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Community wildfire protection planning: is the Healthy Forests Restoration Act's vagueness genius?

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Abstract. The Healthy Forests Restoration Act of 2003 (HFRA) encourages communities to develop community wildfire protection plans (CWPPs) to reduce their wildland fire risk and promote healthier forested ecosystems. Communities who have developed CWPPs have done so using many different processes, resulting in plans with varied form and content. We analysed data from 13 case-study communities to illustrate how the characteristics of HFRA have encouraged communities to develop CWPPs that reflect their local social and ecological contexts. A framework for analysing policy implementation suggests that some elements of HFRA could have made CWPP development and implementation problematic, but these potential shortcomings in the statute have provided communities the freedom to develop CWPPs that are relevant to their conditions and allowed for the development of capacities that communities are using to move forward in several areas.

Additional keywords: community capacity, policy implementation, wildfire management, wildland–urban interface.

Introduction

The Healthy Forests Restoration Act of 2003 (HFRA) is the culmination of nearly a decade of wildland fire policy reforms designed to improve the capacities of land-management agencies in the US Departments of Agriculture and Interior to protect communities, watersheds and other at-risk lands from catastrophic wildland fires (US Congress 2003; Steelman 2008). HFRA identifies several tactics to redress wildfire risk including improving management of insect and disease infestations; protecting, restoring and enhancing biological diversity and other forest ecosystem components; and funding grants to improve the commercial value of biomass (generally small-diameter woody material removed during fuels reduction projects). In this analysis, we focus on HFRA's goal of protecting at-risk communities[A] and other federal and non-federal lands from catastrophic wildland fire through a 'collaborative process of planning, prioritising and implementing hazardous fuel reduction projects' (US Congress 2003, p. 2) that results in a community wildfire protection plan (CWPP) (US Congress 2003, p. 3).

A recent guide to CWPP preparation and implementation characterises the CWPP process as 'one of the most successful tools' for addressing wildland fire management in the wildland–urban interface (WUI) (CWPP Task Force 2008, p. 2). Part of this success is attributed to the fact that the CWPP process permits communities to develop plans to fit local social and ecological contexts at a scale where they can make something happen (Jakes *et al*. 2007*b*; Resource Innovations 2008). It is

[A]An at-risk community is defined by the statute as follows: 'interface community as defined in the notice entitled "Wildland Urban Interface Communities within the Vicinity of Federal Lands that are at High Risk from Wildfire" or a group of homes or other infrastructure in conditions that are conducive to large scale wildfire and where there is a significant threat to human life or property' (US Congress 2003).

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common for policies, including those to reduce risks from natural hazards, to be applied with considerable variation at the local level (McLaughlin 1987; Berke 1998; Steelman and Kunkel 2004). Communities that have developed CWPPs have done so using a myriad of processes that have produced plans of varied form and content. In this paper, we look at how CWWPs were developed in 13 case-study communities, and use a conceptual framework of policy implementation developed by Sabatier and Mazmanian (1980, 1995) (referred to here as the Sabatier–Mazmanian framework) to understand how characteristics of the policy allowed communities the freedom to develop CWPPs that address local social and ecological conditions.

Community wildfire protection plans – HFRA policy implementation at the local level

Communities across the country have engaged in community wildfire protection planning in an effort to reduce their wildland fire risk and promote healthier, more resilient, forested ecosystems (CWPP Task Force 2008). The National Association of State Foresters (NASF) estimated that as of 2009, more than 5560 communities were covered by CWPPs (NASF 2010). Although a seemingly large number, these plans account for less than 10% of the 69 930 at-risk communities identified by the NASF.

HFRA requires that a CWPP be developed collaboratively by multiple stakeholders and 'agreed to' by representatives of the applicable local government (for example, homeowner associations, city or county governments), local fire departments and the state agency responsible for forest management, in consultation with federal land-management agencies (US Congress 2003, p. 3). The requirement for collaboration and stakeholder involvement in wildland fire management reflects a growing and important trend that has resulted in more collaborative planning and community involvement in natural resource and environmental management (Wondolleck and Yaffee 2000; Bradshaw 2003; Koontz and Johnson 2004). Research has found that collaborative planning can be key to effective wildland fire management because a collaborative process has the capacity to bring together multiple private and public stakeholders across the landscape in a partnership to reduce fire risk (Sturtevant *et al*. 2005; Jakes *et al*. 2007*a*; Sturtevant and Jakes 2008). In addition, working collaboratively strengthens relationships and communication within a community, which helps build social capital (Flora and Flora 2004).

A second requirement for a CWPP is that it identify and prioritise land requiring hazardous fuels reduction, and recommend the type and method of treatment. Reducing fuels within a few feet of homes and other structures can significantly reduce fire losses (Cohen 1999). In addition, there is evidence that fuels treatments in wildlands can affect fire behaviour (Graham *et al*. 2004; Lankoande and Yoder 2008) and thereby reduce fire risk for WUI communities (Cohen 2000*a*). By encouraging members of the local community to prioritise fuels management projects on public and private land, social learning around wildland fire management may be enhanced (Brummel *et al*. 2010), support for projects broadened and trust in the agencies implementing the projects increased (Davenport *et al*. 2007).

Finally, a CWPP must also contain recommendations to reduce structural ignitability. Research has shown that the key to limiting the loss of structures from wildland fire is to reduce the ignitability of the structure and its immediate surroundings (Cohen 2000*a*, 2000*b*). Property owners, therefore, have primary responsibility for reducing structural ignitability, with members of the fire services partnering in the process. Also, because at higher building densities the 'immediate surroundings' of a structure may include neighbouring properties (public and private), actions to reduce ignitability must necessarily involve the whole community (Cohen 2000*a*). The requirement that a CWPP include recommendations to reduce structural ignitability is recognition of the key roles property owners and the community, including the fire services, play in preventing the destruction of homes from wildland fire.

The process and content outlined in HFRA for CWPPs has been characterised as vague (Hawkins 2004), and has resulted in great diversity in both when implemented at the local level. Jakes *et al*. (2007*b*) describe how the CWPP process varied across communities in terms of the networks employed, knowledge shared, extent to which the CWPP was integrated with other plans and resources available to complete the plan. In an evaluation of CWPPs developed in the eastern USA, Grayzeck-Souter *et al*. (2009) found variability in who was involved in the CWPP process, the scale of the plan, and whether and how the WUI was defined. Brummel *et al*. (2010) discovered that in developing a CWPP, communities engaged in different kinds of learning, but that social learning did not necessarily result in a shared understanding of wildland fire issues. In the present paper, we employ a framework that identifies elements critical to policy implementation to understand how the characteristics of HFRA and the social contexts of implementing communities resulted in diverse CWPP processes and products.

