama, Mississippi, North Carolina, Tennessee, and Virginia have fewer requirements and are more accessible to landowners with little to no previous fire experience.



Based on our analysis and interviews with CPBM program managers, recommendations for certification programs are to:

- Strike a balance between achievable and rigorous standards.
- Secure adequate funding and personnel for program development and administration.
- Convene a steering team to develop and review certification requirements.
- Engage air quality regulators throughout the process.
- Clearly outline benefits of certification to participants.
- Develop multiple tracks and tiers to certification based on prior experience and burn complexity.
- Conduct a beta-test of course curriculum.
- Include a field component in the CPBM course, with or without a live burn demonstration.
- Facilitate additional field experiences for CPBM trainees.
- Review and provide feedback on burn plans to ensure quality.
- Develop a process for decertification and enforcement.
- Require recertification and continued training.
- Address inclusivity throughout program design.
- Invest in an electronic system to track certified burners.
- Provide clear documentation about the CPBM program online.





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Purpose and need for certified prescribed burn manager programs

Momentum is growing across the West to treat hazardous fuels to protect lives and property from high-severity wildfires. The size and severity of wildfires is increasing due to climate change and ramifications of land management practices over the past century (Miller et al. 2009; Westerling et al. 2006). The exposure of human communities to wildland fire is exacerbated by the growing density of homes in the wildland-urban interface (Radeloff et al. 2018).

Prescribed burning is an effective method to reduce hazardous fuels and restore ecological conditions across a variety of grassland, shrubland, and forest ecosystems (Stephens et al. 2009; Paysen et al. 2000). Prescribed burning is cheaper to implement than mechanical treatments across large landscapes (Hartsough et al. 2008), and fire has unique impacts on vegetation and soils that cannot be replicated by mechanical treatments alone (McIver et al. 2013).

The pace and scale of prescribed burning in the western United States is limited by numerous complexities and risk factors. Managers and landowners cite concerns over liability, the lack of capacity to safely implement prescribed burns, and unfavorable weather conditions as top barriers to prescribed burning (Melvin 2018; Schultz et al. 2018; Kobziar et al. 2015; Quinn-Davidson and Varner 2012).

Prescribed burn acts can address concerns about liability and capacity. Many states have prescribed burn acts that clarify the negligence standard for damages cause by smoke or flames. Twenty-one states have laws or policies that authorize state agencies to oversee formal training programs to certify individuals in safe burning techniques (Table 1). Most of these prescribed burn acts require that individuals successfully complete their state’s certified prescribed burn manager program to receive liability coverage under the law (Table 2).

The Washington State Legislature tasked the Department of Natural Resources (DNR) with developing a certified prescribed burn manager program under Washington House Bill 2733 of 2018. The program will provide training and expertise to private landowners, contractors, non-profit employees, and other individuals that conduct prescribed burns in the state. Certified burners acting in accordance with House Bill 2733 and other state requirements will receive liability protection under a gross negligence standard for damages caused by smoke or fire. The Washington DNR, Washington Resource Conservation & Development Council, and Washington Dry Forest Fire Learning Network contracted the Forest Stewards Guild to compile information about existing CPBM programs and provide guidance for Washington’s certification program.

We use the term certified prescribed burn manager (CPBM) throughout this report, but specific program names differ slightly among states. For example, Texas’s certification is called Certified and Insured Prescribed Burn Managers and South Carolina’s is called Certified Prescribed Fire Managers.

Some states offer trainings for prescribed burning that are not tied to a prescribed burn law, such as Arkansas, Missouri, and Oklahoma; we did not include these states in the report.

Information for this report came from laws, statutes, agency policies, and other web content for each state; white papers and journal articles about prescribed burn certification and liability; interviews with CPBM program managers from Colorado, Florida, Illinois, North Carolina, Ohio, and Texas; and feedback from other experts (see acknowledgements for names and positions of contributors).

Existing certification programs

Fifteen states have active and formal programs for certified prescribed burn managers, and four states are currently developing CPBM programs (Figure 1). State laws authorized the development of CPBM programs in Michigan and Oregon, but these states do not have active certification programs. The Michigan Department of Natural Resources developed requirements for CPBMs but did not implement the program due to lack of funding. A CPBM program was never developed in Oregon.

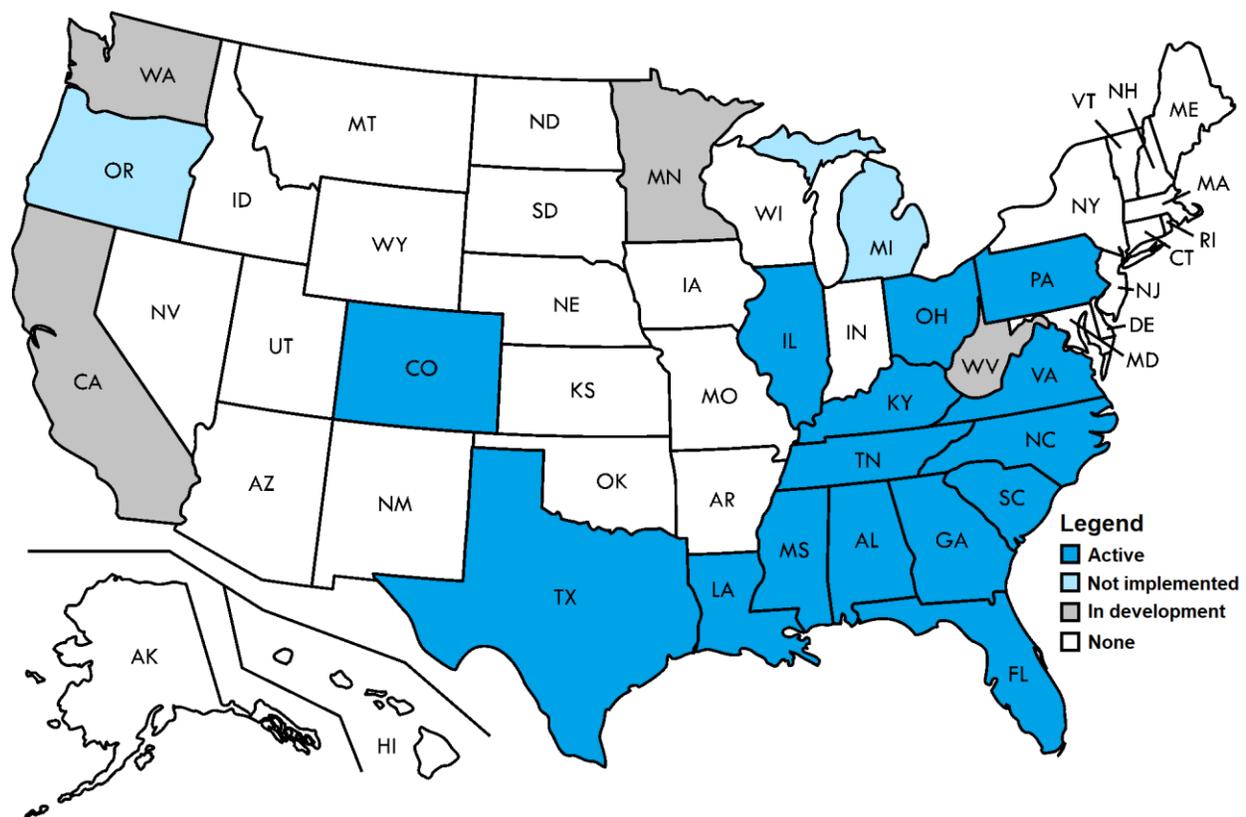


Figure 1. States with certification programs that are linked to state prescribed burn laws or regulations. Laws in Michigan and Oregon authorized the development of CPBM programs, but they were not implemented. *Note:* This figure differs from the map of CPBM programs in the 2018 National Prescribed Fire Use Survey.³

³Melvin (2018) reported that 23 states have CPBM programs. However, we did not find reference to CPBM programs in laws or regulations for Alaska, Arizona, Arkansas, Nebraska, New Mexico, Nevada, Oklahoma, and South Dakota. Mark Melvin (the report’s author) suggested that survey respondents might have confused the concept of CPBM programs with fire trainings for agency personnel or the public that are not linked to prescribed burn acts.



The Montana Department of Natural Resources and Conservation proposed House Bill No. 587 in 2017 to establish liability standards and a certified burn program, but the bill did not pass (Kolman 2018). The New Jersey legislature passed a Prescribed Burn Act in 2018, but the bill does not establish a CPBM program. Instead, the New Jersey Forest Fire Service strongly recommends specific qualifications for individuals conducting prescribed burns on private land (NJ Dept. of Enviro. Protection 2018). The state legislature discussed a CPBM program in 2004, but the New Jersey State Agricultural Convention expressed concerns that the program would be burdensome to landowners and the New Jersey Forest Fire Services (NJ State Agricultural Convention 2004).

The prevalence of CPBM programs is likely to expand in coming years. Prescribed Fire Councils are pushing for legislation regarding prescribed burning and CPBM programs in New Mexico (Kearney 2013), Wisconsin (Werner 2020), and Utah (UT Prescribed Fire Council 2020).

The preponderance of CPBM programs in the southeastern U.S. is explained by the widespread practice of prescribed burning, the low to moderate potential for extreme fire behavior, legislative precedence set by Florida, and the abundance of private land. Managers and landowners conduct more and larger prescribed burns in the southeast than any other part of the U.S. (Melvin 2018; Cleaves et al. 2000). Florida was the first state to pass a law protecting a landowner's right to use fire as a management tool, and eight nearby states passed similar laws during the 1990s. Private forestland is more abundant than public forestland in the southeast, which creates a stronger push for burner certification and liability protection for landowners than in western states (Sun 2006).

The density of wildland-urban interface (WUI) is not clearly related to the presence of certification programs. The highest densities of WUI occur in southeastern and northeastern states (Martinuzzi et al. 2015), but CPBM programs are common in the southeast and not in the northeast.

The impact of public acceptance on the prevalence of CPBM programs is unclear. Public perceptions of prescribed burning are highly variable and influenced by a myriad of factors. Some researchers found a positive relationship between wildfire risk and public support for prescribed burning (Bright et al. 2007), and others found no relationship between perceived likelihood of wildfires and public acceptance of burning (Toman et al. 2014; Toman et al. 2011). Fire managers with the U.S. Forest Service in the Southeast rated public opinion as the largest barrier to prescribed burning (Haines et al. 2001), yet the U.S. Forest Service conducts more prescribed burns in the Southeast than any other region (Cleaves et al. 2000).





Table 1. Prescribed burning acts or statutes and liability standards in states with formal certified prescribed burn manager programs that are active, authorized but not implemented (^), or in development (*).

