Erratum

Erratum to 'Identifying policy target groups with qualitative and quantitative methods: the case of wildfire risk on nonindustrial private forest lands' [Forest Policy and Economics 25 (2012) 62–71]

A. Paige Fischer [a,*], Jeffrey D. Kline [b], Susan Charnley [c], Christine Olsen [d]

[a] USDA Forest Service Pacific Northwest Research Station, Western Wildland Environmental Threat Assessment Center, 3200 SW Jefferson Way, Corvallis, OR 97331, USA
[b] USDA Forest Service Pacific Northwest Research Station, Corvallis, Oregon, USA
[c] USDA Forest Service Pacific Northwest Research Station, Portland, Oregon, USA
[d] Department of Forest Ecosystems and Society, Oregon State University, Corvallis, Oregon, USA

ARTICLE INFO

ABSTRACT

Designing policies to harness the potential of heterogeneous target groups such as nonindustrial private forest owners to contribute to public policy goals can be challenging. The behaviors of such groups are shaped by their diverse motivations and circumstances. Segmenting heterogeneous target groups into more homogeneous subgroups may improve the chances of successfully identifying policy strategies to influence their behavior. Findings from a multimethod study of nonindustrial private forest owners in eastern Oregon suggest four unique subgroups of owners with different fuel management motivations and suitabilities for policy tools: commodity managers could benefit from market-based incentives; amenity managers could benefit from capacity building programs paired with symbolic campaigns; recreational managers could benefit from public incentives provided through consultants or contractors who can help plan the work; and passive managers may benefit from opportunities to respond to the policy strategies designed for the other groupings until more information can be gathered. Incorporating qualitative analysis of interview data with statistical analysis of survey data improved understanding of the groupings and appropriate policy strategies for them.

Published by Elsevier B.V.

1. Introduction

The success of any policy strategy depends on an accurate understanding of the target group. Identifying target groups' motivations and designing policies to harness these motivations will improve chances of successfully influencing their behavior. However, this process is a challenge with highly heterogeneous populations. Segmenting such populations into more homogeneous subgroups can be a helpful step. Segmentation is often done through analysis and classification of quantitative data about socio-demographic characteristics and behavior. Unfortunately, such data generally lack detailed information about target groups' underlying motivations (Schneider and Ingram, 1990). Qualitative data can offer additional insight into people's motivations with high internal validity (Lincoln and Guba, 1985; Patton, 2002). A segmentation approach that combines quantitative and qualitative methods in the development of theories of behavior may improve policy makers' abilities to design strategies that harness target groups' motivations.

We explored the usefulness of segmentation for identifying unique target groups for wildfire risk policy among nonindustrial private forest (NIPF) owners, and whether additional qualitative data

enhanced understanding of the motivations of the target groups and the policies that would be suitable for them. We chose the fire-prone ponderosa pine (*Pinus ponderosa*) ecosystem in Oregon as the study area because of its relatively large proportion of land in NIPF ownership and high fire risk, and the great emphasis on hazardous fuel reduction in local policy and management discussions. The findings identify four unique subgroups of NIPF owners and provide a nuanced picture of why members of these groupings manage fire risk differently and, thus, may benefit from different policy strategies. While the findings are mainly applicable to NIPF owners in Oregon's ponderosa pine areas, the ecological and socioeconomic conditions there are common throughout the arid West; thus, this case may shed light on policy opportunities for NIPF owners in fire-prone areas elsewhere.

2. Nonindustrial private forest owners and Oregon's fire-prone ponderosa pine ecosystem

NIPF owners are a heterogeneous population that researchers have struggled to understand for more than half a century (Amacher et al., 2003; Beach et al., 2005). Few characteristics bind together these individuals, married couples, family estates and trusts, and unincorporated groups who own forest land (Fischer et al., 2010). Once thought to be driven by profit like industrial timber companies (Amacher et al.,

---

2003), NIPF owners are now recognized to hold forestland for diverse reasons, among them recreation, monetary gain (e.g., investment and income generation), residential values (e.g., homesite, privacy, scenery), family legacy (e.g., maintaining family bonds, passing assets on to heirs) and environmental protection (e.g., open space, wildlife habitat, ecosystem services) (Bengston et al., 2011; Butler, 2008). NIPF owners sometimes manage land for competing goals. For example, the opportunity to harvest timber is often important for amenity-oriented owners and may be a consideration when they weigh decisions (Butler, 2008; Kline et al., 2000b).

NIPF lands comprise about 1/6th of the ponderosa pine ecosystem east of Oregon's Cascade Mountains (Oregon Department of Forestry, 2006a). The population of NIPF owners in this region is especially diverse because of its long history of timber and grazing and recent trend of in-migration of ex-urbanites (Kline and Azuma, 2007). This population includes long-time ranch and timberland owners, more recent residential owners, and absentee recreational owners. Similar to other dry forests in the West, the ponderosa pine ecosystem historically experienced frequent fire return intervals. Years of fire suppression, grazing, and repeated selection-cutting have led to an accumulation of hazardous fuel and thus, fire risk in ponderosa pine forests (Hessburg et al., 2005). Because NIPF lands are mostly located at the interface of federal wildlands and populated areas (i.e., the wildland–urban interface, or WUI) they are vulnerable to natural and human-induced wildfires and influence the connectivity of hazardous fuel and potential movement of fire across the landscape (Ager et al., 2012).