A conceptual framework for evaluating CWPP implementation

One of the earliest findings of policy implementation studies is that 'even the best planned, best supported, and most promising policy initiatives depend finally on what happens as individuals throughout the policy system interpret and act on them' (McLaughlin 1987, p. 172). Sabatier and Mazmanian (1980) offer a framework for evaluating policy implementation that starts with a policy decision, such as passage of HFRA, analyses the extent to which its objectives are achieved over time, and attempts to explain success or failure in achieving policy objectives. They focus on three factors that affect a policy's success: (1) the statute's ability to favourably structure the implementation process; (2) the tractability of the problem addressed by the policy; and (3) non-statutory variables affecting implementation. The Sabatier–Mazmanian framework has been used to evaluate policies such as the Resource Conservation and Recovery Act of 1976 (Lester and Bowman 1989), the Education Reform Act of 1988 (Fitz *et al*. 1994) and USA family planning policy (Meier and McFarlane 1995). It has provided the foundation for testing public policy hypotheses including the statutory coherence hypothesis (McFarlane 1989). In the present paper, we use the Sabatier–Mazmanian framework not as a tool for understanding how the three factors affected HFRA

implementation, but for understanding how different communities interpreted HFRA in different ways, resulting in diverse processes and products. The elements defining each of the three factors are summarised below.

Statutory variables

There are several elements inherent in a statute's construction that may affect its implementation. First, a statute's implementation can be facilitated when there are unambiguous and clear policy objectives and these objectives are of high priority to implementing agencies or authorities. Implementation is also facilitated when the actions required by the statute clearly lead to the achievement of program objectives (strong cause and effect linkages). To support implementation, officials in the implementing institutions must have jurisdiction over policy linkages, and access to sufficient financial resources to take action. Implementation will be more difficult and challenging when the policy requires cooperation across agencies and scales (hierarchical integration). Also, when consensus is required among actors or where one actor (either internal or external to the implementing process) has the ability to veto an implementation decision, implementation will be problematic. However, the inclusion of a broad array of stakeholders that support the statutory objectives increases the likelihood of successful implementation.

Tractability of the problem

Tractability refers to the fact that some problems are simply easier to solve than others. Sabatier and Mazmanian suggest four elements that affect tractability. First, policy implementation is facilitated when there is theory that links the policy requirements to solution of the problem, and technology that facilitates problem solution. Second, policy implementation will be easier when the target audience is homogeneous or uniform. In addition, the smaller and more definable the group targeted by the statute, the more likely the problem will be addressed and policy objectives achieved. Finally, the more limited the required behavioural change imposed by the statute, the more successful the implementation.

Non-statutory variables

There are five elements that comprise the non-statutory variables affecting policy implementation. First, there are a variety of socioeconomic conditions and factors that cannot be controlled by the statute that will affect implementation, both positively and negatively. Second, media attention to the problem can aid policy implementation by bringing issues to the attention of the public, particularly issues that are outside an individual's everyday experience. Third, public support for a statute's objectives will facilitate implementation. However, there is often more than one public, and support among different publics can vary, complicating implementation. Fourth, attitudes of constituency groups can support policy implementation, but those attitudes can change, resulting in declining support over time. Unfortunately for policy implementation, opponents are often highly motivated and will generally maintain their opposition for longer periods of time than policy proponents. Gaining support from the sovereigns of each institution that controls legal or financial resources can be protracted and difficult, especially if institutions have conflicting objectives. Implementation depends on the recruitment and support of sovereigns. Successful implementation is facilitated by sovereigns with strong leadership skills and commitment to statutory objectives. This commitment will come more easily if the statute's objectives complement the officials' goals and objectives.

Methods

Data used in this analysis come from a larger study focussed on the extent to which the CWPP process enhances collaboration and builds community capacity (Jakes *et al*. 2007*b*). For the larger study, we conducted case studies in 13 communities that had initiated a CWPP process, with all but one community having completed the process (Fig. 1). Communities were selected using theoretical sampling (Strauss and Corbin 1998), with a goal of representing variation in geography, ecological and social contexts and planning scales (Table 1).

For each case study, we reviewed the CWPP and associated materials. We also interviewed key participants in the CWPP process including, where relevant, forestry, fire and emergency management professionals at the federal, state, county and local levels; elected local officials; non-governmental organisation representatives; homeowner association members and staff; and local homeowners. Participants were selected using purposive sampling, a type of non-probability sampling where participants are chosen for their knowledge and experience of the event or incident being studied, in this case developing a CWPP (Babbie 1998). This means that different types of individuals and organisations were interviewed in each community, representing the different people and groups participating in the development of the CWPP. Interviews were conducted within each community until no novel information was forthcoming from additional interviews (Glaser and Strauss 1999). A total of 133 key informant interviews were conducted, with the smallest number of interviews conducted in Post Mountain, California (five interviews) and the largest in High Knob, Virginia (18 interviews). The number of people interviewed indicates the complexity of the CWPP process and diversity of participation in that process.

The interviews explored the community's historic understanding of wildfires and attempts at wildfire planning; the CWPP process including planning team membership, goals, decision-making structures and how the team defined the WUI; the development of fuels management priorities; critical resources available to the planning team; and outcomes of the CWPP process including increased understanding of wildfire issues, development of shared wildfire knowledge, development of community networks and other lessons learned. We also asked participants about the extent to which the CWPP addressed other goals related to managing fuels, restoring forests and suppressing wildfires, and their thoughts about potential challenges to implementation.

Interviews were digitally recorded and transcribed, and research team members working in that community coded and qualitatively analysed the transcripts. Data analysis consisted of