State	Prescribed burn act	Liability standard ¹	Name of certification program	Agency / organization overseeing certification
Alabama	Alabama Prescribed Burning Act of 1995	Simple negligence for fire and smoke	Certified Prescribed Burn Manager	Alabama Forest Commission
*California	California Senate Bill 1260 of 2018	Simple negligence for fire and smoke	Certified Prescribed Burn Manager	California Department of Forestry and Fire Protection
Colorado	Colorado Prescribed Burning Act of 2013	Gross negligence for fire and smoke	Certified Burn Manager	Colorado Division of Fire Prevention and Control
Florida	Florida Prescribed Burning Act of 1990	Gross negligence for fire and smoke ²	Certified Prescribed Burn Manager	Florida Forest Service
Georgia	Georgia Prescribed Burning Act of 1992	Gross negligence for fire and smoke ²	Prescribed Burn Certification	Georgia Forestry Commission
Illinois	Illinois Prescribed Burning Act of 2007	Simple negligence for fire and smoke	Certified Prescribed Burn Manager	Illinois Department of Natural Resources
Kentucky	House Bill 208 of 2016	Simple negligence for fire and smoke	Kentucky Burn Boss	Kentucky Prescribed Fire Council
Louisiana	Louisiana Act 589 of 1993	Simple negligence for fire and smoke	Certified Prescribed Burner	Louisiana Department of Agriculture & Forestry
^Michigan	Michigan Public Act 529 of 2004	Gross negligence for smoke	Certified Prescribed Burn Manager	Michigan Department of Natural Resources
*Minnesota	Minnesota Laws HF2749 Ch. 189 §46 of 2016	Strict liability for fire and smoke	Certified Prescribed Burner	Minnesota Division of Forestry
Mississippi	Mississippi Prescribed Burning Act of 1992	Simple negligence for fire and smoke	Certified Burn Manager	Mississippi Forestry Commission
North Carolina	North Carolina Prescribed Burning Act of 1999	Simple negligence for smoke	Certified Burner	North Carolina Forest Service
Ohio	Ohio Open Burning Standards (OAC §3745-19)	Uncertain negligence	Certified Prescribed Fire Manager	Ohio Division of Forestry
^Oregon	Senate Bill 225 of 1999	Simple negligence for fire and smoke	Certified Burn Manager	Oregon Department of Forestry
Pennsylvania	Pennsylvania Prescribed Burning Practices Act of 2009	Simple negligence for fire and smoke	Prescribed Burn Manager	Pennsylvania Bureau of Forestry

Table 1. Continued.

State	Prescribed burn act	Liability standard ¹	Name of certification program	Agency / organization overseeing certification
South Carolina	South Carolina Prescribed Fire Act of 1994	Gross negligence for smoke / simple negligence for fire	Certified Prescribed Fire Manager	South Carolina Forestry Commission
Tennessee	Tennessee Prescribed Burning Act of 2012	Simple negligence for fire and smoke	Certified Prescribed Burn Manager	Tennessee Fire Service
Texas	Texas Prescribed Burning Bill of 1999	Simple to gross negligence for fire and smoke	Certified and Insured Prescribed Burn Managers	Texas Department of Agriculture and the Texas Prescribed Burning Board
Virginia	Virginia House Bill 1110 Ch. 156 of 1998	Simple negligence for smoke	Certified Prescribed Burning Manager	Virginia Department of Forestry
*Washington	Washington House Bill 2733 of 2018	Gross negligence for fire and smoke	Certified Prescribed Burn Manager	Washington Department of Natural Resources
*West Virginia	West Virginia House Bill 4394 of 2018	Simple negligence for fire and smoke	Certified Prescribed Burn Manager	West Virginia Division of Forestry

¹See box 1 on page 12 for a description of liability standards.

²The liability standard is simple negligence for fire and smoke damages if prescribed burn regulations are not followed. In Florida, this includes certification as a CPBM. Certification is not required in Georgia to receive liability protection.



Table 2. Requirements for prescribed burners to receive liability protection under state prescribed burn laws. Superscript letters refer to specifics for each state described under the column “details on requirements”. California, Minnesota, Oregon, and Washington are not included in this table. Burn laws in Minnesota do not confer expanded liability protection to certified burners. Oregon did not develop a CPBM program, and requirements in Washington and California are still in development. *indicates a CPBM program in development; ^indicates a CPBM program authorized but not implemented.

State	Certified burner on site	Burn plan	Burn / smoke permits	Follow air quality regs.	Notifications	Land-owner consent	Adequate firebreaks ¹	Sufficient personnel ¹	Burn project records ²
Alabama	X	X	X	X					
Colorado	X ^a	X	X	X	X				X (5 yrs)
Florida	X	X	X ^a	X		X	X	X	
Georgia	^a		X	X					
Illinois	X	X	X	X	X	X			X (5 yrs)
Kentucky	^a	X	X	X	X		X		
Louisiana	X	X	X	X ^a					
^Michigan	X	X	X	X	X	X	X	X	
Mississippi	X	X	X	X					
North Carolina	X ^a	X	X	X ^b					
Ohio	X ^{a,b}	X ^a	X ^a	X	X	X			X (1 yr)
Pennsylvania	X ^a	X	X ^b	X	X	X			X (2 yrs)
South Carolina	X	X	^a	X	X	X	X	X	
Tennessee	X	X	X ^a	X					
Texas	X ^{a,b}	X ^c	X ^d	X	X ^e	X		X	X (5 yrs)
Virginia	X	X	X ^a	X ^b	X				
*West Virginia	X	X	X ^a	X	X				

¹Florida law qualifies what constitutes evidence of adequate firebreaks and sufficient personnel, and Texas law provides that personnel requirements depend on the size of the burn area, fuel volatility, and management of adjacent areas. Burning laws and regulations in Kentucky, Michigan, and South Carolina do not define adequate firebreaks.

²Written record of prescribed burn (acres, weather conditions, date, personnel, etc.). Number in parentheses is the minimum number of years that burners must retain records.

Table 2. Continued.

State	Details on requirements	Regulations / sources (hyperlinked)
Alabama		AL Code §9-13-273 (2016)
Colorado	^a Required certification level depends on burn complexity.	8 CO Code Reg 1507-32
Florida	^a Only required in certain counties and under burn bans.	FL Statutes §590.125 (2019)
Georgia	^a Experienced burner must be on site, but certification is not required.	GA Code §12-6-148 (2014)
Illinois		525 IL Comp Stat 37/15
Kentucky	^a Certification does not confer additional liability protection, but certified burners can burn during seasonal burn restrictions and for extended hours.	KY Rev Stat §149.375 ; KY Rev Stat §149.175 ; KPFC Adm Policy (2019)
Louisiana	^a Includes state voluntary smoke management guidelines.	LA Rev Stat §3.17 (2017) ; LDAF website
[^] Michigan		MI Comp L §324.51503 / 51503a / 51503b (2018)
Mississippi		MS Code §49-19-307 (2016)
North Carolina	^a Landowners burning ≤50 acres of their own property do not need certification but need to follow a burn plan written by a CPBM. ^b Includes state voluntary smoke management guidelines.	NC Gen Stat §106-968 (2013)
Ohio	^a Only required during seasonal burn restrictions. ^b Certification not required to burn one's own land.	OH Ad Code §150:3-13-01 ; OH Ad Code §3745-19-04
Pennsylvania	^a Required certification level depends on burn complexity. ^b Only required in certain counties.	PA P.L. 76, No.17 of 2009
South Carolina	^a Only requirement is verbal notification to the SC Forestry Commission	SC Law §48-34-10 ; SC Law §48-35 ; SC Smoke MG
Tennessee	^a Only required during seasonal burn restrictions.	TN Code §11-4-1003 ; TN Code §39-14-306 (2014)
Texas	^a Certified burners must carry prescribed burn liability insurance. ^b Certified individuals burning their own property must have another certified burner on-site or be a member of a recognized prescribed burn organization. ^c Written burn/do not burn checklist also required during burn bans ^d Only for burning coastal salt-marsh ecosystems in certain counties. ^e Additional notifications required during burn bans.	TX Nat Res Code §6.153 (2017) ; TX Ad Code §4.13
Virginia	^a Only required during seasonal burn restrictions. ^b Includes state voluntary smoke management guidelines.	Code of VA §10.1-11-6.1
[*] West Virginia	^a Only required during seasonal burn restrictions.	WV Code §20-3-5A ; WC Code §20-3-5 (2017)

Program objectives

The overarching goals of certification programs are to (1) ensure that burners have the knowledge and experience to safely conduct prescribed burns, (2) help legitimize and standardize the practice of prescribed burning, and (3) assuage concerns about liability that limit burning by private landowners, contractors, and local governments. Increasing the pace and scale of prescribed burning is a key objective according to CPBM program managers in Florida, Illinois, North Carolina, and Tennessee. Colorado and Pennsylvania have more stringent CPBM programs and are focused on producing highly qualified burners rather than motivating widespread use of prescribed burning.

A primary concern that many citizens have about prescribed fire is the potential for managers to lose control of the burn (Shindler et al 2009). Trust in manager's ability to make wise decisions about fuel management and prescribed burning is positively linked to support for prescribed burning (Toman et al. 2011; Shindler et al. 2009; McCaffrey 2006). The existence of certification programs, regardless of the specific requirements, might increase public trust in prescribed burning.

There are no comprehensive assessments of whether CPBM programs achieve intended outcomes. Yoder (2008) found greater numbers of escaped debris fires in states with CPBM programs; however, this study was based on data when only six states had certification programs. It is difficult to isolate the impact of a single factor on the prevalence of escaped prescribed burns, especially since escapes are relatively infrequent. A formal assessment of learning outcomes and changes in burner behaviors following certification is an important next step for developing new CPBM programs and refining existing programs.

Benefits of certification

A key benefit of prescribed burn certification in many states is liability protection from damages caused by smoke and/or fire. The standard of negligence varies among states (Box 1; Table 1), as do additional requirements for liability protection (Tables 2). Certified burners in Florida receive liability protection under a gross negligence standard, whereas uncertified burners are liable under a simple negligence standard.

Certification is not linked to liability in three states. Georgia offers a CPBM program, but certification is not required for liability protection under a gross negligence standard. In Kentucky, all burners, regardless of certification, fall under a simple negligence standard. Certified burners do not receive liability protection in Ohio; the state does not have a prescribed burn act and there is no clear negligence standard for prescribed burning. However, certification might help a burner prove a higher standard of care in the case of a lawsuit.

Texas Certified and Insured Prescribed Burn Managers receive liability protection, but burners must also obtain their own prescribed burning liability insurance. Insurance policies must cover at least \$1 million per each occurrence of bodily injury or destruction of property and have a minimum aggregate limit of at least \$2 million per policy period.

Box 1. Liability standards for prescribed burning.

Strict liability holds a person legally responsible for harm even if there was no negligence found.

Simple negligence holds a person legally responsible for harm if reasonable care was not taken.

Gross negligence holds a person legally responsible for harm only if less care than even a careless person would use (i.e., reckless disregard for safety) was proven.

Negligence is *uncertain* in states where laws and administrative code are vague on the point of liability for prescribed burning.

Source: Melvin 2018



Certified burners receive additional benefits in some states. Certified burners in Alabama, Ohio, and Texas can receive exemptions to burn during county burn bans. Certified burners in Kentucky and Virginia can apply for extended burning hours and authorization to burn during seasonal burn restrictions. Certified burners in Florida can burn under more extreme fire weather, have extended burning hours, and can submit burn authorizations through an online portal only available to CPBMs. In Illinois, formal certification can help contractors acquire prescribed burn liability insurance and compete for bids to burn on private land. A proposed benefit for the CPBM program currently under development in California is exemption from CalFire suppression billing for burners who follow all requirements under the prescribed burn act.

