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The Political Ecology of Fire in the Andean-Patagonian Region of Argentina

Daniela Marini, MFS 2012

ABSTRACT

The use of fire is still the basis for land management for millions of rural producers around the world. Although it is demonstrated that such traditional management practices are energy efficient and environmentally benign, fire has been long-maligned by colonial officers and modern-day development officials. Since the creation of provincial fire services in the 1960s, fire surveillance in Patagonia has become well established and fire use has been thoroughly legislated. However, fire governance in Patagonia has not yet been studied. The objective of my research is to elucidate the political character of fire management in order to provide recommendations to improve fire management strategies in Patagonia. From June to August 2011 I conducted 60 interviews with farmers, policy makers, scientists and managers in the Andean region of Chubut province. The most common themes in the interviews were the mismanagement of fire by rural inhabitants (22%), intentional fire setting as an expression of social tension (20%), pine plantations as fire hazards (18%), drier conditions promote more fires (18%), institutional corruption (10%), and fire setting for land acquisition (8%). I argue that conflicting interests among different actors result in arson, and that the Fire Service is deliberately obscuring the real causes of fire setting to secure national and provincial funds.

Introduction

Every summer, vast areas of Andean Patagonian forests turn to ash. Land use practices and policies are playing a critical role in the distribution and frequency of fire. The objective of my research is to analyze fire governance to provide recommendations for fire management strategies and a more efficient use of public funds devoted to manage natural resources in Patagonia.

Despite several studies demonstrating that traditional management practices based on the use of fire are energy efficient, environmentally benign and well-integrated into market systems (Peltzer 1978, Pyne 1990), fire has been long-maligned by colonial officers and later development officials (Robbins 2004, Mathews 2005). At present, policymakers in many developing countries are using fire suppression polices to perpetuate the colonial approach to fire management (Eriksen 2007). In light of official efforts to prevent fire, rural people continue to burn and resist regulations by making use of the physical character of fire: its easy anonymity, unpredictability and self-propagation (Kull 2004). Mathews (2005), in a study in rural Mexico, argues that the regulations against the traditional use of fire are part of an official discourse which justifies the Forest Service’s authority by representing the forests as being at the mercy of destructive peasant farmers. Similarly, Kull (2004) documented the familiarity of Malagasy people in using fire, while government officials criminalize their burning practices through rhetoric and repression. Similar studies have concluded that conflicts between

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rural communities and official bodies over fire management always stem from global perspectives on environment and resource management having replaced local standpoints (Eriksen 2007).

In the Andean-Patagonian region of Argentina there is ethno-historical evidence of the use of fire by Tehuelche people who burned frequently for multiple purposes including the hunting of guanaco (*Lama guanicoe*). Beginning in the early 1900s, the central government of Chile developed a policy to use fire on a massive scale to convert forests to cattle pasture and favor settlement (Holtz and Véblen 2011), some of which spread east into Argentinean southern beach forests (*Nothofagus pumilio*) (Tortorelli 1947) (Photograph 1). Since the creation of provincial fire services in the ’60s, fire surveillance in Patagonia has become well established and fire use has been thoroughly legislated. However, fire governance in Patagonia has not yet been studied.

My research aims to elucidate the political character of fire management in order to improve fire management strategies in Patagonia. The concepts of power and knowledge from Foucault (1991) and power and ignorance from Mathews (2005) are central to my analysis. I will draw on Foucault’s idea that some notions of the world are formed through discourse and become true by certain social systems and practices. My argument is that conflicting interests among different actors result in arson, and that the Fire Service is deliberately obscuring the real causes of fire setting to borrow national and provincial funds. I will analyze the policies regulating fire practices in Patagonia, the official fire statistics and the perspectives and situations of all fire related actors.