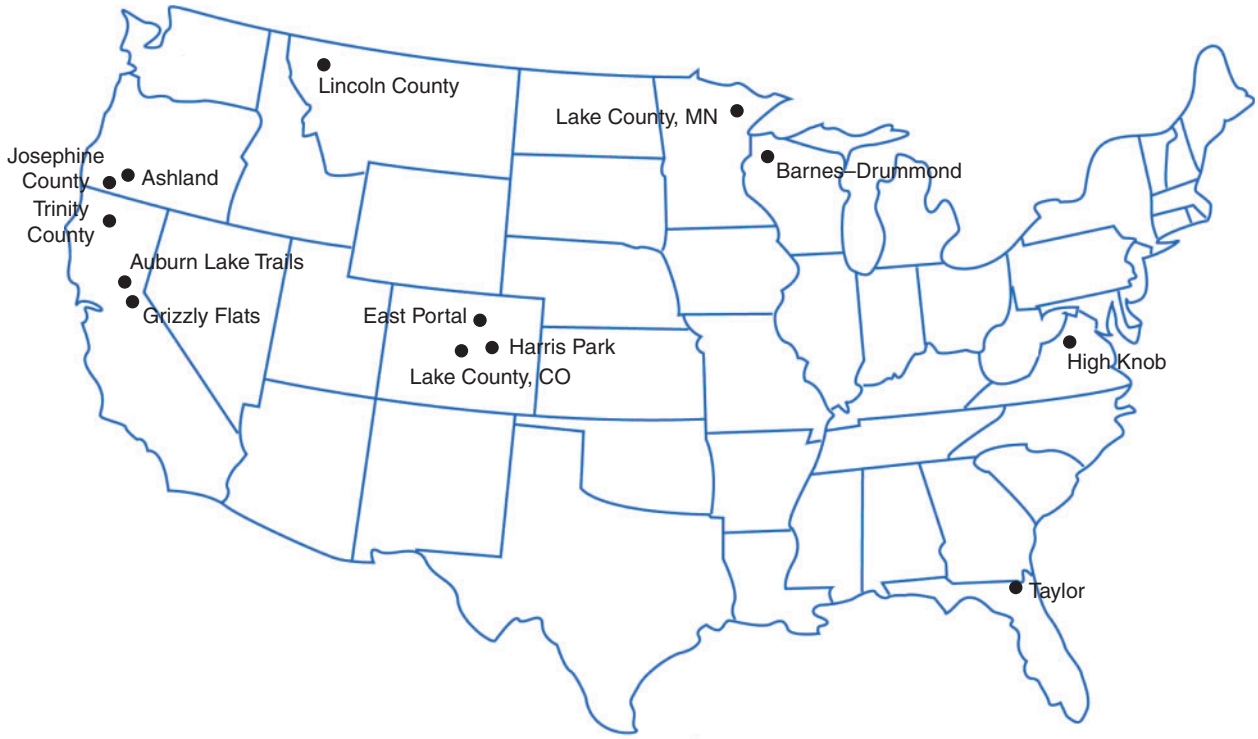

Fig. 1. Research on community wildfire protection planning (CWPP) analysed the CWPP process in 13 communities located in eight states.

analytic induction and thematic analysis. Analytic induction is primarily concerned with providing data-driven explanations of events (Silverman 2001). Initial patterns related to the CWPP process were identified during research team analytical discussions and refined through continual testing against new observations. Thematic analysis serves as a complementary coding strategy to analytic induction by providing a systematic way to support or reject themes based on their reoccurrence in the data (Boyatzis 1998; Silverman 2001). The researchers responsible for each community (1) coded statements using categories reflective of observed patterns in all communities and developed during research team analytical discussions; (2) identified any anomalies or apparent contradictions in these patterns in their communities; (3) reviewed community themes and examples with the research team in order to standardise or reject observations; and (4) selected the most representative quotes of remaining themes through multiple stages of increasingly restrictive coding.

Major lessons learned were identified during research team analytical discussions and revolved around the following themes: CWPP planning scales, community capacity, antecedents to wildfire planning, networks, leadership, framing, collaborative processes, information sharing or social learning, sustainability, and implementation outcomes.

For this paper, we also reviewed the legislative history leading to the passage of the HFRA. This history provides information as to the intent of the US House of Representatives and Senate in passing the statute. In undertaking this analysis, we used common rules of statutory construction, which focus on both the plain meaning of the statute as well as legislative intent reflected in HFRA's legislative history.

Findings related to the implementation of community wildfire protection plans

The causal theory underlying HFRA assumes that if a community (1) develops, and (2) implements a CWPP, then (3) at-risk lands will be protected from catastrophic wildfire (Fig. 2). HFRA specifies necessary conditions or requirements for developing a CWPP, including content and process elements. When the CWPP is implemented, there are wildland fire management outcomes anticipated by HFRA and unanticipated process outcomes identified in ongoing research (Jakes *et al*. 2007*b*). HFRA assumes that the wildland fire management outcomes will contribute to the HFRA goal of protecting at-risk lands.

At the time of this study, most of the case-study communities had just begun implementing their CWPP. We focus here on findings related to the elements of the Sabatier–Mazmanian framework that help explain the diversity in CWPP processes and products.

Effects of statute structure on implementation

Generally a statute embodies the policy decision to be implemented, characterises the nature of the problem addressed, sets forth the policy objectives to be pursued, and structures (to a greater or lesser degree) the implementation process. Below we investigate four factors related to the structure of HFRA that allowed communities to develop CWPPs reflecting their local contexts.

Table 1. Characteristics of case-study communities and community wildfire protection plans (CWPPs) studied

Case study	Vegetation	CWPP characteristics			
		Scale; local representatives or unit of government	Acres covered (ha)	Land ownership	Population; number of structures covered
Ashland, Oregon	Mixed conifers	Watershed; city council	14 000 (5670)	98% federal, 2% City of Ashland	Population 20 000; 1879 structures
Auburn Lake Trails, California	Grasses with scattered trees, oak with scattered conifer overstorey, mixed conifer and oak with brush understorey	Development; property owners association	4000 (1620)	100% private ownership (individuals and Property Owners Association), surrounded by Bureau of Reclamation land managed as a state recreation area	Population 3000; 950 homes
Barnes–Drumond, Wisconsin	Jack and red pine to the west and mixed hardwood forest to the east	2 towns; town boards	171 056 (69 220)	70% public ownership (primarily national forest and county forest)	Population 1151
East Portal, Colorado	Ponderosa pine, Douglas-fir; subalpine forest, shortgrass steppe	Development; homeowners associations	4800 (1940)	Approximately 50% federal (NPS, USFS) 50% private	Population less than 1000; 300 structures
Grizzly Flats, California	Mixed conifer with dense understorey	Development; community service district	1670 (680)	Private surrounded by public land (primarily national forest)	Population 1250; 497 homes
Harris Park, Colorado	Ponderosa pine, Douglas-fir; subalpine forest including spruce, fir and lodgepole pine; shortgrass steppe	Development; fire protection district	38 975 (15 770)	Approximately 30% national forest, 15% state, 55% private	More than 5000 homes
High Knob, Virginia	Dense hardwoods, scattered conifers	Development; homeowners association	600 (243)	Private land within subdivision boundary, 15% adjacent land federally managed	Population more than 1000; 400 structures
Josephine County, Oregon	Heavily forested with 28 different coniferous species	County; county commissioners	1.04×10^6 (420 873)	40% national forest, 27% Bureau of Land Management, 1% State	Population 75 700
Lake County, Colorado	Lodgepole and ponderosa pine, grasslands and sagebrush	County; county commissioners	245 760 (99 456)	74% federal, 26% state and private	Population 7812
Lake County, Minnesota	Aspen, birch, spruce, white pine, red pine, jack pine, black spruce, sugar maple, lowland conifer	County; county commissioners	1.34×10^6 (542 279)	78% publically owned (56% federal, 10% state, 12% county)	Population 11 058; more than 5000 structures
Lincoln County, Montana	Shade-tolerant species such as Douglas-fir	County; county commissioners	2.35×10^6 (951 011)	93% forested (73% national forest, with some state land)	Population 30 827
Post Mountain, California	Overstorey conifers, grasses with scattered tress, oak with scattered conifer overstorey, mixed conifer and oak with brush understorey	Community; volunteer fire department	3000 (1214)	70% federal (primarily national forest), scattered private	Population 275
Taylor, Florida	'Flatwoods' pine and swamp with understorey palmetto or thick brush	Town; Baker County commissioners	1700 (688)	1700 private acres surrounded by national, state and industrial forests	Population 1500; 425 structures