Target audience

Private landowners, contractors, and state employees are the target audience for most CPBM programs. Other participants can include employees with non-profit organizations, volunteers with fire protection districts, and students. Certification courses occasionally attract out-of-state participants if they want continuing education and training that is not offered in their home state.

Agency employees and certification

CPBM program managers in Colorado, Florida, Illinois, Ohio, and North Carolina reported that at least half of program participants are agency personnel. Several states require employees to acquire state-level certification if they are going to lead prescribed burns. Agency requirements can vary if employees hold qualifications from the National Wildfire Coordinating Group (NWCG) (Box 2). The proposed CPBM program in West Virginia will only apply to state employees.

Box 2. Examples of certification requirements for state employees.

Colorado: If employees with the Colorado Division of Fire Prevention and Control want to lead pile burn operations in Colorado, they must take the CPBM course and become Certified Burner B's, regardless of whether they are already qualified as a Prescribed Fire Burn Boss Type 3 (RXB3).

Florida: At least one employee must be a CPBM on state-led burns. Even employees with RXB2s need to take the Florida-specific CPBM course and complete a certification burn under the supervision of a certified burner in Florida.

North Carolina: State employees are required to become CPBMs in North Carolina to lead prescribed burns. Employees qualified as RXB2s can receive approval to bypass the agency certification process after receiving training on laws, policies, and unique burning conditions in North Carolina.

Ohio: Certification is required for state employees that want to lead prescribed burns, and certification standards for employees exceed those for the general public (see Appendix A). Employees qualified as RXB2s automatically qualify as CPBMs after submitting their Incident Qualification System record.

Pennsylvania: Employees of the Pennsylvania Bureau of Forestry must hold NWCG qualifications commensurate with the complexity of burn they are leading. Employees with other state agencies, such as the Pennsylvania Game Commission and Department of Military and Veterans Affairs, require their employees to hold NWCG qualifications or the appropriate CPBM qualifications (see Appendix A for certification tiers in Pennsylvania).

Certification is not required for state employees in Illinois, but it is strongly encouraged by the Illinois Department of Natural Resources. Employees leading burns in Georgia must have prescribed burn experience, but they do not need state-specific certification. The proposed CPBM programs in Michigan and Minnesota would not apply to state fire personnel because employees are already expected to hold appropriate NWCG certifications.

Federal employees burning on federal land are not required to obtain state-level certification. Federal employees are already required to hold appropriate NWCG certification. Federal employees occasionally take CPBM courses for professional development, particularly to learn about writing burn plans and to gain awareness of state-level regulations.

Program requirements

States vary widely in their requirements for burning experience and coursework (Table 3; Appendix A). Several factors might influence the specifics of a state's CPBM program, such as potential fire behavior, the social and political appetite for prescribed burning, lessons learned from other states, and agency capacity.

Certification requirements in Colorado are stringent because of public concern about prescribed burning and the complexity of prescribed burning in the state. Many parts of Colorado have high fuel loads, unpredictable wind pattern, and abundant WUI. The Colorado legislature passed the Colorado Prescribed Burning Act one year after the Lower North Fork Fire resulted in the death of three citizens and destruction of 27 homes.

Negative experiences with escaped prescribed burns do not necessarily lead to more stringent certification programs. In 2008, smoke from an escaped prescribed burn in central Florida contributed to an accident that involved 70 cars and trucks and resulted in 5 deaths and 38 injuries. Despite this experience, the Florida legislature amended the state's open burning regulations in 2013 to specify that "if the certified prescribed burn is contained within the authorized burn area during the authorized period, a strong rebuttable presumption shall exist that adequate firebreaks, sufficient personnel, and sufficient firefighting equipment were present" (McCullers 2014). In 2014, the Florida Forest Service reduced the length of the CPBM course and dropped the field exercise.

Liability standards can influence the prevalence of prescribed burning in a state (Wonkka et al. 2015), but the impact of negligence standards on the mechanics of CPBM programs is opaque. Colorado, Florida, and Georgia have the same liability standard but vary dramatically in requirements for their CPBM programs.



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Table 3. Requirements for prescribed burn certification in states with formal and active CPBM programs (see Appendix A for additional details on program requirements and alternative certifications).

State – track / tier	Prior burning experience ¹	Online course	In-person course ²	Field course		Written exam	Additional burning experience ³	Task book	Alternative certification ⁴
				Live burn demo	No burn demo				
Alabama – new burners			X (32 hrs)						
Alabama – experienced burners	X		X (12 hrs)						CPBM
Colorado – burner B			X (32 hrs)			X	L	X	RXB1/2
Colorado – burner A	X		X					X	
Florida – new burners			X (23 hrs)			X	P + L		
Florida – experienced burners	X	X				X	L		
Georgia – experienced burners	X		X (16 hrs)			X			
Illinois – all burners		X	X (8 hrs)	X			P + L	X	RXB1/2; CPBM; GC
Kentucky – experienced burners	X		X (24 hrs)	X			L	X	RXB1/2/3; GC
Louisiana – new burners			X (20 hrs)	X		X	L		
Louisiana – experienced burners	X		X (8 hrs)	X		X	L		
Mississippi – all burners			X (23 hrs)		X	X			CPBM
Ohio – experienced burners	X		X (24 hrs)	X		X			RXB1/2; GC
North Carolina – all burners			X (16 hrs)		X		L		RXB1/2; CPBM
Pennsylvania – all burners ⁵	X		X				L	X	RXB1/2/3; GC
South Carolina – all burners	X		X (8 hrs)			X			
Tennessee – all burners		X (24 hrs)	X (16 hrs)	X					
Texas – new burners			X (24 hrs)	X		X	L		
Texas – experienced burners	X		X (24 hrs)	X		X			
Virginia – new burners			X (24 hrs)			X			
Virginia – experienced burners	X		X			X			

¹See table 4 for requirements to qualify as an experienced burner.

²Course length includes live burn demonstrations and other activities for states with field components to their CPBM courses.

³Experience must include leading a certain number of prescribed burns (L) or participating in and leading a certain number of burns (P + L).

⁴Individuals can apply for certification without additional coursework or burning experience if they are a CPBM from another state with comparable certification requirements (CPBM) or a Prescribed Fire Burn Boss (RXB1/2/3) or if they meet requirements of a temporary grandfather clause (GC).

⁵Specific requirements vary by level of certification.

Tracks to certification

Five states require prior experience for all participants in their CPBM programs, and five states offer different tracks to certification based on an applicant’s prior fire experience (Table 4). For example, experienced burners in Alabama and Florida can apply for certification after taking a shorter course than that required for inexperienced applicants. Regulations for CPBM programs define requirements for prior experience in Alabama, Florida, and Texas, but prior experience is evaluated on a case-by-case basis in Louisiana and Virginia.



Four states offer a fast track to certification if an individual is a CPBM in another state (Table 3). Reciprocity for state certification is based on whether standards are comparable to or exceed the other state’s standards. Several states recognize NWCG burn boss qualifications in lieu of CPBM coursework and field experience. Illinois, Kentucky, Ohio, and Pennsylvania offered temporary grandfather clauses to certify experienced burners when their CPBM programs were first being implemented.

Mississippi is the only state to offer a pathway to certification through university coursework. Individuals who pass the 3-credit forest fire course at Mississippi State University (FO3203), pass the final exam for the NWCG intermediate wildland fire behavior course (S-290), and pass the final exam for the Mississippi prescribed burning short course can apply to become CPBMs.

Table 4. Experience requirements to participate in CPBM programs or to follow a different track to certification. Acronyms for National Wildfire Coordinating Group positions and courses are explained in the section “List of Acronyms” at the beginning of this report.

State	Definition of experienced burner	Required to participate	Different track
Alabama	Lead ≥5 prescribed burns over the course of ≥2 years		X
Florida	Lead ≥3 prescribed burns in Florida OR participate in ≥5 burns in Florida OR hold RXB2 qualifications OR hold CPBM qualifications from another state		X
Georgia	Lead ≥5 prescribed burns over the course of ≥2 years	X	
Louisiana	Prior experience evaluated on a case-by-case basis		X
Kentucky	Participate in ≥5 prescribed burns or wildfires and complete I-100, S-130, and S-190	X	
Ohio	Participate in ≥10 wildfires or prescribed burns over the course of ≥10 years and complete ≥6 hours of basic wildfire training	X	
Pennsylvania	Required experience depends on desired level of certification (see Appendix A)	X	
South Carolina	Prior experience evaluated on a case-by-case basis	X	
Texas	Have ≥3 years of experience on prescribed burns or wildfires and lead prescribed burns during ≥5 days OR hold RXB2 qualifications		X
Virginia	Prior experience evaluated on a case-by-case basis		X





Tiers of certification

Three states offer different levels of certification based on the complexity of burns that people plan to conduct. Colorado Certified Burner B's can conduct low-complexity pile burns, and Certified Burner A's can conduct broadcast burns after achieving the level of RXB2 under NWCG standards. The state developed a prescribed fire complexity worksheet for Certified Burner B's.

Certified Pile Burners in Florida have fewer certification requirements than CPBMs and can only conduct pile burns. Certifications for Pennsylvania Prescribed Fire Boss 1, 2, and 3 align with NWCG qualifications for Prescribed Fire Burn Boss Type 1, 2, and 3. Required qualifications are based on the Pennsylvania Bureau of Forestry's [prescribed fire complexity worksheet](#).

The Minnesota Division of Forestry is proposing a two-tiered certification process for low- to moderate-complexity burns and high-complexity burns based on the agency's [escape-risk assessment](#).

Course content

All state certification programs involve coursework that cover topics like fire weather, fire behavior, burn planning, burning laws and regulations, safety and personal protective equipment, and smoke management. Some states also cover firing tools and techniques in their courses. Sample schedules and topics for CPBM courses are provided in Appendix B.

Burn planning is a central topic for CPBM courses. In Florida and Colorado, participants work in groups to develop burn plans based on scenarios listing objectives and stand conditions. In North Carolina, CPBM participants learn how to find information required for a burn plan, make decisions about burning objectives and approaches, and identify smoke sensitive areas.

Most states developed their own certification courses and make occasional revisions to expand participation, increase the quality of training, and improve logistics and program administration. The Illinois Department of Natural Resources initially proposed development of an Illinois Prescribed Burning Manager Course, but instead relies on NWCG material for Firefighter Training (S-130) and Introduction to Wildland Fire Behavior (S-190) courses. Instructors in Illinois add additional content about smoke management, burn planning, and burning regulations in the state. Pennsylvania relies exclusively on NWCG courses for certification.

A challenging aspect of CPBM courses is meeting the needs of diverse audiences with different levels of experience. The Colorado Division of Fire Prevention and Control developed one program for all certified burners, but the agency is considering separate programs for agency personnel seeking RXB3 qualifications and landowners seeking to burn piles on their own property. A mixed audience provides unique opportunities for information sharing, but it can create confusion if procedures and expectations for prescribed burning are different for agency personnel and landowners.