**Methods**

**Site Description**

My research was carried out in two towns located at the base of the Andes in Chubut Province, Argentina: Trevelin and Esquel, the surrounding rural areas, and Alerces National
The climate of this region is defined by the rain shadow effect of the Andes which poses a barrier for humid air masses coming from the Pacific Ocean. The average annual precipitation drops abruptly from more than 3000 mm per year on the western side of the Andes to less than 800 mm per year at the forest/steppe ecotone (De Fina 1972). Forest composition changes along the precipitation gradient and also along the temperature gradient associated with increasing elevation (Veblen et al. 1992). Subalpine forests of the deciduous southern beach *Nothofagus pumilio* occur above 1000–1100 m in the entire area. In the west, the lowland rainforests are dominated by the evergreen *Nothofagus dombeyi*. In the eastern area, a native conifer (*Austrocedrus chilensis*) forms relatively open woodlands that grade into the steppe of low shrubs and bunchgrasses (Mermoz et al. 2005).

**Sampling Design**

From June to August 2011 I conducted 20 in-depth interviews with state officials from the Chubut Fire Service (SPMF), General Department of Forests and Parks (DGByP) and academic representatives from the Andean Patagonian Forest Research and Extension Center (CIEFAP) to examine state fire regulations. I obtained contact information from Thomas Veblen and his research group (University of Colorado, USA), who have previously conducted field work in the region. I inquired about the functioning of the institutions involved in fire management, collaborations among them, fire policy, and causes of fire.

To explore official fire surveillance I conducted archival research at the CIEFAP and SPMF libraries, and the Alerces National Park official fire records where I obtained information about all registered fire events since 1939. To analyze the social and institutional fire related system, I carried out 40 informal semi-structured interviews with farmers around rural areas. To approach farmers I first obtained burning notifications from the past 6 months, available at the Fire Service. I also interviewed landowners that did not notify of burning or that were located near recently burned areas. At the park, I interviewed park rangers working for the National Parks Administration (APN), personnel from the Department of Fire, Communications and Emergencies (ICE), and park dwellers living along the Provincial Route No. 71 within the park. The questionnaires I used to guide the interviews were designed to gather data on land use practices with implications for the flammability of the landscape: post-fire cattle grazing, controlled burning to eliminate debris, fire suppression, pine plantations and morel mushroom production. I also inquired about the causes of fire and perception of fire risk.

**Results**

**Fire Legislation**

Fires became a matter of national importance for the Argentinean government in 1948 with the creation of the National Forest Defense Act which contained a chapter on prevention and fire fighting. Provincial legislation regarding fire began to appear in the late 1950s. In 1959 the Provincial Forest and Fire Authority of Chubut Province (DGByP) was created as the maximum authority in all aspects concerning forest fires, with the mission to “protect forest resources of the mountainous area...”
of the province against forest and rural fires.” In 1983 the DGByP established the Chubut Fire Management Provincial Service (SPMF) as the department specializing in fire issues. In 1988 the SPMF enacted the Chubut Province Fire Act. Through this act, with an emphasis on administrative aspects of fire management and budgeting, a fire suppression policy was implemented in all provincial territories. In 2004 the DGByP passed the Forest and Rural Fire Management Act to control fire setting in rural areas. It was adapted from the 1999 Forest Fire Law of the Community of Andalucía, Spain, with minor modifications by the former Director of DGByP Omar Picco. “It is a very comprehensive law with lots of technical recommendations, but we are still far from achieving what is stated by this law due to the immaturity of our administrative and technical system,” stated Picco. Interestingly, a provision of this law allows salvage logging after a low intensity fire event. The adjacent provinces have forbidden the extraction of wood after a fire event to prevent purposefully setting fires to extract wood (Picco 2007), which is another cause of fire setting in Chubut. Another noteworthy fact is that in addition to annual budgets for fire fighting, there are emergency funds to cover the operational expenses of exceptionally large fire events, which creates an incentive for fire workers to set fires.

No official inspections are conducted to determine fire causes; they are established by discarding other possibilities (Picco 2007). During the winter, farmers must report to the fire authority the location, purpose for burning, and surface intended to burn. These notifications, “permisos de quema” (burn authorizations) are granted depending on weather conditions. During the summer, the use of fire is highly restricted to certain days in which the SPMF decides that the humidity and wind conditions allow for low-risk burning.