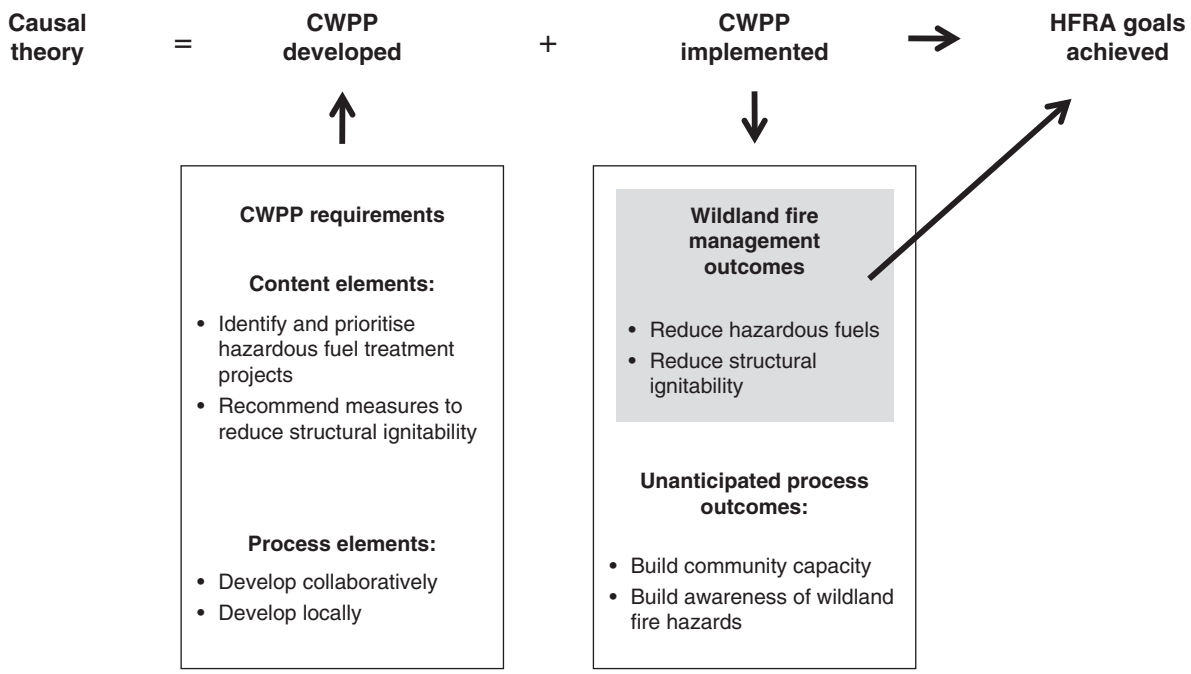

Fig. 2. The causal theory underlying the community wildfire protection plan (CWPP) requirement in the Healthy Forests Restoration Act of 2003 (HFRA) and necessary conditions and outcomes supporting the theory.

Clarity of statutory objectives

The Sabatier–Mazmanian framework suggests that policies with clear objectives are more easily implemented. The broad objective of protecting communities from catastrophic wildfire was clearly set forth in HFRA. In addition, Title I of HFRA sets out six separate statutory purposes related to this objective, two of which specifically mention wildfire and desired outcomes related to reducing wildfire risk. One of the purposes is to 'reduce wildfire risk to communities, municipal water supplies, and other at-risk federal land' through a collaborative planning process intended to prioritise and implement hazardous fuel reduction projects (US Congress 2003, p. 2). The statute also seeks 'to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape' (US Congress 2003, p. 2). Another identified purpose of the statute – to protect, restore and enhance forest ecosystem components – does not directly mention wildfire, but in the legislative debate around Title I of HFRA, there was extensive discussion of how the potential for wildland fire can be reduced by having healthy forest ecosystems.

The general nature of HRFA's objective and statements of purpose allowed communities to identify CWPP priorities that take into account local social and ecological contexts. For example, in Grizzly Flats, California, the initial focus of the CWPP was on improving access to facilitate evacuation during wildfire. The first project undertaken as part of the Taylor, Florida, CWPP engaged public and private forest land owners in completing a shaded fuel break surrounding the community. Improving relationships among agencies to enhance planning and implementation of landscape-scale fuels management projects was a priority of the Lake County, Minnesota, CWPP. While each of these communities are contributing to the HFRA's broad objective of reducing wildland fire risk, lack of specificity in the statute allowed them to approach the problem in ways that reflect their local priorities and conditions.

Most of the CWPPs we examined focussed on reducing wildland fire risks to communities, with little or no mention of healthy forest ecosystems. This choice reflected not only the definition of CWPP provided in Title I of HFRA (where there is no mention of healthy ecosystems), but the local social and ecological contexts. In some communities, like those we studied in California, we were told that introducing the concept of healthy forests would bring up old conflicts over ecosystem management that could derail efforts to reduce fire risk. In other communities, for example in Colorado, a focus on restoring ecosystem health helped the community address the landscape-level problem of insect infestations that have produced extremely high fire risk across entire mountainsides.

Availability of funding

Sabatier and Mazmanian suggest that sufficient funding must be available for successful policy implementation. How and to what extent HFRA projects should be funded was the subject of extensive Congressional debate.[B] The act requires the

[B]The House version of the bill granted the Secretaries of Interior and Agriculture a fair degree of discretion to decide where fuel reduction projects should be implemented, but many agreed with the comments of Representative Mark Udall that the focus of fuel reduction projects should be at the WUI 'where accumulated fuels present the most immediate risks to our communities' (US House of Representatives 2003, p. 23).

Secretaries to spend 50% of allocated fuel reduction project funding in the WUI to encourage fuel reduction in these areas (US House of Representatives Conference Committee 2003). Additionally, the statute states that in allocating funding, the Secretaries:

> 'should, to the maximum extent practicable, give [funding] priority to communities that have adopted a community wildfire protection plan or have taken proactive measures to encourage willing property owners to reduce fire risk on private property' [US House of Representatives Conference Committee 2003, p. 11]

There was some thought, at least in the Senate[C], that the availability of federal funding would provide some motivation for at-risk communities to prepare and implement CWPPs. The direction to Secretaries to fund projects in the WUI was cited in some communities as a reason for broadly defining their WUI and identifying high-priority fuels reduction projects on public and private land in the WUI. Indeed, individuals in all our case-study communities expressed the belief that if they did not have a CWPP in place, they would not be eligible for future federal funding. Although federal funding has not been allocated specifically for CWPP development and implementation, the potential availability of future funding was a motivator for communities to undertake the process.

Hierarchical integration

The Sabatier–Mazmanian framework indicates that a policy that requires integration across multiple scales will be more challenging to implement. HFRA does not explicitly address hierarchical integration. However, the extent to which the CWPP was linked to or nested in other plans suggests some level of hierarchical integration. As an appendix to the Trinity County Fire Safe Council Fire Plan, the Post Mountain CWPP can be seen as integrated in that plan. Similarly, the Grizzly Flats CWPP is integrated into the El Dorado County CWPP to the extent that the local community's projects help achieve strategic county goals. There is evidence that hierarchical integration occurred at the community, county and state levels in Montana. Starting at the community level, we found that projects identified in the Em Kayan, Montana, Firewise Communities plan supported goals in the Lincoln County CWPP. The Lincoln County CWPP served as the wildfire chapter of the county's pre-disaster mitigation plan. The county mitigation plan contributed to the Montana Multi-Hazard Mitigation Plan.