Field tours and burn demonstrations

Eight of the states with active CPBM programs include a field component in their certification course (Table 3). Hands-on field experiences provide an opportunity for participants to learn about nuances and complexities involved in prescribed burning, and it allows instructors to observe the situational awareness of participants. CPBM courses in Illinois, Kentucky, Louisiana, Ohio, Tennessee, and Texas include live, hands-on burn demonstrations, weather permitting. Courses in Mississippi and North Carolina include field tours of burned units, but they do not include hands-on burning.

The Illinois Department of Natural Resources organizes 20-100 acre burn demonstrations in grassy fuel types. They conduct burns on state lands or property managed by non-governmental organizations. Students practice firing techniques under the supervision of experienced personnel. The Illinois CPBM program manager estimated that weather conditions are conducive to live burns almost three-fourths of the time. The program manager for the Ohio Division of Forestry estimates that weather is conducive to live burning only a third of the time.

One day of Texas' CPBM course must involve a live burn demonstration, so instructors will reschedule if conditions are unfavorable. Burn demonstrations can vary from simple pile burns to 300-acre burns on state, university, or private lands. Burn size and complexity depends on the course location and lead instructor. Some course instructors in Texas utilize an evaluation form to provide feedback to participants and document their training experience. Instructors can require participants to retake the field portion of the course if they demonstrate unsafe behavior or poor situational awareness.

Logistical challenges prevent many states from including burn demonstrations in their CPBM courses. The Florida Forest Service included a live burn demonstration for many years, but weather conditions were not conducive to burning more than half of the time. The course in North Carolina does not include live burning due in part to concerns about liability; many participants do not have personal protective equipment.



Course format

The duration of in-person courses varies from 8 hours to 32 hours (Table 3). Louisiana requires a 20-hour course for new burners and an 8-hour course for experienced burners. Course duration is 24 hours in Texas and Ohio, including the live burn demonstration. Alabama's course for inexperienced burners lasts 32 hours, as does the course for all burners in Colorado. The California Department of Forestry and Fire Protection is proposing a 32-hour training course.

Several states have shortened the duration of their CPBM course to expand participation and reduce program logistics. The program in Florida evolved from a 5.5-day course to a 3-day course, and the Florida Forest Service dropped the field component in 2014. In 2018, the North Carolina Forest Service condensed their course from 4 days to 1.5 days. The Texas Prescribed Burning Board shortened the classroom portion of the CPBM program from 5 days to 3 days.

Only three states offer remote instruction for their CPBM program. Florida developed an online self-study course for experienced burners (see the Florida [CPBM course manual](#) online). Tennessee offers a hybrid course with 24 hours of online content and 16 hours of in-person instruction. CPBMs in Illinois take the online version of S-130 and S-190 and then participate in a one-day field course.

The Virginia Fire Council provides [online material](#) for the certified burner course, and Auburn University provides [online material](#) for the certified burner course in Alabama. However, the in-person course must be taken for certification in these states.

Over half of CPBM programs require participants to pass a final exam. Exams hold participants accountable and ensure they understand big-picture concepts. A passing score is defined as $\geq 70\%$ in some states and $\geq 80\%$ in others, and most students pass the exams according to CPBM program managers. Colorado and Florida allow students to fail and retake the exam twice before they need to re-enroll in the entire course.

Course offerings and instruction

Course enrollment is capped at 25-30 individuals in Colorado, Florida, and North Carolina. The North Carolina Forest Service hosts the CPBM course two to three times a year, and they rotate the location to increase participation and discuss region-specific burning conditions. The Colorado Division of Fire Prevention and Control offers the CPBM course at the annual Colorado Wildland Fire & Incident Management Academy, as well as several other times each year.

The Florida Forest Service hosts their CPBM course more frequently than other states, with about five to seven course offerings every winter. The Ohio Division of Forestry offers the course every other year due to low demand.

Lead instructors for CPBM courses are typically employees with the responsible state agency. The Colorado Division of Fire Prevention and Control requires that lead instructors be current or retired RXB2s and that unit instructors hold single-resource qualifications (e.g., engine boss, cross boss, firing boss, etc.). Texas is unique in that instructors do not need to be state employees or certified burners. Lead instructors must have vast burning experience, be approved by the Texas Prescribed Burning Board, and attend an annual meeting for lead burn instructors.

Additional burning experience

Eight states require CPBM trainees to write burn plans and lead a specific number of burns after coursework and prior to certification (Table 3; Appendix A). The number of required burns varies from one in North Carolina to five in Louisiana. Participants can receive certification after coursework and without completing additional burning experience in four states (Alabama, Mississippi, Tennessee, and Virginia). Individuals in Mississippi need to prepare a burn plan to receive certification, but participants do not need to conduct the burn.



Reese Lolley

CPBM trainees must complete certification burns under the supervision of a CPBM in most states with burning requirements. Colorado regulations do not require supervision of training burns, but CPBM trainees do not receive liability protection unless they are supervised by a CPBM or RXB3. Program managers in Florida and Colorado review burn plans for all training burns and provides feedback to trainees.

Colorado, Illinois, Kentucky, and Pennsylvania developed task books for CPBM trainees to document their required burn experience. CPBM trainees in Colorado are required to write burn plans and lead at least three burns. The Illinois CPBM task book requires individuals to participate in at least five burns, write burn plans, and serve as the lead burner on at least two burns. Task books for the Pennsylvania Bureau of Forestry closely mirror NWCG task books for RXB1, 2, and 3, with some exceptions, such as adding aspects of the Incident Commander Type 4 task book to the RXB2 task book. The California Department of Forestry and Fire Protection is also proposing a task book for their CPBM program.

Length of certification

Certified burners must renew their certification in seven of fifteen states with CPBM programs (Table 5). These states require ongoing education, burning experience, and/or training. Florida's program requires a combination of continuing education and burning experience. States with burning requirements specify whether individuals need to lead burns or just participate in burns.

Certification fees

Course and application fees vary among states, with Texas having the highest application and renewal fees (Table 6). Course fees in Texas and Colorado range in cost depending on the venue, accommodations, and instructors. Fees are often waived for state employees, and some agencies apply for grants to subsidize the cost of participation for private citizens.



Table 5. Length of certification and renewal requirements for CPBM programs. Renewal is not required in Georgia, Illinois, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia.

State	Length of certification	Renewal requirements	Additional information on renewals
Alabama	5 years	Continuing education	Attend 6 hours of fire-related continuing education. The Alabama Forestry Commission organizes continuing education for CPBMs.
Colorado	5 years	Burning experience	Lead or participate in 2 prescribed burns.
Florida	5 years	Continuing education and burning experience	Attend 8 hours of approved continuing education (e.g., prescribed fire council meetings) AND lead 2 burns or participate in 5 burns.
Ohio	5 years	Burning experience	Lead 2 burns on 2 separate days OR participate in 5 burns on 5 separate days OR maintain RXB2 qualifications.
Pennsylvania	5 years	Burning experience	Lead at least one burn commensurate with certification level.
Tennessee	3 years	Continuing education	Attend 3 hours of fire-related continuing education.
Texas	2 years	Training and burning experience	Attend 1 hour of instruction on laws / regulations, 1 hour of instruction on smoke management, and 4 hours on other approved topics. Only 3 hours can be wildfire assignments.

Table 6. Fees for CPBM courses and applications. “---” indicates that fee information was not available online. “N/A” indicates that renewal fees are not applicable because certification is indefinite.

State	Course fees	Application fees	Renewal fees
Alabama	\$100 (32-hr course) \$50 (12-hr course)	\$50	\$50
Colorado	\$200-500 ^{1,2}	\$30 ²	\$20 (\$40 if late) ²
Florida	\$175	\$0	\$0
Georgia	\$100	\$0	N/A
Illinois	\$0	\$50 ²	N/A
Kentucky	\$200	\$0	N/A
Louisiana	\$100-150 ¹	---	N/A
Mississippi	\$250	---	N/A
North Carolina	\$50	\$0	N/A
Ohio	\$80	---	---
Pennsylvania	---	---	---
South Carolina	\$50	\$0	N/A
Tennessee	---	---	---
Texas	\$50-500 ¹	\$500	\$500
Virginia	\$75	\$0	N/A

¹Cost depends on course location, accommodations (e.g., meals), and instructor.

²Fees waived for state employees.

Program enrollment

Participation in CPBM programs tends to be higher in states with abundant private land, lower fire risk, and higher social acceptance of prescribed burning (Box 3). Newer programs can have low enrollment due to a lack of awareness about certification. Some states see a pulse of applicants the first few years of their certification programs but then a gradual decline after interested individuals already cycle through the program.

States with more stringent requirements for burning experience, such as Colorado and Pennsylvania, attract fewer participants. A quarter of individuals that take CPBM courses in Colorado never complete the required task book. Insurance requirements in Texas limit the number of participants in the program, as does a lack of training opportunities. It can take new burners five to ten years to obtain the necessary experience for certification in Texas.

Box 3. Enrollment numbers for CPBM programs.

Colorado: About 20 individuals have achieved “Burner B” certification for low-complexity pile burning, and 5 individuals have achieved “Burner A” for broadcast burning since the program started in 2014. About 60-80 individuals participate in CPBM courses every year.

Florida: The Florida Forest Service has certified 5,032 individuals since the early 1990s. There are currently about 1,700 CPBMs and 1,200 certified pile burners active in the state, and the numbers have been stable for about 10 years. Around 200 individuals took CPBM courses in the winter of 2018-19.

Illinois: The Illinois Prescribed Burning Act passed in 2007, and there are currently about 500 CPBMs in the state. The agency received about 100-150 applications every year for the first few years. The number of new applicants has dropped since then; most individuals that wanted certification already went through the program.

Ohio: About 20-30 people take the CPBM course offered every other year.

North Carolina: Each year, about 50-75 people take the CPBM course and 30-35 people are certified as new burners.

Texas: There are about 100 certified burners currently operating in the state.

Decertification

Certified burners in many states can have their certification suspended or revoked for non-compliance with state burning laws and regulations. Violations can occur for burning without a burn plan, failing to notify proper agencies or authorities, violating burn bans, falsifying or misrepresenting information, failing to mitigate impacts near smoke-sensitive receptors, etc.

Point systems for violations and decertification are used in [Colorado](#) and [Florida](#). CPBMs in Colorado that accumulate 15 or more points in violations during one certification period must retake the CPBM course and recomplete their task book. In Florida, individuals that accumulate 15 or more points over a two-year period can have their certification suspended for at least one year, and they must go through the same processes as individual seeking initial certification. If the Florida Forest Service decertifies an individual more than once, that individual is no longer eligible for recertification.

The Michigan Department of Natural Resources proposed a [point system](#) for their CPBM program similar to that in Florida. The Minnesota Division of Forestry is also contemplating a point system for decertification.



The Texas Department of Agriculture does not use a point system but provides a [comprehensive list](#) of violations and penalties. For example, failing to complete a go/no-go pre-burn checklist during county burn bans results in a \$1,000 fine for first-time offenders. The fee increases to \$3,000 for the third violation within three years, and the violator's certification is permanently revoked.