Within the Alerces National Park, the use of fire in the area has been curtailed since the park was created in 1937. At the same time, as is stated in the Argentinean Constitution, park inhabitants were given temporary occupancy permits that not only failed to protect them from a possible expulsion, but also represented a myriad of obstacles to use the land. People living inside the park have to pay for land

### Table 1. Surface burnt (ha) and number of fire events by different fire causes as categorized by the Provincial Fire Service in the 2008, 2010 and 2011 fire seasons in Chubut province, Argentina (DGByP 2011).

<table>
<thead>
<tr>
<th>Official Fire Statistics</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic waste burning</td>
<td>7</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Forest waste burning</td>
<td>55</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Crop waste burning</td>
<td>3</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>Burning</td>
<td>7</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Unknown</td>
<td>7936</td>
<td>83</td>
<td>73</td>
</tr>
<tr>
<td>Intentional</td>
<td>310</td>
<td>46</td>
<td>36</td>
</tr>
<tr>
<td>Grass re-growth</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Child-set fires</td>
<td>46</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Railroad</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Bonfire</td>
<td>190</td>
<td>11</td>
<td>426</td>
</tr>
<tr>
<td>Machinery</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Cigarette</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Power line</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Lightning</td>
<td>1227</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Others</td>
<td>17</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9805</td>
<td>634</td>
<td>2194</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>235</td>
<td>207</td>
<td>198</td>
</tr>
</tbody>
</table>
use rights in the form of grazing fees for each animal they own. Now, to obtain a property title, grazing rights must be surrendered and, as a result, ranching is being abandoned for less profitable tourism initiatives. Park inhabitants are skeptical about tourism initiatives because they require capital and expertise that they don’t have.

Official fire statistics

The earliest records of fire within the Alerces National Park date from 1940. From 1940 to 2009 there were a total of 180 outbreaks that affected an area of 48,500 ha. A record from 1944, described as corta y quema (slash and burn), affected 36,200 ha. Of the 180 outbreaks, 88% were no larger than 10 ha and the fires larger than 10 hectares burned 99.75% of the total surface of the park. Regarding fire causes within the park, 93.5% of the fire events were of anthropogenic origin, and 75% of the surface burnt due to forest clearance. The fire events originated by lightning (6.5%), burned 5.4% of the total area (Salina et al. 2010). Other causes reported are: “fire coming from Chile,” “accidental,” “negligence,” “human causes,” cigarette,” and “intentional.” After the creation of the Department of Fire, Communication and Emergencies (ICE) within the National Park Administration in 1995, firefighting activities as well as the recording and documentation of fire events were notably enhanced. From 1995 to 2009 there were 128 outbreaks (71% of the total number of fires recorded since 1940) and the total area affected was 176 ha. Only two events exceeded 10 ha and burned 74% of the total surface. Considering the location and timing of these fires, it can be inferred that they were set intentionally to damage the forest or property (Salina et al. 2010).

The Provincial Fire Service statistics recorded a total area of 126,327 ha burnt in the 2009, 2010 and 2011 fire seasons. The number of fire events varied between 198 in 2011 and 235 in 2008. The most frequently cited cause of fire is ‘unknown’. In those cases where the causes were identified, ‘lightning’, ‘bonfire’ and ‘intentional fire setting’ are reported as the cause

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**Table 2. Perspectives on fire and legal living situations of all the actors and institutions related to fire use, fire management and fire legislation in the Andean Patagonian region of Chubut Province, Argentina.**