Although we found that some CWPPs were linked to CWPPs at other levels or to other planning documents, this integration is not required by the statute, but dictated by each plan's scale, frame and proposed projects, all of which reflect local priorities. Although this linkage may have contributed to hierarchical integration, not all stakeholders believed that linking the CWPP to other activities or plans would be beneficial. Stakeholders in Oregon were hesitant to link or embed the CWPP in other ongoing efforts for fear that the CWPP structure, goals and projects could be buried or lost within a broader framework.

Stakeholder involvement

Sabatier and Mazmanian argue that having a diverse stakeholder base builds support for policy implementation. Although HFRA is silent about who should be involved in the planning process or ultimately responsible for plan implementation, the individual or group initiating the process had the first word in who was involved in developing a CWPP. In many of our communities, the state played a critical role in initiating the CWPP process, providing leadership from their own staff, developing leadership skills within the local community, or obtaining grants to hire a consultant to lead the planning. In other communities, a local group such as a Fire Safe Council, Firewise Committee or homeowners association organised people to begin the process. The federal agency interim field guide for HFRA encourages federal agencies to partner in the CWPP process 'to the extent that a community desires, within budgetary constraints' (USDA and USDI 2004, p. 35). This guidance highlights the intention that the CWPP be a community plan, not an agency plan. However, in high-risk communities with limited capacity to undertake a CWPP, federal agency staff stepped in to initiate the process, generally stepping down as the process developed momentum and other leaders emerged.

Although the conveners of the CWPP process played a major role in identifying and involving stakeholders in the process, as the scale and objectives of the CWPP were defined, additional stakeholders were encouraged to participate. In Lake County, Minnesota, a focus on landscape-level fuels management highlighted the need to involve large landowners and public land managers in the CWPP process. Because of the landscape focus, the involvement of individual homeowners was less critical. There will be a need for homeowner involvement if the Lake County plan reframes the wildfire issue to concentrate on fuels management around homes and reducing structural ignitability in the future. From the beginning, local homeowners were key to the CWPP process in High Knob, Virginia, and they later led the implementation process.

Although HFRA did not specify who should be involved in development of a CWPP, and initially participants in the process in many communities may have represented the usual fire and land management agencies, as the process unfolded a more diverse group of stakeholders became involved. These new stakeholders were critical to identifying and acquiring resources, prioritising different types of projects and generating support for the CWPP through their networks and organisations.

Effects of problem tractability on CWPP implementation

The data we collected allowed us to examine tractability in terms of: (1) size and diversity of target communities; (2) availability of theory and technical information that leads people to believe that they can achieve statute objectives through local action; and (3) extent of behavioural change required of communities, partners and stakeholders.

Size and diversity of target communities

Sabatier and Mazmanian advise that policies directed towards a small target group that is easily identified and

[C]The House version of the bill had no mechanism for funding fuel reduction projects.

homogeneous will be more readily implemented. State foresters estimate that there are more than 56 000 at-risk communities 'which have been encouraged to develop CWPPs' (NASF 2009, p. 2). We selected our 13 case studies to represent the diversity and heterogeneity found in at-risk WUI communities, with communities selected on the basis of geography (location), ecological context (vegetation), social context (population, political organisation) and planning scale (Table 1). The diversity in our case-study communities meant that different people were involved in the CWPP processes, different resources were used for planning and implementation, and different leaders emerged to guide the process.

First, the case-study communities varied in governmental organisation. This variability is seen in Auburn Lake Trails and Grizzly Flats, the two CWPPs studied in El Dorado County, California. Auburn Lake Trails is a gated development managed by a property owners' board that has the authority to develop and enforce codes, covenants and rules (CCRs). The Auburn Lake Trails property owner's board used these tools when implementing the CWPP recommendations, and raised fees to monitor fuels reduction activities and manage fuels on common property. In contrast, Grizzly Flats developed a CWPP but had no formal governmental or legal tools to leverage its implementation. Rather than CCRs, Grizzly Flats is depending to a large extent on the growing local knowledge about wildland fire risk, social norms and reciprocity to implement CWPP recommendations on reducing structural ignitability.

Diversity was also evident in the resources available for the development of each CWPP, including financial resources. As we have seen, HFRA provides no specific new funding to local communities to support the development of CWPPs; thus, communities were innovative in locating the necessary funding to underwrite the CWPP development process. For example, in Josephine County, Oregon, and Trinity County, California, county governments worked with the applicable County Resource Advisory Committee (RAC) to access funding available through the Secure Rural Schools and Community Self-Determination Act to cover the costs associated with the CWPP process. In some states, natural resource, forestry or fire agencies made National Fire Plan funding available for CWPP development. As noted earlier, in Auburn Lake Trails the board increased association fees to cover the cost of implementing CWPP projects with little to no homeowner protest, reflecting positive homeowner attitudes regarding fuels management and support for action to reduce wildland fire risk.

Another resource critical to the CWPP process was leadership. In some instances, leadership was imported from agencies or institutions. This was the case in Taylor, Florida, where a state employee served as a leader throughout the process and in Lake County, Minnesota, where staff from the Superior National Forest initiated and led the process until local leaders stepped in. Strong leadership came from the county and local university in Josephine County, Oregon. The Wisconsin Department of Natural Resources used National Fire Plan dollars to hire the Northwest Regional Planning Commission to facilitate the Barnes–Drummond CWPP process and write the plan. In other cases, local leadership was developed or encouraged, as in High Knob, Virginia, where a local 'spark plug' took on the task of building relationships and networks important to developing the sense of community necessary for CWPP development and implementation through neighbourhood festivals, community service days and field trips.

Availability of theory and technical information

The Sabatier–Mazmanian framework proposes that when stakeholders clearly understand the link between actions specified in the statute and problem solution, implementation is facilitated. When residents were asked about the most significant outcomes of the CWPP planning process, many identified reduced wildland fire risk, thereby linking actions resulting from CWPP development and implementation to HFRA goals.

There is significant technical information on how to manage hazards in the home ignition zone to protect structures and lives during wildland fire events, placing responsibility for this management with property owners (Cohen 1999, 2000*a*). Findings from this research were mentioned in interviews as providing direction on how to reduce structural ignitability, and contributed to a belief that property owners could take action that would significantly reduce wildland fire risk. In Auburn Lake Trails, California, residents indicated that they were beginning to understand that by taking personal responsibility for fuels on their property, they were helping to protect the entire community.

Our communities did not identify any serious problems with obtaining the technical information or tools necessary to develop their plans. In many communities, fire service organisations and public land managers already had much of the necessary information, and they provided this information to the CWPP committee. For example, in East Portal, Colorado, the USDA Forest Service, National Park Service, Colorado State Forest Service, county and local fire department all provided data for CWPP development. This technical information was augmented by local knowledge, as East Portal community members identified and mapped community values. In Taylor, Florida, individuals involved in developing the CWPP walked through the community, mapping wildfire risk, noting the location of homes in relation to public land boundaries, and identifying hazards present in each home ignition zone. We were told that having this local knowledge in the CWPP increased plan relevance for local officials and residents.