Agencies overseeing CPBM programs in Illinois, Kentucky, Louisiana, Ohio, Pennsylvania, and Virginia have the right to revoke or suspend a burner's certification. However, these states do not have a clear system in place for assessing violations.

Very few CPBM burners have been decertified. No burners have been decertified in Colorado or Illinois according to CPBM program managers. The Florida Forest Service has only decertified three burners over the course of the program. The Texas Department of Agriculture is currently working through its first compliance issue. Many agencies have limited capacity to enforce compliance and rely on self-reporting, which partially explains the low number of decertification.

Program administration

The time commitment for administering CPBM programs varies among states based on certification requirements, the number of individuals holding or seeking certification, field supervision required for CPBM trainees, and systems used to track certification. Agency employees are primarily responsible for overseeing CPBM programs, apart from Kentucky where the Prescribed Fire Council administers the program and Texas where the Prescribed Burning Board plays a central role along with the Texas Department of Agriculture. The Minnesota Division of Forestry recommended that the state form a Prescribed Fire Council to support the CPBM program currently in development (Stoffel 2017). Universities and extension agencies facilitate or instruct CPBM courses in some states, reducing the workload on agency personnel.

Colorado

Development of the CPBM program cost about \$30,000. The Colorado Division of Fire Prevention and Control provided a stipend to members of a steering team that helped develop the course. Printing fees for course materials are about \$40 per person.

For the past five years, CPBM program administration was one-third of the job duty of one employee with the Division of Fire Prevention and Control. The Division recently promoted another employee to assist with the certification program. Program administration involves reviewing every burn plan submitted by CPBMs, organizing courses, and tracking CPBMs. Courses are primarily instructed by employees with the Division of Fire Prevention and Control.

The CPBM program manager uses a spreadsheet to track training and burning experience of CPBMs. The spreadsheet indicates when a burner's certification will expire. The program manager creates hard copies and electronic files for CPBMs with their documentation and burn plans.

Florida

Development of the Florida CPBM program required a substantial investment of personnel time, and staff have contributed to several program updates over the years. Consistent costs are salary time, printing costs for course material, and printing and postage costs for recertification reminders.

The workload for processing and tracking CPBMs, reviewing burn plans, and sending recertification reminders amounts to 1 full-time equivalent (FTE) employee. These responsibilities are shared between two employees of the Florida Forest Service. The CPBM program manager reviews about 350 burn plans every year. Additional personnel are involved in overseeing certification burns, coordinating CPBM courses, and instruction.

The state uses an online system to track burns and continuing education of CPBMs. The system is linked with the state's smoke permit portal and automatically updates CPBMs' records if they submit a burn authorization. The tracking system alerts the CPBM program manager when they need to mail renewal reminders to CPBMs.

Illinois

Trainers with the Illinois Department of Natural Resources instruct S-130 and S-190 several times a year. Three employees on the agency's Fire Training Committee spend a small portion of their time reviewing CPBM task books and applications. Applications take about 15-20 minutes to process, and there are less than 50 new applicants a year. Staff time is required to supervise CPBM on their training burns, but this workload is moderated by allowing trainees to assist with state burns.

A clerical employee enters CPBM information into a database and prints CPBM certificates. There are no renewal requirements, so the activities of CPBMs are not tracked beyond initial certification.

North Carolina

The North Carolina Forest Service does not have a specific individual assigned to CPBM program administration. Two employees coordinate courses and track CPBMs, five to six employees instruct CPBM courses, a clerical staff prints certification cards, and several field staff supervise CPBM trainees on practice burns. The agency is currently hiring a prescribed burn coordinator who will assist with agency-led burns and spend about 20-40% of their time managing the CPBM program.

The agency uses a spreadsheet to track the coursework and burning experience of CPBM trainees. There are no renewal requirements, so the activities of CPBMs are not tracked beyond initial certification.

Ohio

The Ohio Division of Forestry has one employee who serves as the point person for the CPBM program. Agency employees teach the CPBM course every other year and provide supervision to CPBM trainees on state-led burns. Several employees assist with tracking the experience of CPBMs through an Access database. The agency might eventually adopt an online portal that automatically tracks CPBMs for ease and consistency.

Texas

The Prescribed Burning Board was established by the Texas Prescribed Burning Bill of 1999 to assist with the certified burner program. The Board is housed in the Department of Agriculture and has its own Advisory Board. The Prescribed Burning Board and its Advisory Board assisted with initial curriculum development, and they meet regularly to discuss improvements to the program. Enforcement of rules for the certified burner program fall exclusively to the Texas Department of Agriculture.

Two employees with the Texas Department of Agriculture support the CPBM program on a part-time basis. One employee tracks the applications, field experience, and continuing education for certified burners, and the other reviews proof of insurance submitted by certified burners. There are 15 lead burn instructors across the state, only some of which are employees of the Texas Department of Agriculture and Texas A&M AgriLife Extension.

The Texas Department of Agriculture accepts electronic and paper applications, which need to be scanned and kept in separate files for each certified burner. The agency uses an online license renewal program to automatically send renewal notifications to burners. Employees use a separate filing system to track CPBMs' applications and training, and they have to cross reference these files with the online renewal program.





Considerations and recommendations for Washington

Suggestions for developing a certification program in Washington are based on our comparison of existing CPBM programs; interviews with CPBM program managers in Colorado, Florida, Illinois, North Carolina, Ohio, and Texas; and insights from other experts (see acknowledgements).

Strike a balance between achievable and rigorous standards

The Washington DNR needs to identify the objectives and target audience of their certification program upfront. Balancing achievable and rigorous standards is an important and difficult consideration for CPBM programs (Quinn-Davidson 2019). Certification requirements strongly influence who can participate in CPBM programs.

If the goal is to increase public trust in prescribed burning, then more rigorous standards might be warranted. The NWCG-based standards for Prescribed Burn Bosses in Pennsylvania and Certified Burner A's in Colorado are only achievable for active or retired wildland fire professionals. More rigorous standards make sense when program benefits are greater and the potential for extreme fire behavior is higher (Quinn-Davidson 2019).

If the intent of a CPBM program is to increase the pace and scale of prescribed burning, then requirements need to be more achievable. Programs with fewer requirements, like those in Alabama, Mississippi, North Carolina, Tennessee, and Virginia, are more accessible to landowners with little to no previous fire experience.

Secure adequate funding and personnel

Prescribed burn acts direct specific agencies to develop and oversee CPBM programs; however, not all agencies received new line items to pay for these programs. A lack of funding is a primary reason that the Michigan Department of Natural Resources never implemented their CPBM program.

It is important that the Washington DNR identify funding streams and define roles and responsibilities for the CPBM program. Secure funding for program administration could reduce the need to recoup operating expenses through fees for CPBM courses and applications. Texas has the highest application fees for certified burners, but the Texas Department of Agriculture still does not recoup the costs of program administration.

The CPBM program manager in Colorado estimated that program development amounted to \$30,000, and consistent funding is required for personnel time and supplies related to the program. The Colorado Division of Fire Prevention and Control applied for grants to support program development because they did not receive additional funding from the Colorado legislature.

The Minnesota Division of Forestry estimated that their CPBM program would cost \$125,000 to develop (Stofel 2017). This estimate included \$50,000 to set up the CPBM course, \$15,000 to make changes to the agency's electronic open burning permit system, and \$50,000 to train local governments and fire departments about the CPBM program. The report estimates that course instruction will cost an additional \$5,000 per course.

Roles and responsibilities for CPBM programs include (1) coordinating initial program development and improvements over time, (2) tracking CPBM qualifications and retaining records, (3) reviewing CPBM applications and burn plans, (4) coordinating training courses, (5) instructing courses, (6) supervising CPBM applicants on training burns, (7) advertising and maintaining program information online, and (8) enforcing CPBM regulations. CPBM program managers in Colorado, Texas, and Florida estimate that administration of the CPBM program amounts to at least one full-time position, with more employees needed to instruct courses, supervise burns, and address compliance issues. The workload might be higher the first several years of a new program, and time commitments vary throughout the year depending on when people are seeking certification and conducting prescribed burns.

Administrative responsibilities for CPBM programs are often split among several employees. Employees with the North Carolina Forest Service feel the CPBM program would run smoother if the agency had one point-person to coordinate training and interact with certified burners.

Convene a steering team to develop and review certification requirements

Involving private citizens, contractors, researchers, and fire professionals in decisions about certification can increase buy-in and ensure the program is responsive to a variety of needs and concerns. Multi-stakeholder steering teams can vet CPBM program requirements, assist with curriculum development, provide feedback as the program evolves, and help advertise the program through their networks.

CPBM program managers from several states highlighted the importance of gathering broad perspectives from the prescribed burn community. The Texas Prescribed Burning Board is composed of private landowners, contractors, agency representatives, extension specialists, and professors, and they have a legal mandate to develop and update curriculum for burner certification. The Colorado Division of Fire Prevention and Control, Ohio Division of Forestry, and California Department of Forestry and Fire all formed steering committees to develop their CPBM programs.

Engage air quality regulators throughout the process

Open communication between fire management and air quality agencies can ensure standards for CPBMs align with regulations for air quality and smoke management. Air quality regulators can contribute to the development of curriculum and instruct course sections on smoke management.

The CPBM program manager for Colorado highlighted the value of involving the Division of Air Pollution Control throughout development of the state's CPBM program. Representatives from the Texas Commission on Environmental Quality serve on the Texas Prescribed Burning Board, and this facilitates two-way communication about prescribed burning, certification requirements, and air quality standards. A representative from the Environmental Protection Agency in Ohio serves on the state's Prescribed Burn Council, and this has resulted in improved policies that meet the needs of prescribed burners while also addressing air quality concerns.



Clearly outline benefits of certification to landowners and fire professionals

Regulations promulgated by the Washington DNR should specify benefits afforded to certified burners. Participation and compliance might increase if certification provides benefits in addition to liability coverage. Examples from other states include exemptions from burn bans, extended burning hours, reduced suppression billing, and online permitting.

There are pros and cons to different perks for certified burners. The CPBM program manager in Florida cautions against reduced



suppression billing for certified burners; the financial burden of escapes can promote quality decision making and prevent complacency. Exemption for CPBMs during burn bans requires close coordination with local and state agencies that oversee air quality and open burning to ensure consistent regulations.

Develop multiple tiers and tracks to certification

The potential for extreme fire behavior and density of wildland urban interface are highly variable across the state of Washington. To address local variability, the Washington DNR could develop tiers of certification, much like the states of Colorado, Florida, and Pennsylvania. More rigorous standards could apply to individuals conducting higher complexity burns. Certification tiers can keep individuals burning within their limits and provide a path to certification for less experienced individuals interested in burning piles.

Experienced burners were dissatisfied with certification requirements when new CPBM programs were launched in several states. The Washington DNR could address this concern by offering multiple tracks to certification. The track for experienced burners might involve a shorter course, like in Florida and Virginia, and require fewer certification burns, like in North Carolina. The criteria for “experienced burner” should specify the required number of burns, required complexity of burns, required role of the burner on those burns, and acceptable documentation of prior experience. The Washington DNR could offer a pre-test to assess the knowledge of experienced burners, and individuals who pass the exam could qualify for a shorter in-person course.