<table>
<thead>
<tr>
<th>ACTOR</th>
<th>PERSPECTIVE ON FIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chubut’s General Directorate of Forest and Parks (DGByP)</td>
<td>Fire is a threat to be regulated. 80% of fires are anthropogenic. Mission: protect forest resources and promotion of plantations.</td>
</tr>
<tr>
<td>Provincial Fire Service (SPMF)</td>
<td>Fire is a natural element that has to be suppressed because the natural equilibrium has been broken. Mission: fire prevention, fighting, and education</td>
</tr>
<tr>
<td>Patagonian Andes Forest Research and Extension Center (CIEFAP)</td>
<td>Fire as a research topic: natural disturbance. Focus on natural fires (3%).</td>
</tr>
<tr>
<td>Universidad Nacional de la Patagonia San Juan Bosco (UNPSJB)</td>
<td>Fire plays a natural role but it has to be controlled. Mission: train professionals foresters.</td>
</tr>
<tr>
<td>National Parks Administration (APN)</td>
<td>Fire is a threat to conservation purposes. It is caused by park dwellers or carelessness tourists. 5% are natural fires. Mission: minimize the surface affected by fires.</td>
</tr>
<tr>
<td>Small land owners (&lt;2500 Ha)</td>
<td>Fire is not a serious problem. It is used to burn crop waste and, in some cases, to open shrublands.</td>
</tr>
<tr>
<td>Big land owners (&gt;2500 Ha)</td>
<td>Fire is a threat for private property. Own private firefighting equipment. Environmentally friendly attitudes.</td>
</tr>
<tr>
<td>City dwellers</td>
<td>Fire is damaging for nature. Ignorance about fire causes.</td>
</tr>
<tr>
<td>Alerces National Park inhabitants</td>
<td>Anonymous fire setting as a tool of resistance against APN. Extensive knowledge of forest fires and the topography of the park.</td>
</tr>
<tr>
<td>Real estate agents</td>
<td>Fire is caused by tourists and farmers.</td>
</tr>
</tbody>
</table>
of the largest fires in these three years. ‘Forest waste burning’ and ‘child-set fires’ are also frequent sources of ignition (Table 1). The categories used to describe the type of vegetation affected by fires varies from very broad (‘grassland’) to very specific (‘Stipa sp.’), depending on the methods used to estimate the surface area (satellite images and/or visual estimates in the field). The category ‘others’ include forest waste, fruit trees, crops, infrastructure, etc. The two most affected cover types, as well as the most frequently burnt, are ‘grassland’ and ‘scrubland’. A total of 257 ha of pine plantations and 1,148 ha of native forests were burned in the past three fire seasons.

**Fire related actors and institutions**

Fire is being used in many different ways for different purposes by different social groups. In the rural environment fire is used as a silvicultural technique to thin pine plantations, for weed and forest waste burning, and to open shrublands for pasture. Fire is used to clear pastureland of an exotic shrub (*Rosa ruviginosa*) that forms very thick stands that prevent cattle grazing and also to stop the expansion of willow (*Salix humboldtiana*) towards arable land along alluvial floodplains (Table 2).

In Alerces National Park, the park dwellers interviewed expressed an ongoing pressure from the park officials to leave the area. Interviewees reported constant downsizing of their old property lines and numerous eviction orders: “We are not treated as humans. European boars have more rights than us,” Luis Soto declared.\(^2\) It is common knowledge that park dwellers set fires intentionally to protest violations of their property rights and express discomfort for the treatment they receive from park officials. “I know exactly where and how to start a fire and they won’t find proof,” another park inhabitant declared.

In the urban environment, fire is seen as a damaging agent that can destroy the scenic beauty of the area and risk harm to the local tourism industry. The official discourse surrounding fire suppression has been represented so consistently in official statements and newspaper accounts that city dwellers in Chubut have largely accepted that fire is solely destructive and that it results from rural ignorance.

The CIEFAP is a public institution devoted to the implementation of sustainable use of forests and plantations. The center was created in 1988, financed by the German Agency for Technical Cooperation (GTZ). Researchers at CIEFAP provide technical assistance to DGByP and SPMF for strategies for forest protection from fire outbreaks. The research center shares a building with the School of Forestry at Juan Bosco National University of Patagonia. One goal of the school is to train professionals to work at the DGByP, SPMF and CIEFAP. The youngest graduates expressed their unconfor-

**Table 3.** Most recurring themes cited from 60 interviews with farmers, park dwellers, city dwellers, fire service officials and researchers in Chubut Province, Argentina.