Extent of behavioural change required

Sabatier and Mazmanian suggest that if a policy calls for significant behavioural change, implementation will be more difficult. We did not ask specifically about behavioural change required by the CWPP process, but we infer from our cases that the behavioural change required to collaboratively develop a CWPP depends to a large extent on community history – including what occurred during or as a result of earlier planning efforts and historic and current relationships between citizens, governance structures and civic organisations. We found that agencies and communities that had a history of working together collaboratively to solve problems found it easier to work together collaboratively on a CWPP because the CWPP process was similar to these earlier efforts – there was little behavioural change required. In Lincoln County, Montana, residents of Libby had experienced a series of challenges to community sustainability, including mill closures and environmental contamination. Community residents had worked collaboratively to address these threats, and they were able to draw on these earlier experiences, repeating successful behaviours, when organising

to address wildland fire risks. Grizzly Flats, California, residents had no history of working together to solve problems, so the first task for the consultant hired to develop the CWPP was to engage the community in activities that would build collaborative capacity. Coming together to address a common problem was a change in behaviour for Grizzly Flats residents. Auburn Lake Trails, California, is a community of professionals who are accustomed to hiring other professionals to carry out tasks and implement programs. Auburn Lake Trail residents were comfortable hiring a consultant to develop their CWPP with very little resident involvement, and supported an increase in homeowner association fees to cover the costs of implementation by a new local government department. Coming together to collectively develop a CWPP would have required a significant behavioural change, and they chose to not approach their CWPP in this way.

The behavioural change required by public agencies in order to participate in CWPP development fell into two categories, broader sharing of (1) resources, and (2) decision-making. Sharing of resources occurred in all of our case-study communities, with resources including technical information, computer models, maps, staff and facilities. As an example, in East Portal, Colorado, the Colorado State Forest Service, National Park Service and local fire department created a shared seasonal community wildfire defence educator position. The Park Service provided funding for the 2-year position, the Colorado State Forest Service provided position administration and supervision, and the position was housed in the fire department. Creating a shared position was a novel approach for the agencies involved, and although it could have occurred without the CWPP, discussions during the process highlighted the need, and relationships developed during the process facilitated its creation.

Although our case-study communities offered several examples of shared resources, it was more difficult to find examples of shared decision-making. Perhaps a lack of empirical examples from our study is a sign that, given the ambiguity in HFRA language, lead fire and land-management agencies do not interpret HFRA to mandate shared decision-making. The lack of definition for 'collaboration' allowed agency managers to not change behaviour towards sharing decision-making, preserving their own discretion and autonomy. However, one example came from Lake County, Minnesota, as Lake County Forestry staff, Superior National Forest staff and local volunteer firefighters began to inform each other about activities and, in some cases, coordinated fuel treatment activities across jurisdictional boundaries. Data from Ashland, Oregon, suggested that Rogue–Siskiyou National Forest staff were beginning to share some aspects of their decision-making regarding wildland fire. The Ashland CWPP was a response, in part, to the Ashland Forest Resiliency Wildfire Mitigation Project on the national forest. Social learning that took place during the CWPP process and around the wildfire mitigation project contributed to the Forest staff's decision to include a citizens' alternative in National Environmental Policy Act (NEPA) documents for the project and adopt major portions of the alternative. CWPP players (Nature Conservancy and City of Ashland) now have a stewardship agreement to implement the project. The adoption of a citizens' alternative is recognition of the value of local and scientific knowledge in planning and signals a willingness by the Forest staff to share some aspects of wildland fire decision-making.

Effects of non-statutory variables on implementation of CWPPs

The policy embodied in a statute such a HFRA is the result of interactions between the legal system and political system, but implementation of the statute is also affected by several factors operating outside those systems – factors that may or may not be beyond the control of the implementing authority.

Public attitudes and support

We were told in interviews in some of our communities that the CWPP built on or reflected public attitudes supporting fire planning efforts that were already in evidence before the planning process, whereas in other communities, we were told that the planning process changed attitudes and built support for wildfire management. In Harris Park, Colorado, residents indicated that experience with large wildfires, including the Hayman Fire, had motivated them and their neighbours to engage in mitigation work and resulted in new attitudes within the community necessary to support this work. These existing public attitudes and support carried over into the CWPP process, as Harris Park stakeholders saw the CWPP as the next step in the evolution of community-based fire management. Grizzly Flats is an example of a community where the CWPP process and associated activities built support for fire management projects. Discussions among neighbours were critical in recruiting members to the CWPP committee and generating local support for developing and implementing the plan. Demonstration projects along main travel routes developed as a result of the CWPP also helped change the attitudes of residents about fire management. In Lincoln County, Montana, a retired Forest Service employee with local credibility and technical knowledge led the CWPP committee, and, working with an employee from Montana Forestry, met with community members to recruit participants for demonstration projects and other activities that would help generate support for activities to reduce wildland fire risk. Our data suggest that public support, essential to the development and implementation of the CWPP, was best generated through interactions among neighbours, trusted fire managers (including local firefighters) and local experts with relevant knowledge.

Support from sovereigns of implementing institutions

Sabatier and Mazmanian argue that support 'among sovereigns of implementing institutions' is essential to statute implementation. The importance of this support was obvious in our communities where representatives of various institutions participated in the collaborative planning process. For example in our Colorado, Florida and Minnesota cases, support from senior managers allowed staff from the USDA Forest Service, state agencies and county offices to actively participate in the CWPP process. These agency representatives provided valuable services to the planning process, including stable membership on the CWPP committee and access to critical resources and networks. We were told that it is unlikely that the planning

process in these communities could have succeeded without the commitment of these agencies.

Support of agency senior management permitted agency staff to carry issues and concerns raised during the CWPP process back to their home agencies, helping to ensure congruence between CWPP and agency goals and objectives. For example, in Taylor, Florida, the creation of a shaded-fuel break around the town, identified in the CWPP, depended on the support of the USDA Forest Service, Florida Division of Forestry, private industry and private landowners. The fact that representatives of each agency were involved in the collaborative process, negotiating projects and developing support within their organisations for CWPP goals, helped build agency commitment for implementation.

The importance of commitment of the sovereign to implementing structural ignitability measures was less obvious. The authority to regulate activities on private property generally rests with the local unit of government – developments, towns and counties – and in communities with a strong private property ethic, requiring action to reduce structural ignitability could be a problem. An exception to this rule is California, which has statewide regulations regarding defensible space clearance around buildings and structures. Structural ignitability requirements are easier to implement in developments governed by property owners associations, such as in Auburn Lake Trails, California, and High Knob, Virginia, where residents are accustomed to limits detailed in CCRs. In most of our communities, land-use planners indicated that implementing any regulations that could be interpreted as limiting growth or private property rights would be difficult to implement.

Community capacity

Sabatier and Mazmanian identify socioeconomic conditions that could affect policy implementation, and describe these conditions as the context in which a statute is implemented. In our case-study communities, these conditions were characterised by community capacity. Community capacity is the interaction and employment of different resources within a community to solve collective problems and improve or maintain community wellbeing (Chaskin 2001). Community capacity is developed over time and can aid the community in policy implementation.