Several CPBM program managers cautioned that contractors, employees of non-governmental organizations, and private citizens can struggle to produce formal documentation of prior burning experience. The Washington DNR might need to develop a standardized template for individuals and organizations that cannot utilize the Incident Qualification System (IQS) or Incident Qualifications & Certification System (IQCS) to document burning experiences and trainings.

It might not be appropriate for the Washington DNR to offer reciprocity for CPBMs from other states; states that currently have CPBM programs do not have analogous fuel types and weather conditions. The legal environment for prescribed burning warrants state-specific training. Washington could consider qualifying CPBMs from other states as experienced burners but still require they take a condensed course and conduct a supervised certification burn, similar to the approach in Florida.

Conduct a beta-test of course curriculum

The Washington DNR will need to determine the content, format (e.g., in-person, field-based, online), duration, evaluation methods (e.g., final exams, field-day evaluations), and instructors for CPBM courses. The Washington DNR might decide to develop one course for all participants or separate courses tailored to landowners and agency personnel. The DNR could convene a steering team with burn bosses, fire ecologists, smoke regulators, lawyers, and other relevant parties to define learning objectives, identify topics vital for safe and effective burning in Washington, and develop course materials.

The Washington DNR could develop a final exam to gauge the learning of participants. Exam questions should focus on big-picture topics to reinforce their importance in the minds of participants. Colorado's CPBM course involves two exams—one covering basic fire behavior and another covering liability, burn planning, and smoke management.

The Washington DNR could beta-test the new curriculum with a group of landowners and fire practitioners to assess whether content and delivery are appropriate for the target audience. The Colorado Division of Fire Prevention and Control hosted a beta-version of their CPBM course in 2014, and participant feedback helped the Division make the course more accessible to citizens with no prior fire experience. The California Department of Forestry and Fire Protection beta-tested their course in September 2019, and the revised curriculum will go through a review process with CalFire State Fire Training and other agency leaders.

Include a field component in the CPBM course

CPBM courses with a field component allow participants to observe complexities and nuances involved in prescribed burning. Numerous states have shied away from live burn demonstrations due to unpredictable weather conditions, liability concerns, and a lack of trained personnel to supervise participants. The field component of CPBM courses does not need to include a live burn demonstration to provide valuable insights to participants.

North Carolina's certification course involves field tours but no live burning. Participants visit an unburned unit to assess conditions, prepare a burn plan, and consider potential burn impacts. They visit a nearby unit that was recently burned to discuss the actual burn plan implemented on that unit and observe fire effects. Instructors found that the field component works best when students are split into small groups of five to six students per instructor. The Kentucky Prescribed Fire Council uses sand table practicums in lieu of burn demonstrations if weather is prohibitive.



Kara Karboski



Facilitate additional field experiences for CPBM trainees

Requirements for on-the-ground experience and training burns might increase the likelihood that Washington's CPBM program produces competent burners. The Washington DNR needs to decide what constitutes adequate field experience, and this involves an intentional balance between achievable and rigorous standards. Several states require CPBM trainees to participate in AND lead several burns. Leading a prescribed burn provides a unique perspective on risk management and decision making.

The Washington DNR could develop a task book to help CPBM trainees understand what is required of them and track their progress. Task books provide an opportunity for new burners to receive feedback, and they can help state agencies decide if an individual is qualified for certification.

An important consideration for the Washington DNR is the standard of supervision required for CPBM trainees. Many states require individuals to conduct training burns under the supervision of a CPBM. Agency policy needs to specify if individuals receive liability protection during training burns.

Supervised training opportunities can make new burners feel more comfortable and motivated to complete certification. However, if the Washington DNR has limited capacity to supervise trainees, supervision standards can create a bottleneck in the certification process. Options to reduce this obstacle and provide supportive opportunities for CPBM trainees include:

- Permitting CPBM trainees to participate in agency-led burns, as is done by the Illinois Department of Natural Resources, North Carolina Forest Service, and Ohio Division of Forestry.
- Pair CPBM trainees with experienced certified burners that do not work for the agency.
- Support prescribed fire training exchanges or learn-and-burn events hosted by prescribed burn associations.

Review and provide feedback on burn plans to ensure quality

Burn planning is a central topic for CPBM courses and an important practice for safe and effective prescribed burning. The Washington DNR should consider reviewing burn plans from all CPBM trainees to identify deficiencies, provide feedback, and help CPBMs address complexities they might have overlooked. Providing clear guidance for burn planning, including templates with required components and examples of approved plans, might also increase the quality of CPBM burn planning.

Develop a point system for decertification and dedicate resources to enforcement

The Washington DNR should establish a fair and transparent process for suspending or revoking burn certification. The state could build off the point systems used in Colorado and Florida to penalize compliance issues and unsafe burning practices. The Washington DNR needs to determine if fees will be assessed for compliance issues, as is done in Texas. The DNR also needs to define how long suspensions last, the process for recertification, and the conditions under which certification is permanently revoked.

It is also important to establish a process for enforcing CPBM regulations. Several states rely on self-reporting by burners because agencies lack the personnel for enforcement. A better approach might be conducting random checks on burners and coordinating enforcement with air quality regulators.

Require recertification and continued training

CPBM program managers from several states emphasized the importance of recertification standards. Providing feedback and continual training to certified burners can reinforce safe burning practices and reduce compliance issues.



Chad Bladow

The Washington DRN could consider recertification every 3-5 years contingent on CPBMs participating in a specified number of burns, leading at least one burn, and participating in a CPBM refresher course. The Washington DNR would need to specify if burns must occur in the state of Washington and provide a list of acceptable refresher courses. Standards for recertification should balance achievability and rigor, with the goal of enabling CPBMs to conduct safe and effective burns.

Additional considerations for recertification are (1) required documentation, (2) recertification fees, (3) deadlines and penalties for late submissions, (4) recertification periods, and (5) reminders for recertification. Individuals conducting burns on their own lands might not be able to provide documentation with the same standard of proof as individuals burning for the state. As mentioned above, the Washington DNR could develop a standardized template for individuals and organizations that cannot utilize IQS or IQCS to track fire experience.

Program managers in Colorado and Florida base certification periods on the calendar year to simplify their tracking (e.g., the recertification deadline is January 1, 2024 for all individuals certified between January 1 and December 31, 2020). The state of Colorado accepts materials up to 90 days after certification expires, and they charge a higher recertification fee for late applications. The CPBM program manager in Florida accepts documentation for recertification within four months of the expiration date. Some states send electronic and paper reminders to burners as they approach their recertification deadline, but others put the onus on CPBMs to track their certification status.

Address inclusivity through program design

Decisions about course content and format influence the inclusivity of a CPBM program. Options to increase participation by a variety of individuals could include:

- Working with the Indigenous Peoples Burning Network, part of the Fire Learning Network, to develop voluntary certification and training options for Tribal fire managers.
- Offering remote options for coursework to make the program accessible to individuals with full-time jobs or other day-time responsibilities.
- Hosting trainings at different times of the year and in different locations. This also affords an opportunity to discuss unique conditions that influence prescribed burning in different parts of the state.
- Providing alternative exams or course materials for individuals with special learning needs.
- Minimizing program fees to make certification affordable to a wider variety of individuals. The Washington DNR could pursue grant opportunities to subsidize the cost of CPBM courses.



Invest in an electronic tracking system

Programs with recertification standards require robust tracking of CPBMs. Some program managers use a system with spreadsheets and electronic files, but this approach is time consuming and difficult to transfer to other employees. Files on internal agency servers are not accessible to burners that want to track their certification.

The Washington DNR might consider an online tracking platform that is available to burners with log-in information. CPBMs could upload documentation of their burn experience and continuing education, thereby reducing the burden on agency personnel to organize materials submitted by each burner. The agency could consider accepting paper files from individuals that do not have access to a computer or high-speed internet.

Florida developed an online burn authorization platform that communicates with another system for tracking certification. Burn authorizations submitted by CPBMs automatically appear on their certification record. However, the program manager must manually enter information for CPBMs that participate on burns for which they did not submit the authorization. Florida also has an online interface for smoke management planning, which the Washington DNR could consider building into their CPBM tracking system.

Online tracking systems require an upfront cost for development. The Ohio Division of Forestry received a quote of \$25,000 for an online tracking system, and the Minnesota Division of Forestry estimated it would cost \$15,000 to update their electronic permitting system (Stoffel 2017).

Provide clear documentation about the CPBM program online

Comprehensive, organized, and up-to-date documentation can facilitate a successful CPBM program. The Washington DNR could produce a document that clearly outlines expectations and requirements for the CPBM program, such as the [Colorado CPBM regulations](#) and [Michigan prescribed burning regulations](#). The Washington DNR could maintain a webpage specifically devoted to the CPBM program, much like the [Florida Forest Service website for CPBMs](#). A user-friendly CPBM webpage would include announcements for upcoming trainings, links to prescribed burn laws and regulations, program applications and instructions, burn plan templates, information about safe burning practices, and contact information for the CPBM program manager.

Conclusion

Enabling landowners to use prescribed burning on their property can reduce hazardous fuel loads and promote ecological resilience. Prescribed burn acts and associated certification programs reduce landowner concerns about liability and provide training on safe and effective burning practices. The target audience, program objectives, and general burn complexity should drive decisions about certification requirements. The fifteen states with active CPBM programs have similar objectives, but the requirements and mechanics of their programs differ widely.

There are numerous considerations and tradeoffs involved in developing new CPBM programs. Rigorous standards for burning experience can prohibit some landowners from becoming CPBMs. At the same time, requirements for supervised burn experience can increase the likelihood of safe burning by CPBMs. States in the western U.S. can build off lessons learned and successes from CPBM programs in other parts of the country, but fuel and weather conditions in the West require different considerations about risk and training requirements. Beta-testing new curriculum can ensure content meets the needs of the target audience. CPBM program managers should seek feedback from participants, experienced burners, and other experts to identify concerns and bottlenecks in the certification process and to revise and improve the program over time.