A variety of public policy instruments are used to encourage fuel reduction on NIPF lands. The National Fire Plan of the U.S. Department of Agriculture Forest Service and the U.S. Department of the Interior makes financial assistance available to landowners and communities in WUI areas. Financial assistance is also available through the Natural Resource Conservation Service's Environmental Quality Incentives Program. Technical assistance is available through the Forest Service's Forest Stewardship Program, which helps landowners develop forest management plans that include fuel reduction, and Community Wildfire Protection Plans authorized by the Healthy Forests Restoration Act. Regulatory approaches are also used, such as Oregon's Forestland–Urban Interface Fire Protection Act (SB360), which requires property owners located in WUI areas to reduce fuel around structures and along driveways.

Given the heterogeneity of NIPF owners in the area, reducing hazardous fuel, restoring ecosystems, and garnering amenity and financial benefits from forests may not be simultaneously feasible or desirable goals for landowners. Fuel reduction activities are expensive—often hundreds of dollars per hectare (Calkin and Gebert, 2006; Hartsough et al., 2008)—and, on large scales, require heavy investments in equipment and labor. Fuel reduction can also diminish amenity and ecological values such as privacy offered by thick stands of trees and animal forage and cover provided by understory vegetation. Thus, the challenge for policymakers is to encourage owners to adopt practices that yield public goods such as the mitigation of fire risk while also furthering their private interests.

3. Heterogeneous target groups and policy design

Pioneered by Kuuluvainen et al. (1996), numerous studies have attempted to segment owners into more homogeneous subgroups for the purpose of developing more optimal policies and programs. Such studies have commonly used principle components factor analysis and k-means cluster analysis to reduce and categorize quantitative data, producing classifications based on broad management objectives, approaches and intentions and policy dispositions (Butler et al., 2007; Finley et al., 2006; Kendra and Hull, 2005; Kline et al., 2000a; Kluender and Walkingstick, 2000; Kuuluvainen et al., 1996; Majumdar et al., 2008; Serbruyns and Luyssaert, 2006).

The variables that these and other segmentation studies have employed include many well-studied socio-demographic predictors of NIPF management behavior. For example, absenteeism is associated with reduced likelihood for engaging in all sorts of forest management activities including harvesting timber and managing for nontimber uses (Conway et al., 2003; Joshi and Arano, 2009; Vokoun et al., 2006). Income and education are positively associated with likelihood of thinning and reforestation and negatively associated with harvesting timber (Alig et al., 1990; Joshi and Arano, 2009). Length of property ownership is positively associated with harvesting timber and negatively associated with thinning, herbicide application and creating wildlife habitat and recreation values (Conway et al., 2003; Joshi and Arano, 2009; Vokoun et al., 2006). Parcel and ownership size are positively associated with harvesting timber, thinning and having forest management plans (Alig et al., 1990; Amacher et al., 2003; Beach et al., 2005; Butler, 2008). Risk perception has also been recognized as an important influence on how NIPF owners manage. Owners are more likely to reduce fuel when they are aware of the probability of fire, have direct experiences with fire and feel vulnerable (Amacher et al., 2005; Fischer, 2011; Fried et al., 1999; Jarrett et al., 2009; Fischer and Charnley, 2012).

Criticisms have been made of the use of exclusively objective socio-demographic characteristics in segmentation studies rather than subjective attitudinal or psychic constructs that reflect people's perceptions and motivations. Two studies address this concern by basing their analyses on owners' subjective motivations for management: Kendra and Hull (2005) through the use of survey data about attitudes and Carroll et al. (2004) through the use of interview data about wildfire risk perception. Nevertheless, these and other segmentation studies classify owners using very similar schemes: owners who are financially motivated, owners who are amenity motivated, owners who are both financially and amenity motivated, and owners who are neither financially and amenity motivated (Bengston et al., 2011). Such schemes fall short because they are not specific enough to indicate which policy strategies (e.g., market-based vs. public incentives, technical assistance vs. education) are suitable for target groups given their motivations.

Schneider and Ingram (1990) offer a framework for identifying policy strategies that are appropriate for harnessing the motivations of target groups. The framework is a set of assumptions—to be tested as part of the policy design process—about the beliefs and endowments of target groups that would cause them to do the things governments want: 1) people with loyalty to duty, trust in institutions and commitment to obey laws and regulations without the aid of tangible incentives will respond to authority tools (e.g., rules and regulations); 2) people who seek to maximize utility and have adequate information and decision making skills to make choices that will lead to tangible payoffs will respond to financial incentives; 3) people who lack information, skills, or other resources yet are receptive to learning will respond to capacity-building programs; 4) people who engage in behavior on moral grounds will respond to symbolic campaigns; and 5) in cases where policy goals and the behaviors required to attain them are poorly understood and people are willing to explore and learn, learning tools are appropriate.

Schneider and Ingram's framework is one of many that have emerged from the field of policy studies (e.g., Cushman, 1941; Hood, 1983; Linder and Peters, 1989; Lowi, 1966). It is still considered among the most useful approaches because it allows for simultaneous consideration of both the capacities of the state to administer tools effectively and the beliefs that compel a target group to respond (Hood, 2007). In addition, Schneider and Ingram's framework accommodates the increasing emphasis of policy design scholars on designing optimal mixes of tools in complex decision-making contexts (Eliadis et al., 2005; Howlett, 2011) including forestry (Cubbage et al., 2007). Nevertheless, it is important to keep in mind that to provide implications for actual policies Schneider and Ingram's (1990) framework must be adapted to local contexts (Howlett, 2011; Linder