One example of community capacity used to develop and implement CWPPs is civic norms. We found that the existence of shared civic norms was a valuable resource in developing and implementing CWPPs, especially where financial resources were not forthcoming. In Grizzly Flats, California, there were few financial resources for encouraging homeowners to reduce hazards in the home ignition zone, but by discussing homeowners' responsibilities to reduce fire risk on their property at different community gatherings, expectations were established about how property should be managed, and these expectations facilitated the management of fuels and other hazards in home ignition zones by individual property owners.

Reciprocity is another aspect of community capacity that helped facilitate the development and implementation of CWPPs. Reciprocity refers to the social expectation that people will respond to an action in kind. In our case-study communities, there were several examples of one group taking action with the expectation that another group would eventually take complementary action. Reciprocity was demonstrated in Taylor, Florida, where a shaded fuel break around the town was identified as a high-priority project in the CWPP. Land comprising the fuel break was held by a variety of owners. Although the different owners could have entered into formal agreements, instead they depended on reciprocity to ensure that everyone participated in developing the fuel break – each property owner assumed that if he or she created the shaded fuel break on his or her property, his or her neighbour would do likewise. Recognising that they were surrounded by public land on which forest conditions presented a high fire risk, residents of the Em Kayan community in Lincoln County, Montana, committed to becoming a Firewise Community. Although the community's actions did not require the Forest Service to do any fuels mitigation in the surrounding forests, the agency supported the community's efforts by conducting projects on adjacent federal land.

Access to networks, another aspect of community capacity, was critical to the successful development of the CWPPs studied. Access was facilitated by members of the CWPP team, who served as nodes connecting the CWPP team to other networks in which they participate. Consultants are generally linked to a wide range of networks, and in Josephine County, Oregon, the consultant facilitating the CWPP process was able to draw on several of her networks to bring new information, skills and resources to planning. Local fire departments have strong networks with other fire and emergency management teams, and these were drawn on in the development of virtually all of our CWPPs. In Post Mountain, California, and Ashland, Oregon, environmental groups tapped into their networks to build support for the CWPP. There may be some resistance to linking networks that have a history of conflict, for example environmental organisations and land-management agencies, but by inviting potential adversaries to participate in development of a CWPP, the team can proactively work to reduce tensions.

In our case studies, we found that although the elements of community capacity available in each case-study community varied, people were able to blend the resources they had on hand in ways that facilitated the CWPP process. Often, this meant that shortages in financial, physical and natural resources were overcome by employing other social and political resources.

Discussion

The Sabatier–Mazmanian framework offers a set of factors relevant to statute structure, tractability and non-statutory variables that affect implementation, and suggests a relative value for each factor (yes or no, high or low) that will facilitate implementation. In Fig. 3, we illustrate the values suggested by the framework for each factor significant to CWPP implementation, the values for statutory factors observed in HFRA and the range in values for non-statutory factors found in our case-study communities. We presume that when the HFRA and community values do not correspond to the factor value suggested by the Sabatier–Mazmanian framework, that factor is a potential barrier to CWPP implementation. However, we found that in some cases, the lack of a factor was not an obstacle to implementing HFRA's CWPP requirement.

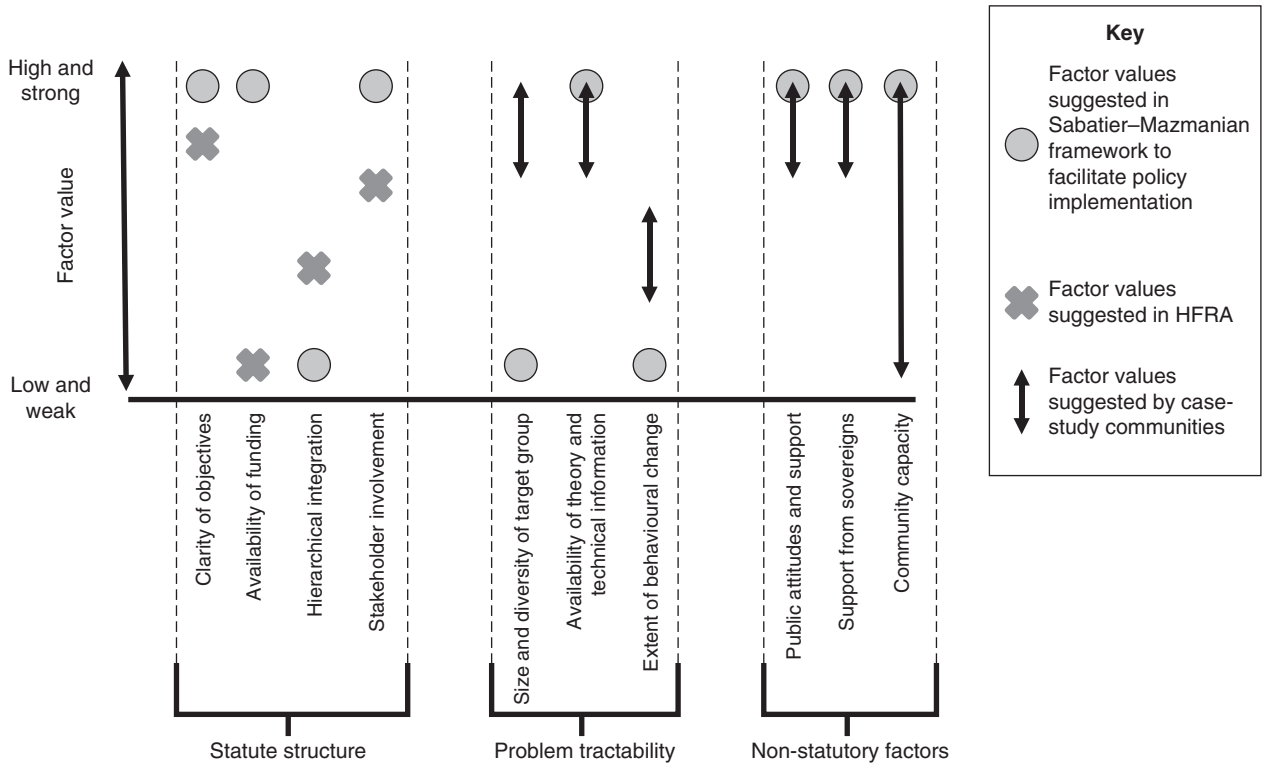

Fig. 3. Factors affecting statute implementation, range of values suggested in the Healthy Forest Restoration Act of 2003 (HFRA) or case-study communities, and value suggested in Sabatier–Mazmanian framework for effective policy implementation.

Looking at the four factors related to the structure of the statute in Fig. 3, we see that Sabatier and Mazmanian suggest that when objectives are clear, funding is available and stakeholder involvement is high, statute implementation will be facilitated. In Title I of HFRA, the objectives for developing a CPWW are clear – to treat fuels and reduce structural ignitability to protect at-risk communities and essential infrastructure. HFRA does not specify how a CWPP is to be developed, what it should contain or how it is implemented, and because of this, we were told that it took some communities 'a long time to get traction'. However, once they accepted the idea that a CWPP could be whatever they needed it to be, they embraced the freedom to act and mustered the various resources necessary to produce a plan that reflected local social and ecological contexts.