Literature cited

- Bright, A.D., P. Newman, and J. Carroll. 2007. Context, beliefs, and attitudes toward wildland fire management: An examination of residents of the wildland-urban interface. *Human Ecology Review* 14(2):212-222.
- Cleaves, D.A., J. Martinez, and T.K. Haines. 2000. Influences on prescribed burning activity and cost in the National Forest System. General Technical Report SRS-GTR-37. U.S. Forest Service, Southern Research Station, Asheville, NC.
- Haines, T.K. R.L. Busby, and D.A. Cleaves. Prescribed burning in the south: Trends, purpose, and barriers. *Southern Journal of Applied Forestry* 25(4):149-153.
- Hartsough, B.R., et al. 2008. The economics of alternative fuel reduction treatments in western United States dry forests: Financial and policy implications from the National Fire and Fire Surrogate Study. *Forest Policy & Economics* 10:344-354.
- Kearney, D. 2013. Building prescribed fire capacity in NM. New Mexico State University, New Mexico Prescribed Fire Council, Las Cruces, NM. Available online at <https://nmrxfire.nmsu.edu/documents/building-prescribed-fire-capacity-in-nm-2013---pdf-accessible.pdf>; last accessed February 2020.
- Kobziar, L.N., D. Godwin, L. Taylor, and A.C. Watts. 2015. Perspectives on trends, effectiveness, and impediments to prescribed burning in the southern U.S. *Forests* 6:561-580.
- Kolman, J. 2018. Prescribed burning: Fires not gone wild. Montana Legislative Services Division, Legislative Environmental Policy Office (Environmental Quality Council), Helena, MT. Available online at <https://leg.mt.gov/content/Committees/Interim/2017-2018/EQC/Meetings/Mar-2018/fire-prescribed-burning.pdf>; last access January 2020.
- Martinuzzi, S., S.I. Stewart, D.P. Helmers, et al. 2015. The 2010 wildland-urban interface of the conterminous United States. Research Map NRS-8. U.S. Forest Service, Northern Research Station, Newtown Square, PA.
- McCaffrey, S.M. 2006. Prescribed fire: What influences public approval? Pp 192-198 in M.B. Dickinson, editor. *Fire in eastern oak forests: Delivery science to land managers*, proceedings of a conference, Nov. 15-17, 2005, Columbus, OH. General Technical Report GTR-NRS-P-1. U.S. Forest Service, Northern Research Station, Newtown Square, PA.
- McCullers, S. 2014. A dangerous servant and a fearful master: Why Florida's prescribed fire statute should be amended. *Florida Law Review* 65(2):587-613.
- McIver, J., S.L. Stephens, J.K. Agee, et al. 2013. Ecological effects of alternative fuel-reduction treatments: Highlights of the National Fire and Fire Surrogate study (FFS). *International Journal of Wildland Fire* 22:63-82.
- Melvin, M.A. 2018. 2018 national prescribed fire use survey report. Technical Report 03-18. The Coalition of Prescribed Fire Councils, Inc. 23 pp.
- Miller, J.D., H.D. Safford, M. Crimmins, and A.E. Thode. 2009. Quantitative evidence for increasing fire severity in the Sierra Nevada and Southern Cascade Mountains, California and Nevada, USA. *Ecosystems* 12(1):16-32.
- New Jersey (NJ) Department of Environmental Protection. 2018. Prescribed burning in New Jersey: A procedure and application guide for private landowners. Version 18.1.L. New Jersey Department of Environmental Protection, Forest Fire Service, Trenton, NJ. Available online at https://www.state.nj.us/dep/parksandforests/fire/docs/Qualified_Professional_Application_v18.1.Q_20180725.pdf; last accessed February 2020.
- New Jersey (NJ) State Agricultural Convention. 2004. Prescribed burning. Statement by delegates of the 89th State Agricultural Convention. 4 February 2004; Long Branch, NJ. Available online at <https://www.state.nj.us/agriculture/04presburnres.htm>; last accessed February 2020.



Paysen, T.E., R.J. Ansley, J.K. Brown, et al. 2000. Chapter 6: Fire in western shrubland, woodland, and grassland ecosystems. General Technical Report RMRS-GTR-42-vol 2. U.S. Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Quinn-Davidson, L. 2019. Finding the sweet spot: Rigor versus impact in certified burner programs. Blog post for the Fire Adapted Communities Learning Network, 05 September 2019. Online at <https://fireadaptednetwork.org/finding-the-sweet-spot-rigor-versus-impact-in-certified-burner-programs/>; last accessed October 2019.

Quinn-Davidson, L., and J.M. Varner. 2012. Impediments to prescribed fire across agency, landscape and manager: An example from northern California. *International Journal of Wildland Fire* 21(3):210-218.

Radeloff, V.C., et al. 2018. Rapid growth of the U.S. wildland-urban interface raises wildfire risk. *PNAS* 115(13):3314-3319.

Schultz, C., et al. 2018. Prescribed fire policy barriers and opportunities. Ecosystem Workforce Program Working Paper Number 86 / Public Lands Policy Group Practitioner Paper Number 2. University of Oregon, Eugene, OR / Colorado State University, Fort Collins, CO. 33 pp.

Shindler, B.A., E. Toman, and S.M. McCaffrey. 2009. Public perspectives of fire, fuels and the Forest Service in the Great Lakes Region: A survey of citizen-agency communication and trust. *International Journal of Wildland Fire* 18:157-164.

Stephens, S.L., J.J. Moghaddas, C. Edminster, et al. 2009. Fuel treatment effects on vegetation structure, fuels, and potential fire severity in western U.S. forests. *Ecological Applications* 19(2):305-320.

Stofel, R. 2017. Prescribed burn requirements report. Minnesota Department of Natural Resources, Division of Forestry, Two Harbors, MN. Online at <https://files.dnr.state.mn.us/aboutdnr/reports/legislative/2016-rx-burning.pdf>; last accessed November 2019.

Sun, C. 2006. Liability of using prescribed fires on forestlands and state legislation evolution. Pp 225–240 in S.J. Chang and M.A. Dunn, editors. *Proceedings of the 35th Annual Southern Forest Economics Workshop*. Mississippi State University, Mississippi State, MS.

Toman, E., B. Shindler, S. McCaffrey, and J. Bennett. 2014. Public acceptance of wildland fire and fuel management: Panel responses in seven locations. *Environmental Management* 54:557-570.

Toman, E., M. Stidham, B. Shindler, and S. McCaffrey. 2011. Reducing fuels in the wildland-urban interface: Community perceptions of agency fuels treatments. *International Journal of Wildland Fire* 20:340-349.

UT Prescribed Fire Council. 2020. Council initiatives: Certified burner program. Utah State University, Utah Prescribed Fire Council, Logan, UT. Available online at <https://forestry.usu.edu/utah-prescribed-fire-council/council-initiatives>; last accessed February 2020.

Werner, G. 2020. Government relations: Here in Wisconsin. Wisconsin Prescribed Fire Council. Available online at <https://prescribedfire.org/plan/government-relations/>; last accessed February 2020.

Westernling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increases western U.S. forest wildfire activity. *Science* 313:940-943.

Wonkka, C.L., W.E. Rogers, and U.P. Kreuter. 2015. Legal barriers to effective ecosystem management: Exploring linkages between liability, regulations, and prescribed fire. *Ecological Applications* 25(8):2382-2393.

Yoder, J. 2008. Effects of liability and regulation on prescribed fire risk in the United States. Pp 639-649 in A. González-Cabán, editor. *Proceedings of the second international symposium on fire economics, planning, and policy: A global view*. General Technical Report PSW-GTR-208. U.S. Forest Service, Pacific Southwest Research Station, Albany, CA.



Appendix A. Detailed requirements for prescribed burn certification

Table A.1. Requirements to obtain and maintain prescribed burn certification in states with formal and active CPBM programs.

State Track / tier	Prerequisites	Coursework (cost)	Additional requirements	Length of certification / Renewal requirements
Alabama				
New burners	None	32-hour in-person course (\$100)	Submit application (\$50)	5 years
Experienced burners	≥2 years supervising ≥5 prescribed burns	12-hour in-person course (\$50)	Submit application (\$50)	Complete ≥6 hours of fire-related continuing education
Alternative qualifications	Certified burners from Mississippi, Georgia, South Carolina, and other states (on a case-by-case basis)		Submit application (\$50)	Submit application (\$50)
Colorado				
Burner B for low complexity burns	None	32-hour in-person course (\$200-500) ^{1,2}	Pass final exam (≥70%) Complete a task book Lead ≥3 burns with burn plans Submit application (\$30) ²	5 years
Alternative qualifications for Burner B	RXB1/2 qualifications	None	Provide IQS/IQCS Master Record 2 letters of recommendation Submit application (\$30) ²	Lead or participate in ≥2 prescribed burns Submit application (\$20 / \$40 within 90 days) ²
Burner A for all complexity burns	Experience as an RXB1/2 and ICT4 within past 10 years	S-390 and burn boss refresher training within past 12 months	Provide IQS/IQCS Master Record 2 letters of recommendation Submit application (\$30) ²	
Florida				
New burners	None	23-hour in-person course (\$175)	Pass final exam (≥70%) Participate in ≥3 burns in FL Lead ≥1 burn with burn plan Submit application (\$0)	5 years Complete ≥8 hours of continuing education AND lead ≥2 burns OR participate in ≥5 prescribed burns
Experienced burners	Lead ≥3 burns in FL OR participate in ≥5 burns in FL OR RXB1/2 OR another state's CPBM	Online self-study course (\$175)	Pass final exam (≥70%) Lead ≥1 burn with burn plan Submit application (\$0)	
Pile burners	None	8-hour in-person course (\$50)	Pass final exam (≥70%) Lead ≥1 burn with burn plan Submit application (\$0)	5 years Lead or participate in ≥5 prescribed burns

Appendix A. Continued.

State Track / tier	Prerequisites	Coursework (cost)	Additional requirements	Length of certification / Renewal requirements
Georgia				
Experienced burners	≥2 years supervising ≥5 prescribed burns	16-hour in-person course (\$100)	Pass final exam (≥70%) Submit application (\$0)	Indefinite
Illinois				
New and experienced burners	None	Online I-100, S-130, and S-190, and 8-hour in-person field day with a live burn demo (weather permitting) (\$0)	Complete a task book Participate in ≥5 burns Lead ≥2 burns with burn plan Submit application (\$50) ²	Indefinite
Alternative qualifications	RXB1/2 or certified burners from other states (on a case-by-case basis) Experience on ≥7 burns, including leading ≥5 burns (grandfather clause expired on December 31, 2015)		Submit application (\$50) ²	
Kentucky				
Experienced burners	Participate in ≥5 burns or wildfires and complete I-100, S-130, and S-190	32-hour in-person course with a live burn demo (sand table activity if weather prohibitive) (\$200)	Complete a task book Lead ≥3 burns Submit application (\$0)	Indefinite
Alternative qualifications	RXB1/2/3 Completed I-100, S-130, and S-190, experience on ≥5 burns, leading ≥3 burns, and writing burn plans (grandfather clause expired on December 31, 2018)		Submit application (\$0)	
Louisiana				
New burners	None	20-hour in-person course with a live burn demo (weather permitting) (\$100-150) ¹	Pass final exam (≥70%) Lead ≥5 burns with burn plan	Indefinite
Experienced burners	On-the-job training (case-by-case basis)	8-hour in-person course with a live burn demo (weather permitting)	Pass final exam (≥70%) Lead ≥5 burns with burn plan	


Appendix A. Continued.