<table>
<thead>
<tr>
<th>Most Recurrent Themes from Interviews</th>
<th>Percent (%) of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers’ mismanagement of fire</td>
<td>22</td>
</tr>
<tr>
<td>Intentional fire setting as an expression of social tension</td>
<td>20</td>
</tr>
<tr>
<td>Pine plantations increase fire hazard</td>
<td>18</td>
</tr>
<tr>
<td>Drier conditions are promoting more fires</td>
<td>18</td>
</tr>
<tr>
<td>Conflicts among institutions regarding fire management</td>
<td>15</td>
</tr>
<tr>
<td>Institutional corruption (“the business of fire”)</td>
<td>10</td>
</tr>
<tr>
<td>Official prevention and surveillance needed</td>
<td>10</td>
</tr>
<tr>
<td>Ignorance about fire effects and causes</td>
<td>8</td>
</tr>
<tr>
<td>Fire setting for land acquisition (real estate pressure)</td>
<td>8</td>
</tr>
<tr>
<td>Fires not a problem</td>
<td>5</td>
</tr>
</tbody>
</table>
In response to questions surrounding the causes of forest and rural fires, the most common reason cited was the mismanagement of fire by farmers (22%) (Table 3). This was a widespread perception among city dwellers and fire service officials. However, all the farmers interviewed mentioned the importance of wind and fuel conditions as conditioning parameters for burning. Fire use by farmers in the rural areas is being inaccurately associated with forest burning among urban inhabitants. The second most recurring theme (20%) is intentional fire setting as an expression of social tension. Interviewees reported cases of fire setting as a result of personal conflicts among neighbors (debts, revenge) or fire setting by fired employees as retribution. Pine plantations, promoted by a national subsidy program to create a high-quality wood production center, are considered to increase fire hazard (18%) (Figure 3). How-

ever, although all costs are subsidized and thinning pine plantations is required by provincial law 5.232, in many cases silvicultural maintenance is not conducted, creating high vertical fuel connectivity. Favorable weather conditions for the spread of fire, such as dry winters with extremely low levels of solid precipitation and dry and windy springs, were mentioned by the interviewees (18%) as an explanation of large fire events in the last decade.

A quarter of the interviewees mentioned conflicts related to jurisdiction and funding between the Provincial Fire Service and the fire department within the National Park. This institutional tension prevented an effective operation to stop a fire event that started inside the park (presumably initiated by a park-dweller asserting property rights) and spread over 7,500 ha of provincial territory in 2008. The theme “institutional corruption” was mentioned in 10% of the interviews (and it may have been omitted by many other interviewees due to the confidential nature of the statements). An anonymous interviewee stated “workers receive instructions to burn, and if you walk around

Photograph 2. Pine plantations (Pinus Ponderosa) reported to increase fire hazard near Esquel city, Chubut Province, Argentina.
burned areas you can find the candles used for organized fire setting.” The budget for firefighting is determined by the number of fires registered in the previous fire season; therefore, more fire events mean more funding for the fire service and income for the temporary fire fighters that are hired every season under short-term contracts. One low-level official who had graduated from the local forestry school referred to the fire problem as “the business of fire.”

Another controversial cause of fire setting reported was related to an increasing real estate pressure for land for acquisition (8%). This trend has a historical basis. In his book *Patagonia Vendida* (“Patagonia Sold”), Sánchez (2006) describes how foreign elites got a “heavenly” piece of land in Patagonia during the 1990s. The ease with which land could be purchased was partly because the government spared no effort to attract foreign investors referring to Patagonia simply as “land that was left over.” Now, nearly the entirety of Patagonia is privately owned, including natural resources such as oil, gas and water. The Benetton family is the owner of a million ha (currently in use as a sheep farm), while Douglas Tompkins, the owner of North Face, owns 900.000 ha devoted to nature conservation (Sánchez 2006).

The need for fire surveillance and fire prevention was mentioned by 10% of the interviewees, mainly those working at the Fire Service, city dwellers and students. This idea is related to the assumption that there is a generalized ignorance about the effects of fire on the ecosystem and about fire prevention strategies (8%). Other respondents argued that fire in the region is no longer a problem (6%) because there is not a continuous forest cover through which the fire could spread.