The lack of new funding for the CWPP process or implementation could be a potential barrier to HFRA implementation, but our case-study communities handled this challenge by leveraging other resources to support their CWPP activities. This leveraging highlighted the importance of having people involved in the CWPP effort who were knowledgeable about funding options and had access to networks that could help generate funds. But our study leaves open the question about whether those at-risk communities lacking community capacity or other resources have the ability to engage in the CWPP process without further federal or state financial investment.

Sabatier and Mazmanian call for a high level of stakeholder involvement to ensure statute implementation, and HFRA stipulates that a CWPP be developed using a collaborative process. In addition, guides for preparing a CWPP argue that its success will depend on involving a broad range of stakeholders (SAF 2004; CWPP Task Force 2008). The lack of specificity in HFRA about who should be involved in the CWPP process gave communities the flexibility to build planning teams with individuals best positioned to achieve local CWPP objectives. The people we interviewed stressed the importance of having the 'right' people at the table early on, and the 'right' people were generally defined by the plan's frame (public safety, fuels reduction, ecosystem health) and scale (neighbourhood or community, county, landscape). The 'right' people were also knowledgeable about community context, had access to networks and would be critical to plan implementation.

Sabatier and Mazmanian suggest that the less hierarchical integration required by the statute, the easier implementation. Again, HFRA did not specify a level of hierarchical integration for CWPPs. In our case-study communities, some CWPPs stood alone whereas others were nested within broader CWPPs or connected to other types of planning documents. It was suggested by some of our interviewees that linking the CWPP to existing governance structures would increase its relevance or sustainability, but others feared that a CWPP's goals or objectives could become diluted if part of a broader framework.

Regarding problem tractability, the Sabatier–Mazmanian framework suggests that the size and diversity of the CWPP target group could limit statute implementation. Other studies have found that the number of communities that could benefit from developing a CWPP is large (NASF 2009) and our case

studies illustrate that there is broad diversity existing in community size, organisation and resources. However, we did not find that this diversity posed a barrier in the development of CWPPs. Diversity is most limiting when a statute's conditions are narrow and strict; HFRA's flexibility allows communities to develop a collaborative process and plan that reflects their local context, making the number and diversity of communities in the target group less of an issue.

For the CWPPs we studied, participants indicated that they were generally able to find the technical information, including data and models, necessary for their plan. Although not often mentioned, CWPP participants who were aware of the research supporting these tools or recommendations indicated some pride in the fact that their plan was based on the best available science. What could be limiting to plan development and implementation is the lack of local knowledge included in the CWPPs. Plans that incorporate local knowledge are more reflective of the community context and relevant to local residents, broadening support for the process and implementation.

The analysis of our case-study data also suggested that the extent of behavioural change outlined in the CWPP, particularly for reducing structural ignitability, could be a barrier to CWPP implementation. Understanding that there could be resistance to recommendations regarding land-use on private properties, communities first concentrated on small projects to reduce structural ignitability on property of willing homeowners. By starting slowly and modelling behaviour desired around homes and other private property, new expectations or norms can be developed about what it means to have a well-managed property. However, as in other studies (Daniel *et al*. 2003; Nelson *et al*. 2005), we were told that issues around privacy and aesthetics and different concepts of 'natural' may limit residents' willingness to remove hazardous vegetation from their property.

In general, public attitudes and support were not barriers to producing a CWPP, and in some communities, they supported plan development and implementation. The same can be said about support from sovereigns – in most cases, sovereigns supported plan development and eased the way to implementation.

Our original research focussed on the social context in which CWPPs are developed, and we identified community capacity as a key non-statutory factor affecting policy implementation. Although we found that social and economic conditions in some communities could impede CWPP development, most communities found ways to overcome these challenges by accessing and leveraging community capacity, finding the resources necessary to offset or substitute for those they lacked.

While communities drew on existing social capital to develop and implement HFRA policy related to CWPPs, the CWPP process also built community capacity. In Josephine County and subdivisions like Grizzly Flats, California, and High Knob, Virginia, the process of developing a CWPP built the relationships and networks critical to a successfully functioning community and enabled the communities to tackle other projects not related to fire. In High Knob, Virginia, and Auburn Lake Trails, California, community norms were established and reinforced that supported the removal of hazardous fuels around homes. The social learning that occurred in Taylor, Florida, and Estes Park, Colorado, resulted in a more sophisticated community understanding of wildland fire and of the responsibilities and roles of different players in wildland fire management. In Barnes–Drummond, Wisconsin, and Taylor, Florida, local governments began to define a broader role for their participation in wildland fire management, and in Auburn Lake Trails, California, they institutionalised wildland fire planning within the local government structure. Representatives from fire management agencies in Harris Park, Colorado, and Josephine County, Oregon, began to understand community values, and how their projects could protect these values and support local priorities. The development and enhancement of community capacity was not identified in HFRA as a goal of the legislation, but in our case-study communities, it may be the most enduring legacy of the act.

The purpose of community wildfire protection planning is 'to reduce wildfire risk to communities … through a collaborative process of planning, prioritising, and implementing hazardous fuels reduction projects' (US Congress 2003, p. 2). In our case-study communities, residents indicated that their wildfire risk had been reduced, and pointed to projects that they believed would protect lives and property during catastrophic wildland fire – a fuel break around Taylor, Florida, an alternative evacuation route out of Grizzly Flats, California, fuel reduction in home ignition zones in Lincoln County, Montana. Although the policy may lack specificity, it provides communities the freedom to use varied processes to produce diverse plans that build on the local context to achieve broad policy goals. The Sabatier–Mazmanian framework helps us understand how different implementation factors were defined in HFRA, and how these factors helped produce diverse plans in 13 case-study communities. The structure of the statute and the nature of the problem can indeed facilitate or impose barriers to policy implementation, and the importance of both sets of factors is established during policy development, meaning that communities can do little to influence these factors or minimise their negative effects. However, in our case-study communities, we have seen how non-statutory factors such as community capacity and support from the public and sovereigns can overcome challenges presented by the tractability of the problem and statute structure to facilitate implementation in spite of statutory barriers.

We pose a question in the title: 'Is HFRA's vagueness genius?' The CWPP requirement in HFRA was a late addition to the bill, and appears to have been a response to criticism that the bill lacked any requirement for public participation in reducing wildland fire risk. Although WUI communities may have initially wished for more direction regarding development of CWPPs, the vagueness of the bill allowed them to produce plans that reflect local ecological and social contexts at a scale relevant to them. If HFRA had been more prescriptive, communities may have found it more difficult to fit their circumstances into a narrowly defined CWPP box, even to the point of resisting a federally engineered program. Thus, if HFRA's vagueness regarding the CWPP process and content was not intended, it was at least fortuitous in that it gave communities the freedom to develop a CWPP to accomplish objectives that reflect local values and concerns. Whether CWPPs ultimately lead to lower wildfire risk to communities is an empirical matter awaiting future research. Perhaps more significantly, HFRA marks a turn

in wildfire policy by opening the door for local community residents and organisations to participate more actively in wildfire risk management and related land management. The Act marks the latest attempt in policy experimentation and learning to address a complex issue.

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