State Track / tier	Prerequisites	Coursework (cost)	Additional requirements	Length of certification / Renewal requirements
Mississippi				
New and experienced burners	None	23-hour in-person course with a field tour but no live burning (\$250)	Pass final exam (≥80%) Write a burn plan	Indefinite
New and experienced burners	None	3-credit forest fire course at MS State University (\$1,115 in-state, \$2,995 out-of-state)	Pass S-290 final exam Pass short-course exam (≥80%) Pass entire course (≥70%)	
Alternative qualifications	Certified burners from other states (on a case-by-case basis)		None	
North Carolina				
New and experienced burners	None	16-hour in-person course that includes a field tour but no live burning (\$50)	Lead ≥1 burn with burn plan Submit application (\$0)	Indefinite
Alternative qualifications	RXB1/2 qualifications or certified burners from other states (on a case-by-case basis)		Submit application (\$0)	
Ohio				
Experienced burners	≥6 hours of basic wildfire training AND ≥10 years of experience on ≥10 wildfires or prescribed burns	24-hour in-person course with a live burn demo (weather permitting) (\$80)	Pass exam Submit documentation	5 years Lead 2 prescribed burns on 2 separate days OR participate in 5 burns on 5 separate days OR maintain RXB2 qualifications
State employees	I-100, S-130, and S-190 AND ≥3 assignments as a prescribed fire crew member	S-290 and 24-hour in-person course with a live burn demo (weather permitting)	Pass exam Successful completion of a CPBM mentorship Submit documentation	
Alternative qualifications	RXB1/2 qualifications		Provide IQS/IQCS Master Record	

Appendix A. Continued.

State Track / tier	Prerequisites	Coursework (cost)	Additional requirements	Length of certification / Renewal requirements
Pennsylvania				
Burn Boss 1 (PA-RXB1)	10 operational periods as PA-RXB2	S-490 and RX-410	10 operational periods as trainee Complete a task book	5 years Perform duties at certification level on ≥1 prescribed burn
Burn Boss 2 (PA-RXB2)	5 operational periods as firing boss (PA-FIRB)	S-390, RX-301, RX-341, RX-310, and S-300	5 operational periods as trainee Complete a task book	
Burn Boss 3 (PA-RXB3)	5 operational periods as firing boss (PA-FIRB)	None	5 operational periods as trainee Complete a task book	
Alternative qualifications	Equivalent NWCG qualifications (RXB1, 2, or 3) Personnel from member organizations of the Pennsylvania Prescribed Fire Council Steering Committee (grandfather clause expired on March 26, 2013)			
South Carolina				
Experienced burners	Relevant experience (case-by-case basis)	8-hour in-person course (\$50)	Pass final exam Submit registration form	Indefinite
Tennessee				
New and experienced burners	None	24-hour online course and 16-hour in-person course with a live burn demo (weather permitting)	None	3 years Complete ≥3 hours of continuing education
Texas				
New burners	None	24-hour in-person course with a live burn demo OR approved alternative (\$50-500) ¹	Pass final exam ≥3 years of experience leading burns on ≥5 days Submit proof of prescribed burning liability insurance Submit application (\$500)	2 years Complete ≥6 hours of continued training Submit application (\$500 on-time, higher if late)
Experienced burners	≥3 years of experience and ≥5 days leading burns OR RXB1/2	24-hour in-person course with a live burn demo OR approved alternative (\$50-500) ¹	Pass final exam Submit proof of prescribed burning liability insurance Submit application (\$500)	



Appendix A. Continued.

State Track / tier	Prerequisites	Coursework (cost)	Additional requirements	Length of certification / Renewal requirements
Virginia				
New burners	None	24-hour in-person course (\$75) OR approved alternative	Pass final exam	Indefinite
Experienced burners	Relevant experience (case-by-case basis)	Short in-person review course	Pass final exam	

Notes: Acronyms for National Wildfire Coordinating Group positions and courses are explained in the section “List of acronyms” at the beginning of this report. Applications and task books are hyperlinked where available online as of February 2020.

¹Cost depends on course location, accommodations (e.g, meals), and instructors.

²Fees waived for state employees.

Appendix B. Sample schedules for CPBM courses in different states

Appendix B.1. Sample schedule for certified burner B courses in Colorado.

Day 1: Introduction to wildland fire and fire behavior

Introductions and overview (10 min.)
Wildland fire terminology (30 min.)
Fire environment (30 min.)
Break (10 min.)
Impacts of weather on fire and considerations for pile design and burning (45 min.)
Break (10 min.)
Fuel characteristics (45 min.)
Break (10 min.)
Fire behavior and safety (45 min.)
Break (10 min.)
Mop up and securing the fire (30 min.)
Break (10 min.)
Exam #1 (30 min.)

Day 2: Introduction to low-complexity prescribed fire

Introductions and overview (10 min.)
Colorado Certified Burner Handbook (15 min.)
Prescribed fire plan: Objectives and area description (15 min.)
*Exercise 1** (30 min.)
Class discussion of exercise 1 (10 min.)
Break (10 min.)
Prescribed fire plan: Complexity analysis (15 min.)
*Exercise 2** (45 min.)
Break (10 min.)
Class discussion of exercise 2 (15 min.)
Pre-burn considerations: Pile placement (45 min.)
Lunch (60 min.)
Pre-burn considerations: Liability (60 min.)
Break (10 min.)
Pre-burn considerations: Smoke management requirements (60 min.)
Break (10 min.)
Managing smoke on burn day (45 min.)
Break (10 min.)
Prescription, notifications, and medical plan (30 min.)

****Exercise 1 (group activity):*** Prepare project objectives and area descriptions based on material provided for the burn scenario.

****Exercise 2 (group activity):*** Complete a complexity analysis for the burn scenario.

Appendix B.1. Sample schedule for certified burner B courses in Colorado (continued).

Day 3: Introduction to low-complexity prescribed fire (cont.)

Review of day 2 (10 min.)

*Exercise 3** (30 min.)

Class discussion of exercise 3 (10 min.)

Break (10 min.)

Communications, tools, organization, and briefing (10 min.)

Go / no-go checklist, test fire, and ignition plan (15 min.)

Ignition devices and techniques (30 min.)

Contingency planning (10 min.)

Holding, mop up, and escape plans (10 min.)

Break (10 min.)

*Exercise 4** (30 min.)

Class discussion of exercise 4 (15 min.)

Lunch (60 min.)

Post-burn activities: Monitoring and fire safe declaration (10 min.)

*Exercise 5** (30 min.)

Break (10 min.)

Class discussion of completed burn plans (30 min.)

General Q&A (15 min.)

Break (10 min.)

Final exam (45 min.)

Break / grading of exam (30 min.)

Initiation of task books, presentation of certificates, and close out (30 min.)

***Exercise 3 (group activity):** Develop pre-burn management considerations for the scenario, such as locations of smoke-sensitive receptors. Develop the burn prescription, agency and public notification plan, and emergency plan.

***Exercise 4 (group activity):** Complete a contingency plan, holding and mop-up plan, and wildfire declaration (escape plan) for the scenario.

***Exercise 5 (individual activity):** Use material from exercises 1-4 to complete a written burn plan for the scenario.



Appendix B.2. Sample schedule for certified prescribed burn manager courses in Florida.

Day 1

Check-in, introduction, and pre-test (0.5 hours)

Why we burn (1 hour)

- Need for burning
- History of fire in Florida

Legal requirements in Florida (1.5 hours)

- Laws, rules, and procedures for open burning
- Burner's legal obligations

Public relations (1 hour)

- Employer vs. individual responsibilities
- Public's fears of fire and how to address them
- Components of a prescribed fire public relations program

Lunch (1 hour)

Safety (2 hours)

- Importance of safety on prescribed fires
- Safety issues to address in burn plans
- Recommended personal protective equipment
- Standard principles of fireline safety
- Function and limitations of fire shelters
- *Activity:* Deploy fire shelters

Fire weather (2 hours)

- Types of wind and impacts of fire behavior
- Relationship between temperature and humidity
- Stability, inversion, mixing height, dispersion index, and transport wind speed
- Methods of heat transfer
- Typical cold fronts and thunderstorms in Florida and impacts on fire behavior
- Importance and usage of weather forecasts
- Steps to obtain spot weather forecasts
- *Activity:* Practice using belt weather kits

Day 2

Fire behavior (2 hours)

- Fire behavior terminology
- Fire triangle
- Methods of heat transfer
- Impacts of fuel characteristics on combustion
- Fuel model categories in Florida
- Difference between fire intensity and severity
- Significance of resident time in prescribed fire
- Indicators of erratic fire behavior

Smoke management (2 hours)

- Major pollutants associated with wildland fire
- Smoke-sensitive areas and critical smoke sensitive-areas
- Legal requirements for smoke management
- Situations creating smoke-related problems
- Dispersion index and LVORI
- Ignition strategies to reduce emissions
- *Activity:* Implement the Florida smoke screening system

Lunch (1 hour)

Ecological effects (2 hours)

- Fire effects on water and soil
- Fire effects on plants and animals
- Fire-dependent ecosystems in Florida
- Impacts of seasons / timing of fire on ecosystems
- Prescribed burn parameters to achieve ecological objectives

Firing techniques (2 hours)

- Head, flanking, and backing fires
- Four common ignition patterns and their appropriate use
- Safety concerns associated with ignition patterns
- *Activity:* Develop ignition plans for a specific scenario

Appendix B.2. Sample schedule for certified prescribed burn manager courses in Florida (continued).

Day 3

Holding and contingencies (1 hour)

- Methods to maintain fires within authorized areas
- How to address escaped fire
- Standards for mop-up and declaring fires out

Planning and evaluation (3 hours)

- Required elements for burn plans
- Clear and measurable objectives
- Contingency plan elements
- Develop a burn plan for a specific scenario

Lunch (1 hour)

Planning and evaluation, continued (1 hour)

Review (1 hour)

Final exam



Appendix B.3. Sample schedule for certified burner courses in North Carolina.

Day 1:

Registration and introduction (30 min.)

North Carolina Prescribed Fire Act (30 min.)

Impacts of fuels and weather on fire behavior (2 hours 30 min.)

Lunch (60 min.)

North Carolina Smoke Management System (45 min.)

Firing techniques (30 min.)

Planning and executing a burn (120 min.)

Mop-up and monitoring after the burn (40 min.)

Day 2:

*Field trips** (4 hours)

Course review and lunch (60 min.)

Test and wrap-up

***Field trips** involve visiting an unburned unit to assess current conditions, prepare a burn plan, and consider potential burn impacts, followed by a visit to a nearby unit that had similar conditions but was recently burned. Instructors share the actual burn plan prepared for the unit and describe observed fire effects, and they lead the participants in a discussion about differences between their practice burn plans and the actual plan used for the unit.

Appendix B.4. Required content for certified and insured prescribed burn manager courses in Texas.

Topics*:

Fire history, use, and ecological effects

Fire behavior

Fire weather

Fuel moisture and characteristics

Topographic influences on fire behavior

Fire effects

Burn planning

Equipment and safety

Firing techniques

Smoke management

Laws and regulations

Evaluation of pre-burned areas

Evaluation of fuels

*The Advisory Board for the Texas Prescribed Burning Board requires lead burn instructors to cover these thirteen topics, but there is no requirement for how much time is spent on each topic. Lead instructors have the freedom to assess the background knowledge of participants and tailor the course to their interests and needs.

Courses must be at least 24 hours (including classroom and field components) and include a live burn demonstration. Lead instructors need to reschedule the field component if weather prohibits burning. Participants must take the standardized exam approved by the Texas Prescribed Burning Board.