**Discussion**

The land-abundant context from Patagonia is far different than the densely populated slash-and-burn cultivation fields of Southeast Asia, Africa or Mexico, from where most of the research on the use of fire comes from (Dove 1983, Kull 2004, Mathews 2005). In Patagonia, farmers are not seen as poor peasants; they own valuable land and the means of production, and nearly the entire indigenous population was removed, except for a few segregated indigenous groups that still persist in the Andean region. The comparison among these different regions can shed light on the unexplored political ecology of fire in Patagonia, and, more generally, about state strategies to exert control over natural resources.

In the last decades of the nineteenth century, nature was disengaged from local ecologies and livelihoods, making Patagonian resources available for the state to offer as raw material for industry. The making of Patagonia as a “resource frontier” (Tsing 2005), determined the power structure of land distribution and resource access, shaping the political ecology of the region. Within this setting of vast uninhabited lands, the bureaucratic structure was built with solid foundations during the late 1950s. Ministries of the environment, forest services, fire services, and the administration of national parks were established to secure control over natural resources. Since then, the Fire Service in Chubut Province has maintained the stereotype of farmers as destructive, by imposing fire regulations specially directed towards them and targeting farmers for fire-use education campaigns.

To defend itself from competing departments, maintain its own definition of environmental problems, and proceed with its particular kind of intervention, a government department must therefore find ways to generate some kind of success (Li 1999). The General Department of Forests and Parks (DGByp) and the Fire Service have developed what I call *constructed ambiguity* to capture funds to perpetuate its bureaucratic procedures. Conflicting interests among different actors in Chubut province result in arson, and the DGByp is deliberately obscuring the real causes of fire setting.
to borrow public funds to justify its operations and maintain its credibility. Ambiguity allows the existence of many different meanings and many different criteria of success (Mosse 2004), and it also allows standardization and space for a circular logic in which failure is used to justify more intervention (Li 1999). Many elements, including indicators of degradation, definition of the fire problem as well as the jurisdiction of competing institutions, have been obscured by these institutions.

Official ignorance is playing an important role in the functioning of the Chubut Fire Service, but in a different sense than that stated by Mathews (2005). In the case of Chubut province, the causes of fire starting are unknown and no efforts are being made to elucidate them. The category of “intentional fire-setting” is the predominantly cited cause every fire season. Official ignorance about intentional fire setting prevents the state from solving the problem: if the causes of intentional fire setting were investigated in Chubut, and the roots of the problem were tackled, there might be not enough fires to justify the Fire Service budget.

Ambiguity and ignorance together produce institutional weakness and open the door to corruption. Most studies of the environmental effect of power are silent on the issue except as an annoying anomaly or as a case of statistical noise in an overall pattern (Robbins 2000). Organized fire setting by state officials working for the Fire Service, as stated by one of the interviewees, is the most blatant form of corruption in the natural resources management of the region. Corruption is reflecting the weaknesses of state institutions and is posing serious challenges for sustainable use of natural resources in Patagonia.

Management implications

The story of fire in Patagonia is a story of struggles over resources. Different interest groups use fire to get access to different kinds of resources: lands, funding, research topics, and jobs. Resource access can be legislated, negotiated, purchased, or just established through use.

It is in the interest of fire users to protect the forest cover and the aesthetic value of the region to attract more tourists and investors. They know how to burn for farming purposes at a minimum risk of fire spread. A key point to be addressed is the widespread attitude among fire officials of “the more fire there is, the more money we need.” It is also necessary to improve the situation of temporary firefighters who are recruited only during the summer, and for some of whom have this as their only source of income during this period. Salvage logging after low intensity fire events should be banned to stop fire setting aimed at extracting wood while burning vast areas of forests. The implementation of maintenance silviculture in private and state owned pine plantations must be reinforced and monitored. There is a need to open a public debate on the causes of fires and to reflect on any interest that may lead to burn the forest. Finally, the 2004 Forest and Rural Fire Management Act (Ley 5.232) (adopted from Andalucía, Spain) should be revised to ensure coherence with the administrative and technical capabilities of Chubut Province. The ultimate goal should be to ensure that no one takes personal advantage of burning for other reasons than farming purposes.

Endnotes


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REFERENCES


